

POPULATION GROWTH, SUSTAINABLE DEVELOPMENT & ENVIRONMENTAL CHALLENGES IN INDIA

Dr. Swati Thakur

Associate Professor

Department of Geography

M.M.H. College, Ghaziabad

C.C.S. University, Meerut

Email:swt21@rocketmail.com

Abstract

The Environmental degradation started with the propagation of the human race. The process of environmental degradation was accelerated with the development of socio-economic activities, e.g., agriculture, industrialization, drugs and pharmaceuticals, transport, civil construction including roads and buildings, etc. with a growing population, the requirements of food grains and other consumer items increased greatly, leading to further environmental degradation. Today there are places where rivers are polluted to the extent that they have practically no assimilation capacity due to domestic waste and trade effluents, e.g. river Ganga at Kanpur, the river Gomti at Lucknow, etc. The production of pesticides to meet the requirements of agriculture, in order to remove the effects of pests on agriculture, also led to water pollution as well as air pollution. The development of a large-scale canal system led to deforestation, water waterlogging around the canal system led to barren lands. So, on one side agriculture was intensified with the input of fertilizers and irrigation and on the other hand, the environment was degraded. India cannot afford to neglect the environment, if sustainable development is desired. The pressures on the environment have to be curtailed by reducing population pressures, increasing literacy, environmental awareness drives and poverty alleviation programs.

Keywords

Environmental degradation, Deforestation, Waterlogging, Sustainable development.

Reference to this paper should be made as follows:

Received: 25/08/25

Approved: 10/09/25

Dr. Swati Thakur

POPULATION GROWTH, SUSTAINABLE DEVELOPMENT & ENVIRONMENTAL CHALLENGES IN INDIA

Article No.29

RJPSS Apr.25-Sept.25, 2025

Vol. L No. 2, Pg. 221-230

Similarity Check - 13%

Online available at:

<https://anubooks.com/journal-volume/rjps-2025-vol-l-no-2-sept>

<https://doi.org/10.31995/rjps.2025.v50i02.029>

Introduction

India is now a country of one billion people i.e. 16% of the world's population on 2.4% of the global land area. If this trend continues India may take over China to become the most populous country in the world. While the global population has increased threefold during the century, from 2 billion to 6 billion, the population of India has increased nearly fivefold, from 238 million to 1 billion in the same period. India's current annual increase in population, of 15.5 million, is large enough to neutralize efforts to conserve the resource endowment and protect the environment.

Table 1: India: Growth of Population 1901-2001

Year	Population (in millions)
1901	236
1911	249
1921	248
1931	276
1941	315
1951	360
1961	439
1971	548
1981	685
1991	844
2001	1022
2011	1261
2025 (UNFPA)	1463

Source: Census of India, General Population Tables, India 1961, 1971, 1981, 1991, 2011, 2025 & Provisional Population Totals, 2011, United Nation Population Fund State of World Population 2025 (UNFPA)

The use of an increasing amount of fertilizer to increase the productivity of land, contributed to water pollution through soil pollution as well as air pollution. There has been a substantial increase in the production of consumer items, including manufacturing products, textiles, paper and paper products, leather and leather products, rubber and rubber products, machinery and transport equipment, food grain, sugar and khandasari, gur, crude petroleum, electricity and building material. So industrialization has been responsible for increasing availability of consumer item, has contributed significantly to environmental degradation. Even today, for a developing country like India, the pulp and paper industry, leather and leather products, manufacturing industries, fertilizer, sugar and alcohol are considered important segments of industrialization. All these industries contribute significantly to standard of living and simultaneously, to environmental degradation.

Aspects of Environmental Pollution: Some aspects of environmental pollution vis-à-vis increasing population are highlighted below:

1. Per capita availability of land in the country is 0.48 hectares as against 4.41 hectares in the USA, 8.43 hectares in the USSR and 0.98 hectares in China.
2. Urbanization in India has resulted in over-crowding of built-up areas and growth of unauthorized colonies, leading to slum formation. At present, 20% of India's urban population lives in slums. In big cities, it ranges from 10% in Bangalore, 37% in Kanpur, 38% in Bombay to 42% in Calcutta, 40% of all slum's population lives in the metropolitan cities.
3. Lack of potable drinking water continues to be a serious problem for a large part of our population. In 1947, the percentage of rural population, having access to potable water, was only 60%; it rose up to 31% in 1980. In urban areas, the percentage was 60% in 1977 and 51.75 in 1988. On a national level, 41% of the total population had access to potable water as compared to 17% in 1970. As such, more than half of our population i.e., 59% is still to be provided with the basic need of potable water supply.

Population & Environment: The growth of population, urbanization and industrialization in India has created several environmental problems, some of which are as Overall reduction in agricultural land, Deforestation, Soil erosion, landslides and expansion of waste land, Problem of waste water & safe drinking water, Gradual change in climatic conditions leads to Increasing frequency of floods and droughts, Adverse effects on human health and quality of life, Problem of solid waste disposal, Unhygienic residential conditions. It is clear that with growing population, the need for increasing food grains, consumer items and other materials, not only to maintain proper standard of living but also to have better standard of living, compared to those of developed nations. At the same time, with increasing socio-economic activities, there will be further degradation of environment. Hence, in order to have proper environmental protection, a balanced approach, with built in provision for pollution control, with each development activity is essential. The environmental degradation is closely linked to development which is considered essential to raise the standard of living, especially in developing countries. Population is one of the key parameters while considering environmental degradation. Hence, a proper balance between population, development, standard of living and resource utilization is essential for healthy environment, the only environment that we have for ourselves.

Population & Sustainable Environment: Stabilizing population is an essential requirement for promoting sustainable environment with more equitable distribution and poverty alleviation. The rising population has serious implications on food and water security, health care, rural and urban services and sustainability of ecosystem. Due to poverty, rapid industrialization, haphazard urbanization, destructive exploitation

and overuse of natural resources, environment stress is inevitable. Ecological degradation is being reflected in the poor air and water quality, soil degradation, deforestation, desertification, droughts, floods, shrinking wetlands, damaged coral reefs, erosion of biodiversity, inadequate urban services and sanitation, indoor pollution in rural areas, water scarcity, the lack of minimum flow in rivers and over extraction of groundwater for irrigation to provide food security for growing population.

In between 1975 and 1995, GDP is doubled in India but the vehicular population load went up eight times and industrial pollution load went up four times. Population pressure is an underlying cause of over-exploitation of natural resources. India's population has grown from 361 million in 1951 to 846 million in 1991 and crossed one billion mark in 2001. India's population has grown 2.6 times during a span of 49 years from 1951 to 2000 while resources have been declining and thinning during a span of 49 years.

At the turn of the century 40 % of India's geographical area was forests. By 1951 it had reduced to 22% and by 1971 to 19%. The total area under forests has declined from 72 million hectares at the time of independence to 63 million hectares in 1997. The current annual withdrawal of fuel wood from forests is estimated at 235 million cubic meters against a sustainable capacity of about 49 million cubic meters. The annual demand for industrial wood is about 26 million cubic meters against the production capacity of 12 million cubic meters.

Global fresh water consumption rose six-fold between 1990 and 1995, more than twice the rate of population growth. Groundwater supplies are withdrawing not only in India but in many regions of the globe. Human waste and untreated sewage is affecting rivers and water bodies in India while chemical pollution threatens water quality and public health in rest of the world. More than a billion lack access to safe drinking water while half of humanity lacks adequate sanitation in the world. In India staggering 120 million people have no toilet facilities.

Land degradation is increasing and the world faces a real threat to future global food security. According to recent survey, some nearly 250,000 species, one of eight is at risk of extinction. The survival of some 25% of the mammalian species and 11% of bird species is also threatened. Almost 70% of the ocean fisheries are either fully exploited or over-exploited. Every year India is losing about 5 to 7 million hectares agricultural land due to several natural and manmade factors. The agricultural productive land is being converted in to other uses like industries, brick kiln; roads etc. the practice of intensive agriculture is also causing land degradation. The current rate of degradation is 5-7 mha per year by the turn of the century. Increasing population is not only creating a gap between food produced and food

required but also increases competitive demand on scarce land resources (reducing man: land ratio).

Table 2: Extent of Land Degradation in India (in million ha)

Kind of Degradation	According to GOI (1990)
Water erosion	144.1
Water logging	8.5
Saline soils	5.5
Sodic soil	3.9
Shifting cultivation	4.9
Ravines and gullies	4.0
Total	173.6

Source: Government of India (1990) Indian Agricultural in Brief, 23rd Edition, Ministry of Agriculture, Dept. of Agriculture & Cooperatives, pp.460

Modern agricultural has encouraged the use of fertilizers and other such chemicals to improve the quality of soil and yield levels. Excessive addition of NPK causes the plants to draw more micronutrients from the soil. It results in soil nutrient stress. Recently used chemical fertilizers find their way in to ground water and increase the concentration of nitrates in drinking water. Seepage of excessive nitrates in to ground water followed by its consumption by children produces a serious disease known as “Methaemoglobinaemia”. Nitrate poisoning has been reported in various parts of Rajasthan.

Indian agriculture as a whole has contributed only 3.2% of the world total methane emissions of which 25% is from agricultural soils. Indian agriculture soils are contributing only 0.88% of world nitrous oxide emission. Methane and nitrous oxide from Indian agriculture soils are responsible for only about 0.23% and 0.1% respectively, of the global warming caused by world’s methane and nitrous-oxide emission. Thus, overall greenhouse gas emission from Indian agriculture soils is a very small fraction of the total world greenhouse gas emissions.

According to UN’s weather agency, the global concentration of CO₂, reached highest levels recorded in 2005. Globally averaged mean ratios of CO₂ in the atmosphere reached 379.1 parts per million (ppm), an increase of over 0.5% over 2004. concentration of nitrous oxide reached 319.2 ppm in 2005, an annual increase of 0.2%. According to WMO, the trend of growing emissions from industry, transport and power generation from burning fossil fuels such as oil and coal is set to continue despite an international agreement to cap emissions. If these greenhouse gases continue to increase at the present rate, the global temperature can rise by 1.5 to 4.5 C in the next 50 years. Such an increase in atmospheric temperature is expected to trigger off major changes in the patterns of rainfall and seasonal cycles, a significant

rise in sea level and a rapid increase in sea level and a rapid increase in the frequency of the occurrence of extreme natural disasters. Mumbai and Kolkatta are among 22 cities- including Karachi, New York, Miami, London and St Petersburg-tipped to face increasing risks of coastal surges and flooding as the earth of coastal surges and flooding as the earth warms by 3 to 4 degrees from mid-century. Many cities like Mumbai have critical infrastructure like nuclear power stations on their coast lines. "Rising sea levels will result in tens to hundreds of millions of more people flooded each year with a warming of 3 or 4 degree Celsius". The earth has warmed by 0.7 degrees since 1900. There will be serious risks and increasing pressures of coastal protection in Bangladesh, Vietnam, small islands in the Pacific and Caribbean and large coastal cities such as Tokyo, Shanghai, Hong Kong, Mumbai, Kolkatta, Karachi, Buenos Aires, St. Petersburg, New York, Miami and London.

Table 3: Per Capita Water Availability in India.

Year	Population (Million)	Per capita water availability (cubic meter)
1951	361	5177
1955	395	4732
1991	846	2209
2001	1027	1820
2025	1394 (projected)	1341
2050	1640 (projected)	1140

Source: TERI Vision, 2001.

India's total renewable per capita water resources in 1985 were 2011 cubic mt. which stands at 1820 cubic mt. on 31st March 2001. The total renewable water resources per person are only 1345 cubic meter.

On one hand, India is faced with environmental degradation from poverty and population pressures, and on the other, from pollution from increased activities due to economic growth and the consequent changing consumption patterns. While the poor depend on the environment for their livelihood, the process of economic development relies on using natural resources to produce goods and services. The waste generated from consuming and producing these goods and services are in turn released back into the environment impacting it. The environment provides security for present and future generations, the health of the environment is closely connected with the health of humans, and it is economically beneficial for countries to prevent environmental degradation. The challenge therefore, in making development compatible with the environment is to restructure the economic system in a way that it will not destroy the environment as economic progress continuous.

Current State on India's Environment: Water pollution is a major cause of concern in India, as it damages ecosystem and affects health of the people and thereby impairs economic productivity of the people. About 90% of India's surface water resources are polluted to the extent that they are not fit for bathing. Also, about 200 million people do not have excess to save drinking water and utilizable water per capita is decreasing. This level of pollution is said to create conflict over water and scarcity even in regions with abundant water.

Table 4: Decreasing Utilizable Water

Year	Cu.m/person
1951	3450
1991	1288
1999	1250
2050	760

Source: TERI Vision, 2001.

The socio-economic costs of water pollution are extremely high: 1.5 million children under 5 years of age die each year due to water related diseases, 200-million-person days of work are lost each year and the country loses about Rs.36,000 crores each year due water related diseases.

**Table 5: Annual Cost of Environmental Degradation in India 1994-1997
(Percent of GDP)**

Resource	Range
Air	0.4
Forest	1.1-1.6
Soil	0.30-0.80
Water	1.70-2.1
Total	3.5-4.9

Source: Parikh J, & Parikh K, (2001) *Environmentally Adjusted GDP Report to the United Nations University*.

Sustainable Development: Necessary for Sustainable Future

Most widely accepted definition of sustainable development (our common future-1987 reported in the proceedings of world commission on environment and development), "sustainable development is the development that meet the needs of the present without compromising the ability of future generations to meet their own needs. Economic development can either promote or distort the speed and direction of social development but it is clear that both economic and social development is vital for overall development. In all developing and developing countries efforts are on to

achieve maximum out of minimum and in this race have damaged vital natural resources. Intensive cultivation, deforestation, wetlands exploitation, coastal zones and over fishing. This all is done in order to meet the demand of the fast-growing population. This has affected the ability of renewable sources to renew themselves. The future generation will need these resources for their living. This will be a disastrous situation where the present generation will make use of all natural resources and exploit them to a greater degree and leave nothing for the future generation. The developmental activities therefore should be changed while meeting demand of the present generation without destroying the productive capacity of the natural resources and retain it for the future generations. Such type of development is called sustainable development. It is a development which involves both economic and social development without destroying natural systems.

The long-term economic development is interlinked with environmental protection. For continued development we need to have adequate safe water supplies, efficient energy use, continued productivity, forests and farmlands and preservation of natural areas. Such type of development poses a challenge because people must learn to live on the world's 'ecological interest' and not on the 'ecological capital'. In order to achieve the sustainable future and development, no. of areas and fields have to be organized such as Improving energy efficiency, saving forests & Safeguarding biodiversity, adopting water resources management, Managing coastal zones and ocean fisheries and Stabilizing world population

All developed and developing countries should come forward and work together to achieve more progress in these areas. Sustainable development requires a rate of development which can be sustained by natural resources without causing the environment degradation that jeopardizes the development options of future generations.

Sustainable development can be pursued more easily by achieving following goals:

· Population stabilizes at a level consistent with the productive capacity of the ecosystem. Global warming is caused by the pollutants released in to the atmosphere. Human beings are nature's greatest pollutants. No pollution control programmes can work without a check on our population growth.

- Deficiencies in housing, water supply, sanitation, health care and essential human needs can be overcome and future requirements adequately planned for.
- Lean and clean technologies can be developed and adopted in all production systems and development of natural resources.
- Renewable sources of energy replace non-renewable ones.
- Services can be provided in a planned manner for a burgeoning urban population.

- Restore degraded shrub jungles, grasslands and ecosystems through afforestation and regeneration of grasses.
- Increase funds for research on alternative energy sources, particularly for the development of low-cost photovoltaic cells.
- Launch a massive tree planting programme and educate people on environmentally friendly technologies.

India cannot afford to neglect the environment, if sustainable development is desired. The pressures on environment have to be curtailed by reducing population pressures, increasing literacy, environmental awareness drives and poverty alleviation programmes. Poor are victims of environmental degradation but they can also aggravate it if the infrastructure and living conditions do not keep pace with population increase. The poor have to be turned in to agents for environmental restoration by involving them in say forest management, waste management, recycling and so on in manners that create incentives for them to use natural resources in sustainable manner. The economic activities must be conducted using environment conserving and resource saving technologies. Managing environment through better urban designs, improvement in transportation infrastructures and creative use of information technologies needs to be considered seriously. Strategy for environmental governance should consist of law enforcement, providing economic incentives, people's participation, institutional reforms and support and technological improvements. With the determination of the government, private sector, NGO's and people, India can perhaps achieve sustainable development. Sustainability of forest ecosystem is an essential component of the environmental conservation efforts and any degradation of forests adverse impact on various systems such as water resources, agriculture, biodiversity, environment, climate and human health besides the subsistence living in tribals and other communities living in and around forest areas. Forest cover has to be increased for conserving soil, water and biodiversity for the welfare of the present and future generations besides promoting sustainable development and alleviation of poverty. Plant and protect more trees on roadsides, village common lands, compounds of offices and homes, and abandoned lands. Every child may be encouraged to plant two trees and take care of them till the completion of school education. Trees are carbon sinks only when they are young and vigorously growing.

Conclusion

Adoption of appropriate policy can harmonize environment and development. Human resource development can meet all the challenges posed by nature. At present, it is the duty of the government and the people to save the planet. Public has to come forward for mounting pressure on governments and industries to adopt eco-friendly

measures and give up harmful and damaging ways. Public awareness is the key to affecting a change in the attitudes and policies affecting the environment by forcing polluters to mend their ways and to conduct themselves in a socially responsible manner. The environment awareness among the people needs to be promoted to enable proper implementation of the rules and regulations. In the last three decades, India has witnessed various mass movements raising different kinds of issues, namely, water conservation and management, natural resources management and harnessing and distribution of resources within the framework of sustainability, equality and justice. Now, an 'environment ideology' has emerged in India which has taken up this challenge to prepare an alternative vision of human society and to adopt and choose environmentally friendly and socially just technologies.

References

1. Chandana R.C., (2001), Geography of Population, Kalyani Publishers, New Delhi.
2. Sumedha Naswa, "Effects of Modern Agriculture on Human Environment", Kurukshetra, November, 1998.
3. Dinesh Mani, "Towards Mitigating Greenhouse Effect and Global Warming", Kurukshetra, November, 1998.
4. Parikh Jyoti, "Environmentally Sustainable Development in India", 77th Orientation Programme, Academic Staff College, Jamia Millia Islamia, New Delhi.
5. Hussain Majid, (2001), Fundamentals of Physical Geography, Rawat Publications, New Delhi.
6. Tiwari D.N., "Population and Sustainable Development", Yojana, vol. 44, no. 8, August 2000.
7. Rai Usha, "Eating into the Green Reserves", Yojana, vol. 44, no. 8, August 2000.
8. Handbook of Agriculture, Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
9. Hindustan Times, Saturday November 4, 2006, New Delhi.
10. Patil Reshma, "Hotter Globe Spells Apocalypse", Hindustan Times, Saturday November 4, 2006, New Delhi.
11. Chauhan A.S., (2004), Environmental Studies, M/s Jain Brothers, New Delhi.
12. Bowonder B., "Environmental Management: Redefining Perspectives", The Hindu, Survey of the Environment, Chennai, 1995.
13. Manoharachary C., Reddy P.J., (2004), Principles of Environmental Studies, BS Publications, Hyderabad.
14. Saxena H.M. (1999), "Environmental Geography", Rawat Publications, New Delhi.