



## Noise Exposure and Agriculture<sup>1</sup>

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Hearing loss is not just a consequence of old age. Noise induced hearing loss ranks among the top 10 work-related conditions outlined by the National Institute for Occupational Safety and Health (NIOSH). Agricultural workers experience one of the highest rates of hearing loss caused by loud noises on the farm. Studies have shown that farmers and other agricultural workers may experience substantial hearing loss by the age of 30.

Prolonged exposure to agricultural noises could result in permanent hearing loss unless noise control measures are taken.

### COMPONENTS OF THE HUMAN EAR: THE EXTERNAL EAR, MIDDLE EAR, AND INNER EAR

The middle ear is made up of three tiny bones or ossicles that transmit noise vibration to the inner ear. Noise will not affect the middle ear unless the sound impact or pressure is so great as to cause the bones to dislodge or fracture.

The inner ear is highly susceptible to damage from overall exposure to loud noise. It is composed of hair-like structures that transmit noise messages to the brain by changing mechanical energy to electrical energy. With repeated noise exposure, hair cells are destroyed, causing substantial hearing loss.

### WHAT IS SOUND?

Sound is energy transmitted through the air. It has two qualities--loudness and tone.

Sound is measured in units of decibels, ranging from the softest sounds heard by humans to the most detrimental sounds that will cause hearing loss (See Table 1). There are recommended exposure levels that everyone should follow (See Table 2).

### LOUD NOISE

Noise is potentially too loud when you have to raise your voice in order to communicate over the sound or you experience one of the following warning signs:

1. Your ears ring after prolonged exposure to noise.
2. Speech and other sounds seem muffled after exposure.
3. You lose the ability to tell musical tones apart.
4. You fail to hear high pitched sound.
5. You feel a fullness in your ears.

According to a 1981 EPA estimate, 10 percent of the 3.6 million United States farm workers are exposed to average daily noise levels in excess of the 85 decibels. An unknown portion of the additional 11.8 million farm family members, part-time farmers, and hired workers may also be exposed to potentially hazardous noise.

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1. For more information about agricultural safety and health, contact: Project Director, Oklahoma Agricultural Health Promotion System, Department of Biosystems and Agricultural Engineering, 226 Agricultural Hall, Oklahoma State University, Stillwater, OK 74078, Phone: 405-744-5427; or The National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, Ohio 45226, Phone: 800-35-NIOSH (800-356-4674)
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**Table 1.** Decibel levels of everyday sounds.

Decibel Level	Common Sounds
0	Faintest sounds heard by ear.
30	Whisper, quiet library.
60	Normal conversation, typewriter.
90	Lawn mower, shop tools, truck traffic; eight hours per day maximum exposure.
100	Chain saw, pneumatic drill, snowmobile; two hours per day maximum exposure without protection.
115	Sandblasting, loud rock concert, auto horn; 15 minutes per day maximum exposure without protection.
140	Gun muzzle blast, jet engine; noise causes pain and brief exposure injures unprotected ears.
<b>Hearing Protection is a Must</b>	

**Table 2.** Recommended exposure time for sound levels

Sound Level	Max. Duration (Hours per Day)
90	8
95	4
100	2
110	1/2(30 minutes)
115	1/4(15 minutes or less)
Limit your exposure to noise levels louder than 90 decibels to specified duration over an eight hour period.	

**NOISE AFFECTS THE WHOLE BODY**

Noise exposure has several effects that can alter your everyday routine.

- Psychological effects--Over a long period of time, noise can cause fatigue, irritability, and communication problems.
- Physical problems--Noise can cause constriction of small arteries in the fingers, toes, skin, and abdominal organs. The heart pumps less blood with every beat in noisy environments. It can weaken our natural resistance to disease, affect our nervous system, and cause headaches.

Hearing loss can be prevented. There are a variety of ways to reduce agricultural noise.

**Engineering Controls**

- Replace worn, loose, or unbalanced machine parts.
- Make sure that machine parts are well lubricated.

- Install a good, high-quality muffler to all engine-powered equipment.
- Isolate yourself from noise sources with an acoustic tractor cab.

**Work Schedules**

Arrange work schedules so that workers don't exceed the noise exposure limit.

**Ear Protection**

If you are continually working in hazardous noise areas, you should wear some sort of hearing protection.

There are two types of protectors that work effectively if worn properly.

- Ear muffs--This type of protection is the most effective. The noise reduction will vary greatly, depending on the size, shape, seal material, shell mass, and type of suspension.
- Ear plugs--Plugs are another form of ear protection. They are usually made from rubber, plastic, or foam. When buying ear plugs, follow the directions so that a snug, tight fit is obtained in the ear canal when the plug is inserted.

Ear plugs and ear muffs do not affect your ability to communicate with others. People around you cannot give verbal warning over the loud noise anyway. Ear plugs do not alter or interfere with a co-worker "getting your attention."

Never use cotton for the purpose of reducing noise exposure; it does not block out high frequency sounds and does not provide protection!

Agricultural work is one of the most dangerous occupations in the United States. Whenever possible, safety precautions should be taken.

Though many people are unaware of it, over exposure to loud noises can gradually damage your hearing. Noise induced hearing loss is not like other types of hearing loss--it can be reduced or prevented. **Once the damage has occurred, no treatment can correct your hearing.**

**Note:** If you suspect you have some sort of hearing loss, contact your physician or local health department for more information. If you are continually exposed to noise, take all appropriate precautions.

## **SOURCES**

American Academy of Otolaryngology

Dr. Donald Crawley, Oklahoma Ear Specialist

Farm Safety Association

OSHA Noise Standard

National Institute for Occupational Safety and Health

The University of Missouri-Columbia Cooperative  
Extension Service

The Pennsylvania State University Cooperative  
Extension Service