Comparative Study of Noise Pollution in Urban and Semi-Urban Areas: A Case Study of Mumbai and Nashik

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Abstract:
Noise pollution is a growing environmental issue in Indian cities due to rapid urbanization and industrialization. This study presents a comparative analysis of noise pollution levels between Mumbai (metropolitan city) and Nashik (emerging tier-2 city). The research examines sources, measured sound levels, health impacts, and regulatory frameworks. Secondary data from environmental reports and monitoring studies indicate that Mumbai experiences significantly higher and continuous noise levels compared to Nashik, where noise is relatively lower but increasing. The study highlights the need for stricter enforcement of environmental regulations and sustainable urban planning.

Keywords: Noise pollution, Mumbai, Nashik, urban environment, environmental health

Introduction:

Noise pollution refers to unwanted sound that adversely affects human health and environmental quality. Rapid urbanization has intensified noise levels in Indian cities, particularly in metropolitan regions. According to the World Health Organization, environmental noise is a major public health concern.[1]

Mumbai, being one of the most densely populated cities, faces severe noise pollution due to traffic congestion, industrialization, and construction activities. In contrast, Nashik, a developing city, experiences moderate noise levels but shows increasing trends due to urban growth.

Literature Review

Studies on urban noise pollution indicate that transportation is the dominant source of environmental noise [2] Research conducted in the Mumbai Metropolitan Region shows that noise levels frequently exceed permissible limits across residential and silence zones due to unplanned urban development [3]

Similarly, reports from Nashik Municipal Corporation reveal that noise levels in residential and commercial areas are rising and often exceed prescribed limits [4]

Objectives of the Study:

To compare noise levels in Mumbai and Nashik

To identify major sources of noise pollution

To analyse health and environmental impacts

To evaluate regulatory effectiveness

Hypothesis:

H0: There is no significant difference in noise levels between Mumbai and Nashik

H1: Mumbai has significantly higher noise levels than Nashik

Research Methodology:

This study is based on secondary data analysis from environmental reports, research articles, and government publications.

Method: Comparative analytical method

Unit of measurement: Decibel (dB)

Data sources: MPCB reports, municipal reports, published studies

6. Data Analysis: Mumbai vs Nashik Noise Levels

Table 1: Comparative Noise Levels

Sr.no.	City	Noise range(dB)	Major Sources
1	Mumbai	49.6 – 81.2 dB	Traffic, construction, industry
2	Nashik	50 – 72 dB	Traffic, markets, festivals

Noise monitoring during festivals showed that Mumbai recorded levels up to 81.2 dB, while Nashik recorded comparatively lower levels up to 72 dB.[5]

Under the Noise Pollution 2000 (Regulation and Control) Rules, residential areas should not exceed 55 dB during the day and 45 dB at night, but readings during the festival were significantly higher across all monitored locations. In Mumbai, Shivaji Park (Dadar) recorded 81.7 dB during the day and 75.9 dB at night on Oct 20, 2025, while Chembur logged 76.6 dB during the day and 73.7 dB at night. In neighbouring Thane, Wagle Estate touched 82.5 dB during the day in 2024, among the highest readings in the dataset, while Gokhale Road recorded levels above 70 dB on several occasions.

Nashik's Central Bus Stand reached 79.6 dB during the day and 78.2 dB at night in 2025. During events like Diwali, both cities exceeded permissible limits, with Mumbai reaching over 80 dB and Nashik around 79 dB, indicating rising noise concerns in both cities. The survey notes that noise pollution from sources such as traffic, construction, industrial activity and festive celebrations can lead to health impacts, including hearing loss, anxiety and other mental health issues. [6]

Sources of Noise Pollution in Mumbai

Heavy vehicular traffic

Construction and infrastructure projects

Industrial activities

Continuous honking
Studies show extremely high noise levels at traffic junctions, even exceeding 100 dB in some locations.

Sources of Noise Pollution in Nashik

Moderate traffic congestion
Commercial activities
Religious and festival events
Although less intense than Mumbai, noise levels in Nashik are increasing due to urban expansion [6]

Health Impacts:

Noise pollution has significant health effects Including hearing loss, Sleep disturbance
Stress and hypertension.
Urban populations in Mumbai are exposed to continuous high noise levels, leading to greater health risks. Studies confirm that environmental noise contributes to both physiological and psychological problems. [7]

Environmental Impacts:

Noise pollution affects ecosystems by disturbing wildlife communication and behaviour. Urban biodiversity in Mumbai is more affected due to constant noise exposure, whereas Nashik experiences relatively lower ecological disturbance.

Legal Framework

Noise pollution in India is regulated under the Noise Pollution (Regulation and Control) Rules, 2000, which prescribe permissible limits for different zones. [8]

Area	Day(dB)	Night(dB)
Residential	55	45
Commercial	65	55

Both Mumbai and Nashik frequently exceed these limits, indicating weak enforcement.

Discussion:

The comparative analysis shows that:
Mumbai experiences chronic and high-intensity noise pollution
Nashik experiences moderate but increasing noise levels
Urban density and traffic volume are key determinants
The findings strongly support H1, indicating a significant difference between the two cities.

Conclusion:

Noise pollution is a serious environmental issue in both Mumbai and Nashik. However, Mumbai shows significantly higher levels due to intense urbanization and continuous activity. Nashik, though comparatively quieter, is experiencing rising noise levels due to rapid development.
Effective policy implementation, public awareness, and sustainable urban planning are essential to control noise pollution in both cities.

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