

Population, Environment and Development in India

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INTRODUCTION

The relationship between population, environment and development is inseparable. They are not only related with each other, but also regulate each other at a higher degree. Environment has become a major worldwide concern today. As we know, there is a two – way relationship is found in between development and environment, both of them likely to influence each other at a higher degree. So, now a day the environmental and developmental issues have drawn the attention of different programme personnel and policy makers. Concern about the environment has risen to the top of the international agenda and has brought in its wake a renewed attention to population issues. At the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, and the International Conference on Population and Development, held in Cairo in 1994, a consensus was reached that population, environment and development were inextricably linked. It was also recognized that bringing about a sustainable relationship between human numbers, resources and development required activities at the local, national, regional and global levels. The centre of this consensus was the realization of the global nature of the most salient environmental issues. The outcome of International conference on population and development gives special emphasis on this matter. In 1994, the International Conference on Population and Development adopted the programme of Action of the International Conference on Population and Development, which recommended, inter alia, the following actions for integrating population, environment and development:

- Integrate demographic factors into environmental impact assessments and other planning and decision making processes aimed at achieving sustainable development;
- Implement measures for poverty eradication with special attention to income generation and employment strategies directed to the rural poor and those living

- within or on the edge of fragile ecosystem;
- Utilize demographic data to promote sustainable resource management, especially ecologically fragile systems;
- Modify unsustainable consumption and production patterns through economic, legislative and administrative measures, as appropriate, aimed at fostering sustainable resource use and preventing environmental degradation;
- Implement policies to address the ecological implications of future population increases, particularly in ecologically vulnerable areas and urban agglomerations.

The United Nations Conference on Environment and Development, which adopted Agenda 21 in 1992, identified several key objectives, including the following:

- To incorporate demographic trends in the global analysis of environment and development issues;
- To develop a better understanding of the relationship among demographic dynamics, technology, cultural behaviour, natural resources and life support systems;
- To assess human vulnerability in ecologically sensitive areas and centres of population to determine the priorities for action at all levels;
- To implement population programmes along with national management and development programmes at the local level to ensure sustainable use of natural resources, improve the quality of people's lives and enhance environmental quality.

This issue is also greatly realised by the every segment of the population. We cannot ignore the population from the environment and the process of development as these two are very intimately related with human civilization. Man lives within the environment and get the better quality of life from the process of development. Environmental degradation has a serious impediment to economic development and the eradication of poverty in the developing world. Mankind's relationship with the environment has passed

through several stages, commencing with primitive time in which human beings lived in a stage of symbiosis with nature, followed by a period of growing mastery over nature up to the industrial age and culminating into material intensive growth patterns of the present century. In India, population, environment and development issues remain, as chronic problem with the process of development could not pace with the growth of population. India, for decades has been facing the adverse consequences of gradual degradation of environment in the form of drought, flood, rainfall, ill health and pollution etc. Slow development processes and rapid growth of population pressurized the huge population to exploit the available resource more that resulted in to the environmental degradation. It is found predominant in urban areas because of the rapid growth of urban population due to migration from rural to urban areas and because of the process of industrialization. Thus, the environmental degradation in India can be attributed to the process of rapid population growth. Here one attempt has made to see the relationship among population, environment and development in India. Here the attempt has been made to see the complex relationship of different demographic and developmental indicators viz: population growth, deforestation, urbanization, industrialization, health, land use pattern and globalisation with the environment in Indian context.

POPULATION GROWTH

After China, India is the second most populous country in the world, accounts near about 16 percent of total population of the world. India is an over populated country because the growth of its population is much faster than the rate of its economic development. Unemployment, poverty, migration and poor mobility are to a large extent the result of this lack of fit between population growth and economic development. Though scientific and technical development has brought about significant improvement in life expectancy and health conditions, there has been little success in controlling population growth to the required extent. The death rate has come down without a corresponding decrease in birth rate. Over population has prevented India from attaining the expected level of economic and social development. The country's Population has grown from

361 million in 1951 to 1027 million in 2001. Life expectancy has increased from 22.9 in 1901 to 60.3 years in 1990-94; Infant mortality has declined from 129 in 1971 to 70 in 2001. The birth rate has declined from 36.9 in 1971 to 26.1 in 2001; Death rate has also declined from 9.7 in 1971 to 8.7 in 2001. Though there is the decline in birth rate is found, most of the population is in the active prime reproductive age. So, this leads to further increase of the country's population. The evidence of increase in life expectancy also leads to ageing of the population and increase in total population.

Table 1 shows some demographic indicators of India. If we look at the natural growth rate of India, we find, the rural areas are growing faster than the urban areas. The growth of rural India is 18.2 as compared to 14.5 in urban areas against

Table 1: Some demographic indicators of India

	Total	Rural	Urban
India Population	1,02,70,15,247	NA	NA
Natural Growth Rate	17.4	18.2	14.5
Decadal Growth Rate	21.34	NA	NA
Crude Birth Rate*	26.1	27.6	20.8
Crude Death Rate**	8.7	9.4	6.3
Infant Mortality Rate*	70	75	44
Child Mortality Rate**	30.6	34.6	17
Literacy Rate	65.38	NA	NA

Source: Census of India (2001) Provisional Population table paper, 1 of 2001. Registrar General & Census commissioner of India.

*SRS Bulletin – April – 2001, Volume – 35-No-1, and

**National Family Health Survey 2 (NFHS-2) - 1998-99.

the natural growth rate of India as a whole i.e. 17.4. Both the crude birth rate and crude death rate are found higher in the rural areas as compared to urban areas. The crude birth rate for rural India is found 27.6 per one thousand populations against 20.8 per one thousand populations in urban areas. Similarly the death rate is found 8.7 per one thousand populations, India as a whole, while it is found 9.4 in case of rural areas and 6.3 per one thousand populations in case of urban areas. The infant and child mortality is also found more in case of rural areas than the urban areas.

DEFORESTATION

Impact of population growth on Environment is apparent in various ways. Forests contribute significantly to the economic, social and environ-

mental well being in the country. Forests meet nearly 40 percent of the energy needs of the country (80 percent energy of rural areas). About four-fifths of India's population depends on agriculture. In many part of the country, primary activities are still dominant. It is estimated that nearly 3000 to 5000 million man – days work are generated annually within the forest sector for collection alone. Though the India has quite a substantial proportion of land is under forest, it is declining rapidly because of the existent of direct relation between the larger population and the forest. Natural grasslands are disappearing rapidly because of over grazing.

Table 2 shows the forest cover estimates in India, which depicts the gradual decline of land under forest. Though the Government is adopting the afforestation policy, still it is unable to meet the increasing demand of the growing population. The demand for forest goods and forest products

Table 2: Forest cover estimates in India (sq km)

S. No.	Years	Forest Cover Estimates
1	1987	640819
2	1989	638804
3	1991	639364
4	1993	639386
5	1995	638879
6	1997	633397

Source: State of Forest Report 1999, Govt. of India.

are increasing at par with the growth of population and at the same time the increasing demand for forest goods and products results into the decline of total land under forest. In 1987, total forest area of the country was 640819 sq. km. It was declined to 638804 in 1989 and gradually to 633397 in 1997. Total forest cover has been declined by 5482 sq. km between the periods 1995-97. Total forestland availability per person was 0.113 hectares in 1950-51. This was declined to 0.097 hectares in 1981 and as small as 0.076 hectares in 1994. In many part of the country, forests are cut down mainly for agricultural purposes.

URBANIZATION AND URBAN ENVIRONMENT

The process of urbanization is one of the indicators of development process. However, in India urbanization has been taking in a haphazard manner, without proper management and planning. In 1901, there were 1915 towns in India with

a population of 25,693,125, which increased to 4615 towns with a population of 215,771,612 in 1991. According to census of India – 1991 (Town and Urban Agglomeration), there were only 24 class one cities with a population of 5569717 in 1901, which was increased to 322 class one cities with a population of 122,291,246 in 1991

Table 3a shows the urbanization trend in India. In the year 1901, only eleven percent of the total population was residing in urban areas and gradually this proportion has gone up i.e. 20 percent in the year 1971, 23 percent in 1981 and 26 percent in 1991. If we look at the urban growth rate, then we find the annual exponential growth rate is showing more or less an increasing trend. In India urban annual population growth rate was 3.5 percent and the cities are facing with multiple

Table 3a: Urbanisation trend in India

Census Year	Urban Population (Million)	Urban as percent of Total Population	Growth Rate (percent)	Decennial Annual Exponential
1901	25.85	10.84	NA	NA
1971	109.11	19.91	38.23	3.64
1981	159.46	23.34	46.14	3.83
1991	217.61	25.71	36.47	3.59

Source: Census of India, 1991 Final Population Tables paper – 2 of 1992.

and complex environmental problems. Urban population pressure depleted environment resource base of cities at a rapid rate. About one fifth of the urban population resides in slums and one-third of the population has not even direct access to proper sanitation and safe drinking water, which in turn result poor health status of the residents. There has been a significant increase in generation of domestic and industrial waste in the last few decades due to rapid increase of urban population and industrialization. Table 3b shows the hazardous waste in some mega cities of India.

Table 3b shows the quantity of solid waste in some of the mega cities of India in 1981. It was found to be highest in Mumbai i.e. 3200 tonnes followed by Chennai i.e. 1819 tonnes. If we look at the percent of non-degradable solid waste, then we find, Delhi and Nagpur are generating more or less the same percentage i.e. 65 percent of their total solid waste. So these wastes are creating a lot of environmental problem to dump or recycle. It envisages further degradation of urban environment. Leaching of the hazardous wastes rates contamination of surface and ground water

Table 3b: Quantity of solid waste in some of the mega cities of India in 1981.

Cities	Waste in (tonnes)
<i>Solid Wastes</i>	
Mumbai	3200
Channi	1819
Bangalore	1800
Ahamadabad	1200
Kanpur	1000
<i>Non – Degradable Solid (percent)</i>	
Delhi	65
Mumbai	60
Kolkata	53
Nagpur	64.19
Banglore	22

Source: Compendium of Environment Statistics (1999)

supplies and is increases a potential risk to human health in general. Establishment of entrepreneurs in different part of the Indian cities caused suffering of people from different environmental health problems and other problems related to environment.

INDUSTRIALIZATION AND ENVIRONMENT

Process of urbanization is always associated with industrialization, which fuelled the alterations of the standard of living of the people from low to high. The consequence of industrialization hazard to man and environment, however, was felt until the post independence. Establishment of industries without proper management have also caused several life and environmental degradation. Industrialization enhanced pollution in many Indian rivers creating problem of safe drinking water due to toxic and high turbidity of water. Water pollution could harm the liver, kidney, reproductive system, respiratory system or the nerves system.

The basic environmental problem linked with industrialization is not only due to physical–chemical alterations but involve social structure in to intricately. Population type, density and distribution are greatly affected through the process of industrialization. All industries involve manpower to varying extent and so they need for different kinds of manpower, such as unskilled labour, skilled labour, technocrats, executives, man, women and children labour section would generally tend to settle close to their place of work. Slums in and around industrial areas are

the out come of this phenomenon.

Pressure on Local Resources

In an area, the industries generally proliferate for which raw material is locally available. It is because the material is readily available at cheaper cost and the cost on transport is also saved. As such, same nature of industries often concentrates in an area, such as limestone and gypsum based industry in some parts of Rajasthan, tea-processing plants in Assam etc. Thus, the result is an ever-increasing pressure on the resource often threatening them of exhaustion.

Industrial Waste

Environmental Pollution are also causing acute health problem now a days. Waste is the outcome of things we make use of. The kind and amount of wastes produced in an industry will depend mainly on two factors. Kind and amount of raw material used and the efficient of technology involved. Further, the release of wastes in environment will depend on whether the wastes in environment will depend on whether the wastes are treated before discharge and the efficacy of treatment process, if it exists.

Table 4 shows the quantity of Industrial and Sewage discharge to the coastal water. If we look at the table, we find, Gujarat, Tamil Nadu and Kerala are discharging maximum industrial waste-water to the coastal water. Andhra Pradesh is discharging 2466 MLD industrial wastewater

Table 4: Quality of industrial and sewage discharge to the costal water

S.No	State/ Coast	Industrial Waste Water (MLD)
1	Andhra Pradesh	2466 *
2	Gujarat	566
3	Tamil Nadu	378
4	Kerala	151
5	Maharashtra	80
6	Karnataka	43
7	West Bengal	22
8	Goa	12
9	Pondicherry	6
10	Orissa	1
Total		3275

Source: Central Pollution Control Board, New Delhi, 1996.

* = Including 2116 MLD from Agriculture forms.

to coastal water including 2116 MLD from agricultural forms. A latest report on *Environment and People* shows that the proportion of industrial and sewage wastewater is increasing day by day with the tune with the urbanisation and modern mode of agriculture. Moreover, many of the town and cities that came up on the bank of the river did not give a thought to the problem of urban sewage (The citizen's fifth report). According to National Engineering and Research Institute, a staggering 70 percent of the available water in India is polluted. Only five states i.e. Maharashtra, Gujarat, Delhi, Uttar Pradesh and West Bengal generate more than 63 percent of the total waste-water in India as they lack the treatment facilities (Down to Earth, July 15, 2000, p.19). Sewage generated from 25 heavy polluting cities and towns account for untreated muck being dumped in river Yamuna every day has become one of the most polluted rivers in the world (Down to Earth, June 30, 2000, p.55). The production of drinking water in Delhi was reduced by half in February 1998 because of deterioration in the quality of raw water in the Yamuna since huge quantities of industrial wastage was dumped into the river upstream of Delhi (Fifth Citizen's Report).

ENVIRONMENT AND HELTH

Relationship between environment and health is fundamental issue in the present century. In many part of the world environmental degradation has caused serious health problems. Environmental factors contribute more than 80 percent of mortality and morbidity in less developed countries. Over crowded slums and sub – towns aggregate close to urban settlements and industrial complexes. Over burdened transport system, polluted surroundings and inadequate community facilities are characteristics of such settlements. Many communicable and non-communicable diseases degrade living conditions of people. It is estimated that up to half of the inhabitants of industrial cities live in slums and sub-towns where drinking water supply, sewage system, garbage collection, diseases prevention measures and primary health care are more dreams, and dysentery, typhoid, food poisoning, malnutrition, cramp conditions and household accidents are daily realities faced by denizens of such settlements.

The industrial hazardous waste may show effects in terms of death and morbidity. Morbidity

may be irreversible or reversible. This may manifest as respiratory disease, skin reaction, allergies, diminution of vision, corneal opacity, abortion, malformation of pregnancy, stunted growth, neurological diseases, mental depression, psychiatric changes. Altered immune response, chromosomal aberration and cancer. Several crores of rupees have been incurred by the Government in health every year in the country. In 1981 total expenditure by the Govt. of India on health was 943 crores that was increased to 9,170 crores in 1996-97 (Selected Socio-Economic Statistic India, 1999). Environmental health problem in urban areas are mainly to do with pollution, over crowding and poor sanitation of Municipal waste of India, cities are characterised by the large organic content. Thus, apart from finding of land for disposal and breeding of pests continues to be a problem. The health morbidity for cough, dyspnoea, common cold, eye irritation, headaches etc. showed a clear and strong relation to the profile of six pollutions.

The main sources of the air pollution are automobile, thermal power plants, industries, agriculture, households etc. with the exponential increase in the number of motor vehicles, vehicular exhausts has become a major source of air pollution in urban centres. The environmental effects of the fuels namely Coal, Oil, Nuclear, etc. at are consumption level. Coal production through open cast mining; its supply to and consumption in power stations; and industrial boilers lead to particulate and gaseous pollution, which can cause Pneumoconiosis, Bronchitis and respiratory diseases. Another major impact of coal mining is land degradation and especially of forest areas.

The consumption of petroleum products in vehicles, industries and domestic cooking activities results in the emission of pollutants in large quantities. Radioactive emissions from nuclear power plants are of grave concern as they can cause serious impact both in terms of spatial and inter-generational concerns.

Air borne emissions emitted from various industries are a cause of major concern. These emissions are of two forms, viz: solid particles (SPM) and gaseous emissions (SO₂, NO_x and CO etc). Liquid effluents generated from certain industries, containing organic and toxic pollutants are also a cause of concern. Heavily polluting industries were identified which are included under the 17 categories of highly polluting indu-

tries for the purpose of monitoring and regulating pollution from them. The ministry of Environment and Forest has, over the last two decades, developed standards for regulating emission from various industries and emission standards for all the polluting industries including thermal power stations, iron and steel plants, cement plants, fertilizer plants, oil refineries, pulp and paper, petrochemicals, sugar, distilleries and tanneries have been prescribed. The industrial units in India are largely located in the states of Gujarat, Maharashtra, Uttar Pradesh, Bihar, West Bengal and Madhya Pradesh. The highest concentration of Sulphur Dioxide and Oxides of Nitrogen is therefore often found in the cities located in these states. Some other industrial estates in Delhi, Punjab, Rajasthan and Andhra Pradesh are also becoming critical. "Hotspots" have been identified where pollutant levels are found to be quite critical with human index being dangerous. Most of the air-borne emission standards include permissible limits for suspended particulate matter (SPM) and in few gases SO_2 where it is the prime pollutant, while no standards for NO_x and CO were specified.

Table 5a shows the state of ambient air qualities in 10 major cities of India. The SO_2 is found highest in the city of Kolkata, where it is found 62 in 10^{-6} grams per cubic metre followed by Delhi 33 and by Mumbai 27. NO_2 is found to be highest in Delhi i.e. 46 followed by Kolkata 39 and Mumbai 26. Similarly in case of NH_3 , Delhi shows a very worsening state i.e. 176 in 10^{-6} gram per cubic metre. Again the cities like Kolkata 93 Cochin 74 and Nagpur 70 are also showing a worsening state in case of NH_3 . The levels of H_2S , though not reached to a path of increasing trend

in the cities like Kolkata, Chennai, Hyderabad and Jaipur, still it is a matter of concern. If we look at the H_2S level, then we find, it is found to be highest in Kolkata followed by Mumbai, Hyderabad, Jaipur and Chennai. Similarly, if we look at the suspended particulate matter (SPM), then it is found to be highest in Delhi i.e. 543 in 10^{-6} gram per cubic metre followed by Kolkata i.e. 394, Kanpur (380), Jaipur (338) and Ahmedabad (285), where it really continuing a gradual degradation of environment at greater concern. Unlike SPM, if we look at the Renewable Suspended Particulate Matter (RSPM), it is found to be highest at Delhi i.e. 204 in 10^{-6} gram per cubic metre followed by Kolkata i.e. 180 in 10^{-6} gram per cubic metre and Kanpur i.e. 135 in 10^{-6} gram per cubic metre. The proportion of RSPM to SPM is found highest at Chennai i.e. 66.3 percent followed by Cochin (50.4 percent), Ahmedabad (48.2 percent), Nagpur (47.4 percent), while, it is found to be least at Jaipur (32.0 percent) followed by Kanpur (35.5 percent). Ambient air quality in many Indian cities both in industrial areas and in residential areas is characterised by high and critical pollution level. According to world health organization study in 1996, 84000 deaths were directly attributed to outdoor pollution in Indian cities. Indoor air pollution accounted for 496000 deaths in village and 93,000 deaths in cities. Indian urban residents mainly suffer from the health problems related to air and water pollution. A World Bank Report in 1996 suggested more than 40,000 people die every year prematurely in India because of air pollution. Delhi for example, is the fourth top polluted city in the world and vehicular emission accounts for more

Table 5a: State of ambient air qualities in 10 major cities of India

Cities	SO_2	NO_2	NH_3	H_2S	SPM	RSPM	Proportion of SPM to RSPM*
Ahmedabad	16	7	17	1	285	122	42.8
Mumbai	27	26	51	2	226	91	40.3
Kolkata	62	39	93	4	394	180	45.7
Delhi	33	46	176	1	543	204	37.6
Hyderabad	10	19	10	2	156	56	35.9
Jaipur	8	14	29	2	338	108	32.0
Cochin	11	10	74	1	115	58	50.4
Kanpur	7	13	65	1	380	135	35.5
Chennai	8	13	33	2	101	67	66.3
Nagpur	9	9	70	1	173	82	47.4

Source: State of the Environment 1995, India, Ministry of Environment and Forest, Units are in 10^{-6} Grams per cubic Metre.

* Calculated

than 70 percent of the air pollution. According to the Central Pollution Control Board (1989) on vehicular pollution, the total emission of particulate matter, sulphur dioxide, nitrogen oxide, carbon and hydrocarbon in Delhi was 872 tonnes per day.

Energy Consumption and Emissions

Because energy consumption is a function of economic growth and level of development, energy consumption is distributed unequally in the world. Although their share has been falling, developed market economies, constituting one-fifths of the world's population, consume almost 60 percent of the world's primary energy. As a consequence of development and the rapid replacement of traditional energy sources by commercial (mainly fossil) sources, some developing countries have consumption patterns similar to those of developed market economies. Nevertheless, per capita consumption in developing countries as a group remains far below that of developed market economies.

The use of fossil fuels has led to substantial growth in global emissions of Carbon dioxide (CO₂) and the build up green house effects, contributing to global warming. Since 1751, over 265 billion tons of carbon have been released to the atmosphere, one half of these emissions having been produced since the mid-1970s (Marland and Others, 1999). Annual global emission of CO₂ emission are in North America, which is followed by Europe where such emissions are less than one half of North America. Continuation of these trends poses serious risk of global warming, including a possible rise in sea levels, flooding of low-lying coastal areas, spread of vector borne diseases and reductions in agricultural yields.

The magnitude of future carbon emissions depends on many factors, including global energy demand, the pace of economic development, the introduction of energy – saving concentration at

present levels can be achieved any if emission are immediately slashed by at least 50 percent and future reduced there after (United Environmental Programme-1999). Because of the inertia of climate system, even with stabilization of emission, global warming and the rise of sea levels could continue for many years.

Table 5b shows the urban pollution from vehicular emissions. If we look at the table, we find, petrol driven vehicles are emitting 85 percent of the total carbon monoxide to the environment and at the same time which expected to increase in future through two wheeler. Similarly, if we look at the emission of unburnt Hydrocarbon, then we find, only two wheelers and three – wheeler are contributing 35 to 65 percent of the emission of unburnt hydrocarbon. The diesel driven vehicles are emitting 90 or more nitrogen oxide to the environment. With the increasing urbanisation and industrialisation, the transport demand has also increased consequently. The total number of vehicles in India has increased from about 11 million in 1986 to more than 33 million, in 1996, of which about 28 percent is concentrated in the 23 metropolitan cities. With this has increased the vehicular pollution. The different factors are responsible for such high emission are the types of engines used, the age of the vehicles, poor road conditions, congested traffic etc. The principal vehicular pollutants are carbon monoxide, Oxides of Nitrogen, Hydrocarbons, suspended and particulate matters, a varying amount of Sulphur Dioxide depending on the Sulphur content of the fuels and lead compounds.

Automobiles exhaust accounts for a sizable part of pollution. Their effect of human health is particularly of concern. There is a strong correlation between average blood lead levels and the lead content in gasoline. Hydrocarbons presents in the exhaust, particularly, in vehicles with poor combustion cause respiratory problems. In the urban areas with tall buildings, which act as

Table 5b: Urban air pollution form vehicular emissions.

<i>Pollution</i>	<i>Source of emission</i>	<i>Contribution to percentage of the source total emission</i>	<i>Remark</i>
Carbon Monoxide	Petrol Driven Vehicles	85.0	Contribution of Two Wheelers is expected to rise.
Unburnt Hydrocarbon	Two and Three Wheelers	35 to 65	NA
Nitrogen Oxide	Diesel Driven Vehicles	90 or More	NA
Particulates	Diesel Driven Vehicles	NA	NA

Source: Teri Energy Data Directory & Year Book 1996/97.

concrete canyons, and in street crossings, the pollutants from vehicles stay for a much larger period. Pollution also causes photochemical smog.

In India, two wheelers which have generally two-stroke engines are getting popular because of greater fuel economy, better specific power, lower operational and maintenance costs and lower production costs. However, in two-and-three wheelers, powered by 2-stroke engines, exhaust emission are the principal source of pollutants. Diesel vehicles exhausts pollution is due to particulate matter, aldehydes and other toxic pollutants like Carbon-mono-oxide, unburned hydrocarbons and oxides of nitrogen.

Again, one out of 10 school children in Delhi suffers from asthma that is worsening due to vehicular air pollution. A World Health Organization (WHO) reports indicates that about 21 percent of all communicable disease in India are water borne disease. Water borne diseases kill more than 3 million people in India and 900 million cases of illness in the world. Since independence, our neglect of water sources has killed more than 50 million children, at least and now even adults will be coming to die of horrendous disease because of the growing chemical pollution (Fifth Citizens Report). UNDP Human Development Report (1995) stated that there were about 185.7 million people in India during 1988-93 who was not access to safe drinking water.

LAND USE PATTERN AND ENVIRONMENT

Providing irrigation facilities, fertilizers, modern agricultural technology and production techniques can increase Land use. All these will maximize the crop yields. But at the same time it is the process of agriculture extensification and intensification, which is leading to land degradation. Land use classification of India from 1951 to 1997 shows a gradual increase in net area shown and increases in the cropping intensity.

The land use statistics states for India is available for roughly 305 million hectares out of the total 329 million hectares of the total geographical areas, which accounts for 93 percent of the total land. The area under barren and uncultivable lands is generally unsuitable for agriculture, either because of topography or its inaccessibility. Instances are the deserts area in Rajasthan, the saline land in part of the Rann of Kutch in Gujarat, and the weed infected and ravine land in Madhya

Pradesh. Recently the area under non – agricultural use has increased due to increases in developmental activities e.g. housing, transport system, irrigation etc. About 22 mha are occupied by the housing. The industry and for other non – agricultural uses, 19.5 mha are snow bound and remote, leaving only 264 mha for agriculture, forestry, pasture and other biomass production.

Table 6 shows the land use classification in India since 1950 to 1997. Out of total geographical area of 329 mha, only 305 mha is the reporting area (the rest being unadministered for various reasons). About 22 mha are occupied for non-agricultural uses (housing, industry and others), 19 mha are snowbound and remote leaving only 264 mha for agriculture, forestry, pasture and other biomass production. The net sown area increased from 119 mha in 1950-51 to 143 mha in 1997 mostly through reclamation of old fallow and cultivable wasteland and diversion of groves. The net sown area under irrigation of old fallow and cultivable wasteland and diversion of groves. The net area under irrigation has increased from 21 mha in 1950-51 to 55.14 mha in 1997-97. The development in irrigation potential is largely due to effort of the government in developing irrigation facilities through major, medium and minor irrigation projects. The data shows that land use in the country, over the five decades undergone drastic change. Land under agriculture has almost doubled, forest cover has dwindled to less than half, and large tracts of fertile agriculture and forest have been diverted for urbanization and settlements. Deforestation contributes to loss of precious topsoil, which amounts to about 35 percent of the global sediment load going to oceans even though water flowing through our rivers is only about five percent of the flow of rivers of the world.

The crop yields have increased greatly in India over the past 20-25 years. Most of these increases have been due to the development of High Yielding Variety (HYVs) crops, which respond to fertilizers. The different types of cropping system practiced in traditional agriculture have given a way to system involving only a few crops, which are highly nutrient depleting but high yielding. The legumes, grasses and millets which were regular components of cropping system in Indian agriculture have largely phased out in highly productive areas due to poor economic returns and replaced by high yielding rice, wheat, sugarcane etc. This has created the problems of

Table 6: Land use classifications in India (in million-hectare area)

Classification	1950-51	1990-91	1991-92	1992-93	1993-94 ^P	1994-95 ^P	1995-96 ^P	1996-97
Geographical Area	328.73	328.73	328.73	328.73	328.73	328.73	328.73	328.73
Reporting Area for	284.32	304.86	304.90	304.84	304.86	304.83	304.88	304.88
Land Utilization Statistics								
(i) Forest	40.48	67.80	67.87	67.98	68.28	68.60	68.83	68.75
(ii) No Available for	47.52	40.48	40.74	40.90	40.90	41.28	41.38	41.54
Cultivation (Non – agricultural uses + Barren and cultivable land)								
Other Cultivated Land	49.45	30.22	30.05	29.47	29.07	29.07	28.64	28.55
(Permanent pastures and other grazing land + millaneous tree crops and groves + cultivable waste land)								
Fallow land	28.12	23.36	24.61	2.83	24.21	23.30	23.85	23.27
(fallow land other than current fallows + current fallows)								
Net area sown	118.75	143.00	141.63	142.72	142.34	142.96	142.20	142.82
(Gross cropped area – area sown more than once)								
Net Irrigated Area	20.85	47.78	49.87	50.30	51.34	53.0	53.40	55.14
Gross Irrigated Area	22.56	62.47	65.68	66.76	68.26	70.65	71.35	73.28

Source: Department of Agriculture and Cooperation, Ministry of Agriculture.
P = Provisional.

soil erosion and the destruction and disturbances to wild life habitats (Compendium of Environment Statistic). The net area under irrigation has also increased from 21 mha in 1950-51 to 53.5 mha in 1995-96 with the huge investment by the government.

GLOBALIZATION AND ENVIRONMENT

In developed and developing countries, Globalization being the outcome of development process has a great impact on environment. However, negative impact is predominant in the developing countries. In the process of Globalization or liberalization, India has become dumping ground for industrial toxic wastes from the north as well as a target of deceptive marketing, double standards and dangerous export of rejected goods. Research revealed that over 150 companies in India had imported about 60,000 tonnes of toxic waste mainly Lead and Zinc from 49 countries between 1994 and march 1996, even though only seven Indian companies have been granted licenses to do so. The Kandla Trade zone in the Gujarat is a common port of entry for hazardous waste. Here arrive thousands tonnes of batteries, which have seldom been drained, of acid before being sent to India. In 1992 United Kingdom (UK) exported 9,915 tonnes of non-ferrous metal waste including ash and residue, copper, aluminium, zinc and tin to India. Canada shipped about 1000 tonnes of lead waste and United State (US) (Pepsi Bottling, Cola Bottling Corporation) was exported about 7,000 tonnes of plastic scrap from California to Mumbai. In 1996, US and Singapore exported 1,127 tonnes of zinc to Mumbai and Australia exported 1,450 tonnes of

hazardous waste including scrap batteries, copper and zinc ash to Mumbai. Pollution in India thus, not derived everything from within but outside the country also contribute to it. India being a free trade country has tendency to inhale large amount of foreign imports. This policy also attracts large entrepreneurs from outside. India, thus without difficulty become world market.

CONCLUSION

The most important matter of concerns of the world is the rapid growth of population and environment degradation. With the passage of time, man's influence on environment became more intensive that ultimately cost heavy price for him to be renewed, else extinction of life of the surface. Extinction of flora and fauna and the rise of temperature that makes life more complicated are already experienced. The next possibility is the major disaster of human life by raising the sea level because of the melting of ice in Greenland and Antarctica. Many Indian cities, particularly in the costal area will suffer because of the rise of sea level. The dictum of friendlier relation with the surrounding thus, has become the common slogan for the people of the world. Complicate living condition of the country so also the possibility of further deterioration of human life because of indifference with environment is strongly felt now by worldwide citizens.

Thus, there is an urgent need has emerged to replace the gap between man and environment and save the nature from destruction. There are number of organizations making the framework of friendlier relation with the environment as well as several acts have been enacted by the Govt. of

India. Besides, people participation is the most important to renew the lost resources. Unless there is participation from the citizens, campaign against degradation of environment will move backward.

KEY WORDS Population. Environment. Deforestation. Land Use Pattern. Globalization. Industrialization.

ABSTRACT Relationship between Man and Environment continues since the early existence of man on the Earth. Mankind's relationship with the environment has passed through several stages, commencing with primitive time in which human beings lived in a stage of symbiosis with nature, followed by a period of growing mastery over nature, up to the industrial age and culminating into material-intensive growth patterns of the contemporary era. In India, population, environment and development issues have emerged as a chronic problem, because the process of development could not pace with the growth of population. India, for decades has been facing the adverse consequences of gradual degradation of environment in the form of drought, flood, rainfall, ill health and pollution etc. slow development processes and rapid growth of population pressurized the huge population to exploit the available resources more that result into the environmental degradation. It is seen predominant in urban area because of the rapid growth of urban population due to migration from rural to urban areas and rapid process of industrialization. Thus, the environmental degradation in India can be attributed to the processes of rapid population growth. This paper deals with the relationship among population, environment, and development in India by investigating the complex relationship of different demographic and development indicators viz; population growth, deforestation, urbanization, industrialization, health, land use pattern and globalization with the environment in Indian context.

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