

# BUDGETING FOR TENNESSEE SHEEP PRODUCTION

Jessy Shanks, UT Extension Specialist, Department of Animal Science

Katie Mason, Assistant Professor and UT Extension Specialist, Department of Animal Science

Andrew P. Griffith, Professor and UT Extension Specialist, Department of Agricultural and Resource Economics

Ty Wolaver, UT Extension Specialist, UT Center of Farm Management

## INTRODUCTION

Sheep production in the United States is an ever-changing industry that has experienced some decline over the years. There is a lot of interest in consuming domestic lamb, but producers still cannot provide enough lamb to fulfill current consumer demand. Therefore, the supply must be supplemented by imports. More than half of the U.S. lamb and mutton supply is coming from other countries like New Zealand and Australia (USDA, Economic Research Service). Historically, sheep numbers in the United States have been high, peaking at 51 million head in 1884, but have mostly declined since then. All sheep and lamb inventory in the United States as of January 1, 2024, was estimated at 5.03 million head, down 2 percent from 2023. As of January 1, 2024, the Tennessee sheep inventory was estimated at 51,000 head, an increase from the 2023 estimate (USDA, NASS, TN Field Office). Breeding ewes and rams also increased by 3,000 head in Tennessee from 2023-2024, and the estimated lamb crop for 2023 was 29,000 head, down 1,000 head from 2022. Tennessee livestock producers currently have a lot of interest in sheep production, and prices are strong for lambs and sheep. Most of the farms in Tennessee are small operations, which mirror operations across the United States sheep industry. Based off this example of a small producer, a budget has been constructed to measure and estimate revenue and costs for new or existing sheep operations.

## BUDGET SECTIONS

The sheep budget template includes tabs for flock data, feed, pasture/hay, veterinary care/medicine, reproduction, marketing, buildings and equipment, breeding stock, and other expenses. The template can be modified to fit the needs of each individual producer, and the cells that can be modified are highlighted orange. This is only to be used as a guide and is not meant to be a guarantee. The cost estimates are made from the most up-to-date sources when the budget is created. Producers are encouraged to enter their own data and estimates to give the best reflection of the current market.

## FLOCK DATA

Sheep in Tennessee typically lamb during the springtime, and a lambing rate of 108 lambs per 100 ewes was reported to the National Animal Health Monitoring System (NAHMS) in 2021. Lambing rate also factors in ewes who did not get pregnant or those who may have had lambs but failed to raise them successfully. This is one of the most critical numbers for profitability of a sheep operation (Enterprise Budgeting, Sheep 201). Producers can change many of the values in this tab including lambing rate to fit their specific operation. Producers are encouraged to customize this budget to allow for a more accurate reflection of their situation. Death loss for ewes is around 6.8 percent and approximately 12 percent for lambs (NAHMS 2021), although this could vary between operations depending on management practices and other factors.

## SUPPLEMENTAL FEED, PASTURE & HAY

This tab includes sections for all the animals within the operation. Most producers will have a few different feeds with which they supplement depending on the production stage of each group of animals. In most cases, lactating ewes need more supplemental feed than breeding rams, for example. Any of the orange boxes can be edited to reflect current feed inputs for the specific operation. Be sure to include correct units, price per unit, days fed, quantity fed, etc. The template gives a total supplemental feed cost based on input values in the bottom right-hand cell. Keep in mind that feed costs are usually one of the highest inputs in a sheep operation and can vary depending on vendor, time of year, commodity prices, etc. Sheep should be fed to maintain an adequate body condition score (BCS) of 3 (on a scale of 1-5, 1 being emaciated, 5 being obese). Forage should be the base of the nutrition program and is typically the most economical, especially with rising feed and input costs.

Feeding grain or store-bought concentrates is something most producers do, but it is often more than what the animal actually needs. For example, if a ewe has a BCS 4 on adequate pasture, she does not need to be supplemented with grain because she is in good body condition. However, if ewes are thin entering breeding season, they would benefit from a supplement to help them get to an ideal body condition for breeding. Another item to be aware of is copper toxicity. Sheep are extremely sensitive to copper because they cannot excrete excess copper like other species. Goats and cattle have a requirement for copper and can sometimes be deficient, so goat- and cattle-specific feeds will have much higher levels of copper than should ever be fed to a sheep. This is the reason sheep should only be fed sheep-specific feed and mineral. Understand that sheep feed can be contaminated with high levels of copper if proper procedure is not followed during mixing, so be vigilant in choosing a high-quality feed mill. Care should be taken to feed only sheep feed and mineral, and to not have other sources of feed (horse, cattle or goat feed, cattle or goat mineral) where they can potentially get into them. Below is a table of sheep nutrient requirements for maintenance (no desired change in body weight) adapted from Susan Schoenian's Sheep 201 website.

| BW  | DMI, lbs. | DMI, % | TDN, lbs. | CP, lbs. | Ca, lbs. | P, lbs. |
|-----|-----------|--------|-----------|----------|----------|---------|
| 125 | 2.6       | 1.7    | 1.26      | 0.22     | 0.0051   | 0.0051  |
| 150 | 2.6       | 1.7    | 1.45      | 0.25     | 0.0057   | 0.0053  |
| 175 | 2.9       | 1.7    | 1.62      | 0.28     | 0.0064   | 0.0059  |
| 200 | 3.2       | 1.6    | 1.79      | 0.31     | 0.0070   | 0.0066  |
| 225 | 3.5       | 1.6    | 1.96      | 0.33     | 0.0077   | 0.0070  |

Source: Nutrient Requirements of Sheep, 6th Edition, 1985

Hay is important for providing adequate roughage in the ruminant diet and can also meet their nutrient requirements if quality is adequate. Harvesting high-quality hay can seem like a complex process, but the easiest way to determine the hay quality is to take a forage sample and have it analyzed.

Some of the basic components to look at include dry matter (DM), total digestible nutrients (TDN), and crude protein (CP). Here is a short description of each of these components:

- Dry matter (DM) is the material remaining after removal of water. It is necessary to always balance and evaluate rations on a dry-matter basis to provide the correct quantity of nutrients that livestock need for performance expectations. As-fed basis are the values of the hay without alterations. Values on a forage analysis are presented on a dry-matter basis.
- Total digestible nutrients (TDN) are the sum of all nutrients in the forage that can be digested and serve as a source of energy for livestock.
- Crude protein (CP) is the estimate of a feed's protein content. This is a measure of the percent nitrogen content of the sample multiplied by 6.25 to equal a percent of 100. This measure accounts for true protein and non-protein nitrogen.

## VETERINARY CARE & MEDICINE

Veterinary care for a sheep operation is typically pretty minimal, but problems can arise and should be accounted for. It also is a good idea to get a veterinarian's input on management practices and additional vaccinations and have the veterinarian perform other services such as ultrasounding or blood testing ewes for pregnancy determination, breeding soundness exams on rams, etc. The importance of this relationship with a veterinarian cannot be overstated. Every sheep should receive a vaccination for clostridial diseases annually. This is commonly referred to as a CDT vaccination and covers clostridial diseases type C&D (over-eating disease), as well as tetanus. It is essential that lambs receive this vaccination once prior to weaning (typically a few weeks after birth), and then a booster just before weaning for a total of two injections. Other veterinary expenses include anthelmintics or de-wormers, which should be used judiciously on an as-needed basis to prevent overuse and development of resistance to de-wormers. Other expenses could arise when veterinarian services are needed including assisting with lambing, performing C-sections, repairing rectal prolapses, etc. A lot of sheep producers perform their own health management (vaccinations, deworming, hoof trimming, lambing assistance, etc.), but there are instances when a veterinarian is necessary. It is best to develop that relationship well in advance of when veterinary services are needed for an emergency situation. A veterinary-client/patient relationship is essential when operating any type of livestock enterprise for multiple reasons. Fly control is normally not a huge expense in a sheep operation but is included in the template in case it is needed.

## REPRODUCTION

This tab includes various expenses associated with advanced reproductive technologies that a sheep producer might utilize. It is important to note that different veterinarians use different protocols for procedures such as laparoscopic artificial insemination, embryo transfer, etc., and this list is not all inclusive in terms of the drugs utilized in such technologies.

The costs of these items are from up-to-date sources, but these prices can change quickly and vary greatly depending on the source. Semen costs can be as little as \$50 per straw and as much as \$300 per straw. A “jump” or one entire ejaculate collection from a ram can cost upwards of \$5,000 but can breed 20-30 females. Therefore, take care when planning for such endeavors to be aware of actual costs. Pregnancy determination can be done via ultrasound for a cost of around \$5 per head (depending on the number of females checked), or blood samples can be used to determine pregnancy status.

## **MARKETING**

Sheep operations generally obtain income from the sale of lambs or meat (Schoenian, Sheep 201 website). There are a variety of ways to market sheep including public auctions, direct marketing, livestock dealers, and marketing alliances. Public auctions have many advantages, including that they are always available, easy, convenient, and payment is guaranteed and quick. There are some negatives associated with public auctions, including significant stress for the animal, distance to the auction, and price is not guaranteed and can fluctuate widely depending on supply and demand. Direct marketing (selling directly to the consumer) has many advantages including higher profits, but these often come at a cost of higher labor, more time spent marketing products, and lend well to producers who have good people skills. Consumers are eager to buy a variety of livestock products directly from producers, but this should not be seen as the easiest method of marketing. Livestock dealers will typically come and pick up animals from the producer’s farm, making this method convenient and easy, but price can fluctuate greatly with market prices. Marketing alliances comprise producers who join together to create larger loads of animals to send directly to public auctions or buyers (such as a retail chain). These are typically not sustained over time, but there have been multiple marketing alliances in Tennessee historically.

In this budget the public auction commission is 8 percent (United Producers, Columbia, TN), but this can vary between auction locations. Yardage is the charge for that animal to be held in confinement at that particular auction location and is \$1.00 in this example. The trucking rate of \$4.00 per loaded mile is the current per mile charge for 18 wheelers, and gooseneck charges will be similar but can also vary. Another item a producer might want to include here is fuel and vehicle maintenance, but these also can be included in the Other Expenses category.

## **BUILDINGS & EQUIPMENT**

Equipment needed for a sheep enterprise can be fairly minimal. Essential buildings would include a barn if planning to lamb indoors or operating on a confinement-based system even for part of the year. Barn design can be partially open sided, fully enclosed, pole barn, etc. Type and style depend on the production system and how animals are managed. Sheep producers also will need somewhere to store hay (round bales or square bales) and a method for feeding it (i.e. a tractor for moving round bales). Another piece of equipment that many might consider essential is a working facility. While not as elaborate as cattle working systems, sheep working facilities can still be very beneficial to a producer. A system such as this usually consists of a crowding pen, sweep tub, alleyways, and sorting gates. Specialty items that can be added include working chutes which can be head catch only or a full tilt table with sides that drop down for easy access to the animal. Working facilities can be elaborate or simple and most producers will add on to the system as time goes by. A full \$10,000 system is not a requirement for a beginning sheep farmer.

Other items of interest include hay and grain feeders and waterers. Automatic waterers are popular options but will be permanent once they are installed, so they may not be ideal for inside the barn. This is something to take into consideration when designing a barn. Clean, fresh water is a daily essential for sheep and lambs (Schoenian, Sheep 201 website), so care should be taken in utilizing waterers that can be emptied out and cleaned easily. Fence-line feeders (hay or grain, or both) are great options for inside or outside the barn and can make feeding large groups much easier. There are many different types of hay and grain feeders available. Human safety needs to be considered (i.e. feeding large groups of mature ewes and getting pushed around or trampled), and there needs to be adequate feeder space for each animal. Feeding on the ground should not be an option whatsoever, as this can open the door for disease, parasites, feed wastage and other issues (Schoenian, Sheep 201 website).

Bulk grain bins are another option for sheep producers and can be a good investment that allow for the purchase of bulk feed or individual commodities. There are portable and stationary options. Type and style depend on how feed will be obtained and what delivery options are available.

Panels are another item that sheep producers use frequently. Panels come in several lengths, heights, and bar spacing and can be bought as a package deal (i.e. a lambing jug, small pen for ewe and lambs after lambing) or can be purchased individually to serve almost any purpose needed. Panels are an excellent way to create temporary pens/alley-ways in a barn, gather animals safely and efficiently, or load animals into a trailer.

Fencing is an essential part of a sheep operation and needs to be secure enough to keep predators out and animals inside areas where they are supposed to be. Perimeter fencing is installed around the boundary of your property, and interior fencing or cross-fencing can be used to divide pastures (Schoenian, Sheep 201 website). Temporary fencing products (electric wire or netting) can be used for interior fences as well as for rotational grazing purposes (a fence you might move frequently as forage availability decreases for example).

Fencing can be a large capital expenditure and requires regular upkeep (spraying herbicides, maintenance, etc.) to maintain its effectiveness. Barbed wire and rail (board or vinyl) fencing are not recommended as perimeter fencing for sheep as they do not effectively keep predators out, but these could be used for corrals and such. Woven wire is effective for sheep, but one disadvantage is the cost. Electric high tensile fencing is also a popular option that costs less than woven wire to construct.

Equipment can be minimal, or it can be extensive. Animal safety and comfort, as well as human safety, are important when considering equipment. Animals need adequate shelter, nutrition, water, and safety from predators to thrive. Producer management style needs to work to meet the goals of the operation.

## BREEDING STOCK

Purchasing breeding stock for a sheep operation should be a top priority on a recurring basis. Animals should be purchased each year in order to maintain sufficient numbers that align with the producer's goals. Animals should be regularly culled from the breeding program for criteria set by the producer. These criteria can be very strict or very loosely defined. For example, some producers might have selection criteria set for meeting breed standards, pregnancy status, lamb numbers, genetic defects, etc. These can be well defined standards that the sheep have to adhere to, or their health status might dictate the decision (i.e. mastitis affecting a ewe's milk production). Culling animals is a necessary practice for a sheep operation in order to maintain quality as well as efficiency. The "culled" lines on the budget will allow the producer to input the sale price for that animal and the weight. If a producer commits to culling animals then it will be necessary to replace them, too. Breeding stock can be purchased directly from another sheep producer (private treaty) or sheep sales (both online and in person). Online sales have become increasingly popular, but a fair amount of sheep sales still happen in person. This budget item is a personal decision related to the producer's goals, budget constraints, and how far they might want to travel to look at and obtain animals.

## OTHER EXPENSES

This tab includes a few items that are predetermined, but it also has the flexibility to add other items that are unique to each operation. Identification tags are essential on a sheep operation. In order to have good records a producer must first be able to identify each individual animal. You can use pre-made tags that are purchased locally at farm supply stores, or custom printed tags can be obtained from multiple online companies. All sheep in the state of Tennessee are required to have official identification (ID). Official identification can be a scrapie tag, a registry tattoo (must be accompanied by registration papers), a microchip, or a blue meat tag (Tennessee Department of Agriculture). Scrapie tags have the premise ID for the farm as well as the animal's individual ID number. These tags also have the US seal on them and are not to be removed. The goal of the scrapie tag is to allow traceability of animals that test positive for scrapie so that testing efforts can be directed accordingly.

Other items in this category could include bedding, livestock guardian animals and their associated supplies and care, costs incurred with hauling, etc. Anything that does not fit into another category can be included on this tab.

## CONCLUSION

A sheep operation should have costs that do not equal more than revenue in order to have profit. This budget is meant to be an example, and the producer should customize it to fit their needs. Accurate prices and amounts will help make this budget a functional and useful tool in determining the financial status of an operation.

## RESOURCES

Sheep Budget Excel Spreadsheet <https://tiny.utk.edu/SheepBudgetExcel>

## SOURCES

Sheep, Lamb & Mutton, USDA, Economic Research Service.  
<https://www.ers.usda.gov/topics/animal-products/sheep-lamb-mutton/>

Kenerson, Debra. (2023, January 31). January 1 Sheep and Goat Inventory. USDA, NASS, TN Field Office. [https://www.nass.usda.gov/Statistics\\_by\\_State/Tennessee/Publications/Current\\_News\\_Release/2023/SheepGoat23\\_TN.pdf](https://www.nass.usda.gov/Statistics_by_State/Tennessee/Publications/Current_News_Release/2023/SheepGoat23_TN.pdf)

Sheep and Goat Identification Requirements, Tennessee Department of Agriculture. <https://www.tn.gov/agriculture/businesses/animals/animal-health/traceability/sheep-goat.html>

Schoenian, Susan. (2021, April 19th). Sheep 201. <http://www.sheep101.info/201/>

National Animal Health Monitoring System. (2021, October). Sheep Death Loss in the United States. <https://www.aphis.usda.gov/aphis/dashboards/tableau/sheep-death-dashboard>



UTIA.TENNESSEE.EDU

Real. Life. Solutions.™