
**COLORADO STATE UNIVERSITY EXTENSION
BOULDER COUNTY**

**B O U L D E R
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L I V I N G
R E S O U R C E
G U I D E**

Livestock



**COLORADO STATE UNIVERSITY
EXTENSION**

LIVESTOCK

In this section, we'll provide some basic information and resources for various livestock species.

Introduction

Poisonous Plants for Livestock

Brand Inspection

Livestock Handling

Biosecurity

Manure Management

Livestock and Adverse Weather

Livestock Species

Beef Cattle

Dairy Cattle

Horses

Poultry

Chickens, Ducks, Geese and Turkeys

Swine

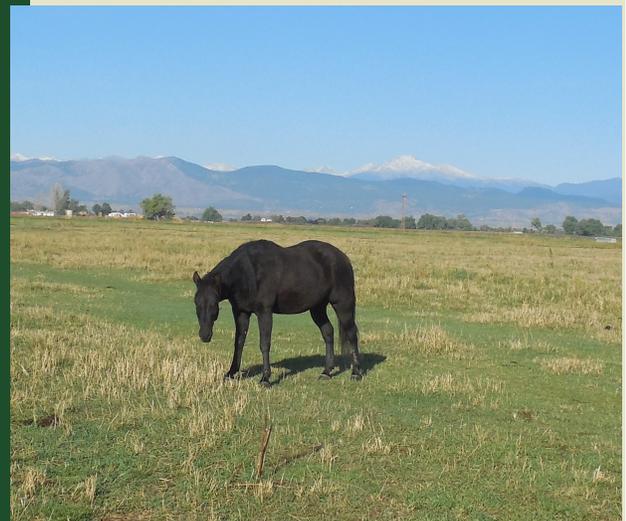
Sheep

Goats

Llamas and Alpacas

Rabbits

Bees



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Livestock

One of the first things to consider when entertaining the idea of raising domestic livestock is whether the enterprise you are considering is compatible with your lifestyle, the community you live in and your property. Is your property zoned for large animal production? How many animals can you legally have? How much forage does your property produce or does your property support? How much money do you have to purchase hay? How will your neighbors react to your project?

Livestock ownership is a 24/7, 365 day a year proposition. If you need to be away from the property, you must have someone lined up and trained to care for your livestock while you are away. You must be prepared to take care of the animals in all conditions, evacuate them in emergencies, and provide veterinary care for them. If your property does not produce enough forage or during drought you must be financially able to purchase additional feed or be prepared to sell some or all of your animals possibly at a loss. Depending on your reason for purchasing the livestock, you must be prepared to slaughter them or to take care of a carcass when they die. There are rules for burying carcasses on your property. Check with the Colorado Department of Agriculture or Boulder County Public Health for information. There are also rendering and disposal companies that haul carcasses off for a fee.

All livestock properties should have biosecurity (how you prevent disease from coming on to the property or manage spread once it is onsite), emergency preparedness and evacuation plans. The Extension Office can help develop these plans.

Some acreages are only suitable for forage production while others are suitable for limited grazing. If you have irrigation water available, you might be in a situation where you can handle a relatively small number of livestock. Depending on the vegetation on your property and irrigation water, the average amount of land to support 1 cow or horse is 25 – 40 acres without supplemental feed for a year. Land Use Codes may allow you more animals per acre than the land can support. A corral, sacrifice area or dry lot, must be available to keep the animals in when irrigating, and when the pasture needs rest from grazing. If there is adequate acreage, you might consider raising some of your own forage. Realize that it is expensive to own and maintain forage harvesting equipment that is only used once or twice a year. While it may not be economically feasible to own equipment, bringing in custom operators may be an option.

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If you decide you want to raise livestock to sell the meat or wool make sure that you have done your market research and know your market prior to purchasing the animals. You need to know the food regulations for processing meat. Any meat that you plan to sell to the public (i.e. at a farmer's market) needs to have been processed at a USDA inspected facility. If you are producing only for family or through a CSA (Community Supported Agriculture), those rules and regulations are different. Take the time to investigate your options and the regulations prior to purchasing the livestock.

Wildlife and pets do not always mix with livestock. You may need to improve enclosures to keep pets and wildlife out of livestock areas or invest in a guard animal such as a llama or dog to protect your livestock.

Livestock Healthcare

Prior to purchasing your livestock, identify and develop a relationship with a veterinarian in your area that treats your livestock species. You may want them to visit your property either before or just after you get your livestock to check out your facility or to check out the livestock prior to purchase. Building a relationship with the veterinarian prior to the midnight emergency call is essential.

With any livestock, follow the recommendations of your veterinarian concerning vaccinations, wormings and other healthcare issues. In addition to identifying a veterinarian, you may need to identify a farrier for horses, someone to trim hooves for goats, llamas and alpacas and a shearer. You can learn to take care of vaccinations, wormings and hoof trimming yourself if this interests you. Talk to other livestock owners in your area to see who they use.

Water Quality for Livestock

Although most livestock can tolerate water quality that may be unsuitable for human consumption, very poor water quality can impact livestock health, reproduction and performance. If the water quality of your livestock's drinking water is unknown, it should be tested for salinity, pH, sulfate, nitrate and potential toxic elements such as selenium.

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References:

National Center for Appropriate Technology Resources

<https://attra.ncat.org/livestock-and-pasture/>

Carcass Disposal Resources, Colorado Department of Agriculture

<https://www.colorado.gov/pacific/aganimals/emergency-preparedness-and-response>

Colorado Department of Public Health and Environment

<https://www.colorado.gov/pacific/sites/default/files/atoms/files/Animal-Carcass-Disposal-CDPHE.pdf>

Utah State University Extension Resources

<http://extension.usu.edu/rangelands/pages/livestock-wildlife>

CDA processing

Colorado State University Veterinary Extension

<http://veterinaryextension.colostate.edu/>



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Colorado Fence and Trespass Law

Colorado is an “open range” state and meaning that it is the landowner’s responsibility to “fence out” any livestock that may come on your property. It is not the livestock owner’s responsibility to fence their livestock, so they remain within their pasture/range boundaries although most do to protect their livestock. Open range is a land definition, not a law.

The old adage “Good fences make good neighbors” rings true still today. The Colorado fence law goes back to the early 1880’s and is very different from many other states and regions. The Colorado Revised Statute pertaining to fence law is CRS 35-46-101. Livestock invading your fenced property is not a criminal offense, but civil recourse may be available to the landowner with a “Lawful Fence” for damages incurred.

Colorado Fence Law addresses key items like defining what is a lawful fence, who is responsible for construction and maintenance of a lawful fence and who can claim damages for trespass. The Colorado Statutes #35-46-101 clearly defines two important terms for addressing issues that apply to fencing and trespass “Lawful Fence” and “Livestock”. The following are the definition of the terms from the Colorado Revised Statutes and they should be referred to when building, maintaining, repairing and replacing any fences.

A “Lawful Fence” is defined as a “well-constructed three barbed wire fence with substantial posts set at a distance of approximately 20 feet apart, and sufficient to turn ordinary horses and cattle, with all gates equally as good as the fence, or any other fence of like efficiency.” “Livestock” includes horses, cattle, mules, donkeys, goats, sheep, swine, and buffalo (bison).

According to the Colorado Department of Agriculture, Colorado’s “Fence Law” will not prohibit any legal action for any escaped livestock involved in an accident on the public highways.

If you do have a “Lawful Fence”, but another’s livestock are on your property, the burden of proof falls upon you, the property owner, to prove that the livestock broke through a “Lawful Fence” and did not simply walk through an open gate, unfenced portion or a broken fence. It is legal to take possession of livestock that have trespassed on your property, but if you do keep that livestock, you also become legally responsible to feed and care for the livestock. (CRS 35-46-102) You must also notify your local brand inspector and the sheriff’s office when livestock is held for trespass damage.

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Construction and Maintenance of "Lawful Fence":

Colorado Statute #35-46-112 puts the burden of the construction cost or repair of a fence on adjoining properties on both land owners. Caution should be taken in that the statute only requires a land owner to meet the standard of the definition of a lawful fence. If one land owner wants to make the fence to a higher standard that landowner may be responsible for the additional costs. In any case, they should follow the procedure set forth in Statute #35-46-113 - If after thirty days written notice (certified letter), served personally or by registered mail by either owner or tenant of another, if such owner neglects or refuses to erect or repair one-half of the partition fence, the person giving notice then may undertake repairs and may collect by a civil action one-half of the cost, refers only to a "Lawful Fence". It is always good practice to have written documentation of all agreements and how you complied with the above procedure before purchasing any materials.

Livestock Trespass

Colorado Statute #35-46-102 does give provision that helps protect landowners from stock producers that knowingly drive herds on to another person's land or from repeated livestock trespass where a "Lawful Fence" is in place and maintained to recover damages through a civil court process. In any case of livestock trespass, it is best that you keep local sheriff's office and brand inspection office (a division of the Colorado Department of Agriculture) involved. There are some generalizations that can be made in helping with issues that arise between neighbors in regard to livestock and fencing:

- Always refer to updated Colorado Revised Statutes on Fencing Laws and consult with local law enforcement and brand inspection.
 - Make sure that a "Lawful Fence" is in place and that it is regularly maintained.
 - Colorado fence laws favor the livestock owner and put the duty of protecting property on the landowner.
 - An open and good working relationship with adjacent landowners is the best prevention for issues with livestock and fencing.
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Resources:

Colorado Revised Statute on Fencing Laws. CO Dept. of Agriculture Open Range and Fencing

www.colorado.gov/ag

Fencing with Wildlife in Mind. Colorado Division of Wildlife

<https://cpw.state.co.us/Documents/LandWater/PrivateLandPrograms/FencingWithWildlifeInMind.pdf>

Fences for horses, University of Georgia Extension

https://secure.caes.uga.edu/extension/publications/files/pdf/B%201192_5.PDF

Planning Fencing Systems for Intensive Grazing Management, University of Kentucky Cooperative Extension Service

<http://www2.ca.uky.edu/agcomm/pubs/id/id74/id74.pdf>

Planning and Building Fences on the Farm, University of Tennessee Extension

<https://extension.tennessee.edu/publications/documents/pb1541.pdf>

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Poisonous Plants for Livestock

If you are pasturing livestock, be aware that there are some plants that are poisonous to animals. Some are native plants, not noxious weeds, but they are still undesirable in the pasture (but are fine in areas where livestock doesn't graze). Others are noxious weeds, and thus should be managed. While many poisonous plants have an unpleasant taste that animals avoid, if other forage is limited due to drought or overgrazing, livestock may graze them anyway or even develop a taste for them. Some plants cause extreme photosensitivity/sunburn due to liver disease, others cause only temporary symptoms until the animal is removed from the plant source, while others cause incurable symptoms or death even after the animal is removed from the source. Livestock owners should inspect their pasture prior to turning animals out to graze for the first time each season. Watch for unusual behavior in your animals. If you suspect a poisoning, consult a veterinarian as soon as possible. Be sure to collect plant samples you suspect caused the poisoning for positive identification.

The Six Worst Plants for Horses (according to Colorado's Poisonous Menace booklet)

- Senecio (Senecio spp.) (S. jacobea or tansy ragwort is a List A noxious weed. There are many species of native Senecios, many of which are toxic).
- Houndstongue (Cynoglossum officinale) Also a list B noxious weed.
- Locoweed (Oxytropis lambertii and sericea and Astragalus molissimus) All grazing animals are affected, damage is often irreversible. These are native plants.
- Sages (Artemisia frigida, A. ludoviciana, these are native plants) (A. absinthium is a list B noxious weed but is rare on the front range). Sage poisoning is most pronounced in winter time when heavy snow covers the lower growing range grasses. Horses can eat sage without problem provided they are not forced to eat it exclusively when other forages are scarce.
- Russian knapweed (Acroptilon repens) Also a list B Noxious weed (rare in the Front Range mountains) is only toxic to horses and can cause an irreversible and usually fatal brain disease.



Fringed sage, Artemisia frigida

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Other Common Plants that may be Poisonous to Livestock (list is not necessarily comprehensive)

Golden Banner ([Thermopsis divaricarpa](#)) Native

Chokecherry ([Prunus virginiana](#)) Native, All plants in the Prunus family contain cyanide and are poisonous.

Virginia creeper ([Parthenocissus quinquefolia](#)) Non-native

Larkspur ([Delphinium spp.](#)) (Causes more fatal poisoning of cattle than any other naturally occurring species – horses are less susceptible) Native

Monkshood ([Aconitum spp.](#)) Native

Lupines ([Lupinus spp.](#)) Native

Hairy vetch ([Vicia villosa](#)) Non-native

Poison hemlock ([Conium maculatum](#)) Non-native List C noxious weed.

Water hemlock ([Cicuta maculata](#)) Native

Death Camas ([Anticlea elegans](#), or at lower elevations, [Toxicoscordion venenosum](#)) Native

Flixweed ([Descurainia sophia](#)) Non-native

Field Bindweed, morning glory ([Convolvulus arvensis](#)) Non-native

Nightshades ([Solanum spp.](#)) Both native and non-native

Serviceberry ([Amelanchier alnifolia](#)) Native

Other plants and weeds may become poisonous to livestock when they accumulate high levels of certain elements such as nitrogen (in the form of nitrates) or selenium. Kochia, a common nuisance weed, can accumulate toxic nitrate levels when growing in an over fertilized area or drylot (excess nitrates due to urine accumulation). In certain areas in Boulder County, soils contain higher selenium levels. Forage plants grown in these soils can take up and store excess selenium levels. Having hay tested helps in managing this problem.



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References:

Online guide to poisonous plants - from Dr. Tony Knight at CSU (includes pictures, symptoms)
http://southcampus.colostate.edu/poisonous_plants/index.cfm

Webinar on Poisonous plants for horses by Dr. Tony Knight
<https://connect.extension.iastate.edu/p3dl0a6bkb3/>

Book: A guide to plant poisonings of animals in North America, by Anthony Knight and Richard Walter.

http://southcampus.colostate.edu/poisonous_plants/book/book.html

Booklet: Colorado's Poisonous Menace: Do you know what your horse is eating? Produced by the Colorado Dept. of Agriculture

<http://www.co.weld.co.us/assets/3B6a9C9450D27066296d.pdf>



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Livestock Handling

It is important for both your health and your livestock's health that you know how to handle them safely and with confidence. Prior to purchasing livestock is the best time to learn all you can about your particular species such as what is a healthy animal and what care do they need, what are their needs when it comes to nutrition, fencing and housing, and learning how to handle and move them around your property.

Vision

Animals sense their surroundings very differently than humans due to their better hearing, sense of smell and their wider field of vision. When handling livestock, it is important to keep this in mind both for the comfort of the animal and their safety and yours.

Many livestock species only see in black and white, not color. Due to the placement of their eyes on the sides of their heads, livestock have a field of vision almost twice that of humans but only a portion of it is binocular which means they have poor depth perception.

Fields of Vision

Humans – 155 to 210 degrees

Cattle – 330 degrees, 25 – 50 degrees binocular

Horse – 350 degrees, 65 degrees binocular

Sheep – 270 – 320 degrees

Goats – 320 – 340 degrees

Swine – 310 degrees, 35 – 50 degrees binocular

Chickens – 300 degrees

Hearing

Most livestock have wider hearing ranges than humans. Because of their more sensitive hearing, livestock are able to detect sounds that humans cannot hear. Loud and unexpected noises easily frighten them. So being calm and quietly talking to and touching them, keeps them calmer and easier to handle.

Humans – to 20,000 Hz, most sensitive between 1,000 to 3,000 Hz

Cattle – to 40,000 Hz, most sensitive between 7,000 to 8,000 Hz

Sheep – to 40,000 Hz

Swine – to 40,000 Hz, most sensitive up to 16,000 Hz

Chickens – to 7,200 Hz, most sensitive at 2,000 Hz

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Livestock like humans prefer a routine such as feeding and milking at the same time every day. They also have their “friends” or herd (other animals that they are around each day). Removing them from these “safe” environments or adding new elements or animals to the farm can add stress. Most livestock are herd animals meaning that they prefer to not be alone and to have other animals around them. Maintaining that routine and familiar territory keeps animals happier and calmer.

Much like dealing with children, patience is a virtue when handling livestock. Reacting with impatience or yelling when the animals are not doing what you want them to do will not serve you well. Calmly walking and talking to them gets them to respond faster and in the manner you want. Working with your animals routinely teaches them to know you and your expectations and get comfortable with your handling methods. Be confident but not cocky in how you handle them. Being able to handle them during an emergency evacuation starts when you handle them when it’s not an emergency. Make sure family members and others who may handle your animals know how to properly handle your livestock both prior to and during an emergency.

Intact male animals are naturally more aggressive and should be handled with extra care. It’s a good idea to have a separate area to handle them. Females with young are also more protective and may respond differently or more aggressively. Take these considerations into account when handling these animals.

Livestock have a flight zone which is their personal space and in their vision range. They are most comfortable when they can hear and see what is in the area and will act/move to get back into their comfort zone. For most animals their point of balance is at their shoulders. If you are in front of the animal, it will take steps backward to a more comfortable position. If you are in back of the animal, you trigger the animal to move forward away from you. By positioning yourself, you can calmly move animals around without the use of a prod or loud noises. Most animals cannot see directly behind them or right in front of their nose. They move so that they keep you within their field of vision.

Your facilities can make handling your livestock easier. Having a rough finished concrete floor with good drainage provides better footing for your animals. High traffic areas provide the best footing if they have grooved concrete. While a smooth finish to a concrete floor makes it easier to clean, it can become slippery when wet making animals uneasy. Lighting should be even that does not create shadows which scare animals. Fences, gates and other structures should be built with your species in mind and be structurally sound and not have sharp edges or other protrusions that can injure animals. Chutes and alleys should be wide enough for animals to pass each other but not wide enough for them to be able to turn around. Periodically inspect all structures and repair any areas that could harm animals. Good housekeeping and cleaning provide a healthier environment.

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When working with any livestock in closer quarters, be sure to have a way of escape. Animals can change mood depending on the situation and you need to be ready to get out of the enclosure quickly.

The main points to remember are:

- Avoid quick movements and loud noises.
- Be patient and act calmly.
- Establish a routine.
- Move slowly and deliberately around livestock; gently touch animals rather than shoving or bumping them. Don't shout.
- Always have an escape route when working with animals in close quarters.
- Most animals tend to be aggressive when protecting their young; be extra careful around cows with newborn calves.
- Males of breeding age are very dangerous. Use special facilities for them and practice extreme caution when handling them. Never trust them or assume they are tame.
- Keep young children away from animal handling areas.
- Never prod an animal when it has nowhere to go.
- Respect animals-their size and bulk make them potentially dangerous.
- Be cautious around animals that are frightened.

When you are handling livestock watch for the following signs that may indicate fear or aggression in the animals:

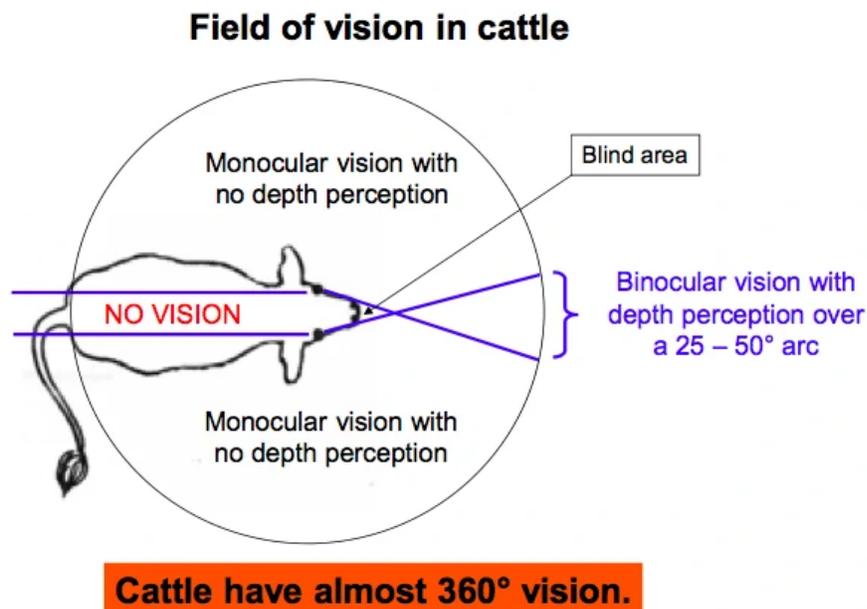
- raised or pinned (flattened) ears;
- raised tail or rapidly lashing tail;
- raised hair on the back;
- bared teeth;
- pawing the ground;
- stiff-legged gate or posture;
- snorting/growling.



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Resources:

Livestock Handling Safety, Texas Department of Insurance
<https://www.tdi.texas.gov/pubs/videoresource/stpsafelivest.pdf>
Livestock Handling and Confinement Safety, National Ag Safety Database
<https://nasdonline.org/911/d000754/livestock-handling-and-confinement-safety.html>
Cattle Handling Safety, University of Wisconsin - Madison
<https://fyi.extension.wisc.edu/agsafety/dairy-worker/cattle-handling/>
Recommended Basic Livestock Handling
<https://www.grandin.com/behaviour/principles/principles.html>
Animal Handling Safety Considerations
<https://extension.missouri.edu/publications/g1931>



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Brand Inspection

The following items are a highlighted overview of the requirements to purchase, sell or transport livestock within Colorado, or into or out of the state. Also included are a few pointers when purchasing livestock in other states that are transported into Colorado. Employees of the State Board of Stock Inspection are charged with the protection of the Colorado livestock industry. They must certify that the shipper or seller is the legal owner prior to issuing a certificate. All lost, missing, stray or stolen livestock fall under the jurisdiction and control of the State Board.

Things to Remember

- Inspection is required for the sale or movement of livestock, even if the previous parties did not comply the last time the animal was sold or transported.
- Inspection is required regardless of whether or not the animal is branded.
- Inspection is required on all classes of livestock. Registration papers, or lack of registry, does not exempt inspection.
- For the purposes of this article, the definition of a brand is a permanent mark on the hide of an animal registered with any state as a livestock brand. (Tattoos are not brands.)
- Inspection is required at the point of origin, unless released by the local inspector.
- A health certificate may be required prior to sale or movement. Contact the Colorado Department of Agriculture for requirements.

Regulations

Additional information regarding exact regulations can be obtained from the Division of Brand Inspection, State Board of Stock Inspection Commissioners (Brand Board), a section of Colorado's Department of Agriculture.

Information About Out-of-State Livestock Purchases

When purchasing animals in states other than Colorado, be sure to check that state's requirements concerning inspection and movement prior to the purchase and transport of livestock into Colorado.

Several states do not have an inspection law and, therefore, a certified inspection cannot be obtained. Always get a valid bill of sale and a health certificate when purchasing animals in no-inspection states. This needs to include a complete description of the animals being purchased, including number of head, color, sex, breed, markings, registration numbers and hot iron brands among other pertinent information.

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Resources:

Office of the State Board of Stock Inspection Commissioner
www.colorado.gov/ag



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Biosecurity

Preventing Disease Outbreaks on the Property

Biosecurity is defined as the measures taken to prevent disease from entering a farm and to prevent transmission within a farm. Biosecurity maximizes livestock health and minimizes potential for disease spread. The 3 basic tenants of biosecurity are Isolation, Traffic Control and Sanitation. These tenants are accomplished by exclusion and containment.

What does this mean for the small acreage livestock owner? The first step is to isolate as much as possible your animals from wildlife and other livestock, for example your poultry from wild birds. Wildlife, especially wild birds, can be disease carriers such as avian influenza. By allowing your livestock to interact with wildlife or livestock owned by others, you may be allowing disease transmission. For poultry owners, if your property attracts a lot of wild geese and ducks, do not allow your flock to use the areas where the wild birds congregate. If you use a chicken tractor to move your flock around the property, make sure to avoid areas where wild birds have congregated. It is also a good idea to have a roof on your enclosure not only for biosecurity purposes but also from a predator protection point.

For poultry owners, it is best to practice an all-in/all-out management system. This means that you start with a flock of same age birds and you do not add any new birds to the flock. When you are ready either to sell or harvest them, the whole flock goes. You do not keep any of them. You can then thoroughly clean and disinfect the coop and run. You then purchase a new flock. If you do bring in new birds or take birds to shows, it is best to isolate them for 4 weeks after returning just in case they are carrying a disease. For new birds, try to get their care history. This way you do not run the risk of the whole flock getting sick. If you notice that one of your birds is sick, isolate that bird so that it does not spread the illness to other birds. Flock owners need to know what a healthy bird is and what normal behavior is.

For all livestock owners, have separate boots and clothing that are only worn on your farm and when you are working with your livestock. Wear different clothing and boots when visiting other facilities. Disinfect the clothing you wore offsite when you get home before you work with your livestock. If others visit your property, have a disinfectant foot bath or booties at a minimum so they don't bring disease to your property. Be aware of other vehicles that can bring disease on your property. Do you have large quantities of feed delivered? If so, you may want to have it delivered to an area that is separate from your animals. Keep your coops, stables/barns, shelters and areas around them clean. Make sure you clean and disinfect your coop and other livestock areas at least once a year but more is better. Rodent proofing feed storage areas helps prevent disease transmission. Cleanup feed spills to prevent attracting rodents and wildlife. Water tanks should also be cleaned and disinfected

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on a routine schedule. Having wildlife ladders in water tanks prevents bats, birds and other wildlife from accidentally getting into water tanks and not being able to get out.

Tools and equipment should not be shared with other livestock owners and be routinely cleaned, disinfected and stored so that wildlife does not have access. Hand washing and sanitizing stations should be used prior to entering livestock areas. Keep the property clean by mowing grasses and weeds and not providing trashy areas that rodents and other wildlife can inhabit.

When taking care of livestock, do it in order of youngest (most vulnerable) to older and from healthiest to ill animals. This prevents disease spread to more vulnerable animals. Use different equipment for ill animals than for healthy animals. Check your animals daily, watch them for any different behaviors that may indicate problems. Keeping pets out of livestock areas is also a good idea. Remove and dispose of any carcasses as soon as they are found.

Identify a veterinarian in your area that is knowledgeable about the livestock species that you have and is available to treat them when necessary. Your local extension agent is most likely not a veterinarian and will not diagnose the problem with your animal over the phone. They can help you with improving the biosecurity on your property, developing a biosecurity plan and most likely be involved if your property is involved in a disease outbreak and may have a list of local veterinarians.

Resources

Biosecurity: Protecting your Livestock and poultry, USDA

https://www.aphis.usda.gov/publications/animal_health/content/printable_version/fs_bio_sec_07.pdf

Colorado State University Veterinary Extension Biosecurity website

<http://veterinaryextension.colostate.edu/menu1/biosecurity.shtml>

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Manure Management

Manure can be an invaluable resource for soil and plant health, but it can also be a water pollutant, produce odor, a disease source, attract flies and parasites and be a general nuisance. Animal owners are responsible for managing manure to protect surface and ground water and provide their animals with a safe and clean environment. Federal and state laws forbid discharging animal waste into water. Manure has the potential to pollute water, affecting human and aquatic health, recreation (fishing and swimming), and drinking water.

Manure contains nutrients (particularly nitrogen and phosphorous), bacteria and protozoa (such as *E. coli* and *Giardia*) that can negatively impact our lakes, rivers, and groundwater (i.e. well water). High nitrogen levels in water can be toxic to fish, and can cause blue baby syndrome in humans, livestock deaths, and other health problems in humans or animals drinking the water. Excess phosphorus can cause algae blooms which can lead to fish kills. In addition, manure can produce fecal coliform contamination in water, making it potentially hazardous to fish and humans.

Mud and manure can cause abscesses, thrush, and other livestock diseases. Dried manure produces molds that contribute to respiratory problems in horses and cattle. By adopting simple and low-cost best management practices (BMPs) for storing, handling, managing and utilizing manure, the environment and livestock health benefit. Lost nutrients can contribute to water pollution. Manure nutrients can be lost through erosion, water run-off, volatilization, and even leaching.

Manure management means having a plan for properly storing and using the manure produced by your animals. Manure can be stockpiled, composted, spread on fields and pastures, and/or disposed of off-site. For all these options, there are strategies which when implemented, reduces the likelihood of water pollution and pathogenic infection.

Disposal Options

Dispose off-site to a landfill or hire someone to pick up and dispose of or compost manure. Although not the best option, check with your local waste disposal company to see if they allow manure or can haul to their composting facility. Other ways to get rid of manure are to market it to friends, family, coworkers, and neighbors for use in their compost pile, pastures or landscaping.

Composting

Composting requires the correct ratio of carbon (bedding or leaves or other brown material) .

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and nitrogen (manure, grass clippings) for rapid decomposition. A 30:1 (C:N) ratio, water to keep the pile moist and aerating the pile regularly promotes the quickest decomposition. Composting manure takes additional labor and time, but it reduces the total volume by more than half, reduces smell, and can kill weed seeds and pathogens like E. coli.

For composting to work, the proper ingredients are needed:

1. Mix the correct carbon:nitrogen ratio (30:1). For manure composting, this means using by volume about 2 parts carbon (bedding, leaves, shredded paper, and brown grass clippings) for 1-part manure or other green material (i.e. grass clipping, manure) by volume.
2. Oxygen throughout the pile is required for decomposing organisms. Aeration, getting oxygen into the pile, is created by turning the pile regularly.
3. The pile should be 50% moist (feels like a wrung-out sponge). This can be achieved by watering as needed. Try using a tarp over the pile to keep moisture contained and prevent outer layer from drying out.
4. Allow enough time for the material to break-down. The composting process may take much longer during cold winter temperatures and in our arid climate and if you are not actively watering and aerating it.
5. Naturally occurring bacteria and microorganisms break down the material. There is no need to add any kind of starter organism. They are naturally occurring in soil, vegetation and manure.

Actively composting manure properly kills most E. coli and weed seeds. For a manure pile to be composted properly, the following requirements must be met:

- Mix the compost regularly. This is important not only for aeration but also to ensure that the entire pile has reached the required temperature and time to kill pathogens.
- Monitor the temperature. Long probe thermometers are available for this purpose. The temperature must reach 130 to 140 degrees F for at least two five-day heating cycles. Mix the compost between cycles. The temperature drops temporarily after turning but quickly heats back up. Pathogens are a potential problem with fresh manure, especially on vegetable gardens. Home-composted products containing manure are best used in flower gardens, shrub borders and other nonfood gardens. To prevent E. coli infection, always wash your hands with soap and warm water after handling manure. Don't use the same tools for manure handling that you use for crop harvesting (buckets or gloves, for example). Remove manure-contaminated clothing, including shoes and gloves, before going into the house and specially before eating, drinking or preparing food.
- After composting the composting process is complete allow the compost to cure for two to four months before applying it to your soil. This allows the beneficial bacteria to kill disease-causing bacteria.

Spread manure in spring or summer when the ground is not frozen. To integrate using

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manure as part of your fertilization plan, you may want to test manure for nutrient content and spread based on soil test recommendations. Unused nutrients pollute water bodies and groundwater. Keeping records is essential to manure application because you don't want to apply more nutrients than the vegetation can utilize. Keep track of when and how much manure or compost is applied. If possible, regularly have manure or compost analyzed for nutrient content (N, P, K, and electrical conductivity (salts)) and apply manure at a rate that does not exceed crop nutrient requirements. Test your soil and manure at a certified laboratory.

Never apply manure to land that is highly erodible (steep slope), frozen, or saturated. Spread manure evenly, no more than one inch thick per year. Incorporating (mixing manure with soil) manure immediately after application reduces nutrient losses from erosion and volatilization. Harrowing pastures after spreading manure further breaks-up and distribute manure for faster decomposition. The best time to spread manure is in the spring because nutrients are quickly utilized by plants at this time of year.

If your manure is mostly wood shavings (more than the 30:1 ratio), consider composting it first before land application. The shavings as a carbon source may tie up too much of your soil's nitrogen during decomposition. Grasses do not have access to all the soil nitrogen during decomposition. Don't apply fresh manure to your fruit or vegetable garden. Even aged manure can have E. coli present. Additionally, fresh manure is higher in salts and nitrogen that can damage crops. This is another reason to let your manure compost and cure before use.

Stockpiling Manure

Stockpile manure at least 150 feet away from surface water (ponds, wetlands, streams), wells, and gardens preferably not on a slope. Reroute rainwater (including roof water) or snowmelt away from manure stockpiles. Build an earthen berm or diversion and use gutters and downspouts to divert clean water away from manure piles. If manure has historically been stored near a well head or other human or livestock drinking water source, your drinking water should be tested for nitrates, heavy metals, and fecal coliform by a certified laboratory. Manure storage must be moved away from human and livestock drinking water sources.

Manure Management Strategies

- Keep animals out of surface water bodies. While animals are drinking or walking through water bodies, they often leave manure behind. Manure nutrients can kill fish, cause algae blooms, and spread bacteria to our drinking water. Use temporary or permanent fence to prevent or limit livestock access to surface waters. Install water tanks so animals don't have to drink from surface water.
 - Manure management on pastures depends on getting good manure distribution across the pasture. Rotational grazing is an excellent way to achieve good manure distribution. Moving mineral blocks, supplemental feeding and watering facilities often encourages better manure distribution. Use a harrow to break-up and spread manure in pastures.
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- Be aware that manure tends to be high in salts, when applied at excessive rates it can contribute to soil salinity. Soil salinity causes plants to become water stressed. When manure is applied to pastures, salts can accumulate on the soil surface unless they are leached into the subsoil. Salt accumulation is most common with clay-based soils with limited irrigation and rainfall.
- Plant shrubs and trees to reduce wind and odor near stockpiles. Stockpile manure downwind from barns and 200 feet from your neighbors. Control insects. Raw manure and mud provide a breeding ground for flies. Remove manure and soiled bedding from barns, shelters and corrals on a regular basis. Composting at proper temperatures inhibits fly development. Use fly predatory wasps or one of the several pesticides labeled for use on manure piles to kill maggots.
- Be aware that if animals eat forage which was treated with herbicides containing aminopyralid, clopyralid, or picloram, the herbicide can carry over in manure and composted manure. This becomes a problem when the manure or composted manure is used on vegetable gardens. If you purchase forage, compost, or manure, be sure to ask what herbicides were used on the field.

References:

Choosing a Soil Amendment, CSU Extension Fact Sheet #7.235

<https://extension.colostate.edu/topic-areas/yard-garden/choosing-a-soil-amendment/>

Preventing e-coli from Garden to Plate, CSU Extension Fact Sheet #9.369,

<https://extension.colostate.edu/topic-areas/nutrition-food-safety-health/preventing-e-coli-from-garden-to-plate-9-369/>

CSU Soil, Water, Plant Testing Lab

<http://www.soiltestinglab.colostate.edu/>

For more information on herbicide carryover read, "Contaminated Organic Material Kills Sensitive Vegetables", Small Acreage Management Newsletter, Summer 2011, archived at

<http://www.ext.colostate.edu/sam/nlarch.html>

Best Management Practices for Manure Utilization

<https://extension.colostate.edu/docs/pubs/crops/568A.pdf>

Anaerobic Digestion of Animal Wastes in Colorado, CSU Extension Factsheet No. 1.227

<https://extension.colostate.edu/topic-areas/agriculture/anaerobic-digestion-of-animal-wastes-in-colorado-1-227/>

National Center for Appropriate Technology ATTRA Resources

<https://attra.ncat.org/soils/>

Composting Horse Manure for Environmental and Economic Benefit, Texas A&M University

<http://lshs.tamu.edu/docs/lshs/end->

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Livestock and Adverse Weather

Helping your livestock survive and thrive in winter weather starts with planning. Key considerations are providing them with feed (livestock have increased nutritional needs in colder weather and getting feed to the livestock may be challenging), shelter, water, and your choice of species and breed. Livestock with more hair stay warmer than those with minimal hair (i.e. beef cattle versus dairy cattle). Consider breeds that originate from colder climates rather than tropical areas. Purchase your animals locally so that they are adjusted to our climate and elevation. For poultry, choose those that have smaller combs and wattles to prevent freezing. You may want to insulate their coop and keep a light on for heat on those subzero nights.

Most livestock species are designed to live outside and survive most weather conditions. The Lowest Critical Environmental Temperature (LCT) is the temperature at which animals can maintain their main core body temperature without supplemental energy (feed). For most livestock, if they are dry, the LCT is 20 to 32 degrees F. However, if they get wet, it goes up to 60 degree F. Both temperatures are without a wind chill factor. For every 20 degrees F drop-in wind-chill temperature, livestock energy (feed) requirements go up 1%.

To help your livestock maintain good body condition in adverse weather, you need to do several things.

- Monitor your livestock for excessive shivering, lethargy and weakness. As animals begin to experience hypothermia, they increase their metabolism to generate more heat. Blood flow to the extremities is reduced. Ears, combs and teats may experience frostbite. Rapid warming of the teats is needed to minimize damage and monitoring for mastitis is required after calving. Some frostbite damage may not be reversible.
 - Provide them with plenty of forage to meet their added calorie requirement. Have your hay tested so that you know the nutritional value. Providing good, top quality hay is essential during the winter months. For horses, you can provide some “comfort” food such as warm bran mash, moistened beet pulp or soaked pelleted feed to increase water intake and provide some warmth. You may need to increase the feed amount and the “nutrient density” (feeding alfalfa in addition to grass hay, be careful doing this with ruminants so that you don’t cause bloat). More nutritionally dense (packed with nutrients) grains may need to be added to the diet.
 - Water is critical to all living beings. Livestock daily water requirements range from 3 gal/day for sheep to 14 gal/day or more for cattle. They cannot meet their requirements from either forage or consuming snow or ice. Consuming snow or ice lowers body temperature making them more vulnerable to problems. They need fresh, unfrozen and, if possible, slightly warmed water. They tend to drink less when water is
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cold, so they can become dehydrated. You can use tank heaters to help keep stock tanks clear of ice and water slightly warmed (35 – 40 degrees F). However, you need to check the heaters frequently to prevent fire and electrocution problems. Have a backup generator in the event power fails. Young and older animals are especially vulnerable during the cold.

Providing them extra bedding, protection, and warm food and water is important. If you are lambing or calving during the cold, make sure that the mothers are in a well-protected building or area with plenty of bedding for warmth. Make sure that the young get dried off quickly after birth.

Most livestock don't need a fully insulated, state-of-the-art, heated barn. In many cases, a roofed three-sided structure, a hill, clumps of trees, or a solid fence provides enough protection from cold winter winds. Reducing winter wind exposure is a must so orient the building based on your winter prevailing winds. The structure, or area, must have plenty of dry bedding. Livestock can conserve 20 to 25% heat loss by lying down on dry bedding.

The shelter needs to be sized to handle all the livestock that will be using it. Please refer to the Oregon State document link for square footage needed for each species. Wet, muddy, or no bedding can increase their vulnerability to cold temperatures. During a snowstorm or cold spring rain, a structure that provides not only wind protection but a roof to keep them dry is needed. Remember that the LCT jumps drastically as they get wet. Protection desired varies by species. Sheep don't mind getting wet, but goats do so they seek shelter rather than graze in the open. Dairy cattle chill quicker than beef cattle since they tend to have less hair to insulate them. The coat condition is critical to providing insulation. The more hair the better as it allows for air space between the hairs to act as insulation. When hair is wet or muddy, it becomes matted, limiting the insulating air spaces available. Manage mud in your dry lot area and provide drier areas with bedding so animals can stay dry. Check your livestock going into the fall not only for general health and body condition but also for skin and hair health.

Deep Snow and Drifts

When storing hay, consider how you get it to your livestock in winter. You don't want to lug 50 - 80# bales through 1' or more snow. You may want to store several days' worth in the stable or barn or wherever your livestock are kept during major winter storms. Consider how you get from your house to the barn in case of a large snow fall or snow drifts. Consider a windbreak or fence that provides a path to the livestock. Also, consider a fence or windbreak around their shelter and water tanks. If you can, build feedlots, shelters and other buildings on south facing slopes and other protected areas where temperatures are higher, and snow depth is lower or melts off quicker. If your livestock is a considerable distance from the house, have equipment ready to plow a path to the area and for the livestock to be able to move around. With deep snows, fencing may be covered so that animals can walk over or through it. Keep your fencing in good condition and check for areas that might allow animals to escape.

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Livestock can survive several days without feed but must have access to water. When reintroducing food, provide livestock smaller portions several times a day. There can be some potential for nitrate poisoning if your feed is high in nitrates and your livestock has not been fed for several days. It is always a good idea to have your hay tested but especially for winter feed. Make sure that they have enough salt and mineral blocks.

References:

Living on the Land: Winter Livestock Care, Oregon State University Extension

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19671/ec1635.pdf>

Management and Feeding Horses in Cold Weather, Ontario Ministry of Agriculture, Food and Rural Affairs

<http://www.omafra.gov.on.ca/english/livestock/horses/facts/info-coldweather-man.htm>

Winter Livestock Care Tips, University of Wisconsin – Madison Extension

<https://fyi.extension.wisc.edu/smallfarms/2014/07/08/winter-livestock-care-tips/>

Severe Cold Weather Rangeland and Livestock Considerations, CSU Extension Publication

<https://extension.colostate.edu/topic-areas/agriculture/severe-cold-weather-rangeland-and-livestock-considerations/>

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Livestock Species Information

The following pages are provided to provide a sample of the considerations for raising domestic livestock that are common in our area. For further information, consult your local Extension Agent or visit one of the web resources that follow. Events like the National Western Stock Show or your local county fair provide opportunities to talk with livestock owners. With any species learn how they look and act when they are healthy, handling and plan for dealing with sick animals and disasters and emergencies.



References:

Colorado State University Veterinary Extension

<http://veterinaryextension.colostate.edu/>

CDC Resources

<https://www.cdc.gov/healthypets/pets/farm-animals.html>

Utah State University Extension

https://extension.usu.edu/carbon/agriculture_natural_resources/livestock_production

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Beef Cattle

Cattle can be ideal for the small acreage land owner and nationally the average herd size is 25 cows. Cattle can be a great tool to help manage a small-acreage ecosystem. Forage plants especially grasses are designed to be in relationship with a foraging animal in order to be healthy.

Two basic beef cattle operations are cow/calf and weanling/yearling enterprises. Cow/calf enterprises operate year-round, with calves as the primary product. Weanling/yearling enterprises purchase weaned calves or yearlings and graze them only for summer gain or feed them out for meat. While these are the two typical commercial systems for beef production, we now are seeing more and more small acreage landowners totally integrated who are producing calves and raising them for their own freezer or a local market. These cow/calf enterprises can be commercial or registered. Registered cow/calf enterprises produce breeding stock; commercial cow/calf enterprises produce calves for meat production.

There are now smaller breeds of conventional breeds (i.e. miniature Herefords or Angus). These smaller cattle breeds may be more appropriate for small acreages. They produce less meat which may be better suited to smaller families. The smaller breeds require one third less feed than standard size breeds. Another bovine relative, the yak, has found popularity on small acreages. They produce meat, fiber and milk (mostly used for cheese). Take advantage of events such as the National Western Stock Show to speak to breeders of various breeds prior to purchasing any cattle.

Shelter

Cattle do not require an enclosed barn. A covered 3-sided shed is enough in most areas if properly situated. Site the shed so that animals are protected from prevailing winds and snow drifts. The shed should have plenty of good insulating bedding material that is clean and dry. Periodically clean the bedding out and replace it with clean dry bedding.

Fencing

Cattle can be kept in a pasture using several different kinds of fencing. Highly visible wire fencing either multiple strand or net wire at least 50" in height will keep cattle confined. Wood fences can be used but are more expensive. Electric fence, once the cattle are trained to respect it (they get shocked a time or two) may be the easiest to install but does require maintenance. Spacing between the wires or boards should be small enough so that cattle do not try to put their head through and graze. Make sure that all wire ends, nails and other sharp objects are protected so that the cattle do not injure themselves.

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Feed

Beef cattle may drink 3 – 30 gallons per day (basically 1 gallon/day /100# of body weight in cold temperatures and 2 gallons/day/100# of body weight in hot temperatures). They require 2 – 3% of their body weight in forage daily. Beef cattle do fine on grass pastures and grass hay. Hay should be tested to make sure nutrition needs are being met. Limit the amount of alfalfa to prevent bloat or have a non-bloating legume in your pasture or hay.

Beef Cattle Products

There is no one breed that is best! Instead of selecting a breed, beef cattle producers should select a biological type that is compatible with their property, production and marketing goals. Because of their ability to take low quality resources and transform them into high quality protein products, cattle are a great value to our food system. The typical beef animal spends 11 to 12 months of its life grazing grassland and then 3 to 4 months on a high energy grain diet finishing before slaughter. This high energy diet efficiently increases the tenderness and flavor of the final beef product. Another product gaining popularity is grass-fed beef. In a grass-fed operation cattle forgo the high energy diet and continue a forage-based diet for an additional 8 to 10 months before slaughter.

Cattle performance and land carrying capacity are related to, and affected by, forage production and quality. Feed cost directly impacts profitability. It is extremely important that producers evaluate the cow herd's nutritional needs versus available forage resources. Carrying capacity and cattle performance are not easy to predict and change from month to month.



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Resources:

Colorado State University Beef Page

www.csubeef.com

Cattle, CSU Extension Veterinary Resources

<http://veterinaryextension.colostate.edu/menu2/cattle.shtml>

Beef Nutrition, Merck Vet Manual

[https://www.merckvetmanual.com/management-and-nutrition/nutrition-beef-cattle/nutritional-requirements-of-beef-cattle?](https://www.merckvetmanual.com/management-and-nutrition/nutrition-beef-cattle/nutritional-requirements-of-beef-cattle?network=o&matchtype=p&keyword=beef%20cattle%20nutrition&creative={creative}&device=c&devicemodel={devicemodel}&placement={placement}&position={adposition}&campaignid=301079513&adgroupid=1293025737445438&loc_physical_ms=94796&loc_interest_ms=&msclkid=9a07c2e9f843187128169f76a7b21c52&utm_source=bing&utm_medium=cpc&utm_campaign=EDL_MERCKVET_Management%20And%20Nutrition-P_SE_SEM_N_PHM_NTL_US_EN_M&utm_term=beef%20cattle%20nutrition&utm_content=Cattle%20-%20Nutritional%20Requirements)

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Beef Cattle Production Nutrition Management, University of Nebraska

<https://beef.unl.edu/beef-cattle-production/nutrition-management>

Small Farm Beef Resources, Oregon State University Extension

<https://extension.oregonstate.edu/smallfarms/resources#paragraph-33221>

Bovine Respiratory Disease Preconditioning Calves, CSU Extension Fact Sheet #8.023

<https://extension.colostate.edu/topic-areas/agriculture/bovine-respiratory-disease-preconditioning-calves-8-023/>

Nitrate Poisoning, CSU Extension Fact Sheet #1.610

<https://extension.colostate.edu/topic-areas/agriculture/nitrate-poisoning-1-610/>

Pinkeye Problems in Cows, CSU Extension Fact Sheet #8.020

<https://extension.colostate.edu/topic-areas/agriculture/pinkeye-problems-in-cows-8-020/>

Prussic Acid Poisoning, CSU Extension Fact Sheet #1.612

<https://extension.colostate.edu/topic-areas/agriculture/prussic-acid-poisoning-1-612/>

Alternative Feeds for Cattle During Drought, CSU Extension Fact Sheet #1.626

<https://extension.colostate.edu/topic-areas/agriculture/alternative-feeds-for-cattle-during-drought-1-626/>

Feed Composition for Cattle and Sheep, CSU Extension Fact Sheet #1.615

<https://extension.colostate.edu/topic-areas/agriculture/feed-composition-for-cattle-and-sheep-1-615/>

Formulating Rations with the Pearson Square, CSU Extension Fact Sheet #1.618

<https://extension.colostate.edu/topic-areas/agriculture/formulating-rations-with-the-pearson-square-1-618/>

Utah State University Extension

<http://smallfarms.usu.edu/animals/beef-cattle>

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Dairy Cattle

While most small acreage landowners are more likely to have beef cattle some landowners want a dairy cow for the milk. Dairy cattle require better housing (due to less hair) and higher nutritional needs than beef cattle as they are either pregnant or lactating. They also need to be bred

periodically to continue to produce milk. You need to be prepared to sell the calf or use the calf for veal or beef, or a replacement heifer depending on its sex. Most people are familiar with the Holstein breed but might want to consider Brown Swiss, Jersey or Guernsey breeds as they tend to be a smaller animal and produce milk with higher butter fat which may be more desirable depending on what you will be doing with the milk. Higher butter fat milk is ideal for cheese making. There are now miniature dairy cattle breeds that may make more sense for a small acreage.

If you want the cow so that you can utilize the milk without processing (raw milk), make sure that you know and understand the risks involved with raw milk and all the steps you can take to protect you and your family from food borne illnesses.

Shelter

Dairy cattle prefer a more enclosed shelter or barn due to less hair. Providing them with plenty of clean, dry bedding is essential for their health.

Fencing

Dairy cattle can be kept in a pasture using several different kinds of fencing. Highly visible wire fencing either multiple strand or net wire at least 50" in height keeps cattle confined. Wood fences can also be used but are more expensive. Electric fence once the cattle are trained to respect it (they get shocked a time or two) may be the easiest to install but does require maintenance. Spacing between the wires or boards should be small enough so that cattle will not try to put their head through and graze. Make sure that all wire ends, nails and other sharp objects are protected so that the cattle will not injure themselves.

Nutrition

Dairy cattle drink 30 – 50 gallons/day gallons per day on the higher end when it's hot. Dairy cattle require a higher quality and nutritious diet to produce milk than beef cattle. A higher protein diet is required to maintain the cow's health and milk production. They require 2 – 3% of their body weight per day in feed. This can consist of grass and alfalfa hay along with grain to achieve the higher protein level they required.

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Small Farm Cattle Resources, Oregon State University Extension

<https://extension.oregonstate.edu/smallfarms/resources#paragraph-33221>

Dairy Cattle Nutrition, eXtension

<https://dairy-cattle.extension.org/tag/dairy-cattlenutrition/>

<https://dairy-cattle.extension.org/>

Cattle, CSU Veterinary Extension Website

<http://veterinaryextension.colostate.edu/menu2/cattle.shtml>

Real Raw Milk Facts

<https://realrawmilkfacts.com/>

Bovine Respiratory Disease Preconditioning Calves, CSU Extension Fact Sheet #8.023

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Prussic Acid Poisoning, CSU Extension Fact Sheet #1.612

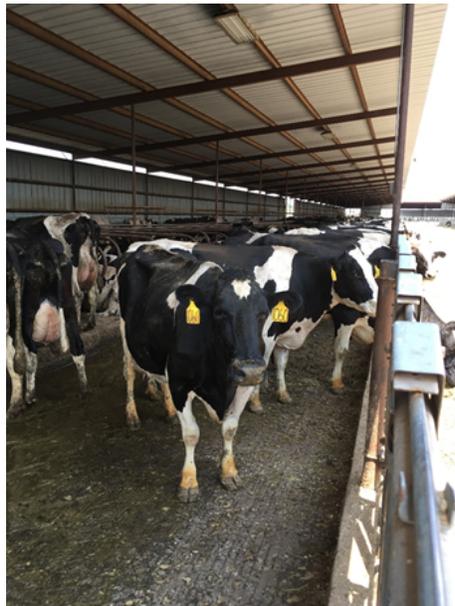
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Alternative Feeds for Cattle During Drought, CSU Extension Fact Sheet #1.626

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Formulating Rations with the Pearson Square, CSU Extension Fact Sheet #1.618

<https://extension.colostate.edu/topic-areas/agriculture/formulating-rations-with-the-pearson-square-1-618/>



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Horses

Many land owners buy their small acreages solely based on the ability to own a horse. However, owning and caring properly for a horse is a large and expensive responsibility. Careful thought and consideration should always be taken before purchasing a horse. The average cost in the United States to maintain a horse is \$3.17 per day (\$1,200.00 per year). This includes feed and veterinary services. Feed will cost a minimum of \$400.00 per year depending on hay prices. If you include facilities, tack, transportation, depreciation and interest, then the average cost is \$6.75 per day (\$2,500.00 per year). If you plan to show or hire a professional trainer, additional funds are needed. Your initial investment maybe the cheapest part of owning a horse.

Facilities and Fencing

A two or three-sided wind shelter with a roof and plenty of dry bedding may be adequate, even in cold climates. You may opt for an enclosed barn with box stalls (at least 12ft X 12ft), a tack room and a feed room or hay storage area. Several fencing materials are suitable for horses including poles, rails, or boards for smaller areas, such as paddocks. For pasture areas consider using smooth wire, woven wire, or electric fencing. Avoid barbed wire or large opening woven wire. The fence should be 5' tall and easily visible to the horse. Electric fencing is economical and convenient, especially for dividing irrigated pastures.

Feeding

The average horse in good physical condition consumes from 1.5 to 4 % of its body weight in air dry feed per day depending on activity level. For example, a 1,000-pound horse can consume 15 to 40 pounds of feed per day. Most light work horses get along nicely on good quality grass. Other supplements or higher quality grass and alfalfa hay are usually not necessary, except for pregnant and lactating mares, young horses (aged two years or less), hardworking, and geriatric horses. As with all livestock, having access to clean, not frozen water is critical to horses' health.

Buying a Horse

When buying a horse, first you must decide what you want. First-time buyers should look at purchasing a four-year-old, or older, well broke, started, or trained gelding or mare. For pleasure and leisure riding, avoid ponies, which are horses less than 14 hands tall, and avoid draft breeds. Common breeds to ride found in Colorado are Arabian, Appaloosa, Morgan, Paint, Pinto, Quarter Horse and Thoroughbred. However, a grade horse (not registered) may also fit your needs. Purchase your horse from a reputable breeder or trainer. Ask many questions and then some, because very few horses come with a guarantee. Also, once a horse is brought home and placed in a different environment, its behavior can change.

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Basic First Aid & Emergencies

There are many types of emergencies that horse owners can experience. Anything from heat stroke to bone fractures to snake bites to foaling difficulties to colic and puncture wounds can happen without warning. Regardless of any situation, here are a few points to remember:

1. Keep the horse and yourself as calm as possible.
2. Move the animal to a safe area where it is unlikely to get injured should it go down.
3. Get someone to help you and then delegate responsibilities, such as calling the Veterinarian, retrieving the first aid kit, holding the horse, etc.
4. Notify the Veterinarian immediately, if the situation warrants.
5. Listen closely and follow your equine practitioner's instructions.
6. Do not administer drugs, especially tranquilizers or sedatives, unless specifically instructed to do so by the Veterinarian.

References:

CSU Ext. Veterinary Information

<http://veterinaryextension.colostate.edu/menu2/horse.shtml>

Small Farm Horse Resources, Oregon State University Extension

<https://extension.oregonstate.edu/animals-livestock/horses/horse-resources-small-farms>

Rabies in Horses Should Horses be Vaccinated in Colorado, CSU Extension Fact Sheet, #1.819

<https://extension.colostate.edu/topic-areas/agriculture/rabies-in-horses-should-horses-be-vaccinated-in-colorado-1-819/>

Stretching Your Horses Hay Supply During Drought, CSU Extension Fact Sheet #1.625

<https://extension.colostate.edu/topic-areas/agriculture/stretching-your-horses-hay-supply-during-drought-1-625/>



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Poultry

Chickens, Ducks, Geese and Turkeys

Managing a home poultry flock can be rewarding and the entire family can participate in flock care. Successful management begins with planning. For that reason, you need to make several decisions before you start your flock including the desired flock size and do you want the birds for meat or eggs. How many eggs a day you wish to have along with any municipal, homeowner's association or county regulations determine the number of birds. Most chicken breeds produce around 200 eggs per year while ducks produce between 50 to 300 eggs per year depending on the breed and geese produce 20 to 100 eggs per year depending on breed. Geese are primarily spring layers and are affected more by seasonal changes than chickens. If you are a baker, you might want to consider raising a few ducks as they have larger yolks making them more desirable for baking. Typically, a chicken lays one egg every 26 hours during the longer days and are less consistent during the winter months. If a family wishes to have three to four eggs per day, then they would need six hens. If you wish to sell eggs, you need additional hens. You do not need to have a rooster unless you want to have fertilized eggs. Chickens egg production peaks the first 2 -3 years and declines after that. At that time, a decision needs to be made whether to keep birds past their laying prime or to sell or slaughter them.

Ducks take naps throughout the day rather than sleeping through the night. They can be quite noisy anytime of the day or night. Placing a light in the coop can help keep them quieter and making neighbors happier.

Fencing, Facilities and Feed

Housing is one of the most important factors in proper poultry care. Poultry houses, runs, and yards are as diverse as the people who raise them. Some considerations should include: is there proper ventilation and shelter from harsh elements and predators; is there plenty of room for feed, water, nesting boxes, and roosts, is there easy access to the coop for cleaning and disinfecting. Construction and fencing should be carefully designed and chosen to prevent predators such as skunks, raccoons, foxes, hawks, owls, and the neighbor's dogs from accessing your birds. Coops must have solid floors (concrete is ideal as it can be disinfected) and the fencing around covered runs should be buried at least 12 inches in the ground. Coops must be kept clean and disinfected and proper ventilation is a must for your coop. During the winter months, coops can be insulated from wind and cold. Make sure birds cannot get access to insulation and protect wiring by placing it out of reach or place it in conduit. Heat lights and heated water can be used to add extra warmth for extremely cold days.

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Each average size laying hen requires 2 to 3 square feet of coop floor space and 10 square feet in the run. Ducks require 4-6 square feet, geese need 3-5 square feet and turkeys 3-5 square feet per bird interior space. Ducks and geese thrive and are healthier with a pond, the more pond surface area the better. Ducks and geese require water to clean their bills, eyes and nostrils. The pond helps keep them cleaner, increase egg fertility, survive extreme temperatures, evade predators and a place to play and burn off energy. If you don't have a pond and want to use a tank, you need to use one that has hard sides. Do not try to use a children's swimming pool. You need to periodically clean the pool out so that it doesn't smell and to prevent disease. Depending on the tank size if you use one instead of a pond, you may also want to add ramp into the tank and one in the tank so that the birds and other wildlife, i.e. bats, can get out of the tank. You need 6-9 square feet of surface water per duck. If you have an outside run, it should be twice as big as the coop. Covered protective runs are great when owners cannot keep a watchful eye over their birds.

Nesting boxes and Roosts

You need 1 nesting box per 3 - 5 birds for chickens. Nesting boxes need to be a little over 1 square foot for chickens, 2 ¼ square feet for ducks and 4 square feet for geese and turkeys.

Nesting boxes for ducks, geese and turkeys can be on the ground where chicken roosting boxes need to be above ground level (18 to 20 inches). Roosts should allow 12 inches per chicken and be higher than the nesting boxes. Roosts for turkeys should be 18 to 24 inches off the ground. In the wild, turkeys roost in trees.

Feed

One chicken eats 6 to 10 lbs. of feed per month, a duck 10 – 16 pounds per month, a goose 15-25 lbs. per month and a turkey 20-30 lbs. per month. Feed and water should be raised off the ground, filled and cleaned and disinfected daily. Complete feeds can be purchased and provide complete nutritional requirements. Raising your own feed requires testing to determine nutritional value of each component and takes more time to process and mix correctly to provide complete nutrition.

Eggs

Be sure to collect eggs at least twice daily (three times is better, twice in the morning and once in late afternoon) to prevent dirty, broken, or frozen eggs. Plastic coated wire baskets or plastic egg cartons are best for collecting eggs. You need to clean and disinfect the collection baskets just as you clean and disinfect cartons. Discard any eggs that are cracked or broken. Despite all your efforts, you will still get some dirty eggs. When you are collecting eggs, the dirty eggs should be placed in a separate container so that you don't contaminate the clean eggs. You can clean all the eggs at day's end. You don't have to wash all the eggs; you can remove some dirt and debris with an emery cloth, fine sandpaper or a brush. Clean eggs do not have to be washed.

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Although they appear solid, egg shells have minute holes in them to allow air to enter the egg. This affects how you should wash your eggs. When washing eggs, it is best to use water between 110 degrees F and 120 degrees F or at least 20 degrees F warmer than the eggs. The principle behind this is to get the egg contents to expand preventing contaminants/pathogens from entering the eggs. Using cooler water shrinks the contents creating a vacuum that then allows contaminants/pathogens to enter the holes in the egg shell. Eggs should be washed individually using water and non-foaming, unscented detergent and then rinsed in clean water. Make sure you use an unscented detergent as the scented detergent may give the eggs an off taste. If you have a larger flock, the washing solution should be cleaned every 3 to 4 dozen eggs. Eggs should never be soaked in the water. To make a sanitizing solution for use after washing, mix 1 gallon of 120 degrees F water with 1 ounce (1 tablespoon) of bleach. Either dip or spray the eggs with the sanitizing solution. After cleaning and sanitizing the eggs, dry the eggs thoroughly on a rack and refrigerate them. Any containers that you use to store the eggs should be either new or one that can be thoroughly disinfected (i.e. plastic re-usable egg cartons that can be put in a dishwasher). Re-using store bought fiber containers is not a good idea. Eggs should be stored in the main area of the refrigerator not in the door. The main part of the refrigerator should be 35 to 40 degrees F while the door can be warmer. Eggs stored properly can have a safe shelf life of 3 weeks. Make sure that you date the container so that you use older eggs first. If your birds are producing more eggs than you can use, you can freeze them. Only freeze fresh eggs. Break the eggs out of their shells, beat them adding a small amount of salt, sugar or corn syrup to preserve quality and prevent gelling. Place them in containers dating them and noting the number of eggs. You can also freeze whites and yolk separately.

Caring for Baby Birds (chicks, ducklings, poults)

Purchase birds from a commercial hatchery or reputable breeder. Birds from these sources are generally free of disease and vaccinated for Marek's disease. Raising your own birds is not that difficult, but you need a rooster and additional equipment: heat lamp, chick waterer, chick feeder and a protective area (livestock troughs work well).



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Brooding and Rearing Chicks for the Family Flock, CSU Extension Fact Sheet #2.509

<https://extension.colostate.edu/topic-areas/agriculture/brooding-and-rearing-chicks-for-the-family-flock-2-509/>

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Ailments of Turkeys and other Fowl, CSU Extension Fact Sheet #2.506
<https://extension.colostate.edu/topic-areas/agriculture/ailments-of-turkeys-and-other-fowl-2-506/>



AGRICULTURE

Swine

Contrary to the stereotype, pigs are the cleanest and smartest of all farm animals. They require little space and can produce an average of 150 pounds of pork products in five to six months. They can however grow quite large and while a finished market hog may only weigh 250 lbs., a two-year-old sow can weigh 500 lbs. Most pigs are cross-breeds for improved genetics. Hampshire, Berkshire, Duroc and Landrace are meat breeds; Yorkshires are known for their maternal traits. Buy at least two pigs of similar age and weight at a time to keep each other company, preferably from a single source. Pigs are weaned at about four weeks of age; sold at six to eight weeks; and weigh 20 to 30 pounds at six weeks; and 30 to 40 pounds at eight weeks. Piglets should be eating dry food on their own at six weeks.

There are 3 different types of swine operations: farrow (birth) to finish (slaughter), farrow to feeder and feeder to finish. For most small acreage owners', the feeder to finish may be the best option as it requires the least time and equipment.

Fencing, Facilities and Feed

Simple housing is enough if pigs are purchased in spring and are butchered prior to winter. However, build a good solid fence, or use electric fence as they may try to escape. Once trained, pigs respect the wire. Electric fence is portable; however, it may be a problem for young pigs, because the wire must be low to the ground. Two strands are necessary for young pigs. The bottom wire should be placed a bit lower than snout height; the top wire placed a bit lower than the pigs' height. Adjust the wire height as needed to accommodate the piglets' rapid growth. Fences must be four feet high. A 200-pound pig can scale a lower fence. For young pigs, space wires or boards four inches apart or less. Pigs root, so bottom boards or wire must be buried six inches deep to prevent rooting under the fence. They are very intelligent and take advantage of any flaw in the fencing. Pigs need shade to prevent overheating and sunburn. This is why they cover themselves in mud, it's their sunscreen.

Elaborate structures are not needed, but dependable shade is a requirement. Pigs require 1.5–2 feet of feeding space per animal. Use a non-tipping feeder, since pigs love to turn their dishes over. Self-feeders and self-waterers designed for pigs are commercially available and offer constant supplies of food and water.

Feed

Pigs need a balanced diet, much like humans, including proteins, carbohydrates, fats, mineral salts, vitamins, and water. Most commercial pig feeds are "complete" feeds, containing all the nutrients needed. Two pigs grow faster and more economically than one. From weaning to processing weight, you will need 600 to 1,500 pounds of commercial feed per animal. They require 1 – 3 gallons of water per day.

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AGRICULTURE

Sheep

Sheep production is popular in Colorado (Colorado is #1 in lamb production in the United States). Sheep are well-suited to this area and can provide two crops: lamb (meat) and wool. First determine the carrying capacity of your acreage; then determine your market goals. Market options include: freezer lambs, breeding stock, weaned lambs or wool. The desired marketing option determines the breed or breeds you select. If wool production is your goal, choose a fine wool breed, such as Rambouillet or Merino. These breeds are rugged, adaptable, have a long breeding season and excellent herding instincts, and are long-lived; but they do not produce a heavily-muscled carcass. If your goal is both wool and meat, select a medium wool breed, such as Columbia, Targhee or Polypay. Medium wool breed lambs grow faster and have better body conformation, as well as good herding instincts; however, they require more feed and have a shorter breeding season than fine wool breeds. Meat breeds were developed primarily for lamb production and populate many farm flocks. Suffolk and Hampshire are the most popular meat breeds.

Fencing and Facilities

Sheep need protection during wet and cold weather, and ewes and lambs need a dry, draft-free shelter for lambing. A shed or barn with a dirt floor that opens to the south makes a good sheep shelter. If you have a problem with predators, you need to provide a more substantial shelter so you can secure your animals at night. Provide the best fences you can for your sheep to reduce predation by coyotes and dogs. Many different material types can be used for sheep fencing. Barbed wire is not effective. A 4' woven wire fence is good just make sure they can't put their head through the wires or a 5 – 7 high tensile strand wire fences with 2 strands of electric wires works well. Predator control animals can be utilized effectively, however careful consideration must be made before purchasing a predator control animal. Determine which species is best for your situation. Guard dogs can be a great tool in large pastures however; they can be a threat to neighbors. Llamas and donkeys are also good predator control animals if they aren't a nuisance to neighbors or visitors. When using any guard animal, the herd and the guard animal need to bond for the guard animal to be effective. Sheep take less labor than other livestock and do well with low-cost housing and equipment.

Feeding

Sheep can generally meet their nutrient requirements by utilizing high quality pasture. They require 2 – 3% of their body weight in forage per day. During the winter, a ewe can be maintained on three to three and one-half pounds of good-quality hay daily. During the last six weeks of pregnancy, additional nutrients are required.

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www.extension.org/sheep

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<https://extension.oregonstate.edu/animals-livestock/sheep-goats/sheep-resources-small-farms>

Sheep Resources, New Mexico State University

https://aces.nmsu.edu/pubs/_b/100B15.pdf

Sheep Production Handbook

<https://www.premier1supplies.com/p/sid-sheep-production-handbook>

Nitrate Poisoning, CSU Extension Factsheet No. 1.610

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<https://extension.colostate.edu/topic-areas/agriculture/prussic-acid-poisoning-1-612/>

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Gastrointestinal Parasites in Sheep and Goats Frequently Asked Questions, CSU Extension Factsheet No. 8.019

<https://extension.colostate.edu/topic-areas/agriculture/gastrointestinal-parasites-in-sheep-and-goats-frequently-asked-questions-8-019/>

Lamb Feedlot Nutrition, CSU Extension Factsheet No. 1.613

<https://extension.colostate.edu/topic-areas/agriculture/lamb-feedlot-nutrition-1-613/>

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<https://extension.colostate.edu/topic-areas/agriculture/sheep-feeds-and-management-guidelines-during-drought-1-633/>

AGRICULTURE

Goats

Increasingly goats are finding homes on small acreages as well as in some urban backyards. Goats' popularity is due to their size and ability to utilize very low-quality browse and weeds. In fact, many weed control districts are using them as weed management tools. There are three types of goats found in the United States: fiber, dairy, and meat goats. The key management issues for a successful goat enterprise are fencing, parasite and predator control and marketing.

Types of Goats

Meat goats fit in well with other enterprises, particularly cattle operations, and may be used to help manage noxious weeds and brush to improve pastures for other livestock. The increasing economic importance of meat goat production in the United States can be attributed both to a strong ethnic demand for goat meat, and to an interest in ecologically-sound forms of vegetation management. Meat goats can be raised with very little supplemental grain, and with minimal shelter, and are generally an easy-care animal. Meat goat breeds are Spanish, Boer, Kiko, Mytonic (fainting), Savanna(h) and Texmaster.

Dairy goats fit well into operations where milk is the desired product. Dairy breeds are Alpine, Guernsey, LaMancha, Oberhasli, Sable, Nigerian dwarf, Nubian, Saanen and Toggenburg. If milk production is important, feed maximum amounts of high-quality hay balanced with a grain ration containing enough protein, minerals and vitamins to support production and animal health. Local producers have found favor with locally produced artisan cheese producers and people with lactose intolerance find goat's milk a great alternative to cow's milk. Like dairy cows, dairy goats must be bred periodically to continue producing and the kid must be dealt with either kept as a replacement, sold or slaughtered. If you want goats so that you can utilize the milk without processing (raw milk), make sure that you know and understand the risks involved with raw milk and all the steps you can take to protect you and your family from food borne illnesses.

Fiber goats (Cashmere and Angora) are also popular in Colorado. Cashmere goats produce a very fine down undercoat that can be brushed out and is extremely soft. Angoras produce Mohair, a product that can be shorn twice a year and is more durable, warmer and less inclined to shrink than sheep wool. Check in your area for a wool cooperative if you plan to sell the wool

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Two other goat types are packing and weed management. Packing goats are used to pack supplies for backpacking trips and are breeds such as Alpine, Toggenburg, Saanen, LaMancha and Oberhasli. Extra time is required to train the goats to be pack animals. Since they are foragers, finding food along the trail is not difficult. There aren't specific breeds identified for weed management. Many municipalities use goats to graze weeds located in areas that are not accessible to equipment or unsafe for personnel to spray. The goats are only another tool in the weed management toolbox.

Fencing, Facilities and Feed

Housing needs for goats are very simple and, in moderate climates, may consist of natural cover, such as thick trees and brush, or rock ledges. Goats do, however, need protection from rain (they don't like to be in the rain), cold wind and snow. A sturdy shed open to the south or opposite prevailing winds, with a rear eave height of four to six feet and a front eave height of six to eight feet with enough dry, clean bedding helps conserve body heat. For night shelter, allow five square feet per goat. If predators are a problem in your area, you need to provide a more substantial structure so you can secure your animals in a barn at night. You can try using a guard animal like you would for sheep.

Goats have a propensity to try to escape fences. A sturdy 48" woven wire fence (make sure they can't get their heads stuck in the openings) with or without a strand of electric wire at the top should work. Providing them with play items to jump on and over can help keep them entertained and inside the fence.

They need 2 – 3% of their body weight in feed per day. Commercial goat feeds are available and provide a fully balanced diet. Goats are browsers rather than grazers meaning that they prefer broadleaf plants over grasses. Pastures need to be a mix of both grasses and forbs to provide a balanced diet. Be aware of potentially poisonous plants in the pasture and deal with those before allowing animals to graze.



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Angora Goat Resources, University of California Davis

<http://sfp.ucdavis.edu/pubs/brochures/ANGORA/>



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Llamas and Alpacas

Llamas and alpacas are easy to keep, lower maintenance animals. They have become popular for pack animals (llamas) and for their wool (alpacas). They are herd animals, so you need at least two to keep them happy and healthy. They require minimal care and can do well on native rangeland plants. All members of the camelid family use a specific location for their manure deposition which make manure cleanup easier. As with most livestock, working with and handling them makes them easier to handle when you need to vaccinate or shear them. Training builds the animal's trust.

Fencing, Facilities and Feed

They don't try to escape fences like goats so a basic 48" woven wire livestock fence contains them. You may want to add an electric wire to deter predators. Most predators do not attack an adult animal, they attack crias (babies). While they only need a 3-sided roofed enclosure, some owners may prefer to provide them with a barn. Being a herd animal, they don't require individual stalls but providing a way to separate the barn is useful if you are breeding animals. They do well on a wide variety of forages and only require 1.8 – 2% of their body weight in forage per day. While a grass pasture with some legumes in it can be enough, you may want to supplement this with pellets balanced for camelids. Grass hay should test 8 – 10% protein. As with all livestock, they must have access to clean unfrozen water.

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Camelid Resources, CSU Veterinary Extension
<http://veterinaryextension.colostate.edu/menu2/camelids.shtml>

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Rabbits

Rabbits make good animals to have on small properties and for 4-H projects. They can be raised just for the fun of it or they can be used for their fur (angora breed) or for meat.

Fencing, Facilities and Feed

To keep them healthy, it's best to keep them in a climate-controlled area. The hutch should be at least 18" high and the floor space needs to be $\frac{3}{4}$ square feet per pound of mature weight of your rabbit breed. The floor and sides should be made of $\frac{1}{2}$ " X 1" wire mesh while the floor should be $\frac{1}{2}$ " X $\frac{1}{2}$ " mesh. You can try to formulate your own hay and grain ration but purchasing a pre-formulated pellet most likely be more convenient and provide a better-balanced diet. Providing them a leafy green treat periodically is fine just don't make it most of their diet.

References:

Poultry and Rabbit Resources, Oregon State University Extension
<https://extension.oregonstate.edu/animals-livestock/poultry-rabbits>

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Bees

While most people do not consider bees as livestock, they are under certain circumstances. A single hive is a hobby, but multiple hives can be a livestock operation.

Some people get into beekeeping thinking that they can save pollinators. This is not the best reason to get into beekeeping. While they don't take a lot of work, they do need routine checks. They are just like keeping any other livestock or pet. A better strategy might be for you to provide the forage plants for nearby native pollinators and local beekeepers. Lack of good forage forces native pollinators and honey bees to compete for limited food sources.

One major consideration before getting into beekeeping is do you have enough forage (flowering plants) around your property all growing season (early spring to late fall) to keep a hive healthy. Do you have wildlife that visits your property that would love to break into your hives, i.e. bears? If you don't have enough forage for your bees, you end up supplementing their forage. Remember that the bees need forage from early spring through fall. A sudden burst of flowering plants from June to August is not enough to keep a hive fed and healthy. Your bees will also be competing with native bees for their forage. A variety of plants blooming at different times is better than a monoculture (i.e. alfalfa field) to provide all the nutrients they need to be healthy.

Beginning beekeepers should work with an experienced beekeeper or take a class to learn how to care for their hives. This is an expensive hobby to get into and if you want to be successful, you need to know what you are doing.

Unless you can get a swarm from an existing beekeeper, you need to order your hive and queen in the spring. The hive should be set-up and ready before your bees arrive. There are different types of bees so do your homework to figure out what type of bees and queen suit your area and beekeeping method.

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