

# Introduction

[Sociology](#), [Population](#)



Introduction The world has changed greatly since the 1960s and 1970s, when there existed a virtual consensus among Western experts that rapid population growth in the developing world represented a serious global crisis. One of the primary causes of environmental degradation in a country could be attributed to rapid growth of population, which adversely affects the natural resources and environment. The uprising population and the environmental deterioration face the challenge of sustainable development. The existence or the absence of favorable natural resources can facilitate or retard the process of socio-economic development. The three basic demographic factors of births (natality), deaths (mortality) and human migration (migration) and immigration (population moving into a country produces higher population) produce changes in population size, composition, distribution and these changes raise a number of important questions of cause and effect. Population growth and economic development are contributing to many serious environmental calamities in India. These include heavy pressure on land, land degradation, forests, habitat destruction and loss of biodiversity. Changing consumption pattern has led to rising demand for energy. The final outcomes of this are air pollution, global warming, climate change, water scarcity and water pollution. The rapid growing population and economic development is leading to a number of environmental issues in India because of the uncontrolled growth of urbanization and industrialization, expansion and massive intensification of agriculture, and the destruction of forests. Major environmental issues are forest and agricultural degradation of land, resource depletion (water, mineral, forest, sand, rocks etc.), environmental degradation, public health,

loss of biodiversity, loss of resilience in ecosystems, livelihood security for the poor. The increase of population has been tending towards alarming situation. Population Reference Bureau estimated the 6.14 billion world's population in mid 2001. Contribution of India alone to this population was estimated to be 1033 millions. It is estimated that the country's population will increase to 1.26 billion by the year 2016. The projected population indicates that India will be a first most populous country in the world and China will be second in 2050. India having 18% of the world's population on 2.4% of world's total area has greatly increased the pressure on its natural resources. Water shortages, soil exhaustion and erosion, deforestation, air and water pollution afflicts many areas. If the world population continues to multiply, the impact on environment could be devastating. The rapid population growth in a developing country like India are frightening the environment through the expansion and intensification of agriculture, the uncontrolled growth of urbanization and industrialization and the destruction of natural habitats. The pressures on the environment intensify every day as the population grows. The growing trends of population and consequent demand for food, energy, and housing have considerably altered land-use practices and severely degraded India's forest vis-à-vis environment also. The growing population put immense pressure on land extensification at cost of forests and grazing lands because the demand of food could not increase substantially to population. Thus, horizontal extension of land has fewer scopes and relies mostly on vertical improvement that is supported by technical development in the field of agriculture i. e. HYV seeds, Fertilizers, Pesticides, Herbicides, and agricultural implements. All these practices cause

degradation and depletion of environment with multiplying ratio. Poverty is amongst the consequences of population growth and its life style play major role in depleting the environment either its fuel demands for cooking or for earning livelihood for their survival. The unequal distribution of resources and limited opportunities cause push and pull factor for people living below poverty line that in turn overburdened the population density and environment get manipulated by manifolds.

### Population Dynamics

Population dynamics is the branch of life sciences that studies short-term and long-term changes in the size and age composition of populations, and the biological and environmental processes influencing those changes. Population dynamics deals with the way populations are affected by birth and death rates, and by immigration and emigration, and studies topics such as ageing populations or population decline. One common mathematical model for population dynamics is the exponential growth model. With the exponential model, the rate of change of any given population is proportional to the already existing population.

#### How do populations grow?

1. Exponential Growth \* Optimum environmental conditions required \* Constant rate of growth per unit time
2. Logistic Growth \* Most pop. grow exponentially then slow as they reach the CC. \* Environmental resistance- factors that reduce population growth rates \* Produces S-curve on graph

#### Factors that Increase or Decrease Populations:

- \* Natality- making new offspring by birth, hatching, germination or cloning
- \* Fecundity- physical ability to reproduce
- \* Fertility- measure of actual number of offspring produced. Those without children may be fecund but not fertile.
- \* Immigration- Movement of members into a population.
- \* Emigration- Movement of members out of a population \*

Mortality- death rate-Determined by dividing the number of organisms that die in a certain time period by the number alive at the beginning of the period. Types of Age Structure Diagrams: Expanding Population \* Young (pre-reproductive) dominates population \* Has population momentum- more children will move up to become reproductive \* Potential for rapid increase in birth rates once the youngsters reach reproductive age. \* EX: Developing countries- many countries in Africa Stable Populations \* Birth rates = death rates \* All age groups are about equal \* EX: Most Western European countries, U. S. Declining Populations \* Birth rates are lower than death rates \* Many more older people who are not reproducing \* Population will become much smaller when they die. Demographic Change The world experienced dramatic population growth during the twentieth century, with the number of inhabitants doubling from 3 to 6 billion between 1960 and 2000. India, too, saw very rapid population growth during this period — from 448 million to 1.04 billion — and to 1.21 billion in 2010. The effects of past and projected future demographic change on economic growth in India is the main focus of this chapter. Figure 1 plots world population from 1950 to 2050, and shows the share of world population attributable to India; post-2010 data are United Nations (UN) projections. Global population grew at roughly 2% per annum from 1960-2000, a level that is unsustainable in the long term, as it translates into population doubling every 35 years. India's population is currently growing at a rate of 1.4% per year, far surpassing China's rate of 0.7%. The differential between India and China will result in India surpassing China with respect to population size in less than 20 years. During the past few decades, rapid population growth has been accompanied by an

unparalleled decline in mortality rates and by an increase in income per capita, both globally and in India. India's changing demographic profile

India's population pyramid 1950, 1970, 1990, 2010. Effect of population growth on environment Population growth and economic development are causing several serious environmental problems in India. These include pressure on land, deforestation and water scarcity and water pollution. 1. Households with available & safe drinking water Access to safe drinking water and proper sanitation is both a right and a basic need. Access to safe drinking water in many households is non-existent or inadequate and remains an urgent need. The percentage distribution of households having safe drinking water facilities is presented briefly. In India, in 1981, 38 percent of households were access to safe drinking water facilities which was increased to 62 percent of households in 1991. About 27 percent and 75 percent of rural and urban households were access to safe drinking water facilities in 1981 increased to 55 percent and 81 percent of rural and urban households in 1991 respectively. The situation in rural areas is much worst. The households in eleven states and five union territories were access to safe drinking water more than the national average, and the households in 13 states and two union territories were access to safe drinking water below the national average during 1991. More than 50 percent of households in 13 states and 5 union territories were access to safe drinking water in rural India as compared to 21 states and 6 union territories in urban India. In India, almost all surface water resources are contaminated and unfit for human consumption. The impact of drinking water pollution is more severe on the poor. The problems have become more acute in the slum areas where such

basic necessities of life are either non-existent, or are inadequate and very low in standard. The diseases commonly caused due to contaminated water are diarrhea, trachoma, intestine worms, and hepatitis. Inadequate access to safe drinking water leads to intestinal mortality and intestinal diseases. 2.

Trends in poverty and its environmental effects in India Most of India's poor live in rural areas and are engaged in agriculture. India, with a high density of population relative to resources, faces developmental challenges in alleviating massive poverty and deprivation, and in raising the quality of life of poor people. The growth performance of states has crucial implications in poverty reduction, which is an important objective of the economic policy.

India's poverty reductions through the anti-poverty and employment generation programmes along with overall economic growth-planning efforts have helped to reduce the poverty ratio in the country. The people below the poverty line have declined from 55 percent in 1973 to 26 percent in 1999-2000 for India as a whole. Nineteen states and union territories have lesser percentage of population below poverty line than the national average.

There are wide interstate variations in the poverty ratios of different states.

The poverty ratio in Orissa at 47. 15 percent is about eight times that in Punjab (6. 16 percent). Almost half the population in Orissa and Bihar is below the poverty line. On the other hand there are 14 states, which have less than 20 percent of population below the poverty line. The highest percentage of population below poverty line found in Orissa, Bihar and Madhya Pradesh whereas the lowest percentage of population below poverty line found in Jammu and Kashmir, Goa, Punjab, Himachal Pradesh and Haryana. Poverty is said to be both cause and effect of environment

degradation. The poverty and rapid population growth are found to coexist and thus seems to reinforcing each other. The poor people, who rely on natural resources more than the rich, deplete natural resources faster as they have no real prospects of gaining access to other types of resources. Poorer people, who cannot meet their subsistence needs through purchase, are forced to use common property resources such as forests for food and fuel, pastures for fodder, and ponds and rivers for water. Moreover degraded environment can accelerate the process of impoverishment, again because the poor depend directly on natural assets. It also contributes to environmental degradation through over exploitation of natural resources like land and water. The deterioration of natural resources and unsafe living conditions affects the environment and health of the poor people. 3. Huge stress on land India confronts severe pressure on agricultural land. Over the past fifty years, while India's total population increased by about 3 times, the total area of land under cultivation increased by only 15. 92 percent from 118. 75 to 141. 23 million hectares. Despite past expansion of the area under cultivation, less agricultural land is available to feed each person in India. The extent of agricultural intensification and extensification is characterized by increase in cropping and irrigation intensity and higher use of chemical fertilizers, pesticides and insecticides. The process of agricultural extensification and intensification is leading to land degradation, overexploitation of underground water resources, increased use of chemical fertilizers leading to eutrophication and water pollution. 4. Degradation of Land/Soil Direct impacts of agricultural development on the environment arise from farming activities, which contribute to soil erosion, land salination



and loss of nutrients. Leaching from extensive use of pesticides and fertilizers is an important source of contamination of water bodies. Intensive agriculture and irrigation contribute to land degradation particularly salination, alkalization and water logging. It is evident that most of the land in the country is degrading, thus affecting the productive resource base of the economy. The estimated area of land affected by soil erosion and land degradation in India varies state to state and it varies 0.1 percent in Goa to 21.6 percent in Rajasthan. Soil erosion results in huge loss of nutrients in suspension or solution, which are removed away from one place to another, thus causing depletion or enrichment of nutrients. Besides the loss of nutrients from top soil, there is also degradation through the creation of gullies and ravines, which make the land unsuitable for agricultural production.

5. Continuous diminution of per capita forest land and agricultural land

The population growth has resulted in a downward trend in per capita availability of forest and agricultural land since the 1950s. Per capita availability of forests in India is much lower than the world average. The per capita availability of forest land declined from 0.124 hectares from 1960-61 to 0.071 hectares in 1998-99 - a level that is extremely low compared to the world standards. The growth of population is expected to be faster than hoped for improvements in forest cover as well as quality. Over the last ten years, despite governmental initiatives of joint forest management, tree grower's co-operative movements and other efforts tangible results are still to be observed, and forest depletion and degradation is still increasing. Similarly, the per capita availability of agricultural land in rural areas has decline consistently from 0.638 hectare in 1950-51 to 0.271

hectare in 1998-99 and is expected to decline further as population continues to grow.

6. Altered consumption patterns The economic and industrial development is inevitably accompanied by changing patterns of consumption. The number of registered motor vehicles in India provides one useful indicator of expanding consumption and economic growth. The increasing vehicles in country, producing more air pollution, fuel consumption, traffic jams and demands for road construction-often at the cost of agricultural land. The total number of registered vehicles in India has increased from 3 million in 1950-51 to 55 million in 2001-2002. The major share is contributed by metropolitan cities in all registered vehicles in the country. The population of India in 2000 was just over 1 billion, and there were about 10 motor vehicles for every 1000 people, or a total of roughly 10 million motor vehicles in the country. In 2020, the population of India will be about 1.3 billion, and there will be about 44 motor vehicles for every 1000 people, making a total of 57 million vehicles (Energy Information Administration, 2001). An increase in vehicular pollution is associated with a number of environmental problems like air pollution and global warming. In most urban areas of India, air pollution has worsened due to traffic congestion, poor housing, poor sanitation and drainage and garbage accumulation.

7. Gradually Intensifying demand for energy The environmental effects due to increasing consumption levels of fuels like coal; lignite, oil and nuclear etc. are of growing concern to various researchers. The combustion of these fuels in industries has been a major source of pollution. The production of coal and lignite has increased from 32.2 million tons in 1950-51 to 313.70 million tons in 2000-2001, an increase of 9.74

times. The production of petroleum products registered an increase of 29 times, from 3.3 million tons in 1950-51 to 95.6 million tons in 2000-2001. The bulk of commercial energy comes from the burning of fossil fuels viz. coal and lignite in solid form, petroleum in liquid form and gas in gaseous form. In addition to emission of greenhouse gases, the burning of fossil fuels has led to several ecological problems and associated with health problems like cancer risk, respiratory diseases and other health problems. Burning of traditional fuel adds a large amount of carbon-di-oxide into atmosphere and increases air pollution.

8. Ground Water Resources, Water scarcity and water pollution

Out of the total replenishable ground water; about 84 percent is made available for agriculture and livestock, the rest 16 percent is made available for domestic consumption, industrial use and power generation. The amount of water available per person has declined in recent decades primarily because of population growth and water scarcity is projected to worsen in the future. The water pollution in India comes from three main sources: domestic sewage, industrial effluents and run off from activities such as agriculture. The increasing river water pollution is the biggest threat to public health. The diseases commonly caused due to polluted water are cholera, diarrhea, hepatitis, typhoid amoebic and bacillary, dysentery, guinea worm, whereas scabies, leprosy, trachoma and conjucvitis are some of the diseases associated with water scarcity. All these could be attributed to the rapidly increasing population and lack of water resources. Inadequate access to safe drinking water and sanitation facilities leads to higher infant mortality and intestinal diseases.

9. Global warming resulting climate change

The country's large population resulting fast increasing energy use plays an

important and growing role in global warming. Global warming can have major physical, environmental and socioeconomic consequences, which can be both positive and negative. The estimation of these impacts is complex and marked with uncertainties. Climate change would cause changes in 14 precipitation patterns, ocean circulation and marine systems, soil moisture, water availability, and sea level rise. These would make an impact on agriculture, forestry and natural eco-systems like wetlands and fisheries. Also with rising temperatures, and subsequent increasing heat stress and alternation in patterns of vector-borne diseases, the global population would be more vulnerable to health problems, causing disruptions in settlement patterns and large-scale migration. All these would have significant socio-economic consequences. Conclusion The result of high population growth rates are increasing population density, increasing number of people below poverty line and pressure on natural resources which contributes to environmental degradation through over exploitation of natural resources. The study reveals that rapid population growth continues to be a matter of concern for the country as it has manifold effects, most important being land degradation and soil erosion, deforestation and declining per capita land, forest and water resources.