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Commodity Feed Barn Storage: Is It Profitable For Me?

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There are about 25,000 farms in Alabama with cattle. The majority of these farms use supplemental feed (alfalfa pellets, citrus pulp, corn, corn gluten feed, cottonseed meal, hay, hominy, peanut skins, soybean meal, soyhulls, wheat midds, whole cotton seed, etc.) for their cattle during the winter months and periods of adverse weather (droughts, floods, hurricanes, etc.) when adequate forage is not available. Thus, the demand is higher for supplemental feeds during the winter months and periods of adverse weather. The supply of most feedstuffs is usually largest during the summer and fall months. Given the seasonal demand and supply of supplemental feedstuffs, they typically exhibit a seasonal price trend where higher prices are incurred during the winter months and lower prices during the summer months. Additionally, buying supplemental feeds in truckload quantities (22-24 tons) usually offers a significant price discount. Therefore, the combination of buying in truckload quantities and during the off-season provides cattle farmers with an opportunity to lower their cost of supplemental feed if low-cost storage can be utilized.

The average Alabama cattle farm has about 30 brood cows which are fed some type of supplemental feed for approximately 100 to 150 days per year. The amount of supplemental feed fed per brood cow per day varies widely as individual cattle farmers do things very differently. The amount of supplemental feed fed can range between 5 to 45 pounds per head per day depending on the size of the brood cow, and the price and availability of forages and feedstuffs. Using these parameters results in a wide range of possible quantities from a minimum of 7.50 tons to a maximum of 101.25 tons of supplemental feed fed to a cattle herd of 30 brood cows annually. Therefore, given such a wide range in the quantity of supplemental feed needed and the various price differences between stored bulk feed purchased in the off-season compared with bagged feed purchased on an as needed basis during the winter, each cattle farmer must evaluate their individual situation to determine if it is profitable to utilize a commodity feed barn to store supplemental feed for their cow-herd.

Commodity Feed Barn Assumptions

In this study we are trying to determine if the use of a commodity feed barn is profitable. Thus, the optimum level of the supplemental feed is not evaluated. In essence, we are assuming

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that the cattle operation is profitable at the indicated level of supplemental feed use. As such, we will assume that you will use the same amount of supplemental feed regardless of whether you buy it on an as needed basis as bagged feed during the winter or if you buy bulk feed and store it in a commodity feed barn during the summer. In either situation, the use of supplemental feed is a variable cost. In this study we will use soyhulls, a by-product feed, as the selected feed. The price of the soyhulls was estimated at \$170 per ton for bagged feed used on an as needed basis and \$120 per ton for bulk feed bought in the off-season and stored in a commodity feed barn for use during the winter months. The prices of each feed were assumed to be on farm delivered prices. Additionally, the annual fixed cost of the commodity storage barn was included to account for the total costs (variable and fixed costs) of the bulk stored feed. The storage cost of the bagged feed purchased on an as needed basis is assumed to be zero in this study. The cost incurred to place each supplemental feed in the feed bunk is assumed to be the same. For operations where either there is a bagged feed storage cost incurred or a feeding cost difference exists between the two alternatives, an adjustment can be made by adding or subtracting the dollar difference on a per ton basis.

What are the annual fixed costs of a commodity barn?

When making an investment in most capital assets you will incur annual fixed costs. The fixed costs of an asset, such as the commodity feed barn, includes annual allocations for depreciation, interest, repairs, taxes, and insurance. These fixed costs are incurred regardless of what level of output (pounds of beef production) is realized. Fixed costs are calculated based on the level of investment cost, salvage value, the economic life of the asset, and the respective cost rates for the use of money, repairs, and insurance. Each type of fixed cost is expressed as an annual fixed cost. Table 1 describes the estimated annual fixed costs of a commodity feed barn.

Table 1. Estimated annual fixed costs of a commodity feed barn.

Item	Dollars
One-bay commodity feed barn investment cost*	\$7,500.00
Annual Depreciation	\$300.00
Annual Interest	\$337.50
Annual Repairs	\$75.00
Annual Taxes	\$9.38
Annual Insurance	\$22.50
Estimated total annual fixed cost	\$744.38

*The dimensions of the one-bay commodity feed barn was 12'x40'x14' with a 12'x14' apron. The commodity feed barn was assumed to have a feed storage capacity of 30 tons and an economic life of 25 years.

The investment cost of a one-bay commodity feed barn was assumed to be \$7,500. The commodity feed barn was assumed to have a supplemental feed storage capacity of 30 tons and an economic life of 25 years. Straight line depreciation (purchase value – salvage value divided by years of economic life) was used to calculate the annual depreciation. An average of the investment cost and salvage value multiplied by a 9 percent interest rate was used to calculate the annual interest expense. Twenty-five percent of the investment cost divided by the economic life was used to calculate the annual repair expense. An average of the investment cost and salvage value divided by the economic life multiplied by a 25 mill tax rate was used to estimate the annual taxes. An average of investment cost and salvage value multiplied by .06 (\$6 per \$1,000 of average value) was used to estimate the annual insurance expense. The sum of annual depreciation, interest, repairs, taxes, and insurance provides the estimated total annual fixed cost of owning the commodity feed barn which in this example totaled \$744.38 per year. This annual fixed cost is assumed to be incurred each year of the 25-year economic life of the commodity feed barn. Should the commodity feed barn have a longer/shorter useful life, then the annual fixed costs would be lower/higher than estimated here. After investing in a commodity feed barn, the annual fixed costs are incurred regardless of production level. That is, you will incur approximately \$744.38 per year in expenses over the life of the asset whether we produce 0 or 100,000 pounds of calf production per year.

In addition, there are numerous types of commodity feed barns with different dimensions and capacities used in the livestock industry. If you are considering building a commodity feed barn, it is strongly encouraged that you visit other farmers and/or Extension agents to learn about the advantages and disadvantages of various sizes, types of construction, and configurations of commodity barns.

Many cattle farmers prefer multiple feed bays in a commodity barn. The use of multiple feed bays offers several advantages such as: you can buy large quantities of bulk feeds at discount prices; you can store different types of feedstuffs separately; you can minimize feed waste by completely feeding the feedstuff from a given feed bay before taking delivery of another load of feed thereby eliminating feed spoilage; and maintain an inventory of stored feed for emergencies.

What are the annual fixed costs per ton of stored feed?

The estimated annual fixed cost of the commodity barn, however, can be divided among the units used, such as the tons of feed stored annually. By using the estimated total annual fixed cost of \$744.38 per year and an estimate of how many tons per year will be stored in the commodity feed barn, you can estimate the annual fixed cost per ton. An estimate of how many tons per year will be stored can be estimated by the average tons per delivery to the commodity feed barn and the number of refills per year. Table 2 describes the estimated annual fixed cost per ton to store supplemental feed. In this analysis, the average tons per delivery to the commodity feed barn ranged from 2 to 22 tons and the number of refills per year ranged from 1 to 5. Therefore, the total tons per year potentially stored in the commodity feed barn ranged from 2 to 110 tons per year (1 refill per year at 2 tons per delivery compared with 5 refills per year at 22 tons per delivery). Simply dividing the estimated annual fixed cost of \$744.38 per year by the total tons per year stored provides the annual fixed cost per ton of stored feed. For example, the annual fixed cost of \$744.38 divided by 66 total tons per year (an average of 22

tons per delivery times 3 refills per year) results in an annual fixed cost of approximately \$11 per ton. Given the wide range of potential usage per year (2 to 110 tons per year), the annual fixed cost per ton ranged from \$7 to \$372 per ton. In short, the larger the number of total tons stored and fed during the year, the smaller the annual fixed cost per ton.

Table 2. Estimated annual fixed cost per ton to store supplemental feed.

Number of Refills/Year	Average Amount of Feed Received Per Delivery (Tons)					
	2	6	10	14	18	22
1	\$372	\$124	\$74	\$53	\$41	\$34
2	\$186	\$62	\$37	\$27	\$21	\$17
3	\$124	\$41	\$25	\$18	\$14	\$11
4	\$93	\$31	\$19	\$13	\$10	\$8
5	\$74	\$25	\$15	\$11	\$8	\$7

What does it really cost to feed a stored supplemental feed?

Feeding stored supplemental feed involves more than just the cost of the supplemental feed. The total cost of stored supplemental feed includes the cost of the supplemental feed, transportation cost to the farm, storage cost, and feeding cost. Table 3 describes the estimated total cost of stored supplemental feed during March 2007. In this example, the total cost of stored supplemental feed was \$141 per ton (\$110+\$10+\$11+\$10).

Table 3. Estimated total cost of feeding stored supplemental feed.

Item	Dollars Per Ton	Percent Waste
Supplemental feed cost	\$110	
Transportation cost	\$10	1%
Storage cost*	\$11	5%
Feeding cost	\$10	5%
Total cost of feeding stored supplemental feed	\$141	11%
Total cost of feeding stored supplemental feed adjusted for waste	\$159	

*Assumes 3 refills of 22 tons each delivery.

Additionally, an important factor that must be considered with all feeds is the percent of feed waste incurred during transportation, storage, and feeding. In this example, the percent of feed waste totaled 11 percent. Thus, the total cost of stored supplemental feed after adjusting for feed waste is \$159 per ton ($\$141/0.89$). These estimates of percent waste can range widely and have a significant impact on the total cost of stored supplemental feed. A watchful eye on managing percent waste will pay handsome dividends.

Stored supplemental feed is necessary on most cattle operations. Unfortunately, stored supplemental feed is also usually much more expensive than grazing. Thus, you should try to minimize the use of stored supplemental feed in your cattle operation. In general, the more days of grazing you can attain, the more profitable your cattle operation. This is consistent with an old saying that says “it is almost always cheaper to let the cow harvest the forage.”

Limitations of Commodity Feed Barns

As should be expected with any investment, there are some limitations associated with the commodity feed barn. Some of these limitations include:

- Utilizing the commodity feed barn for less than its full economic life (say 25 years) results in significantly higher storage costs.
- Feed waste can occur if feed is not used within a reasonable time period or from feed bunk mis-management
- Nutritional content of feeds procured have to be monitored carefully to maintain adequate quality for the livestock being fed
- Quantity of feed procured has to be accurately estimated to ensure that the feed is readily available when needed and minimal feed waste is incurred
- Machinery and equipment needed to effectively and efficiently move feeds to livestock is required to be available and operational
- A reasonable quantity of feedstuff to be stored/fed annually is needed to reduce storage cost per ton

Commodity Feed Barn Savings and Repayment Period

The reason most farmers build a commodity feed barn is to save money. Many farmers can purchase by-product bulk feeds during the off-season at lower or discount prices and store them for later use. These savings can be substantial. Table 4 describes the total cost of feed purchased with and without storage, the savings per year due to commodity feed barn storage, and an estimated payback period for the use of the commodity feed barn. The annual savings increase as the tons of feed fed annually increases.

Assuming 44 tons of supplemental feed is fed annually, non-stored bagged feed would cost the livestock farmer \$7,480 per year and stored supplemental bulk feed would cost \$5,280 per year. The savings for 44 tons of feed fed annually was \$2,200 per year. Thus, the farmer would realize a net benefit of \$1,456 per year ($\$2,200 - \744) for building and using a commodity feed barn. In this analysis, the building of a commodity feed barn was profitable for farmers that can use one or more truckloads (≥ 22 tons) of supplemental feed annually.

The repayment period for a commodity feed barn is the total investment cost (\$7,500) divided by the annual savings associated with the use of a commodity feed barn. The years necessary to

pay for the commodity feed barn decreases as you increase the tons of feed fed annually. The repayment period ranged between 0.85 to 6.82 years. In this example, a farmer feeding 66 tons annually has a repayment period of 2.27 years and a savings per year due to the commodity feed barn of \$3,300 per year. This farmer will realize a net annual savings of \$2,556 per year (\$3,300 – \$744). Over the 25-year life of the commodity feed barn this would total \$63,891 (\$2,556*25) in net savings.

Table 4. Total cost of feed purchased with and without storage, annual savings due to commodity feed storage, and an estimated payback period for the use of the commodity feed barn*.

Item	Tons of Feed Fed Annually							
	22	44	66	88	110	132	154	176
Non-stored Supplemental Bagged Feed @ Winter Average Price of \$170/Ton	\$3,740	\$7,480	\$11,220	\$14,960	\$18,700	\$22,440	\$26,180	\$29,920
Stored Supplemental Bulk Feed @ Summer Average Price of \$120/Ton	\$2,640	\$5,280	\$7,920	\$10,560	\$13,200	\$15,840	\$18,480	\$21,120
Savings Per Year Due To Commodity Feed Barn Storage	\$1,100	\$2,200	\$3,300	\$4,400	\$5,500	\$6,600	\$7,700	\$8,800
Net Savings Per Year Due To Commodity Feed Barn Storage	\$356	\$1,456	\$2,556	\$3,656	\$4,756	\$5,856	\$6,956	\$8,056
Net Savings Over 25-Year Life of the Commodity Feed Barn	\$8,891	\$36,391	\$63,891	\$91,391	\$118,891	\$146,391	\$173,891	\$201,391
Years Necessary To Pay For The Commodity Feed Barn	6.82	3.41	2.27	1.70	1.36	1.14	0.97	0.85

*This analysis used a three-year average cost of soyhulls supplemental feed delivered during the winter months (Dec., Jan., & Feb.) and summer months (June, July, & Aug.).

A spreadsheet is available for you to evaluate your individual situation on our website (<http://www.ag.auburn.edu/agec/pubs/budgets/>). Simply insert your values into this spreadsheet and it will calculate an estimate of your annual fixed cost to store supplement feed, the annual net savings associated with stored feed, and the repayment period for the commodity feed barn.

Summary

A commodity feed barn is a useful asset to have on many cattle operations. However, the profitability of investing in a commodity feed barn depends on many factors. Some of these factors include: 1) the number of tons of annual feed usage; 2) the cost to build a commodity feed barn; 3) the number of years the commodity feed barn will be utilized; 4) the difference between the purchase of bulk feed for storage and bagged feed on an as needed basis; and others. The decision to build a commodity feed barn must be tailored to your farm and your supplemental feed needs. Only by using your numbers can you determine that a commodity feed barn will be profitable for your livestock operation.

Feeding stored commodity feeds is a viable cost saver for many livestock operations. Livestock farmers feeding one truckload or more (≥ 22 tons) of supplemental feed annually will likely find that a commodity feed barn is a profitable investment if managed properly. A few minutes spent crunching the numbers in the above spreadsheet will help you better assess whether a commodity feed barn is profitable for you. Likewise, talking with fellow livestock farmers who have commodity feed barns and/or Extension agents will help you learn about some of the advantages and disadvantages of a commodity feed barn.