UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES
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2016

SAMPLE COSTS TO PRODUCE
GRAIN SORGHUM

SAN JOAQUIN VALLEY

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San Joaquin Valley – 2016

STUDY CONTENTS

INTRODUCTION

Sample costs to produce grain sorghum in the San Joaquin Valley are represented in this study. The study is intended as a guide only, and can be used to make production decisions, estimate potential returns, prepare budgets and evaluate production loans. Practices described are based on the production practices considered typical for this crop and region, but will not apply to every farm situation. Sample costs for labor, materials, equipment, and custom services are based on early 2016 figures. A "*Your Costs*" column in Tables 1 and 2 is provided to enter your estimated costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Jeremy Murdock or Donald Stewart; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651, jmmurdock@ucdavis.edu, or destewart@ucdavis.edu.

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

ASSUMPTIONS

The following assumptions refer to Tables 1 to 7 and pertain to sample costs to produce grain sorghum in the San Joaquin Valley. Practices described represent production practices and materials considered typical of a well-managed farm in the region. The costs, materials, and practices shown in this study will not apply to all situations. Establishment and production cultural practices vary by grower and the differences can be significant. **The use of trade names and cultural practices 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 or cultural practices.**

Farm. The hypothetical farm consists of 2000 non-contiguous acres of which 500 acres are used for this study-250 acres are rented and 250 owned by the grower. Sorghum for grain is planted on 240 acres of the 250 acres of rented land. The remaining 10 acres are roads and field edges. The grower-owned 250 acres includes 10 acres occupied by buildings, irrigation system, and homestead. The remaining 240 acres that are grower-owned are planted in sorghum for grain. Other field crops are grown on 1500 acres.

Production Cultural Practices and Material Inputs

Tables 1-3 show the costs associated with ground preparation, planting, growing, and harvesting grain sorghum.

Land Preparation. Land preparations begin in the spring (April/May). The fields are disced once with a stubble disc to incorporate the previous crop residue, fifty percent of this operation is charged to the previous crop as crop destruct. Borders are pulled to make irrigation basins for the pre-irrigation and are left in place for the season. After irrigation one pass is made with a finish or offset disc to prepare the seedbed.

Planting. Sorghum is planted from late May through early July in this region. For this study, the sorghum seed is planted in May on flat ground in rows spaced 30 inches apart at 10 pounds of seeds per acre. A seed treatment (Lorsban granules) for cutworms is applied with the planting. A custom planter does the planting for $19 per acre. Raised beds are formed after planting by cultivating and furrowing.

Fertilization. Growers should apply fertilizer or soil amendments after soil tests determine nutrient and pH levels. Nitrogen (N) as UAN-32 is injected and side-dressed once in June at 120 pounds N per acre and water run once in June and again in July at 40 pounds N per acre. Commercial fertilizers may be reduced or eliminated with the use of dairy pond water or manure.

Irrigation. The grower uses both well and surface water at an average cost of $16.67 per acre-inch or $200 per acre-foot. A preplant irrigation of eight acre-inches is made in May. The amount of water applied preplant will vary depending on soil type and moisture remaining from winter rains and previous crop. Effective rainfall is not accounted for in this study. Four irrigations including the pre-irrigation totaling 24.5 acre-inches of water are applied. In past years a total of five irrigations was standard practice, but due to reduced water availability caused by drought one irrigation event in July has been eliminated.

Pest Management. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu.or contact your local UCCE farm advisor. For information and pesticide use permits, contact the local county agricultural commissioner's office. Adjuvants or surfactants may be recommended for use with some pesticides, but are not included in this study. Pesticide costs vary by location and grower volume. Pesticide and fertilizer costs are taken from a single dealer and are shown as full retail.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition, the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. In this study, the PCA is provided by the Ag chemical dealer.

Weeds. Post plant weed control consists of mechanical and chemical practices. Shortly after planting, an herbicide, Yukon is applied for broadleaf and nutsedge control. A layby application of Prowl is applied in June. Normally, seven to eight days after the post-emergent herbicide application, the field is cultivated and furrowed and again approximately two weeks after the first irrigation.

Insects. Several insect and spider mite pests attack sorghum, but aphids are the only one assumed to reach an economic threshold in this study. Monitoring is important for effective insect control and to minimize insect control costs. Aphids are controlled with an insecticide Lorsban 4E application. An insecticide Lorsban 15G is applied with the seed at planting for cutworm control.

Harvest. In September the sorghum grain is custom harvested and hauled. A combine harvests the grain and fills a bank out wagon that is alongside the combine.

Yields. The crop is assumed to yield 4.0 tons per acre at 18 to 20 percent moisture. Individual yields can range from 2.0 to 5.5 tons per acre in this region.

Returns. The Kern County 2010-2014 average price of $179 per ton is used to calculate returns. Table 4 shows a range of grower returns over a range of yields.

Labor, Equipment, and Interest

Labor. Labor rates of $23.36 per hour for machine operators and $19.60 for general labor includes payroll overhead of 46 percent. The basic hourly wages are $16.00 for machine operators and $12.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops (code 0171), and a percentage for other possible benefits. Workers' compensation costs will vary among growers. For this study, the cost is based upon the average industry rate as of January, 2016.

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 take off (PTO) horsepower and fuel type. Prices for on-farm delivery of diesel and gasoline are $2.49 (excludes excise taxes) and $2.77 per gallon, respectively. The fuel prices are the average costs from January 2016 derived from Energy Information Administration monthly data. The cost includes a 7.5 percent sales tax on gasoline. The fuel, lube, and repair cost per acre for each operation in the "Cost Per Acre to Produce" table is determined by multiplying the total hourly operating cost in the "Hourly Equipment Costs" table for each piece of equipment used from the Operation Time (Hrs/Ac) column 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 and is calculated monthly until harvest at a nominal rate of 4.25 percent per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post-harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this

study is considered a typical lending rate by a farm lending agency as of January 2016.

Risk. Production risks 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 the profitability and economic viability.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the farm and not to a particular operation.

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. Average value equals new cost plus salvage value divided by 2 on a per acre basis. Land value is assumed to remain unchanged.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. 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 covers accidents on the farm and costs $1,543 for the entire farm.

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

Land Rent. The cash rent for the land is $250 per acre or $260 per production acre (240 acres) for a single crop. The land rented includes developed wells and irrigation system. Land rent appears as a Cash Overhead cost.

Investment Repairs. Annual repairs are calculated as 2 percent of the purchase price.

Non-Cash Overhead

Non-Cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

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 prices and salvage value (unrecovered capital). 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 formula for the calculation of the annual capital recovery costs is; ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate).

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery 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 the 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 the purchase price because land does not depreciate. The purchase price and salvage value for 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 and equipment life.

Interest Rate. The interest rate of 3.25 percent is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2016.

Building. The shop building is a 2,400 square foot metal building or buildings on a cement slab with a bathroom.

Land. Land values for row crop land in the region range from $16,000 per acre to $24,000 per acre. An average cost of $20,000 per acre will be used in this study. Prices are affected by location, soil type, and water availability. As stated in the assumptions section, sorghum silage is grown on both rented land (see Land Rent) and owned land.

Fuel Tanks. Two 1000-gallon fuel tanks using gravity feed are on separate metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Shop Tools. This includes shop tools and equipment and miscellaneous hand tools. The cost is assumed and not based on any collected data.

Irrigation System. An irrigation district supplies water, though growers may supplement this with well water in some areas. The amount of water used to irrigate sorghum will vary in the San Joaquin Valley. District and well water costs were combined to obtain an average cost for water. The permanent irrigation system consists of buried mainline. This part of the system is already in place when the land is purchased/rented; therefore, no costs are shown.

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 the Whole Farm Annual Equipment, Investment, and Business Overhead Costs table. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

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

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TABLE 1. COSTS PER ACRE TO PRODUCE GRAIN SORGHUM
SAN JOAQUIN VALLEY - 2016

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Pre-Plant:								
Stubble Disc 50% Ac	0.09	3	3	2	0	0	7	
Pull Borders	0.17	5	2	1	0	0	8	
Pre-irrigate	0.00	2	0	0	133	0	135	
Finish Disc & Roll	0.12	3	4	3	0	0	10	
TOTAL PRE-PLANT COSTS	0.38	13	9	7	133	0	162	
Planting:								
Plant Sorghum	0.00	0	0	0	25	19	44	
TOTAL PLANTING COSTS	0.00	0	0	0	25	19	44	
Cultural:								
Pests-Weeds Post-Plant	0.21	6	3	2	23	0	33	
Pests-Weeds Layby	0.21	6	3	2	13	0	24	
Cultivate & Furrow 2X	0.43	12	6	5	0	0	22	
Pests- Insects Aphids	0.21	6	3	2	9	0	19	
Fertilize- UAN-32 Sidedress	0.00	0	0	0	71	16	87	
Irrigate 3X	0.00	6	0	0	275	0	281	
Fertigate- UAN-32	0.00	0	0	0	47	0	47	
Pickup Truck Use	0.67	19	3	2	0	0	24	
TOTAL CULTURAL COSTS	1.73	54	16	13	438	16	538	
Harvest:								
Harvest: Combine & Haul	0.00	0	0	0	0	132	132	
TOTAL HARVEST COSTS	0.00	0	0	0	0	132	132	
Interest on Operating Capital at 4.25%							11	
TOTAL OPERATING COSTS/ACRE	2	67	25	20	597	167	886	
CASH OVERHEAD:								
Liability Insurance							1	
Office Expense							75	
Land Rent							250	
Property Taxes							201	
Property Insurance							17	
Investment Repairs							1	
TOTAL CASH OVERHEAD COSTS/ACRE							544	
TOTAL CASH COSTS/ACRE							1,430	
NON-CASH OVERHEAD:		Per Producing Acre		Annual Cost Capital Recovery				
Fuel Tanks-1,000 Gal (2)		5		0			0	
Shop Building- 2400 sq. ft.		36		2			2	
Shop Tools		8		0			0	
Land-SJV		20,000		650			650	
Equipment		262		24			24	
TOTAL NON-CASH OVERHEAD COSTS		20,311		677			677	
TOTAL COSTS/ACRE							2,107	

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TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE GRAIN SORGHUM

SAN JOAQUIN VALLEY – 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Grain	4	Ton	179.00	716	
TOTAL GROSS RETURNS	4	Ton		716	
OPERATING COSTS					
Fertilizer:				**118**	
UAN-32	200.00	Lb N	0.59	118	
Insecticide:				**9**	
Lorsban 15G	2.00	Oz	0.19	0	
Lorsban 4E pt	1.00	Pint	8.65	9	
Herbicide:				**36**	
Yukon	6.00	Oz	3.80	23	
Prowl H20	3.00	Pint	4.48	13	
Seed:				**25**	
Sorghum Seed Grain	10.00	Lb	2.50	25	
Custom:				**167**	
Plant Sorghum Grain	1.00	Acre	19.00	19	
Sidedress UAN-32	1.00	Acre	16.00	16	
Harvest Grain	4.00	Ton	22.00	88	
Haul Grain (20 miles)	4.00	Ton	11.00	44	
Irrigation:				**408**	
Water	24.50	AcIn	16.67	408	
Labor				**67**	
Equipment Operator Labor	2.53	hrs	23.36	59	
Irrigation Labor	0.40	hrs	19.60	8	
Machinery				**45**	
Fuel-Gas	1.00	gal	2.77	3	
Fuel-Diesel	9.06	gal	2.49	23	
Lube				4	
Machinery Repair				16	
Interest on Operating Capital @ 4.25%				11	
TOTAL OPERATING COSTS/ACRE				886	
TOTAL OPERATING COSTS/TON				222	
NET RETURNS ABOVE OPERATING COSTS				-170	

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TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE GRAIN SORGHUM

SAN JOAQUIN VALLEY - 2016

	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	Total
Pre-Plant:						
Stubble Disc 50% Ac	7					7
Pull Borders	8					8
Pre-irrigate	135					135
Finish Disc & Roll	10					10
TOTAL PRE-PLANT COSTS	162					162
Planting:						
Plant Sorghum	44					44
TOTAL PLANTING COSTS	44					44
Cultural:						
Pests-Weeds Post-Plant		33				33
Pests-Weeds Layby		24				24
Cultivate & Furrow 2X		11	11			22
Pests- Insects Aphids		19				19
Fertilize- UAN-32 Sidedress		87				87
Irrigate 3X		94	94	94		281
Fertigate- UAN-32		24	24			47
Pickup Truck Use	5	5	5	5	5	24
TOTAL CULTURAL COSTS	5	297	133	98	5	538
Harvest:						
Harvest: Combine & Haul					132	132
TOTAL HARVEST COSTS	0	0	0	0	132	132
Interest on Operating Capital @ 4.25%	1	2	2	3	3	11
TOTAL OPERATING COSTS/ACRE	211	298	135	101	140	886
CASH OVERHEAD						
Liability Insurance	0	0	0	0	0	1
Office Expense	15	15	15	15	15	75
Land Rent					250	250
Property Taxes					100	201
Property Insurance					8	17
Investment Repairs	0	0	0	0	0	1
TOTAL CASH OVERHEAD COSTS	15	15	15	15	374	544
TOTAL CASH COSTS/ACRE	227	314	151	116	514	1,430

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TABLE 4. RANGING ANALYSIS – GRAIN SORGHUM

SAN JOAQUIN VALLEY - 2016

COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE GRAIN SORGHUM

	YIELD (TONS)						
	2.50	3.00	3.50	4.00	4.50	5.00	5.50
OPERATING COSTS/ACRE:							
Pre-Plant	162	162	162	162	162	162	162
Planting	44	44	44	44	44	44	44
Cultural	538	538	538	538	538	538	538
Harvest	83	99	116	132	149	165	182
Interest on Operating Capital @ 4.25%	10	10	10	11	11	11	11
TOTAL OPERATING COSTS/ACRE	836	853	869	886	903	919	936
TOTAL OPERATING COSTS/TON	334.54	284.30	248.42	221.50	200.57	183.83	170.13
CASH OVERHEAD COSTS/ACRE	544	544	544	544	544	544	544
TOTAL CASH COSTS/ACRE	1,381	1,397	1,414	1,430	1,447	1,463	1,480
TOTAL CASH COSTS/TON	552.26	465.73	403.93	357.58	321.53	292.69	269.09
NON-CASH OVERHEAD COSTS/ACRE	677	677	677	677	677	677	677
TOTAL COSTS/ACRE	2,057	2,074	2,091	2,107	2,124	2,140	2,157
TOTAL COSTS/TON	823.00	691.00	597.00	527.00	472.00	428.00	392.00

Net Return per Acre above Operating Costs for Sorghum

PRICE ($/ton)	YIELD (tons/acre)						
Grain	2.50	3.00	3.50	4.00	4.50	5.00	5.50
89.00	-614	-586	-558	-530	-502	-474	-446
119.00	-539	-496	-453	-410	-367	-324	-281
149.00	-464	-406	-348	-290	-232	-174	-116
179.00	-389	-316	-243	-170	-97	-24	49
209.00	-314	-226	-138	-50	38	126	214
239.00	-239	-136	-33	70	173	276	379
269.00	-164	-46	72	190	308	426	544

Net Return per Acre above Cash Costs for Sorghum

PRICE ($/ton)	YIELD (tons/acre)						
Grain	2.50	3.00	3.50	4.00	4.50	5.00	5.50
89.00	-1,158	-1,130	-1,102	-1,074	-1,046	-1,018	-990
119.00	-1,083	-1,040	-997	-954	-911	-868	-825
149.00	-1,008	-950	-892	-834	-776	-718	-660
179.00	-933	-860	-787	-714	-641	-568	-495
209.00	-858	-770	-682	-594	-506	-418	-330
239.00	-783	-680	-577	-474	-371	-268	-165
269.00	-708	-590	-472	-354	-236	-118	0

Net Return per Acre above Total Costs for Sorghum

PRICE ($/ton)	YIELD (tons/acre)						
Grain	2.50	3.00	3.50	4.00	4.50	5.00	5.50
89.00	-1,835	-1,807	-1,779	-1,751	-1,723	-1,695	-1,667
119.00	-1,760	-1,717	-1,674	-1,631	-1,588	-1,545	-1,502
149.00	-1,685	-1,627	-1,569	-1,511	-1,453	-1,395	-1,337
179.00	-1,610	-1,537	-1,464	-1,391	-1,318	-1,245	-1,172
209.00	-1,535	-1,447	-1,359	-1,271	-1,183	-1,095	-1,007
239.00	-1,460	-1,357	-1,254	-1,151	-1,048	-945	-842
269.00	-1,385	-1,267	-1,149	-1,031	-913	-795	-677

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

SAN JOAQUIN VALLEY - 2016

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Years Life	Salvage Value	Capital Recovery	Insurance	Taxes	Total
16	Pickup 1/2 Ton	28,000	5	12,549	3,806	17	203	4,026
16	Disc - Stubble 18'	45,000	10	7,958	4,657	22	265	4,944
16	205HP Crawler	350,000	15	68,139	26,254	176	2,091	28,521
16	Disc - Finish 25'	58,000	10	10,257	6,002	29	341	6,372
16	Ring-roller 25'	29,000	10	5,128	3,001	14	171	3,186
16	Border Ridger	19,625	10	3,702	2,011	10	117	2,137
16	#1 Saddle Tanks 300gal	1,660	3	690	367	1	12	380
16	#1 Spray Boom 20'	2,900	6	836	411	2	19	432
16	Cultivator 6 Row	12,000	5	3,909	1,906	7	80	1,993
16	#2 Spray Boom 20'	2,900	6	836	411	2	19	432
16	95HP2WD Tractor	120,465	15	23,452	9,036	61	720	9,817
	TOTAL	669,550	-	137,456	57,863	340	4,035	62,238
	60% of New Cost*	401,730	-	82,474	34,718	204	2,421	37,343

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Years Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks-1,000 Gal (2)	10,975	20	768	727	5	59	220	1,011
Shop Building- 2400 sq. ft.	72,000	30	0	3,793	30	360	1,440	5,623
Shop Tools	15,000	20	1,050	994	7	80	300	1,381
Land-SJV	5,000,000	30	5,000,000	162,500	4,215	50,000	0	216,715
TOTAL INVESTMENT	5,097,975	-	5,001,818	168,014	4,257	50,499	1,960	224,730

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	2000	Acre	.77	1,540
Office Expense	480	Acre	75.00	36,000
Land Rent	250	Acre	250	62,500

UC COOPERATIVE EXTENSION - AGRICULTURAL ISSUES CENTER
TABLE 6. HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY - 2016

Yr	Description	Sorghum Hours Used	Total Hours Used	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Operating Lube & Repairs	Operating Fuel	Operating Total Oper.	Total Costs/Hr.
16	Pickup 1/2 Ton	320	400	5.71	0.03	0.30	3.40	4.16	7.56	13.60
16	Disc - Stubble 18'	43	200	13.97	0.07	0.79	7.57	0.00	7.57	22.40
16	205HP Crawler	110	1066	14.78	0.10	1.18	13.72	29.62	43.34	59.40
16	Disc - Finish 25'	57	200	18.01	0.09	1.02	9.76	0.00	9.76	28.87
16	Ring-roller 25'	57	200	9.00	0.04	0.51	3.36	0.00	3.36	12.91
16	Border Ridger	81	200	6.03	0.03	0.35	0.30	0.00	0.30	6.71
16	#1 Saddle Tanks 300gal	304	500	0.44	0.00	0.01	0.46	0.00	0.46	0.91
16	#1 Spray Boom 20'	203	250	0.99	0.00	0.04	0.80	0.00	0.80	1.83
16	Cultivator 6 Row	207	400	2.86	0.01	0.12	2.53	0.00	2.53	5.52
16	#2 Spray Boom 20'	101	250	0.99	0.00	0.04	0.80	0.00	0.80	1.83
16	95HP2WD Tractor	652	800	6.78	0.05	0.54	7.33	11.62	18.95	26.31

UC COOPERATIVE EXTENSION - AGRICULTURAL ISSUES CENTER
TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS
SAN JOAQUIN VALLEY – 2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Stubble Disc 50% Ac	May	205HP Crawler	Disc - Stubble 18'	Equipment Operator Labor	0.11	hour
Pull Borders	May	95HP2WD Tractor	Border Ridger	Equipment Operator Labor	0.20	hour
Pre-irrigate	May			Irrigation Labor	0.10	hour
				Water	8.00	AcIn
Finish Disc & Roll	May	205HP Crawler	Disc - Finish 25'	Equipment Operator Labor	0.14	hour
			Ring-roller 25'			
Plant Sorghum	May			Sorghum Seed Grain	10.00	Lb
				Lorsban 15G	2.00	Oz
				Plant Sorghum Grai	1.00	Acre
Pests-Weeds Post-Plant	June	95HP2WD Tractor	#1 Saddle Tanks 300gal	Equipment Operator Labor	0.25	hour
				Yukon	6.00	Oz
			#1 Spray Boom 20'			
Pests-Weeds Layby	June	95HP2WD Tractor	#1 Saddle Tanks 300gal	Equipment Operator Labor	0.25	hour
				Prowl H20	3.00	Pint
			#1 Spray Boom 20'			
Cultivate & Furrow	June	95HP2WD Tractor	Cultivator 6 Row	Equipment Operator Labor	0.26	hour
	July	95HP2WD Tractor	Cultivator 6 Row	Equipment Operator Labor	0.26	hour
Pests- Insects Aphid	June	95HP2WD Tractor	#1 Saddle Tanks 300gal	Equipment Operator Labor	0.25	hour
				Lorsban 4E pt	1.00	Pint
			#2 Spray Boom 20'			
Fertilize- UAN-32	June			UAN-32	120.00	Lb N
				Sidedress UAN-32	1.00	Acre
Irrigate 3X	June			Irrigation Labor	0.10	hour
				Water	5.50	AcIn
	July			Irrigation Labor	0.10	hour
				Water	5.50	AcIn
	Aug			Irrigation Labor	0.10	hour
				Water	5.50	AcIn
Fertigate- UAN-32	June			UAN-32	40.00	Lb N
	July			UAN-32	40.00	Lb N
Pickup Truck Use	July		Pickup 1/2 Ton	Equipment Operator Labor	0.80	hour
Harvest: Combine & Haul	Sept			Harvest Grain	4.00	Ton
				Haul Grain	4.00	Ton