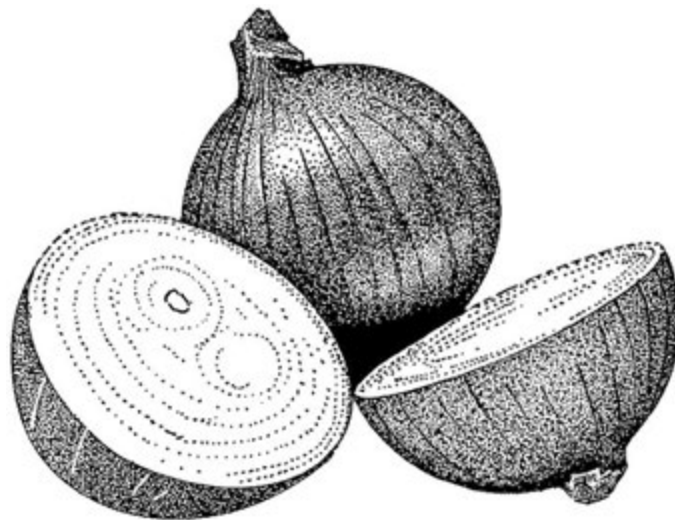

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES
AGRICULTURAL ISSUES CENTER

2016

SAMPLE COSTS TO PRODUCE

ONIONS

For Dehydrating



**INTERMOUNTAIN REGION
TULELAKE & KLAMATH BASINS**

Prepared By:

Rob Wilson

UC Cooperative Extension Farm Advisor, Modoc & Siskiyou Counties and
Director, Intermountain Research & Extension Center

Daniel A. Sumner

Director, Agricultural Issues Center, Department of Agricultural and
Resource Economics, UC Davis

Karen Klonsky

UC Cooperative Extension Economist, Department of Agricultural and
Resource Economics, UC Davis

Donald Stewart

Staff Research Associate, Department of Agricultural and Resource Economics,
Ag Issues Center, UC Davis

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
 AGRICULTURE AND NATURAL RESOURCES
 AGRICULTURAL ISSUES CENTER
Sample Costs to Produce Onions for Dehydrating
 In the Tulelake-Klamath Basin of the Intermountain Region-2016

STUDY CONTENTS

INTRODUCTION	2
ASSUMPTIONS	3
Cultural Practices and Material Inputs	3
Labor, Equipment and Interest	5
Cash Overhead	5
Non-Cash Overhead	7
REFERENCES	8
Table 1. COSTS PER ACRE TO PRODUCE PROCESSING ONIONS	9
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE PROCESSING ONIONS	11
Table 3. MONTHLY CASH COSTS – ONIONS	12
Table 4. RANGING ANALYSIS	14
Table 5. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS	15
Table 6. HOURLY EQUIPMENT COSTS	16
Table 7. OPERATIONS WITH EQUIPMENT & MATERIAL INPUTS	17

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, estimating 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 January 2016 figures. A “*Your Cost*” column in Tables 1 and 2 is provided for you to enter your estimated costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Donald Stewart; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or destewart@ucdavis.edu. The local extension office can be contacted through; Rob Wilson, 530-667-5117 or rgwilson@ucanr.edu, and 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.

Acknowledgements. The authors appreciate the help provided by those growers and other cooperators who provided information for this study.

The University of California is an affirmative action/equal opportunity employer.

ASSUMPTIONS

The following assumptions pertain to sample costs to produce onions for the dehydration market in the Tulelake 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 is rented. The whole 1,500 acre farm has 50 acres in roads, irrigation systems, farmstead, and buffer zones 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. 6 acres of the rented land are in the buffer zone or unused land. No chemicals are used in this portion of the field. 2 acres of the buffer zone are disced twice, seeded with wheatgrass using a grain drill, and irrigated with sprinklers. The planted 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 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 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 seeds are provided by the processor and are treated with a fungicide. A granular pesticide (Lorsban) to manage maggots and a fungicide (Folicur 3.6F) to control onion rot are applied at planting. Growers 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. **Pest control costs can vary considerably each year depending upon local conditions and pest populations in any given year.** For information and pesticide use permits, contact your local county Agricultural Commissioner's office. **Pesticides mentioned in this study are not recommendations, but those commonly used in the region.**

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 (Lorsban 15G) is used to control seed and seedling insects. Insecticides such as Lannate LV, Movento and Radiant SC are chemigated and/or air applied to manage insects during the growing season.

Diseases. Folicur 3.6F, a fungicide is applied at planting to control onion rot. Fungicides such as Bravo, Quadris, Reason, and Manzate are applied via chemigation and/or by air from May through September.

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. 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 480 hundredweight (cwt) per acre. Yields have varied over the years in the Tulalake Basin of the Intermountain Region.

Returns. A current selling price of \$7.00 per cwt of fresh onions is used to estimate market income. In

this study, growers are paid an additional incentive of \$0.30 per cwt.

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 \$28.00 per hour for machine operators and \$19.60 for non-machine workers includes payroll overhead of 40 percent. The basic hourly wages are \$20.00 for machine operators and \$14.00 for non-machine labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for truck crops (code 0171), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 2016 (California Department of Insurance).

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 (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.49 and \$2.77 per gallon, respectively. The costs are based on January 2016 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 6 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 4.25 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 January, 2016.

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 \$1,543 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 \$50 per acre. These expenses include office supplies, telephones, bookkeeping, accounting and legal fees, road maintenance, and miscellaneous business expenses.

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 potatoes. The costs are \$11,087 for 200 acres or \$55.44 per acre. Any returns 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 \$300 to \$450 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 194 acres and pays \$350 per rented producing acre or \$340 per acre for entire rented acreage, (200 Acres, 6 acres in buffer or non-crop).

Irrigation Pipe Rental. 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 rented.

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: $((\text{Purchase Price}-\text{Salvage Value}) \times (\text{Capital Recovery Factor})) + (\text{Salvage Value} \times \text{Interest Rate})$.

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 (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear-out life, as given by ASAE 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 3.25 percent is used to calculate capital recovery cost is the effective long term interest rate in January 2016. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Land. Land suitable for onion production normally ranges in value from \$2,000 to \$5,000 per acre. All of the 200 acres in this study is rented.

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 6 and 7. 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.

REFERENCES

American Society of Agricultural and Biological Engineers (ASABE). *2013 ASABE Standards Book with 2015 Standards Supplement*. St. Joseph, MI: Curran Associates, Inc., 2015.

Boehlje, Michael D., and Vernon R. Eidman. *Farm Management*. New York: John Wiley and Sons, 1984.

California Chapter of the American Society of Farm Managers and Rural Appraisers. *Trends in Agricultural Land & Lease Values*. Woodbridge, CA: American Society of Farm Managers and Rural Appraisers, 2015.

"U.S. Gasoline and Diesel Retail Prices." U.S. Energy Information Administration (EIA). Last modified January 2016. https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm.

"Workers' Compensation Rate Comparison." California Department of Insurance. <http://www.insurance.ca.gov/01-consumers/105-type/9-compare-prem/wc-rate/index.cfm>

"Economic Research Service - Publications." United States Department of Agriculture. www.ers.usda.gov/data-products.aspx.

"Identify and Manage Pests in Crops and Agriculture." University of California Statewide Integrated Pest Management Program. <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>.

"National Agricultural Statistics Service." United States Department of Agriculture. www.nass.usda.gov/Quick_Stats/.

"Tax Rates for Motor Vehicle and Diesel Fuels." California State Board of Equalization. Last modified May 2015. <http://www.boe.ca.gov/pdf/1413.pdf>.

Modoc and Siskiyou Counties Agricultural Commissioner Office, 2014 Crop Reports.

Integrated Pest Management Education and Publications. 2010. UC IPM Pest Management Guidelines:

Onion. In M. L. Flint (ed.) UC IPM Pest Management Guidelines. University of California. Division of Agriculture and Natural Resources. Oakland, CA. Publication 3339PS3 & 3453. <http://www.ipm.ucdavis.edu/PMG/selectnewpest.onion-and-garlic.html>

Rob Wilson, Willie Riggs, Karen M. Klonsky, Richard L. DeMoura, and Pete Livingston. 2011. Sample Costs to Produce Onions for Dehydrating Tulelake Basin in the Intermountain Region. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 1. COSTS PER ACRE TO PRODUCE ONIONS-DEHYDRATED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

Operation	Operation		Cash and Labor Costs per Acre				Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Pre-Plant:								
Plow 80% Ac	0.17	6	5	5	0	0	16	
Chisel 50% Ac	0.06	2	2	1	0	0	5	
Buffer: Disc/Plant/Irrigate	0.00	1	0	0	1	0	1	
Sub-Soil 1.5X 60% Ac	0.25	8	9	5	0	0	23	
Roto-Spike 1.5X	0.27	9	8	5	0	0	22	
List Beds/Fertilize	0.17	6	5	2	221	0	234	
Shape Beds 1.5X	0.25	8	7	3	0	0	18	
Irrigate-Setup SS Sprinklers	0.17	11	0	0	0	0	11	
Roll Beds 2X	0.22	7	4	2	0	0	13	
TOTAL PRE-PLANT COSTS	1.55	58	40	23	222	0	343	
Plant:								
Plant Onions/Pesticides	0.24	8	9	8	74	0	98	
TOTAL PLANT COSTS	0.24	8	9	8	74	0	98	
Cultural:								
Irrigate	0.00	0	0	0	280	0	280	
Weeds-Pre-Emergence	0.00	0	0	0	6	15	21	
Chemigate-Herbicides 2X	0.00	0	0	0	103	0	103	
Weeds-Hand Hoe 2X	0.00	294	0	0	0	0	294	
Fertigate-UAN32/APS	0.00	0	0	0	96	0	96	
Cultivate	0.13	4	3	1	0	0	8	
Weeds-Post-Emergence Herbicides	0.00	0	0	0	15	15	30	
Fertilize-Top Dress 21-0-0-24% S	0.19	6	5	4	88	0	104	
Chemigate-Insects/Fungicides	0.00	0	0	0	51	0	51	
Insects-Air/App 2X	0.00	0	0	0	158	30	188	
Disease-(50% Air 50% Chemigation)	0.00	0	0	0	68	15	83	
Chemigate-Diseases/Insects	0.00	0	0	0	51	0	51	
Take Out Pump & Pipe	0.17	64	0	0	0	0	65	
Irrigation Labor	0.00	230	0	0	0	0	230	
Cut Bed Sides	0.11	4	3	1	0	0	8	
Pickup 1/2 Ton	1.00	34	5	3	0	0	42	
ATV Use	0.67	22	2	0	0	0	25	
TOTAL CULTURAL COSTS	2.26	659	18	10	917	75	1,679	
Harvest:								
Top Onions 2.5X	0.32	11	8	5	0	0	23	
Roll Onions-Crop	0.17	6	0	0	0	0	7	
Dig/Lift/Windrow Onions	0.53	18	17	8	0	0	42	
Harvest Onions	0.53	18	17	8	0	0	42	
Sort Onions	0.00	0	0	0	0	140	140	
Field Haul Onions	1.00	151	26	9	0	0	187	
TOTAL HARVEST COSTS	2.54	203	69	29	0	140	441	
Assessment:								
Assessments	0.00	0	0	0	6	0	6	
Inspection Fee	0.00	0	0	0	8	0	8	
TOTAL ASSESSMENT COSTS	0.00	0	0	0	13	0	13	
Interest on Operating Capital at 4.25%							36	
TOTAL OPERATING COSTS/ACRE	7	928	135	71	1,225	215	2,610	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 1. CONTINUED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

Operation	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
CASH OVERHEAD:								
Field Sanitation							2	
Field Supervisor Salary							55	
Irrigation Pipe Rental							100	
Land Rent - Onions							340	
Liability Insurance							1	
Office Expense							50	
Property Taxes							2	
Property Insurance							0	
Investment Repairs							5	
TOTAL CASH OVERHEAD COSTS/ACRE							555	
TOTAL CASH COSTS/ACRE							3,165	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost Capital Recovery				
Fuel Tanks & Pumps 5000 Gal (2)		15		1			1	
Fuel Wagons		1		0			0	
Pipe Trailers (5)		7		0			0	
125 HP Booster Pumps (2)		27		3			3	
Semi-Truck & Lowbed		63		5			5	
Shop Building		17		1			1	
Shop Tools		13		1			1	
Tool Carrier		11		1			1	
Truck-Service 2 Ton		26		5			5	
Equipment		1,057		91			91	
TOTAL NON-CASH OVERHEAD COSTS		1,237		108			108	
TOTAL COSTS/ACRE							3,273	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE ONIONS-DEHYDRATED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Onions	480	Cwt	7.00	3,360	
Incentive	480	Cwt	0.30	144	
TOTAL GROSS RETURNS	960	Cwt		3,504	
OPERATING COSTS					
Fertilizer:				369	
10-34-0	40.00	Gal	2.23	89	
16-20-0	80.00	Lb N	1.65	132	
UAN 32	50.00	Lb N	0.70	35	
APS	10.00	Gal	2.46	25	
21-0-0-24% S	400.00	Lb	0.22	88	
Custom:				215	
Air App Spray 10g	5.00	Acre	15.00	75	
Sorting Onions	1.00	Acre	140.00	140	
Seed:				0	
Wheatgrass	0.14	Lb	1.30	0	
Insecticide:				212	
Lorsban 15G	6.70	Lb	1.96	13	
Lannate LV	6.00	Pint	6.74	40	
Movento	10.00	FLOz	6.88	69	
Radiant SC	12.00	FIOz	7.47	90	
Fungicide:				143	
Folicur 3.6F	21.00	FIOz	2.88	60	
Bravo Weatherstik	3.00	Pint	4.65	14	
Quadris	8.00	FIOz	2.22	18	
Manzate-Flowable	6.00	Pint	3.00	18	
Reason 500 SC	8.00	FIOz	4.06	32	
Herbicide:				76	
Roundup PowerMax	2.00	Pint	2.75	6	
Goal 2XL	10.50	FIOz	1.08	11	
Prowl H2O	3.00	Pint	4.50	14	
Outlook	20.90	Oz	1.46	30	
Fusilade DX	10.00	FIOz	1.49	15	
Assessment:				13	
California Garlic/Onion Research	480.00	Cwt	0.01	3	
Tulelake Growers Association	1.00	Acre	2.50	3	
Inspection Fee	1.00	Acre	7.50	8	
Irrigation:				413	
Water-Pumped (TID)	34.39	AcIn	12.00	413	
Labor				928	
Equipment Operator Labor	7.90	hrs	28.00	221	
Non-Machine Labor	24.28	hrs	19.60	476	
Irrigation Labor	11.75	hrs	19.60	230	
Machinery				206	
Fuel-Gas	2.54	gal	2.77	7	
Fuel-Diesel	51.44	gal	2.49	128	
Lube				20	
Machinery Repair				51	
Interest on Operating Capital @ 4.25%				36	
TOTAL OPERATING COSTS/ACRE				2,610	
NET RETURNS ABOVE OPERATING COSTS				894	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE ONIONS-DEHYDRATED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

	NOV 15	DEC 15	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Pre-Plant:													
Plow 80% Ac	16												16
Chisel 50% Ac						5							5
Buffer: Disc/Plant/Irrigate						1							1
Sub-Soil 1.5X 60% Ac						23							23
Roto-Spike 1.5X						22							22
List Beds/Fertilize						234							234
Shape Beds 1.5X						18							18
Irrigate-Setup SS Sprinklers						11							11
Roll Beds 2X						13							13
TOTAL PRE-PLANT COSTS	16					327							343
Plant:													
Plant Onions/Pesticides						98							98
TOTAL PLANT COSTS	0					98							98
Cultural:													
Irrigate						126	33		48		73		280
Weeds-Pre-Emergence						21							21
Chemigate-Herbicides 2X							52	52					103
Weeds-Hand Hoe 2X								157	137				294
Fertigate-UAN32/APS								96					96
Cultivate								8					8
Weeds-Post-Emergence Herbicides									30				30
Fertilize-Top Dress 21-0-0-24% S									104				104
Chemigate-Insects/Fungicides									51				51
Insects-Air/App 2X									94			94	188
Disease-(50% Air 50% Chemigation)										34	49		83
Chemigate-Diseases/Insects										51			51
Take Out Pump & Pipe											65		65
Irrigation Labor											230		230
Cut Bed Sides												8	8
Pickup 1/2 Ton	3	3	3	3	3	3	3	3	3	3	3	3	42
ATV Use	2	2	2	2	2	2	2	2	2	2	2	2	25
TOTAL CULTURAL COSTS	6	6	6	6	6	152	90	317	470	91	518	13	1,679
Harvest:													
Top Onions 2.5X												23	23
Roll Onions-Crop												6	6
Dig/Lift/Windrow Onions												42	42
Harvest Onions												42	42
Sort Onions												140	140
Field Haul Onions												187	187
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	441	441
Assessment:													
Assessments												6	6
Inspection Fee												8	8

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 3. CONTINUED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

	NOV 15	DEC 15	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
TOTAL ASSESSMENT COSTS	0	0	0	0	0	0	0	0	0	0	0	13	13
Interest on Operating Capital @ 4.25%	0	0	0	0	0	2	3	4	5	6	7	9	36
TOTAL OPERATING COSTS/ACRE	21	6	6	6	6	579	93	321	475	97	525	476	2,610
CASH OVERHEAD													
Field Sanitation	0	0	0	0	0	0	0	0	0	0	0	0	2
Field Supervisor Salary	5	5	5	5	5	5	5	5	5	5	5	5	55
Irrigation Pipe Rental	8	8	8	8	8	8	8	8	8	8	8	8	100
Land Rent - Onions												340	340
Liability Insurance	0	0	0	0	0	0	0	0	0	0	0	0	1
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	50
Property Taxes			1						1				2
Property Insurance			0						0				0
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	5
TOTAL CASH OVERHEAD COSTS	18	18	19	18	18	18	18	18	19	18	18	357	555
TOTAL CASH COSTS/ACRE	39	23	24	23	23	597	110	339	494	114	543	833	3,165

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 4. RANGING ANALYSIS - ONIONS-DEHYDRATED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ONIONS-DEHYDRATED

	YIELD (CWT)						
	780.00	840.00	900.00	960.00	1,020.00	1,080.00	1,140.00
OPERATING COSTS/ACRE:							
Pre-Plant	343	343	343	343	343	343	343
Plant	98	98	98	98	98	98	98
Cultural	1,679	1,679	1,679	1,679	1,679	1,679	1,679
Harvest	392	410	425	441	457	474	489
Assessment	12	12	13	13	13	14	14
Interest on Operating Capital @ 4.25%	36.27	36.33	36.38	36.44	36.50	36.56	36.62
TOTAL OPERATING COSTS/ACRE	2,560	2,578	2,594	2,610	2,626	2,644	2,660
TOTAL OPERATING COSTS/CWT	3.28	3.07	2.88	2.72	2.57	2.45	2.33
CASH OVERHEAD COSTS/ACRE	555	555	555	555	555	555	555
TOTAL CASH COSTS/ACRE	3,115	3,133	3,148	3,165	3,181	3,199	3,214
TOTAL CASH COSTS/CWT	3.99	3.73	3.50	3.30	3.12	2.96	2.82
NON-CASH OVERHEAD COSTS/ACRE	108	108	108	108	108	108	108
TOTAL COSTS/ACRE	3,223	3,241	3,257	3,273	3,289	3,307	3,323
TOTAL COSTS/CWT	4.13	3.86	3.62	3.41	3.22	3.06	2.91

Net Return per Acre above Operating Costs for Onions-Dehydrated

PRICE (\$/cwt)		YIELD (Cwt/acre)						
Onions		390.00	420.00	450.00	480.00	510.00	540.00	570.00
Incentive		390.00	420.00	450.00	480.00	510.00	540.00	570.00
5.50	0.30	-298	-142	16	174	332	488	646
6.00	0.30	-103	68	241	414	587	758	931
6.50	0.30	92	278	466	654	842	1,028	1,216
7.00	0.30	287	488	691	894	1,097	1,298	1,501
7.50	0.30	482	698	916	1,134	1,352	1,568	1,786
8.00	0.30	677	908	1,141	1,374	1,607	1,838	2,071
8.50	0.30	872	1,118	1,366	1,614	1,862	2,108	2,356

Net Return per Acre above Cash Costs for Onions-Dehydrated

PRICE (\$/cwt)		YIELD (Cwt/acre)						
Onions		390.00	420.00	450.00	480.00	510.00	540.00	570.00
Incentive		390.00	420.00	450.00	480.00	510.00	540.00	570.00
5.50	0.30	-853	-697	-538	-381	-223	-67	92
6.00	0.30	-658	-487	-313	-141	32	203	377
6.50	0.30	-463	-277	-88	99	287	473	662
7.00	0.30	-268	-67	137	339	542	743	947
7.50	0.30	-73	143	362	579	797	1,013	1,232
8.00	0.30	122	353	587	819	1,052	1,283	1,517
8.50	0.30	317	563	812	1,059	1,307	1,553	1,802

Net Return per Acre above Total Costs for Onions-Dehydrated

PRICE (\$/cwt)		YIELD (Cwt/acre)						
Onions		390.00	420.00	450.00	480.00	510.00	540.00	570.00
Incentive		390.00	420.00	450.00	480.00	510.00	540.00	570.00
5.50	0.30	-961	-805	-647	-489	-331	-175	-17
6.00	0.30	-766	-595	-422	-249	-76	95	268
6.50	0.30	-571	-385	-197	-9	179	365	553
7.00	0.30	-376	-175	28	231	434	635	838
7.50	0.30	-181	35	253	471	689	905	1,123
8.00	0.30	14	245	478	711	944	1,175	1,408
8.50	0.30	209	455	703	951	1,199	1,445	1,693

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
16	200 HP 4WD Tractor	259,295	15	50,480	19,450	131	1,549	21,130
16	18' Rollover Plow	50,000	10	8,842	5,174	25	294	5,493
16	Chisel - 21'	20,000	10	3,537	2,070	10	118	2,197
16	Finish Disc 28'	65,000	10	11,495	6,726	32	382	7,141
16	125 HP 4WD Tractor	115,412	15	22,469	8,657	58	689	9,405
16	15' Grain Drill	17,285	7	4,410	2,229	9	108	2,347
16	225 HP 4WD Tractor	270,940	15	52,747	20,324	136	1,618	22,079
16	Subsoiler 14'	37,100	5	12,085	5,894	21	246	6,161
16	Rotospike - 18'	29,000	10	5,128	3,001	14	171	3,186
16	175 HP 4WD Tractor	190,897	15	37,164	14,319	96	1,140	15,556
16	Saddle Tanks 300 Gallons	1,000	10	189	102	1	6	109
16	Lister-6 Row 18'	20,176	5	6,572	3,205	11	134	3,350
16	Bed Shaper-6 Row 18'	10,500	10	1,857	1,087	5	62	1,154
16	75 HP 4WD Tractor	55,814	15	10,866	4,187	28	333	4,548
16	Roller - Flat -18'	7,500	10	1,326	776	4	44	824
16	Planter 6 Row 18'	80,000	10	14,147	8,279	40	471	8,789
16	Cultivator Sled 6 Row	9,500	8	2,145	1,129	5	58	1,192
16	Cultivator/Fertilizer Bar 6 Row	51,864	10	9,172	5,367	26	305	5,698
16	Side Cutter 6 Row 18'	12,000	5	3,909	1,906	7	80	1,993
16	Flail Mower 18'	13,203	10	2,335	1,366	7	78	1,451
16	Pickup 1/2 Ton #1	28,000	5	12,549	3,806	17	203	4,026
16	#1 ATV	8,500	5	3,809	1,155	5	62	1,222
16	158HP 4WD Tractor	176,445	15	34,351	13,235	89	1,054	14,378
16	Onion Harvester	95,000	15	9,729	7,589	44	524	8,157
16	Onion Digger/Lifter/Windrow	85,000	15	8,705	6,790	39	469	7,298
TOTAL		1,709,431	-	330,017	147,824	860	10,197	158,881
60% of New Cost*		1,025,659	-	198,010	88,695	516	6,118	95,329

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Fuel Tanks & Pumps 5000 Gal (2)	21,950	20	2,195	1,430	10	121	439	2,000
Fuel Wagons	2,186	10	219	241	1	12	44	298
Pipe Trailers (5)	10,705	20	535	717	5	56	250	1,028
125 HP Booster Pumps (2)	39,838	10	3,984	4,386	18	219	797	5,421
Semi-Truck & Lowbed	95,000	15	3,617	7,911	42	493	531	8,977
Shop Building	25,000	25	0	1,476	11	125	500	2,112
Shop Tools	20,000	20	2,000	1,303	9	110	400	1,822
Tool Carrier	16,730	15	1,673	1,339	8	92	837	2,275
Truck-Service 2Ton	38,600	5	3,860	7,765	18	212	3,860	11,856
TOTAL INVESTMENT	270,009	-	18,083	26,568	121	1,440	7,658	35,788

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Field Sanitation	194	Acre	2.00	388
Field Supervisor Salary	194	Acre	55.00	10,670
Irrigation Pipe Rental	194	Acre	100.00	19,400
Land Rent - Onions	194	Acre	350.00	67,900
Liability Insurance	1,500	Acre	1.03	1,542
Office Expense	194	Acre	50.00	9,700

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 6. HOURLY EQUIPMENT COSTS
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

Yr	Description	Onions-Dehydrated	Total	Cash Overhead			Operating			Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	
16	200 HP 4WD Tractor	277	1050	11.11	0.07	0.89	11.10	28.90	40.01	52.08
16	18' Rollover Plow	34	200	15.52	0.07	0.88	14.46	0.00	14.46	30.94
16	Chisel - 21'	12	200	6.21	0.03	0.35	4.32	0.00	4.32	10.91
16	Finish Disc 28'	0	200	20.18	0.10	1.15	10.94	0.00	10.94	32.36
16	125 HP 4WD Tractor	74	1066	4.87	0.03	0.39	5.77	18.06	23.83	29.13
16	15' Grain Drill	0	214	6.25	0.03	0.30	4.98	0.00	4.98	11.56
16	225 HP 4WD Tractor	104	1050	11.61	0.08	0.92	11.95	32.51	44.46	57.08
16	Subsoiler 14'	49	400	8.84	0.03	0.37	8.70	0.00	8.70	17.94
16	Rotospike - 18'	53	150	12.00	0.06	0.68	8.90	0.00	8.90	21.65
16	175 HP 4WD Tractor	294	1050	8.18	0.05	0.65	8.78	25.29	34.07	42.95
16	Saddle Tanks 300 Gallons	116	500	0.12	0.00	0.01	0.02	0.00	0.02	0.15
16	Lister-6 Row 18'	33	400	4.81	0.02	0.20	4.26	0.00	4.26	9.28
16	Bed Shaper-6 Row 18'	48	200	3.26	0.02	0.19	2.31	0.00	2.31	5.78
16	75 HP 4WD Tractor	107	1066	2.36	0.02	0.19	1.85	2.49	4.34	6.90
16	Roller - Flat -18'	75	200	2.33	0.01	0.13	0.87	0.00	0.87	3.34
16	Planter 6 Row 18'	46	150	33.11	0.16	1.88	22.65	0.00	22.65	57.80
16	Cultivator Sled 6 Row	25	250	2.71	0.01	0.14	2.12	0.00	2.12	4.98
16	Cultivator/Fertilizer Bar 6 Row	37	200	16.10	0.08	0.92	11.43	0.00	11.43	28.53
16	Side Cutter 6 Row 18'	21	400	2.86	0.01	0.12	2.53	0.00	2.53	5.52
16	Flail Mower 18'	62	200	4.10	0.02	0.23	5.68	0.00	5.68	10.03
16	Pickup 1/2 Ton #1	195	400	5.71	0.03	0.30	2.88	5.19	8.07	14.11
16	#1 ATV	130	400	1.73	0.01	0.09	0.55	2.77	3.32	5.15
16	158HP 4WD Tractor	199	1050	7.56	0.05	0.60	8.03	22.83	30.86	39.08
16	Onion Harvester	103	320	14.23	0.08	0.98	2.05	0.00	2.05	17.34
16	Onion Digger/Lifter/Window	103	300	13.58	0.08	0.94	1.79	0.00	1.79	16.38

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Plow 80% Ac	Nov	200 HP 4WD Tractor	18' Rollover Plow	Equipment Operator Labor	0.21	hour
Chisel 50% Ac	Apr	200 HP 4WD Tractor	Chisel - 21'	Equipment Operator Labor	0.07	hour
Buffer Area-Plant	Apr	200 HP 4WD Tractor	Finish Disc 28'	Non-Machine Labor	0.03	hour
				Water-Pumped (TID)	0.03	AcIn
				1% Acres		
				Disc 2X		
	Apr	125 HP 4WD Tractor	15' Grain Drill	Equipment Operator Labor	0.00	hour
				Wheat Grass	0.14	Lb
				1% Acres		
				Disc 2X		
Sub-Soil 1.5X 60% Ac	Apr	225 HP 4WD Tractor	Subsoiler 14'	Equipment Operator Labor	0.30	hour
Roto-Spike 1.5X	Apr	175 HP 4WD Tractor	Rotospike - 18'	Equipment Operator Labor	0.32	hour
List Beds/Fertilize	Apr	175 HP 4WD Tractor	Saddle Tanks 300 Gallons	Equipment Operator Labor	0.20	hour
				10-34-0	40.00	Gal
				16-20-0	80.00	Lb N
Shape Beds 1.5X	Apr	175 HP 4WD Tractor	Lister-6 Row 18'	Equipment Operator Labor	0.29	hour
Irrigate-Setup SS Sprinkler	Apr	75 HP 4WD Tractor	Bed Shaper-6 Row 18'	Non-Machine Labor	0.25	hour
Roll Beds 2X	Apr	125 HP 4WD Tractor	Roller - Flat -18'	Equipment Operator Labor	0.26	hour
Plant Onions	Apr	225 HP 4WD Tractor	Saddle Tanks 300 Gallons	Equipment Operator Labor	0.28	hour
				Lorsban 15G	6.70	Lb
				Planter 6 Row 18'	21.00	FLOz
Irrigate	Apr			Folicur 3.6F	10.50	AcIn
	May			Water-Pumped (TID)	1.75	AcIn
	May			Water-Pumped (TID)	1.00	AcIn
	July			Water-Pumped (TID)	4.00	AcIn
	Sept			Water-Pumped (TID)	6.11	AcIn
Weeds-Pre-Emergence	Apr			Air App Spray 10g	1.00	Acre
				Roundup PowerMax	2.00	Pint
Chemigate-Herbicides	May			Water-Pumped (TID)	2.00	AcIn
				Goal 2XL	5.25	FLOz
				Prowl H2O	1.50	Pint
				Outlook	10.45	Oz
	June			Water-Pumped (TID)	2.00	AcIn
				Goal 2XL	5.25	FLOz
				Prowl H2O	1.50	Pint
				Outlook	10.45	Oz
Weeds-Hand Hoe 2X	June			Non-Machine Labor	8.00	hours
	July			Non-Machine Labor	7.00	hours
Fertigate-UAN32/APS	June			Water-Pumped (TID)	3.00	AcIn
				UAN 32	50.00	Lb N
				APS	10.00	Gal
Cultivate	June	125 HP 4WD Tractor	Cultivator Sled 6 Row	Equipment Operator Labor	0.15	hour
Weeds-Post-Emergence	July			Air App Spray 10g	1.00	Acre
				Fusilade DX	10.00	FIOz
Fertilize-Top Dress	July	175 HP 4WD Tractor	Saddle Tanks 300 Gallons	Equipment Operator Labor	0.23	hour
				21-0-0-24%S	400.00	Lb
			Cultivator/Fertilizer Bar 6 Row			
Chemigate	July			Bravo Weatherstik	1.50	Pint
				Water-Pumped (TID)	2.00	AcIn
				Lannate LV	3.00	Pint
Insects-Air/App 2X	July			Air App Spray 10g	1.00	Acre
				Movento	5.00	FIOz
				Radiant SC	6.00	FIOz
	Sept			Air App Spray 10g	1.00	Acre
				Movento	5.00	FIOz
				Radiant SC	6.00	FIOz
Disease	Aug			Quadris	8.00	FIOz
				Air App Spray 10g	0.50	Acre
	Aug			Manzate-Flowable	3.00	Pint
	Sept			Air App Spray 10g	0.50	Acre
				Manzate-Flowable	3.00	Pint
	Sept			Reason 500 SC	8.00	FIOz
Chemigate-Diseases	Aug			Bravo Weatherstik	1.50	Pint
				Water-Pumped (TID)	2.00	AcIn
				Lannate LV	3.00	Pint
Take Out Pump & Pipe	Sept	75 HP 4WD Tractor		Non-Machine Labor	3.00	hours
Irrigation Labor	Sept			Irrigation Labor	11.75	hours
Cut Bed Sides	Oct	158HP 4WD Tractor	Side Cutter 6 Row 18'	Equipment Operator Labor	0.13	hour
Pickup 1/2 Ton	Oct		Pickup 1/2 Ton #1	Equipment Operator Labor	1.20	hours
ATV Use	Oct		#1 ATV	Equipment Operator Labor	0.80	hour

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 7. CONTINUED
 INTERMOUNTAIN REGION - TULELAKE BASIN 2016

Operation	Operation Month	Tractor	Implement	Labor Type/	Rate /	Unit
Top Onions 2.5X	Oct	158HP 4WD Tractor	Flail Mower 18'	Equipment Operator Labor	0.38	hour
Roll Onions-Crop	Oct	75 HP 4WD Tractor	Roller - Flat -18'	Equipment Operator Labor	0.20	hour
Dig/Lift/Windrow Onions	Oct	200 HP 4WD Tractor	Onion Digger/Lifter/Windrow	Equipment Operator Labor	0.63	hour
Harvest Onions	Oct	200 HP 4WD Tractor	Onion Harvester	Equipment Operator Labor	0.63	hour
Sort Onions	Oct			Sort Onions	1.00	Acre
Field Haul Onions	Oct	175 HP 4WD Tractor		Non-Machine Labor	3.00	hours
				Dollies furnished by company		
	Oct	158HP 4WD Tractor		Non-Machine Labor	3.00	hours
Assessments	Oct			California Garlic/Onion Research	480.00	Cwt
				Tulelake Growers Association	1.00	Acre
Inspection Fee	Oct			Inspection Fee	1.00	Acre