



Severe weather tips for farmers

- Tornado-like winds pick up a storage shed and two farm workers are hurt.
- Caught in a sudden summer thunderstorm, a tractor operator is seriously burned after being struck by lightning.
- A truck stalls near an isolated livestock facility and the driver is hospitalized after walking two miles in severe cold to get help.
- Two farm workers suffer heat stroke while baling hay on an hot, humid afternoon.

Farmers work in all kinds of weather. These examples of injuries caused by severe weather can and do happen every year in agricultural operations. While they cannot avoid the elements altogether, farmers must know when to take cover and the type of precautions necessary to avoid serious injuries or death.

This publication briefly reviews weather conditions that can play havoc with Iowans—tornadoes, thunderstorms, winter storms, and excessive heat—and special considerations for farm workers.



Tornadoes

Every year, between 600 and 1,400 tornadoes are reported in the United States that result in as many as 400 deaths and more than 1,500 injuries. One of the worst years in recent history was 1974, when early spring tornadoes killed 315 people in the Midwest and the South.

Tornadoes are small but violent storms that can pack up to 250 mph winds and travel 50 miles. One weather system can spawn multiple storms. For example, the Plains Outbreak, April 26-27, 1991, produced more than 70 tornadoes that caused 21 deaths, 308 injuries, and more than \$277 million damage. In Iowa, most tornadoes occur from April to June between noon and midnight, although they can occur at any time of the year and at any time of the day or night.

What to watch for:

- dark, often greenish sky,
- large hail,
- a cloud that looks like a wall, and
- a loud roar, similar to a freight train.

What to do:

- In an open field, stop and get out of the tractor or vehicle. Lie in a low area or ditch away from the tractor. Cover your head with your arms to protect yourself from flying debris.
- Do not try to outrun a tornado on your tractor. A tornado's speed and direction are deceptive.
- Know which buildings can offer the best protection, such as a building with a below-grade floor (basement), or a building with a strong inner structure (barn). Stay away from the outside walls of the building.

Severe weather safety

How much do you know?

1. When a tornado warning is issued you should:
 - a) watch the weather closely.
 - b) take shelter.
 - c) wait until you hear further instructions.
2. Lightning occurs only where it is raining. True or false?
3. Hypothermia is:
 - a) a disease of the hypothalamus gland.
 - b) not a concern in the summer months.
 - c) a condition marked by low body temperature.
 - d) a condition that stops when you go indoors.
4. The Heat Index (HI) measures how hot it really feels by combining the actual air temperature with the relative humidity. True or false?
5. Wind chill combines wind speed and air temperature to indicate how cold it really feels. True or false?

See answers on back page.



Winter storms

The U.S. Weather Notification System

The National Weather Service issues daily forecasts and long-range weather outlooks, and decides when to issue severe weather watches.

Private companies also issue forecasts that help farmers plan field work and monitor market prices.

Severe weather watch:

Indicates when conditions are favorable for the development of severe weather, such as tornadoes, thunderstorms, and blizzards.

Severe weather warning:

Indicates when a tornado, severe thunderstorm, or winter storm is in the immediate vicinity. People who are outdoors should take appropriate actions as soon as possible.

Blizzards and periods of extreme cold are a fact of life in Iowa. Although many people heed winter storm warnings, stay off roads, and remain indoors, these storms can be deadly. In 1993, a severe snowstorm hit the Eastern United States and killed 270 people. Each year, 23 deaths are attributed to winter storms in the United States.

To alert people to the dangers, the National Weather Service issues winter storm watches and warnings. Wind chill indicates how cold it really feels by combining air temperature with wind speed.

In addition to exposure, cold weather also presents risk of hypothermia. This serious medical condition develops when the core body temperature drops below 96°F. Most susceptible are elderly persons (due to inactivity and low metabolism) and children (lack of insulating body fat). However, other people can develop hypothermia even in relatively mild conditions if they're not dressed for the weather, they get wet, or are caught in a sudden, strong wind. Alcohol consumption, chronic illness, and certain medications also can decrease body temperature.

Severe hypothermia can lead to serious problems, and the person can go into shock. Emergency medical treatment is recommended.

What to watch for:

- signs of hypothermia, including confusion, clumsiness, drowsiness, slurred speech, shallow breathing, and uncontrollable shivering;
- signs of frostbite, including numbness in the extremities (ear lobes, nose, cheeks, fingers, toes, hands, and feet);
- winter storm warnings; and
- a low wind chill temperature.

What to do:

- Avoid outdoor work during winter storms and severe cold.
- Dress in layers. Cotton socks worn under two pairs of wool socks and heavy, properly fitting boots can keep feet warm.
- Cover all exposed areas, including neck, face, fingers, and wrists.
- Always wear a hat.
- Keep extra clothes, a blanket, source of emergency heat, and flares in all vehicles.

Wind Chill Factor Comparisons (°F)

		Wind speed (miles per hour)			
		Calm	15	30	40
Air temperature (°F)	30	30	11	-2	-4
	20	20	-6	-18	-22
	10	10	-18	-33	-36
	0	0	-33	-49	-54
	-10	-10	-45	-63	-69
	-20	-20	-60	-78	-87

NOTE: Wind speeds greater than 40 mph have little additional chilling effect. Source: *Stalled...but Safe*, NCR Extension Publication 170.

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Excessive heat

In a normal year, an average of 175 people succumb to the demands of summer heat. Heat cramps, heat exhaustion, and heat stroke are real risks for people exposed to excessive heat. In the disastrous heat wave of 1980, more than 1,250 people died.

Heat disorders occur when the body is unable to either shed heat by sweating, or make up fluids (or salt) lost through perspiration. The most serious condition, heat stroke, requires emergency medical treatment and can be fatal. The severity of heat disorders tends to increase with age and physical activity. Persons with weight or alcohol problems are more susceptible to heat reactions. Exposure to full sunlight and humid conditions add to how hot it really feels. Strong, very hot, dry winds also increase the risk of developing heat disorders.

What to watch for:

- the daily Heat Index (HI) from the National Weather Service, a combination of air temperature and relative humidity.
- symptoms of heat disorders including painful muscle spasms (heat cramps), heavy sweating, weakness, cold and clammy skin, fainting, or vomiting (heat exhaustion), and hot dry skin, rapid pulse, and high body temperature (heat stroke).

What to do:

- Reschedule strenuous activity to coolest time of day.
- Wear light-colored clothing that reflects heat.
- Drink plenty of water before you feel thirsty.
- Always wear a wide-brimmed hat to shield face and neck from sun. Use sunscreen.
- Take frequent breaks in the shade, or a long break in an air-conditioned room. Guard against drastic changes over long periods of time by keeping the air conditioner at a moderate, rather than chilly, setting.

How to stay on top of things

A National Oceanic and Atmospheric Administration (NOAA) radio provides more accurate and current weather information that is specific to your area. Some NOAA radios have a feature that automatically sounds a tone when a watch or warning is issued in your area.

Related publications:

Also available are these Safe Farm publications:

- *Farm emergency and first aid kits*, PM 1563k
- *How to respond to farm accidents*, PM 1518l
- *Remember sun safety in the field*, PM 1518h

Heat Index (Apparent Temperature)

Air temperature (°F)	Relative humidity (percentage)													
	0	10	20	30	40	50	60	70	80	85	90	95	100	
140	125													
135	120													
130	117	131												
125	111	123	141											
120	107	116	130	148										
115	103	111	120	135	151									
110	99	105	112	123	137	150								
105	95	100	105	113	123	135	149							
100	91	95	99	104	110	120	132	144						
95	87	90	93	96	101	107	114	124	136					
90	83	85	87	90	93	96	100	106	113	117	122			
85	78	80	82	84	86	88	90	93	97	99	102	105	108	
80	73	75	77	78	79	81	82	85	86	87	88	89	91	
75	69	70	72	73	74	75	76	77	78	78	79	79	80	
70	64	65	66	67	68	69	70	70	71	71	71	71	71	72

NOTE: People with weight or alcohol problems, elderly persons, young children, and those on certain medications are at high risk for heat disorders. When the Heat Index reaches 90°, sunstrokes, heat cramps, and heat exhaustion are possible during prolonged exposure and/or physical activity. Source: 1979 *Journal of Applied Meteorology* 18:861-873.



Thunderstorms

Compared to other storms, thunderstorms are small. They typically are only 30 miles wide and last an average of 30 minutes. Despite their size, thunderstorms are more deadly than tornadoes. All thunderstorms produce lightning, which kills an average of 93 people every year. Some thunderstorms produce heavy rain that leads to flash flooding, which kills approximately 140 people every year. Of the estimated 100,000 thunderstorms each year in the United States, only 10 percent are classified as severe.

Most deaths by lightning happen outdoors, although you can be injured from lightning while indoors (e.g., talking on the telephone, taking a shower or bath, or standing near a window or open door). The air near a lightning strike is heated to 50,000°F, hotter than the surface of the sun. To estimate the distance in miles between you and the lightning flash, count the seconds between the lightning and thunder and divide by five.

Contrary to popular belief, lightning often strikes areas outside of heavy rain and may occur as far as 10 miles away from any rainfall. Many people also believe that “heat lightning” after very hot summer days poses no threat. In reality, “heat lightning” is from a storm too far away for the thunder to be heard. Caution is advised because the storm could be moving toward you.

Flash flooding quickly can result in fatalities when preventative actions are not taken, such as avoiding low-water bridges or roads that could be washed out.

For more information

This publication provides only the basics about severe weather and related medical conditions, and is not intended to be a first aid guide. For more information, enroll in a first aid course or consult a first aid manual. If you or someone else experiences any of the symptoms described in this publication, get emergency medical treatment as soon as possible.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Cathann A. Kress, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.

Many deaths occur when people are trapped in vehicles. When a storm occurs at night, the warning may not reach people who need to move out of or avoid low-lying areas.

What to watch for:

- increasing wind,
- flashes of lightning,
- sound of thunder, and
- static on your AM radio.

What to do:

- In an open field, find a low spot away from trees, fences, and poles. Make sure the place is not subject to flooding.
- If you are in the woods, take shelter under shorter trees.
- If you have no shelter, make yourself the smallest target by squatting low to the ground on the balls of your feet. Minimize contact with the ground, and place your hands on your knees with your head between them when your skin tingles or your hair stands on end.
- If you are in a tractor or other vehicle during an electrical storm, stay put. Vehicles often provide better protection than lying exposed in open fields.
- When a flash flood warning has been issued for your area, avoid low-lying areas, and do not drive over low-water bridges, small creeks, or roads that may be soft or partially washed out. It is better to spend the extra time to take other routes than to be caught in swiftly moving floodwaters.

More information about severe storms also is available from the American Red Cross, which participates in production of various preparedness guides issued by the U.S. Department of Commerce and the National Weather Service. County health departments also may have materials about planning for weather emergencies.

Severe weather safety

What can you do?

Being prepared can help farmers respond to all kinds of weather. Follow these tips to make sure you're safe while working outdoors:

- Check weather reports before planning work activities.
- Make sure you have a way of receiving weather information while you work, especially at remote locations.
- Prepare a family response plan for all types of severe weather conditions.
- Enroll in a first aid course.

Answers to quiz: 1-b; 2-False; 3-c; 4-True; 5-True



Safe Farm is an Iowa State University Extension and Outreach project helping to make Iowa farms a safer place to work and live.

For more safety information, check the web at www.abe.iastate.edu.