

NC STATE UNIVERSITY

Small Grain Silage: Estimated annual revenue, operating & fixed cost, and net returns per acre (No-till).

Budget 88-5

6/1/2013

Description	Unit	Price	Quantity	Value	Comments
Operating Inputs Pre-Harvest					
-Lime, applied, pro rated share	Ton	\$50.00	0.33	\$16.50	
-10-20-20, dry bulk	Cwt.	\$33.60	2.50	84.00	
-30% N Solution	Cwt.	\$20.50	3.50	71.75	
-Fert. Spread, custom	Acre	\$7.00	2.00	14.00	
-Seed	Bu.	\$35.00	1.50	52.50	
-Herbicide, Burndown	Acre	\$5.00	1.00	5.00	
-Other	Acre	\$0.00	0.00	0.00	
-Other	Acre	\$0.00	0.00	0.00	
-Machinery Labor (From Table 2)				10.71	
-Other Labor	Hours	\$12.00	0.00	0.00	
-Machinery Fuel, Maint, Repairs (Table 2)				10.01	
-Miscellaneous, e.g., soil test	Acre	\$2.00	1.00	2.00	
-Operating Capital Interest ^b	\$	5.0%	88.82	4.44	
Total Pre-Harvest Operating Costs				\$270.92	
Operating Inputs for Harvesting^a					
-Harvesting Machinery Labor (From Table 2)	Acre			6.57	
-Other Labor	Hours	\$12.00	0.00	0.00	
-Harvesting Machinery Fuel, Maint, Repairs (Table 2)	Acre			13.39	
Subtotal Harvest Operating Costs				\$19.97	
-Transporting Labor (From Table 2)	Acre			18.66	
-Transporting Machinery Fuel, Maint, Repairs (Table 2)	Acre			21.75	
Subtotal Transporting Operating Costs				\$40.41	
-Filling/Packing Machinery Labor (From Table 2)	Acre			9.86	
-Other Labor	Hours	\$12.00	0.50	6.00	
-Filling/Packing Machinery Fuel, Maint, Repairs (Table 2)	Acre			8.27	
-Cover, pro rated share	Sq. foot	0.060	60	3.60	
Subtotal Filling/Packing & Covering Op. Cost				\$27.73	
Total Harvest Operating Costs				\$88.10	
Silo & machinery housing maintenance (from Table 2)				6.00	
Total Operating Costs				\$365.02	
Fixed Costs					
Fixed Costs From Table 1			Amount	Value	
= Machinery Depreciation, Taxes, Ins. & Interest					
-Pre-Harvest				16.39	
-Harvesting				37.58	
-Transporting				26.89	
-Filling/packing & covering				3.67	
-Silo & machinery housing				49.20	
Total Fixed Costs				\$133.73	
Land Rent^c	Acre			0.00	
Total Cost				\$498.75	
REVENUE^e					
Small Grain Silage	Ton	\$50.00	9.0	450.00	
Total Revenue				\$450.00	
COST PER TON AS MADE OR AS SOLD				\$55.42	
COST PER TON OF DRY MATTER (DM)	Dry matter %		33%	\$167.93	
COST OR RETURNS ABOVE TOTAL OPERATING COST PER ACRE				\$179.08	
RETURNS ABOVE ALL SPECIFIED COSTS PER ACRE				-\$48.75	

^a Harvesting expense includes transporting silage to the silo, filling or packing and sealing the silo.

^b Interest on operating expenses for an average of 4 months.

^c Land rent is not normally included in an enterprise budget but rent cost appropriate for a contract grower using rented land.

^d If the silage is for your own use or is for sale as pickled silage, use the estimated quantity of pickled silage produced per acre, after allowing for fermentation and spoilage losses. Loss estimates vary from 5% to 50% with 10% to 20% most common.

^e Only include revenue if the silage crop is sold. If so, use the price and quantity as sold (field chop or pickled silage)

Spreadsheet developed by G.A. Benson, Extension Economist (Retired).

Budget data developed by J.T. Green, Jr., Crop Science Extension Specialist, NCSU (Retired), and G.A. Benson, Extension Economist, NCSU (Retired).

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

Operation and Item	Horse Power	Life Years	Initial	Salvage	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
			Cost	Value	\$	\$	\$	\$	\$	Hours	\$	No.	\$	No.
Rate Charged, percent =====>						5.00%	1.40%							
Land preparation														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	3.5	1.47	0	0.00
+ Chisel plow		10	3,675	1,213	246	122	34	403	100	4.03	3.5	1.15	0	0.00
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	5.4	0.95	0	0.00
+ Disc		10	6,150	1,845	431	200	56	686	100	6.86	5.4	1.27	0	0.00
Tractor, HP=	35	10	19,075	5,913	1,316	625	175	2,116	500	4.23	5.4	0.78	0	0.00
+ Harrow		10	1,500	450	105	49	14	167	100	1.67	5.4	0.31	0	0.00
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		10	2,350	940	141	82	23	246	100	2.46	11.1	0.22	1	0.22
Planting														
Tractor, HP=	80	10	42,350	13,129	2,922	1,387	388	4,697	500	9.39	5.1	1.84	1	1.84
+ Planter/drill		10	25,700	10,280	1,542	900	252	2,693	50	53.87	5.1	10.56	1	10.56
Weed control														
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		10	2,350	940	141	82	23	246	100	2.46	11.1	0.22	1	0.22
Other Pre-harvest														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	1.0	5.14	0	0.00
+ Implement		10	0	0	0	0	0	0	100	0.00	1.0	0.00	0	0.00
Pickup Truck, 3/4 Ton		10	30,225	7,859	2,237	952	267	3,455	500	6.91	10.0	0.69	4	2.76
Harvesting														
Self-propelled, HP=	450	5	348,800	87,200	52,320	10,900	3,052	66,272	150	441.81	14.0	31.56	0	0.00
Tractor, HP=	100	10	60,475	18,747	4,173	1,981	555	6,708	500	13.42	2.1	6.39	1	6.39
+ Pull Harvester		10	56,950	14,238	4,271	1,780	498	6,549	100	65.49	2.1	31.19	1	31.19
Transportation														
Truck, used		5	20,000	5,000	3,000	625	175	3,800	150	25.33	2.1	12.06	1	12.06
Tractor, HP =	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	2.1	2.45	0	0.00
+ Wagon		10	10,450	2,613	784	327	91	1,202	100	12.02	2.1	5.72	0	0.00
Tractor, HP =	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	2.1	2.45	0	0.00
+ Wagon		10	10,450	2,613	784	327	91	1,202	100	12.02	2.1	5.72	0	0.00
Pickup Truck, 3/4 Ton		10	30,225	7,859	2,237	952	267	3,455	500	6.91	10.0	0.69	4	2.76
Filling/Packing														
Tractor, HP=	55	10	23,150	7,177	1,597	758	212	2,568	500	5.14	1.4	3.67	1	3.67
+ Blower		10	0	0	0	0	0	0	100	0.00	1.4	0.00	0	0.00
										Crop Acres	Expense per Acre			
Silo		20	40,000	0	2,000	1,000	280	3,280	100	32.80				32.80
Machinery housing ^f		20	20,000	0	1,000	500	140	1,640	100	16.40				16.40
TOTAL														133.71

^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 Show only the share of machinery housing and maintenance buildings attributed to corn silage machinery and equipment based on use.

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

Operation and Item	Repairs & Maint. ^a	Repairs & Maint. ^b	Repairs & Maint. ^b	Fuel Use	Cost per Gal	Fuel & Lube ^c	Equip. Op. Cost	Acres per Hour	Times Over	Oper. Cost ^d	Labor Cost	Labor Cost ^e	Total Expense
													\$/Acre
Fuel cost per gallon & Labor cost per hour =====>					3.45								12.00
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	3.5	0	0.00	12.00	0.00
+ Chisel plow		3%	110	1.10	0			1.10	3.5	0	0.00		0.00
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	5.4	0	0.00	12.00	0.00
+ Disc		2%	123	1.23	0			1.23	5.4	0	0.00		0.00
Tractor, HP=	35	2%	382	0.76	1.54	3.45	6.11	6.87	5.4	0	0.00	12.00	0.00
+ Harrow		3%	45	0.45	0			0.45	5.4	0	0.00		0.00
Tractor, HP=	35	2%	382	0.76	1.54	3.45	6.11	6.87	11.1	1	0.68	12.00	1.24
+ Sprayer		3%	71	0.71	0			0.71	11.1	1	0.07		0.07
Tractor, HP=	80	2%	847	1.69	3.52	3.45	13.97	15.66	5.1	1	3.38	12.00	2.71
+ Planter/drill		1%	257	5.14	0			5.14	5.1	1	1.11		1.11
Tractor, HP=	35	2%	382	0.76	1.54	3.45	6.11	6.87	11.1	1	0.68	12.00	1.24
+ Sprayer		3%	71	0.71	0			0.71	11.1	1	0.07		0.07
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	1.0	0	0.00	12.00	0.00
+ Implement		2%	0	0.00	0			0.00	1.0	0	0.00		0.00
Pickup Truck, 3/4 Ton		2%	605	1.21	2.00	3.45	7.94	9.14	10.0	4	4.02	12.00	5.52
Self-propelled, HP=	450	1%	3,488	23.25	19.8	3.45	78.56	101.81	14.0	0	0.00	12.00	0.00
Tractor, HP=	100	2%	1,210	2.42	4.4	3.45	17.46	19.88	2.1	1	10.41	12.00	6.57
+ Pull Harvester		1%	570	5.70	0			5.70	2.1	1	2.98		2.98
Truck, used		4%	800	5.33	2.50	3.45	9.92	15.25	2.1	1	7.99	12.00	6.57
Truck, used		4%	800	5.33	2.50	3.45	9.92	15.25	2.1	1	7.99	12.00	6.57
Tractor, HP =	55	2%	463	0.93	2.42	3.45	9.60	10.53	2.1	0	0.00	12.00	0.00
+ Wagon		2%	209	2.09	0			2.09	2.1	0	0.00		0.00
Tractor, HP =	55	2%	463	0.93	2.42	3.45	9.60	10.53	2.1	0	0.00	12.00	0.00
+ Wagon		2%	209	2.09	0			2.09	2.1	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	5.77	12.00	5.52
Tractor, HP=	55	2%	463	0.93	2.42	3.45	9.60	10.53	1.4	1	8.27	12.00	9.86
+ Blower		3%	0	0.00	0.00			0.00	1.4	0	0.00	12.00	0.00
Silo		1%	400								4.00		4.00
Machinery housing ^f		1%	200								2.00		2.00
TOTALS											59.42	45.80	105.23

^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.

^f Based on the machinery housing and maintenance buildings investment attributed to corn silage machinery and equipment in Table 1.

Table 3. Sensitivity Analysis

These tables show A) the total cost per ton of silage as made or sold, and B) 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. The cost adjustments are "across the board" and, for example, do not reduce harvest costs if yields are reduced

A. TOTAL COST PER TON OF SILAGE AS MADE OR SOLD, AT THE MOISTURE CONTENT LISTED IN THE BUDGET

		YIELD		
		-10%	Base Budget	+10%
COST	-10%	\$55.41	\$49.87	\$45.34
	Base	\$61.57	\$55.41	\$50.38
	+10%	\$67.73	\$60.96	\$55.41

B. TOTAL COST PER TON OF DRY MATTER PRODUCED

		YIELD		
		-10%	Base Budget	+10%
COST	-10%	\$167.92	\$151.13	\$137.39
	Base	\$186.58	\$167.92	\$152.66
	+10%	\$205.24	\$184.71	\$167.92

NOTES, RESOURCES AND REFERENCES

Other NCSU enterprise budgets are available on the internet at http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html or from your county extension office. A searchable national enterprise budget library is available on-line at <http://www.agrisk.umn.edu/Budgets/> "Estimating Farm Machinery Costs" Ag Decision Maker A3-29, Iowa State University, University Extension, November 2009