

ENVIRONMENTAL PROBLEMS IN THE THIRD WORLD: A CASE STUDY OF INDIA

Dissertation submitted to the Jawaharlal Nehru University
in partial fulfilment of the requirements for
the award of the Degree of
MASTER OF PHILOSOPHY

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1986

P R E F A C E

The experience of the industrial countries in which the effects of environmental neglect were perceived first, has alerted developing countries to the need to adopt a pattern of growth which sets safe limits to the exploitation of the world's natural heritage. India shares global concern about the quality of the human environment.

Indeed, considerable environmental damage has already taken place in India. There has been a large-scale denudation of forest areas leading to soil erosion and excessive floods. Incorrect land use and overgrazing have resulted in widespread erosion, leading to desertification in some parts of the country. There are also pockets with high levels of pollution of air and water caused by industrial effluents. The overall problems of environmental pollution and degradation in India are growing in magnitude.

The industrial nations are responsible for the most serious environmental damage that has already occurred. Now that the habitability of the planet is the overall issue confronting mankind, there must be ecologically sound, regional and continental cooperation if man is to survive.

The task, therefore, is to evolve a pattern of development which is compatible with environmental protection.

During the preparation of this work the discussion on two main subjects has been the prime objective. In the first place while presenting a relatively comprehensive account of the multifaceted character of the environmental issues, effort has been made to delineate the most pertinent problems of the developing countries. In the second place, while aiming to find a remedy, recommendations have been presented for the solution of the future complex and relevant exigencies of the developing countries.

In preparing this dissertation, I have benefitted from a variety of sources. My greatest debt is to my Supervisor, Professor S.C.Gangal, Director, Gandhian Studies Programme, at the School of International Studies, who not only gave me the benefit of his advice at every stage of the work, but also helped me with some material, not otherwise easily available.

The publications, bulletins and journals of the various international organisations and scientific units relating to environmental issues in different countries, particularly the affiliated units of the United Nations have been of utmost value. I take this opportunity to

acknowledge my indebtedness to the renowned authorities from whom I have borrowed a great deal.

I am grateful to the staff of the Jawaharlal Nehru University Library and the Indian Council of World Affairs Library for varied kind of help in the preparation of this work. I also acknowledge my gratitude to my parents, sisters, uncles and friends for their help and encouragement.

Lastly I wish to thank Mrs. Kunjamma Varghese for having taken the trouble to type out the manuscript so well.

Valsamma Joseph

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CHAPTER I
I N T R O D U C T I O N

The Problem and Its Dimension

Environmental disruptions particularly in the Third World countries are multi-sided phenomena influenced by many factors. They are a threat to man's quality of life. As such environmental issues have been a matter of serious concern to all mankind. In view of the enormity of the problem, isolated or unilateral national action has proved ineffective.¹ National governments, in recognition of their common interests in these issues, have developed cooperative arrangements to cope with them.

John F. Kennedy, the late American President, was one of the first to turn attention to this "crisis of the human environment", facing the modern world. He observed:²

The effort to improve the conditions of man... is not a task for the few. It is the task of all nations... acting alone, acting in groups and acting in the United Nations. For plague and pestilence, plunder and pollution, the hazards of nature and the hunger of children, are the foes of every nation. The earth, the sea and the air are the concern of every nation. Science, technology and education can be the allies of every nation.

Never before has man had such capacity to control his own environment: to end thirst and hunger, to conquer poverty and disease, to banish illiteracy and massive human misery. We have the power to make this the best generation... or make it the last.

1. Lynton Keith Coldwell, "Cooperation and Conflict: International Response to Environmental Issues," Environment, Vol. 27, No. 1, January/February 1985.

2. Address to the UN General Assembly, 20 September 1963.

The United Nations position in regard to the preservation of nature as laid down in Second Principle of the Stockholm Declaration is as follows:³

The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Some other things prohibited in the declaration are: the discharge of toxic substance and the release of heat in such quantities or concentration as to exceed the capacity of the environment..., pollution of the seas by substances that are likely to create hazards to human health, to harm living resources and marine life etc.

An important principle from the standpoint of developing countries, lays down:

Economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.

Forms of Environmental Damage

Damage to environment started in the past decades. Its pace is increasing rapidly now essentially because of man's activities. As a result of the steep rise in human

3. "Declaration of the United Nations Conference on the Human Environment," UN Doc.A/Conf.48/Rev.1 (1972).

population, man has literally denuded a good part of earth's surface of vegetation resulting in the spread of desertic conditions, erosion of soil and floods.

Atmospheric Pollution

Atmospheric pollution has risen very considerably because of increasing industrialisation, the main pollutants being smoke and soot from coal burning industrial furnaces and other chemical effluents from factories manufacturing or processing chemicals, dyes, paper, leather and a host of other products.

The phenomenal growth of oil industry and trade has introduced a new danger in the shape of oil pollution of certain areas of the sea. Ocean pollution by oils and chemicals has serious effects on marine life, and extensive stretches of the seas are rapidly becoming hazardous to marine plants and animals. Plastic wastes and other non-degradable material discarded into the sea by ships pose additional dangers to marine life.

There are also other aspects of environmental pollution, namely, toxic materials introduced into streams and rivers in the shape of pest control and crop protection agents, which find their way into fish, domestic animals and finally man himself.

Water Pollution in the Third World

In developing countries, most inland waters are also polluted by the regular discharge of human wastes into the rivers and lakes. The expected industrial growth in the country indicates that the volume of waste water will increase manifold in the coming years.

Non-availability of potable water has become a major problem in almost all the developing countries. The chief sources of water pollution namely domestic and industrial wastes, contain different water borne germs, organic matter, oils, detergents, sediments, radioactive substances etc. The pathogenic organisms in the community wastes cause cholera, typhoid, gastroenteritis, bacillary dysentery, infectious hepatitis and other diseases.⁴

Solid Wastes

Every year an estimated nine to ten billion tons of solid wastes are produced. These include about one billion tons of household, municipal and industrial wastes, about seven billion tons of agricultural wastes and 'junk' materials such as factory scrap, discarded machinery, glass and plastic containers as well as organic wastes from cities

4. V. Haraprasad, "Water Pollution - A National Problem," Yojana, Vol. XXIV/10, June 1980, p.11.

and agricultural wastes.⁵ Unless recycled and reclaimed, these solid wastes would contribute a continuing source of pollution.

Solid Fuels

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Solid fuels are now being burnt at the rate of about 2,500 million tonnes a year, releasing a corresponding amount of soot, ash and smoke into the atmosphere.⁶ This quantity would, tend to rise sharply as a result of the recent hikes in the price of fuel oils. The incidence of respiratory diseases in the urban population and miners, especially in such regions, has become disturbingly high.

Liquid Fuel

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During the past thirty years, the use of liquid fuels has gone up considerably. Oil has replaced coal as the source of energy. In large installations, oil contaminates the environment. Oil in the form of gasoline and high speed diesel for motor vehicles has become a serious source of pollution, because of lead compounds in petroleum.

5. R.Rama Rao, "Environment Problems of Developed and Developing Countries," Economic and Scientific Research Foundation, New Delhi, March 1976, p.17.

6. Ibid., p.19.

Growth of Aviation

Supersonic aircrafts, apart from generating shock waves, which affect humans and other living organisms could damage the ozone layer in the atmosphere, thus lowering its capacity to filter harmful radiation. They also pollute the atmosphere by their exhaust fumes.

The cumulative influence of automobiles, railways, heavy vibrating machinery in factories and high speed aircraft has been increasing noise to levels which are having an adverse effect on human and animals. Human population constantly exposed to noise induced stresses is prone to nervous breakdown and other ailments.

These indicate the true dimensions of the problems of environmental pollution.

Environmental Protection - A Human Right

It has been pleaded that the right to an adequate environment can be conceived of as a human right. "Those who, by their acts endanger the environment on which life depends, clearly are committing an act of aggression against human rights, an act of aggression against the right to life itself."⁷

7. Transcript of the Presentation of the Earth Care Petition to the United Nations, October 23, 1975, p.2.

The UN Conference on Human Environment, held in Stockholm in June 1972, considered the need for common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the Human Environment. It proclaimed that science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems for the common good of mankind.

The environmental scientists have coined slogans for the so-called continuously deteriorating environment. 'Environmental crises', 'stress protection management' and the like have become catch-words in scientific literature. The gloomy picture of the environment is highlighted by atmospheric fallouts in the troposphere, human volcano, pollution domes and heat islands over big cities, genetic damages, disposal of liquid, solid and radioactive wastes, radiation during nuclear fission, ocean dumping of toxic wates, effects of pesticides and insecticides, and a number of similar consequences of the manipulation by man.

That the United Nations recognises the human right to environmental protection can be concluded from the "Right to Earthcare" petition signed by over 200,000 persons

all over the world and submitted to the Secretary-General on 23rd October 1975.⁸ In conclusion, it may be observed that as our human horizons widens, man is at last becoming conscious of the extent of the damage caused to his environment by his own uncontrolled use of earth's resources.

Conflict Between Right to Environment and Right to Economic Development

While the industrialised Western states perceive over-accelerated industrialisation, coupled with unwise management of resources as the cause of environmental degradation, the emerging nations contention is that underdevelopment presents an even greater threat to mankind.

The late Prime Minister of India, Indira Gandhi observed "Environmental problems of developing countries are not the side effects of excessive industrialisation but reflect the inadequacy of development.... Are not poverty and need the greatest polluters?"⁹

8. H.O.Gregory, "UN Recognition of the Human Right to Environmental Protection," Earth Law Journal, April 1976, p.227.

9. Indira Gandhi, "The Unfinished Revolution," Address before the UN Conference on the Human Environment at Stockholm, June 6, 1972.

Developing countries in their ultimate struggle to attain certain standards comparable to the developed countries are constantly planning progressive projects which would mean the establishment of heavy industries, processing of mineral resources, creation of refineries, net of highway construction etc. Naturally the impacts of all such modernised concepts would be reflected in some form of penalties to be paid by the community such as pollution and other forms of environmental disruptions.

Presently the developing countries are unconscious of the extreme hazards to health and property induced by the noxious gases and their toxic effects as they are being pumped into the atmosphere, nor they are conscious of the extent of damage that the water disposal systems produce on their land and seas.

Manufacturers and consumers in the developed and the developing countries are equally guilty of only considering their monetary interests by producing cheaper to be consumed more and no scientific and rational means for prevention and further deterioration of the environment has been adopted.

Industrial and economic growth as recognised to be an essential developmental parameter should not overlap the consideration of the quality of life. Similarly are the

dangers associated to an uncontrolled industrial growth.¹⁰

Large scale development projects are often motivated by political considerations as much as for economic reasons. Adverse environmental consequences of these projects often become apparent after a lapse of time. Remedial measures may in some cases be more expensive than planned pollution control action had preliminary evaluations been carried out.¹¹

In some instances, economic development has been associated with adverse impact on the environment and resources and have increased the income disparities between economic groups. In the capital cities, where development has been most intense and concentrated, environmental deterioration has so reduced the quality of life that it is threatening to negate the fruits of economic development.

The techniques to be taken against environmental disruptions are much complicated for a developing country with little technological potentialities than similar measures for an advanced country. The Third World countries are more prone to the devastating effects and are not technologically prepared to take the necessary defence measures prior to imminent danger.

10. H.K.Afshar, "The Earth's Impending Physical Environment Round the Year 2000 and the Problems of the Developing Countries," Vol.I, Tehran, March 1973, p.412.

11. Colin Mac Andrews and Chia Lin Sein, "Developing Economies and the Environment: The Southeast Asian Experience," McGraw-Hill, South East Asia Series, Singapore, 1979, p.9.

✓ There cannot be a transplantation of Western models of environmental management without the essential conditions of available financial, technical and managerial resources and the distinctly different physical, socio-cultural and economic background from the advanced to the developing economies.¹²

Third World countries will need to innovate and improvise with the help of the 'advanced' nations in order to evolve a set of 'appropriate technology' in order to ensure environmental conservation and management.

Despite the fact that so far only some of the developed countries have taken strong and serious campaign measures against the drastic effects of any environmental deteriorations, tragically enough little has been achieved. The measures taken either scientifically or legally have not been potentially competent to provide the real desired effects.

For the developing countries of South East Asia, intensified economic activities, particularly in the industrial and agricultural sectors, and rapid urbanisation in recent decades have resulted in environmental deterioration of the land and water of the countries concerned.¹³

12. Ibid., p.12.

13. Ibid., p.11.

There is the danger of accelerated soil erosion when land is cleared for agriculture and the natural protection of vegetation removed. In the Andes of Columbia and Ecuador, the results of past negligence are clearly visible and large areas of land are badly eroded.

Prolonged weathering and leaching of the land surface particularly in the older plainlands of Africa and South America, have given rise to soils of low fertility, even though they may support a luxuriant forest vegetation. Moreover, the nutrients which are present are rapidly leached if forest clearance occurs.

In India situations are common in which residential and industrial complexes intermingle with each other and the residents are continuously subjected to oxides of sulphur, hydrocarbons and oxidants. It is surprising that the power station at Delhi, which is supposed to be one of the most well planned cities in the world is discharging several tons of sulphur dioxide every day.¹⁴

One of the most important factors contributing to the seriousness of the pollution problem in India is the laxity in adhering to rules and regulations meant for maintaining the level of pollution at a minimum.

14. T.S.Rama Rao, "Air Pollution Control and Environment Protection in India," in a Seminar, on Law and Science in the Protection of Environment, New Delhi, March 1986.

The industries in general are the major offenders in creating the pollution hazards in this subcontinent. The motivating force being profit alone in complete disregard of environment, is the guiding principle underlying their operations which are promoted by the laxity in the enforcement of environmental laws.

The Bhopal tragedy which is described as the worst in industrial history resulted as a consequence of the sudden vapourisation and discharge of MIC on 2 December 1984, and resulted in the death of about 5000 persons and affected 2,00,000 (a quarter of the city's population). Such criminal negligence of the multi-nationals in not adopting the necessary safety mechanism shows that they consider the developing nations as 'pollution-havens', where they can obtain maximum profits at minimum costs, ignoring the lives and the safety of the population in these countries.

The Bhopal tragedy had placed a moral responsibility on environmentalists to take a fresh look at the industrial siting criteria, inspection mechanism, industrial safety, control and prevention of pollution from hazardous substances and disaster management.

In developing countries, like India, no environmental problem is of greater magnitude and significance than the pervasive contamination of the environment with a variety of

deadly pesticides. Multitudes of toxic pesticides known to cause mis-carriages, birth deformities and other severe disorders are regularly found in the environment.¹⁵

Some research institutes like the Indian Agricultural Research Institute, New Delhi, the Central Plant Protection and Training Institute, Hyderabad, the CFTRI have independently shown that everything that is consumed by people is contaminated with these chemicals beyond the tolerance limit.

Industrial effluents pollute rivers and streams at a rate that if immediate steps are not taken the pollution may cross the point of redemption. It will not be many years when quite a number of big cities in India will be choking with smog and carbon monoxide in the air.¹⁶ Poorly maintained motor vehicles and the thermal stations near big cities are polluting the air fast.

The neglect of environment goes on unabated. The Union Government had not paid serious attention to the

15. Brojendra Nath Bannerjee, Bhopal Gas Tragedy: Accident or Experiment, New Delhi, 1986, p.67.

16. V.Ranganathan, Environmental Policies and Their Implications for Trade and Development: A Case Study of India, (Geneva, UNCTAD, 1977) p.11.

problem of pollution and ecological imbalance while chalking out its development programme. The first small attempt was made only in 1980 when the Department of Environment was set up to plan, promote and coordinate environmental programmes.

A new ministry under the title of Ministry of Environment and Forests was set up in 1985. And the ministry was belted up to deal forthwith the problem of water and air pollution, the two areas that affect directly the health of the people.

Various non-governmental organisations have sprung up at the local levels and cities in India to assist the government in matters of environmental protection and improvement. The non-governmental organisations not only help in enhancing awareness about environmental issues through seminars, workshops, publications etc. but also attempt practical studies and projects to carry out or demonstrate environmental protection and are involved in environmental activities, thereby serving the needs of the community and helping the government as a valuable source of practical knowledge.

India is probably the only democratic country whose constitution prescribes a national commitment to

environmental protection and improvement. However, because of the Centre-State jurisdictional conflicts due to the federal character of the system, an uneven situation exists in various states regarding environmental management and the implementation and enforcement of national policies.

Voluntary environmental non-governmental organisations have drawn attention to issues through the press, legislatures etc. This has happened in the case of the Silent Valley Project, the Mathura Refinery, the West Coast Fertiliser Plant and the Dal Lake Project.

(One could almost draw a parallel between strategic appropriateness of Gandhi's campaign against untouchability and the presently re-emerging campaigns against environmental destructions. As the issue of untouchability was a point where the entire decadent caste system was most vulnerable, similarly, the industrial and technological system is most vulnerable at the level of environment and ecology.¹⁷)

It would not be out of place here to draw the attention of the voluntary rural development institutions

17. Rajiv Vohra, "Whose Environment Must We Preserve?" Gandhi Marg, Vol.5, no.7, October 1983, p.414.

and constructive programme institutions, mainly in Gandhian field, to the need for a review of their certain approaches from an ecological point of view. The entire Gandhian approach is rooted in the laws of nature which shape the laws of a society.

At present, industries are being located on the basis of raw material availability, access to the market, transport facilities and other related considerations. While taking into account all these factors, no attention had been paid to the environmental aspects. Now it is felt that the environmental considerations should have priority whenever an industry is to be located anywhere.

In order to help authorities and the entrepreneurs, guidelines have been recommended which indicate the areas to be avoided for setting up the industries, precautions to be taken for site-selection and the aspects of environmental protection to be incorporated during implementation of industrial development projects.

The State governments have been directed to make changes in the Motor Vehicles Rules for enforcement of standards on vehicular exhaust emissions. Efforts are also made to develop precision instruments to check exhaust emission; building up facilities in metropolitan cities

for owners to get their vehicles checked with respect to exhaust emission and strengthening of inspectorate with transport authorities for making tests on vehicles.

(A key element in achieving effective environmental management is the role of the public. The imposition of severe penalties on the offenders pre-supposes an efficient system of surveillance and process of law enforcement.

In developing countries, there may be a need to open up channels through which the public may voice their concern on environmental issues. The practice of public hearings as a means of resolving conflict and providing objective lessons in environmental control is important.)

An additional factor in heightening environmental awareness has stemmed from the consequences of the energy crisis since 1973. Greater emphasis has thus been placed on the conservation of natural resources and the need to sustain productivity in the sectors concerned with the production of primary commodities.

Whatever the steps taken to achieve adequate development, there are two basic considerations.¹⁸ First, development needs to be undertaken in relation to the

18. Alan B. Mountjoy, The Third World - Problems and Perspectives, " MacMillan Press Ltd., 1978, p.140.

qualities and limitations of the environment, if environmental potential is to be realised and its deterioration avoided.

Second, technological exploitation must be culturally appropriate if ordered progress is to be made. Such considerations are as relevant in modern urban society as in the developing countries.

The concept of ecodevelopment is actively sponsored by UNEP. It stresses the need to look for concrete development strategies capable of making a good and ecologically sound use of the specific resources of a given ecosystem in order to satisfy the basic needs of the local population. Ecodevelopment insists on the variety of ecological and cultural situations and, therefore, on the diversity of proposed solutions as well as on the citizen participation in the identification of needs and resources, the research of appropriate techniques, the design and implementation of development schemes and structural changes when needed.

Developing countries like India have to make a choice between right of environmental protection and the right to economic development. Developing countries must not ignore environmental issues; any assumption that environmental

concerns can be set aside until a later stage of development may be extremely dangerous.¹⁹ The lesson to be learnt is that there are limits to growth beyond which development itself is threatened by the deterioration of ecology.

19. R.P.Anand, "Development and Environment: The Case of the Developing Countries," Indian Journal of International Law, Vol.20, 1980, p.14.



CHAPTER II

THE CASE OF THE DEVELOPING COUNTRIES

The concept of 'environment' relating mankind to the natural systems of the biosphere, has been a major factor in international relations for less than two decades. Within a relatively few years, major environmental issues have emerged for which unilateral national action has proved ineffective, and national governments, in recognition of their common interests in these issues, have developed cooperative arrangements to cope with them.

But where national interests - especially economic and military - appear to conflict with international environmental objectives, cooperative action has not occurred or has proceeded slowly. With the growing pressure of human activities on natural resources and the environment, the potential for serious conflict may increase. Anticipatory measures need to be taken to avoid costly and disruptive future consequences.

The environmental crises in Third World countries is made up primarily of the interaction of three factors: (i) population growth, (ii) the growth and expansion of technology with its companion by-product of pollution, and (iii) land use.¹

1. Nicholas Polunin, The Environmental Future, Proceedings of the International Conference on Environmental Future held in Finland from 27 June to 3 July 1971 (Great Britain, 1972), p.420.

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The developing countries in the days to come would be facing different environmental complexities and it will not be too easy to establish a definite and well calculated and balanced policies for the use and exploitation of natural resources as is the case for the highly technologically advanced countries.

The developing countries are now facing the greatest dilemma of all the times - industrialisation or environmental disruptions. Not only the hazardous impacts are beginning to be felt, but also they continue to increase at an accelerated rate far beyond our present concepts, aggravated by the social stresses that are gradually justifying an existence.

We are led to the concept, that modernization, mechanisation and industrialisation, as initiated by the highly developed countries while disturbing nature's balance partially are detrimental to our life continuancy. But modernisation and progress are inherent in human nature and only science and advanced technology are capable of preventing partial disruptions and diverting the future deteriorative course of events to man's interest and welfare.

Industrial and economic growth as recognised to be an essential developmental parameter should not overlap the

consideration of the quality of life.² Similarly are the drawbacks and dangers associated to an (uncontrolled industrial growth.)

The developing countries in order to safeguard their own interests should take decisive measures to avoid the errors as committed by the developed countries some decades ago and accept the implications of economic growth versus environmental deteriorations.

In the years to come, the long debated dilemma, industrialisation without pollution may become a reality and the developing countries could benefit from the results of research and findings of industrialised countries where serious campaign studies against such problems are presently in progress.³

It has only in the recent decades that the general public throughout the world and particularly the environmentalists have become extremely conscious of the signs of environmental deterioration. Present anti-pollution movements, regulations, legal acts etc. have not helped communities in the strict sense of the policy, because regardless of moral obligations. some manufacturers find

2. H.K.Afshar, The Earth's Impending Physical Environment Round the Year 2000 and the Problems of the Developing Countries, Vol.1, March 1973.

3. Ibid..

it almost cheaper to pay the incurred penalty rather than to invest capital and improve the techniques of production and divert pollution regardless of society's welfare and interests.

Current development programmes are seriously inadequate because they are not significantly reducing the poverty. There are two over-riding reasons: "the developing countries are not moving decisively enough to reduce the several social and economic inequalities among their own peoples; and the developed countries are not moving decisively enough to reduce the gross imbalance between their own opulence and the penury of the less priveleged nations."⁴

Without economic growth a poor country can only remain poor. But economic growth means manipulating the traditional environment. It is at this point that injury to the environment can take place. If nature is abused beyond limits, its revenge is inevitable.⁵

In developing countries like India, the deterioration of the environmental quality is conjoined with the growth of population and industrial development. The urban

4. Robert S. McNamara, Address to the United Nations Conference on the Human Environment, Stockholm, Sweden, June 8, 1972.

5. Ibid.

areas are affected by air, water and noise pollution. Natural hazards are replaced by more damaging technological hazards. Even the most suitable areas for human settlements are not free of hazards. Even the most suitable areas for human settlements are not free of hazards. There is a threat to the civilisation with the inclusion of land, population and settlement in the advancing risk zones.

The application of technology has led to technological hazards. The so-called experts of funding countries and agencies have limited understanding of the constraints in developing countries. This as well as imported technology, have made developing countries their victims, and in extreme cases have resulted in damages beyond repair.

Again the leap in technology has contributed to economic disparities, hence social imbalances, which as in developed countries, terminated in social pollution or social hazards. Third World countries acknowledge that far from being an exclusive problem of the industrialised world, environmental degradation and overtaxing of nature form very much a part of their own predicament.⁶

The industrialised countries are increasingly recognising that patterns of resource use and maladministration are an important aspect of the 'environmental crisis'.

6. Reshaping the International Order - A Report to the Club of Rome, New York, 1976, p.161.

The sad fact is that very few practical steps have yet been taken to translate the implied awareness into genuine blueprint for ecological survival.⁷ The current negotiations on the management of ocean space and resources demonstrate the difficulties involved failure to take such steps, given the unprecedented scale of human interference with nature and ecological balances might prove disastrous to all.

The Implication of Population Growth

The cumulative actions of a world population approaching five billion are now capable of causing continental and even global changes in natural systems, according to the State of the World (SOTW) 1985, a world watch institute report on "progress toward a sustainable society".⁸

The study reports that as human pressures on the economy's natural support systems build, the more evenly stressed ones are beginning to break down.

"Nowhere is this more tragically evident, than in Africa, where famine is spreading across the continent,"

7. Ibid., p.162.

8. "Population Threat to Global Systems," Hindustan Times, 2 January 1986.

says Lester Brown, President of the Washington based institute and director of the study.

As recently as 1970, Africa was essentially self-sufficient in food. In 1984, however, some 140 million Africans out of a total of 531 million were fed with grain from abroad. Brown terms drought the "triggering event" for Africa's famine, not the basic cause. The gradual decline in per capita food grain production in Africa since 1967 is the result of the fastest population growth of any continent in history, widespread soil erosion and neglect to agriculture by governments.

Stating that the scale of human activity is now influencing the evolution of life itself, the study points out that "as human demands on ecosystems have grown, extinctions of plants and animals have outpaced the appearance of new species at a rate never before experienced."

According to the study, Africa will be the first test of the international community's capacity to deal with new environmental threats to the economy. If rainfall is slowly declining in Africa because of population, then the continent wide decline in per capita food production can be reversed only by family planning, tree

planting, soil conservation and water resource development on a massive scale.

Rapid population growth is often accompanied by strong tendency in urban development, accelerated industrialisation, excess consumption and naturally serious environmental complexities etc. are usually caused by over utilisation of land, depletion of natural resources, increased wastes etc.

Population densities, and in all probabilities not the population explosion, are the greatest menace in environmental disruptions and deteriorations. Presently congestion in urban centres and industrial sites which form the nucleus for the mass migration of rural inhabitants to the new urban areas is the greatest problem to administrative authorities.

The Environmental Problems Connected to Urban Development:

Witnessing an unchecked process of urbanisation, developing countries are by 2000 AD doomed to face the negative effects of city life in more serious form than the developed countries where city population have started falling.

According to United Nations estimates, the urban population of the world may increase by some 1.6 million between 1975 and 2000. Of the total, 1.3 billion or more than 75 per cent will be in the developing countries.

Shanghai was the only city in the developing countries in 1950 with a population of more than five million. By 2000 AD there will be 45 such cities, mostly in Asia.

The main problems the process of urbanisation created were listed as lack of shelter, unemployment, crime, slums, inadequacy of social services, erosion of social values and an unbearable strain on essential services.

According to the 1971 census, about 20 per cent of India's total population was residing in urban areas. The percentage increased to 24 by 1981. The total urban population of the country comes to 156 million. India has 12 cities of million plus population and 200 cities of population between one and ten lakhs.

Mexico city is projected to be the largest in the world by the turn of the century when it will have a population of 31 million. Among the other super cities of the developing countries will be three Indian cities:

Greater Bombay (17.1 million), Calcutta (16.7 million) and Madras (12.9 million). Beijing will have a population of 19.9 million, Cairo of 13.1 million and Manila 12.3 million.

Urbanisation causes a social revolution within the traditional family system to the point of weakening its very foundation. This deprives its members of reference to models, values and standards usually passed on by family environment.

One third of the urban population in all developing countries is presently living in squatter settlements which are growing at 15 per cent per annum and will double their number in six years. In Asia, slum and squatters settlement population ranges from 17 to 67 per cent.

The deadly gas leak in Bhopal in 1984 showed that regardless of an area's vicinity, squatter carved out their shelter next door to or within the disaster sites. They exist on minimum family incomes within houses improvised from industrial debris.⁹

Children will be the major sufferers of urbanisation. The majority of 800 million children who will inhabit the

9. Deepak Razdan, "Urbanisation poses Threat to Third World," Hindustan Times, December 8, 1985.

urban areas in 2000 AD will face deprivation of health care, education, immunisation, nutrition, safe water supply and other needs.

The pollution of city air from industrial units, slums and traffic will be one of the formidable problems in Asia. Equally serious will be noise pollution which has, in Bombay, reached the harmful level of 72 decibels between 8 a.m. and 8 p.m. in the busy areas.¹⁰

There has been an increasing incidence of the 'Western' diseases such as heart ailments, nervous disorders, stroke and other stress-related diseases in Asia. A study has shown that in Bombay the occurrence of cancer is 2.5 times more in the highly polluted areas than the rest of the city.¹¹

Any urban development plan should seriously take into account the role of the ecological parameters. In rapidly developing cities and urban centres with rich and poor populations, the problems connected to mass housing under varied living conditions deserve due consideration.

10. Ibid.

11. Ibid.

The appearance of slums with all its ramifications and congestion consequences and the proliferation of environmental issues in densely populated centres where shortages of the prime necessities such as schooling and hospital facilities, recreational centres and other public requirements such as adequate sewage disposal mechanisms etc. are felt, reveal cases for further proliferation of environmental complexities and causes of severe concern.

The majority of the rural immigrants fail to be absorbed within the industrial occupational pattern and the balance of labour is aggravated by the inferior quality of the required skill. Since they have to live on the minimum subsistence, therefore, a series of adverse urban conditions will develop all culminating to the deterioration of the environment.

Such deterioration disturbs not only the adequate provision of transportation, water and electricity needs and other service facilities, but the deterioration of the physical environment, delinquency rates and crimes etc. will be rapidly increasing with serious complications in the administrative framework of the concerned communities.

Environmental Problems Associated with Waste Disposal

Up to the present, owing to existing natural environmental concerns, the disposal of waste and refuse usually

dumped into an open space and discarded, had not presented any serious problems. The situation now is entirely changing and owing to the fact that the natural resources and reserves of the earth are approaching depletion and are getting less and less abundant, there is felt a need to recover, reuse and reclaim the used materials.

The disposal of the toxic and non-degradable constituent parts, if they have to be disposed present serious social and hygienic problems. The problems concerning the situation of disposal sites still presents serious complications, because they may cause serious contamination to the local air and water reservoirs inducing considerable hazards.

Environmental Problems Associated with Water Consumption

In the underdeveloped communities, the water treatment to make it safe, from the standpoint of public health either chemically or biologically is neglected. The wastes of man, his domestic animals and industries with nearby waters offers ample opportunities for infection and contamination. The frequent cholera epidemic in some parts of South and South East Asia are typical cases.¹²

12. H.K. Afshar, The Earth's Impending Physical Environment Round the Year 2000 and the Problems of the Developing Countries, (Tehran, March 1974), Vol.2, p.252.

Schistosomiasis, a typical water-borne disease, is readily incurred by various water-contact activities such as ploughing and planting in wet paddy fields, fishing, washing clothes, bathing etc. Such public health problems, particularly in developing countries, are extremely acute and the extent of the activities are such that it seems useless and futile to embark into the defense problems connected to the degradation of aquatic resources and their repercussions, unless concrete and adequate control measures are effected to prevent the spread of water borne diseases and save man from their future hazardous and lethal effects. Such measures mostly to be effected in the developing countries require sanitary control facilities coupled with the most drastic social changes and educational reconstruction activities.¹³

Destruction of Biotic Habitats

The destruction of the habitats of fisheries through the industrial pollution and siltation and the destruction of the coral reefs by dredging and dynamiting as to be seen in the coastal regions of Philippines and other countries of Southern Asia reveal the tragic consequences of coastal developmental plans by industrialisation.¹⁴

13. Ibid., p.253

14. Ibid., p.257.

The multi-dimensional nature of the environmental problems require a better understanding of the utilisation of water resources, its ecological implications, its conceptual potentialities and its impact effects on the phases of social life.

The Oceans as Receptacles for Waste and Refuse

Unfortunately today the oceans have become the final receptacle for many of the chemical effluents and industrial wastes which are presently the greatest sources of pollution in the coastal and estuary regions. The seas and the oceans almost receive any type of pollutants discharged into the atmosphere or absorbed by the biotas on land and these ultimately find their way directly into the adjacent rivers and waters and are fed into the seas.

The Menace of Oil Spillage

Frightful enough is another curse of modern civilisation, the pollution of the oceans through oil. Practically at the moment some five million tons of oil annually are discharged somehow into the oceans. This pollution in the long run is more dangerous than the volume of some million tonnes of toxic gases annually discharged into the atmosphere. It has a dual ill-effect of not only changing the

global temperature, but as a side effect causes the extermination of marine and oceanic biotas.

Oil introduced into the marine environment induces several adverse effects, the most hazardous being that it may clog the animal filtering mechanism and above all any direct contact with the respiratory organs of the marine animals either weakens or kill the organisms.¹⁵

The Effects of Oceanic Vessels

The increasing number of the oceanic vessels are presently becoming a great cause of concern and a serious source of pollution. In USA wastes from approximately 46,000 federally registered commercial vessels and 8 million recreational boats already have polluted many coastal waters to the extent that the sensitive shellfishes' life is in danger.

The data indicate that in the last decades the pollution due to oil spills from such vessels and leaks from off-shore oil drilling facilities have caused quite a number of accidents, collisions and fires.¹⁶

The Existing Environmental Radiations

The environmental radiations presently originating from sources such as nuclear energy to generate electrical

15. Ibid., p.309

16. Ibid., p.310.

power is the greatest source of environmental concern.

Radioactive particles causing environmental contamination could be generated not only through artificial fission products, but also induced through the natural emanations and natural fissions of heavy nuclei. The greatest hazards and infections are exposures to radio-nuclides as absorbed by man and animals via the food chain and water.

The Extent of Potential Hazards of Noise

Noise being a form of radiation is scientifically and psychologically considered to be the greatest negative reward of our modern life.

Nowadays nearly 70 per cent of the population of advanced societies are concentrated in urban areas where the roar of mechanised life, heavy road transportation, air traffic, the industrial noise generated by constructive projects, factories etc. are all causing serious stress beyond the possible and tolerable limits.

Noise may under circumstances cause mental fatigue, loss of nervous balance, reduced physical and mental energy, temporary restlessness etc. It would mean reduced economic efficiency with grave social implications.

The Role of Multi-national Corporations in Environmental Deterioration

Over the last ten years, arguments have ranged over the proper environmental role of MNCs (Multinational Corporations) particularly those in less developed countries. On one side there are those who believe that MNCs deliberately seek out 'pollution havens' so that they can be free from costly pollution control legislation. On the other side there are those who claim that the command of advanced technology by MNCs will lead them automatically to install modern and clean plants.¹⁷

One question that is often asked is, "What is the behaviour of MNCs in developing countries compared to their home countries?" From numerous enquiries made of MNCs, it is clear that the guiding principle is the minimisation of costs. This principle has nuances, as it is in the self-interest of the company both to prevent expensive future legislation will demand and to avoid costly conflict with local residents and groups at home.

It is obvious that MNCs will invest less in pollution control equipment in a developing country than they would if they had to comply with the strictest controls and regulations.

17. Michael G. Royston, "Local and Multinational Corporations: Reappraising Environmental Management," Environment, Vol.27, No.1, January-February 1985, p.19.

Nevertheless, the decision on where to locate a plant is determined by accessibility of the proposed site to markets, raw materials, energy and labour etc. In short, the way MNCs behave abroad depends on political and social pressures.¹⁸

Economic transactions among nations are not inherently harmful to the quality of environments, but their effects have often been damaging. This damage has frequently resulted from the way in which the costs and benefits of economic enterprise have been allocated. Short term benefits to entrepreneurs can be increased to the extent that their costs can be offloaded on to others, especially future generations. National governments have adopted anti-pollution measures to deal with this 'externalising' of costs resulting from the discharge of industrial and biological wastes into the environment.¹⁹

External costs are also shifted onto the environment by the unremedied disruption of natural systems. In most developed countries, governmental controls and performance standards have been established for mining, lumbering, manufacturing and transportation. Nevertheless law and governance in many countries do not effectively protect the environment from these activities.

18. Ibid., p.20.

19. Lynton Keith Campbell, "Cooperation and Conflict: International Response to Environmental Issues," Environment Vol.27, no.1, January/February 1985, p.10.

Traditional societies in developing countries are especially vulnerable to the unforeseen and often adverse effects of foreign investment and imported technologies. These effects which are both social and ecological, are associated with a process of modernisation that has widely contrasting effects upon people and their traditional institutions. In some countries - conspicuously in Iran - the stresses of too rapid and insensitive modernisation led to violent reaction and an attempted eradication of foreign influences.²⁰

Environmental Problems in Malaysia

In a developing country such as Malaysia, which has a limited land area for productive development, it has long been recognised that early steps must be taken to protect and conserve its finite resources, its ecology and its human environment. A convincing case has to be made to persuade planners that development projects must undergo environmental impact scrutiny.

In the case of Malaysia, there was early recognition of the importance of the renewable resource sectors of the economy and of environmental conditions, and some of the more important measures were taken on time. From the

20. Ibid., p.11.

Malaysian experience, it is crucial for small developing countries to pay particular attention to the social costs of development. This is necessary in order that they do not impose an unacceptable strain upon their social, medical and other services.

The problem of water pollution poses serious consequences in certain areas in Malaysia. The Klang river basin Selangor, the Juru river basin in Prai, and the Scudai river basin in Johore are also known to be grossly polluted. The major sources of water pollution are attributed to agricultural activities and agro-based industries including the processing of oil palm, rubber, pineapple, tapioca, sugar and to some extent paper and pulp manufacturing.

Domestic and agro-industries discharge over 909,000 kilo grams per day of Biochemical Oxygen Demand (BOD) into the public water courses of which oil palm mills and rubber factories account for about 363,600 kgs. of BOD per day.²¹

A number of areas such as Mak Maudin, Kuala Lumpur, Petaling, Jaya and Johore Bahru already suffer from noticeable air pollution problems. Large quantities of toxic

21. Mamraz bin Abdul Majid, "Towards Environmental Management - The Malaysian Experience," in Colin Mac Andrews and Chia Lin Sien, eds., Developing Economies and the Environment - The Southeast Asian Experience (Singapore, 1979), McGraw-Hill Southeast Asia Series, p.46.

gases are discharged into the air daily by motor-vehicles, chimney stacks of factories, cement works, as well as from blasting in quarries.

Large-scale tin mining has a long history in Malaysia. The problems of erosion and silting remain largely uncontrolled, and their effects are still visible in places near Kuala Lumpur, Selangor etc. Land under forest is now being cleared without any ecological considerations and is posing an extremely difficult problem.

Another major threat is that of marine pollution, as the oil tanker accidents and oil spills in the Straits of Malacca have demonstrated. It has become a serious risk because of the growing numbers of very large crude carriers that use the Straits. In addition, tankers are known to discharge their bilge routinely as they pass through the Straits, turning it into a 'dirty international backlane'.²²

Environmental Management in China

In China's environmental management, the central organisation is mainly incharge of working out principles,

22. Tan Sri Abdul Kaider bin Yusof, Minister of Law and Attorney General, Malaysia, in a statement before the plenary session of the Law of the Sea Conference, Caracas, 1974.

policies, decrees, and standards for environmental quality and putting forward proposals for planning requirements, leaving the concrete tasks of inspection and supervision to the local environmental management organisations at various levels. But neither the central organisation nor the local ones have clearly defined functions and responsibilities. The work of environmental management still lacks coordination.

The management of forest is chaotic, with overlapping, competing, uncoordinated bureaucracies trying blindly to fulfil assorted plans. Past destructive practices continue: forest fires, illegal purchase by mining enterprises and army units, widespread, mostly illegal use of wood as industrial fuel.

Most of China's current desertification can be clearly ascribed to human actions, above all to widespread and indiscriminate reclamation for grainfields as well as to frequent overgrazing and tree felling.²³

Some of the areas in the North China Plain suffer from alkalinization. Urgent action is needed in virtually every region of the country to moderate the rapid erosion rates. Nationwide figures are alarming: topsoil loss is

23. Vaclav Smil, The Bad Earth: Environmental Degradation in China, (Armonk, New York 1984), p.24.

now at least five billion tons per year.²⁴

In March and April 1980, a 'Propoganda' month for environmental protection in connection with the popularization and implementation of the 'Law of Environmental Protection' was launched.²⁵

The publicity also covered scientific information about environmental management and prevention of pollution. Mobilisation meetings presided over by leading government officials were held in most provinces, municipalities and autonomous regions, as well as in large and medium sized cities.

Since 1978 a new 'Great Green Wall' - a forest-belt for protection from sand and wind - is being developed in the 324 counties of the north west, northern and north-east regions of China.²⁶

Another important aspect of the effort to protect forests in China has been the formal establishment of forest basing as well as reserved hillside for forest development. Patrolling and surveillance are important steps that have been taken to enforce the forest law.

24. Qu Geping and Woyen Lee, Managing the Environment in China, (Dublin, Tycooly International Publishing Ltd., 1984), p.74.

25. Ibid., p.63.

26. Ibid., p.27

Every country and every commune has established such patrol troops to ensure its implementation.²⁷

Environment and Development

In conclusion, it has to be pointed out that the basic remedy for the manifold ills that beset the Third World countries is rapid industrialisation, an inevitable concomitant of which is environmental pollution. And we have to accept it. So instead of decrying industrialisation, it would be more sensible for our environmentalists to recognise the contradiction inherent in the situation and try to grapple with the problems posed by the complex interplay between environment and industrial development.

The thrust of the campaign against pollution should be to force the industries to adopt modern scientific techniques to bring down to the minimum the toxicity of, or convert to useful substances, the industrial wastes. It is misguided ecological strategy to protect our environment at the expense of development. Let our slogan be: "Environment with development".²⁸

27. Ibid., p.73

28. V.M.Mohanraj, "This Bogey of Environmental Protection," Yojana, Vol.30, no.10, June 1986.

CHAPTER III
A CASE STUDY OF INDIA

The Need for a Creative Environment Policy for India

In a way India's environmental problems are similar to many countries of the developing world. Whereas, in the West excessive use of technology has resulted in environmental degradation, in India, poverty is one of the basic causes of environmental deterioration. Therefore, it is necessary to adopt and formulate a general policy for environment in India so that we maintain a wholesome human environment and provide for a creative and healthy life with the aid of science and technology.

Our villages, cities and towns are changing fast. Urbanisation is proceeding at a rapid rate. With increase in the population, our systems of transportation, energy-use, human settlements etc. are experiencing heavy strains.

There has to be a conscious effort to check the pace of this change, and secure the originality of our national environment. As the UN Declaration of 1972 at Stockholm states, "man is a creator and moulder of his environment which gives him spiritual, intellectual, material and moral growth. We can, therefore, to an extent improve our living

environments and make them beautiful by careful planning and pursuit of some national policy objectives."

Environmental Policy Objectives of India

The objectives of our environment policy are in accord with our ethos and culture.

The first objective of our environment policy is to strive to attain 'harmony' with nature.¹ The relationship of man and nature has been the most vital aspect of our national life. The problems of modern man have arisen as a result of disharmony with nature. Therefore, in our national planning and in the application of science and technology our policy has to strive for harmony with the laws of nature.

A second goal of our environment policy is to strive for seeking greater 'knowledge' about the environment.² In ancient times, as the Upanishads show, there was great stress for acquiring knowledge about the universe. There are many areas of scientific research, about the origin of life, life on other planets, cosmology, genetics and its impact on environment etc. which should be the goals of any national environment policy. The third goal of our

1. K.Gopinath, "State of India's Environment," Bulletin, Vol.16, No.1, January-May 1984, p.64.

2. Ibid., p.65.

✓ environment policy is to achieve development.³ Development means economic and technological progress by a careful use of our resources and in balance with nature. In this process, we have to adopt conservation and recycling of resources, so that we do not run short of resources.

Our planning of human settlements, transportation system, land-use, energy-use in particular should be worked out carefully. A creative environment policy will look to maintaining a balance between the material and the aesthetic and intellectual progress in our country.

✓ Another goal of our environment policy is 'international co-operation'.⁴ In an interdependent world order, and with ecological interdependence, no country can ignore the vital principle of international co-operation in environment planning.

Common environmental problems between countries can be solved better by international co-operation. There is need for exchange of information and joint remedial steps between countries for solving environmental problems in resource management in air space, land areas, oceans and outer space.

3. B.D. Nag Chaudhari and S.Bhatt, "Reflections on Environment Policy of India," India Quarterly, Vol.34, 1983, p.74.

4. Ibid., p.76.

Relevance of Pollution Problems in Indian Conditions

Pollution is primarily, at least in its more virulent forms, a byproduct of an industrialised society. One may ask whether problems of pollution are at all relevant to the less developed countries. Even if pollution is a significant problem, one may still wonder whether the tools of analysis or economic models or practical insights based on Western experience are relevant in Indian conditions.

Air, water and noise pollution are significant problems in India. Persistent pollutants and new hazardous chemicals also pose serious problems.

A study of pollution problems is needed for other reason too. Because of stricter environmental controls in advanced economies, many multi-national corporations may try to locate 'dirty' industries in the Third World.⁵ Similarly drugs and chemicals banned in Developed Market Economies (DMES) may find their ways to Less Developed Countries (LDCs). Without an adequate study of pollution, LDCs will not be able to respond to such problems.

5. G. Subha Rao, "Economics of Pollution Control," Administrator, Winter, October-December, Vol. XXIX, No. 4, p. 438.

Constitutional Environmental Perspectives in India

It was only in 1976 that the constitutional commitment to the environmental perspectives became clearly pronounced with the enactment of the Constitution (Forty Second Amendment) Act, 1976. This amendment has added a few environment oriented provisions to the Constitution. Thus article 48A of the Constitution reads:

The state shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.

Another important provision added by the Constitution 42nd Amendment is article 51A. Article 51A which finds a place in Part IVA entitled "Fundamental Duties" states:

It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

India is probably the only democratic country whose Constitution prescribes a national commitment to environmental protection and improvement. However, because of the Centre-State jurisdictional conflicts, due to the federal character of the system, an uneven situation exists in various States regarding environmental management and the implementation and enforcement of national policies.

The Sixth Five-Year Plan (1980-85) is the first serious attempt to appreciate and plan environmental

protection. The Sixth Plan document, presents an overview of the government's approach to the environmental problems. It classifies environmental problems as due to (a) conditions of poverty and underdevelopment; (b) negative effects of the process of development. The Sixth Plan lays emphasis on protection of land from degradation due to soil erosion, flooding, siltation, shifting cultivation, salinity, avoiding deforestation, exploitation of grass lands, provision of drinking water, social forestry and restoration of vegetative corners.

Prevention of water and air pollution and planned urbanisation are other major planks of the national environment policy. The amount of untreated industrial and municipal sewage being constantly dumped in rivers is staggering.

Industrial pollution constitutes only 6 to 10 per cent of the total water pollution.⁶ But due to major commercial and industrial activities, air pollution is on increase especially in areas with refineries and thermal power stations.

Smoke nuisance is posing a grave health hazard in cities like Calcutta, Kanpur and Bombay. Similarly unplanned and illegal urban growth is yet another environmental

6. R.B.Jain, "Role of Non-Governmental Organisations in Environmental Protection," Some Experiences in Indian Cities," The Indian Journal of Public Administration, April-June 1984, Vol.XXX, No.2, p.303.

problem, because of staggering exodus of people from the countryside and the human greed in converting the prime agricultural land into residential or commercial areas.

The Responsibility for Environmental Protection

The problem of conserving the environment while proceeding with necessary development is a colossal one. It is so huge that in a country like India it presents a great challenge to those responsible for the planning, those concerned with drawing up detailed programmes and finally those who have to implement the policies and programmes.

The problems encompass many fields and therefore, vast areas of the subject of environment are handled at the national level by various ministries and departments of the Government of India. However, India being a federal system, much of the action in this field has to be decentralised and lies in the States, and it is mainly the state governments, who have to carry out the necessary measures.

At the behest of the National Committee on Environmental Planning and Co-ordination (NCEPC) which was established in February 1972 to provide a focal point in the structure of the Government where environmental considerations could receive close attention in an integrated

manner. Almost all the States and the Union Territories in India have established environmental Boards with the terms of reference almost similar to the national committee.

These Boards are chaired by the respective Chief Ministers because it was thought that chairmanship by the Head of Government would link executive authority with the Boards. An official of the Department of Environment is invariably a member of the State Board Committee. This arrangement has been thought necessary to enable good liaison between the national committee and the State Boards.

However, at present the State Environmental Boards lack necessary technical expertise. These administrative bodies suffer in their work and effectiveness due to utter paucity of staff. A further handicap is the non availability of funds or financial support for setting up necessary expert committees, visits to project sites, and the preparation of environmental appraisal of projects handled by state governments. The situation is really serious, in the sense that in most states, these environmental committees are not at all active. Financial stringency coupled with inadequate attention being paid by State Governments is affecting the dedication and motivation of the Centre's leadership and its officials.

The net result of this state of affairs is that at the decentralised levels of administration, which are charged with the responsibility to take action for the protection of the environment are unable to act effectively. The main obligation of the State to meet its constitutional requirements, by appropriate laws, rules and regulations, enforcement and review mechanism and invite the public to participate in the environmental policy process remain largely unfulfilled.

Despite the indifference shown by the administration in the cities and towns in India in either enforcing the laws to protect the quality of the environment, the Non-Governmental Organisations (NGOs) and the judiciary in some cases have been quite active in bringing to the notice of the administrative authorities in the cities the damage caused to the environment as a result of the government's development policies or commercial exploitation of the forests and wild life by private organisations.

Whose Environment Must We Preserve?

Some of the newer ecological and environmental movements and campaigns in India have gone beyond the dictates of the current infra-structure of high technology development. They have on the one hand raised basic issues with

a challenge to the current development strategies and on the other, tended to explore and restate the best technologies continuously improved upon over generations by non-modern societies and which were adapted to the geo-cultural environment of these societies.

One could almost draw a parallel between strategic appropriateness of Gandhi's campaign against untouchability and the presently re-emerging campaigns against environmental destructions. As the issue of untouchability was a point where the entire decadent caste system was most vulnerable, similarly, the industrial-technological system is most vulnerable at the level of environment and ecology.

It would not be out of place here to draw the attention of the voluntary rural developmental institutions and constructive programme institutions, mainly in Gandhian field, to the need for a review of certain approaches from an ecological point of view. The entire Gandhian approach is rooted in the laws of nature which shape the laws of a society.⁷

"Clean the Ganga Campaign" launched by the Sankat Mochan Foundation of Varanasi is an ambitious project hoping to marshal all scientific, technological, as well as religious methods and facts towards a massive education programme on the issue of pollution of River Ganga.

7. Rajiv Vohra, "Whose Environment Must We Preserve?" Gandhi Marg, Vol.5, No.7, October 1983, p.404.

Similarly, a campaign against pollution of Narmada river by urban garbage at Hoshangabad in Madhya Pradesh draws much strength from the religious significance of Narmada. Work has begun on an oxidation plant according to the 'Save the Narmada Committee', to remedy pollution.⁸ A massive and spontaneous popular participation has been evident in this case.

In Goa, the construction of a big irrigation dam, mechanisation of iron ore mines and mechanisation of fishing industry have combined to offset the economic balance of the region. A rapid industrialisation of Goa started from 1970 onwards.

As soon as a huge factory, Juari Agro Chemicals, came into existence at the cost of Rs. 560 million, it started heavily polluting the seashore, tube wells, and the drinking water wells etc. The people of the affected area launched a struggle against the factory, and, after a long course of mediations, the factory management agreed to dump its poisonous waste two kilometers deep into the Arabian Sea, through a 2300 metre long polythene pipeline imported from the USA at the cost of Rs. 25 million.⁹

8. Anupam Mishra, "Narmada Valley," Narmada, Environmental Cell, Gandhi Peace Foundation, New Delhi, July 1986, pp. 22-28.

9. Vohra, n. 7, p. 412.

Public campaign against factory borne pollution forced the Goa legislative to enact a law prohibiting the further installation of such factories.

With the introduction of the fishing industry, a new class of owners of fishing trawlers emerged: different from the traditional fisherman known as 'rapankar' for whom this was the beginning of a struggle for survival.¹⁰ Trawler owners, their motor boats and ships, soon captured the industry, netting both the fish and the benefits. Modernisation of fishing poses a grave threat to the natural habitat for fish eggs. Trawlers have a destructive impact on the breeding area for fish, they totally disturb it which traditional fishing boats do not. Secondly trawlers indiscriminately catch fish both from shallow water nearer the coast as well as in the deep sea.

As this became a threat to the natural breeding of fish, it equally threatened fishermen out of occupation. It became increasingly difficult for them to get enough usual catch as the trawlers would sweep away the bulk. The fishermen protested and waged a sustained struggle.

After four years of sustained efforts, they made the government change its law pertaining to fishing, according to which an area up to five kilometers from the coast was reserved for traditional fishing.

10. Ibid., p.414

The Aravalli range is endangered by a variety of environmental hazards. It will turn into another desert if large-scale indiscriminate felling of trees is not stopped. This warning has come from the Gandhi Peace Foundation Centre, Jodhpur. This region was till recent times a wild life sanctuary but today wild life stands extinct.

Destruction of the Aravalli forest has made drought a recurring phenomenon, which used to be rare. Aravalli was thick with lush green forests, it was never a drought prone area, which it has now come to be.

'Katha', 'Arjun', 'Gurjan', and 'Semal' trees have disappeared. Tribals mainly Garasia and Bhil, whose source of livelihood used to be these trees, are facing grave struggle for survival.¹¹

Before Aravalli is totally lost (to become a desert), a massive tree plantation campaign is needed in order to reserve the situation. The Gandhi Peace Centre of Jodhpur is seized with this problem.

In another survey conducted by the same team, it has been brought to light that poisonous chemical pollution is being spread by 1500 units of the textile printing

11. Ibid., p.415.

and dyeing industry. At least three towns - Jodhpur, Pali and Balotra - are severely affected by industrial effluents. About fifteen million litres of chemically saturated wastes from this industry have already turned seven to ten hectare of fertile land into uncultivable land and almost all the drinking water wells are polluted.

Industrial effluents are carried by small gutters into Loni, Jojari and Bandi rivers, affecting a number of villages. This is sandy area and hence makes it easy for industrial effluents to seep through the layers of sand and reach into the wells and water reservoirs.

Factories are even blind to the health hazards amongst their own labourers. About 20 per cent, according to this survey, of them suffer from a variety of skin, lungs and eye diseases. The entire population of this area has become victim to many more serious diseases.

In all these cases, destruction of environment has directly affected people of their basic amenities of life. It is not the future exhaustion and depletion of resources but the immediate degradation of life that is at stake.

Impact of Tourism on Environment

Indeed, the twentieth century has ushered in a new age, qualitatively different from the preceding one, where

people by necessity are on the move in search of environment having cleaner air, lesser noise, healthier food, better fuel and cultural stimulants.

Our urban agglomerations, from where the mass tourist originates, have increasingly failed to supply the environment in which a healthy physical and spiritual human life is possible. Closely tied up with the problem of mass tourism is the issue of environmental resources which the tourist community in their holiday making moods, erodes or degrades directly and indirectly. This is important both to tourism and environment as the quality of tourism products depends upon a high quality of natural environment.¹²

Resource-based areas, unique in ecological features, are largely demanded by the tourist community. Resource composition of these beauty areas may differ but certainly they need a proper deal from the planners, promoters and preservationists. Development of tourism and preservation of amenities need proper reconciliation.

Not enough work has been done to assess the ecological effects of the tourism industry in India. Vehicles, helicopters, snowcrafts, mass buggies etc. are not only adding

12. Tej Vir Singh, "Impact of Tourism on Development: A Partial Analysis of Uttarakhand Himalaya." The National Geographic Journal of India, Vol.26, Pt.1-2, March-June 1980, p.16.

to the range and intensity of pressure of visitors, but also noise and pollution to the host areas.

The Himalaya is rich in flora and fauna wealth and has beautiful scenery. Because of its relative inaccessibility and difficult geographic terrain, most of it has escaped damaging human impact except in the foot-hill areas. Because of excessive human concentration during peak time, such Himalayan towns as Nainital and Mussoorie have suffered serious environmental degradation. Reports have shown symptoms of unsightly water-colour, less attractive for boating and swimming, presence of excessive weeds debris and silt.¹³ The fact is that our planning, whatever it is, has not been environment-oriented. This is more true in the case of hill-tourism.

Environmental Action for Doon Valley

On 12 March 1985, an Supreme Court Bench headed by Chief Justice P.N.Bhagwati gave a pioneering judgement on India's first major environmental litigation, upholding the need for conservation in the broader social interest. The public interest litigation was filed by the citizens of Doon Valley as a part of their struggle to save this unique and ecobiome of the Himalayas. The groups involved

13. Ibid., p.18.

in this litigation were the 'Rural Litigation and Entitlement Centre,' 'The Friends of the Doon,' 'Save Mussorie Society', and the 'City Board of Mussorie'.

The Doon Valley is endowed with rich and perennial water resources that supported flourishing forests, agriculture, horticulture and the growth of an urban settlement based on research and educational institutions. The Valley also has a huge limestone deposit in its ecologically sensitive northern part. Recently, serious conflict of interest had developed over the quarrying of the limestone and the case reached the Supreme Court of India, as the country's first public interest litigation on ecological grounds.

For the limestone quarry operators, quarrying was the easy way of making quick money. However for the local villagers depending on the productivity of the land, for the sustainability of urban and rural water supply schemes, for the tourism industry of Mussoorie, for a large number of schools and institutions in the Valley, the quarrying was closing future options for development and even survival.

Further, the limestone-based industries pollute the closed Valley with foul dust, transforming the serene Doon Valley into a 'gas chamber'.¹⁴

14. Nicholas Polunin, ed., "Peoples' Environmental Action for Doon Valley, India," Environmental Conservation, Vol.12, No.3, Autumn 1985, p.273.

In the 12 March 1985 judgement the Supreme Court allowed quarrying to be continued in only seven out of sixty quarries. Fifty three mines have been closed, making rehabilitation a possibility.¹⁵ In the contemporary reality of rapid environmental degradation, such citizen's participation in environmental action provides a new hope that has been rekindled in India by the Supreme Court judgement.

Himalayan Tragedy

The commercial exploitation of forests began in the Himalayas in the middle of the last century under the pretext of scientific management. The neighbouring hill states soon fell a prey to the greed to earn money from the forests. There was no regeneration of forests and some of the river valleys, specially those of Chenab in Doda District, Sutlej in Rampur, Bhagirathi in Tehri and Alaknanda in Chamoli and Garhwal, present a deserted look.

Though the pine forests have created a number of ecological problems like depletion of soil fertility, drying up of water sources and scarcity of fuel and fodder, yet these are facing extinction due to resin tapping. In Kashmir Valley, the village women have to collect the fallen leaves of the poplars for charcoal while the World

15. Ibid., p.274.

Bank Social Forestry Programme is planting commercially viable species. The slogan is "Plant trees, grow money."¹⁶

Construction of roads is given top priority in this region. The construction of 4,400 kms. of roads has generated 2,650 million cubic meters of debris. Each year every kilometer of these roads produces 550 cubic meters of debris by landslides and rockfalls, so that every year about 24 million cubic meters of sediments slide down the slopes killing vegetation and choking mountain streams.¹⁷

A number of hydel projects are underway in the Himalayas. Construction of big dams like Tehri and Utsayu will create a number of ecological problems. The siltation rate of reservoirs over Himalayan rivers is three to five times more than estimated and the failure of Rs.800 million Maneri-Bhali power Project at Uttarkashi has put a big question mark on the utility of these projects. These problems pose a threat not only to this region but to the whole sub-continent. Fortunately the Planning Commission in the Seventh Five-Year Plan, has realized that "the hill development plan should be both ecologically sustainable and economically viable for the local community". Cultivation

16. Hindustan Times, 6 January 1986.

17. Ibid.

at agricultural crops in areas above fifteen degree slopes should be stopped and these areas should be planted with five Fs (food, fodder, fuel, fertiliser and fibre) trees. Tree culture should be extended to forest and other barren areas.

Dismal Progress in Forestry

The Sixth Five-Year Plan failed in practice to lay emphasis on measures which could be conducive to enhance productivity of the resources and to reallocate the resources to meet the basic needs of the rural community. In fact, the budgetary allocations in the initial Plans were a mere pittance, i.e. between 0.4 per cent to 0.6 per cent of the total Plan outlay for the country.¹⁸ This caused such damage to the forests in the country that they fell far below the optimum level of 33 per cent of the total geographic area of the country. The present area under forests is only about 22 per cent. The massiveness of the programmes in the Sixth Plan was also not matched with the necessary infrastructure. The result is that today the organisation in the States is both technically and managerially weak and consequently inefficient.

18. Hindustan Times, 11 July 1985.

Air Pollution

Air Pollution may be termed as the presence of one or more pollutants or combinations of these pollutants in such quantity and for such duration which may prove to be injurious to human, plant, animal life or property. Air pollution occurs when the capacity of the atmosphere to dilute the pollutants is overburdened.

The most injurious pollutants found in the air are sulphur dioxide, nitrogen oxide, hydrogen flouride, dusts and grit, carbon monoxide and oxidants. The National Environmental Engineering Research Institute (NEERI) at Nagpur has carried out surveys of air pollution in Bombay, Delhi and Calcutta.

The NEERI set up monitoring stations in the following nine cities of India - Bombay, Delhi, Calcutta, Madras, Hyderabad, Ahmedabad, Jaipur, Kanpur and Nagpur. According to the studies Calcutta seems to be one of the most polluted cities in India. It has frequent atmospheric inversions, primarily on account of the inefficient performance of the engines of the transport systems.

The air quality survey of Bombay city was started in 1970 by NEERI Zonal Laboratory in Bombay.¹⁹ In addition,

19. Study prepared by Dr. Ranganathan, "Environmental Policies and Their Implications for Trade and Development: A Case Study of India" (UNCTAD, Geneva, 1977), p.14.

regular air quality data are being furnished to the WHO Regional Centre on air pollution control. Pollution surveys should also be conducted at the micro level, as they will indicate the serious implications of pollution levels which could endanger the health and well being of people.

Air Pollution from Thermal Power Stations

Among the principal sources of pollution of the air in India are thermal power stations. Through careful planning of land use in keeping with environmental objectives, an improvement in the condition of air pollution can be effected. Where topographical and meteorological conditions favour the dispersal of pollutants, major emission sources can be located in such areas. The pollution control policy for a region will have to be established after taking into account the availability of different fuels and local factors, such as the nature of pollution sources, geographical and meteorological conditions and the extent of urban and industrial development.

Lethal Chemicals Take a Heavy Toll

The Bhopal tragedy, which is described as the worst in industrial history, had placed a moral responsibility on environmentalists to take a fresh look at the industrial

siting criteria. The chronic effects of exposure in small doses to chemicals for a long period lead to irreversible damage in the ecosystem and cause severe disorder and disease in the affected populations. Even warning signs are not displayed in asbestos, cement and fabric factories. All these factors have combined to cause a variety of diseases among the factory workers in India.

In 1977, in the districts of Lakhimpur and Hardoi in UP, several families suffered from epilepsy caused by grain contamination. In the mid-seventies, in Karnataka, a large number of the landless were critically afflicted with a mysterious crippling disease after consuming fish from paddy fields which had been sprayed heavily with the highly toxic eldrin and folidol.²⁰

The Food and Drug Administration in India is ill-equipped with poor testing facilities and lack of trained personnel. Pesticidal hazards are known even in Britain and the USA where government agencies monitor pesticide regulations strictly. India, like other developing countries, does not have any set up to monitor the health hazards of pesticides.

20. Upendra Baxi, "Agro-Economic Systems: Emerging Legal Issues," Mainstream, Vol.23, No.18, December 1979, p.12.

Crime Against Ecology

Experts repeatedly voiced concern and expressed fear about declining standards of industrial safety measures but evidently to no avail. Madhya Pradesh, in particular, had over ten years a high frequency of industrial accidents, given its comparatively low level of administration.²¹

The authorities of the insecticides plants were actually to blame for violating the environmental guidelines for setting up such a hazardous industry.

An accident (similar to Bhopal's) involving hutdwellers in the close vicinity of a solvent extraction plant at Amravati in Maharashtra State during the early morning hours on 7 September 1966 resulted in the death of over fifty persons.²²

A common feature in most of the major disasters has been the involvement of the people residing in the close proximity of such hazardous plants.

Environmental Guidelines

In the environment guidelines, as issued in July 1980, the Department of Environment said that at the time of setting up of a hazardous industry, if any major settlements notified

21. Brojendra Nath Banerjee, Bhopal Gas Tragedy - Accident or Experiment, New Delhi 1986, p.63.

22. Ibid., p.74.

limit was within fifty kilometers. The special direction of the settlement for at least a decade must be assessed and the industry should be sited at least twenty five kilometers from the projected growth boundary of the settlement.

The department listed twenty-one industries which were required to obtain environmental approval for siting. These included fertilizers, ferrous and non-ferrous metallurgical, mining, coal, power, paper, cement, glass, ceramic, petroleum, drugs and pharmaceuticals, fermentation, rubber, leather and metal finishing industries. The guidelines said that in siting industries, care should be taken to minimise the adverse impact of the industrial sites which are required to maintain a distance of at least twenty-five kilometers from ecologically sensitive areas, a distance of half a kilometer from the flood plain of riverine systems and at least half a kilometer from transport and communication systems.

A new procedure has been proposed in respect of the issue of industrial licences. Under this procedure the letters of intent can be converted to industrial licenses only after certain conditions have been fulfilled.. These conditions require confirmation from the State Director of Industries that the site of the project has been approved

from the environmental angle by the competent State authority; that the entrepreneur commits both to the State Government and Central Government that he will set up appropriate equipment and implements for the prevention and control of pollution, that the concerned State Pollution Board will certify that the equipment to be installed is adequate and appropriate for the purpose.²³

The new guidelines say that the entrepreneur would be required to submit half yearly progress reports on installation of pollution control device where they are required. If the State Pollution Control Board reports neglect of progress, strong deterrent action to the extent of revoking industrial licence should be taken.

New technology means that poisonous explosives and inflammable substances are being handled in unprecedented volumes and at high pressure in factories all over the country. There had been a major fire at power stations at Karadi, Singrauli and Obra and at the Cochin as well as the Mathura Refineries.

An off-shore well caught fire at Bombay High, an oil tanker exploded and blazed for six days at Bombay port, and

23. Raj Gill, "Pollution Control - Now or Never," Hindustan Times, 4 July 1985.

there was a major explosion at the LPG bottling plant at the Indian Oil Corporation in Delhi.²⁴ It is clear that safety standards in the country are unsatisfactory, and that every city with large industries has become a danger zone.

Air Pollution by Motor Vehicles

Studies conducted by the NEERI Nagpur have revealed that the level of pollution due to automobile exhausts in Indian cities is reaching figures quite comparable with other major cities of the world. The inferior maintenance of vehicles, in combination with lower combustion efficiency, is making the vehicular exhausts a menace to the city dwellers.²⁵

Among the gaseous components, oxides of nitrogen and the nitrated organics and oxidants generated by them, are considered to be the most hazardous. Carbon monoxide is also hazardous to human beings and animals. It reacts and neutralises a part of the haemoglobin in the blood, thus reducing respiratory capacity. Being concerned about this

24. Banerjee, n.21, p.65.

25. P.S. Gangal, "Air Pollution by Motor Vehicles - Indian Strategy for Control," Paper presented for International Seminar on Law and Science for Protection of Environment in India, India International Centre, New Delhi, March 1985.

menace, the rather recently enacted Air (Prevention and Control of Pollution) Act 1981, empowers the State governments in consultation with the State Boards, to give instructions to transport Authorities in this connection.

Pollution of air by the exhausts from automobiles, especially in the metropolitan cities with increasing traffic density, is becoming a serious problem. The Central Board for Pollution carried out tests on 1,000 motor vehicles including scooters, autorickshaws, cars and buses in Haryana, Himachal Pradesh, Delhi and Chandigarh.²⁶ At the instance of the Board, the Indian Institute of Petroleum also conducted a survey of various types of vehicles in Delhi.

The findings of the two tests led to the revelation that less than 20 per cent buses meet the standard of seventy HSU (Hartridge Smoke Unit). According to the specifications prescribed by the Indian Standards Institution, the vehicles powered by spark ignition engine should not emit carbon monoxide exceeding 3 per cent by volume of exhaust gases and vehicles which have completed five years of life of 80,000 kilometers distance.

It has been found in the two tests that a sizable number of vehicles are exceeding the limits. Only 38 per

26. Gill, n.23.

cent of the two-wheelers, 53 per cent of the three-wheelers and 24 per cent of the four-wheelers meet the limit of 3 per cent CO emission.²⁷

The State governments have been directed to make changes in the Motor Vehicles Rules for enforcement of standards on vehicular exhaust emissions. Efforts are also afoot to develop precision instruments to check exhaust emission, building up facilities in metropolitan cities for owners to get their vehicles checked with respect to exhaust emission, and strengthening of the inspectorate and other transport authorities for making tests on vehicles. The Government proposes to enact a comprehensive law to deal with the problems of environmental pollution.²⁸

Major Problems of Environment Related to Aviation

The increased aircraft operations contribute to environmental pollution mainly in two ways - noise and engine emissions. For the aircraft flying at supersonic speeds, a third dimension gets added in the form of 'Sonic Boom'. We have not yet given any serious consideration to the certification of aircraft for emissions and the necessary machinery for this purpose is yet to be developed. Airports

27. Ibid.

28. Hindustan Times, 13 December 1985.

have generated pollution since their inception. Since pollution may be generated within an airport as well as within the area surrounding it, environmental laws should be generally applicable to the airport and its environments.²⁹

Pollution of Land Due to Disposal of Liquid Wastes (Sewage) and Solid Wastes

Only primitive methods of solid waste disposal have been practised in many towns and cities. While towns and medium-sized cities have adopted composting with sewers, in the big cities there are several problems like costs, land availability and marketing of the composts. Generally, in India, the alternative to composting has been simple dumping of solid wastes in low-lying areas. In Bombay the dumping of refuse in low-lying areas adjoining the creeks has led to pollution of their waters where BOD (Biochemical Oxygen Demand) values as high as 400 parts per million have been recorded.³⁰

Water Pollution

Water pollution, which is a major problem in India, has increased steadily over the last few years in and around

29. Air Marshal C.K.S.Raje AVSM, "Aviation Activities and Environmental Protection in India," paper presented for a seminar on Law and Science for Protection of Environment in India, March 1985, New Delhi.

30. Ranganathan, n.19, p.17.

industrial and urban centres. Quantitative data in respect of water pollution in India are limited. However, some surveys have been carried out by the All India Institute of Hygiene and Public Health, Calcutta and the NEERI, Nagpur and its zonal stations.

So far, in the absence of proper legislation in regard to industrial wastes and water quality standards, only a few industries have constructed waste treatment plants. Even here the plants are not regularly operated and the performance is not quite up to the desired level.

In the major industrial cities of India, like the city of Bombay and surrounding area, untreated industrial wastes are discharged into municipal sewers or into the seas and creeks or other water courses. Studies have indicated that the river system in the area have acidic conditions. Mercury pollution greater than 500 μ g on a fresh weight basis has also been reported.³¹

The Hooghly river receives waste from jute mills, textile mills, tanneries, pulp and paper mills, distilleries and a number of miscellaneous industries. It has been estimated that there are nearly 350 outfalls on either bank of the river, pouring out large quantities of obnoxious industrial effluents.

31. Ibid., p.19.

Damodar receives wastes from steel mills and coke industries. In addition, there are fertiliser, chemical and several other plants near Damodar which add to the pollution. The BOD has been found to vary from 5 mg per litre to 30 mg per litre. The water is unfit for drinking and is also not fit for fish and other aquatic life.

It is stated that about 1,60,000 cubic meters of waste having a BOD load of over 43,000 kg. are discharged daily into the river by eight major industries. It has been estimated that approximately Rs.15.5 million will be required to treat these wastes to acceptable standards.

The report on another survey of the Jamuna river between Delhi and Agra, covering a distance of 325 kms. along the river shows that the sewage and industrial discharge are the main causes of pollution. During summer, the discharge into the river is very slow and sometimes there is no flow at Okhla reservoir and the organic matter added to the river upstream from Agra seriously interferes with the raw water quality at Agra.

The eutrophication of certain types of inland and coastal waters occur through over-fertilisation. Fertilisers act as plant nutrients and they are discharged through sewage effluents, wastes from cattle farm, and drainage from fertile soil. Of the various ingredients in the fertilisers, phosphorous is the most important.

As a long term programme, the design and installation of facilities for the removal of phosphorous from sewage on a sufficient scale by treatment process should be an essential element in the programme for the control of eutrophication.

A National Clean Up Effort

A big clean up operation of the Ganga is in progress. The apex body of Operation Ganga Authority is headed by the Prime Minister and nine members. Having the largest river basin of 9,00,000 sq.kms. covering 26 per cent of India's land mass and carrying 25 per cent of India's water wealth, the Ganga is now in a miserable state. Out of her 2,525 kms. length, the worst polluted stretch is almost 600 kms. long.

Apart from rapid industrialisation, a booming population and disproportionate development, many social factors have also contributed in polluting the Ganga. The main sources of pollution are urban liquid waste, industrial liquid waste, large scale wallowing of cattle and the throwing of dead bodies into the river. The untreated city sewage, however remains the worst polluter.

Operation Ganga is a vital operation in view of the alarming state of pollution. The Action Plan seeks to

channelise national effort. The first phase of the operation during 1985-90, had an estimated outlay of Rs.250 crore but this has recently been slashed to Rs.80 crore by the Planning Commission.³²

The major thrust of Operation Ganga will be on renovating the existing sewage treatment plants.

"The volume and complexity of the Ganga Action Plan called for innovative approaches and new technological applications."³³ The success of the operation will largely depend upon the co-ordinated efforts of various agencies involved in it. The ultimate implementation as well as monitoring of the task is expected to rest with the concerned State Water Pollution Control Boards.

Problem of Water Pollution

In India, about 2.5 crore people in 34,000 villages are endemic to cholera, 18 lakh people of 3000 villages are infected with guinea worms. The death rate due to dysentery is 9.6 and 16.5 per thousand persons in the urban and rural areas respectively.

Radioactive pollution of stream is of recent origin. Radioactive waste waters emanate from atomic energy installations.

32. Hindustan Times, 20 July 1985.

33. J.A.Kalyankrishnan, address at the first meeting of the Steering Committee of the Ganga Action Plan, 1985.

establishments; hospitals and industries using artificially produced radioactive isotopes for research and other purposes. The disintegration of radioactive elements involves the release of many different types of radiations highly dangerous to human beings, animals and the plant kingdom.³⁴

In respect of Greater Bombay and the adjacent six municipal councils of Thane, Kalyan, Bhiwandi, Dombivli, Ulhasnagar and Ambarnath, a World Bank loan has been obtained for the purpose of scientific and hygienic disposal of sewage and for augmenting the water supply to these areas.³⁵ Similar action will be necessary to encourage the other municipal councils in the State to take up sewage disposal on modern lines.

Preventive and Control Measures

The above aspects of water pollution highlight the need for proper preventive and control measures to be adopted. The State of Maharashtra took the lead to enact the first Water Pollution Control Act in 1969. Subsequently "The Water (Prevention and Control of Pollution) Act 1974 was passed by the Parliament and Central Board for Prevention and Control of Water Pollution was established. A number of states have since established similar Boards.

34. V. Haraprasad, "Water Pollution - A National Problem," Yojana, Vol. XXIV/10, June 1980, p.14.

35. "Impact of Water Pollution Control Measures in Maharashtra," Yojana, Vol. XXIV/8, May 1980.

The primary function of the Central Board is to promote cleanliness of the streams and the wells in different States and to advise the Central Government on any matter concerning the prevention and control of water pollution. The Central Board Co-ordinates the activities of the State Boards and provides technical assistance and guidance to carry out research relating to the prevention, control or abatement of water pollution.

Another important activity of the Central Board is to collect, compile and publish technical and statistical data relating to water pollution and the measures devised for its effective control and to disseminate information connected therewith. To fulfil the objective it plans and organise the training of personnel engaged in the water pollution control activities.

Some of the functions of the State Board are to inspect the sewage works or trade effluent works to review the plant specifications or other data relating to the plants set up for the treatment of water, and so on. They can lay down, modify, or annual effluent standards for the sewage and trade wastes and for the quality of receiving waters and classify waters of the Stated.

The State Boards also advise the State Government on whether the location of any proposed industry would pollute a stream, well or a tank. They are empowered to obtain

information, take samples, enter and inspect the various avenues of pollution, refuses or withdraw the consent given and to make application to courts for restraining apprehended pollution of water in stream or well and to take emergency measures in case of pollution.

Realising the need to preserve our natural water resources, the Indian Standards Institution has published many criteria and tolerance limits for different type of waste waters which can be disposed of by different methods. Scores of professional association and voluntary agencies are also involved in the endeavour of liberating our water from pollution. Notable among them is the Indian Association for Water Pollution Control.

Refuse of waste waters is one of the methods of containing water pollution and continuous research in this field is being carried out in some state Government departments and in some Central Laboratories. The National Environmental Engineering Research Institute (Nagpur) with its nine zonal laboratories spread over the length and breadth of India is actively engaged in evolving appropriate technological solutions to contain the environmental pollution in the country.

Apart from the R & D activities the Institute also conducts refresher courses on "Water Pollution Control" for

practising engineers and scientists. The Sewage Reclamation Research Unit, Madras has been carrying out research studies in the reuse of sewage and industrial effluents and low cost waste treatment methods.

For effective water pollution control it is essential to have a system of adequate collection, treatment and disposal of community wastes which could otherwise pollute the natural water resources. With this object in view, an expenditure of Rs. 815 crore was made in the five year plan outlay 1978-83 for urban water supply and water pollution control.

A sound system of water pollution control results in the preservation of the aquatic biota, lower water treatment costs, savings in the avoidable expenditure on medical services for patients suffering from waterborne diseases.

NGO's Role in Implementation of Environmental Policy

The Non-Governmental Organisations have been quite successful in forcing the ministries and other developmental agencies in the states to allow the Department of Environment (DOE) to study and analyse the potential environmental impact of critical projects.

Such references have sometimes resulted in changes of site, project design etc. in deference to environmental considerations. There have been occasion when DOE's decisions have been distorted by political expediency. The NGO's have battled against this through lobbying in the corridors of power.³⁶

Some Specific Case Studies

Kalpa Vriksh

Kalpa Vriksh is an environmental action group composed mostly of students who got together to act against the visible deterioration of Delhi's environmental conditions. The group had been greatly concerned at the fast eloping green areas in the city. A rally organised by the group, coupled with increased citizen's pressure, and finally a memorandum presented to the Prime Minister in 1980 were instrumental in getting the Ridge and other green areas declared as 'Protected Areas'.

The group also extended its activities in respect of tree planting and bird counts, running Nature Clubs and holding workshops for students during 1981 etc.

36. Jain, n.6, p.308.

Save the Soil Campaign

A farmers' movement called 'Save the Soil Campaign' had sprung up in Madhya Pradesh to campaign against an irrigation project, which did more harm than benefit in the district of Hoshangabad. The black soil of Hoshangabad was giving more yield per acre before the advent of the irrigation. The soil now lies water logged and is increasingly less productive a 'wet desert' as the local farmers call it.

'Save the Soil Campaign' group had been making efforts to repair the damage as far as possible. As a result of its efforts and a report of Government of India that Rs.300 million spent on Tawa Irrigation Project in Hoshangabad district of Madhya Pradesh has decreased from production instead of increasing it, the Auditor General of India, referring also to the reports of the Land Records Commission, has requested the Madhya Pradesh Government to review the project and not to waste more funds on it.

Bombay Natural History Society

This non-governmental voluntary organisation has undertaken several research projects on the conservation of wild life during the period 1961-79. Specifically, it

made a study of the ecology of birds in an around airports with a view to reducing the possibility of bird strikes of aircraft; studies on the movement and population structure of Indian Avi fauna; Hydrobiology Research Institute at Keoladev Ghana Bird Sanctuary and an Ecological Reconnaissance of Vedaranyam Swamp.

Bombay Environmental Action Group

This has been one of the most successful of the NGO's in conducting an intensive campaign against planes to locate a major fishing harbour and industrial complex near Colaba at the southern tip of Bombay which would completely devastate that area and also result in the reversal of Maharashtra Government's policies, such as the decongestion of South Bombay, the industrial location policy etc.

As a result of the Group's efforts and consequent stay granted by the Bombay High Court, the Central Government had agreed to appoint a visiting team to review the whole project. Further as a result of the group's efforts a large part of Nhava Island (behind Elephanta island in Bombay City) has been preserved for a green belt. The Group also campaigned to various civic organisations to preserve the neglected historical buildings.

The biggest victory for environmental NGO's in 1983 was the abandoning of the Silent Valley Project. The

crusade was spearheaded by the formidable Kerala Sastra Sahitya Parishath (KSSP) which is often referred to as a 'people's science movement'.³⁷ Since 1980 the KSSP has been organising its popular 'sastra kala jathas' wherein through the medium of folk art, street corner plays and music etc. attempts are made to increase people's awareness on issues such as deforestation, pollution, public health, etc.

The KSSP had within its fold and among its sympathisers professional expertise of a high order. This enabled the organisation to challenge official statements with reasoned arguments backed by scientific data and analysis. Indeed the KSSP were the first to highlight possibilities of viable alternatives to the benefits that would have flowed from the Silent Valley Project.

Meanwhile the State government continues to be under severe populist pressures to allot forest land to the landless for cultivation. Encroachers on forests in the Iddukki area have virtually won their battle to get their gains regularised. The point here is that even the Silent Valley and adjoining areas as a Biosphere

37. Thomas Mathew, "Agents of Change - The Role of Government and NGO's in Environmental Management," The Administrator, Vol. XXIX, No. 4, October-December Winter 1984, p. 340.

Reserve would not solve anything in the absence of state government and Forest Department's resolve to protect the area.

In many cases like the 'Chipko' movement in Garhwal, there were spontaneous public demonstration of protests against government policies.

The Chipko Movement

^a The Chipko movement in India began in the 1920s with the people's struggle for forest rights, which culminated in May 1930 at Tiladi in erstwhile Tehri when sixteen persons died in military firing.³⁸ Throughout Uttarakhand today, Tiladi is a symbol of what people are prepared to face.³⁹

This movement was revived in the early 1970s in order to resist the continuing devastation of Himalayan forests, particularly in the Alaknanda catchment area. It has made some progress in resisting green felling, but has by no means been completely successful. The struggle to

38. The word 'Chipko' is the imperative of the Hindustani 'chipakna', which means to stick to (something). The movement is called 'chipko' because people 'stick' themselves to the trees to prevent them from being cut.

39. Sumi Krishna Chauhan, "Forest People's Rights Axed," Hindustan Times, 16 April 1979.

prevent green felling and to implement a forestry programme oriented towards meeting people's need continues. The following is the programme of the movement:

- (1) Stop all green fellings in the hills. Manage hill forests as protection forests.
- (2) Mass plantation with priority to (i) food (nuts, oil-seeds, fruit trees); (ii) fodder (even in conifer areas for mixed forests); (iii) fuel, (iv) fertilizer; (v) fibre.
- (3) The whole programme should be chalked out and implementation entrusted to the people.

Among the major new grassroots environmental NGO's movements that have received publicity during 1983 is the APPIKO (Hug). On 8 September, about 160 men and women from Salkani village of Sirsi taluk in Uttar Kanara District of Karnataka successfully hugged the trees to prevent forest department contractor's from carrying out felling operations.

The Dasohli Gram Swarajya Mandal has made concerted efforts to organise villagers in some twenty villages of the Garudaganga Valley to grow tree and fodder crops on their own steep hilly lands and on degraded reserve forest lands.

A parallel case in Karnataka relates to the eucalyptu controversy. The protest by some NGOs against what they

claim to be indiscriminate planting of eucalyptus with adverse ecological consequences led to uprooting of plantations.

Interaction of Environmental NGO's With Government

State Governments have still to involve themselves seriously in environmental planning despite the establishment of Department of Environment. Interaction between environmental NGO's and the states in which they are located is confined largely to functional matters (clearances information, advice) etc. whereas for financial and technical support various central departments and agencies have to be relief upon.

The three main sources for programme funds are the Department of Environment, the Department of Science and Technology and the Ministry of Education and Social Welfare. Some NGOs of course have overseas funding while a small handful are about to generate enough resources through consultancy work and sale of products (publications, educational material etc.).

There is now a concerted effort by the Department of Environment to support NGOs in their work and use their expertise for the Department's own programme.

Thus the number of NGO representations in official committees has gone up manifold. The recently constituted Rashtriya Pariyavaran Samithi, has representation from a number of prominent environmental NGOs and other unofficials. Similarly, 'environmental monitoring committees' for various projects such as the four projects in Bombay (ONGC-MDL base at Nhava Island, Nhava Sheva Port - Sasson Docks and Thal Vasishet Fertilizer Plant Township) have strong environmental NGO representation.⁴⁰

Constraints on Environmental NGO Functioning

The major constraints in the way of effective functioning of NGOs apart from shortage of funds are listed below:

- i) Lack of trained personnel to carry out indepth analysis of environmental issues. This limits the role of a vast majority of otherwise enthusiastic environmental NGOs to the organisation of repetitive and poorly planned seminars, competitions and functions.
- ii) Lack of access to authentic data from official sources or projects, programmes and other development activities with environmental implications.

- iii) Lack of statutory support and judicial sympathy for efforts of non-official groups willing to fight against agents of environmental destruction.
- iv) Apathy of the public in general towards sustained campaigns for environment related legislation as well as in monitoring of their implementation.

Linkages between city-based NGOs attempting to conduct environment programmes in rural areas with their grassroots level counterparts in such areas are subject to a number of imbalances. It is necessary for city based NGOs to develop much greater sensitivity to the real needs of the rural areas.

CHAPTER IV
C O N C L U S I O N

The combined effects of misdirected technology, short-sighted and inequitable exploitation of resources, lack of population planning in many parts of the world, emphasis on military constructions and weapons at the expense of human welfare, and the excessive production of the affluent, are the most important causes of the present state of the environment.

It is clear that in environmental matters the developing countries enjoy one of the very few advantages of being late-comers in the development process: they are in a position to avoid some of the more costly and needless mistakes the developed countries made in the past. They can far more easily and inexpensively build into their industrial infrastructure, the practical preventive measures necessary to avoid the ecological damage the developed world has already suffered.

Most people recognise the urgent need for environmental education. The chief objective of environmental education is that individual and social groups should acquire awareness and knowledge, develop attitudes, skills and abilities and participate in solving real-life environmental

problems. This perspective should be integrated and interdisciplinary in character.

During recent decades a series of unforeseen issues have arisen to alarm and impel governments to domestic and international action. Among the more conspicuous of these have been discoveries regarding the environmental effects of mercury, chlorinated hydrocarbons, dioxins, and acid precipitation. At mid-twentieth century, none of these was a political or an international issue.

There is need for a legitimized and effective means through which international action may be interposed to prevent, or to take into receivership, cases of national ecological bankruptcy. The need for such an arrangement is more apparent than is its feasibility. Obstacles include national sensitivities, political conflicts within impoverished countries and among competing interventionist states, and rivalry among aid-giving international agencies.

It would be unrealistic to believe that nations will bury their differences in the interest of the world environment. Yet experience shows that nations can modify their antagonisms to an extent necessary to deal with common environmental problems.

Politically antagonistic governments have joined in cooperative scientific efforts towards better understanding of the global environment. This understanding, derived from investigations in such fields as agronomy, climatology, hydrology, oceanography, ecology etc. provides the informational basis for the formulation of national and international policies relating to the environment.

The record of the treaties ratified and multinational programmes initiated since the 1972 UN Conference is encouraging. However, there remains a critical need for international foresightedness based upon reliable science, coupled with broad public acceptance.

The Scientific Committee on Problems of the Environment (SCOPE) considered the possibility of an International Center for the environment. Such an institution would provide a focal point and coordinating facility for investigations of the global environment.

World Bank are doing a great deal with the environmental issue in the day-to-day operations. In 1970, the post of Environmental Advisor was established with a strong mandate to review and evaluate every investment project from the standpoint of its potential effects on the environment.

The environmental criteria established in the Bank encompass the entire spectrum of development. They consist of a comprehensive checklist of questions designed to insure that foreseeable and injurious environmental consequences are carefully considered from the initial concept of a project, through its design stage, its actual construction and into its ongoing operations. The projects which pass for review through Environmental Office include every major region of the developing world.

Monitoring is essential to any programme for environmental conservation and for studying climate and biological changes affecting productivity of biological system and of man's environment. "Our present knowledge about biological parameters, especially with regard to relationships to the chemical and physical composition of water and the atmosphere such as result from changes coming from natural or man-made causes is insufficient.

It is urgent that international agencies within their specific fields of competence continue critically to evaluate all relevant parameters, take further steps to standardize methods, and exchange information pertaining to the monitoring of the environment.

Ecological considerations have made us all more aware of the interdependencies of our world. What must be done to reconcile our mandate to assist in the economic advancement of the developing countries with the responsibility to preserve and enhance the environment?

There are few essential requirements. We must:

- (i) Recognise that economic growth in the developing countries is essential if they are to deal with the human problems.
- (ii) Act on the evidence that such growth, if properly planned, need not cause unacceptable ecological penalties.
- (iii) Assist the developing countries in their choice of a pattern of growth which will yield a combination of high economic gain with low environmental risk.
- (iv) Mobilise and stimulate existing national and international bodies, both governmental and non-governmental, already engaged in various aspects of the environmental problems.
- (v) And, above all, realize that human degradation is the most dangerous pollutant.

Environmental considerations in the location of industry are important. UNEP has prepared guidelines for

for incorporating environmental aspects in location policy. India India, states compete for location of major projects which create jobs and trading opportunities.

Environmental Impact Assessment (EIA) is being made as part of a projects benefit cost analyse. It is necessary to make EIA at a preliminary stage for building the necessary environmental safeguards into the project. If such costs are included in the project outlays, they more completely reflect its environmental impact.

This in turn is helpful in two ways. Firstly, a more accurate picture of the costs and benefits emerges. Secondly, it is at least ensured that the needed expenditure for environmental safeguards are explicitly provided in the project costs. Project authorities in the public sector will not have to seek separate financial outlay, later for environmental control measures.

National Plan of Action

The EIA of all major public projects have now been built into the clearance procedures in India. Detailed questionnaires have been devised for incorporating data environmental aspects in project documents. Environmental Appraisal Committee, have been set up in the union department of Environment for hydroelectric and irrigation projects mining projects, industrial projects and thermal power projects.

Department of Environment has proposed certain steps in the industrial licensing system to ensure that environmental considerations are incorporated right from the site selection stage.

These include the following:

- i) At the stage of conversion of letter of intent into a licence, approval of the project site from environmental angle should be obtained from the states department of environments. In those states, where such departments have not yet been set up, approval should be obtained from the competent authority designated for looking after environmental matters.
- ii) In respect of projects where support from the Central Government or international agencies is envisaged, approval of the project site from environmental angle should be obtained from the Department of Environment, Government of India.
- iii) Approval of the State Pollution Control Boards should also be obtained at the stage of converting a letter of intent into licence.
- iv) The entrepreneur should provide the details of control technology to be adopted for pollution control, which should be reviewed and cleared by the relevant State Pollution Control Board.

- v) Half yearly progress reports on installation of pollution control devices shall be submitted to State Pollution Control Boards.
- vi) Cost of pollution control and such other measures for environmental safeguards should be treated as an integral cost of all industrial development projects. The financing units should not release the funds for the projects until concurrence from environmental angle from competent authority is obtained.

The attempt should be to introduce a new 'approach' to environmental education. The idea should be to bring environmental concerns in all subject areas so that environmental bias permeates into all facets of one's life and does not get compartmentalised at one place.

The non-formal education must cater to adult education, rural youth, tribals and forest dwellers, public representatives, senior executives, administrators etc.

One of the important recommendations of Tiwari Committee is the training and appointment of Environmental Advisers in various ministries, public and private sector undertakings etc. This would go a long way to help to bring in environmental concerns in the working of the

ministries and departments as also solve environmental problems created by the developmental activity of the concerned ministries.

The important issues of policy nature are:

- 1) The plans for environmental management should be integrated in all the developmental activities of all sectoral authorities (from a ministry/corporate body/municipal council down to panchayat) who have the primary responsibility for environmental protection. Implicit in the statement are the following points:
 - Key to the success in environment lies in cooperation between central and state governments; their subsidiary agencies, financial institutions, non-governmental bodies etc.
 - Environmental management should be a statutory obligation for all developmental projects. Environmental considerations should form important criteria for assessment of performance, achievement of targets etc. of all developmental activities in all sectors.
 - For sustainability of high productivity, resources have to be made available for all times to come. It is only possible if we manage them well.

- ii) Programmes on environmental amelioration can succeed only when participation of public is secured and public at large develop a stake in environment.
- iii) Mechanism need to be strengthened for ensuring:
 - Corrective or restorative action with regard to environmental damage that has already taken place. An example of such action is Mission on Ganga.
 - Preemptive action regarding the environmental damage expected from the future developmental activities and thereby insulating the country from further damage.

In a vast developing country like India measures for environmental planning and control cannot be concentrated at the national level only. Under the Indian Constitution, the constituent states have a vital role to play in the development of their respective areas. In such environmentally relevant fields as regulations of land use, irrigation development and forest management, State Governments bear virtually the entire responsibility. In the field of power generation, most of the projects are executed by State governments, and even in the industrial sphere, especially the development of medium and small scale industries, the states play an important role.

Therefore, it is also necessary to build up institutional arrangements at the state level with requisite expert support in order to deal with the wide range of environmental problems arising at state and local levels. The state governments have already established state environmental committees, headed in most cases by the Chief Ministers themselves, for dealing with environmental matters.

Global Agency for Environmental Protection

There is need to mobilise international economic relations in the simultaneous pursuit of economic development and environmental improvement. Like for example:

- (a) International technical and economic assistance from developed countries for programmes of natural resource assessment, monitoring, augmentation and management.
- (b) Exchange of knowledge and technical cooperation for pollution abatement and waste-recycling technologies among countries.
- (c) Technical and economic cooperation among countries of the region for evolving alternative environmentally prudent approach to development, example biogas technology, waste recycling and fish culture, integrated planning of small towns and villages, and of

regional economic development and human settlement development within countries.

There is significant role for international agencies, and for the regional offices of United Nations specialised agencies, to promote multinational projects in the region, involving training, education, technical assistance, research and monitoring.

Moreover, such organisations could act as houses of information to assist developing countries, provide technical expertise and fund specialised regional studies. Further, at the regional level surveys of development should integrally include assessment and monitoring of natural resources. Development assistance should be given to the overall development effort, taking into account specific environmental standards and approaches.

The motivation in compiling these pages has been basically to assess the present and future complexities of the environmental problems with due consideration and emphasis to the problems of the development countries with principal objective to formulate the best and most realistic means of defense and solution.

It is hoped that the authorities and policy makers will give due consideration to the question raised here

when planning development projects and save their respective countries from the ill-effects of environmental deterioration and the depletion of natural resources.

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