*International Journal of Environmental Monitoring and Analysis*
2025, Vol. 13, No. 2, pp. 61-73
https://doi.org/10.11648/j.ijema.20251302.12

Research Article

# Assessing the Extent of Noise Pollution in Laxmipur District Town, Bangladesh

**Ahmad Kamruzzaman Majumder[1, 2, *], Md. Taiful Arefin Bhuiyan[1]**

[1]Department of Environmental Science, Stamford University Bangladesh, Dhaka, Bangladesh

[2]Center for Atmospheric Pollution Studies (CAPS), Dhaka, Bangladesh

## Abstract

Noise pollution is a concerning issue in Bangladesh due to its impact on human health. It is increasing in Laxmipur District Town in recent years due to the introduction of a number of different vehicles. Some vehicles, particularly rickshaws and auto-rickshaws, may use outdated mechanical horns, exacerbating the noise, the use of heavy machinery for construction, and the unregulated use of loudspeakers in social, religious, and political events and public announcements. The current study has been carried out to assess the extent of noise pollution in various areas of Laxmipur District Town. 7 different zones, along with 45 locations, were selected in Laxmipur District Town based on land use. A sound level meter (REED SD-4023) was used to monitor noise levels in Laxmipur District Town from January 01, 2021, to April 30, 2021. At each sampling location, several samples were collected. Three times a day, we have measured the noise level in every location. The mean noise pollution level and Leq of Laxmipur District Town were determined to be 68.78 dBA and 92.46 dBA, respectively. The measured mean and Leq values were 69.11 dBA and 89.00 dBA for silent areas, 67.76 dBA and 79.34 dBA for residential areas, 76.75 dBA and 82.32 dBA for mixed areas, 70.90 dBA and 81.07 dBA for commercial areas, 67.57 dBA and 95.70 dBA for industrial areas, 74.28 dBA and 87.29 dBA for road intersections, and 64.49 dBA and 75.40 dBA for village areas, respectively. The hierarchy in different land uses based on mean noise level was Mixed Areas > Road Intersection > Commercial Area > Silent Area > Residential Area > Industrial Area > Village Area. The three highest noise-polluted areas were Rehana Food (105.62 dBA), Titakha Mosjid-2 (98.49 dBA), and Dalal Bazar (96.75 dBA), whereas the three lowest noise-polluted areas were Vumi Office (58.51 dBA), Banchan Nogor (61.38 dBA), and Hi Food (66.19 dBA), based on Leq. However, a study found that every sample location's noise level exceeded the national guideline.

## Keywords

Noise Pollution, Land Use, Dispersion, Cluster, Laxmipur District Town, Bangladesh

## 1. Introduction

Noise pollution refers to the intrusion of unwanted or harmful sounds into the environment. Such noises can disrupt normal daily activities, cause psychological stress, and lead to long-term health issues for both humans and wildlife. Noise pollution in Laxmipur District Town is a growing concern due to rapid urbanization and high population density. Key contributors include intense traffic congestion, building activities, industrial noise, and public events employing

*Corresponding author: dk@stamforduniversity.edu.bd (Ahmad Kamruzzaman Majumder)

**Received:** 23 April 2025; **Accepted:** 6 May 2025; **Published:** 20 June 2025

loudspeakers. The continuous honking of automobiles, building activities, and noise from markets and industries create a more disturbing environment. This persistent noise negatively affects individuals' quality of life and leads to physical and mental health issues like headaches, reduced work capacity, impaired concentration, hearing loss, sleep disturbances, fatigue, and stress [1-3]. The traffic police frequently suffer from diminished hearing functions and have psychological difficulties [4-7]. Despite several governmental efforts to regulate noise levels, the problem remains a significant burden in the bustling metropolis. One of the main causes of noise pollution in cities is the noise produced by motor vehicles [8].

Individuals employed as traffic officers, particularly at heavily trafficked junctions, have a significant risk of illness due to noise and air pollution [9-15]. Due to the acute irritation of the upper respiratory tract causing cough, most traffic police personnel utilize masks to mitigate the adverse effects of air pollution. Nonetheless, the majority remain oblivious to the health implications of noise on their auditory capacity, as this is a gradual process that takes some time to manifest. The World Health Organization (WHO) evaluated the worldwide illness burden attributable to industrial noise and systematically identified 25 risk variables [16].

Occupational hearing loss, which may be partial or total in one or both ears, can result from employment [17]. It encompasses traumatic acoustic damage and Noise-Induced Hearing Loss (NIHL). Elevated levels of workplace noise persist as an issue globally. In the United States, more than 30 million workers are subjected to harmful noise [18]. In Germany, 4-5 million individuals (12-15% of the labor force) are subjected to noise levels classified as dangerous by the WHO [19]. Noise is prevalent in nearly all job activities; nevertheless, certain tasks are linked to particularly elevated noise levels, notably those involving impact operations, certain material handling, and operating commercial aircraft. Professions with the greatest susceptibility to noise-induced hearing loss (NIHL) encompass manufacturing, transportation, mining, construction, agriculture, and military service. The circumstances are enhancing in industrialized nations, as the broader recognition of the risk has resulted in protective initiatives. Data pertaining to poor countries is limited; nevertheless, existing research indicates that mean noise levels significantly exceed the occupational standards suggested in several wealthy nations [20-23].

The health consequences of noise encompass both auditory and non-auditory impacts. Extensive study has been conducted on these effects across many populations employed in environments characterized by loud and high-frequency noise [24-28]. The auditory impact of noise produced by autos on traffic police personnel has not been investigated, especially in India [15]. The circumstances for traffic policeman in Dhaka city are quite analogous. This may be a basis for not supplying hearing protection equipment to this set of workers. Traffic officers should recognize the necessity, contingent upon their comprehension of the health hazards. The majority of individuals do not regard noise as a substantial environmental contaminant, resulting in minimal worry over its effects and potential harm. Medical professionals assert that exposure to a noise level of 80 dBA for over 15 minutes may result in temporary or permanent hearing impairment.

Currently, noise pollution in Bangladesh may not appear to be a significant issue. It is prudent to contemplate the possibilities. The noise problem might get much worse if the government does nothing to protect the people. Hence, in order to ascertain the whole extent of the issue, the correlation between noise levels and various land uses, and the dispersion of noise levels across Laxmipur District Town, this study examined the noise pollution levels in several regions.

## 2. Methodology

### 2.1. Study Area

The study was conducted at Laxmipur District Town (Figure 1). The selection of Laxmipur District Town is attributed to its significant tourist demand, increasing urbanization, and a substantial rise in the number of cars and industries in recent years. The ambient noise level in Laxmipur District Town typically exceeds international norms by two to three times. This poses possible detrimental effects on the environment and public health. This research focused on the Laxmipur District Town areas with elevated traffic volumes relative to other locations. An ambient sound pressure level meter (REED SD-4023) was utilized for measuring noise levels in the specified region. The survey was conducted on weekdays. The measurements were conducted at prominent traffic crossings throughout the city. The sound pressure level in the traffic zone was assessed using A-weighting. In Laxmipur District Town, 7 distinctive zones and 45 sites were delineated according to land use.

### 2.2. Data Collection

The sound level meter (REED SD-4023) was utilized to assess noise levels in Laxmipur District Town from January 1, 2021, to April 30, 2021. The SD series sound level meter offers triple range measurement and allows users to pick sample rates between 1 and 3600 seconds. A user may utilize an SD card (up to 16 GB) to set a preferred sampling rate and swiftly produce an Excel file containing raw data, all without requiring software. Optional accessories comprise a tripod and AC adapter for uninterrupted long-term monitoring, as well as PC software that enables users to monitor live measurements.

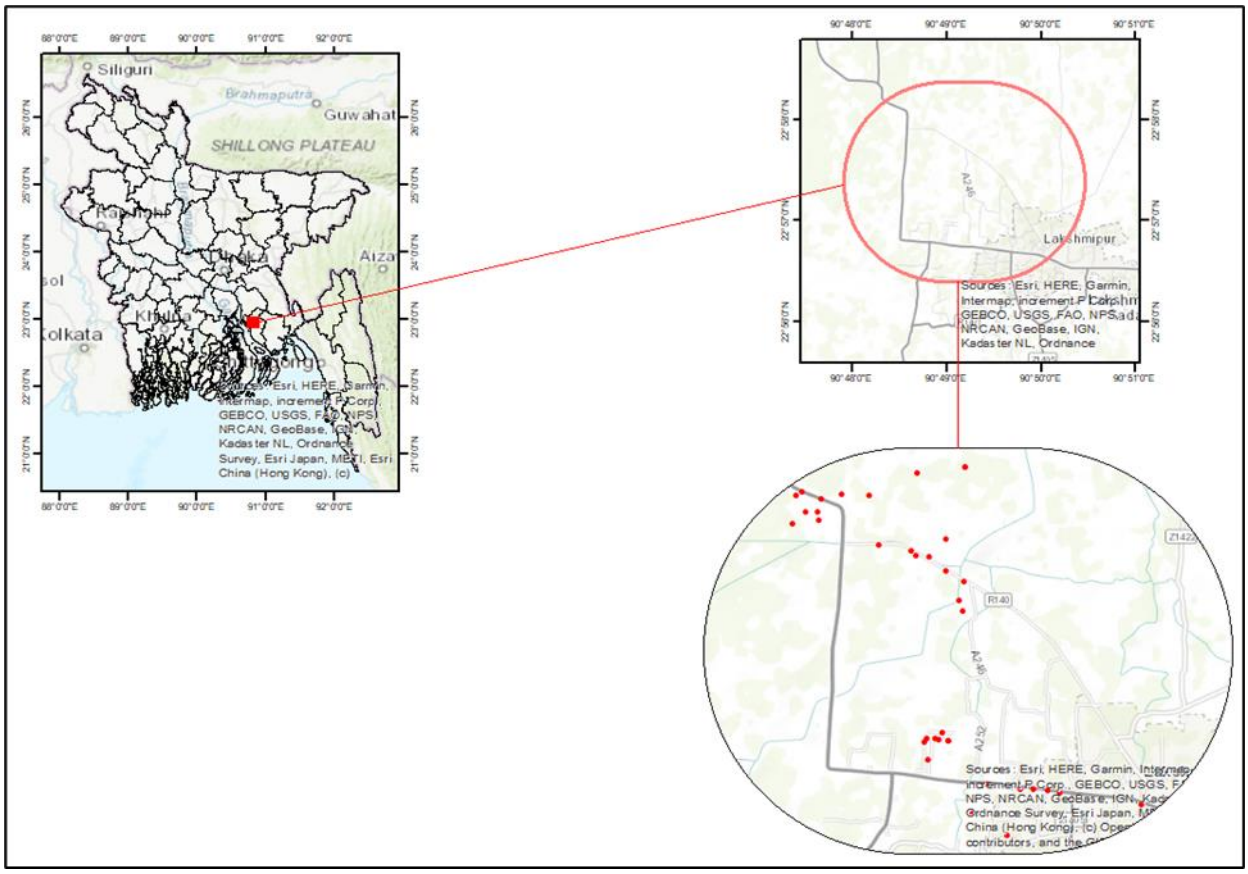



***Figure 1.*** *Study Area of Laxmipur District Town.*

## 2.3. Measuring Procedure and Analysis

The data recording function captures the highest and minimum values. Press the REC button once to initiate the Data Record function, and a "REC" sign will be shown. The screen will exhibit the "REC" symbol. 1. Press the REC button once, and a "REC. MAX." sign accompanied by the maximum value will be shown. To erase the maximum value, press the Hold Button once; the display will then indicate a “REC.” sign and constantly perform the memory operation. 2. Press the REC button once more, and a “REC. MIN.” sign accompanied by the minimal number will be shown. To eliminate the minimum value, push the Hold Button once; the display will then exhibit a “REC.” sign exclusively and will continually perform the memory function. 3. To terminate the memory recording feature, press the REC button for 2 seconds. The display will return to the present reading. The data was obtained at a height above 1.5 meters from the ground while positioned on the roadway. All forms of noise barriers were eliminated during the measurement of the real sound level. Data was sampled every second, with a total sampling duration of 5 minutes for each station. Recorded data was saved on a microSD card. The gathered data were analyzed using Microsoft Excel version 2010 and IBM SPSS version 20. All data are represented in various graphs and tables in accordance with different versions of ArcGIS v.10. Version 2.1 was utilized to create a research area map and a noise attenuation map.

## 3. Results and Discussion

Analysis of data from 10 points in the silent area of Laxmipur District Town shows that in Figure 2, despite the highest mean noise recorded being Samsundor Mondir and the Department of Forest (84.77 dBA), which is up to twice the silent area's standard daytime noise level. Conversely, the lowest mean noise level recorded at Titakha Mosjid-1 was 57.70 dBA. Furthermore, the maximum noise was found in Titakha Mosjid-2 (121.20 dBA), and the minimum noise was found in Titakha Mosjid-1 (40.70 dBA). The Leq of the silent area was 89 dBA and the mean noise level was 69.11 dBA. Titakha Mosjid-2 had the highest Leq level at 98.49 dBA, whereas Laxmipur Govt. Mohila College registered the lowest at 66.24 dBA.

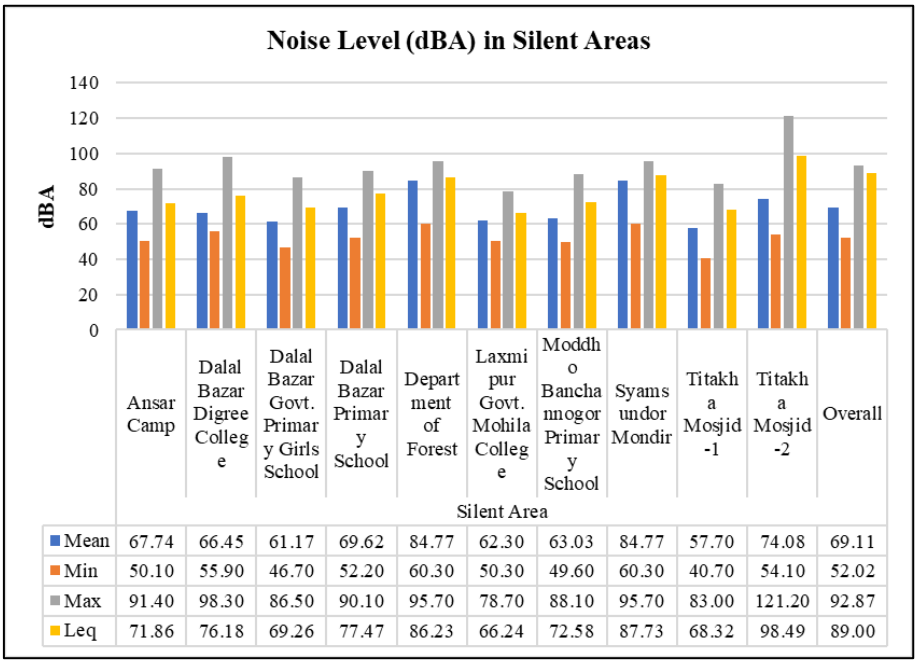



***Figure 2.*** *Noise Level (dBA) in Silent Areas.*

Figure 3 depicts the noise level in residential areas among 3 points, despite the maximum noise level found at Master Road (101.10 dBA) and the minimum noise listed at Mia Bari Abasik (42.30 dBA). The Leq of the residential area was 79.34 dBA and the mean noise level was 67.76 dBA. The residential area's mean noise level was found at Master Road (71.98 dBA) as the maximum and the minimum mean at the Mia Bari Abasik (60.83 dBA). Moreover, the highest Leq was recorded in Master Road (80.16 dBA), while the lowest Leq was found in Mia Bari Abasik (77.31 dBA). Figure 4 illustrates that Laxmipur District Town noise data shows the maximum and minimum noise levels were observed at College Road (97.40 dBA and 61.70 dBA) between 2 areas. The Leq of the mixed areas was 82.32 dBA and the mean noise level was 76.75 dBA. The maximum noise level is significantly higher than the standard noise level for the mixed area. The highest mean was reported at Bagbari (77.41 dBA) and the lowest mean was at College Road (75.88 dBA). Furthermore, the maximum Leq was recorded in College Road (81.64 dBA), whereas the minimum Leq was found in Bagbari (80.07 dBA). Figure 5 illustrates the commercial area among 8 locations, with Dalal Bazar-1 having the highest noise level at 104.20 dBA and Temuhoni CNG Station having the lowest at 49.40 dBA. Additionally, the mean noise level was recorded as highest at Dalal Bazar-1 (81.44 dBA) and lowest at Fire Service (62.33 dBA). The Leq of the commercial area was 81.07 dBA and the mean noise level was 70.90 dBA. Furthermore, the highest Leq was found in Dalal Bazar-1 (86.30 dBA) and the lowest Leq was recorded in Vumi Office (58.51 dBA).

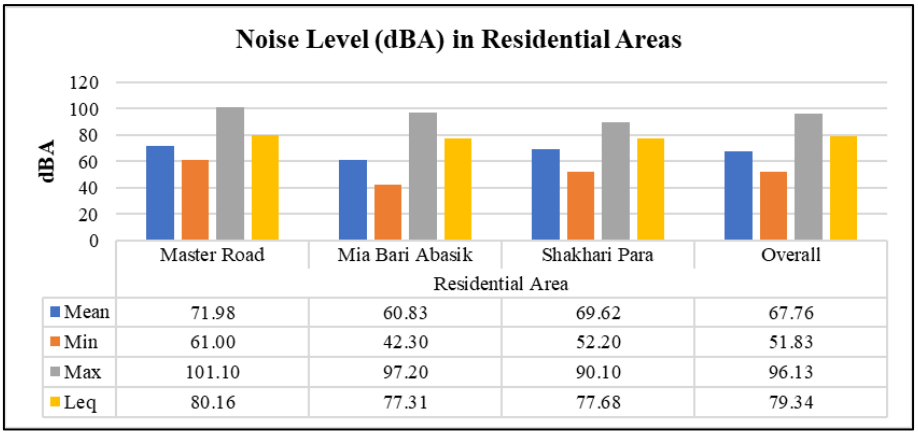
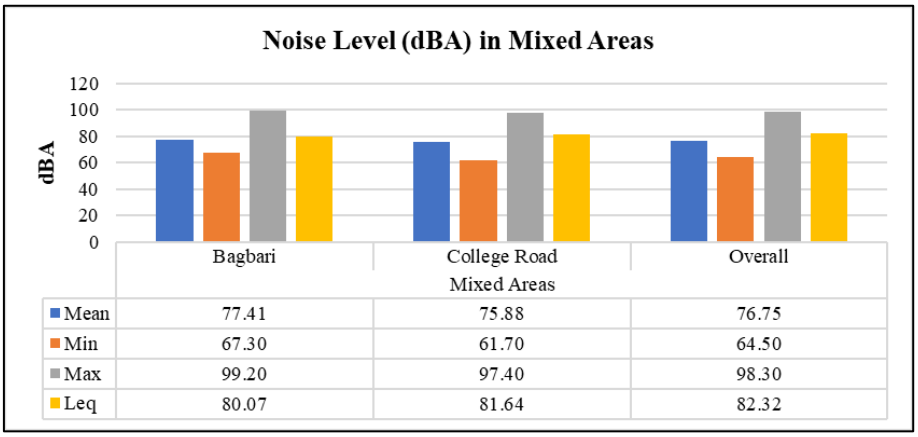
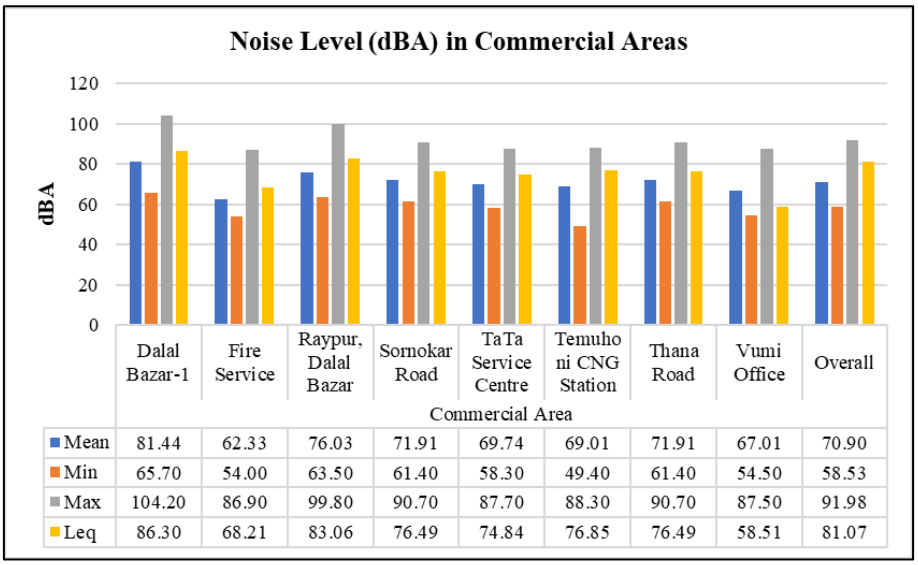



***Figure 3.*** *Noise Level (dBA) in Residential Areas.*




| | Bagbari | College Road | Overall |
|---|---|---|---|
| Mean | 77.41 | 75.88 | 76.75 |
| Min | 67.30 | 61.70 | 64.50 |
| Max | 99.20 | 97.40 | 98.30 |
| Leq | 80.07 | 81.64 | 82.32 |

***Figure 4.*** *Noise Level (dBA) in Mixed Areas.*




| | Dalal Bazar-1 | Fire Service | Raypur, Dalal Bazar | Sornokar Road | TaTa Service Centre | Temuhoni CNG Station | Thana Road | Vumi Office | Overall |
|---|---|---|---|---|---|---|---|---|---|
| Mean | 81.44 | 62.33 | 76.03 | 71.91 | 69.74 | 69.01 | 71.91 | 67.01 | 70.90 |
| Min | 65.70 | 54.00 | 63.50 | 61.40 | 58.30 | 49.40 | 61.40 | 54.50 | 58.53 |
| Max | 104.20 | 86.90 | 99.80 | 90.70 | 87.70 | 88.30 | 90.70 | 87.50 | 91.98 |
| Leq | 86.30 | 68.21 | 83.06 | 76.49 | 74.84 | 76.85 | 76.49 | 58.51 | 81.07 |

***Figure 5.*** *Noise Level (dBA) in Commercial Areas.*

Despite the maximum noise found at the Industrial Area being Rehana Food (127.50 dBA), the minimum was also reported at Meghnar Par MBM Brick Field (38.70 dBA) in Figure 6 out of 9 sites. The highest mean noise level was observed in Quality Agro Industry (76.58 dBA), whereas the lowest mean noise level was found in Meghnar Par MBM Brick Field (56.45 dBA). The Leq of the industrial area was 95.70 dBA and the mean noise level was 67.57 dBA. Moreover, the highest Leq was recorded in Rehana Food (105.62 dBA) and the lowest Leq was found in Hi Food (66.19 dBA). Figure 7 demonstrates the noise levels in road intersections out of 4 areas, where the maximum noise level was found at Dalal Bazar (112.70 dBA) and the minimum at Temohoni (48.90 dBA). The mean maximum noise reported was in Chowkbazar (76.03 dBA), while the minimum was found in Temohoni (69.46 dBA). The Leq of the road intersection was 87.29 dBA and the mean noise level was 74.28 dBA. All the noise level values mentioned were nearly the same in their category. The highest Leq value was recorded at Dalal Bazar (96.75 dBA), whereas the lowest Leq was recorded in Temohoni (75.79 dBA). The village area in Figure 8 discloses the highest noise level at Berir Matha Meghna Road (101.20 dBA) and the lowest noise level was found at Banchon Nogor (39.60 dBA) among 9 areas. In addition, the mean value was found to be highest at Berir Matha Meghna (68.13 dBA) and lowest at Banchan Nogor (54.43 dBA). The Leq of the village area was 75.40 dBA and the mean noise level was 64.49 dBA. The maximum Leq was recorded in Berir Matha Meghna Road (79.55 dBA), while the minimum Leq was found in Banchan Nogor (61.38 dBA).

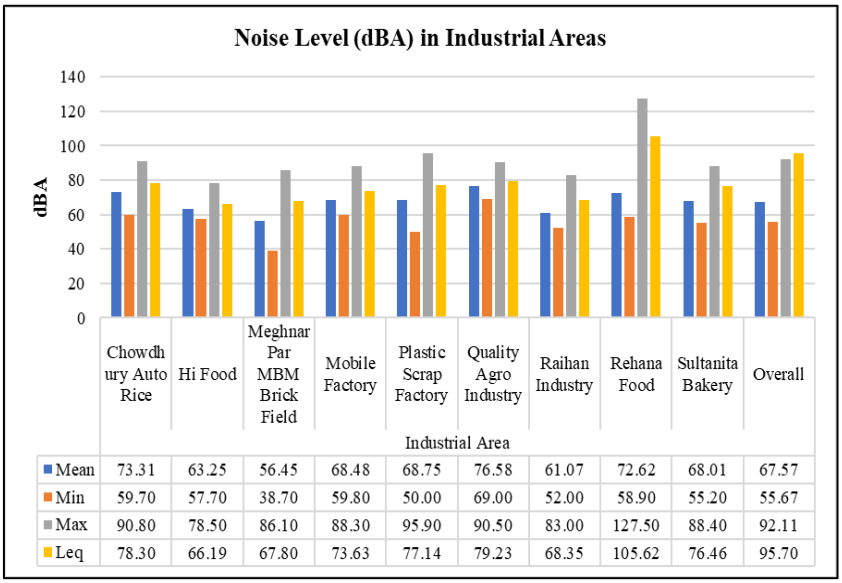



***Figure 6.*** *Noise Level (dBA) in Industrial Areas.*

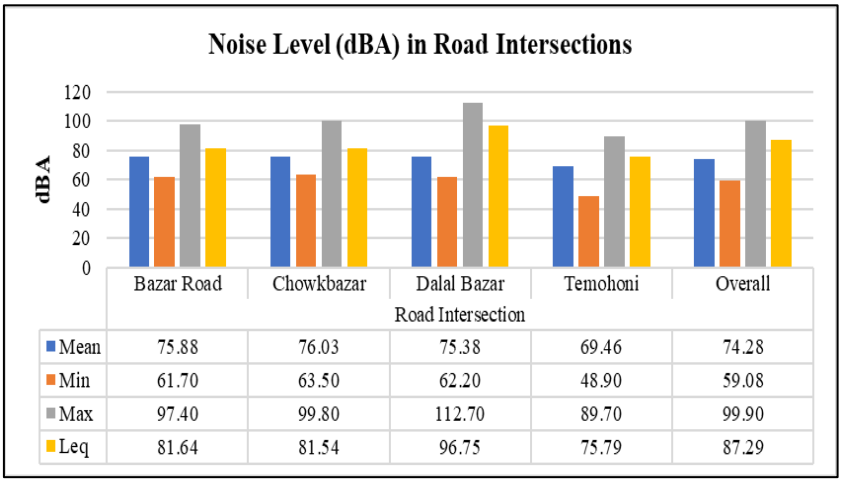



***Figure 7.*** *Noise Level (dBA) in Road Intersection.*

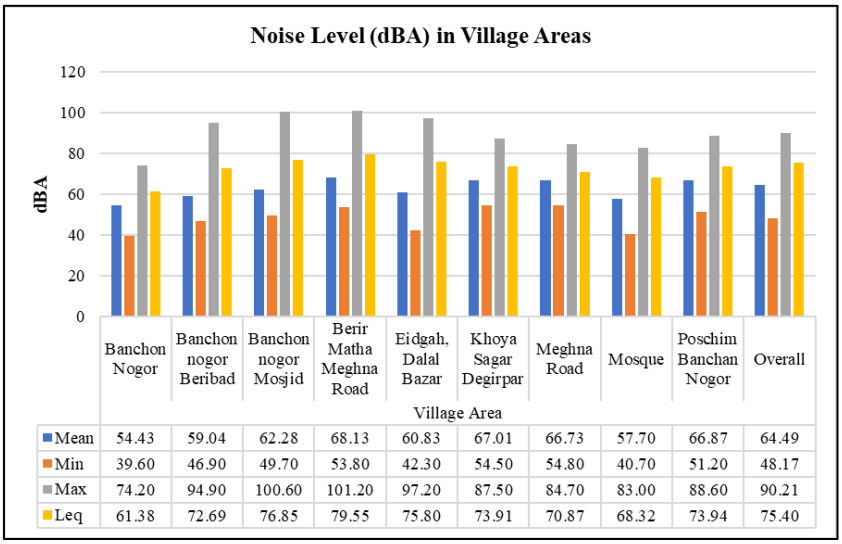



***Figure 8.*** *Noise Level (dBA) in Village Areas.*

***Table 1.*** *Dispersion of Noise Quality in Different Land Use in Laxmipur District Town.*

| Land Use (N) | Mean | Minimum | Maximum | Standard Deviation | Range | Median | Rank |
|---|---|---|---|---|---|---|---|
| Silent Area (10) | 69.11 | 40.70 | 121.20 | 12.11 | 80.50 | 67.80 | 4 |
| Residential Area (3) | 67.76 | 42.30 | 101.10 | 10.14 | 58.80 | 67.30 | 5 |
| Mixed Areas (2) | 76.75 | 61.70 | 99.20 | 6.31 | 37.50 | 76.20 | 1 |
| Commercial Area (8) | 70.90 | 49.40 | 104.20 | 8.93 | 54.80 | 70.10 | 3 |
| Industrial Area (9) | 67.57 | 38.70 | 127.50 | 9.32 | 88.80 | 67.40 | 6 |
| Road Intersection (4) | 74.28 | 48.90 | 112.70 | 8.19 | 63.80 | 73.40 | 2 |
| Village Area (9) | 64.49 | 39.60 | 121.20 | 9.45 | 81.60 | 64.20 | 7 |
| Mean (45) | 68.78 | 38.70 | 127.50 | 10.35 | 88.80 | 68.40 | - |

The subsequent table 1 demonstrates the descriptive statistics for the noise quality of the study. There are a total of 7 land use categories. The table shows the descriptive data for the noise quality of the research area seven land uses. The highest mean was in the Mixed Area (76.75 dBA) and the lowest mean was in the Village Area (64.49 dBA). The Industrial Area (88.80 dBA) has the highest ranges, while the Mixed Area (37.50 dBA) has the lowest.

The analysis of the mean, standard deviation, and coefficient of variation reveals that the road intersection exhibits the most significant variation. This evidence indicates that the noise levels in this area fluctuate significantly due to the diverse activities occurring within it. The whisker box plot (Figure 9) illustrates the mean noise pollution levels in Laxmipur District Town. A horizontal black line indicates the median value. The lower boundary of the box represents the 25th percentile. The 75th percentile is located at the upper edge of the box. The whisker indicates the maximum value (upper whisker) and the minimum value (lower whisker). Values exceeding the whiskers represent outliers.

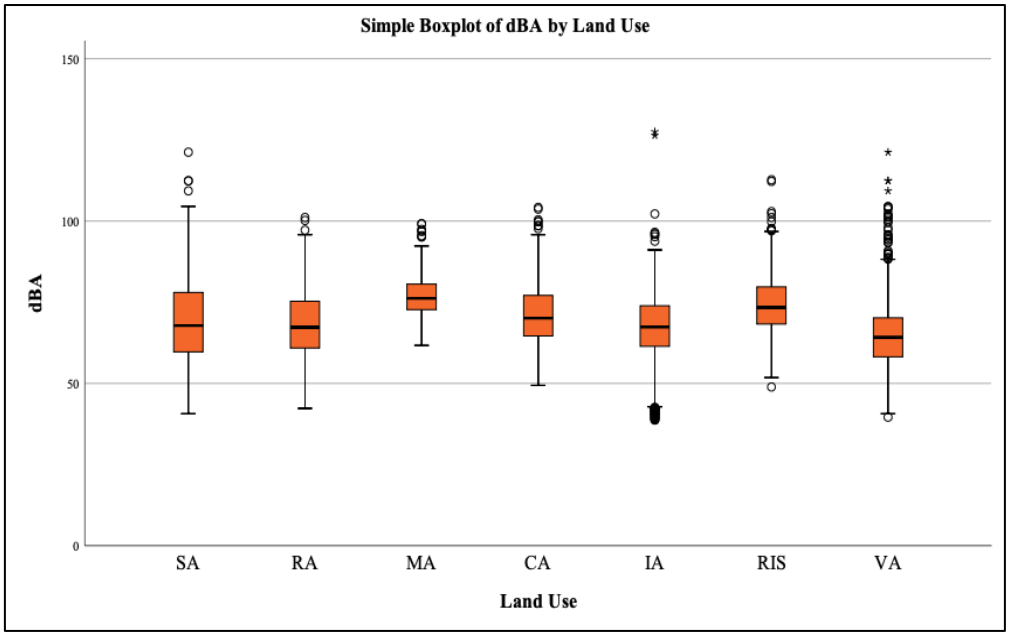



***Figure 9.*** *Mean Noise Pollution in Laxmipur District Town.*

Figure 10 shows the land-use-based cluster in terms of dBA. There is only one cluster representing residential and industrial areas.

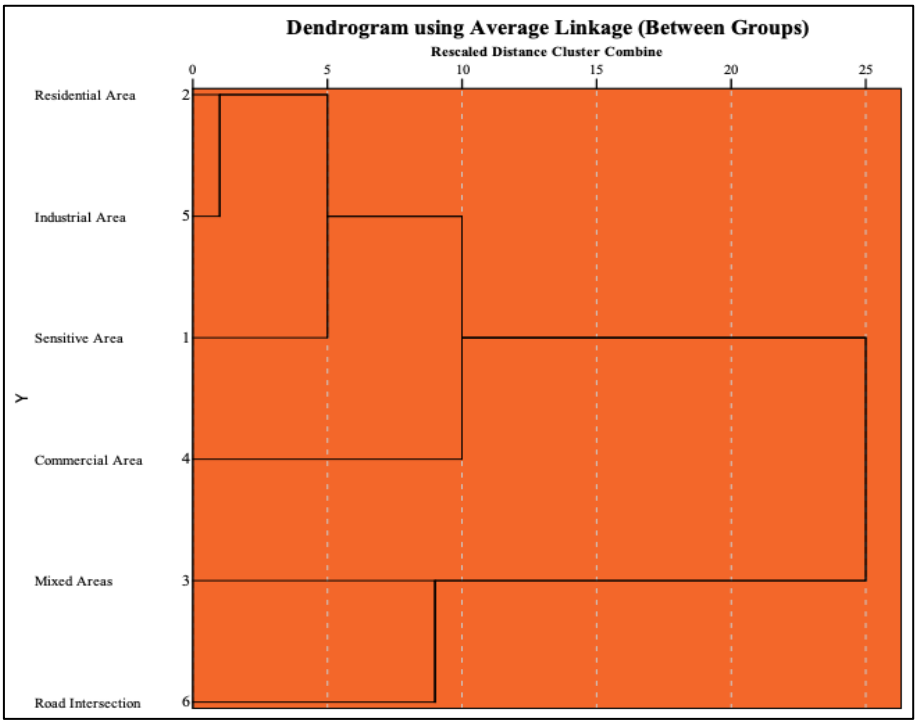



*Figure 10. Land Use based Cluster, in Terms of dBA.*

*Table 2. Post-hoc Analysis.*

| (I) Land Use | (J) Land Use | Mean Difference (I-J) | Standard Error | Sig. |
|---|---|---|---|---|
| Silent Area | Residential Area | 1.3514* | 0.50538 | 0 |
| | Mixed Areas | -7.6376* | 0.31107 | 0.007 |
| | Commercial Area | -1.7854* | 0.36438 | 0 |
| | Industrial Area | 1.5447* | 0.284 | 0 |
| | Road Intersection | -5.1681* | 0.30863 | 0 |
| | Village Area | 4.6172* | 0.47997 | 0 |
| Residential Area | Silent Area | -1.3514* | 0.50538 | 0 |
| | Mixed Areas | -8.9890* | 0.513 | 0 |
| | Commercial Area | -3.1367* | 0.54697 | 0.55 |
| | Industrial Area | 0.1933 | 0.49705 | 0 |
| | Road Intersection | -6.5195* | 0.51152 | 0.206 |
| | Village Area | 3.2659* | 0.6299 | 0.019 |
| Mixed Areas | Silent Area | 7.6376* | 0.31107 | 0.007 |
| | Residential Area | 8.9890* | 0.513 | 0 |
| | Commercial Area | 5.8522* | 0.37487 | 0 |
| | Industrial Area | 9.1823* | 0.29734 | 0 |
| | Road Intersection | 2.4695* | 0.32095 | 0 |
| | Village Area | 12.2549* | 0.48798 | 0 |
| Commercial Area | Silent Area | 1.7854* | 0.36438 | 0 |

| (I) Land Use | (J) Land Use | Mean Difference (I-J) | Standard Error | Sig. |
|---|---|---|---|---|
| Industrial Area | Residential Area | 3.1367* | 0.54697 | 0.55 |
| | Mixed Areas | -5.8522* | 0.37487 | 0 |
| | Industrial Area | 3.3300* | 0.35273 | 0 |
| | Road Intersection | -3.3827* | 0.37285 | 0.009 |
| | Village Area | 6.4026* | 0.52357 | 0.001 |
| | Silent Area | -1.5447* | 0.284 | 0 |
| Road Intersection | Residential Area | -0.1933 | 0.49705 | 0 |
| | Mixed Areas | -9.1823* | 0.29734 | 0 |
| | Commercial Area | -3.3300* | 0.35273 | 0 |
| | Road Intersection | -6.7128* | 0.29479 | 0 |
| | Village Area | 3.0726* | 0.47119 | 0 |
| | Silent Area | 5.1681* | 0.30863 | 0 |
| Village Area | Residential Area | 6.5195* | 0.51152 | 0.206 |
| | Mixed Areas | -2.4695* | 0.32095 | 0 |
| | Commercial Area | 3.3827* | 0.37285 | 0.009 |
| | Industrial Area | 6.7128* | 0.29479 | 0 |
| | Village Area | 9.7854* | 0.48643 | 0.089 |
| | Silent Area | -4.6172* | 0.47997 | 0 |
| Silent Area | Residential Area | -3.2659* | 0.6299 | 0.019 |
| | Mixed Areas | -12.2549* | 0.48798 | 0 |
| | Commercial Area | -6.4026* | 0.52357 | 0.001 |
| | Industrial Area | -3.0726* | 0.47119 | 0 |
| | Road Intersection | -9.7854* | 0.48643 | 0.089 |

Based on observed means. The error term is Mean Square (Error) = 99.403. * The mean difference is significant at the 0.

Table 2 shows the post-hoc analysis revealing disparities among land uses. It demonstrates substantial disparities among the seven allocated land uses. The mean differences are greatly reduced (the mean difference is significant at the 0.05 level) for certain land uses.

***Table 3.*** *Comply with Noise Standard [29].*

| Land Use (N) | Location | Standard Value | Within Standard (%) |
|---|---|---|---|
| Silent Area (10) | Ansar Camp | 50 | 0.00% |
| | Dalal Bazar Digree College | | 0.00% |
| | Dalal Bazar Govt. Primary Girls School | | 11.25% |
| | Dalal Bazar Primary School | | 0.00% |
| | Department of Forest | | 0.00% |
| | Laxmipur Govt. Mohila College | | 0.00% |
| | Moddho Banchannogor Primary School | | 0.33% |

| Land Use (N) | Location | Standard Value | Within Standard (%) |
|---|---|---|---|
| | Samsundor Mondir | | 0.00% |
| | Titakha Mosjid-1 | | 25.00% |
| | Titakha Mosjid-2 | | 0.00% |
| Mean | | | 3.66% |
| | Master Road | | 0.00% |
| Residential Area (3) | Mia Bari Abasik | 55 | 47.62% |
| | Shakhari Para | | 21.97% |
| Mean | | | 23.20% |
| Mixed Areas (2) | Bagbari | 60 | 0.00% |
| | College Road | | 6.00% |
| Mean | | | 3.00% |
| | Dalal Bazar -1 | | 4.04% |
| | Fire Service | | 88.08% |
| | Raypur, Dalal Bazar | | 21.57% |
| | Sornokar Road | | 43.95% |
| Commercial Area (8) | TaTa Service Centre | 70 | 55.23% |
| | Temuhoni CNG Station | | 55.10% |
| | Thana Road | | 43.95% |
| | Vumi Office | | 70.82% |
| Mean | | | 47.84% |
| | Chowdhury Auto Rice | | 59.02% |
| | Hi Food | | 95.51% |
| | Meghnar Par MBM Brick Field | | 98.30% |
| | Mobile Factory | | 82.85% |
| Industrial Area (9) | Plastic Scrap Factory | 75 | 75.08% |
| | Quality Agro Industry | | 49.28% |
| | Raihan Industry | | 94.44% |
| | Rehana food | | 73.46% |
| | Sultanita Bekari | | 80.00% |
| Mean | | | 78.66% |
| All Mean | | | 26.63% |

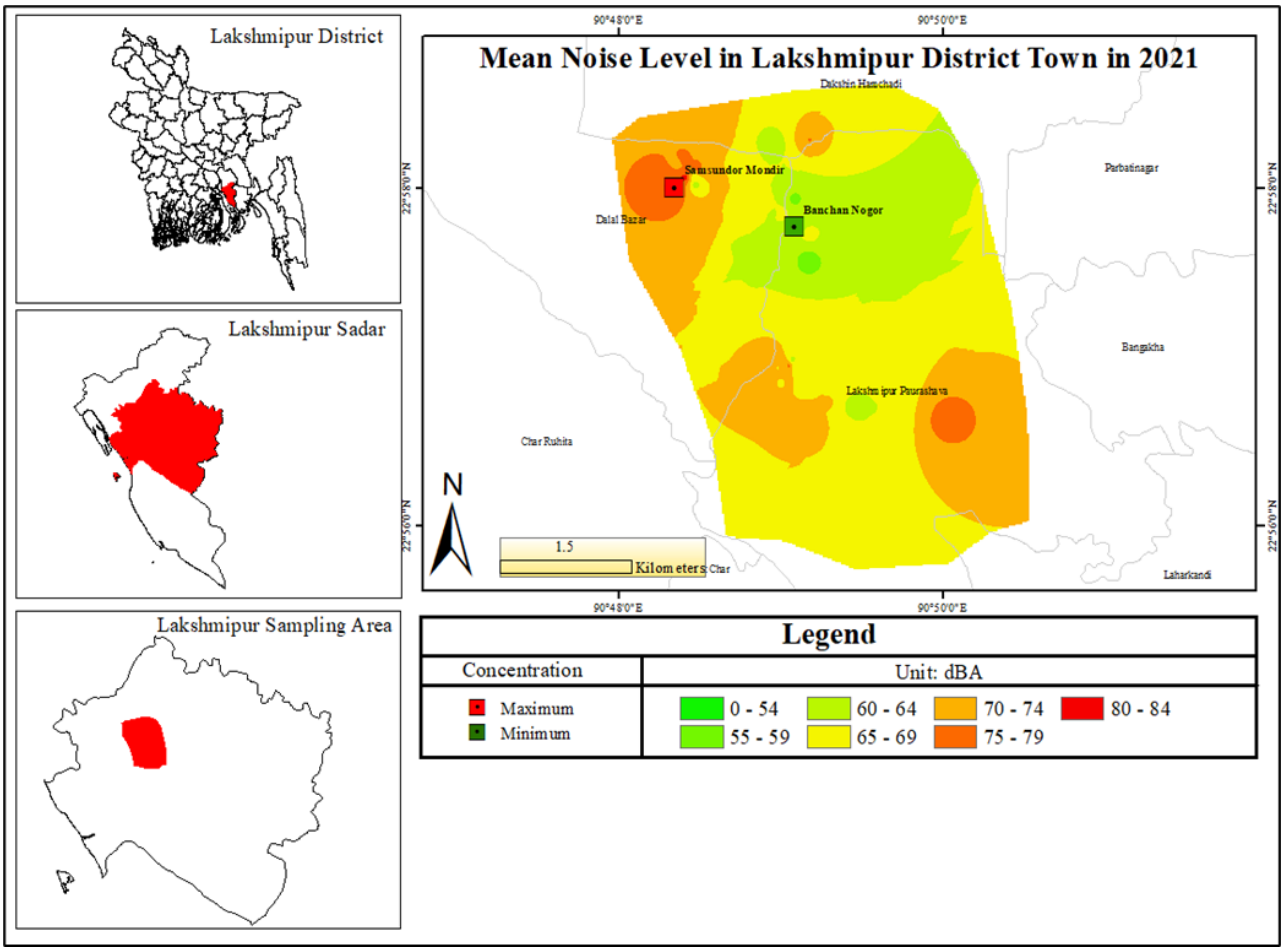



***Figure 11.*** *Spatial Map of Mean Noise Pollution.*

Table 3 demonstrates that 26.63% areas of Laxmipur District Town were belonged to the noise standard among 5 land uses. 3.66% of the areas in the silent zone met the noise standard across 10 locations, 23.20% of the areas in the residential zone met the noise standard across 3 locations, 3.00% of the areas in the mixed zone met the noise standard across 2 locations, 47.84% of the areas in the commercial zone met the noise standard across 8 locations, and 78.66% of the areas in the industrial zone met the noise standard across 9 locations.

25.00% within the standard observed in Titakha Mosjid (Silent region). The residential area values constitute 47.62% of the standard value in Mia Bari Abasik. The mixed areas depicted on College Road are 6.00% within the normal range. The commercial area data is highest within the norm for fire service at 88.08%. The results in the industrial area shown indicate a peak value of 98.30% within the standard stated at Meghnar Par MBM Brick Field.

The present study was carried out on 7 land uses, but only 5 were included in the Sound Pollution (Control) Rules—2006. Therefore, while comparing all land uses with noise standards, village areas and road intersections were not taken into account.

Figure 11 illustrates the noise levels at several locations inside Laxmipur District Town. The yellow regions are restricted, while elevated levels are shown in orange and red. The noise level was determined to be higher (78-81 dBA). The Department of Forest (84.77 dBA), Samsundor Mondir (81.77 dBA), and Dalal Bazar-1 (81.44 dBA) were classified in the red zone, whereas Banchan Nogor (54.43 dBA), Meghnar Par MBM Brick Field (56.45 dBA), and Mosque (57.70 dBA) were classified in the green zone.

## 4. Conclusions

In our study, we found that in all the locations, the noise level exceeded the national standard. Noise pollution has become one of the worst environmental problems, affecting about ten million inhabitants, including Laxmipur District Town, other big cities, and rapidly growing semi-urban areas in Bangladesh. Laxmipur District Town's mean noise pollution level and Leq were found to be 68.78 dBA and 92.46 dBA, respectively. Silent areas had a mean of 69.11 dBA and Leq of 89.00 dBA; residential areas had a mean of 67.76 dBA and Leq of 79.34 dBA; mixed areas had a mean of 76.75 dBA and Leq of 82.32 dBA; commercial areas had a mean of 70.90 dBA and Leq of 81.07 dBA; industrial areas had a mean of 67.57 dBA and Leq of 95.70 dBA; road intersections had a

mean of 74.28 dBA and Leq of 87.29 dBA; and village areas had a mean of 64.49 dBA and Leq of 75.40 dBA. Based on mean noise level, the hierarchy in various land uses was Mixed Areas > Road Intersection > Commercial Area > Silent Area > Residential Area > Industrial Area > Village Area. Based on Leq, the three greatest noise-polluted places were Rehana Food (105.62 dBA), Titakha Mosjid-2 (98.49 dBA), and Dalal Bazar (96.75 dBA); the three lowest were Vumi Office (58.51 dBA), Banchan Nogor (61.38 dBA), and Hi Food (66.19 dBA). The economic cost of the sickness and premature death associated with noise pollution has been estimated to be several hundred million dollars per year, according to a World Bank study. The present work has several more specific implications for future research linked to the points listed above. This work has revealed the need for further monitoring of noise quality. With an increasing number of vehicles and tourists in Laxmipur District Town, the noise level has been rising rapidly over the last few years. But noise pollution is not looked at as a major form of pollution, as people are not aware of the adverse effects it can have on human health. Noise pollution is a serious and neglected issue in Laxmipur and throughout Bangladesh. It is time for NGOs, the media, and the government of Bangladesh to work together to reduce the problem and increase the quality of life in this country. As many of the sources of noise pollution are unnecessary and could be reduced fairly easily and at little cost, there is no excuse for further delaying action. Given the magnitude of the problem and of the human suffering that results, we can no longer afford to neglect the issue of noise pollution. We must take this issue seriously and start working on solutions for the health, sanity, and well-being of the population and our children. Whether as individuals, NGO staff, or members of the media, we can and must take specific steps to reduce the problem of noise pollution.

## Abbreviations

| | |
|---|---|
| AC | Alternating Current |
| CA | Commercial Area |
| CAPS | Center for Atmospheric Pollution Studies |
| CNG | Compressed Natural Gas |
| dBA | A-weighted Decibel |
| DoE | Department of Environment |
| GB | Gigabyte |
| GIS | Geographic Information System |
| Govt. | Government |
| IA | Industrial Area |
| Leq | Equivalent Continuous Sound Pressure Level |
| Ltd | Limited |
| MA | Mixed Areas |
| MAX | Maximum |
| MBM | Madina Bricks Manufacturing |
| MIN | Minimum |
| N | Number (in Terms of Quantity) |
| NIHL | Noise-Induced Hearing Loss |
| PC | Personal Computer |
| RA | Residential Area |
| REC | Record |
| RIS | Road Intersections |
| SA | Silent Area |
| SD | Secure Digital |
| Sig | Significant |
| SPSS | Statistical Package for the Social Sciences |
| VA | Village Area |
| WHO | World Health Organization |

## Acknowledgments

The authors would like to thank the Center for Atmospheric Pollution Studies (CAPS) for their noteworthy support.

## Informed Consent

Informed consent was obtained from each individual participant involved in this study.

## Statement of Human Rights

This study was conducted in accordance with the 1964 Declaration of Helsinki and its subsequent amendments.

## Statement of Animal Welfare

All animals involved in this study were treated in accordance with the ethical standards set forth by the institution at which the study was conducted.

## Author Contributions

**Ahmad Kamruzzaman Majumder:** Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

**Md. Taiful Arefin Bhuiya:** Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

## Funding

This study was funded by the Center for Atmospheric Pollution Studies (CAPS).

## Conflicts of Interest

The authors declare no conflicts of interest.

## References


[1] Islam Z, Abdullah F, Khanom M. Evaluation of traffic accessibility condition and noise pollution in Dhaka City of Bangladesh. American Journal of Traffic and Transportation Engineering. 2021; 6(2): 43-51.

[2] Rao PR, Rao MGS. Community Reaction to Road Traffic Noise. Applied Acoustics. 1992; 37: 51-64.

[3] United Nations Environment Programme (UNEP). Frontiers 2022: Noise, Blazes and Mismatches – Emerging Issues of Environmental Concern. Nairobi: UNEP; 2022.

[4] Majumder AK. Noise Induced Hearing Quality Assessments of Traffic Police Personnel in Dhaka City. Journal of Environment Pollution and Human Health. 2018; 6(4): 121-5.

[5] Majumder AK, Bhuiyan, ML, Akter, S. Status of Noise Pollution in Different Silent Zone of Lalmatia Residential Area of Dhaka City. Journal of SUB. 2016; 6(1): 81–91.

[6] Majumder AK. Health Impact Assessment of Noise Pollution on Traffic Policemen of Kathmandu Valley, Nepal. Stamford Journal of Environment and Human Habitat. 2012; 1: 120–32.

[7] Majumder AK, Rauniyar R, Carter WS, Khanal SN, Bajracharya RM, Joshi SK. Noise induced hearing loss of Kathmandu valley traffic police: A self reported occupational health study. Bangladesh J Environ Sci. 2010; 18: 77-82.

[8] Alam MJB, Rauf, AFMA, Ahmed, MF. Traffic induced noise pollution in Dhaka City. J Civil Engineer 2001; 29(1): 1-9.

[9] Wongsurakiat P, Maranetra KN, Nana A, Naruman C, Aksornint M, Chalermsanyakorn T. Respiratory symptoms and pulmonary function of traffic policemen in Thonburi. Journal of the Medical Association of Thailand; Chotmaihet thangphaet. 1999 May 1; 82(5): 435-43.

[10] Karita K, Yano E, Jinsart W, Boudoung D, Tamura K. Respiratory symptoms and pulmonary function among traffic police in Bangkok, Thailand. Archives of Environmental Health: An International Journal. 2001 Sep 1; 56(5): 467-70.

[11] Shrestha I. *Health Effects of Vehicular Noise Pollution on Traffic Police Personnel in Kathmandu*. Dissertation submitted in partial fulfillment of the requirements for the degree of Bachelor of Science, Department of Environment Science, St Xavier's College. 1998.

[12] Shakya S. *Health problems prevalent in the Traffic police personnel due to vehicular air pollution in Kathmandu* (Doctoral dissertation, Dissertation submitted in partial fulfillment of the requirement of the requirements of the degree of Bachelor of Science (Environmental Science), St. Xavier's College, Kathmandu). 2001.

[13] Tamura K, Jinsart W, Yano E, Karita K, Boudoung D. Particulate air pollution and chronic respiratory symptoms among traffic policemen in Bangkok. Archives of Environmental Health: An International Journal. 2003 Apr 1; 58(4): 201-7.

[14] DeToni A, Finotto L. Respiratory diseases in a group of traffic police officers: results of a 5-year follow-up. Giornale italiano di medicina del lavoro ed ergonomia. 2005 Jul 1; 27(3): 380-2.

[15] Tripathi SR, Tiwari RR. Self-reported hearing quality of traffic policemen: A questionnaire-based study. Indian journal of occupational and environmental Medicine. 2006 May 1; 10(2): 82-4.

[16] World Health Organization. The world health report 2002: reducing risks, promoting healthy life. World Health Organization; 2002.

[17] Nandi SS, Dhatrak SV. Occupational noise-induced hearing loss in India. Indian journal of occupational and environmental medicine. 2008 May 1; 12(2): 53-6.

[18] NIOSH. Criteria for a recommended standard: occupational noise exposure. Cincinnati, OH, National Institute for Occupational Safety and Health. 1998.

[19] World Health Organization. Occupational and community noise. In Occupational and community noise 2001.

[20] Majumder AK, Islam, KMN, Biswas, JD, Paul, B. Assessment of Citizens Perception towards Traffic Noise Induced Hearing Loss in Dhaka City. Stamford Journal of Civil Engineering. 2011; 3(1).

[21] Suter A. The noise manual. 5th ed. Berger E, Royster L, Rozster J, Driscoll D, Layne M, editors. American Industrial Hygiene Association, Fairfax, VA.; 2000.

[22] Goelzer BI. Hazard prevention and control programmes. Goelzer, B., Hansen, CH, Sehrndt, GA (Ed.). Occupational Exposure to Noise: Evaluation. Prevention and Control, WHO, Geneva. 2001; 233: 244.

[23] Murthy VK, Majumder AK, Khanal SN, Subedi DP. Assessment of traffic noise pollution in Banepa, a semi urban town of Nepal. Kathmandu University journal of science, engineering and technology. 2007; 3(2): 12-20.

[24] Bluhm G, Nordling E, Berglind N. Road traffic noise and annoyance-An increasing environmental health problem. Noise and Health. 2004 Jul 1; 6(24): 43-9.

[25] Meijer H, Knipschild P, Sallé H. Road traffic noise annoyance in Amsterdam. International archives of occupational and environmental health. 1985 Oct; 56: 285-97.

[26] Ouis D. Annoyance caused by exposure to road traffic noise: An update. Noise and Health. 2002 Apr 1; 4(15): 69-79.

[27] Öhrström E. Longitudinal surveys on effects of changes in road traffic noise—annoyance, activity disturbances, and psycho-social well-being. The Journal of the Acoustical Society of America. 2004 Feb 1; 115(2): 719-29.

[28] De Hollander AE, van Kempen EE, Houthuijs DJ, Van Kamp I, Hoogenveen RT, Staatsen BA. Environmental noise: an approach for estimating health impacts at national and local level. Geneva: World Health Organization (Environmental Burden of Disease series). 2004.

[29] Environmental Conservation Rules. Ministry of Environment & Forest, Government of the People's Republic of Bangladesh. 2006.