Enterprise Budget

Hemp for Fiber, Mechanical Harvest, Lower Columbia Basin, North Central Region

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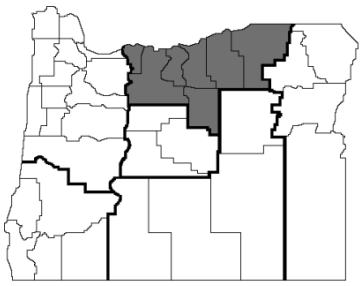

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This enterprise budget estimates the typical economic costs and returns to produce hemp for fiber in the 2022 crop year. It should be used to calculate actual costs and returns and is not representative of any specific farm. The assumptions used in constructing this budget are discussed below. Assistance provided by area hemp producers and other agribusinesses is much appreciated.

This study's results are based on our current understanding of hemp production, market, and yields. As research advances, we expect these assumptions to change.

Cropping Pattern
This budget is based on a farm with 3,000 acres with 250 acres in hemp, 750 acres in field corn, 500 acres in winter wheat, 375 acres in potatoes, 375 acres in onions, and 750 acres in alfalfa hay. Most crops are grown under center pivot irrigation in 125-acre fields. Typical hemp for fiber yield in this budget is 12,000 pounds per acre.

Labor
Tractor driver labor costs $22 per hour, and all other labor costs are $16 per hour; both rates include social security, workers' compensation, unemployment insurance, and other labor overhead expenses. For this study, owner labor is valued at the same rate as tractor driver rates, and all work is assumed to be a cash cost. Tractor labor hours are calculated based on machinery hours, plus ten percent.

Capital
Interest on operating capital for production inputs, machinery labor, repairs, and maintenance (six percent) is a cash expense borrowed for six months. An opportunity cost for machinery and land ownership is six and three percent, respectively. The market value for land is $15,000 per acre.

Machinery and Equipment
The machinery and equipment used in this budget are sufficient for a 3,000-acre farm with the crops described above. The machinery and equipment hours reflect growing grass seeds, small grains, oil and forage seeds, and alfalfa hay. A detailed breakdown of machinery values is shown in Table 2. Estimated labor, variable, and fixed costs for machinery are shown in Table 3, based on an hourly and per acre basis. The machinery costs are calculated based on the total farm use of the machinery. Off-road diesel is $4.00 per gallon.

Operations
Table 1 shows the machine operations for hemp production. A 340-hp tractor is used to pull the v-ripper, offset disk, and field cultivator. A 165-hp pulls the drill, fertilizer spreader, boom sprayer and baler. A charge for miscellaneous and other expenses is five percent of production costs, including additional labor, repairs and maintenance, supplies and materials, tax preparation, memberships in professional organizations, and educational workshops not included in field operations.

Results
The total gross income in this budget is $1,320 per acre. At harvest, hemp fiber is custom hauled to a processor for $2 per mile, 25 miles round-trip, and six loads per acre per year. Variable cash costs are $1,069 per acre, giving a net return above variable costs of $251 per acre. Total costs are $1,654 per acre when all costs are considered, resulting in a projected net return of -$334. A break-even price of $0.089 per pound is needed to pay all variable costs and $0.138 for total expenses. Therefore, a break-even yield of 9,716 pounds is required to pay variable costs and 15,040 pounds for total expenses.

Hemp production in Oregon is a relatively new crop, and prices paid to the grower and production levels are quite variable. Therefore, tables 4 and 5 are sensitivity analyses of the returns per acre for variable cash and total costs at different yields and prices.

Note: Not included in this study are a return to management, family living withdrawals for unpaid labor, depreciation and opportunity costs for vehicles, buildings, and improvements, an accounting for all regulatory costs, and local, state, and federal income taxes paid by the owner.

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Table 1. Economic and Cash Costs and Returns of Producing Hemp for Fiber, $/acre

Returns		Unit	$/Unit		Quantity	Value
Hemp for Fiber		pound	$0.11		12,000.00	$1,320.00
Total Returns						**$1,320.00**
Variable Cash Costs	Price	Quantity	Unit	Labor	Machinery	Materials	Total
Land Preparation and Maintenance							
V-Ripper		1.00	acre	$8.07	$22.86	$0.00	$30.92
Offset disk		1.00	acre	4.22	15.04	0.00	19.26
Field cultivator		1.00	acre	2.77	7.32	0.00	10.09
Crop Production							
Drill		1.00	acre	4.84	21.70	160.00	186.54
- Seed	$160.00	1.00	acre				
Fertilizer spreader		1.00	acre	1.68	5.01	77.00	83.69
- Fertilizer Inputs	$77.00	1.00	acre				
Boom sprayer		2.00	acre	1.42	3.70	50.00	55.11
- Spray Inputs	$50.00	1.00	acre				
Irrigation				40.00	18.00	150.00	208.00
Center Pivot - Irrigation Water Applied	$150.00	1.00	acre				
Center Pivot - Irrigation Labor	$16.00	2.50	hour				
Center Pivot - Repairs & Maint.	$18.00	1.00	acre				
Harvest							
Pre-harvest testing (THC)	$50.00	1.00	acre	0.00	0.00	50.00	50.00
Swather		1.00	acre	1.94	2.84	0.00	4.78
Baler		1.00	acre	3.03	20.70	0.00	23.73
- Baling Twine	$0.00	1.00	acre				
Bale wagon		1.00	acre	3.03	9.78	0.00	12.80
Trucking	$2.00	150.00	miles	0.00	0.00	300.00	300.00
Other Charges							
Other Expenses		5.00%		0.00	0.00	49.41	49.41
Interest on Operating Capital		6.00%		0.00	0.00	31.13	31.13
Total **Variable Cash** Costs				$70.98	$126.94	$870.84	$1,068.76
Total Returns minus Total Variable Cash Costs							$251.24
Fixed Cash Costs					Unit	$/Unit	Value
Property Insurance					acre	$5.00	$5.00
Property Taxes					acre	2.85	2.85
Land Interest Charge or Cash Rent					acre	450.00	450.00
Total Fixed Cash Costs							$457.85
Fixed Non-Cash Costs					Unit	$/Unit	Value
Power Units, Machinery & Equipment, depreciation & interest					acre	$127.77	$127.77
Total Fixed Non-Cash Costs							$127.77
Total Annual Costs							**$1,654.38**
Returns minus Total Annual Costs							**-$334.38**
Break-even Price to Cover Variable Costs							**$0.089**
Break-even Price to Cover Total Costs							**$0.138**
Break-even Yield to Cover Variable Costs							**9,716**
Break-even Yield to Cover Total Costs							**15,040**

Table 2. Whole Farm Machinery Cost Assumptions

Machine	Width (feet)	Market Value	Hours of Annual Use	Expected Life (Years)
340 HP 4WD tractor	N/A	$250,000	921	10
165 HP 2WD tractor	N/A	135,000	946	20
V-Ripper	12.0	22,000	115	10
Offset disk	18.0	37,000	300	15
Field cultivator	20.0	10,000	79	15
Drill	20.0	25,000	275	15
Fertilizer spreader	40.0	18,000	72	15
Boom sprayer	90.0	9,500	151	15
Swather	16.0	75,000	110	15
Baler	16.0	120,000	172	10
Bale wagon	16.0	120,000	172	15

Table 3. Machinery Cost Calculations, on a per hour and per acre basis.

		-- Variable Costs --		Fixed Cost	
Machine		Fuel & Lube	Repairs & Maint.	Deprec. & Interest	Total Cost
		---------- Costs Per Hour ----------			
340 HP 4WD tractor		$36.80	$6.91	$34.44	$78.15
165 HP 2WD tractor		23.00	17.87	17.28	58.16
V-Ripper		0.00	6.16	24.48	30.64
Offset disk		0.00	19.07	13.82	32.88
Field cultivator		0.00	18.94	86.24	105.18
Drill		0.00	38.02	10.61	48.64
Fertilizer spreader		0.00	11.59	28.58	40.16
Boom sprayer		0.00	4.98	7.15	12.13
Swather		18.40	7.42	75.54	101.36
Baler		0.00	79.58	89.27	168.84
Bale wagon		23.00	33.89	85.64	142.52
		---------- Costs Per Acre ----------			
Field Operation	Acres/ Hour	Operator Labor	Variable Costs	Fixed Costs	Total Costs
340 HP 4WD tractor & V-Ripper	2.18	$8.07	$22.86	$27.01	$57.93
340 HP 4WD tractor & Offset disk	4.17	4.22	15.04	11.57	30.83
340 HP 4WD tractor & Field cultivator	2.55	6.91	24.61	47.41	78.94
340 HP 4WD tractor & Flail	3.64	4.84	21.70	7.67	34.21
165 HP 2WD tractor & Fertilizer spreader	10.47	1.68	5.01	4.38	11.07
165 HP 2WD tractor & Boom sprayer	24.82	0.71	1.85	0.98	3.54
Swather	9.09	1.94	2.84	8.31	13.09
165 HP 2WD tractor & Baler	5.82	3.03	20.70	18.31	42.04
Bale wagon	5.82	3.03	9.78	14.72	27.52

Table 4. Estimated Per Acre Returns Over Variable Cash Costs at Varying Yields and Prices.

	---------- Pounds per Acre ----------						
$/Pound	**6,000**	**8,000**	**10,000**	**12,000**	**14,000**	**16,000**	**18,000**
$0.05	($769)	($669)	($569)	($469)	($369)	($269)	($169)
$0.07	($649)	($509)	($369)	($229)	($89)	$51	$191
$0.09	($529)	($349)	($169)	$11	$191	$371	$551
$0.11	($409)	($189)	$31	$251	$471	$691	$911
$0.13	($289)	($29)	$231	$491	$751	$1,011	$1,271
$0.15	($169)	$131	$431	$731	$1,031	$1,331	$1,631
$0.17	($49)	$291	$631	$971	$1,311	$1,651	$1,991

Table 5. Estimated Per Acre Returns Over Total Costs at Varying Yields and Prices.

	---------- Pounds per Acre ----------						
$/Pound	**6,000**	**8,000**	**10,000**	**12,000**	**14,000**	**16,000**	**18,000**
$0.05	(1,354)	(1,254)	(1,154)	(1,054)	(954)	(854)	(754)
$0.07	(1,234)	(1,094)	(954)	(814)	(674)	(534)	(394)
$0.09	(1,114)	(934)	(754)	(574)	(394)	(214)	(34)
$0.11	(994)	(774)	(554)	(334)	(114)	106	326
$0.13	(874)	(614)	(354)	(94)	166	426	686
$0.15	(754)	(454)	(154)	146	446	746	1,046
$0.17	(634)	(294)	46	386	726	1,066	1,406