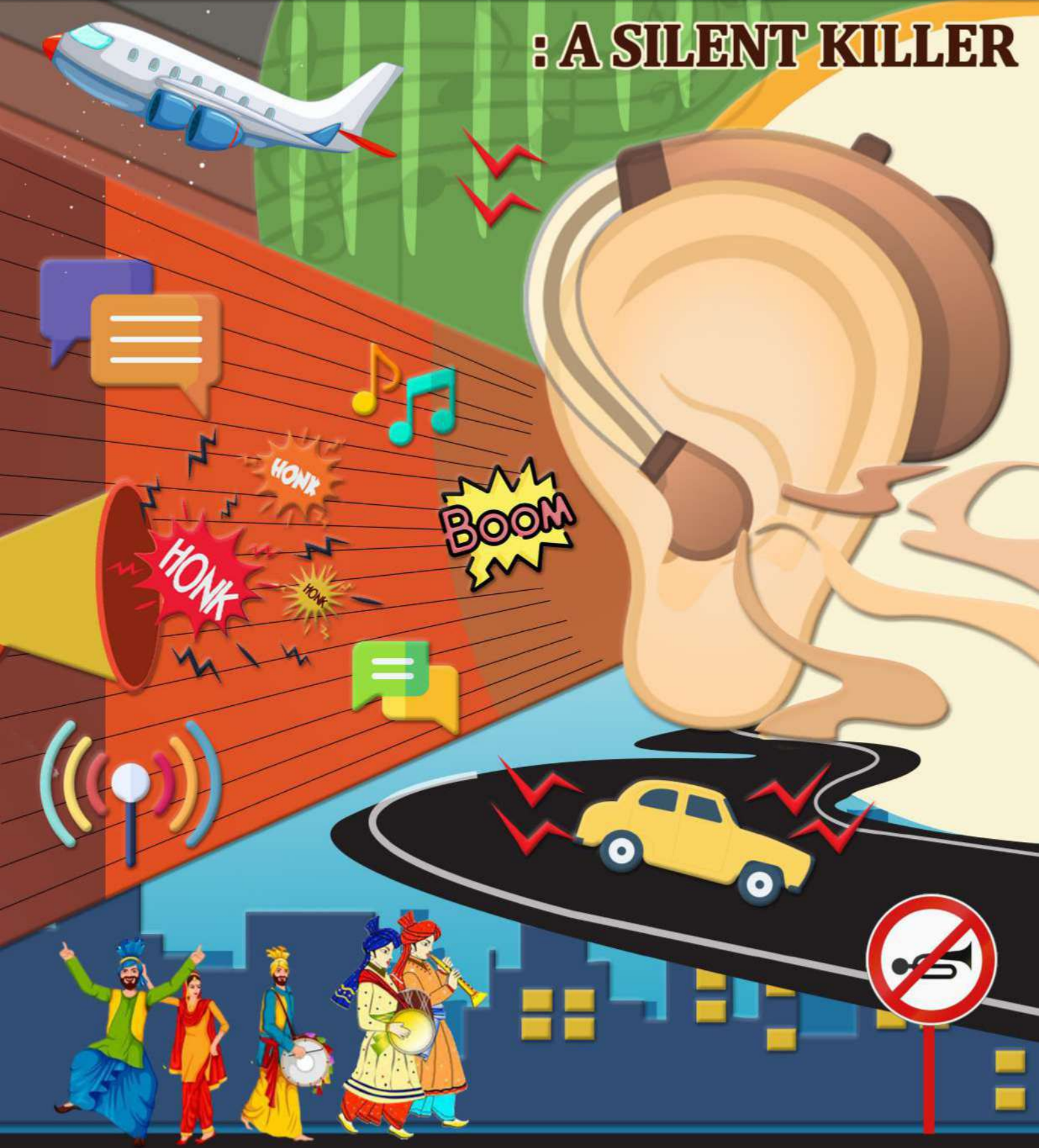


# NOISE POLLUTION

: A SILENT KILLER



**Dr. Suman Mor**  
**Dr. Ravindra Khaiwal**





**Dr. Prashant Gargava**

Member Secretary

**डॉ. प्रशांत गार्गव**

सदस्य सचिव



**केंद्रीय प्रदूषण नियंत्रण बोर्ड**  
**CENTRAL POLLUTION CONTROL BOARD**

पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार  
MINISTRY OF ENVIRONMENT FOREST AND CLIMATE CHANGE GOVT. OF INDIA



## **FOREWORD**

I am pleased to introduce this pictorial booklet titled 'Noise Pollution: A Silent Killer', a concise & comprehensive source of information on various aspects of noise pollution, such as sources, health & environmental impacts & prevention & mitigation actions.

Noise pollution is a comparatively underrated form of pollution that has potential to cause auditory & non-auditory health effects & public nuisance. It reduces the quality of life. The booklet compiles various indoor & outdoor sources of noise pollution, such as transportation, commercial activities, noise & vibration from construction sites, recreational sources, etc. It also discusses the impact of noise pollution on human health & environment.

The booklet explains different types of hearing loss, signs for their identification, & instructions for better communication with people suffering from hearing loss. It also discusses various noise control solutions at individual & community levels & actions taken by regulatory bodies. It presents day & night noise limits for residential, commercial, industrial & silence zone in an easy-to-understand manner.

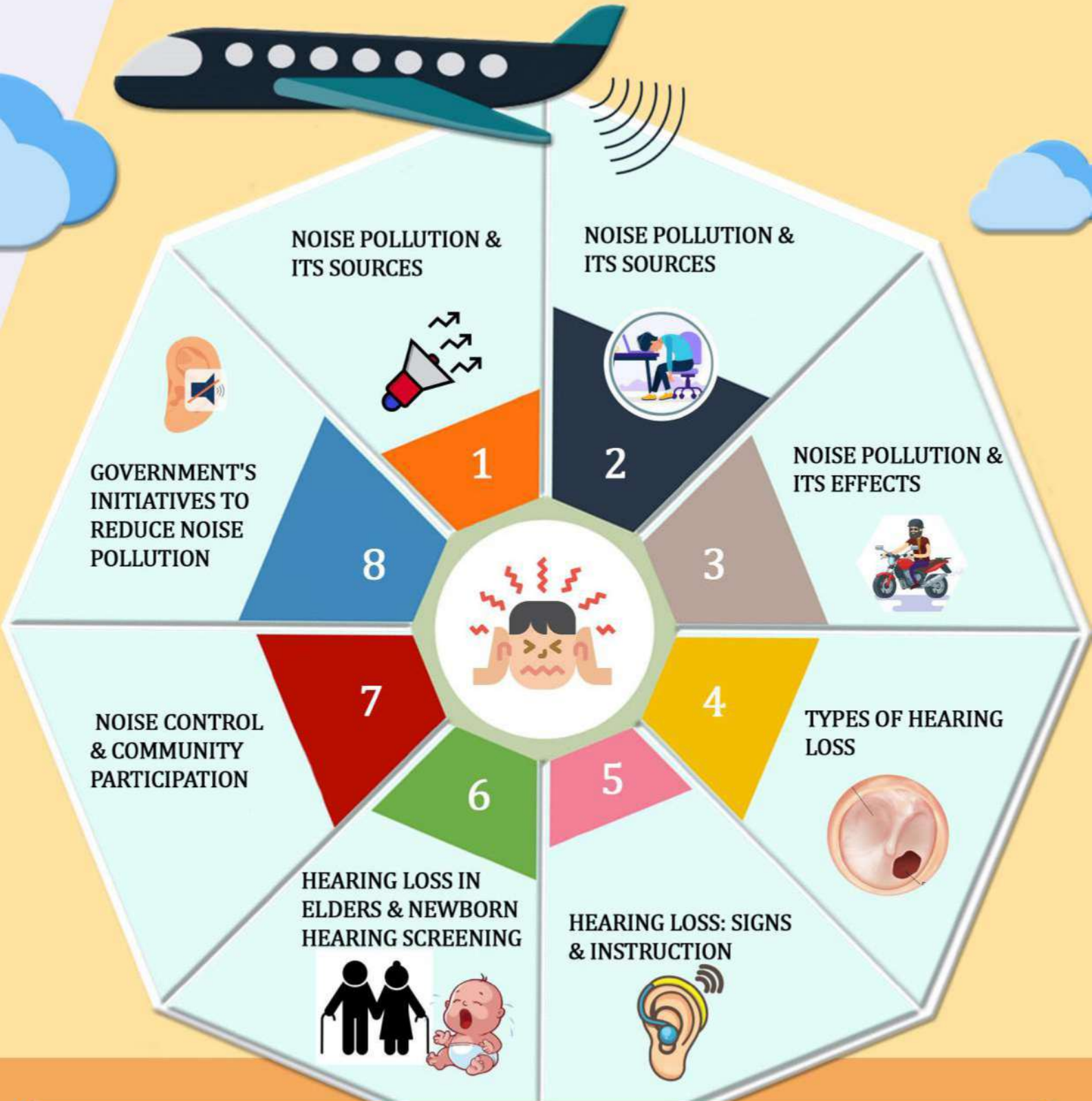
I commend Dr. Suman Mor & Prof. Ravindra Khaiwal for their efforts in bringing out this guidebook in a pictorial format, making it accessible & interesting to all age groups. It can be used as a reference guide in educational institutions & shared widely for public dissemination.

Let us all come together to work for the prevention of noise pollution for a better quality of life & healthier surroundings.

(Prashant Gargava)

# NOISE POLLUTION

: A SILENT KILLER



This booklet is based on current knowledge & may need to be updated with the emerging evidence.





# NOISE POLLUTION & ITS SOURCES

## NOISE POLLUTION:

The unwanted sound that creates nuisance is considered as noise pollution

## SOURCES OF NOISE POLLUTION:

### NATURAL SOURCES



SEA STORMS



EARTHQUAKES



HEAVY WATERFALL

### MAN-MADE SOURCES

#### MACHINERY



#### CONSTRUCTION SITE



#### AGRICULTURAL OPERATION



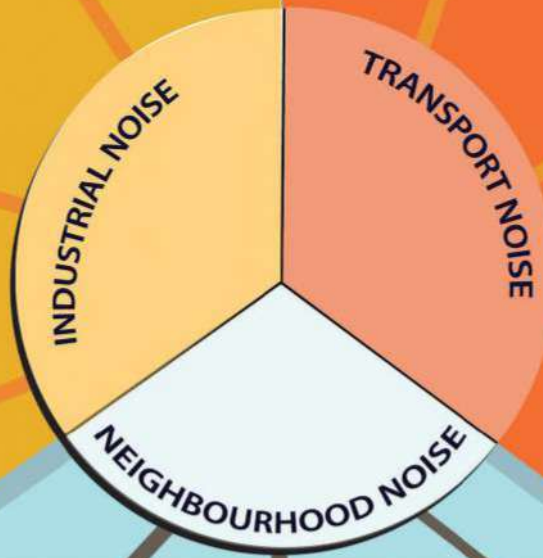
#### ROAD TRAFFIC NOISE



#### AIRCRAFT NOISE



#### RAIL TRAFFIC NOISE



FIRE-CRACKERS



RADIO



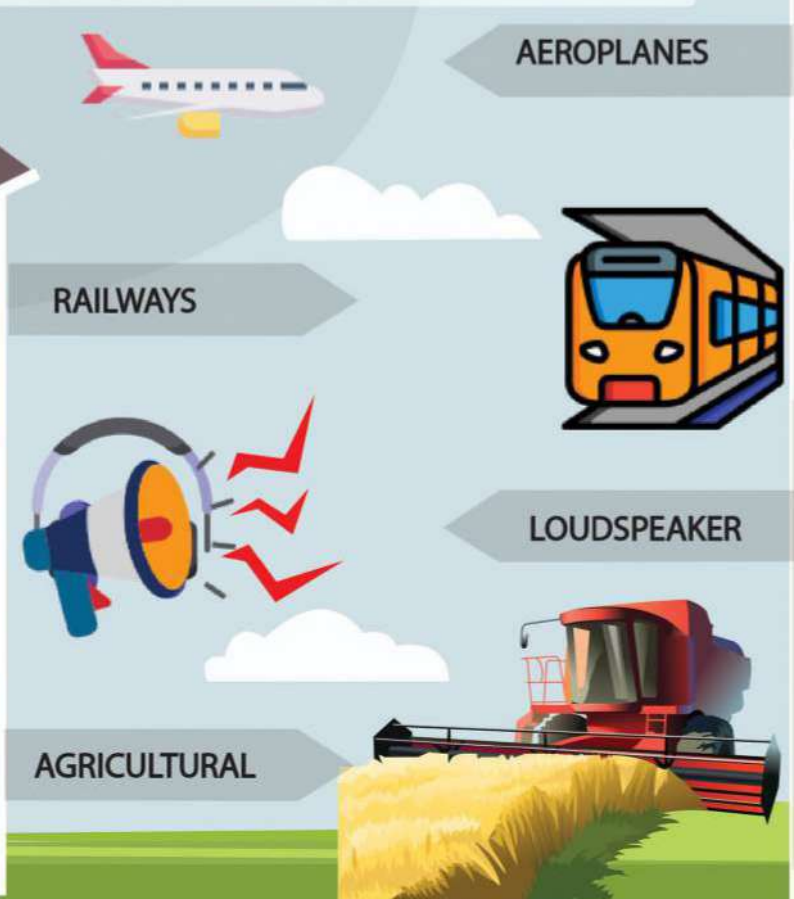
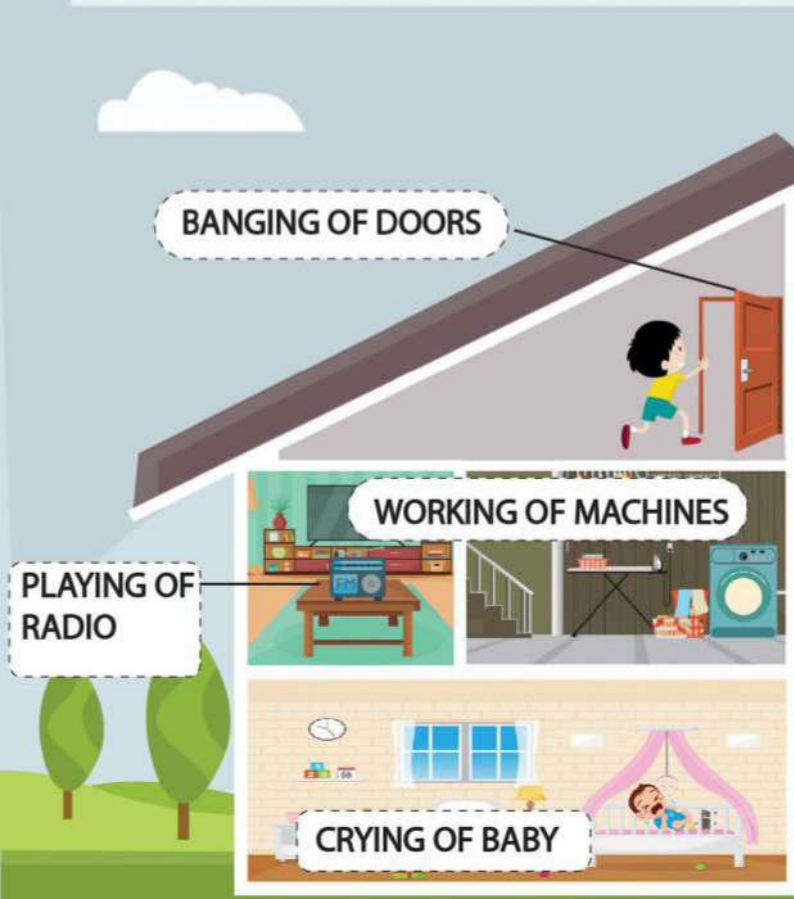
FIGHTING



# NOISE POLLUTION & ITS SOURCES

## INDOOR SOURCES

## OUTDOOR SOURCES



## RECREATIONAL ACTIVITIES & THEIR NOISE LEVEL

- ★ Noise levels at or above 85 decibels, when experienced for prolonged periods of time, can cause hearing loss
- ★ Recreational activities are dangerously loud & will cause permanent damage to our hearing



**MOTORBOATS:**  
85 – 115 decibels



**SNOWMOBILES:**  
99 decibels



**MOTORCYCLE:**  
105 decibels



**HEADPHONES:**  
105 – 120 decibels



**VIDEO ARCADES:**  
110 decibels



**MOVIE THEATERS:**  
118 decibels



**AEROBIC STUDIOS:**  
120 decibels



**FIRECRACKERS AT 10 FEET:** 125 – 155 decibels



**GUNSHOTS:**  
160 – 170 decibels





# NOISE POLLUTION & ITS EFFECTS

## AUDITORY EFFECTS

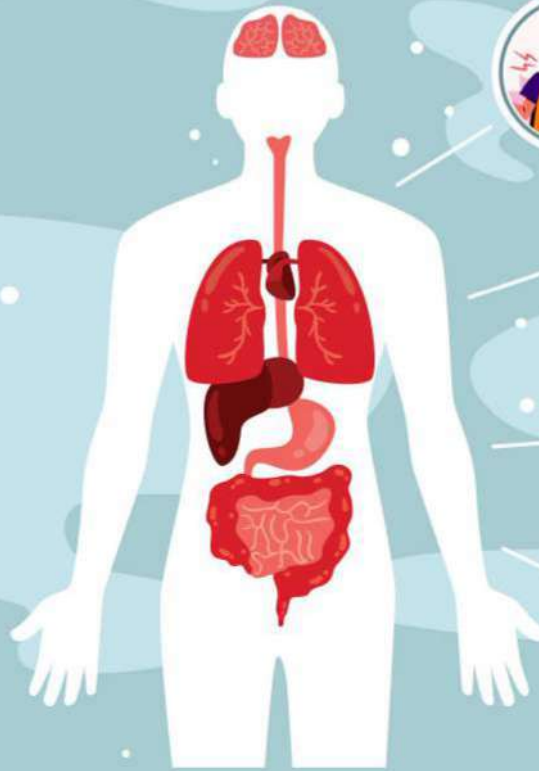
## NON-AUDITORY EFFECTS



DEAFNESS



FATIGUE



Interference in speech communication



Physical Disorders like an increase in heart beat



Loss of working efficiency



Annoyance

## ENVIRONMENTAL EFFECTS

Increase caterpillars' heart-beat



Difficulty in navigation



Searching of food



Affect communication in marine creatures



Effect reproduction in bluebirds



Feeding behavior in blue whales



Ear damage due to blast of seismic surveying/air gun



Interference in the breeding cycle



Change in feeding habits

Effects Mating



# TYPES OF HEARING LOSS

## Hearing Loss

When a person is unable to hear completely or partially in one or both ears



According to National Institute on Deafness & Other Communication Disorders, 25% of people between the ages of sixty-five & seventy-four are said to experience hearing loss

**Conductive Hearing Loss:** This Mechanical problem in the ear where the waves of sound have trouble moving from the outer ear to the eardrum as well as middle ear bones



Too much earwax



Swimmer's ear



Something struck in the ear canal



A hole in the eardrum



Birth defects



Otosclerosis



Cholesteatoma

**Sensorineural Hearing Loss (SNHL):** Permanent damage which happens due to the nerve damage in the inner ear

Aging



Autoimmune inner ear disease

High noise exposure



Head injury

Meniere's disease



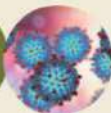
Acoustic neoplasm

Sudden changes in air pressure



## INFECTIONS

MEASLES



MENINGITIS



MUMPS



SCARLET FEVER



### Ototoxic Medications

Some medications, referred to as toxic medications, may additionally cause SNHL



### Mixed Hearing Loss

This is the combination of both types of hearing loss





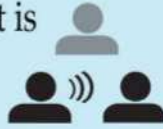
# HEARING LOSS: SIGNS & INSTRUCTIONS

## Signs of Hearing Loss



Have trouble hearing over the telephone

When two or more people are talking, it is difficult to follow the conversation



Need to turn up the television sound that annoys others



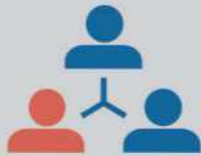
Think that others seem to mumble



Often ask people to repeat what they are saying

## How to Talk with Someone with Hearing Loss

In a group, including people with hearing loss in the conversation



Speak at a reasonable speed



Find a quiet place to talk to help reduce background noise, especially in restaurants & at social gatherings



Do not hide your mouth, eat, or chew gum while speaking



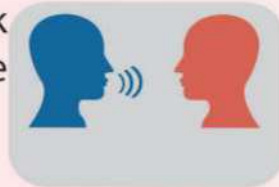
Stand in good lighting & use facial expressions or gestures to give clues



Repeat yourself if necessary, using different words



Face the person & speak clearly. Maintain eye contact



Try to make sure only one person talks at a time



Speak a little more loudly than normal, but don't shout



Be patient. Stay positive & relaxed

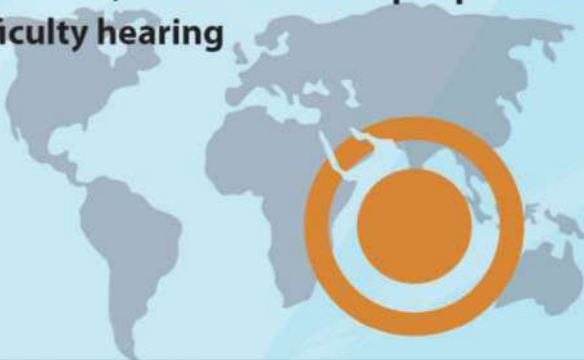




# HEARING LOSS IN ELDERS

## & NEWBORN HEARING SCREENING

Between 65 & 74 years of age, approximately one-third of people have been found to be hearing difficulty & above 75, half of the people have difficulty hearing



90% of elders with hearing loss can improve communication with:



COUNSELLING



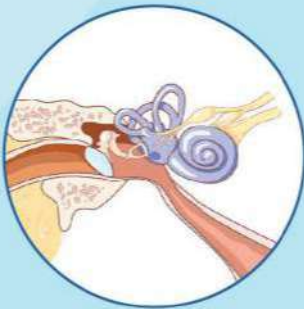
ENVIRONMENT  
CHANGE



HEARING  
AIDS

## CAUSES OF HEARING IN ELDERS

Structural changes in your inner ear



Changes to how your brain process speech & sound



Impairment to the nerve that carries sound to your brain



Blood flow changes in your ear



**Age-Related Hearing Loss (Presbycusis):** as a person gets the older, hearing ability of a person decreases with age. It usually affects both ears & mostly occurs in families



**Tinnitus**  
The other common problem of older people is Tinnitus. In Tinnitus, sound like ringing or buzzing that may be associated with hearing loss

## NEWBORN HEARING SCREENING



Identify newborn with hearing loss

It is a part of comprehensive early hearing detection & intervention





# NOISE CONTROL & COMMUNITY PARTICIPATION

## NOISE CONTROL

Solution of any noise problem might require alteration or modification in any or all of three basic elements.



### SOURCE

- Modify
- Redesign
- Relocate

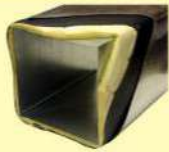
### PATH

- Enclosure
- Adsorption
- Barrier

### RECEIVER

- Enclosure
- Adsorption
- Relocate

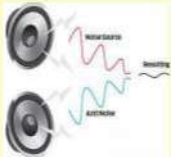
### CONTROL METHODS



ACOUSTICAL LINING



EXPOSURE TRIANGLE



ACTIVE NOISE CONTROL

## INDIVIDUAL PARTICIPATION



Avoid noisy leisure activities

Play the music at safe listening levels while using headphones



Choose your residential area as far removed from heavy traffic

Quieter means of transport such as electric bus, cycle, etc



Use noise-absorbing shields at home

Wear adequate hearing protection, such as foam ear plugs or a variety of other types of ear plugs if the music sounds too loud



## COMMUNITY PARTICIPATION



Raise awareness regarding noise pollution, the sources, & its impact



Regulation of noise levels (quiet zones) next to hospitals & schools



Pay attention to the volume during exercise; if too loud ask the instructor to turn the volume down



Plant trees as they absorb noise




Should monitor political public announcements, outdoor gatherings, & loudspeaker use.



Improved machine maintenance to lessen noise pollution & increase the effectiveness



# GOVERNMENT'S INITIATIVES TO REDUCE NOISE POLLUTION

 Constraints on the use of loud speakers & other instruments that produce sound on or during any cultural /religious holiday to address the public with a maximum period of fifteen days & similar devices should be used at night hours between **10 p.m. to 12 a.m.**

Ban on pressure horns like sirens & multi-ton horns except for police van, ambulance & brigades under provisions of the Central Motor Vehicles Rules, 1989



**Ban on sound-producing instruments at night time (10 p.m. to 6 a.m.) except in closed premises.**



Restriction on the use sound emitting construction equipment & bursting of fire crackers



## AREA CODE

## CATEGORY OF AREA/ZONE

## LIMIT IN dB(A) Leq\*

### DAY TIME/NIGHT TIME

	A	INDUSTRIAL AREA 	75	70
	B	COMMERCIAL AREA 	65	55
	C	RESIDENTIAL AREA 	55	45
	D	SILENCE ZONE 	50	40

## National Ambient Noise Monitoring Network (NANMN)



Systematic monitoring of ambient noise national noise monitoring network covering 25 cities by 2012 to make Indian cities less noisy

### SOUND HEARING 2030

is an initiative for the prevention & elimination of hearing impairment

50%

2015



90%

2030

The Goal of the SOUND HEARING 2030 program is to reduce avoidable hearing impairment to 50% by 2015 & 90% by the year 2030



# NOISE POLLUTION: A SILENT KILLER

Go Green by  
planting trees



Sound-proof  
gadgets

STOP NOISE POLLUTION



Use Noise  
absorbents



Follow  
guidelines

Regular  
Monitoring



Turn off  
Appliances

Exposure to noise pollution causes both auditory & non-auditory human health effects. This pictorial booklet aims to create awareness about various aspects of noise pollution, including sources, types & mitigation strategies. Let's be a part of the solution not noise.

## About the authors:



**Dr. Suman Mor**

Associate professor  
Department of Environment Studies  
Panjab University, Chandigarh, 160014,  
India  
[sumanmor@yahoo.com](mailto:sumanmor@yahoo.com)



**Dr. Ravindra Khaiwal**

Professor of Environment Health  
Department of Community Medicine  
& School of Public Health  
PGIMER, Chandigarh, 160012, India  
[khaiwal@yahoo.com](mailto:khaiwal@yahoo.com)

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