

THE COST OF PASTURE VERSUS HAY

Kenny Burdine
Extension Economist
University of Kentucky

Whenever I discuss the economics of grazing, I like to start by thinking about hay production costs. Regardless of which species we are talking about, a livestock producer should know what his / her most expensive feeding days are. In most cases, these will be winter feeding days, and that will generally consist of feeding either purchased or home-grown hay. So, I encourage producers to start by getting a solid feel for what their daily winter feeding costs are. For the purposes of this article, I am going to present some specific estimates for winter feeding costs, and other items, but readers should understand that all these things are very “operation-specific” and it is always best to work through estimates using actual production costs.

Most cow-calf operations produce their own hay so we can start there. In these cases, hay production expenses include fertilizer, machinery, fuel, labor, and many other items. Producers should estimate hay costs on a per ton basis, then convert this into a cost per winter feeding day by tracking the amount of hay that cows are consuming through the winter. It's also important to consider storage and feeding losses as they can greatly increase the actual winter feeding costs. The UK Department of Agricultural Economics has a set of forage budgets that can be accessed at <http://www.ca.uky.edu/agecon/index.php?p=29> for producers who would like to use an interactive tool to help estimate these costs.

Estimating a hay cost is always easier in the spring, when fertilizer costs are known with more certainty. However, there is no doubt that hay production and pasture maintenance costs have both increased considerably in today's environment of high fertilizer and fuel prices. Using this tool and some bold assumptions about prices, I ran a quick estimate for hay costs for 2013. To keep things simple, I assumed that Urea, DAP, and Potash were all priced at \$700 per ton come spring. I further assumed that 60, 60, and 120 units of actual N, P, and K were applied. I assumed one ton of lime, \$40 in fuel, oil and repairs, and 4 hours of labor per acre. Assuming 3 ton per acre hay yields, I estimated variable hay costs in the low \$80's on a per ton basis (low \$40's per 1,000 lb roll bale). When also including depreciation on a fairly modest amount of hay equipment, total costs can easily approach and exceed \$100 per ton (\$50 per 1,000 lb roll bale).

Table 1. Estimated Winter Feeding Costs per Cow per Day

Estimated Hay Storage and Feeding Losses	Estimated Hay Production Cost per Ton			
		\$80 per ton	\$100 per ton	\$120 per ton
15% loss		\$1.41	\$1.76	\$2.12
25% loss		\$1.60	\$2.00	\$2.40
35% loss		\$1.85	\$2.31	\$2.77

Assumptions: 30 lbs of hay consumed per cow per day

I also wanted to consider this same question from the perspective of an equine operation that purchased an alfalfa / orchard grass type hay for winter feeding. While the process is very much the same, daily costs tend to be considerably higher. Table 2 on the following page estimates winter feeding days for a typical horse operation. I always encourage producers to think about where they likely fit on tables 1 and 2. While these charts are intended to give a realistic range, producers are certainly encouraged to estimate based on their own records.

Table 2. Estimated Winter Feeding Costs per Horse per Day

Estimated Hay Storage and Feeding Losses	Estimated Hay Cost per 50 lb Square Bale			
		\$5.00 per bale	\$7.50 per bale	\$10.00 per bale
15% loss		\$3.53	\$5.29	\$7.06
25% loss		\$4.00	\$6.00	\$8.00
35% loss		\$4.62	\$6.92	\$9.23

Assumptions: 1200 lb horse consumes 2.5% BW per day

Now, let's turn our attention to grazing costs. Pasture maintenance costs usually include fertilizer, lime, seed, machinery, and clipping. These costs vary greatly by operation and by year, but likely will range from \$50 per acre to over \$150 per acre depending on fertility and how often pastures are clipped. I also encourage producers to think about pasture maintenance costs in a typical or average year. For example, if fertilizer is not applied annually, think about averaging fertilizer costs over a period of time.

Once pasture costs have been considered, a reasonable estimate can be obtained for pasture costs per head by per day by estimating stocking rate per acre and the number of grazing days per year. Table 3 below estimates grazing costs given a 240 day grazing season and various assumptions about stocking rate and pasture maintenance costs per acre. The sensitivity table ranges are very wide in an attempt to cover both cattle operations and equine operations that might stock less dense and / or spend a lot more money maintaining and clipping pastures.

Table 3. Estimated Average Grazing Costs per Day

		Estimated Pasture Maintenance Costs per Acre				
		\$50 / acre	\$75 / acre	\$100 / acre	\$125 / acre	\$150 / acre
Estimated Stocking Rate	2 acre per head	\$0.42	\$0.63	\$0.83	\$1.04	\$1.25
	3 acres per head	\$0.63	\$0.94	\$1.25	\$1.56	\$1.88
	4 acres per head	\$0.83	\$1.25	\$1.67	\$2.08	\$2.50

Assumptions: 240 grazing days per year

Getting a handle on average winter feeding costs and average grazing costs is typically a good place to start when considering profitability. Hay and pasture costs are likely two of the largest components of production cost. Next, one should ask if there are ways to replace some of those more expensive winter feeding days with something cheaper (typically additional grazing days). It is also important to note that winter feeding days are typically replaced at the beginning (fall) and end (spring) of the winter feeding period. So, additional grazing days at these times are likely to be more expensive than the average grazing day costs estimated in table 3. However, if additional grazing days can be added for less than those hay feeding days, variable costs per head can potentially be reduced.

The remainder of this discussion will focus on potential strategies to reduce the number of winter feeding days, and how to think through the economics of those options. Some will apply to both cattle and equine operations, while some will apply to one, but not the other. Regardless, producers should carefully consider the merits of each one to determine if it makes sense for their operation and if it can truly reduce their costs.

Generally speaking, the first hay feeding days are the easiest to replace. Sometimes additional grazing days can be added on the same forage base. Often, this comes back to improved pasture utilization. Pasture utilization is one of the most critical factors in grazing economics. It refers to the percentage of the forage production that is actually consumed by the animals. Just as there are losses when storing and feeding hay, there are grazing losses that should be considered. If we can improve forage utilization rates, we can stretch the grazing season and decrease our dependence on stored feed.

Of course, improved utilization isn't free, and these costs should be considered as well. Setting up a rotational grazing system will potentially require investment in a fencing and watering system, as well as time. If a watering system is already in place, getting water to additional paddocks can likely be achieved much easier. Regardless, figure a useful life on these investments, value the time spent setting up and the additional management time (if applicable), estimate the additional grazing days that can be added, and compare the cost of these additional grazing days to the hay feeding days they are replacing. Use tables 1 and 2 to estimate the value of the winter feeding days that you are likely to replace.

Fall fertilization to stockpile fescue is probably the next most logical practice to consider and one that is used pretty often in Kentucky. Nitrogen fertilization can increase fall forage production and stretch the grazing season beyond what it would be without fall fertilization. This practice may work in tandem with rotational grazing, as improved pasture utilization may be the tool that frees up some pasture for stockpiling purposes. When considering the economics of stockpiled fescue, one should consider the cost of the nitrogen, the additional production resulting from the nitrogen, and the all important utilization rate. Figure the cost of additional fall forage production, how much will actually be utilized, and again, put this on a cost per day basis that can be directly compared to the cost of those hay feeding days. Fall fertilization for stockpiling purposes will be more attractive in years when nitrogen response rate is likely be high, nitrogen fertilizer is reasonably priced, and alternative winter feeds (such as hay) are expensive. The Agricultural Economics Department develops a publication each year that looks specifically at fall fertilization for the purpose of stockpiling fescue pastures. The 2012 publication can be found at:

<http://www.ca.uky.edu/cmsspubsclass/files/ProfitabilityStockpilingTallFescuePastures2012Guide.pdf>.

From here, there are a large number of potential grazing crops that could provide additional grazing days. As stated earlier, each one should be considered carefully. For example, as one starts thinking broadly about grazing options, corn grazing is likely something worth consideration. Establishing corn for grazing purposes will represent a significant investment, yet has considerable grazing potential. When looking at an annual grazing crops like corn, one should consider all establishment costs such as seed, fertility, chemicals, and machinery costs. And, once again, additional fencing and water costs, as well as utilization rate should be considered. In the case of something like corn, one should also consider the opportunity costs of that ground. For example, if we are converting some pasture ground to corn for grazing purposes, there is a value to the grazing ground. Or, if this is additional ground, we should consider what it might be worth if used to produce corn for grain or rented to a grain producer for that purpose. Similar to how I approached average winter feeding and grazing days, I would also suggest that the costs of additional grazing days on the corn ground be put on a cost per cow per day basis, so they can easily be compared.

This same approach can be applied to any potential annual grazing crop. Other warm season annuals would be forages like Sorghum Sudan or Pearl Millet. In general, I would make a couple general overlying comments. First, when considering corn, or some of these other summer annuals, sticker shock can be significant. The cost outlays are much higher than what is seen for typical forage crops. However, the production capabilities are also much greater. This makes it very important that costs be scaled to a cost per day so that they can be compared to winter feeding days.

Second, one should not underestimate the importance of utilization rates. A common mistake that is made when considering grazing costs is to estimate the dry matter production, but not discount that for utilization rate. For example, one might correctly

estimate costs and accurately estimate forage intakes and figure a cost per day based on those two factors. However, this would greatly underestimate costs as it effectively assumes 100% utilization. For example, if utilization rates are 66%, then 1.5 lbs of forage must be produced for every lb of intake. When grazing, forage utilization is just as important as forage production.

Regardless of how one approaches grazing, the key is to look at everything marginally. For any change in the grazing program, estimate the additional expenses, and compare those to the addition benefits (which may be an increase in income or a decrease in expenses). Specifically, if one can add grazing days at a lower cost than the winter feeding days being replaced, profitability can be improved. Livestock producers have faced some incredible challenges over the past three years including drought, rising feed, fuel, and fertilizer costs, and declining prices. The forage program is one area where producers should probably look for opportunities to improve their bottom line.