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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2012

SAMPLE COSTS TO PRODUCE  
**RICE**



**SACRAMENTO VALLEY**  
Rice Only Rotation, Medium Grain

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## SAMPLE COSTS TO PRODUCE RICE Sacramento Valley - 2012

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### INTRODUCTION

Sample costs to produce medium grain rice in the Sacramento Valley are presented in this study. This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets, and evaluating production loans. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. Sample costs for labor, materials, equipment, and custom services are based on current figures. A blank column titled, “*Your Costs*”, is available in Table 1 and Table 2 to enter your own costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the “Assumptions” section. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis at (530) 752-3589, or contact your local UC Cooperative Extension office.

Sample Cost of Production Studies for current and archived commodities are available at <http://coststudies.ucdavis.edu>, or can be requested from the Department of Agricultural and Resource Economics, UC Davis, at (530) 752-6887, or obtained from selected county UC Cooperative Extension offices.

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## ASSUMPTIONS

The assumptions refer to Tables 1 through 7 and pertain to sample costs to produce medium grain rice in the Sacramento Valley. The cultural practices shown represent production operations and materials considered typical of a well-managed farm in the region. Costs, materials, and practices in this study will not apply to all situations. Timing and types of cultural practices will vary among growers within the region and from season to season due to variables such as weather, soil, insect, and disease pressure. **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.**

**Land.** The hypothetical farm consists of 840 acres. The grower owns 201 acres and rents 639 acres. Medium grain rice (Calrose) is grown on 800 acres and 40 acres (10 owned and 30 rented) are used for roads, irrigation systems, equipment and shop area, and homestead. Typically, a grower with this amount of rice acreage will have several non-adjacent fields and the cultural practices will vary among fields. Additionally, extra costs may be incurred moving equipment between fields, but are not included in this study. No other crops are grown in rotation with rice. Both the grower-owned and rented land has a rice base and is eligible for farm program benefits. All operations are done on 100% of the acres unless noted otherwise.

This study values land at \$8,000 per acre. Approximately 24% of land is owned outright by the grower. The balance of land is rented at a price of \$350 per acre. For more details about owned and rented land, please refer to the “Cash Overhead Costs” and “Non-Cash Overhead Costs” sections.

### Cultural Practices and Material Inputs

**Land Preparation.** Most of the primary tillage, which includes chiseling, plowing, discing, land leveling, laser leveling, and rolling is normally done from March through May. In this study, the permanent levees, which comprise 5% of the acres, are reworked and drains are maintained as necessary. The Endangered Species Act may affect the way the drains are maintained and additional costs may be incurred. All fields are chiseled two times to open the ground and dry the soil. This is followed by one discing to break up large clods with a stubble disc, and then disced twice more with a finish disc, which increases the soil’s drying surface. The field is then leveled and smoothed with a triplane. Laser leveling is done once every seventh year and in this study 1/7 of the cost is charged to the cultural operations. The ground is rolled with a corrugated roller prior to flooding and planting.

**Fertilization.** Aqua ammonia is applied preplant at 130 pounds of N per acre with an aqua fertilizer injector, 3 to 4 inches deep. At the same time, a starter fertilizer, 12-23-20 at 200 pounds per acre, is applied by air and incorporated using the aqua rig or roller. Zinc sulfate is applied by air to 50% of the acres at 30 pounds per acre. In July, 75% of the acres are top dressed with ammonium sulfate at 31.5 pounds of N or 150 pounds of material per acre. Adding soil amendments such as calcium and sulfur should only be done if a soil test indicates a need.

**Planting.** Water seeding, in contrast to drill-seeding or dry-seeding, is the primary seeding method in California. The soil is flooded, the seed is soaked and drained, and then the seed is broadcast by air on the fields at a rate of 180 lbs/acre. Most planting is done from April 20 to May 20, but sometimes continues into June.

**Irrigation.** The grower purchases the majority of irrigation water from an irrigation district; however growers may also use well water. The grower pays the water costs on the rented and grower-owned land. The cost of water varies widely between irrigation districts in the Sacramento Valley. The seasonal cost of irrigation water for this study is \$100.00 per surface acre. This does not include water needed for straw management.

**Pest Management.** The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Rice*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

Several sprays are applied for developing costs in this study.

*Weeds.* Broadleaf and grass weeds are controlled with separate aerial and ground applications. An herbicide to control grass weeds is applied to virtually 100 percent of the conventional grown rice, at or shortly after, planting (e.g. Cerano, Clincher, Bolero, and Granite GR). This study assumes that Cerano is applied to 100% of the acres by air in May. An additional foliar active herbicide (e.g. Propanil, Grandstand, and Regiment) is applied in June to control broadleaf weeds, sedges and grasses that escape the first herbicide treatment. Tank mixes of two foliar active herbicides are often used. This study assumes that a Propanil (Super Wham) and Grandstand tank mix is applied by ground to 80% of the acres. Final weed control is a cleanup herbicide (e.g. Regiment) application in late June that is applied by air on 20% of the acres.

*Insects.* Rice water weevil control begins in May after planting, by treating 15% of the acres, which includes the field borders or edges, levees, and field area adjacent to these areas with Warrior insecticide. Armyworms are controlled with one insecticide application of Warrior in July on 5% of the acres.

*Arthropod Management (Algae and Shrimp).* After planting in May, copper sulfate is applied to 20% of the acres to control algae and shrimp.

*Diseases.* Blast and aggregate sheath spot are controlled July through August with one application of Quadris on 45% of the acres.

**Harvest.** The rice crop is harvested at 20% kernel moisture (green rice) using one combine with a cutter-bar header. The grower also owns a pulled grain cart. The grain is dumped from the one combine into the grain cart, which is then taken to bulk grain trailers for transport to the dryer.

*Transportation.* The grower pays the transportation of green rice from the field to the dryer. Hauling grain from the dryer to storage may be considered a processing or marketing expense, but it is a cost and is reflected in the price returned to the grower. In this study, the cost of transporting the rice from the field to the dryer is included, but the hauling cost between the dryer and warehouse is not. The cost of transporting rice is based on a green weight of 95.34 hundredweight (cwt) per acre and a \$0.45 per cwt field pickup and hauling charge. In this study, green weight is the calculated weight of the harvested rice at 20% moisture, including 'invisible shrink'.

*Drying and Storage.* Drying charges increase with moisture content. Most dryers use a rate schedule that reflects the loss of moisture plus other 'invisible' losses in the system associated with immature kernels, dockage and dust. The non-moisture factor varies among dryers, but usually ranges from 2% to 6%. Together, these losses are called 'shrink'. Rice is assumed to be dried to 13% moisture. The drying rate charge is based on a green weight of 95.34 cwt. The current cost of drying the rice in this study is \$0.95 per cwt. Storage is

charged at \$0.78 per cwt on the dry weight and is similarly increased to estimate future power costs. Most of the drying cost is related to natural gas prices, and the storage cost to electricity prices.

*Yields.* The crop yield used in this study is 8,300 pounds (83 cwt) per acre at 13% moisture. Yields have varied over the years in California and are shown in Table A.

*Returns.* A selling price of \$17.00 per cwt of grain rice (with an assumed loan value of \$6.50, or \$10.50 above loan value) is used to estimate market income, based on 2012 grower input. A range of yields and prices are presented in Table 4 (page 16). This study also includes revenue received by rice growers from the Direct Payments (DP), but not Counter Cyclical Payments (CCP) or the Marketing Loan Program (MLP), which are all authorized by the Farm Security and Rural Investment Act of 2002 administered by the United States Department of Agriculture’s (USDA), Farm Service Agency (FSA). Limits apply to the DP, CCP, and MLP paid to each actively engaged individual associated with the farm. Here we assume that the farm is organized as a two-entity farm growing rice to the approved limits. Direct payments are tied to a history of rice base but not to current rice production. Individual farms’ direct payments depend on each farm’s acreage and yield base and other factors. For more information on this, other programs, or on meeting minimum requirements to comply with the programs please contact the USDA FSA or visit the website: <http://www.ers.usda.gov/briefing/FarmPolicy/programProvisions.htm>.

Table A. Average California Yield and Prices

Year	Yield/Acre (Medium Grain) <i>cwt</i>	Return/cwt (all types) <i>\$/cwt</i>
2000	80.00	4.99
2001	83.00	5.28
2002	83.00	6.32
2003	78.40	10.40
2004	88.00	7.34
2005	75.50	10.10
2006	78.80	13.00
2007	85.00	16.20
2008	85.50	27.50
2009	87.40	19.60
2010	82.00	21.00
2011	85.00	16.00

Source: USDA NASS Historical Data

*Direct Payments.* The total farm Direct Payment income is calculated by taking 85% of the payment yield multiplied by the payment rate and the individual farm’s base acreage. In this study the Direct Payment yield is assumed to be 68.20 cwt per acre and the 2012 Direct Payment rate is \$2.35 per cwt. Per acre program support is calculated as  $0.85 \times \$2.35/\text{cwt} = \$1.998/\text{cwt}$ . Growers may elect to participate in the Average Crop Revenue Election (ACRE) Program, but this study assumes that growers do not participate. More information on Direct Payments is available at the USDA website: <http://www.ers.usda.gov/briefing/FarmPolicy/DirectPayments.htm>. Farms are not required to grow rice to receive the Direct Payments, but almost all rice farms do collect this revenue and most Direct Payments go to farms that continue to grow rice.

*Counter Cyclical Payments.* Counter-Cyclical Payments (CCP) are only made to growers when the market price or national average loan rate is less than the target price. This study assumes that the current market price is higher than the target price, so the CCP are not applicable in this study. For more details regarding counter cyclical payments, please visit: <http://www.ers.usda.gov/briefing/FarmPolicy/CounterCyclicalPay.htm>.

*Marketing Loan Gains and Loan Deficiency Payments.* Rice farmers are eligible to receive a loan from the government by putting up their production as collateral. The loan rate for rice in 2012 is \$6.50 per cwt. When market prices fall below the loan rate, farmers can repay the loans at a lower loan repayment rate resulting in a benefit to producers. The loan repayment rate for rice is the average world price for rice calculated weekly by the government. The difference between the loan rate and the average world price is called a Marketing Loan Gain. Alternatively, eligible farmers can choose to receive direct loan deficiency payments equivalent to the Marketing Loan Gain without having to take out the loan and then repay it. In this study we assume that the world price is above the loan rate and so marketing loan gains are not an additional source of revenue.

**Assessments.** Under a state marketing order a mandatory assessment fee is collected and administered by the California Rice Research Board (CRRB). This assessment of \$0.07 per dry cwt pays for rice research funded by the CRRB. In addition, the California Rice Commission (CRC) assesses each rice grower \$0.04625 per dry cwt Rice millers and marketers also contribute an equal amount of \$0.04625 per dry cwt This provides the CRC with a total budget based on \$0.0925 per cwt for all California rice produced to work on a variety of issues facing the California rice industry.

**Straw Management.** Postharvest operations for straw management are usually done using a single or a combination of commonly used methods, including: 1) burning (up to 25% of acres with disease), 2) chopping, discing, and flooding, 3) chopping and flooding, 4) chopping, flooding and rolling, 5) chopping and discing, and 6) baling. In this study a combination of methods 1, 4, and 5 are used postharvest.

Rice straw burning is done on 10% of the acres in the fall and/or spring for straw management. Burning permits and fees vary for each air pollution control district. For this study, a \$20 burn permit is charged to the farm and an additional \$2.75 per acre is charged for each acre burned. Check with the air pollution office in your county for burning regulations and fees. The rice straw is chopped, flooded, and then rolled on 30% of the acres. The balance 60% of acreage is chopped and disced twice. The winter water costs for single and continuous flooding vary by district, and may be rain fed.

### **Labor, Equipment and Interest**

**Labor.** A labor rate of \$20.55 per hour for general and equipment labor includes payroll overhead of 37%. The basic hourly wage is \$15.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops, and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2011 (personal email from California Department of Insurance, March 2011, unreferenced).

Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk. However, growers wanting to account for management may wish to add a fee. The manager makes all production decisions including cultural practices, action to be taken on pest management recommendations, and labor.

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by 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 red dye diesel and gasoline are \$3.43 (excludes excise tax) and \$3.82 per gallon, respectively. Fuel costs are derived from the Energy Information Administration, 2011 January to December monthly data. The cost includes a 2.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax.

**Risk.** The risks associated with crop production should not be underestimated. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability. Crop insurance is a risk management tool available to growers.

## Cash Overhead Costs

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

**Rent.** Cash rents range from \$300 to \$400 per acre with surface water attached to the land, but water is not paid for by the landowner. The cost of water is borne by the grower renting the land. A rental price of \$350 per acre is used in this study.

**Rented Equipment.** A 325 HP 4WD tractor is rented for one month (250 hours). The tractor is used for tillage operations over the 800 acres.

**Property Taxes.** Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

**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 0.803% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,324 for the entire farm.

**Office Expense.** Office and business expenses are estimated at \$30 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities.

**Regulatory Compliance and Administrative Costs.** Compliance and administrative costs are estimated to be \$5 per acre. This includes expenses such as managing paperwork for compliance, as well as miscellaneous administrative costs that accompany the compliance paperwork.

**Investment Repairs.** Annual repairs on investments or capital recovery items that require maintenance are calculated as 2% of the purchase price. This includes repair on all investments (e.g. fuel tanks and pumps, backhoe, irrigation system, shop buildings, tools, etc.), except for land.

## Non-Cash Overhead Costs

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

**Land.** Land values range from \$6,000 to \$8,000 per acre. This study uses a value of \$8,000 per acre. However, the majority of rice growers do not own much of the ground that they farm. Environmentally important rice land is valued in excess of the amount that growers can profitably afford to pay because environmental associations or government agencies may be willing to pay more to acquire the land, however such land represents a small portion of total rice land. In this study, 24% of land is owned by the grower.

**Capital Recovery Costs.** Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). 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  $[(\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}] + (\text{Salvage Value} \times \text{Interest Rate})$ .

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

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

*Interest Rate.* An interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January, 2011.

*Irrigation System.* The irrigation system in this study has the water delivered by a water district via canal and moved to the field by a portable PTO powered, low-lift pump. Many growers use well water to supplement surface water deliveries. In this study a 75 HP electric pump with a 500 foot deep well pumps water from an average depth of 120 feet. The water delivery system or returns system is not calculated as a cost in this study.

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



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UC COOPERATIVE EXTENSION  
**Table 1. COSTS PER ACRE TO PRODUCE RICE**  
 SACRAMENTO VALLEY - 2012

Operation	Operation Time (Hrs./A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
<b>Cultural:</b>								
Maintain drains	0.10	2	2	0	0	0	5	
Maintain and rework levees	0.05	1	2	1	0	0	4	
Chisel 2X	0.17	4	10	2	0	16	32	
Stubble disc	0.15	4	7	2	0	0	12	
Finish disc 2X	0.28	7	12	4	0	0	23	
Triplane fields 2X	0.19	5	12	3	0	10	29	
Laser level – 1X/7 years	0.00	0	0	0	0	16	16	
Fertilize – Aqua @ 130 lbs N	0.00	0	0	0	75	25	100	
Fertilize – 12-23-20 @ 200 lbs	0.07	2	3	1	27	15	47	
Roll final seedbed	0.07	2	3	1	0	0	6	
Fertilize – zinc, 50% of acreage	0.00	0	0	0	9	5	14	
Irrigate	1.00	21	0	0	100	0	121	
Weed control – grass spray	0.00	0	0	0	64	12	76	
Soak (chlorine) and deliver seed	0.00	0	0	0	58	5	63	
Plant @ 180 lbs/acre	0.00	0	0	0	0	15	15	
Insect control rice weevil, 15% of acreage	0.00	0	0	0	2	2	3	
Pest control shrimp/algae, 20% of acreage	0.00	0	0	0	7	2	8	
Weed control – broadleaf spray, 80% of acreage	0.00	0	0	0	76	16	92	
Weed control – cleanup spray, 20% of acreage	0.00	0	0	0	11	2	14	
Fertilize – topdress 21-0-0, 75% of acreage	0.00	0	0	0	26	11	38	
Insect control – armyworm, 5% of acreage	0.00	0	0	0	1	1	1	
Disease control – fungicide, 45% of acreage	0.00	0	0	0	14	5	19	
Pickup truck use	0.41	20	6	2	0	0	28	
<b>TOTAL CULTURAL COSTS/ACRE</b>	<b>2.50</b>	<b>67</b>	<b>57</b>	<b>15</b>	<b>469</b>	<b>157</b>	<b>766</b>	
<b>Harvest:</b>								
Combine rice – cutterbar header	0.39	10	25	14	0	0	49	
Grain cart	0.21	5	14	3	0	0	22	
Haul rice to dryer	0.00	0	0	0	0	43	43	
Dry & store rice	0.00	0	0	0	0	155	155	
Rice Research Board assessment	0.00	0	0	0	6	0	6	
California Rice Commission assessment	0.00	0	0	0	4	0	4	
<b>TOTAL HARVEST COSTS</b>	<b>0.59</b>	<b>15</b>	<b>39</b>	<b>17</b>	<b>10</b>	<b>198</b>	<b>279</b>	
<b>Postharvest:</b>								
Burn permit & fees, 10% of acreage	0.50	10	0	0	0	0	11	
Chop, flood & roll, 30% of acreage	0.07	4	4	1	8	0	16	
Chop, 60% of acreage	0.16	4	3	1	0	0	8	
Disc, 60% of acreage	0.09	2	4	1	0	0	7	
<b>TOTAL POSTHARVEST COSTS</b>	<b>0.83</b>	<b>20</b>	<b>10</b>	<b>3</b>	<b>8</b>	<b>0</b>	<b>42</b>	
Interest on operating capital at 5.75%							23	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>3.91</b>	<b>102</b>	<b>107</b>	<b>36</b>	<b>487</b>	<b>355</b>	<b>1,110</b>	

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**Table 1. Continued**

SACRAMENTO VALLEY - 2012

Operation	Cash and Labor Costs per Acre							Total Cost	Your Cost
	Time (Hrs./A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent	Total Cost		
<b>CASH OVERHEAD:</b>									
Land rent <sup>1</sup>								280	
Liability insurance								2	
Office expense								30	
Compliance & administration								5	
Property taxes								23	
Property insurance								2	
Investment repairs								3	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>								<b>345</b>	
<b>TOTAL CASH COSTS/ACRE</b>								<b>1,454</b>	
<b>NON-CASH OVERHEAD:</b>									
		Per producing Acre		Annual Cost					
				Capital Recovery					
Backhoe		18		2				2	
Fuel tanks & pumps		13		1				1	
Fuel wagons – 550 gallons (2)		4		1				1	
Irrigation system		28		2				2	
Land		2,010		95				95	
Shop building		57		4				4	
Shop tools		16		1				1	
Tool carrier		18		1				1	
Equipment		355		43				43	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>2,519</b>		<b>152</b>				<b>152</b>	
<b>TOTAL COSTS/ACRE</b>								<b>1,606</b>	
<b>TOTAL COSTS/CWT</b>								<b>19.35</b>	

<sup>1</sup>Land Rent is \$350/acre. This study allocates the total cost of rent (\$223,650) over all rice producing acres (800) for a total of approximately \$280 per producing acre.

UC COOPERATIVE EXTENSION  
**Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE RICE**  
 SACRAMENTO VALLEY - 2012

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Rice	83.00	cwt	17.00	1,411	
Direct Pay	68.20	cwt	1.998	136	
<b>TOTAL GROSS RETURNS</b>				<b>1,547</b>	
<b>OPERATING COSTS</b>					
<b>Rent:</b>				26	
Tractor 325 HP 4WD	0.33	hour	80.00	26	
<b>Custom:</b>				131	
Laser leveling	0.13	acre	125.00	16	
Fertilizer rig – Aqua Ammonium	1.00	acre	25.00	25	
Air application – dry fertilizer	1.75	acre	15.00	26	
Air application – zinc dry	0.50	acre	9.00	5	
Air application – Cerano	1.00	acre	12.00	12	
Soaking (chlorine) seed	1.80	cwt	2.25	4	
Delivery – seed	1.80	cwt	0.70	1	
Air application – seed	1.80	cwt	8.55	15	
Air application – Warrior	0.15	acre	10.75	2	
Air application – copper	0.20	acre	8.55	2	
Ground application – Propanil/Grandstand	0.80	acre	20.00	16	
Air application – Regiment	0.20	acre	10.75	2	
Air application – Warrior	0.05	acre	10.75	1	
Air application – Quadris	0.45	acre	10.75	5	
<b>Fertilizer:</b>				137	
Aqua Ammonia	130.00	lb N	0.58	75	
12-23-20	200.00	lb	0.13	27	
Zinc Sulfate 36%	15.00	lb	0.61	9	
21-0-0 Ammonia Sulfate	112.50	lb	0.23	26	
<b>Herbicide:</b>				125	
Cerano	10.00	lb	4.90	49	
Grandstand	4.80	fl oz	1.13	5	
Super Wham	4.80	qt	12.38	59	
Regiment	0.13	oz	87.03	11	
<b>Insecticide:</b>				9	
Warrior	0.77	fl oz	3.21	2	
Copper Sulfate Fine	3.00	lb	2.26	7	
<b>Fungicide:</b>				14	
Quadris	5.40	fl oz	2.53	14	
<b>Adjuvant:</b>				26	
Adjuvant	3.50	fl oz	0.22	1	
Crop oil	1.80	gal	13.85	25	
<b>Seed:</b>				58	
Seed	1.80	cwt	32.25	58	
<b>Irrigation:</b>				108	
Water – irrigation	1.00	acre	100.00	100	
Water – straw management	0.30	acre	25.00	8	

Note: Stated rates in the table represent total amount of product applied spread over total rice producing acres.

## UC COOPERATIVE EXTENSION

Table 2. Continued

SACRAMENTO VALLEY - 2012

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>Contract:</b>					198
Hauling	95.34	cwt	0.45		43
Drying	95.34	cwt	0.95		91
Storage	83.00	cwt	0.78		65
<b>Assessment:</b>					10
California Rice Research Board	83.00	cwt	0.07		6
California Rice Commission	83.00	cwt	0.05		4
<b>Burn Permit:</b>					0
Burning fees	0.10	acre	2.75		0
Burn permit	0.10	acre	0.03		0
<b>Labor:</b>					102
Equipment operator labor	3.39	hour	20.55		70
Irrigation labor	1.60	hour	20.55		33
<b>Machinery:</b>					143
Fuel – gas	1.63	gal	3.82		6
Fuel – diesel	29.26	gal	3.43		100
Lube					16
Machinery repair					20
Interest on operating capital at 5.75%					23
<b>TOTAL OPERATING COSTS/ACRE</b>					1,111
<b>NET RETURNS ABOVE OPERATING COSTS</b>					437
<b>CASH OVERHEAD COSTS</b>					
Land rent					280
Liability insurance					2
Office expense					30
Compliance & administration					5
Property taxes					23
Property insurance					2
Investment repairs					3
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>					345
<b>TOTAL CASH COSTS/ACRE</b>					1,455
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Backhoe					2
Fuel tanks & pumps					1
Fuel wagons – 550 gallons (2)					1
Irrigation system					2
Land					95
Shop building					4
Shop tools					1
Tool carrier					1
Equipment					43
<b>TOTAL NON-CASH OVERHEAD COSTS</b>					152
<b>TOTAL COST/ACRE</b>					1,607
<b>TOTAL COST/ CWT</b>					19.36
<b>NET RETURNS ABOVE TOTAL COST</b>					-60

UC COOPERATIVE EXTENSION

**Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE RICE**  
SACRAMENTO VALLEY - 2012

Beginning 02-12	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending 10-12	12	12	12	12	12	12	12	12	12	
Cultural:										
Maintain drains	5									5
Maintain and rework levees			4							4
Chisel 2X			32							32
Stubble disc			12							12
Finish disc 2X			23							23
Triplane fields 2X			29							29
Laser level – 1X/7 Years			16							16
Fertilize – Aqua @ 130 lbs N			100							100
Fertilize – 12-23-20 @ 200 lbs			47							47
Roll final seedbed			6							6
Fertilize – zinc, 50% of acreage			14							14
Irrigate				24	24	24	24	24		121
Weed control – grass spray				76						76
Soak (chlorine) and deliver seed				63						63
Plant @ 180 lbs/acre				15						15
Insect control rice weevil, 15% of acreage				3						3
Pest control shrimp/algae, 20% of acreage				8						8
Weed control – broadleaf spray, 80% of acreage					92					92
Weed control – cleanup spray, 20% of acreage					14					14
Fertilize – topdress 21-0-0, 75% of acreage						38				38
Insect control – armyworm, 5% of acreage						1				1
Disease control – fungicide, 45% of acreage						19				19
Pickup truck use	3	3	3	3	3	3	3	3	3	28
<b>TOTAL CULTURAL COSTS</b>	<b>8</b>	<b>3</b>	<b>287</b>	<b>194</b>	<b>133</b>	<b>84</b>	<b>27</b>	<b>27</b>	<b>3</b>	<b>766</b>
Harvest:										
Combine rice – cutterbar header								49		49
Grain cart								22		22
Haul rice to dryer								43		43
Dry & store rice									155	155
Rice Research Board assessment									6	6
California Rice Commission assessment									4	4
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>114</b>	<b>165</b>	<b>279</b>

## UC COOPERATIVE EXTENSION

**Table 3. Continued**

SACRAMENTO VALLEY - 2012

Beginning 02-12	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending 10-12	12	12	12	12	12	12	12	12	12	
Postharvest:										
Burn permit & fees, 10% of acreage									11	11
Chop, flood & roll, 30% of acreage									16	16
Chop, 60% of acreage									8	8
Disc, 60% of acreage									7	7
<b>TOTAL POSTHARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>42</b>	<b>42</b>
Interest on operating capital at 5.75%	0	0	1	2	3	3	4	4	5	23
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>8</b>	<b>3</b>	<b>288</b>	<b>196</b>	<b>136</b>	<b>88</b>	<b>31</b>	<b>145</b>	<b>215</b>	<b>1,110</b>
<b>TOTAL OPERATING COSTS/CWT</b>										
CASH OVERHEAD:										
Land rent										280
Liability insurance										2
Office expense										30
Compliance & administration										5
Property taxes	12					12				23
Property insurance	2									2
Investment repairs	0	0	0	0	0	0	0	0	0	3
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>345</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>22</b>	<b>3</b>	<b>288</b>	<b>196</b>	<b>136</b>	<b>100</b>	<b>31</b>	<b>146</b>	<b>215</b>	<b>1,454</b>
<b>TOTAL CASH COSTS/CWT</b>	<b>0.27</b>	<b>0.04</b>	<b>3.47</b>	<b>2.36</b>	<b>1.64</b>	<b>1.20</b>	<b>0.37</b>	<b>1.75</b>	<b>2.60</b>	<b>17.52</b>

UC COOPERATIVE EXTENSION  
**Table 4. RANGING ANALYSIS**  
 SACRAMENTO VALLEY - 2012

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE RICE

	YIELD (cwt/acre)						
	59	67	75	83	91	99	107
<b>OPERATING COSTS:</b>							
Cultural	766	766	766	766	766	766	766
Harvest	188	211	233	279	279	301	324
Postharvest	42	42	42	42	42	42	42
Interest on operating capital at 5.75%	23	23	23	23	23	23	24
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>1,019</b>	<b>1,041</b>	<b>1,064</b>	<b>1,110</b>	<b>1,109</b>	<b>1,132</b>	<b>1,155</b>
Total Operating Costs/cwt	17	16	14	13	12	11	11
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>345</b>	<b>345</b>	<b>345</b>	<b>345</b>	<b>345</b>	<b>345</b>	<b>345</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>1,363</b>	<b>1,386</b>	<b>1,409</b>	<b>1,454</b>	<b>1,454</b>	<b>1,477</b>	<b>1,499</b>
Total Cash Costs/cwt	23	21	19	18	16	15	14
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>
<b>TOTAL COSTS/ACRE</b>	<b>1,515</b>	<b>1,538</b>	<b>1,561</b>	<b>1,606</b>	<b>1,606</b>	<b>1,629</b>	<b>1,651</b>
Total Costs/cwt	25.68	22.95	20.81	19.35	17.65	16.45	15.43

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE(\$/cwt)		YIELD(cwt/acre)						
Rice		59.0	67.0	75.0	83.0	91.0	99.0	107.0
	Direct Pay	68.0	68.0	68.0	68.0	68.0	68.0	68.0
11.00	1.998	-264	-189	-113	-60	38	114	189
13.00	1.998	-146	-55	37	106	220	312	403
15.00	1.998	-28	79	187	272	402	510	617
17.00	1.998	90	213	337	438	584	708	831
19.00	1.998	208	347	487	604	766	906	1,045
21.00	1.998	326	481	637	770	948	1,104	1,259
23.00	1.998	444	615	787	936	1,130	1,302	1,473

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE(\$/cwt)		YIELD(cwt/acre)						
Rice		59.0	67.0	75.0	83.0	91.0	99.0	107.0
	Direct Pay	68.0	68.0	68.0	68.0	68.0	68.0	68.0
11.00	1.998	-609	-533	-458	-405	-306	-231	-155
13.00	1.998	-491	-399	-308	-239	-124	-33	59
15.00	1.998	-373	-265	-158	-73	58	165	273
17.00	1.998	-255	-131	-8	93	240	363	487
19.00	1.998	-137	3	142	259	422	561	701
21.00	1.998	-19	137	292	425	604	759	915
23.00	1.998	99	271	442	591	786	957	1,129

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE(\$/cwt)		YIELD(cwt/acre)						
Rice		59.0	67.0	75.0	83.0	91.0	99.0	107.0
	Direct Pay	68.0	68.0	68.0	68.0	68.0	68.0	68.0
11.00	1.998	-761	-685	-610	-557	-458	-383	-307
13.00	1.998	-643	-551	-460	-391	-276	-185	-93
15.00	1.998	-525	-417	-310	-225	-94	13	121
17.00	1.998	-407	-283	-160	-59	88	211	335
19.00	1.998	-289	-149	-10	107	270	409	549
21.00	1.998	-171	-15	140	273	452	607	763
23.00	1.998	-53	119	290	439	634	805	977



UC COOPERATIVE EXTENSION  
**Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND OVERHEAD COSTS**  
 SACRAMENTO VALLEY - 2012

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		
						Insurance	Taxes	Total
12	200 HP 4WD tractor	170,712	10	50,426	17,784	888	1,106	19,778
12	225 HP 4WD tractor	185,891	10	54,909	19,366	967	1,204	21,536
12	95 HP 4WD utility tractor	47,735	16	8,550	3,958	226	281	4,465
12	Chisel – 21'	18,000	10	3,183	2,047	85	106	2,238
12	Combine – no header	370,000	7	100,690	50,904	1,890	2,353	55,147
12	Disc – offset 21'	42,500	10	7,516	4,833	201	250	5,284
12	Disc – stubble 14'	17,814	10	3,150	2,026	84	105	2,215
12	Disc ridger – 12'	12,000	10	2,122	1,365	57	71	1,492
12	Mower – flail 15'	18,000	20	938	1,385	76	95	1,556
12	Pickup – 1/2 ton	30,000	7	11,380	3,729	166	207	4,102
12	Pickup – 3/4 ton	45,000	7	17,070	5,594	249	310	6,154
12	Roller rice 22'	20,000	20	1,042	1,539	84	105	1,728
12	Triplane 16'X30'	20,914	10	3,698	2,378	99	123	2,600
12	V-ditcher	5,000	20	261	385	21	26	432
12	Triplane 24'X30'	35,000	10	6,189	3,980	165	206	4,351
12	Header – conv. 25'	60,000	7	16,328	8,255	306	382	8,943
12	Grain tub	35,000	10	6,189	3,980	165	206	4,351
<b>TOTAL</b>		<b>1,133,566</b>		<b>293,642</b>	<b>133,506</b>	<b>5,730</b>	<b>7,136</b>	<b>146,372</b>
40% of new cost*		453,426		117,457	53,402	2,292	2,854	58,549

\*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
Backhoe	14,000	10	0	1,791	50	70	280	2,191
Fuel tanks & pumps	10,500	20	0	825	37	53	210	1,125
Fuel wagons – 550 gallons (2)	3,478	10	349	417	14	19	70	520
Irrigation system	22,500	20	0	1,767	80	113	450	2,410
Land	1,608,000	40	1,608,000	76,380	0	16,080	0	92,460
Shop building	45,338	20	0	3,561	162	227	906	4,856
Shop tools	13,087	20	1,309	987	51	72	262	1,373
Tool carrier	14,418	20	1,442	1,088	64	79	120	1,351
<b>TOTAL INVESTMENT</b>	<b>1,731,321</b>		<b>1,611,100</b>	<b>86,817</b>	<b>458</b>	<b>16,712</b>	<b>2,298</b>	<b>106,285</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Land rent	639	acre	350.00	223,650
Liability insurance	840	acre	1.58	1,324
Office expense	800	acre	30.00	24,000
Compliance & administration	800	acre	5.00	4,000

UC COOPERATIVE EXTENSION  
**Table 6. HOURLY EQUIPMENT COSTS**  
 SACRAMENTO VALLEY - 2012

Yr.	Description	COSTS PER HOUR							Total Costs/Hr.
		Actual Hours Used	Capital Recovery	Cash Overhead		Operating			
				Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	
12	200 HP 4WD tractor	201	4.45	0.22	0.28	12.28	61.71	73.99	78.94
12	225 HP 4WD tractor	809	5.06	0.25	0.31	9.41	39.81	49.23	54.85
12	95 HP 4WD utility tractor	233	2.11	0.12	0.15	3.68	15.16	18.84	21.22
12	Chisel – 21'	133	4.09	0.17	0.21	2.56	0.00	2.56	7.03
12	Combine – no header	340	47.57	1.77	2.20	27.64	59.72	87.36	138.89
12	Disc – offset 21'	224	7.73	0.32	0.40	3.74	0.00	3.74	12.19
12	Disc – stubble 14'	234	3.46	0.14	0.18	1.60	0.00	1.60	5.39
12	Disc ridger – 12'	40	2.73	0.11	0.14	1.32	0.00	1.32	4.30
12	Mower – flail 15'	132	4.20	0.23	0.29	3.59	0.00	3.59	8.31
12	Pickup – 1/2 ton	326	4.58	0.20	0.25	2.44	7.64	10.08	15.12
12	Pickup – 3/4 ton	326	6.87	0.31	0.38	3.09	7.64	10.73	18.29
12	Roller rice 22'	135	4.55	0.25	0.31	1.09	0.00	1.09	6.20
12	Triplane 16'X30'	100	3.17	0.13	0.16	2.14	0.00	2.14	5.61
12	V-ditcher	80	1.54	0.08	0.11	0.88	0.00	0.88	2.61
12	Triplane 24'X30'	53	5.31	0.22	0.27	3.59	0.00	3.59	9.39
12	Header – conv. 25'	309	10.70	0.40	0.49	6.12	0.00	6.12	17.71
12	Grain cart	181	5.31	0.22	0.27	0.00	0.00	0.00	5.80
12	Rented 325 HP 4WD tractor	183	0.00	0.00	0.00	9.70	64.70	74.40	74.40

UC COOPERATIVE EXTENSION  
**Table 7. OPERATIONS WITH EQUIPMENT & MATERIALS**  
 SACRAMENTO VALLEY - 2012

Operation	Operation Month	Tractor	Implement	Material	Rate/ acre	Unit
Maintain drains	Feb	95 HP 4WD Utility tractor	V-ditcher			
Maintain and rework levees	Apr	225 HP 4WD tractor	Disc ridger – 12'			
Chisel 2X	Apr	Rented 325 HP 4WD tractor	Chisel – 21'	Lube	0.15	acre
		225 HP 4WD tractor	Chisel – 21'			
Stubble disc	Apr	225 HP 4WD tractor	Disc – stubble 14'			
Finish disc 2X	Apr	225 HP 4WD tractor	Disc – offset 21'			
Triplane fields	Apr	225 HP 4WD tractor	Triplane 24'X30'			
	Apr	Rented 325 HP 4WD tractor	Triplane 16'X30'			
				Diesel	12.00	gal
				Lube	0.17	acre
Laser level 1X/7 Years	Apr			Laser leveling	0.13	acre
Fertilize – Aqua Ammonium	Apr			Aqua ammonia	130.00	lb N
				Fertilizer rig – Aqua Ammonium	1.00	acre
Fertilize – 12-23-20	Apr	225 HP 4WD tractor	Roller rice 22'	12-23-20	200.00	lb
				Air application – dry fertilizer	1.00	acre
Roll final seedbed	Apr	225 HP 4WD tractor	Roller rice 22'			
Fertilize – zinc, 50% of acreage	Apr			Zinc Sulfate 36%	15.00	lb
				Air application – zinc dry	0.50	acre
Irrigate	May			Water	0.20	acre
	June			Water	0.20	acre
	July			Water	0.20	acre
	Aug			Water	0.20	acre
	Sept			Water	0.20	acre
Weed control – grass spray	May			Cerano	10.00	lb
				Air application – Cerano	1.00	acre
				Adjuvant	3.50	fl oz
				Crop oil	1.00	gal
Soak (chlorine) and deliver seed	May			Seed - rice	1.80	cwt
				Soaking (chlorine) seed	1.80	cwt
				Delivery – seed	1.80	cwt
Plant seed	May			Air application – seed	1.80	cwt

## UC COOPERATIVE EXTENSION

Table 7. Continued

SACRAMENTO VALLEY - 2012

Operation	Operation Month	Tractor	Implement	Material	Rate/ acre	Unit
Insect control rice weevil, 15% of acreage	May			Warrior	0.58	fl oz
				Air application – Warrior	0.15	acre
Pest control shrimp/algae, 20% of acreage	May			Copper Sulfate fine	3.00	lb
				Air application – copper	0.20	acre
Weed control – broadleaf spray, 80% of acreage	June			Grandstand	4.80	fl oz
				Crop oil	0.80	gal
				Super wham	4.80	qt
				Ground application – Prop/Grand	0.80	acre
Weed control – cleanup spray, 20% of acreage	June			Regiment	0.33	oz
				Air application – Regiment	0.50	acre
Fertilize – topdress 21-0-0, 75% of acreage	July			21-0-0 Ammonia Sulfate	112.50	lb
				Air application – Dry Fertilizer	0.75	acre
Insect control – armyworm, 5% of acreage	July			Warrior	0.38	fl oz
				Air application – Warrior	0.10	acre
Disease control – Quadris, 45% of acreage	July			Quadris	5.40	fl oz
				Air application – Quadris	0.45	acre
Combine rice	Sept		Combine – no header Header – conv. 25'			
Grain tub	Sept	200 HP 4WD tractor	Grain cart			
Haul rice to dryer	Sept			Hauling	95.34	cwt
Dry & store rice	Oct			Drying charge	95.34	cwt
				Storage charge	83.00	cwt
				California Rice Research Board	83.00	cwt
Rice Research Board assessment	Oct			California Rice Commission	83.00	cwt
California Rice Commission assessment	Oct			Burning fees	0.10	acre
Burn permit & fees, 10% of acreage	Oct			Burn permit	0.10	acre
Chop, flood & roll, 30% of acreage	Oct	225 HP 4WD Tractor	Disc – Stubble 14'			
		200 HP 4WD tractor	Roller rice 22'	Water – straw management	0.30	acre
Chop, 60% of acreage	Oct	95 HP 4WD Utility tractor	Mower – flail 15'			
Disc, 60% of acreage	Oct	225 HP 4WD Tractor	Disc – stubble 14'			