

Disaster Preparedness For Livestock
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Unit Objective

After completion of this module of instruction the producer should be able to state the definition of a disaster and match disaster terms with their definition. The producer should be prepared to identify the specific type of disaster that could occur at his/her goat farm and identify and obtain a specific list of emergency supplies and equipment that should be on hand at the family farm for use in case a disaster does occur. The producer should develop an emergency preparedness plan to follow in case a disaster does occur at the family goat farm. The producer should be able to complete all assignment sheets with 100% accuracy and score a minimum of 85% on the module test.

Specific Objectives

After completion of this instructional module the producer should be able to:

1. Select from a list the definition of a disaster.
2. Distinguish between an emergency and a disaster.
3. State problems that affect goats in a stressful situation.
4. State the kinds of records and plans that should be kept on your goats for use in case of a disaster.
5. Select from a list of alternative essential supplies that need to be kept in cars of an emergency.
6. Match disaster terms with their definition.
7. State the effects that drought plays on the goat herd.
8. Match the types of fire extinguishers with their proper use.
9. State the first priority that should be followed in case of a disaster fire.
10. Select from a list of disaster alternative the one which more livestock is lost.
11. Match the name of Hurricane, Typhoon and Cyclone to the region of the country where they occur.
12. State the number of hurricane classification.
13. State the most common disaster.
14. State one of nature's most violent disasters.
15. Select from a list of alternatives the worse month for tornadoes in the U. S.
16. Match the National Weather Services projection of severe storm warnings to the condition that is likely to occur.
17. State the two types of winter storms.
18. State the greatest damage to livestock in cold weather.
19. State the percentage of animals killed by lightning as compared to other accidents on the family goat farm.
20. Match the five key parts of a lightning protection system to their purpose.
21. State the greatest damage in the aftermath of a destructive earthquake.

22. Develop a list of emergency supplies that should be kept at the goat farm for use in case of a disaster.
23. Evaluate the possibility of a specific (type) of disaster occurring at your goat farm and develop an emergency preparedness plan to follow in case a specific disaster does occur at your goat farm.

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Introduction

Every year in the United States, ranchers and farmers lose millions of dollars with the loss of the lives of thousands of head of livestock, most of which are killed by collapsed barns, kidney failure due to dehydration, electrocution from downed power lines, and fencing failures during and following disasters. A disaster is considered to be an incident that is beyond the ability of individual, local and community resources to deal with as an emergency. A rule of thumb: "You respond to an emergency - you recover from a disaster." While not all losses can be prevented, livestock losses to disaster can, in most cases, be mitigated to some degree. There are steps that farmers and ranchers can take before, during, and after a disaster that can help them save some, if not all of their livestock.

Purpose

The purpose of this module is to provide livestock producers with knowledge of State, Federal and local agencies that may aid in disaster preparedness and disaster relief, to provide some specific steps to prepare for specific disasters, and to provide some specific actions that may be taken during the emergency.

Scope

This module will focus on the different types of disaster and how to prepare for them. It will provide a brief description and contact information for agencies that aid in preparing for disaster. It will describe the different types of disaster, along with the causes and socio-economic and environmental effects the disaster is likely to produce. It will provide some significant historical examples and perhaps most importantly, it will detail specific actions that livestock producers can take prior to a disaster. While there will be some mention of specific actions to be taken during and following a disaster, it is beyond the scope of this module to provide detailed instructions on disaster recovery.

General considerations

During a disaster, adrenalin flow creates panic and confusion in both humans and animals. Humans at least have the reasoning ability to understand (in most cases) what is happening and why. Animals, not having this ability, must rely on their humans to get them through a disaster. *The survival instincts of livestock will make them, at best, difficult and possibly even dangerous to handle in a disaster.*

Healthy goats on a nutritionally balanced diet are far more likely to survive a disaster. Goats in a stressful situation tend to overeat and suffer from such varied disorders as enterotoxaemia, bloat, founder, scours, and coccidiosis. As a minimum, goats should be vaccinated regularly against Clostridium Perfringens, types C&D and tetanus. In areas subject to a lot of rainfall, particularly southern states in hurricane season, a multivalent pneumonia vaccine is also advisable.

Discuss your disaster plan with your neighbors, and familiarize local emergency personnel with it. Together, you may come up with a collective solution that may make it easier for all

concerned. Evaluate your own abilities to handle your livestock during an emergency. Pay particular attention to manpower and equipment you might need. Contact friends, relatives, or other livestock producers that may live far enough away from the probable disaster and make arrangements with them to provide temporary care for you and your stock. Identify facilities such as fairgrounds, sale barns, show arenas and any other facilities that may house animals in an emergency.

Prepare an emergency loading plan in case you have to evacuate your animals. Prepare a loading area, where animals may be easily and quickly confined. Keep your truck or trailer stored there. Practice loading your animals onto trucks or trailers, so that they and you become familiar with the effort and will be less likely to panic. *Always, always, always have a "Plan B."*



Records

Well-kept and accurate records can make recovery from a disaster less chaotic. Keep copies of all registration papers, herd inventories, etc, handy in case of an emergency or disaster. Keep animal health records up to date. Make sure that external identification marking such as ear tags are somewhat permanent, easily read from several feet away, and designed so they do not pull out easily by braches, fence or other animals. Keep copies of plans such as floor plans, wiring, water supply systems, and lightning control systems where you can find them.

Agencies for disaster assistance

There are many agencies, Federal, State and local that offer disaster preparedness assistance. A [list of these agencies](#) is found at the end of this module.

Types of disaster

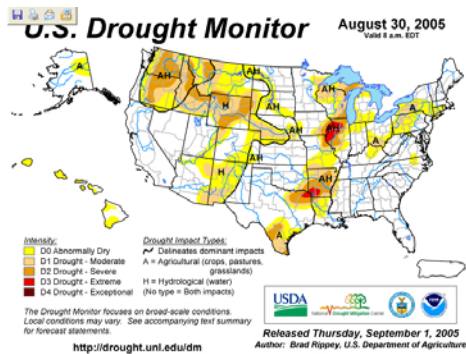
Learn the types of disaster which are likely to befall your area, and what kinds of conditions cause them. Monitor television and radio broadcasts that may provide information about developing conditions. Each disaster requires a different approach to prepare for it, but the primary focus of a livestock producer during a disaster is to provide immediate safety for his or her animals, and this is made much easier if he or she has taken some basic preparatory action.

Drought

Drought is a condition of extreme dryness sufficient to have an adverse effect on vegetation, animals, and man over a sizeable area. It is characterized by diminished rainfall, dry soil, low reservoirs, water rationing, and in dire cases, widespread famine.

Drought is caused by such weather phenomena as "La Niña," a weather pattern that drives moisture-rich air away from the American Southwest, creating extensive arid conditions in that region. Normally, the evaporation of moisture in the soil cools the ground and releases moisture

back into the air. However, drought breeds drought. During a dry spell, the warm temperatures heat the ground and create an atmospheric high-pressure area that blocks rain-bearing storm systems from entering the area.



Drought can grip a region for as long as seven years at a time. During the drought of the 1930s, 70% of the U.S. was dry. Topsoil was blown away, and erosion was widespread. In the Great Plains, America's Breadbasket became America's Dust Bowl. Agriculture collapsed over entire regions, farmers lost their land and being dispossessed, hungry and homeless, streamed off their farms by the thousands seeking work of any type, anywhere they might find it. Most would never return, heralding a national shift from a largely agrarian society to a modern industrial superpower.

In addition to the obvious effects of drought such as lack of water and reduced grazing, livestock are exposed to a wide variety of potential health problems. Lowering water levels in streams and reservoirs cause damage to banks, and a deterioration of water quality. This opens the door for exposure to water-borne disease, algae toxins, foot rot, leg injuries, stress, and sometimes death by either drowning or being stuck in mud.

During hot weather, water requirements can more than double for animals. Although moisture consumed with feed helps contribute to daily water intake, most of the animal's water requirements are met through drinking water, which must be clean and fresh. *If animals do not meet their water needs, they may refuse to eat, causing decreased growth rates, sickness or even death.*

Preparing for drought

Monitor weather forecasts. Daily conditions and 5-7 day forecasts and long-term forecasts will give you some idea that drought is impending. Drought's impact on livestock can be dramatic. Hot, dry weather increases livestock's needs for water and often decreases water supplies at the same time. Having a dependable water source or a workable plan to get water during drought is important for maintaining the health of your herd.

Water supplies will probably become a problem as drought continues. Shallow wells, dugouts or streams may dry up. Existing delivery systems may be inadequate if water demand increases dramatically. Access to an alternate water source is very important. Some alternatives to consider include: drilling wells to tap into deep underground aquifers; hauling water in tanks, barrels or other containers; piping water from adjacent farms, or collecting and storing rainwater during less dry times.

Work with your neighbors to develop community projects to collect and store water to be used specifically for livestock. Use high-capacity springs or wells, surface water sources, community tanks, or pipelines or canal systems. The underground cistern has been used though the ages to

collect and store rainwater and water hauled from another source. Two obvious drawbacks are the initial cost of construction, and the fact that when you need water, it can sometimes be difficult to get out. Despite this, most people that live in arid or drought-prone areas agree that the cistern is the preferred water storage method over dugouts or ponds.

Dugouts or ponds may be used as storage, but bear in mind that evaporation and heavy use can dry up a pond in "no-time-flat" during a drought. As the water evaporates, the mineral content of the remaining water becomes concentrated to the point that it becomes a serious health hazard to animals drinking from it. The idea of a dugout is to collect rainwater runoff, so it needs to be situated to collect from as large an area as possible. Build new dugouts or enlarge existing dugouts to hold at least a one-year supply, but preferably a three-year supply of water if at all possible.



In addition to plenty of water, animals must have fresh palatable food. Grazing will probably suffer tremendously, so you will need a stockpile of hay and /or grain to get your animals through a dry spell. Volunteer organizations usually offer emergency hay lifts during drought years.

Emergency actions

To ease a drought situation somewhat, you may want to consider culling older and weaker animals early on. This is important for two reasons. Older, weaker animals stand less chance of surviving long term drought conditions. Also, overgrazing during a drought can lead to all sorts of health and production problems. If conditions worsen to the point that you can no longer sustain your livestock, you may want to consider moving them to another area where there is enough water. In the past, some ranchers have destocked almost completely except for a few head of sturdy seed stock.

Protect your livestock from heat by providing ample shade and ventilation, critical during very hot weather. You may even consider letting any animals that are kept in barns out at night to allow them and the barn to cool. Shade trees, and pasture wallows are effective for preventing sunburn and for cooling wet skin.

Essential supplies

If possible, you will need to stockpile enough hay and feed to last at least a year. Also, if possible, build new or enlarge existing water storage tanks, ponds, etc, to store enough water to water your stock for at least a year. In an emergency, having some extra piping and pumps around could also be very helpful. *By stockpiling these two items - feed and water - you can avoid almost all livestock losses to drought.*

Fire

More livestock are lost to fires (most caused by lightning) than to any other disaster. The two most common types are *barn fires* and *brush fires or wildfires*, with one sometimes being fed by the other.

On October 8, 1871, a barn fire got out of control and burned three square miles of Chicago, killing over 250 people. At the same time Chicago was burning, a brush fire was raging 250 miles to the north. The fire (now believed to have been caused by a meteor impact), quickly erupted into an inferno and within an hour Peshtigo, Wisconsin was consumed and in Wisconsin and Michigan, sixteen other towns and more than 1.2 million acres were destroyed. Thousands of head of livestock of all types perished, and over 1200 human lives were lost. The extent of destruction and loss of life make the Great Peshtigo Fire the worst disaster in U.S. history.

Preparatory/preventive measures

If possible, make firebreaks around your home, barn and if possible, your pastures and pens where livestock is kept. Store wood, fuel, paints, etc., well clear of the house. Make good housekeeping part of your daily routine. Remove rubbish, leaf litter and weeds and brush from around buildings. Remove cobwebs and loose dust. Keep a ladder handy for roof access (inside and outside) and hoses to reach all parts of your barn and outbuildings. Check all water delivery systems at least once a week to make sure they work. If water is not connected, obtain a high pressure pump. Install fire doors and shutters and inspect them regularly.

Install lightning protection systems. Insure that all wiring is adequate and that power needs for ventilation, automatic feeding systems, etc. are not subject to overloading. Inspect wiring, switches, motors and appliances for exposed wires. Install a smoke/fire alarm system and test it regularly. When using heat lamps, make sure they are not deployed near any flammable material. Always install heat lamps where an animal cannot bump into the lamp and break the bulb and expose a bare wire. Make sure power cords are placed where goats cannot chew on them. Use stall fans, radios and space heaters only when someone is in the barn.

Install fire extinguishers at key locations, especially at all entrances to buildings, and know how to use them. There are basically three types and each has its limits. They are:



Type A: for use on ordinary combustibles - wood, cloth, paper, rubber, hay, plastics and other common materials.



Type B: for use on flammable liquids such as gasoline, kerosene, diesel fuel, oil and grease.



Type C: for use on energized ("hot" or "live") electrical items.

Remove any insulation from your barn that might release toxic fumes when afire. Enforce a strict "No Smoking" rule around any type of combustible materials, whether indoors or out. Keep above-ground fuel tanks at least forty feet from buildings. Keep other flammable liquids properly stored in labeled safety containers.

Make sure all hay is adequately dry before you store it. Moist hay will "go through a heat", and may spontaneously combust. If possible, store hay away from the barn in a dry, covered area.

Plan evacuation routes for all areas of your farm or ranch, and keep aisles, doors and gates free of equipment and debris. Practice evacuating your animals. Use flashlights and flashing lights so they will be used to them, and not get spooked by them in an emergency. Post emergency phone numbers at all telephones and at the entrances to buildings. Make sure your address is clearly visible at the road so emergency personnel can find you easily.

Emergency actions

During a fire, remember the first priority is to evacuate people and livestock to safety. Remember, also, that animals will panic and will be difficult to evacuate at best. Sometimes, throwing a feed sack or gunny sack over an animal's head will calm it down enough that you can lead it to safety. Start with the most accessible animals. Sometimes an animal will refuse to leave the building and it is not uncommon for an evacuated animal to back into a burning building. Move the animals quickly to fenced area so they will not re-enter a burning building. If possible, hose them down with water to cool them. Do not enter any building if it is engulfed in flames. If you have a slowly smoldering fire in a haymow or loft, DO NOT try to throw the burning hay out, since exposure to oxygen will fuel a blaze. Evacuate the area and call the fire department.

Hurricane/Typhoon/Cyclone

In the Atlantic Ocean, they are called "Hurricanes"; in the Pacific, "Typhoons"; and in the Indian Ocean they are called by their generic name, "Cyclones". *A hurricane is a low pressure weather system that forms over water in the tropics.* The rotation of the earth, the prevailing wind patterns and ocean currents combine to produce a rotating storm system that can assume catastrophic proportions. A typical hurricane is accompanied by thunderstorms, and high winds near the earth's surface that, in the Northern Hemisphere, rotate counterclockwise. Hurricanes cause catastrophic damage to coastlines and several hundred miles inland. *Winds can exceed 155 miles per hour, often spawning tornadoes, secondary storms, heavy seas, heavy rains and hail, and severe flooding.*

Hurricanes are classified into five categories based on their wind speed, central pressure, and typical expected damage. Category Three and higher hurricanes are considered major hurricanes, and are extremely dangerous and warrant your full attention.

The Atlantic hurricane season lasts from June 1 through November 30. Texas and Florida are by far the most hurricane-prone states, with North Carolina and Louisiana coming in right behind them. Other coastal states, particularly Alabama, Georgia and Mississippi also suffer hurricane

damage periodically. Even inland states like Tennessee have suffered flooding from the remnants of a hurricane.

Hurricanes wreak havoc on everything they touch, man-made or natural. Coral reefs have been totally destroyed, entire islands moved or washed away, forests flattened, buildings, roads and other infrastructure destroyed. Recovery after a severe hurricane can take years, even decades.

Preparing for a hurricane

Prior to hurricane season, reinforce houses, barns and outbuildings with hurricane straps and other measures. When erecting new buildings, use hurricane-resistant designs and materials. Have on hand plywood or other suitable material to install over glass windows. Have generators and plenty of fuel ready to provide electricity. Perform regular, periodic inspections and maintenance of all utilities, buildings and other farm infrastructure.

During hurricane season, pay attention to weather forecasts and bulletins. Modern storm tracking technology can predict, with a high degree of accuracy, when and where a hurricane will strike, usually giving you ample time to prepare. The National Weather Service issues *watches* and *warnings* of impending storms. Under a Hurricane/Tropical Storm Watch, hurricane or tropical storm conditions are *possible*, usually within 36 hours. Under a Hurricane/Tropical Storm Warning, hurricane or tropical storm conditions are *expected*, usually within 24 hours.

Upon the issuance of a hurricane watch in your area, begin final preparations. Board up any windows, secure any loose items. Open gates or provide other escape routes to areas where your animals can be safe from flood waters.

Most hurricanes of Category 3 and above will require evacuation. If you have three or four days leeway until landfall (and know where it will come ashore), the best thing to do is to load your animals and head inland.

At very best, evacuation of animals is a miserable experience for animals as well as their caregivers. Since hurricane season is in the hottest part of the sub-tropical year, sitting in creeping bumper-to-bumper traffic is extremely stressful, and even dangerous to goats. If you have only a few goats, the situation is not quite as bad, but the logistics of moving a large herd of animals to safety can be quite staggering. More often than not, goats usually fare better where they are than when they are being transported on the hot, crowded highways.

If you choose to evacuate the area, plan at least two evacuation routes to each possible destination, avoiding, if possible, routes that would almost certainly be congested in the event of an emergency. Drive the routes, making notes of possible watering facilities, sheltering facilities, etc. along the way. Pay particular attention to areas that could be subject to flooding and avoid them if possible. Practice loading your animals so they will be somewhat used to the procedure.

You should have at least two destinations, at least 40-70 miles inland and in different directions, to which you could go if a hurricane hits. Plan with friends, family members, and members of agriculture associations to which you might belong, and any others who might have ample room

to hold your animals until the emergency passes. Do not overlook such facilities as fairgrounds, agricultural expo centers, and sale barns. In an emergency most of these facilities can accommodate a large number of animals.

Develop and implement a back-up feeding plan for use during an evacuation. On the move, grain and concentrate are more practical than hay or silage. Make sure the feed goes with the animals when they go. It could be disastrous if the vehicle carrying the feed was trapped or otherwise detained or delayed. It is easier to keep feed dry if stored and transported in barrels.

Water supplies will more than likely be contaminated, so *you will need to plan to move water with you* as well. Drums and barrels work well, but the most practical is perhaps the plastic water tanks designed for use on a truck bed. Some of these can carry 500 gallons or more. Carry plenty of buckets to use to water and feed your animals.

Emergency actions

Fill water tanks for livestock - you may need several days' supply. Construct emergency "ladders" for livestock, or open gates so livestock can escape high water. Stacked bales of hay can provide safety for goats; they'll climb them to escape rising water. In areas subject to flooding, leave doors and windows open at least 2 inches to equalize water pressure and help prevent buildings from shifting or collapsing. Move grain or other feeds to an area not likely to be flooded. Disconnect electric power to all barns and buildings that could be flooded. Develop a plan to milk any dairy animals. Check with the state health department for approved emergency milking procedures and facilities. You may be forced to dispose of the milk.

Flood

Floods are the most common natural disasters, and the most common causes of flood are excessive rainfall, snowmelt (including sudden volcano snowmelt) and hurricane storm surges. Some other less-common causes are tsunamis (discussed in the Earthquake section below), and dam and levee failure.

Floods destroy cropland, pastureland, forests, cities, and homes - basically anything in its path. Since damage from a flood usually covers a large geographical area, monetary damage can often run into the billions of dollars. Rivers and streams change course, often depositing large amounts of sediment or gravel over large areas, making any type of agriculture impossible.

Preparatory measures

If you buy a farm in a floodplain, check with your insurance agent to ensure that flood insurance is available. If your farm is below a dam, check out the dam's safety record and visit with the government agency responsible for its maintenance.. Make sure that access roads are not in the floodplain.

If you pasture animals in a floodplain, make sure your fencing arrangement allows an escape route for them to go to higher ground. Goats caught in high water risk ingesting water

contaminated with everything from agricultural chemicals such as pesticides and herbicides to human fecal matter and petroleum-based and other industrial chemicals. Remove barbed wire from areas that are subject to flooding. Animals can and do injure themselves severely on unseen submerged barbed wire.



Plan an evacuation route, should it be necessary to move animals any distance. Ensure that the route will not be cut off by rising waters. *Practice loading the animals* so they may become accustomed to the procedure. Keep your trailers maintained so they will be ready to use in an emergency. If you are in an area subject to flash flooding, plan at least two evacuation routes.

You should have a destination as close as possible to your farm where you can keep your animals until the water recedes. A neighboring farm, local fairgrounds, sale barn, or show arena make excellent emergency accommodations for livestock. Coordinate with the owner(s) well in advance.

As much as possible, protect feed from rising water. If that is not possible, plan to evacuate as much feed as you can, just as you plan to evacuate your livestock. Water supplies will probably be contaminated for several days following the flood. Have an alternative water supply plan and a back-up should that fail.

Emergency actions

Monitor rising water closely. If it looks like you will need to evacuate your animals, begin doing so early on. Keep them as calm as possible. Avoid leading them through flood waters which can hide all sorts of hazards - logs, debris, etc. Bear in mind that flood waters can also carry electrical current from downed power lines, etc. If you do have to lead animals through high water, be careful of fences that may be hidden.

Tornado

One of Nature's most violent and capricious forces is the *tornado*, a *funnel-shaped cloud with wind speeds exceeding 300 miles per hour*. Almost always accompanied by *hail* and *heavy rainfall*, a tornado destroys everything in its path, which can be up to a mile wide and as long as 50 or 60 miles. These destructive storms are categorized by intensity on the Fujita or "F" scale from F0 to F6; with an F6 being so strong and destructive, that it exists only in theory. Interestingly, a highly respected consulting firm once maintained that the relative strength of a tornado could be ascertained by the number of feathers lost by chickens in its path!

Most tornadoes occur with supercell thunderstorms that are created when warm moist air is forced upward (by the heat of the afternoon sun, a cold front, or other weather disturbance). If the updraft is strong enough and the wind shear is strong enough, a tornado may form. Supercells occur with winds that rotate from south to west and this orientation of the supercell's rotation causes it to track generally southwest-to-northeast.

On September 20, 2000 a tornado destroyed the automated watering and feeding systems serving twelve barns housing 85,000 hens each at a farm complex in Croton, Ohio. By October 3, an estimated one million laying hens had died slowly from thirst, exposure, and starvation or were reportedly crushed by bulldozers after two weeks of suffering.

April is the worse month for tornadoes in the U.S. On the night of April 3-4, 1974, during the worst tornado outbreak in U.S. history no less than 148 tornadoes tore through 13 states in less than 16 hours. In their wake were 330 people dead and 5,484 injured in a swath covering more than 2,500 miles.

Damages from tornadoes are often counted in the millions of dollars. Entire towns have been wiped off the map. Forests have been turned from magnificent stands of stately trees to tangled masses of twisted splinters in a matter of moments - damage that takes Nature decades to repair.

Preparatory measures

Tornadoes often strike with such suddenness that there is little time for preparation. Human safety is of such a concern that people seek cover immediately, having little or no time to get their livestock to safety. As a result, unlike with most other disasters, preparedness for a tornado focuses not on taking actions beforehand to mitigate damages and losses from a tornado, but on taking action after the event. After a tornado, livestock is usually found to be running loose due to destruction of barns and fences. Be prepared to do any emergency fencing necessary to contain your animals.

Emergency actions

The National Weather Service uses a simplified tornado/severe storm warning system:

TORNADO WATCH: Conditions are favorable for tornadoes. Remain alert for approaching storms.

TORNADO WARNING: A tornado has been sighted or indicated by weather radar. Take cover immediately.

SEVERE THUNDERSTORM WATCH: Severe thunderstorms are possible in your area.

SEVERE THUNDERSTORM WARNING: Severe thunderstorms are occurring.

Emergency actions are limited, for the most part, to seeking immediate shelter. Once the danger has passed, you will need to tend to your animals. There will probably be fences damaged, destroyed, or just plain missing, therefore your first item of business will be to contain your animals and to treat any injuries. Watch out for fallen power lines and stay out of the damaged area. Listen to the radio for information and instructions.

Winter Storms

Winter weather is dangerous at best and can be deadly to humans and livestock alike, if protective measures are not taken. There are basically *two types of severe winter storms* that present a danger to life: *blizzards* and *ice storms*. The bitter cold temperatures that cause them create a deadly situation when combined with even the slightest wind. Cold alone usually presents no danger to livestock in and of itself, but a 20-mph wind is equivalent to a 30-degree drop in temperature. Two common injuries in cold weather are frostbitten ears, which present little economic impact, and frostbitten male reproductive organs - disastrous to breeding. Despite the obvious dangers presented by winter weather, the Number One Killer of livestock in cold weather is dehydration.

A blizzard is defined by the National Weather Service as large amounts of falling or blowing snow with winds in excess of 35 mph and visibility of less than 1/4 mile. Ice storms occur when the temperature at the surface hovers around the freezing point. Liquid precipitation freezes as soon as it hits and accumulates very quickly. Trees and power lines quickly become overburdened with ice and begin to break.

During the Blizzard of 1888, millions of cattle perished in the Great Plains and Rocky Mountain regions, effectively destroying the beef industry in the United States. The effects escalated as time went on, and by the following summer, the economy of the United States was gripped in a great economic depression.

Preparing for a winter storm

Of primary importance for man and beast during a winter storm is shelter. Even a simple windbreak can mean the difference between life and death for a herd of animals. Incredibly enough, properly designed windbreaks, or timber-covered lowlands are better protection for range cattle, than most shed-type shelters, into which they are prone to overcrowd and overheat, causing subsequent respiratory problems such as pneumonia.



A better shelter is a well-ventilated barn with plenty of room to prevent overcrowding. In very cold temperatures, it is advisable to provide some sort of heat source for the barn, with a back-up source, of course. Kidding barns especially need to be warm.

Proper feeding is crucial to an animal's well-being in cold weather. *During severe or prolonged cold weather, animals need extra feed to maintain body heat and production weight gains.* A grain ration that maintains an animal during the summer will probably not carry it through the stress of prolonged or severe cold. Haul extra grain to feeding areas before the storm arrives. If the storm lasts for more than 48 hours, you may need to use emergency feeding methods. *Pelleted concentrates with molasses make good emergency feed.* Automatic feeders may not work during power failures unless you have a source of emergency power. Be sure to place sand or other gritty material on icy feedlots to provide good footing.

Add hay to the ration as soon as possible. Feeding hay daily will greatly reduce the possibility of overeating disorders. Even moisture-saturated hay can be used until suitable feed is available, but never feed mildewed hay.

As stated above, *the greatest danger to livestock in cold weather is dehydration*, often accompanied by *kidney failure*. All animals, especially ruminants, need plenty of water during cold weather. Livestock will not be able to satisfy all of their water requirements by eating snow. In pastures with severe drifting, water in shallow streams may be absorbed by snow in the stream bed or frozen solid. Very little, if any, running water may be available for several days. You may need to haul water to goats. If water is limited, keep goats off salt. Animals which have been away from feed and water for several days may overeat salt, causing salt poisoning. Whatever the source of water, watch that it remains unfrozen so animals can drink it.

Evacuation is seldom an option during a winter storm therefore it is best to be prepared for anything Old Man Winter throws your way. In remote areas, or when stock cannot be reached by roads, use planes, helicopters or snowmobiles to supply emergency rations.

Lightning

Lightning, by far the most powerful force on earth, occurs when a thundercloud becomes polarized with a positive electrical charge in the upper regions, and a negative charge in the lower regions. Updrafts carry positively charged ions skyward, while heavier, negatively charged ions are sped earthward on downdrafts. Immense electrical charges - up to 100 million volts - build up rapidly between the opposing poles in the cloud.

At the same time, the earth (usually negatively charged) builds up a positive charge caused by the negatively charged ions in the base of the cloud. Eventually, the charge becomes so great that it overwhelms the atmosphere's ability to act as an insulator, and in one of Nature's most spectacular optical illusions, a white-hot (50,000° F) stroke of lightning forms within millionths of a second and surges skyward at the fantastic rate of 422 million feet per second.

The awesome power of lightning is sometimes freakish. It has been known to melt holes in church bells, weld chains into iron bars, and cook potatoes while still in the ground. And contrary to popular belief, lightning does strike twice in the same place: the Empire State Building is struck by lightning about 50 times a year.

Each year, lightning strikes 400 people; killing 20% of its victims and leaving another 70% with serious long-term injuries. According to the Insurance Information Institute, in 1990, national lightning damage amounted to nearly five percent of all paid insurance claims, with residential claims alone exceeding one billion dollars.

Lightning is responsible for more than 80% of all livestock losses due to accidents and some 10,000 forest fires are attributed to lightning in the U.S. each year. Most livestock losses to lightning are not from direct strikes, but result from animals perishing in barn fires or brush fires started by lightning. Occasionally, lightning will strike an animal in the open, but most livestock

deaths in the open are the result of animals congregating under a tree or around a pole that is struck by lightning.

Preventive measures

While not all losses to lightning can be prevented, they can at least be mitigated by the installation of lightning protection systems for buildings, trees, fences, windmills, silos, etc. An effective lightning protection system includes many essential parts.

The five key parts of a system are:

1. ***Air terminals (lightning rods)***: Designed to attract and take any lightning bolt that may strike in the immediate area
2. ***Down (or main) conductors***: Conduct the lightning bolt safely from lightning rod to the ground
3. ***Secondary conductors***: Connect metal parts of buildings to the main conductors
4. ***Lightning arresters***: Protect a building's wiring system from lightning surges.
5. ***Ground connections or rods***: All grounding systems should enter the ground at the same point to prevent dangerous side flashes: telephone, electric service, antennas, metal plumbing including underground pipes and conduit, and lightning protection systems.

Installing lightning protection systems *providing at least two grounds for all buildings*, being sure to ground wire fences (not electric fences - they are already grounded), metal doors, hay tracks and rails, and metal roofs. Install terminals on cupolas, ventilators, etc. Ground metal stanchions, gates and corral panels. Install lightning arresters on overhead wires. Ground chimneys, stovepipes and vent pipes. Install lightning rods on all silos and ground the silos. Ground metal water pipes, light poles, and sign posts. Bury utility lines, including electric and telephone lines. Avoid traditional suspended lines which are much more likely to be struck by lightning and carry the current directly into a building. Ground metal dog run wires. To protect a tree, you can install terminals, making sure the rod sticks up above the crown of the tree. Alternately, you can put a fence around a lone tree at the drip line so animals won't gather under it.

Once you have your lightning protection system in place, make detailed *sketches* and *diagrams* so that you know where a strike will go to ground. Keep it with diagrams of wiring systems in barns and other buildings.

Emergency actions

If possible, bring animals into shelter if an electrical storm arises. Avoid tethering animals with a metal chain. Don't use metal-fastened collars or metal chains on animals to left in the open.

Seismic Activity

Interestingly, the disaster with the potential to be the most catastrophic is one which animals can sometimes sense long before it happens. Hours, sometimes days, before a seismic event, animals begin displaying abnormal behavior. Some become anxious and agitated, others become still and quiet. Sometimes a normally docile creature becomes aggressive right before an event, or a normally aggressive one may cower into a corner of its pen or cage.

Seismic activity can take many forms, virtually all of which can be deadly. Seismic activity basically occurs in two types of areas. The *edges of continental plates* pass under, pull apart from, collide with, or slide past their neighbors, creating zones of incredibly intense heat and pressure. When stresses in these regions of the earth's crust reach a critical point, the plates shift, sometimes causing the most intense earthquakes on the planet. It is also in this zone that you will find the greatest number of active volcanoes. If the epicenter of the activity is under the seabed, the resulting shockwave can set into motion a massive tidal wave, known as a *tsunami* that can slam ashore thousands of miles away with devastation on a biblical scale.

Mid-continental *hot-spots* are thin places in the earth's crust where molten rock, or *magma*, rises to or near the surface. Hot-spots can spawn earthquakes, geysers or volcanoes. Wyoming's Yellowstone Basin is a hotspot characterized by earthquakes, geysers and lava flows. The volcanic islands of Hawaii were formed on a plate sliding over a hot-spot. A mid-continental hot-spot in the U.S. is responsible for the creation of the namesake springs of Hot Springs, Arkansas; the formation of the Ozark Plateau; and the earthquake-prone fault zone centered near New Madrid, Missouri.

Loss of life (for both humans and animals) can come in many forms during a seismic event. For example, a March, 2004 *earthquake* in Turkey resulted in the loss of 60% of the affected region's livestock, most buried in valleys by rock and *landslides* from the slopes above. An eruption of Iceland's volcano, Laki, lasted from June of 1783 to February of 1784. The resulting *haze* was responsible for the loss of all of the island's livestock. Crops failed, and the human death toll was 9,350, most to starvation.

An eruption of the volcano Vesuvius in A.D. 79 buried the city of Pompeii, Italy (along with virtually all its inhabitants) under many feet of *ash*. The eruption of the *volcano* Mt. St. Helen's in Washington in 1980 melted the snow that blanketed its slopes in a matter of minutes, the resulting flood and *mudslide* almost as damaging as the force of the blast itself. An earthquake in San Francisco, California in 1906 spawned a *fire* that was far more destructive than the quake itself.

Seismic activity in the Mediterranean in ancient times resulted in *subsidence*, with entire islands slipping below the surface of the sea, giving rise to the legends of the Lost City of Atlantis. An earthquake in the Indian Ocean in December, 2004 created a *tsunami* that proved to be the most deadly natural disaster in history. Around the rim of the Bay of Bengal, 300,000 people lost their lives and thousands of miles of coastline were destroyed.

Preparatory measures

While it is next to impossible to prevent losses due to the immediate action of an earthquake, losses to causes after the event can be minimized. Of critical importance is a source of safe drinking water. *One of the greatest dangers in the aftermath of a destructive earthquake is disease, which is usually spread by contaminated drinking water.* As with most disasters, if you live in a fault zone, you need to develop a back-up water source, preferably one that is independent of the local public utility system. It helps as well, to keep a stockpile of feed, because roads into the area may be come blocked by debris, fallen bridges, etc.



If you are in an area that is subject to damage by the various destructive forces of a volcano, you may (as was the case in the 1980 Mt. St. Helens eruption) have ample warning to evacuate the danger area. *You need to have at least two escape routes leading to two different destinations.* Drive the routes, paying attention to areas that could become flooded or otherwise impassable. Keep your trailer tires aired up. Be ready to pull out on a moment's notice. Practice loading your animals so they get used to the procedure.

Miscellaneous Disasters

War and civil unrest (including peacetime maneuvers)

In a combat zone, livestock face unique dangers. Historically, (and this is still true in some under-developed countries) an army foraged for its food from local sources, commandeering whatever it needed to feed its soldiers.

Even with modern, well-fed troops, local livestock becomes an emergency food source for civilians who are unable to get fresh supplies due to the military situation. Also, the occasional stray artillery round finds a single animal or a herd, or animals get caught in cross fire. Animals get caught in razor wire entanglements, step on land mines and booby traps and generally get in the way, suffering all sorts of injuries.

In peacetime in the United States, the most likely scenario is fences being torn down by military vehicles on maneuver. In such cases, the military will have a Public Affairs officer contact all whose land his unit crossed and set in motion the process to get the farmers paid for damages.

Epidemic

Of all disasters likely to hit the livestock of the United States, perhaps none is more terrifying than an epidemic of some ruminant disease for which there is no cure. The panic-induced slaughter of a few herds of cows and sheep over "Mad Cow" Disease in recent years is nothing when you think of the possibility of a highly-contagious, rapidly-acting fatal disease that kills in a few hours. Such a disease could wipe out our nation's meat supply in only a few days.

Foreign diseases arrive in many forms and in many different ways. Importation of infected or exposed animals, even dirt on someone's shoes could introduce new and potentially dangerous diseases to the U.S. Perhaps one of the more interesting ways diseases travel is by hurricane. After Hurricane Dennis in 2005, animals as far north as Missouri developed a strain of pneumonia previously known only on the islands Caribbean. Although prompt treatment with powerful antibiotics took care of it, animals vaccinated against several strains of pneumonia became infected.

Outbreaks of diseases such as foot and mouth disease, vesicular stomatitis, and other viral and bacterial menaces are being monitored world-wide by the USDA Disease Research Center on Plum Island, NY. The center on Plum Island has partnered with the U.S. Department of Homeland Security to constantly seek methods of early detection of these and other diseases in an effort to head off acts of agroterrorism before our food supply is threatened.

What can producers do to help prevent an epidemic? Use extreme caution when importing animals from foreign countries. Close your herd as soon as practical. And most importantly, report any unusual health problem to your veterinarian immediately.

Livestock/Disaster Insurance

Insurance laws vary from state-to-state. Many farmer/rancher-owned insurance companies such as the Grange and the Farm Bureau underwrite some form or another of livestock insurance. Many Federal agencies subsidize disaster-specific insurance programs such as the National Flood Insurance Program (www.floodsmart.gov)

Since such insurance programs are often subject to available funding, check with your insurance agent, your County Extension Agent, or your local USDA office for currently available programs.

Conclusion

Preparedness for each of the disasters discussed above can be as detailed as your time and money will allow. Unfortunately, however, despite all your diligent preparations, you will lose some animals to disaster. Since disease is a great danger following a disaster, dispose of any carcasses as quickly as possible. The preferred method is rendering or cremation. Take extreme care when handling dead animals. Wear protective gloves and clothing.

By preparing as carefully as you can for disaster, despite the fact that you will lose animals, you can cut those losses to a minimum and save a great many.



Suggested Assignments

Completion of *Assignment Sheet 1 - Disaster Preparedness Kit*, that lists items that should be included in a disaster kit for your farm, and *Assignment Sheet 2 - Evaluate Disaster Types for Possible Occurrence at Family Farm and Develop an Emergency Preparedness Plan for Each Type of Disaster* are not required to complete this module or to pass the post test. These sheets can, however, assist you in planning for disasters that may occur in your area.

 [Assignment Sheet 1 - Disaster Preparedness Kit](#)

 [Assignment Sheet 2 - Evaluate Disaster Types for Possible Occurrence and Develop an Emergency Plan](#)

Agencies for Disaster Assistance

The agencies listed below have several programs for immediate and long-term disaster relief. While this is not a complete list by any means, their websites contain links to other disaster-relief agencies and organizations.

State Animal Health Departments - State Animal Health Departments have a variety of programs and services and are a rich source of information.

County Agents - State agricultural research and extension agents are usually well-informed and are an excellent source of information.

[Farm Service Agency Disaster Assistance. U.S. Department of Agriculture information on disaster relief programs](#)

[Federal Emergency Management Agency. FEMA: The Disaster Assistance Process for Individuals.](#)

[American Red Cross - A non-government organization that provides many disaster-related services](#)

[Government Loans - Low-interest government loans](#)

Resources

The sites listed below offer a wealth of information to aid in planning and preparing for a disaster.

[Drought Watch. U.S. Geological Survey state-by-state information on drought](#)

[Drought Information Center. Various National Oceanic and Atmospheric Administration websites and information on drought and climate conditions](#)

[National Drought Mitigation Center. Helps people reduce vulnerability to drought. Stresses preparation and risk management rather than crisis management](#)

[Drought Research & Resource Center - Colorado State University - Provides information for planning and managing drought events](#)

[U.S. Department of Agriculture Drought Assistance. USDA information on drought](#)

[Emergency Management Institute - A learning module similar to this one, but far more detailed](#)

[U.S. Department of Agriculture](#)

[National Oceanic and Atmospheric Administration](#)

[U.S. Geological Survey Earthquake Hazards Program](#)

[National Fire Protection Association](#)

[National Lightning Safety Institute - Provides objective assistance on many kinds of lightning problems](#)

[National Hurricane Center - A branch of the National Weather Service that provides storm information, hurricane awareness, historical information, tropical weather analysis and forecasting](#)

[National Ag Safety Database - A clearinghouse for hazards associated with agriculture-related injuries, deaths and illnesses](#)

[The Federal Alliance for Safe Homes - FLASH, Inc. is a non-profit, 501\(c\)3 organization dedicated to promoting disaster safety and property loss mitigation](#)

[Federal Emergency Management Agency - An agency of the U.S. Department of Homeland Security, FEMA emergency managers prepare for emergencies and disasters, respond to them when they occur, help people and institutions recover from them, mitigate their effects, and reduce the risk of loss](#)

[Farm Service Agency - A USDA agency that helps farm operations recover from the effects of disaster](#)

[National Flood Insurance Program - Information about flood insurance and mitigation activities](#)

[U.S. Army Corps of Engineers - The world's premier engineering organization, charged with controlling floods on America's inland waterways](#)

[U.S. Department of Agriculture](#)

[U.S. Department of Homeland Security](#)

[National Fire Protection Association - Publishes fire and building safety standards, including the National Electrical Code](#)

[Risk Management Agency, A U.S. Department of Agriculture agency, RMA promotes, supports, and regulates sound risk management solutions to preserve and strengthen the economic stability of America's agricultural producers](#)

[Plum Island Animal Disease Research Center - a U.S. Department of Agriculture agency partnered with the Department of Homeland Security to be the nation's first line of defense against foreign animal disease](#)

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