

Cost of Onion Production in Eastern Oregon and Idaho



Gina Greenway 2019



Objectives and Limitations

The goal of this project is to provide industry stakeholders tools for estimating and understanding the costs incurred by onion producers in Idaho and Eastern Oregon. The first budget (Appendix A) is based on marketable yields and includes the cost of storage and packing. The second budget (Appendix B) is based on field run yields and includes the cost of storage but does not include packing charges.

The estimates developed in this document are intended to capture typical production practices and input use of Treasure Valley onion growers, but cannot capture the exact cost structure and resource use of each individual farm. Prices and yields used in these documents are based on 3 year averages.

Practices outlined in this document are not endorsements or recommendations for any particular product or practice used in the production of onions. Farm size, acres planted to onions, equipment choice, rotation, irrigation practices, and management will vary and are unique to each individual operation.

Farm Size and Rotations

The costs and returns estimates for Treasure Valley onion production estimated in this document are based on a hypothetical 1,200 acre “model” farm. Our hypothetical farm grows onions on 150 acres irrigated with a drip system designed for a “conventional” bed. In addition to onions, the farm grows sugarbeets, dry beans, corn, and wheat. Choice of rotation crops and length of rotation will vary by producer, field conditions, and the whole farm plan.

Yield and Price Considerations

Yields vary based on soil type, variety, location, and weather. Yields used in the field run budget

(Appendix B Table 1) are based on historical three year average (2016-2018) yields for Idaho and Malheur County Oregon reported by the United States Department of Agriculture National Agricultural Statistics Service (USDA-NASS). Yield estimates for 2019 were not yet available for publication in this document.

Marketable yields used in (Appendix A Table 1.) are calculated by adjusting the 3 year average field run yields. We assume on average, 10% of the crop will grade in the super colossal size class, 20% of the crop will grade in the colossal size class, 40% of the crop will grade in the jumbo size class, 20% of the crop will grade in the medium size class, while 10% of the crop will fall in the cull category.

Prices used in Appendix A Table 1 are based on **USDA Agricultural Marketing Service Market News Reports**. The marketing year average (FOB prices) by size class for **50# sacks** of yellow onions shipped from Idaho and Malheur County Oregon from October of 2017 through December of 2019 are reported under the price heading of the budget.

Three year average (2016-2018) USDA-NASS marketing year average prices for Idaho and Malheur County Oregon reported in **dollars per hundredweight** are used as a proxy for an off the field price (Appendix B).

Variable Costs

We estimated two types of costs in our budgets: fixed and variable

Variable costs are:

- 1) Incurred on an annual basis
- 2) Only incurred if the crop is produced
- 3) Vary with the amount of production

The variable cost categories for onion production include: seed, fertilizer, plant protection, custom

and consultants, irrigation, machinery, labor, storage, fees and insurance, and operating interest.

Seed

The seed price of \$569.25 is based on utilizing one third of a pail of seed per acre. Pricing for yellow onion seed with pellet and treatment was collected from local seed suppliers; the average is reported in this budget. Seed costs will vary based on variety, coating, and treatment applied.

Fertilizer

Onion variety and yield goals affect nutrient requirements. We estimate nitrogen, phosphorous, and potassium requirements as essential amendments for production of a quality onion. Some growers will apply micronutrients and may also use sulfuric acid.

Grower interviews provided a range of estimates for fertility needs on a per acre basis which varied with location and soil type. Soil tests are required to determine precise nutrient needs for individual producers. Soil testing costs appear in the “custom and consultants” section of the budget, where \$5 per acre is allocated to soil testing.

The midpoints of the ranges provided by growers are used as the estimates for dry nitrogen, liquid nitrogen, and phosphorous requirements outlined in the budget. In our model, we assume fertilizer is custom applied once in fall and once in spring at a cost of \$10 per acre. The per acre application charge is found in the “Custom and Consultants” section of the budget. Surveys with local input dealers provided pricing used to estimate the fertilizer costs reported in the budget.

We assumed only a fraction of onion acres would receive micronutrients and/or sulfuric acid and allocate \$25 per acre to these products. Overall fertilizer requirements are estimated to cost about \$205.55 per acre.

Plant Protection

Fumigation

In this budget, custom fumigation services are used for application of chloropicrin in the fall. We assume the full label rate is used at a cost of \$300

per acre. Growers fumigating with Vapam could expect to pay around \$7.00 per gallon for product and budget a total cost of \$280 per acre. The custom application charge is estimated at \$42.50 per acre and appears in the “Custom and Consultants” section of the budget.

Weed Control

Methods of weed control vary based on individual preference, environmental factors, economic considerations, and resources of individual producers. In this budget, a combination of chemical applications, mechanical cultivation, and use of hand crews are assumed for suppression of weeds. Our estimates assume herbicides are used 5 times throughout the growing season. Adjuvant cost are estimated at \$2.00 per pint. A total of \$93 is budgeted for herbicides.

In addition to herbicide applications, the onions are cultivated 3 times for weed control. Tractor hours and fuel use are estimated based on using a 160 horsepower (HP) wheel tractor and a 4 bed onion cultivator. Costs of fuel for cultivating are accounted for and discussed in the “Machinery” section of the budget, while the labor hours required for cultivating appear in the labor section of the budget.

The majority of growers estimated using a hand crew for weeding 3 times throughout the 2019 growing season. A cost of \$125 per acre is applied each time a hand crew is brought in. We budget a total of \$375 to hand weeding crews for the 2019 growing season. The cost of hand crews for weeding appears in the “Custom and Consultants” section of the budget and can vary widely based on location and individual farm.

Insects

For Treasure Valley Onion growers one of the most serious concerns is thrips and thrips transmitted Iris yellow spot virus (IYSV). Thrips pressure will vary from year to year, field to field, by location, and with environmental factors. Management costs will depend on severity of pressure, and choice of products used. For the 2019 growing season we estimate 7 insecticide applications targeted at psyllids, at a cost of about \$319.87 per acre.

Diseases & Other Treatments

The majority of growers estimated using 4 fungicide applications during the 2019 growing season to help protect the crop from diseases such as neck rot. We budget \$130.60 per acre to cover fungicide treatments for the onion crop.

We assume use of chlorine dioxide for maintenance of the drip lines, budgeting \$40 per acre for this expense. One application of MH-30 at a cost of \$33 per acre is budgeted to help with control of in storage sprouting.

Fuel

Wholesale pricing from the United States Energy Information Administration for number 2 diesel in the Rocky Mountain region was used as a proxy for dyed (off road) diesel pricing. We calculated a nine (Jan 2019-Sept 2019) month average of \$1.95 per gallon for use in the budget. On road diesel was estimated using the nine month (Jan 2019-Sept 2019) retail average price of \$3.00 per gallon. On road gasoline pricing was based on the nine month (Jan 2019-Sept 2019) retail average price of regular gas in the Rocky Mountain region of \$2.60 per gallon.

Irrigation

Pumping Charge

This budget assumes the pump used to supply the drip system with water is powered by a diesel engine. Energy requirements for operating the pump are estimated using standard agricultural engineering formulas that relate PSI, pumping lift, and irrigation application rates to the Nebraska Performance Criteria (NPC) water horsepower value for diesel fuel. Onions receive 30 acre inches of water throughout the growing season. A minimum of 20 gallons of diesel fuel per acre would be needed to power the pump. Applying the \$1.95 diesel charge to the 20 gallons of fuel results in a total charge of \$39.01 per acre dedicated to fuel for irrigation.

Irrigation Repair

We allocate \$5.00 per acre for repair and maintenance on the pump.

Drip Supplies and Labor

Drip tape and supplies are budgeted at \$250

per acre. Installation and removal of drip irrigation systems is labor intensive. Rolling out the layflat, hooking up couplers, spaghettis, end plugs, and setting up the filter station and pump are all required before the first irrigation can be applied. We budget 8 hours of labor per acre to setting up and removing the drip irrigation system. Once the drip system is removed growers must dispose of the tape. We estimate a \$10 per acre charge to cover drip disposal expenses.

Variable Costs of Machinery

The operating or variable cost categories that appear under the Machinery heading in the budget include charges allocated to off road diesel for tillage, spraying, planting, and harvest operations. We allocate a small charge to cover road gas and diesel for pickups and service trucks used on the farm. Machinery repairs, and lube are also accounted for under the machinery heading.

Tillage and Harvest Practices Used to Calculate Fuel Requirements

In preparation for the onion crop, we assume the field is disked twice in fall then receives a custom broadcast fertilizer application. The custom fertilizer application charge is accounted for in the custom and consultants section of the budget, while materials are accounted for in the fertilizer section of the budget. The field is then plowed, groundhogged twice, and landplaned. The field is fumigated and bedded by a custom applicator. The charge for the chloropicrin appears in the plant protection category of the budget while the fee for fumigation services appears in the custom and consultants section of the budget.

In spring the beds are harrowed twice. In the model farm represented in this budget we assume the drip tape is installed while the onions are being planted, but recognize that many operations will apply drip tape in a separate operation. For 2019 we estimated that onions were cultivated 3 times throughout the growing season. Herbicide, insecticide, and fungicide applications result in a total of 12 spray applications throughout the 2019 growing season. In preparation for harvest, the drip tape is removed with a drip tape lifting tool. The tape is then rolled and prepared for haul away. We budget \$10 per acre to cover the cost of drip tape disposal, which appears in the irrigation section of the budget. The layflat is removed from the field using a lay flat deck.

In advance of lifting the onions it is typical to break the centers. Onions are then typically lifted once. However, we budget enough fuel to lift the onions twice because of the difficult weather conditions in the 2019 season that resulted in many producers lifting the onions a second time. The fields are then opened and a topper loader is used to harvest the onions. Trucks haul the onions to the shed.

Fuel Consumption Calculations

We estimate fuel consumption per hour for all field and harvest operations that are not custom applied by using agricultural engineering equations. Each PTO horsepower is related to fuel consumption per hour using a factor of 0.044 for diesel. An example calculation for per hour fuel consumption is provided for a 160 HP tractor ($160 \times 0.044 = 7.04$ gallons per hour of use). Fuel costs per hour are calculated by using the estimated fuel consumption of each operation multiplied by the cost of diesel fuel. Using our previous example ($\$1.95 \times 7.04 = \13.72 per hour).

Acres per hour calculations are used as intermediary step in estimation of final costs used in the budget and apply the following agricultural engineering formula.

$$\frac{\text{Speed (mph)} \times \text{machine width (ft)} \times \text{machines field efficiency (\%)}}{8.25}$$

In our budget we aggregated all machinery hours (tractor + implement) per acre before applying the cost of diesel fuel. We arrived at an estimate of 43.38 gallons of fuel per acre. The \$1.95 per gallon diesel fuel price is applied to arrive at an estimated cost of \$84.58 per acre for fuel in the 2019 growing season. Hauling charges are estimated separately. We assume use of the farm's own trucks and labor but our labor and fuel allocations per acre are consistent with a custom hauling fee that ranges between \$7-10 per ton.

Repairs & Maintenance and Lube

Repair and maintenance costs for tractors are based on the purchase price divided by 1,000 multiplied by a factor of 0.083. Repair and maintenance for implements is based on the purchase price divided by 1000 times a factor of .05. All individual repair and maintenance charges are aggregated and appropriately

allocated to the onion operation to arrive at a single charge per acre for repair and maintenance.

Lubrication costs are estimated using the standard engineering coefficient of 15 percent of estimated fuel costs.

Labor

Assumed wages include a base hourly rate plus adjustments for payroll taxes, workman's compensation and benefits. Base H2-A hourly rates were estimated using the average (\$14.25) of Idaho (\$13.48) and Oregon's (\$15.03) adverse effect wage rates. We acknowledge that by using the average, labor costs are likely to be underestimated for Oregon producers, while being slightly overestimated for Idaho producers.

For locally sourced labor used in the irrigation and general labor category, the average from the Pacific and Mountain I regions of the 2019 USDA (NASS) Farm Labor Report are used. We arrive at an estimated wage of \$14.00 per hour. The locally sourced skilled labor rate (truck driver and equipment operators) is factored at \$15.50 per hour. Sorters and pickers are paid at a base rate of \$11.00 per hour.

We adjust the H-2A labor rate by 20% to cover meals and transportation, resulting in an effective rate of \$17.10. A 15.25% percent adjustment (to cover payroll taxes and workman's compensation) is applied to the base rate for general labor, skilled labor, and sorting labor categories resulting in effective rates of \$16.14, \$17.86, and \$12.68 respectively. The labor rate for machinery (tractor and harvest equipment) operators is adjusted by a factor of 25.25% to cover workman's compensation and payroll taxes resulting in an effective wage rate of \$19.41 per hour

Storage & Packing

We budget \$1.00 per cwt stored to cover bin rental and storage operating costs. The charge for packing is estimated at \$3.50 per **50# sack**.

Fees & Crop Insurance

Crop Insurance is budgeted at \$84.00 per acre. The assessment fee for onions grown under the federal marketing order in the Idaho-Eastern Oregon region is \$0.05 per cwt. We budget \$10 per acre to cover the costs of GAP audits.

Operating Interest

Operating Interest based on a borrowing period of 6 months and is calculated at 6.25% of total operating costs.

Fixed Costs

Fixed costs are incurred even if no production takes place. Fixed costs are:

1. Fixed only after the expense has been incurred
2. A function of time, not output
3. Not relevant for determining optimal level of input use

The **DIRTI** five are the most common category of fixed costs which include **D**epreciation, **I**nterest, **R**ent, **T**axes, and **I**nsurance.

Fixed costs categories for onion production in the treasure valley include:

- (1) Depreciation and interest on machinery
- (2) Machinery insurance and housing
- (3) Land Rent

Equipment values are representative of a mix of new and used equipment and are presented in Appendix C of this document. Pricing for the equipment is provided from dealers; when dealer pricing is not available we use the USDA Farm Machinery Prices Paid Index to make valuation adjustments.

Our calculated ownership costs appear under the fixed cost category of the budget and include annual depreciation, interest, housing and insurance. Property taxes on agricultural equipment are omitted due to exemptions in Idaho and Oregon (ORS 307.394, ID 63-602EE).

Straight line depreciation (cost-salvage value)/useful life, (with a useful life figure of 15 years for tillage equipment, 10 years for harvest equipment, and 7 years for pickups and ATV's) was used to arrive at depreciation estimates. Trucks used for hauling were depreciated over a 25 year useful life.

Interest is an opportunity cost of capital and is charged for all capital outlay not just the amount borrowed. The interest rate in the fixed cost section of the budgets is estimated at 5.42 percent. This rate

was collected through a survey of regional lending institutions.

Housing and Insurance are estimated at 1% of the Average Annual Investment calculated for each piece of equipment used on the farm.

Land Rent

The \$367 dollar per acre land rent charge was based on a survey of cash land rents in the region. This charge does not accurately capture the cost of land ownership.

Overhead Cost & Management Fee

Overhead costs are calculated at 2.5 percent of total operating costs to account for office expenses, accounting fees, and utilities. The allocation to management is estimated at 5% of operating costs. The management fee in appendix A is based on 5% of adjusted variable costs (variable costs – packing charges).

Additional Information

For spreadsheet versions of the budgets provided in this report please email ggreenway@collegeofidaho.edu. The author wishes to extend her most sincere appreciation to the growers who willingly sacrificed a significant amount of time in order to make meaningful contributions to this document. Funding provided by the Idaho-Eastern Oregon Research Committee made this analysis possible and is gratefully acknowledged.

AppendixA Table 1 Cost of Production with Storage and Packing, **Marketable Yields**

	Quantity	Unit	Price	\$/acre
Marketable Yield				
Super Colossal	160	50 # Sack	\$9.88	\$1,580.93
Colossal	320	50 # Sack	\$8.79	\$2,811.95
Jumbo	640	50 # Sack	\$7.60	\$4,861.61
Medium	320	50 # Sack	\$6.25	\$1,999.54
Total	1,440	50 # Sack	\$7.82	\$11,254.03
Seed				
Seed	0.33	pail	\$1,725.00	\$569.25
Subtotal Seed				\$569.25
Fertilizer:				
Dry Nitrogen - Pre-plant	50	lb	\$0.50	\$25.00
Dry P2O5	115	lb	\$0.57	\$65.55
Micronutrients/Sulfuric Acid	1	acre	\$25.00	\$25.00
K2O	100	lb	\$0.40	\$40.00
Liquid Nitrogen	100	lb	\$0.50	\$50.00
				\$205.55
Plant Protection:				
Chloripicrin	4.0	gal	\$75.00	\$300.00
Roundup Power Max	16.0	fl oz	\$0.20	\$3.20
Prowl H2O (2x)	2.5	pint	\$6.25	\$15.63
Poast 1.5EC	1.0	pint	\$16.25	\$16.25
Dual II Magnum 7.64EC	1	pint	\$12.50	\$12.50
Outlook (2X)	21.0	oz	\$1.21	\$25.41
Adjuvants (10X)	10.0	pint	\$2.00	\$20.00
Radiant (2x)	16	fl oz	\$6.60	\$105.60
Lannate LV (2x)	6	pint	\$10.75	\$64.50
Movento (2X)	10	fl oz	\$10.93	\$109.30
AZA-Direct	16	fl oz	\$1.67	\$26.72
M-Pede	1	qt	\$13.75	\$13.75
Bravo Weatherstik	3	pt	\$8.00	\$24.00
Dithane 75DF Rainshield	2.4	quarts	\$10.50	\$25.20
Quadris	15	fl oz	\$1.64	\$24.60
Pristine	16	fl oz	\$3.55	\$56.80
Chlorine Dioxide (drip lines)	1	gal	\$40.00	\$40.00
MH30 Sprout Inhibitor	1.33	gal	\$25.00	\$33.25
				\$916.71
Custom & Consultants:				
Custom Fertilize	2	acre	\$10.00	\$20.00
Custom Fumigate	1	acre	\$42.50	\$42.50
Hand Weed	3	acre	\$125.00	\$375.00
Soil Testing	1	acre	\$5.00	\$5.00
				\$442.50
Irrigation				
Irrigation Fuel pump (diesel)	20.01	gal	\$1.95	\$39.02
Irrigation Repair (pump)	1.00	ac	\$5.00	\$5.00
Drip Tape/Supplies	1.00	ac	\$250.00	\$250.00
Irrigation Set-up/Removal Labor	8.00	hrs	\$17.10	\$136.80
Drip Tape recycling/haul away	1.00	ac	\$10.00	\$10.00
Total Irrigation				\$440.82
Machinery				
Equipment Fuel	43.38	gal	\$1.95	\$84.59
Road Gas	2.00	gal	\$2.60	\$5.20
Road Diesel	3.00	gal	\$3.00	\$9.00
Repairs	1.00	acre	\$81.71	\$81.71
Lube				\$14.82
Fuel For Hauling	150.00	gal	\$1.95	\$292.50
Total Fuel, Lube, Repairs				\$487.82
Labor				
Equipment Labor	5.79	hrs	\$19.41	\$112.41
Irrigation Labor	1.50	hrs	\$16.14	\$24.20
Sorting/Pickers Labor	2.50	hrs	\$12.68	\$31.69
Truck Driver Labor	5.00	hrs	\$17.86	\$89.32
General Labor	3.50	hrs	\$16.14	\$56.47
Total General, Equipment & Harvest Labor				\$314.09
Storage & Packing :				
Bin Rental	1,600.00	50# sacks	\$0.50	\$800.00
Packing	1,440.00	50# sacks	\$3.50	\$5,040.00
Storage and Packing Subtotal				\$5,840.00
Other (Fees and Insurance):				
Crop Insurance	1	acre	\$84.00	\$84.00
Assessments	1,440	50# sacks	\$0.025	\$36.00
GAP Audit	1	acre	\$10.00	\$10.00
Subtotal Fees				\$130.00
Subtotal Variable Costs				\$9,346.74
Interest on Operating Capital				\$292.09
Total Operating Costs				\$9,638.82

Appendix A Table 1 (Continued) Cost of Production with Storage and Packing, **Marketable Yields**

Fixed Costs			
Depreciation, Interest, Housing & Insurance On Equipment			\$576.26
Land	1.00	\$367.00	\$367.00
Management			\$222.06
Overhead			\$240.97
Total Fixed Costs			\$1,406.29
Total Operating and Fixed Costs			\$11,045.11
Returns over operating Costs			\$1,615.21
Returns over Fixed Costs			\$208.92
Operating Cost Per (paid 50 # sack)			\$6.69
Total Cost per (paid 50# sack)			\$7.67
	-		+
Price	5%	Paid Yield	5%
Breakeven Yield 50# sack	1368	1440	1512
Operating Cost 50# sack	\$7.05	\$6.69	\$6.37
Ownership Cost 50 # sack	\$1.03	\$0.98	\$0.93
TC	\$8.07	\$7.67	\$7.30
		Price	
Yield	\$7.42	\$7.82	\$8.21
Operating Cost 50# sacks	1298	1233	1175
Ownership Cost 50# sacks	189	180	171
TC	1488	1413	1346

AppendixB. Table 1 **Field Run** Cost of Production with Storage NO Packing Charge

	Quantity	Unit	Price	\$/acre
Field Run Yield	800	cwt	\$7.35	\$5,880.00
Seed				
Seed	0.33	pail	\$1,725.00	\$569.25
Subtotal Seed				\$569.25
Fertilizer:				
Dry Nitrogen - Pre-plant	50	lb	\$0.50	\$25.00
Dry P2O5	115	lb	\$0.57	\$65.55
Micronutrients/Sulfuric Acid	1	acre	\$25.00	\$25.00
K2O	100	lb	\$0.40	\$40.00
Liquid Nitrogen	100	lb	\$0.50	\$50.00
				\$205.55
Plant Protection:				
Chloripicrin	4.0	gal	\$75.00	\$300.00
Roundup Power Max	16.0	fl oz	\$0.20	\$3.20
Prowl H2O (2x)	2.5	pint	\$6.25	\$15.63
Buctril 2EC	1.5	pint	\$6.87	\$10.31
Poast 1.5EC	1.0	pint	\$16.25	\$16.25
Adjuvants (5X)	5.0	pint	\$2.00	\$10.00
Dual II Magnum 7.64EC	1	pint	\$12.50	\$12.50
Goal 2XL	0.5	pint	\$10.62	\$5.31
Radiant (2x)	16	fl oz	\$6.60	\$105.60
Lannate LV (2x)	6	pint	\$10.75	\$64.50
Movement (2X)	10	fl oz	\$10.93	\$109.30
AZA-Direct	16	fl oz	\$1.67	\$26.72
M-Pede	1	qt	\$13.75	\$13.75
Bravo Weatherstik	3	pt	\$8.00	\$24.00
Dithane 75DF Rainshield	2.4	quarts	\$10.50	\$25.20
Quadris	15	fl oz	\$1.64	\$24.60
Pristine	16	fl oz	\$3.55	\$56.80
Chlorine Dioxide (drip lines)	1	gal	\$40.00	\$40.00
MH30 Sprout Inhibitor	1.33	gal	\$25.00	\$33.25
				\$896.91
Custom & Consultants:				
Custom Fertilize	2	acre	\$10.00	\$20.00
Custom Fumigate - Deep	1	acre	\$42.50	\$42.50
Hand Weed	3	acre	\$125.00	\$375.00
Soil Testing	1	acre	\$5.00	\$5.00
				\$442.50
Irrigation				
Irrigation Fuel pump (diesel)	20.01	gal	\$1.95	\$39.02
Irrigation Repair (pump)	1.00	ac	\$5.00	\$5.00
Drip Tape/Supplies	1.00	ac	\$250.00	\$250.00
Irrigation Set-up/Removal Labor	8.00	hrs	\$17.10	\$136.80
Drip Tape recycling/haul away	1.00	ac	\$10.00	\$10.00
Total Irrigation				\$440.82
Machinery				
Equipment Fuel	43.38	gal	\$1.95	\$84.59
Road Gas	2.00	gal	\$2.60	\$5.20
Road Diesel	3.00	gal	\$3.00	\$9.00
Repairs	1.00	acre	\$81.71	\$81.71
Lube				\$14.82
Fuel for Hauling	150.00	gal	\$1.95	\$292.50
Total Fuel, Lube, Repairs				\$487.82
Labor				
Equipment Labor	5.79	hrs	\$19.41	\$112.41
Irrigation Labor	1.50	hrs	\$16.14	\$24.20
Sorting/Pickers Labor	2.50	hrs	\$12.68	\$31.69
Truck Driver Labor	5.00	hrs	\$17.86	\$89.32
General Labor	3.50	hrs	\$16.14	\$56.47
Total General, Equipment & Harvest Labor				\$314.09
Storage :				
Bin Rental	800.00	cwt	\$1.00	\$800.00
Storage subtotal				\$800.00
Other (Fees and Insurance):				
Crop Insurance	1	acre	\$84.00	\$84.00
Assessments	800	cwt	\$0.05	\$40.00
GAP Audit	1	acre	\$10.00	\$10.00
Subtotal Fees				\$134.00
Subtotal Variable Costs				\$4,290.94
Interest on Operating Capital				\$134.09
Total Operating Costs				\$4,425.03

Appendix B. Table 1 Continued **Field Run** Cost of Production with Storage NO Packing Charge

Fixed Costs			Per Acre
Depreciation, Interest, Housing & Insurance On Equipment			\$576.26
Land	1.00	\$367.00	\$367.00
Management			\$221.25
Overhead			\$110.63
Total Fixed Costs			\$1,275.14
Total Operating and Fixed Costs			\$5,700.17
Returns over operating Costs			\$1,454.97
Returns over Fixed Costs			\$179.83
Operating Cost (per cwt)			\$5.53
Total Cost per (cwt)			\$7.13
	-		+
Price	5%	Yield	5%
Breakeven Yield (Per Cwt)	760	800	840
Operating Cost (per cwt)	\$5.82	\$5.53	\$5.27
Ownership Cost (Per Cwt)	\$1.68	\$1.59	\$1.52
TC	\$7.50	\$7.13	\$6.79
		Price	
Yield	\$6.98	\$7.35	\$7.72
Operating Cost (Per Cwt)	634	602	573
Ownership Cost (Per Cwt)	183	173	165
TC	816	776	739

Appendix C. Machinery Complement and Replacement Value Treasure Valley Onion Production

Machinery Complement Treasure Valley Onion Production	
<u>Tractors</u>	<u>Replacement Value</u>
Wheel Tractor 75 HP	\$47,000.00
Wheel Tractor 200 HP	\$157,000.00
Wheel Tractor 160 HP	\$131,000.00
Wheel Tractor 250 HP	\$230,000.00
<u>Tillage</u>	
Landplane	\$15,561.00
Groundhog (Roller Harrow)	\$25,447.50
Spike Harrow	\$1,053.00
Chisel Plow	\$36,000.00
Offset Disk	\$25,740.00
Cultivator	\$12,285.00
Bedder	\$4,095.00
<u>Trucks/Pickups</u>	
Truck w/ box	\$104,500.00
Service Truck	\$35,100.00
Pickup	\$56,628.00
Pickup	\$35,392.50
4 wheeler	\$7,722.00
Sprayer Self Propelled	\$169,000.00
<u>Other Equipment</u>	
<u>8-row (4 bed) planter + 4 bed drip tape installation equipment</u>	\$58,930.00
Rod Lifter	\$6,084.00
Center Breaker	\$2,925.00
Tape Puller	\$8,000.00
Tape Winder	\$13,000.00
Layflat Deck	\$12,000.00
<u>Harvester</u>	
4 bed Topper/Loader	\$175,000.00

Appendix D Schedule of Operations Treasure Valley Onion Production

Operation	Tooling
Disk 2X	15 ' Offset Disk + 160 HP WT
Fertilize 2X	Custom
Plow	20 ' Chisel Plow+ 200 HP WT
Groundhog 2X	Roller Harrow 12'+160 HP WT
Landplane	16' Landplane +200 HP WT
Fumigate/bed	Custom
Harrow 2X	20' Spike Harrow +200 HP WT
Plant/Install Drip Tape	4 bed planter w/Drip Installation Equip +250 HP WT
Cultivate 3X	4 bed cultivator + 160 HP WT
Spray (Weeds, Thrips, Fungicides) 12X	Self Propelled Sprayer
Lift Drip Tape	Tape Lifer +250 HP WT
Roll Tape	Tape Roller +200 HP WT
Roll Layflat	Layflat Deck +200 HP WT
Break Centers	Center Breaker +75 HP WT
Lift Onions 2X	Onion Rod Lifter +75 HP WT
Harvest	4 Bed Topper/Loader + 250 HP WT
Haul Onions	10 Wheeler

References

Idaho State Legislature revenue and taxation committee <https://legislature.idaho.gov/wp-content/uploads/sessioninfo/2019/legislation/H0087.pdf>

State of Oregon personal property assessment and taxation <https://www.oregon.gov/DOR/programs/property/Pages/personal-property.aspx>

U.S. Energy Information Administration https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMA_EPD2D_PWG_NUS_DPG&f=M

US Department of Labor Adverse Effect Wage Rates https://www.foreignlaborcert.doleta.gov/pdf/AEWR/AEWR_Map_2019.pdf

United States Department of Agriculture Agricultural Marketing Service <https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice>

United States Department of Agriculture Farm Labor Report https://www.nass.usda.gov/Publications/Todays_Reports/reports/fmla0519.pdf

United States Department of Agriculture Vegetable Summary Report <https://downloads.usda.library.cornell.edu/usda-esmis/files/02870v86p/gm80j322z/5138jn50j/vegean19.pdf>