

Environmental Management

INTRODUCTION

The irrepressible human curiosity and the unquenchable thirst for knowledge are the fundamental basis for scientific development. A major part of innovations in scientific and technological development has been directed towards generation or elevation of human comforts, thereby increasing the standard of living in the society. This led to increase in industrialisation. Some of the important improvements to our standard of living that can be attributed to the application of science and technology include :

- (a) Production of more and better quality food.
- (b) Elimination of many infectious diseases
- (c) Invention of new faster communication systems
- (d) Creation of reliable and faster transportation
- (e) Supply of safe water
- (f) Invention of machines to replace human and animal power.
- (g) Minimising water-borne diseases through improved water technology.
- (h) Mitigation of bad effects due to natural disasters e.g., droughts, floods, volcanic eruptions, etc.

Consequent to these improvements, disturbing side effects such as environmental pollution, deforestations, urbanisation, loss of arable land, evolution of new organisms resistant to control, etc., have emerged. These effects are considered as potential threats to environment and to humans.

In agrarian society, people lived essentially in harmony with nature raising food, gathering firewood and making clothing and tools from the land. The wastes from animals and humans were returned to the soil as fertilizer. Hence there were no appreciable problems of air, water or land pollution. For the small settlements which grew up, the supply of water, food and other essential goods and the disposal of wastes had to be kept in balance with the changing community, but no serious environmental problems were created.

The cities of ancient times, especially those of the Roman Empire, had built systems for water supply and waste disposal. However, the municipal technologies of ancient cities seem to have been forgotten or ignored or neglected for many centuries by those who built cities throughout Europe. This resulted in the outbreaks of water-borne diseases like cholera, typhoid and dysentery. Until the middle of the 19th century, it was not realised that improper waste disposal polluted water supplies with the disease-carrying organisms. The industrial revolution in 19th century particularly in Britain, Europe and North America aggravated the environmental problems due to increased industrialisation and urbanisation. These 2 factors caused such levels

of water pollution and air pollution which the cities of that time could not handle effectively. However, rapid advances in technology for the treatment of water and the partial treatment of wastewater took place in the developed countries, over the next few decades. This led to a considerable decrease in the incidence of water-borne diseases.

After the Second World War, the industrialized countries had an economic boom due to burgeoning population, advanced technology, and a rapid increase in energy consumption. These activities increased considerably from 1950 onwards thereby increasing the variety and quality of wastes discharged into the environment. New chemicals, including pesticides and insecticides, used without adequate data regarding their environmental and health effects caused and continued to cause, enormous environmental problems. Alarmingly, these problems are aggravating further since the types and amounts of such pollutants discharged to the environment are increasing inexorably as against the limited capacity of our water, air and land systems to assimilate these waste materials.

The financial crunch since 1970 forced changes in the priorities of many countries. Issues like unemployment inflation, energy, effects of globalization, resource crunch, high technology, war threats, social and political compulsions became major concerns. Thus it appears that concern about the public health and safety aspects of hazardous wastes will continue to increase for a long time. It is in this backdrop that development and implementation of effective environmental management strategies assume paramount importance.

The United Nations Conference on Human Environment was held during June 5-11, 1972 at the Swedish capital, Stockholm. This Stockholm conference was the first major international event which created global awareness about the environment by placing environmental concerns on the agenda of major international topics. The Stockholm declaration containing 26 principles reflects the range of environmental concerns of that period. The set of 109 recommendations of the Stockholm conference, widely considered to be the "magna carta" of environment, laid down the principles and action plan to control and regulate human environment. To commemorate this great event, June 5 of every year is rightly observed as the "World Environment Day". The historic Stockholm declaration called for the world community to bear a Golemn responsibility to protect and improve the environment for present and "future generation" and gave the concept of "eco-development".

The United Nations Environment Programme (UNEP) convened a meeting in 1982 to commemorate the 10th anniversary of the Stockholm conference, to assess the State of environment and changes in the perception of environment since 1972 conference. In 1983, the U.N. General Assembly appointed the "World Commission on Environment and Development". This commission, having 21 countries as its members, was entrusted with the task of formulation of a "global agenda for change" and to prepare an environmental perspective upto the year 2000. After deep study, the committee submitted its report entitled "our common future" in 1987. The committee recognized that the "sustainable development" should become a central guiding principle of the United Nations. Sustainable development implies "meeting the needs of the present without compromising the ability of the future generations to meet their own needs".

The United Nations Conference on Environment and Development (UNCED), known as the "Earth Summit" or "Eco-92", held during June 3-12, 1992 at Rio de Janeiro, Brazil, is considered as another historic event involving virtually all member states of the U.N. About 170 countries, 500 non-governmental organizations and about 2000 Journalists all over the globe participated. This conference identified the practical environmental and developmental challenges and opportunities and their inter-linkages upto the end of this century and even beyond. This conference also paved the way for creation of new partnership among the various countries. The "*earth charter*" prepared at the conference enunciates the principles, setting out

rights and obligations of all nations in relation to environment and guidelines to nations in their quest for ecologically sustainable development. "Agenda-21" evolved at this conference provides a resume of global environment and a blue-print of action plan for solving environmental problems and the tools and resources desirable for implementing the action plan. Besides the "earth charter" and the "Agenda-21", the earth summit also came up with "Convention on climate change" and the "Convention on biodiversity".

The blame for deterioration of environmental quality cannot be laid only on industrial activities. Wastes from residential and commercial sources also cause environmental stress. Further, both affluence and poverty also cause pollution in their own ways. Natural calamities, illiteracy, and lack of environmental ethics are also partially responsible. Therefore, skillful and equitable environmental management often requires balancing of a number of factors some of which, at times, may be conflicting with each other.

OBJECTIVES OF ENVIRONMENTAL MANAGEMENT

- (i) Regulating the exploitation of natural resources.
- (ii) Protecting environmental degradation and maintaining environmental quality.
- (iii) Balancing the ecosystem.
- (iv) Preserving the biological diversity.
- (v) Regulation of exploitation of natural resources.
- (vi) Adopting engineered technology without creating adverse effects on environment.
- (vii) Formulation of suitable environmental laws and regulations and effective implementation of the same.

COMPONENTS OF ENVIRONMENTAL MANAGEMENT

The major components of effective environmental management are :

- (i) Control of atmospheric pollution and environmental degradation.
- (ii) Adopting technologies which ensure sustainable development.
- (iii) Conducting environmental impact assessment to review the existing technologies and making it mandatory for clearing major projects of environmental concern.
- (iv) Institute environmental perception among people by conducting awareness programmes.
- (v) Environmental education and training at schools, colleges and universities. The importance of environmental education was highlighted at the Environmental Education Conference (EEC) held at Belgrade in 1975 (called Belgrade Charter) by UNESCO and at Tblisi, U.S.S.R. in 1977 by the United Nations Education Programme (UNEP).
- (vi) Controlling over-population.
- (vii) Controlling over-consumption and craze by inculcating sublime human values such as service to society, non-material enrichment and spiritual solace.

(A) ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

"Environmental Impact Assessment (EIA) is an activity designed to identify and predict the impact on the biogeophysical environment and on human health and well-being of Legislative proposals, policies, programmes, projects, and operational procedures, and to interpret and communicate information about the impacts."

ENVIRONMENTAL IMPACT STATEMENT (EIS)

"EIS is a public document written in a format specified by authorized national, state, and/or Local agencies".

"Environmental Inventory is a description of the environment as it exists in an area where a particular proposed action is being considered".

HISTORICAL BACKGROUND

Whenever a new development project is planned which is likely to affect environmental quality, it is useful to carry out Environmental Impact Assessment (EIA). In many jurisdictions, EIA is mandatory before according permission to proceed with development projects such as power plants, dams, smelters, petrochemical industries, paper industries, iron and steel mills, mining, oil exploration, flood-control systems, etc.

The first comprehensive environmental legislation in the United States came into force on 1st January, 1970, in the form of National Environmental Policy Act (NEPA). The Act contained the following 3 main sections:

- (1) Declaration of National Policy defining the environmental goals to be pursued by the Federal Government.
- (2) Specification for the preparation of Environmental Impact Statement (EIS) on actions which significantly affect the environmental quality.
- (3) Institutionalization of the Environmental Impact Assessment (EIA) in the Executive office of the president through the establishment of the council on Environmental Quality.

In Canada, the environmental assessment and review process started in 1973 for planning decision making and implementation of new projects, programmes and activities with potentially significant environment effects.

Today, the EIA process has been accepted in many industrialized countries including United States, Canada, Japan, Australia, Netherlands, Columbia, India, Thailand, Philippines and even in some African countries like Rwanda, Botswana and Sudan. In India, the Central Ministry of Environment and Forests issued a Notification on 27th January, 1994 making EIA Statutory for 29 specified activities falling under various sectors such as Industries, Mining, Irrigation, Power, Transport, Tourism, etc. This Notification was amended on 4th May, 1994, and the amended version includes a self-explanatory note detailing the procedure for obtaining environmental clearance, technical information, documents required to be submitted at the time of applying for environmental clearance from the Ministry of Environment and Forests (MOEF), so as to enable the submission of complete application for environmental appraisal.

The EIA process, when it started in the early 1970s, laid emphasis on evaluating the adverse/beneficial effects of development projects/activities on Physical factors, particularly those for which codes and standards are available (e.g., air quality, water quality, solid waste disposal), and to incorporate suitable remedial measures at the project formulation stage. After a few years, EIA began to include biological and ecological factors, although they were difficult to quantify. Later on, the scope of EIA was further broadened to include socio-economic factors (e.g., creation of employment opportunities, recreational factors, cultural impacts, etc.) In some cases, EIA process was used to evaluate class actions such as banning a particular pesticide or regulating the lead content of gasoline.

The EIA system has been welcomed, in principle, by many people. However, in practice, some sections of people feel that it is often too technical and it does not deal with the environment in a holistic way.

ELEMENTS OF THE EIA PROCESS

The first step in the Environment Impact Assessment (EIA) process is to determine whether the project under consideration falls within the Jurisdiction of the relevant Acts/Regulations, and if so, whether it is likely to create a significant environmental disruption. If so, an EIA is undertaken and the Environmental Impact Statement (EIS) is prepared. In some countries, the EIS is open to public scrutiny and reviewed at public hearings. Eventually, a political decision is taken so as to whether the development project is (a) accepted or (b) accepted with amendments or (c) an alternative proposal is accepted or (d) rejected.

Participants in EIA process: The following persons/groups/agencies usually are involved in EIA process.

- (1) Proponent : Government or Private Agency which initiates the project.
- (2) Decision Maker : Designated individual or Group or Body.
- (3) Assessor : Individual or Agency responsible for the preparation of EIS.
- (4) Reviewer : Individual/Agency/Board entrusted with the responsibility for reviewing the EIS and assuring compliance with the relevant guidelines/regulations.
- (5) Other Government Agencies having special interest in the project.
- (6) Expert advisers.
- (7) Media and Public at large.
- (8) Special interest groups : Environmental Organisations, Professional Societies, Labour Union, Local Associations.

Contents of EIS : The EIS should contain the following information/ data:

- (1) Description of proposed action and alternatives including that of no action:
It should include details of the construction phase, operation phase and the shut-down phase wherever applicable. Selection of alternatives to the proposed action e.g., different ways of building and operating the project, alternative sites, etc.
- (2) Estimation of the nature and magnitude of the likely environmental effects of the various alternatives proposed: This is mainly done under the following 3 broad categories.
 - (a) Physical factors (e.g., possibility of earthquakes, possible effects on surface and groundwater quality, soil and air quality, etc.).
 - (b) Biological factors (e.g., effects on vegetation, wild life, sport and commercial fish species, endangered species, etc.).
 - (c) Socio-economic factors (e.g., economic, demographic, social values and attitudes).
- (3) Identification of the relevant human concerns.
- (4) Criteria to be used in measuring the significance of environmental changes including the relative weightages to be assigned in comparing different types of changes.
- (5) Estimating the significance of the predicted environmental changes and thereby the impacts of the proposed action.

- (6) Recommendations for acceptance of the Project/Remedial Action/Acceptance of one or more alternatives/rejection of the project.
- (7) Recommendations regarding monitoring procedures to be followed during and after implementation of the project.

Determination as to which environmental changes (including even those which are not covered by laws/regulations) are relevant is critical to the validity and credibility of the EIA process. It is also important to limit the scope of the assessment in time, space, and number of factors in order to enable the usefulness of the EIS document.

When once the factors to be included in EIS have been determined, their future magnitudes must be predicted, though qualitatively. A weighting system may then be devised to enable comparison of different impacts.

One of the single approaches to provide a visual assessment of the effects and magnitudes of the selected factors in EIA is the Leopold matrix (Fig. 11.1). The steps for using the Leopold matrix are given below:

- (i) Identify all such actions that are part of the proposed project and locate them across the top of the matrix (e.g., a, b, c, vide Fig. 20).
- (ii) List the relevant environmental characteristics or conditions down the side of the matrix. (m, n,).
- (iii) Under each of the proposed actions (namely, a, b, ...), place a slash at the intersection with each item on the side of the matrix, if an impact is possible.
- (iv) After completing the matrix, write, in the upper left-hand corner of each box with a slash, a number in the scale of 1 to 10, which indicates the *magnitude* of the possible impact. In the scale of 1 to 10 chosen above, number 10 represents the *greatest magnitude* of impact whereas number 1 represents the least. Before each number so placed, put + if the impact would be beneficial.
- (v) In the lower-right-hand corner of each box with a slash, write a number, in the scale 1 to 10, which indicates the *importance* of the possible impact (e.g., Regional vs. Local). Here also, number 10 represents the *greatest importance* of the impact, while number 1, represents the least importance.
- (vi) The text that accompanies the matrix should provide discussion of the significant impacts, of those columns and rows with large numbers of boxes marked, and of those individual boxes which have larger numbers.

	a	b	c	d	e
m	4 2			7 3	8 5
n	6 1	8 8		+1 +1	9 6
.

Fig. 11.1. Leopold matrix (Leopold et al. 1971)

DESIGN OF EIA

There are several approaches for EIA documented in literature which should be consulted. Further, it will be useful to study Environmental Impact Statements that have been prepared for similar developments/projects. Some of the important aspects that should be considered for the design of an EIA process are listed below :

(A) Project Design and Construction

- (i) Type of project under consideration.
- (ii) Physical dimensions of the area being considered.
- (iii) Whether there is an irretrievable commitment of land ?
- (iv) Whether there will be serious environmental disruptions during construction ?
- (v) Whether the resources will be used optimally ?
- (vi) Whether the project is a critical phase of a larger development ?
- (vii) What are the long-term plans of the proponent ?

(B) Project Operation

- (i) How will the hazardous waste products be handled ?
- (ii) What provisions have been made for training the employees for environmental protection ?
- (iii) What are the contingency plans developed to cope up with the possible accidents ?
- (iv) What plans have been made for environmental monitoring ?
- (v) What provisions have been made to check the safety equipment regularly ?

(C) Site Characteristics

- (i) Whether the terrain is creating problems in predicting groundwater characteristics, air pollution, etc. ?
- (ii) Whether the site is susceptible to floods, earthquakes and other natural disasters ?
- (iii) How many people are likely to be displaced because of the project ?
- (iv) Whether the local environment is conductive for the success of the project ?
- (v) Whether the project will interfere with the movements of fish population and important migratory animals ?
- (vi) What are the main attributes (e.g., protein content, calorie content, weed or pest status, domesticity, carnivorousness, rarity of species, etc.) of the local fauna and flora ?
- (vii) Whether any historic sites or traditional thoroughfares are likely to be endangered because of the project ?

(D) Possible Environmental Impacts

- (i) What are the possible short-term and long-term environmental impacts for this type of projects during construction and after construction ?
- (ii) Who would be effected because of these impacts ?

(E) Socio-Economic Factors

- (i) Who are the expected Gainers and losers by the projects ?
- (ii) Where are the expected trade-offs ?
- (iii) Will the project interfere (blend, increase or reduce) the existing inequalities between occupational, ethnic, sex, and age groups ?
- (iv) Will it effect the patterns of local/regional/national culture ?

(F) Socio-Political Factors

- (i) What are the relevant political factors that have to be considered ?
- (ii) What will be the difficulties in implementation of construction and operation phase of the project ?
- (iii) What are the relevant governmental regulations and procedures ?

(G) Availability of Information and Resources

- (i) Whether local and outside experts are available to consult regarding specific impacts of the project?
- (ii) Whether the relevant guidelines, technical information, and other publications are available to identify and deal with the possible impacts of similar projects?
- (iii) Whether relevant environmental standards, by-laws etc. are considered?
- (iv) Whether the sources of relevant environmental data are identified and whether they are accessible?
- (v) Whether the views of the specialist groups and general public regarding the project have been ascertained and considered?
- (vi) Whether the competent technical manpower available to handle the project and the possible impacts?

When once the magnitude and the significance of the impacts have been determined, the EIA may be considered to be essentially complete. Then follows the political decision as to whether the project be accepted, accepted with alteration or rejected.

The EIA is a potentially useful component of good environmental management. It represents a reconciliation of environmental and socio-economic factors with respect to the proposed development. However, some people still seem to have reservations about this system on the plea that the EIA is expensive, it delays the projects and the predictions are uncertain.

ENVIRONMENTAL AUDIT FOR SUSTAINABLE DEVELOPMENT

Environmental Management is absolutely essential for sustainable development because it minimizes the environmental disturbances and ensures unhampered pace of industrial development and economic growth. Environmental audit is an important tool for environmental management because it enables the environmental Pollution Control Agencies to ensure the compliance with the environmental protection laws. It also motivates the mining and processing industries to demonstrate their concern and greater overall awareness towards their social obligation for environmental protection and to adapt eco-friendly technologies.

Environment Audit is an important management tool comprising of a systematic, periodic, objective and documented evaluation and assessment as to how well the environmental management systems are organised to facilitate control of environmental practices and how well the company policies are complying with regulatory requirements. *Environmental review, environmental surveillance or environmental assurance* are the other synonyms used for environmental audit.

Environmental auditing comprises of the following steps :

- (i) Compiling of all relevant information on environmental management.
- (ii) Evaluation of the information collected.
- (iii) Formulation of conclusions and identification of areas that warrant improvement.
- (iv) Active follow-up of the points raised and recommendations made to achieve the objectives of environmental management.

Environmental auditing may be practised in different organisations having different audit objectives. However the following interrelated characteristics are identified for an effective audit programme :

- (i) Scope
- (ii) Organisation
- (iii) Objectives
- (iv) Resources
- (v) Approach
- (vi) Coverage

Environmental audit may have flexible methodology depending on the type of industry and its situation. Environmental audit should be preceded by well-defined pre-audit activities, on-site visits and post-visit activities, followed by preparation of report and suitable follow-up action plan.

Environmental audit is regarded as a voluntary responsibility of an industry or organisation. The following benefits will be accrued for an industry/organisation that practises environmental audit :

- (1) It helps in assessing whether the existing environmental practices being followed are satisfactory and whether the environmental protection regulations are complied with.
- (2) It provides an opportunity for comprehensive review of environmental policies, management systems, organisations and practices and to assess whether introduction of new innovative practices are necessary to comply with the stringent regulations from time to time.
- (3) It protects against possible penalties, litigations or regulatory risks.
- (4) It contributes its modest share towards sustainable development and gives due credit for environmental management to the Management.
- (5) It provides an up-to-date environmental data base which may be useful in emergencies and also while making decision on plant modifications.

In India, environmental audit system has been introduced for the assessment of development projects on a regular basis. The system envisages submission of an Environmental Audit Report in a prescribed form for the financial year ending 31st March on or before 15th May starting from 1993 to the State Pollution Board by every person carrying on an industry, operation or process requiring approval under the water (Prevention and Control of Pollution) Act, 1974 or the Air (Prevention and Control of Pollution) Act, 1981 or both or an authorization under the Hazardous waste (Management and Handling) Rules, 1989. The report should clearly spell out the steps taken or proposed to be taken for adoption of clean technologies, waste minimization, recycling and reuse, pollution control investment in environmental protection and resource conservation measures taken.

Environmental audit is an effective tool for environmental management and sustainable development. The concept of sustainable development is based on

- (i) Symbiotic relationship between consumer human race and producer natural systems, and
- (ii) Compatibility between ecology and economy.

The principle of sustainable development is basically related to the carrying capacity of the ecosystem. The carrying capacity may be defined as the rate of maximum resource consumption and waste discharge into the environment that can be sustained indefinitely in a defined region with progressively impairing bioproduction and ecological integrity. Thus, "carrying capacity" provides the physical limits to economic development.

United Nations World Commission on Environment and Development defined sustainable development as a new path of progress in which the needs and aspirations of the present generation can be met without compromising the ability of the future generations to meet their own needs and aspirations. Sustainable development is a process in which the exploitation of natural resources, the pattern of investments, and the institutional changes are all made keeping in view of the present as well as future needs of the human race on our planet.

In order to minimize the cost of environmental protection while maintaining the cost of natural resource exploitation within acceptable limits, it is essential to make structural economic changes to raise the levels of ecological and economic efficiency. This involves the following steps :

(1) Resorting to eco-friendly technologies which conserve natural resources, generate least pollution, promote sustainable industrial growth and provide direct economic benefits to society.

(2) Pursuing environmentally compatible areas of economy.

Some examples of such structural changes in different facets of human activity are as follows:

(1) Energy Sector

(a) Rational use of energy

(b) Conservation of energy and (c) harnessing renewable sources of energy.

(2) Agriculture Sector

(a) Development of land-use plans that are compatible with the ecosystem.

(b) Eco-cultivation.

(c) Harnessing modern development in biotechnology and genetic engineering in agricultural practices.

(d) Use of organic manures, and

(e) Use of biopesticides.

(3) Transport Sector

(a) Providing efficient public transport system.

(b) Replacing diesel and petrol with LPG.

(c) Reduction in the specific energy consumption of automobiles.

(d) Convincing people to use private vehicles selectively for long distances and for emergencies.

(e) Encouraging sharing of vehicles among people going to same or nearby destinations.

(f) Proper maintenance of vehicles for high efficiency and less pollution.

(4) Manufacturing Industries

(a) Utilizing highly efficient and eco-friendly technologies with built in waste treatment systems.

(b) Recycling and Reuse of raw materials.

(5) Construction Sector

(a) Use of environmentally compatible building materials.

(b) Efficient use of land, water and energy.

(c) Use of renewable energy sources.

(d) Replacing energy-intensive design with labour intensive designs.

Apart from the above, other measures such as imparting environmental education and environmental consciousness among masses and inculcating the values of non-material enrichment and spiritual solace among people, go a long way in our endeavours to achieve sustainable development.

ECO-LABELLING OF ENVIRONMENT FRIENDLY-PRODUCTS

The scheme of eco-labelling of environment-friendly products provides accreditation and labelling for consumer products which meet certain environmental criteria along with quality requirements of the Indian standards for that product. This scheme was introduced by the

Ministry of Environment and Forests by a resolution dated 20th February, 1991, which was published in the gazette of Indian Extraordinary. According to this, an "environment-friendly product" is defined as any product which is made, used or disposed off in a way that significantly reduced the harm it would otherwise cause to the environment. Such products which meet the stipulated environmental and quality requirements are labelled with "Eco-mark" of the notified design. The major objectives of the scheme are as follows :

- (a) To provide incentive for manufacturers and importers to minimise adverse environmental impact of products.
- (b) To reward genuine initiatives by manufacturers to reduce adverse environmental impact of their products.
- (c) To encourage people to purchase products having less harmful environmental impacts, thereby contributing to their environmental responsibility.
- (d) To contribute towards improvement of quality of the environment and to encourage sustainable resource management.

The Resolution regarding Eco-labelling also provides for the following mechanism for implementation of the scheme :

- (i) A Steering Committee of the Ministry of Environment and Forests to determine the category of products to be covered under this scheme and priority wise criteria to be adopted.
- (ii) A Technical Committee constituted by the Central Pollution Control Board (CPCB) to identify the specific product to be selected and criteria to be adopted, including "inter se" priority between the criteria.
- (iii) The Bureau of Indian Standards (BIS) would assess and certify the products and draw-up a contract with the manufacturers, allowing the use of the label, on payment of a fee.

The scheme also includes launching of countrywide mass awareness campaign to encourage consumers to purchase products having less harmful environmental impacts. The scheme also envisages assistance to consumer organisations for comparative testing of products and dissemination of information to the public. Obviously, the major purpose is to direct the market forces to bring about a change in the manufacturers to produce products that are environmentally more being.

Sixteen consumer product categories have been identified for this purpose in the first phase and the criteria for awarding Eco-mark to products like toilet soaps and detergents have already been notified.

JUDICIAL RESPONSE FOR ENVIRONMENTAL PROTECTION

The judiciary in our country has also been exhibiting exemplary concern and appreciation towards environmental protection and ecological conservation. The Supreme Court of India, in its historical Judgement on 12th March, 1985, in a conflict between environmental conservation and industrial development, observed as follows :

"This is the first case of its kind in the country involving issues relating to environment and ecological balance and the questions arising for consideration are of grave movement and significance not only to the people residing in the Mussorie Hill range forming part of the Himalayas but also in their implications to the Welfare of the generally of people living in the country. It brings into sharp focus the conflict between development and conservation and serves to emphasize the need for reconciling the two in the larger interest of the country."

The consequence of this order made by us would be that most of time stone quarries would be thrown out of business. This would undoubtedly cause hardship to them, but it is a price that has to be paid for protecting and safeguarding ecological balance and for protecting their cattle, homes and agricultural land.

We are conscious that as a result of this order made by us, the workmen employed in the lime stone quarries will be thrown out of employment. We would, therefore, direct that immediate steps shall be taken for reclamation of the areas forming part of such lime stone quarries with the help of the already available Eco-task Force of the Department of Environment, Government of India and the workmen who are thrown out of employment in consequence of this order shall, as far as practicable and in the shortest possible time, be provided employment in the afforestation and soil conservation programmes to be taken up in this area".

In another case, the Rural Litigation and Entitlement Kendra, Dehradun brought to the notice of the Supreme Court that in Doon Valley, the mine owners and lessees were carrying on indiscriminate quarrying of limestone. The mining operations led to deforestation resulting in stripping the landscape base of its Verdant cover. The waste produced due to digging was carried down by rain-water to the villages and the agricultural lands located at lower levels. Some of the naturally formed streams were blocked. Blasting of the lime stone in the mines loosened the rocky structures by shaking the soil, thereby disturbing the entire ecology of the area. It was also apprehended that if the mining continued further, it may lead to dearth of water in the entire belt. The Supreme Court treated the letter received from Rural Litigation and Entitlement Kendra Dehradun as a Writ Petition. After hearing the case, the Supreme Court ordered that all fresh quarrying be stopped. It also directed that some of the quarries be closed down. The District Magistrate and the Superintendent of Police, Dehradun were directed to enforce the order.

In a landmark Judgement issued on July, 1987 (AIR 1987, AP 171), the Andhra Pradesh High Court observed as follows :

"The protection of Environment is not only the duty of the citizen but it is also the obligation of the State and all other State organs including courts. In this context, environment law has succeeded in unshackling man's right to life and personal liberty from the clutches of common law theory of individual ownership. The enjoyment of life and its attainment and fulfillment guaranteed by Article 21 of the Constitution embraces the protection and preservation of nature's gift without which life cannot be enjoyed. There can be no reason why practice of violent extinguishment of life alone should be regarded as violative of Article 21 of the Constitution. The slow poisoning by the polluted atmosphere caused by environmental pollution and spoilation should also be regarded as amounting to violation of Article 21 of the Constitution".

India's activist Judiciary has taken up the task of environmental protection. The Judiciary's concern for protection of the environment and its efforts to ensure prompt action by the Authorities are the remarkable features of Judicial activism in our country. In all such endeavours, the approach of the Judiciary is not that of agitating environmentalists, but that of an objective arbiter. This is how, the Judiciary is keeping a balance between environmental protection on one hand and development on the other.

(B) Environmental Legislations in India

Our country also demonstrated its concern for pollution control and environmental protection by enacting several legislations and constituting Statutory Bodies dedicated for this cause. A list of Environment related legislations is given in Table 11.1

Table 11.1: Select list of Environment Related Legislations in India.

A. Central Enactments

1. **Air Pollution**
 - (a) The Indian Boilers' Act, 1923
 - (b) The Factories Act, 1948
 - (c) The Mines and Minerals (Regulation and Development) Act, 1947
 - (d) The Industries (Development and Regulation) Act, 1951
 - (e) The Air (Prevention and Control of Pollution) Act, 1981, amended in 1987.
2. **Water Pollution**
 - (a) The River Boards Act, 1956
 - (b) The Merchant Shipping (Amendment) Act, 1970
 - (c) The Water (Prevention and Control of Pollution) Act, 1974 amended in 1988
 - (d) The Water (Prevention and Control of Pollution) cess Act, 1977 amended in 1991
3. **Pesticides**
 - (a) The Factories Act, 1948
 - (b) The Insecticides Act, 1968
 - (c) The Poison Act, 1991
4. **Radiation**
 - (a) The Atomic Energy Act, 1962
 - (b) Radiation Protection Rules, Act, 1972
5. **Forests, Fisheries and Others**
 - (a) The Indian Fisheries Act, 1897
 - (b) The Indian Forest Act, 1927
 - (c) The Prevention of Food Adulteration Act, 1954
 - (d) The Ancient Monuments and Archaeological sites and Remains Act, 1958
 - (e) The Wild Life (Protection) Act, 1972, amended in 1983, 1986 and 1991
 - (f) The Urban Land (Ceiling & Regulation) Act, 1976
 - (g) The Forest Conservation Act, 1980, amended in 1988
6. **Comprehensive Environment Protection**
The Environment (Protection) Act, 1986

B. State Enactments

1. **Smoke Control**
 - (a) The Bengal Smoke Nuisance Act, 1905
 - (b) The Bombay Smoke Nuisance Act, 1912
 - (c) The Gujarat Smoke Nuisance Act, 1963
2. **Water Pollution**
 - (a) Orissa River Pollution Prevention Act, 1953
 - (b) Maharashtra Prevention of Water Pollution Act, 1969
3. **Land Use**
 - (a) The Bihar Waste Land (Reclamation, Cultivation and Improvement) Act, 1946
 - (b) The Andhra Pradesh Improvement Scheme Act, 1949
 - (c) The Acquisition of Land for Flood Control and Prevention of Erosion Act, 1955
 - (d) The Delhi Restriction of uses of Land Act, 1964
4. **Pest Control**

- (a) The Mysore Destructive Insects and Pests Act, 1917
- (b) The Andhra Pradesh Agricultural Pests and Disease Act, 1919
- (c) The U.P. Agricultural Disease and Pests Act, 1954
- (d) The Assam Agricultural Pests and Disease Act, 1954
- (e) The Kerala Agricultural Pests and Disease Act, 1958

SALIENT FEATURES OF SOME IMPORTANT LAWS

(1) The Wild Life Protection Act, 1972 (Amended In 1983, 1986 and 1991)

This was enacted for providing protection to wild animals and birds. The Act also provides for the constitution of a Wild Life Advisory Board, appointment of Chief Wild Life Warden, Wild Life Wardens and other employees by the State Governments for the protection of Wild Life. Regulation of hunting of wild animals and birds, laying down the procedures for declaring areas as sanctuaries, national parks and biosphere reserves, and regulation of trade in wild animals were also provided by the Act. List of endangered species, which is revised from time to time, is also included in the schedule of the Act.

As per the provisions of this Act, no one is permitted to hunt any wild animal, except Vermin, without a licence from the chief Wild Life Warden. A record of Wild Life animals hunted or captured has to be maintained. A special permit may be granted to hunt a wild life animal for education, scientific research, scientific management and collection of specimens for Zoological gardens, museums, etc. The Act provides for the establishment of sanctuaries, national parks, game reserves, and closed areas.

All wild life animals are the property of the Government. Trade or Commerce in wild animals and animal articles and trophies is strictly regulated. No person can cook or serve meat of wild animals in any eating house without a licence. Penalties for violating the provisions of the Act have also been laid down in the Act.

(2) The Forest Conservation Act, 1980 (Amended In 1988)

As per this Act, no forest land or any portion thereof may be used for any non-forest purposes without the prior permission of the central Government. The Act has been amended in 1988 for incorporating more stringent penal provisions against violators of the Act. The scope of the definition of "non-forest purpose" was extended to include cultivation of tea, coffee, rubber, palms, oil-bearing plants, horticultural crops and medicinal plants. No State Government or other authority may issue order directing that any forest land or any portion thereof may be assigned by way of lease or otherwise to any private person or to any authority, corporation, agency or any other organisation not owned, managed or controlled by Government without prior approval of Central Government.

(3) The Water (Prevention and Control of Pollution) Act, 1974 (Amended In 1988)

This Act provides for the prevention and control of water pollution and for maintaining or resorting of wholesomeness of water. The Act stipulates establishment of the central and State Boards for this purpose, and also stipulates how these Boards are to be constituted.

The Act defines terms like pollution, sewage effluent, trade effluent, stream and boards. The Act also assigns the functions to be carried out by the Central and State Boards.

The Water Boards have power to obtain information, to take samples of effluents from any industry/establishment and to make survey of any area and gauge and keep record of the flow or volume and other characteristics of any stream or well.

A person empowered by the Board has the right to enter, and inspect any place and examine any plant, record register, document or any other material object, or for conducting a search of any place where he has reason to believe that no offence of water pollution is committed. The Board has wide powers to prohibit the use of any stream or well for discharging any pollutant in it. The Board has powers to restructure the outlets for dumping pollutants.

The Act prohibits disposal of any poisonous, noxious or polluting matter or any matter causing obstruction to the proper flow of water in a stream. However, dumping of any material into a stream for the purpose of reclamation of land is not considered an offence.

The Act provides for severe and deterrent punishments for violation of the Act which includes fine and imprisonment.

(4) The Water (Prevention and Control of Pollution) Cess Act, 1977 (Amended in 1991)

This Act empowers the Central Water Board to collect cess on water consumed by persons carrying on certain scheduled industries and by local Authorities responding for supplying water. The cess and the consent fees form the major sources of revenue to run the central and State Water Boards. The Act has been amended in 1991 with a view to augment the resources of the Boards by removing the lacunae in the Act and to provide rebate to the Industries for complying with the consumption and effluent quality standard.

(5) Air (Prevention and Control of Pollution) Act, 1981 (Amended in 1987)

This Act was passed under Article 253 of the Constitution of India and in pursuance of decisions of Stockholm Conference. The objective of this Act is to provide for the prevention, control and abatement of air pollution in order to preserve the quality of air.

The Act defines relevant terms such as air pollution, air pollutant, automobile, industrial plant, etc.

Air pollution is defined as the "presence of any liquid or gaseous substances 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".

All sources of pollution such as automobiles, diesel vehicles, industries, transport, railways and domestic fuels.

The Central and State Water Boards have been entrusted with the task of controlling and preventing air pollution and accordingly they have been redesignated as Central Pollution Control Board and State Pollution Control Board respectively. The functions of these Boards were clearly defined.

The Act provides the declaration of certain heavily polluted areas as "Air Pollution Control Area" and no industrial plant shall be operated in these areas without prior consent of the State Pollution Control Board.

The State Boards have to pay down and enforce standards for prevention and control of air pollution. The State Government in consultation with the respective Board may give instructions to the concerned Authority in charge of Registrations under the Motor Vehicles Act 1939, to ensure emission standards from automobiles. Failure to comply with the conditions prescribed for this purpose is punishable with fine and imprisonment.

The State Boards have powers to sue a polluter in a court of law to prevent him from polluting the air, and the expenses incurred by the Board for doing so will be recovered from the polluter. Further, the Boards have powers to authorize any person to enter and inspect the premises of the polluter and to collect samples of emissions from Chimneys, flues, ducts or any other outlets for analysis of the pollutants.

The Act has been amended comprehensively in 1987 to render it more effective and to include "noise" also under the definition of air pollutants.

(6) The Environment (Protection) Act, 1986

The Environment (Protection) Act, 1986 was enacted as per the spirit of the Stockholm Conference held in June, 1972 to take appropriate steps for the protection and improvement to prevent hazards to human beings, living creatures and property. This is a landmark legislation to provide a single focus in the country for the protection of environment and to plug the loopholes in the earlier laws.

This Act ensures enforcement of several Acts/Regulations concerning pollution control and environmental protection/safety. This Act confers powers to the Central Government to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution. It empowers the Central Government to issue directions (a) for the closure, prohibition or regulation of any industry, operation and process and (b) for the stoppage or regulation of the supply of water, power or any other service, even without obtaining court orders.

The Act also empowers the Central Government to make rules for the first time for the (i) Standard of quality of air, water and soil for various areas and for various purposes (ii) Maximum permissible limits of concentration for various environmental pollutants (including noise) for different areas (iii) procedures and safeguards for handling of hazardous substances (iv) prohibition and restrictions on the location of industries and carrying out processes and operations in different areas (v) Procedures and safeguards for prevention of accidents which may cause environmental pollution and (vi) providing for remedial measures in case of accidents.

It is mandatory for persons carrying on any industry, operation etc. not to allow emission or discharge of environmental pollutants over and above the limits stipulated by the relevant standards. The Act provides for stringent penalties for defaulters. Any person can make a complaint of violation of provisions of the Act to the Central Government or Authority or Officer authorized for this purpose.

(C) Environmental Management System (EMS) Standard – ISO 14000 Series

The preparatory work on the first international standards on environmental management systems was undertaken by the International Organisations for Standardisation (ISO). These norms come under the ISO 14000 series. The major objectives of these series is "to promote more effective and efficient environmental management in organisations and to provide useful and usable tools — ones that are cost-effective, system-based, flexible for gathering, interpreting and communicating environmentally relevant information". The intended end-result is the improvement of environmental performance.

ISO 14000 series of standards represents an opportunity for industrial organisations and enterprises in developing countries for technology transfer.

Further, it offers a source of guidance for introducing and adopting environmental management systems based on the best universal practices, in the same way that the ISO 9000 series on quality management systems, which is now widely applied, represents a tool for technology transfer of the best available quality management practices.

The subjects covered under the various ISO numbers are given below :

<i>ISO Number Range</i>	<i>Subject</i>
ISO 1400 - 1409	— Environmental Management Systems
ISO 14010 - 14019	— Environmental Auditing
ISO 14020 - 14029	— Environmental Labelling
ISO 14030 - 14039	— Environmental Performance Evaluation
ISO 14040 - 14049	— Life Cycle Assessment
ISO 14050 - 14059	— Terms and Definitions
ISO 14060	— Environmental Aspects in Product Standards

The basic standard in this series is ISO 14001 Environmental Management Systems—specification with guidelines for use. It contains the requirements of a sound environmental management system, in the same way that ISO 9001 contains the requirements of a sound quality management system.

The ISO 14001 standard is applicable to any organisation (e.g., a public or private enterprise, company, firm, institution or operational unit within an organisation) aiming at

- (a) Implementing, maintaining and improving an environmental management system.
- (b) Ensuring its conformance with its stated environmental policy.
- (c) Demonstrating such conformance to others, either through an independent, third party certification or registrations of its environmental management system or a self-declaration or conformance with the standard.

ISO 9000 series on quality management system is focussed mainly on ensuring customer satisfaction and specifies 20 requirements in ISO 9001 to achieve this objective. Similarly, ISO 14000 series on environmental management systems addresses the needs of a wide cross-section of people in the society to protect the environment and for this purpose the following key requirements were specified under ISO 14000:

(I) Environment Policy

(2) Planning

- (2.1) Environmental aspects
- (2.2) Legal and other requirements
- (2.3) Objectives and targets
- (2.4) Environmental management programmes

(3) Implementation and Operation

- (3.1) Structure and Responsibility
- (3.2) Training, Awareness and Competence
- (3.3) Communication
- (3.4) Environmental Management System Documentation

(3.5) Document Control

(3.6) Operational Control

(3.7) Emergency preparedness and response

(4) Checking and corrective action

(4.1) Monitoring and Measurement

(4.2) Non-conformance and corrective and preventive action

(4.3) Records

(4.4) Environment Management System Audit

(5) Management Review

ISO 14001 exemplifies each of the above requirements giving details of what should be done but not on how it should be done. for instance, under 2.3 (objectives and targets), it states as follows:

"The organisation shall establish and maintain documented environmental objectives and targets, at each relevant function and level within the organisation.

The objective and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution.

When establishing and reviewing its objectives, an organisation shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties.

Adoption of ISO 14000 series of Environmental Management Standards by any organisation/company is voluntary. However, exporters from developing countries are already subjected to pressure from buyers in industrialized countries who are insisting on ISO 1400 certification for the products being exported. However, ISO 14000 should not be considered only as an export requirement but as a practical demonstration of environmental concern of an organisation. thus, the overall aim of the ISO 14000 environmental management standards is to support environmental protection in balance with socio-economic needs.

QUESTIONS

1. Discuss the objectives of environmental management system.