

EFFECT OF NOISE POLLUTION ON EXPOSED PEOPLE OF GORAKHPUR CITY**SHWETA YADAV^{1a} AND RAM BILAS^b**^aDepartment of Geography, B.H.U, Varanasi, U.P, India^bDepartment of Geography, B.H.U, Varanasi, U.P., India**ABSTRACT**

Increasing noise pollution has posed serious threat to urban life. The increasing number of vehicles, population, indiscipline among the public due to disobedience of Noise Act., ignorance of traffic rules and regulations are the main reason for increasing problem of noise pollution in the study area. For this purpose present study was carried out at different locations of city with Sound Level Meter to assess the day and night sound level. Study also includes a gentle discussion regarding willingness to pay and the general behavior of respondent toward problem through interviewed covering different cross section of the community. Gorakhpur city is one of the important cities of Uttar Pradesh. So an attempt has been made in city of Gorakhpur to measure noise level and also made recommendations to overcome this noise pollution in the prominent city.

KEYWORDS : Traffic, Noise level, Annoyance, Willingness, Recommendation

Environmental pollution is assuming dangerous proportions all through the globe and India is not free from this problem. It is a gift of modern civilization, industrialization and urbanization. Among other problems of urban life, noise is considered as an important problem which affects the quality of urban life. Noise is defined as an unwanted sound usually of high intensity and it causes irritation and discomfort to human beings. Traffic noise pollution is considered as one of the important source effects on life activities in most urban areas of the world, especially in developing countries. Traffic is the dominating source of noise (Skanberg and Ohrstrom, 2002) and is the major source of nuisance and annoyance as cited in social surveys by Pandya (2003). Existing evidence indicating that noise pollution may have negative impacts on human health has justified research in order to provide better understanding of noise pollution problems and control (Georgiadou *et al.*, 2004). All major cities in developing nations are over populated; a continuous migration from rural to urban areas is in the process, there is a lack of proper city planning and practically no control strategies for reducing the level of noise from various sources (Al-Mutairi.N *et.al*, 2009). Maschke (1999) treated the impact of noise as a stress inductor, and stated that induced stress by noise has a psychosocial component. Noise-related health hazards cause damage to humans ranging from annoyance to insanity and death (Mato and Mufuruki, 1999). There are many researchers has been done in many countries to investigate and characterize problems related to traffic noise (Agarwal, S. 2009, Ali, S.A., 2002, 2003, Abo-Qudais, 2004; Georgiadou *et al.*, 2004; Ghatass F. Zekry,

2009, Koushki, P.A., 1999, Murli, Krishana,*et.al.*, 1983, Pandya, 2003; Pathak *et al.* 2008, Skanberg and Ohrstrom, 2002, Sommerhoff *et al.*, 2004, Agarwal S and Swami B L 2010, Chauhan Avinash 2010).

Increasing number of vehicles, musical instruments, industries, urbanization, population explosion are considered as main causes of noise pollution but indiscipline among the mob is more responsible for the ambient noise overall. It is more severe and widespread than ever before, and it will continue to increase in magnitude unless everyone is aware about its effects. Thus may not seem to be, but it definitely disturbs our whole system and often we become a part of it knowingly or unknowingly. Gorakhpur, being a prominent city in Eastern UP, happens to be the focal point of major business, commercial, industrial and other activities in the region.

The city has not been developed as per provisions of master plan, therefore Commercial, Industrial, Residential and Silence Zones have not been separated properly and facing transport crisis characterized by level of congestion, noise pollution, traffic facilities, outdated transport infrastructure, sharply rising motor vehicle ownership and use, deteriorating public transportation facilities (i.e., Buses, Tempo. etc) and uncoordinated land use. Therefore, the present study was performed to find out the level of noise pollution in Gorakhpur city.

STUDY AREA

The present district of Gorakhpur, 265 km east of capital Lucknow, on National Highway -28, lies between Lat. 26°13'2N and 27°29'2 N and Long. 83°05'2 E and

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83°56'2 E situated on the basin of rivers Rapti and Rohin, the geographical shape of the Gorakhpur city is of bowl. The famous Ram Garh Tal has also been included in the National Lake Conservation list. A city of saints and revolutionaries is situated on the banks of the river Rapti and Rohini, which originates from the Himalayan Kingdom, Nepal. It is named after the great saint of Nath cult Guru Gorakhnath who is said to be an incarnation of Lord Shiva. Gorakhpur has been the center of Aryan culture and civilization. According to ancient history it was a part of "Madhyadesh" and was included in the famous kingdom of Kosala. In Valmiki Ramayana, it is referred to as Karupath and is described as a beautiful quiet country, which was assigned to Angad and Chandrakatu, the two sons of Laxman. It again finds in Mahabharata episode relating to Bhim's conquest of the eastern part before the Rajsuya Yajus of Yudhisthir. In the sixth century BC, this was the original home of Chandragupta Maurya and Ashoka. Also Gorakhpur rose to great eminence during the Buddhist period. Buddha spent his early life at Kapilvastu which was a part of Gorakhpur then. He attained parinirvan at Kushinagar, 52 km from the city. It is also considered as the origin place of Sarjupareen Brahmins.

During the regime of Mughal emperor Akbar, Gorakhpur was made the headquarter of one of the five sarkars of Oudh (Under British rule, the district was under the charge of Mr. W Paterson (collector), Mr. W Wynyard (judge) and Mr. F Bird (joint magistrate). Gorakhpur rose to great eminence due to the historic 'CHAURI CHAURA' incident of February 4, 1922, which was a turning-point in the history of India's freedom struggle. Gita Press is located in Gorakhpur. It is the world's largest publishers of Hindu religious texts. Gorakhpur is also the Head Quarter of Air Force and known for Squadrons of Jaguar jet fighters. It is the Headquarter of NE Railway and a strategic cum-civilian airport is also located here.

DATABASE AND METHODOLOGY

Present study with special reference to assess the existing status of noise level, 18 sampling sites were selected from three categorized areas out of which 8 sites from commercial, 5 from residential, and 6 from silence areas as per the guidelines of Central Pollution Control Board. Noise level has been also monitored in four times of

a day during peak hours of the working day (10.00 am to 11.00 pm, 1.00 pm to 2.00 pm, 4.00 pm to 5.00 pm and 6.00 pm to 7.00 pm.) with the help of sound level meter and compared it with the CPCB standards for noise and cross-sectional survey has also done to examine the problems of noise pollution and its ill-effect on the quality of life in selected zones of Gorakhpur city. For this purpose, 200 people were interviewed covering different cross-section of the community to assess awareness regarding noise pollution.

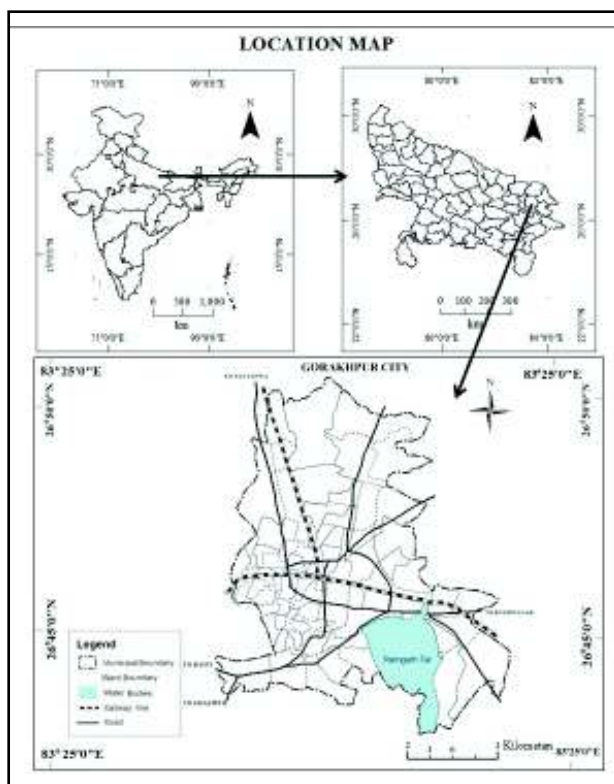


Fig. 1 : Gorakhpur City

The aim of enlightened governmental controls should be to protect citizens from the adverse effects of airborne pollution, including those produced by noise. People have the right to choose the nature of their acoustical environment; it should not be imposed by others. Central Pollution Control Board (CPCB) has requested to all State Pollution Control Board (SPCB) and Pollution Control Committees (PCC) for providing information on the identified authority for implementation of THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 in their respective state.

Table 1: Noise standards as given by the Central Pollution Control Board (CPCB, 1998)

Area Code	Category of Area Zone	Limit in dB (A)	
		Day time	Night time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40

RESULTS AND DISCUSSION

Spatial Pattern of Noise Level at Different Sampling Sites

In present work the result shows that most of the sampling sites were badly affected with traffic noise result of these noise levels were found higher comparison to the standards of the Central Pollution Control Board (Table 2) for different categorized area.

The noise was recorded in different area of Gorakhpur city categorized in commercial, residential and silent zones, respectively. It is revealed that the range of noise levels in all the areas were much higher than the permissible values as per standards.

The permissible noise limits of the silent zone are 50 dB in the day time and 40 dB in the night time. However, noise levels at all the observation sites were found insatiable and reasons being mostly the shops and traffic. The noisiest observation site is MME College with night noise 69 dB of the permissible limit 40 dB and the day noise also very high 82 of the permissible limit 50 dB (Table 1). The least noisy site among is Carmel in the day time while Jubilee in the night time but still affected by noise pollution.

The permissible noise limits of the silent zone are 55 dB in the day time and 45 dB in the night time. The sources mostly seemed to be domestic, loudspeakers and automobiles. The noisiest site is Rajendra nagar while Taramandal is least noisy but still not under permissible limit.

Table 2: Noise Pollution Level at Selected Areas

S. No.	Sampling Sites	Localities	Day dB (6 A.M. to 10 P.M)	Night dB (10 P.M. to 6 A.M)	Whether in Limit Yes/No
1	Mohaddipur	COMMERCIAL	95	77	No
2	Betiyahata	COMMERCIAL	90	74	No
3	Miya Bazaar	COMMERCIAL	97	75	No
4	Dharamshala	COMMERCIAL	92	76	No
5	Rustampur	COMMERCIAL	94	74	No
6	Naushar	COMMERCIAL	97	77	No
7	Taramandal	RESIDENTIAL	71	50	No
8	Raptinagar	RESIDENTIAL	75	55	No
9	Rajendranagar	RESIDENTIAL	89	70	No
10	Humayunpur	RESIDENTIAL	84	76	No
11	Vikas Nagar	RESIDENTIAL	80	74	No
12	Awas Vikas Colony	RESIDENTIAL	85	77	No
13	Gorakhnath Temple	SILENT	90	74	No
14	DDU University	SILENT	80	77	No
15	MMME College	SILENT	82	70	No
16	Carmel School	SILENT	75	65	No
17	District Hospital	SILENT	85	70	No
18	Divine Public School	SILENT	77	54	No

Source: Based on field survey, 2015.

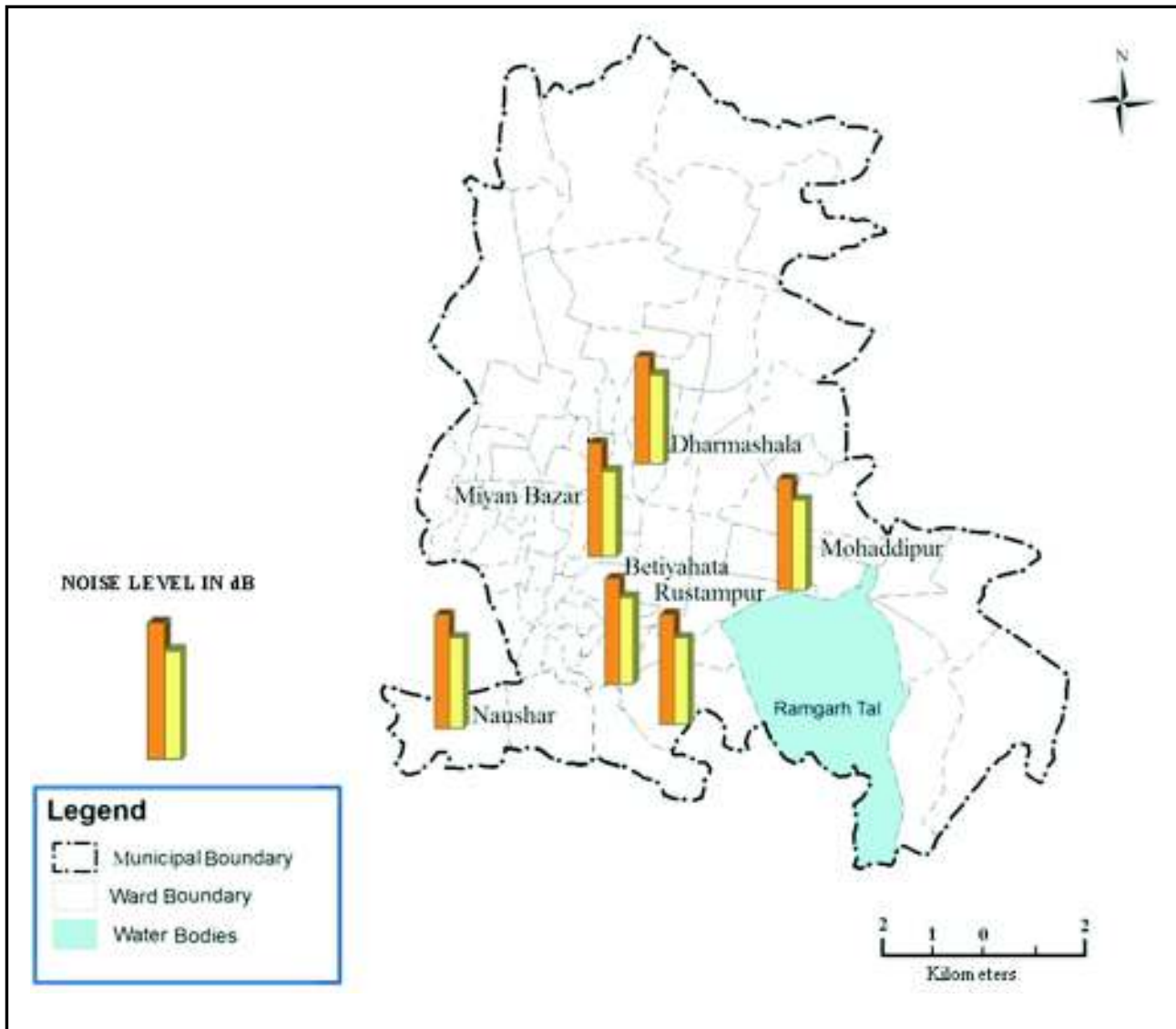


Fig. 1.2 : Gorakhpur city Selected areas of commercial zone for noise pollution level during day and night time

Among the above (Table 2 and Fig 1.2) it is observed from different sampling sites that, the commercial zone had values of different noise level ranging between 97 dB to 90 dB at day time and 76 dB to 72 dB at night time. The commercial core areas of the Gorakhpur city like, Miya Bazar (97 dB) at day time and (75 dB) at night, Mohaddipur (95dB) day and (77 dB) at night , Rustampur and Naushar (94 dB and 97 dB) at day and (74 dB and 77 dB) at night, Dharmshala (92dB) day and (76 dB) at night and Betiyahata (90 dB) at day time, and (74 dB) at night have recorded very high level of noise owing to movement of light vehicles, two

wheelers, cycle-rickshaw etc. and other busy commercial activities such as grain markets, fertilizer shops, commission muddies for fruits and cloths. In addition to these the traffic in such busy compact and old part of the city also plays an important role in creating noise.. Being situated along the road side of National highway 28 , NH-29, and other Major Road which run to Lucknow, Ghazipur and Kushinagar. Besides the railway station and bus stand are also situated in the vicinity.

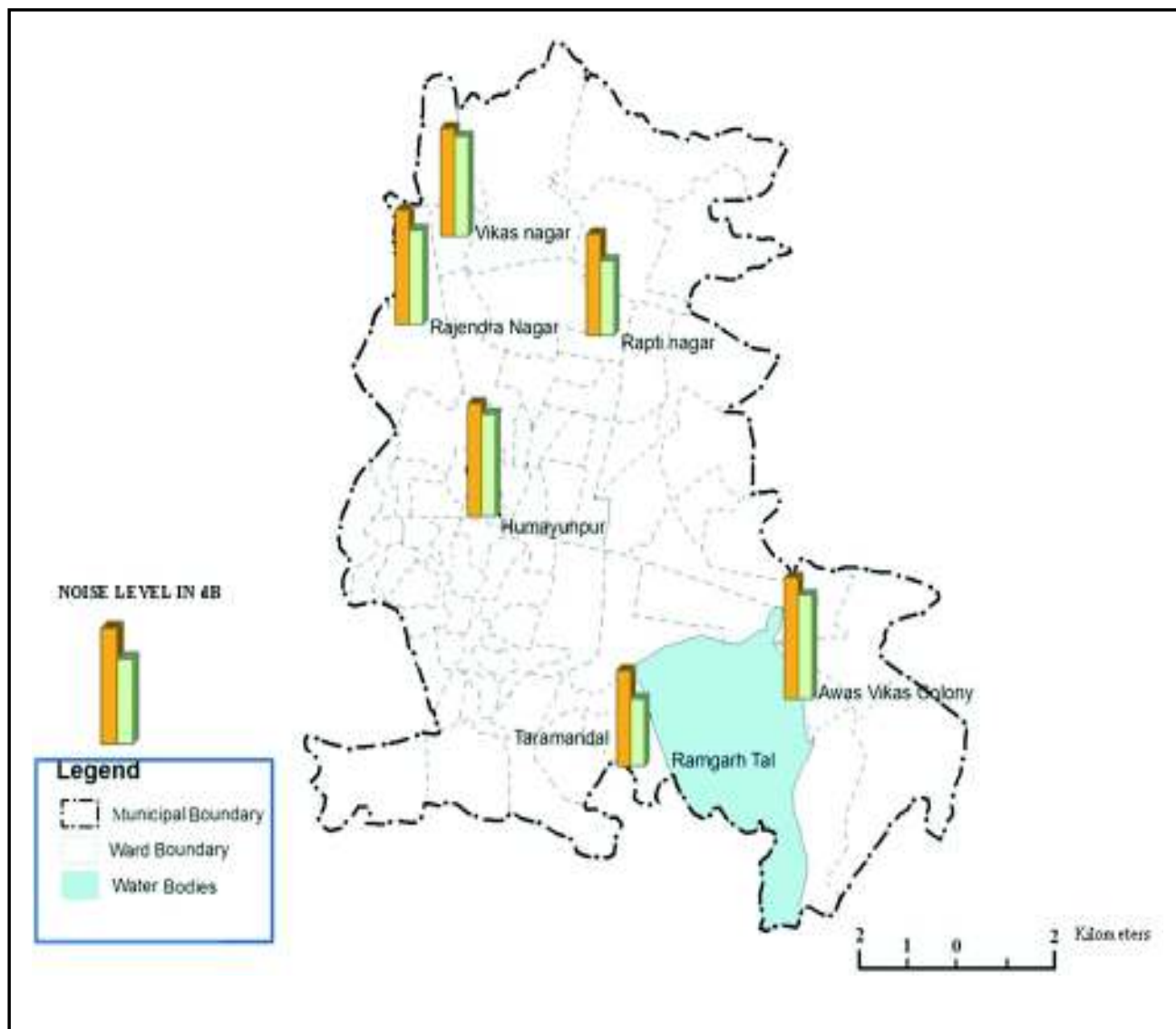


Fig. 1.3 : Gorakhpur city Selected areas of residential zone for noise pollution level during day and night time

The observations recorded (Table 2 and Fig. 1.3) in residential areas reveals average noise level was recorded at Awas Vikas Colony (85 dB) at day and (77 dB) at night which situated near big business centre, Vikas nagar (80dB) day and (74 dB) night, Rajendranagar (89dB) day and (70 dB) night, Humayunpur (84dB) day and (76 dB) at night, and (77dB), (71 dB) recorded in day and (55 dB and 50 dB) at night in Raptinagar and Taramandal being the areas situated away from major transport arteries and business activities.

There are a number of educational institutions, hospitals and govt. organization in the city which come under silent zone (Table 2 and Fig.1.4). The average noise level of different educational institutions, hospitals and court areas such as, DDU the biggest university in City recorded (80 dB) in day and (77dB) at night, Divine Public School (77dB) and (64 dB) at night, Gorakhnath Temple (90 dB) at day and 74 at night, District hospital (85dB) and (70 dB) at night, MME Collage (82dB) in day and (70 dB) at night, Carmel school, recorded lower noise pollution (75

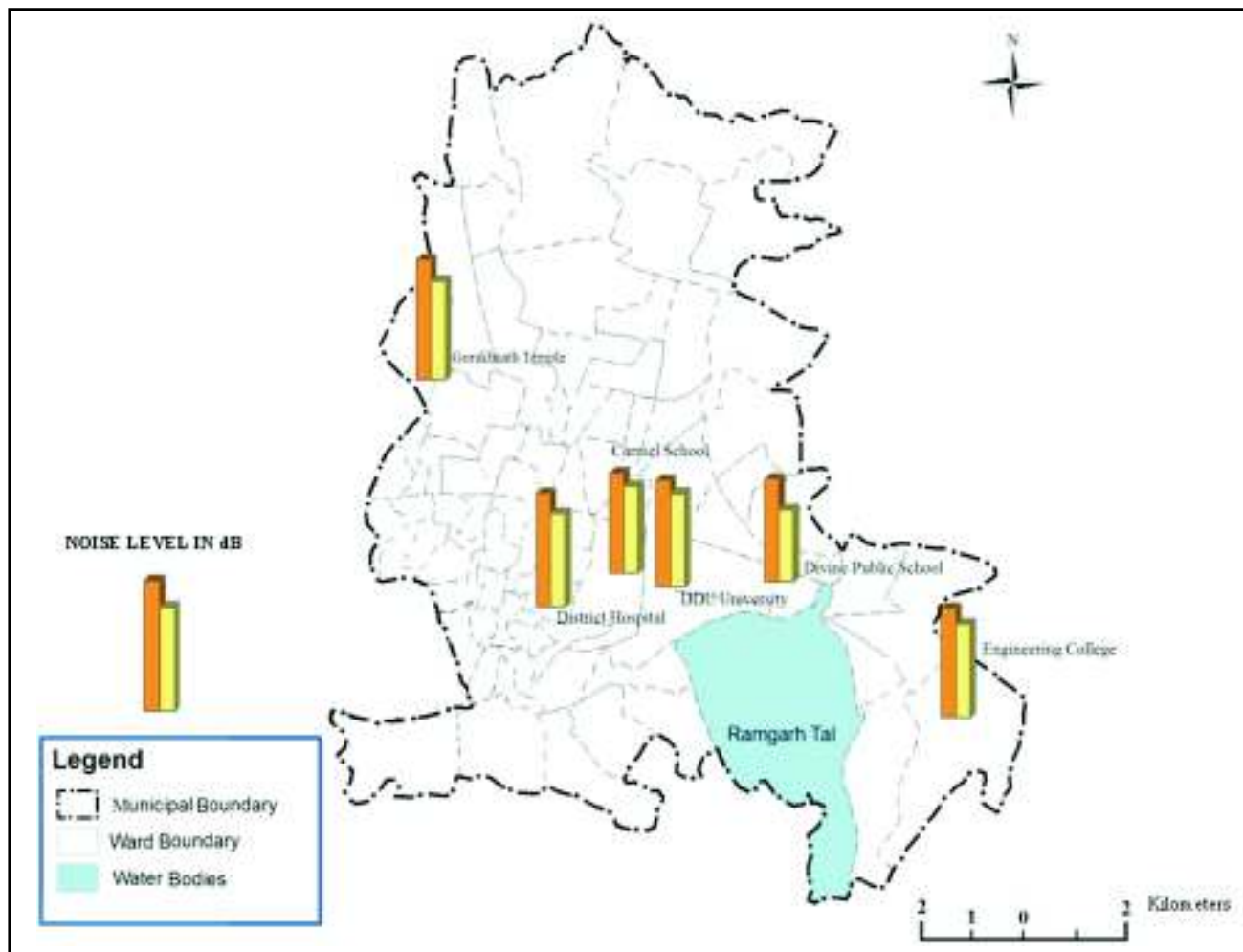


Fig. 1.4 : Gorakhpur city Selected areas of silent zone for noise pollution level during day and night time

dB) in day and (65 dB) at night. It is observed that these organizations are affected with high level of noise which is still further harmful to the patients admitted and visiting for the treatment of various diseases and also the reading students. The observation reveals that the noise level is much harmful to the concern people being higher than the prescribed limit of CPCB (Prescribed limit has been depicted in table 1).

HUMAN RESPONSES TOWARDS NOISE POLLUTION

The study has been continued to analyze human response to noise pollution among the people of various age sections of the society in Gorakhpur city. This contributes

the most important factors influencing perceptions of the people regarding noise.

The responses to the question Which source of noise pollution affects you more? are particularly interesting in the light of the responses from selected location in Gorakhpur city.

The above analysis (Table 3) reveals that the majority of respondents from each occupational level out of the total 62.5 per cent, 34.5 per cent respondents of business class, 15.5 per cent from service class, 6 per cent from student, 4.5 per cent from other groups (pensioners and housewives etc.), and very low proportion of respondents 2.0 per cent from daily wage earner perceived that road traffic are major sources of noise pollution in the city.

Table 3: Distribution of responses covering sources of noise pollution based on occupational group

Occupation	Road Traffic	Domestic Appliances	Loudspeaker	Generator	Total (N)
Business	34.5	1.5	4.0	6.5	(93) 46.5
service	15.5	0.5	1.5	1.0	(37) 18.5
Daily wage earner	2.0	-	0.5	1.0	(7) 3.5
Student	6.0	-	-	0.5	(13) 6.5
Others	4.5	6.0	2.5	12	(50) 25.0
Total (N)	(125) 62.5	(16) 8.0	(17) 8.5	(42)21.0	(200) 100

Source: Based on personal survey, 2015.

Note: (n) Number of respondents, Chi-square significance P= 0.05

Similarly out of the total respondents of 8.0 per cent, 1.5 per cent from business class, 6.0 per cent other groups (pensioners and housewives etc.), 0.5 per cent from service class, reported that domestic appliances is another one most important sources of noise pollution which affect the people severely. The majority of respondents 5.0 per cent, of which 4.5 per cent from others (pensioners and housewives etc.), 0.5 per cent from business felt that loudspeaker create a severe problem of noise pollution. Besides, about 21 percent of respondents, 12.0 per cent from others (pensioners and housewives etc.), 6.5 per cent from business, and 1.0 from service class and daily wage earner,

0.5 per cent student said that generator is the important source to create the problem of noise pollution. It is evident from the above analysis that distributions of responses covering sources of noise pollution based on occupational group are significant at chi-square test.

The impact of noise on the health has shown that about 69.8% of the interviewed people were extremely disturbed by traffic noise, 42.5% reported having headache, 14.5% suffered from high blood pressure (BP) problem, 18.5% felt irritation, 10.5% hearing loss, and 14.0% suffered from speech interference. The effect of noise pollution was found to be significantly at the 98.9% affected by age (chi-square = 62.4; df=3; p=0.001).

Table 4: Impact of Noise Pollution on Human Health

Age	Through headache (%)	High Bp problem (%)	Hearing loss (%)	Speech interference (%)	Irritation (%)	Total (N)
Business	23.5	13.0	-	3.0	7.0	(93) 46.5
service	15.0	0.5	-	2.5	0.5	(37) 18.5
Daily wage earner	0.5	-	-	-	3.0	(7) 3.5
Student	1.5	1.0	-	-	4.8	(13) 6.5
Others	2.0	-	10.5	8.5	4.0	(50) 25.0
Total (N)	(85) 42.5	(29) 14.5	(21) 10.5	(28) 14.0	(37) 18.5	(200) 100

Source: Based on personal survey, 2015. Note: Chi square significance p= 0.001

The data of table 4 shows the responses of different occupational level. The above table reveals that occupational level of Business group become more affected from noise pollution, of which 23.5 per cent report that noise pollution affect them through headache, many of the respondents 13.0 per cent perceived High Bp problem, 3.0 per cent of respondents were found to be suffering from the problem of speech interference and 7.0 per cent of

respondents found affected from traffic noise through irritation. It has been found that of other groups (pensioners and housewives etc.), the majority of 10.5 per cent respondents of this group perceived hearing loss due to noise pollution, 8.5 per cent respondents treat it as speech interference. In this group 4.0 per cent of respondents feel irritation. Similarly, in the occupation group of service class, (15.0%) perceived it as a headache, while (2.5%)

speech interference and 0.5 per cent of the total number of respondents felt high BP and irritation from noise pollution. It is further observed that 6.5 per cent respondents from student group 4.8 percent felt the problem of irritation, (1.5%) headache (1.0%) High BP problem. Out of 3.5 per cent respondent of Daily wage earner, 0.5 per cent said that noise pollution has effect through headache and maximum 3.0 per cent of respondents reported that irritation problem from noise pollution. It is evident from the analysis that responses covering effect of noise pollution based on occupational group are highly significant at chi-square test.

CONCLUSION

This paper indicates health effects and increasing level of noise pollution in Gorakhpur city. The study revealed that noise level reached an alarming level in most area of the city than the prescribed limits of Central Pollution Control Board (CPCB). The monitoring of different area categories showed that maximum noise level was recorded in the commercial area, followed by residential area, and silence zone. This result interestingly showed that silence area has a lower value of noise in comparison to the commercial and residential area, which is an alarming signal for the local inhabitants. Out of the total people interviewed, about 62.5 per cent were found to be disturbed by traffic noise. About 92.4 per cent of the people reported that traffic noise is the main cause of headache, high BP problem, irritation, hearing loss and speech interference. The people having different age group were found to be significantly affecting the annoyance level caused by traffic noise. Noise Pollution was found to be interfering with daily activities at different places such as, at home, at outdoor, at work and everywhere.

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