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Types of environmental pollution and their effects

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ABSTRACT

When smoke releases, air is polluted. When water changes colour, it is clear that it is contaminated. When the soil does not yield crops, it is barren land. High level of noise troubles us. It is noise pollution. In other words, pollution refers to the changes in characteristics of air, water and land that are unacceptable. These changes affect plant, insects, birds, animals and human health. As the use of natural resources increases, waste increases and pollution increases too. This is because waste is a by-product of the use of natural resources. Wastes damage the environment after an extent, and turn into pollutants. Thus, overuse of natural resources leads to pollution. Modernization, industry, machines and transport have speeded up the consumption of all natural resources. The resultant pollution has affected air, water, soil and life on the earth, chemically, physically and as far as human beings is concerned, even psychologically. Our world today is affected by different kinds of pollution. Air, water, soil, noise, waste and heat radiation are a result of speedy consumption of natural resources. The pollution effects are health, economic and social effects. Due to pollution, health spoiled with the diseases like respiratory problems, lung diseases diarrhea, dysentery, intestinal worms and hepatitis and these diseases are causing severe health risks particularly on the poor people in the developing countries. Economic problems are loss of man days, earnings etc due to ill health. The pollution affects the societal progress and leads to the societal dichotomy affecting the possibilities for promotion of human resources development.

Key Words : Types of environmental pollution- air, Water, Noise, Solid waste pollution, Effects of pollution- health, Economic and social effects

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When smoke releases, air is polluted. When water changes colour, it is clear that it is contaminated. When the soil does not yield crops, it is barren land. High level of noise troubles us. It is noise pollution. In other words, pollution refers to the changes in characteristics of air, water and land that are unacceptable. These changes affect plant, insects, birds, animals and human health. As the use of natural resources increases, waste increases and pollution increases too. This is because waste is a by-product of the use of natural resources. Wastes damage the environment after an extent, and turn into pollutants. Thus, overuse of natural resources leads to pollution. Modernization, industry, machines and transport have speeded up the consumption of all natural resources. The resultant pollution has affected air, water, soil and life on the earth, chemically, physically and as far as human beings is concerned, even psychologically. Our world today is affected by different kinds of pollution. Air, water, soil, noise, waste and heat radiation are a result of speedy consumption of natural resources (Fig. 1).

Air pollution:

Air pollution is described as substances put into the air by the activity of man kind into concentrations sufficient to cause harmful effects to health, property, crop yield or to interfere with the enjoyment of property (as defined by the World Health Organization). The main sources of air pollution are industries (chemicals, petro chemicals, fertilizers, zinc plants, textile units, synthetic manufacturing industries, drugs and pharmaceuticals, cast iron plants, cement plants etc.,), thermal power plants quarrying, agriculture and automobiles. Many oxides of carbon and particulate matter is generated

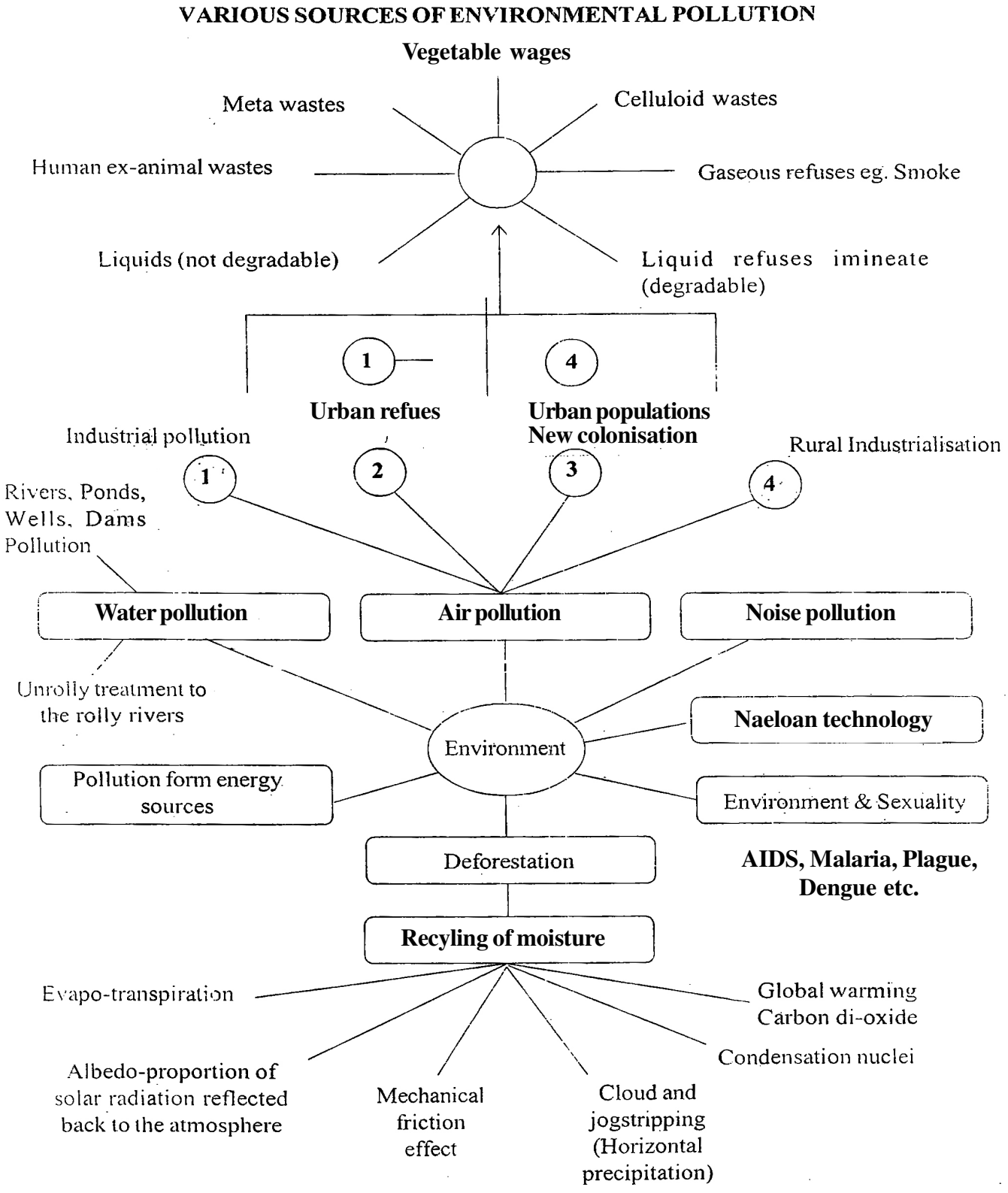

Fig 1: Various sources of environmental pollution

during the process of combustion of fuels. Several industrial units generate pollutants such as SO_2, H_2S, ammonia, nitrozen oxides, hydro carbons and other toxic substance including lead and fluorides, paper and pulp, leather and chemical industries also produce pollutants with noxious smell. These pollutants and particulate matter create air pollution beyond the tolerable limits and absorbing capacity of nature.

Air pollution is supposed to cause lot of damage to the human beings and culminate in respiratory diseases and heart and lung cancers. Air pollution hither to a predominant problem of the industrial countries has now become concentrated even in the developing world, owing to rapid industrialization.

There has been deterioration in the air quality and higher levels of deterioration of air quality is prevalent in the urban areas and metropolitan cities in view of the concentration of growing industrialization, with out giving any attention for pollution abatement, and rising number of vehicles over the years.

The annual mean concentration trends for atmospheric pollutants observed by the National Environmental Engineering Research Institute (NEERI), indicate that the concentration of pollutants depict an increasing tread in all metropolitan cities in India. The total emissions per day are also increasing in all the metropolitan cities-air pollution also causes acid rains.

The air pollution arising out of the man made sources that is increasing industrial production, vehicular emissions and energy use, are increasing over the years. The rates of urbanization and of energy consumption percapita are rising rapidly in the developing regions and this is increasing the intensity of air pollution. The projected growth in the demand for vehicular transport and electricity use indicate that the emissions arising from the pollutants from these sources would increase around five to eleven fold (by 2030 years).

The exposure to suspended particulate matter (spm), and spm concentrations will exceed abnormally and the developing countries are subjected to face the increasing intensity of air pollution. Indoor air pollution is also increasing in high income countries.

The indoor emissions are arising from synthetic materials, resins and from random gases. In developing countries the indoor air pollution arises when the households cook or heat their homes with biomass (wood, straw or dung). Studies have indicated that the exposure to bio-mass smoke is more the indoor air pollution is causing lot of health risks. The particle of lead contained in the vehicular emissions of transport is also causing lot of problems particularly in the developing countries. Sulphur dioxide concentrations are also serious in the countries that use more high sulphur fuels. These trends exhibit that the growing levels of air pollution have become and environmental problem that has serious implication for both the industrialized and to that of the developing countries.

Water pollution:

Water pollution has been increasing rapidly all over the world and mostly in the developing countries. Toxic chemicals, minerals, pesticides and lead and pollutant materials are found in the drinking water in industrialized countries and in the developing countries also. Waste waters and being discharged directly into streams, rivers and lakes and coastal waters. Most of the rivers carry harmful bacteria from human excreta. Water pollution is also caused by the organic pollutants, suspended solids in most parts of the world (Asia and Africa).

In the industrialized countries the over use of fertilizers has been causing the water pollution problems. In the industrialized and other countries, nitrides from the over loaded fields pollute the ground water supplies. High levels of arsenic linked to heavy use of phosphoric fertilizers have been dampening the ground water quality in India. The river waters are being contaminated due to the discharges of industrial pollutants. The growing water scarcity and the increasing levels of pollution are causing most of the environmental problems that culminate in health hazards. Human waste disposals into the ponds and rivers are deteriorating the water quality. The capacity of the rivers is also decreased when the decomposition of the pollutants lowers the amount of oxygen dissolved in the water and this threatens the sustenance of acquatic life.

The discharge of human sewage and agro industrial effluents are causing the water pollution intensity. With intensive fertilizer use water pollution is increasing by and large. The expansion of industry, mining activities and the increased use of agricultural chemicals has resulted in contaminating the river waters with toxic chemicals and with heavy metals such as lead mercury which are hard to remove from water. All over the world the river waters have been contaminated and these waters have become unsafe for drinking proposes or for other uses and even for the sustenance of acquatic organisms. Ground water is also polluted due to the improper and disposal of heavy metals, synthetic chemicals and hazardous waste. A large qualities of such compounds are reaching the ground water owing to the accumulation of waste dumps. Industrial effluents are also discharged directly. Through the intensive agriculture relied on chemical inputs combined with irrigation, the chemicals also reach the ground water. The improper maintenance of spetic tanks and sewage systems pollute the surface waters which causes contamination of water. Water scarcity still further aggravates the problems are the polluted waters are causing more environmental problems that affect the human welfare and economic growth.

Water pollution causes several diseases and the human

beings are exposed to these diseases, and the health hazards. It also affects the acquatic life and results in damaging the quality of the acquatic life that brings in more dangers through the contamination of the food supplies. The major sources of water pollution are industrial waste water, domestic waste water and effluents and agricultural run off. Water pollution from domestic and human waste water causes many severe water borne diseases. The major water polluting industries are leather, pulp and paper, textiles, chemicals, metalurgical industries and manufacturing plants belonging to several lines of industry. Many of the rivers, lakes in India are being contaminated from industrial effluents, agricultural run off with toxic chemicals and heavy metals that are hard to remove and costly. The disposal of urban waste into water bodies, open dumps, and poorly designed land fills, causes surface water and ground water contamination. Industrial waste ontaining heavy metals such as mercury, chromium, lead and arsenic destroys the acquatic life either in the rivers or in the seas. Human exposure to volatile organic compounds in water can occur from path ways such as the inhalation of contaminants transferred in to the air from showers, baths, toilets, washing machines and cooling. Cumisative human exposure through inhalation, ingestiove and dermal to volatile organic compounds increases the health risk. Most of the metropolitan cities are facing water sacristy and the increasing procers of urbanization is also causing the increase of effluents and the water equality has been affected over the years. Water pollution has been imposing serious environmental problems affecting the quality of human life and that of acquatic organism and plant life, imposing serious risks for the maintenance of ecological balance.

Noise pollution:

Noise pollution also causes environmental problems and that may emanate mostly from industries and the transport sector. The exaposure to noise continuously over and above the norms leads the human beings susceptible for health problems.

Solid waste pollution:

Domestic solid wastes has been increasing world wide both in absolute and per capita terms. The solid waste generation has been around 100-330 kg per capita annually in the developing countries. With the increase of incomes, the composition of solid wastes changes from primarily bio-degradeble organic materials to plastic and synthetic materials which take much longer periods to decompose. Most of the cities in the world generate more solid wastes than they can collect and the problem of disposal of solid waste has been faced by these cities. The volume of solid wastes is increasing along with the increase of income. The safe disposal of even the collected solid wastes is a problem. Open dumping and uncontrolled land filling methods are creating problems of environmental hazards in developing countries.

In the developing countries cities, most of the domestic solid wastes remains uncollected (20 to 50 per cent), even through half of the local government recurrent spending has been going for wastes collection. With the rising income and rising consumption levels, the cities of the world confront the ever increasing garbage heaps. Inadequate collection and unmanaged disposal has been creating a number of problems for human health, while affecting the human resources.

The refuse dumped enter into the water ways and contributes to the spread of diseases. The solid wastes along with the industrial and hazardous waste many enter as seep into water supplies. The uncollected wastes with human excreta, contributes to the spread of infections, diseases and the water borne diseases.

The industrial hazardous wastes such as toxic effluents from mines and chemicals plants, pulp and paper plants and leather tanneries are increasing and creating environmental pollution and the consequent problems there of. The containments are organic compounds, chlorines, dioxides, pesticides, greece and oils, acid and caustic and heavy metals such as cadmium and lead. Illegal dumping and improper disposal of solid wastes are common in many developing countries. The presence of heavy metals such as lead, arsenic and mercury in the solid waste which enters into water destroy the acquatic organism. Pesticide residues also cause lot of environmental pollution that dampen the water quality while increasing the occupational hazards. Studies have revealed that the hazardous waste causes environmental pollution and has serious effects on health. The industrial accidents and the discharges of hazardous waste will cause damage to the human beings particularly the Chernobyl disaster and the Bhopal disaster in India (1984) have been industrial accidents that has caused severe environmental pollution and injustice.

Effects of environmental pollution:

The effects of environmental pollution are:

– Health effects,
– Economic effects and
– Social effects

The health effects of environmental pollution are as follows:

Air pollution causes respiratory diseases and it imposes health hazards on the human beings. Air pollution from industrial emissions and transport exhaust is supposed to cause heart and lung diseases and cancers. Air pollution is also causing deaths particularly in the urban areas and these deaths have been of considerable magnitude in India. The deaths from outdoor pollution in urban areas has been of the order of eight four thousands in India and 147 thousands in industrialized countries and in to it has been around 511

thousands in 1996. The deaths from indoor pollution has been of a higher magnitude and it is around 496 thousands in India and 366 thousands in Asian countries and 180 thousands in Latin America. The total death from air pollution has been around 673 thousands in India and 443 thousands in China as well as in the other Asian countries. Air pollution also causes the spread of viral diseases, fevers and other health hazards that imposes substantial health risks for the human pollution. Air pollution also causes hyper tension and there has been 400 deaths in an year in Mexico owing to the high incidence of air pollution.

Air pollution causes most serious health risks that arise from exposure to suspended particulate matter (SPM) and from indoor air pollution. Studies have indicated that the sickness and death linked to suspended particulate mater are the most important consequences arising out of the trends of increasing levels of air pollution. Studies have indicated that there has been increased mortality at higher particulate concentrations particularly among old people with chronic obstructive pulmonary diseases, pneumonia and heart diseases. Pollution causes more stress on the individuals whose health is already in a poor condition.

The World Health Organization studies have indicated that many of the deaths due to the suspended particulate matter (SPM) concentrations could have been averted in China and India by proper environmental management. Higher levels of mortality chronic coughing and permanent respiratory damages have been prevalent in the children owing to the excessive particulate pollutants. The respiratory illness among the adult workers has been also widely noticed. Indoor air pollution has also been causing acute respiratory infections and infants children are exposed to higher levels of mortality, chronic bronchititis and emphysema and frequent heart failures. Neuro logical disorders lower IQ levels and agility have also been increasing due to the air pollution caused by the lead content and particulate matter prevalent in vehicular emissions.

Water pollution causes water borne diseases diarrhea, dysentery, intenstainal worms and hepatitis and these diseases are causing severe health risks particularly on the poor people in the developing countries. Diarrhoea and dysentry account for an estimated 20 per cent of the total burden of disease in developing countries. The polluted water is creating 2 billion cases of diarrhea in the developing countries. Diarrhoeal diseases are causing 5 million deaths in an year of which 3 million people are children. The contaminated waters have also lead to 900 million and 200 million cases of sehistosomiasis. World Health Organization data indicates that about 20 per cent of all communicable borne diseases in India are water borne diseases.

Health hazards such as malaria, filariasis and epidemics such as cholera have been occurring due to water pollution. Children in the rural areas are exposed to parasitic and helmenthic diseases owing to water pollution. Water pollution due to the improper disposal of solid wastes imposes several problems for human health and the poor are more vulnerable. Environmental pollution imposes health hazards on the human beings, Noise pollution causes hypertension and results in deafness and sustained exposure to noise pollution leads to the increase of heart diseases.

Ecomonic effect of pollution:

The economic effects of pollution are as follows: Loss of man days/working days, loss of employment, loss of income/ earnings, loss of productivity, loss of yields and loss of economic value of the assets.

Environmental pollution adversely affects the health of human population. Workers and labour force whose health have been affected may not be in a position to do the work and this may even lead to diere economic effects. The increasing of pollution affects the human beings particularly the workers and others, due to the indisposition and adverse health conditions they may not be in a position to attend to the work and participate in carrying out the economic activities. Therefore they have to forgo their earnings and income. Continued and Prolonged illness or suffering due to diseases may also make the human beings to loose their earning capability and loss of employment and consequently resulting in loss of income. Productive assets will loose their capacity in giving yields and ultimately there will be loss of productivity/ yield and the consequent income arising there of. The assets will also loose permanently their productive capacity and there will be loss of economic valve of the assets. The polluted lands will loose their capacity to give good crop yields and ultimately this leads to not only the loss of income but also results in the loss of economic valve of the assets.

Environmental pollution thus affects the areas the areas under the grip of pollution and the regions there of imposing not only health problems and risks but also hampers the possibilities for the carrying out of economic activities and this may culminate in the emergence of a sick and regressive economy with all economic in equalities. The increase of environmental pollution hampers not only the growth possibilities but also makes the affected economies due to pollution to become the dependent economies.

Social effects of pollution:

The possibilities for social interaction of the human beings affected with environmental pollution, with the people of other areas that are not affected or that do not have environmental pollution, in the cultural, social and economic and participatory activities relating to the enhancement of the welfare of the people will be either lost or hampered. This adversely affects the societal progress and leads to the societal dicotamy affecting the possibilities for promotion of human resources development.

The economies that are worst affected by environmental pollution will face lot of health hazards for its human population and economic activities could not be sustained in the required manner. As a results, the economies will become sick and unhealthy and regressive economies that are economically dependent on other countries for maintaining their economies. These dependent economies will be caught in the debt trap with heavy burden of debt that has been revised to maintain the human population from adverse health risks and to meet the nutritional requirements and that of the investment requirements for sustaining these economic over the years. Even this depends on the trans-economic and political conditions. Therefore, the economies that are affected with increased levels of environmental pollution are subjected to lot of economic difficulties and their developmental possibilities are worst affected resulting in a dependency syndrome that affects the economic growth possibilities and income generating activities which minimizes/reduces economic growth while affecting the possibilities for distribution and that of the attainment of higher levels of consumption by the human populations and the prospectus for attaining higher levels of economic prosperity and social welfare.

The poor people are worst affected due to the environmental pollution and there is environmental pollution and there is poverty and environmental damage nexuses in the developing countries particularly due to the growth of population depending of resource degradation and acute poverty conditions and depletion of resources such as deforestation carried out for human survival. This further degrades the environment while impoverishing the people. Studies have indicated that there has been decline in the yields and harvests (3-10%) and this affects the increase of the GDP.

More agricultural production (10 billion tones of grain per year) is required to maintain the projected population growth (9.5 billions) and this require that the agricultural land and area under cultivation has to increase substantially (3 fold) for producing the requirements.

The estimated costs of environmental degradation in China through productivity losses has been around 14-30 billion dollars and the cost as a per cent of GDP has been around 4-7 per cent. Health and productivity losses in China has been around 6-9 billion dollars and the cost as a prevent of GDP has been around 2-2.5 per cent in Indonesia, Pakistan and Philippines and Thailand the annual cost of environmental degradation has been around 2-3 billion dollars accounting for 2-3 per cent of GDP as cost. Owing to health effects/ impacts due to air and water pollution and lead levels above WHO standards. Contaminated water threatens the fishing industry and marine life. Soil degradation not only reduces agricultural productivity but also reduces the fodder availability and affects the formers to search for fertile lands culminating in deforestation. This leads to the extinction of species and wild life and cause a loss of biodiversity.

The environmental damage in India has been estimated to be around 10 billion dollars a year and 4.5 per cent of GDP (in 1992). The total environmental damage cost would be 14 billion dollars and it is nearly 6 per cent of GDP. Urban air pollution costs have been 1.3 billion dollars per year. Water degradation leading to health cost are around 5.7 billion dollars per year and these costs are nearly 3/5 ths of the total environmental damage cost. Soil erosion affects around 83-163 million hectares of land per year. Land degradation has been causing productivity loss equal to 4-6.3 per cent of total agricultural output per year and a loss amounting to 2.4 billion dollars. Deforestation has proceeded at the rate of 0.6 per cent imposing a cost of 214 million dollars per year. However, the major environmental cost arising out of biodiversity loss and population due hazardous wastes have not been included in this .This indicates that the cost of environmental degradation has been substantial and efforts are required for reducing the environmental pollution to reduce the environmental damages cost and to sustain development while maintaining the environmental quality.

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