



<p>Farm Business Management Reports</p>		<p>EB1979E</p>
	<p>2004 Estimated Cost and Returns for Producing Onions Columbia Basin, Washington</p> 	
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<p>WASHINGTON STATE UNIVERSITY  EXTENSION <i>World Class. Face to Face.</i></p>		

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NOTE

Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in:

- ! Capital, labor, and management resources
- ! Type and size of machinery complement
- ! Cultural practices
- ! Size of farm and enterprise
- ! Crop yields
- ! Input prices
- ! Commodity prices

Costs can also be calculated differently depending on the intended use of the cost estimate. The information in this publication serves as a general guide for onions grown on modern, well-managed farms in the Columbia Basin. To avoid drawing unwarranted conclusions for any particular enterprise, you must closely examine the assumptions used. If they are not appropriate for the situation at hand, you should adjust the costs and/or returns.

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2004 ESTIMATED COST AND RETURNS
FOR PRODUCING ONIONS
COLUMBIA BASIN, WASHINGTON

Herbert Hinman and Gary Pelter*

INTRODUCTION

In 1992, approximately 8,000 acres of onions were produced in the Columbia Basin. By 1998, the acreage of onions produced had risen to approximately 17,000. In 2004, an estimated 19,000 acres of onions will be produced in the Columbia Basin. This publication presents 2004 projected cost and return information for representative Columbia Basin onion enterprises producing onions under rill irrigation, center pivot irrigation, and drip irrigation. The projected costs are those of producing onions from pre-harvest operations to delivering the onions to storage. Costs for storage and marketing the onions are not included. The projected prices are those prices to the farmer minus storage and marketing costs. Producers, lenders, and others should find this information helpful in identifying enterprise strengths and weaknesses, planning production adjustments, estimating financial requirements, and resolving numerous other business management problems.

OBJECTIVES OF THE STUDY

The overall objective of this study was to develop enterprise budgets for onions grown under three different irrigation systems. These were the specific objectives:

1. To identify production practices representative of well-managed onion enterprises grown under rill irrigation, center pivot irrigation and drip irrigation in the Columbia Basin
2. To provide estimates of capital requirements, production costs to storage, and returns
3. To provide current and prospective producers with a procedure and tool for analyzing the profitability of their onion enterprise

While representative of the Columbia Basin, the resulting budgets will likely not be representative of any particular farm in the Columbia Basin. Therefore, individual producers can use the blank spaces on the right-hand side of the budget tables or the Excel spreadsheets (which will be discussed in Appendix D) to develop a budget representative of their own operation.

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SOURCES OF INFORMATION

The primary information for this study was obtained from a group of Columbia Basin producers. These producers were considered representative of well-managed farms. Their production practices and requirements for labor, equipment, and supplies are the basis for the assumptions used in this study and represent what is considered to be the latest field practices. Local farm suppliers provided price information on materials and other services commonly used by farmers. Machinery costs were based on current purchase prices and rates of annual use considered typical.

BUDGET ASSUMPTIONS

The following assumptions were made in developing the enterprise data:

1. The representative farms include 950 acres, with 145 acres in onion production.
2. The cash rent for rill irrigated land used to produce onions is \$300 per acre. The landowner furnishes the gravity flow irrigation system (excluding tubes and dams) and the operator pays the irrigation charge of \$50 per acre per year and annual repair costs of \$4 per acre.

The cash rent for center pivot irrigated land used to produce onions is \$400 per acre. The landowner furnishes the center pivot irrigation system and the operator pays the water charge of \$50 per acre per year, electricity cost of \$50 per acre (pumping out of wells), and annual repair costs of \$15 per acre.

The cash rent for drip irrigated land used to produce onions is \$400 per acre. The landowner provides the water to the field. The tenant furnishes the irrigation pump, filters, valves, etc., at a cost of \$600 per acre. The irrigation system has a 10-year life. In addition, the irrigation system requires new drip tubes every year at a cost of \$270 per acre and an irrigation design cost of \$30 per acre. The water charge is \$50 per acre, the electrical charge is \$40 per acre and the annual repair cost is \$100 per acre.

3. Annual yield for onions grown under rill irrigation is assumed to be within a range of 24 to 40 tons per acre (an average of 32 is used for the attached tables).

Annual yield for onions grown under center pivot irrigation is assumed to be within a range of 24 to 40 tons per acre (an average of 35 is used for the attached tables).

Annual yield for onions grown under drip irrigation is assumed to be within a range of 24 to 55 tons per acre (an average of 45 is used for the attached tables).

4. The price ranges between \$70 per ton to \$100 per ton (an average price of \$80 was used for the attached tables).

5. Cost of labor is \$11.00 per hour for seasonal labor, \$14.00 per hour for rill irrigators and \$18.00 per hour for full-time labor. These costs include social security, labor and industry payments, and fringe benefits.
6. The interest rate assessed against both producer debt and owner equity is 8%.
7. The acreage on which the onions are grown is preceded by wheat.

DISCUSSION OF BUDGET INFORMATION

Budget information for onions grown under rill irrigation, center pivot irrigation, and drip irrigation are presented in Appendixes A, B and C, respectively. Each irrigated onion enterprise is reported in seven tables. A summary of the data in each table is presented below.

Tables 1Rill, 1CP and 1Drip: Schedule of Operations and Estimated Costs Per Acre

Table 1 outlines the schedule of field operations by month, the type of machinery and labor use, the hours of machine use per acre, and total production costs.

Production costs are divided into two categories: (1) fixed cost which includes machinery ownership, land costs, and management; (2) variable costs associated with operating machinery, hiring labor, and purchasing services and materials. Total cost is the sum of fixed and variable costs.

Machinery fixed costs includes depreciation, interest on the investment, property taxes, insurance, and machine housing costs. These costs are incurred whether or not a crop is grown and do not vary with the enterprise. Machinery fixed cost for a specific field operation was determined by multiplying the machine hours per acre times the per-hour fixed cost. The per-hour fixed costs, shown in Table 8, are determined by dividing the total annual fixed cost by the annual hours of machinery use over all enterprises for the representative farm. Fixed cost per acre for the machine shed and shop, shop tools, irrigation tubes, and dams were determined by dividing the total annual fixed cost by the number of acres.

Land fixed cost is equal to gross rental rates typical of the area. Much of the land used for production is rented. Although individual rental arrangements vary, in many situations the tenant pays a cash rent and the landowner pays the taxes.

An opportunity cost for management is reported in Table 1. For management, a cost of \$150 per acre was used. This is representative of what the producer committee felt was the value of an operator's management skills.

Variable costs depend directly on the number of crop acres and type of enterprise. These costs include fuel, oil, repairs, fertilizer, chemicals, custom work, overhead (telephone, utilities, legal, accounting, organization dues, etc.), and interest on operating capital. Both operator labor and hired labor are included as a variable cost.

Tables 2Rill, 2CP and 2Drip: Materials and Services Used by Operation

Table 1 reports under the "Service" column and "Materials" column the dollar amounts spent on services and materials used with the different operations. Table 2 lists by operation, the specific types and quantities of services, and materials used in this study along with their respective prices.

Tables 3Rill, 3CP and 3Drip: Itemized Costs Per Acre

Table 3 is an itemized list of the costs in Table 1. Most items are self-explanatory. However, "Machine Interest" warrants additional explanation. These costs represent opportunity cost (returns foregone by investing in the machinery and building complement rather than in some alternative) or interest paid to finance machinery and buildings. Total interest cost on these capital purchases is calculated on the average value of the machinery and buildings over their respective years of use. The 8% interest charge made against this "average" value represents the total interest cost.

Tables 4Rill, 4CP and 4Drip: Break-Even Selling Price Per Ton

Table 4 shows break-even selling prices for different yield levels. The first break-even price is the price needed to cover total variable costs—those costs that occur only if the crop is produced. If the price received does not equal or exceed the variable cost break-even price, the crop becomes uneconomical to produce, even in the short run, because the added costs of production are greater than the added returns.

The second break-even price is the price you must receive to recover total costs including cash costs, depreciation, operator labor and management, and opportunity costs for investments in machinery and buildings. Failure to receive this price means the owner-operator will not realize a return on his/her management, labor, and capital contributions equivalent to what could be earned in an alternative use. Realizing a price above the break-even level means that in addition to covering all costs a premium (profit) is earned for the risk assumed in producing the crop.

Tables 5Rill, 5CP and 5Drip: Returns Per Acre to Management and Risk at Various Price and Yield Levels

Returns per acre at various price and yield levels are summarized in Table 5. These returns are to both management and risk insofar as the \$150 per acre management cost has been deducted from the total cost.

Tables 6Rill, 6CP and 6Drip: Machinery and Building Complement

Table 6 lists the type of machines used to produce onions, plus on a per-unit basis, their replacement value, years of life before trade-in, salvage value, hours of annual use, annual repair cost, fuel type (if applicable), and gallons of fuel used per hour. The same information is provided for the irrigation equipment, fuel and containment tanks, machine shop and shed, and the shop tools, except the number of acres these assets support are specified instead of annual hours of use.

Tables 7Rill, 7CP and 7Drip: Per-Hour/Acre Machinery and Building Cost

Table 7 presents the estimated fixed and variable costs per hour of use for the machinery listed in Table 6. For irrigation equipment, fuel and containment tanks, machine shop and shed, and the shop tools, costs are calculated on a per-acre basis.

Equipment fixed costs includes depreciation, interest on investment, property taxes, and insurance. Equipment prices are representative of what growers would currently pay to replace equipment. While this assumption may result in an overstatement of production costs currently experienced by producers, it indicates the enterprise's ability to generate the earnings needed to replace depreciable assets. Continuing increases in prices paid for replacement machinery and equipment due to inflation and improved technology mean that depreciation claimed on assets purchased before price advances understates the amount of capital currently required for asset replacement. When an enterprise is evaluated to determine its long-run viability, it is important to consider its ability to replace depreciable assets on a replaceable cost basis. Note that interest on investment represents an 8% opportunity cost to the enterprise. These are earnings foregone by investing in the equipment complement rather than in the next best alternative investment. Equipment variable costs include equipment repair, fuel, and lubrication costs - costs that vary with the crop grown or the number of acres produced.

CONCLUDING NOTE

To use these budgets, one should fully comprehend the procedures and assumptions used in this study and interpret the results accordingly. The authors and producers who organized this data recognize that these budgets do not represent any one particular operation. They should be used as a general guide to help derive budgets for individual operations. Moreover, this publication does not recommend production practices. Rather, it presents current technology used to produce onions in the Columbia Basin. It should further be noted that the resulting figures in these budget estimates do not include storage and marketing costs. In Appendix D, a discussion on how producers may use these budgets to generate “financial budgets” for their own operation is fully covered. In addition, in Appendix D, instructions are given as to how to download Excel spreadsheets that can be used in developing producer budgets.

APPENDIX A

BUDGET TABLES FOR

PRODUCING ONIONS UNDER

RILL IRRIGATION

TABLE 1R1LL: SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ONIONS, FOLLOWING WHEAT, UNDER RILL IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004.

VARIABLE COST													

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	TOTAL VARIABLE COST	TOTAL COST

						\$	\$	\$	\$	\$	\$	\$	\$
SHRED STUBBLE	140HP-WT, 15' SHREDDER	FALL	2003	.50	.55	14.51	8.28	9.90	.00	.00	1.33	19.51	34.02
DISC/PACK	200HP-WT, 18' DISC/20' PACKER	FALL	2003	.10	.11	3.12	2.31	1.98	.00	.00	.31	4.60	7.72
CORRUGATE	140HP-WT, 8-ROW CORRUGATOR	FALL	2003	.13	.14	2.32	1.40	2.47	.00	.00	.28	4.16	6.48
MAKE HEADLAND	85HP-WT, HEADLANDER	FALL	2003	.05	.06	.52	.45	.99	.00	.00	.11	1.54	2.06
MAKE DRAIN	140HP-WT, 8' BLADE	FALL	2003	.05	.06	1.23	.58	.99	.00	.00	.12	1.69	2.92
IRRIGATE	IRRIGATOR LABOR, TUBES & DAMS	SEA	2004	.00	8.00	2.60	.00	112.00	50.00	4.00	6.64	172.64	175.24
SOIL TEST	SOIL CONSULTANT	FALL	2003	.00	.00	.00	.00	.00	5.00	.00	.37	5.37	5.37
APPLY LIME	CUSTOM APPLICATION @ NO CHG.	FALL	2003	.00	.00	.00	.00	.00	.00	90.00	6.60	96.60	96.60
DISC/PACK	200HP-WT, 18' DISC/20' PACKER	FALL	2003	.10	.11	3.12	2.31	1.98	.00	.00	.31	4.60	7.72
FUMIGATE FIELD	CUSTOM APPLIED	FALL	2003	.00	.00	.00	.00	.00	45.00	120.75	12.16	177.91	177.91
EROSION CONTROL	THROUGH WATER W/FISH FEEDER	SEA	2004	.00	.00	2.10	.00	.00	.00	5.90	.24	6.14	8.24
FERTILIZE	CUSTOM APPLIED	MAR	2004	.00	.00	.00	.00	.00	6.50	95.00	4.74	106.24	106.24
PLOW/PACK	140HP-WT, 4BTM PLOW/7' PACKER	MAR	2004	.40	.44	9.38	6.15	7.92	.00	.00	.66	14.73	24.11
DISK/PACK (2X)	200HP-WT, 18' DISC/20' PACKER	MAR	2004	.20	.22	6.24	4.62	3.96	.00	.00	.40	8.98	15.21
REFINE SEEDBED	140HP-WT, SEEDBED MAKER	MAR	2004	.33	.37	11.06	6.36	6.60	.00	.00	.60	13.56	24.62
MARK SEEDBED	140HP-WT, 8-ROW CORRUGATOR	MAR	2004	.25	.28	4.64	2.81	4.95	.00	.00	.36	8.12	12.75
PLT/INSECT/CORRU	140HP-WT, 8-ROW MILTON PLANTER	MAR	2004	.25	.30	11.24	5.53	5.40	.00	262.94	12.78	286.65	297.89
MAKE HEADLAND	85HP-WT, HEADLANDER	MAR	2004	.05	.06	.52	.45	.99	.00	.00	.07	1.50	2.03
MAKE DRAIN	140HP-WT, 8' BLADE	MAR	2004	.05	.06	1.23	.58	.99	.00	.00	.07	1.65	2.88
PRE-EMERGE HERB.	CUSTOM APPLIED	APR	2004	.00	.00	.00	.00	.00	7.50	7.05	.58	15.13	15.13
CULT/CORRUGATE	140HP-WT, 8-ROW CULTIVATOR	APR	2004	.25	.28	6.19	3.58	4.95	.00	.00	.34	8.87	15.06
POST-EMER HB(2X)	CUSTOM GROUND APPLICATION	MAY	2004	.00	.00	.00	.00	.00	15.00	31.44	1.55	47.99	47.99
CULT/CORRUGATE	140HP-WT, 8-ROW CULTIVATOR	MAY	2004	.25	.28	6.19	3.58	4.95	.00	.00	.28	8.82	15.01
APPLY INSECT.	85HP-WT, SPRAYER	MAY	2004	.10	.12	1.58	.86	2.16	.00	10.41	.45	13.97	15.45
SIDE DRESS FERT.	85HP-WT, APPLICATOR (NO CHG.)	MAY	2004	.25	.30	2.42	1.89	5.40	.00	30.00	1.24	38.54	40.96
WEED FIELD	CONTRACT LABOR	JUN	2004	.00	.00	.00	.00	.00	100.00	.00	2.67	102.67	102.67
SOIL TEST	SOIL CONSULTANT	JUN	2004	.00	.00	.00	.00	.00	5.00	.00	.13	5.13	5.13
SIDE DRESS FERT.	85HP-WT, APPLICATOR (NO CHG.)	JUN	2004	.25	.30	2.42	1.89	5.40	.00	30.00	.99	38.29	40.71
CULT/CORR/HERB	140HP-WT, 8-ROW CULT/SPRAYER	JUN	2004	.25	.30	7.71	3.83	5.40	.00	4.84	.38	14.45	22.16
APPLY INSC/T/FUNG	AERIAL APPLICATION	JUN	2004	.00	.00	.00	.00	.00	7.50	23.77	.83	32.10	32.10
WEED FIELD	CONTRACT LABOR	JUL	2004	.00	.00	.00	.00	.00	100.00	.00	2.00	102.00	102.00
APPLY HERBICIDE	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	12.28	.40	20.18	20.18
APPLY INSC/T/FUNG	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	28.93	.73	37.16	37.16
APPLY INSC/T/FUNG	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	23.77	.63	31.89	31.89
SPROUT INHB/FUNG	AERIAL APPLICATION	AUG	2004	.00	.00	.00	.00	.00	7.50	31.73	.52	39.75	39.75
FILL IN HD&DRAIN	140HP-WT, 8' BLADE	SEP	2004	.05	.06	1.23	.58	.99	.00	.00	.01	1.59	2.81
LIFT ONIONS	85HP-WT, 4-BED ONION LIFTER	SEP	2004	.43	.47	10.26	3.59	8.49	.00	.00	.08	12.15	22.41
WINDROW	140HP-WT, WINDROWER	SEP	2004	.29	.31	11.68	3.83	5.66	.00	.00	.06	9.55	21.23
HARVEST ONIONS	CUSTOM HARVEST	SEP	2004	.00	.00	.00	.00	.00	144.00	.00	.96	144.96	144.96
HAUL ONIONS	CUSTOM HAULING	SEP	2004	.00	.00	.00	.00	.00	184.00	.00	1.23	185.23	185.23
MISC. USE	MANAGER'S PICKUP	ANN	2004	.75	.82	4.48	3.57	14.85	.00	.00	.74	19.16	23.64
MISC. USE	LABOR'S PICKUP	ANN	2004	.75	.82	4.84	6.06	14.85	.00	.00	.84	21.75	26.59
MISC. USE	SERVICE TRUCK	ANN	2004	.20	.00	1.60	1.78	.00	.00	.00	.07	1.85	3.45
MISC. USE	MACHINE SHED & SHOP	ANN	2004	.00	.00	5.39	.00	.00	.00	.00	.00	.00	5.39
MISC. USE	SHOP TOOLS	ANN	2004	.00	.00	3.12	.00	.00	.00	.00	.00	.00	3.12
MISC. USE	FUEL TANKS/CONTAINMENT	ANN	2004	.00	.00	1.83	.00	.00	.00	.00	.00	.00	1.83
LAND COST	LAND RENT	ANN	2004	.00	.00	300.00	.00	.00	.00	.00	.00	.00	300.00
OVERHEAD	LEGAL, UTILITIES, ACCT., ETC.	ANN	2004	.00	.00	.00	.00	.00	94.46	.00	.00	94.46	94.46
MANAGEMENT	VALUE OF MANAGEMENT	ANN	2004	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00

TOTAL PER ACRE				6.27	14.79	594.77	76.87	234.22	793.96	812.79	65.85	1983.69	2578.46

Table 2Rill. Materials and Services Used by Operation for Producing Onions Under Rill Irrigation.

Operation		Material and/or Service
Irrigate	Season	Water charge @ \$50.00/acre Irrigation repair @ \$4.00/acre
Soil Test	Fall	Soil consultant @ \$5.00/acre
Apply Lime	Fall	1.5 tons @ \$60.00/ton (no charge for application)
Fumigate Field	Fall	Custom fumigation @ \$45.00/acre 37.5 gal. of metham sodium @ \$3.22/gal.
Erosion Control	Season	2.0 lbs. of polyacrylamide (PAM) @ \$2.95/lb.
Fertilize	March	Custom applied @ \$6.50/acre Pre-plant fertilizer @ \$95.00/acre
Plant/Insecticide/Corrugate	March	6.5 lbs. of Lorsban 15G @ \$1.99/lb. Onion seed @ \$250.00/acre
Apply Pre-Emergent Herbicide	April	Custom applied @ \$7.50/acre 1.5 pints of glyphosphate @ \$4.55/pint 0.1 pint of surfactant @ \$2.22/pint
Apply Post-Emergent Herbicide (2X)	May	Ground application @ \$7.50/acre, per application 10 ounces of Goal 2XL, per application @ \$.90/oz. 12 ounces of Buctril, per application @ \$.56/oz.
Apply Insecticide	May	3.8 ounces of Warrior @ \$2.68/ounce 0.1 pint of surfactant @ \$2.22/pint
Side Dress Fertilizer	May	Fertilizer @ \$30.00/acre
Weed Field	June	Contracted hand labor @ \$100.00/acre
Soil Test	June	Soil consultant @ \$5.00/acre
Side Dress Fertilizer	June	Fertilizer @ \$30.00/acre
Cultivate/Corrugate/Herbicide	June	1.5 pints of Prowl @ \$3.23/pint
Apply Insecticide/Fungicide	June	Aerial application @ \$7.50/acre 3.8 ozs. of Warrior @ \$2.68/oz. 2.0 pints of chlorothalonil @ \$6.68/pint 0.1 pint of surfactant @ \$2.22/pint

Table 2Rill: Materials and Services Used by Operation for Producing Onions
Under Rill Irrigation (continued).

Operation		Material and/or Service
Weed Field	July	Contracted hand labor @ \$100.00/acre
Apply Herbicide	July	Aerial application @ \$7.50/acre 6 ounces of Select @ \$1.83/oz. 26 ounces of crop oil @ \$.05/oz.
Apply Insecticide/ Fungicide	July	Aerial application @ \$7.50/acre 3 pints of Lannate @ \$7.51/pint 2.0 lbs. of mancozeb @ \$3.09/lb. 0.1 pint of surfactant @ \$2.22/pint
Apply Insecticide/ Fungicide	July	Aerial application @ \$7.50/acre 3.8 ounces of Warrior @ \$2.68/ounce 2.0 pints of chlorothalonil @ \$6.68/pint 0.1 pint of surfactant @ \$2.22/pint
Apply Sprout Inhibitor/Fungicide	August	Aerial application @ \$7.50/acre 10.6 pints of maleic hydrazide @ \$2.41/pint 2.0 lbs. of mancozeb @ \$3.09/lb.
Harvest Onions	September	Custom harvest of 32 tons @ \$4.50/ton
Haul Onions	September	Custom haul of 32 tons @ \$5.75/ton
Overhead	Annual	5% of variable cost

TABLE 3RILL. ITEMIZED COST PER ACRE FOR PRODUCING ONIONS,
 FOLLOWING WHEAT, UNDER RILL IRRIGATION IN THE
 COLUMBIA BASIN, WASHINGTON, 2004.

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	5.00	2.00	10.00	_____
CUSTOM FUMIGATE	ACRE	45.00	1.00	45.00	_____
METHAM SODIUM	GAL.	3.22	37.50	120.75	_____
CUSTOM FERTILIZE	ACRE	6.50	1.00	6.50	_____
PRE-PLANT FERTILIZER	ACRE	95.00	1.00	95.00	_____
SIDE DRESS FERTILIZER	ACRE	30.00	2.00	60.00	_____
ONION SEED	ACRE	250.00	1.00	250.00	_____
CUSTOM AERIAL	ACRE	7.50	6.00	45.00	_____
LIME	TON	60.00	1.50	90.00	_____
LORSBAN 15G	LB.	1.99	6.50	12.94	_____
GLYPHOSPHATE	PINT	4.55	1.50	6.82	_____
SURFACTANT	PINT	2.22	.50	1.11	_____
WARRIOR	OZ.	2.68	11.40	30.55	_____
PROWL	PINT	3.23	1.50	4.84	_____
CHLOROTHALONIL	PINT	6.68	4.00	26.72	_____
SELECT	OZ.	1.83	6.00	10.98	_____
CROP OIL	OZ.	.05	26.00	1.30	_____
MACOZEB	LB.	3.09	4.00	12.36	_____
LANNATE	PINT	7.51	3.00	22.53	_____
MALEIC-HYDRAZIDE	PINT	2.41	10.60	25.55	_____
POLYACRYLAMIDE	LB.	2.95	2.00	5.90	_____
CUSTOM SPRAY	ACRE	7.50	3.00	22.50	_____
GOAL	OZ.	.90	20.00	18.00	_____
BUCTRIL	OZ.	.56	24.00	13.44	_____
CONTRACT WEEDING	ACRE	100.00	2.00	200.00	_____
WATER CHARGE	ACRE	50.00	1.00	50.00	_____
IRRIGATION REPAIR	ACRE	4.00	1.00	4.00	_____
IRRIGATION LABOR	HOURL	14.00	8.00	112.00	_____
MACHINERY REPAIRS	ACRE	37.54	1.00	37.54	_____
MACHINE FUEL/LUBE	ACRE	39.32	1.00	39.32	_____
LABOR (TRAC/MACH)	HOURL	18.00	6.79	122.22	_____
CUSTOM HARVEST	TON	4.50	32.00	144.00	_____
CUSTOM HAUL	TON	5.75	32.00	184.00	_____
INTEREST ON OP. CAP.	ACRE	65.85	1.00	65.85	_____
OVERHEAD	ACRE	94.46	1.00	94.46	_____

TOTAL VARIABLE COST				1983.69	_____
FIXED COSTS		\$		\$	
MACHINE DEPRECIATION	ACRE	75.52	1.00	75.52	_____
MACHINE INTEREST	ACRE	53.26	1.00	53.26	_____
MACHINE INSURANCE	ACRE	4.00	1.00	4.00	_____
MACHINE TAXES	ACRE	11.99	1.00	11.99	_____
MANAGEMENT	ACRE	150.00	1.00	150.00	_____
LAND RENT	ACRE	300.00	1.00	300.00	_____

TOTAL FIXED COST				594.77	_____
TOTAL COST				2578.46	_____

TABLE 4RILL. BREAK-EVEN SELLING PRICE PER TON AT VARIOUS YIELD LEVELS FOR ONIONS GROWN UNDER RILL IRRIGATION.

-----YIELD LEVEL-----					
	24 TONS \$	28 TONS \$	32 TONS \$	36 TONS \$	40 TONS \$
B-E PRICE NECESSARY TO COVER VARIABLE COSTS	79.07	69.31	61.99	56.30	51.74
B-E PRICE NECESSARY TO COVER TOTAL COSTS	103.85	90.55	80.58	72.82	66.61

TABLE 5RILL. RETURNS PER ACRE TO MANAGEMENT AND RISK AT VARIOUS PRICE AND YIELD LEVELS FOR ONIONS GROWN UNDER RILL IRRIGATION.

-----YIELD LEVEL-----					
PRICE PER TON	24 TONS \$	28 TONS \$	32 TONS \$	36 TONS \$	40 TONS \$
\$70	-662	-425	-188	48	285
\$75	-542	-285	-28	228	485
\$80	-422	-145	132	408	685
\$85	-302	-5	292	588	885
\$90	-182	135	452	768	1,085
\$95	-62	275	612	948	1,285
\$100	58	415	772	1,128	1,485

TABLE 6RILL. MACHINERY AND BUILDING COMPLEMENT FOR PRODUCING ONIONS UNDER RILL IRRIGATION.

DESCRIPTION	REPLACE- MENT VALUE	YEARS TO TRADE	SALVAGE VALUE	ANNUAL HOURS OF USE	ANNUAL REPAIR	FUEL TYPE*	GAL. PER HOUR
	\$		\$		\$		
200HP WHEEL TRACTOR	115,000	15	18,000	800	3,300	D	8
140HP WHEEL TRACTOR	90,000	15	17,000	600	2,500	D	4.5
85HP WHEEL TRACTOR	50,000	15	8,000	600	1,850	D	3
MANAGER'S PICKUP	26,000	5	12,000	800	500	G	2
LABOR'S PICKUP	12,000	5	3,000	400	750	G	3
SERVICE TRUCK	7,000	8	500	150	400	G	3
4-BOTTOM PLOW	7,500	8	1,700	250	1,000		
15' SHREDDER	15,000	15	2,400	150	850		
18' OFFSET DISC	20,000	10	3,500	250	1,450		
20' PACKER	4,200	7	840	250	300		
7' PACKER	2,200	10	400	250	120		
8-ROW MILTON PLT.	22,500	12	4,400	110	1,200		
SEEDBED MAKER	15,000	15	3,000	110	900		
8-ROW CULTIVATOR	9,000	10	1,600	175	600		
8-ROW CORRUGATOR	1,500	15	300	150	50		
HEADLANDER	2,000	15	400	300	400		
8' BLADE	3,500	20	700	50	40		
ONION LIFTER, 4-BED	5,000	10	1,000	50	40		
WINDROWER	13,000	10	2,000	80	200		
SPRAY TANK & PUMP	2,000	10	0	50	50		
				ACRES COVERED			
IRRIGATION TUBES	8	5	0	1	0		
IRRIGATION DAMS	2	2	0	1	0		
FISH FEEDER (PAM)	250	5	0	30	0		
MACHINE SHED & SHOP	60,000	30	0	950	0		
SHOP TOOLS	25,000	15	0	950	0		
FUEL TANKS/ CONTAINMENT	17,000	20	0	950	0		

TABLE 7RILL. HOURLY AND PER ACRE MACHINERY COSTS FOR PRODUCING ONIONS UNDER RILL IRRIGATION.

MACHINERY	PURCHASE PRICE	YEARS			DEPREC- IATION	INTER- EST	INSUR- ANCE	TAXES	HOUSING	TOTAL		FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
		TO TRADE	ANNUAL HOURS							FIXED COST	REPAIR			
	\$									-----COST PER HOUR-----				
200HP-WT	115,000.00	15	800	8.08	6.65	.50	1.50	.00	16.73	4.12	11.96	16.09	32.81	
140HP-WT	90,000.00	15	600	8.11	7.13	.54	1.61	.00	17.38	4.17	6.73	10.89	28.28	
85HP-WT	50,000.00	15	600	4.67	3.87	.29	.87	.00	9.69	3.08	4.49	7.57	17.26	
MANAGER'S PICKUP	26,000.00	5	800	3.50	1.90	.14	.43	.00	5.97	.63	4.14	4.77	10.74	
LABOR'S PICKUP	12,000.00	5	400	4.50	1.50	.11	.34	.00	6.45	1.88	6.21	8.09	14.54	
SERVICE TRUCK	7,000.00	8	150	5.42	2.00	.15	.45	.00	8.02	2.67	6.21	8.88	16.89	
4BTM PLOW	7,500.00	8	250	2.90	1.47	.11	.33	.00	4.81	4.00	.00	4.00	8.81	
15' SHREDDER	15,000.00	15	150	5.60	4.64	.35	1.04	.00	11.63	5.67	.00	5.67	17.30	
18' OFFSET DISC	20,000.00	10	250	6.60	3.76	.28	.85	.00	11.49	5.80	.00	5.80	17.29	
20' PACKER	4,200.00	7	250	1.92	.81	.06	.18	.00	2.97	1.20	.00	1.20	4.17	
7' PACKER	2,200.00	10	250	.72	.42	.03	.09	.00	1.26	.48	.00	.48	1.74	
8-ROW MILTON PLANTR	22,500.00	12	110	13.71	9.78	.73	2.20	.00	26.43	10.91	.00	10.91	37.34	
SEEDBED MAKER	15,000.00	15	110	7.27	6.55	.49	1.47	.00	15.78	8.18	.00	8.18	23.96	
8-ROW CULTIVATOR	9,000.00	10	175	4.23	2.42	.18	.55	.00	7.38	3.43	.00	3.43	10.81	
8-ROW CORRUGATOR	1,500.00	15	150	.53	.48	.04	.11	.00	1.16	.33	.00	.33	1.49	
HEADLANDER	2,000.00	15	300	.36	.32	.02	.07	.00	.77	1.33	.00	1.33	2.10	
8' BLADE	3,500.00	20	50	2.80	3.36	.25	.76	.00	7.17	.80	.00	.80	7.97	
15' RIPPER	5,000.00	10	70	5.71	3.43	.26	.77	.00	10.17	7.14	.00	7.14	17.31	
4-BED ONION LIFT	5,000.00	10	50	8.00	4.80	.36	1.08	.00	14.24	.80	.00	.80	15.04	
WINDROWER	13,000.00	10	80	13.75	7.50	.56	1.69	.00	23.50	2.50	.00	2.50	26.00	
SPRAY TANK & PUMP	2,000.00	10	50	4.00	1.60	.12	.36	.00	6.08	1.00	.00	1.00	7.08	
				ACRES COVERED-----					-----COST PER ACRE-----					
IRRIGATION TUBES	8.00	5	1	1.60	.00	.00	.00	.00	1.60	.00	.00	.00	1.60	
IRRIGATION DAMS	2.00	2	1	1.00	.00	.00	.00	.00	1.00	.00	.00	.00	1.00	
FISH FEEDER (PAM)	250.00	5	30	1.67	.33	.03	.08	.00	2.10	.00	.00	.00	2.10	
MACHINE SHED & SHOP	60,000.00	30	950	2.11	2.53	.19	.57	.00	5.39	.00	.00	.00	5.39	
SHOP TOOLS	25,000.00	15	950	1.75	1.05	.08	.24	.00	3.12	.00	.00	.00	3.12	
TANKS & CONTAINMENT	17,000.00	20	950	.89	.72	.05	.16	.00	1.83	.00	.00	.00	1.83	

APPENDIX B

BUDGET TABLES FOR

PRODUCING ONIONS UNDER

CENTER PIVOT IRRIGATION

TABLE 1CP. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ONIONS, FOLLOWING WHEAT, UNDER CENTER PIVOT IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	VARIABLE COST						TOTAL VARIABLE COST	TOTAL COST
						TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
						\$	\$	\$	\$	\$	\$	\$	\$
SHRED STUBBLE	140HP-WT, 15' SHREDDER	FALL	2003	.50	.55	14.51	8.28	9.90	.00	.00	1.33	19.51	34.02
RIP	200HP-WT, 15' RIPPER	FALL	2003	.25	.28	6.72	5.81	4.95	.00	.00	.79	11.55	18.27
SOIL TEST	SOIL CONSULTANT	FALL	2003	.00	.00	.00	.00	.00	5.00	.00	.37	5.37	5.37
APPLY LIME	CUSTOM APPLIED @ NO CHARGE	FALL	2003	.00	.00	.00	.00	.00	.00	90.00	6.60	96.60	96.60
PLANT COVER CROP	AERIAL APPLICATION	FALL	2003	.00	.00	.00	.00	.00	7.50	12.00	1.43	20.93	20.93
FUMIGATE FIELD	CUSTOM APPLIED	FALL	2003	.00	.00	.00	.00	.00	45.00	120.75	12.16	177.91	177.91
FERT/STRIP TILL	200HP-WT, 15' STRIP ROTOVATOR	MAR	2004	.25	.30	6.92	5.69	5.40	.00	150.00	7.52	168.61	175.52
PLANT/INSEC/FERT	140'HP-WT, 8-ROW MILTON PLANTR	MAR	2004	.25	.30	10.95	5.45	5.40	.00	322.94	15.58	349.36	360.32
IRRIGATE	CENTER PIVOT IRRIGATION SYSTEM	SEA	2004	.00	1.00	.00	.00	18.00	100.00	47.00	6.60	171.60	171.60
FERTIGATE	CENTER PIVOT IRRIGATION SYSTEM	SEA	2004	.00	.00	.00	.00	.00	.00	150.00	6.00	156.00	156.00
PRE-EMERGE HERB.	CUSTOM APPLIED	APR	2004	.00	.00	.00	.00	.00	7.50	7.05	.58	15.13	15.13
CULTIVATE	140HP-WT, 8-ROW CULTIVATOR	MAY	2004	.25	.28	6.19	3.58	4.95	.00	.00	.28	8.82	15.01
POST-EMER HB(2X)	CENTER PIVOT IRRIGATION SYSTEM	MAY	2004	.00	.00	.00	.00	.00	.00	31.44	1.05	32.49	32.49
APPLY INSECTICID	85HP-WT, SPRAYER	MAY	2004	.10	.12	1.58	.86	2.16	.00	10.41	.45	13.87	15.45
BACTERICIDE (5X)	CENTER PIVOT IRRIGATION	MAY-AUG	2004	.00	.00	.00	.00	.00	.00	30.00	.60	30.60	30.60
WEED FIELD	CONTRACTED HAND LABOR	JUN	2004	.00	.00	.00	.00	.00	100.00	.00	2.67	102.67	102.67
SOIL TEST	SOIL CONSULTANT	JUN	2004	.00	.00	.00	.00	.00	5.00	.00	.13	5.13	5.13
RESERVOIR TILL	200HP-WT, 8-ROW RESERVOIR-TILLR	JUN	2004	.16	.19	4.65	4.07	3.42	.00	.00	.20	7.69	12.34
CHEMIGATE	CENTER PIVOT IRRIGATION SYSTEM	JUN	2004	.00	.00	.00	.00	.00	.00	36.92	.98	37.90	37.90
HERBIGATE	CENTER PIVOT IRRIGATION SYSTEM	JUN	2004	.00	.00	.00	.00	.00	.00	4.84	.13	4.97	4.97
WEED FIELD	CONTRACTED HAND LABOR	JUL	2004	.00	.00	.00	.00	.00	100.00	.00	2.00	102.00	102.00
APPLY HERBICIDE	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	12.28	.40	20.18	20.18
APPLY INSECTICID	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	28.93	.73	37.16	37.16
CHEMIGATE	CENTER PIVOT IRRIGATION SYSTEM	AUG	2004	.00	.00	.00	.00	.00	.00	36.92	.49	37.41	37.41
SPROUT INHB/FUNG	AERIAL APPLICATION	AUG	2004	.00	.00	.00	.00	.00	7.50	25.55	.44	33.49	33.49
LIFT ONIONS	85HP-WT, 4-BED ONION LIFTER	SEP	2004	.43	.47	10.26	3.59	8.49	.00	.00	.08	12.15	22.41
WINDROW	140HP-WT, WINDROWER	SEP	2004	.29	.31	11.68	3.83	5.66	.00	.00	.06	9.55	21.23
HARVEST ONIONS	CUSTOM HARVEST	SEP	2004	.00	.00	.00	.00	.00	157.50	.00	1.05	158.55	158.55
HAUL ONIONS	CUSTOM HAULING	SEP	2004	.00	.00	.00	.00	.00	201.25	.00	1.34	202.59	202.59
MISC. USE	MANAGER'S PICKUP	ANN	2004	.75	.82	4.48	3.57	14.85	.00	.00	.74	19.16	23.64
MISC. USE	LABOR'S PICKUP	ANN	2004	.75	.82	4.84	6.06	14.85	.00	.00	.84	21.75	26.59
MISC. USE	SERVICE TRUCK	ANN	2004	.20	.00	1.60	1.78	.00	.00	.00	.07	1.85	3.45
MISC. USE	MACHINE SHED & SHOP	ANN	2004	.00	.00	5.39	.00	.00	.00	.00	.00	.00	5.39
MISC. USE	SHOP TOOLS	ANN	2004	.00	.00	3.12	.00	.00	.00	.00	.00	.00	3.12
MISC. USE	TANKS AND CONTAINMENTS	ANN	2004	.00	.00	1.83	.00	.00	.00	.00	.00	.00	1.83
LAND COST	LAND RENT	ANN	2004	.00	.00	400.00	.00	.00	.00	.00	.00	.00	400.00
OVERHEAD	LEGAL, UTILITIES, ACCT., ETC.	ANN	2004	.00	.00	.00	.00	.00	104.63	.00	.00	104.63	104.63
MANAGEMENT	7% OF GROSS RETURN	ANN	2004	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00
TOTAL PER ACRE				4.17	5.45	644.72	52.56	98.02	855.88	1117.02	73.68	2197.16	2841.88

Table 2CP. Materials and Services Used by Operation for Producing Onions Under Center Pivot Irrigation.

Operation		Material and/or Service
Soil Test	Fall	Soil consultant @ \$5.00/acre
Apply Lime	Fall	1.5 tons @ \$60.00/ton (no charge for application)
Plant Cover Crop	Fall	Aerial application @ \$7.50/acre Wheat seed @ \$12.00/acre
Fumigate Field	Fall	Custom fumigation @ \$45.00/acre 37.5 gal. of metham sodium @ \$3.22/gal.
Fertilize/Strip Till	March	Pre-plant fertilizer @ \$150/acre
Plant/Insecticide/ Fertilize	March	6.5 lbs. of Lorsban 15G @ \$1.99/lb. Onion seed @ \$250.00/acre Fertilizer @ \$60.00/acre
Irrigate	Season	Water charge @ \$50.00/acre Electrical charge @ \$50.00/acre Irrigation repair @ \$15.00/acre Liquichlor @ \$32.00/acre
Fertigate	Season	Fertilizer @ \$150/acre
Apply Pre-Emergent Herbicide	April	Custom applied @ \$7.50/acre 1.5 pints of glyphosphate @ \$4.55/pint 0.1 pint of surfactant @ \$2.22/pint
Apply Post-Emergent Herbicide (2X)	May	10 ounces of Goal 2XL, per application @ \$.90/oz. 12 ounces of Buctril, per application @ \$.56/oz.
Apply Insecticide	May	3.8 ounces of Warrior @ \$2.68/ounce 0.1 pint of surfactant @ \$2.22/pint
Apply Bactericide (5X)	May-Aug	1.5 lbs. of ManKocide per application @ \$4.00/lb.
Weed Field	June	Contracted hand labor @ \$100.00/acre
Soil Test	June	Soil consultant @ \$5.00/acre
Chemigate	June	4.0 pints of Vydate @ \$9.23/pint
Herbigate	June	1.5 pints of Prowl @ \$3.23/pint
Weed Field	July	Contracted hand labor @ \$100.00/acre

Table 2CP. Materials and Services Used by Operation for Producing Onions Under Center Pivot Irrigation (continued).

Operation		Material and/or Service
Apply Herbicide	July	Aerial application @ \$7.50/acre 6 ounces of Select @ \$1.83/oz. 26 ounces of crop oil @ \$.05/oz.
Apply Insecticide/ Fungicide	July	Aerial application @ \$7.50/acre 3 pints of Lannate @ \$7.51/pint 2.0 lbs. of mancozeb @ \$3.09/lb. 0.1 pint of surfactant @ \$2.22/pint
Chemigate	July	4.0 pints of Vydate @ \$9.23/pint.
Apply Sprout Inhibitor	August	Aerial application @ \$7.50/acre 10.6 pints of maleic hydrazide @ \$2.41/pint
Harvest Onions	September	Custom harvest of 35 tons @ \$4.50/ton
Haul Onions	September	Custom haul of 35 tons @ \$5.75/ton
Overhead	Annual	5% of variable cost

TABLE 3CP. ITEMIZED COST PER ACRE FOR PRODUCING ONIONS,
 FOLLOWING WHEAT, UNDER CENTER PIVOT IRRIGATION
 IN THE COLUMBIA BASIN, WASHINGTON, 2004.

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	5.00	2.00	10.00	_____
CUSTOM FUMIGATE	ACRE	45.00	1.00	45.00	_____
METHAM SODIUM	GAL.	3.22	37.50	120.75	_____
WHEAT SEED	ACRE	12.00	1.00	12.00	_____
ONION SEED	ACRE	250.00	1.00	250.00	_____
PRE-PLANT FERTILIZER	ACRE	150.00	1.00	150.00	_____
FERTILIZER	ACRE	60.00	1.00	60.00	_____
FERTIGATE MATERIAL	ACRE	150.00	1.00	150.00	_____
CUSTOM APPLIED	ACRE	7.50	1.00	7.50	_____
CUSTOM AERIAL	ACRE	7.50	4.00	30.00	_____
LIME	TON	60.00	1.50	90.00	_____
LORSBAN 15G	LB.	1.99	6.50	12.94	_____
GLYPHOSPHATE	PINT	4.55	1.50	6.82	_____
SURFACTANT	PINT	2.22	.30	.66	_____
WARRIOR	OZ.	2.68	3.80	10.18	_____
GOAL	OZ.	.90	20.00	18.00	_____
BUCTRIL	OZ.	.56	24.00	13.44	_____
PROWL	PINT	3.23	1.50	4.84	_____
VYDATE	PINT	9.23	8.00	73.84	_____
SELECT	OZ.	1.83	6.00	10.98	_____
CROP OIL	OZ.	.05	26.00	1.30	_____
LANNATE	PINT	7.51	3.00	22.53	_____
MANCOZEB	LB.	3.09	2.00	6.18	_____
MANKOCIDE	LB.	4.00	7.50	30.00	_____
MALEIC-HYDRAZIDE	PINT	2.41	10.60	25.55	_____
LIQUICHLOR	ACRE	32.00	1.00	32.00	_____
CONTRACT WEEDING	ACRE	100.00	2.00	200.00	_____
WATER CHARGE	ACRE	50.00	1.00	50.00	_____
ELECTRICITY	ACRE	50.00	1.00	50.00	_____
IRRIGATION REPAIR	ACRE	15.00	1.00	15.00	_____
MACHINERY REPAIRS	ACRE	24.64	1.00	24.64	_____
MACHINE FUEL/LUBE	ACRE	27.91	1.00	27.91	_____
LABOR	HOUR	18.00	5.45	98.02	_____
CUSTOM HARVEST	TON	4.50	35.00	157.50	_____
CUSTOM HAUL	TON	5.75	35.00	201.25	_____
INTEREST ON OP. CAP.	ACRE	73.68	1.00	73.68	_____
OVERHEAD	ACRE	104.63	1.00	104.63	_____
TOTAL VARIABLE COST				2197.16	_____

FIXED COSTS		\$		\$	
MACHINE DEPRECIATION	ACRE	48.85	1.00	48.85	_____
MACHINE INTEREST	ACRE	35.28	1.00	35.28	_____
MACHINE INSURANCE	ACRE	2.65	1.00	2.65	_____
MACHINE TAXES	ACRE	7.94	1.00	7.94	_____
MANAGEMENT	ACRE	150.00	1.00	150.00	_____
LAND RENT	ACRE	400.00	1.00	400.00	_____
TOTAL FIXED COST				644.72	_____
TOTAL COST				2841.88	_____

TABLE 4CP. BREAK-EVEN SELLING PRICE PER TON AT VARIOUS YIELD LEVELS FOR ONIONS GROWN UNDER CENTER PIVOT IRRIGATION.

	-----YIELD LEVEL-----					
	24 TONS \$	28 TONS \$	32 TONS \$	35 TONS \$	36 TONS \$	40 TONS \$
B-E PRICE NECESSARY TO COVER VARIABLE COSTS	86.62	75.78	67.65	62.78	61.33	56.27
B-E PRICE NECESSARY TO COVER TOTAL COSTS	113.48	98.80	87.80	81.20	79.24	72.39

TABLE 5CP. RETURNS PER TON TO MANAGEMENT AND RISK AT VARIOUS PRICE AND YIELD LEVELS FOR ONIONS GROWN UNDER CENTER PIVOT IRRIGATION.

PRICE PER TON	-----YIELD LEVEL-----					
	24 TONS \$	28 TONS \$	32 TONS \$	35 TONS \$	36 TONS \$	40 TONS \$
\$70	-893	-657	-420	-242	-183	54
\$75	-773	-517	-260	-67	-3	254
\$80	-653	-377	-100	108	177	454
\$85	-533	-237	60	283	357	654
\$90	-413	-97	220	458	537	854
\$95	-293	43	380	633	717	1,054
\$100	-173	183	540	808	897	1,254

TABLE 7CP. HOURLY AND PER ACRE MACHINERY COSTS FOR PRODUCING ONIONS UNDER CENTER PIVOT IRRIGATION.

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPREC-IATION	INTER-EST	INSUR-ANCE	TAXES	HOUSING	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
	\$								-----COST PER HOUR-----				
200HP-WT	115,000.00	15	800	8.08	6.65	.50	1.50	.00	16.73	4.12	11.96	16.09	32.81
140HP-WT	90,000.00	15	600	8.11	7.13	.54	1.61	.00	17.38	4.17	6.73	10.89	28.28
85HP-WT	50,000.00	15	600	4.67	3.87	.29	.87	.00	9.69	3.08	4.49	7.57	17.26
MANAGER'S PICKUP	26,000.00	5	800	3.50	1.90	.14	.43	.00	5.97	.63	4.14	4.77	10.74
LABOR'S PICKUP	12,000.00	5	400	4.50	1.50	.11	.34	.00	6.45	1.88	6.21	8.09	14.54
SERVICE TRUCK	7,000.00	8	150	5.42	2.00	.15	.45	.00	8.02	2.67	6.21	8.88	16.89
15' SHREDDER	15,000.00	15	150	5.60	4.64	.35	1.04	.00	11.63	5.67	.00	5.67	17.30
8-ROW MILTON PLANTR	22,500.00	12	110	13.71	9.78	.73	2.20	.00	26.43	10.91	.00	10.91	37.34
8-ROW CULTIVATOR	9,000.00	10	175	4.23	2.42	.18	.55	.00	7.38	3.43	.00	3.43	10.81
15' RIPPER	5,000.00	10	70	5.71	3.43	.26	.77	.00	10.17	7.14	.00	7.14	17.31
15' STRIP ROTOVATOR	14,000.00	15	150	5.60	4.11	.31	.92	.00	10.94	6.67	.00	6.67	17.61
8-ROW RESERV-TILLER	16,000.00	15	150	5.69	5.12	.38	1.15	.00	12.34	9.33	.00	9.33	21.68
4-BED ONION LIFT	5,000.00	10	50	8.00	4.80	.36	1.08	.00	14.24	.80	.00	.80	15.04
WINDROWER	13,000.00	10	80	13.75	7.50	.56	1.69	.00	23.50	2.50	.00	2.50	26.00
SPRAY TANK & PUMP	2,000.00	10	50	4.00	1.60	.12	.36	.00	6.08	1.00	.00	1.00	7.08
			ACRES COVERED						-----COST PER ACRE-----				
MACHINE SHED & SHOP	60,000.00	30	950	2.11	2.53	.19	.57	.00	5.39	.00	.00	.00	5.39
SHOP TOOLS	25,000.00	15	950	1.75	1.05	.08	.24	.00	3.12	.00	.00	.00	3.12
TANKS & CONTAINMENT	17,000.00	20	950	.89	.72	.05	.16	.00	1.83	.00	.00	.00	1.83

APPENDIX C

BUDGET TABLES FOR

PRODUCING ONIONS UNDER

DRIP IRRIGATION

TABLE 1DRIP. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ONIONS, FOLLOWING WHEAT, UNDER DRIP IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	VARIABLE COST						TOTAL VARIABLE COST	TOTAL COST
						TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
						\$	\$	\$	\$	\$	\$	\$	\$
SHRED STUBBLE	140HP-WT, 15' SHREDDER	FALL	2003	.50	.55	14.51	8.28	9.90	.00	.00	1.33	19.51	34.02
DISC/PACK	200HP-WT, 18' DISC/20' PACKER	FALL	2003	.10	.11	3.12	2.31	1.98	.00	.00	.31	4.60	7.72
CORRUGATE	140HP-WT, 8-ROW CORRUGATOR	FALL	2003	.13	.14	2.32	1.40	2.47	.00	.00	.28	4.16	6.48
MAKE HEADLAND	85HP-WT, HEADLANDER	FALL	2003	.05	.05	.52	.45	.60	.00	.00	.08	1.13	1.65
MAKE DRAIN	140HP-WT, 8' BLADE	FALL	2003	.05	.05	1.23	.58	.60	.00	.00	.09	1.28	2.50
RILL IRRIGATE	IRRIGATOR LABOR, TUBES & DAMS	FALL	2003	.00	.80	.26	.00	11.20	5.00	.40	1.22	17.82	18.08
SOIL TEST	SOIL CONSULTANT	FALL	2003	.00	.00	.00	.00	.00	5.00	.00	.37	5.37	5.37
APPLY LIME	NO CHARGE APPLICATION	FALL	2003	.00	.00	.00	.00	.00	.00	90.00	6.60	96.60	96.60
DISC/PACK	200HP-WT, 18' DISC/20' PACKER	FALL	2003	.10	.11	3.12	2.31	1.98	.00	.00	.31	4.60	7.72
FUMIGATE FIELD	CUSTOM APPLIED	FALL	2003	.00	.00	.00	.00	.00	45.00	120.75	12.16	177.91	177.91
FERTILIZE	CUSTOM APPLIED	MAR	2004	.00	.00	.00	.00	.00	6.50	80.00	4.04	90.54	90.54
PLOW/PACK	140HP-WT, 4BTM PLOW/7' PACKER	MAR	2004	.40	.44	9.38	6.15	7.92	.00	.00	.66	14.73	24.11
DISK/PACK (2X)	200HP-WT, 18' DISC/20' PACKER	MAR	2004	.20	.22	6.24	4.62	3.96	.00	.00	.40	8.98	15.21
REFINE SEEDBED	140HP-WT, SEEDBED MAKER	MAR	2004	.33	.37	11.06	6.36	6.60	.00	.00	.60	13.56	24.62
LAY TAPE	140HP-WT, TAPE INJECTOR	MAR	2004	.25	.83	6.44	3.08	11.00	30.00	270.00	14.66	328.74	335.18
PLANT/INSECT.	140HP-WT, 8-ROW MILTON PLANTER	MAR	2004	.25	.30	10.95	5.45	5.40	.00	262.94	12.78	286.56	297.52
LAY FLAT TAPE	85HP-WT, LAY FLAT MACHINE	MAR	2004	.13	.41	2.03	1.08	5.50	.00	.00	.31	6.89	8.92
IRRIG ASSEMBLY	CUSTOM ASSEMBLED	MAR	2004	.00	.00	.00	.00	.00	35.00	.00	1.63	36.63	36.63
IRRIGATE	DRIP IRRIGATION	SEA	2004	.00	3.50	91.20	100.00	49.00	108.00	.00	10.28	267.28	358.48
PRE-EMERGE HERB.	CUSTOM APPLIED	APR	2004	.00	.00	.00	.00	.00	7.50	7.05	.58	15.13	15.13
FERTIGATE	DRIP IRRIGATION SYSTEM	SEA	2004	.00	.00	.00	.00	.00	.00	265.00	10.60	275.60	275.60
POST-EMER HB(2X)	CUSTOM GROUND APPLICATION	MAY	2004	.00	.00	.00	.00	.00	15.00	31.44	1.55	47.99	47.99
APPLY INSECT.	85HP-WT, SPRAYER	MAY	2004	.10	.12	1.58	.86	2.16	.00	10.41	.45	13.87	15.45
WEED FIELD	CONTRACTED HAND LABOR	JUN	2004	.00	.00	.00	.00	.00	100.00	.00	2.67	102.67	102.67
SOIL TEST	SOIL CONSULTANT	JUN	2004	.00	.00	.00	.00	.00	5.00	.00	.13	5.13	5.13
APPLY HERBICIDE	AERIAL APPLICATION	JUN	2004	.00	.00	.00	.00	.00	7.50	4.84	.33	12.67	12.67
CHEMIGATE	DRIP IRRIGATION SYSTEM	JUN	2004	.00	.00	.00	.00	.00	.00	36.92	.98	37.90	37.90
APPLY FUNGICIDE	CUSTOM GROUND APPLICATION	JUN	2004	.00	.00	.00	.00	.00	7.50	13.58	.56	21.64	21.64
WEED FIELD	CONTRACTED HAND LABOR	JUL	2004	.00	.00	.00	.00	.00	100.00	.00	2.00	102.00	102.00
APPLY HERBICIDE	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	12.28	.40	20.18	20.18
APPLY INSECT/FUNG	AERIAL APPLICATION	JUL	2004	.00	.00	.00	.00	.00	7.50	16.59	.48	24.57	24.57
CHEMIGATE	DROP IRRIGATION SYSTEM	AUG	2004	.00	.00	.00	.00	.00	.00	36.92	.49	37.41	37.41
APPLY FUNGICIDE	AERIAL APPLICATION	AUG	2004	.00	.00	.00	.00	.00	7.50	13.58	.28	21.36	21.36
SPROUT INHB/FUNG	AERIAL APPLICATION	AUG	2004	.00	.00	.00	.00	.00	7.50	31.73	.52	39.75	39.75
LAY FLAT RETRIEV	85HP-WT, LAY FLAT MACHINE	SEP	2004	.13	.41	2.03	1.08	4.54	.00	.00	.04	5.66	7.69
TAPE REMOVABLE	85HP-WT, REMOVAL TOOL	SEP	2004	.33	1.10	7.79	3.08	12.10	.00	.00	.10	15.28	23.07
TAPE DISPOSAL	PER ACRE COST	SEP	2004	.00	.00	.00	.00	.00	10.00	.00	.07	10.07	10.07
LIFT ONIONS	85HP-WT, 4-BED ONION LIFTER	SEP	2004	.43	.47	10.26	3.59	8.49	.00	.00	.08	12.15	22.41
WINDROW	140HP-WT, WINDROWER	SEP	2004	.29	.31	11.68	3.83	5.66	.00	.00	.06	9.55	21.23
HARVEST ONIONS	CUSTOM HARVEST	SEP	2004	.00	.00	.00	.00	.00	202.50	.00	1.35	203.85	203.85
HAUL ONIONS	CUSTOM HAULING	SEP	2004	.00	.00	.00	.00	.00	258.75	.00	1.73	260.48	260.48

TABLE 1DRIP. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ONIONS, FOLLOWING WHEAT, UNDER DRIP IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004, (CONTINUED).

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	VARIABLE COST						TOTAL VARIABLE COST	TOTAL COST							
						TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.									
													\$	\$	\$	\$	\$	\$	\$	\$
MISC. USE	MANAGER'S PICKUP	ANN	2004	.75	.82	4.48	3.57	14.85	.00	.00	.74	19.16	23.64							
MISC. USE	LABOR'S PICKUP	ANN	2004	.75	.82	4.84	6.06	14.85	.00	.00	.84	21.75	26.59							
MISC. USE	SERVICE TRUCK	ANN	2004	.20	.00	1.60	1.78	.00	.00	.00	.07	1.85	3.45							
MISC. USE	MACHINE SHED & SHOP	ANN	2004	.00	.00	5.39	.00	.00	.00	.00	.00	.00	5.39							
MISC. USE	SHOP TOOLS	ANN	2004	.00	.00	3.12	.00	.00	.00	.00	.00	.00	3.12							
MISC. USE	FUEL TANKS/CONTAINMENT	ANN	2004	.00	.00	1.83	.00	.00	.00	.00	.00	.00	1.83							
LAND COST	LAND RENT	ANN	2004	.00	.00	400.00	.00	.00	.00	.00	.00	.00	400.00							
OVERHEAD	LEGAL, UTILITIES, ACCT., ETC.	ANN	2004	.00	.00	.00	.00	.00	136.23	.00	.00	136.23	136.23							
MANAGEMENT	VALUE OF MANAGEMENT	ANN	2004	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00							
TOTAL PER ACRE				5.46	11.93	766.96	165.92	180.76	1114.48	1304.42	95.20	2860.78	3627.74							

Table 2Drip. Materials and Services Used by Operation for Producing Onions Under Drip Irrigation.

Operation		Material and/or Service
Rill Irrigate	Season	Water charge @ \$5.00/acre Irrigation repair @ \$.40/acre
Soil Test	Fall	Soil consultant @ \$5.00/acre
Apply Lime	Fall	1.5 tons @ \$60.00/ton (no charge for application)
Fumigate Field	Fall	Custom fumigation @ \$45.00/acre 37.5 gal. of metham sodium @ \$3.22/gal.
Fertilize	March	Custom applied @ \$6.50/acre Pre-plant fertilizer @ \$80.00/acre
Lay Tape	March	Design cost @ \$30.00/acre. Drip tape @ \$270.00/acre
Plant/Insecticide/ Corrugate	March	6.5 lbs. of Lorsban 15G @ \$1.99/lb. Onion seed @ \$250.00/acre
Irrigation Assembly	March	Custom assembled @ \$35.00/acre
Irrigate	Season	Water monitor @ \$18.00/acre. Water charge @ \$50.00/acre. Electricity @ \$40.00/acre
Apply Pre-Emergent Herbicide	April	Custom applied @ \$7.50/acre 1.5 pints of glyphosphate @ \$4.55/pint 0.1 pint of surfactant @ \$2.22/pint
Fertigate	Season	Fertilizer @ \$255.00/acre Drip line cleaner @ \$10/acre
Apply Post-Emergent Herbicide (2X)	May	Ground application @ \$7.50/acre, per application 10 ounces of Goal 2XL, per application @ \$.90/oz. 12 ounces of Buctril, per application @ \$.56/oz.
Apply Insecticide	May	3.8 ounces of Warrior @ \$2.68/ounce 0.1 pint of surfactant @ \$2.22/pint
Weed Field	June	Contracted hand labor @ \$100.00/acre
Soil Test	June	Soil consultant @ \$5.00/acre

Table 2Drip. Materials and Services Used by Operation for Producing Onions
Under Drip Irrigation (continued).

Operation		Material and/or Service
Apply Herbicide	June	Aerial application @ \$7.50/acre 1.5 pints of Prowl @ \$3.23/pint
Chemigate	June	4.0 pints of Vydate @ \$9.23/pint
Apply Fungicide	June	Custom applied @ \$7.50/acre 2.0 pints of chlorothalonil @ \$6.68/pint 0.1 pint of surfactant @ \$2.22/pint
Weed Field	July	Contracted hand labor @ \$100.00/acre
Apply Herbicide	July	Aerial application @ \$7.50/acre 6 ounces of Select @ \$1.83/oz. 26 ounces of crop oil @ \$.05/oz.
Apply Insecticide/ Fungicide	July	Aerial application @ \$7.50/acre 3.8 ozs. of Warrior @ \$2.68/oz. 2.0 lbs. of mancozeb @ \$3.09/lb. 0.1 pint of surfactant @ \$2.22/pint
Chemigate	August	4.0 pints of Vydate @ \$9.23/pint
Apply Fungicide	August	Aerial application @ \$7.50/acre 2.0 pints of chlorothalonil @ \$6.68/pint 0.1 pint of surfactant @ \$2.22/pint
Apply Sprout Inhibitor/Fungicide	August	Aerial application @ \$7.50/acre 10.6 pints of maleic hydrazide @ \$2.41/pint 2.0 lbs. of mancozeb @ \$3.09/lb.
Tape disposal	September	\$10.00 per acre
Harvest Onions	September	Custom harvest of 45 tons @ \$4.50/ton
Haul Onions	September	Custom haul of 45 tons @ \$5.75/ton
Overhead	Annual	5% of variable cost

TABLE 3DRIP. ITEMIZED COST PER ACRE FOR PRODUCING ONIONS,
 FOLLOWING WHEAT, UNDER DRIP IRRIGATION IN THE
 COLUMBIA BASIN, WASHINGTON, 2004

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM
VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	5.00	2.00	10.00	_____
CUSTOM FUMIGATE	ACRE	45.00	1.00	45.00	_____
METHAM SODIUM	GAL.	3.22	37.50	120.75	_____
DESIGN COST	ACRE	30.00	1.00	30.00	_____
IRRIGATION ASSEMBLY	ACRE	35.00	1.00	35.00	_____
DRIP TAPE	ACRE	270.00	1.00	270.00	_____
CUSTOM FERTILIZE	ACRE	6.50	1.00	6.50	_____
PRE-PLANT FERTILIZER	ACRE	80.00	1.00	80.00	_____
FERTIGATE MATERIAL	ACRE	255.00	1.00	255.00	_____
DRIP LINE CLEANER	ACRE	10.00	1.00	10.00	_____
ONION SEED	ACRE	250.00	1.00	250.00	_____
CUSTOM APPLICATION	ACRE	7.50	4.00	30.00	_____
CUSTOM AERIAL	ACRE	7.50	5.00	37.50	_____
LIME	ACRE	60.00	1.50	90.00	_____
GLYPHOSPHATE	PINT	4.55	1.50	6.82	_____
LORSBAN 15G	LB.	1.99	6.50	12.94	_____
SURFACTANT	PINT	2.22	.50	1.11	_____
GOAL	OZ.	.90	20.00	18.00	_____
BUCTRIL	OZ.	.56	24.00	13.44	_____
WARRIOR	OZ.	2.68	7.60	20.36	_____
CHLOROTHALONIL	PINT	6.68	4.00	26.72	_____
VYDATE	PINT	9.23	8.00	73.84	_____
PROWL	PINT	3.23	1.50	4.84	_____
SELECT	OZ.	1.83	6.00	10.98	_____
CROP OIL	OZ.	.05	26.00	1.30	_____
MACOZEB	LB.	3.09	4.00	12.36	_____
MALEIC-HYDRAZIDE	PINT	2.41	10.60	25.55	_____
CONTRACT WEEDING	ACRE	100.00	2.00	200.00	_____
WATER CHARGE	ACRE	50.00	1.10	55.00	_____
WATER MONITOR	ACRE	18.00	1.00	18.00	_____
ELECTRICAL CHARGE	ACRE	40.00	1.00	40.00	_____
TAPE DISPOSAL	ACRE	10.00	1.00	10.00	_____
CUSTOM HARVEST	TON	4.50	45.00	202.50	_____
CUSTOM HAUL	TON	5.75	45.00	258.75	_____
MACHINERY REPAIRS	ACRE	132.16	1.00	132.16	_____
MACHINE FUEL/LUBE	ACRE	33.75	1.00	33.75	_____
RILL IRRIGA. REPAIR	ACRE	4.00	.10	.40	_____
RILL IRRIGA. LABOR	HOUR	14.00	.80	11.20	_____
HAND LABOR	HOUR	11.00	4.45	48.92	_____
LABOR(TRAC/MACH)	HOUR	18.00	6.70	120.64	_____
INTEREST ON OP. CAP.	ACRE	95.20	1.00	95.20	_____
OVERHEAD	ACRE	136.23	1.00	136.23	_____
TOTAL VARIABLE COST				2860.78	_____
FIXED COSTS		\$		\$	
MACHINE DEPRECIATION	ACRE	124.28	1.00	124.28	_____
MACHINE INTEREST	ACRE	71.29	1.00	71.29	_____
MACHINE INSURANCE	ACRE	5.35	1.00	5.35	_____
MACHINE TAXES	ACRE	16.04	1.00	16.04	_____
MANAGEMENT	ACRE	150.00	1.00	150.00	_____
LAND RENT	ACRE	400.00	1.00	400.00	_____
TOTAL FIXED COST				766.96	_____
TOTAL COST				3627.74	_____

TABLE 4DRIP. BREAK-EVEN SELLING PRICE PER TON AT VARIOUS YIELD LEVELS FOR ONIONS GROWN UNDER DRIP IRRIGATION.

	-----YIELD LEVEL-----						
	24 TONS	30 TONS	35 TONS	40 TONS	45 TONS	50 TONS	55 TONS
	\$	\$	\$	\$	\$	\$	\$
B-E PRICE NECESSARY TO COVER VARIABLE COSTS	109.78	89.98	78.66	70.17	63.57	58.29	53.97
B-E PRICE NECESSARY TO COVER TOTAL COSTS	141.74	115.54	100.58	89.35	80.62	73.63	67.92

TABLE 5DRIP. RETURNS PER ACRE TO MANAGEMENT AND RISK AT VARIOUS PRICE AND YIELD LEVELS FOR ONIONS GROWN UNDER DRIP IRRIGATION.

	-----YIELD LEVEL-----						
PRICE PER TON	24 TONS	30 TONS	35 TONS	40 TONS	45 TONS	50 TONS	55 TONS
	\$	\$	\$	\$	\$	\$	\$
\$70	-1,572	-1,216	-920	-624	-328	-32	265
\$75	-1,451	-1,066	-745	-424	-103	218	540
\$80	-1,332	-916	-570	-224	122	468	815
\$85	-1,212	-766	-395	-24	347	718	1,090
\$90	-1,092	-616	-220	176	572	968	1,365
\$95	-972	-466	-45	376	797	1,218	1,640
\$100	-852	-316	129	576	1,022	1,468	1,915

TABLE 7DRIP. HOURLY AND PER ACRE MACHINERY COSTS FOR PRODUCING ONIONS UNDER DRIP IRRIGATION.

MACHINERY	PURCHASE PRICE	YEARS					INSUR-ANCE	TAXES	HOUSING	TOTAL		FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
		TO TRADE	ANNUAL HOURS	DEPREC-IATION	INTER-EST	FIXED COST				REPAIR	COST			
	\$									-----COST PER HOUR-----				
200HP-WT	115,000.00	15	800	8.08	6.65	.50	1.50	.00	16.73	4.12	11.96	16.09	32.81	
140HP-WT	90,000.00	15	600	8.11	7.13	.54	1.61	.00	17.38	4.17	6.73	10.89	28.28	
85HP-WT	50,000.00	15	600	4.67	3.87	.29	.87	.00	9.69	3.08	4.49	7.57	17.26	
MANAGER'S PICKUP	26,000.00	5	800	3.50	1.90	.14	.43	.00	5.97	.63	4.14	4.77	10.74	
LABOR'S PICKUP	12,000.00	5	400	4.50	1.50	.11	.34	.00	6.45	1.88	6.21	8.09	14.54	
SERVICE TRUCK	7,000.00	8	150	5.42	2.00	.15	.45	.00	8.02	2.67	6.21	8.88	16.89	
4BTM PLOW	7,500.00	8	250	2.90	1.47	.11	.33	.00	4.81	4.00	.00	4.00	8.81	
15' SHREDDER	15,000.00	15	150	5.60	4.64	.35	1.04	.00	11.63	5.67	.00	5.67	17.30	
18' OFFSET DISC	20,000.00	10	250	6.60	3.76	.28	.85	.00	11.49	5.80	.00	5.80	17.29	
20' PACKER	4,200.00	7	250	1.92	.81	.06	.18	.00	2.97	1.20	.00	1.20	4.17	
7' PACKER	2,200.00	10	250	.72	.42	.03	.09	.00	1.26	.48	.00	.48	1.74	
8-ROW MILTON PLANTR	22,500.00	12	110	13.71	9.78	.73	2.20	.00	26.43	10.91	.00	10.91	37.34	
SEEDBED MAKER	15,000.00	15	110	7.27	6.55	.49	1.47	.00	15.78	8.18	.00	8.18	23.96	
8-ROW CORRUGATOR	1,500.00	15	150	.53	.48	.04	.11	.00	1.16	.33	.00	.33	1.49	
HEADLANDER	2,000.00	15	300	.36	.32	.02	.07	.00	.77	1.33	.00	1.33	2.10	
8' BLADE	3,500.00	20	50	2.80	3.36	.25	.76	.00	7.17	.80	.00	.80	7.97	
4-BED ONION LIFT	5,000.00	10	50	8.00	4.80	.36	1.08	.00	14.24	.80	.00	.80	15.04	
WINDROWER	13,000.00	10	80	13.75	7.50	.56	1.69	.00	23.50	2.50	.00	2.50	26.00	
SPRAY TANK & PUMP	2,000.00	10	50	4.00	1.60	.12	.36	.00	6.08	1.00	.00	1.00	7.08	
TAPE LAYER	5,000.00	15	70	4.29	3.14	.24	.71	.00	8.37	1.43	.00	1.43	9.80	
LAY FLAT MACHINE	2,500.00	15	45	3.33	2.44	.18	.55	.00	6.51	1.11	.00	1.11	7.62	
TAPE REMOVAL MACH	7,000.00	15	60	7.00	5.13	.39	1.16	.00	13.67	1.67	.00	1.67	15.34	
				ACRES COVERED-----					-----COST PER ACRE-----					
IRRIGATION TUBES	8.00	5	1	1.60	.00	.00	.00	.00	1.60	.00	.00	.00	1.60	
IRRIGATION DAMS	2.00	2	1	1.00	.00	.00	.00	.00	1.00	.00	.00	.00	1.00	
IRRIG. PUMP&FILTERS	600.00	10	1	60.00	24.00	1.80	5.40	.00	91.20	100.00	.00	100.00	191.20	
MACHINE SHED & SHOP	60,000.00	30	950	2.11	2.53	.19	.57	.00	5.39	.00	.00	.00	5.39	
SHOP TOOLS	25,000.00	15	950	1.75	1.05	.08	.24	.00	3.12	.00	.00	.00	3.12	
TANKS & CONTAINMENT	17,000.00	20	950	.89	.72	.05	.16	.00	1.83	.00	.00	.00	1.83	

APPENDIX D

UNDERSTANDING AND USING WSU ONION ENTERPRISE BUDGETS

Understanding and Using WSU Onion Enterprise Budgets

The purpose of these onion budgets is to estimate the costs and returns of producing onions in the Columbia Basin for research and policy purposes and to provide producers and their credit providers with a tool to use in determining the financial requirements of the enterprise.

These budgets were assembled by a group of progressive producers in the area working with the area extension agent and a WSU extension economist. It is fully realized by those involved in this process that the resulting enterprise budgets do not represent any one particular farm and must be modified by individual producers to fit their situation. However, the resulting budgets are reasonable estimates for the area.

Producers reviewing these budgets most likely will state their own costs are lower than those presented. Furthermore, others outside the industry may question the cost estimates and “break-even” prices stating, “Since some WSU budgets show producers are operating at a loss, how do they stay in business?” To adequately address these concerns and questions, one must understand the difference between “economic” and “financial” budgets and how an economic budget can be used to develop a financial budget.

WSU enterprise budgets are economic budgets. The budget shown in Table 8, the estimated cost per acre for producing onions under rill irrigation is the same budget as shown in Table 3Rill, page 10, of this bulletin. In developing this budget, it was assumed that the representative farm includes 950 acres with 145 acres currently in onions. The onion yield for this budget is assumed to be 32 tons.

This budget indicates the total cost per acre to produce an acre of onions to be \$2,578 and that to break even the producer must clear \$80.58 per ton, net of marketing costs. Any price received above \$80.58 per ton is a return to the producer for risk incurred in producing the crop.

While individual producers may differ relative to the type and amount of inputs and the yield, the main sources of confusion are the cost of owned capital, labor, management, and land. To fully understand these onion budgets, one must understand the concept of opportunity costs.

Opportunity cost is the revenue lost by not investing in the next best similar risk alternative. For instance, if a producer invests \$50,000 of equity capital in equipment, the producer gives up the alternative of investing this money in the stock market or paying off a current loan. Thus, if the producer is to realize an “economic” profit, the equipment investment must realize a return greater than that associated with the next best alternative. If the next best alternative happens to be paying off a current loan with 9% annual interest, economic profits are not realized until a net return greater than \$4,500 is realized by the equipment investment. Thus, the onion enterprise budgets reflect an interest cost on both owned and borrowed capital.

**TABLE 8. COST OF PRODUCING ONIONS, FOLLOWING WHEAT, UNDER RILL
IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004
ECONOMIC BUDGET**

	UNIT	COST/ UNIT	QUANTITY	COST/ ACRE	COST/ 145 ACRES
VARIABLE COSTS		\$		\$	\$
SOIL TEST	ACRE	5.00	2.00	10.00	1,450.00
CUSTOM FUMIGATE	ACRE	45.00	1.00	45.00	6,525.00
METHAM SODIUM	GAL.	3.22	37.50	120.75	17,508.75
CUSTOM FERTILIZE	ACRE	6.50	1.00	6.50	942.50
PRE-PLANT FERTILIZER	ACRE	95.00	1.00	95.00	13,775.00
SIDE DRESS FERTILIZER	ACRE	30.00	2.00	60.00	8,700.00
ONION SEED	ACRE	250.00	1.00	250.00	36,250.00
CUSTOM AERIAL	ACRE	7.50	7.00	45.00	6,525.00
LIME	TON	60.00	1.50	90.00	13,050.00
LORSBAN 15G	LB.	1.99	6.50	12.94	1,875.58
GLYPHOSPHATE	PINT	4.55	1.50	6.83	989.63
SURFACTANT	PINT	2.22	0.50	1.11	160.95
WARRIOR	OZ.	2.68	11.40	30.55	4,430.04
PROWL	PINT	3.23	1.50	4.85	702.53
CHLOROTHALONIL	PINT	6.68	4.00	26.72	3,874.40
SELECT	OZ.	1.83	6.00	10.98	1,592.10
CROP OIL	OZ.	0.05	26.00	1.30	188.50
MANCOZEB	LB.	3.09	4.00	12.36	1,792.20
LANNATE	PINT	7.51	3.00	22.53	3,266.85
MALEIC-HYDRAZIDE	PINT	2.41	10.60	25.55	3,704.17
POLYACRYLAMIDE	LB.	2.95	2.00	5.90	855.50
CUSTOM SPRAY	ACRE	7.50	2.00	15.00	2,175.00
GOAL	OZ.	0.90	20.00	18.00	2,610.00
BUCTRIL	OZ.	0.56	24.00	13.44	1,948.80
CONTRACT WEEDING	ACRE	100.00	2.00	200.00	29,000.00
WATER CHARGE	ACRE	50.00	1.00	50.00	7,250.00
IRRIGATION REPAIR	ACRE	4.00	1.00	4.00	580.00
IRRIGATION LABOR	HOURL	14.00	8.00	112.00	16,240.00
MACHINERY REPAIRS	ACRE	37.54	1.00	37.54	5,443.30
MACHINE FUEL/LUBE	ACRE	39.32	1.00	39.32	5,701.40
LABOR (TRAC/MACH)	HOURL	18.00	6.76	122.22	17,721.90
CUSTOM HARVEST	TON	4.50	32.00	144.00	20,880.00
CUSTOM HAUL	TON	5.75	32.00	184.00	26,680.00
INTEREST ON OP. CAP.	ACRE	65.85	1.00	65.85	9,548.25
OVERHEAD	ACRE	94.46	1.00	94.46	13,696.87
TOTAL VARIABLE COST				1,983.68	287,634.20

FIXED COSTS		\$		\$	\$
MACHINE DEPRECIATION	ACRE	75.52	1.00	75.52	10,950.00
MACHINE INTEREST	ACRE	53.26	1.00	53.26	7,722.70
MACHINE INSURANCE	ACRE	4.00	1.00	4.00	580.00
MACHINE TAXES	ACRE	11.99	1.00	11.99	1,738.55
MANAGEMENT	ACRE	150.00	1.00	150.00	21,750.00
LAND RENT	ACRE	300.00	1.00	300.00	43,500.00
TOTAL FIXED COST				594.77	86,241.65
TOTAL COST				2,578.45	373,875.85

YIELD PER ACRE 32.00 TONS
PRICE \$80.00 PER TON

NET RETURNS -\$18.45 PER ACRE
NET RETURNS -\$2,675.85 PER TOTAL ACREAGE

VARIABLE COST
BREAK-EVEN PRICE \$61.99 PER TON

TOTAL COST
BREAK-EVEN PRICE \$80.58 PER TON

The same is true for operator labor and management, and owned land. In calculating labor and management costs, operator labor and management are valued at their opportunity cost of being hired out to a neighboring farmer, or the dollar amount it would cost to hire someone else to do the labor and management being furnished by the producer. For owned land, the opportunity cost included in the onion budgets is the rental rate the producer could rent the land for if not used by the producer to produce a crop.

Since most producers have equity in their farm business and provide labor and management associated with running their operation, in order to determine a given producer's costs excluding opportunity costs (i.e., financial costs), adjustments must be made to the "economic" onion budgets presented in this bulletin. Let us assume, for example, a producer in the Columbia Basin agrees with all the per acre onion budget figures for onions grown under rill irrigation except for the overhead, interest, management, machinery, labor, and land costs. The owner-operator farms a total of 500 acres and produces 80 acres of onions on land that is owned. The producer also owns all equipment and furnishes all management on the farm and has a full time irrigator but does approximately 50% of all machine work. This person has an outstanding real estate loan of \$95,000 on the 80 acres of land on which the onions are grown which carries 8% interest and is being paid off over a remaining 15-year period with annual principal and interest payments of \$11,099. The producer purchases approximately \$45,000 of machinery each year and currently has outstanding machinery loans of \$215,000 on which 6.5% interest is being paid. To make things simple, it is assumed that the farm equipment is used equally throughout the 500 acres regardless of the crops produced. The producer also carries approximately \$320,000 in operating loans for an average of 6 months per year at 7.5% annual interest and estimates an annual

overhead expense for the entire farm of approximately \$55,000 per year. The cost of the operating loans and overhead are also to be allocated equally over the 500 acres.

Table 9, a financial budget for the producer in the example above, is a modification of Table 8. In doing this modification, all opportunity costs on equity capital and unpaid operator labor and management are eliminated. The entries that have been modified from the economic budget are “bold” entries in Table 9. Overhead and machinery and building replacement cost were replaced with the actual cost experienced by the producer. Management cost was eliminated since the operator furnishes all management. All other modifications, with the exception of land cost, have to do with eliminating opportunity cost on equity capital and operator labor and including only interest and labor costs actually paid. In the case of land cost, although principal payments are not expenses, both the principal and interest payment on the land loan are included since principal payments are annual cash obligations that the enterprise must cover. In the case of machinery, the principal payments on the loans are covered by the annual “Machinery Purchases” cost figure.

The resulting budget is the financial (cash) cost of producing onions on a per acre basis for the producer in the given example. This budget indicates the total financial cost per acre to produce an acre of onions under rill irrigation to be \$2,169 and that to break even the producer must clear \$67.78 per ton, net of marketing cost. Any returns above these costs are returns to the operator’s management, labor, equity capital, and risk. In the above example, at a price of \$80 per ton, the producer is returning \$390.97 per acre to management, labor, equity capital and risk, before income and social security taxes are deducted.

Thus, it can be seen why producers who have sizable equity in their farm business can often “survive” at prices below those determined as break-even prices by “economic” crop enterprise budgets. However, it must still be realized that if the enterprise does not return full cost of production (financial and opportunity), the owner-operator is not earning a return on labor, management, and capital contributions equivalent to those that could be generated by the producer’s labor, management, and capital contributions if they had been invested in the next best similar risk alternative.

Onion Cost Excel Workbook

The Onion Cost Workbook that contains the Table 2 spreadsheets, including the financial budget for onions produced under rill irrigation, can be downloaded from the WSU Farm Management web site at <http://www.farm-mgmt.wsu.edu/>; select “Publication Links,” then “Irrigated Crops.” Or, you may go directly to the irrigated crops page at <http://www.farm-mgmt.wsu.edu/irr.htm>. The workbooks are listed directly below the extension bulletin, and are presented in both Excel and Quattro Pro formats. To download the Onion Cost Workbook, click on either the Excel file or the Quattro Pro file. Let the workbook come up in the selected program and save this workbook in a specified folder on your hard drive.

Once the Onion Cost Workbook is downloaded, go to the folder in which you stored this file on your hard drive and use it to generate budgets that better fit your own personal needs. It is recommended, however, that you make the original Onion Cost Workbook a “read-only” file by right-clicking on the Onion Cost Workbook file name, left-clicking on “Properties,” “General,” “Read-only,”

and “OK.” Making the file a “read-only” file will preserve the workbook in its original form. If you want to save new data loaded into this workbook, simply save it under another file name.

**TABLE 9. COST OF PRODUCING ONIONS, FOLLOWING WHEAT, UNDER RILL
IRRIGATION IN THE COLUMBIA BASIN, WASHINGTON, 2004
FINANCIAL BUDGET**

	UNIT	COST/ UNIT	QUANTITY	COST/ ACRE	COST/ 80 ACRES
VARIABLE COSTS		\$		\$	\$
SOIL TEST	ACRE	5.00	2.00	10.00	800.00
CUSTOM FUMIGATE	ACRE	45.00	1.00	45.00	3,600.00
METHAM SODIUM	GAL.	3.22	37.50	120.75	9,660.00
CUSTOM FERTILIZE	ACRE	6.50	1.00	6.50	520.00
PRE-PLANT FERTILIZER	ACRE	95.00	1.00	95.00	7,600.00
SIDE DRESS FERTILIZER	ACRE	30.00	2.00	60.00	4,800.00
ONION SEED	ACRE	250.00	1.00	250.00	20,000.00
CUSTOM AERIAL	ACRE	7.50	6.00	45.00	3,600.00
LIME	TON	60.00	1.50	90.00	7,200.00
LORSBAN 15G	LB.	1.99	6.50	12.94	1,034.80
GLYPHOSPHATE	PINT	4.55	1.50	6.83	546.00
SURFACTANT	PINT	2.22	0.50	1.11	88.80
WARRIOR	OZ.	2.68	11.40	30.55	2,444.16
PROWL	PINT	3.23	1.50	4.85	387.60
CHLOROTHALONIL	PINT	6.68	4.00	26.72	2,137.60
SELECT	OZ.	1.83	6.00	10.98	878.40
CROP OIL	OZ.	0.05	26.00	1.30	104.00
MANCOZEB	LB.	3.09	4.00	12.36	988.80
LANNATE	PINT	7.51	3.00	22.53	1,802.40
MALEIC-HYDRAZIDE	PINT	2.41	10.60	25.55	2,043.68
POLYACRYLAMIDE	LB.	2.95	2.00	5.90	472.00
CUSTOM SPRAY	ACRE	7.50	2.00	15.00	1,200.00
GOAL	OZ.	0.90	20.00	18.00	1,440.00
BUCTRIL	OZ.	0.56	24.00	13.44	1,075.20
CONTRACT WEEDING	ACRE	100.00	2.00	200.00	16,000.00
WATER CHARGE	ACRE	50.00	1.00	50.00	4,000.00
IRRIGATION REPAIR	ACRE	4.00	1.00	4.00	320.00
IRRIGATION LABOR	HOUR	14.00	8.00	112.00	8,960.00
MACHINERY REPAIRS	ACRE	37.54	1.00	37.54	3,003.20
MACHINE FUEL/LUBE	ACRE	39.32	1.00	39.32	3,145.60
LABOR (TRAC/MACH)¹	 HOUR	18.00	3.40	61.20	4,896.00
CUSTOM HARVEST	TON	4.50	32.00	144.00	11,520.00
CUSTOM HAUL	TON	5.75	32.00	184.00	14,720.00
INTEREST ON OP. CAP.²	 ACRE	24.00	1.00	24.00	1,920.00
OVERHEAD³	 ACRE	110.00	1.00	110.00	8,800.00
TOTAL VARIABLE COST				1,896.35	151,708.24

FIXED COSTS		\$		\$	\$
MACHINERY PURCHASES ⁴	ACRE	90.00	1.00	90.00	7,200.00
MACH LOAN INTER PAYMT ⁵	ACRE	27.95	1.00	27.95	2,236.60
MACHINE INSURANCE	ACRE	4.00	1.00	4.00	320.00
MACHINE TAXES	ACRE	11.99	1.00	11.99	959.20
MANAGEMENT	ACRE	-	1.00	-	-
LAND P&I PAYMENT ⁶	ACRE	138.74	1.00	<u>138.74</u>	<u>11,099.20</u>
TOTAL FIXED COST				272.68	21,814.40
TOTAL COST				2,169.03	173,522.64

YIELD PER ACRE	32.00 TONS
PRICE	80.00 PER TON
NET RETURNS	390.97 PER ACRE
NET RETURNS	31,277.36 PER TOTAL ACREAGE
VARIABLE COST	
BREAK-EVEN PRICE	59.26 PER TON
TOTAL COST	
BREAK-EVEN PRICE	67.78 PER TON

¹ \$18.00 x 6.79 x .50 = \$61.20

² (\$320.000 x .075 x .50)/500 ACRES = \$24.00

³ \$55,000/500 ACRES = \$110.00

⁴ \$45,000/500 ACRES = \$90.00

⁵ (\$215,000 x .065)/500 ACRES = \$27.95

⁶ \$11,099/80 ACRES = \$138.74

These spreadsheets are illustrated in Tables 8 and 9. For each spreadsheet the shaded cells are protected cells and the non-shaded cells are unprotected, or data cells. In this original workbook all line items are filled with data in both the variable and fixed cost sections. However, any of the spreadsheets can be easily unprotected and lines added or modified by the user by simply clicking on "Tools," "Protection," and "Unprotect Sheet."

If you have problems downloading or using the Onion Cost Workbook, contact Herb Hinman at hinman@wsu.edu or by phone at 509-335-2855.

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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