

URBANIZATION AND ENVIRONMENTAL CHANGE: THE LOCAL EFFECTS OF URBAN WARMING IN INDIA

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Abstract

This paper focuses on the demographic transition of the third-world countries from rural and agrarian societies to an urban and industrial societies. The urban population is rapidly increasing in the Asian countries and out of which the maximum growth will be in India and China. In developing countries, the migration from the rural to urban areas often results in a rise in income which in turn leads to an increase in the consumption of food and energy which at last leads to a rise in carbon emissions. In the 1970s, due to globalization and the industrial revolution, the process of urbanization started in India. With an annual growth of 3.52 percent, the urban population increased from 17.35 percent to 31.2 percent in 2011. Due to urbanization, the concentration of these gases is increasing in the environment resulting in unpredictable changes in the environment and an increase in the earth's temperature. The various anthropogenic activities that are responsible for the emission of these gases are urbanization and industrialization. Local effects of urbanization are resulting in increasing slums, environmental damage, natural imbalance, increasing poverty etc. Government should adopt various policies and measures equally for the whole population to enhance a sustainable urban development. Social awareness should be created and the cities should concentrate on the policies and actions of the Environment Protection Act, 1986.

Keywords

Urbanization, Industrialization, Green House Gases, Carbon Emissions, Anthropogenic activities.

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Introduction

Industrialisation is causing a demographic transition in the third-world countries from a rural and agrarian society to an urban and industrial society. Today half of the population is residing in urban areas which will increase to almost seventy-five percent by the year 2050¹. Urbanization is the process of increasing the percentage of people living in the towns and cities. According to the United Nations, Urbanization is defined as the movement of population from the rural to urban areas of a country equating the population growth to urban mitigation. The urban population is rapidly increasing in the Asian countries and out of which the maximum growth will be in India and China². In developing countries, the migration from the rural to urban areas often results in a rise in income which in turn leads to an increase in the consumption of food and energy which at last leads to a rise in carbon emissions. In 1961, seventy-nine million people were residing in urban areas which increased to approximately 285 million in the year 2001. There were only 23 metropolitan cities in India rising to 35 in the year 2001. The main metropolitan cities in India are Chennai, Delhi, Mumbai and Kolkata. The demand for land increases for various urban uses due to industrialization. It can be said that now India is no longer a country of villages.

In the 1970s, due to globalization and the industrial revolution, the process of urbanization started in India. This caused the depletion of forests, grazing of the grasslands, draining of the wetlands and encroachment of the croplands. As per the 2001 Census, approximately more than ten times the urban population increased from 1901 to 2001. With an annual growth of 3.52 percent, the urban population increased from 17.35 percent to 31.2 percent in 2011³. It is estimated that in the next fifty years, almost fifty percent population of the population will be the urban population. However urbanization causes more challenges. Rapid industrialization causes large number of jobs, advanced lifestyles, availability of facilities, basic infrastructure etc. which poses a threat to the environment. This urbanization leads to the degradation of the environment due to the Green House Effect. Anthropogenic carbon dioxide emissions occur from the burning of fossil fuels in industries, and vehicles used in the transportation of goods and people. More than ninety percent of the carbon emissions are in urban areas. The largest emissions have increased since the mid of the 1990s degrading the quality of the environment. The ill effects of the urbanization are: the discharge of pollutants and generation of various wastes, depletion of natural resources, poverty and threat to sustainable development.

Table 1
Trends of Urbanization in India

Year	Total Population (In Crores)	% of Urban Population
1951	36.10	17.29
1961	43.92	17.97
1971	59.81	19.91
1981	68.33	23.34
1991	84.43	25.72
2001	102.70	27.86
2011	121.01	31.16

Source: Census Report of India, 2011

Urbanization and Environmental Problems in India

1. Environment Degradation Due to Solid Waste

As a result of the rapid urbanization, solid waste is showing a cumulative trend due to rising urbanization and industrialization. The problem of solid waste management produced daily in huge quantities is a huge task. Decomposition of the waste material into constituent chemicals is the main source of environmental pollution. Health hazards caused by the urbanization directly contribute to waste generation and also cause urban environment degradation. Rapid production and consumption generate solid waste material frequently and thus increasing the volume of waste generated from industrial, commercial, domestic and institutional waste. Typical urban society generates waste like garbage, construction and leaf litter and some hazardous wastes etc⁴. FICCI (Federation of Indian Chambers of Commerce & Industry, 2009) in a survey revealed that small cities generate 65 tons per day while metropolitan cities generate 6800 tons per day of waste. Class one cities generate the least quantum of waste (200 tons per day) while the class two cities generate the maximum waste. The data conclude that high urbanization is followed by high waste generation which degrades the environment in these areas.

Another concern in the urban areas is the gas released by the decomposition of the garbage. An anaerobic bacteria releases the harmful methane gas, which can spread up to fifty percent of the composition of landfill gas at maximum anaerobic decomposition. If there is no proper methane emitting, the gas leaks into the porous soil surrounded by the waste and reaches the basements and homes resulting in the risk of explosion. The second predominant gas emitted by the landfills is the carbon dioxide which is less reactive than methane which is mainly emitted by the nearby residential dwellings. These gases contribute to the Green House Effect and climate change.

2. Urbanization and Water Pollution

A growing amount of waste from water due to urbanization enters into rivers and canals and adds to the water cycle. Once, the Yamuna River had “clear blue” water but the industrialization of Mathura and Delhi has polluted this river and has become the most polluted river in the world. The pollutants in the Yamuna River are increasing at an alarming rate in which the Delhi dumps fifty-eight percent of waste. The irony is that seventy percent of the drinking water in Delhi is recycled and treated water from the Yamuna River. The problem of water pollution came to the forefront at the beginning of the 1970s with the dumping of the domestic waste and industrial discharge into the rivers. The common source of local environmental pollution is the decomposition of the waste into chemical constituents which contaminates the water and the air systems.

3. Urbanization and Air Pollution

In India unplanned urbanization is taking place as the rural areas are converted into urban areas which are raising the level of air pollution. Unpleasant odor, gaseous pollutants, and Suspended particulate matter such as dust, fumes, mist and smoke are the major air pollutants. A major environmental concern is the quality of air in cities. Delhi has been experiencing serious breathing problems due to smog in the recent years especially during the onset of the winter season. It indirectly affects climatic conditions and directly affects the health of the community. The major air pollutants are CO, Ozone, gaseous lead, sprays and Suspended particulate matter. The congestion of traffic, poor maintenance of motor vehicles, bad quality of fuel, and inefficient engines are the highest concentrations of the air pollutants.

Impact of Urbanization on Green House Effect

Due to Urbanization, the major concern is about the increase in the Green House gases (GHGs) which is creating a harmful impact on the environment. The greenhouse gases are: Carbon dioxide (CO₂), Nitrous Oxide (N₂O), Methane (CH₄), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF₆). Among these gases carbon dioxide is the most harmful gas causing global warming. Carbon dioxide accounts for seventy-seven percent of total GHG emissions.

As a result of urbanization, the concentration of these gases is increasing in the environment resulting in unpredictable changes in the environment and an increase in the earth's temperature. These gases make the lower part of the atmosphere warmer by absorbing the energy radiated by the sun which is known as the Green House Gas Effect. The various anthropogenic activities that are responsible for the emission of these gases are urbanization and industrialization. During the post-

industrialization era, the concentration of GHGs has increased many times. The share of the different sectors in the GHGs is:

1. Industrial Sector

This is a major sector responsible for GHG emissions. This sector emits one-third of global CO₂ emissions. The major industries in India that emit these gases are cement plants, thermal power plants, steel industry, chemical plants, fertilizer plants etc. Among these aluminum, iron and steel, fertilizer, glass and paper have been identified as the energy-intensive industries. Heat production and electricity emit more CO₂ and account for 46% of the global increase in emissions. Gujarat(14%) figured as the top emitter in India⁵. The fertilizer and the petro industries also increase the emissions.

2. Transport Sector

In India, most of the GHG emission is attributed to this sector because of the consumption of diesel in the vehicles and increasing number of vehicles on the road day by day. Now the fast fast-moving vehicles are replaced by fast-moving vehicles. The mega-cities produce more carbon emissions in India. For example, Delhi's transport sector produces six times as much greenhouse gas emissions (GHG) as that of Kolkata, five times as much as Ahmedabad's and three times as much as Greater Mumbai and Chennai (Ramachandra Aithal 2015). The number of vehicles on the road is increasing more than the population since the 1960s at the rate of 15-20 percent per year. Bangalore is adding 500 vehicles per day while Delhi is adding 963 vehicles per day⁶. An increase in the urban population further aggravates the situation. The mega-cities of the country account for more than fifteen percent of the total population of vehicles of the country while the thirty-five percent of vehicular population is from the other mega-cities of the country. In major megacities, vehicles account for around seventy percent of the carbon dioxide and fifty percent of Hydrocarbons. Various respiratory diseases like bronchitis, tuberculosis, and lung cancer are caused by the air pollution in India.

3. Generation of Waste

Due to waste burning of the inorganic matter also contributes to CO₂ emissions where no energy is recovered. Almost ten percent of the anthropogenic methane emissions are responsible for the wastewater treatment both from domestic and industrial waste sources. Most of the emission comes from the pulp and paper as well as beverage processing industries. Waste management affects the methane emissions mainly.

Table 2

Table showing Sector-wise Carbon Emission In India

S. No.	Name of Sector	% of Emission
1.	Industry	24.2
2.	Transport	16.2
3.	Buildings	17.5
4.	Unallocated fuel Combustion	7.8
5.	Energy Production	5.8
6.	Agriculture and Fishing	1.7
7.	Direct Industrial Processes	5.2
8.	Waste	3.2
9.	Forestry and land use	18.4

Source:[http:// ourworldindata.org](http://ourworldindata.org) 2020-21

Local Effects of Urbanisation on the Environment in India

Unplanned growth of the Indian cities and the urban sprawl pose a significant threat to the local climate. The cities like Bhopal, Pune, and New Delhi remain intensely warm while the cooling effects of the coastal cities like Chennai, Vishakhapatnam and Chennai restrict the temperature rise.

Rising heat increases the vulnerability of residents to heat exposure. This situation aggravates the thermal discomfort in heat lands culminating the health issues. Among the total population, the harmful effect attacks the poor and the physically weak population. More than 21% of the of the Indian population lives below the poverty line⁷ and they remain vulnerable to health hazards.

Excessive population and congested cities are the key indicators of the urbanization in India with environmental degradation. Local effects of urbanization are resulting in increasing slums, environmental damage, natural imbalance, increasing poverty etc. Almost all the cities in India are a threat to the health due to higher rates of air, water, land and noise pollution levels. Government should adopt various policies and measures equally for the whole population to enhance a sustainable urban development.

Conclusion

Climate change is posing a major threat to the Indian economic growth. The absence of the technical data and scientific awareness among the city dwellers has deteriorated the green cover. Planning choices information should be made available to the people. People in India are more money-minded than environmental consciousness which aggravates the nearby conditions. Unnecessary emission of the carbon from the different industries and domestic waste makes the situation worse. In the era of urbanization, there is no serious and mandatory focus on the

sustainable environmental conditions. There is a need for carbon sequestering potential of urban greenery in India. If the serious steps are not be taken then India will face serious climate changes which will pose a threat to the future generations. Social awareness should be created and the cities should concentrate on the policies and actions of the Environment Protection Act, 1986.

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