

ASSESSMENT OF CAUSES AND EFFECT OF NOISE POLLUTION IN PAMGARH BLOCK OF JANJGIR-CHAMPA DISTRICT, CHHATTISGARH(INDIA)

**Ms. Bhawna Pandey¹, Rishabh Deo Pandey², Dr. Kiran Vajpai³, Ms. Smriti Singh⁴,
Mr. Devanand Sahu⁵**

^{1,2,3,4,5}Chaitanya Science and Arts College Pamgarh, India.

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ABSTRACT

Noise pollution, a significant form of environmental pollution, arises from unwanted or harmful sound that disrupts the natural balance and poses risks to health and well-being. In the Pamgarh block of Janjgir-Champa district, the sources of noise pollution include transportation, industrial activities, construction work, mining, and domestic chores. This persistent issue adversely affects human health, leading to conditions such as hearing impairment, stress, hypertension, cardiovascular problems, sleep disturbances, cognitive impairment, and annoyance. Given the escalating impact, there is an urgent need for effective noise pollution control measures. Initiatives such as planting trees and shrubs, which act as natural sound barriers, can significantly reduce ambient noise levels. Additionally, promoting the use of public transport or bicycles over private vehicles can help mitigate transportation-related noise pollution. This environmental impact assessment emphasizes the necessity for community awareness and collaborative action to address noise pollution in the Pamgarh block. Implementing green urban infrastructure, enforcing stricter noise control regulations, and fostering sustainable practices can collectively create a healthier and quieter environment for the region's inhabitants.

Keywords: Noise pollution, Human health, Sound barriers, Transportation, Stress, Cardiovascular diseases, Sustainable practices, environmental impact assessment.

1. INTRODUCTION

Noise pollution is an invisible threat that affects people around the world. Distt Janjgir Champa of Chhattisgarh state in also affected by this problem. Pamgarh Block of Janjgir Champa dist is one of the blocks which is seriously suffering from problem of noise pollution. It is definite as unwanted or harmful sound that interferes with normal activities. Such as sleeping, working, studying or relaxing the source of outdoor noise worldwide is mainly caused by machines, transport and propagation systems. Poor urban planning may give rise to noise pollution, side by side industrial and residential buildings can result in noise pollution in the residential areas of Pamgarh block.

(Tiwari G, Shukla A, Anthony FM. 2022.)

2. OBJECTIVE

- To assess the current levels of noise pollution in various residential, commercial, and industrial area.
- To identify the primary sources of noise pollution and evaluate the potential health and environmental impacts of noise pollution.
- To compare the noise pollution levels and established noise standards and guidelines, both national and international, risk to the environment and public health.
- To propose evidence-based mitigation strategies and policy recommendations.

Study area- The study area of Pamgarh is a Block and a tahsil in Janjgir-Champa dist of Chhattisgarh state, India. It is located on Southern part of Janjgir Champa dist. Leelagar river makes its western boundary and shivnath and Mahanadi makes its southern boundary. Here are 72 villages and 2 municipalities in this block. According to census 2011 Pamgarh block has population of 166176 including 83353 males and 82823 females. It is also known for its natural beauty and scenic views. The block has moderate climate and receives adequate rainfall. Pamgarh may be a small block but with the increasing population in the last decade noise pollution is also appearing as a serious problem, which is worth considering some important places of Pamgarh block have been selected for noise level study purpose.

The following figure shows the study area in Pamgarh block:

Table 01: Area of study is categorized in different Zones:

Name of zone	Name of Area		
Commercial	Ambedakar chauk, Pamgarh	Bus stand Rahod	Kharod Market

Silent	C.H.C. Pamgarh.	I.G. college Rahod.	Govt. High School Kharod.
Residential	Irrigation colony Pamgarh.	Village- Loharsi	Shukulpara Kharod.
Industrial	Crusher factory Vyasnagar.	Stone mine Kharod.	Cooler Factory Kharod.

According to the Noise pollution(regulation and control Rules, 2000) the permissible noise level for each area or zone is given in the table below

Table No 02: Permissible noise level

Area/Zone	Day time (6am to 10pm)	At night (10 pm to 6 am)
Commercial	65dB	55dB
Silent	50dB	40dB
Residential	55dB	45dB
Industrial	75dB	70dB

dB stands for decibel, which is a unit of measuring sound intensity ,

The higher the decibel value the louder the sound.

All data were collected between 6:00 a.m. to 10:00 p.m. Every hour the noise levels have been measured to make the noise level more accurate each reading were taken in a gape of 5 minutes, that is 12 readings per hour and The average of the reading was taken as per hour sound intensity level the study period of the survey was 15 days.

3. DATA COLLECTION AND ANALYSIS

Noise level of the commercial zone.

Table below specifies the sound level on working and none working days in different areas.

Commercial zone-

Table No. 03: Noise level at Ambedakar chauk, Pamgarh

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	60.01	58.91
2	7 to 8	62.41	58.41
3	8 to 9	65.71	61.72
4	9 to 10	67.35	65.34
5	10 to 11	71.41	68.31
6	11 to 12	72.41	69.00
7	12 to 01	71.49	69.19
8	01 to 02	70.19	69.85
9	02 to 03	70.00	66.41
10	03 to 04	69.45	65.31
11	04 to 05	72.41	67.04
12	05 to 06	73.85	66.39
13	06 to 07	72.49	63.22
14	07 to 08	68.39	60.00
15	08 to 09	68.41	58.39
16	09 to 10	61.05	53.07

Source: Field survey 2023

Table No. 04: Noise level at Bus stand Rahod

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	56.04	53.11
2	7 to 8	56.91	54.05
3	8 to 9	58.41	54.91
4	9 to 10	60.85	55.49
5	10 to 11	60.91	56.00
6	11 to 12	61.05	58.41
7	12 to 01	61.03	58.05
8	01 to 02	62.99	57.29
9	02 to 03	64.03	59.49
10	03 to 04	61.81	60.11
11	04 to 05	68.41	60.31
12	05 to 06	70.00	65.41
13	06 to 07	71.31	65.65
14	07 to 08	65.45	61.09
15	08 to 09	59.41	59.55
16	09 to 10	58.99	55.41

Source: Field survey 2023

Table No. 05: Noise level at Kharod Market

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	55.89	51.01
2	7 to 8	62.10	53.05
3	8 to 9	65.25	55.41
4	9 to 10	65.00	55.85
5	10 to 11	68.41	59.48
6	11 to 12	69.25	62.41
7	12 to 01	68.16	62.85
8	01 to 02	68.45	65.43
9	02 to 03	69.31	66.21
10	03 to 04	69.45	65.35
11	04 to 05	70.71	66.00
12	05 to 06	70.35	68.01
13	06 to 07	71.82	68.21
14	07 to 08	71.82	66.41
15	08 to 09	62.41	61.41
16	09 to 10	63.29	59.08

Source: Field survey 2023

Silent Zone-

Table No. 06: Noise level at C.H.C. Pamgarh

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	51.22	49.31
2	7 to 8	52.30	50.42
3	8 to 9	54.14	51.09
4	9 to 10	53.70	51.38
5	10 to 11	55.92	53.41
6	11 to 12	58.91	56.06
7	12 to 01	58.83	56.85
8	01 to 02	59.15	58.75
9	02 to 03	60.90	59.11
10	03 to 04	61.00	59.39
11	04 to 05	61.32	60.49
12	05 to 06	62.25	60.05
13	06 to 07	60.45	59.71
14	07 to 08	59.03	58.00
15	08 to 09	57.81	56.71
16	09 to 10	57.35	55.03

Source: Field survey 2023

Table No. 07: Noise level at I.G. College Rahod

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	52.19	47.01
2	7 to 8	53.85	48.91
3	8 to 9	55.08	48.35
4	9 to 10	56.58	51.01
5	10 to 11	58.49	52.81
6	11 to 12	59.82	55.89
7	12 to 01	60.10	56.00
8	01 to 02	60.85	56.35
9	02 to 03	62.99	57.25
10	03 to 04	62.95	58.48
11	04 to 05	64.81	55.45
12	05 to 06	63.41	53.47
13	06 to 07	59.42	53.35
14	07 to 08	58.03	52.19
15	08 to 09	55.01	49.25
16	09 to 10	54.17	49.01

Source: Field survey 2023

Table No.08: Noise level at High School Kharod

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	49.21	47.33
2	7 to 8	51.34	48.91
3	8 to 9	54.15	51.04
4	9 to 10	55.80	53.47
5	10 to 11	58.12	55.30
6	11 to 12	59.19	55.19
7	12 to 01	59.81	57.31
8	01 to 02	60.90	57.16
9	02 to 03	60.95	59.39
10	03 to 04	61.32	60.11
11	04 to 05	62.73	60.31
12	05 to 06	60.09	58.61
13	06 to 07	57.88	55.81
14	07 to 08	57.35	56.89
15	08 to 09	56.59	53.35
16	09 to 10	55.39	51.20

Source: Field survey 2023

Residential Zone-

Table No. 09: Noise level at Irrigation colony Pamgarh

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	46.22	46.65
2	7 to 8	48.88	48.95
3	8 to 9	50.40	50.45
4	9 to 10	53.60	53.68
5	10 to 11	55.51	56.60
6	11 to 12	55.20	55.40
7	12 to 01	54.61	54.93
8	01 to 02	54.90	55.20
9	02 to 03	51.47	52.35
10	03 to 04	55.21	55.95
11	04 to 05	56.32	56.76
12	05 to 06	57.52	58.25
13	06 to 07	58.38	58.30
14	07 to 08	56.48	57.65
15	08 to 09	55.59	55.96
16	09 to 10	51.25	51.23

Source: Field survey 2023

Table No. 10: Noise level at Village Loharsi

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	47.53	46.50
2	7 to 8	48.58	48.80
3	8 to 9	51.80	52.65
4	9 to 10	54.67	53.40
5	10 to 11	56.50	55.60
6	11 to 12	56.85	57.80
7	12 to 01	54.92	56.05
8	01 to 02	54.28	57.95
9	02 to 03	52.81	58.10
10	03 to 04	56.72	56.60
11	04 to 05	57.91	56.45
12	05 to 06	60.41	55.20
13	06 to 07	56.41	56.59
14	07 to 08	52.49	58.06
15	08 to 09	53.68	55.19
16	09 to 10	53.22	54.25

Source: Field survey 2023

Table No. 11: Noise level at Sukulpara kharod

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	48.11	49.22
2	7 to 8	50.55	50.80
3	8 to 9	53.23	50.91
4	9 to 10	56.45	55.04
5	10 to 11	56.04	57.02
6	11 to 12	55.25	56.41
7	12 to 01	53.70	56.19
8	01 to 02	50.69	54.21
9	02 to 03	53.60	55.01
10	03 to 04	57.15	57.41
11	04 to 05	57.90	57.94
12	05 to 06	60.34	58.47
13	06 to 07	58.35	59.19
14	07 to 08	55.63	59.04
15	08 to 09	55.84	55.19
16	09 to 10	52.25	53.02

Source: Field survey 2023

Industrial Zone

Table No. 12: Noise level at Crusher factory, Vyasnagar

	Sound level on Working day		Sound level on non Working day
S.N	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	68.04	66.91
2	7 to 8	68.35	67.00
3	8 to 9	70.11	69.41
4	9 to 10	71.05	69.55
5	10 to 11	72.41	70.21
6	11 to 12	72.91	70.49
7	12 to 01	74.32	71.81
8	01 to 02	75.91	72.04
9	02 to 03	76.00	70.92
10	03 to 04	77.41	73.47
11	04 to 05	75.31	74.00
12	05 to 06	74.91	71.91
13	06 to 07	74.00	70.41
14	07 to 08	72.51	68.06
15	08 to 09	70.01	68.04
16	09 to 10	69.22	68.00

Source: Field survey 2023

Table No.13: Noise level at Stone mine kharod

	Sound level on Working day		Sound level on non Working day
S.N	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	68.01	65.41
2	7 to 8	68.45	66.25
3	8 to 9	69.41	68.09
4	9 to 10	70.81	68.41
5	10 to 11	71.49	69.36
6	11 to 12	72.41	70.41
7	12 to 01	72.95	70.55
8	01 to 02	73.99	71.43
9	02 to 03	74.00	72.71
10	03 to 04	75.25	73.11
11	04 to 05	74.09	70.44
12	05 to 06	76.69	72.91
13	06 to 07	73.04	70.92
14	07 to 08	70.66	69.81
15	08 to 09	69.76	68.04
16	09 to 10	68.95	68.00

Source: Field survey 2023

Table No. 14: Noise level at Cooler Factory kharod

S.N	Sound level on Working day		Sound level on non Working day
	Time	The Noise level in dB	The Noise level in dB
1	6 to 7	68.93	67.09
2	7 to 8	68.95	67.40
3	8 to 9	70.98	69.49
4	9 to 10	71.04	70.00
5	10 to 11	73.86	70.95
6	11 to 12	73.95	71.42
7	12 to 01	7.04	72.41
8	01 to 02	77.99	74.08
9	02 to 03	76.56	75.00
10	03 to 04	75.01	72.94
11	04 to 05	75.31	70.33
12	05 to 06	73.04	71.92
13	06 to 07	70.37	69.04
14	07 to 08	69.04	69.91
15	08 to 09	68.93	68.31
16	09 to 10	65.20	68.01

Source: Field survey 2023

4. RESULT REPORTING AND DATA ANALYSIS

The data from a different location was analyzed and the results showed the number of working and non working days in the commercial zone at Ambedkar chowk maximum sound level was found to be 73.85 dB at 05 - 06 p.m. , maximum sound level at bus stand Rahod was 71.31 dB at 06- 07 p.m. similarly for kharod market 71.85 at 07-08 p.m.

Now in the silent zone at C.H.C. pamgarh level was 62.25 dB at 05-06 p.m. and 63.41dB at 05-06 p.m. for the I.G. college Rahod lastly at Govt. High school kharod level was found to be 62.73 dB at 04-05 p.m.

Now now the residential zone firstly irrigation colony pamgarh was taken and result was found to be 58.38 dB at 06-07 p.m. similarly for village loharsi result was found to be 60.41 dB at 05pm-06pm. p.m. lastly for shukulpara kharod result was 16.34 dB at 05-06 p.m. The Industrial zone Was divided into three Areas and the noise levels were measured at different times of the day for crusher factory Vyasnagar maximum sound level 77.41 dB at 03-04 p.m. and 75.69 dB at 05-06 p.m. for stone mine kharod lastly for cooler factory kharod 77.99dB at 01-02 p.m.

Table 15: Maximum sound level at Different locations of Pamgarh block in summarized manner.

Zones	Name of area	Maximum sound level on working day and time	Maximum sound level on non working day and time	Standard limit set by Central Pollutoin Control Board
Commercial zone	Ambedkar chauk, Pamgarh	73.85 dB 05PM to 06 PM	69.85dB 01pm to 02pm	65dB
	Bus stand, Rahod	71.31 dB 06PM to 07PM	65.65dB 06pm to 07pm	
	Kharod Market	71.85dB 07PM to 08PM	68.21dB 06pm to 07pm	
	C.H.C. Pamgarh	62.25 dB 05PM to 06PM	60.49dB 04pm to 05pm	

Silent Zone	I.G. College Rahod	64.81Db 04PM to 05 PM	58.48dB 03pm to 04pm	50dB
	Govt. High School Kharod	62.73Db 04 pm to 05 pm	60.31dB 04pm to 05pm	
Residential Zone	Irrigation colony, Pamgarh	58.38 dB 06 pm to 07 pm	58.30dB 06pm to 07pm	55dB
	Village- Loharsi	60.41dB 05pm to 06pm	58.06dB 07pm to 08pm	
	Sukulpara, Kharod	60.34 dB 05 pm to 06 pm	59.04dB 07pm to 08pm	
Industrial Zone	Crusher factory, Vyasnagar.	77.41dB 03pm to 04pm	74.00dB 04pm to 05pm	75dB
	Stone mines, Kharod.	76.69dB 05pm to 06pm	73.11dB 03pm to 04pm	
	Cooler Factory, Kharod.	77.99 dB 01pm to 02 pm	75.00dB 02pm to 03pm	

Some measures to control noise pollution

- Maintaining and repairing vehicles and machines regularly
- Using noise canceling devices or earplugs when exposed to loud sounds
- Following the noise regulations and limits set by the authorities
- Educating and the public about the harmful effects of noise pollution
- Reporting and complaining about excessive noise sources to the authorities

5. CONCLUSION

The noise level at the locations observe exceed the standard set by the central pollution control board. This indicates that noise pollution is a serious issue in this areas and requires urgent attention from the state government and the pollution board. The residence of this locations may Safar from adverse health effects due to the high noise level.

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