UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES
UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

2023
SAMPLE COSTS TO PRODUCE
ONIONS
For Dehydrating

INTERMOUNTAIN REGION
TULELAKE & KLAMATH BASINS

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES

Sample Costs to Produce Onions for Dehydrating

In the Tulelake-Klamath Basin of the Intermountain Region-2023

STUDY CONTENTS

INTRODUCTION

The sample costs to produce onions for dehydrating in the Klamath Basin of the Intermountain Region are presented in this study. The study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. The practices described are based on production procedures considered typical for this crop and area but will not apply to every situation. Sample costs for labor, materials, equipment, and custom services are based on current figures. A "*Your Cost*" column in Tables 1 and 2 is provided for you to enter your costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Paul Long, Department of Agricultural and Resource Economics, University of California, Davis at 530-752-4651 or pmlong@ucdavis.edu You may also contact Rob Wilson at your local extension office at 530-667-5117 or rgwilson@ucanr.edu , http://ucanr.edu/sites/Intermountain_REC/.

Sample Cost of Production studies for many commodities are available and can be down loaded from the Department website, http://coststudies.ucdavis.edu. Archived studies are also available on the website.

Costs and Returns Study Program/Acknowledgements. A cost and return study is a compilation of specific agricultural crop data collected from the region where the study is based. The authors thank the farmer cooperators and the industry representatives who provided information, assistance, and expert advice. The University of California, Division of Agriculture and Natural Resources (UCANR) is an equal opportunity provider.

ASSUMPTIONS

The following assumptions pertain to sample costs to produce onions for the dehydration market in the Tulelake and Klamath Basin of the Intermountain Region. Practices described should not be considered recommendations by the University of California, but represent production procedures considered typical for this crop and area. Some of the costs and practices may not be applicable to your situation or used during every production year. Other practices not indicated may be needed. Cultural practices and costs to produce onions will vary by grower and region, and can be significant. The practices and inputs used in this cost study serve as a sample or guide, only. The costs are presented on an annual, per acre basis. **The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products.**

Farm. This report is based on a hypothetical 1,500-acre farm. Onions are grown on 200 acres of which the grower rents. The whole 1,500-acre farm has 50 acres in roads, irrigation systems, farmstead, and unused or unusable land.

Typically, a grower with this amount of onion acreage will have several non-adjacent fields and the cultural practices may vary among fields. Additionally, extra costs may be involved for moving equipment between fields, but are not included in the study. Other crops that might be grown in rotation with the onions include potatoes, small grains, and alfalfa. In this report, practices completed on less than 100 percent of the onion acres are denoted as a percentage of the total onion crop acreage.

Buffer Area. Leased ground on Federal Wildlife Refuge requires a 60-foot buffer between the crop and adjacent land. Privately-owned land needs a buffer zone of 25 feet. Just over 2.5 acres are in the buffer zone and are part of the 50 acres of unused land. No chemicals are used in this portion of the field. The buffer zone is disced twice, seeded with wheatgrass using a grain drill, and irrigated with sprinklers. The buffer area is assumed to be 1 percent of the onion acreage.

CULTURAL PRACTICES AND MATERIAL INPUTS

Land Preparation. It is assumed that the ground planted to the onion crop is coming out of rotation with another crop. Land preparation begins by plowing 80 percent of the acreage in the fall. One-half of the ground is chiseled and 60 percent of the ground is ripped 1.5 times. The ground is rotospiked 1.5 times, prior to pulling the beds. Once the beds are shaped and planted, solid set sprinklers are placed in the field.

Irrigation. Irrigation water cost is composed of a mix of 50 percent ground and 50 percent surface water. Growers with surface water use a portable pump with a diesel engine and fuel tank that is placed along a canal to move the water to the solid set pipes. The well pump lifts the groundwater and another pump pressurizes the water to adequate pressure for solid-set sprinklers. Onions are irrigated for six months after planting (April through September). A total of 33.36 acre-inches of water, at a cost of 12.00 an acre inch (Acin), are sprinkled on during the growing season with additional water applied to the buffer area and pre-plant. Most fertilizers and pesticides are applied via chemigation through the sprinklers. Prior to harvest all irrigation equipment is removed from the fields.

Fertilization. A mixed preplant fertilizer (APS) with other nutrients is custom applied in April when the beds are shaped. Nitrogen and phosphorus are put directly into the beds prior to planting. Liquid fertilizers are applied through the sprinklers during irrigation. Ammonium sulfate (21-0-0-24%S) is

applied as a top-dress to the onions.

Planting. Onion bulbs are provided by the processor and are treated with a fungicide. A granular pesticide (Lannate) to manage maggots and a fungicide (Fontelis at 24FlOz/Acre) to control onion rot are applied at planting. Grower's plant four lines of onions on 36 inch-beds using a six-row vacuum planter.

Pest Management. The pesticides and rates mentioned in this cost study are listed in; *Integrated Pest Management for Onions and UC Pest Management Guidelines, Onions*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. **Although growers commonly use the pesticides mentioned, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** For information and pesticide use permits, contact the local county agricultural commissioner's office. Pesticides with different active ingredients, mode of action, and sites of action should be rotated as needed to combat species shift and resistance. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study.

All pesticides are applied by chemigation and/or by air. Some pesticides are mixed and applied together during the same application and some are applied multiple times during the growing season.

Weeds. Weeds are managed with herbicides, mechanical removal, and hand weeding. Roundup is applied at 2 pints per acre by air, shortly before crop emergence. This study assumes that two hand weeding's (total of 15 hours per acre) will be needed to manage weed escapes for the growing season. Goal 2XL, Prowl H2O, and Outlook are chemigated between the 2-leaf and 4-leaf stage to control weed seedlings. Fusilade DX is applied by air in June or July to control grass weeds.

Insects. At planting a granular insecticide (Lannate 15G) is used to control seed and seedling insects. Insecticides such as AgriMek, Movento and Radiant SC are chemigated and/or air applied to manage insects during the growing season.

Diseases. Fontelis, a fungicide, is applied at planting to control onion rot. Fungicides such as Bravo, Quadris, Luna Experience and Manzate are applied via chemigation and/or by air from May through September.

Endangered Species. It is important to know if your farm is located in an area where endangered or threatened species reside. PRESCRIBE is an online database application to allow pesticide applicators to learn if endangered species are in the vicinity of an application site, and the use limitations applicable to the pesticide product(s) they intend to use. The database is implemented by the California Department of Pesticide Regulation. https://www.cdpr.ca.gov/docs/endspec/prescint.htm

Harvest. After sprinkler pipe removal the sides of the beds are cut away by a side cutter to lessen the amount of dirt and trash (onion tops/leaves in the furrow) put through the harvester. The tops of the onions are cut by a flail mower 2.5 times to reduce the vegetation for the harvester and then rolled. Two passes are made with mechanical onion diggers. The first pass is with a large horsepower tractor and a 4-row digger that places the onions on top of the beds while it simultaneously windrows them. In the second pass a four-row digger/lifter picks up the onions and conveys them by a belt to a trailer pulled by a tractor. Two trailers support the harvester. A crew on the digger sorts the onions, pulling out clods and rot.

Growers may choose to own harvesting equipment, purchased either new or used, or hire a custom harvester. In this Study we assume grower owns their own harvesting equipment. Many factors are important in deciding which harvesting option a grower uses.

Transportation. The grower transports the onions from the harvester to the field's edge. Hauling onions from the field over the road is the responsibility of the dehydrating company.

Yields. The crop yield used in this study is 465 hundredweight (cwt) per acre. Yields have varied over the years in the Tulelake Basin of the Intermountain Region.

Revenue. A current selling price of $12.00 per cwt of fresh onions is used to estimate market income. In this study, growers are paid an additional incentive of $0.50 per cwt for quality.

Assessments: In the Tulelake area, onion growers pay three assessments. A $0.00625 per cwt charge supports garlic and onion research done by the California Garlic and Onion Research Board. Tulelake Growers Association assesses its members $2.50 per acre. Additionally, an inspection fee of $7.50 per acre is charged for any onion transported over the highway.

LABOR EQUIPMENT AND INTEREST

Labor. Labor rates of $30.13 per hour for machine operators and $24.25 for non-machine workers includes payroll overhead of 47 percent. The basic hourly wages are $20.50 for machine operators and $16.50 for non-machine labor. The overhead includes the employer's share of federal and California state payroll taxes, workers' compensation insurance for field crops and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of May 2023. Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $4.10 and $3.70 per gallon, respectively. The costs are based on May 2023 average prices from the Energy Information Administration, Department of Energy (DOE) weekly data.

Fuel Lube & Repair. The fuel, lube, and repair costs per acre for each operation in Table 1 are determined by multiplying the total hourly operating cost in Table 5 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10 percent higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs calculated monthly until harvest at a nominal rate of 8.50 percent per year. It is assumed that all cash operations are financed. A nominal interest rate is the typical market cost of borrowed funds. Any post-harvest costs of operations are discounted back to the harvest month using a negative interest charge. Rate is typical lending rate for a basic loan as reported by a local farm lending agency as of May 2023.

Risk. The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real-world practices, it cannot fully

represent financial, agronomic and market risks, which affect profitability and economic viability of producing processing onions. Because of so many potential risk factors, effective risk management must combine specific tactics in a detailed manner, in various combinations for a sustainable operation.

CASH OVERHEAD

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, rents, and investment repairs. Cash overhead costs are included in Tables 1, 2, 3 and 4.

Property Taxes. Counties charge a base property tax at the rate of 1 percent on the assessed value of the property including land, equipment, buildings, and improvements. In some counties, special assessment districts exist and charge additional taxes on property. For this study, county taxes are calculated as 1 percent of the average value of the property.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage.

Property Insurance. Property insurance provides coverage for property loss and is charged at 0.843 percent of the average value of the assets over their useful life.

Liability Insurance. A standard farm liability insurance policy will help cover the expenses for which you become legally obligated to pay for bodily injury claims on your property and damages to another person's property as a result of a covered accident. Common liability expenses covered under your policy include attorney fees and court costs, medical expenses for people injured on your property, injury or damage to another's property. In this study, liability insurance costs $1,623 for the entire farm.

Crop Insurance. This is available to growers for any unavoidable loss of production, damage or poor quality resulting from adverse weather conditions such as cool wet weather, freeze, frost, hail, heat, rain, wind and damage from birds, drought, earthquakes and fire. Coverage levels are from 50-85 percent of the approved average yield as established by verifiable production records. Actual insurance coverage is by unit, not by acre. Due to variability in coverages no level is specified in this study.

Office Expense. Office and business expenses are estimated at $75 per acre. These expenses include office supplies, telephones, bookkeeping, accounting and legal fees, road maintenance, and miscellaneous business expenses.

Regulatory Compliance. A set rate of 55.00 per acre is set for all regulatory costs, and fees assessed to the grower by compliance agencies.

Field Supervisors' Salary. Supervisor salaries for the entire farm, including insurance, payroll taxes, and benefits, and are $85,285 per year for two supervisors. Onions comprise 13 percent of the land and the same percentage is used to allocate salary cost to Onions. The costs are $11,087 for 200 acres or $55.44 per acre. Any revenue above total costs are considered returns on risk and investment to management (or owners).

Pickup/ATV. The pickup is for farm use, transporting workers, picking up supplies and moving equipment. The ATV is used for irrigating and checking crops.

Land Rent. In this region land rent ranges from $350 to $700 per acre are with surface water attached to the land, but the water is not paid for by the landowner. The cost of the water is paid by the grower renting the land. For this study, the grower rents 200 acres and pays $550 per rented producing acre to the landlord.

GPS Auto-Trac. An annual activation fee is charged for Auto-trac service that controls the GPS systems mounted in tractors.

Investment Repairs. Annual cash maintenance or repair costs are associated with investments under non-cash overhead. Repairs to the fuel tanks and pumps, shop building, shop tools, irrigations system, tool carrier, and fuel wagon are calculated at 2 percent of new cost distributed over the investment life.

NON-CASH OVERHEAD

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. This study shows the current purchase price for new equipment and then adjusts the price to 60 percent of new cost to indicate a mix of new and used equipment.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). Put another way, it is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The calculation for the annual capital recovery costs is as follows: ((Purchase Price-Salvage Value) x (Capital Recovery Factor)) + (Salvage Value x Interest Rate).

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear-out life, as given by ASABE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is equal to the purchase price because land does not depreciate. The purchase price and salvage value for certain equipment and investments are shown in Table 5.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 7.00 percent is used to calculate capital recovery cost is the effective long term interest rate in May 2023. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Irrigation Pipe. The irrigation system in this study is a canal with a portable powered low lift pump that pumps the water into the irrigation pipes and sprinklers. The irrigation pipe and all of the needed parts for a solid set system are owned by grower.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60 percent to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Tables 5 and 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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TABLE 1. COSTS PER ACRE TO PRODUCE ONIONS-DEHYDRATED

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

		Cash and Labor Costs per Acre						
Operation	Time (Hrs/Ac)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Pre-plant:								
Plow 80% Ac	0.19	6.15	8.90	2.88	0.00	0.00	17.92	
Chisel 50% Ac	0.66	22.30	23.52	15.48	0.54	0.00	61.84	
Sub-Soil 1.5X 60% Ac	0.50	16.45	23.25	8.81	0.00	0.00	48.51	
List Beds/Fertilize	0.19	6.15	7.79	3.40	132.00	0.00	149.33	
Fertilize	0.00	0.00	0.00	0.00	89.20	0.00	89.20	
Rotospike/Shape Beds 1.5X	0.28	9.04	11.45	7.16	0.00	0.00	27.65	
Roll Beds 2X	0.24	7.95	7.20	1.98	0.00	0.00	17.13	
Irrigate-Setup SS Sprinkler	0.19	12.21	2.82	0.55	0.00	0.00	15.59	
TOTAL PRE-PLANT COSTS	2.23	80.24	84.94	40.25	221.74	0.00	427.17	
Cultural:								
Plant Onions/Pesticide	0.53	8.68	14.13	10.36	60.48	0.00	93.65	
Irrigate	0.00	5.09	0.00	0.00	328.32	0.00	333.41	
Weeds-Pre-Emergence	0.00	0.00	0.00	0.00	5.50	30.00	35.50	
Chemigate-Herbicides	0.00	0.73	0.00	0.00	104.72	0.00	105.45	
Weeds-Hand Hoe 2x	0.00	363.75	0.00	0.00	0.00	0.00	363.75	
Fertigate-Uan32/Aps	0.00	0.73	0.00	0.00	89.60	0.00	90.33	
Cultivate	0.59	19.50	17.64	22.25	0.00	0.00	59.39	
Weeds-Post-Emergence	0.00	0.00	0.00	0.00	0.00	30.00	30.00	
Fertilize-Top Dress	0.42	6.87	8.70	4.84	344.00	0.00	364.42	
Chemigate-Insect	0.00	0.00	0.00	0.00	10.11	0.00	10.11	
Insecticide	0.00	0.00	0.00	0.00	20.22	0.00	20.22	
Insects-Air/App 2x	0.00	0.00	0.00	0.00	79.22	30.00	109.22	
Spray	0.00	0.00	0.00	0.00	79.22	30.00	109.22	
Disease-50%Air50%Chem	0.00	0.00	0.00	0.00	16.72	0.00	16.72	
Spray	0.00	0.00	0.00	0.00	41.48	15.00	56.48	
Chemigate-Disease/Insect	0.00	0.73	0.00	0.00	44.40	0.00	45.13	
Take Out Pump & Pipe	3.30	466.16	49.83	22.48	0.00	0.00	538.46	
Cut Bed Sides	0.27	8.74	9.49	6.55	0.00	0.00	24.78	
Pickup 1/2 Ton	1.10	36.16	12.21	2.71	0.00	0.00	51.07	
ATV Use	0.74	24.22	2.73	1.12	0.00	0.00	28.07	
TOTAL CULTURAL COSTS	6.94	941.34	114.74	70.30	1223.99	135.00	2485.38	
Harvest:								
Top Onions 2.5x	0.35	11.57	12.56	4.94	0.00	0.00	29.07	
Roll Onions-Crop	0.19	6.15	2.82	0.75	0.00	0.00	9.72	
Dig/Lift/Windrow Onions	0.58	19.16	27.74	11.20	0.00	31.50	89.61	
Harvest Onions	0.58	19.16	27.74	10.88	0.00	31.50	89.28	
Sort Onions	0.00	24.25	0.00	0.00	0.00	140.00	164.25	
Field Haul Onions	1.10	181.66	42.53	10.73	0.00	0.00	234.92	
Assessments	0.00	0.00	0.00	0.00	12.10	0.00	12.10	
Inspection Fee	0.00	0.00	0.00	0.00	7.50	0.00	7.50	
TOTAL HARVEST COSTS	2.81	261.95	113.41	38.50	19.60	203.00	636.45	
Interest on Operating Capital at 8.5%							65.02	
TOTAL OPERATING COSTS/ACRE	11.98	1283.53	313.08	149.05	1465.33	338.00	3614.02	

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TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE ONIONS-DEHYDRATED

INTERMOUNTAIN REGION- TULELAKE BASIN 2023

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Onions	465	Cwt	12	5580	
Quality Incentive	465	Cwt	0.5	232.5	
TOTAL GROSS RETURNS				5812.5	
OPERATING COSTS					
Herbicide				**86.22**	
Roundup PowerMax	2	Pint	2.75	5.50	
Goal 2XL	10.5	FlOz	1.08	11.34	
Prowl H2O	3	Pint	8.01	24.03	
Outlook	20.9	Oz	1.457	30.45	
Fusilade DX	10	FlOz	1.49	14.90	
Fungicide				**138.90**	
Fontelis	21	Floz	2.88	60.48	
Bravo Weatherstik	3	Pint	6.74	20.22	
Quadris	8	FlOz	2.09	16.72	
Manzate-Flowable	3	Pint	3	9.00	
Luna Experience	8	FlOz	4.06	32.48	
Insecticide				**188.95**	
Lannate LV	3	Pint	6.74	20.22	
Movento	10	FlOz	6.88	68.80	
Radiant SC	12	Oz	7.47	89.64	
AgriMek	3	FlOZ	3.43	10.29	
Custom				**338.00**	
Application Air 10G	4.5	Acre	30	135.00	
Dig/Lift/Windrow Onions	0.63	Acre	50	31.50	
Harvest Onions	0.63	Acre	50	31.50	
Sort Onions	1	Acre	140	140.00	
Fertilizer				**618.80**	
16-20-0-24% S	80	Lb	1.65	132.00	
10-34-0	40	Gal	2.23	89.20	
UN-32	50	Lb	0.58	29.00	
APS	10	Gal	2.46	24.60	
21-0-0-24	400	Lb	0.86	344.00	
Seed				**0.18**	
Wheat Grass	0.14	Lb	1.3	0.18	
Assessment				**19.60**	
CPRAB	480	Cwt	0.02	9.60	
Tulelake Growers Associatio	1	Acre	2.5	2.50	
Inspection Fee	1	Acre	7.5	7.50	
Irrigation				**412.68**	
Water-Pumped	34.39	AcIn	12	412.68	
Labor				**1283.53**	
Equipment Operator	12.55	Hr	30.13	378.28	
Irrigation	15.08	Hr	24.25	365.69	
Non-Machine	22.25	Hr	24.25	539.56	
Machinery				**463.37**	
Fuel-Diesel	72.72	Gal	4.1	298.15	
Fuel-Gas	4.04	Gal	3.7	14.94	
Lube				46.96	
Machinery Repair				103.32	
Interest on Operating Capital 8.50%				65.05	
TOTAL OPERATING COSTS/ACRE				3615.29	
TOTAL OPERATING COSTS/CWT				7.77	
NET RETURNS ABOVE OPERATING COSTS				2197.21	

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TABLE 2. CONTINUED COSTS AND RETURNS PER ACRE TO PRODUCE ONIONS-DEHYDRATED

INTERMOUNTAIN REGION- TULELAKE BASIN 2023

Cash Overhead Costs	
Land Rent-Onions	550.00
Field Sanitation	2.00
Field Supervisor Salary	55.44
GPS Auto-TracActivation	2.33
Liability Insurance	1.08
Regulatory Compliance	55.00
Office Expense	75.00
Investment Repairs	4.46
Property Insurance	0.76
TOTAL CASH OVERHEAD COSTS/ACRE	746.07
TOTAL CASH OVERHEAD COSTS/CWT	1.60
TOTAL CASH COSTS/ACRE	4361.36
TOTAL CASH COSTS/CWT	9.38
NET RETURNS ABOVE CASH COSTS	1451.14
Non-Cash Overhead Costs (Capital Recovery)	
Building 2400 sq ft	1.43
Fuel Tanks 2-500, 1000 gal	1.35
Pipe Trailer (10)	3.15
Booster Pumps (125 HP x 2)	3.59
Semi-Truck & Lowbed	6.86
Implement Carrier	1.18
GPS Guidence System	0.77
Shop Tools	1.23
Solid Set/pump/main line	4.44
Equipment	132.77
TOTAL NON-CASH OVERHEAD COSTS/ACRE	156.75
TOTAL NON-CASH OVERHEAD COSTS/CWT	0.337
TOTAL COSTS/ACRE	4518.11
TOTAL NON-CASH COSTS/CWT	9.716
NET RETURNS ABOVE TOTAL COSTS	1294.39

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE ONIONS-DEHYDRATED

INTERMOUNTAIN REGION - TULELAKE BASIN

Operation	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Total
Pre-plant:													
Plow 80% Ac	18												17.97
Chisel 50% Ac						62							62.08
Sub-Soil 1.5X 60% Ac						49							48.58
List Beds/Fertilize						149							149.33
Fertilize						89							89.20
Rotospike/Shape Beds 1.5X						28							27.55
Roll Beds 2X						17							17.16
Irrigate-Setup SS Sprinkler						16							15.60
TOTAL PRE-PLANT COSTS	18					410							427.48
Plant Onions/Pesticide						94							93.77
Irrigate						127	34	25	73		74		333.41
Weeds-Pre-Emergence						36							35.50
Chemigate-Herbicides							58	33	15				105.45
Weeds-Hand Hoe 2x								194	170				363.75
Fertigate-Uan32/Aps								90					90.33
Cultivate								60					59.73
Weeds-Post-Emergence									30				30.00
Fertilize-Top Dress									364				364.43
Chemigate-Insect									10				10.11
Insecticide									20				20.22
Insects-Air/App 2x									109				109.22
Spray											109		109.22
Disease-50%Air50%Chem										17			16.72
Spray											56		56.48
Chemigate-Disease/Insect										45			45.13
Take Out Pump & Pipe											538		538.50
Cut Bed Sides												25	24.62
Pickup 1/2 Ton												51	51.09
ATV Use												28	28.07
TOTAL CULTURAL COSTS						256	92	402	792	62	778	104	2,485.74
Top Onions 2.5x												29	29.16
Roll Onions-Crop												10	9.74
Dig/Lift/Windrow Onions												90	89.77
Harvest Onions												89	89.41
Sort Onions												164	164.25
Field Haul Onions												235	235.10
Assessments												12	12.10
Inspection Fee												8	7.50
TOTAL HARVEST COSTS												637	637.02
Interest on Operating Capital at 8.5%	0	0	0	0	0	5	5	8	13	14	19	-	65.05
TOTAL OPERATING COSTS/ACRE	18	0	0	0	0	670	97	410	806	76	797	741	3,615.29

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
TABLE 3. CONTINUED MONTHLY COSTS PER ACRE TO PRODUCE ONIONS-DEHYDRATED
INTERMOUNTAIN REGION - TULELAKE BASIN

Operation	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Total
CASH OVERHEAD													
Land Rent-Onions												550.00	550.00
Field Sanitation			2.00										2.00
Field Supervisor Salary	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	55.44
GPS Auto-TracActivation											2.33		2.33
Liability Insurance											1.08		1.08
Regulatory Compliance	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	55.00
Office Expense	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	75.00
Investment Repairs	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	4.46
Property Insurance			0.38						0.38				0.76
TOTAL CASH OVERHEAD COSTS/ACRE	15.82	15.82	18.20	15.82	15.82	15.82	15.82	15.82	16.20	15.82	19.24	565.82	746.07
TOTAL CASH COSTS/ACRE	33.92	15.95	18.33	15.95	15.95	685.99	113.21	425.55	821.72	91.53	816.65	1,306.62	4,361.36

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 4. RANGING ANALYSIS - ONIONS-DEHYDRATED

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ONIONS

	YIELD (Cwt/Acre)						
	459.00	**461.00**	**463.00**	**465.00**	**467.00**	**469.00**	**471.00**
OPERATING COSTS/ACRE:							
Pre-Plant	427	427	427	427	427	427	427
Cultural	2,486	2,486	2,486	2,486	2,486	2,486	2,486
Harvest	629	632	634	637	640	643	645
Interest on operating capital	65	65	65	65	65	65	65
TOTAL OPERATING COSTS/ACRE	3,607	3,610	3,613	3,615	3,618	3,621	3,624
TOTAL OPERATING COSTS/CWT	7.86	7.83	7.80	7.77	7.75	7.72	7.69
CASH OVERHEAD COSTS/ACRE	746	746	746	746	746	746	746
TOTAL CASH COSTS/ACRE	4,353	4,356	4,359	4,361	4,364	4,367	4,370
TOTAL CASH COSTS/CWT	9.48	9.45	9.41	9.38	9.34	9.31	9.28
NON-CASH OVERHEAD COSTS/ACRE	157	157	157	157	157	157	157
TOTAL COSTS/ACRE	4,510	4,513	4,515	4,518	4,521	4,524	4,526
TOTAL COSTS/CWT	9.83	9.79	9.75	9.72	9.68	9.65	9.61

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ONIONS

PRICE	**YIELD (Cwt/Acre)**						
$/Cwt	**459.00**	**461.00**	**463.00**	**465.00**	**467.00**	**469.00**	**471.00**
4.50	-1,542	-1,535	-1,529	-1,523	-1,517	-1,510	-1,504
7.00	-394	-383	-372	-360	-349	-338	-327
9.50	753	770	786	802	818	835	851
12.00	1,901	1,922	1,943	1,965	1,986	2,007	2,028
14.50	3,048	3,075	3,101	3,127	3,153	3,180	3,206
17.00	4,196	4,227	4,258	4,290	4,321	4,352	4,383
19.50	5,343	5,380	5,416	5,452	5,488	5,525	5,561

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ONIONS

PRICE	**YIELD (Cwt/Acre)**						
$/Cwt	**459.00**	**461.00**	**463.00**	**465.00**	**467.00**	**469.00**	**471.00**
4.50	-2,288	-2,281	-2,275	-2,269	-2,263	-2,256	-2,250
7.00	-1,140	-1,129	-1,118	-1,106	-1,095	-1,084	-1,073
9.50	7	24	40	56	72	89	105
12.00	1,155	1,176	1,197	1,219	1,240	1,261	1,282
14.50	2,302	2,329	2,355	2,381	2,407	2,434	2,460
17.00	3,450	3,481	3,512	3,544	3,575	3,606	3,637
19.50	4,597	4,634	4,670	4,706	4,742	4,779	4,815

NET RETURNS PER ACRE ABOVE TOTAL COST ONIONS

PRICE	**YIELD (Cwt/Acre)**						
$/Cwt	**459.00**	**461.00**	**463.00**	**465.00**	**467.00**	**469.00**	**471.00**
4.50	-2,444	-2,438	-2,432	-2,426	-2,419	-2,413	-2,407
7.00	-1,297	-1,286	-1,274	-1,263	-1,252	-1,241	-1,229
9.50	-149	-133	-117	-101	-84	-68	-52
12.00	998	1,019	1,041	1,062	1,083	1,104	1,126
14.50	2,146	2,172	2,198	2,224	2,251	2,277	2,303
17.00	3,293	3,324	3,356	3,387	3,418	3,449	3,481
19.50	4,441	4,477	4,513	4,549	4,586	4,622	4,658

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

ANNUAL EQUIPMENT COSTS

					Cash Overhead		
	Price	Years Life	Salvage Value	Capital Recovery	Insurance	Taxes	Total
225 Hp 4WD Tractor	245,388	15	166,864	20,299	174	2,061	22,534
200 Hp 4wd Tractor	233,353	15	-	25,611	98	1,167	26,876
175 Hp 4wd Tractor	175,833	15	119,566	14,545	125	1,477	16,147
158 Hp 4Wd Tractor	166,954	15	113,529	13,811	118	1,402	15,331
125 Hp 4wd Tractor	115,412	15	78,480	9,547	82	969	10,598
Onion Harvester	55,814	2	31,256	13,904	37	435	14,376
Onion Digger/Lifter/W	42,400	5	25,440	5,917	29	339	6,285
75 Hp 4wd Tractor	45,000	40	30,600	3,222	32	378	3,632
Planter 6 Row 18'	65,000	8	39,000	7,303	44	520	7,867
Finish Disc 28'	14,000	10	8,400	1,385	9	112	1,507
Cultivator/Fertilizer B	29,000	13	17,400	2,584	20	232	2,836
18' Rollover Plow	20,000	10	12,000	1,979	13	160	2,153
Rotospike-18'	7,500	10	4,800	720	5	62	787
Chisel- 21'	18,000	10	10,800	1,781	12	144	1,937
Flail Mower 18'	13,203	10	7,922	1,306	9	106	1,421
Bed Shaper-6 Row 18'	38,000	7	24,320	4,340	26	312	4,678
Roller- Flat- 18'	10,500	10	6,300	1,039	7	84	1,130
Saddle Tanks 300 Gall	20,176	5	12,913	2,675	14	165	2,855
Cultivator Sled 6 Row	120,000	12	72,000	11,083	81	960	12,124
15' Grain Drill	50,000	6	4,946	9,798	23	275	10,096
Subsoiler 14'	53,000	10	9,373	6,868	26	312	7,206
Pickup 1/2 ton #1	11,259	10	7,656	1,049	8	95	1,151
Lister- 6 Row 18'	9,500	10	5,700	940	6	76	1,022
Side Cutter 6 Row 18'	33,309	10	21,318	3,200	23	273	3,496
#1 ATV	13,054	5	8,877	1,640	9	110	1,759
Pipe Trailer	10,250	4	6,560	1,549	7	84	1,640
Total	1,615,905		846,019	168,097	1,038	12,310	181,445
60% of New Cost*	969,543		507,611	100,858	623	7,386	108,867

*Used to reflect a mix of new and used equipment

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 5. CONTINUED WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Investment	Price	Years Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
Building 2400 sq ft	25,000	25	-	2,145	11	125	500	2,781
Fuel Tanks 2-500, 1000 gal	21,950	20	2,195	2,018	10	121	439	2,588
Pipe Trailer (10)	35,000	10	3,500	4,730	16	193	700	5,639
Booster Pumps (125 HP x 2)	39,838	10	3,984	5,384	18	219	797	6,418
Semi-Truck & Lowbed	95,000	15	3,617	10,287	42	493	1,900	12,721
Implement Carrier	16,700	15	1,670	1,767	8	92	334	2,201
GPS Guidence System	8,500	10	850	1,149	4	47	170	1,369
Shop Tools	20,000	20	2,000	1,839	9	110	400	2,358
Solid Set/pump/main line	72,404	20	7,240	6,658	34	398	1,448	8,538
Total Investment	334,392		25,056	35,976	152	1,797	6,688	44,613

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/Farm	Units	Price/Unit	Total
Land Rent-Onions	200	Acre	550	110,000
Field Sanitation	1,500	Acre	2	3,000
Field Supervisor Salary	1,500	Acre	55	83,160
GPS Auto-TracActivation	1,500	Acre	2	3,500
Liability Insurance	1,500	Acre	1	1,623
Regulatory Compliance	1,500	Acre	55	82,500
Office Expense	1,500	Acre	75	112,500

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 6. HOURLY EQUIPMENT COSTS

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

			HOURLY EQUIPMENT COSTS						
				Cash Overhead		Operating			
Description	Total Hours Used	Onions Hours Used	Capital Recovery	Insurance	Taxes	Lube and Repairs	Fuel	Total Operating	Total Costs/Hr
225 Hp 4WD Tractor	1066	93	11.43	0.10	1.16	13.92	53.54	67.46	80.14
200 Hp 4wd Tractor	1066	315	14.42	0.06	0.66	12.74	47.59	60.33	75.46
175 Hp 4wd Tractor	1066	304	8.19	0.07	0.83	10.47	41.64	52.11	61.20
158 Hp 4Wd Tractor	1066	234	7.77	0.07	0.79	9.36	35.69	45.05	53.68
125 Hp 4wd Tractor	1066	253	5.37	0.05	0.55	7.23	29.74	36.98	42.94
Onion Harvester	1066	106	7.83	0.02	0.25	6.75	-	6.75	14.84
Onion Digger/Lifter/Windrow	400	106	8.88	0.04	0.51	7.42	-	7.42	16.85
75 Hp 4wd Tractor	400	735	4.83	0.05	0.57	3.04	15.10	18.14	23.59
Planter 6 Row 18'	200	48	21.91	0.13	1.56	19.92	-	19.92	43.52
Finish Disc 28'	200	29	4.16	0.03	0.34	2.24	-	2.24	6.76
Cultivator/Fertilizer Bar6 Row	150	38	10.34	0.08	0.93	5.60	-	5.60	16.94
18' Rollover Plow	200	34	5.94	0.04	0.48	3.20	-	3.20	9.66
Rotospike-18'	200	54	2.16	0.02	0.18	3.63	-	3.63	5.99
Chisel- 21'	200	12	5.34	0.04	0.43	3.77	-	3.77	9.58
Flail Mower 18'	200	64	3.92	0.03	0.32	5.41	-	5.41	9.67
Bed Shaper-6 Row 18'	300	50	8.68	0.05	0.62	16.73	-	16.73	26.08
Roller- Flat- 18'	200	78	3.12	0.02	0.25	1.19	-	1.19	4.58
Saddle Tanks 300 Gallons	400	120	4.01	0.02	0.25	8.44	-	8.44	12.73
Cultivator Sled 6 Row	400	108	16.62	0.12	1.44	33.94	-	33.94	52.12
15' Grain Drill	400	79	14.70	0.03	0.41	23.39	-	23.39	38.54
Subsoiler 14'	150	37	27.47	0.11	1.25	10.59	-	10.59	39.41
Pickup 1/2 ton #1	200	220	3.15	0.02	0.28	2.47	11.10	13.57	17.03
Lister- 6 Row 18'	200	0	2.82	0.02	0.23	1.95	-	1.95	5.02
Side Cutter 6 Row 18'	200	48	9.60	0.07	0.82	16.12	-	16.12	26.60
#1 ATV	400	147	2.46	0.01	0.16	1.52	3.70	5.22	7.86
Pipe Trailer	500	600	1.86	0.01	0.10	4.16	-	4.16	6.13

UC COOPERATIVE EXTENSION- AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS

INTERMOUNTAIN REGION - TULELAKE BASIN 2023

Operation	Operation Month	Tractor	Implement	Labor Type	Labor Hours/Acre	Material/Custom	Rate/Acre	Unit
Plow 80% Ac	Nov	200 HP 4WD Tract	18' Rollover Plow	Machine	0.20			
Chisel 50% Ac	April	200 Hp 4wd Tracto	Chisel- 21'	Machine	0.07			
Buffer: Disc	April	200 Hp 4wd Tracto	Finish Disc 28'	Machine	0.17			
Sub-Soil 1.5X 60% Ac	April	225 HP 4WD Tract	Subsoiler 14'	Machine	0.22		0.3	
Roto-Spike 1.5X	April	175 Hp 4wd Tracto	Rotospike-18'	Machine	0.32		0.32	
List Beds/Fertilize	April	175 Hp 4wd Tracto	Saddle Tanks 300 Gallons	Machine	0.20	16-20-0-24% S	80	Lb
Fertilize	April		Lister- 6 Row 18'			10-34-0	40	Gal
Rotospike/Shape Beds 1.5)	April	175 Hp 4wd Tracto	Bed Shaper-6 Row 18'	Machine	0.30			
Rotospike/Shape Beds 1.5)	April	175 Hp 4wd Tracto	Bed Shaper-6 Row 18'	Machine	0.30			
Irrigate-Setup SS Sprinkler	April	75 Hp 4wd Tractor		Non-Machine	0.45			
Roll Beds 2X	April	125 Hp 4wd Tracto	Roller- Flat- 18'	Machine	0.26			
Plant Onions/Pesticide	April	225 Hp 4WD Tract	Saddle Tanks 300 Gallons	Machine	0.29			
Plant Onions/Pesticide	April		Planter 6 Row 18'	Machine		Fontelis	21	Floz
Irrigate	April			Irrigation	0.03	Water-Pumped	10.5	Acln
Irrigate	May			Irrigation	0.03	Water-Pumped	1.75	Acln
Irrigate	May			Irrigation	0.03	Water-Pumped	1	Acln
Irrigate	July			Irrigation	0.03	Water-Pumped	4	Acln
Irrigate	Sept			Irrigation	0.03	Water-Pumped	6.11	Acln
Weeds-Pre-Emergence	April					Application Air 10G	1	Acre
Weeds-Pre-Emergence	April					Roundup PowerMax	2	Pint
Chemigate-Herbicides	May			Irrigation	0.03	Water-Pumped	2	Acln
Herbicide	May					Goal 2XL	5.25	FlOz
Herbicide	May					Prowl H2O	1.5	Pint
Herbicide	June					Goal 2XL	5.25	FlOz
Herbicide	June					Prowl H2O	1.5	Pint
Herbicide	June					Outlook	10.45	Oz
Fertigate-Uan32/Aps	June			Irrigation	0.03	Water-Pumped	3	Acln
Fertilizer	June					UN-32	50	Lb
Fertilizer	June					APS	10	Gal
Cultivate	June	125 Hp 4wd Tracto	Cultivator Sled 6 Row	Machine	0.65		0.15	
Weeds-Post-Emergence	July					Application Air 10G	1	Acre
Herbicide	July					Fusilade DX	10	FlOz
Fertilize-Top Dress	July	175 Hp 4wd Tracto	Saddle Tanks 300 Gallons	Machine	0.23	21-0-0-24	400	Lb
Fertilize	July		Cultivator/Fertilizer Bar6 Rov					
Chemigate-Insect	July					Bravo Weatherstik	1.5	Pint
Irrigate	July			Irrigation	0.03	Water-Pumped	2	Acln
Insecticide	July					Lannate LV	3	Cwt
Insects-Air/App 2x	July					Application Air 10G	1	Acre
Insecticide	July					Movento	5	FlOz
Insecticide	July					Radiant SC	6	Oz
Spray	Sept					Application Air 10G	1	Acre
Insecticide	Sept					Movento	5	FlOz
Insecticide	Sept					Radiant SC	6	Oz
Disease-50%Air50%Chem	Aug					Quadris	8	FlOz
Spray	Sept					Application Air 10G	0.5	Acre
Fungicide	Sept					Manzate-Flowable	3	Pint
Fungicide	Sept					Luna Experience	8	FlOz
Chemigate-Disease/Insect	Aug					Bravo Weatherstik	1.5	Pint
Irrigate	Aug			Irrigation	0.03	Water-Pumped	2	Acln
Insecticide	Aug					AgriMek	3	FlOZ
Take Out Pump & Pipe	Sept	75 Hp 4wd Tractor	Pipe Trailer	Non-Machine	3.60			
Irrigation Labor	Sept			Irrigation	14.75			
Cut Bed Sides	Oct	158 Hp 4Wd Tracto	Side Cutter 6 Row 18'	Machine	0.29		0.13	
Pickup 1/2 Ton	Oct	Pickup 1/2 Ton #1		Machine	1.20		1.2	
ATV Use	Oct	#1 ATV		Machine	0.80		0.8	
Top Onions 2.5x	Oct	158 Hp 4Wd Tracto	Flail Mower 18'	Machine	0.38			
Roll Onions-Crop	Oct	75 Hp 4wd Tractor	Roller- Flat- 18'	Machine	0.20		0.2	
Dig/Lift/Windrow Onions	Oct	200 Hp 4wd Tracto	Onion Digger/Lifter/Windrow	Machine	0.64	Dig/Lift/Windrow Onio	0.63	Acre
Harvest Onions	Oct	200 Hp 4wd Tracto	Onion Harvester	Machine	0.64	Harvest Onions	0.63	Acre
Sort Onions	Oct			Non-Machine	1.00	Sort Onions	1	Acre
Field Haul Onions	Oct	175 Hp 4wd Tracto		Non-Machine	3.60		3	
Field Haul Onions	Oct	158 Hp 4Wd Tracto		Non-Machine	3.60		3	
Assessments	Oct					CPRAB	480	Cwt
Assessments	Oct					Tulelake Growers Asso	1	Acre
Inspection Fee	Oct					Inspection Fee	1	Acre