

Enterprise Budget

Sweet Corn, Processed Market, Willamette Valley, Oregon

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This enterprise budget estimates the typical per-acre costs associated with processed market sweet corn production in the Willamette Valley. It was developed through individual consultations with processed vegetable growers in the Willamette Valley, as well as vegetable processors and university experts. The budget is intended to be used as a guide to estimate actual costs and does not represent any specific farm. The major assumptions used in constructing this budget are discussed below. An attempt has been made to report typical cultural practices used in production of sweet corn for the processing market; however, this does not represent the only production method. This baseline budget is accompanied by an Excel file with editable parameters. The reader is encouraged to modify this budget according to their own situation and assumptions to achieve more accurate estimates of enterprise profitability.

Farm Size and Crop Mix: This budget is based on 100 acres of sweet corn production on a farm with 400 total tillable acres. Other crops may include squash, bush beans, and grass seed. Machinery is shared across the farm's crop enterprises, which impacts machinery overhead costs that are attributed to sweet corn production. Average sweet corn yield is assumed to be 10 net tons per acre at a gross price to the grower of \$125 per ton.

Land and Irrigation: The land is assumed to be leased at a rate of \$250 per acre. Irrigation equipment costs are based on a used system with a \$75 per acre per year repair and maintenance cost. In the baseline budget, the crop is irrigated 3 times during the course of the season, using traveling guns, with two acre-inches applied per watering event. Pumping expenses are based on electricity costs of \$10.00 per acre-inch of water applied during the growing season. Irrigation labor is assumed at a rate of 1.0 hours per acre per watering event to set up and move equipment and lines. Irrigation rates vary considerably based upon soil type, weather, and farm infrastructure. Higher rates may be standard practice within some systems and should be updated in Table 1 of the spreadsheet to reflect individual grower conditions.

Labor: General labor is hired at a rate of \$22.33 per hour, which is based on the 2024 Adverse Effective Wage rate for Oregon plus 16% for labor overhead expenses. Tractor drivers are paid \$22.25 per hour plus 16% for labor for labor overhead expenses for a total of \$25.81 per hour. This budget does not account for the phase-in of required overtime pay for agricultural workers.

Capital: Interest on operating capital (8 percent) is treated as a cash expense. Variable cash expenses are assumed to be borrowed for a 6-month period. Interest on intermediate and long-term capital (8 percent) is treated as a non-cash opportunity cost and categorized as a fixed-cost to machinery ownership.

Machinery and Equipment: The machinery and equipment used in the budget reflect the typical machinery complement for a 400-acre farm growing processed market vegetables in the Willamette Valley.

A detailed breakdown of machinery values is shown in Table 2. Estimated machinery costs are shown in Table 3, assuming straight-line depreciation. The machinery costs are estimated based on the total farm use of the machinery. Table 4 shows the per acre labor, variable, and fixed costs for certain machinery operations, including both the implement and the associated power unit. Fuel prices are assumed to be \$3.50 per gallon for gasoline and \$4.00 per gallon for diesel. Fuel consumption for field operations is assumed to be 0.044 gallons of diesel per horsepower, per hour of use (Lazarus, 2024). Repair and salvage



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value coefficients are taken from the American Society of Agricultural and Biological Engineers (as cited in Edwards, 2015). Complete calculations of machinery ownership and operating costs can be found in the accompanying Excel file.

Operations: The cultural operations are listed approximately in the order in which they are performed. A 225-hp tractor is used to pull the plow, power harrow, and field cultivator. A 155-hp tractor is used to pull the disk and the row cultivator. A 67-hp tractor is used to pull the planter. There are no expenses listed for the purchase of seed or for harvest operations. The seed is provided by the processor and planted by the grower, while harvest is carried out by the processor. Table 1 shows operations, rates and units. Pre-plant fertilizer, lime, and pesticide applications are performed as custom applications. The cost of lime application is spread evenly across each crop in the rotation although it would not typically be applied each year. Given the variability of crop protection treatments required across individual farms and years to respond to environmental and pest conditions, average expenditure on chemical inputs were assumed, based on feedback from industry representatives.

Results and Other Notes: Under the baseline set of assumptions, there is an estimated return over cash costs of \$265 per acre and a net return over total economic costs of \$25 per acre. Cash costs include all expenses that would actually be paid out of pocket in the growing year, while economic costs include machinery depreciation and the opportunity cost of capital from machinery and other long-term capital investments. Since we assumed a cash lease for the cropland in this budget, the cash costs are higher than they would be if we assumed that cropland is owned by the farmer. It is important to note that this budget does not include a charge for management time, meaning that although labor is included for machinery operations, no time is budgeted for scouting, decision making, interaction with input suppliers and buyers, managing employees, or time spent to ensure compliance with environmental, food safety, or workplace regulations. Therefore, the net return can be interpreted as a return to management. It is also important to recognize that whole-farm profitability is more complex than the sum of individual enterprise profits. Processed vegetable growers in the Willamette Valley produce a variety of different crops, and the planting sequence and the machinery complement required for a given cropping system can impact the agronomic performance as well as the overhead costs incurred by the farm. A whole-farm budget and profitability analysis should be carefully considered before implementing a new production plan.

Break-Even Analysis: Table 5 shows the estimated return over *cash costs* for different levels of yield and price. Table 6 shows the estimated returns over *total economic costs*, which include depreciation and opportunity cost of invested capital. Given the assumptions described above and a yield of 10 tons per acre, the break-even price over total economic costs is \$119 per ton. Assuming a price of \$125 per ton, the yield that achieves a break-even return over cash costs is 7.6 tons per acre. A yield of 9.5 tons per acre would allow break-even on net returns over total costs at this price.

References:

Edwards, W. 2015. Estimating Farm Machinery Costs. Iowa State University. A3-29. Available at:

<https://www.extension.iastate.edu/agdm/crops/pdf/a3-29.pdf>

Lazarus, W. 2024. Machinery Cost Estimates. University of Minnesota. Available at:

<https://wlazarus.cfans.umn.edu/william-f-lazarus-farm-machinery-management>

Table 1. Sweet Corn, Processed Market, 2024, \$/acre economic costs and returns

GROSS INCOME		Quantity	Unit	\$/Unit	Total	Price/Ton
Sweet Corn		10.00	Ton	\$125	<u>\$1,250</u>	<u>\$125</u>
Total gross income					1,250	125
VARIABLE CASH COSTS	Units	Labor	Machinery	Materials	Total	Cost/Ton
<i>Field Preparations & Planting</i>						
Lime, custom	1.0 x/acre	6.00	0.00	30.00	36.00	3.60
Tandem Disc Harrow	1.0 x/acre	2.65	5.64	0.00	8.29	0.83
Chisel Plow	1.0 x/acre	2.42	9.74	0.00	12.16	1.22
Power Harrow	2.0 x/acre	3.58	8.95	0.00	25.06	2.51
Fertilizer, custom	1.0 x/acre	11.85	0.00	105.00	116.85	11.69
Field Cultivator	2.0 x/acre	1.33	3.92	0.00	10.50	1.05
Row Crop Planter	1.0 x/acre	3.97	5.04	0.00	9.01	0.90
Sidedress Fertilizer	1.0 x/acre	17.75	0.00	104.00	121.75	12.18
<i>Weed and pest control</i>						
Row Cultivator	1.0 x/acre	1.90	4.15	0.00	6.05	0.61
Fungicide, custom	1.0 x/acre	0.00	0.00	0.00	0.00	0.00
Herbicide, custom	1.0 x/acre	12.00	0.00	40.00	52.00	5.20
Insecticide, custom	1.0 x/acre	12.00	0.00	15.00	27.00	2.70
<i>Irrigation</i>						
Labor	3.0 hours	22.33	0.00	0.00	66.99	6.70
Electricity	6.0 acre-inch	0.00	0.00	10.00	60.00	6.00
Maint. & Repairs	1.0 x/acre	0.00	0.00	75.00	75.00	7.50
<i>Other Costs</i>						
Corn topping	1.0 x/acre	17.00	0.00	0.00	17.00	1.70
Pickup and ATV	1.0 x/acre	0.00	31.04	0.00	31.04	3.10
Interest: operating capital	6.0 months				25.57	2.56
Total variable costs		114.78	68.49	379.00	700.26	70.03
FIXED CASH COSTS				Unit	Total	Cost/Ton
Property insurance				acre	35.00	3.50
Land Charge				acre	250.00	25.00
Total fixed cash costs					285.00	28.50
Total cash costs					985.26	98.53
Returns over cash costs					264.74	26.47
FIXED NON-CASH COSTS				Unit	Total	Cost/Ton
Machinery and equip - depreciation and interest				acre	134.19	13.42
Pickup & ATV - depreciation and interest				acre	105.97	10.60
Total fixed non-cash costs					240.17	24.02
Total fixed costs					525.17	52.52
Total of all costs per acre					\$1,225.43	\$122.54
Net projected returns					\$24.57	\$2.46

Table 2. Machinery Cost Assumptions

Machine	Size or description	Market value (\$)	Hours or miles of annual use	Expected life (years)	Salvage Value	
					As % of market value	Salvage Value (\$)
Tractor # 1	4WD 225 hp	\$384,230	400	15	16%	61,477
Chisel Plow	23 ft	\$77,866	50	15	29%	22,581
Power Harrow	10 ft	\$13,000	75	15	22%	2,860
Field Cultivator	25 ft	\$61,043	50	15	22%	13,429
Tractor # 2	4WD 155 hp	\$265,600	300	15	16%	42,496
Tandem Disc Harrow	21 ft	\$78,180	75	15	22%	17,200
Row Cultivator	20 ft	\$60,000	50	15	22%	13,200
Tractor # 3	2WD 105 hp	\$133,737	300	15	18%	24,073
Tractor # 4	2WD 67 hp	\$32,574	300	15	18%	5,863
Row Crop Planter	15 ft	\$48,000	50	15	40%	19,200
Pickup	3/4 ton 4x4	\$50,000	10,000	10	26%	13,000
ATV	4 wheeler	\$6,000	500	10	26%	1,560

Table 3. Machinery Cost Calculations.

Machine	Size or description	---- Variable costs ----		----- Fixed costs -----		Total Cost
		Fuel & Lube	Repairs & Maint.	Depreciation	Interest	
----- Costs per hour (\$) -----						
Tractor # 1	4WD 225 hp	39.60	23.05	53.79	44.57	161.02
Chisel Plow	23 ft	0.00	41.27	73.71	80.36	195.34
Power Harrow	10 ft	0.00	1.95	9.01	8.46	19.42
Field Cultivator	25 ft	0.00	13.43	63.48	59.58	136.49
Tractor # 2	4WD 155 hp	27.28	15.94	49.58	41.08	133.87
Tandem Disc Harrow	21 ft	0.00	11.73	54.20	50.87	116.80
Row Cultivator	20 ft	0.00	13.20	62.40	58.56	134.16
Tractor # 3	2WD 105 hp	18.48	9.36	24.37	21.04	73.25
Tractor # 4	2WD 67 hp	11.79	2.28	5.94	5.12	25.13
Row Crop Planter	15 ft	0.00	18.72	38.40	53.76	110.88
----- Costs per acre (\$) -----						
Pickup	3/4 ton 4x4	7.67	1.92	9.25	3.15	21.98
ATV	4 wheeler	2.19	0.55	1.11	0.30	4.15

Table 4. Estimated Cost of Each Operation with Power Unit.

Operation	Tractor	Field Speed (mph)	Acres per hour	----- Machine costs (\$/acre)-----			Total costs
				Labor costs	Variable costs	Fixed costs	
Chisel Plow	Tractor # 1	4.5	10.7	2.42	9.74	23.66	35.83
Power Harrow	Tractor # 1	7.0	7.2	3.58	8.95	16.06	28.59
Field Cultivator	Tractor # 1	8.0	19.4	1.33	3.92	11.41	16.67
Tandem Disc Harrow	Tractor # 2	4.5	9.7	2.65	5.64	20.10	28.39
Row Cultivator	Tractor # 2	7.0	13.6	1.90	4.15	15.58	21.64
Row Crop Planter	Tractor # 4	5.5	6.5	3.97	5.04	15.87	24.89

Table 5. Estimated Per Acre Returns Over CASH Costs at Varying Yields & Prices

Price/Ton	----- Tons per Acre -----						
	7.0	8.0	9.0	10.0	11.0	12.0	13.0
\$80	(425)	(345)	(265)	(185)	(105)	(25)	55
\$95	(320)	(225)	(130)	(35)	60	155	250
\$110	(215)	(105)	5	115	225	335	445
\$125	(110)	15	140	265	390	515	640
\$140	(5)	135	275	415	555	695	835
\$155	100	255	410	565	720	875	1,030
\$170	205	375	545	715	885	1,055	1,225

Table 6. Estimated Per Acre Returns Over TOTAL ECONOMIC Costs at Varying Yields & Prices

Price/Ton	----- Tons per Acre -----						
	7.0	8.0	9.0	10.0	11.0	12.0	13.0
\$80	(665)	(585)	(505)	(425)	(345)	(265)	(185)
\$95	(560)	(465)	(370)	(275)	(180)	(85)	10
\$110	(455)	(345)	(235)	(125)	(15)	95	205
\$125	(350)	(225)	(100)	25	150	275	400
\$140	(245)	(105)	35	175	315	455	595
\$155	(140)	15	170	325	480	635	790
\$170	(35)	135	305	475	645	815	985