Forage and Hay Economics

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Forage Economics

I am interested in Cool-Season Annual Forages because they provide nutrition that exceeds the requirements of Fall and Winter Calving Herds during their most critical time period.

Cool-Season Annual Forage Mix (CSAFM)

*Total Digestible Nutrients (**TDN**): 65%*

*Crude Protein (**CP**): 15%*

Forage Economics

Break out your Costs and Focus on the BIG ITEMS

My Three Main Cool-Season Annual Forage Costs

- *Fertilizer*
- *Seed*
- *Planting Machinery and Equipment* ***(Variable and Fixed)***

Forage Economics

Other Forage Costs

- *Lime*
- *Lime Application*
- *Weed Control*
- *Weed Control Application*
- *Hired Labor*
- *Soil Tests*
- *Forage Tests*
- *Miscellaneous Expenses*
- *Interest on Operating Costs*

Land Rent
General Overhead

Forage Economics

$150	*Cost of Forage Production, $/acre*
100	*Beef Cows*
100	*Acres of Cool-Season Annual Forages*
120	*Number of Grazing Days*
1.0	*Stocking Rate, head/acre*
$1.25	*$/head/day*
$125	*$/grazing day*

Forage Economics

$150	*Cost of Forage Production, $/acre*	
100	*Beef Cows*	
100	*Acres of Cool-Season Annual Forages*	
1.0	*Stocking Rate, head/acre*	
	Number of Grazing Days	
60	*90*	*120*
	$/head/day	
$2.50	*$1.67*	*$1.25*

Forage Economics

Forage Systems

Forage Production, DM lbs./acre

Level of Forage Utilization, %

Forage Consumption, DM lbs./acre

Cost of Forage Production, $/acre

Forage Cost, $/DM ton produced

Forage Cost, $/DM ton consumed

Forage Economics

Forage Systems

4,000	*Forage Production, DM lbs./acre*
50%	*Level of Forage Utilization, %*
2,000	*Forage Consumption, DM lbs./acre*
$200	*Cost of Forage Production, $/acre*
$100	*Forage Cost, $/DM ton produced*
$200	*Forage Cost, $/DM ton consumed*

I can get DDG's for $175/ton

Forage vs. Feeding Systems

Forage vs. Feeding Systems

Total cost should be evaluated on the amount of feed utilized or consumed, not the purchase price or cost of production.

Additionally, all costs must be incorporated.

Forage vs. Feeding Systems

- *Commodity Purchase Price or Cost to Raise*
- *Transportation Costs*
- *Storage Costs*
- *Mixing Costs?*
- *Feeding Costs*
- *Waste*

Forage vs. Feeding

Table 1. Bahiagrass Hay and Whole Cottonseed Cost and Waste Estimates

Type of Cost	Bahiagrass Hay	Percent Waste	Whole Cottonseed	Percent Waste
Feedstuff cost per ton	$94		$160	
Feedstuff cost per dry matter ton	$112		$174	
Feedstuff transportation cost per dry matter ton	$0	0.0%	$0	0.0%
Feedstuff storage cost per dry matter ton	$5	2.5%	$5	2.5%
Feedstuff feeding cost per dry matter ton	$10	15.0%	$10	15.0%
Totals	$127	17.5%	$189	17.5%
Total feedstuff cost per dry matter ton adjusted for waste	$149		$222	
Total feedstuff cost per dry matter pound adjusted for waste	$0.075		$0.111	

% of Normal Forage Production	*Forage Production, DM lbs./acre*	*$/DM ton Produced*	*$/DM ton Consumed*
75%	4,500	$78	$156
85%	5,100	$69	$137
95%	5,700	$61	$123
100%	6,000	$58	$117
105%	6,300	$56	$111
115%	6,900	$51	$101
125%	7,500	$47	$93

Cool-Season Annual Forage Cost of Production of $175/acre.

Level of Forage Utilization is 50 percent.

Cool-Season Annual Forage Mix (CSAFM)

Forage Production, DM lbs./acre	6,000
Level of Forage Utilization, %	50%
Forage Utilization, DM lbs./acre	3,000
Forage Utilization, DM tons/acre	1.5
Cost of Production Per Acre, $/acre	$175
Forage Cost, $/DM ton produced	$58
Forage Cost, $/DM ton consumed	$117

Table 1. An Economic Analysis of Cool-Season Annual Forage Cost Per Dry Matter Ton Produced For Various Levels of Forage Production and Production Costs Per Acre								
Forage Production, DM lbs./acre	***Cool-Season Annual Forage Production Costs, $/acre***							
	$125	**$150**	**$175**	**$200**	**$225**	**$250**	**$275**	**$300**
	Total Cost of Growing and Grazing Per Dry Matter Ton Produced							
3,000	$83	$100	$117	$133	$150	$167	$183	$200
4,000	$63	$75	$88	$100	$113	$125	$138	$150
5,000	$50	$60	$70	$80	$90	$100	$110	$120
6,000	$42	$50	$58	$67	$75	$83	$92	$100
7,000	$36	$43	$50	$57	$64	$71	$79	$86
8,000	$31	$38	$44	$50	$56	$63	$69	$75
9,000	$28	$33	$39	$44	$50	$56	$61	$67
10,000	$25	$30	$35	$40	$45	$50	$55	$60

Table 2. An Economic Analysis of Cool-Season Annual Forage Cost Per Dry Matter Ton Consumed For Various Levels of Forage Production and Production Costs Per Acre

Forage Production, DM lbs./acre	***Forage Utilization*, DM lbs./acre***	***Cool-Season Annual Forage Production Costs, $/acre***							
		$125	**$150**	**$175**	**$200**	**$225**	**$250**	**$275**	**$300**
		Total Cost of Growing and Grazing Per Dry Matter Ton Consumed							
3,000	1,500	$167	$200	$233	$267	$300	$333	$367	$400
4,000	2,000	$125	$150	$175	$200	$225	$250	$275	$300
5,000	2,500	$100	$120	$140	$160	$180	$200	$220	$240
6,000	3,000	$83	$100	$117	$133	$150	$167	$183	$200
7,000	3,500	$71	$86	$100	$114	$129	$143	$157	$171
8,000	4,000	$63	$75	$88	$100	$113	$125	$138	$150
9,000	4,500	$56	$67	$78	$89	$100	$111	$122	$133
10,000	5,000	$50	$60	$70	$80	$90	$100	$110	$120

**Forage utilization was assumed to be 50 percent of forage production (column one x .50)*

Table 3. An Economic Analysis of Cool-Season Annual Forage Cost Per Dry Matter Ton Consumed For Various Levels of Forage Production and Production Costs Per Acre

Forage Production, DM lbs./acre	***Forage Utilization*, DM lbs./acre***	***Cool-Season Annual Forage Production Costs, $/acre***							
		$125	**$150**	**$175**	**$200**	**$225**	**$250**	**$275**	**$300**
		Total Cost of Growing and Grazing Per Dry Matter Ton Consumed							
3,000	1,500	$167	$200	$233	$267	$300	$333	$367	$400
4,000	2,000	$125	$150	$175	$200	$225	$250	$275	$300
5,000	2,500	$100	$120	$140	$160	$180	$200	$220	$240
6,000	3,000	$83	$100	$117	$133	$150	$167	$183	$200
7,000	3,500	$71	$86	$100	$114	$129	$143	$157	$171
8,000	4,000	$63	$75	$88	$100	$113	$125	$138	$150
9,000	4,500	$56	$67	$78	$89	$100	$111	$122	$133
10,000	5,000	$50	$60	$70	$80	$90	$100	$110	$120

**Forage utilization was assumed to be 50 percent of forage production (column one x .50)*

***The total cost of growing and grazing cool-season annual forages is lower than the cost of using a comparable high quality feedstuff ($188) in the yellow highlighted areas.*

Table 1. A Sensitivity Analysis of Cool-Season Annual Forage Cost Per Dry Matter Ton Consumed For Various Levels of Forage Utilization and Forage Production Per Acre

Forage Utilization		Forage Production, DM lbs./acre						
Change in Forage Utilization, %	Level of Forage Utilization, %	Change in Forage Production, %	-30%	-20%	-10%	Base	10%	20%	30%
		Level of Forage Production	4,374	4,860	5,400	6,000	6,600	7,260	7,986
		Total Cost of Growing and Grazing Per Dry Matter Ton Consumed							
-30%	20%		$400	$360	$324	$292	$265	$241	$219
-20%	30%		$267	$240	$216	$194	$177	$161	$146
-10%	40%		$200	$180	$162	$146	$133	$121	$110
Base	50%		$160	$144	$130	$117	$106	$96	$88
10%	60%		$133	$120	$108	$97	$88	$80	$73
20%	70%		$114	$103	$93	$83	$76	$69	$63
30%	80%		$100	$90	$81	$73	$66	$60	$55

Table 3. Calculating the Cost Per Dry Matter Ton of Cool-Season Annual Forage Consumed

Cool-Season Annual Forage Production: 6,000 *DM lbs./acre*
Level of Cool-Season Annual Forage Utilization: 50 *%*
Cool-Season Annual Forage Utilization: 3,000 *DM lbs./acre*
Cool-Season Annual Forage Production Costs: $175*/acre*

Forage Utilization (*DM lbs./acre or DM tons/acre*)

$$= Forage\ Production\ (DM\ lbs./acre)\ x\ Level\ of\ Forage\ Utilization\ (\%)$$

$$Forage\ Utilization = 6{,}000\ DM\ \ lbs./acre\ x\ 50\% = 3{,}000\ DM\ lbs./acre$$

$$Forage\ Utilization = \frac{3{,}000\ DM\ \ lbs./acre}{2{,}000\ \ lbs./ton} = 1.5\ DM\ \ tons/acre$$

Cost of Growing and Grazing Cool-Season Annual Forage Per Dry Matter Ton Consumed

$$= \frac{Cool\ Season\ Annual\ Forage\ Production\ Costs\ (\$/acre)}{Forage\ Utilization\ (DM\ \ tons/acre)}$$

$$Cost\ of\ Growing\ and\ Grazing\ Per\ Dry\ Matter\ Ton\ Consumed = \frac{\$175/acre}{1.5\ DM\ tons/acre}$$

$$Cost\ of\ Growing\ and\ Grazing\ Per\ Dry\ Matter\ Ton\ Consumed = \$117/DM\ ton$$

Cost of Feeding Hay

1 Roll of Bahiagrass Hay (850 DM lbs.) @ $45/Roll

2.35 Rolls of Bahiagrass/DM ton

*2.35 Rolls/DM ton * $45/Roll = $106/DM ton*

$106 / 2,000 lbs. = $0.053/DM lb.

1,200 lb. Gestating Beef Beef Cow during the Last 1/3 of her pregnancy requires a dry matter intake of 2.0% of her body weight, or 24 DM lbs.

*$0.053 * 24 DM lbs. = $1.27/beef cow/day*

(with no hay waste, storage, or feeding costs included, just the cost of the hay)

Cost of Feeding Hay

Assumption 1: *There was easily 15% hay waste once they started feeding hay in January. Some rolls there was more, some there was less. This brings the amount of DM Hay required to 27.6 DM lbs.*

Assumption 2: *Feeding hay using a tractor burns fuel and costs money. Additionally, the barn the hay sits under is nice. We'll add another $5 per roll to store and get it fed.*

Assumption 3: *Their time spent feeding hay is part of their labor and management. Additional labor costs were not accounted for in this analysis. If they had used hired labor, that would have been an added expense.*

Cost of Feeding Hay

Original Cost: $106/DM ton

New Cost: $111/DM ton

Original Dry Matter Intake: 24 DM lbs./beef cow/day

New Dry Matter Intake: 27.6 DM lbs./beef cow/day

*Original Cost: $0.053 * 24 DM lbs. = $1.27/beef cow/day*

*New Cost: $0.055 * 27.6 DM lbs. = $1.53/beef cow/day*

Cost of Feeding Hay

Original Cost: $106/DM ton

New Cost: $111/DM ton

Original Dry Matter Intake: 24 DM lbs./beef cow/day

New Dry Matter Intake: 27.6 DM lbs./beef cow/day

*Original Cost: $0.053 * 24 DM lbs. = $1.27/beef cow/day*

For 75 Days: $95/beef cow

*New Cost: $0.055 * 27.6 DM lbs. = $1.53/beef cow/day*

For 75 Days: $115/beef cow

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