

# Grass Hay Production

Robert L. Smathers



## Background and Assumptions

Economic costs are used in the University of Idaho costs and returns estimates. All resources are valued based on market price or opportunity cost. Input prices are based on the U of I's annual survey of agricultural supply companies. Except for contract crops, the selling price is a 10-year average. The costs and returns estimate shown here is typical for growing grass hay in northern Idaho. Production practices most closely represent those in Clearwater and Idaho counties.

Production practices may be similar among individual farms, but each has a unique set of resources with varying levels of productivity and production problems, and therefore, slightly different costs. Farm size, crop rotation, age and type of equipment, soils, and quality of management are crucial factors that influence production costs.

### The Model Farm

This costs and returns estimate models a 1,500-acre farm with 200 acres in grass hay and 1,300 acres in grain. The grass hay stand is kept in production 7 years including the establishment year. No production occurs the first year.

### Tillage, Fertilization, and Pest Control

Tillage costs are incurred only in the year hay is established and should be prorated along with other establishment costs over the grass hay production years. This is approximately \$20 per acre assuming a 7-year stand life. Grass hay is swathed and baled one time during the summer by the farm operator. Two and one half tons of hay are cut, baled, and custom stacked. Fertilizer is applied in the spring by the farm operator. No costs are included for insect or weed control.

### Resources: Machinery, Land, Labor, and Capital

Table 3 lists the tractors, trucks, and other equipment used for grass hay, along with their operating and ownership costs. All machinery except the trucks is valued at 75 percent of new prices. This adjustment reduces the machinery repair operating cost, and the depreciation and interest ownership costs on equipment by 25 percent. Each truck's price includes the cost of a used truck.

The land charge is based on a crop share arrangement. The landowner pays one-half of the fertilizer, seed, and chemical costs in exchange for one-half of the crop. A labor charge is made for all labor pertaining to field operations and includes a base rate plus overhead expenses. Custom charges account for those field operations that are contracted out. A management charge, 5 percent of gross returns, is included as an ownership cost.

Labor to operate machinery is valued at \$13.15 per hour and non-machine labor is valued at \$7.70 per hour. The non-machine rate accounts for extra harvest labor. Labor rates include a base wage plus a percentage for Social Security, Medicare, unemployment insurance, and other labor overhead expenses. Labor overhead amounts to 15 percent for non-machine labor, and 30 percent for machinery labor.

Interest on operating capital is charged from the time an input is applied until the month of harvest and calculated at a nominal rate of 7.5 percent. Interest on intermediate term capital is calculated using a rate of 7.75 percent. A general overhead charge of 2.5 percent of operating expenses is included to cover unallocated costs such as office expenses, legal and accounting fees, and utilities.

**Table 1. Costs And Returns Per Acre to Produce Grass Hay  
NI Production**

**EBB1-GH-05**

	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Gross Returns					
Grass Hay	2.50	ton	60.00	150.00	_____
Total Gross Returns For Grass Hay				150.00	_____
Operating Costs					
Custom:					
Fertilizer Spreader	1.00	acre	2.00	2.00	_____
Custom stack	2.50	ton	9.00	22.50	_____
Fertilizer:					
Nitrogen	25.00	lb	0.40	10.00	_____
P2O5	70.00	lb	0.25	17.50	_____
Sulfur	10.00	lb	0.17	1.70	_____
Labor (machine)	1.51	hrs	13.15	19.88	_____
Labor (non-machine)	0.00	hrs	0.00	0.00	_____
Fuel - Gas	1.13	gal	2.66	3.01	_____
Fuel - Diesel	4.68	gal	2.45	11.46	_____
Lube				2.17	_____
Machinery Repair				3.98	_____
Interest on Operating Capital @ 7.50%				1.09	_____
Total Operating Costs per Acre				95.30	_____
Net Returns Above Operating Costs				54.70	_____
Cash Ownership Costs					
General Overhead				2.50	_____
Land Rent				40.00	_____
Management Fee				7.50	_____
Property Taxes (machinery)				0.00	_____
Property Insurance				0.94	_____
Total Cash Ownership Costs per Acre				50.94	_____
Non-Cash Ownership Costs (depreciation and interest)					
Amortized Establishment Costs				28.16	_____
Equipment				35.35	_____
Total Non-Cash Ownership Costs per Acre				63.51	_____
Total Costs per Acre				209.76	_____
Returns to Risk				-59.76	_____

**Table 2. Monthly Summary of Cash Expenses per Acre**

EBB1-GH-05

	Mar 05	Apr 05	May 05	Jun 05	Jul 05	Aug 05	Sep 05	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Total
Preharvest:													
Fertilize		33.45											33.45
General Pickup Use	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	9.56
<b>Total Preharvest Costs</b>	<b>0.80</b>	<b>34.25</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	<b>43.01</b>
Harvest:													
Swath					12.23								12.23
Bale					16.47								16.47
Custom Haul & Stack					22.50								22.50
<b>Total Harvest Costs</b>					<b>51.20</b>								<b>51.20</b>
Interest on Operating Capital	0.00	0.22	0.22	0.23	0.55	-0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	1.09
Operating Costs per Acre	0.80	34.47	1.02	1.03	52.55	0.79	0.79	0.78	0.78	0.77	0.77	0.76	95.30
Cash Ownership													
General Overhead	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	2.50
Land Rent	40.00												40.00
Management Fee	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	7.50
Property Insurance		0.94											0.94
<b>Cash Ownership Costs</b>	<b>40.83</b>	<b>1.77</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>0.83</b>	<b>50.94</b>
<b>Total Cash Costs per Acre</b>	<b>41.63</b>	<b>36.24</b>	<b>1.85</b>	<b>1.86</b>	<b>53.39</b>	<b>1.62</b>	<b>1.62</b>	<b>1.62</b>	<b>1.61</b>	<b>1.61</b>	<b>1.60</b>	<b>1.60</b>	<b>146.24</b>

**Table 3. Machinery and Equipment Costs per Hour**

Description	Purchase Price	Years to Trade	Salvage Value	Hours Used	<-Non-Cash-> Ownership		<-----Cash-----> Ownership		<-----Operating----->			Total Costs/Hr.
					Cap. Rec.	Insur.	Taxes	Repairs	Fuel & Lube	Total Oper.		
Hay Baler - 16x18	25000	10	4126	110	23.11	0.50	0.00	4.16	0.00	4.16	27.77	
Mower Conditioner1	16000	12	2216	45	33.00	0.76	0.00	1.34	0.00	1.34	35.11	
Pickup 1 - 3/4 ton	37000	8	12913	300	12.88	0.31	0.00	3.59	12.24	15.83	29.03	
Pickup 2 - 3/4 ton	11000	8	3839	200	5.76	0.14	0.00	0.91	7.65	8.56	14.45	
Tractor 2 - 105hp	77000	15	14991	301	20.70	0.57	0.00	1.49	17.17	18.66	39.93	

Net Returns Per Acre Above Operating Costs For Grass Hay  
Yield (ton/acre)

	1.75	2.00	2.25	2.50	2.75	3.00	3.25
42.00	-14	-6	2	10	18	25	33
48.00	-3	6	15	25	34	43	53
54.00	7	18	29	40	51	61	72
60.00	18	30	42	55	67	79	92
66.00	28	42	56	70	84	97	111
72.00	39	54	69	85	100	115	131
78.00	49	66	83	100	117	133	150

Net Returns Per Acre Above Cash Costs For Grass Hay  
Yield (ton/acre)

	1.75	2.00	2.25	2.50	2.75	3.00	3.25
42.00	-65	-57	-49	-41	-33	-26	-18
48.00	-54	-45	-36	-26	-17	-8	2
54.00	-44	-33	-22	-11	-0	10	21
60.00	-33	-21	-9	4	16	28	41
66.00	-23	-9	5	19	33	46	60
72.00	-12	3	18	34	49	64	80
78.00	-2	15	32	49	66	82	99

Net Returns Per Acre Above Total Costs For Grass Hay  
Yield (ton/acre)

	1.75	2.00	2.25	2.50	2.75	3.00	3.25
42.00	-124	-118	-111	-105	-98	-91	-84
48.00	-114	-106	-98	-90	-82	-73	-65
54.00	-103	-94	-84	-75	-65	-55	-45
60.00	-93	-82	-71	-60	-49	-37	-26
66.00	-82	-70	-57	-45	-32	-19	-6
72.00	-72	-58	-44	-30	-16	-1	13
78.00	-61	-46	-30	-15	1	17	33

The practices and chemicals specified here are based on survey information representative of typical operations. They are not recommendations. Because of constantly changing labels, laws, and regulations, the University of Idaho can assume no liability for the consequences of use of chemicals specified here. In all cases, read and follow the directions and precautionary statements on the specific pesticide product label. To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

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