

## RAPID URBANIZATION AND ITS IMPACT ON THE ENVIRONMENT

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Dr. Aman Singh Anahal\*  
Mrs. Anista Chauhan\*\*

### ABSTRACT

*People move from rural to urban areas through the process of urbanisation, which results in the growth of cities and towns. While urbanization has led to increased economic growth and development, it has also had a significant impact on the environment. Rapid urbanization in India has led to a number of environmental issues, including as air and water pollution, deforestation, biodiversity loss, and climate change. One of the biggest environmental problems that urban regions in India face is air pollution. The major contribution in air pollution has many sources one of them is the burning of fossil fuels for transportation and industrial uses. The availability of particulate matter in the air can have significant health impacts, including respiratory illnesses and cardiovascular disease. The present paper analyses the impact of urbanization in India and its impact on environment and the strategies that can manage the impact.*

**Keywords:** Urbanization, Environment, Deforestation, Biodiversity, Fossil Fuels.

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### Introduction

Urbanization, the process of increasing the proportion of the population living in cities or towns, has significant impacts on the environment. India is experiencing rapid urbanization, which is putting a significant strain on natural resources and the environment. India is rapidly urbanising, with the percentage of the people residing in cities predicted to rise from 34% in 2011 to 60% by 2050. This growth in urban areas is bringing about significant changes in the environment, putting a strain on natural resources and contributing to environmental degradation. For instance, the level of air pollution in Indian cities make the one of the worst in the world, exceeding permissible limits and posing major health risks. Water resources are also under pressure, with groundwater depletion and contamination of surface water sources. In addition, urbanization is leading to deforestation and loss of biodiversity, by contributing to change in climate through increased greenhouse gas emissions.

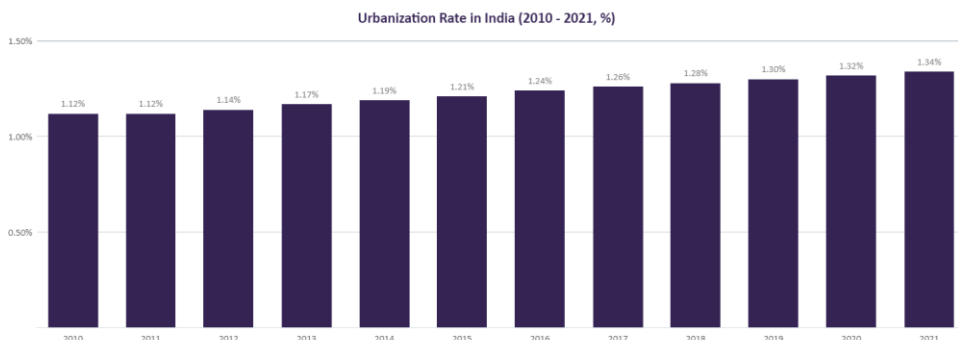
Given these challenges, it is important to understand the impact of urbanization on the environment and identify potential solutions to mitigate its negative effects. This could involve adopting sustainable urban planning practices, investing in green infrastructure, promoting public transportation and reducing reliance on private vehicles, and promoting renewable energy sources. By addressing these challenges, India can build more environmentally friendly, habitable cities that promote both human and environmental well-being.

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\* Associate Professor in Economics. Department of Commerce, Sri Aurobindo College (Eve.), University of Delhi, Delhi, India.

\*\* Associate Professor in Economics, Sri Aurobindo College (Eve.), University of Delhi, Delhi, India.

**India: Urbanization Rate**



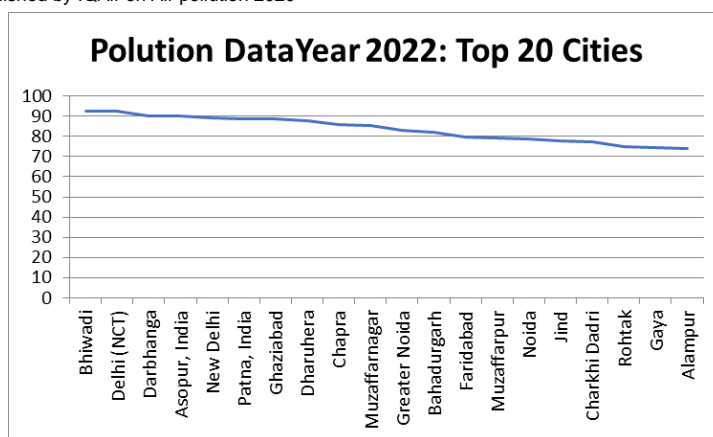
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Data on cities which are most polluted

**Ranking of Cities which are Most Polluted in India**

Rank	City	2022	2021	2020	2019	2018	2017
1	Bhiwadi, India	92.7	106.2	95.5	83.4	125.4	-
2	Delhi (NCT), India	92.6	96.4	84.1	98.6	113.5	108.2
3	Darbhanga, India	90.3	175.9	-	-	-	-
4	Asopur, India	90.2	-	-	-	-	-
5	New Delhi, India	89.1	-	-	-	-	-
6	Patna, India	88.9	78.2	68.4	82.1	119.7	118.5
7	Ghaziabad, India	88.6	102	106.6	110.2	135.2	144.6
8	Dharuhera, India	87.8	76.9	72.5	-	-	-
9	Chapra, India	85.9	-	-	-	-	-
10	Muzaffarnagar, India	85.5	73	78.6	89.1	-	-
11	Greater Noida, India	83.2	87.5	89.5	91.3	-	-
12	Bahadurgarh, India	82.2	139.9	-	-	-	-
13	Faridabad, India	79.7	88.9	83.3	85	129.1	123
14	Muzaffarpur, India	79.2	82.9	74.3	81.2	110.3	107.4
15	Noida, India	78.7	91.4	94.3	97.7	123.6	134
16	Jind, India	77.9	84.1	81.6	85.4	91.6	126.5
17	Charkhi Dadri, India	77.4	73.9	-	-	-	-
18	Rohtak, India	74.7	86.9	74.4	59.7	81.6	96.7
19	Gaya, India	74.3	46.6	46.3	59.4	96.6	102.6
20	Alampur, India	74.1	72.5	66.2	59.2	-	-

Source: The report published by IQAir on Air pollution 2020



Source: The report published by IQAir on Air pollution 2020

### Review of Literature

Singh, R. B., & Singh, R. K. (2018). Urbanization and its impact on environment: A review. *International Journal of Agriculture, Environment and Biotechnology*, 11(3), 329-334. The authors of this article give a general summary of the effects of urbanisation on the environment in India, including deforestation, waste management, and air and water pollution. They also discuss potential solutions to mitigate these effects, such as green infrastructure and sustainable transportation.

Chakraborty, A., & Chakraborty, S. (2020). Rapid urbanization and its impact on the environment: An overview. *International Journal of Environmental Science and Sustainable Development*, 5(4), 137-142. This article gives a thorough analysis of how India's growing urbanisation has affected the country's ecology, including the effects on air and water quality, biodiversity, and climate change. The authors also suggest solutions to mitigate these effects, such as promoting sustainable urban development and reducing greenhouse gas emissions.

Kumar, P., & Singh, R. K. (2019). Urbanization and environmental degradation in India: Is there a link?. *Asian Journal of Water, Environment and Pollution*, 16(2), 19-26. In this article, the authors examine the relationship between urbanization and environmental degradation in India, including the impact on air and water pollution, deforestation, and climate change. They also suggest potential solutions, such as promoting sustainable urban development and increasing public awareness of environmental issues.

Gurjar, B. R., Jain, A., Sharma, A., Agarwal, A., Gupta, P., Nagpure, A. S., & Lelieveld, J. (2010). Human health risks in megacities due to air pollution. *Atmospheric Environment*, 44(36), 4606-4613. This study explores how urban air pollution affects people's health, focusing on large cities like Delhi and Mumbai, and offers various remedies to reduce these hazards.

Jaganmohan, M., & Nambiar, S. (2015). Urbanization and the environment in India: The challenges of governance. *Journal of Planning Education and Research*, 35(2), 216-229. In order to strengthen governance and encourage sustainable urban growth, this article focuses on the governance issues that India has in addressing the effects of urbanisation on the environment.

Kumar, P., & Singh, R. K. (2021). Urbanization and environmental degradation in India: A critical review. *International Journal of Sustainable Development and World Ecology*, 28(2), 189-200. This study provides its view on the impact of urbanization on the environment in India, identifies gaps in research, and suggests potential directions for future studies.

Mukherjee, S., & Chakraborty, D. (2019). Urbanization and environmental sustainability in India: A review. *Journal of Environmental Management*, 234, 215-227. This article offers a thorough assessment of the research on the consequences of urbanisation on the environment in India, including deforestation, waste management, and air and water pollution. It also makes suggestions for potential remedies to reduce these effects.

Tiwari, P. C. (2017). Urbanization and environmental degradation in India: A review of literature. *International Journal of Social Science and Economic Research*, 2(4), 2123-2135. This study provides a review of the literature on the urbanisation and its impression on environment in India, identifies key trends and themes, and suggests potential directions for future research.

- **Air Pollution:** IQAir released the World Air Quality Report 2020. The report provides data on air pollution levels in cities across the world, including India.
- **Water Pollution:** A statutory agency of the Indian government's pollution control board by ministry on environment, climate change and environment monitors the water quality in various water bodies in India and publishes reports on water pollution levels. The information on water pollution in India in my previous response was based on the reports published by CPCB.

Deforestation National organisation known as the Forest Survey of India by ministry on environment, climate change and environment surveys the nation's forest resources and forest cover on a regular basis. The information on deforestation in India in my previous response was based on the surveys conducted by forest survey of India.

- **Waste Generation:** Ministry on environment, climate change and environment publishes the report on waste management. The information on waste generation in India in my previous response was based on the reports published by the Ministry.

These studies shed light on the effects of India's growing urbanisation on numerous environmental factors, such as climate change, biodiversity, and air and water quality. They offer suggested remedies as well in order to lessen these consequences and encourage sustainable urban growth.

Reports from governmental organisations including Indian government's pollution control board by ministry on environment, climate change and environment and the Forest Survey of India" are included in the review of literature. In addition, it is critical to recognise the various viewpoints and experiences of Indians who live in metropolitan areas and to take into account the larger socioeconomic and political framework in which environmental challenges are rooted.

#### **Urbanization in India: Statistics**

- In 2020, urban regions were home to 55% of the world's population. By 2050, this percentage is projected to rise to 68%.
  - Urban regions are responsible for 60% of greenhouse gas emissions and 70% of world energy demand.
  - Urban areas produce 80% of the world's waste.
  - Urban air pollution is to blame for 4.2 million fatalities annually.
  - 1.8 million fatalities brought on by urban water pollution per year.
  - Hearing loss, tension, and difficulty sleeping are all effects of urban noise pollution.
- Urban heat island effect can cause cities to get hotter, which can be harmful to both the environment and people's health.
- **Air Pollution:** The Board which monitors the pollution reported in its 2020 report that the average PM2.5 concentration in Delhi was 98.6 g/m<sup>3</sup> in 2016, 110.2 g/m<sup>3</sup> in 2017, 89.4 g/m<sup>3</sup> in 2018, 101.6 g/m<sup>3</sup> in 2019, and 84.0 g/m<sup>3</sup> in 2020. This data shows that despite some fluctuations, the air pollution levels in Delhi have remained consistently high over the past five years.
  - **Water Pollution:** The Central Pollution Control Board (CPCB) reported in 2017 that excessive amounts of fluoride, nitrate, and other contaminants are present in 61% of India's groundwater supply. According to the research, 63% of the sewage produced in metropolitan areas is released into water bodies without being treated. However, there is no available data for year-wise changes in water pollution levels over the past five years.
  - **Deforestation:** According to the "Forest Survey of India, India" lost 7,243 sq km of forest cover between 2015 and 2017, 6,778 sq km between 2017 and 2019, and 3,976 sq km between 2019 and 2021. This data shows that while the rate of deforestation has decreased in recent years, it is still a significant environmental challenge in India.
  - **Waste Generation:** The Indian government's ministry on environment, climate change and environment said in 2017 that India produces solid trash approx. 1.5 lakh MT per day, with urban regions producing 65% of the nation's waste. However, there is no available data for year-wise changes in waste generation levels over the past five years.

#### **Impact of Urbanization on Environment in India**

These statistics show that urbanization has a significant impact on the environment. Urban areas consume more energy, produce more waste, and pollute the air and water more than rural areas. This is brought on by a variety of things, such as the concentration of people and businesses in metropolitan areas, the usage of automobiles and other modes of mobility, and the scarcity of open space.

One of the biggest environmental issues Indian cities have to deal with is air pollution. Burning of fossil fuels for transportation and industrial purposes is one of the main cause of air pollution. High amounts of particulate matter in the air that come from this can have a serious negative impact on health, including respiratory ailments and cardiovascular disease.

Water pollution is another major issue in urban areas in India. The discharge of untreated sewage into water bodies is a common problem, leading to the contamination of water sources. Industrial activities also contribute to water pollution, with chemicals and heavy metals being released into water bodies.

In India's urban regions, deforestation is a significant problem since trees are frequently felled to make room for structures and infrastructure. This has resulted in an increase in greenhouse gas emissions, soil erosion, and biodiversity loss.

- **Habitat Loss:** Urbanization often leads to the destruction of natural habitats, including forests, wetlands, and grasslands, which can cause loss of biodiversity.
- **Air Pollution:** Cities are a significant source of air pollution, which can affect both people and wildlife by causing respiratory disorders and other health concerns. 22 of the top 30 most polluted cities in the planet, according to the World Air Quality Report 2020, are in India. The average PM2.5 levels in Delhi, the nation's capital, are higher than the recommended limit of 10 g/m<sup>3</sup>, making it one of the world's most polluted cities. With an estimated 7 million premature deaths yearly attributable to exposure to outdoor and interior air pollution, air pollution in cities is a serious health risk. (2018 World Health Organisation)
- **Water Pollution:** Urbanization can lead to increased runoff from roads and other impervious surfaces, which can pollute nearby water sources.
- **Climate Change:** Urbanization contributes to climate change through increased energy consumption, transportation emissions, and other factors.
- **Waste Management:** India produces more than 1.5 lakh metric tonnes of solid trash each day, according to the reports of ministry on environment. Only a small percentage of this waste is treated and disposed of properly, leading to pollution of land and water bodies.
- Urbanization leads to increased waste generation, which can lead to landfill overflow and other environmental problems.
- Approximately 70% of the world's carbon dioxide emissions come from urban regions. In 2020, the UN Habitat.
- The urban heat island effect can raise city temperatures by several degrees above those in the nearby rural areas, which increases energy use for cooling and raises air pollution levels. (2021, the Environmental Protection Agency).
- Municipalities are collecting approx. 1.3 billion MT solid waste which is generated globally each year; by 2025, that amount is expected to increase to 2.2 billion tonnes. (World Bank, 2018)
- Urbanization-related changes in land use are a key cause of habitat loss and fragmentation, two major factors in the decline of biodiversity.
- Deforestation: According to the 'Forest Survey of India', between 2017- 2019, India lost 1,243 sq km of forest cover, with the highest loss occurring in the northeastern states. Urbanization and infrastructure development are some of the major drivers of deforestation in India.

These statistics highlight the urgent need for sustainable development practices in India, especially in urban areas, to mitigate the impact of urbanization on the environment.

### Potential Solutions

Overall, urbanization has significant impacts on the environment, but there are many potential solutions that can help mitigate these effects. To put these concepts into practice and build more sustainable urban environments, governments, corporations, and people must work together. There are a number of things that can be done to reduce the environmental impact of urbanization. These include:

- **Smart Growth:** Encouraging more compact, mixed-use development can reduce the need for cars and decrease the amount of land required for development.
- **Green Infrastructure:** Building more green spaces, such as parks, green roofs, and vegetated swales, can help reduce the impact of urbanization on the environment.
- **Sustainable Transportation:** Promoting the use of bicycles, walking, and public transportation helps cut down on carbon emissions and air pollution.
- **Waste Reduction:** Reducing the amount of garbage produced in urban areas can be accomplished by using effective waste management strategies, such as composting and recycling.
- **Building Codes:** Urbanization's negative effects on the environment can be mitigated by implementing building rules and standards that put an emphasis on energy efficiency and sustainable design.
- **Renewable Energy:** Urban regions can have a lower carbon footprint if renewable energy sources like solar and wind are encouraged.

- **Green Building:** Constructing buildings with sustainable materials and design elements such as green roofs, solar panels, and energy-efficient appliances can reduce energy consumption and carbon emissions.
- **Water Management:** Implementing sustainable water management practices such as rainwater harvesting, water-efficient landscaping, and grey-water reuse can help reduce water consumption and runoff.
- **Urban Agriculture:** Urban agriculture initiatives like rooftop farms, community gardens, and orchards can assist improve access to fresh, regional food while minimizing the environmental effect of food production and transportation.
- **Education and Awareness:** Educating the public about the environmental impact of urbanization and promoting sustainable lifestyle choices can help create a culture of environmental responsibility and encourage more sustainable urban development.
- **Green Jobs:** Creating green jobs such as urban forestry, green building construction, and sustainable transportation can help promote sustainable economic development and reduce the environmental impact of urbanization.

To mitigate the impact of urbanization on the environment, several solutions can be implemented. Promoting sustainable urban planning, which entails creating cities that are both socially and environmentally inclusive, is one strategy. This can include measures such as promoting public transport and non-motorized transport, building green spaces and parks, and adopting sustainable building practices. Promoting the usage of renewable energy sources like solar and wind power is another option. Fossil fuel consumption will decrease as a result, as will greenhouse gas emissions. Reducing waste generation and promoting recycling and waste management is also crucial in mitigating the impact of urbanization on the environment. This can include measures such as reducing plastic use, segregating waste at source, and promoting composting and recycling.

By implementing these solutions, we can create more sustainable and resilient urban environments that balance economic growth with environmental responsibility.

#### **Strategies for Reducing Impact of Urbanization on Environment**

- **Encouraging sustainable transportation:** Promoting the usage of bicycles, walking, and public transport can help reduce car emissions and enhance air quality. **Implementing green infrastructure:** This involves using vegetation, such as trees and green roofs, to absorb carbon dioxide, enhance storm water management and lessen the impact of the urban heat island.
- **Promoting energy efficiency:** Promoting the use of energy-saving furnishings, lighting, and structures can aid in lowering energy use and greenhouse gas emissions.
- **Increasing recycling and waste reduction:** Implementing programs to increase recycling and reduce waste can help reduce landfill emissions and conserve resources.
- **Protecting natural areas:** Preserving natural areas within or near urban areas can help protect biodiversity, provide green space for residents, and reduce the heat island effect.
- **Encouraging sustainable building practices:** Urbanization's negative effects on the environment can be lessened by promoting the use of sustainable building materials, such as recycled materials, and ecologically friendly building design.
- **Educating the public:** Raising public knowledge of sustainability and encouraging behavioural changes like using reusable bags and water conservation are two other ways to decrease the detrimental effects of urbanisation on the environment.

By taking these steps, cities can be made more sustainable and protect the environment.

#### **Conclusion**

In India, growing urbanisation has led to a number of environmental problems, including deforestation, air and water pollution, biodiversity loss, and climate change. However, it is feasible to lessen the effects of urbanisation on the environment and build more habitable and sustainable cities by embracing sustainable urban design, encouraging renewable energy, and putting into practice efficient waste management techniques.

In addition, it is critical to recognise the various viewpoints and experiences of Indians who live in metropolitan areas and to take into account the larger socioeconomic and political framework in which environmental challenges are rooted.

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