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Noise Pollution Monitoring at Sedam Taluka in Kalaburagi District

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ABSTRACT: Noise pollution is an increasingly critical environmental issue, especially in urban and industrialized areas. It is caused by a variety of sources such as road traffic, construction activities, industrial operations, and loud public events. Unlike other forms of pollution, noise pollution does not accumulate in the environment, but its impact on human health and well-being can be severe and long-lasting. High noise levels can lead to hearing loss, sleep disturbances, increased stress, and cardiovascular problems. Additionally, it disrupts ecosystems by affecting the behavior and survival of wildlife. . The noise level in Sedam Taluka of kalaburgi district of karnataka, india has increasing rapidly due to rapid urbanization,uncontrolled momement of vehicles.

The noise level by taking into account of morning, afternoon & evening hours considering of Commercial area, Industrial area and Silence zone. The minimum noise level at Commercial area is 67.11dB and the maximum noise level is 85.28dB and the average is 77.23dB and at the Industrial area the minimum noise level is 60.2 dB and the maximum noise level is 89.6dB and the average is 71.64dB and at Silence Zone the minimum noise level is 62.3 dB, the maximum level is 71.7dB and the average is 67dB. which is more than the limits compared to CPCB Standards. Result shows, the noise should be identified as the major environmental problem and should take necessary steps to minimize it.

KEYWORDS: Noise, Sound Level Meter, Sedam Taluka, Decibel

I. INTRODUCTION

Noise pollution, often referred to as environmental noise, is the excessive or disturbing sound that may harm human or animal life. Unlike other forms of pollution, noise leaves no visible residue, yet its effects can be profoundly damaging. Common sources include traffic, industrial activities, construction work, loudspeakers, and household appliances. In today's fast-paced urban environments, constant exposure to high levels of noise has become an unavoidable part of life, leading to serious health issues such as stress, hearing loss, sleep disturbances, and even cardiovascular problems. Understanding the causes, impacts, and solutions to noise pollution is essential in creating a healthier and more sustainable environment for all living beings.

OBJECTIVES

- 1.To monitor Noise pollution in different areas of Sedam Taluka.
- 2.Comparing the level of noise with CPCB standards
- 3.To examine ways to control (Suggestions) Noise Pollution.

SOURCES OF NOISE POLLUTION

Transportation:

Road traffic: Cars, trucks, motorcycles, and honking contribute to significant noise levels in urban areas.

Air traffic: Aircraft noise from airports and flight paths, especially during take off and landing.

Railways: Trains, including high-speed and freight trains, produce substantial noise, particularly near tracks and stations.

Industrial Activities:

Factories and plants: Machinery, generators, and production processes in industrial areas generate continuous noise.

Construction sites: Activities like drilling, hammering, and the operation of heavy

Urbanization:

Urban infrastructure: Power generators, air conditioners, and other machinery in densely populated areas.

Public spaces: Loudspeakers, public announcements, and events can increase volume of noise in parks and squares.

Household Sources:-Appliances: Washing machines, vacuum cleaners, and kitchen gadgets contribute to indoor noise pollution.

Television and music systems: Loud media equipment in homes or from neighbors.

Pets: Continuous barking or other sounds from domestic animals

Natural Sources:

Natural disasters: Earthquakes, volcanic eruptions, and thunderstorms create loud and disruptive sounds.

Wildlife: In some areas, particularly near forests or coastlines, animals can contribute to noise pollution

EFFECTS OF NOISE POLLUTION

Noise pollution effects on plants:

Disruption of Pollinators: Many plants rely on animals, such as bees, birds, and bats, for pollination. Noise pollution can disrupt the behaviors of these pollinators by masking the sounds they use to communicate, navigate, or locate food. For instance, some birds may avoid noisy areas, reducing the chances of pollination for plants in those regions.

Altered Growth Patterns: Certain research indicates that noise pollution (NP) can alter plant growth patterns indirectly. For example, if noise pollution affects the behavior of herbivores, it could change grazing patterns, which in turn could influence the growth and distribution of certain plants.

Noise pollution effects on animals:-

Stress and Health Impacts: Prolonged exposure to noise can lead to chronic stress in animals, resulting in weakened immune systems and lower rates of successful reproduction, and even death. Stressful environments can cause animals to abandon their habitats, leading to population declines.

Communication Disruption: Many animals rely on sound for communication, navigation, and detecting predators or prey. Noise pollution can mask these sounds, leading to difficulties in finding mates, coordinating group activities, or avoiding danger.

Noise pollution impact on the health of human and environment:-

Hearing Loss:-Chronic Exposure: Prolonged exposure to loud noise, especially in workplaces or urban areas, this can result in permanent hearing loss. Even everyday sounds like traffic, & construction, and loud music can contribute to this over time. Temporary Threshold Shift: Short-term exposure to loud noise can cause a temporary reduction in hearing, known as a temporary threshold shift, which can become permanent with repeated exposure.

Sleep Disturbances:-Noise pollution, especially during night time, can interfere with sleep patterns, making it harder to fall asleep & wake up a lot and overall poor sleep quality. Chronic sleep abnormalities have been linked to heart disease and cognitive decline, among other long term health issues.

II. LITERATURE REVIEW

1.Singh D,et.al:- It concerns the monitoring of noise pollution in various locations across Meerut City during the Deepawali festival night. The study involved precise measurements of noise levels using advanced sound metering technology. Over the past three years, there has been a remarkable and consistent decrease in noise pollution, with the lowest recorded levels in 2009, demonstrating a clear improvement compared to 2008 and 2007. This decline can be confidently attributed to the growing environmental consciousness among the residents of Meerut City. Significantly, a growing number of schools in the city now actively promote the celebration of Deepawali, the festival of lights, without

sound and smoke. There is a strong expectation that the campaign for an eco-friendly Deepawali will not only gain momentum but also be widely embraced by the people of Meerut City, based on their strong commitment to environmental conservation.

2.Bablu Kumar, et.al:- Noise pollution, a significant global health hazard, has increased due to technological advancements, industrialization, urbanization, and communication systems. It can cause health issues like high blood pressure, sleeplessness, nausea, heart attacks, depression, dizziness, headaches, and hearing loss. A road traffic noise survey was conducted in Bhopal city at five sites, including Rani Kamalapati railway station, board office square, Bhopal railway station, Prabhat square, and Bhopal talkies square. The study provides broad conclusions and suggests ways to reduce traffic noise.

3.Bhavan Tandel, et.al:- "Traffic-related noise pollution makes up nearly two-thirds of the total noise pollution in urban areas. Noise, which is a result of urbanization, industrialization, and motorization, is increasingly acknowledged as an environmental nuisance that has an impact on human health and well-being. The noise from traffic on urban roads reduces the quality of life and property values for people living near these urban corridors." Surat is currently the tenth largest city in India, with an estimated population of over 4 million. The city has experienced an astonishing population growth rate of 76.02% in the last decade, largely due to rapid industrialization. The job opportunities created by this industrialization have led to significant migration from various parts of India, particularly from Orissa, U.P., M.P., Bihar, and Rajasthan.

4.Abbaspour M. PhD, et.al:- The study conducted in Hamadan, Iran, in 2005-2006, used statistical modelling to predict road traffic noise in Iranian road conditions. The dataset included 282 noise measurements, which were used to develop a new model using regression analysis. The model, with twelve explanatory variables, achieved a good fit for measured values of Leq ($r^2=0.913$). The proposed model can effectively be used as a decision support tool for predicting traffic noise index of $Leq(30min)$ in Iran's cities.

STUDY AREA

→ Sedam formly known as seram it is a town in gulbarga district in Indian State of Karnataka.

→ Sedam is famous for Historical places like Temples. Here cement factory vasvadatta is famous

→ Sedam taluka is largest for Gulbarga district as compared to Others Talukas

Here is a detailed over view of Kalaburagi Covering its residential, Commercial and industrial areas.

According to the 2011 census, of India Sedam taluka in gulbarga, district, Karnataka State, had the following key demogrghic details

The Sedam Town municipal council has a population of 39,341 341 in 2011 with 19,816 males and 19,525 Females, Sedam as a sub-division of Kalaburagi has a total population of 218,572 according 2011 census.

→ The Sex ratio in sedam taluk is 10,126 meaning there are 10,126 females for every 1000 males This ratio is based on the The 2011 census,

→ The literacy rate of Kalaburagi district, which includes Sedam is 65%

The district has a male literacy rate of 74.4%. And a female literacy rate of 55% ,67.6% which is lowest in the district.

→ According to census 2011 There was 30,493 children between age 0 to 6 years in sedan Taluka out of of which 15,372 where male which 15,121



Fig.No:1 Represents the location of Sedam Taluka

COMMERCIAL AREA:

Sedam has several commercial hubs that serve as the city's economic backbone. Some of the key commercial areas are:
KSRTC busstand sedam
Market area
Railway Station

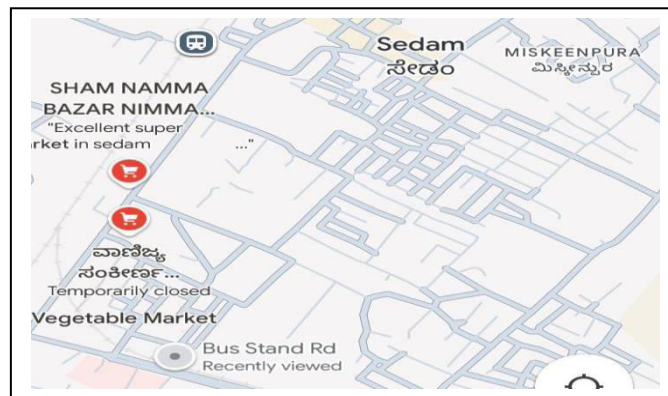


Fig No:2 Represents the Commercial Area (Sedam)

INDUSTRIAL AREA:

Sedam has a growing industrial sector, primarily focused on cement production, textiles, and agro-based industries. Key industrial areas include :-
Vasavadatta cement factory.



Fig No:3 Represents the Industrial Area (Sedam)

SILENCE ZONE:

Sedam has a growing Silence Zone, Key silence zone include :-
Govt Hospital

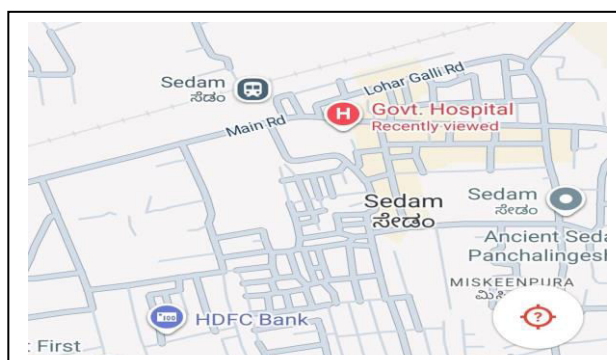


Fig No:4 Represents the Silence Zone (Sedam)

III. METHODOLOGY

The process of measuring noise level entails the use of specialist tools, such as sound level meters, often known as noise dosimeters, can gauge and record the level of noise in a specific space. I measured the noise pollution in various parts of Sedam Taluka using the device below. to measure and quantify the intensity of sound in each environment.

About the Instrument:

To monitor the sound pollution, we used an instrument which is known as Decibel meter or meter for Sound Level.



Fig No:5 Represents the Decibel meter

Functioning of Sound Level Meter (SLM)

The machine in the above image is a sound level meter, specifically the HT-80A model from Hti (Hongda industrial). A sound level meter measures the intensity of sound waves in decibels (dB). It is commonly used to assess (quality) noise levels in various environments, such as workplaces, construction sites, and public spaces

Procedure of SLM

Power ON

Press the <POWER> button to turn on the device. The device is in a suspended state.

Sound Detection: The sound level meter has a microphone (the black foam cover at the top) that detects sound waves in the environment.

Signal Processing: The detected sound waves are converted into an electrical signal, which is then processed by the meter's internal circuitry.

Measurement: The processed signal is measured and displayed on the LCD screen as a decibel value.

Weighting: The meter may apply weighting filters (such as A, C, or Z) to the measurement to account for the human ear's sensitivity to different frequencies.

Display: The measured decibel value is displayed on the LCD screen, along with other information such as the maximum and minimum values recorded.

OBSERAVATION

Commercial Area

Bus stand:-

Sedam is actually a town in the Kalaburagi district of Karnataka, India. The Sedam Bus Stand serves as a vital transportation hub for the town and surrounding areas. It provides bus connectivity to nearby cities, towns, and villages, facilitating travel for locals and commuters. The bus stand likely offers basic amenities such as waiting areas and ticket counters, making it a convenient spot for people to catch their buses.

In Bus stand the climatic condition changed day after day it was cloudy, rainy, sunny conditions. We monitored noise pollution in Bus stand at morning, afternoon and evening hours and analyzed readings are in the below table.

Table No:1 Noise Level During Morning, Afternoon and Evening Hour's In (db)

Days	Hour's	Time	LAmx	LAmin	LAavg
Day 1	Morning	9:10 to 9:20	90.6	73.8	82.2
	Afternoon	1:30 to 1:40	79.4	68.6	74
	Evening	4:50 to 5:00	82.8	78.7	80
Day 2	Morning	9:00 to 9:10	94.9	77.2	86.
	Afternoon	1:40 to 1:50	79.4	68.6	74
	Evening	5:10 to 5:20	89.1	74.3	81.7
Day 3	Morning	9:30 to 9:40	94.7	73.7	84.2
	Afternoon	2:00 to 2:10	84.2	63.2	73.7
	Evening	5:20 to 5:30	88.5	72.8	80.65
Day 4	Morning	9:00 to 9:10	91.9	70.9	81.4
	Afternoon	1:40 to 1:50	78.6	67.4	73
	Evening	4:40 to 4:50	81.5	76.9	79.2
Day 5	Morning	9:20 to 9:30	98.9	71.2	85
	Afternoon	1:20 to 1:30	80.6	64.9	72.75
	Evening	4:30 to 4:40	86.2	78.8	82.5
Day 6	Morning	9:00 to 9:10	89.1	74.3	81.7
	Afternoon	1:30 to 1:40	78.9	65.4	72.15
	Evening	4:20 to 4:30	85.6	67.2	76.4
Day 7	Morning	9:30 to 9:40	82.8	78.7	80.75
	Afternoon	1:50 to 2:00	78.2	59.8	69
	Evening	5:00 to 5:10	84.1	75.1	79.6
			Lamax=82.75	Lamin=70.64	Laavg=77.58

Market Area:-

The market in Sedam Taluka, Kalaburagi District, is likely an agricultural market that plays a crucial role in the local economy, and the market likely deals with crops such as sugarcane, cotton, pulses, and other agricultural produce grown in the region. Farmers and traders buy and sell agricultural products, including seeds, fertilizers, and equipment. In Market area the climatic condition changed day after day it was cloudy, rainy, sunny conditions. We monitored noise pollution in Market Area at morning, afternoon and evening hours and analyzed readings are in the below table.

Table No:2 Noise Level During Morning, Afternoon and Evening Hour's In (db)

Days	Hour's	Time	LAmax	LAmin	LAavg
Day 1	Morning	9:00 to 9:10	98.6	75.1	86.85
	Afternoon	1:20 to 1:30	89.2	58.7	73.95
	Evening	4:40 to 4:50	88.6	76.7	82.65
Day 2	Morning	9:30 to 9:40	95.2	79.8	87.5
	Afternoon	1:40 to 1:50	84.6	65.2	74.9
	Evening	5:00 to 5:10	80.2	70.9	75.55
Day 3	Morning	9:10 to 9:20	80.2	79.2	79.7
	Afternoon	1:30 to 1:40	86.2	69.5	77.85
	Evening	4:40 to 4:50	96.2	77.7	86.95
Day 4	Morning	9:00 to 9:10	93.1	71.4	82.25
	Afternoon	1:40 to 1:50	76.9	66.5	71.7
	Evening	5:10 to 5:20	88.3	72.9	80.6
Day 5	Morning	9:00 to 9:10	82.9	72.5	77.7
	Afternoon	1:20 to 1:30	75.2	60.2	67.7
	Evening	4:40 to 4:50	85.2	79.8	82.5
Day 6	Morning	9:20 to 9:30	96.9	76.5	86.7
	Afternoon	1:40 to 1:50	87.1	66.4	76.75
	Evening	5:10 to 5:20	82.8	68.7	75.75
Day 7	Morning	9:00 to 9:10	84.6	65.2	74.9
	Afternoon	1:30 to 1:40	88.6	56.7	72.65
	Evening	4:40 to 4:50	88.1	79.6	83.85
			Lamax=85.89	Lamin=70.91	Laavg=80.37

Railway Station:-

Sedam Railway Station (SEM) is a small, Grade C station in the Sedam taluka of Kalaburagi district, Karnataka, located on the Begumpet–Wadi line within the South Central Railway zone. It serves as a local transportation hub with basic amenities like waiting rooms and ticket counters, connecting the town to other areas of the state and country.

In railway station the climatic condition changed day after day it was cloudy, rainy, sunny conditions. We monitored noise pollution in railway station at morning, afternoon and evening hours and analyzed readings are in the below table.

Table No:3 Noise Level During Morning, Afternoon and Evening Hour's In (db)

Days	Hour's	Time	LAm _{max}	LAm _{in}	LAA _{avg}
Day 1	Morning	9:00 to 9:10	79.2	65.9	72.55
	Afternoon	1:20 to 1:30	75.1	59.8	67.45
	Evening	4:40 to 4:50	80.6	61.4	71
Day 2	Morning	9:20 to 9:30	82.9	70.2	76.55
	Afternoon	1:40 to 1:50	72.4	60.9	66.65
	Evening	5:00 to 5:10	86.2	62.5	74.35
Day 3	Morning	9:30 to 9:40	84.9	70.6	77.75
	Afternoon	1:20 to 1:30	73.9	68.6	71.25
	Evening	5:10 to 5:20	82.2	65.7	73.95
Day 4	Morning	9:40 to 9:50	87.2	72.9	80.05
	Afternoon	1:50 to 2:00	79.6	62.4	71
	Evening	5:20 to 5:30	81.4	68.5	74.95
Day 5	Morning	9:00 to 9:10	80.9	69.9	75.4
	Afternoon	2:00 to 2:10	75.9	61.9	68.9
	Evening	4:30 to 4:40	85.9	70.2	78.05
Day 6	Morning	9:20 to 9:30	81.9	60.4	71.15
	Afternoon	1:30 to 1:40	77.3	60.8	69.05
	Evening	4:40 to 4:50	82.9	70.2	76.55
Day 7	Morning	9:00 to 9:10	78.9	68.2	73.55
	Afternoon	1:20 to 1:30	80.2	64.9	72.55
	Evening	4:30 to 4:40	84.5	68.5	76.5
			Lam _{max} =87.2	Lam _{in} =59.8	Laavg=73.74

Industrial Area

The Vasavadatta Cement plant is located in Sedam taluk of Kalaburagi district in Karnataka. This area is dominated by the Vasavadatta Cement factory, a unit of Kesoram Industries Limited, which is a significant cement manufacturer and a pioneering industry that brought economic activity to the historically backward Sedam region

In Industrial Area the climatic condition changed day after day it was cloudy, rainy, sunny conditions. We monitored n noise pollution in Industrial Area at morning, afternoon and evening hours and analyzed readings are in the below table.

Table No:4 Noise Level During Morning, Afternoon and Evening Hour's In (db)

Days	Hour's	Time	LAm _{max}	LAm _{in}	LAA _{avg}
Day 1	Morning Afternoon Evening	9:00 to 9:10 1:20 to 1:30 4:30 to 4:40	87.9 74.5 80.9	64.9 60.2 68.9	76.4 67.35 74.9
Day 2	Morning Afternoon Evening	9:30 to 9:40 1:20 to 1:30 5:10 to 5:20	78.9 64.8 81.2	65.8 61.2 69.9	72.35 63 75.55
Day 3	Morning Afternoon Evening	9:40 to 9:50 1:50 to 2:00 5:20 to 5:30	79.9 65.4 82.9	62.4 60.8 69.9	71.15 63.1 76.4
Day 4	Morning Afternoon Evening	9:20 to 9:30 1:40 to 1:50 5:00 to 5:10	84.9 78.5 80.6	70.8 65.9 70.2	77.85 72.2 75.4
Day 5	Morning Afternoon Evening	9:00 to 9:10 2:00 to 2:10 4:30 to 4:40	79.9 69.8 82.4	64.9 60.2 69.8	72.4 65 76.1
Day 6	Morning Afternoon Evening	9:00 to 9:10 1:20 to 1:30 4:40 to 4:50	89.6 75.9 82.9	72.4 60.6 70.5	81 68.25 76.7
Day 7	Morning Afternoon Evening	9:20 to 9:30 1:30 to 1:40 4:40 to 4:50	80.9 75.9 82.4	68.5 60.6 70.9	74.7 68.25 76.65
			Lam _{max} =89.6	Lam _{in} =60.2	Laavg=71.64

Silence Zone

Government Hospital

Government General Hospital is located in Sedam Gulbarga, making it easily accessible to patients from neighbouring cities and towns. Government General Hospital is a dedicated hospital in Sedam Gulbarga, that offers high-quality healthcare services to patients of all ages. The hospital's team of professionals is highly skilled and well-versed in their respective domains. Patients can expect to receive top-notch treatments, surgeries, and procedures at the hospital.

In Government hospital the climatic condition changed day after day it was cloudy, rainy, sunny conditions. We monitored noise pollution in government hospital at morning, afternoon and evening hours and analyzed readings are in the below table.

Table No:5 Noise Level During Morning, Afternoon and Evening Hour's In (db)

Days	Hour's	Time	LAmx	LAmin	LAavg
Day 1	Morning	9:30 to 9:40	78.2	65.4	71.8
	Afternoon	1:20 to 1:30	65.9	60.2	63
	Evening	5:10 to 5:20	72.4	64.9	68.65
Day 2	Morning	9:00 to 9:10	74.5	2.4	38.45
	Afternoon	1:20 to 1:30	69.2	60.9	65
	Evening	4:30 to 4:40	70.8	64.8	67.8
Day 3	Morning	9:00 to 9:10	75.5	69.2	72.35
	Afternoon	1:20 to 1:30	68.9	60.2	64.55
	Evening	4:40 to 4:50	69.9	60.1	65
Day 4	Morning	9:40 to 9:50	79.6	65.4	72.5
	Afternoon	1:50 to 2:00	64.2	60.3	62.25
	Evening	5:20 to 5:30	70.8	64.4	67.6
Day 5	Morning	9:20 to 9:30	78.5	69.4	73.95
	Afternoon	1:40 to 1:50	67.5	60.8	64.15
	Evening	5:00 to 5:10	69.2	60.2	64.7
Day 6	Morning	9:10 to 9:20	79.6	62.4	71
	Afternoon	1:30 to 1:40	68.4	59.8	64.1
	Evening	4:40 to 4:50	70.8	59.9	65.35
Day 7	Morning	9:20 to 9:30	79.5	62.4	70.95
	Afternoon	1:40 to 1:50	68.2	60.4	64.3
	Evening	5:00 to 5:10	65.4	60.6	63
			Lamax=71.7	Lamin=62.3	Laavg=67

IV. RESULTS AND DISCUSSION

After Identifying different locations in Sedam Taluka. And the readings are taken in Market area and Bus stand as considering Commercial Area (R.A) in morning, afternoon and evening hours. We have observed the readings from the table which varies from day 1 to day 7. The noise level by taking into account of morning, afternoon & evening hours considering of Commercial area, Industrial area and Silence zone. The minimum noise level at Commercial area is 67.11dB and the maximum noise level is 85.28dB and the average is 77.23dB and at the Industrial area the minimum noise level is 60.2 dB and the maximum noise level is 89.6dB and the average is 71.64dB and at Silence Zone the minimum noise level is 62.3 dB, the maximum level is 71.7dB and the average is 67dB. which is more than the limits compared to CPCB Standards. Result shows, the noise should be identified as the major environmental problem and should take necessary steps to minimize it.



Fig.No.6 Monitoring of Noise level in Commercial Area



Fig.No.7 Monitoring of Noise level in Silence Zone



Fig.No.8



Fig.No.9



Fig.No.10

Suggestions

1. Planting bushes and trees within and surrounding sound generating sources is a productive solution to noise pollution.
2. Regular servicing and tuning of automobiles can effectively reduce the noise pollution
3. Workers should be provided with equipment's such as ear plugs and earmuffs for hearing protection.
4. Like automobiles, lubrication of the machinery and servicing should be done to minimize noise generation.
5. Educate the public about the effects of noise pollution and ways to reduce it.

V. CONCLUSION

Sound intensity levels in Sedam Taluka have been assessed and documented through a tabualr column. The data reveals that regions designated as commercial, industrial and silent zones have exhibited considerably higher decibel levels than those prescribed by the CPCB (Central Pollution Control Board). This indicates that these zones are key sources of excessive noise disturbance within the area.

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