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Noise Pollution Monitoring at Jewargi Town 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 Jewargi Town of Kalaburagi district of Karnataka, India has increased rapidly due to rapid urbanization, uncontrolled movement of vehicles.

The noise level by taking into account of morning, afternoon & evening hours considering of Commercial area and Silence zone. The minimum noise level at Commercial area is 69.4dB and the maximum noise level is 88.01dB and the average is 78.77dB and at the Silence Zone the minimum noise level is 62.73dB, the maximum level is 75.31dB and the average is 69.11dB 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, Jewargi Town, 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 Jewargi town.
- 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

→ Jewargi is a town in Kalaburgi district of Karnataka India.

It is the Head quarters of the Jewargi Taluk.

→ Jewargi town has 23 wards which are of municipal council

→ Jewargi town has a famous mahalaxmi temple and Jain Temple

Here is a detailed overview of Jewargi covering its, residential, areas Commercial and Industrial

→ According to the 2011 Census of India Jewargi taluk in Gulbarga district. Karnataka State had the following. Key demographic details

The Jewargi town municipal council has a population of 25,686 of which are. 12,976 are males and 12,710 are females as per report relased by census India 2011

→ The Sex ratio of Jewargi Taluka is 25,686 people 12,976 and 12,710 females giving a sex ratio of 980 as per 2011 Cent

The literacy rate of Kalaburayi district, which includes jewargi is 73.83%

The male literacy rate is 82.75%

while the female literacy rate is only 64.78%.

→ According to Census 2011 There was 4083 children between age 0-6 Years in Jewargi.



Fig.No:1 Represents the location of Jewargi town

COMMERCIAL AREA:

Jewargi has several commercial hubs that serve as the city's economic backbone. Some of the key commercial areas are:

KSRTC busstand jewargi

Market area



Fig No:2 Represents the Commercial Area (Jewargi)

Silence Zone:

Jewargi has a growing Silence Zone,

Key silence zone include :-

Govt Hospital

Govt School

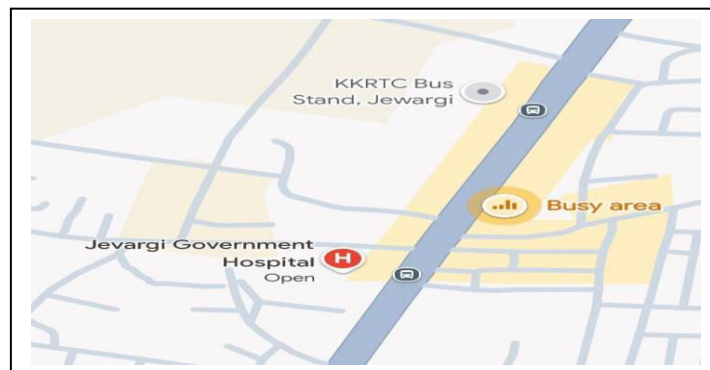


Fig No:3 Represents the Silence Zone (Jewargi)

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 Jewargi town 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:4 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.

OBSERVATION

Commercial Area

Bus Stand:-

The KSRTC Bus Stand in Jewargi serves as a vital local and regional transport hub, connecting Jewargi with numerous towns and villages across Karnataka. Jewargi is a Town in Jewargi Taluk in Gulbarga District of Karnataka State, India. It belongs to Gulbarga Division It is located 43 KM towards South from District head quarters Gulbarga.

Table No:3.1 Represents the Noise Level During Morning, Afternoon & Evening Hour's In (Db)

Days	Hour's	Time	LAm _{ax}	LAm _{in}	Average
Day 1	Morning	9:00 to 9:10	88.9	70.4	79.6
	Afternoon	12:50 to 1:00	86.4	69.8	78.1
	Evening	4:40 to 4:50	90.9	72.4	81.65
Day 2	Morning	9:20 to 9:30	87.9	70.1	79
	Afternoon	1:00 to 1:10	85.4	60.6	73
	Evening	4:10 to 4:20	89.1	64.3	76.7
Day 3	Morning	9:30 to 9:40	89.9	69.2	79.5
	Afternoon	1:30 to 1:40	94.2	73.2	83.7
	Evening	5:00 to 5:10	99.5	72.8	86.15
Day 4	Morning	9:00 to 9:10	98.6	67.4	83.
	Afternoon	1:00 to 1:10	80.6	74.9	77.7
	Evening	1:20 to 1:30	94.1	75.1	84.6
Day 5	Morning	9:15 to 9:25	91.5	66.9	79.2
	Afternoon	1:40 to 1:50	80.9	71.2	76
	Evening	4:50 to 5:00	91.9	70.9	81.4
Day 6	Morning	9:40 to 9:50	90.6	73.8	82.2
	Afternoon	1:45 to 1:55	85.2	70.9	78
	Evening	5:00 to 5:10	98.2	79.8	89
Day 7	Morning	9:00 to 9:10	98.9	75.4	87.15
	Afternoon	1:30 to 1:40	86.2	68.8	77.5
	Evening	5:30 to 5:40	98.6	77.2	87.9
			LAm _{ax} =90.83	LAm _{in} =69.3	LA _{avg} =80

Market Area: -

The "Jewargi Market" generally refers to the agricultural produce market located in Jewargi, a town in the Kalaburagi (Gulbarga) district of Karnataka, in Jewargi the climatic condition changed day after day it was cloudy, rainy, sunny conditions.

Table No:3.2 Represents the Noise Level During Morning, Afternoon & Evening Hour's In (Db)

Days	Hour's	Time	LAm _{ax}	LAm _{in}	LA _{avg}
Day 1	Morning	8:40 to 8:50	89.9	75.3	82.6
	Afternoon	1:20 to 1:30	76.7	69.5	73.1
	Evening	5:00 to 5:10	82.8	68.7	75.75
Day 2	Morning	9:00 to 9:10	84.7	72.3	78.5
	Afternoon	12:50 to 1:00	87.1	66.4	76.75
	Evening	4:40 to 4:50	80.9	76.5	78.7
Day 3	Morning	9:30 to 9:40	83.1	61.4	72.25
	Afternoon	1:00 to 1:10	84.6	65.2	74.9
	Evening	4:30 to 4:40	85.2	60.2	72.7
Day 4	Morning	8:50 to 9:00	80.2	60.9	70.55
	Afternoon	1:30 to 1:40	82.9	69.5	76.2
	Evening	5:10 to 5:20	88.1	69.6	78.85
Day 5	Morning	9:30 to 9:40	88.6	75.1	81.85
	Afternoon	1:40 to 1:50	89.2	58.7	73.95
	Evening	5:15 to 5:25	88.3	62.9	75.6
Day 6	Morning	9:10 to :20	95.2	79.8	87.5
	Afternoon	1:15 to 1:25	82.9	62.5	72.7
	Evening	4:40 to 4:50	88.6	66.7	77.65
Day 7	Morning	8:40 to 8:50	80.2	69.2	74.7
	Afternoon	1:00 to 1:10	86.2	69.5	77.85
	Evening	5:00 to 5:10	96.2	77.7	86.95
			LAm _{ax} =85.19	LAm _{in} =69.51	LA _{avg} =77.54

Silence Zone

Government Hospital:-

The Jewargi Government Hospital is a public healthcare facility located in Jewargi, Gulbarga, Karnataka, providing essential medical services, including treatments and surgeries, to the local community, and the climatic condition changes day after day it was cloudy, rainy, sunny conditions and we monitored noise pollution in government hospital at morning, afternoon and evening hours.

Table No:3.3 Represents Noise Level During Morning,Afternoon and Evening Hour's In (Db)

Days	Hour's	Time	LAm _{ax}	LAm _{in}	LAA _{vg}
Day 1	Morning	9:30 to 9:40	74.9	62.1	68.5
	Afternoon	1:30 to 1:40	79.2	65.4	72.3
	Evening	4:40 to 4:50	84.7	61.7	73.2
Day 2	Morning	9:10 to 9:20	79.4	65.4	72.4
	Afternoon	1:10 to 1:20	85.1	63.2	74.15
	Evening	5:00 to 5:10	74.8	63.2	69
Day 3	Morning	9:20 to 9:30	80.1	63.4	71.75
	Afternoon	1:40 to 1:50	80.9	67.2	74.05
	Evening	4:30 to 4:40	78.2	62.1	70.15
Day 4	Morning	9:00 to 9:10	79.4	60.4	69.9
	Afternoon	1:30 to 1:40	80.2	68.9	74.55
	Evening	4:20 to 4:30	78.9	60.9	69.9
Day 5	Morning	9:00 to 9:10	78.9	64.4	71.65
	Afternoon	1:40 to 1:50	81.9	68.2	75.05
	Evening	5:00 to 5:10	77.9	66.4	72.15
Day 6	Morning	9:25 to 9:35	79.9	68.1	73.95
	Afternoon	1:35 to 1:45	82.2	64.5	73.35
	Evening	4:50 to 5:00	78.9	60.1	69.5
Day 7	Morning	9:00 to 9:10	80.4	64.9	72.65
	Afternoon	1:30 to 1:40	78.2	62.4	70.3
	Evening	4:50 to 5:00	77.4	64.6	71
			LAm _{ax} =79.38	LAm _{in} =64.05	LAA _{vg} =71.62

Government School:-

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

Table No:3.4 Represents Noise Level During Morning,Afternoon and Evening Hour's In (Db)

Days	Hour's	Time	LAmax	LAmin	LAavg
Day 1	Morning	9:20 to 9:30	74.1	67.2	70.65
	Afternoon	1:20 to 1:30	71.5	64.5	68
	Evening	4:40 to 4:50	70.9	56.1	63.5
Day 2	Morning	9:00 to 9:10	72.4	62.9	67.65
	Afternoon	1:30 to 1:40	76.4	52.3	64.35
	Evening	5:00 to 5:10	72.9	64.8	68.85
Day 3	Morning	9:30 to 9:40	70.7	69.2	69.95
	Afternoon	1:30 to 1:40	69.6	62.4	66
	Evening	5:00 to 5:10	70.9	48.8	59.85
Day 4	Morning	9:40 to 9:50	70.4	63.1	66.75
	Afternoon	1:40 to 1:50	60.1	53.1	56.6
	Evening	5:10 to 5:20	74.1	64.4	69.25
Day 5	Morning	9:20 to 9:30	70.8	60.1	65.45
	Afternoon	1:30 to 9:40	66.1	60.2	63.15
	Evening	5:20 to 5:30	74.9	60.8	67.4
Day 6	Morning	9:10 to 9:20	72.8	60.9	66.85
	Afternoon	1:20 to 1:30	70.9	62.4	66.65
	Evening	4:40 to 4:50	74.1	60.4	67.25
Day 7	Morning	9:00 to 9:10	70.9	61.2	66.05
	Afternoon	1:40 to 1:50	69.4	58.7	64.05
	Evening	5:10 to 5:20	72.9	62.9	67.9
			LAmax=71.24	LAmin=61.41	LAavg=66.60

IV. RESULTS AND DISCUSSION

After Identifying different locations in Jewargi Town. Commercial areas such as Market area and Bus stand and Silence Zone. The readings are taken in morning, afternoon and evening hours. We have observed the readings from the table which varies from day 1 to day ,by considering the noise levels by taking into account of morning, afternoon & evening hours considering of Commercial area and Silence zone. The minimum noise level at Commercial area is 69.4dB and the maximum noise level is 88.01dB and the average is 78.77dB and at the Silence Zone the minimum noise level is 62.73dB, the maximum level is 75.31dB and the average is 69.11dB which is more than the limits compared to CPCB Standards. Result shows that,the noise should be identified as the major environmental problem and should take necessary steps to minimize it.



Fig.No.5 Monitoring of Noise level in Commercial Area



Fig.No.6 Monitoring of Noise level in Silence Zone

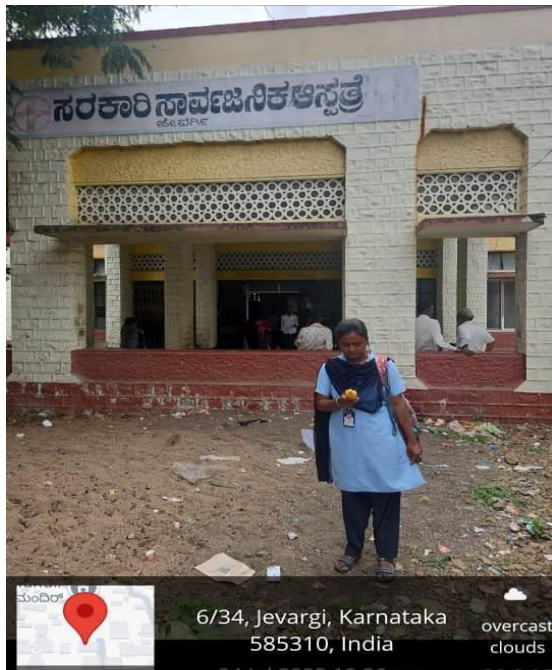


Fig.No.7



Fig.No.8

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 Jewargi Town have been assessed and documented through a tabualr column. The data reveals that regions designated as commercial 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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