

POPULATION AND ENVIRONMENT IN INDIA

Abstract

Rapid population growth and economic development in country are threatening the environment through expansion and intensification of agriculture, uncontrolled growth of urbanization and industrialization, and destruction of natural habitats. The present paper is an attempt to study the population change and its impacts on land, forest and water resources. The data have been analyzed from various secondary sources of data. Conducted an analysis of changes and trends over last forty years. The analysis reveals that outcomes of high population growth rates are increasing population density and number of people below poverty line. Population pressure contributes to land degradation and soil erosion, thus affecting productive resource base of the economy. Rapid population growth plays an important role in declining per capita agricultural land, forest and water resources. The importance of population and environment has been highlighted. The paper concludes with some policy reflections and emphasizes the potential importance of natural resources.

POPULATION AND ENVIRONMENT IN INDIA

Introduction

The rapid population growth and economic development in country are threatening the environment through the expansion and intensification of agriculture, the uncontrolled growth of urbanization and industrialization and the destruction of natural habitats. One of the major causes of environmental degradation in India could be attributed to rapid growth of population, which is adversely affecting the natural resources and environment. The growing population and the environmental deterioration face the challenge of sustained development without environmental damage. The existence or the absence of favorable natural resources can facilitate or retard the process of economic development. The poverty-environmental damage nexus in India must be seen in the context of population growth as well. The pressures on the environment intensify every day as the population grows. The rapid increase of human numbers combines with desperate poverty and rising levels of consumption are depleting natural resources on which the livelihood of present and future generations depends.

As the 21st century begins, growing number of people and rising levels of consumption per capita are depleting natural resources and degrading the environment. Though the relationship is complex, population size and growth tend to expand and accelerate these human impacts on the environment. What is more concern, the number of population rise will increase to such an extent in future that it will cause overall scarcity for resources. India is having 18 percent of the world's population on 2.4 percent of its land area has great deal of pressure on its all natural resources. 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. If the world population continues to multiply, the impact on environment could be devastating.

The availability of cultivation land per capita in India has declined from 0.89 ha in 1951 to 0.33 ha in 2000 A.D. Globally, about 1/3 of agricultural land is devoted to crops and the remaining 2/3 is devoted to pasture for livestock grazing. Lack of pastureland to poor mass also affects environment. In India, pastures and grazing land hardly occupy 40 percent of agricultural land, although we have over 20 percent of the world's cattle, buffalo, sheep and goat population. Overgrazing of all community lands has converted them in to barren lands. 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 causing 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 growth in India

India is the second most populous country in the world after China. Recently, the population of India has crossed the one billion marks. According to the Census of India 2001, the population of India on 1st March 2001 is 1027 millions. About 17 Million people, almost the size of Australia's population, are added each year to India's population. It is a matter of great concern to all that India needs to support this massive and rapidly growing population on a land area that is less than one-half of Australia's land area. Recent trends of population show that India's population doubled in just two decades and it is estimated that next would be in 10 to 15 years time to take its double. During the 20th century alone about 600 million more people have been added. Most of this massive 20th century increase in India's population has come during the post-Independence period. Table 1 presents one hundred years of demographic changes in India. Around 1911, the population growth rate in India was under 1 percent, and during 1911 to 1921 it was actually negative. This was mainly because mortality levels before were nearly as high as fertility levels. Since 1921, there has been a continuous decline in the death rate. Many factors, such as the disappearance of plague and control over cholera, malarial fever, and other infectious diseases, as well as improvements in food production and distribution systems and progress in public health and sanitation, have contributed to improvements in mortality conditions, especially after the Second world War when death rates fell at a faster rate (Coale and Hoover 1958). Infant mortality rate declined from over 200 around 1921 to 66 in 2001, and life expectancy at birth for both male and females increased from little more than 20 years in 1921 to 61 years during 1993-1997.

Fertility did not decline as fast as mortality. The birth rate stayed well above 40 for most part of the pre- independence period and for about two decades after independence. It was not until the late 1960s, when family planning efforts were increased, that fertility started to fall. But these benefits were significantly mitigated by an unduly coercive approach to family planning during the emergency period in the mid 1970s. The family planning program has since recovered. According to the Sample Registration System, the birth rate is 25.4 births per 1000 population per year in 2001. The differential changes in fertility and mortality after 1921 are clearly reflected in the widening gap between the birth rate and death rate. After independence it experience steady rate of population growth, it can visualize that during a period of 40 years India literally added another India. Though the growth rate appears to have stopped increasing, its level is still quite high. At the time of independence, the country's population was 342 million. The number has multiplied three-fold during five decades. The total population size of India had grown from 361 million in 1951 to 1027 million in 2001.

Population Distribution in the States of India

The growth of population, distribution and density of population are interrelated with each other. It is important to note that the population in the states is not always proportionate to the area of

the states. People move more in areas where employment opportunities are available by way of agriculture or industry and less in forest and dry areas. Since majority of the population in the country depends upon agriculture, variation in population distribution is related with the agricultural potentialities, which are mostly affected by natural conditions such as climate, soil, rainfall and temperature. The various natural factors, urbanization and industrialization have played a dominant role in the distribution of population in different states of India. The state-wise distribution of population for the four census years from 1971 to 2001 is presented in Table 2. India is the second most populous country of the world. The population of India increased from 548 million in 1971 to 1027 million in 2001. The population has been increasing at more than a desirable rate in all the states. Wide variations have also been observed in the growth of population among various states. It can be seen from the table that in census year 1971, Uttar Pradesh and Bihar were the most populous state in the country with 16.12 percent and 10.28 percent to the total population whereas in the census year 2001, Uttar Pradesh remains the most populous followed by Maharashtra and Bihar. The percentage of population is still higher in eight states namely, U.P, Bihar, M.P, Maharashtra, Tamil Nadu, West Bengal, Andhra Pradesh and Rajasthan. Among the states, Uttar Pradesh is a highest populous state in the country. The population of this state was 8.83 million in 1971, which increased to 16.60 million in 2001. The lowest population was recorded in Nagaland. While among the Union Territory, Delhi is the most populous, whereas L. M. and A. islands is the least populous union territory. These differences might be due to the poverty, illiteracy and inadequate access to health and family welfare services, which coexist and reinforce each other. The five states of Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh that currently constitute nearly 402.49 million population to the total population of India. Demographic outcomes in these states will determine the timing and size of population at which India achieves population stabilization.

Growth Rates of Population in the states of India

The percentage decadal and annual growth rate of different states and Union Territory as recorded in various censuses from 1971 to 2001 are presented in Table 3 and 4. The percentage decadal growth rate during 1991-2001 has registered the sharpest decline since independence. It has declined from 24.80 percent in 1961-71 to 21.35 percent in 1991-2001, i.e. a decrease of 3.45 percent. The percentage decadal growth of population during 1961-71 has recorded low of 15.61 percent in Jammu and Kashmir, while the highest in Delhi (52.93 percent), Nagaland with 39.84 percent, Aruanchal Pradesh with 38.99 percent, Manipur (37.44 percent), Tripura (36.25 percent), Goa (34.97 percent) and Assam (34.95 percent) and very high growth also recorded in one small Union Territory, Andman and Nicobar Island with 82.54 percent. Whereas during 1991-2001, the decadal percentage growth varied from a low of 9.42 percent in Kerala to a very high 64.43 percent in Nagaland followed by Delhi (46.31 percent), Chandigarh (40.19 percent), Sikkim (33.0 percent) rates and small Union Territory of Dadar and Nagar Haveli also registered very high growth rates. Kerala and two other major States in Southern India i.e. Tamil Nadu and Andhra Pradesh reported low growth rates during 1991-2001. The percentage annual exponential growth rate in states and Union Territory of India has declined from 2.24 percent in 1961-71 to 1.95 percent in 1991-2001. The average annual exponential growth rate has declined during the census decades 1991-2001 as compared to the previous census decade in all the states and Union Territories except Jammu and Kashmir, Bihar, Nagaland, and Dadar and Nagar Haveli etc.

Population Density in the States of India

The density of population varies from state to state. Density of population can be used as an indicator to measure the population pressure on land area. The present study will attempt to examine the population density per square Km. of total land area only. The density of population per square Km. of total land area from 1971 to 2001 is shown in Table 5. There has been an increase in the population density in all the states of India from 1971 to 2001. West Bengal is having the highest population density whereas Arunachal Pradesh is having the lowest population density. In 1971 and 1981 there were 9 states and 5 union territories with higher population density as compared to 9 states and 6 union territories in 1991 and increased to 11 states and 6 union territories in 2001 as compared to national average. When the rate of increase in different states is examined, West Bengal and Bihar has recorded the highest population density during the 30 years period from 1971 to 2001. The third, fourth and fifth positions have been taken by Kerala, Tamil Nadu and Uttar Pradesh respectively. Arunachal Pradesh, Jammu and Kashmir, Mizoram, Sikkim and Andaman and Nicobar Islands registered a lower percentage of increase in population density than national average during 2001. There were 14 states and 1 union territory with lower population density as compared to national average. It is clear from table that average population density at the national level had increased by more than double in the last three decades. Population density in Bihar, Haryana, Kerala, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal is very high (more than 400 persons per square Km. of total land area).

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 trends in poverty in India are depicted in Table 6. 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. In the absence of capital resources, the poor are directly

dependent on natural resources. 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.

Environmental challenges

Population growth and economic development are contributing to many serious environmental problems in India. These include pressure on land, deforestation and water scarcity and water pollution.

Pressure on land

India faces the most acute 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. A change in land utilization pattern implies an increase or decrease in the proportion of area under different land uses at a point in two or more time periods. Table 7 describes the land utilization pattern in India from 1951 to 2000. It shows variations in land use and a narrow range of fluctuations in the proportion of net sown area to total land in the country since 1951 to 2000. Out of total geographical area of 329 million hectares, only 306 million hectares is the reporting area (the rest being unadministered for various reasons). The land for non-agricultural uses (housing, industry and others) is increased from 9.36 million hectares in 1951 to 42.41 million hectares in 2000. About 19 million hectares are snow bound and remote leaving only 264 million hectare for agriculture, forestry, pasture and other biomass production. The area under cultivation had increased by about 30 percent until 1981 and thereafter depicts marginal decline. The net sown area increased from 119 million hectares in 1950-51 to 140 million hectares in 1970-71 mostly through reclamation of old fallow and culturable wastelands and diversion of groves. The net area sown has increased only marginally from 140 million hectares in 1970-71 to 141.23 million hectares in 1999-2000, indicating that the private efforts have peaked and the intervention of the Government is required for further land reclamation.

The extent of agricultural intensification and extensification 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. Agricultural intensification because of increasing cropping intensity, irrigation intensity and excessive use of chemical fertilizers resulting into water logging, salinization and alkalinization of croplands and eutrophication of water bodies and ill health of oceans and thus reductions in biodiversity.

Land/Soil degradation

Direct impacts of agricultural development on the environment arise from farming activities, which contribute to soil erosion, land salination and loss of nutrients. The spread of green revolution has been accompanied by over exploitation of land and water resources and use of fertilizers and pesticides have increased many folds. Shifting cultivation has also been an important cause of land degradation. 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. Out of the total geographical area of 328.7 million hectares, 175 million hectares are considered to be land-degraded area (Table 8). Water and wind erosion is the major contributor of 141.3 million hectares to soil erosion, with other factors like water logging 8.5 million hectares, alkali soil 3.6 million hectares, acid soil 4.5 million hectares, saline soil including coastal sandy areas 5.5 million hectares adding to the situ degradation. While soil erosion by rain and river in hill areas causes landslides and floods, deforestation, overgrazing, traditional agricultural practices, mining and incorrect siting of development projects in forest areas have resulted in opening up of these areas to heavy soil erosion. Ravines and gullies reported 4 million hectares; area subject to shifting cultivation reported 4.9 million hectares and riverine and torrents erosion due to floods and eutrophication due to agricultural run off reported 2.7 million hectares. The increasing intensification and extensification also results in salination, alkalization and water logging in irrigated areas of the country. For achieving and maintaining food security, sustainable forestry, agricultural and rural developments controlling of land/soil erosion is very much necessary.

State wise area affected by soil erosion and land degradation in India

Land is degraded when it suffers a loss of intrinsic qualities, decline in its capabilities or loss in its productive capacity. Land degradation may be due to natural causes or human causes or it may be due to combination of both. Soil erosion is the major cause of land degradation. Soil is the non-renewable natural resource, which supports life on earth. The estimated state wise area affected by soil erosion and land degradation in India during 1984 is given in Table 9. The estimated area affected by soil erosion and land degradation is considered to be 1731.1 lakh hectares in India during 1984. Land affected by soil erosion is the major contributor of 1266.2 Lakh hectares and land degraded through other problems is 465 lakh hectares. The highest estimated land affected by soil erosion and land degradation is 374 lakh hectares (21.6 percent) in Rajasthan, land affected by soil erosion contributes to 199 lakh hectares and 175 lakh hectares through other problems. The estimated land affected by soil erosion and land degradation varies from 78 lakh hectares to 207 lakh hectares (4.5 percent to 12 percent) in Orissa, Karnataka, Andhra Pradesh, Gujarat, Uttar Pradesh, Maharashtra and Madhya Pradesh. The estimated land affected by soil erosion was highest in Rajasthan (199 lakh hectares), Madhya Pradesh (196.1 lakh hectares), Maharashtra (191.8 lakh hectares), Andhra Pradesh (115 lakh hectares), Karnataka (109.9 lakh hectares), Gujarat (99.5 lakh hectares) and Uttar Pradesh (71.1 lakh hectares). The estimated land degraded through other problems was highest in Rajasthan (174.9 lakh hectares), followed by Uttar Pradesh (60.1 lakh hectares), West Bengal (32.7 lakh hectares), Orissa (32.3 lakh hectares), Gujarat (26.4 lakh hectares) and Haryana (25.7 lakh hectares). 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.

Deforestation

Forests are an important natural resource of India. They have moderate influence against floods and thus they protect the soil erosion. Forests also play an important role in enhancing the quality of environment by influencing the ecological balance and life support system (checking soil erosion, maintaining soil fertility, conserving water, regulating water cycles and floods, balancing carbon dioxide and oxygen content in atmosphere etc. India has a forest cover of 76.52 million square kilometers of recorded forest area, while only 63.34 million square kilometers can be classified as actual forest cover. This accounts for 23.28 percent of total geographic area against 33 percent recommended by National Forest Policy of 1988. Per capita availability of forests in India is much lower than the world average. In the year 2001, as compared to 1999, the total forest cover had increased by 38245 Sq. Kilometers. The states, which have shown significant decline in the forest covers, are Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Andaman and Nicobar Islands. Whereas the states of Assam, Bihar, Himachal Pradesh, Karnataka, Tamil Nadu, Gujrat, Maharashtra, Punjab, Rajasthan and West Bengal have shown an increase in forest cover. However, it has increased in 1999 by 3896 square Kilometers as compared to 1997 and it has decreased by 6203 Sq. Kilometers in 1997 as compared to 1995 and it has again decreased by 1228 Sq. Kilometers in 1995 as compared to 1993 (Table 10).

In 1981-83, only 11.2 percent of country's total land area comprises dense forest with a crown density of more than 40 percent, thus reflecting a qualitative decline of forests in the country. The total forest area diverted for non-forestry purposes between 1950 and 1980 was 4.5 million hectares i.e. at an annual rate of 0.15 million hectare. To regulate unabated diversion of forestland for non-forestry purposes, Forest (Conservation) Act, 1980 was enacted. It has resulted in reduction of diversion of forest area for non-forestry purposes considerably and the present rate of diversion is 16,000 hectare annually (Economic Survey of India, 1998-99). Continuing deforestation, therefore, has brought us face to face with a major ecological and socio-economic crisis.

Declining Per Capita Forest and Agricultural Land

The population growth has resulted in a downward trend in per capita availability of forest and agricultural land since the 1950s. The per capita availability of forest and agricultural land is depicted in Table 11. Overall, per capita availability of forestland had oscillated around 0.113 hectare during 1950s, and then consistently declined. The per capita availability of forest land declined from 0.124 hectares per capita during 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. Despite governmental initiatives of joint forest management, tree grower's co-operative movements etc. Over the last

ten years, 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 decline consistently from 0.638 hectare in 1950-51 to 0.271 hectare in 1998-99. Availability is expected to decline further as population continues to grow.

Ground Water Resources, Water scarcity and water pollution

Water use in India has been increased over the past 50 years. 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. However, not all the water abstracted is effectively used, there are sizable losses in conveyance and application of irrigated water, a large part of water used by industry and domestic purposes is returned to the streams as effluent waste; and most of the water drawn by power station is used for cooling purposes and is available for reuse. The ground water resource in India is presented in Table 12. Out of the total replenishable ground water resource of 43.38 MhaM/Yr, the largest share goes to utilizable ground water resource for irrigation at 36.26 MhaM/Yr and 7.12 MhaM/Yr provision for domestic, industrial and other uses. Balance ground water resource for future use in net terms is 22.73 MhaM/Yr. Level of ground water development is 37.24 percent. 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. Major industrial sources of pollution in India include the fertilizer plants, refineries, pulp and paper mills, leather tanneries, metal plating and other chemical industries. Levels of solid wastes increased in rivers and lakes and other water systems are also heavily polluted due to the intrusion of solid wastes. Largely because of widespread pollution, access to safe drinking water remains an urgent need as only 70.1 percent of the households in urban areas and 18.7 percent in rural areas received organized pipe water supply and others have to depend on surface and ground water which is untreated. Population pressure driven overexploitation of the surface and underground water resources by the poor has resulted into contamination and exhaustion of the water resources. Urban population is also using rivers to dispose of untreated sewage and industrial effluent. The result is that health of those dependents on untreated water resources is increasing at risk. The deterioration of natural resources and unsafe living conditions affects the environment and health of the poor people (Statistical Abstract of India, 1999).

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, guineaworm, 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. More than one million children died due to diarrhea and other gastrointestinal disorders in 1990s. In addition, around 90 lakh cases of acute diarrhea diseases have been reported in India, Uttar Pradesh reporting the highest number of cases (Central Bureau of Health Investigation, 1996). It is estimated that 73 million workdays are lost every year due to water related diseases. The cost of treating them and the loss in production amount to Rs. 600 crores a year (Citizen's Report, 1982).

Households Having Safe Drinking Water Facilities

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 in Table 13. In India, in 1981, 38 percent of households were access to safe drinking water facilities 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.

Summary, Conclusions and Policy implications

The outcomes of high population growth rates are increasing population density, increasing number of people below poverty line and pressure on natural resources. The poverty and rapid population growth contributes to environmental degradation through over exploitation of natural resources. 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. The study reveals that rapid population growth has led to the over exploitation of natural resources. The deforestation has led to the shrinking of forest cover, which eventually affects human health. Population pressure on arable land contributes to the land degradation, thus affecting the productive resource base of the economy. From the various effects of human beings on environmental degradation, discussed in this paper, it appears that if human beings want to exist on earth, there is now high time to give top priority to protect natural resources and environment. The creation of employment opportunities is essential in agricultural areas with high poverty, unemployment and landlessness. Poverty also affects the demographic characteristics of the population and hinders the transition to slower population growth. Unless significant measures are taken to incorporate environmental concerns into agricultural development, urban planning, technological innovations, industrial growth, and resource management, the situation is likely to worsen in the future. There is a need to control population growth below replacement level in the country. Special efforts should be made for informing and educating the people and local leaders about the adverse effects of large population through specially designed Information, Education and Communication (IEC) activities. In order to increase green cover and to preserve the existing forests, afforestation and social forestry programmes should be implemented at the local level. There is a need for

preventive and curative measures to control water pollution due to chemical fertilizers, pesticides and other wastes. More emphasis should be laid on compulsory environmental education at the school level in order to make people aware of the environment protection. The environment protection should not be a responsibility of government alone but local people and leaders should be encouraged to make dedicated efforts to eradicate the environmental problems.

Table 1: One hundred years of demographic changes in India, 1901-2001.

Year	Population (million)	Density	Crude birth rate	Crude death rate	Natural growth rate	Infant mortality rate	Life Expectancy at birth males	Life Expectancy at birth Female
1901	238	77	49.2	42.6	6.6	222	22.6	23.3
1911	252	82	48.1	48.6	-0.5	212	19.4	20.9
1921	251	81	46.4	36.3	10.1	176	26.9	26.6
1931	279	90	45.2	31.2	14	168	32.1	31.4
1941	319	103	39.9	27.4	12.5	148	32.4	31.7
1951	361	117	41.7	22.8	18.9	142	41.9	40.6
1961	439	142	41.2	19	22.2	136	46.4	44.7
1971	548	173	34.6	14.7	19.9	129	50.9	50
1981	683	216	32.5	11.4	21.1	98	56.6	56.9
1991	846	274	29.5	9.8	19.7	80	58.6	59
2001	1027	324	25.4	8.4	17.0	66	60.4	61.8

- Sources:
1. For The period 1881-1940, Kingsley Davis, population of India and Pakistan (Princeton University press, 1951).
 2. For the period 1941-1970, India's population: Demographic Scenario, Department of Family Welfare, Ministry of Health and family Welfare, Government of India (1987).
 3. For the period 1971-2001, Sample Registration System, Office of the Registrar General, India.
 4. Census of India, 2001

Table 2: State wise population of India, 1971-2001

States/UTs	(Thousands)			
	1971	1981	1991	2001
Andhra Pradesh	43503	53550	66508	75,727
Assam	14958	19897	22414	26,638
Bihar	56353	69915	86374	82,878
Gujarat	26697	34086	41309	50,596
Haryana	10037	12922	16463	21,082
Himachal Pradesh	3460	4281	5170	6,077
Jammu & Kashmir	4617	5987	7718	10,069
Karnataka	29299	37136	44977	52,733
Kerala	21347	25454	29098	31,838
Madhya Pradesh	41654	52179	44977	60,385
Maharashtra	50412	62784	66181	96,752
Manipur	1073	1421	78937	2,388
Meghalaya	1012	1336	1837	2,306
Nagaland	516	775	1209	1,988
Orissa	21945	26370	31659	36,706
Punjab	13551	16789	20281	24,289
Rajasthan	25766	34262	44005	56,473
Tamil Nadu	41199	48408	55858	62,110
Tripura	1556	2053	2757	3,191
Uttar Pradesh	88341	110862	139112	166,052
West Bengal	44312	54581	68077	80,221
A & N Islands	115	189	280	356,265
Arunachal Pradesh	468	632	864	1,091
Chandigah	257	451	642	900
Dadra and Nagar Haveli	74	104	138	220
Delhi	4066	6220	9420	13,782
Goa, Daman, and Diu	858	1087	1270	1,501
L. M. & A. Islands	32	534	740	60
Pondicherry	472	604	807	973
India	547950	685185	846302	1,027,015

Source: Census of India, 1971-2001.

Table 3: State wise decadal growth rate of population in India, 1961-71 to 1991-2001.

States/Uts	1961-71	1971-81	1981-91	1991-2001
Andhra Pradesh	20.90	23.10	24.20	13.86
Arunachal Pradesh	38.99	35.12	36.93	26.27
Assam	34.95	23.36	22.74	20.30
Bihar	21.33	24.06	23.54	27.11
Goa	34.97	26.67	16.09	14.88
Gujarat	29.39	27.67	21.19	22.48
Haryana	32.23	28.76	27.40	28.06
Himachal Pradesh	23.04	23.71	20.79	17.53
Jammu & Kashmir	15.62	45.46	28.91	30.46
Karnataka	24.22	26.74	21.17	17.19
Kerala	26.29	19.23	14.32	9.42
Madhya Pradesh	28.67	25.27	26.84	22.66
Maharashtra	27.45	24.54	25.73	22.57
Manipur	37.44	32.46	29.37	29.99
Meghalaya	31.47	32.05	32.88	29.99
Mizoram	24.81	48.49	39.76	29.32
Nagaland	39.84	50.00	56.20	64.43
Orissa	25.05	20.17	20.06	15.94
Punjab	21.70	23.81	20.88	19.76
Rajasthan	27.83	32.97	28.44	28.33
Sikkim	29.01	51.20	28.48	33.00
Tamil Nadu	22.30	17.50	15.39	11.19
Tripura	36.25	31.94	34.29	15.74
Uttar Pradesh	19.78	25.49	25.48	25.46
West Bengal	26.87	23.17	24.73	17.84
A&N Islands	82.54	63.48	48.94	27.14
Chandigarh	15.97	75.49	42.35	40.19
D & N Haveli	29.82	39.19	33.98	59.42
Delhi	52.93	53.01	51.45	46.31
Lakshadweep	29.17	29.03	27.50	17.65
Pondicherry	27.64	28.24	33.61	16.11
India	24.80	24.66	23.85	21.35

Source: Census of India, 1971-2001.

Table 4: State wise annual growth rate of population in India, 1961-71 to 1991- 2001.

States/Uts	1961-71	1971-81	1981-91	1991-2001
Andhra Pradesh	1.92	2.10	2.19	1.31
Arunachal Pradesh	3.35	3.06	3.19	2.36
Assam	3.04	2.12	2.07	1.87
Bihar	1.95	2.18	2.14	-0.41
Goa	3.04	2.39	1.50	1.40
Gujarat	2.61	2.47	1.94	2.05
Haryana	2.83	2.56	2.45	2.50
Himachal Pradesh	2.10	2.15	1.91	1.63
Jammu & Kashmir	1.46	3.82	2.57	2.69
Karnataka	2.19	2.40	1.94	1.60
Kerala	2.36	1.77	1.35	0.90
Madhya Pradesh	2.55	2.28	2.41	-0.91
Maharashtra	2.46	2.22	2.32	2.06
Manipur	3.23	2.85	2.61	2.66
Meghalaya	2.77	2.82	2.88	2.66
Mizoram	2.24	4.03	3.40	2.60
Nagaland	3.41	4.14	4.56	5.10
Orissa	2.26	1.85	1.84	1.49
Punjab	1.98	2.16	1.91	1.82
Rajasthan	2.49	2.89	2.53	2.53
Sikkim	2.58	4.22	2.54	2.89
Tamil Nadu	2.03	1.63	1.44	1.07
Tripura	3.14	2.81	2.99	1.47
Uttar Pradesh	1.82	2.30	2.30	1.79
West Bengal	2.41	2.11	2.23	1.66
A&N Islands	6.20	5.04	4.06	2.43
Chandigarh	8.00	5.79	3.59	3.44
D & N Haveli	2.64	3.36	2.97	4.77
Delhi	4.34	4.35	4.24	3.88
Lakshadweep	2.59	2.58	2.46	1.64
Pondicherry	2.47	2.52	2.94	1.50
India	2.24	2.23	2.16	1.95

Source: Census of India, 1971-2001.

Table 5: State wise Population Density of India

State/Uts	(in square. kilometers)			
	1971	1981	1991	2001
Andhra Pradesh	158	195	242	275
Arunachal Pradesh	6	8	10	13
Assam	186	230	286	340
Bihar	324	402	497	880
Goa	215	272	316	363
Gujarat	136	174	211	258
Haryana	227	292	372	477
Himachal Pradesh	62	77	93	109
Jammu & Kashmir	NA	59	76	99
Karnataka	153	194	235	275
Kerala	549	655	749	819
Madhya Pradesh	94	118	149	196
Maharashtra	164	204	257	314
Manipur	48	64	82	107
Meghalaya	45	60	79	103
Mizoram	16	23	33	42
Nagaland	31	47	73	120
Orissa	141	169	203	236
Punjab	269	333	403	482
Rajasthan	75	100	129	165
Sikkim	30	45	57	76
Tamil Nadu	317	372	429	748
Tripura	148	196	263	304
Uttar Pradesh	300	377	473	689
West Bengal	499	615	767	904
A. & N. Islands	14	23	34	43
Chandigarh	2257	3961	5632	7902
Dadra & Nagar Haveli	151	211	282	449
Daman & Diu	559	705	907	1411
Delhi	2742	4194	6352	9294
Lakshadweep	994	1258	1616	1894
Pondicherry	959	1229	1642	2029
India	177	216	267	324

Source: Statistical Abstract of India, 1971-2001.

- \$: While working out the density of India, Jammu & Kashmir has been excluded as comparable figures of area and population are not available for the state.
- @ : The 1981 census could not be held in Assam, therefore, for calculating the density of India & Assam, the population figures for 1981 for Assam as worked by interpolation have been taken.
- + : For working out the density of India and J& K, the entire area and population of those portions of J&K which are under illegal occupation of Pakistan and China have not been taken in to account.
- * : The 1991 census was not held in J& K . for calculating density of India and J & K, the population projected by standing committee of experts in population projections (oct,1989) have been taken.

** : figures shown against Gujrat state have been arrived at after including estimated total rural and urban population of entire Kachchh district, Morvi, Maliya- Miyana and Wankaner taluks of Rajkot district, Jodiya taluka of Jamnagar district where population enumeration of the census of India , 2001 could not be concluded due to natural calamity.

Table 6: State wise percentage of population below poverty line in India, 1973-74 to 1999- 2000.

State/UTs	1973-74	1977-78	1983-84	1987-88	1993-94	1999-2000
Andhra Pradesh	48.86	39.31	28.91	25.86	22.19	15.77
Arunachal Pradesh	51.93	58.32	40.68	36.22	39.35	33.47
Assam	51.21	57.15	40.47	36.21	40.86	36.09
Bihar	61.91	61.55	62.22	52.13	54.96	42.60
Goa	44.26	37.23	18.90	24.52	14.92	4.40
Gujarat	48.15	41.23	32.79	31.54	24.21	14.07
Haryana	35.36	29.55	21.37	6.54	25.05	8.74
Himachal Pradesh	26.39	32.45	16.40	15.45	28.44	7.63
Jammu & Kashmir	40.83	38.97	24.24	23.82	25.17	3.48
Karnataka	54.47	48.78	38.24	37.53	33.16	20.04
Kerala	59.79	52.22	40.42	31.79	25.43	12.72
Madhya Pradesh	61.78	61.78	49.78	43.07	42.52	37.43
Maharashtra	53.24	55.88	43.44	40.41	36.86	25.02
Manipur	49.96	53.72	37.02	31.35	33.78	28.54
Meghalaya	50.20	55.19	38.81	33.92	37.92	33.87
Mizoram	50.32	54.38	36.00	27.52	25.66	19.47
Nagaland	50.81	56.04	39.25	34.43	37.92	32.67
Orissa	66.18	70.07	65.29	55.58	48.56	47.15
Punjab	28.15	19.27	16.18	13.20	11.77	6.16
Rajasthan	46.14	37.42	34.46	35.15	27.41	15.28
Sikkim	50.86	55.89	39.71	36.06	41.43	36.55
Tamil Nadu	54.94	54.79	51.66	43.39	35.03	21.12
Tripura	51.00	56.88	40.03	35.23	39.01	34.44
Uttar Pradesh	57.07	49.05	47.07	41.46	40.85	31.15
West Bengal	63.43	60.52	54.85	44.72	35.66	27.02
Andman & Nicobar Islands	55.56	55.42	52.13	43.89	34.47	20.99
Chandigarh	27.96	27.32	23.79	14.67	11.35	5.75
Dadra & Nagar Haveli	46.55	37.20	15.67	67.11	50.84	17.14
Daman & Diu	NA	NA	NA	NA	15.80	4.44
Delhi	49.61	33.23	26.22	12.41	14.69	8.23
Lakshadweep	59.68	52.79	42.36	34.95	25.04	15.60
Pondicherry	53.82	53.25	50.06	41.46	37.40	21.67
INDIA	54.88	51.32	44.48	38.86	35.97	26.1

Source: Ninth Five-Year Plan 1997-2002.

Note:

1. Poverty Ratio of Assam is used for Sikkim, Aruanchal Pradesh, Meghalaya, manipur, Nagaland, and Tripura.
2. Poverty line of Maharashtra and expenditure distribution of Goa is used to estimate Poverty Ratio of Goa.
3. Poverty line of Himachal Pradesh and expenditure distribution of Jammu and Kashmir is used to estimate poverty ratio of Jammu and Kashmir.
4. Poverty Ratio of TamilNadu is used for Pondicherry and A & N Islands.

5. Urban Poverty Ratio of Punjab used for both rural and urban Poverty of Chandigarh.

6. Poverty Ratio of Goa is used for Daman and Diu.

7. Poverty ratio of Kerala is used for Lakshadweep.

8. Urban poverty ratio of Rajasthan for the year 1999- 2000 may be treated as tentative.

9. Poverty Ratio of Himachal Pradesh is used for Jammu and Kashmir for 1993-94.

Table 7: Land use patterns in India, 1951- 2000.

(Million hectare)

Classification	1950-51	1960-61	1970-71	1980-81	1990-91	1999-2000@
I. Geographical area	328.7	328.7	328.7	328.7	328.73	328.73
II. Reporting area for land utilization statistics (1 to 5)	284.32	298.46	303.76	304.15	304.86	306.05
1. Forests	40.48	54.05	63.91	67.47	67.8	69.02
2. Not available for cultivation (a+b)	47.52	50.75	44.64	39.62	40.48	42.40
(a) Non agricultural uses	9.36	14.84	16.48	19.66	21.09	22.45
(b) Barren and unculturable land	38.16	35.91	28.16	19.96	19.39	19.09
3. Other uncultivated land (excluding fallow land) (a+b+c)	49.45	37.64	35.06	32.31	30.22	28.47
(a) Permanent pasture and other grazing land	6.68	13.97	13.26	11.97	11.4	11.04
(b) Land under miscellaneous tree crops and grooves not included in net area sown	19.83	4.46	4.3	3.6	3.82	3.61
(c) Culturable wasteland	22.94	19.21	17.5	16.74	15	13.82
4. Fallow land (a+b)	28.12	22.82	19.88	24.75	23.36	24.91
(a) Fallow land other than current fallows	17.44	11.18	8.76	9.92	9.66	10.11
(b) Current fallows	10.68	11.64	11.12	14.83	13.7	14.80
5. Net area sown	118.75	133.2	140.27	140	143	141.23
6. Gross cropped area	131.89	152.77	165.79	172.63	185.74	189.74
7. Area sown more than once	13.14	19.57	25.52	32.63	42.74	48.51
8. Cropping intensity*	110.1	114.7	118.2	123.3	129.9	134.34
III Net irrigated area	20.85	24.66	31.1	38.72	47.78	57.23

IV Gross irrigated area	22.56	27.98	38.19	49.78	62.47	76.34
-------------------------	-------	-------	-------	-------	-------	-------

Source: Compendium of Environment Statistics, 2000.

@ Statistical Abstract of India, 2002.

- : Cropping Intensity is obtained by gross cropped area by net area sown

Table 8: Soil Erosion and Land Degradation (Million Hectares).

1. Total Geographical Area	328.7
2. Area Subject to Water and Wind Erosion Area Degraded through Special Problems	141.3
3. Water Logged Area	8.5
4. Alkali Soil	3.6
5. Acid Soil	4.5
6. Saline Soil including Coastal Sandy areas	5.5
7. Ravines and Gullies	4
8. Area subject to Shifting Cultivation.	4.9
9. Riverine and Torrents	2.7
Total 3 to 9	33.7

Source: Economic Survey of India, 1998-99, Government of India.

Table 9: Estimates of area affected by soil erosion and land degradation in India, 1984 (Lakh Hectares).

State/UTs	Land affected by soil erosion	Land degraded through other problems	Total problems area	Percent to all India total
Rajsthan	199.0	174.9	373.9	21.6
Madhya Pradesh	196.1	11.1	207.2	12.0
Maharastra	191.8	6.7	198.5	11.5
Uttarpradesh	71.1	60.1	131.2	7.6
Gujarat	99.5	26.4	125.9	7.3
Andhra Pradesh	115.0	7.3	122.3	7.1
Karnataka	109.9	4.1	114.0	6.6
Orissa	45.8	32.3	78.1	4.5
Bihar	42.6	22.9	65.5	3.8
West Bengal	10.3	32.7	43.0	2.5
Haryana	15.9	25.7	41.6	2.4
Tamil Nadu	36.4	1.8	38.2	2.2
Punjab	10.1	22.3	32.4	1.9
Assam	22.2	7.8	30.0	1.7
Arunachal Pradesh	24.4	2.1	26.5	1.5
Kerala	17.6	1.8	19.4	1.1
Himachal Pradesh	19.1	-	19.1	1.1
Meghalaya	8.4	2.7	11.1	0.6
Jammu & Kashmir	8.8	0.1	8.9	0.5
Manipur	3.7	3.6	7.3	0.4
Mizoram	4.2	1.9	6.1	0.4
Nagaland	4.1	0.8	4.9	0.3
Sikkim	3.0	--	3.0	0.2
Tripura	1.7	1.1	2.8	0.2
Goa	2.0	--	2.0	0.1
Union Territories	3.4	--	3.4	0.2
India	1266.2	464.9	1731.1	100.0

Source: Forest Survey of India, The State of Forest Report, 1999

Table 10: Comparative Situation of Forest Cover in India, 1993-1999.

(Square Kilometers)

State/UTs	2001 Assess ment	1999 Assess ment	1997 Assess ment	1995 Assess ment	1993 Assess ment	Change s in 2001	Change s in 1999	Change s in 1997	Change s in 1995
Andhra Pradesh	44637	44229	43290	47112	47256	408	939	-3822	-114
Arunachal Pradesh	68045	68847	68602	68621	68661	-802	245	-19	-40
Assam	27714	23688	23824	24061	24508	4026	-136	-237	-447
Bihar	28357	26474	26524	26561	26587	1883	-2	-26	-26
Delhi	111	88	26	26	22	23	62	0	-4
Goa	2095	1254	1255	1250	1250	844	-1	2	0
Gujarat	15152	12965	12578	12320	12044	2187	387	258	276
Haryana	1754	964	604	603	513	790	360	1	90
Himachal Pradesh	14360	13082	12421	12501	12502	1278	561	20	-1
Jammu & Kashmir	21237	20441	20440	20433	20443	796	1	7	-10
Karnataka	36991	32467	32403	32382	32343	4524	64	21	39
Kerala	15560	10323	10334	10336	10336	5237	-11	-2	0
Madhya Pradesh	133713	131830	131195	135164	135396	1883	635	-232	-232
Maharashtra	47482	46672	46143	43843	43859	810	529	2300	-16
Manipur	16926	173384	17418	17558	17621	-458	-34	-140	-63
Meghalaya	15584	15633	15657	15714	15769	-49	-24	-57	-55
Mizoram	17494	18338	18775	18576	18697	-844	-437	199	-121
Nagaland	13345	14164	14221	14291	14348	-819	-57	-70	-57
Orissa	48838	47033	46941	47107	17145	1805	92	-166	-38
Punjab	2432	1412	1387	1342	1343	1020	25	45	-1
Rajasthan	16367	13871	13353	13280	13099	2496	518	73	181
Sikkim	3193	3118	3129	3127	3119	75	-11	2	8
Tamil Nadu	21482	17078	17064	17766	17729	4404	14	-702	-681
Tripura	7065	5745	5546	5538	5538	1320	199	8	0
Uttar Pradesh	37684	34006	33994	33986	33961	3668	5	-23	25
West Bengal	10693	8362	8349	8276	8186	2331	13	73	90
A & N Islands	6930	7606	7613	7615	7624	-676	-7	-2	-9
Chandigarh	9	7	7	7	5	2	0	0	2
D & N Haveli	219	202	204	204	206	17	-2	0	-2
L M & A Islands	27	0	0	NA	NA	27	0	-	-

Pondicherry	36	0	0	NA	NA	36	0	-	-
India	675538	637293	633397	638879	640407	38245	3896	-6203	-1228

Source: Compendium of Environment Statistics India, 2002.

Table 11: Per capita Availability of forest and agricultural land.

Year	Per capita Availability of Forest Land (in hectare)	Per capita Availability of Agricultural land in rural areas (in hectare)
1950-51	0.113	0.638
1960-61	0.124	0.503
1970-71	0.115	0.410
1980-81	0.099	0.356
1990-91	0.081	0.315
1998-99	0.071	0.271

Source: Selected socio-economic statistics, India 2002.

Note: Estimates in this table have been worked out on the basis of area figures on land utilization published by the Ministry of Agriculture and Mid-Year Estimates of population based on the reports of Standing Committee on Population Projections and Technical Group on Population Projections constituted by Planning Commission.

Table 12: Ground Water Resources (million hectare-meters per year)

States	Total Replenishable Ground Water Resource	Provision for Domestic Industrial & other Uses	Available Ground Water Resource for Irrigation in Net Terms	Utilizable Ground Water Resource for Irrigation in Net Terms	Gross Draft Estimated on Prorata Basis	Net Draft	Balance Ground Water Resource for Future Use in Net Terms	Level of Ground Water Development (%)
States	43.30063	7.09873	36.20191	32.58033	19.25207	13.47627	22.72564	37.23
Andhra Pradesh	3.52909	.52936	2.99973	2.69975	1.11863	0.78304	2.21668	26.10
Arunachal Pradesh	0.14385	0.02158	0.12227	0.11005	-	-	0.12227	-
Assam	2.24786	0.33718	1.91068	1.71962	0.20356	0.14249	1.76819	7.46
Bihar	2.69796	0.40470	2.29327	2.06394	1.17895	0.82527	1.46800	35.99
Chhattisgarh	1.60705	0.24106	1.36599	1.22939	0.10925	0.07647	1.28952	5.60
Goa	0.02182	0.00327	0.01855	0.01669	0.00219	0.00154	0.01701	8.30
Gujarat	2.03767	0.30566	1.79199	1.55881	1.21895	0.85327	0.87872	49.27
Haryana	1.11794	0.16769	0.95025	0.85523	1.02637	0.71846	0.23179	75.61
Himachal Pradesh	0.02926	0.00439	0.02487	0.02238	0.00591	0.00413	0.02073	16.63
Jammu & Kashmir	0.44257	0.06640	0.37620	0.33860	0.00586	0.00403	0.37217	1.07
Jharkhand	0.66045	0.09907	0.56138	0.50525	0.17352	0.12146	0.43992	21.64
Karnataka	1.61750	0.24186	1.37564	1.23665	0.64973	0.45481	0.92083	33.06
Kerala	0.79003	0.13135	0.65869	0.59281	0.17887	0.12509	0.53360	18.99
Madhya Pradesh	3.48186	0.52228	2.95958	2.66362	1.05494	0.73846	2.22112	24.95
Maharashtra	3.78677	1.23973	2.54704	2.29233	1.26243	0.88370	1.66334	34.70
Manipur	0.31540	0.04730	0.26810	0.24129	Neg.	Neg.	0.26810	Neg.
Meghalaya	0.05397	0.00810	0.04587	0.04128	0.00260	0.00182	0.04405	Neg.
Mizoram	Not Assessed							
Nagaland	0.07240	0.01090	0.06150	0.05535	Neg.	Neg.	0.06150	Neg.
Orissa	2.01287	0.30193	1.71094	1.53984	0.37196	0.26037	1.45057	15.22
Punjab	1.81923	0.18192	1.63730	1.47357	2.30028	1.61020	0.02710	98.34
Rajasthan	1.26021	0.19977	1.06044	0.95440	1.10350	0.77245	0.28799	72.84
Sikkim	Not Assessed							
Tamil Nadu	2.64069	0.39610	2.24458	2.02013	2.00569	1.40398	0.84060	62.55
Tripura	0.06634	0.00995	0.05639	0.05075	0.02692	0.01885	0.03754	33.43
Uttar Pradesh	8.25459	1.23819	7.01640	6.31476	4.25171	2.97619	4.04021	42.42
Uttaranchal	0.28411	0.04262	0.24149	0.21734	0.09776	0.06843	0.17306	28.34
West Bengal	2.30914	0.34637	1.96277	1.76649	0.90250	0.63175	1.33102	32.19
Union Territories	0.0853	0.02782	0.03358	0.03022	0.03966	0.02777	0.00581	
A & N Islands	Not Assessed							
Chandigarh	0.00297	0.00044	0.00252	0.00227	0.00351	0.00245	0.00007	-
D & N Haveli	0.00422	0.00063	0.00359	0.00323	0.00065	0.00046	0.00313	12.81
Daman	0.00071	0.00011	0.00060	0.00054	0.00069	0.00048	0.00012	80.00
Diu	0.00037	0.00006	0.00031	0.00028	0.00042	0.00029	0.00002	94.84
NCT Delhi	0.02916	0.01939	0.00977	0.00879	0.01684	0.01180	-0.00203	120.78
Lakshadweep	0.03042	0.00456	0.00195	0.00176	0.00109	0.00076	0.00119	39.12
Pondicherry	0.01746	0.00262	0.01484	0.01335	0.01645	0.01152	0.00332	77.63
Grand Total	43.38593	7.12665	36.25938	32.63345	19.29173	13.50404	22.73145	37.24

Source: Compendium of Environment Statistics, 2002

Table 13: Percentage Distributions of Households Having Safe Drinking Water Facilities.

States/UTs	1981			1991		
	Total	Rural	Urban	Total	Rural	Urban
Andhra Pradesh	25.89	15.12	63.27	55.08	48.98	73.82
Arunachal Pradesh	43.89	40.16	87.93	70.02	66.87	88.2
Assam	--	--	--	45.86	43.28	64.07
Bihar	37.64	33.77	52.31	58.76	56.55	73.39
Goa	22.5	8.57	86.78	43.41	3.54	61.71
Gujrat	52.41	36.16	90.72	69.78	6.04	87.23
Haryana	55.11	42.94	89.56	74.32	67.14	93.18
Himachal Pradesh	44.5	39.56	86.67	77.34	75.51	91.93
Jammu& Kashmir	40.28	27.95	74.4	--	--	---
Karnataka	33.87	17.63	39.72	71.68	67.31	81.38
Kerala	12.2	6.26	66.65	18.89	12.222	38.68
Madhaya Pradesh	20.17	8.09	85.56	53.41	45.56	79.45
Maharastra	42.29	18.34	38.71	68.49	54.02	90.5
Manipur	19.54	12.91	74.4	38.72	33.72	52.1
Meghalaya	25.11	14.26	8.79	36.16	26.82	75.42
Mizoram	4.88	3.57	57.18	16.21	12.89	19.88
Nagaland	45.63	43.43	51.33	53.37	55.6	45.47
Orissa	14.58	9.47	91.13	39.07	35.32	62.83
Punjab	84.56	81.8	78.65	92.74	92.09	94.24
Rajasthan	27.14	13	71.93	58.96	50.62	86.51
Sikkim	31.23	21.7	69.44	73.05	70.84	92.85
Tamil Nadu	43.07	3.97	67.92	67.42	64.28	74.17
Tripura	27.33	22.17	73.23	37.18	30.6	71.12
Uttar Pradesh	33.77	25.31	79.78	62.24	56.62	85.78
West Bengal	69.65	65.78	91.95	81.98	80.26	86.23
A & N Islands	51.64	36.35	99.39		59.43	90.91
Chandigarh	99.09	94.39	99.39	97.73	98.11	97.68
D & N Haveli	19.35	16.85	54.35	45.57	41.17	90.97
Daman & Diu	54.48	46.42	67.04	71.42	56.87	86.76
Delhi	92.97	62.26	94.91	95.78	91.01	96.24
Lakshadweep	2.19	0.97	3.65	11.9	3.41	18.79
Pondicherry	80.59	76.88	84.18	88.75	92.86	86.05
All India	38.19	26.5	75.06	62.3	55.54	81.38

Source: Statistical Abstract, India, 2001

(1) Excludes Assam in 1981 and Jammu & Kashmir in 1991.

References

- [1] Agrawal, Anil, Ravi Chopra and Kalpana Sharma. 1982. *The State of India's Environment 1982: The first citizen Report*. New Delhi: Centre for Science and Environment.
- [2] Central Bureau of Health Intelligence. 1995 & 1996. *Health Information of India*, Ministry of Health and Family Welfare, Government of India, New Delhi.
- [3] Central Statistical Organization. 1998, 1999, 2000 & 2002. "Compendium of Environment Statistics", Department of Statistics, Ministry of Planning and Programme Implementation, Government of India, New Delhi.
- [4] Central Statistical Organization. 1971-2001. "Statistical Abstract of India ", Ministry of Statistics and Programme Implementation, Government of India, New Delhi.
- [5] Central Statistical Organization. 2002. "Selected Socio-Economic Statistics of India", Ministry of Statistics and Programme Implementation, Government of India, New Delhi.
- [6] Coale, Ansley J. and R.M. Hoover. 1958. *Population Growth and Economic Development in Low Income Countries: A Case Study of India's Prospects*. Princeton: Princeton University Press.
- [7] Davis, Kingsley. 1951. *The Population of India and Pakistan*. New York: Russell and Russell.
- [8] Forest Survey of India. 1999. *The State of Forest Report*, Ministry of Environment and Forests, Government of India, Dehradun.
- [9] Government of India. 1987. *India's Population: Demographic Scenario*. New Delhi: Department of Family Welfare, Ministry of Health and Family Welfare.
- [10] Government of India. 1995 & 1996. *Health Information of India*. New Delhi: Central Bureau of Health Intelligence, Ministry of Health and Family Welfare,
- [11] Government of India. 1999. "Economic Survey: 1998-99", Ministry of Finance, Economic Division, Government of India, New Delhi.
- [12] Government of India. 2000. *Ninth Five-Year Plan 1997-2002, Volume-I*. New Delhi: Ministry of Finance, Economic Division.
- [13] Population Reference Bureau (PRB). 2001. *World population data sheet*, Washington, D.C.
- [14] Registrar General and Census Commissioner of India. 1971-1993. *Sample Registration System: Annual Report 1971-92*. New Delhi: Government of India.
- [15] Registrar General and Census Commissioner of India. 1961-1991. "Population Totals", *Census of India*. New Delhi: Government of India.
- [16] Registrar General and Census Commissioner of India. 2001. "Provisional Population Totals", *Census of India*, Paper 1 of 2001, New Delhi: Government of India.
- [17] Registrar General and Census Commissioner of India. 2001. "Provisional Population Totals", *Rural-Urban Distribution of Population, Census of India*, Paper 2 of 2001, New Delhi: Government of India.