
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2015

**SAMPLE COSTS TO PRODUCE
RICE**



SACRAMENTO VALLEY

Rice Only Rotation, Medium Grain

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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) 752-4651, (530) 752-5489, 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) 752-1515, 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 10 acres and rents 830 acres. Medium grain rice (Calrose) is grown on 800 acres and 40 acres are 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. All operations are done on 100% of the acres unless noted otherwise.

This study assumes the grower owns 10 acres, valued at \$10,000 per acre, and rents 830 acres, rented at \$425 per acre. This study assumes 100% of farmed land is rented. 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, including 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. Environmental regulations may affect the way the drains and levees are maintained and additional costs may be incurred, which are not accounted for in this study. 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 with a dual GPS scraper. Precision leveling is done once every other year and one-half of the cost is charged to the cultural operations annually. In between GPS land and laser leveling years, the grower triplanes the fields to maintain even ground for water flow. 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 ground and incorporated using a roller (can also be applied by air). 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 31.5 pounds of N, or 150 pounds of ammonium sulfate, 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 into a few inches of water on the fields at a rate of 165 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 farmed land, which varies widely between

irrigation districts in the Sacramento Valley. The seasonal cost of irrigation water for this study is \$150.00 per surface acre. Typically, 4 to 6 acre-feet of water are applied during the growing season. This results in a water depth of 4 to 6 inches during the growing season. 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*. Visit the UC IPM website at www.ipm.ucdavis.edu for more information on other pesticides available, pest identification, monitoring, and management. For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

Weeds. Grass weeds and broadleaf weeds are controlled with separate aerial and ground applications. An herbicide (e.g. Cerano, Clincher, Bolero, Granite GR, or a combination) to control grass weeds is applied to 100% of the rice shortly after planting. The study assumes that Cerano is applied to 100% of the acres by air in May. Additional foliar active herbicides (e.g. propanil, Grandstand, or Regiment) are applied by air in June to control broadleaf weeds, sedges and grasses on 100% of the acres. Tank mixes of two foliar active herbicides are often used for the second herbicide application. This study assumes that a propanil (Super Wham) and Grandstand tank mix is applied by air, as stated above, on 100% of planted acres. Final weed control is a cleanup herbicide (e.g. Regiment) application in late June that is applied using a ground rig on 80% of the acres. Weed material programs vary amongst growers due to management of herbicide resistant weeds or other production circumstances. However, material costs per acre are within similar ranges.

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.

Algae and tadpole shrimp. After planting in May, copper sulfate is applied to 20% of the acres to control algae and tadpole shrimp.

Diseases. Aggregate sheath spot and blast are controlled July through August with one application of Quadris on 80% 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 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 98 hundredweight (cwt) per acre and a \$0.50 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 98 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 8,500 pounds (85 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 \$20.70 per cwt. of grain rice (with an assumed loan value of \$6.60, or \$14.10 above loan value) is used to estimate market income, based on 2013 USDA prices. A range of yields and prices are presented in Table 4 (page 16). Direct Payments and Counter cyclical Payments (but not the Marketing Loan Program) have been eliminated in the Agricultural Act of 2014 (ACT) and are replaced with alternative commodity programs that provide growers with some income protection in the event of a downturn in price, yield or a combination of both. In March, 2015 producers chose between Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC), and remain enrolled in the selected program over the life of the current Farm Bill. The PLC program pays indemnities when the crop price drops below the established reference price for the commodity, which is \$16.10 per cwt for Temperate Japonica, as of 2015. The ARC program pays indemnities when revenues (individual or county averages) fall below the revenue guaranteed value, based on 5-year historical yields and the commodity reference price. These programs are administered by the United States Department of Agriculture’s (USDA), Farm Service Agency (FSA). A single limit of \$125,000 for each “person...actively engaged in farming” (as defined by the ACT) applies to all payments under these programs. Payments are tied to a farm’s historical rice and other commodity base acres and yields, and are not available to producers whose average adjusted gross income exceeds \$900,000. The support payments are included in this study in the Ranging Analysis (Table 4) for the \$14.70 scenario. The study assumes that a grower selects the PLC program, however selection criteria should be based on individual farm analysis. For more information on these and other programs, or on meeting minimum requirements to comply with the programs please contact the USDA FSA, or visit the website: <http://www.usda.gov/wps/portal/usda/usdahome?navid=farbill>.

Table A. Average California Yield and Prices

Year	Yield/Acre (Medium Grain)	Return/Cwt. (all types)
	Cwt.	\$/Cwt.
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	27.40
2009	87.40	19.50
2010	82.00	20.80
2011	85.00	18.40
2012	83.50	18.40
2013	86.70	20.70
2014	88.00	-

Source: USDA NASS Historical Data

Net Returns. A grower will achieve a positive cash flow when net returns above cash costs (gross returns less operating costs) are positive. This means that returns are sufficient to cover annual operating expenses (material inputs, labor costs, harvest, fuel, lube and repairs, and interest on operating loans). However, a positive cash flow does not include consideration of a return on investment in owned capital, also called non-cash overhead expenses. Nor does it include loan payments on capital investments such as equipment, irrigation system, and buildings. Net returns over total cost (gross return less total costs) include both cash costs and non-cash costs. If net returns above operating costs are positive but net returns above total costs are negative, over time gross returns will be insufficient to replace equipment and other investments necessary for production.

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 \$0.07 per dry cwt. Rice millers and marketers also contribute an equal amount of \$0.07 per dry cwt. This provides the CRC with a total budget based on \$0.14 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), 2) chopping, discing, and flooding, 3) chopping and flooding, 4) chopping, flooding and rolling (stomping), 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 8% 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 \$90 burn permit is charged to the farm and an additional \$2.50 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 62% 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 \$21 per hour for general labor and \$35 per for irrigation labor are used, and include payroll overhead of 40%. The basic hourly wage is \$15 for general labor and \$25 for irrigation labor. The overhead includes the employer's share of federal and California state payroll taxes, workers' compensation insurance for field crops, and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of March 1, 2014 (personal email from California Department of Insurance, January 2015, 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 \$3.88 (excludes excise tax) and \$3.79 per gallon, respectively. Fuel costs are derived from the Energy Information Administration, 2014 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.

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 5.75% 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 interest rate will vary depending upon various factors. The rate in this study is considered a typical lending rate by a farm lending agency as of January, 2015.

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.

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 \$350 to \$500 per acre with surface water rights 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 \$425 per acre is used in this study. All farmed acres are assumed to be rented, and considered a cash cost. This study assumes all farmed acres are rented to account for the current cost of farming on rice land.

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 0.843% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$14,994 for the entire farm.

Office and Business Expense. Office and business expenses are estimated at \$50 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 \$25 per acre. This includes expenses such as managing paperwork for compliance, as well as miscellaneous administrative costs that accompany the compliance paperwork.

Crop Insurance. Crop insurance is a tool that some growers use to help offset revenue loss risk. This study assumes that all acres in the farm are eligible for Prevented Planting (PP) coverage, which is available under catastrophic (CAT) crop insurance and buy-up insurance policies. A buy-up insurance policy offers growers more coverage and flexibility to tailor a crop insurance plan to a specific operation. Yield and revenue insurance are the most common buy-up policies and offer coverage levels between 50% and 85%. The USDA RMA sets crop insurance policies and costs, which are administered by private insurance companies. Various crop insurance policies are offered for rice growers in the Sacramento Valley including revenue protection, revenue protection with harvest price exclusion and yield protection. Between 2011 and 2014, yield protection represented between 89 and 94 percent of total buy-up policies for rice growers in California. Depending on the crop insurance policy, the USDA RMA will subsidize between 38 and 67 percent of the grower premium cost, as of 2014. The grower is assumed to purchase a 75 percent yield protection policy, with an additional 55 percent PP coverage level, assumed to cost \$18 per acre. For more information on crop insurance, visit the Risk Management Agency website: <http://www.rma.usda.gov/>, and for more information on prevented planting coverage, refer to the RMA Handbook: Prevented Planting Loss Adjustment Standards Handbook (FCIC-25370 [10-2006]).

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. Rice land values range from \$7,000 to \$12,000 per acre. This study uses a value of \$10,000 per acre. 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, 10 acres of land is assumed to be 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, 2015.

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. The grower is assumed to own two portable pumps. 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 135 feet.

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 - 2015

Operation	Operation Time (Hrs./A)	Cash and Labor Costs per Acre						Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:									
Maintain Drains	0.10	3	2	1	0	0	5		
Maintain and Rework Levees	0.05	1	4	1	0	0	6		
Chisel 2X	0.17	4	13	3	0	16	36		
Stubble Disc	0.15	4	11	3	0	0	18		
Finish Disc 2X	0.28	7	21	6	0	0	34		
Triplane Fields 1X/2yrs	0.07	2	5	1	0	0	8		
GPS Field Leveling - 1X/2yrs	0.00	0	0	0	0	20	20		
Fertilize - Aqua @ 130 Lbs N	0.00	0	0	0	75	23	98		
Fertilize - 12-23-20 @ 200 Lbs	0.15	4	11	3	44	0	61		
Roll Final Seedbed	0.07	2	5	1	0	0	9		
Fertilize - Zinc, 50% of Acreage	0.00	0	0	0	7	5	12		
Irrigate	0.00	35	0	0	150	0	185		
Weed Control - Grass Spray	0.00	0	0	0	65	12	77		
Soak (Chlorine) and Deliver Seed	0.00	0	0	0	53	5	58		
Plant @ 165 Lbs/Acre	0.00	0	0	0	0	14	14		
Insect Control Rice Weevil, 15% of Acreage	0.00	0	0	0	2	2	4		
Pest Control Shrimp/Algae, 20% of Acreage	0.00	0	0	0	5	2	6		
Weed Control - Broadleaf Spray	0.00	0	0	0	95	12	107		
Weed Control - Cleanup Spray, 80% of Acreage	0.00	0	0	0	32	16	48		
Fertilize - Topdress 21-0-0, 75% of Acreage	0.00	0	0	0	17	11	29		
Insect Control - Armyworm, 5% of Acreage	0.00	0	0	0	1	1	1		
Disease Control - Quadris, 80% of Acreage	0.00	0	0	0	22	9	31		
Pickup Truck Use	0.41	21	6	2	0	0	28		
TOTAL CULTURAL COSTS/ACRE	1.44	82	78	20	567	147	894		
Harvest:									
Combine Rice – Cutterbar Header	0.39	10	29	17	0	0	55		
Grain Cart	0.21	5	15	3	0	0	24		
Haul Rice to Dryer	0.00	0	0	0	0	49	49		
Dry & Store Rice	0.00	0	0	0	0	159	159		
Rice Research Board Assessment	0.00	0	0	0	6	0	6		
California Rice Commission Assessment	0.00	0	0	0	6	0	6		
TOTAL HARVEST COSTS	0.59	15	44	20	12	208	299		
Postharvest:									
Burn Permit & Fees, 8% of Acreage	0.00	10	0	0	0	0	10		
Chop, Flood & Roll, 30% of Acreage	0.02	4	2	0	11	0	17		
Disc 30%	0.05	1	3	1	0	0	5		
Chop, 62% of Acreage	0.17	4	3	2	0	0	9		
Disc, 62% of Acreage	0.10	2	7	2	0	0	11		
TOTAL POSTHARVEST COSTS	0.33	22	15	5	11	0	53		
Interest on Operating Capital at 5.75%								26	
TOTAL OPERATING COSTS/ACRE	2.37	119	138	45	590	355	1,273		

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Table 1. Continued

SACRAMENTO VALLEY - 2015

Operation	Cash and Labor Costs per Acre							Total Cost	Your Cost
	Operation Time (Hrs./A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent	Total Cost		
CASH OVERHEAD:									
Land Rent ¹								420	
Liability Insurance								18	
Office Expense								48	
Compliance & Administration								24	
Crop Insurance								18	
Property Taxes								53	
Property Insurance								3	
Investment Repairs								4	
TOTAL CASH OVERHEAD COSTS/ACRE								588	
TOTAL CASH COSTS/ACRE								1,860	
NON-CASH OVERHEAD:									
		Per producing Acre		Annual Cost					
				Capital Recovery					
Backhoe		24		3				3	
Fuel Tanks & Pumps		13		1				1	
Fuel Wagons – 550 Gallons (2)		4		1				1	
Irrigation System		28		2				2	
Land		119		6				6	
Shop Building		119		9				9	
Shop Tools		16		1				1	
Tool Carrier		17		1				1	
Equipment		467		55				55	
TOTAL NON-CASH OVERHEAD COSTS								80	
TOTAL COSTS/ACRE								1,940	
TOTAL COSTS/CWT								22.82	

¹Land Rent is \$425/acre. This study allocates the total cost of rent (\$352,750) over all rice producing acres (840) for a total of approximately \$420 per producing acre.

UC COOPERATIVE EXTENSION
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE RICE
 SACRAMENTO VALLEY – 2015

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Rice	85.00	Cwt	20.70	1,760	
TOTAL GROSS RETURNS				1,760	
OPERATING COSTS					
Rent:					
Tractor 325 HP 4WD	0.20	Hour	80.00	16	
Custom:					
GPS Laser leveling	0.50	Acre	40.00	20	
Fertilizer Rig – Aqua Ammonium	1.00	Acre	22.50	23	
Air Application – Dry Fertilizer	0.75	Acre	15.00	11	
Air Application – Zinc Dry	0.50	Acre	9.00	5	
Air Application – Cerano	1.00	Acre	12.00	12	
Soaking Seed (Water with 2.5% Chlorine)	1.65	Cwt	2.25	4	
Delivery – Seed	1.65	Cwt	0.70	1	
Air Application – Seed	1.65	Cwt	8.55	14	
Air Application – Warrior	0.20	Acre	11.50	2	
Air Application – Copper	0.20	Acre	9.00	2	
Ground Application – Propanil/Grandstand	0.80	Acre	20.00	16	
Air Application – Quadris	0.80	Acre	11.50	9	
Fertilizer:					
Aqua Ammonia	130.00	Lb N	0.58	75	
12-23-20	200.00	Lb	0.22	44	
Zinc Sulfate 36%	15.00	Lb	0.48	7	
21-0-0 Ammonia Sulfate	112.50	Lb	0.16	17	
Herbicide:					
Cerano	10.00	Lb	5.00	50	
Grandstand	6.00	FlOz	1.13	7	
Super Wham	6.00	Qt	12.38	74	
Regiment	0.53	Oz	60.00	32	
Insecticide:					
Warrior	0.77	FlOz	3.21	2	
Copper Sulfate Fine	2.00	Lb	2.26	5	
Fungicide:					
Quadris	8.80	FlOz	2.53	22	
Adjuvant:					
Adjuvant	3.50	FlOz	0.22	1	
Crop Oil	2.00	Gal	13.85	28	
Seed:					
Seed	1.65	Cwt	32.25	53	
Irrigation:					
Water – Irrigation	1.00	Acre	150.00	150	
Water – Straw Management	0.30	Acre	35.00	11	

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 - 2015

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Contract:				208	
Hauling	98.00	Cwt	0.50	49	
Drying	98.00	Cwt	0.95	93	
Storage	85.00	Cwt	0.78	66	
Assessment:				12	
California Rice Research Board	85.00	Cwt	0.07	6	
California Rice Commission	85.00	Cwt	0.07	6	
Burn Permit:				0	
Burning Fees	0.08	Acre	2.75	0	
Burn Permit	0.08	Acre	0.03	0	
Labor:				119	
Equipment Operator Labor	3.33	hrs	21.00	70	
General Labor	0.50	hrs	20.55	10	
Irrigation Labor	1.10	hrs	35.00	39	
Machinery:				184	
Fuel – Gas	1.63	gal	3.79	6	
Fuel – Diesel	33.88	gal	3.88	131	
Lube				21	
Machinery repair				25	
Interest on Operating Capital at 5.75%				26	
TOTAL OPERATING COSTS/ACRE				1,273	
NET RETURNS ABOVE OPERATING COSTS				486	
CASH OVERHEAD COSTS					
Land Rent				420	
Liability Insurance				18	
Office Expense				48	
Compliance & Administration				24	
Crop Insurance				18	
Property Taxes				53	
Property Insurance				3	
Investment Repairs				4	
TOTAL CASH OVERHEAD COSTS/ACRE				588	
TOTAL CASH COSTS/ACRE				1,861	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Backhoe				3	
Fuel Tanks & Pumps				1	
Fuel Wagons – 550 Gallons (2)				1	
Irrigation System				2	
Land				6	
Shop Building				9	
Shop Tools				1	
Tool Carrier				1	
Equipment				55	
TOTAL NON-CASH OVERHEAD COSTS				80	
TOTAL COST/ACRE				1,941	
TOTAL COST/ CWT				22.83	
NET RETURNS ABOVE TOTAL COST				-182	

UC COOPERATIVE EXTENSION

Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE RICE
SACRAMENTO VALLEY - 2015

Beginning 02-15	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending 10-15	15	15	15	15	15	15	15	15	15	
Cultural:										
Maintain Drains	5									5
Maintain and Rework Levees			6							6
Chisel 2X			36							36
Stubble Disc			18							18
Finish Disc 2X			34							34
Triplane Fields 1X/2yrs			8							8
GPS Field Leveling - 1X/2yrs			20							20
Fertilize - Aqua @ 130 Lbs N			98							98
Fertilize - 12-23-20 @ 200 Lbs			61							61
Roll Final Seedbed			9							9
Fertilize - Zinc, 50% of Acreage			12							12
Irrigate				37	37	37	37	37		185
Weed Control - Grass Spray				77						77
Soak (Chlorine) and Deliver Seed				58						58
Plant @ 165 Lbs/Acre				14						14
Insect Control Rice Weevil, 15% of Acreage				4						4
Pest Control Shrimp/Algae, 20% of Acreage				6						6
Weed Control - Broadleaf Spray					107					107
Weed Control - Cleanup Spray, 80% of Acreage					48					48
Fertilize - Topdress 21-0-0, 75% of Acreage						29				29
Insect Control - Armyworm, 5% of Acreage						1				1
Disease Control - Quadris, 80% of Acreage						31				31
Pickup Truck Use	3	3	3	3	3	3	3	3	3	28
TOTAL CULTURAL COSTS	8	3	304	197	195	101	40	40	3	894
Harvest:										
Combine Rice – Cutterbar Header								55		55
Grain Cart								24		24
Haul Rice to Dryer								49		49
Dry & Store Rice									159	159
Rice Research Board Assessment									6	6
California Rice Commission Assessment									6	6
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	128	171	299

UC COOPERATIVE EXTENSION

Table 3. Continued

SACRAMENTO VALLEY - 2015

Beginning 02-15	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending 10-15	15	15	15	15	15	15	15	15	15	
Postharvest:										
Burn Permit & Fees, 8% of Acreage									10	10
Chop, Flood & Roll, 30% of Acreage									17	17
Disc 30%									5	5
Chop, 62% of Acreage									9	9
Disc, 62% of Acreage									11	11
TOTAL POSTHARVEST COSTS	0	0	0	0	0	0	0	0	53	53
Interest on Operating Capital at 5.75%	0	0	2	2	3	4	4	5	6	26
TOTAL OPERATING COSTS/ACRE	8	3	306	199	198	105	44	173	234	1,273
TOTAL OPERATING COSTS/CWT	0.10	0.04	3.59	2.34	2.33	1.24	0.52	2.03	2.75	14.97
CASH OVERHEAD:										
Land Rent										420
Liability Insurance										18
Office Expense										48
Compliance & Administration										24
Crop Insurance										18
Property Taxes	27					27				53
Property Insurance	3									3
Investment Repairs	0	0	0	0	0	0	0	0	0	4
TOTAL CASH OVERHEAD COSTS	30	0	0	0	0	27	0	0	0	588
TOTAL CASH COSTS/ACRE	38	4	306	199	199	132	45	173	234	1,860
TOTAL CASH COSTS/CWT	0.45	0.04	3.60	2.35	2.34	1.56	0.53	2.04	2.75	21.89

UC COOPERATIVE EXTENSION
Table 4. RANGING ANALYSIS
 SACRAMENTO VALLEY - 2015

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE RICE

	YIELD (Cwt/Acre)						
	70	75	80	85	90	95	100
OPERATING COSTS:							
Cultural	894	894	894	894	894	894	894
Harvest	229	244	259	299	288	303	318
Postharvest	53	53	53	53	53	53	53
Interest on Operating Capital at 5.75%	26	26	26	26	26	26	27
TOTAL OPERATING COSTS/ACRE	1,203	1,217	1,232	1,273	1,262	1,276	1,291
Total Operating Costs/Cwt	17	16	15	15	14	13	13
CASH OVERHEAD COSTS/ACRE	588	588	588	588	588	588	588
TOTAL CASH COSTS/ACRE	1,790	1,805	1,820	1,860	1,849	1,864	1,879
Total Cash Costs/Cwt	26	24	23	22	21	20	19
NON-CASH OVERHEAD COSTS/ACRE	80	80	80	80	80	80	80
TOTAL COSTS/ACRE	1,870	1,885	1,899	1,940	1,929	1,944	1,958
Total Costs/Cwt	26.71	25.13	23.74	22.82	21.43	20.46	19.58

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE(\$/CWT)	YIELD (Cwt/Acre)						
	70	75	80	85	90	95	100
Rice							
14.70*	-68	-9	50	83	167	226	285
16.70	-34	35	104	147	241	310	379
18.70	106	185	264	317	421	500	579
20.70	246	335	424	487	601	690	779
22.70	386	485	584	657	781	880	979
24.70	526	635	744	827	961	1,070	1,179
26.70	666	785	904	997	1,141	1,260	1,379

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE(\$/CWT)	YIELD (Cwt/Acre)						
	70	75	80	85	90	95	100
Rice							
14.70*	-655	-596	-538	-505	-420	-362	-303
16.70	-621	-553	-484	-441	-346	-278	-209
18.70	-481	-403	-324	-271	-166	-88	-9
20.70	-341	-253	-164	-101	14	102	191
22.70	-201	-103	-4	69	194	292	391
24.70	-61	47	156	239	374	482	591
26.70	79	197	316	409	554	672	791

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE(\$/CWT)	YIELD (Cwt/Acre)						
	70	75	80	85	90	95	100
Rice							
14.70*	-735	-676	-617	-584	-500	-441	-382
16.70	-701	-632	-563	-520	-426	-357	-288
18.70	-561	-482	-403	-350	-246	-167	-88
20.70	-421	-332	-243	-180	-66	23	112
22.70	-281	-182	-83	-10	114	213	312
24.70	-141	-32	77	160	294	403	512
26.70	-1	118	237	330	474	593	712

* PLC program payment of \$106.08 per acre is included in calculation.

UC COOPERATIVE EXTENSION
Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND OVERHEAD COSTS
 SACRAMENTO VALLEY - 2015

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
15	95 HP 4WD Utility Tractor	75,000	16	13,433	6,218	373	4,643	11,234
15	300 HP 4WD Tractor	250,000	10	73,846	26,044	1,365	17,002	44,411
15	Chisel - 21'	21,000	10	3,714	2,388	104	1,297	3,790
15	Combine - No Header	420,000	7	114,296	57,783	2,252	28,051	88,086
15	Disc - Offset 21'	42,500	10	7,516	4,833	211	2,626	7,669
15	Disc - Stubble 14'	28,000	10	4,952	3,184	139	1,730	5,053
15	Disc Ridger - 12'	15,000	10	2,653	1,706	74	927	2,707
15	Mower - Flail 20'	23,000	20	1,199	1,769	102	1,270	3,142
15	Pickup - 1/2 Ton	30,000	7	11,380	3,729	174	2,172	6,076
15	Pickup - 3/4 Ton	45,000	7	17,070	5,594	262	3,259	9,114
15	V Ditcher	5,000	20	261	385	22	276	683
15	Header - Conv. 25'	78,000	7	21,226	10,731	418	5,209	16,359
15	Grain Tub	35,000	10	6,189	3,980	174	2,162	6,316
15	Triplane 24'X40'	35,000	10	6,189	3,980	174	2,162	6,316
15	Roller Rice 24' + Dry Box	40,000	20	2,085	3,077	177	2,209	5,464
TOTAL		1,142,500		286,009	135,402	6,021	74,997	216,420
40% of New Cost*		457,000		114,404	54,161	2,408	29,999	86,568

*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	20,000	10	0	2,559	50	1,050	400	4,059
Fuel Tanks & Pumps	10,500	20	0	825	37	551	210	1,624
2 - 550G Fuel Wagons	3,478	10	349	417	14	201	70	701
Irrigation System (2 Pumps)	22,500	20	0	1,767	80	1,181	450	3,479
Land	100,000	40	100,000	4,750	0	10,500	0	15,250
Shop Building	100,000	20	0	7,855	162	5,250	2,000	15,267
Shop Tools	13,087	20	1,309	987	51	756	262	2,057
Equipment Carrier	14,418	20	1,442	1,088	67	833	120	2,107
TOTAL INVESTMENT	283,983		103,100	20,248	462	20,322	3,512	44,543

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/	Total
	Farm	Unit	Unit	Cost
Land Rent	830	Acre	425.00	352,750
Liability Insurance	840	Acre	17.85	14,994
Office Expense	800	Acre	50.00	40,000
Compliance & Administration	800	Acre	25.00	20,000
Crop Insurance	800	Acre	18.00	14,400

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 SACRAMENTO VALLEY - 2015

Yr Description	COSTS PER HOUR								
	Rice	Total	Capital	Cash Overhead			Operating		
	Hours Used	Hours Used	Recovery	Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	Total Costs/Hr.
15 Chisel - 21'	133	200	4.78	0.21	2.59	2.98	0.00	2.98	10.56
15 Combine - No Header	340	428	54.00	2.10	26.22	31.34	67.55	98.89	181.21
15 Disc - Offset 21'	224	224	8.63	0.38	4.69	4.17	0.00	4.17	17.87
15 Disc - Stubble 14'	236	236	5.39	0.23	2.93	2.49	0.00	2.49	11.04
15 Disc Ridger - 12'	40	200	3.41	0.15	1.85	1.65	0.00	1.65	7.06
15 Pickup - 1/2 Ton	326	326	4.58	0.21	2.67	2.43	7.58	10.01	17.48
15 Pickup - 3/4 Ton	326	326	6.87	0.32	4.00	3.08	7.58	10.66	21.85
15 V-Ditcher	80	100	1.54	0.09	1.10	0.88	0.00	0.88	3.61
15 Header - Conv. 25'	309	309	13.91	0.54	6.75	7.96	0.00	7.96	29.15
15 Grain Tub	181	300	5.31	0.23	2.88	0.00	0.00	0.00	8.42
15 95 HP 4WD Utility Tractor	238	750	3.32	0.20	2.48	4.78	17.15	21.93	27.92
15 Rented 325 HP 4WD Tractor	73	250	0.00	0.00	0.00	10.98	73.18	84.16	84.16
15 300 HP 4WD Tractor	1077	1600	6.51	0.34	4.25	14.57	67.55	82.12	93.22
15 Triplane 24'X40'	53	300	5.31	0.23	2.88	3.59	0.00	3.59	12.01
15 Roller Rice 24' + Dry Box	194	194	6.34	0.37	4.55	1.52	0.00	1.52	12.79
15 Mower - Flail 20'	136	136	5.19	0.30	3.73	4.44	0.00	4.44	13.66

UC COOPERATIVE EXTENSION

Table 9. OPERATIONS WITH EQUIPMENT & MATERIALS

SACRAMENTO VALLEY - 2015

Operation	Month	Tractor	Implement	Material	Rate/ acre	Unit
Maintain Drains	Feb	95 HP 4WD Utility Tractor	V Ditcher	Non-Machine Labor		
Maintain and Rework Levees	Apr	300 HP 4WD Tractor	Disc Ridger - 12'	Equipment Operator Labor	0.06	hour
Chisel 2X	Apr	Rented 325 HP 4WD Tractor	Chisel - 21'	Equipment Operator Labor	0.10	hour
				Tractor 325 HP 4WD	0.20	Hour
	Apr	300 HP 4WD Tractor	Chisel - 21'	Equipment Operator Labor	0.10	hour
Stubble Disc	Apr	300 HP 4WD Tractor	Disc - Stubble 14'	Equipment Operator Labor	0.18	hour
Finish Disc 2X	Apr	300 HP 4WD Tractor	Disc - Offset 21'	Equipment Operator Labor	0.34	hour
Triplane Fields - 1X per 2 yrs	Apr	300 HP 4WD Tractor	Triplane 24'X40'	Non-Machine Labor		
GPS Field Leveling - 1X per 2 yrs	Apr			GPS Laser Leveling	0.50	Acre
Fertilize - Aqua 130 Lbs N	Apr			Aqua Ammonia	130.00	Lb N
				Fertilizer Rig - Aqua Ammonium	1.00	Acre
Fertilize - 12-23-20, 200 Lbs	Apr	300 HP 4WD Tractor	Roller Rice 24' + Dry Box	Equipment Operator Labor	0.18	hour
				12-23-20	200.00	Lb
Roll Final Seedbed	Apr	300 HP 4WD Tractor	Roller Rice 24' + Dry Box	Equipment Operator Labor	0.09	hour
Fertilize - Zinc, 50% of Acreage	Apr			Zinc Sulfate 36%	15.00	Lb
				Air Application - Zinc Dry	0.50	Acre
Irrigate	May			Irrigation Labor	0.20	hour
				Water - Irrigation	0.20	Acre
	June			Irrigation Labor	0.20	hour
				Water - Irrigation	0.20	Acre
	July			Irrigation Labor	0.20	hour
				Water - Irrigation	0.20	Acre
	Aug			Irrigation Labor	0.20	hour
				Water - Irrigation	0.20	Acre
	Sept			Irrigation Labor	0.20	hour
				Water - Irrigation	0.20	Acre
Weed Control - Grass Spray	May			Cerano	10.00	Lb
				Air Application - Cerano/Bolero	1.00	Acre
				Adjuvant	3.50	FLOz
				Crop Oil	1.00	Gal
Soak (Chlorine) and Deliver Seed	May			Seed - Rice	1.65	Cwt
				Soaking (Chlorine) Seed	1.65	Cwt
				Delivery - Seed	1.65	Cwt

UC COOPERATIVE EXTENSION

Table 9. Continued

SACRAMENTO VALLEY - 2015

Operation	Month	Tractor	Implement	Material	Rate/ acre	Unit
Plant @ 165 Lbs/Ac	May			Air Application - Seed	1.65	Cwt
Insect Control Rice Weevil, 15% of Acreage	May			Warrior	0.58	FLOz
				Air Application - Warrior	0.15	Acre
Pest Control Shrimp/Algae, 20% of Acreage	May			Copper Sulfate Fine	2.00	Lb
				Air Application -Copper	0.20	Acre
Weed Control - Broadleaf Spray	June			Grandstand	6.00	FLOz
				Crop Oil	1.00	Gal
				Super Wham	6.00	Qt
				Air Application - Propanil/Grandstand	1.00	Acre
Weed Control - Cleanup Spray, 80% of Acreage	June			Regiment	0.53	Oz
				Ground Application - Prop/Grand	0.80	Acre
Fertilize - Topdress 21-0-0, 75% of Acreage	July			21-0-0 Ammonia Sulfate	112.50	Lb
				Air Appl - Dry Fertilizer	0.75	Acre
Insect Control - Armyworm, 5% of Acreage	July			Warrior	0.19	FLOz
				Air Application - Warrior	0.05	Acre
Disease Control - Quadris, 80% of Acreage	July			Quadris	8.80	FLOz
				Air Application - Quadris	0.80	Acre
Pickup Truck Use	July		Pickup - 1/2 Ton	Equipment Operator Labor	0.98	hour
			Pickup - 3/4 Ton			
Combine Rice - Cutterbar Header	Sept		Combine - No Head Header - Conv. 25'	Equipment Operator Labor	0.46	hour
Grain Tub	Sept	300 HP 4WD Tractor	Grain Tub	Equipment Operator Labor	0.25	hour
Haul Rice To Dryer	Sept			Hauling	98.00	Cwt
Dry & Store Rice	Oct			Drying Charge	98.00	Cwt
				Storage Charge	85.00	Cwt
Rice Research Board Assessment	Oct			California Rice Research Board	85.00	Cwt
California Rice Commission	Oct			California Rice Commission	85.00	Cwt
Burn Permit & Fees 8%	Oct			Non-Machine Labor	0.50	hour
				Burning Fees	0.08	Acre
				Burn Permit	0.08	Acre
Flood & Roll 30%	Oct	300 HP 4WD Tractor	Roller Rice 24' + Dry Box	Irrigation Labor	0.10	hour
				Water - Straw Management	0.30	Acre
Disc 30%	Oct	300 HP 4WD Tractor	Disc - Stubble 14'	Equipment Operator Labor	0.06	hour
Chop 62%	Oct	95 HP 4WD Utility Tractor	Mower - Flail 20'	Equipment Operator Labor	0.20	hour
Disc 62%	Oct	300 HP 4WD Tractor	Disc - Stubble 14'	Equipment Operator Labor	0.11	hour