

Impact of Coronavirus on Noise Pollution in the Himalayan City of Dehradun: A Case Study

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Case study

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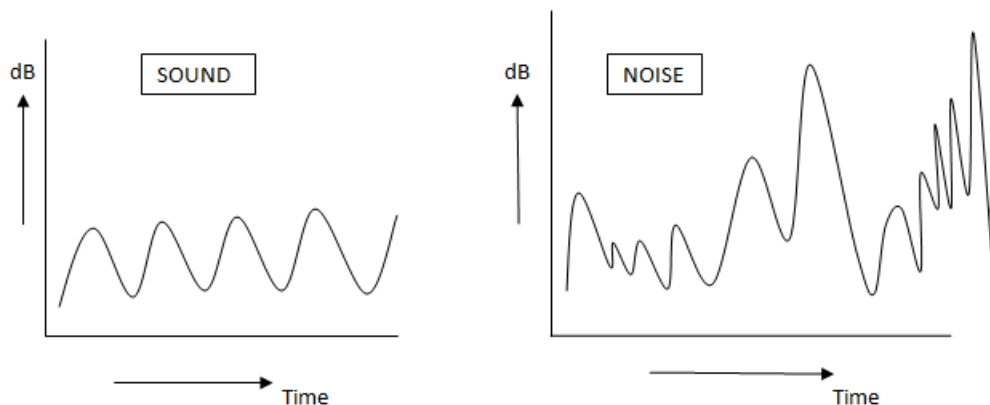
ABSTRACT

This article aims at analyzing the level of sound pollution at six major locations of Dehradun city, a Himalayan district of Uttarakhand, India. The study is based upon the collection of real-time data by the state's pollution control board during and before the Coronavirus generated lockdown conditions. On analyzing data, it reveals tranquility attained by the city during lockdown conditions. The study also swings on two extremes by comparing lockdown duration noise data with one of the noisiest time i.e. during Deepawali, the festival of lights, and firecrackers. An attempt to sketch a brief technical note on the harmful effects of noise pollution and measures to check it through manmade interventions is also made in this text.

INTRODUCTION

Sound is nothing but a wave or a vibration that can propagate through a medium such as air, water, and solid. It can propagate in longitudinal as well as the transverse way in a medium. Though the sound is essential for our daily lives but an unwanted sound or sound which produces unpleasant effects and discomfort is highly undesirable and is generally called as noise. Household gadgets like a mixer, grinder, vacuum cleaner, washing machine, dryer, cooler, commercial and industrial activities, and various modes of air, water and road transportation are the prominent sources of noise in the atmosphere. Word noise is always used in a negative connotation which signifies an unwanted element intruding into one's life. Pitch and periodicity are two very important traits of distinguishing between sound and noise. Contrary to sound [1-4], the noise has a highly variable pitch and irregular motion. In a literary sense, the sound produces meaningful communication while noise has no significant transmission for humans.

Figure 1: shows a clear technical difference between sound and noise:



Union government on 14th February 2000 enacted the Noise Pollution (Regulation and Control) Rules, 2000 in the exercise of its powers conferred under the Environmental Protection Act of 1986 to control the increasing ambient noise level at public places [5-6].

Silence area is an area comprising not less than 100 meters around hospitals, educational institutes, courts, religious places, or any other place as notified by the competent authority. Decibel (dB) is a logarithmic unit used to measure sound level in which A in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear [7,8].

Dehradun is the capital city of the state of Uttarakhand, India. Spread over an area of about 300 square kilometers at an elevation of 447 meters and with a population of about half a million, Dehradun city is being developed as one of the "Counter Magnets" of the National Capital Region (NCR). This city is located in the Doon valley at the foothills of Himalaya between the river Ganga on its East and the river Yamuna on its West. It is well connected with rail, road and air transport. Since British time, this city is famous for its various prestigious institutions like Indian Military Academy, Forest Research Institute, Survey of India, Indian Petroleum Institute, Oil and Natural Gas Corporation Limited, and a number of renowned schools and colleges. Being newly formed state's capital, since November 2000; this city is now gradually becoming heavily thronged with thousands of daily visitors in transit, excessive vehicular movements, unrestrained construction activities, and never-ending cultural fests.

In order to estimate the sound levels in the city, in the year 2019 around the year, real-time data collection was done by the state's pollution control board. Table 1 shows noise levels at 6 selected monitoring stations in the city during the year 2019 [9].

Table 1: Year 2019 (Month wise data)

Monitoring Station	Zone	Noise Level dB(A) (Day Time)												Average (A. Mean)
		Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	
Clock Tower	B	73	72	73	72	71	70	71	70	75	76	69	72	72
CMI Hospital junction	B	71	72	73	74	75	74	75	73	74	75	60	62	71.5

Race	C	53	55	56	57	58	59	58	56	55	53	54	53	55.5
Nehru Colony	C	52	53	54	55	56	57	56	54	55	56	54	55	54.7
Dun Hospital	D	49	50	51	53	56	57	58	54	56	53	59	57	54.4
Gandhi	D	53	54	55	56	58	59	60	61	62	60	53	54	57

India is a country where every religion and community celebrates its culture in a unique way. India is very rich in state wise, region-wise, and community wise mix of festivals. The Deepawali (the grand festival of light) is one of the most prominent Hindu festivals in India, which is celebrated with great religious sentiments along with pomp and show. During these festivals, houses are decorated with lights, clay lamps, candles, and flowers. People participate in religious activities and in the night they burst heavy firecrackers like New Years' Eve celebrations, the Las Fallas in Spain, the Lantern Festival in China, Bonfire night in the United Kingdom, Tihar in Nepal, Skyfest in Ireland and Bastille in France. Though all the festivals are related to some spiritual belief and practices which unites people and exchange good wishes to each other but at the same time use of drums, loudspeakers, musical instruments, and firecrackers during Deepawali, creates heavy disturbances to the living creatures and has serious long term and short terms negative implications on human health and environment. Table 2 shows the noise level recorded by the state's pollution control board on the day of Deepawali i.e. on October, 27th 2019 [10-14].

Table 2: Data on deepawali day 27/10/19 between 20.00 to 23.00

Monitoring Station	Zone	Noise Level dB(A)		Average (A. Mean)
		Maximum	Minimum	
Clock Tower	B	65.3	89.3	77.3
CMI Hospital junction	B	55.1	81.4	68.3
Race Course	c	60.2	84.1	72.2
Nehru Colony	c	54.1	88.6	71.3
Dun Hospital	D	58.1	83.1	70.6
Gandhi Park	D	59.1	81.3	70.2

The new Coronavirus has brought the whole world near standstill. Since last January - February 2020, almost every nation of the world is under lockdown conditions, strictly keeping people at home. By mid-May, around 5 million people in about 200 countries are affected by COVID-19, Coronavirus pandemic claiming about 3, 00,000 plus lives. India is also adversely affected by this virus attack with nearly 1, 00,000 positive cases, and around 3000

plus deaths. India is also observing nationwide lockdown conditions since mid-march 2020. During this, the state's pollution control board collected noise data at the same predefined 6 monitoring stations. Table 3: shows the maximum-minimum noise levels at these locations on 4th April and 28th April 2020.

Table 3: Data on Lock down days (Day Time)

Monitoring Station	Zone	Noise Level dB(A)		
		6-4-20 Maximum-Minimum	28-4-20 Maximum-Minimum	Average (A. Mean)
Clock Tower	B	50-76	51-74	62.7
CMI Hospital junction	B	45-61	50-74	57.5
Race Course	c	39-46	41-53	44.7
Nehru Colony	c	42-56	40-59	49.2
Dun Hospital	D	41-58	43-60	50.5
Gandhi Park	D	40-46	40-57	45.7

Table 4: Shows a complete at a glance picture of the simple arithmetic mean of the noise data collected at 6 monitoring stations during normal days, Deepawali, and lockdown days.

Table 4: Comparative Data on a normal day, Deepawali day and Lock down day

Monitoring Station	Zone	Noise Level dB(A)		
		Normal day (from table 1)	Deepawali day (from table 2)	Lock down day (from table 3)
Clock Tower	B	72	77.3	62.7
CL\<II Hospital junction	B	71.5	68.3	57.5
Race Course	c	55.5	72.2	44.7
Nehru Colony	c	54.7	71.3	49.2
Dun Hospital	D	54.4	70.6	50.5

Gandhi Park	D	57.0	70.2	45.7
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On the basis of the above observations, following inferences are drawn with the convention that normal conversation is about 60 dB level and in general prolonged exposure to sound levels above 70 dB may be harmful to human beings.

During normal days of the year

1. By and large residential and silence zones of Dehradun city remain under permissible sound limits as defined by the Noise Pollution (Regulation and Control) Rules, 2000.
2. Though commercial areas show a little higher sound levels against permissible limits but even than these levels are within the safe limits for human beings.
3. During a normal day of the year, the clock tower area is mostly noisy. That is primarily because of the heavy vehicular movement around the clock tower round the year.

During Deepawali

- During Deepawali, almost every monitoring station recorded an appreciable rise of noise levels as compared to the limits prescribed under the rules of 2000. This is primarily at the time of bursting the firecrackers i.e between 8 pm to 11 pm. During this time period, every station recorded noise levels of a high order. Irrespective of the area or zone, the whole city of Dehradun recorded almost similar sound levels i.e. around 70 to 75 dB.
- It indicates the intensity of the Dooniets to ignite firecrackers exorbitantly and irrespective of the zone considerations.

During Coronavirus Lockdown

- Coronavirus has changed the whole scenario at all the monitoring stations of Dehradun city, bringing the noise levels much below the normal conversation limits of 60 dB.
- Areas under silence and residential zones strictly followed the lockdown norms during the COVID-19 attack and the noise level reached as close as the whispering levels i.e 30 to 40 dB.
- Though commercial areas like clock tower and Combine Medical Institute junction showed a higher noise value as compared to silence and residential zones but even than these levels were much below the prescribed limits as per the rules of 2000.
- Combine Medical Institute being a medical institution and clock tower being the main intersection point of 5 to 6 major city roads showed a little higher noise levels as compared to residential and silent zones because of the emergency vehicular movements.

DISCUSSION

The above inferences clearly show that the lockdown conditions because of the COVID 19 attack have shown unprecedented results to control noise pollution in the city of Dehradun.

CONCLUSION

The World Health Organization has documented many categories of adverse health effects of noise pollution on human beings. Noise pollution may lead to heart deceases, mental disorders, sleeplessness, disturbed

concentration, mild deafness to even profound deafness. Noise above 70 dB, over a prolonged period of time may start damaging hearing, and noise above 120 dB may cause immediate harm to one's hearing ability. Though Coronavirus has taught us to live in tranquility and peace it's a lifetime opportunity for us to redefine our lifestyles and consumerism pattern and inhabit the art of living with calm and peace. Based upon the above observations following set of prescriptions may be followed to ensure a much healthier way of living in the city in the times to come:

- Identification of the places in the city where planting trees could be done, the green mufflers can be made by dense rows to reduce noise pollution.
- All the residential places should have some green belts with in the area.
- The residential places which are located in crowded places should have some soundproofing technology within the house structures.
- Loudspeakers, musical concerts should be banned in residential areas.
- Honking within the city should be viewed as an offense and due penalty should be imposed.
- Strict rules related to the movement of the private vehicles must be framed like the implementation of odd-even formula, encouragement for a solar operated vehicles, parking first-vehicle next, etc.
- We must inculcate to keep our domestic appliances like TV, Radio, Music systems, etc at a moderate sound level.
- Smart city plans must consider industrial and commercial areas to be situated away from silent and residential areas.

Moreover there is always a scope to learn from our follies and in order to provide a healthy environment to our coming generations, we must care for the Mother Earth from all types of polluting activities and for this let Coronavirus pandemic be a whistle blower for all of us.

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