

Department of Zoology
Dr.BRR Government College
Jadcherla

Student Study Project

On

**“A Report on the Environment
Pollution – Causes- Remedies”.**

Academic Year 2021-22

Dr. BRR GOVERNMENT DEGREE COLLEGE

JADCHERLA- 509301

(Accredited with B⁺⁺ by NAAC)

Dr.CH.AppiyaChinnamma, M.Sc., Ph.D.

Principal

The department of Zoology has conducted student study projects during the academic year 2021-22

Title: "A Report on the Environment Pollution – Causes- Remedies".

Place of Work: Dr.BRR Government Degree College Jadcherla T.S

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Student Study Project Certificate

CERTIFICATE

This to certify that, the project work Title: "A Report on the Environment Pollution – Causes-Remedies" is a bonafide work done by Amina, Ayesha begum, Saniya begum, Javeriya amber, A.Malleshwari, M. Mounika, Y. Pavani, the students of B.Sc (BZC) IV semester under my supervision in Zoology at the Department of Zoology Dr.BRR Government Degree College Jadcherla during the academic year 2021-22 and the work has not been submitted to any other college or university either part or full for the award of any degree.

Place:

Jadcherla.

Date:

31/12/2022

K. Neeraja

Asst, Prof, of Zoology

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Objectives:

To Promote interest in research aptitude among students

To promote the concept of Sustainable Environment

To preserve the natural composition of Environment

To know the role of Humans in causing Pollution

ABSTRACT

Pollution is an undesirable change in the physical and biological operations of our air, land and water. They may be or will be harmful to human life, living condition and culture assets or deteriorate our material resources. During the last few decades, the global environment has gone through serious challenges and changes. Population pressure has escaped rapidly consequently resources have dwindled. Scientific developments have been a growing concern about the links between the health and environment and worldwide industrial, land and resources management practices. Today there is a growing concern for global scale environmental degradation brought by combinations of all people on earth. The present study is conducted From July 2021 to December 2021 to collect the information related to Environment and its degradation in its composition. Data is collected from various sources of internet and compiled. A report on Environmental Pollution is submitted to the Department of Zoology Dr.BRR Government Degree College Jadcherla.

Key Words: Environment, Sustainability, Pollution, Pollutants

Introduction:

The systematic pollution of our environment is one of the biggest hazard that humanity faces today. People are becoming increasingly aware of the threat posed by pollution and governments are enacting legislations aimed at protecting the environment. Human being can be exposed to pollutant in many ways through the air they breathe, the water they drink, the food they eat and the cosmetics, drugs and other products they use. The continuing discovery of previously unsuspected hazards from various chemicals and other substances underscore the point. The environmental and human health effect of even those substances identified for priority consideration. Manufacturing plants, agriculture production and other sources release pollutants into the air, water and soil, pollutants are intentionally moved away through the management of waste including residues removed from the air and water by pollution control equipment. Pollutants also move among the media by changing into more, or less hazardous substances as they move through environment. They may accumulate in sinks for long period of time and people often are exposed to the same pollutant through the one medium by breathing air, drinking water, eating food or absorbing it through skin. Generally new industrial plants reduce less waste than older ones. One report estimates that new factories cut the amount of hazardous waste to half. Dilution which increases the volume of waste, is now more common than segregations.

Firms dilute waste to lower pollutants concentration for discharge into a sewage treatment plant or directly into air or water, or to inject them more easily into deep wells. To save money, small electroplating firms after mix their organic waste with those containing metals and cyanide before dumping them in the sewer rather than treating them independently. The sewage treatment plant can degrade the organic waste but the metal of cyanide accumulates in the plants sludge. A cross media approach designed to avoid this problem might require the discharger to segregate and treat separately the heavy metals and cyanide to prevent their release. Once wastes are segregated, they are easy to recycle or treat. As a better understanding of nature and extent of Cross media problem is gained, society will also find better ways to improve both the effectiveness and efficiency of pollution control policies. Man is the main agent for polluting the environment Nature can cope with certain degree of pollution because it has its own cleaning agents. . Our air, water and land has been polluted. On the whole we can say the survival of living organism is in danger. All the external conditions that affect the life of organisms in their natural habitats aggregates to form the environment of the surrounding of an organism. The environment is made up of three main constituents: atmosphere; lithosphere and

hydrosphere. A change in one or more components of the environment affects the environment as a whole as well as its constituent organisms. Nature has provided the basic ingredients for living in abundance and whatever is used up during normal course of living is recaptured through natural cycle. Any effort to disturb this process is termed as Environment pollution.

Environmental pollution is the result of increased production of waste products by the industries, rapid urbanization, wanting and irresponsible. Harnessing of the natural resources as well as unplanned sewage and waste disposal from industries and cities etc.

(Thus presence of any environment pollutant called environment pollution.)

Material Methods:

A Team of seven students studying in 2nd year B.Sc have grouped together to collect the data related to the Environmental Pollution from various sources of Internet platform. The collected data is carefully studied and analysed to find out the causes of pollutions such as consequences of population growth, Radioactivity Anthropogenic activities etc,

A Report

According to Environment Protection Act 1986.

“Environment” includes water, air and land and the interrelationship which exist among and between water, air and land and human being, other living creatures, plant, micro-organism and property.

The term environment refers to the sum total of all conditions which surround man. Man is the part of environment and he cannot be isolated. From the beginning of man is using the environment for his comfort. In the past the use of this environment was so limited that does not affect environmental balance.

But when man started progress he overused the environment. Due to greediness he has exploited their environment, which gave birth to several environment implication on the name of progress he has cut the forest, our lakes has been poisoned with hazard chemical.

The environment has been classified into:

(i) Physical or abiotic environment:

It is composed of external physical factors like temperature, humidity, water, minerals and gases etc., and

(ii) Living or biotic environment:

It is composed of all the living components- plants, animals and micro-organisms. All these constituents of environment are referred to as the environmental factors or ecological factors or simply as factors.

A factor is defined as an ecological condition which directly or indirectly affects the growth and development and hence the life of an organisms. These biotic and abiotic components are in a dynamic state i.e. they constantly affect each other and cannot be isolated from each other.

Besides the abiotic and biotic components, ecosystem is a natural unit of living community (plants and animals) and non-living environment. The biotic and abiotic community are constantly interacting and exchanging materials and energy between themselves.

The life in an ecosystem depends upon the environment which provides energy in the form of sunlight and nutrients for the living components of the ecosystem. Waste matter and energy produced by human beings through, their irresponsible and wanting activities cause disturbance in the natural environment or is the ecosystem is called environment pollution.

In a homeostatic ecosystem there is a balance between the living organisms and the environment. Disturbance in any component of the environment is likely to have a harmful effect on the ecosystem. Any change in the environment which contributes to its deterioration is called pollution of the environment and the agent which causes the pollution is called the pollutant.

This change in the physical, chemical or biological characteristics of our physical environment (air, water and land) is undesirable and harms human life, other living organisms and cultural assets. The resulting impact on the environment has been so massive with far-reaching consequences that the very existence of life is threatened.

* Factors Affecting Environmental Pollution:

Some of the factors which are affecting environment and causes pollution are described below:

i. Consequences of Population Growth:

Population growth is one of the prominent factors that affect the degradation of the environment. Earlier, pestilence and famine kept the population under control, but with the development of chemical compounds to restore and enhance the soil fertility, and with reduction in the death rate, there has been an explosive growth in population with inevitable consequences.

This dramatic growth coupled with the development of cheap sources of energy like coal, petroleum, natural gas etc., and industrial revolution has posed a grave threat to the environment because earth is a finite system in which any further increase will be restricted by environmental constraints.

Pollution increases not only because the people multiply and the space available to each person becomes smaller but also because the demands per person are continuously increasing and each throws away more and more every year. Pollutants are the residues of the things we make, use and throw away.

An intimate relationship is found between human number (population) and environment. The impact of any human group in environment can be conceptually resolved into three factors; Pollution, Affluence i.e. material aspects of per capita consumption of goods and resources and technology of production.

Using appropriate indices these factors can be incorporated into an environmental impact equation as under:

Impact = Population X Affluence X Technology

(or)

$I=PAT$

Of the factors responsible for environmental crisis, the increasing population growth is considered to be a key factor.

ii. Pollution of Indian Lakes:

Among the surface water bodies, lakes and reservoirs are considered to be most valuable water resources. These surface water bodies are currently under serious pollution threat not only in India but also globally considered to be an important issue.

Over past couple of decades national and international programmes on lake water quality assessment and their management in the perspective of conservation were attempted.

As a result, considerable biotic changes along with loss of productivity is noticed

The activities covered under NLCP include:

- a. Prevention of pollution from point sources by intercepting, diverting and treating the pollution loads entering the lake;
- b. In situ measures of lake cleaning such as desalting, de-weeding, bioremediation, constructed wetland approach etc. depending upon the site conditions;
- c. Catchment area treatment and lake front eco-development which may include bonding, fencing, shoreline development, creation of facilities for public recreation and entertainment and public area;
- d. Public awareness and public participation;
- e. Other activities depend upon location-specific conditions including the interface with human population.

iii. Pollutants:

According to "The Indian Environment Protection Act 1980" a pollutant has been defined as any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to environment.

Any substance present in the environment in such concentration which adversely effects the environment by damaging the growth rate of a species and by interfering with the food chains, and affects the health, comfort and property etc. is considered as a pollutant.

Smoke from industries and automobiles, domestic and commercial sewage, radioactive substances from nuclear plants and discarded household articles (tins, bottles, broken crockery etc.) come under the category of pollutants.

Classification of Pollutants:

The classification of pollutants is done from different points of view.

Depending upon their existence in nature pollutants are of two types, namely:

- (i) Quantitative and
- (ii) Qualitative pollutants.

(i) Quantitative Pollutants:

These are those substances normally occurring in the environment, who acquire the status of a pollutant when their concentration gets increased due to the un-mindful activities of man. For example, carbon dioxide, if present in the atmosphere in concentration greater than normal due to automobiles and industries, causes measurable effects on humans, animals, plants or property, then it is classified as a quantitative pollutant.

(ii) Qualitative Pollutant:

These are those substances which do not normally occur in nature but are added by man, for example, insecticides. Depending upon the form in which they persist after being released into the environment, the pollutants are categorized into two types, namely (a) primary and (b) secondary pollutants.

(a) Primary Pollutants:

These are those which are emitted directly from the source and persist in the form in which they were added to the environment. Typical examples of pollutants included under this category are ash, smoke, fumes, dust, nitric oxide, sulphur dioxide, hydrocarbons etc.

(b) Secondary Pollutants:

These are those which are formed from the primary pollutants by chemical interaction with some constituent present in the atmosphere.

Examples are:

Sulphur trioxide, nitrogen dioxide, aldehydes, ketones, ozone etc. Nitrogen oxides and hydrocarbons are two primary pollutants released from automobiles but in the presence of sunlight, they react to form peroxyacyl nitrate (PAN) and ozone, two secondary pollutants which are far more toxic than the primary pollutants from which they are derived.

This phenomenon of increased toxicity by chemical interaction among the pollutants is known as Synergism.

From the ecosystem point of view, i.e., according to their natural disposal, pollutants are of two types:

(i) Bio-degradable Pollutants:

These are the pollutants that are quickly degraded by natural means. Heat or thermal pollution, and domestic sewage are considered in this category as these can be rapidly decomposed by natural processes or by engineered systems such as municipal treatment, plants etc.

(ii) Non-degradable Pollutants:

These are the substances that either do not degrade or degrade very slowly in the natural environment. These include mercury salts, long chain phenolic chemicals, DDT and Aluminium cans etc.

Such non-degradable pollutants accumulate and are biologically magnified as they move in the biogeochemical cycle and along food chains in the ecosystem. For example, DDT, when washed from the ground goes to the streams where it is absorbed by the phytoplankton's which are eaten by the fishes.

So, the initial dose of DDT which was harmless in the phytoplankton become very harmful as it accumulates in the fish day by day, with the result that large populations of fish die or become sterile and same is the case with the birds feeding on such fishes. This phenomenon is known as bio-magnification or biological magnification.

*** Types of Environmental Pollution:**

Pollution is of five mains types:

(a) Atmospheric or Air pollution

(b) Water pollution

(c) Land and soil pollution

(d) Noise pollution

(e) Radioactive pollution

(a) Atmospheric or Air Pollution:

It is an atmospheric condition in which certain substances (including the normal constituents in excess) are present in concentrations which can cause undesirable effects on man and his environment. These substances include gases, particulate matter, radioactive substances etc.

Gaseous pollutants include oxides of sulphur (mostly SO_2 , SO_3) oxides of nitrogen (mostly NO and NO_2 or NO_x), carbon monoxide (CO), volatile organic compounds (mostly hydrocarbons) etc. Particulate pollutants include smoke, dust, soot, fumes, aerosols, liquid droplets, pollen grains etc. Radioactive pollutants include radon-222, iodine-131, strontium 90, plutonium-239 etc

(b) Water Pollution:

Water is one of the most important biological components that sustain life. Its great solvent power makes the creation of absolute pure water a theoretical rather than a practical goal. Human population has the habit of dumping their wastes into water. This has the effect of diluting the waste and getting it dispersed if it is a running water system.

The term "water quality" is infinitely related to water pollution. The water is said to be polluted when it has more "negative" qualities than "positive" ones. Water quality refers to the physical, chemical and biological characteristics of water. Thus, in simple words, we can say that polluted water is that water which has been abused, defiled in some way, so that it is no longer fit for use.

Water pollution can be defined as **"the presence of too much of undesirable substances in water which tend to degrade the quality of water's physical, chemical and biological characteristics, making it unsuitable for beneficial use"**

(c) Land and Soil Pollution:

Soil is the loose mineral material and is the most important component of the earth's surface (lithosphere). It is the growth medium for many microbes, plants and animals. The formation of soil is the result of chemical, physical and biological weathering.

Like air and water, soil is also subjected to pollution. Soil contains many microbes.

(d) Noise Pollution:

We hear various types of sounds every day. Sound is mechanical energy from a vibrating source. A type of sound may be pleasant to someone and at the same time unpleasant to others. The unpleasant and unwanted sound is called noise.

Sound can propagate through a medium like air, liquid or solid. Sound wave is a pressure perturbation in the medium through which sound travels. Sound pressure alternately causes compression and rarefaction. The number of compressions and rarefactions of the molecules of the medium (for example air) in a unit time is described as frequency. It is expressed in Hertz (Hz) and is equal to the number of cycles per second.

There is a wide range of sound pressures, which encounter human ear. Increase in sound pressure does not invoke linear response of human ear. A meaningful logarithmic scale has been devised. The noise measurements are expressed as Sound Pressure Level (SPL) which is logarithmic ratio of the sound pressure to a reference pressure.

(e) Radioactive Pollution:

The elements such as uranium, thorium etc. having unstable nuclei emit radiations such as alpha, beta and gamma in nature to acquire stability. These elements are called radioactive elements.

Some ordinary elements like zinc, calcium, chlorine etc. can be converted into radioactive by bombardment with neutron or other particles. This bombardment is called disintegration and the disintegration rate is measured in curie (Ci) named on the discoverer, of radioactive elements.

$$1 \text{ curie} = 3.7 \times 10^{10} \text{ disintegrations/sec.}$$

*** Sources of Environmental Pollution:**

There are two main sources of environmental pollution:

- i. Natural sources, and
- ii. Man made or Anthropogenic sources.

Natural Sources of Environmental Pollution:

- (a) Volcanic eruptions release gases and volcanic ash.

(b) Forest fires produce smoke and trace gases.

(c) Dust storms increase the wind-blown dust into the environment.

(d) Bacteria, spores, cysts and pollens are all natural pollutants.

(e) Decay of organic matter in marshy places releases marsh gas (methane— CH_4) which is a light, colourless, inflammable hydrocarbon

Man-Made or Anthropogenic Sources of Environmental Pollution:

Anthropogenic source covers a wide spectrum of types as man has aggravated the problem of pollution by his innumerable activities like,

1. Domestic sources

2. Industries

3. Agriculture activities

4. Radioactive waste

5. Thermal power stations

(a) Industrialisation

(b) Invention of automobiles

(c) Over population

(d) Deforestation: Destruction of natural habitat

(e) Nuclear explosions

(f) Over-exploitation of natural resources

(g) Construction of buildings, roads and dams

(h) Explosives used in wars

(i) Use of fertilizers and pesticides

(j) Quarrying and mining.

Effect of Pollution on the Environment:

The term "environment" refers to the immediate surroundings in which man lives. It comprises of living and non-living constituents that support life and sustain various human activities. Pollution affects both the living as well as the non-living components of the environment.

It brings about drastic changes in the physical environment causing community wide problems by polluting the air, water and land; adversely affecting the health of humans and animals, and damaging plants and property. Besides there are effects of noise pollution and the hazards associated with radiation pollution.

As environmental stress on the human body increases, many medical scientists fear a terminal increase in infectious disorders not only because of lower body resistance but because viruses and other disease organisms will increasingly slip through water treatment and food processing plants as the quality of water and food at the intake deteriorates.

Effect on plants, the adverse effects range from reduction in growth rate to death of the plant. The damage caused to plants by pollution includes necrosis (dead areas on a leaf structure), chlorosis (loss or reduction of chlorophyll leading to yellowing of leaf), epinasty (downward curvature of the leaf due to higher rate of growth on the upper surface) and abscission of leaves (premature fall). Pollution also causes deterioration of structural materials such as marble and lime stone.

Pollution has been changed the atmospheric conditions. An average temperature has been increased due to increase in pollution. Effects of pollution at international level are depletion of ozone layer, global warming acid rain, rising sea level etc.

Environmental Protection and Control of Pollution:

Over population and pollution are potent ecological forces impinging upon man by affecting the quality of the environment. All efforts aimed at bringing more and more people above the poverty line actually increase the pressure on natural resources.

Careless management of natural resources is disrupting the ecological processes so much so that earth's life supporting capacity is being substantially threatened. Unmindful exploitation of the finite resources of the biosphere has a severe ecological backlash because no development is sustainable unless it is environmentally compatible.

Environmental compatibility demands that the economic and social development should be linked with environmental management.

Articles 48.A and 51.A of our constitution provide for environmental protection.

According to the National Committee of Environment-Planning and Co-ordination (NCEPC), the frame work for environmental protection aims at:

- i. Control of environmental pollution
- ii. Conservation of natural resources
- iii. Land management
- iv. Development of non-polluting sources of energy
- v. Environmental education
- vi. Environmental laws.

Pollution is the burning of the day at the global level. A combined effort to control pollution has to be made by all government agencies, technologists, industrialists, agriculturists and last but not the least the common man.

An international conference on "**Human Environments**" was held at Stockholm in 1971, to emphasise the need to control pollution. Several measures were recommended by the scientists participating in the conference, e.g..

- i. The first step should be to identify those causes of pollution that have global implications, and to devise protective measures to be adopted.
- ii. The second step should be to find out the carrying capacity of the environment and reduce the emission of the major sources of pollution.
- iii. The third step should be to find a neutralizer for each type of pollutant.
- iv. The fourth step should be to ensure that anti-pollution measures are adopted by all industries.
- v. The fifth step should be the identification of areas where the cause of pollution is poverty and lack of environmental education. Contamination of food and water are the basic causes of pollution in such areas.

vi. Most important is initiation of adequate research to devise measures for controlling pollution.

Environmental monitoring is urgently required for controlling pollution.

This involves:

- i. Careful scrutinization of the environmental characteristics.
- ii. Laying down the standards of environmental quality.
- iii. Regular assessment of the above mentioned environmental characteristics.
- iv. Keeping track of the changes in the environmental characteristics and educating people about the changes due to these changes.
- v. Devising measures to combat the menace of pollution.
- vi. Enacting environmental laws and taking legal action against environmental offenders.

Efforts are required to be made by each individual to control pollution.

These efforts include:

- i. Installation of proper sewage disposal methods.
- ii. Dumping of non-biodegradable wastes in low lying areas.
- iii. Installation of gohar gas plants in areas of high availability of cow dung.
- iv. Reduction of smoke emission and treatment of chimney smoke to remove solid carbon particles.
- v. Judicious use of fertilisers, pesticides and detergents (Detergents of low-level phosphate content are less harmful).
- vi. Growing plants like *Pyrus* (apple), *Pinus* (chir) and *Vitis* (grapes) is advocated because of their capability of metabolizing gaseous nitrogenous pollutants like nitrogen dioxide etc. and plants like *coleus*, *ficus* (banyan) can fix Carbon monoxide.

Skilled personnel with know-how to tackle the problems arising from pollution and for devising environmental pollution control measures are working in many institutions in India.

Important ones amongst them are:

- i. National Environmental Engineering Research Institute (NEERI), Nagpur.
- ii. Bhabha Atomic Research Centre (BARC), Mumbai.
- iii. National Committee of Environmental Planning and Co-ordination (NCEPC), New Delhi.
- iv. Central Drug Research Institute (CDRI), Lucknow.
- v. Council of Scientific and Industrial Research (CSIR).
- vi. Central Public Health Engineering Research Institute (CPHERI), Nagpur.

Scientists have rightly said that, 'in the course of our progress from one age to another, we have simply passed from a savage sewage'. What is important in the query – 'Will there be any salvage'?

Factors Causing Pollution:

- (i) Over population: Pollution increases with the population density. As the population increases more burden is placed on the environment.
- (ii) Urbanization: Shifting of population from rural to urban. A thickly populated area is the home of large number of vehicles reservoir solid and liquid wastes with poor sanitary conditions and many problems.
- (iii) Industrialisation: Power generation, Vehicular.
- (iv) Per capita income: Standard of living, goods and services demanded per person increased.
- (v) Extent of recycling: Waste product is cleaned and reused pollution level is decreased.
- (vi) Technology: Efficient Engines provides less in pollution/wastes.
- (vii) Waste treatment: Cleaning of air and water.
- (viii) Ionic
- (ix) Deforestation

- (x) Water depletion
- (xi) Refrigeration
- (xii) Aerosol
- (xiii) Radioactivity
- (xiv) Volcanic eruption
- (xv) Strong wind
- (xvi) Forest fire
- (xvii) Vibration

Effects of Pollution on Human Health:

Air pollution can cause death, impairment of health, reduce visibility, bring about vast economic losses and contribute to the general deterioration. It can also cause intangible losses to historical monuments.

Minor symptoms include headaches, mucosal irritation (eye, nose, throat or respiratory discomfort). Severe reaction can include nausea or asphyxiation and prolong exposure can lead to various system effects of toxic poisoning or to cancer of the lungs or other organs.

- i. Odour nuisance
- ii. Increase in mortality rate
- iii. Increase in morbidity rate
- iv. Asthmatic attack
- v. Bronchitis
- vi. Cardio vascular diseases
- vii. Pulmonary diseases
- viii. Fluorosis
- ix. Mottling of fat

x. Silicosis, asbestosis.

Policy Statement of Abatement of Environmental Pollution:

i. Preamble:

The commitment of Government on abatement of pollution for preventing deterioration of the environment is stated here. The policy elements seek to shift emphasis from defining objectives for each problems area towards actual implementation, but the focus in on the long term, because pollution particularly affects the poor.

The complexities are considerable given the number of industries, organisations and government bodies involved. To achieve the objectives maximum use will be made of a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, educational programmes and information campaigns. The emphasis will be on increased use of regulations and an increase in the development and application of financial incentives.

ii. The Problem:

a. There is an increasing trend in environmental pollution. Water is polluted by four kinds of substances: traditional organic waste generated from industrial processes, chemical agents for fertilisers and pesticides for crop protection and silt from degraded catchments.

While it is estimated that three-fourths by volume of the waste water generated is from municipal sources, industrial waste, though small in volume, contributes over one-half of the total pollutant load, and the major portion of this is coming from large and medium industries. For Class-I cities of the Country, less than five percent of the total waste water generated is collected and less than one-fourth of this treated.

b. Ambient air quality trends in the major cities indicate that levels of suspended particulate matter are higher than the prescribed standards or limits, especially in summer months. Levels of nitrogen dioxide are increasing in urban centres with growing emissions.

c. Environmental problems are becoming larger in scale. The chemical industry generates an increasing quantity of substances every year; adversely affecting essential aspects of the composition of the atmosphere, soil and water. In the industrial high density areas, in addition to the effects on local health and impact on nature, we are confronted with damage to the social and economic functions of the environment.

d. With restrictions on releases to air and waste water, hazardous chemical wastes are getting diverted to land for their disposal. Earlier concerns with pollution that was visible and degradable area giving way to new types of pollution with very small quantities of synthetic chemicals that are not so visible and are injurious to health and damage the environment because of widespread use, persistence and toxicity. Reducing the hazards from toxic chemicals is now a primary public concern.

e. Human activities are also influencing the composition of the atmosphere. Despite uncertainties and insufficient knowledge, political and scientific decisions concerning environmental change will increasingly be necessary.

f. The state of the environment continues to deteriorate. The growth in scientific and technical knowledge has made it possible to use an ever increasing quantum of natural resources. The increase in population is further enhancing the pressure on the environment. The depletion of forests has been accompanied by increasing amount of pollution affecting atmosphere, soil and water. Some of the damage is irreversible.

In seeking a higher quality of life while developed countries need to focus on changing the composition of their processes and products, developing countries will need to obtain the benefits of economic growth.

The policy statement on Abatement of Pollution thus complements the Forest Policy Statement. The Government seeks to ensure that its policies in every sector are based on a set of principles that harmonise economic development and environmental imperatives.

iii. Future Directions and Objectives:

a. It is not enough for the Government to notify laws which are to be complied with. A positive attitude on the part of everyone in society is essential for the prevention of pollution and wide consultation has been held with those who will ultimately implement the policy.

b. A comprehensive approach is taken to integrate environmental and economic aspects in development planning; stress is laid on preventive aspects for pollution abatement and promotion of technological inputs to reduce industrial pollutants; and through reliance upon public cooperation is securing a clean environment to respond to the coming challenges.

c. The objective is to integrate environmental considerations into decision making at all levels.

To achieve this, steps have to be taken to:

- a. Prevent pollution at source;
- b. Encourage, develop and apply the best available practicable technical solutions;
- c. Ensure that the polluter pays for the pollution and control arrangements;
- d. Focus protection on heavily polluted areas and river stretches; and
- e. Involve the public in decision making.

iv. Critically Polluted Areas:

a. Mechanisms will be evolved to reduce local concentration of pollutants in complex industrial sites. Strategies will be developed for areas with high pollution loads where the accumulative effect of the various types of pollutants would be taken into account including pollution of ground water.

Existing units in these areas will be targeted for effective action. New units in these areas will be required to comply with location specific standards for stringent environmental quality objectives. These will include matching waste generators with waste buyers, with the objective of solving waste disposal.

b. Setting up of industrial estates, and clusters of small industrial units in rural areas, will include pollution abatement measures as an essential component of infrastructure. In the past, the absence of adequate provision of space for installing treatment facilities and arrangements for disposal of wastes has led to severe pollution of agricultural land and rivers.

c. There has been a steady increase in the amount of waste water produced from urban communities and industries. In the coming years, due to rapid growth in population, urbanisation, industrial development and better water supply, the amount of waste water may increase manifold.

Generally, these waters are discharged into lagoons or dumped on low lying areas without any pre-treatment, thereby creating sewage pools, contaminating ground waters, salinizing good quality lands around cities, acting as a source of foul smell and breeding grounds for mosquitoes and other pathogens. At many places this waste water is discharged into drains and rivers causing serious water pollution.

However, awareness has now grown and more attention is being paid to develop systems to treat sewage waters. For a country like India, conventional treatment plants are costly. In fact, these are beyond the financial means of many small towns.

Biological waste water treatment, on land disposal using suitable vegetative cover and resource recovery technologies cannot only be attractive alternative, but also economical, safe and socially acceptable.

d. Mining operations will not ordinarily be taken up in ecologically fragile areas. Every mining project shall be accompanied by a mining plan, including an environmental management plan and time bound reclamation programme for controlling the environmental damage and for restoration of mined areas.

v. Assistance for Adoption of Clean Technologies by Small Scale Industries:

a. Small scale industries are special feature of our economy. Government are implementing a scheme for providing assistance for promoting combined facilities for treatment of effluents and solid wastes generated in clusters of small scale units. This scheme will be extended to provide necessary technical support as well.

b. While the large and medium industrial units will remain totally responsible for control of their pollution, assistance will be provided to small-scale industrial units, particularly those located in rural areas, to aid the implementation of pollution control measures. This will be achieved by promoting development and adoption of cleaner technologies, including environmentally friendly biotechnology.

vi. Standards:

a. The present standards are based on the concentration of pollutants in effluents and in emissions. The norms will be revised to lay down mass-based standards, which will set specific limits to encourage the minimisation of waste, promote recycling and reuse of materials, as well as conservation of natural resources, particularly water.

Since the standards will be source related, they will require for the most polluting industrial processes, particularly those using toxic substances, application of the best available technological solutions, and also be an instrument for technological up-gradation.

b. To act against potential problems in the future, new units will have to conform to stricter standards. They will need to select technologies that produce no or low quantities of wastes and recycle or reuse waste products. Progressively, more strict vehicle emission

standards will also be evolved to deal with environmental hazards caused by vehicular traffic.

c. Standards will not merely be a regulatory tool but will be mechanism to promote technological up-gradation to prevent pollution, conserve resource and regulate waste. For this purpose codes of practice and guidelines will be evolved for specific processes.

d. The environmental effects, from production to disposal of products that are hazardous and toxic will be taken into account in the regulations. Chemicals will be reviewed according to the level of risk, and where safer alternatives have become available, restrictions will be imposed.

Regulations for liability and compensation for damages will supplement standards, to promote greater care and caution, particularly in the management of hazardous waste and remedial action in case of contamination of soil and ground water.

vii. Fiscal Measures:

a. While regulatory measures remain essential for the effectiveness of the policy, new approaches for considering market choices will be introduced. The aim is to give industries and consumers clear signals about the cost of using environmental and natural resources. The expectation is that market-oriented price mechanisms will influence behaviour to avoid excessive use of natural resources.

b. There are at present several fiscal incentives for installation of pollution control equipment and for shifting polluting industries from congested areas. The items for which excise and customs rebate are allowed will be reviewed. This will stimulated the advancement of abatement technologies and create increased demands for the products.

c. Economic instruments will be investigated to encourage the shift from curative to preventive measures, internalise the costs of pollution and conserve resources, particularly water. A direct economic signal is offered by an effluent charge based on the nature and volume of releases to the environment.

The level will be based on the cost of treatment and the flow discharged, in order to provide an incentive to set up treatment plants. The scope of the charges will also be extended to emission and solid waste. Charges provide a continuing incentive towards optimal releases.

d. These instruments will also have a distributive effect as the revenues will be used for enforcement, collective treatment facilities, research and promoting new investment.

e. The precise choice of economic instruments adopted will be determined by the ease with which releases can be measured, as well as prospective changes in technology and market structures. To deal with the range of pollution problems a mix of regulatory and economic measures will be adopted.

viii. Integration:

a. Critical policy areas for control of pollution come under different departments and levels of Government. Sectoral Ministries, State Governments, local bodies and agencies responsible for planning and implementation of development projects will be required to integrate environmental concerns more effectively in all policy areas.

Local authorities play a key role in abatement of pollution and environmental concerns need to be built into the way they operated. Steps will have to be taken to strengthen governmental and institutional structures dealing with environmental management, especially within the ministries dealing with the sectors of energy, industry, water resources, transport and agriculture and who would develop specific programmes in regard to pollution prevention.

b. Policy making, legislation and law enforcement influence each other. The increase in the number of regulations increases difficulties in enforcement. Legislation regulating particular activities will be amended to incorporate and eliminate clashes with environmental criteria.

Traditional instruments for monitoring of compliance and investigation of offences are becoming overburdened. An integrated overview and organisational structure for decentralised environment impact assessments and environmental law enforcement based on cooperation with local authorities will be sought.

c. While pollution from specific sources including towns and industries have been addressed, non-point pollution from run-off of agricultural inputs such as pesticides, insecticides, fertilisers, etc. has not been dealt with. This is gaining increasing proportions, which is polluting not only our water bodies but even sub-soil water resources and would affect the health of human beings.

A long-term policy for pesticides use, including the introduction of environmentally acceptable pesticides, particularly bio-pesticides and non-persistent biodegradable ones, and integrated pest management together with the phasing out of the proven harmful toxic and persistent ones, would be formulated in collaboration with the concerned Ministries

and infrastructure involved for its effective implementation. A similar policy for fertiliser use will also need to be formulated.

d. Plant and vegetation in general play a vital role in controlling pollution by regulating the climate and atmospheric equilibrium, protecting the soil and maintaining the hydrological regime. Hence, existing forests and natural vegetation should be fully protected.

The forest and vegetal cover should be restored and increased wherever possible, especially on hill slopes, in catchment areas of rivers, lakes and reservoirs, ocean shores, semiarid and arid tracts, in around urban centres and industrial establishments.

It is necessary to encourage the planting of trees alongside roads, rail lines, canals and on other unutilized lands under State/corporate, institutional or private ownership. Green belts should be raised in urban and industrial areas as well as in arid tracts. Such a programme will also check erosion, desertification as well as improve the microclimate.

e. The Annual Administration Reports of the Ministries will and the action taken to follow up the policy statement, and other environmental initiatives they have taken or are proposing.

ix. Environmental Audit:

a. Industrial concerns and local bodies should feel that they have a responsibility for abatement of pollution. The procedure of an environmental statement will be introduced in local bodies, statutory authorities and public limited companies to evaluate the effect of their policies, operations and activities on the environment, particularly compliance with standards and the generation and recycling of waste.

An annual statement will help in identifying and focusing attention on areas of concern, practices that need to be changed and plans to deal with adverse effects. This will be extended to an environmental audit. The measures will provide better information to the public.

x. Environmental Statistics:

a. Authoritative statistical data on the environment is vital for Developmental decision making. Resource accounting will be used to give an idea how economic policies are affecting the environment. Current economic accounts are concerned mainly with the volume of economic activity; they ignore expenditures to protect the environment and encourage inefficient use of resources.

The collection and integration of environmental, economic and health data will be done to determine the status and to develop a concise set of environmental indicators for monitoring the effects of pollution. Information and access to the public are essential so that everyone knows what is happening to the environment.

xi. Public Partnership:

a. The public must be made aware in order to be able to make informed choices. A high governmental priority will be to educate citizens about environmental risks, the economic and health dangers of resource degradation and the real cost of natural resources. Information about the environment will be published periodically.

Affected citizens and non-governmental organisations play a role in environmental monitoring and therefore allowing them to supplement the regulatory system and recognising their expertise where such exists and their commitments and vigilance, will also be cost effective. Access to information to enable public monitoring of environmental concerns, will be provided for.

b. Public interest litigation has successfully demonstrated that responsible non-governmental organisations and public spirited individuals can bring about significant pressure on polluting units for adopting abatement measures. This commitment and expertise will be encouraged and their practical work supported.

c. Householders, as consumers, make large number of relatively small individual contributions, whose cumulative effect is considerable. A system of certification of goods that are "environmentally friendly" will be set up to make available information to encourage environmental consciousness amongst consumers.

This advice; will also encourage manufacturers to produce goods that are environmentally more friendly as well as encourage recycling and adequate waste management. Consumer awareness would also be encouraged by involvement of consumer organisations in cooperative testing, and dissemination of information relating to environmental friendliness of these products.

d. As the present system of jurisprudence does not provide for compensation to individuals for environmental damage, including effects on health and environmental damage caused by pollution, it is proposed to set up special legal institutions to redress this deficiency and also make adequate arrangements for interim relief.

e. Greater emphasis will be placed on promoting awareness, undertaking and competence in schools, colleges, and training institutions. Professional and non-governmental bodies will be encouraged to be more active in environmental training and building awareness.

f. Society has accepted many practices which cause pollution. Reckless use of loudspeakers, dumping in water bodies, and scattering of wastes are common. Noise nuisance requires specific devices as well as greater consideration for neighbours and there is growing concern that litter has increased in recent years. Social action in these matters by voluntary organisations and individuals will be promoted through knowledge, education, training camps and public information campaigns.

g. This statement is based on considerations of effectiveness, efficiency and availability of financial resources. The responsibility for abatement of pollution is not a duty of the Government alone, it is an obligation on all. The approach mentioned above should indicate how everyone can help in achieving a safe and environmentally appropriate environment in our country.

Conclusion:

Pollution is the creation of imbalances between nature and environment life cycle by human beings and other living inhabitants on the earth due to their day to day input output activities carrying unhealthy surrounding, deforestation, ecological degradation. Soil erosion, depletion of natural resources creation of industries slumps and ugly dwellings.

- a. Maximum feasibility reduction of all wastes generated at production sites.
- b. Source reduction, energy efficiency, reuse of input materials during production and reduced water consumption.
- c. Change products and production processes to reduce pollution at the source.

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