

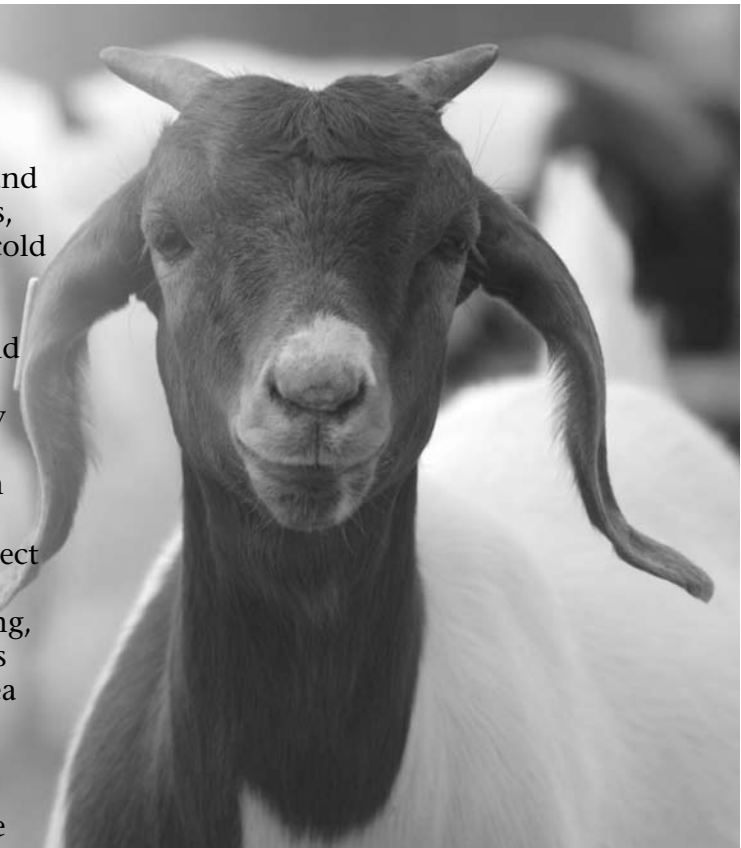
HOUSING, FACILITIES, AND EQUIPMENT FOR COMMERCIAL

Meat Goat PRODUCTION

Housing

Meat goats are very adaptive and do not require fancy or costly housing; however, they need protection from the elements and weather extremes. When it rains or snows, goats will seek shelter. They can tolerate cold weather but should not remain cold and wet for long periods of time. While goats are generally more tolerant of the heat and humidity than sheep, during the summer months it is important to provide a shady area with adequate air circulation. Flies should be controlled for reasons of health and sanitation.

Natural shade and windbreaks can protect meat goats during much of the year. The primary need for housing is during kidding, especially if kidding occurs during periods of inclement weather. A dry, draft-free area is needed for kidding. Does can deliver in large community pens and be moved to individual kidding pens shortly after kidding. Kidding pens or “jugs” should be





approximately 4 (or 5) ft. x 5 ft. in size. One pen is recommended for every 10 does in the herd; however, more pens will be needed if kidding is tightly spaced. In mild weather, it may not be necessary to put does and kids into jugs. Does can kid outside on a clean, well-rested pasture. Pregnant and lactating does should be kept in separate pens or pastures.

Often, existing buildings and structures can be utilized to house meat goats, and store hay, feed, and other equipment. Confinement housing, which can be completely closed as needed, is popular in cold climates and for human comfort and convenience. Confinement housing allows close supervision of animals, but is generally more expensive than other types of housing. Goats in confinement require 20 square feet of space, plus an additional 30 square feet of exercise area, if pasture is not available.

Three-sided or open-sided shelters are suitable in many situations and climates. The open side of the shelter should face away from prevailing winds, the roof should be sloped to repel rain, and there needs to be adequate drainage around the building. Goats require 10 to 15 square feet of space in open housing.

Hoop or greenhouse structures offer an alternative to traditional livestock housing. In these structures, semicircular tubular steel

provides structural support to a covering of either polyethylene or fabric. The appeal of hoop structures is the lower cost of materials and construction. Movable sheds, poly domes, calf hutches, quonset huts, and carports can be used to shelter young stock and smaller numbers of animals. Housing for bucks can be simple, but it must be strong. Taller, sturdier fences and panels are needed to keep bucks away from the rest of the herd, especially from does in heat.

In shelters, dirt or stone floors are preferred to concrete floors. Pens should be bedded with 3 to 4 inches of straw or other absorbent material. Besides straw, poor quality hay, wood shavings, sawdust, shredded newspaper, peanut hulls, and sand can all be utilized for bedding. Five to 6 inches of bedding is recommended if the floor is concrete. In the winter, the manure pack should be allowed to build up, as the decomposing layers provide a source of heat.

Buildings with raised decks of expanded metal or wooden slats have been used successfully to house and feed goats. Only half as much square footage is required per animal as compared to dirt floors or lots. Parasite problems can also be kept to a minimum.

Building plans for livestock housing are available at many county extension offices and from various websites.

Ventilation

Ventilation is an important, yet often overlooked aspect of animal housing, particularly closed housing. Poor ventilation can be detrimental to animal health and performance. Harmful gases and dust can cause respiratory problems, while temperature extremes can reduce both animal and human productivity.

The purpose of ventilation is to provide the desired amount of fresh air, without drafts, to all parts of the shelter; to maintain temperatures within desired limits; to maintain relative humidity within desired limits; and to maintain ammonia levels below specified levels. Ventilation can be natural (cold housing) or mechanical (warm housing). Natural ventilation systems move air through adjustable and fixed openings, such as vents, windows, and doors. Mechanical ventilation systems incorporate fans, thermostats, and air inlets and/or outlets. Agricultural engineers can help troubleshoot ventilation problems and design proper ventilation systems for goat housing.

Manure Handling

Goats will produce about 5 percent of their body weight in manure (60-70 percent moisture) daily, thus housing must be designed with manure handling in mind. Manure should be removed from buildings and shelters at least once per year, more often in exercise areas. Goat manure can be collected with a shovel, fork, or power equipment. Removing manure with a front end or skid loader will save labor. A manure spreader is desirable for distributing animal wastes evenly over large pastures and crop fields. Soil and manure tests should be conducted before manure is applied to the land. Manure storage may be needed. Unprotected piles of manure should not be stored in places where runoff may occur. It may be advisable to cover manure piles with tarps. Composting animal waste reduces odors and fly problems. Composted manure is an excellent soil amendment. Keeping animals outside in their natural environment where manure and urine will be spread more



evenly will greatly reduce odor and manure handling requirements.

Producers need to familiarize themselves with local, state, and national nutrient management laws and comply accordingly. In Maryland, a nutrient management plan is required on farms with 8 or more animal units and/or \$2,500 or more of gross income. One animal unit is equal to 1,000 lbs., and according to state guidelines, 8 animal units equals approximately 90 goats.

Fencing

Fencing represents a significant financial investment for goat producers, especially if all new fence must be constructed. On a goat farm, there is need for two distinct types of fencing: perimeter (or exterior) and interior (or cross) fencing, in addition to pens and corrals.

Perimeter fencing has two purposes: keep goats in and predators out. Goats are curious and crafty and will often look for a way out. They are also vulnerable to predators, such as dogs, bears, and coyotes. Perimeter fences are generally permanent and intended to last for a long period of time with minimal repairs. They should be constructed out of high-quality materials. Interior fences are used to subdivide pasture fields to manage animals, utilize forage more efficiently, and control parasites to some extent. While interior fences need not deter predators,



they need to effectively control stock, to prevent weaned offspring from returning to their dams or to prevent bucks from causing unwanted pregnancies. Interior fencing may be permanent or temporary.

Many different types and combinations of fencing can be used for goats. The decision as to which type of fence to install depends upon the purpose of the fence, its cost, the situation, and the personal preference of the fence owner.

Woven wire. Woven wire, the conventional sheep/goat fence, goes by several other names including field fence, farm fence, and “American wire.” It consists of horizontal lines of smooth wire held apart by vertical wires called “stays.” The spacing of the horizontal wires gets wider as the fence gets taller, varying from as small as 1½ inches at the bottom for small animals to 9 inches at the top for large animals. The distance between vertical stays varies from 6 to 8 inches for small animals to 10 to 12 inches for large animals. The larger openings are advantageous for horned goats who may otherwise get their heads stuck.

A four-foot-high woven wire fence, with one to two strands of barbed or electric wire along the top of the fence makes an excellent perimeter fence for goats. A strand of barbed wire along the bottom of the fence will serve as a “rust” wire and extend

the life of the fence. An electric offset wire at shoulder height of the goat will reduce animal pressure and further extend the life of the fence. Another offset wire, approximately 7 inches up from the ground, will help to keep predators from crawling under the fence.

The biggest disadvantage to woven wire is that it is expensive and difficult to install over hilly terrain. High-tensile, woven wire fences are even more expensive, but they do not sag or stretch as readily as standard woven wire. They are also more resistant to rust and considerably lighter in weight.

Barbed wire. Though generally not recommended, barbed wire fences can be used for goats if the wires are evenly spaced and tightly stretched. Eight to ten strands of 15½ gauge wire is recommended, with several twisted wire stays between posts. Barbed wire fences are easier and less expensive to construct than woven wire, but the barbs can cause serious injury to animals and people and the fence will not effectively deter predators. Barbed wire should not be electrified. The best use of barbed wire is to rejuvenate old fences and reinforce woven wire fences.

Rail. Board or rail fences, which may be constructed from treated wood, painted wood, vinyl coated wood or PVC plastic, are common on horse and estate farms, but are generally not suitable as either interior or exterior fences for goats unless the boards are close together or strands of electric wire are run between the gaps. Board fences may also be covered with woven or mesh wire to close the gaps. Otherwise, young kids and more importantly, predators can get through the gaps in the fence. Moreover, although board fences can be pleasing in appearance, they are much more expensive to construct and usually require costly upkeep.

High-tensile. Generally speaking, the most effective and economical fence for all types and classes of livestock is high-tensile (HT) electric. High-tensile fence utilizes a smooth wire that due to its greater tensile strength can be pulled tighter than standard electrified wire, which tends to sag over time. Strong corners and end braces contribute greatly to the strength of a high-tensile fence.

High-tensile fences are usually electrified to create a psychological barrier and more effectively deter predators. For sheep and goats, 5, 6, or 7 strands of 12½ gauge high-tensile wire is recommended with wire spacings of approximately 6, 8, 8, 8, and 10 inches. In areas where there is relatively even rainfall and green vegetation most of the year, it is recommended that all wires be electrified (hot). Where there is low rainfall, stony and dry soil conditions, or where the ground is frequently frozen or snow covered, every other wire should be grounded (cold). Installing switches will make it possible to ground one or more hot wires, which can be useful when the bottom wire has grounded out because too much vegetation is covering the wire.

The charger (or energizer) is the “heart” of an electric fence system. It converts main or battery power into a high voltage pulse or “shock” felt by the animal when it touches the fence. In the past, electric fence chargers shorted out easily. Today’s chargers are low impedance and designed to effectively shock through vegetation and other foreign materials touching the fence. A 4,000 volt charger is generally sufficient for goats. The number of joules needed depends on the length of the fence, the number of electrified wires, and the severity of conditions. A joule is the amount of energy released per pulse. As a general rule, 1 joule will power 6 miles of single fence wire; 4.5 joules is usually adequate for 20 to 50 acres.

Lightning strikes can damage energizers. Surge protectors and lightning arresters are recommended to minimize damage. Poor grounding is the leading cause of electric fence failures. An electric fence must be properly grounded so that the pulse can complete its circuit and give the animal an effective shock. It is important to follow manufacturer’s instructions for grounding electric fences.

An electric fence is a psychological barrier in addition to being a physical one. Animals must be trained to respect electric fences. A voltmeter measures the charge the fence delivers and is an inexpensive, yet useful tool for troubleshooting electric fence problems. Another common cause of electric fence failure is weed pressure. Fence lines

should be mowed and sprayed to prevent excessive weed pressure.

A non-electric, high-tensile fence is more expensive because additional wires (8 to 10) and posts are needed, but you save money by not having to buy an energizer. Non-electric, high-tensile fences are well-suited to corrals and lots.

Permanent interior fences can be installed, or temporary fencing materials such as polywire, twine, rope, tape or electric netting can be used to subdivide fields or temporarily fence areas in for grazing or brush control. Wind-up and reel systems are easy to move and install. Temporary fences can also be made with regular high-tensile wire, using fiberglass or step-in posts. Cost and ease of use are the primary considerations when selecting temporary fence materials.

Other. Mesh wire and galvanized livestock (hog) panels are desirable for barn lots and other high stress areas, but are generally too expensive for enclosing large sections of land. Board fences and woven wire with small openings are also suitable for barn lots. Chainlink fences are effective, but very expensive. Barbed wire and electric fences should not be used in high traffic areas. Fences in barn lots or pens need to be higher than those in pastures, because the goats will challenge them more. Goats are very curious animals and often look for ways out, while cattle and sheep tend to be content wherever they are. Goats can also jump higher than sheep.

Gates. A fence is only as good as its gates. All gates should be fitted with goat-proof latches. A simple hook and eye will not fool a goat for very long. The gate should be as high as the fence itself, and there should be no gaps beneath the gate. Some gates will need to be wide enough to drive equipment through.

Handling Equipment

Handling equipment is useful when performing routine management tasks such as catching, sorting, drenching, vaccinating, hoof trimming, weighing, and loading. Without adequate facilities, these jobs often get postponed or neglected. A small pen is usually adequate for most small



operations, but a handling facility, complete with crowding pens, gates, and chutes, is suggested for larger herds.

A working chute (or raceway) for meat goats should be approximately 10 feet long, 4 feet high, and 12 inches wide. The sides should be solid. For horned goats, the sides should be tapered with the top nearly twice as wide as the bottom. There should be a crowding (gathering) pen at the entrance to the chute. At the end of the chute, there should be a squeeze chute or head gate for restraining goats and a sorting or cutting gate for sorting goats into different pens. Other components of the system may include a footbath, scales, cradle (or tilt/turn table), and loading ramp.

Handling equipment can be made from pressure treated lumber or metal. Existing fences, walls, and sides of buildings can be incorporated into the system. Buildings can also be used as gathering or holding pens. Building plans for livestock handling facilities are available at most county extension offices.

Several companies specialize in portable handling equipment for sheep and goats. Buying equipment is generally more expensive than making it, but it may pay for itself in the long run. Manufactured equipment is easier to transport, move, and assemble. Metal surfaces are safer

for livestock and people. Metal gates and panels have alternative uses on the farm. Commercial handling equipment is available in pressure treated wood, painted steel, galvanized steel, and lightweight aluminum.

Feeders

Good feeders are essential to the meat goat operation. Feeding on the ground results in considerable feed wastage and contributes greatly to the spread of disease, especially internal parasites. If goats are able to stand in their feed or feeders, they will defecate and urinate in the feed. Feeders need to be raised off the ground and constructed in such a way to keep goats out.

There are various designs for grain feeders. V-shaped feeders are easier to clean than feeders with square bottoms. Rubber or metal pans are useful for hand feeding small numbers of goats. Keyhole feeders are popular with dairy goat producers, but may present problems to goats with horns. Especially effective are feeders that can be hung on the side of the fence, then removed after the goats have finished eating.

Hay can be fed in bunks or racks or along a fence line. V-shaped racks with vertical or diagonal slats work best. A toe board will help keep the goats' feet out of the feeder. Round hay bales should be fed in feeders

with movable sides or an overhead rack. There should be enough feeder space for all goats to eat at once—approximately 16 linear inches per doe (8 to 12, if hay is self fed). Young stock require 12 inches of feeder space, 2 to 4 inches if grain or hay is self fed. Ideally, you should be able to access feeders from outside the pen or pasture to prevent being trampled by the goats during feeding.

It's a good idea to hang mineral feeders higher than the goats can reach, then provide a block for them to stand on. Some producers have made mineral feeders from old tires, PVC pipe, and plastic garbage cans. If goats are fed outside, a lid is needed to keep the mineral dry.

Feeders can be made from pressure-treated lumber, metal, chainlink, concrete, plastic, or PVC pipe. They can be homemade or purchased commercially. Building plans for feeders are available at most county extension offices and on several websites. (See Resources section.)

Water

Clean, fresh water is a daily necessity for goats. A goat will consume anywhere from ½ to 4 gallons of water per day, depending on its age and stage of production. Requirements increase greatly during late gestation and lactation. Goats will consume more water during hot weather and when the forage is dry. Goats will consume more feed if they drink more water, and conversely, eat less feed when they consume less water.

Water can be free flowing or provided in buckets, troughs, tubs, stock tanks, or automatic waterers. In an open tank drinking system, 1 foot of space is required for each 15 to 25 head. In an automatic watering system, 1 bowl or nipple is generally sufficient for 50 head.

It goes without saying that water sources should be kept clean and free from hay, straw, and fecal matter. Smaller troughs are easier to drain and clean. Water will be more readily consumed during cold weather if the water is ice-free and during hot, humid weather if the water trough is in the shade.

Feed Storage

All feedstuffs—hay, grain, salt, and minerals—need to be kept dry and protected from rodents. Feed must be accessible in all weather conditions, but inaccessible to goats. Ample feed storage can result in considerable cost savings if feed ingredients can be purchased and stored in bulk on the farm.

Unprotected hay deteriorates in quality. Hay should not be left uncovered. Hay bales should be stored in hay lofts or storage sheds, or covered with tarps. Hay and straw bales should not be placed in a barn unless they are thoroughly dry; otherwise there is risk of overheating and fire.

A bulk grain bin can prove to be a good investment, even for the small producer. It enables the producer to accept bulk deliveries of grain or purchase commodities directly from grain producers or dealers at farm level prices. Salt and minerals and smaller amounts of grain can be stored in barrels, garbage cans, or old freezers/refrigerators.

Dead Animal Disposal

In a typical meat goat enterprise, approximately 10 percent of the kids die before weaning. A mortality rate of 5 percent is common among adult animals. Dead goats can be buried, incinerated, or composted.

The most common method of disposal is burial. Carcasses should be buried deep (4 to 8 ft. depth) and never in areas where leaching is known to occur. Incinerators eliminate carcasses and destroy pathogens but are expensive to buy and operate, therefore not a viable option for most goat producers.

An increasingly popular method of dead animal disposal is composting. Under this system, goat carcasses are placed in a bin containing sawdust or another source of carbon, thus creating an ideal environment for the growth of bacteria.

Bacterial action rapidly heats compost piles to temperatures as high as 160°F. Within several weeks carcasses are reduced, leaving only brittle bones that are easily crumbled. Turning the compost pile by moving it to a new bin (secondary bin) after two weeks helps maintain high temperatures and speeds up the composting process.

Resources

Northeast Natural Resource, Agriculture, and
Engineering Service (NRAES)
Cooperative Extension
152 Riley-Robb Hall
Ithaca, NY 14853-5701
Phone: 607-255-7654
<http://www.nraes.org/>

MidWest Plan Service
219 Biosystems and Agricultural
Engineering Bldg.
University of Minnesota
1390 Eckles Avenue
St. Paul, MN 55108-6005
612-625-9733
<http://www.mwpsdq.org/>

Blueprints and Housing/Equipment Plans
[http://www.cerc.colostate.edu/Blueprints/
blueprints.html](http://www.cerc.colostate.edu/Blueprints/blueprints.html)

Canada Plan Service
<http://www.cps.gov.on.ca/>

Maryland Small Ruminant Page
[http://www.sheepandgoat.com/
housing.html](http://www.sheepandgoat.com/housing.html)
[http://www.sheepandgoat.com/
fencing.html](http://www.sheepandgoat.com/fencing.html)

Purdue Fencing Information
[http://www.agry.purdue.edu/ext/forages/
rotational/fencing/fencing.html](http://www.agry.purdue.edu/ext/forages/rotational/fencing/fencing.html)

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Housing, Facilities, and Equipment for Commercial Meat Goat Production

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