

## **CHAPTER - 3**

# **REGULATORY FRAMEWORK FOR THE PROTECTION OF ENVIRONMENT**

### **Environmental protection**

Environmental protection is a practice of protecting the natural environment on individual, organizational or governmental levels, for the benefit of both the natural environment and humans. Due to the pressures of population and technology, the biophysical environment is being degraded, sometimes permanently. This has been recognized, and governments have begun placing restraints on activities that cause environmental degradation. Since the 1960s, activity of environmental movements has created awareness of the various environmental issues. There is no agreement on the extent of the environmental impact of human activity, and protection measures are occasionally criticized. Academic institutions now offer courses, such as environmental studies, environmental management and environmental engineering, that teach the history and methods of environment protection. Protection of the environment is needed due to various human activities. Waste production, air pollution, and loss of biodiversity (resulting from the introduction of invasive species and species extinction) are some of the issues related to environmental protection. Environmental protection is influenced by three interwoven factors: environmental legislation, ethics and education. Each of these factors plays its part in influencing national-level environmental decisions and personal-level environmental values and behaviors. For environmental protection to become a reality, it is important for

societies to develop each of these areas that, together, will inform and drive environmental decisions.

## **Approaches to environmental protection**

### **Voluntary environmental agreements**

In industrial countries, voluntary environmental agreements often provide a platform for companies to be recognized for moving beyond the minimum regulatory standards and thus support the development of best environmental practice. In developing countries, such as throughout Latin America, these agreements are more commonly used to remedy significant levels of non-compliance with mandatory regulation. The challenges that exist with these agreements lie in establishing baseline data, targets, monitoring and reporting. Due to the difficulties inherent in evaluating effectiveness, their use is often questioned and, indeed, the environment may well be adversely affected as a result. The key advantage of their use in developing countries is that their use helps to build environmental management capacity.

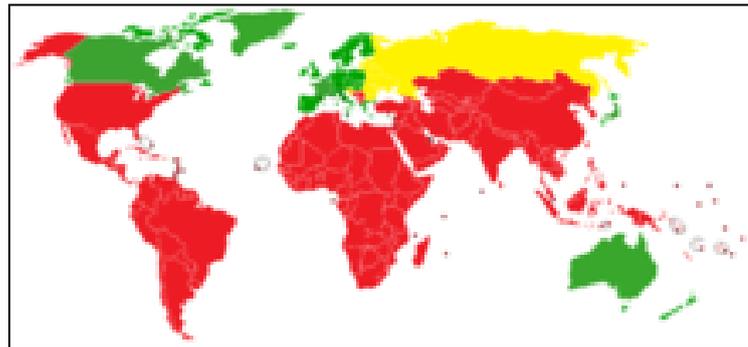
### **Ecosystems approach**

An ecosystems approach to resource management and environmental protection aims to consider the complex interrelationships of an entire ecosystem in decision making rather than simply responding to specific issues and challenges. Ideally the decision-making processes under such an approach would be a collaborative approach to planning and decision making that involves a broad range of stakeholders across all relevant governmental departments, as well as representatives of industry, environmental groups and community. This approach ideally supports a better

exchange of information, development of conflict-resolution strategies and improved regional conservation.

## **International environmental agreements**

**Fig.3.1: Kyoto Protocol Commitment map 2010**



Many of the earth's resources are especially vulnerable because they are influenced by human impacts across many countries. As a result of this, many attempts are made by countries to develop agreements that are signed by multiple governments to prevent damage or manage the impacts of human activity on natural resources. This can include agreements that impact factors such as climate, oceans, rivers and air pollution. These international environmental agreements are sometimes legally binding documents that have legal implications when they are not followed and, at other times, are more agreements in principle or are for use as codes of conduct. These agreements have a long history with some multinational agreements being in place from as early as 1910 in Europe, America and Africa. Some of the most well-known multinational agreements include: the Kyoto Protocol, Vienna Convention on the Protection of the Ozone Layer and Rio Declaration on Environment and Development

## **Government**

Discussion concerning environmental protection often focuses on the role of government, legislation, and law enforcement. However, in its broadest sense, environmental protection may be seen to be the responsibility of all the people and not simply that of government. Decisions that impact the environment will ideally involve a broad range of stakeholders including industry, indigenous groups, environmental group and community representatives. Gradually, environmental decision-making processes are evolving to reflect this broad base of stakeholders and are becoming more collaborative in many countries. Many constitutions acknowledge the fundamental right to environmental protection and many international treaties acknowledge the right to live in a healthy environment. Also, many countries have organizations and agencies devoted to environmental protection. There are international environmental protection organizations, as the United Nations Environment Programme. Although environmental protection is not simply the responsibility of government agencies, most people view these agencies as being of prime importance in establishing and maintaining basic standards that protect both the environment and the people interacting with it.

## **Laws and institutions relating to environmental protection in India**

An important criterion in welfare economics is the notion of Pareto optimality. According to Pareto an economic state is efficient if it is not possible to improve the welfare of at least one individual without making others worse off. The fundamental theorem of welfare economics based on the Pareto criterion states that, under certain conditions, a decentralised economic system motivated by self interest and guided by price signals would be compatible with a coherent disposition of economic resources

that could be regarded as superior to a large class of possible alternative economic systems. If Pareto (economic) efficiency is the sole criterion and the conditions are valid then the appropriate pricing rule is the long-run marginal cost pricing rule. When these conditions are violated, different kinds of ‘market failures’ occur. Important sources of market failures are economies of scale in production, externalities in production and consumption, presence of public goods, asymmetric information among economic agents, and uncertainty. Also, goals other than economic efficiency such as intergenerational and intragenerational equity and balanced regional development do influence public policies even in capitalist economies. Externality arises when consumption or production decisions of one economic agent enters into the utility or production function of another economic agent without any compensation. Economists’ policy prescriptions for internalising the externalities are based either on Pigouvian approach or Coasean approach. In a pioneering work Pigou (1920/1952) views externality as a divergence between marginal social net product and marginal private net product. He notes that under conditions of competition, ‘self-interest will tend to bring about equality in the value of the marginal private net products of resources invested in different ways ... But when there is a divergence between these two sorts of marginal net products, self-interest will not, therefore, tend to make the national dividend a maximum; and, consequently certain specific aspects of interference with normal economic processes may be expected not to diminish but to increase the dividend’(p.172). He notes that divergences between private and social net products that come about through the existence of uncompensated services and undischarged services can be removed via bounties and taxes. He adds that ‘sometimes, when the interrelations of the various private persons affected are highly complex, the Government may find it necessary to

exercise some means of authoritative control' (p.194). Coase(1960) notes that the application of Pigouvian approach to the problem of smoke emission by a factory leads to the conclusion that it would be desirable to make the owner of a factory liable for the damage caused to those injured by the smoke, or alternately to place a tax on the factory owner varying with the amount of smoke produced and equivalent in monetary terms to the damage it would cause, or finally to exclude the factory from the affected area. He argues that the suggested courses of action are inappropriate, in that they lead to results which are not desirable. According to him the problem is reciprocal in nature. He says it is necessary to know whether the damaging business is liable or not for the damage caused since without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them. But the ultimate result (which maximises the value of production) is independent of the legal position if the pricing system is assumed to work without cost. This proposition is known as the Coase Theorem. Coase advocates a role for the state in defining and enforcing property rights for environmental resources and in mitigating transaction costs but rules out government intervention in the form of specifying standards or levying a tax to correct the externality. It is difficult to define property rights for natural resources like air, water in lakes, rivers and oceans, and scenic spots. The transaction costs in reaching a negotiated settlement between polluters and pollutees can be high when the number involved is very large and polluters and pollutees are widely dispersed and measurement of the value of damages is highly uncertain. When the transaction costs become very high markets cease to exist. There are many problems in designing and implementing the Pigouvian tax. Baumol and Oates (1987) identify problems such as existence of non-convexity in the production set in the presence of detrimental externalities, the possibility of multiple

maxima and enormous information requirements in the valuation of environmental damages. Therefore they suggest a second-best approach to pollution prevention and control. The second-best approach is that, given the environmental standards, the society's problem is to achieve the standards at least cost. Here, the criterion is cost minimization or cost effectiveness. Even in this approach there is a choice among policy instruments ranging from command and control (CAC) type of instruments to economic or market based instruments. Until the early seventies most countries, including developed countries, relied heavily on CAC type of instruments. Since the seventies many developed countries have been using market based instruments (MBIs). There is also a perceptible difference even in the choice among MBIs. The United States seems to prefer tradable emission permits presumably because of its faith in the allocative efficiency of markets while many countries in Europe seem to prefer fiscal approach to solve the pollution problem presumably because of their commitment to the concept of a welfare state. Two international conferences on Environment and development – one at Stockholm in 1972 and another at Rio de Janeiro in 1992 – have influenced environmental policies in most countries, including India. Many countries and international agencies have accepted the polluter pays principle, the precautionary principle and the concept of intergenerational equity as guidelines for designing environmental policies. India adopted the socialist pattern of society in 1954 as a framework for social and economic policies. This framework articulates that public policy decisions must enable the society to maximise social gain and not private profit. This framework also envisages a catalytic role for the State in the social and economic transformation of the country. The Constitution of India provides a number of Directive Principles of State Policy. Indian Five year Plans have also stressed goals such as rapid economic growth, employment

generation, poverty alleviation and balanced regional development. Since June 1991 there has been a tilt in economic policy towards economic liberalisation and globalisation. The importance of sustainable development is also being stressed as an objective of public policy. This paper deals with the evolution of laws, institutions and policies relating to environmental protection in India. It considers the following questions: (a) whether the laws are evolved indigenously or influenced by external factors? (b) how have the mixed economy model and the stage of development influenced the design of policies for internalisation of the externalities?, (c) how is liability allocated? (d) how are the laws enforced?, and (e) what is the scope for using non-market non-government institutions for achieving environmental sustainability? Section 2 deals with the evolution of environmental laws and policies. We consider four policy periods: (i) pre-independence period to 1947, (ii) from independence to the Stockholm Conference, 1947 – 1972, (iii) from the Stockholm Conference to Bhopal disaster, 1972-1984, and (iv) Bhopal Tragedy to 1998. In the first two periods, there were no major legislations relating to environmental protection. The Stockholm Conference on Environment and Development exerted great influence on environmental policymaking leading to an amendment of the Constitution, passage of important legislations such as the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 and creation of institutions such as Central and State Pollution Control Boards for implementing the provisions of the Acts. The Bhopal gas tragedy in 1984 triggered the passage of comprehensive environment legislation in 1986 and Public Liability Insurance Act in 1991. The new economic policy initiated in 1991 favours decentralisation, debureaucratisation and globalisation. Constitutional amendments were made in 1994 to facilitate devolution of powers and resources to local bodies. The Policy Statement

on Pollution Abatement issued in 1992 advocates the need for combining regulatory instruments with market-based instruments and various supportive measures to deal with environmental protection. Section 3 is devoted to implementation of the laws, rules and policies relating to environmental protection. Problems in the determination and enforcement of source-specific standards are considered. It describes the active role of the courts not only in enforcing the laws and rules but also in giving directions to the central and state governments on creation of new authorities and policy matters. Section 4 deals with some issues in the transition from a state-allocative closed economy policy regime toward a market-oriented open economy policy regime. Section 5 contains some concluding remarks.

## **Evolution of Legal Framework for Environmental Protection**

### **(i) Pre-independence period**

The ancient Indian religious literature, for example, Vedas, Upanishads, Smritis and Dharmas preached a worshipful attitude towards earth, sky, air, water, plants, trees, and animals and enshrined a respect for nature and environmental harmony and conservation. It regarded sun, air, fire, water, earth and forest as God and Goddesses. Many animals, birds, trees and plants were associated with the names of God and Goddesses. The Indian Penal Code 1860, enacted during the British rule, contains one chapter (Chapter XIV) on offences affecting public health, safety, convenience, decency and morals. Section 268 covers public nuisance. Sections 269 and 272 deal with adulteration of food or drink for sale and adulteration of drugs respectively. Section 277 lays down that, whoever, voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used shall be punished with imprisonment for a term which may extend to 3

months, or with a fine which may extend to Rs.500, or with both. Section 278 lays down that whoever voluntarily vitiates the atmosphere so as to make it noxious to the health of persons in dwelling or carrying on business in the neighbourhood or passing along a public way shall be punished with fine which may extent to Rs.500. Sections 284,285 and 286 deal with negligent conduct with respect to poisonous substances, combustibile matter and explosive substances. Sections 428 and 429 cover mischief to animals. The Shore Nuisance (Bombay-Kalova) Act, 1893 was enacted to check wastes and marine water pollution. The Oriental Gas Company Act, 1857 and the Bengal Smoke Nuisance Act, 1905 were enacted to prevent or reduce atmospheric pollution in and around Calcutta. The Bombay Smoke Nuisance Act, 1912 was passed to check smoke nuisance in Bombay area. For preservation of forests, the Cattle Trespass Act 1871 and Indian Forest Act 1927 were passed. The Indian Easement Act of 1882 guaranteed property rights of riparian owners against “unreasonable” pollution by upstream users. Municipal and Public Health Acts on the pattern of Local Authorities Act of United Kingdom conferred powers on the local bodies for controlling water pollution caused by industrial effluents and for necessary action against the erring industries. These Acts prohibit the discharge of any pollutant or trade effluent from factories into municipal drains, except in accordance with the relevant byelaws. These Acts prohibit the discharge of sewage into any watercourse until it had been treated so as not to contaminate the water. These laws are applicable to large industrial cities and municipal towns. Until 1947, the environmental problem was not serious because of the low rate of population growth and lack of industrialisation, except in and around a few big cities.

*(ii) From Independence to the Stockholm Conference, 1947 – 1972*

The Indian Constitution provides for a federal structure within the framework of parliamentary form of government. Part XI of the Constitution governs the division of legislative and administrative authority between the centre and states. Article 246 divides the subject areas for legislation into three lists, viz, Union List, State List and Concurrent List. The subject areas related to environmental protection are:

***Union List***

*6 Atomic energy and mineral resources necessary for its production*

*14 Entering agreements with foreign countries and implementing of treaties, agreements and conventions with foreign countries*

*24 Shipping and navigation on inland waterways*

*25 Maritime shipping and navigation, including shipping and navigation on tidal waters*

*29 Airways, regulation and organisations of air traffic and of aerodromes*

*52 Industries, the control of which by the Union is declared by Parliament by law to be expedient in the public interest*

*53 Regulation and development of oil fields and mineral oil resources*

*54 Regulation of mines and mineral development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest*

*56 Regulation and development of inter-state rivers and river valleys*

*57 Fishing and fisheries beyond territorial waters*

***State List***

*6 Public health and sanitation, hospitals and dispensaries*

*10 Burials and burial grounds, cremations and cremation grounds*

*14 Agriculture*

*15 Preservation, protection and improvement of stock and prevention of animal diseases*

*17 Water, that is to say, water supplies, irrigation and canals, drainage and embankment, water storage and water power subject to the provisions of Entry 56 of*

***Union List***

*18 Land*

*21 Fisheries*

***Concurrent List***

17 Prevention of cruelty to animals

18 Adulteration of food stuffs and other goods

19 Drugs and poisons

20 Economic and social planning

20A Population control and family planning

29 Prevention of the extension from one state to another of infecting or contagious diseases or pests affecting, men, animals or plants

32 Shipping and navigation on inland waterways as regards mechanically propelled vessels

36 Factories

37 Boilers

38 Archaeological sites and remains other than those declared by or under law made

by Parliament to be of national **importance**.

Under the Concurrent List, both Parliament and state legislatures can enact laws. Article 248 gives the centre the residual power to legislate on any subject not covered in the three lists. Articles 251 and 254 state that a central law on any subject in the Concurrent List generally prevails over a state law on the same subject. Article 249 states that the centre can legislate in the national interest on any subject in the State List provided it can obtain a two-thirds majority in the Rajya Sabha, the upper house of Parliament. Article 252 states that the centre can also pass laws on state subjects if two or more state legislatures consent to such legislation. Article 253 empowers the Parliament 'to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with any other country or countries or any decision made at any international conference, association or other body'. These provisions of the Constitution of India give a dominant role for the central government on matters relating to environmental protection. Even though many entries in the three lists deal with location-specific subjects which generally come under the jurisdiction of local bodies viz, municipalities and panchayats, until 1992, they were not given the necessary powers to deal with these subjects. Part IV (Directive Principles of State Policy), Article 40 provides that 'the State shall take steps to organize village panchayats and endow them with such power and authority as may be necessary to enable them to function as units of self government'. These are only guidelines for policy formulation. Until the 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution in 1992, the Constitution did not assign powers to the local bodies; local government was simply treated as a subject in the State List.

## ***Legislations***

Some important legislations relating to environmental protection enacted by the Parliament during this period were:

The Factories Act, 1948

The Prevention of Food Adulteration Act, 1954

The River Boards Act, 1956

The Mines and Minerals (Regulation and Development) Act, 1957

The Ancient Monuments and Archaeological Sites and Remains Act, 1958

The Atomic Energy Act, 1962

The Insecticides Act, 1968

The Factories Act, 1948 provides that the liquid effluents, gases and fumes generated during a manufacturing process should be treated before their final disposal to minimise the adverse effects. During this period the focus of economic policy was on planned economic development in a mixed economy framework. The dominant policy objectives were economic growth, employment generation, balanced regional development and equity. Environmental considerations did not play major role in policy making.

### ***(iii) Stockholm Conference to the Bhopal Disaster, 1972-1984***

The UN Conference on Human Environment held at Stockholm in 1972 exerted major influence on environmental legislations in India. A National Committee on Environmental Planning and Coordination (NCEPC) was set up in the Department of Science and Technology in 1972 to make necessary preparations for the Conference. The Government of India took a number of steps to implement the decisions taken at

the Conference by means of amendments to the Constitution, new legislations relating to environmental protection and creation of institutions for implementing the legislations. Many Supreme Court judgements in the late eighties and the nineties refer to the decisions made at the Stockholm Conference. The Bhopal gas tragedy claiming more than 3000 lives triggered the passage of environmental legislations and formulation of rules relating to the use of hazardous substances.

### ***Constitutional Amendments***

The 42<sup>nd</sup> Constitution Amendment Act, 1976, inserted specific provisions for environmental protection in the form of Directive Principles of State Policy and Fundamental Duties. Article 48A (Directive Principles) enunciates that ‘the state shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country’. Article 51A(g) (Fundamental Duties): ‘To protect and improve the natural environment including forests, lakes, rivers, wildlife and to have compassion for living creatures’. Two entries 17A – Forests and 17B – Protection to wild animals and birds were added in the Concurrent List.

### ***Legislations***

The Wild Life (Protection) Act, 1972. This Act was enacted under the provisions of Article 252 to prevent the decline of wild animals and birds. It prohibits the poaching of certain animals except for the purpose of education or scientific research. In respect of certain wild animals, license is made a prerequisite for their hunting. It provides that a state government may declare any area to be a sanctuary or as a national park if it considers that such area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance for protecting, propogating or developing wild life or its environment.

### ***The Water (Prevention and Control of Pollution) Act, 1974***

The first important environmental law enacted by Parliament is the Water (Prevention and Control of Pollution) Act, 1974. As water is a state subject and as 12 states had passed the enabling resolutions, the Government of India, in pursuance of clause 19 of Article 252, passed this legislation. It defines pollution 'such contamination of water or such alteration of the physical, chemical or biological properties of water of such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or it is likely to create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or of aquatic organisms'. This Act paved the way for the creation of Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs). The main function of the CPCB 'shall be to promote cleanliness of streams and wells in different areas of the states'. The term stream includes river, watercourse, inland water, subterranean waters, and sea or tidal waters to such extent or such point a state government may specify in this behalf. The Board may perform functions such as

- (a) lay down, modify or annul in consultation with the state government concerned, the standards for a stream or well;
- (b) plan and cause to be executed a nationwide programme for the prevention, control and abatement of water pollution;
- (c) collect, compile and publish technical and statistical data relating to water pollution and the measures devised for its effective prevention and control and prepare manuals, codes or guides relating to treatment and disposal of

sewage and trade effluents and disseminate information connected therewith;

- (d) advise the central government on any matter concerning the prevention and control of water pollution;
- (e) coordinate the activities of the SPCBs and provide technical assistance and guidance to the SPCBs; and
- (f) carry out and sponsor investigation and research relating to problems of water pollution and prevention, control or abatement of water pollution.

The SPCBs have similar functions within their areas. The Act gives powers to the SPCBs to take samples of effluents from any source and lays down the procedure to be followed in connection therewith. It gives power of entry and inspection into the premises of the polluters' premises. It prohibits any poisonous, noxious or polluting matter to enter into any stream, or well or sewer or land. Consent of the Board is required to 'establish or take any steps to establish any industry, operation or process or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land; or bring into use any new or altered outlet for the discharge of sewage; or begin to make any new discharge of sewage'. Any person who is not granted the consent may, within 30 days from the date on which the order is communicated to him, prefer an appeal to the appellate authority constituted by the state government. The SPCBs have the powers to carry out certain works stipulated in the consent order if the person fails to meet the conditions and to make application to courts for restraining apprehended pollution of water in streams or wells. In the event of accident or other unforeseen act or event, resulting in the discharge or likely discharge of polluting matter into a stream or well or sewer or land, the person in charge of such a place is required to

intimate the occurrence of such an accident, act or event to the SPCB. Both central government and state governments are given the powers to make rules in consultation with their respective Boards.

The Previous Chapter of the Act prescribes penalties for

- (a) failures to comply with the SPCBs directions restraining or prohibiting the discharge of polluting matter into the stream, well or land;
- (b) failures to comply with court's decision to restrain discharge of effluent on application by the SPCBs,
- (c) failures to comply with SPCB's directions for closure, prohibition or regulation of any industry, operation or process or the stoppage or regulation or supply of electricity, water or any other service.

The penalties for non-compliance are imprisonment from 18 months to 6 years with a fine for the first contravention and additional fine upto Rs.5000 per day till the failure continues. For non-compliance with effluent standards prescribed by SPCBs, the penalties are imprisonment from 18 months to 6 years and fine. For making new outlets and thus discharging effluent without consent of the SPCBs, the penalties are imprisonment from 2 to 6 years and fine for the first contravention and imprisonment from 2 to 7 years and fine after the first conviction.

Dwivedi (1977) points out that this Act left many grey areas that were difficult to administer. This Act does not cover groundwater contamination. Municipalities which are primarily responsible for treating residential wastes remain free from direct liability. It allows the government agencies too much flexibility. For example the Act states that the head of a polluting unit would not be punished 'if he proves that the offence was committed without his knowledge or that he exercised all due diligence

to prevent it'. This Act does not give the victims the right to go to the courts to punish the erring units; charges can be brought to courts only by the Boards. The penalties for non-compliance with the standards or directions are independent of the extent of violations. The Boards are expected to depend largely on government grants for their operations. As it was found that the Boards were overburdened and underfunded, the Water Cess (Prevention and Control of Pollution) Act, 1977 was enacted. Even after revisions in 1992, the rates of water cess varied between 1.50 paise to 5.00 paise for kilolitre for various uses. These rates are too low compared with the opportunity costs of water. Many SPCBs raise large proportion of their revenues from the consent fees.

#### ***Forest (Conservation) Act, 1980***

This Act was passed to prevent deforestation, which results in ecological imbalance and environmental deterioration. It prevents even the state governments and any other authority dereserve a forest which is already reserved. It prohibits forestland to be used for non-forest purposes, except with the prior approval of the central government.

#### ***The Air (Prevention and Control of Pollution) Act, 1981***

The preamble to the Act states that 'whereas decisions were taken at the United Nations Conference on the Human Environment held in Stockholm in June 1972, in which India participated, to take appropriate steps for the preservation of the natural resources of the earth which, among other things, include the preservation of the quality of air and control of air pollution; And, whereas it is considered necessary to implement the decisions aforesaid in so far as they relate to the preservation of the quality of air and control of air pollution'. The central government used Article 253 to enact this law and made it applicable throughout India. This Act defines air pollutant

as ‘any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment’. The CPCB and the SPCBs created under the Water Act 1974 are entrusted with the implementation of the provisions of the Act. The CPCB may

- (a) advise the central government on any matter concerning the improvement of the quality of air and prevention, control or abatement of air pollution;
- (b) plan and cause to be executed a nation wide programme for the prevention, control or abatement of air pollution;
- (c) coordinate the activities of the SPCBs;
- (d) provide technical assistance and guidance to the SPCBs;
- (e) collect, compile and publish technical and statistical data relating to air pollution and the measures devised for its effective prevention, control or abatement and prepare manuals, codes or guides relating to prevention, control or abatement of air pollution; and
- (f) lay down standards for the quality of air.

The functions of the SPCBs also include inspection of any control equipment, industrial plant or manufacturing process and to give, by order, such directions to such persons as it may consider necessary to take steps for the prevention, control or abatement of air pollution. The units belonging to the list of polluting industries should obtain consents before their establishment or/and continuing their operations. The SPCBs, in consultation with the state governments, wherever necessary, can exercise the following powers:

- (a) declare any area or areas within the state as air pollution control area; prohibit the use of certain fuels or appliances in this control area; prohibit the banning of any material (not being fuel) which may cause air pollution;
- (b) give instructions for ensuring standards for emission from automobiles;
- (c) restrict use of certain industrial plants;
- (d) disallow discharge of the emission of any air pollutant in excess of the standards laid down;
- (e) make applications to court for restraining persons from causing air pollution;
- (f) power of entry and inspection into the premises of the polluters;
- (g) obtain information from the polluting units and take samples of air or emission; and
- (h) direct the closure, prohibition or regulation of any industry, operation or process; or the stoppage or regulation of supply of electricity, water or any other service.

For failures to comply with the restriction on use of certain industrial plants, discharging emission of air pollutants in excess of the standards laid down by the SPCBs, and non-compliance with directions relating to closure, prohibition or regulation of any industry, operation or process or the stoppage of utility services, the penalties are imprisonment for a term between 18 months and 6 years and with fine; and in case the failure continues, with and additional fine which may extend to Rs.5000 for every day during which such failure continues after conviction for the first such failure. If the failure continues beyond one year after the date of conviction, the offender shall be punishable with imprisonment for a term between 2 years and 7 years and with fine. The penalties for certain acts such as obstruction of any person acting under the orders of SPCBs, failure to intimate the occurrence of the emissions

in excess of the standards, giving false information for obtaining consent to operate, are imprisonment for a term which may extend to 3 months with fine which may extend to Rs.10000 or both. As in the case of the Water (Prevention and Control of Pollution) Act, 1974, the central and state governments can make rules. As in the Water Act, company officials may be exempted from liability if they establish due diligence and lack of knowledge about the emissions. Also, the victims cannot go to the courts to frame charges against the polluters.

### ***The Tiwari Committee, 1980***

The Government of India set up a Committee in January 1980, under the Chairmanship of N.D. Tiwari, then Deputy Chairman of the Planning Commission, to review the existing environmental legislation and to recommend legislative measures and administrative machinery for environmental protection. This Committee stressed the need for the proper management of the country's natural resources of land, forest and water in order to conserve the nation's ecological base. Its major recommendations are:

- (a) creation of a comprehensive environmental code to cover all types of pollution and environmental degradation;
- (b) constitution of environment courts in all District Head Quarters, and the appointment of experts to assist the Court;
- (c) creation of a Department of Environment;
- (d) setting up of a Central Land Commission;
- (e) provision of economic incentives to industries to encourage environment friendly products, income tax and sales tax benefits for adopting clean technology, investment tax credits for purchases of purification devices,

inclusion of replacement cost of purification equipment in annual operating costs, and minimal tax or no tax on the manufacture of pollution control devices; and

- (f) environmental impact assessment (EIA) not only be a prerequisite for industry to start, but also must be repeated periodically.

The government had constituted the Department of Environment in 1980, which was transferred to the newly created Ministry of Environment & Forests (MoEF) in 1985. It had also set up the Land Commission. Fiscal incentives such as rebates on excise/customs duties for pollution control equipments, accelerated depreciation allowance on selected pollution control equipments, financial and technical assistance to small scale units in industrial clusters to set up common effluent treatment plants are now available. EIA has become mandatory for highly polluting industries since 1994.

***(iv) Bhopal Tragedy to the 1998, 1984 to 1998***

Constitutional amendments, legislations and policies relating to environmental protection during this period were influenced by domestic events, shift in economic policy and international events. The Bhopal gas tragedy and the difficulties faced in claiming compensation from the company and disbursing compensations to the victims necessitated the need for a comprehensive environmental legislation, rules relating to storing, handling and use of hazardous wastes and a law to provide immediate compensations to the victims of industrial accidents.

Since June 1991, the Government of India announced a series of reform measures to liberalise and globalise the Indian economy. An urgent need was felt for decentralisation and debureaucratisation. The amendments to the Constitution in 1994

recognized the three-tier structure of the government and facilitated the transfer of powers and resources to the local governments. The Supreme Court and High Courts have been very active in the enforcement of legislations relating to environmental protection. The decisions reached at the UN Conference on Environment and Development held at Rio de Janeiro in 1992 as well as the shift in economic policy led the Government of India to reexamine the command and control (CAC) type of regulatory regime for environmental protection and to explore the feasibility of combining regulatory instruments along with economic instruments for controlling environmental pollution.

### ***Constitutional Amendments and Public Interest Litigation***

The 73<sup>rd</sup> and 74<sup>th</sup> Constitutional amendments of 1992 recognized the three-tier structure of the government by devolution of power to the local bodies viz. panchayats in rural areas and municipalities in urban areas. With the passage of bills by the state legislatures and devolving powers and allocating revenue sources, these local bodies can become institutions of self-government. The eleventh schedule contains environmental activities such as soil conservation, water management, social forestry and non-conventional energy, that panchayats can undertake. The twelfth schedule lists activities such as water supply, public health and sanitation, solid waste management and environmental protection which the municipalities can undertake. These grass root level institutions can facilitate greater participation by the people in local affairs, promote better planning and implementation of developmental and environmental programmes and be more responsive to the needs of the people.

The Supreme Court and the High Courts have played an active role in the enforcement of constitutional provisions and legislations relating to environmental

protection. The fundamental right to life and personal liberty enshrined in Article 21 has been held to include the right to enjoy pollution free air and water. In *R.R. Delavoi v. The Indian Overseas Bank* case, 1991, the Madras High Court pointed out: 'Being aware of the limitations of legalism, the Supreme Court in the main and the High Courts to some extent for the last decade and a half did their best to bring law into the service of the poor and downtrodden under the banner of Public Interest Litigation. The range is wide enough to cover from bonded labour to prison conditions and from early trial to environmental protection'. This is a new remedy available to public spirited individuals or societies to go to the court under Article 32 for the enforcement of the fundamental right to life (including clean air and water) contained in Article 21.

### ***Legislations***

#### ***The Environment (Protection) Act 1986***

This Act was enacted in the aftermath of the Bhopal gas tragedy in 1984 claiming more than 3000 lives. The Statement of Objects and Reasons of this Act refers to the decisions taken at the Stockholm Conference in June 1972 and expresses concern about the decline in environmental quality, increasing pollution, loss of vegetal cover and biological diversity, excessive concentrations of harmful chemicals in the ambient atmosphere, growing risks of environmental accidents and threats of life system.

According to this Act environment includes 'water, air and land and the interrelationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro organism and property'. It defines hazardous substance as 'any substance or preparation which, by reasons of its

chemical or physiochemical properties or handling, is liable to cause harm to human beings, other living creatures, plants, micro-organism, property or the environment'

This Act gives the following powers to the central government:

- (a) coordination of actions of the state governments, officers and other authorities under the Act or any other law which is relatable to the objects of the Act;
- (b) planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution;
- (c) laying down standards for the quality of environment in its various aspects;
- (d) laying down standards for emission or discharge of environmental pollutants from various sources;
- (e) restriction of areas in which any industry, operations or processes or class of industries, operations or processes shall not be carried out subject to certain safeguards;
- (f) laying down procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents;
- (g) examination of such manufacturing processes, materials and substances as are likely to cause environmental pollution;
- (h) carrying out and sponsoring investigations and research relating to problems of environmental pollution;
- (i) inspection of any premises, plant, equipment, machinery, manufacturing or other processes, materials or substances and giving, by order, of such directions to such authorities, officers or persons as it may consider to take

- steps for the prevention, control and abatement of environmental pollution;
- (j) establishment or recognition of environmental laboratories and institutions;
- (k) collection and dissemination of information in respect of matters relating to environmental pollution; and
- (l) preparation of manuals, codes or guides relating to the prevention, control and abatement of environmental pollution.

The central government may constitute an authority or authorities for the purpose of exercising such of the powers and functions under this Act.

The central government may make rules covering the following matters:

- (i) The standards of quality of air, water or soil for various areas and purposes;
- (ii) The maximum allowable limits of concentration of various environmental pollutants (including noise) for different areas;
- (iii) The procedures and safeguards for the handling of hazardous substances;
- (iv) The prohibitions and restrictions on the handling of hazardous substances in different areas; and
- (v) The prohibitions and restrictions on the location of industries and the carrying on the process and operation in different areas and;
- (vi) The procedures and safeguards for the prevention of accidents which may cause environmental pollution and for providing for remedial measures for such accidents.

The Environment (Protection) Act is a comprehensive piece of legislation. Under this Act, Environment Protection Rules were announced in 1986. Schedule VI contains specification of standards of different types. Hazardous Wastes (Management and Handling) Rules 1989; Manufacture, Storage, and Import of Hazardous Chemicals,

Rules 1989, Chemical Accident (Emergency Planning, Preparedness and Response) Rules, 1996; Bio-medical Waste (Management and Handling) Rules, 1998 were framed using the powers given in this Act. Under Rule 14 of the E.P. Rules 1986, the government evolved guidelines for submission of yearly environmental audit/statement by units requiring consent under the Water Act, Air Act and authorization under Hazardous Wastes (Management and Handling) Rules<sup>11</sup>. However, submission of an environmental statement by polluting units seeking consent under the Water Act 1974 or the Air Act, 1981 or both and authorization under the Hazardous Wastes Rules, 1989 to the concerned SPCBs was made mandatory only in 1992. Khan (1998) notes that the definition of environmental pollutant in this Act does not include heat energy, sound and nuclear radiation or even pollution caused by deforestation and unrestricted development. This Act gives wide range of powers to the central government. Padia (1996) suggests a suitable entry in the Concurrent List in respect of environmental pollution by specially referring to air, water and land pollution in all forms, prevention of hazards to human beings, other living creatures, plants, microorganism and property.

### ***The Public Liability Insurance Act, 1991***

The Statement of Objects and Reasons mentions the need ‘ to provide for mandatory public liability insurance for installations handling hazardous substances to provide minimum relief to the victims. Such an insurance apart from safeguarding the interests of the victims would also provide cover and enable the industry to discharge its liability to settle large claims arising out of major accidents. If the objective of providing immediate relief is to be achieved the mandatory public liability insurance should be in the principle of “no fault” liability as it is limited to only relief on a

limited scale. However, availability of immediate relief would not prevent the victims to go to courts for claiming larger compensation. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act, 1986, and exceeding such quantity as may be specified, by notification, by the central government.

As per this Act the owner shall be liable to pay relief as specified in the Schedule:

- (i) Reimbursement of medical claim upto Rs. 12, 500 in each case;
- (ii) Relief of Rs.25,000 per person for fatal accident in addition to the reimbursement of medical expenses upto Rs.12,500;
- (iii) For permanent total or permanent partial disability or other injury or sickness, the relief will be (a) reimbursement of medical expenses incurred upto a maximum of Rs.12,500 in each case and (b) cash relief on the basis of percentage of disablement as certified by an authorised physician. The relief for total permanent disability will be Rs.25,000;
- (iv) Compensation for loss of wages due to temporary disability will be Rs.1000 per month for a maximum of 3 months; and
- (v) For damage to property upto Rs.6000 depending on the damage.

The claimant shall not be required to plead that the accident was due to any wrongful Act. The owner is also liable to pay other compensation, if any. This Act stipulates that every owner shall take out before he starts handling any hazardous substance, one or more insurance policies and renew it or them from time to time before the expiry of validity. As per Rule 10 notified in May 1991, the extent of liability is Rs.50 million / one accident or Rs. 150 million per year for a number of accidents. Rule 11 states that an owner shall contribute to Environmental Relief Fund a sum equal to premium.

Every application for claim should be filed to the Collector within 5 years of the occurrence of accident. The Collector should decide the amount and inform the parties within 15 days. The insurer shall pay within 30 days. The Collector shall have the power of Civil Court and the case should be disposed off within 3 months. This law is comparable to the laws enacted by the Member States under the Council of European Community's Directive on Civil Liability for Damage caused by waste since 1991. Article 3 of the Directive states that the producer of waste shall be liable under Civil law for the damage and injury to the environment caused by the waste, irrespective of fault on his part. The Public Liability Insurance (Amendment) Act, 1992 states that the 1991 Act could not be implemented on account of the insurance companies not agreeing to give insurance policies for unlimited liability of the owners. This Amendment limits the liability of insurance companies to the amount of insurance policy but the owner's liability shall continue to be unlimited under the Act. It provides for creation of an Environment Relief Fund with the additional money collected from the owners having control over handling of hazardous substances.

### ***The National Environment Tribunal Act 1995***

The aim of the Act is to provide for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident, with a view to giving relief and compensation or damages to persons, property and the environment and for matters connected therewith or incidental thereto. It cites the decision reached at the U.N. Conference on Environment and Development held at Rio de Janeiro in June 1992 which called upon the countries to develop national laws regarding liability and compensation for the

victims of pollution and other environmental damages.

### ***Rio Conference***

The U.N. Conference on Environment and Development held at Rio in 1992 specifies the following objectives of environment policy: (i) to incorporate environmental costs in the decisions of producers and consumers.....and to pass these costs on to the other parts of society, other countries or to future generations; (ii) to move more fully towards the integration of social and environmental costs into economic activities, so that prices will appropriately reflect the relative scarcity and total value of resources and contribute towards the prevention of environmental degradation; and (iii) to include, wherever appropriate, the use of market principles in the framing of economic instruments and policies to pursue sustainable development.

### ***Policy Statement for Abatement of Pollution, 1992***

The Policy Statement for Abatement of Pollution issued by the Ministry of Environment and Forests (MOEF) in February 1992 identifies the environment problems and admits that ‘the state of the environment continues to deteriorate’. It favours a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, educational programmes and information campaigns. It recommends the polluter pays principle, involvement of the public in decision making and new approaches for considering market choices ‘ to give industries and consumers clear signals about the cost of using environmental and natural resources’.

### ***Implementation of Laws Relating to Environmental Protection***

The nodal agency for implementing various legislations relating to environmental protection at the centre is the MoEF. Besides giving directions to the CPCB on matters relating to prevention and control of pollution, the MoEF is responsible for designing and implementing a wide range of programmes relating to environmental protection. The Annual Report of the MoEF for 1996-97 states that ‘the focus of various programmes of the Ministry and its associated organisations, aimed at prevention and control of pollution is on issues such as promotion of clean and low waste technologies, waste minimization, reuse or recycling, improvement of water quality, environmental audit, natural resource accounting, development of mass based standards, institutional and human resource development etc. The whole issue of pollution prevention and control is dealt with a combination of command and control methods as well voluntary regulations, fiscal measures, promotion of awareness, involvement of public etc’ (p.63). Based on the environmental laws and directions given by the Supreme Court, the central government has created a number of authorities for designing, implementing and monitoring its environmental programmes. At the state level, most states have set up Departments of Environments and the SPCBs. The CPCB and the SPCBs are responsible for implementing legislations relating to prevention and control of pollution. Pollution arises both from point sources, for example, factories and non-point sources, for example, automobiles. Source-specific effluent and emission standards have been fixed for polluting point sources. For non-point sources, as monitoring of pollution generation is very difficult, indirect measures of pollution prevention control such as catalytic converters in automobile engine for new cars, led-free petrol, fuel with low sulfur content, periodic inspection of vehicles etc. are being adopted. In addition, ambient standards for air

and water have been laid down and are being regularly monitored by the CPCB with the support of the SPCBs. Mehta, Mundle and Sankar (1993/1997) find that despite the legislative and administrative efforts and fiscal incentives for pollution control, 'ambient standards of air and water pollution continue to be routinely exceeded and in some places quality has distinctly deteriorated'. They attribute this 'among other things to a certain hiatus between the macro goals of our environmental policy and the micro nature of operational provisions for enforcement of the policy. Hence, though standards have been laid down for ambient air and water quality, actual enforcement relates mostly to source standards laid down for individual polluters, factories, transport vehicles and so on. Furthermore, the ambient and source standards are laid down independently, unrelated in terms of the volume of pollution generating activities. Hence, it is quite conceivable that the quality of the environment could continue to deteriorate despite of high degree of compliance among individual polluters. It is also possible, of course, that the degree of compliance itself is poor, adding to the adverse effects of the policy hiatus' (pp 1-2). This paper focuses on issues in the determination of and enforcement aspects of the source-specific standards.

### ***Determination of Standards***

Under Rule 3A of Environment Protection Rules 1986, the Government of India notified on May 19, 1993 that emission or discharge of environmental pollutants from industries, operations or processes shall not exceed the relevant parameters and standards specified in Schedule VI. There are three types of effluent standards. The general standards for discharge of effluents cover more than 40 parameters including colour and odour, suspended solids, dissolved solids, pH, BOD, COD, various

chemicals and metals. The permissible limits vary depending on where the effluents are charged viz. inland water surface, public sewers, land for irrigation and marine coastal areas. These standards are based on concentrations of pollutants per unit of effluent. Wastewater generation standards are applicable to 11 industries including iron and steel, sugar, pulp and paper, textiles, tanneries and fertiliser. These standards are specified as quantities of wastes generated per unit of output or input e.g.  $16 \text{ m}^3$  / ton of steel produced,  $0.4 \text{ m}^3$  / ton of cane crushed. Load based standards have been prescribed for oil refineries and large pulp and paper, newsprint, and rayon grade plants of capacity about 24000 MT / annum. In the case of oil refinery the parameters are oil and grease, phenol, BOD, suspended solids and sulphide and the limits are prescribed in the form of quantum in kg. /1000 tonnes of crude processed. For the other industries, the parameter is total organic chloride<sup>1</sup> and the quantum is 2 kg/ton of product. In enforcing the effluent standards, the SPCBs should follow guidelines such as treatment of the wastewater with the best available technology, minimisation of the discharge of wastes into the environment by recycling and reuse of waste materials as far as practicable, removal of colour and unpleasant odour as far as practicable and the assimilative capacity of the receiving bodies.

There are three types of emission standards. The concentration based standards relate to 12 parameters including suspended particulate matter (SPM), fluoride, mercury, chloride, carbon monoxide, lead and sulphur dioxide. The concentrations are not to exceed the permissible levels specified in  $\text{mg}/\text{NM}^3$ . Equipment based standards for control of sulphur dioxide emissions are achieved through dispersion. Maximum stack height limits are prescribed which vary with capacity. Load/mass-based standards are prescribed for fertiliser (urea), copper, lead and zinc smelting converter, nitric acid, sulphuric acid, coke oven, oil refineries, aluminum plant and glass units.

Noise standards are prescribed for automobiles, domestic appliances and construction equipments at the manufacturing stage. The state governments and the SPCBs can prescribe tighter standards taking into consideration the assimilative capacity of the local environments. The central government can prohibit/restrict operations of industries in certain areas. The EPR Rule 5 mentions the following considerations which may be taken into account on this decision: (i) standard for quality of environment, (ii) maximum allowable limits for various pollutants, (iii) likely emission or discharge of pollutants from the industries, (iv) topographic and climatic features of the area, (v) biological diversity, (vi) environmentally compatible land use, (vii) net adverse environmental impact likely to be caused, and (viii) proximity to protected areas like ancient monument, sanctuary, national park, game reserve, closed area under Wile Life Protection Act and proximity to human settlement. We have already noted that the CPCB and the SPCBs have powers of examination of such manufacturing processes, materials and substances as are likely to cause environmental pollution. The polluting industries coming under the Water Act, Air Act and Environmental Protection Act are required to get consent certificates from their respective SPCBs for starting an industry or continuation of production. They are also required to submit environmental audit statements in prescribed format to their SPCBs annually. Some questions have been raised about the basis of arriving at the standards and their relevance to the whole country. In the determination of standards two considerations are important: (i) the impact of the release of pollutants into the environment on human health, plant and animal life and eco-system and (ii) the technical and economic feasibility of prevention, control and abatement of pollution. Any regulation, including imposition of standards on the polluting units, involves costs to society and these costs have to be weighed against the benefits

arising from improvement in environmental quality. The experiences of developed countries, indicate that many including USA, initially prohibited the weighing of benefits against costs in setting of environmental standards but after a decade or so, these countries required that benefit cost analysis be performed for all major regulations. See, for example, Cropper and Oates (1992) and Opschoor and Vos (1989). In USA, the standard setting exercise is a transparent process and an opportunity is given to all the parties, including the polluters, to participate in the standard determination process. In India, the standards are determined mainly on the basis of comprehensive industry studies undertaken by technical institutions at the initiative of the CPCB. These studies provide estimates of pollution generation industry-wise, assess available abatement technologies and give tentative estimates of costs of abatement for different levels of abatement. The polluting units are not given an opportunity to air their views on this matter. During our discussions with owners and managers of the polluting industries, we heard two types of complaints: (i) the standards have been borrowed from developed western countries without assessing their relevance to Indian conditions. In the case of water pollution, they stress the self-cleansing properties of major Indian rivers and the tropical climate with sunshine for half day most of the days in a year. Hence, they argue that the standards for BOD<sub>5</sub> at 20°C of 30 mg/litre on land for discharge into inland surface water and 100 mg/litre on land for irrigation are too stringent. (ii) Standards for certain parameters have been fixed without considering the availability of least-cost abating technologies. This issue arose when Tamil Nadu Pollution Control Board fixed a totally dissolved solids (TDS) standard of 2100 mg/l for effluent discharged into land or inland surface water. The tanneries and textile dyeing units argued that meeting this standard was not feasible because the water used for tanning and dyeing in many areas had already

TDS levels in the range 5000 to 10000 mg/l. The Supreme Court had directed the National Environmental Engineering Research Institute to examine the feasibility of achieving the standards. Another issue at the implementation level is whether or not a nation-wide uniform effluent or emission standard is desirable. Critics of nation-wide uniform standards point out that the carrying capacities of different regions differ and the trade-off between environmental quality and other goals such as growth and employment also differ in different regions. At present, the Air (Prevention and Control of Pollution) Act, 1981 and the Environment Protection Act, (1986) give powers to the central and state governments to restrict or prohibit certain activities in certain areas on the basis of considerations mentioned earlier. But the rules do not permit any state government or SPCB to lower the standards fixed by the central government in any region. The pollution haven argument favours uniform standards throughout the country because in the absence of such standards, state governments may lower the standards in order to attract new industries. For a discussion of this argument and its relevance to India, see Gupta (1996). The standards prescribed for most industries are concentration-based standards. In case of effluents, a polluting unit can meet the standards by dilution of effluents by adding water. With growth of the industry aggregate amount of pollution can increase even when there is compliance at the plant level.

### ***Enforcement of Standards***

When the standards are the same for many industries or even when industry-specific standards are applied to all firms in the same industry, the aggregate costs of compliance with the standards will not be minimized. The reason is that the marginal abatement costs even for firms within an industry vary from firm to firm because of

variations in factors such as vintage of the firm, technology used, quality of input used, product mix, size of the firm etc. When a regulatory agency puts restrictions on the process used or prescribes input-output norms or imposes other physical standards, the firms' choices in the minimization of abatement costs are constrained. Effective enforcement of the standards involves costs to the SPCBs. In the absence of metres which can record the quantities of and concentrations of pollutants in the effluents, the SPCBs can monitor the firms' behaviour only by inspection and sampling. The Acts provide powers to the SPCBs to inspect the premises of the polluters and take samples in the manner prescribed. Recognized laboratories must test the water quality and report the results. When the concentrations of pollutants exceed the permissible levels, the SPCBs can issue show cause notice. The polluting units are given an opportunity to go to the Appellate Court. Meanwhile, the state governments can also intervene and influence the decisions of the SPCBs. Even though the SPCBs are autonomous bodies, the members owe their positions to the state governments and the Boards depend on the state governments for financial support. Many state governments are under pressure to delay or stop proceedings against the erring units because of fear of loss of output or/and employment.

Poor enforcement of the laws/rules occurs due to the following reasons. First, the pollution control authorities do not have reliable information regarding the quantities of effluents/emissions/solid wastes and their characteristics. There is information asymmetry: the polluters know more about the sources, magnitudes and concentrations of pollutants as well as the costs of controlling pollution than the regulators. It is very difficult and perhaps there is no motivation on the part of the regulated agencies to acquire and process the information from thousands of units dispersed in their regions. Second, the regulators face budget constraints. Most SPCBs

do not have adequate technical facilities and skilled manpower for monitoring the polluting units and filing charges against the units violating the standards. Third, the fines are fixed in nominal terms and are independent of the extent of violations. Penalties such as imprisonment of officials, stoppage of water and electricity and closure of units can impose hardships on the affected firms, but in a weak enforcement regime with principal agent problem collusion between regulators and regulated units are possible. Dispute settlement by going to the courts is a cumbersome process and involves considerable delays. This situation creates an opportunity to indulge in rent-seeking activities.

As on July 31, 1995 of the 6214 cases under the Water Act and Air Act, decisions were made on 2758 cases and 3456 cases were pending. Of the 2758 decisions, 1010 were against the Boards. 821 cases were either dismissed or withdrawn. See Gupta (1996). Until recently, the CPCB and the SPCBs concentrated their efforts on enforcing compliance with the standards by large and medium size units. They have classified the units under three categories – Red, Orange and Green, in terms of their pollution intensities. They have identified 17 highly polluting industries. According to the Annual Report of the MoEF for the year 1997-98, ‘out of the total number of 1551 industries belonging to the 17 categories of highly polluting industries, 1261 industries have already installed adequate pollution control facilities to comply with the stipulated standards. 125 units have been closed down and the remaining 165 are in the process of installing the requisite pollution control facilities’ (p.66). However, it does not mean that the 1261 industries comply with the standards. Fiscal incentives such as rebates on customs duties/excise duties on pollution control equipments and accelerated depreciation allowances on certain investments in pollution abatement plants as well as the belief that erection of an abatement plant is the first necessary

step in meeting the requirements of the SPCBs have encouraged the units to set up the abatement plants. But the firms have an incentive to operate their plants on their own only when the net operating cost, that is, the gross operating cost less the value of products recovered is negative; otherwise continuous or at least random monitoring with the expected penalty for non-compliance higher than the cost of compliance is necessary to ensure compliance. The authorities can experiment with alternative means such as adverse publicity for non-compliance by units, higher probability of inspection or/and sampling of units with poor compliance records, or/and seeking the assistance of NGOs and other local residents in detecting the violations. In February 1991, the MoEF launched a scheme of labelling of environment friendly products with ECOMARK. Under this scheme, any product which is made, used or disposed of in a way that significantly reduces the harm it would otherwise cause to the environment would be considered as environment friendly product. Many large industrial units which are desirous of exporting their products are obtaining ISO 9001 certificates to get market access to the European Union, USA and other countries.

### ***Small-Scale Industries***

Pollution problems in small scale industries such as leather tanning, textile bleaching and dyeing, aquaculture, dairy, foundries, coke-coal based activities, chemicals etc. have received public attention in recent years. Most of the units are organised under single proprietor or partnership form of organisation. They are dispersed and labourintensive but their pollution intensities are generally higher than those of the corresponding medium and large units partly because of the use of obsolete technologies and poor management practices and partly because they do not come under the orbit of regulatory authorities. Certain industries such as leather and

garment making received boost from the Government of India since 1970 because of their significant contributions to export earning. The state governments and the SPCBs did not pay much attention to the pollution generated by these activities because of the difficulties in monitoring the units, the high costs of pollution abatement for small units compared with large units, and the possible adverse impact of enforcement of the standards on outputs and employment of these industries.

### ***Judicial Activism***

The interpretation of Article 21 of the Constitution to include the right to clean air and water by the Supreme Court and the High Courts, the remedy available to any citizen to go to the court under the banner of public interest litigation for the enforcement of the right to clean air and water, and the growing public awareness evident in the formation of NGOs and welfare organisations for the promotion of environmental quality, radically altered the situation in the nineties. We present a summary of selected Supreme Court judgments below. In *Rural Litigations and Entitlement Kendra v. State of Uttar Pradesh*, the Supreme Court directed the closure of mining operations though blasting in the Doon Valley. It held that closure would cause hardship to the affected parties, but it was a price that had to be paid for protecting and safeguarding the rights of the people to live in healthy environment with minimal disturbance of ecological balance. It further directed the affected areas to be reclaimed and afforestation and soil conservation programmes to be taken up so as to provide employment opportunities to the affected workers. In *M.C. Mehta v. Union of India* case, the Court directed the stopping of the working of tanneries which were discharging effluents in River Ganga and which did not set up primary effluent treatment plants. It held that the financial incapacity of the tanners to set up primary

effluent treatment plants was wholly irrelevant. The Court observed the need for (a) imparting lessons in natural environments in educational institutions, (b) group of experts to aid and advise the Court to facilitate judicial decisions, (c) constituting permanent independent centre with professionally public spirited experts to provide the necessary scientific and technological information to the Court, and (d) setting up environmental courts on regional basis with a right to appeal to the Supreme Court..

In *Vellore Citizens Welfare Forum v. Union of India and Others*, a writ petition was filed in 1991 and after many hearings and directions, the Court delivered judgment on August 29, 1996. After citing the Stockholm Declaration of 1972, the constitutional and statutory provisions, and common law to protect a person's right to fresh air, clean water and pollution free environment, it endorsed the concept of sustainable development and endorsed "the precautionary principle" and "the polluter pays principle". It directed the central government to constitute an authority under Section 3(3) of the Environment (Protection) Act, 1986 to implement the two principles. It said: 'the authority shall, with the help of expert opinion and after giving opportunity to the concerned polluters assess the loss to the ecology/environment in the affected areas and shall also identify the individuals/families who have suffered because of the pollution and shall assess the compensation to be paid to the said individuals/families. The authority shall further determine the compensation to be recovered from the polluters as cost of reversing the damaged environment. The authority shall lay down just and fair procedure for completing the exercise'. It imposed a fine of Rs.10,000 on each of the 700 tanneries in Tamil Nadu and asked them to instal individual effluent treatment plants(IETPs) or become members of CETPs. The Court also directed the Madras High Court to constitute a special Bench, "Green Bench" to deal with this case and other environmental matters. Some other important decisions of the Supreme

Court in 1996 resulted in orders for closure of 69 foundries in Howrah for their failure to install pollution control devices; shifting of 513 industries out of Delhi for having damaged the health of Delhi's citizens; closure of 39000 illegal industrial units operating in residential areas in Delhi; closure of aquaculture farms within 500 metres of the coast along India's 6000 km, coastline by March 31, 1997 and payment of six years compensation to the employees in lieu of loss of employment; and shifting of 550 tanneries located in east Calcutta by September 30, 1977 and setting up of environmental pollution fund, with each unit paying Rs.10000 as fine, to be used for restoring the pollutant – riddled Hooghly. It is clear from the above directions, that the Court has played a very active role in the enforcement of legislations and rules relating to environmental protection. In compliance with the various Supreme Court Orders, the MOEF has constituted several authorities under the Environment (Protection) Act, 1986. It is obvious that the Court has taken quasi-legislative and quasi-administrative functions. While the judgements have been helpful in pressurising the non-complying polluting units to comply with the legislations, in reminding the responsibilities of the enforcing agencies and also in awakening public awareness of the environmental problems, they have generated some issues for public discussion. First, the existing information base and the capacity of the regulatory agencies for monitoring and enforcing the regulations are weak. Second, the judicial process is time-consuming. For example, the writ petition relating to the Vellore Citizens Welfare Forum versus Union of India and others on the tannery pollution case was filed in 1991 and the judgement was delivered in 1996. The Court directed the central government to constitute an Authority under Section 3(3) of the Environment Protection (Act), 1986 before September 30, 1996 to assess the loss to the ecology in the affected areas, and to identify the individuals/families who have

suffered because of the pollution to assess the compensation to be paid to the said individuals/ families. This Authority was constituted only in 1998 and the assessment has not yet been completed. Even when the assessment is done, many litigations would arise at the time of disbursement of the compensations to the said individuals / families. Third, there is lack of sufficient legal expertise to deal with environmental cases particularly those involving valuation of the damages. Hence, there is a need to develop the expertise. It is also worth exploring the feasibility of using prelitigatory remedial measures such as community participation and special forums to resolve environmental conflicts and also to reduce the excessive burden imposed on the court system.

### ***Issues in Transition to Market-Oriented Policy Regime***

We noted earlier that since June 1991 the Government of India initiated economic reforms to liberalise and globalise the Indian economy in stages. Substantial progress has been made in reforms pertaining to the external sector, industrial sector, fiscal sector and monetary sector. There has been little progress in public sector reforms, administrative reforms and environmental policy reforms. Agenda 21 of the Rio Conference stresses the need for internalising the externalities and endorses the polluter pays principle. It also recommends that prices of scarce natural resources should reflect their scarcity values. The Policy Statement on Abatement of Pollution, 1992 favours a mix of regulatory and MBIs for environmental protection. Environmental standards are being brought into world trade agenda. Indian exporters of leather goods, textile garments, and marine products face difficulties in gaining access to the markets of developed countries because of the allegation that these products are being produced under conditions which do not meet their environmental

standards. Hence, India's environmental policy regime must enable these producers to comply with the environmental standards at least cost so that their comparative advantage in these exportables will not be eroded when the environmental costs are added to the costs of production.

What are the issues in relying on MBIs for achieving environmental protection? Markets can be relied upon to achieve allocative efficiency in case of private goods. In India, the administered prices of many private goods do not reflect their social scarcity values. Free electricity to farmers in some states and subsidized tariff based on horsepower of pumpsets (implying zero marginal price of electricity) in other states have not only worsened the financial position of the State Electricity Boards but also resulted in indiscriminate exploitation of groundwater and consequent lowering of ground water levels and decline in water quality. Irrigation charges in many states have not been revised for two decades and the revenues do not cover even one-third of the operation and maintenance costs. In most states, the irrigation charges are unrelated to the crop sown or the season. Subsidy for nitrogenous fertilizers has not only affected the NPK balance in agriculture and caused environmental problems but also discouraged the use of organic fertilizers and increased the subsidy burden to the central government. There are political obstacles to setting these prices right, but a transparent public discussion on the costs and benefits of the pricing policies and distribution of the benefits among different users along with estimates of the fiscal burden and an assessment of the long-run environmental damages resulting from the policy is needed to undertake the price reforms. The reform package can be worked out in such a manner that the price increases are spread over a period of time and subsidies being targeted to reach the poor. India's pollution control regime may be seen as a "standard and regulation" regime. The CAC polices do not take into account

the private information available with the polluters regarding pollution prevention and control; they are not cost effective. The penalties for non-compliance with the standards are unrelated to the costs of compliance. Further the judicial process is time consuming. Economic instruments provide an opportunity to the polluters to make use of their private information in finding least cost means of complying with the standards. Given the standards, a pollution charge system wherein the pollution charge for each pollutant is equal to the marginal abatement cost at the prescribed standard provides an incentive to internalise the negative externality. Since the marginal abatement cost is an increasing function of the level of abatement most polluters would prefer to undertake pollution abatement than pay the charges. However, there are many conceptual, information and econometric problems in getting reliable estimates of the marginal abatement costs. We need better data base, more empirical studies in this field and perhaps some experimentation before we can implement the pollution charge system. In fact even the pollution charge systems in many European countries and in the United States are not designed in such a way that the charges reflect the marginal abatement costs of different pollutants. However, most charge systems take into consideration both the volume of effluent / emission and concentrations of pollutants in the emission / effluent. This charge system generates revenues to governmental agencies. Compliance with the standards is being achieved via market signalling mechanisms such as ecolabelling of products, adverse publicity for the erring units, and enforcement procedures such as placing frequent violators under the category where the probability of inspection is higher than for the complying units. The case for designing pollution / user charges for locally provided services such as drinking water supply, sanitation and solid wastes disposal is very strong. The 73<sup>rd</sup> and 74<sup>th</sup> constitutional amendments of 1992 assign the above subjects

to the local bodies. Most local bodies do not have the resources to carry out the tasks. At present these services are either provided free or at rates independent of the volume of and quality of the services. A user charge system will enable the local bodies to find resources to provide these services and also make them financially independent of state governments to some extent. The user charge system will also signal the users about the costs of the services provided by the local bodies. In fact there is an enormous scope for converting the wastes into valuable products. Municipal wastes can be converted into manures, the wastewater can be recycled after treatment and so on. At present most municipal towns do not have sewage systems. A well designed municipal sewage system with a facility for combined treatment of municipal wastewater and industrial wastewater would be beneficial to society because of economies of scale and economies of scope in the combined wastewater treatment. A non-market non-government institutional arrangement is needed for solving environmental problems which require collective action on the part of the affected people. Examples of such actions are management of common property and common pool resources such as grazing lands, forest lands, and fisheries, and common effluent treatment plants for polluting units in industrial clusters. In such cases, the government's role may be confined to providing the legal framework for establishing and operating the institutions, provision of technical expertise and perhaps initial lumpsum subsidies. When the stakeholders are convinced that these institutions can provide permanent income streams they have an incentive to cooperate and design rules and norms for sustainable management of these resources. Rawlsian principles of fairness, efficiency and stability can be applied in the design and management of each such institution. Social justice has been one of the cherished goals in India's socio-economic policies. The dependence of the poor on

environmental resources such as clean air, clean water and forest products is greater than that of the rich. Also, the poor do not have the resources to undertake pollution averting measures. Dasgupta (1993) illustrates how the erosion of common property resources can come about 'in the wake of shifting populations and the consequent pressure on these resources, technological progress, unreflective public policies, predatory governments and thieving aristocracies'. He points out the need for increased decentralisation of rural decision making but stresses the role of governments in providing infrastructure and credit and insurance facilities, and also in ensuring that 'the seat of local decisions is not usurped by the powerful'. Apart from the role of creating and enforcing property rights for environmental resources wherever feasible, the government has to act as a trustee of natural resources whose non-use values such as option values and existence values are high. There may be conflicts among preservation, conservation and preservation options with respect to a natural resource. The choice cannot be made purely on the basis of market signals or even on the basis of anthropogenic valuation of the resource. If there is great uncertainty associated with the use and non-use of values of an ecological resource and if the development option can result in irreversible damage to the ecosystem, then a CAC type of policy of reservation or restricted access may be in the public interest.

## **Environment Protection in Delhi**

### **Plantation**

As per latest Forest Survey of India report 2011, Green cover of Delhi has increased to about 296.20 sq km in 2009 from 26 Sq. Km in 1997. After having achieved unprecedented success in increasing the green cover, efforts have been sustained to plant more and more trees on vacant lands through active involvement of greening

agencies and community participation. This also includes free distribution of saplings to schools, RWAs, NGOs and other citizen groups through Forest Department's nurseries, petrol pumps, CNG Stations, mother dairy booths etc and financial assistance to RWAs for maintenance of parks and gardens.

In 2009, Delhi received INDIRA PRIYADARSHINI VRIKSHA MITRA AWARDS from Ministry of Environment and Forest, Govt. of India for increasing and maintaining the green cover in Delhi. Today, Delhi has nearly 20000 small/medium/big parks and gardens, 40 city forests, 5 ridge areas, 2 bio-diversity parks and other green belts Under City Plants a Million Tree Campaign, 2011 conducted during monsoon, a total of 14.5 lakh saplings have been planted by various departments / agencies / organizations. This year also similar campaign during monsoon will be conducted. The Forest department is striving to increase the forest and tree cover in Delhi to 310 sq.km by the end of 2012 Parks and gardens in Delhi are being maintained and developed through Delhi Parks and Garden Society (DPGS), an autonomous body under Department of Environment, which also provide financial assistance to RWAs / NGOs for maintaining parks / gardens. So far, 1205 parks are being maintained by 253 RWAs through Grant-in Aid from DPGS, which amounts to Rs. 3.34 Crores

### **Rain Water Harvesting**

- Made mandatory for plots having minimum area of 100 sq. meters to install the Rainwater Harvesting Structures in their premises.
- The financial assistance for 50% of the project cost or Rs. One Lakh, whichever is maximum, is provided by Delhi Govt/DJB to the RWAs/Schools for this purpose

- Rain water harvesting structures have been created in more than 100 schools and colleges to harvest the 40 hours of rain in Delhi
- Rain water harvesting structure will be installed in 2500 schools and colleges.

### **Waste Paper Recycling Machine**

- Waste Paper Recycling machine has been setup in the Delhi Secretariat for recycling the waste paper.
- 88 paper recycling machines installed in schools of Delhi so far and 100 more being installed this year.
- Cost of Paper Recycling Unit is about Rs.1.0 lakh

### **Solar Water Heating System**

- Delhi Govt. has made the use of solar water heating system mandatory in the buildings like Industries, Hospitals, Nursing homes, Hotels, Canteen, Residential buildings having an area of 500 sq.m, and above educational colleges, hostels, technical or vocational colleges etc.
- Govt. of Delhi is providing rebate/ incentive of Rs. 6000/- to domestic consumers and uptoRs. 60000/- @ Rs. 6000/- per 100 LPD to Non-Comercial Institutes.
- 45 solar water heater installed in schools & colleges of Delhi so far and 50 more being installed this year.
- Cost for 1000 liter of solar water heater is about Rs.1.2 to 1.4 lakh.
- Savings are 50 – 85% annually on power bills.

## **Green Building Concept**

- High performance Green Building design relies on renewable sources for energy systems; recycling and reuse of water and materials; integration of native and adapted species for landscaping; passive heating, cooling and ventilation; and other approaches that minimize environmental impact and resource consumption.
- Delhi Government has brought out an Action Plan for Implementing the Climate Change Agenda 2009-2012, wherein it has identified one of the point for implementation is as follows:
  - “To reduce the energy consumption in existing buildings by 30-40% in relation to the conventional buildings. Make at least 250 Green Buildings by adopting the Green Buildings Standards and 50% buildings be retrofitted for this and another 50 % new buildings to be made.”
- The Government of NCT of Delhi has been promoting these measures over a period of time. In this context, some of the issues relating to above have already been addressed. Site selection and orientation of building, Rain Water Harvesting both roof top and storm water management, use of LED lights (Light Emitting diodes), self reliant energy productions (Gas base turbines has been installed in Thyagraja Stadium for generation of electricity), replacement of CFCs (Chloro Fluoro Carbons) refrigerants by HFCs (Hydro Fluoro Carbons) refrigerants, use of solar energy and use of energy efficient chillers in air conditioning systems, etc. are to name a few.
- The Energy Conservation Building Code (ECBC) was launched by Bureau of Energy Efficiency in 2007 with the goal of specifying standards for new, large and energy efficient commercial buildings. The ECBC sets minimum energy

performance standards for commercial buildings. ECBC provides guidelines and norms for the energy-efficient design and construction of buildings, reduced energy requirement, enhanced residents' comforts and environmentally benign design techniques.

- The Government of Delhi has made mandatory implementation of Energy Conservation Building Code (ECBC) in Government Building/ Building complexes (new construction) including building/building complex of municipalities/ local bodies, Boards, Corporations, Government aided institutions and other Autonomous Bodies of the Government of NCT of Delhi.
- To establish a baseline for construction of green building from concept to completion, the Government of Delhi adopted GRIHA (Green Rating for Integrated Habitat Assessment) ratings in conjunction with ECBC norms and NBC code, for developing three star rating Green Building. GRIHA was conceived by TERI and developed jointly with the Ministry of New and Renewable Energy, Government of India. It is a green building 'design evaluation system', and is suitable for all kinds of buildings in different climatic zones of the country.
- Energy Auditing has been in Government buildings in Delhi. Also, the energy efficiency of existing government buildings are being upgraded through retrofitting.

## **Environmental Awareness**

About 2000 Eco-Clubs have been established in various schools/colleges of Delhi, which include Government Schools. These Eco-Clubs are conducting various environmental activities throughout the year. At the end of every year, Annual Eco Meet and Environmental Exhibition is organized wherein the representatives from all the Eco-club schools participate and exhibit various eco friendly products.

## **Environmental Awareness**

- According to the present scenario about 574 TPD of plastic waste is generated in Delhi. Plastic waste especially carry bags has been creating nuisance in Delhi despite over 12 years of massive awareness campaign “Say No To Plastic Bags”. Hon’ble High Court of Delhi had passed a judgment in August 2008 for imposing ban on plastic carry bags in main markets, local shopping centers, etc. subsequent to which Government of Delhi had issued a notification on 07.01.2009.
- Eco-care Programme (Environment and Sanitation drive ) in the residential areas is conducted with the help of RWAs, Eco-club schools/colleges, NGO's, Educational Institutions etc. These programmes evoked enthusiastic response from all the stakeholders indicating the success of the Bhagidari concept.
- Anti-Fire Crackers Campaign is conducted every year on the occasion of Diwali festival with full support of citizens of Delhi especially the school children through Eco Clubs. The RWAs, NGOs, MTAs, Corporates are also actively involved. This Campaign is one the success stories of the Department of Environment since the last few years. The spirit of Bhagidari is a guiding factor behind the success.

- Khelo Holi Naturaly Campaign is conducted every year during the Holi Festival to encourage the use of Natural Colours, instead of chemicals and Synthetic colours.
- Awareness regarding menace created by littering of plastic bags, for use of alternate to plastic bags, like jute bags, cloth bags/paper bags etc also being carried out.

### **Ambient Air Quality**

Over the last four years, distinct improvement has been recorded in the ambient air quality of Delhi in terms of suspended particulate matter (SPM), Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO) and Lead. This was achieved through persistent efforts of phasing out old commercial vehicles, introduction of unleaded petrol and low Sulphur Diesel, extensive use of CNG based vehicles and increase in forest cover.

5 Automated Continuous Monitoring Stations have been installed by DPCC in the year 2010 for ambient quality monitoring as per new notified air quality standards.

### **Air Pollution**

- Air Pollution sources are Transportation, Industries and Domestic air emissions
- The Govt of Delhi has taken the following steps to ensure control of air pollution from vehicles:
  1. More than 15 year old commercial / transport vehicles have been phased out.
  2. Entire public transport has been switch over to CNG fuel mode (appx. 1,60,000).

### 3. Implementation of Bharat Stage IV/Euro-IV emission norms.

- Sulphur content in Diesel has been reduced upto 50 PPM since April 2010.
- 500 PUCs being linked on the net so that daily reports can be downloaded & monitoring can be done.
- Air Ambience Fund has been created by levying fee on the sale of diesel at the rate of Re. 0.25 per liter in the NCT of Delhi. The Air Ambience Fund is utilized for promoting clean technologies.
- VAT refund of 12.5% allowed for conversion of vehicles to clean fuel like CNG
- Use of Battery operated Vehicles having zero tailpipe emissions are being given concessions upto 30% of the price of the vehicles.
- Gas based Power Plants are being promoted.
- Whole of Delhi declared as air pollution control area under Air Act.
- Stringent emission norms for industries and thermal power stations.
- Installation of Emission Control System in air polluting industries.
- Burning of leaves/plastics is prohibited.
- Use of 5 KVA or more capacity of DG set is prohibited from 10 PM to 6AM except in group housing societies. Also, acoustic enclosure has been made mandatory in DG sets
- 6000 cell phone towers and 600 Nursing Homes have been asked to provide acoustic enclosure and proper stack height in DG sets.

### **Water Pollution**

Major sources: Domestic sewage and Industrial effluent Problems: Lesser Dissolved Oxygen, Higher Bio-Chemical Oxygen Demand, Fecal coliform and Toxic chemicals

and heavy metals. The Govt. of Delhi has ensured that more than 1200 industrial units have installed effluent treatment plants to treat their industrial wastewater.<sup>13</sup> Common Effluent Treatment Plants (CETPs) which treat wastewater generated from 15 industrial areas are being monitored every month.<sup>23</sup> Sewage Treatment Plants of 512 MGD capacity, which have been installed to treat the sewage, are being monitored every month. Interceptor sewer concept is being implemented by DJB on 3 major drains (Najafgarh, Supplementary and Shahadra drains) to keep Yamuna clean. Installation of on Site STP/ETP in up coming construction projects.

Recycle & Reuse of treated waste water for flushing, horticulture, cooling, etc are being encouraged.

### **Noise Pollution**

The major sources are industrial, aircraft, transportation and diesel generator sets.

Government of Delhi has notified an area of 100 meters, around the hospitals with 100 beds or more, educational institutions with 1000 students or more, all court complexes, all Govt. Office complexes as Silence Areas/Zones.

Acoustic enclosure is mandatory for Diesel Generator sets.

As per Hon'ble LG's order, Generator sets of more than 5 KVA capacities are banned between 10.00 PM to 6.00AM, except for group housing societies

## **Waste Management**

### **A. Municipal Solid Waste**

Approximately 8000 MT MSW generated daily in Delhi.

- Okhla Waste to Energy Plant: 1950 Ton per day MSW. Electricity generation capacity is 16 MW.
- Ghazipur Waste to Energy Plant: 1300 Ton per day MSW with output of 450 Tons RDF. This is under process & is expected to be done by 2013. Electricity generation capacity will be 10 MW.
- Narela Waste to Energy Plant: 1200 Tons per day MSW with output of 450 Tons RDF 24 MW Power.
- MCD Compost Plant at Bhalaswa Sanitary Landfill Site: Composting is being done for 500 MT/day.
- Compost Plant at Okhla: 200 Tons per day.
- APMC: Existing Compost plant of capacity 125TPD is being upgraded to 200 TPD.

### **B. Biomedical Waste**

Decentralized Green Waste Management

- Generation of biodiesel from waste cooking oil in an environmentally sound way.
- A Pilot project based on Nisargruna Technology of BARC for converting biodegradable waste into biogas has been installed at Delhi Secretariat.
- Delhi Cabinet has approved bio-gas production from bio-degradable waste using BARC developed Nisargruna technology by giving fiscal incentives to the tune of 33% of plant cost.
- Potential exist in hotels, Hospital canteens, Group Housing Societies, etc.

### **C. Electronic Waste**

The Waste Electrical and Electronic equipments (e-waste) need to be properly managed and disposed off. Keeping this objective, Government of India has notified E-waste (Management and Handling) Rules, 2011. The Electrical and Electronic waste in a broader sense covers the mainframe minicomputers, personal computers, laptops, notebook computers, notepad computers, printer including cartridges, copying equipments, electrical and electronic typewriters, facsimiles telex, telephones, television sets (including LED & LCD display) refrigerator, washing machine, air-conditioners. These rules are available at: [http://moef.nic.in/downloads/rules-and-regulations/1035e\\_eng.pdf](http://moef.nic.in/downloads/rules-and-regulations/1035e_eng.pdf). The said Rules have come into force w.e.f. 01.05.2012. These Rules apply to every producer, consumer or bulk consumer involved in sale, purchase and processing of electrical and electronic equipment or components as specified in Schedule-1, collection center, dismantler and recycler of e-waste. The implementing agency for these rules in Delhi is DPCC. Central Pollution Control Board has issued the guidelines for implementation of E-waste (Management and Handling) Rules, 2011. Also as per Finance Department, Government of Delhi, Office Memorandum vide No. F13/2/2010-AC/dsfa/DSIII/731-732 for unserviceable articles of all the Departments of Government of NCT of Delhi should be done by MSTC. It is mandatory to hand over all the E-waste through MSTC to the authorized collection centers or registered dismantlers or recyclers as mentioned below:

1. M/s Earth Sense Recycle Pvt. Ltd.
2. M/s Greens cape Eco Management Pvt. Ltd.
3. M/s. SIMS Recycling Solutions Pvt. Ltd.

4. M/s Attero Recycling Pvt. Ltd.

Besides these, DPCC has authorized two E-waste Collection centers in Delhi, which are as follows:

1. M/s Chintan Environmental Research and Action Group
2. M/s HRA E-waste Private Limited

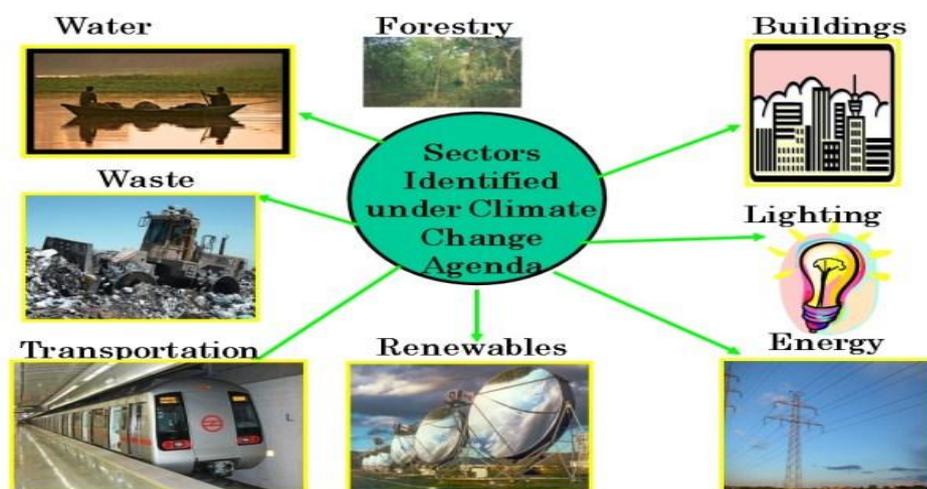
Any violation of the provisions is punishable as per the provisions of section 15 of the Environment Protection Act, 1986 which may attract fine upto Rupees One Lakh or imprisonment for a maximum period of five years or both.

#### **D. Plastic Waste**

According to the present scenario about 574 TPD of plastic waste is generated in Delhi. Plastic waste especially carry bags has been creating nuisance in Delhi despite over 12 years of massive awareness campaign “Say No To Plastic Bags”. Hon’ble High Court of Delhi had passed a judgment in August 2008 for imposing ban on plastic carry bags in main markets, local shopping centers, etc. subsequent to which Government of Delhi had issued a notification on 07.01.2009. Since even 2 years after the issue of 07.01.2009 Notification, the results were not encouraging. Delhi Govt. decided to put a blanket ban on plastic carry bags in NCT of Delhi. Consequently, a Notification imposing ban on manufacture, sales, storage, usage, import and transport in the NCT of Delhi was issued on 23.10.2012. The Aim and objective of the Schemes Carbon Credit Facility (Climate Change) is to Promote and facilitate the Environment friendly projects for reduction in the emissions of Greenhouse Gases, and addressing climate change related issues.

- Climate Change Agenda for Delhi 2009-12 released by Shri. Jairam Ramesh Hon'ble Minister of State, Environment and Forests, Govt. of India in the presence of the Hon'ble Chief Minister, Smt. Sheila Dikshit, on 5th Nov. 2009 at 12.30 pm at Auditorium, Delhi Secretariat, New Delhi.
- The Infrastructural Agencies in general agreed to adopt the following concepts in making CDM projects:
  - Energy Conservation
  - Use of CFL and Electric Chokes
  - Solar Water Heating Systems
  - Efficient Street-lighting
  - Efficient use of water pumps
  - Energy efficient buildings
  - Promotion of LEDs
  - Solar Air-conditioning, etc.
- Further to Climate Change Agenda for Delhi 2009-12, State of Action Plan for Climate Change (SAPCC) beyond 2012 is being prepared.

**Fig. 3.2: Sectors Identified under climate change agenda**



## **Plan Schemes**

The Department of Environment has fourteen plan schemes for undertaking various programmes which would facilitate increased environmental awareness amongst the citizens of NCT of Delhi. The programmes are multi-dimensional in nature and include research projects, actual field oriented activities and specific campaigns aimed at educating the general public. These programmes are carried out as per the plan schemes given below:

1. Public Environmental Awareness and Other Activities
2. Eco Clubs in Schools and Colleges.
3. Pollution Control and Environment Management.
4. Technical Setup in the Department of Environment.
5. Environment Data Generation, Survey, Research Project and Other Activities.
6. Assistance to NGOs in the Promotion, Conservation and Preservation of Environment.
7. Involvement of Weaker Sections of Society in Improvement & Upgradation of the Environment.
8. Integrated Waste Management
9. Carbon Credit Facilities (Climate Change).
10. Science Technology Awareness Programmes
11. Delhi Parks and Garden Society.
12. Solar Energy/Renewable Energy.
13. Energy Efficiency and Conservation.

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