

**Switch Grass for Biomass for Energy Production:** Estimated revenue, operating cost, fixed cost, and net returns per acre in the **establishment** year.

Budget 87-11  
6/1/2013

Description	Unit	Price	Quantity	Value	Comments
<b>Operating inputs</b>					
-Lime, applied	Ton	\$50.00	1.00	50.00	
-10-10-10, dry bulk	Cwt.	\$20.70	5.00	103.50	
-30% N Solution	Cwt.	\$20.50	0.00	0.00	
-Fert. Spread, custom	Acre	\$7.00	1.00	7.00	
-Switchgrass Seed <sup>a</sup>	lb.	\$9.60	6.00	57.60	
-Burndown Herbicide	Acre	\$5.00	1.00	5.00	
-Baling Twine	Ball	\$15.00	0.06	0.90	
-Other:				0.00	
-Other:				0.00	
-Other:				0.00	
-Machinery Labor (From Table 2)				30.19	
-Other Labor	Hours	\$12.00	0.00	0.00	
-Machinery Fuel, Maint, Repairs (Table 2)	Acre			30.87	
-Annual Operating Capital	\$	5.0%	118.78	5.94	
<b>Total Operating Costs</b>				<b>291.00</b>	
			<b>Amount</b>	<b>Value</b>	
<b>Fixed Costs</b>					
-Machinery Depr, Taxes, Insurance, & Interest (From Table 1)				<b>36.88</b>	
<b>Total Cost</b>				<b>327.88</b>	
	<b>Unit</b>	<b>Price<sup>c</sup></b>	<b>Quantity</b>	<b>Value</b>	
<b>Production</b>					
-Harvested as Pasture, Dry Matter	Ton	\$40.00	0.50	20.00	
-Harvested as Biomass, Dry Matter	Ton	\$80.00	1.00	80.00	
<b>Total Receipts</b>				<b>100.00</b>	
<b>RETURNS ABOVE TOTAL OPERATING COST</b>				<b>-191.00</b>	
<b>RETURNS ABOVE ALL SPECIFIED COSTS<sup>c</sup></b>				<b>-227.88</b>	

<sup>a</sup> Seeding rate assumes pure, live seed.

<sup>b</sup> Interest on operating expenses for an average of 5 months.

<sup>c</sup> Use the sale price or market value of any hay produced. Use the estimated value of any pasture if used or the actual rent received if pasture is rented out.

<sup>d</sup> This is the net cost per acre for the establishment year, calculated as the Total Establishment Cost LESS the value of the hay or pasture produced during the establishment year.

**NOTES**

Establishment year production may be harvested as hay and/or grazing.

Hay typically is fifty-five percent digestible and provides 1100 pounds of TDN per ton of dry matter.

To convert budget dry matter cost to hay cost as made, multiply by hay dry matter % as a decimal (E.g., 0.85).

Pasture typically is 65% digestible and provides 1300 pounds of TDN per ton of dry matter.

One half ton of pasture dry matter typically provides 43 animal unit days of grazing. A beef cow = 1 AU.

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

Operation and Item	Life	Initial Cost	Salvage Value	Depreciation <sup>a</sup>	Interest <sup>b</sup>	Tax & Ins. <sup>c</sup>	Annual D.I.T.I.	Annual Use	D.I.T.I. per Hour	Acres per Hour	Expense per Acre <sup>d</sup>	Times Over <sup>e</sup>	Total Expense	
	Years	\$	\$	\$	\$	\$	\$	Hours	\$	No.	\$	No.	\$/Acre	
Rate Charged, percent =====>														
					5.00%	1.40%								
Spraying														
Tractor, HP=	35	10	19,075	5,913	1,316	625	175	2,116	500	4.23	11.1	0.38	1	0.38
+ Sprayer	15		2,350	940	94	82	23	199	80	2.49	11.1	0.22	1	0.22
Planting														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	3.8	1.35	1	1.35
+ No-till Planter	12		15,850	6,340	793	555	155	1,503	100	15.03	3.8	3.95	1	3.95
Mow														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	4.1	1.25	1	1.25
+ Mower-Cond.	10		22,525	6,758	1,577	732	205	2,514	100	25.14	4.1	6.13	1	6.13
Ted/Rake														
Tractor, HP=	35	10	19,075	5,913	1,316	625	175	2,116	500	4.23	4.1	1.03	2	2.06
+ Tedder/Rake	10		4,650	1,163	349	145	41	535	75	7.13	4.1	1.74	2	3.48
Bale														
Tractor, HP=	80	10	42,350	13,129	2,922	1,387	388	4,697	500	9.39	2.5	3.76	1	3.76
+ 4'X4' Baler	8		23,525	6,587	2,117	753	211	3,081	125	24.65	2.5	9.86	1	9.86
Move & Stack														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	3.3	1.56	1	1.56
+ Bale Fork	10		325	114	21	11	3	35	100	0.35	3.3	0.11	1	0.11
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
<b>TOTAL</b>													<b>\$36.88</b>	

<sup>a</sup> Depreciation = (Initial cost - Salvage value) / years of life

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

<sup>c</sup> Combined rate of property taxes and insurance premiums as a percentage of the average investment

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

<sup>e</sup> Total number of trips across the field per year for this operation

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

Operation and Item	Repairs & Maint. <sup>a</sup>	Repairs & Maint. <sup>a</sup>	Repairs & Maint. <sup>b</sup>	Fuel Use	Cost per Gal	Fuel & Lube <sup>c</sup>	Total Cost	Acres per Hour	Times Over	Equip. Op. Cost <sup>d</sup>	Labor Cost	Labor Cost <sup>e</sup>	Total Expense	
	%	\$/Year	\$/Hour	Gals/hr	\$	\$/Hour	\$/Hour	No.	No.	\$/Acre	\$/Hour	\$/Acre	\$/Acre	
Fuel cost per gallon & Labor cost per hour =====>											3.45	12.00		
Tractor, HP=	35	2%	382	0.76	1.54	3.45	6.11	6.87	11.1	1	0.68	12.00	1.24	1.92
+ Sprayer		3%	71	0.88	0	0.00	0.00	0.88	11.1	1	0.09			0.09
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	3.8	1	3.05	12.00	3.63	6.68
+ No-till Planter		1%	159	1.59	0	0.00	0.00	1.59	3.8	1	0.46			0.46
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	4.1	1	2.82	12.00	3.37	6.19
+ Mower-Cond.		4%	901	9.01	0	0.00	0.00	9.01	4.1	1	2.42			2.42
Tractor, HP=	35	2%	382	0.76	1.54	3.45	6.11	6.87	4.1	2	3.69	12.00	6.73	10.42
+ Tedder/Rake		2%	93	1.24	0	0.00	0.00	1.24	4.1	2	0.67			0.67
Tractor, HP=	80	2%	847	1.69	3.52	3.45	13.97	15.66	2.5	1	6.89	12.00	5.52	12.41
+ 4'X4' Baler		1%	235	1.88	0	0	0.00	1.88	2.5	1	0.83			0.83
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	3.3	1	3.51	12.00	4.18	7.69
+ Bale Fork		1%	3	0.01	0	0	0.00	0.01	3.3	1	0.00			0.00
Pickup Truck, 3/4 Ton		2%	605	1.21	3.00	3.45	11.90	13.11	10	4	5.77	12.00	5.52	11.29
<b>TOTALS</b>										<b>\$30.87</b>	<b>\$30.19</b>	<b>\$61.06</b>		

<sup>a</sup> Repairs and maintenance costs are calculated as a % of the initial cost in Table 1. Percentages are higher for equipment that is bought used.

<sup>b</sup> Repairs and maintenance costs per hour based on annual use shown in Table 1.

<sup>c</sup> Total fuel cost plus lube costs estimated as 15% of the fuel cost.

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

<sup>e</sup> 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 annual charge to recover the full establishment cost under various assumptions about costs and stand life or planning horizon. Specifically, the cost 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 can vary from year to year. The table shows the effects of costs that are 10% higher or lower than the basic budget, singly and in combination with variations in stand life or planning horizon. Stand life is affected by many factors including persistence and farming plans may call for a stand to be replaced by another crop for reasons other than stand persistence. The annual prorated costs shown in the table do not include an interest charge on this investment.

AVERAGE ANNUAL ESTABLISHMENT COST PER ACRE OVER THE LIFE OF THE STAND  
STAND LIFE OR PLANNING HORIZON

COST	STAND LIFE OR PLANNING HORIZON		
	15 Years	20 Years	25 Years
-10%	-\$13.67	-\$10.25	-\$8.20
Base	-\$15.19	<b>-\$11.39</b>	-\$9.12
+ 10%	-\$16.71	-\$12.53	-\$10.03