

# University of Idaho

College of Agricultural *and* Life Sciences



Photo: woollydesigns.com

## **2016 Enterprise Budgets: District 1 Grass Hay**

Kathleen Painter, PhD  
Agricultural Extension Educator  
Boundary County  
PO Box 267  
Bonners Ferry ID 83805  
(208) 267-3235  
[kpainter@uidaho.edu](mailto:kpainter@uidaho.edu)

## Summary of Yield, Price, and Returns for Grass Hay Production in Northern ID (\$/acre)

		Yield	Price*	Revenue	Returns	Returns	Crop & Cost	%	
By Crop:	Unit	per acre	per unit	per acre	over TC (\$/acre)	over VC (\$/acre)	Share** Cost (\$/acre)	Share	
<a href="#">Establishing Grass Hay</a>	ton	0	0	0	-157	-123	0	67/33	Operator
<a href="#">Grass Hay Production</a>	ton	2.5	85	213	-35	77	39	67/33	Owner
Stand life, in years	6								

Note: Establishment costs are amortized over the productive years of the hay stand. The negative returns for the establishment year are carried forward as a cost for each year of production.

## Input Prices

Item	Unit	2016 Price/unit
<b>Fuel:</b>		
Diesel, offroad, bulk (gal)	gal	\$2.00
Gas (gal)	gal	\$2.35
<b>Seed:</b>		
Grass Hay Seed, mixed	lb	\$2.40
Alfalfa Seed, Ladek	lb	\$4.35
<b>Fertilizer:</b>		
Nitrogen (dry)	lb	\$0.59
Phosphorous (dry)	lb	\$0.71
Sulfur (dry)	lb	\$0.53
Potassium (dry)	lb	\$0.31
Gypsum	lb	\$0.16
<b>Adjuvants:</b>		
Amm. Sulf. (20-0-0-24)	lb	\$0.22
Amm. Sulf. (liquid)	pt	\$0.05
Class Act (adjuvant, antifoam)	oz	\$0.12
Crop Oil Concentrate	pt	\$1.31
<b>Custom Rental:</b>		
Custom Aerial	acre	\$8.95
Fertilizer Applicator	acre	\$1.00
26' Rental Shredder	acre	\$10.00
36' Ripper Shooter	acre	\$2.50
90' Rental Sprayer	acre	\$2.00
<b>Labor<sup>1</sup>:</b>		
Hourly machine labor	hour	\$17.80
Other labor	hour	\$10.25
<b>Overhead:</b>		
Overhead <sup>2</sup>	percent	5.0%
<b>Management fee:</b>		
Management fee <sup>3</sup>	percent	5.0%
<b>Cash rent:</b>		
Cash rent	acre	\$0.00
<b>Land Tax:</b>		
Land Tax	acre	\$5.50
<b>Interest:</b>		
Operating Loan	percent	5.00%
Machinery Loan/investment	percent	6%

<sup>1</sup>Includes all applicable state and federal taxes.

<sup>2</sup>Covers legal, accounting, and utility fees. Calculated as percentage of operating expenses.

<sup>3</sup>Calculated as a percentage of gross revenue.

## INSTRUCTIONS AND ASSUMPTIONS

---

### Input Prices:

Input costs are based on a annual survey of input suppliers for each region, available online at <http://web.cals.uidaho.edu/idahoagbiz/enterprise-budgets/>

### Crop Prices:

Crop prices are typically based on five-year average prices received by Idaho growers, with adjustments by region and for some contract crops.

### Machinery Costs:

The machinery complement and associated hourly machinery cost data are in the last two sheets. The per acre machinery cost data are used to create the individualized machinery cost data for each budget, all located below the main table at the top. Machinery fixed costs include depreciation, interest, property taxes, insurance, and housing. For the overall farm operation, these costs do not vary by crop, given the ownership of a specific machinery complement, and are incurred whether or not crops are grown. Your per acre fixed costs will change if the farm size differs significantly from the size used in these budgets.

### Land Costs:

Land costs, included either as real or as opportunity costs, are based on a typical share rental arrangement. We calculate net land rental cost as a cost share as follows:

$$1/3 \text{ Crop Value} - (1/3 \text{ Fertilizer Cost} + 1/3 \text{ Chemical Cost} + 1/3 \text{ Crop Insurance} + \text{Land Taxes})$$

A typical lease agreement in the areas surveyed is a one-third land owner and two-third tenant crop share, with the land owner paying land taxes, one-third of the fertilizer cost, one-third of the chemical cost, and one-third of the crop insurance. The tenant covers all other production expenses. **This crop-share percentage can be adjusted in the Excel version of the crop worksheets files.** If the percentage is adjusted on the Summary tab, it is changed for all crops. If you want different crop-share percentages for different crops, adjust the percentage on the budget sheet for that crop. This valuable tool reveals how factors such as crop and input price increases as well as cropping choices affect revenue for landlords and operators differently. Note that pea, lentil, and garbanzo crop-share arrangements are typically 25/75.

While the owner-operator will not actually experience a land rental cost, this cost represents the minimum return owner-operators must realize to justify growing the crop themselves. To determine the profitability of crop production relative to other activities, the owner-operator may want to consider these forgone rental returns along with the usual production expenses.

### General Assumptions:

Since farming is inherently variable and constantly changing, we hope that this spreadsheet format will be helpful in adjusting these budgets to reflect your particular operation. Enterprise costs and returns vary from one location to the next and over time for any particular farming operation. Variability stems from differences in the following:

- Capital, labor, and natural resources
- Type and size of machinery complement
- Cultural practices
- Size of farm enterprise
- Crop yields
- Input prices
- Commodity prices
- Management skill

Please examine closely the assumptions we have used and make adjustments to reflect your particular operation. Adjustments in the variable costs can easily be made without affecting the overall accuracy of the budget information. Machinery costs are more difficult to adjust, due to the underlying complexity of machinery cost calculations. A separate machinery cost calculator program is used to develop the costs used in these budgets, which are based on specific machinery widths, tractor horsepower, type of operation, etc. The machinery cost program and data sets specific to this budget are available upon request.

### Acknowledgments:

I wish to thank everyone who helped gather all of the information needed to create these worksheets. First and foremost, I thank the farmers who were willing to take the time to share their enterprise information in order to create this worksheet. Without their assistance we would not be able to provide this critical information to others. However, I take responsibility for any errors in these budgets.

**Budget spreadsheets are available at the following link:**

<http://web.cals.uidaho.edu/idahoagbiz/enterprise-budgets/>

**Schedule of Operations for Establishing Grass Hay for District 1**

Month	Operation	Tooling	Materials/Service
Sept	Plow	350HP-WT, 10-Bottom Plow	
April	Cultivate	350HP-WT, 40' Cultivator	
April	Fertilize	350HP-WT, rented spreader	60 lb N, 10 lb S
April	Harrow	350HP-WT, 20' Spike Harrow	
April	Harrow	350HP-WT, 20' Spike Harrow	
May	Plant	350HP-WT, 36' Drill	7 lb grass seed 5 lb alfalfa seed

## Production Costs for Establishing Grass Hay for District 1

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
<b>Variable Costs</b>				
<b>Seed:</b>				<b>\$38.55</b>
Grass Seed	7	lb	\$2.40	\$16.80
Alfalfa Seed	5	lb	\$4.35	\$21.75
<b>Fertilizer:</b>				<b>\$40.70</b>
<i>Base your rate on your soil test results.</i>				
<i>A typical recommendation might include the following:</i>				
Nitrogen (dry)	60	lb	\$0.59	\$35.40
Sulfur	10	lb	\$0.53	\$5.30
<b>Pesticides:</b>				<b>\$0.00</b>
<i>Rates &amp; chemicals will depend on the pests in your crop.</i>				
<i>Consult a certified pesticide applicator or the PNW Pest Control Management Guides.</i>				
<i>The following cost estimates are typical:</i>				
<b>Machinery:</b>				<b>\$39.50</b>
Fuel	7.37	gal	\$2.00	\$14.74
Lubricants	1	acre	\$2.42	\$2.42
Machinery Repairs	1	acre	\$7.65	\$7.65
Machinery Labor	0.83	hours	\$17.80	\$14.70
<b>Custom &amp; Consultants:</b>				<b>\$1.00</b>
Rented fertilizer spreader	1	acre	\$1.00	\$1.00
<b>Other:</b>				<b>\$0.00</b>
Crop insurance				\$0.00
Storage Facility & Equip. Repairs				\$0.00
Other Labor				
Operating Interest <sup>1</sup>				\$2.99
<b>Total Variable Costs</b>				<b>\$122.75</b>
<b>Ownership Costs:</b>				
Machinery depreciation			\$11.32	\$11.32
Machinery interest			\$9.39	\$9.39
Machinery insurance, taxes, housing, licenses			\$2.40	\$2.40
Cash rent				\$0.00
Land taxes				\$5.50
Overhead <sup>2</sup>				\$5.99
<b>Total Fixed Costs</b>				<b>\$34.60</b>
<b>Total Costs per Acre</b>				<b>\$157.35</b>

<sup>1</sup>Calculated as 5.75% interest on operating capital for 6 months.

<sup>2</sup>Covers legal, accounting, and utility fees. Calculated as 5% of operating expenses.

**Schedule of Operations for Grass Hay Production for District 1**

Month	Operation	Tooling	Materials/Service
Apr	Fertilize	350HP-WT, fertilizer spreader	25 lb N, 70lb P, 10 lb S, rented fertilizer spreader
July	Swath	105HP-CT, Mower/Conditioner	
July	Rake	105HP-CT, Side delivery rake	
July	Bale	105HP-CT, Baler (16 x 18)	
July	Haul & Stack	Custom	\$9 per ton

## Production Costs for Grass Hay Production for District 1

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
<b>Gross Returns</b>				
Grass Hay	2.50	ton	\$85.00	\$212.50
<b>Variable Costs</b>				
<b>Fertilizer:</b>				<b>\$69.75</b>
<i>Base your rate on your soil test results.</i>				
<i>The following fertilizer estimates are typical:</i>				
Nitrogen	25	lb	\$0.59	\$14.75
Phosphorus	70	lb	\$0.71	\$49.70
Sulfur	10	lb	\$0.53	\$5.30
<b>Pesticides:</b>				<b>\$0.00</b>
<i>Rates &amp; chemicals will depend on the pests in your crop.</i>				
<i>Consult a certified pesticide applicator or the PNW Pest Control Management Guides.</i>				
<i>The following cost estimates are typical:</i>				
<b>Machinery:</b>				<b>\$28.98</b>
Fuel	3.14	gal	\$2.00	\$6.27
Lubricants	1	acre	\$1.02	\$1.02
Machinery Repairs	1	acre	\$8.23	\$8.23
Machinery Labor	0.76	acre	\$17.80	\$13.46
<b>Custom &amp; Consultants:</b>				<b>\$23.50</b>
Custom Haul & Stack	2.50	ton	\$9.00	\$22.50
Fertilizer Rental	1	acre	\$1.00	\$1.00
<b>Other:</b>				<b>\$9.63</b>
Baling twine	2.50	ton	\$3.85	\$9.63
Operating Interest <sup>1</sup>				\$3.30
<b>Total Variable Costs</b>				<b>\$135.16</b>
<b>Net Returns Above Variable Costs</b>				<b>\$77.34</b>

**Ownership Costs:**

Machinery depreciation			<b>\$14.69</b>	\$14.69
Machinery interest			<b>\$9.06</b>	\$9.06
Machinery insurance, taxes, housing, licenses			<b>\$2.73</b>	\$2.73
Land Cost*	1	acre	\$39.35	\$39.35
*Based on share rent percentage:				
Landlord	<b>33%</b>			
Tenant	<b>67%</b>			
Cash Rent				\$0.00
Amortization of establishment costs**	5.8%	acre	\$31.75	\$31.75
**Based on years of production:	6			
Overhead				\$4.50
Management fee				\$10.00
<b>Total Fixed Costs</b>				<b>\$112.08</b>
<b>Total Costs per Acre</b>				<b>\$247.24</b>
Total Costs per Unit				<b>\$98.89</b>
<b>Returns to Risk</b>				<b>-\$34.74</b>

## Notes:

<sup>1</sup>Calculated as 5.75% interest on operating capital for 6 months.

<sup>2</sup>Covers legal, accounting, and utility fees. Calculated as 5% of operating expenses.

<sup>3</sup>The management fee is calculated as a 5% of gross revenue.

**Breakeven Analysis:**

	- 10%	Base Yield	+ 10%
<u>Price</u>	2.3	2.50	2.8
Operating Cost Breakeven	\$60.07	\$54.06	\$49.15
Ownership Cost Breakeven	\$49.81	\$44.83	\$40.76
Total Cost Breakeven	\$109.88	\$98.89	\$89.90
	- 10%	Base Price	+ 10%
<u>Yield</u>	\$76.50	\$85.00	\$93.50
Operating Cost Breakeven	1.77	1.59	1.45
Ownership Cost Breakeven	1.47	1.32	1.20
Total Cost Breakeven	3.23	2.91	2.64

## Machinery Costs (\$/acre)

Note: Per hour machinery costs can be changed in this master table and they will update throughout. Per acre costs are calculated in a separate machinery cost

	Fixed Costs (\$/acre):				Variable Costs (\$/acre):				Labor		Fuel Use	Total Cost (\$/acre)
	Depreciation	Interest	Taxes, Housing,	Total Fixed Costs	Repairs	Fuel	Lubrican	Total	(\$/acre)	(hr/acre)	(gal/acre)	
<i>Machinery costs for these implements are spread across every acre of the farm, regardless of crops produced:</i>												
Pickup 3/4 ton 4WD, newer	\$1.40	\$0.82	\$0.75	\$2.97	\$0.79	\$2.01	\$0.19	\$2.99	\$3.57	0.22	0.58	\$9.54
Pickup 3/4 ton 4WD, older	\$0.24	\$0.16	\$0.15	\$0.55	\$0.79	\$0.34	\$0.03	\$1.16	\$1.19	0.07	0.10	\$2.90
Subtotal:	\$1.64	\$0.98	\$0.90	\$3.52	\$1.58	\$2.36	\$0.22	\$4.16	\$4.76	\$0.29	\$0.67	\$12.44
<i>Machinery costs for these implements are specific to the operations for each crop:</i>												
105HP-WT + 36' Drill	\$2.89	\$2.16	\$0.71	\$5.76	\$1.71	\$1.11	\$0.11	\$2.93	\$1.23	\$0.08	\$0.32	\$9.91
105HP-WT + 16 x 18 Baler	\$5.52	\$3.01	\$0.81	\$9.33	\$2.84	\$1.84	\$0.17	\$4.85	\$2.05	\$0.13	\$0.53	\$16.24
105HP-WT + Mower/Conditioner	\$5.29	\$3.23	\$0.79	\$9.30	\$2.89	\$2.77	\$0.25	\$5.91	\$3.07	\$0.19	\$0.79	\$18.29
105HP-WT + Hay Rake	\$1.71	\$1.40	\$0.17	\$3.28	\$0.62	\$1.38	\$0.13	\$2.13	\$1.53	\$0.09	\$0.40	\$6.94
350HP-WT + 10-B Plow	\$3.74	\$3.70	\$0.41	\$7.85	\$2.39	\$9.65	\$0.90	\$12.94	\$3.21	\$0.20	\$2.76	\$24.00
350HP-WT + 40' Cultivator	\$0.89	\$0.71	\$0.10	\$1.70	\$0.66	\$2.61	\$0.24	\$3.51	\$0.86	\$0.05	\$0.75	\$6.08
350HP-WT + 20' Spike Harrow	\$0.82	\$0.70	\$0.11	\$1.62	\$0.50	\$3.72	\$0.35	\$4.57	\$1.24	\$0.08	\$1.06	\$7.44
350HP-WT + Rented Fertilizer App.	\$0.52	\$0.45	\$0.07	\$1.04	\$0.31	\$2.63	\$0.24	\$3.18	\$0.88	\$0.05	\$0.75	\$5.10

Note: Farm size is assumed to be 2000 acres for the purposes of machinery cost calculations.

Machinery Costs for District 1 Grass Hay Establishment (\$/acre) from the University of Idaho Machinery Cost Calculator												
	Ownership Costs (\$/acre):				Operating Costs (\$/acre):				Labor		Fuel Use	Total Cost (\$/acre)
	Depreciation	Interest	Taxes, Housing, Insurance, Licenses	Total Ownership Costs	Repairs	Fuel	Lubricants	Total	(\$/acre)	(hr/acre)	(gal/acre)	
<i>Machinery costs for these implements are spread across every acre of the farm, regardless of crops produced:</i>												
Pickup 3/4 ton 4WD, newer	\$1.40	\$0.82	\$0.75	\$2.97	\$0.79	\$2.01	\$0.19	\$2.99	\$3.57	0.22	0.58	\$9.54
Pickup 3/4 ton 4WD, older	\$0.24	\$0.16	\$0.15	\$0.55	\$0.79	\$0.34	\$0.03	\$1.16	\$1.19	0.07	0.10	\$2.90
<i>Machinery costs for these implements are specific to the operations for each crop:</i>												
350HP-WT + 10-B Plow	\$3.74	\$3.70	\$0.41	\$7.85	\$2.39	\$9.65	\$0.90	\$12.94	\$3.21	0.20	2.76	\$24.00
350HP-WT + 40' Cultivator	\$0.89	\$0.71	\$0.10	\$1.70	\$0.66	\$2.61	\$0.24	\$3.51	\$0.86	0.05	0.75	\$6.08
350HP-WT + Rented Fertilizer App.	\$0.52	\$0.45	\$0.07	\$1.04	\$0.31	\$2.63	\$0.24	\$3.18	\$0.88	0.05	0.75	\$5.10
350HP-WT + 20' Spike Harrow	\$0.82	\$0.70	\$0.11	\$1.62	\$0.50	\$3.72	\$0.35	\$4.57	\$1.24	0.08	1.06	\$7.44
350HP-WT + 20' Spike Harrow	\$0.82	\$0.70	\$0.11	\$1.62	\$0.50	\$3.72	\$0.35	\$4.57	\$1.24	0.08	1.06	\$7.44
105HP-WT + 36' Drill	\$2.89	\$2.16	\$0.71	\$5.76	\$1.71	\$1.11	\$0.11	\$2.93	\$1.23	0.08	0.32	\$9.91
<b>Total:</b>	<b>\$11.32</b>	<b>\$9.39</b>	<b>\$2.40</b>	<b>\$23.11</b>	<b>\$7.65</b>	<b>\$25.80</b>	<b>\$2.42</b>	<b>\$35.86</b>	<b>\$13.42</b>	<b>\$0.83</b>	<b>\$7.37</b>	<b>\$72.39</b>

[Back to Costs by Crop](#)

<b>Machinery Costs for District 1 Grass Hay Production (\$/acre) from the University of Idaho Machinery Cost Calculator</b>												
	Ownership Costs (\$/acre):				Operating Costs (\$/acre):				Labor		Fuel Use	Total Cost (\$/acre)
	Depreciation	Interest	Taxes, Housing, Insurance, Licenses	Total Ownership Costs	Repairs	Fuel	Lubricants	Total	(\$/acre)	(hr/acre)	(gal/acre)	
<i>Machinery costs for these implements are spread across every acre of the farm, regardless of crops produced:</i>												
Pickup 3/4 ton 4WD, newer	\$1.40	\$0.82	\$0.75	\$2.97	\$0.79	\$2.01	\$0.19	\$2.99	\$3.57	0.22	0.58	\$9.54
Pickup 3/4 ton 4WD, older	\$0.24	\$0.16	\$0.15	\$0.55	\$0.79	\$0.34	\$0.03	\$1.16	\$1.19	0.07	0.10	\$2.90
<i>Machinery costs for these implements are specific to the operations for each crop:</i>												
350HP-WT + Rented Fertilizer App.	\$0.52	\$0.45	\$0.07	\$1.04	\$0.31	\$2.63	\$0.24	\$3.18	\$0.88	0.05	0.75	\$5.10
105HP-WT + Mower/Conditioner	\$5.29	\$3.23	\$0.79	\$9.30	\$2.89	\$2.77	\$0.25	\$5.91	\$3.07	0.19	0.79	\$18.29
105HP-WT + Hay Rake	\$1.71	\$1.40	\$0.17	\$3.28	\$0.62	\$1.38	\$0.13	\$2.13	\$1.53	0.09	0.40	\$6.94
105HP-WT + 16 x 18 Baler	\$5.52	\$3.01	\$0.81	\$9.33	\$2.84	\$1.84	\$0.17	\$4.85	\$2.05	0.13	0.53	\$16.24
<b>Total:</b>	<b>\$14.69</b>	<b>\$9.06</b>	<b>\$2.73</b>	<b>\$26.48</b>	<b>\$8.23</b>	<b>\$10.98</b>	<b>\$1.02</b>	<b>\$20.23</b>	<b>\$12.29</b>	<b>\$0.76</b>	<b>\$3.14</b>	<b>\$59.00</b>

### Machinery Complement for Hay Production, Northern Idaho Counties

Type of Machine	Replacement Value \$	Age When Purchased	Years of Life	Annual Hours of Use	Salvage Value \$	Annual Repairs (Materials & Labor) \$	Gallons of Fuel/Hr.	Taxes, Housing, Insur., Licenses %	Labor Multiplier	Acres per Hour
<i>Tractors:</i>										
350HP-WT	95,000	5	15	500	20,000	3,000	15	1.2	1.1	
105HP-CT	60,000	0	20	300	7,700	1,000	4.6	1.1	1.1	
<i>Equipment, used with 350HP-WT:</i>										
10-Bottom Plow	22,000	0	20	80	4,000	600	15	0.6	1.1	5.56
40' Cultivator	15,500	5	15	125	2,000	850	15	0.6	1.1	20.61
20' Spike Harrow	1,000	0	15	50	100	35	15	0.6	1.1	14.42
<i>Equipment, used with 105HP-CT:</i>										
36' Drill	51,150	0	15	100	5,000	2,000	4.6	3	1.2	15.27
Hay baler 16 x 18	30,000	5	10	75	2,500	1,500	4.6	2.5	1.2	4.36
Mower/conditioner	18,000	5	10	80	1,800	1,000	4.6	2.5	1.2	5.82
Hay rake	5,000	5	15	60	500	100	4.6	0.6	1.1	11.64
<i>Trucks:</i>										
				Miles/year:			MPG:			
3/4-Ton Pickup	34,000	5	10	12,000	8,000	600	12	6.8	1.1	
3/4-Ton Pickup	7,500	15	15	2,000	450	1,500	12	6.8	1.1	

*Note: Farm size is assumed to be 2000 acres for the purposes of machinery cost calculations.*