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A Study on Noise Intrusion Effect on Ethological and Faunal Activities

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Abstract – Noise is one of the most widespread environmental pollutants because of increasing human activities concentrated in towns and cities affecting the human efficiency and health. Noise pollution causes a number of adverse effects on human beings ranging from mild annoyance to permanent loss of hearing. This article covers the study on Effect of noise pollution, Present scenario in Indian context, Sources of noise, Enviornmental noise, Noise power level, Noise hazards, Noise effects on human body, Major causes of noise, Physical aspects of noise, Physiological effects of noise, Noise pollution and Effects of noise pollution.

Keywords – Noise, Noise Pollution, Effects, Environmental Noise, Noise Hazards

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INTRODUCTION

Generally, noise pollution is defined as the exposure to elevated sound that is harmful for both physical and mental health. Noise pollution is not harmful for humans only; this has adverse effects on all living organisms. As opined by Bugliarello, Alexandre and Barnes (2016), the sound levels that are less than 60dB are not harmful for the living organism. Sound levels more than 85dB are very harmful and exposure to more than 8 hours daily to that kind of sound can have adverse effects on health, which can be short term and long term. Simply the noise pollution can be described as an "audible sound that causes disturbance". However, the disturbance is for some not only minutes or hours. Daily exposure to that so-called disturbance can create long-term health problems including high blood pressure, cardiovascular disease, stress, anxiety or others (Anees, Qasim and Bashir, 2017). Generally, it has seen that people are not aware about it because it takes time to show the effect that has been caused by excessive sound.

Sources of noise pollution can be diverse. In the modern days with emerging technology, there is no limitation of the sources. Those are:

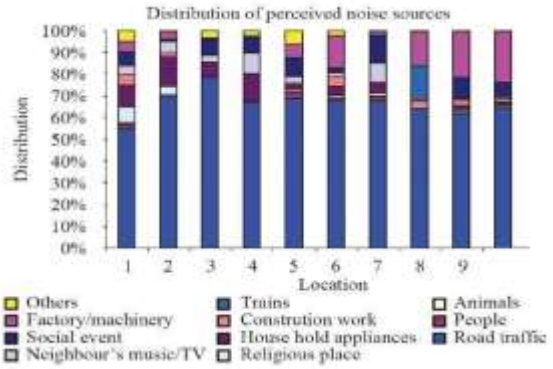

Figure 1: Source of noise pollution

(Source: Ronacher, 2019)

EFFECT OF NOISE POLLUTION

Effects of noise pollution are huge and those effects can be long term as well. Excessive noise not only affects the physical health, it is harmful for mental health as well. The effects of excessive sound are described below:

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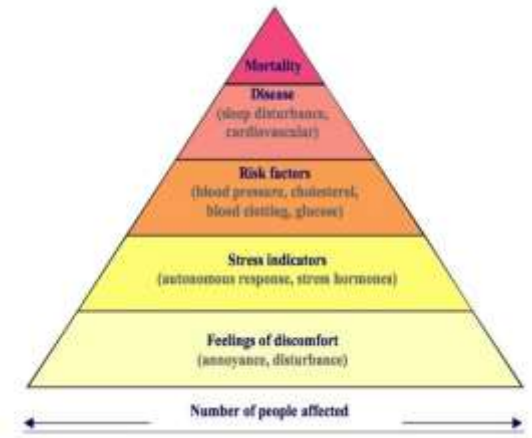

Figure 2: Effects of noise pollution

(Source: Khaiwal et al. 2016)

PRESENT SCENARIO IN INDIAN CONTEXT

In India, the noise pollution is very high because of high population and increasing industrialization. It has been seen from different studies that the limit of sound has exceeded in the metropolitan cities. In the last some decades, the number of cars and the industries has increased rapidly in India. That is the reason for huge noise pollution. This is highly affecting the ethological and faunal activities in the environment. Another reason is that people are not aware of this issue because the short-term impact cannot be understood easily. The impacts are generally seen in the long term and that is the reason behind lack of seriousness of the people with this issue.

SOURCES OF NOISE

Based on the types of noise, sources are divided into following categories:-

► Industrial Sources

Machines used for scientific innovation are to blame. There is a lengthy range of noise emission causes including various equipment from various manufacturers, industries and mills. The majority of global factories use large equipment which manufacture at a higher rate.

► Non- industrial Sources

This includes Loudspeaker, Domestic Appliances, Means of Transport, TV, radio and tape recorders.

ENVIRONMENTAL NOISE

Environmental noise production is a threat to humanity's well-being and development. It is more serious and far-reaching than at any other period, and it will continue to grow in size and importance as a result of current social trends. Its severity would grow in tandem with the increased use of dynamically more capable, modified, and extremely portable noise sources. With continued growth in highway, rail, and air traffic, the main sources of ambient pollution, noise levels will continue to rise.

Escape from human-generated sound is far more difficult now than it was a century ago, and it could be all but impossible in the next half-century. We might wonder how humanity arrived at the current state of affairs. It can seem that a few causative elements are capable.

NOISE POWER LEVEL

► Noise Measurements

Noise measurements are generally essential for determining the properties of a noise field in order to identify optimal control means (Gaur G., 1997). Noise measurements can generally only be performed at some points in a region of noise. Therefore several measurements are required to accurately calculate the noise distribution in space.

A root medium-sqaure (rms) noise value may be measured on a weighted logarithmic scale by a tool for noise calculation by air.

This device is referred to as the sound level meter and is named the sound level of a reading in decibel (dB).

It may be a difficult process and quantify sound levels and determine whether or not they are dangerous to health and safety or meet municipal legal limits. A variedad of measuring methods and sound level descriptors are proposed by various staff, based on their intention of measuring and the required precision of the result.

► Sound measuring Devices

Linear pressure levels calculated in decibels at the source are the easiest measuring criteria for characterizing the noise. The sono frequency calculated may be calibrated to provide the signal value that approximates the reaction of the human ear by weighing specific frequencies within the signal spectrum. The weighting A is most commonly used[9], among the various weighting systems produced. In ambient noise measurement, the weighted A sound intensity level dB(A) is almost uniformly used and several specifications are focused on it and the majority of noise meters are fitted specifically for registering dB(A).

► Sound Level Meter

The measurement of the RMS value of a sound is based on the frequency material. Originally, the sound intensity meter was standards for the sonic stage, assigning the overall sound intensity of one

amount in decibels, and is weighed for pure sounds, by a loudness sensitivity approximation of the ear.

A conventional sound level meter is a microphone, an amplifier, a logarithmic attenuator with a calibration value, frequency response networks and a logarithmic measuring meter (Figure 1.1). After the weighing networks have weighted frequency information, an electrical signal provided by the microphone in the presence of the sound is read on the meter.

The sound level meter is essentially an instrument to use on the ground and is normally autonomous and controlled by the battery. It is secure, compact, stable and lightweight under battery action. The input impedance is good enough to ensure a minimum load for microphones with high impedance. The impedance is poor and the degree of performance suffices for most analyzers to operate.

NOISE HAZARDS

Road noise impacts will be greatest where busy roads pass through densely populated areas. Noise sensitivity affects certain neurons rather than others. Road noise in industrial zones and uninhabited areas without much wildlife is not likely to be particularly problematic, whereas residential suburbs and particular localities such as schools or hospitals may experience significant impacts. It should be recognized that there are some locations (such as busy urban intersections) where it is very difficult to implement noise-limiting measures.

NOISE EFFECTS ON HUMAN BODY ARE

► Hearing

Audition as human characteristic is classified as sound detection capability within 16-20000 Hz frequency ranges. Regular threshold for human hearing ranges from 0 to 26 dB. The listening level is 0 dB at 1 kHz extrapolated from youth testing. It differs with frequency because we are less receptive to lower and higher frequencies and hence the use of A-weighting, etc., to link measurements to subjective evaluations. The pain tolerance is between 120 dB and 140 dB in literature.

► Noise-Induced Permanent Threshold Shift (NIPTS)

NIPTS represents a continuous change in the ear threshold (reduction) attributable to noise exposure. It's not revolutionary. NIPTS may either be due to the sole exposure to high amplitude impulsive noise like fires or to reduced but also harmful amounts of noise over prolonged periods of time. In general, noisy loss at higher frequencies, particularly around the level of 4000 Hz, occurs at first (3000-6000 Hz). For our sample it suggests that the noise in higher frequency ranges can be taken more carefully.

Maximum noise level Protects General damage population Environmental noise at the ear level of that individual should be restricted to 75 dB 24hours a day, seven days a week (within margin of safety). However, irritation and frustration will surface much earlier.

MAJOR CAUSES OF NOISE

Noise from traffic is the primary source of urban noise emissions. As the number of vehicles on the road is the, the sound caused by automobiles and the exhaust systems of cars, lorries, buses, and motorcycles is the main source of noise pollution.

Many residing next to train stations get a variety of disruption from trains, bells and whistles, and railway yards are changing and shunting.

Building noise is one cause of urban noise emissions While not an important reason, the noise emissions caused by manufacturing noise contributes. A lot of noise is generated from machinery, engines, and compressors in industry, adding to the already harmful noise emissions.

Generators, air conditioners, and fans all produce a lot of noise, adding to the current noise pollution in homes. The disturbance of the household, such as household cleaners, mixers and other kitchen equipment,

PHYSICAL ASPECTS OF NOISE

► Sound

Sound is described by acousticians as a feeling inside the ear caused by pressure changes or air vibration. Sound is made up of several frequencies, some of which influence more than one person. Because sound in decibels (dB) are measured in a log-scale, the resultant sound level does not equal 140 dB (A) but 73 dB, when two sound sources each weigh 70 dB (A) (A). The (A) applies to an estimate of the way people hear higher frequencies than lower frequencies (Corbisier Chris, 2003).

In the frequency spectrum from 20,000 Hz to less than 20 Hz, sound is characterized in the auditory system as acoustic energy characteristic of human sound. A source's sound production constitutes its strength and the sound intensity is determined at one point in space by the flow rate of energy per unit field. Intensity is commensurate with the mean square of the sound intensity and, because the variable's range is so wide, the logarithmic value is normal to convey its value in decibels (dB). The acoustic pressure is Pascal unit (Pa), while the acoustic pressure amount is dB. Loud effects rely

heavily on the frequency of the oscillation of sound pressure. Thus, in measuring noise (Berglund, B. and Lindvall, T. (Eds.) 1995), sample analytics are relevant.

Sound is a vibratory noise produced in the vibration and density of a gaseous, liquid medium or in the elastic tension of a substance which can be sensed in the hearing organs by a moving or vibrating source. Just a longitudinal wave motion is conveyed in air. Sound. Thus, a vibrating object conveyed by pressure waves by medium to human(or animal-) ears can be regarded as a mechanical force.

From a physical point of view, the idea of sound and noise differs, but for the human ear it makes an important difference. Noise is a sound class which is deemed unwelcome. Noise may have a detrimental impact on the health and welfare of persons or the community in certain cases, though not often. Since scientists have agreed for a long time, noise cannot be described solely based on physical sound criteria. It is normal practice instead to defin noise as a sound energy that adversely affects, or may affect, people's physiology and psychology.

► **Noise**

The Latin term "noise," "Nausea" is the word noise. It can be described as a sound which is unnecessary and offensive.

'Noise is an undesirable tone' for Vitles.

In Harrel's terms, "noise is an undesirable sound that raises exhaustion and induces deafness in certain manufacturing environments."

"Acoustics noise is characterized as any sound under riding," according to Encyclopedia Britannica. Noise is usually the combination of several tones in a non-musical way.

"Noise, by definition, is unwelcome sound," Encyclopedia Americanna says. Based on a variety of social causes, what is good to certain people is incredibly uncomfortable to others. In other terms, if conditions interrupt it, every signal may be noise.

Noise is an unwelcome byproduct of our modern way of life, characterized as unnecessary or excessive tone. Sleep, job or entertainment can become irritating, and physical and psychological harm may be extremely damageable (Highway Traffic Noise in the United States, 2006).

Loudness may be viewed through distortion of noise, sleep, studying, recreation and property values as an unwelcome sound that adversely affects quality of life. But noise may be arbitrary – an individual may have noisy music and the next person can have a sound annoying (Broviak Pam, 2005).

Noise — is characterized as the noisy, disagreeable, unwelcome or unwanted sound and can therefore be categorized as a more unique sound category. Sound and noise perceptions are very subjective: The music of one individual is the headache of another. The two words are sometimes used to mean the tone of a highway, but few would label it anything but traffic.

PHYSIOLOGICAL EFFECTS OF NOISE

Sound is one of a number of instruments that enable species to connect with, communicate with and prevent predators in the world. But if the recipient of the stimuli does not like a certain echo, it is known as noise (Maling 2007). Noise is able to cause adverse physical or neurological effects in a person related to distress, in comparison to noises for contact utilized by animals. Intensity increases are usually attributed to greater discomfort because increased amplitude means more energy in the sound wave, activating the frequency and force in the vibrating audible system. This, along with each animal species' particular range of hearing, describes much of the noise irritation (Cone & Hayes 1984).

The noise has other essential characteristics that render it harmful to the receiver, such as sound complexity, characterized by the combination of various noises. In animals discordant friction mixes are more visible and aversive (i.e. unnecessary complexity) than pure tones (single frequency sounds) (Cone & Hayes 1984). Noise may often be associated with nonlinearity in strong connection with sound complexity, i.e. the existence of dechronized sound which can produce extremely complicated sounds with unstable component parts (Blesdoe & Blumstein 2014, Fitch, et al. 2002, Tokuda, et al. 2002). Any animals like the white-crowned sparrow (Zonotrichia leucophry) and the yellow-bellied marmots (Marmota flaviventris) reaction to artificial non linear sound like they will respond to conspecific calls for distress (Blesdoe & Blumstein 2014 Blumstein et al. 2008, Crino, et al. 2012, Slaughter et al. 2013). (Slaughter et al. 2013; Blesdoe and Blumstein 2014). Accordingly, the sound can transform into noise, depending on wave dynamics, frequency composition and receiver hearing capacities.

Noise is not only an incentive of harmful physiological consequences, but it is also a common occurrence directly linked to human activity. These practices are prevalent in areas with a large number of fauna, rendering noise a problem for the protection of wildlife.

NOISE POLLUTION

Noise production in the atmosphere was a special condition that made it hard to associate noise properly with other emissions in the environment. Although the comparison with water, air or solid waste issues is enticing, noise is a completely different entity. Noise is not readily identified, a

physical pollutant. This is since the response of the human ear is naturally tuned to the sound frequency and thus the ambient level rises slowly. Thus noise is already quietly causing harm.

Noise is an environmental perturbation that is so highly aggravated that it is a significant danger to human quality. Noise has increased rapidly over the last 30 years, especially in urban areas. The spike in noise emissions has its impacts on the human population. Loudness may have a significant impact on the Human body by auditory system, the physiological non-auditory systems and solely psychological mechanisms (Nunez Daniel; Sampath, 2004).

CONCLUSION:

The study of different types of noise reveals that noise spectra exhibit a wide variety of characteristics. This study includes study in distinct patterns or Effect of noise pollution such as a Noise power level, Noise hazards, Noise effects on human body, Physical aspects of noise, Physiological effects of noise, Noise pollution, and Noise Pollution Effects, and so on.

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