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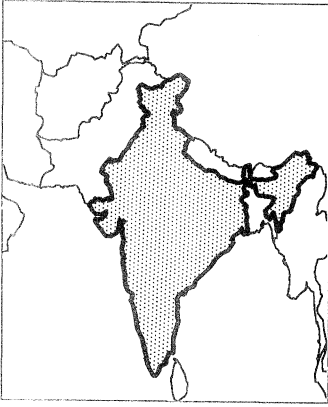
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The Centre for Science and Environment is a non-profit society based in Delhi to undertake public interest research and to increase public awareness of vital issues in science, technology, environment and development. Its activities and publications are described in more detail in the NGO Profile (see page 84). This paper is based on information drawn from two very detailed citizen reports on The State of India's Environment which CSE produced in collaboration with a large network of other Indian non-government organizations - the first one published in 1982, the second in 1985.

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(1) There are many different estimates for the final toll of death, disablement and injury and there is evidence of official figures considerably understating the real toll; see *The State of India's Environment 1984-5: the Second Citizen's Report* page 210 for more details.

I. INTRODUCTION

IN INDIA, AS in most of the Third World, there has been a very rapid growth in urban population over the last few decades. Three-quarters of India's population still lives in rural areas (mostly in villages of between 500 and 5,000 inhabitants) but the urban population more than doubled between 1961 and 1981 from 77 million to 156 million inhabitants. Seventy percent of the population increase in urban areas between 1971 and 1981 took place in cities of over 100,000 inhabitants. In 1901, Calcutta was the only city with a population of more than one million, but by 1951 it had been joined by Bombay, Delhi, Madras and Hyderabad and in 1981, also by Ahmedabad, Bangalore, Kanpur, Pune, Nagpur, Lucknow and Jaipur. These 12 cities accounted for more than 25 percent of the nation's urban population in 1981. By the year 2000, India is projected to have 350-400 million urban inhabitants, with 20 cities of more than 1 million people, and Calcutta, Bombay, Delhi and Madras each with a population of more than 10 million.

This article concentrates on the environmental problems associated with the development of India's larger cities. This is not to say that no serious environmental problems exist in other cities. Indeed, just one major factory in an urban centre can have a serious environmental impact - for instance by disposing of toxic liquid wastes untreated into a water body which is also used as a source of water for human consumption. Similarly, there can be serious environmental problems in even a relatively small urban centre where no drains or sewers exist and where many people are daily exposed to faecal matter with all the attendant health risks. But perhaps the need for action is most urgent in the major cities where environmental problems are taking a very large toll on human health and on the possibility of sustainable natural resource use both within and outside the cities.

This article does not consider the issue of industrial accidents. The tragedy in Bhopal which arose from the accidental release of methyl isocyanate from the Union Carbide plant was of great importance in drawing public attention to the dangers posed by having residential areas in close proximity to industries where large volumes of toxic chemicals are stored and used. The sheer scale of the human suffering - over 2,800 people dying and 40,000 or more disabled⁽¹⁾ - ensured that the accident was widely covered in the Indian press and world-wide. It is also well known that comparable accidents are likely to occur in the future. But what is perhaps more worrying is the enormous toll on human health in terms of disease, disablement and premature death caused daily by air and water pollution. The scale of the impact is

difficult to gauge since it affects so many people in different ways in different cities. The impact is less dramatic - for instance, relatively few deaths can be attributed directly to air pollution but millions suffer from respiratory infections and many will die of some form of cancer caused or exacerbated by air pollution.

There is also the environmental impact that cities have on the wider region in which they are located and on the health and livelihoods of those living there. As cities grow in size and population, environmental problems associated with their development are perhaps best considered not only at the level of the city and of the home and workplace but also at the regional level. This paper will discuss each of these in turn, starting at the city-region level.

II. THE CITY-REGION

A CONSIDERATION OF cities' environmental problems which go beyond their boundaries is relatively unusual. But cities are major centres of production and consumption. City activities require large inputs of resources such as water, foodstuffs, wood, crops used in industrial processes, fossil fuels, building materials (for instance aggregate and clay for bricks) and minerals which are drawn from beyond their boundaries. Cities are also major centres of resource degradation and the wastes they produce - waste water (with both domestic and industrial liquid wastes), solid industrial and domestic waste and air pollution - can all have an impact upon the region surrounding the city. Thus, a consideration of environmental problems associated with cities should include consideration of city-based demand for timber, firewood or charcoal and its contribution to deforestation. It should also include consideration of how waste water from cities (sewage and industrial related and city run-off) affects fish production in streams and rivers beyond city limits.

The physical expansion of cities encroaches upon agricultural land. Some 1.5 million hectares of land in India have been taken over in the past 30 years and a further 0.8 million will have been lost by the year 2000. The most intensive urban development has taken place in the best agricultural areas of India, especially on the Indo-Gangetic plain; cities have always tended to grow in or close to the most productive land since, prior to the development of motorized transport, only close proximity to good quality land could guarantee the provisioning of the city. But as cities have expanded to become multi-million inhabitant metropolitan centres, little thought has been given to protecting highly productive farmland. For example, the oil refinery at Bad in Mathura district and the industrial estate in Agra district have helped transform the Delhi-Agra rail route from an area of farms and fallow lands to a continuous stretch of industrial and urban building. Delhi's urban area has increased from 43.3 square kilometres in 1901 to 660 square kilometres in 1981, absorbing over 100 villages in the process. Good agricultural land is also being destroyed to produce bricks as the silt loam used in brick kilns is ideal for agriculture.

City-based industries' requirements for fossil fuels and raw materials have a major impact in the areas where these are extracted; a lot of mining in India takes place in forested areas causing deforestation, land erosion and clearance of huge tracts of land. Mining wastes pollute streams and rivers, making many unfit for human and animal consumption. Millions of litres of water are used to drain underground mine galleries and are then released into waterways, causing silting, flooding and waterlogging. This can also reduce the level of the surrounding water table, resulting in less available ground-water and

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less natural vegetation.

Urban demand for electricity can also have a regional impact. The building of hydroelectric dams affects the surrounding ecology, for example acting as barriers to fish migration, changing the quality of water downstream and varying the volumes of flow. These can all affect the natural vegetation and the feeding and breeding habits of fish. There is also the impact of dam construction, and the development of their reservoirs, on populations and communities through displacement and resettlement.

Firewood is one of the most important energy sources for India's poor and provides 50 percent of the cooking energy in cities. A large number of urban households burn firewood and their demands are a major factor in the deforestation of the country. With increasing urban populations and especially increasing numbers of low income urban inhabitants, the demand for firewood has increased substantially. The result is more and more firewood being brought into the cities both from surrounding villages and from further afield. In Delhi, for example, 223,600 tons of firewood were brought in by rail during 1981-82, mostly from the forests of Madhya Pradesh some 700 kilometres away. This increased urban demand for firewood is a major threat to forests, particularly as it relates to its commercialization. Madhya Pradesh is the biggest supplier of firewood to Indian cities, and official statistics state that firewood production has overtaken timber production. The continuing denuding of the forests, as demand outstrips supply, will have serious implications for the ecology of northern and central India because the watersheds of several major rivers lie in the state.

Another regional impact is water pollution, as a result of city-based activities. The Kalu river flows through Bombay's industrial suburbs of Ambarnath and Ulhasnagar and receives effluents from over 150 industrial units. The toxic wastes include heavy metals, chlorides, dyes and organic acids. There are dangerously high levels of mercury and lead in the water near the village of Ambivali and the villagers are slowly being poisoned as the heavy metals enter the food chain through the cattle browsing on river bank vegetation. Pollutants are also responsible for the destruction of much fish life, leading to the loss of a major source of protein and loss of livelihood for millions of Indian fishermen. Wastes from the IFFCO fertilizer complex near Allahabad and the liquid wastes from human activities within the city which end up in the Ganga river means a discharge 5,500 cubic metres of effluent daily, with heavy fish mortality and damage to some farm animals up to 16 kilometres from the discharge points.

One final example of regional impact arises from air pollution. Increased industrialization, especially where emission controls and standards are poor, can cause air pollution problems which not only affect large cities but also the surrounding region. Just outside Bangalore, a fine dust discharged by Graphite India's industrial unit kills plants and flowers and causes lack of appetite, eye irritations and stomach pains in local people. Thermal power stations, which rank among the country's worst air polluters, are often coal-fired and produce fly ash, soot and sulphur dioxide. In power stations in Madras, fly ash is mixed with water and dumped off the coast at Ennore. Fly ash is suspected of containing heavy metals which are likely to accumulate in fish in an area which is a major fishing ground.

III. THE CITY ENVIRONMENT

IT IS WITHIN cities themselves that the environmental effects of uncontrolled industrial development and inadequate investments in basic

infrastructure (drainage and sewage systems, treatment plants) are most evident. Seventy percent of available water in India is polluted. In terms of volume, sewage is the most serious problem since it accounts for four times as much waste water as industrial effluents. River water pollution in India has reached a crisis point with the river Ganga amongst the most polluted rivers in the country. Of India's 3,119 towns and cities, only 209 have partial or full sewage systems. Sewage treatment facilities cover less than a third of the urban population. One hundred and fourteen cities, each with 50,000 or more inhabitants dump untreated sewage into the Ganga every day. DDT factories, tanneries, paper and pulp mills, petrochemical and fertilizer complexes, rubber factories and many others also pour their wastes directly into the waters, increasing toxicity and killing off fish life in sections of the river. The section of the Yamuna river which flows through Delhi collects nearly 200 million litres of untreated sewage daily. It also receives 20 million litres of industrial effluents, including half a million litres of DDT wastes. From Delhi to Agra the water is unfit for bathing and drinking and this pollution can have serious health implications.

According to one estimate, about two-thirds of all illnesses in India are related to water-borne diseases such as typhoid, infective hepatitis, cholera, diarrhoea and dysentery; and 73 million work-days a year are lost due to water-related diseases. The Hooghly river passing through Calcutta and its estuary is choked by untreated wastes from more than 150 factories and 361 raw sewage outfalls, resulting in a considerable reduction in the number of fish caught. In Kanpur, only three of the city's 647 factories have treatment plants, the rest dispose of their waste water and industrial effluent, 200 million litres a day, straight into the river Ganga. This has caused huge fish mortality and the average catch has more than halved.

The Sixth Five Year Plan states that "...problems of air pollution are becoming severe in major cities like Calcutta, Bombay and Delhi ...levels of sulphur dioxide and particulate matter in some major cities exceed permissible limits set by organizations like WHO (the World Health Organization)." Industry, transport and the burning of non-commercial fuels in the home are responsible for these increasing levels of pollution. Some of the major pollutants are carbon monoxide, sulphur dioxide, oxides of nitrogen, suspended particulate matter, hydrocarbons and metallic traces. These are mainly from the burning of fossil fuels but there are also more specific pollutants, such as lead from the exhausts of cars, trucks, buses and other vehicles powered by petrol, fluorides from aluminium production and lime dust from cement factories.

Of the four largest cities, Bombay's air pollution is probably the worst. Unlike other Indian cities, where a large proportion of air pollution is generated by domestic stoves or open fires in the home, industry and transport are the main contributors. There is a large concentration of industries in the Trombay-Chembur area along the eastern coast of the island and in the Lalbaug area, including the Tata Thermal Power plant, the Rashtriya Chemicals and Fertilizers plant, the Bombay Gas Company and numerous petrochemical plants, refineries and textile mills. Because of prevailing winds, a lot of the pollution affects those living in the industrial east first and then is wafted across to the mainland, affecting those living in New Bombay. A survey conducted by NEERI in 1970 found higher levels of sulphur dioxide in New Bombay (108 microgrammes/cubic metre) than in metropolitan Bombay (61 microgrammes/cubic metre). However, a survey of 4,000 residents from the clean, western suburb of Khar and industrial eastern suburbs of Chembur and Lalbaug was conducted at Kem hospital and the Air Pollution Prevention Cell of Bombay Municipal

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Corporation in 1977-78. It was found that those living in the congested industrial areas suffered higher incidences of chronic bronchitis, TB, skin allergies, anaemia and eye irritations. There was also a higher absentee rate amongst workers, particularly textile mill workers where there was a 10-16 percent incidence of byssinosis. A Bombay Municipal Corporation survey also states that TB and respiratory diseases are major killers in the city. Between 1971-79, TB deaths went up from 82.7 to 101.2 per 100,000 people and, although deaths due to breathing impairment dropped from 169.7 to 142.6 per 100,000, largely due to the use of low-sulphur gas in the most highly polluting industries, it is still the single largest killer. Cardiovascular diseases have also increased, probably also as a result of a deteriorating environment. This is particularly alarming when you consider that the number of deaths from infectious diseases has declined and that from gastroenteritis has stabilized. These high pollution levels are even more important when you consider the population densities of the city, which are amongst the highest in the world.

The burning of domestic fuel generates about half the air pollution in Delhi, according to Professor Dave of Jawaharlal Nehru University. The two major industrial polluters are the Badarpur and Indraprastha thermal power stations. They produce 180 tons of fly ash and 70 tons of sulphur dioxide a day and thick black smoke covers the surrounding area with soot. The electrostatic precipitators which can reduce emissions are old and poorly maintained, which reduces their efficiency. Fly ash causes various kinds of respiratory stress and diseases. There are also serious problems within the power stations; inside the Indraprastha plant, the air is heavily contaminated and preliminary results from a survey by the New Delhi Tuberculosis Centre showed that TB incidence among workers is about twice the normal levels.

In Madras, the major industries are Madras Refineries Ltd., Madras Fertilizers Ltd., Kothari Chemicals and Ennore and Basin Bridge thermal power stations. Sulphur dioxide contamination is a major problem in some areas, as is urea dust from the fertilizer plant. Ammonia leaking from pipelines and storage tanks causes eye irritations and coughing.

In Calcutta, a NEERI study shows that 1,299 tons of suspended particulate matter, carbon monoxide, sulphur dioxide, hydrocarbons and nitrogen oxides are emitted each day by industry, power stations and domestic fuel burning; the report also states that 60 percent of Calcutta's residents suffer from some kind of respiratory disease due to air pollution.

There have been some local air pollution laws for some time, but the 1981 Air (Prevention and Control of Pollution) Act is the first national legislation, enacted in response to growing concern about air pollution. It prescribes emission standards and lays down how to implement regulations and monitoring procedures. However, it does not control vehicle emission standards.

Urban transport is a growing problem in the large cities. The population growth, the expansion of city limits, the concentration of business and economic activity in the city centre while residential areas are further out all contribute towards the increased use of trains and motor transport, both public and private. Between 1961 and 1978 there was a 244 percent increase in the number of private vehicles in Bombay and a 158 percent increase in the number of buses; in Delhi the figures were 560 percent and 380 percent, respectively. This, along with infrastructural developments which are unable to keep up, with poor general maintenance of vehicles, faulty traffic planning and a disregard for traffic regulations causes huge traffic jams and unsafe roads with many accidents, injuries and deaths. It also means an over-

burdened public transport system.

The pollution arising from such traffic is mainly a problem in congested, poorly ventilated streets, particularly with old and poorly maintained vehicles. According to Professor Dave of Jawaharlal Nehru University, New Delhi is the most polluted city in the country with respect to vehicle exhaust. His survey showed that 400 tons of pollutants are emitted each day from 500,000 vehicles, or 34 percent of the smoke and dust in the city. In Bombay and Delhi, automobile emissions account for 70 percent of carbon monoxide, 50 percent of hydrocarbons and 30-40 percent of particulates in the atmosphere, and the incidence of smog in New Delhi has increased over the years. To help prevent vehicle exhaust pollution from getting worse, emission control standards must be issued and enforced and traffic limited in congested and poorly ventilated streets.

Noise pollution is also a health hazard which must not be ignored. Factories, vehicles, trains, planes and social gatherings all contribute towards making Calcutta, Bombay and Delhi among the noisiest cities in the world, with an average noise level of 90 decibels. Prolonged exposure at levels greater than 90 decibels can cause permanent deafness and factory workers working in such conditions have shown neurological, digestive and metabolic disorders.

IV. THE WORKPLACE AND THE HOME

WITH INCREASED INDUSTRIALIZATION, the environment of the workplace has also to be considered. The use of toxic substances with inadequate protection for those handling them, exposure to chemicals, dust, fibres, excessive noise, poorly maintained and obsolete equipment, inadequate ventilation and poorly enforced or inadequate safety regulations all combine to make the working environment a hazardous place. In industrial Bombay, for example, in 1979 approximately 19,000 workers and family members were hospitalized at the Mahatma Gandhi Memorial Hospital with TB, byssinosis, cancer, heart disease and accident injuries. A pamphlet published in 1983 by the Centre for Education and Documentation in Bombay states that "...one-third of the workers in asbestos factories are suffering from asbestosis." Byssinosis is a respiratory disease common among textile mill workers, as a result of inhaling quantities of cotton dust over a number of years. One study of three cotton mills in Bombay between 1970-75 revealed an incidence of byssinosis of 12 percent among workers exposed to dust. In the chemical industry, inhalation of fumes can cause chest pains, stomach pains, vomiting, skin and eye irritations and various respiratory problems. A Central Labour Institute study showed that 24 percent of workers in the Bombay Gas Company's factory were suffering from chronic bronchitis, TB and emphysema. This is one of the most hazardous factories in the city and in addition to the problems with workers' health, over 25 workers have been killed in four major explosions between 1958 and 1978.

There are also known to be serious workplace-related environmental problems in many small-scale enterprises. A high proportion of India's urban population works in small-scale enterprises (often referred to as 'informal sector enterprises') and in many of these, workers are also exposed to toxic chemicals, unsafe machinery and high levels of dust and noise - but the scale and nature of the problems are poorly documented.

In terms of the home environment, despite greater per capita public investment on urban inhabitants, there are still huge problems of housing, water supply, sanitation, health and transport with the poor

suffering the most deprivation. It is the poorer majority of citizens who suffer most. A high proportion of city households cannot afford the cheapest house or apartment with basic services like piped water and sewage connections. They have no alternative but to rent single rooms in inner city slums or to buy, build or rent shelters in illegal settlements. The Planning Commission estimates that over 30 million people, or one-fifth of the urban population, live in slums; other estimates put the figure as high as 30 percent.

In Bombay, 3-5 million slum dwellers live on some 3,200 hectares and, if present trends continue, by the year 2000, 75 percent of Bombay's population will be living in slums. The city already has one of the largest slums in the world, Dharavi, with half a million dwellers. The majority of Bombay's population lives in one-room houses and a shortage of 55,000 units is added yearly to the 800,000 backlog. A survey of 4,000 households in 9 Bombay slums showed that 40 percent had 2-4 people in one room; 35 percent had 5-9 and one percent had more than 10 to a room. Furthermore, 15 percent of the population live in 11,000 buildings on the verge of collapse and another 20,000 buildings have only 5-15 years left. The slums of Calcutta house 3.6 million people or 40 percent of the metropolitan population. According to the Calcutta Metropolitan Development Authority, two-thirds of the population lives in temporary buildings and more than 57 percent of families have only one room to live in. Half of Kanpur's 1.6 million inhabitants live in squalid, unsanitary conditions. Due to its rapid population growth from 202,800 in 1901 to 1,687,000 in 1981, and a lack of investment in basic services and infrastructure, there are now 780 slum colonies, or 'ahatas'; two-thirds of Kanpur's population lives in single room tenements.

Rapid physical expansion of cities, as their populations grow, can mean that construction takes place in areas ill-suited to that purpose. For example, in Salt Lake City in Calcutta, around 4,000 hectares of lagoons and wetlands near the eastern fringe which were once intensively used for fishing were filled in, with the dual purpose of removing silt from the Hooghly river and providing housing for 100,000 middle income families. However, this land fill has affected the normal drainage cycle of the city, since the wetlands used to absorb excess rain-water. Now that the land level is higher than that of the rest of the city, there is water-logging in eastern fringe areas. In addition, the development's destruction of fisheries reduced the supply of fish by some 25,000 tons a year.

The provision of clean water has also become a grave problem in many of the major cities. The Government's Sixth Plan claimed that nearly 83 percent of the urban population had drinking water facilities, 42 percent with house connections. However, the per capita daily amount available is below the requirement figure worked out by the Union Ministry for Works and Housing. There are many seasonal shortages and cuts and the areas in which poorer groups live (especially the peripheral illegal settlements) are the hardest hit. Most slum inhabitants obtain their water from stand-pipes and in Beckbagan slum in Calcutta, for example, the public taps have been dry ever since installation. In Madras there are always long queues and long journeys are necessary to obtain supplies. These shortages are further exacerbated by loss from leakages due to poor maintenance and illegal diversion of water from the mains.

There are also problems of water contamination. In Madras, for example, faecal contamination of water is frequent and the chief water analyst of Tamil Nadu (the state within which Madras is located) states that, in general, Madras water is unfit for human consumption; one survey showed that 96.5 percent of samples tested showed recent

faecal contamination. Leaking sewers and defective and poorly maintained water pumps and treatment plants are also responsible for contamination.

The general level of sanitation in Indian cities in terms both of removal of domestic wastes and of excreta is very poor. About 20 million tons of garbage is disposed of in urban areas each year, the rest is just left lying in the open. In Kanpur, nearly 150 tons of the 900 tons produced each day are left uncollected. The composting plant can handle only 350 tons a day; the rest is dumped on vacant sites. Garbage removal is expensive and although composting is a sanitary method of disposal and is relatively cheap, it is also relatively rare.

Defaecating in the open is common practice. A third of the urban population (over 50 million people) doesn't have access to a latrine of any kind; another third uses bucket latrines. A third of the urban population has access to sewer facilities but only 10 percent has actual domestic connections. Composting excreta would help solve the problem of dumping raw sewage into rivers and streams. Only 47 percent of the sewage of 151 larger cities is fully treated, the rest is discharged only partially treated or untreated. A survey in nine Bombay slums showed that there were no private toilets and 25 percent of people defaecated in the open air, with no access to community toilets. More than a third had no drainage facilities and 40 percent had uncovered drains. Poor drainage causes flooding during rains and leaves stagnant pools of water which become ideal breeding grounds for many disease-carrying insects. Overcrowded, unsanitary conditions affect the health of the inhabitants and help spread cholera, typhoid, dysentery, diarrhoea and jaundice. The Kanpur Development Authority estimates that 60 percent of its slum children under the age of six have TB, the highest incidence in the country, and one-third of the workers are chronically ill, leading to high rates of absenteeism. The Government's aim is to provide a proper sewage system to all cities with more than 100,000 inhabitants by the year 1990. Some of the problems they will face include a lack of money, a lack of space for individual family latrines because of overcrowding and the lack of a proper organizational structure to ensure adequate maintenance.

As mentioned earlier, domestic fuel burning is responsible for a large proportion of the air pollution in Indian cities. At a household level, the thick smoke produced by cooking fuels such as firewood, cowdung and crop stalks can be a problem responsible for millions of deaths a year. Again it affects mostly poor people, who tend to use these fuels more than higher income groups. High levels of inhalation can cause heart disease, bronchitis, emphysema, respiratory disorders, low birth weights in children and increased perinatal mortality. Women tend to be more affected as they spend a few hours a day squatting in front of a fire, cooking in cramped conditions, with poor ventilation. Possible solutions include cleaner fuels, improved stoves and better ventilation but certainly in the case of cleaner fuels, the cost is likely to be too great for the poorest.

V. CONCLUSIONS⁽²⁾

THIS PAPER HAS covered but one aspect of environmental problems in India. In many ways, it is misleading to remove a consideration of cities' environmental problems from the environmental problems within the wider society. This paper hardly touched on many of the subtle and invisible processes which continue to undermine both the human and the natural resource base and which, in effect, are creating a wasteland in ever larger areas of India. Satellite data confirms that India is losing more than a million hectares of forests every year. All India's hill and

(2) This is drawn from 'The Second Statement of Shared Concern' at the end of *The State of India's Environment 1984-5: the Second Citizen's Report* page 394, signed by 59 people

mountain ecosystems are deteriorating rapidly. Even in heavy rainfall areas where forests should be in full bloom, the land is becoming a barren desert. Every day, thousands of hectares of India's once rich biosphere are turned into wastelands which now cover more than a third of India's land mass. At the root of this deterioration is the exploitation of what were previously common property resources. Diverse, decentralized community control systems which previously managed these common property resources have been replaced by centralized government control which has then put such resources at the disposal of powerful vested interests. Meanwhile, the quality of life in towns and cities is degenerating rapidly. Environmental degradation threatens every Indian today.

The creation of wastelands has hit every rural and urban household. Even bare necessities for survival such as fuel, fodder and water are now so difficult to obtain that women and children have to spend extraordinary amounts of time scavenging for them. When life becomes impossible within the rural ecosystem, because of growing floods, droughts, deforestation, soil erosion or because of declining soil productivity, people join the stream of urban migrants, leading to what the urban planners call 'unplanned urban growth'.

But this growth is not 'unplanned'. Urban-led development has always been a basic feature of planning in India. The rural development strategy has not been to develop rural areas per se, to meet the basic needs of the rural poor in particular. The strategy has been largely to 'develop' the rural areas by putting their resources at the dictates of urban markets and thus to transform the rural environment itself into mass monocultures of marketable commodities. In this sense, much of the rural development has simply been an extension of urban development. And within the urban system, we have followed without questioning the extremely high cost and resource intensive Western model. The result is a very rapidly expanding urban population which despite disproportionate investments still suffers a rapidly declining quality of life and a ravaged rural system whose productivity is declining every day and which keeps pushing more and more people into urban areas.

An alternative pattern of development must be sought. Rural and urban development have to occur in a symbiotic manner. Such a process will require planning for more self-sustaining urban areas and the enrichment of the rural environment to meet the rural population's diverse biomass needs for food, fuel, fodder, soil enrichment, building materials, agricultural implements and artisans' raw materials. Indian urban planners will have to rethink what is appropriate for their own society and culture; it is perhaps ironic that Western models and precedents are still used in Third World nations when their utility and value is increasingly questioned in the nations from which these models originated.

But beyond this, more fundamental changes are needed - in the end a clear vision, an imaginative and honest political system in which elections are fought without black money, in which contractors and land speculators are put under control and in which the industrialist who pollutes is prosecuted. India has never had a greater challenge before it and never a more urgent need to restore ethical values in its social and political life. The land can be greened and the environment improved, but only if the people who control the socio-political system can learn to control their greed.