

A Study of Noise Pollution and Its Impact on Health in Nashik City a Geographical Perspective

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Research Guide

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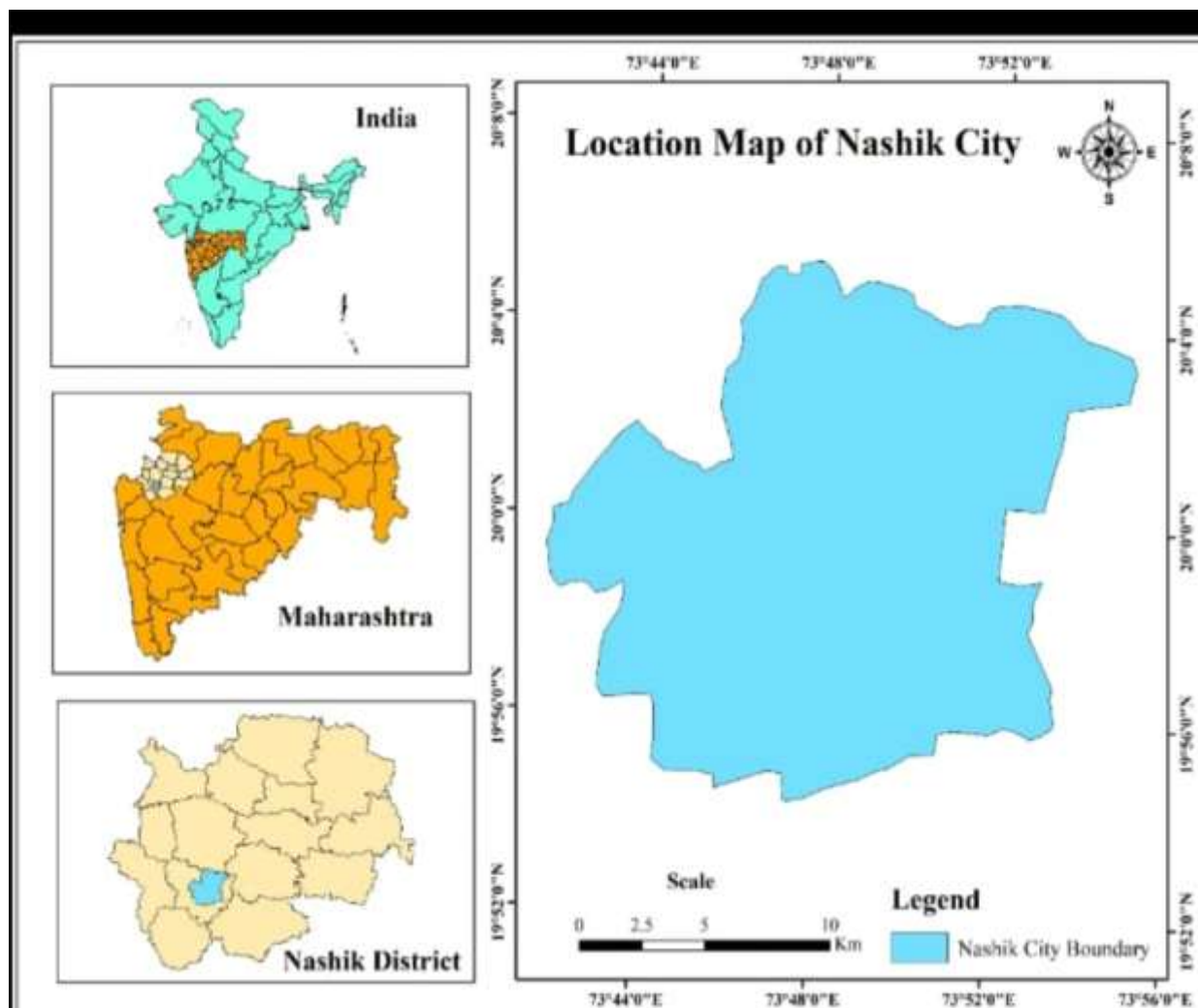
Abstract: Rapid urbanization and alarming growth of population is causing serious environmental problems in Nashik city. Noise is one of the environmental problems that uncomforted in daily life. Noise pollution has become major concern for communities living within the city. The study examines the problem of noise pollution in the wake of its ill effect on the life of the people. (Rahman et al., 2022; Singh & Davar, 2004). Major effects of noise pollution include interference with communication, sleeplessness, and reduced efficiency. The extreme effects e.g. deafness and mental breakdown neither is ruled out. Generally, However, complaints to the administration and police have also been accepted as a way of solving this menace. Public education appears to be the best method as suggested by the respondents. However, government and NGOs can play a significant role in this process. This study examines the spatial distribution of noise pollution in Nashik City and its associated health impacts from a geographical perspective and the findings emphasize the need for noise management policies, stricter enforcement of CPCB norms, and urban planning interventions to safeguard public health in Nashik City.

Keywords: Urbanization, Noise Pollution, Environment, sleeplessness. Deafness, Public health.

Introduction Noise, commonly defined as unwanted sound. It is an environmental phenomenon to which we are exposed before birth and throughout life. Noise can also be considered an environmental pollutant a waste product generated in conjunction with various anthropogenic activities. It is also defined as, Noise is any sound independent of loudness that can produce an undesired physiological or psychological effect in an individual, and that may interfere with the social ends of an individual or group Noise pollution — unwanted or harmful sound from human activities — is an escalating urban environmental problem with measurable public-health consequences. The World Health Organization's environmental noise guidance synthesizes evidence that long-term exposure to elevated environmental noise increases risks of cardiovascular disease, hypertension, sleep

disturbance, cognitive impairment, hearing impairment and mental-health outcomes, and that even moderate chronic exposures (particularly at night) have quantifiable population health impacts. In India the Noise Pollution (Regulation & Control) Rules (2000) and CPCB guidelines set ambient limits for different land-use zones: residential (55 dB day / 45 dB night), commercial (65/55 dB) and industrial (75/70 dB), with stricter limits (50/40 dB) for silence zones such as hospitals and schools. Many urban sites routinely exceed these thresholds, particularly during peak traffic and festival_Nashik — a rapidly urbanizing city with busy commercial hubs, expanding transport corridors, industrial pockets and frequent religious festivals — exhibits significant spatial and temporal variability in ambient noise. Recent noise-mapping and ambient monitoring studies of Nashik and metropolitan areas in Maharashtra report noise hotspots with daytime levels far exceeding the prescribed limits (some local hotspots recorded above ~84 dB(A)), and festival-period monitoring shows sharp temporary spikes that drive acute exposures in commercial and residential neighbourhoods. These spatial patterns highlight the importance of mapping and zonal analysis to identify vulnerable populations and exposure pathways. Noise Pollution mainly occurs due to use of equipment's like mobiles, music system, and television etc. due to change in life style. It also occurs during Diwali, Dahihandi, Ganesh Visarjan and Navratri festivals. During celebrations, musical instruments and noise making crackers are being used. So, during these festivals the noise pollution level is high. During Ganesh festival, Navratri and Diwali festival, noise levels at residential societies are observed well above the permissible limits.

Study Area Nashik is the third largest city of Maharashtra after Mumbai & Pune. Nashik lies in the northern part of Maharashtra state at elevation of 560m above the mean sea level which gives it ideal temperature, particularly in winters. The river Godavari originates from the Brahmagiri Mountain, Trimbakeshwar about 32 km (20 miles) from Nashik and flows through the old residential settlement, now in the central part of the city is where from river Godavari originates. Nashik lies on the western edge of the Deccan Plateau, which is a volcanic formation. The land area of the city is about 259.13 Sq Km. Anjaneri near Nashik is the birth place of lord Hanuman. The city's tropical location and high altitude combine to give it a relatively mild version of a tropical wet and dry climate. Temperatures rise slightly in October, but this is followed by the cool season from November to February. The cool season sees warm temperatures of around 28°C during the day, but cool nights, with lows averaging 10°C and extremely dry air. The main functional areas of the city are, the Nashik core area (the Nucleous), Satpur, Ambad Industrial areas and the second functional area is the Nashik–Pune road area with Nashik-Road railway station, supported by the industrial activities at Eklahara Thermal Power Plant, Railway Traction Factory etc. Satpur Industrial area is towards west. The MIDC Satpur Industrial Estate is mainly responsible for industrial and commercial growth of Satpur area. The Civic Administration area of 267.48 square kilometre (26747.75 hectares) is managed by Nashik Municipal Corporation.



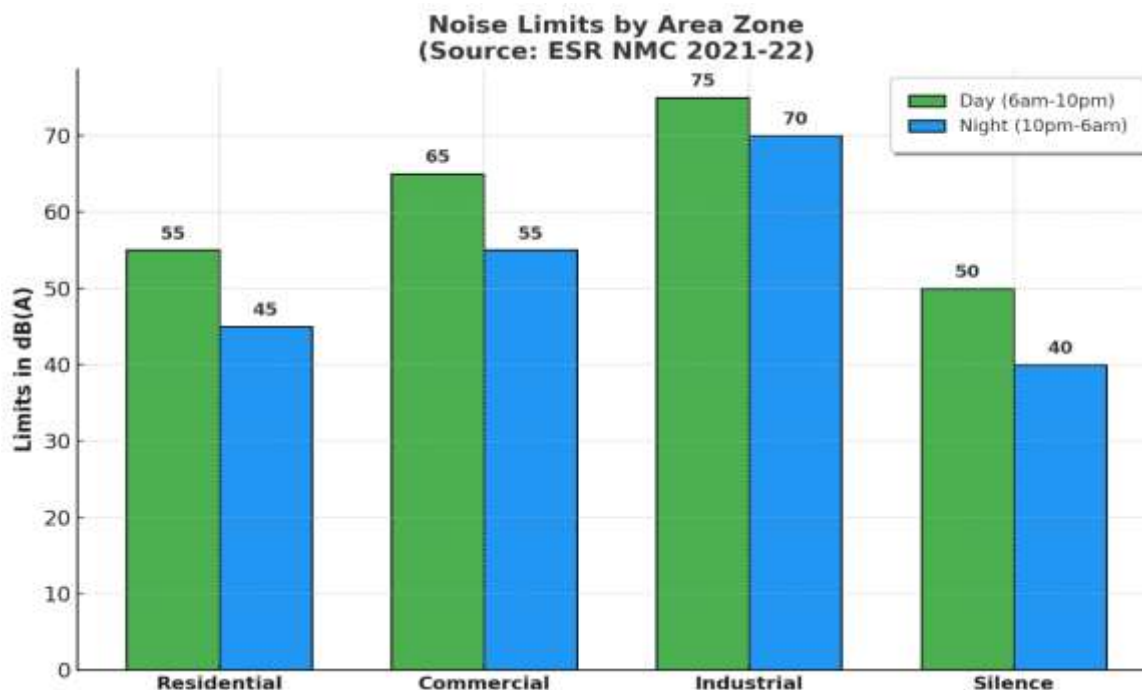
Noise Status in Nashik city

Nashik City is divided into 4 zones viz., Residential, Commercial, Industrial and Silence zone. CPCB has specified the standards of noise levels during day and night times. Following Table 10.1 shows standards for different zones, as per Noise pollution (Regulation and Control), Rules 2016.

Ambient Noise Quality Standards

Sr. No	Category/ Area Zone	Limits in dB(A)	
		Day (6 am to 10pm)	Night (10pm to 6 am)
1	Residential	55	45
2	Commercial	65	55
3	Industrial	75	70
4	Silence	50	40

Source: Environment Status Report of Nashik Municipal Corporation 2021-22



If noise level is not meeting the norms, action is taken against concerned person by Police Department. As per rule 3 (1) and 4 (1) of Noise Pollution (Control and Regulation) Rules, 2000, Area within periphery of 100 meters of Courts, hospitals and educational institutions is declared as Silence Zone. Boards declaring Silence Zone have been installed and implementation of keeping silence zone is monitored by Police Department. Noise is measured by noise meter and expressed in units of decibel dB (A) Leq. Internationally accepted method is used for noise measurement.

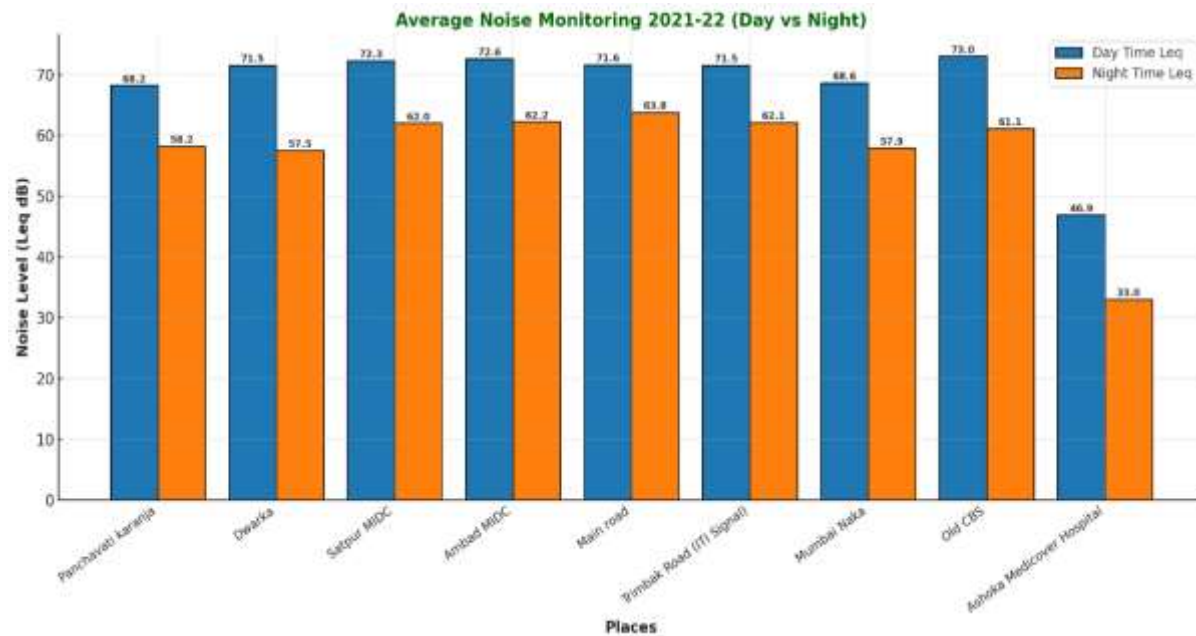
Noise Monitoring in Nashik city

Average Noise Monitoring 2021 -22

Sr no	Name of the place	Day Time In Leq	Night Time In Leq	CPCB NORMS (Day time)	CPCB NORMS (Night time)
A	Residential				
1	Panchavati karanja	68.2	58.2	55	45
2	Dwarka	71.5	57.5		
B	Industrial				
3	Satpur MIDC	72.3	62	75	70
4	Ambad MIDC	72.6	62.2		
C	Commercial				
5	Main road	71.6	63.8	65	55
6	Trimbak Road (ITI Signal)	71.5	62.1		
7	Mumbai Naka	68.6	57.9		

8	Old CBS	73	61.1		
	Silence				
9	Ashoka Medicover Hospital Indiranagar	46.9	33	50	40

Source: Environment Status Report of Nashik Municipal Corporation 2021-22

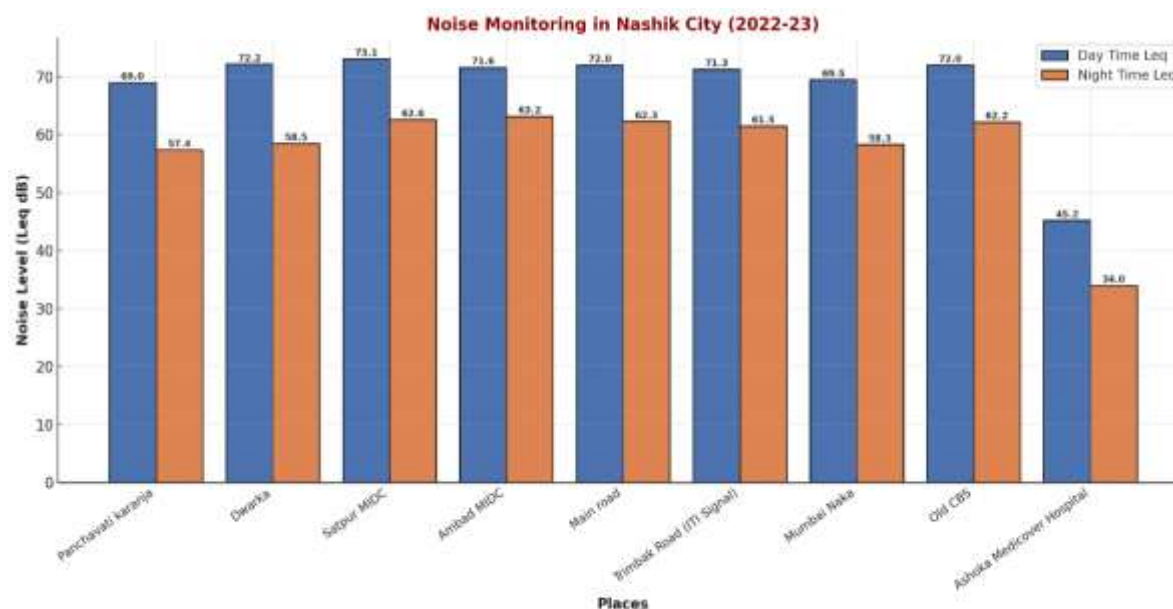


Noise Monitoring in Nashik city(2022-23)

Sr no	Name of the place	Day Time In Leq	Night Time In Leq	CPCB NORMS (Day time)	CPCB NORMS (Night time)
A	Residential Zone				
1	Panchavati karanja	69.0	57.4	55	45
2	Dwarka	72.2	58.5		
B	Industrial zone				
3	Satpur MIDC	73.1	62.6	75	70
4	Ambad MIDC	71.6	63.2		
C	Commercial zone				
5	Main road	72.0	62.3	65	55
6	Trimbak Road (ITI Signal)	71.3	61.5		
7	Mumbai Naka	69.5	58.3		
8	Old CBS	72	62.2		

	Silence Zone				
9	Ashoka Medicover Hospital Indiranagar	45.2	34	50	40

Source: Environment Status Report of Nashik Municipal Corporation 2022-23



Source: Environment Status Report of Nashik Municipal Corporation 2022-23

Comparative Analysis of Noise Monitoring in Nashik City of 2022 to 2024)

1. Residential Areas (Panchavati Karanja & Dwarka)

- Panchavati Karanja:**
 - 2021-22 → Day: **68.2 dB**, Night: **58.2 dB**
 - 2022-23 → Day: **69.0 dB**, Night: **57.4 dB**

Trend: Both are louder than what the CPCB allows (55 dB during the day and 45 dB at night). • Dwarka: Day: 71.5 dB, Night: 57.5 dB 2022–23: Day: 72.2 dB, Night: 58.5 dB
Trend: More noise during the day and at night. It always stays above CPCB norms, which means traffic is getting worse. Satpur MIDC: o Day: 72.3 dB, Night: 62.0 dB; 2022-23: Day: 73.1 dB, Night: 62.6 dB; Trend: Slight rise in both times, but still within CPCB limits (75 dB day, 70 dB night). Ambad MIDC: Day noise dropped by 1 dB (–1 dB) in 2021–22; night noise rose by 1 dB (–2 dB) in 2022–23; day noise dropped by 71.6 dB; night noise rose by 63.2 dB; The analysis of noise levels across key traffic nodes in Nashik reveals distinct spatial and temporal variations between 2021–22 and 2022–23. On Main Road, the day-time noise marginally increased from 71.6 dB to 72.0 dB, while night levels declined from 63.8 dB to 62.3 dB, though both remain significantly above the CPCB norms of 65 dB (day) and 55 dB (night), indicating persistent anthropogenic stress in a densely built-up corridor. At Trimbak Road (ITI Signal), both day and night values showed a slight decline

(−0.2 dB and −0.6 dB respectively), suggesting a minor reduction in traffic congestion, yet still exceeding permissible thresholds. In contrast, **Mumbai Naka** recorded a marginal increase in both day (68.6 to 69.5 dB) and night noise (57.9 to 58.3 dB), reflecting intensified vehicular flow at this nodal junction. Meanwhile, Old CBS exhibited a mixed trend, with day noise levels decreasing from 73.0 to 72.0 dB, but night noise rising from 61.1 to 62.2 dB, indicating shifting diurnal traffic pressure. Overall, the spatial pattern highlights that all observed locations continue to surpass CPCB standards, with central transport corridors such as Main Road and Old CBS emerging as critical noise pollution hotspots in the urban landscape.

4. Silence Zone (Ashoka Medcover Hospital, Indiranagar)

- 2021-22 → Day: **46.9 dB**, Night: **33.0 dB**
- 2022-23 → Day: **45.2 dB**, Night: **34.0 dB**
- **Trend:** Minor decline in daytime levels but slight increase at night. Both are **within CPCB norms** (50 dB day, 40 dB night).

The comparative analysis of noise monitoring in Nashik city for 2021-22 and 2022-23 shows that residential areas like Panchavati Karanja and Dwarka consistently exceed CPCB norms, with slight increases in daytime and mixed changes at night due to heavy traffic congestion. Industrial zones such as Satpur MIDC and Ambad MIDC remain within permissible limits, though a marginal rise in nighttime levels indicates growing disturbance. Commercial areas, including Main Road, Trimbak Road, Mumbai Naka, and Old CBS, record persistently high noise levels above CPCB standards, reflecting dense vehicular movement and business activities, with Old CBS remaining a major hotspot. The silence zone around Ashoka Medcover Hospital shows controlled noise levels within norms, maintaining a suitable environment. Overall, the data highlights that Nashik's residential and commercial belts face serious noise pollution challenges, while industrial and silence zones remain comparatively better, revealing a clear geographical pattern of urban core areas being more affected than peripheral zones.

Ambient Noise Levels in dB(A) during Diwali Festival-2024 in Nashik

Nashik In Nashik, a total of five locations were monitored. On 24th October, the highest noise level during day time and night time was recorded at Bytco Point with 72.0 dB(A) and 65.6 dB(A) respectively. However, on the day of Laxmi poojan, i.e. 31st October the highest noise level during day time was observed at Bytco Point with 72.2 dB(A) and CBS during night time 63.6 dB(A). On 1st November, the highest noise level during day was observed at Bytco Point with 72.2 dB(A) and night time is observed at CBS with 62.9 dB(A) respectively.

Ambient Noise Levels in dB(A) during Diwali Festival-2024 in Nashik

Pre-Diwali (24th October 2024) – NASHIK												
Location	Day Time (6am-10pm)						Night Time (10pm-6am)					
	Leq	Lmin	Lma	L10	L50	L90	Leq	Lmi	Lma	L10	L50	L90
			x					n	x			

CBS	69.8	56.0	76.0	72.0	69.0	60.0	65.4	54.0	73.0	71.0	60.0	56.0
Panchavati	68.9	48.0	76.0	72.0	68.0	53.0	62.8	52.0	70.0	67.1	58.0	54.0
Dahipool	68.5	57.0	77.0	72.0	66.0	59.0	56.5	50.0	64.0	60.0	54.0	51.0
CIDCO Residential	67.1	46.0	76.0	71.0	65.0	50.0	62.3	51.0	69.0	67.0	60.0	52.9
Bytco Point	72.0	63.0	79.0	75.0	71.0	65.0	65.6	54.0	74.0	71.2	60.0	57.0

Diwali (31st October 2024) - NASHIK

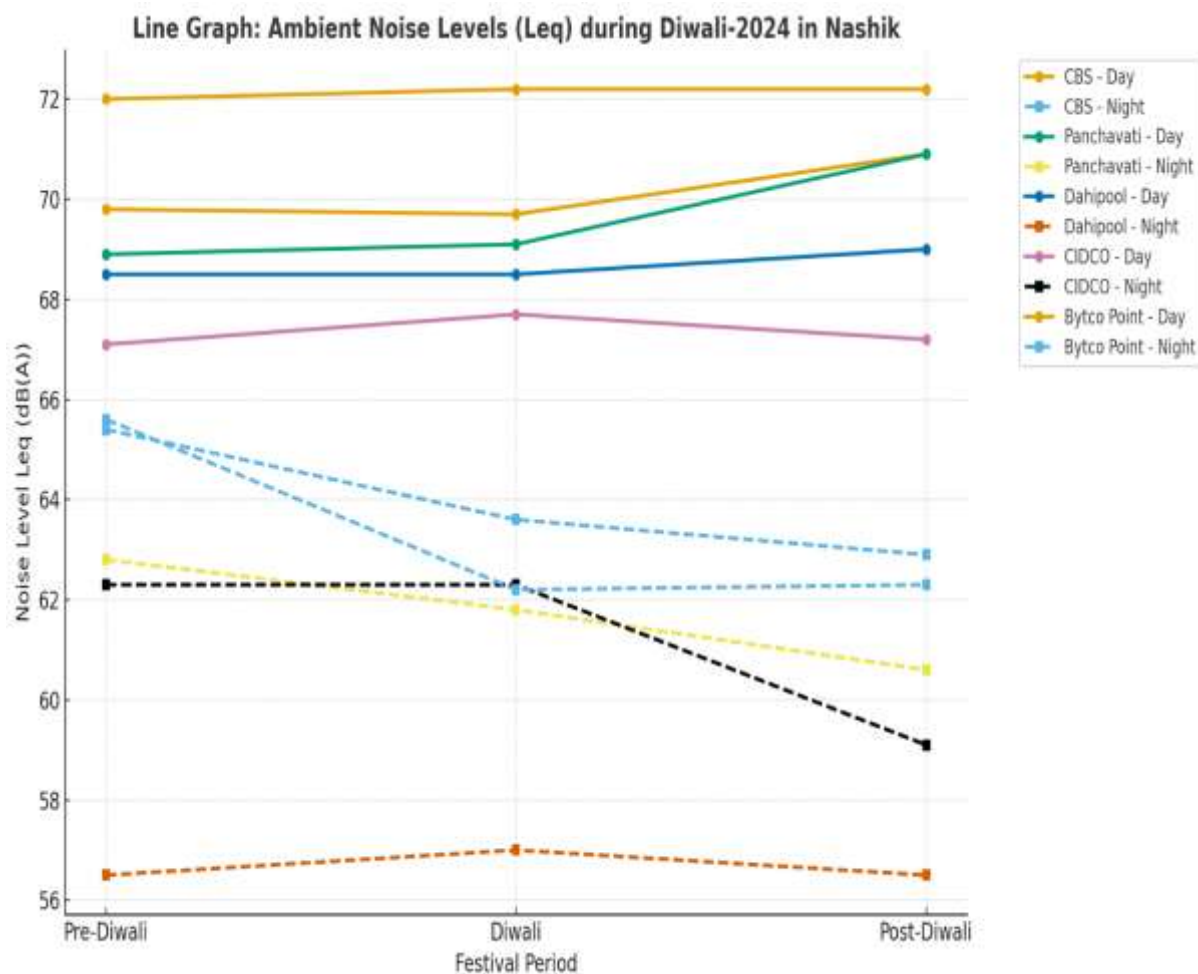
Location	Day Time (6am-10pm)						Night Time (10pm-6am)					
	Leq	Lmin	Lmax	L10	L50	L90	Leq	Lmin	Lmax	L10	L50	L90
CBS	69.7	54.0	76.0	72.0	69.0	59.9	63.6	54.0	70.0	68.0	60.0	56.0
Panchavati	69.1	48.0	76.0	72.0	68.0	54.0	61.8	52.0	70.0	66.0	57.0	54.0
Dahipool	68.5	57.0	77.0	72.0	66.0	61.0	57.0	50.0	64.0	60.1	55.0	51.0
CIDCO Residential	67.7	48.0	76.0	71.0	65.0	50.0	62.3	51.0	69.0	67.0	60.0	52.0
Bytco Point	72.2	63.0	79.0	75.1	71.0	65.0	62.2	51.0	72.0	68.2	56.0	52.0

(1st November 2024) - NASHIK

Location	Day Time (6am-10pm)						Night Time (10pm-6am)					
	Leq	Lmin	Lmax	L10	L50	L90	Leq	Lmin	Lmax	L10	L50	L90
CBS	70.9	57.0	76.0	74.0	70.0	61.0	62.9	54.0	72.0	69.0	58.0	54.0
Panchavati	70.9	57.0	76.0	74.0	70.0	61.0	60.6	51.0	70.0	65.1	56.0	53.0
Dahipool	69.0	58.0	76.0	73.1	67.0	60.9	56.5	50.0	63.0	61.0	54.0	51.0

CIDCO Residential	67.2	48.0	75.0	72.0	63.0	51.0	59.1	50.0	66.0	63.0	56.5	51.0
Bytco Point	72.2	64.0	78.0	75.0	70.0	68.0	62.3	51.0	72.0	68.1	56.0	52.0

Source (Report on Ambient Noise Monitoring in Maharashtra during Diwali-2024)



During the Diwali festival of 2024 in Nashik, ambient noise levels showed clear spatial and temporal variations linked to land-use patterns and festive activities. Core urban nodes like Bytco Point and CBS consistently recorded the highest Leq values (around 72 dB daytime and 62–65 dB nighttime), reflecting their role as transport and commercial hubs with heavy traffic and celebrations, while CIDCO Residential, a planned township, showed comparatively lower values (around 67 dB daytime and 59–62 dB night-time) but still above CPCB's safe limits. Mixed-use zones such as Panchavati and Dahipool exhibited intermediate noise levels, indicating the impact of dense markets and residential areas. Daytime levels were generally higher than night-time, yet even at night, noise exceeded permissible limits, highlighting disturbance from firecrackers and late-night gatherings. Temporally, noise levels before Diwali (24 Oct), on Diwali day (31 Oct), and post-Diwali (1

Nov) remained persistently high, with some locations like CBS and Panchavati showing increases after the festival due to extended celebrations and resumed traffic. Geographically, the study reveals that cultural practices combined with urban land-use intensify noise pollution, creating environmental and health concerns across both central and peripheral areas of the city.

Impacts on human health due to noise pollution

1. High sound levels above 100 dB lead to deafness.
2. Increased noise levels lead to enhanced blood pressure, lack in concentration, irritation, mental & physical imbalance.
3. Noise pollution may cause diseases like heart disease etc.
4. Noise also affects migration of birds & animals.
5. Noise pollution may adversely affect pregnant women.
6. Probable harmful impacts on human health by sound pollution at different levels are

Impact of Noise levels on human body

Sr. No.	Noise levels in dB	Health Hazards
1	80	Annoying
2	90	Pain in ear
3	95	Very annoying
4	110	Stimulation of skin
5	120-130	Pain threshold
6	130-135	Dizziness, vomiting
7	140	Pain in ear & Headache
8	150	Significant change in heart pulse rate

Suggestions for reduced noise pollution

- **Strict enforcement of Noise Pollution (Regulation and Control) Rules, 2000** – regular monitoring in commercial, residential, and silence zones with penalties for violations.
- **Traffic noise control** – construct noise barriers along highways (e.g., Mumbai–Agra Highway near Nashik), enforce speed limits, reroute heavy vehicles during night hours.
- **Green buffer zones** – plant dense rows of trees along busy roads and near public institutions to naturally absorb sound.

- **Soundproofing of public buildings** – hospitals, schools, and libraries in high-noise areas should have double-glazed windows and acoustic panels.
- **Regulated construction activities** – Restrict Work to Daylight Hours and Mandate Use of Quieter Machinery.
- **Silent Zones** – Establish and Clearly Mark 100 M “Silence Areas” Around Hospitals, Schools, and Courts, With Strict Monitoring.
- **Public Awareness Campaigns** – Educate Citizens About Noise-Related Health Risks Like Hypertension, Hearing Loss, And Sleep Disorders.
- **Festival And Event Noise Management** – Encourage Use Of Eco-Friendly, Low-Decibel Sound Systems During Ganeshotsav And Other Local Celebrations.
- **Personal Protective Equipment (Ppe)** – Provide Earplugs/Earmuffs To Workers In High-Noise Occupations (Factories, Construction, Traffic Police
- **Lifestyle Adjustments** – Residents In Noisy Areas Should Use Heavy Curtains, Carpets, And Indoor Plants To Dampen Indoor Sound.
- **Health Screening Camps** – Periodic Hearing And Blood Pressure Checks For People In High-Noise Zones.
- **Sound-Masking Techniques** – Use White Noise Devices or Low-Volume Calming Music To Reduce Perception Of External Noise Indoors.
- **Noise Mapping of Nashik** – Create GIS-Based Maps Of Noise Hotspots For Targeted Action. Long also Term Health Surveillance – Track Prevalence of Noise-Related Illnesses in Affected Wards.
- **Integration With Smart City Initiatives** – Install Real-Time Noise Sensors At Key Junctions, Linked To Public Dashboards.

Conclusion The main finding is that noise pollution levels have significantly increased due to rapid urbanisation and population growth, which has a detrimental effect on human health. Noise levels in the city usually surpass the allowable limits established by pollution control boards, especially in commercial, industrial, and "silence zones" like hospitals. According to a geographical study on noise pollution in Nashik City, the main causes of dangerously high noise levels are unchecked traffic growth and fast urbanisation. These levels regularly surpass legal limits, especially in business districts, industrial areas, and busy thoroughfares, which has a serious negative influence on public health. Geographically, there is a distinct pattern of noise hotspots that are closely associated with densely populated and economically active areas. Both auditory and non-auditory health problems, such as stress, sleep disorders, and cardiovascular issues, are associated with this pervasive noise exposure. The close relationship between cultural customs, urban land-use patterns, and environmental quality is demonstrated by the examination of ambient noise levels in Nashik during the 2024 Diwali festival. While planned residential areas like CIDCO experienced relatively lower but still dangerous noise levels, central commercial and transport hubs like Bytco Point and CBS consistently recorded the highest

noise intensities. Measured values exceeded the CPCB and WHO permissible limits for both daytime and nighttime during all study periods—pre-Diwali, Diwali day, and post-Diwali—indicating that noise pollution persists after the immediate festive period. This implies that because of the constant traffic and prolonged festivities, Diwali not only intensifies the already-existing urban noise environment but also prolongs its effects. Geographically speaking, the results show that while peripheral planned colonies are less impacted, they are still at risk, while densely populated mixed-use areas in Nashik are more susceptible to dangerous sound levels. The quality of life, urban sustainability, and public health are all significantly impacted by such prolonged exposure to high noise levels. To reduce noise pollution in Indian cities during festivals, the study emphasises the urgent need for stronger noise regulations, eco-friendly celebration awareness campaigns, and urban planning initiatives.

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