

Switch Grass for Biomass for Energy Production: Estimated annual revenue, operating cost, fixed cost and net returns per acre (one cutting/year).

Budget 87-12

6/1/2013

Description	Unit	Price	Quantity	Value	Comments
Operating inputs					
-Lime, applied, pro-rated share	Ton	\$50.00	0.20	10.00	
-10-10-10, dry bulk	Cwt.	\$20.70	4.00	82.80	
-30% N Solution	Cwt.	\$20.50	1.33	27.27	
-Fert. Spread, custom	Acre	\$7.00	2.00	14.00	
-Baling Twine	Roll	\$15.00	0.30	4.50	
-Other:				0.00	
-Other:				0.00	
-Other:				0.00	
-Machinery Labor (From Table 2)				59.47	
-Other Labor	Hours	\$12.00	0.00	0.00	
-Machinery Fuel, Maint, Repairs (Table 2)	Acre			63.39	
-Annual Operating Capital	\$	5.0%	108.92	5.45	
Total Operating Costs				266.86	
			Amount	Value	
Fixed Costs					
-Machinery Depreciation, Taxes, Insurance, and Interest (From Table 1)				71.72	
-Pasture Establishment Depreciation and Interest (From Table 1)				17.09	
Total Fixed Costs				88.81	
Total Cost				355.67	
	Unit	Price^b	Quantity	Value	
Production					
-Harvested as Biomass, Dry Matter	Ton	\$60.00	6.00	360.00	
-Harvested as Pasture, Dry Matter	Ton	\$0.00	0.00	0.00	
Total Receipts				360.00	
RETURNS ABOVE TOTAL OPERATING COST				93.14	
RETURNS ABOVE ALL SPECIFIED COSTS^c				4.33	
AVERAGE COST PER TON OF DRY MATTER^d				\$59.28	

^a Interest on operating expenses for an average of 5 months.

^b Use the sale price or market value of any hay or biomass produced. Use the actual rent received if any residual pasture is rented out.

^c This is the cost of any residual grazing per acre = Total annual cost LESS the value of biomass or hay sold or any pasture rented out.

^d Total cost divided by total dry matter produced.

NOTES

These are estimated production costs and include the cost of moving bales off the field. Additional costs of transportation to a storage site, storage facilities, loading out, and losses in storage are not included. To convert the budget DM cost to a cost of biomass as harvested, multiply by the biomass dry matter %.

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Table 1. Initial investment in specialized equipment and annual ownership expenses

Operation and Item	Life	Initial Cost	Salvage Value	Depreciation ^a	Interest ^b	Tax & Ins. ^c	Annual D.I.T.I.	Annual Use	D.I.T.I. per Hour	Acres per Hour	Expense per Acre ^d	Times Over ^e	Total Expense	
	Years	\$	\$	\$	\$	\$	\$	Hours	\$	No.	\$	No.	\$/Acre	
Rate Charged, percent =====>					5.00%	1.40%								
Mowing														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	2	2.57	1	2.57
+ Mower-Cond.		10	22,525	6,758	1,577	732	205	2,514	100	25.14	2.0	12.57	1	12.57
Ted/Rake														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	2.4	2.14	4	8.56
+ Tedder/Rake		10	4,650	1,163	349	145	41	535	75	7.13	2.4	2.97	4	11.88
Baling														
Tractor, HP=	80	10	42,350	13,129	2,922	1,387	388	4,697	500	9.39	1.2	7.83	1	7.83
+ 4'X4' Ton Baler		8	23,525	6,587	2,117	753	211	3,081	125	24.65	1.2	20.54	1	20.54
Move & Stack														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	1.1	4.67	1	4.67
+ Bale Fork		10	325	114	21	11	3	35	100	0.35	1.1	0.32	1	0.32
Pasture Clipping														
Tractor	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	3.7	1.39	0	0.00
+ Bushhog		10	4,225	1,268	296	137	38	472	100	4.72	3.7	1.27	0	0.00
Other														
Pickup Truck, 3/4 Ton		10	30,225	7,859	2,237	952	267	3,455	500	6.91	10	0.69	4	2.76
Pasture Establishment ^f		20	228	0	11	6								17.09
TOTALS			220,425	65,581	15,908	7,150	2,002	25,060						88.79

^a Depreciation = (Initial cost - Salvage value) / years of life

^b Interest on investment = ((Initial cost + Salvage value) / 2) X interest rate

^c Combined rate of property taxes and insurance premiums as a percentage of the average investment

^d Per acre costs for self-propelled vehicles include an additional 10% allowance for travel time from farm to field

^e Total number of trips across the field per year for this operation

^f Establishment cost per acre from Budget 87-11, net of any revenue. Land cost or charges are not included.

Table 2. Operating expense for forage machinery and equipment per hour and per acre

Operation and Item	Repairs & Maint. ^a	Repairs & Maint.	Repairs & Maint. ^b	Fuel Use	Cost per Gal	Fuel & Lube ^c	Total Cost	Acres per Hour	Times Over	Equip. Op. Cost ^d	Labor Cost	Labor Cost ^e	Total Expense	
	%	\$/Year	\$/Hour	Gals/hr	\$	\$/Hour	\$/Hour	No.	No.	\$/Acre	\$/Hour	\$/Acre	\$/Acre	
Fuel cost per gallon & Labor cost per hour =====>														
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	2.0	1	5.79	12.00	6.90	12.69
+ Mower-Cond.		4%	901	9.01	0	0.00	9.01	2.0	1	4.51			4.51	
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	2.4	4	19.30	12.00	23.00	42.30
+ Tedder/Rake		2%	93	1.24	0	0.00	1.24	2.4	4	2.07			2.07	
Tractor, HP=	80	2%	847	1.69	3.52	3.45	13.97	15.66	1.2	1	14.35	12.00	11.50	25.85
+ 4'X4' Ton Baler		1%	235	1.88	0	0.00	1.88	1.2	1	1.57			1.57	
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	1.1	1	10.53	12.00	12.55	23.07
+ Bale Fork		1%	3	0.03	0	0.00	0.03	1.1	1	0.03			0.03	
Tractor	55	2%	463	0.93	2.42	3.45	9.60	10.53	3.7	0	0.00	12.00	0.00	0.00
+ Bushhog		1%	42	0.42	0	0.00	0.42	3.7	0	0.00			0.00	
Pickup Truck, 3/4 Ton		2%	605	1.21	3.00	3.45	11.90	13.11	10.0	4	5.24	12.00	5.52	10.76
TOTALS										63.39		59.47	122.85	

^a Repairs and maintenance costs are calculated as a % of the initial cost in Table 1. Percentages are higher for equipment bought used.

^b Repairs and maintenance costs per hour based on annual use shown in Table 1.

^c Total fuel cost plus lube costs estimated as 15% of the fuel cost.

^d Per acre costs for tractors and other self-propelled equipment includes an additional 10% allowance for travel time from farm to field.

^e Labor cost per acre includes an additional 15% allowance for travel time, setting up and finishing up.

Table 3. Sensitivity Analysis

This table shows the total cost per ton of dry matter produced under various assumptions about costs and yields.

Specifically, the cost and yields shown in the enterprise budget on the first page are believed to be fairly representative of conditions in North Carolina. However, there is a wide variation in conditions from one farm to another and costs and yields can vary from year to year. The table shows the effects of yields and costs that are 10 percent higher or lower than the basic budget, singly and in combination.

AVERAGE TOTAL COST PER TON OF DRY MATTER PRODUCED

		YIELD		
		-10%	Base Budget	+10%
COST	-10%	\$59.28	\$53.35	\$48.50
	Base	\$65.86	\$59.28	\$53.89
	+10%	\$72.45	\$65.20	\$59.28