Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol.12 Issue 12, DECEMBER 2023

Assessment on Noise Level in The North-eastern Block of Sandur Taluk, Ballari District, Karnataka, India

Ramesh K, Venkataiah C And Vasanth Patil S.B
Department of Applied Geology Vijayanagara Srikrishnadevaraya
University PG Centre, Nandihalli-583119 Sandur Taluk, Bellary District

***Abstract*— As the demand for iron ore continues to surge, Sandur Taluk in Ballari District, Karnataka, India, has witnessed a significant escalation in iron ore production, driven by industrial growth. This assessment delves into the nuanced task of monitoring noise levels emanating from the mining activities and the transportation of Lorries in iron ore mining areas. The transportation phase in mining operations is a significant contributor to ambient noise, necessitating a comprehensive evaluation of methodologies, impacts on communities and the environment, regulatory compliance, and the efficacy of mitigation measures. Through an interdisciplinary lens, this abstraction synthesizes key findings, offering insights into the dynamic challenges and potential solutions associated with lorry-related noise in the context of iron ore mining areas. The primary objective of this study is to examine the impact of this heightened iron ore production on a range of environmental factors, encompassing noise levels in the study area. For this purpose a study was taken and the various environmental parameters were monitored after increase in iron ore production in the region. The Study shows that there is significant Increase in noise level found at most of the locations of the study area. Therefore, serious attempts should be made by mine owners as well as statutory bodies to reduce the sound level at various locations for increasing the quality of life in these locations in terms of sound level.**

***Keywords*—Noise level monitoring, Sound meter, North-Eastern Block**

INTRODUCTION

Sandur Taluk, nestled in the heart of Ballari District, Karnataka, India, has long been a significant player in the country's mining sector, particularly in the extraction of iron ore. The region has witnessed a substantial surge in iron ore production in recent years, fueled by growing demands from the steel industry and rapid industrialization. While this economic development has brought about socio-economic benefits, it has also raised concerns about the potential environmental consequences.

The expansion of iron ore mining activities often leads to substantial land-use changes, including deforestation and habitat destruction. As the mining footprint expands, it encroaches upon ecologically sensitive areas, affecting biodiversity and disrupting delicate ecosystems.

The mining activities and the transport of ore-laden Lorries in iron ore mining areas is a focal point of this assessment, recognizing its pivotal role in shaping the acoustic environment of these regions. As mining activities continue to expand, the need to assess and manage the impact of lorry-related noise on both communities and ecosystems becomes imperative. This abstraction sets the stage for an in-depth exploration of methodologies and their effectiveness in capturing the multifaceted nature of noise in the context of transportation.

Sound emissions from mining operations and transportation can lead to noise pollution, affecting both the environment and public health. Strategic sensor placement, continuous data collection, and calibration practices constitute the core methodologies assessed in this study. The evaluation considers the adaptability of these methods to the dynamic nature of lorry movements, scrutinizing their efficacy in providing representative data for a comprehensive understanding of noise patterns.

Decibel levels, frequency spectra, and temporal patterns serve as key parameters monitored to unravel the intricacies of lorry-related noise. The assessment appraises the utility of these parameters in distinguishing between ambient sounds and transportation-related noise, particularly during varying operational hours.

This assessment explores the ripple effects of ore transporting lorry-related noise on local communities and the environment. It delves into the role of noise monitoring in fostering community awareness, engagement, and empowerment. Additionally, it assesses the ecological impact of noise on surrounding habitats and wildlife, contributing to a holistic understanding of the repercussions of transportation-related noise.

The study evaluates the contribution of noise level monitoring to regulatory compliance within the mining sector. It examines the alignment of monitoring data with established noise standards and regulations, shedding light on the industry's efforts to mitigate noise and adhere to legal requirements

Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol.12 Issue 12, DECEMBER 2023

I. STUDY AREA

The study area is located in a part of the North-eastern region of Sandur Schist Belt, Ballari District, Karnataka State between latitudes 15.257787°N to 15.088812°N and longitudes 76.356183° E to 76.607385°E. The lowest elevation is 625m above the MSL and the highest elevation is 997m above the MSL. It covers an area of 165 sq km. The study area consists of hills and flatlands. The Sandur Schist Belt in the north-eastern region of the Sandur area has a hilly terrain and several mining leases for Iron and Manganese Ores. Fig.1 depicts a location map of the Study area.

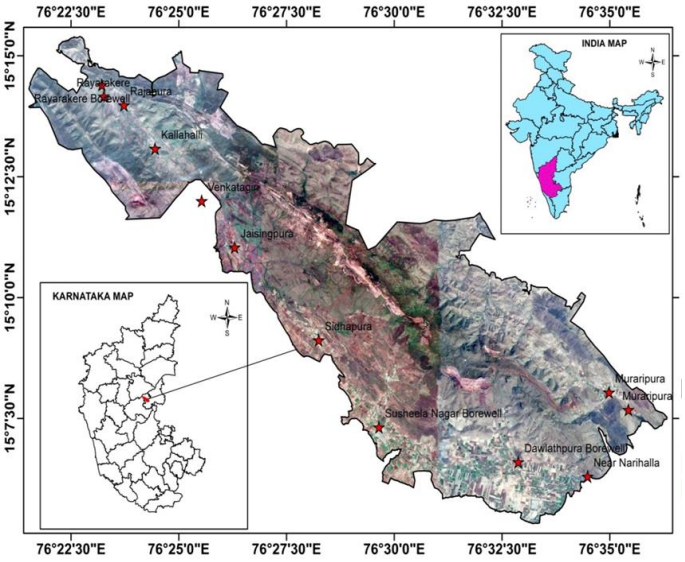


Figure 1: Location map of the study area.

II. METHODS AND METHODOLOGY

Noise level is increased due to mining activities and Transportation of ore-laden trucks in the surrounding areas due to significant increase in iron ore production was studied by considering study area. The noise levels were monitored in all 3 seasons for the year from 2021 to 2022. Comparison of each of these parameters was done with the existing CPCB standards in dB using sound level meter.

The Central Pollution Control Board (CPCB) in India has established ambient noise standards to regulate noise levels in various environments. The standards are measured in decibels (dB) and are specified for different zones and times of the day.

Monitoring frequency	Area code	Category/ Zone	Limit in dB(A)	
			Day*	Night*
24 H	A	Industrial	75	70
	B	Commercial	65	55
	C	Residential	55	45
	D	Silence	50	40

*Day time shall mean from 6.00 AM to 10.00 PM.
Night time shall mean from 10.00 PM to 6.00 AM.

Table 1 - List of Ambient noise standards and zone

Noise level Monitoring:

Mining and allied activities usually cause noise pollution. The workers exposed to occupational noise of a potentially damaging quality and intensity suffers from hearing Impairment of several degrees. Further, other physiological and psychological stresses due to high sound level, adversely affects their job performance. Noise impact due to various mining and allied activities was assessed by selecting few villages in the study area, viz., Susheelanagar, Siddapura, Jaisingpura, Venkatagiri, Kallahalli and Rajapura villages. Noise level monitoring was carried out using digital sound level meter held 1.2 m above the ground .Advanced statistical analyses and GIS mapping are employed to analyze noise data. The assessment evaluates the effectiveness of these analytical methods in identifying patterns and sources of noise, particularly those attributed to lorry transportation.

III. RESULT AND DISCUSSION

Noise Level Assessment:

Noise qualities in the villages were assessed by continuously monitoring the sound level. The results of the noise level survey are given in Table 2,3,4. Study shows increase in ambient sound levels at different villages during the day time due to transportation of ore-laden lorries.

Location	Area/ Zone	CPCB std. dB(A)		Season I	
		Leq (Day)	Leq (Night)	Leq (Day)	Leq (Night)
Susheelanagar	Residential Area	55	45	58.12	42.92
Siddapura	Residential Area	55	45	57.46	46.2
Jaisingpura	Residential Area	55	45	58.14	38.97
Venkatagiri	Residential Area	55	45	57.35	38.57
Kallahalli	Residential Area	55	45	57.49	44.61
Rajapura	Residential Area	55	45	61.12	42.13

Table 2: ambient sound levels at different villages in the season-1

Published by :
http://www.ijert.org

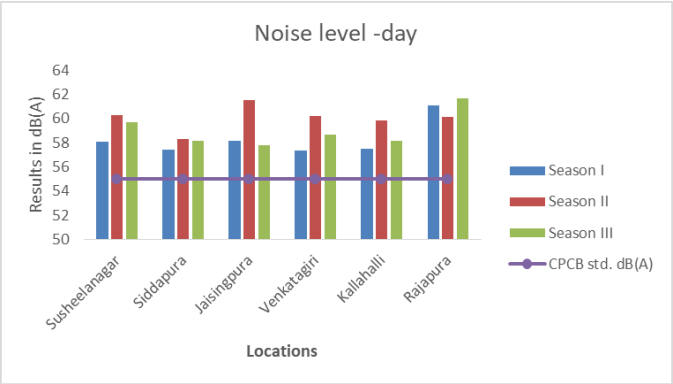
International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol.12 Issue 12, DECEMBER 2023

Location	Area/ Zone	CPCB std. dB(A)		Season II	
		Leq (Day)	Leq (Night)	Leq (Day)	Leq (Night)
Susheelanagar	Residential Area	55	45	60.27	43.78
Siddapura	Residential Area	55	45	58.32	50.92
Jaisingpura	Residential Area	55	45	61.54	38.78
Venkatagiri	Residential Area	55	45	60.18	38.67
Kallahalli	Residential Area	55	45	59.87	37.56
Rajapura	Residential Area	55	45	60.13	41.12

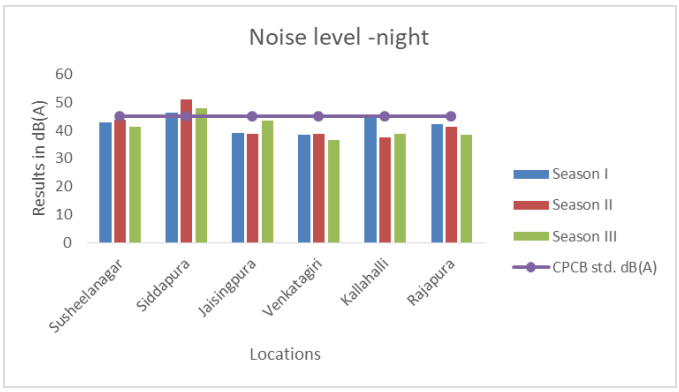
Table 3: ambient sound levels at different villages in the season-II

Location	Area/ Zone	CPCB std. dB(A)		Season III	
		Leq (Day)	Leq (Night)	Leq (Day)	Leq (Night)
Susheelanagar	Residential Area	55	45	59.72	41.34
Siddapura	Residential Area	55	45	58.15	47.78
Jaisingpura	Residential Area	55	45	57.76	43.56
Venkatagiri	Residential Area	55	45	58.65	36.45
Kallahalli	Residential Area	55	45	58.13	38.78
Rajapura	Residential Area	55	45	61.67	38.45

Table 4: ambient sound levels at different villages in the season-III



Bar Graph 1: ambient sound levels at different villages Seasonal variation of noise during day in study area



Bar Graph 2: ambient sound levels at different villages Seasonal variation of noise during Night in study area

From this study we know that the increase in the ambient sound level have exceeded the Central Pollution Control Board (CPCB) Standards may be due to the following reasons:

- There are several iron ore mine leases are under operation around these villages. Various mining companies of NEB range & Ramgad range are utilizing the road, which passes through these villages covered in the study area.
- Increase in the movement of Iron ore transportation by lorries/tippers through these villages. According to the information collected from 2 Toll collection Points located on Sandur-Hospet Road, more than 750 numbers of iron ore loaded trucks & same number of empty trucks in total more than 1200 trucks per day are passing through all five villages covered in study area
- The tucks/tippers transporting ore from various mines to steel plants/end-user destinations through these villages are inadequately covered with tarpaulins, leading to elevated pollution levels in the study area.
- The mining companies are not consistently spraying water on the roads in these villages to control the dust/pollution generated by the constant movement of trucks transporting iron ore from various mines to end-user destinations..
- Increase in the loading activity in the Stock yards/Hopper points/Ore transfer points located nearby the villages situated in study area thereby increasing the movement of iron ore trucks to this facility.

IV. CONCLUSION

The Study shows increase in ambient sound levels at different villages during the day time and it exceeded the Central Pollution Control Board (CPCB) Standards due to transportation of ore-laden Lorries. In conclusion, this assessment emphasizes the critical role of noise level monitoring in iron ore mining areas, particularly in relation to lorry transportation. It acknowledges advancements in methodologies and data analysis while recognizing persistent challenges. The conclusion underscores the need for ongoing vigilance, collaboration, and innovative solutions to mitigate the impact of lorry-related noise, promoting sustainable mining practices and fostering positive relationships with local communities.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol.12 Issue 12, DECEMBER 2023

There has been a considerable increase in iron ore production in Ballari- Hospet-Sandur sector of Karnataka, there is significant Increase in noise level is found at most of the locations of the study area due to increase in the movement of tippers through villages and deployment of HEMM in the mines located close to the villages.

Therefore, serious attempts should be made by mine owners as well as statutory bodies to reduce the sound level & mitigative measures to be adopted to reduce the air quality parameters within the permissible limits at various locations for increasing the quality of life in these locations in terms of sound level.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the Chairmen of the Department of Applied Geology, Vijayanagara Srikrishnadevaraya University PG Centre, Nandihalli-583119, Sandur, Bellary District, Karnataka state for providing facilities for laboratory work.

REFERENCES

1. Ili Najaa Aimi Mohd Nordin et al.,(2021), Development of Real-time IoT based Air and Noise Monitoring System, Alinteri J. of Agr. Sci. 36(1): 500-506.
2. Hedaoo, M. N. and Chavan, Aniket B.,(2022), Monitoring of Air Pollutant and Noise Pollution Level Using IoT - A Review ,Elsevier,July 12.
3. Pervez Alam et al.,(2020), Noise Monitoring, Mapping, and Modelling Studies – A Review, J. Ecol. Eng. 2020; 21(4):82-93 Volume 21, Issue 4.
4. Pelumi E. Oguntunde et al.,(2020), A Study of Noise Pollution Measurements and Possible Effects on Public Health in Ota Metropolis, Nigeria, Open Access Maced J Med Sci. 2019 Apr 30; 7(8): 1391–1395.
5. Amulya Gulati et al.,(2021), Air and Noise Pollution Monitoring Systems: A Critical Review, International Journal of Science and Research (IJSR)ISSN: 2319-7064, Volume 12 Issue 5, May 2023.2010-2014.
6. Patil, P.(2017). Smart IoT based system for vehicle noise and pollution monitoring. In: International Conference on Trends in Electronics and Informatics (ICEI):322-326.
7. Sumithra, J. et al.,(2016).A Smart Environmental Monitoring System Using Internet of Things. International Journal of Scientific Engineering and Applied Science (IJSEAS), 2(3): 1-5.
8. Deshmukh, M.R et.al.,(2018). IOT Based Air & Sound Pollution Monitoring System. International Journal of Advance Research and Innovative Ideas in Education, 4(3):750-753.
9. Pattar, S.M., et.al.,(2018). A survey paper on air pollution monitoring using IOT. International Journal of Advance Research and Innovative Ideas in Education, 4(6): 663-666.
10. Kavitha, B.C., et al.,(2018). IoT based pollution monitoring system using Raspberry –PI. International Journal of Pure and Applied Mathematics, 118(24): 1-9.
11. Deepak Jhanwar, et al.,(2016),"Noise Pollution: A Review." Journal of Environment Pollution and Human Health, vol. 4, no. 3,72-77.
12. E. Atmaca, et al.,(2005), Industrial Noise and Its Effects on Humans, Polish Journal of Environmental Studies, Vol 14, no. 6 (721-726), January 2005.
13. E.Kumar,(2014), Environmental Impact Assessment for Iron Ore Mines – An Expert System, IJLTEMAS, ISSN 2278 – 2540, Volume III, Issue VI, June.10-16.
14. Bhumika Das,(2014), Environmental impact due to iron ore mining in Chhattisgarh, Recent Research in Science and Technology,ISSN: 2076-5061,volume VI,issue I.