UNIVERSITY OF CALIFORNIA AGRICULTURAL AND NATURAL RESOURCES
COOPERATIVE EXTENSION
UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

2022
SAMPLE COSTS TO PRODUCE
RICE

DELTA REGION
OF
SAN JOAQUIN & SACRAMENTO COUNTIES
SAN JOAQUIN VALLEY - North
Continuous Rice Production

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University of California Agriculture and Natural Resources
Cooperative Extension
UC Davis Department of Agricultural and Resource Economics

SAMPLE COSTS TO PRODUCE RICE (Continuous Rice Culture)
Delta Region of San Joaquin & Sacramento Counties
San Joaquin Valley – North 2022

STUDY CONTENTS

INTRODUCTION

Sample costs to produce rice in the northern Sacramento-San Joaquin Delta region (San Joaquin and Sacramento counties) are presented in this study. This study is intended as a guide only and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on those production practices considered typical for the crop and area but will not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "*Your Costs*", in Tables 1, 2 and 3 is provided to enter your farming costs.

For an explanation of calculations used, refer to the section titled Assumptions. For more information contact Jeremy Murdock, Department of Agricultural and Resource Economics, UC Davis at 530-752-4651 or jmurdock@ucdavis.edu. To discuss this study with a local county extension farm advisor, contact your county cooperative extension office. ucanr.edu/County_Offices/.

Sample Cost of Production studies for many commodities are available and can be downloaded from the Department website: coststudies.ucdavis.edu. Archived studies are also available on the website.

Costs and Returns Study Program/Acknowledgements. A cost and returns study is a compilation of specific crop data collected from meetings with professionals working in production agriculture from the region. The authors thank farmer cooperators, UC Cooperative Extension, and other industry representatives who provided information, assistance, and expert advice.

ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to produce medium grain rice in the Sacramento-San Joaquin Delta region (San Joaquin and Sacramento counties). The cultural practices described represent production operations and materials considered typical for a well-managed farm in the region. Costs, materials, and practices in this study will not apply to all farms. 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, and pest pressure.

Farm. The study is based on a hypothetical non-contiguous 1,100 acre farm of which 1,000 acres are continuously planted to rice. The land was planted in row crops prior to rice planting. The remaining 100 acres are farmstead, roads, rice levees, and ditches. Typically, a grower with this amount of rice acreage will have several non-adjacent fields and the cultural practices will vary among fields. The farm is located on high percent organic peat soils in the Delta region of San Joaquin and Sacramento Counties. The farm is leased by the grower.

Cultural Practices and Material Inputs

Field Establishment (Table 1). The rice paddies are being established for long term continuous rice production. Tillage operations are done in the previous year and consist of disking twice with a stubble disk, landplaning to firm up the ground, applying Roundup, GPS leveling and building levees, chiseling 14-16 inches deep (may not be necessary in all fields), and installing irrigation (pipe, gate valves, and risers) as well as rice boxes. Gate valve installation allows pipes to maintain siphon. Levees are large, flat and approximately 15 feet wide for long term stability and provide ample room for mowing weeds. The rice boxes are installed in the permanent levees and are included in the establishment costs.

Field Preparation. In the spring of each year, the field is disked three times – twice with a stubble disk and once with a finish disk. Fields are then rolled once with a clod roller and twice with a brillion roller. Levees are mowed and the boxes repaired.

Planting. Certified seed of M-206 rice is planted in April or May at a rate of 150 pounds per acre. M-206 is a medium grain Calrose variety having wide adaptability across California rice growing regions. Each check or paddy is 20 acres. The rice is drilled into moist soil with a 25-foot grain seeder onto the prepared seed bed at 6-inch spacing. The planting operation runs 12 hours per day but includes lunch and downtime. The planting crew uses one tractor driver for the planter. Starter fertilizer is applied with the seed. Two tractors plus two tenders that are furnished by the fertilizer company are used to transport the seed and fertilizer from the truck to the drill. One operator handles both of these operations. Two 30-foot belt loaders (furnished by the fertilizer company) are located at the truck to load the tenders from the bottom dump trailers. The ground is flat rolled after planting to help pull up moisture and even the ground.

Nutrition. At planting, 100 pounds of starter fertilizer 11-52-0 is applied through the grain drill. In June, before permanent flood, a dry 20-0-20 fertilizer (blend of urea ammonium sulfate and sulfate of potash) is applied by ground at the rate of 300 pounds of material per acre. If the field is deficient in nitrogen (determined by leaf sampling), a top-dress fertilizer may be applied. In this study, 100 pounds of 40-0-0-5S (a blend of urea and sulfur) is applied by air (helicopter) in July.

Soil/Tissue Sampling. Soil samples are taken in March (not necessarily on an annual basis) for phosphorous (P) and potassium (K) analysis at one sample per 25 acres. Tissue samples are collected in late June for N analysis at one sample per 25 acres. All samples are collected by the PCA and the analysis are included as part of the grower service agreement.

Irrigation. The fields are flooded beginning in early June when the rice is six inches tall and drained in late August or early September. Flooding and draining labor costs are included in the irrigator labor. It is assumed that the irrigator checks the field daily during June, July and August. The irrigator travels the fields in a pickup and based on grower information takes 0.133 hours per acre. The land is below sea level and after opening a siphon valve on the river, the water flows into the fields. It is assumed that the land has riparian water rights. Landowners pay a reclamation fee for water and electricity costs and levee maintenance. In this study, since the grower leases the land, the reclamation fees are included in the land rent cost. In the fall after harvest, the fields are flooded and allowed to set over the winter. They are then drained in the spring (March) to prepare the field for the new season.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Agronomy Research and Information Center, Rice,* rice.ucanr.edu. **Pesticides mentioned in the study are not recommendations but are those commonly used in the region**. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at ipm.ucdavis.edu.

For additional information and pesticide use permits, contact the local county Agricultural Commissioner's office. **The owner/manager who applies pesticides to his or her property may need to hold a valid private applicator certificate that is issued by the Agricultural Commissioner's office**. Pesticides with different active ingredients, mode of action, and sites of action should be rotated as needed to combat species shift and resistance. Adjuvants and crop oils are recommended for use with many pesticides for effective control.

Pest Control Adviser/Certified Crop Advisor, (PCA/CCA). An individual who is licensed as a PCA and/or a CCA may monitor the field for pests and disease, collect samples for nutrient analyses, and complete surveys and paperwork for regulatory compliance. A CCA emphasizes fertilizer and plant nutrient management issues. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical company. Pesticide costs may vary by location and grower volume. In this study, the PCA service is provided by the chemical/fertilizer company at no additional cost.

Weeds. Broadleaf and grasses are troublesome weeds in rice fields. The first step for weed control may be a Roundup (glyphosate) ground application to early germinating weeds, before the rice emerges. This study assumes that 25% of the acreage receives a Roundup spray. After rice emergence (at 3-4 leaf), Regiment, Prowl, Sandea, and SuperWham are ground applied to the field for control of broadleaves and grasses. For each application, one person delivers the material to the applicator, while one person mixes the materials. Both work while the field applicator is spraying. Another person delivers water to the mixing area and works half the time as the mixer. The water tank and ball tank for hauling the mixture is furnished by the chemical company. The levees are mowed once (April) or twice a year (April, October), with dual rotary mowers when there is no water in the field. The October operation is shown in the tables under post-harvest.

Insects. Armyworms are an occasional but serious problem in some rice fields. In this study Intrepid insecticide is applied in July by air to 20% of the acres. In 2022, Intrepid usage was through a Section 18 Emergency Exemption. The final registration process was started in 2022, and completed in 2023.

Disease. No diseases assumed. After five years of rice culture a fungicide, such as Quadris may be needed to control stem rot or other fungal pathogens.

Harvest. The water is drained from the field 3 to 4 weeks before harvest. The rice crop is harvested beginning at 22% kernel moisture using a rice combine with a cutter-bar header. The grower owns the rice combine and bankout wagon. Although not included in this study, a grower of this size may have a second or backup combine. The grain is dumped from the combine into a bankout wagon that transports the grain to the grain trailers at the field edge. Once the grain trailers are full, the grain is transported to the grower's designated dryer

at a cost of $114 per acre.

Yields. For this study, an average of 85 hundredweight per acre yield at 14% moisture (dry weight) is assumed.

Returns. The rice is sold in this study for $21.50 per hundredweight (cwt). A range of yields and prices are presented in Table 5.

The Agriculture Improvement Act of 2018 (the 2018 Farm Bill) amended the Agricultural Improvement Act of 2014 (2014 Farm Bill) and reauthorized the Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC) programs with modifications. usda.gov/farmbill.

The 2018 Farm Bill requires a unanimous election to obtain PLC or ARC-CO on a covered commodity-by-commodity basis that will remain in effect for the 2019 through 2023 crop years. An election of ARC-CO in any year will apply to all covered commodities on the farm. Starting with the 2021 crop year, and each crop year thereafter through 2023, the producers on a farm may change the election of PLC or ARC on a year-to-year basis.
fsa.usda.gov/programs-and-services/price-support/commodity-loans/non-recourse-loans/rice program/index

Assessments. Under a state marketing order, a mandatory assessment is collected and administered by the California Rice Research Board. The $0.07 per dry hundredweight pays for rice research in California. In addition, the California Rice Commission assesses the grower and handler each $0.10 per dry hundredweight.

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 two percent to six percent. Together, these losses are called 'shrink'. Rice is assumed to be dried to 14% moisture. The drying and storage charge is $2.00 per cwt.

Post-Harvest. In October, the levees are mowed, the straw is shredded/mulched with a flail mower, and then the field is rolled and flooded for the winter. This is done on all of the acreage. In some circumstances, growers may bail and sell the straw.

Pickup. The one-half ton pickup is used by the irrigator and included in the irrigation cost. Non-irrigation pickup use for the one-half ton is listed as a separate line item. The three-quarter ton pickup used by the owner/operator is included as a line item. The mileage and times are estimated and not taken from any specific data.

Labor, Equipment, and Interest Costs

Labor. Labor Rates are $23.93 per hour for machine operators and $22.48 for non-machine hand labor. These rates include payroll overhead of 45 percent. The basic hourly wages are $16.50 for machine operators and $15.50 for non-machine hand labor.

Wages for management are not included as a cash cost. Any revenue 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 & Biological Engineers (ASABE). Fuel

and lubrication costs are also determined by ASABE equations based on maximum Power Take Off (PTO) horsepower, and fuel type. Average prices for on-farm delivery of red-dye diesel and gasoline, based on grower cooperator information and September 2022 data from the Energy Information Administration, are $5.65 and $5.20 per gallon, respectively. The cost includes a 13.0 percent sales tax on diesel and 2.25 percent sales tax on gasoline. Federal and state excise taxes on diesel ($0.36/gal) and gasoline ($0.473/gal) are refunded for on-farm use when filing the farm income tax return.

Fuel/Lube/Repairs. The fuel, lube, and repair costs per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is ten 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 7.00% 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 September 2022.

Risk. Risks associated with rice production are not assigned a production cost. While this study makes an 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 of rice production. It is important to realize that actual results may differ from the returns presented in this study.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs can include property taxes, interest on operating capital, liability and property insurance, sanitation services, equipment repairs, and management.

Property Taxes. Counties charge a base property tax rate of one percent 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. Property taxes applied in this study are calculated as one percent of the average value of the property and are not influenced by the Williamson Act or additional county taxes. Average property value equals new cost, plus salvage value divided by two on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage.

Property Insurance. This provides coverage for property loss and is charged at 0.886 percent of the average value of the assets over their useful life.

Liability Insurance. A standard farm liability insurance policy fee of $1,623 is included as a cost for the entire farm. This is the cost of the basic policy and paperwork. Additional coverage will incur additional costs. A standard farm liability insurance policy will help cover the expenses for which the owner becomes legally obligated to pay for bodily injury claims on owned property and damages to another person's property as a result of a covered accident.

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 to 85 percent.

The United States Department of Agriculture Risk Management Agency (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 Delta region, including revenue protection, revenue protection with harvest price exclusion and yield protection. Depending on the crop insurance policy, the USDA RMA will subsidize between 38 and 67 percent of the grower premium cost, as of July 2018.

The grower, in this study, is assumed to purchase a 75 percent yield protection policy, with an additional 55 percent PP coverage level, assumed to cost $11 per acre. For more information on crop insurance, visit the Risk Management Agency website: 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]).

Rent. Cash rents range from $250 to $500 per acre with surface water rights attached to the land. A rental price of $400 per acre is used in this study. The land rent incudes reclamation fees. 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.

Regulatory Compliance and Administrative Costs. Compliance and administrative costs are estimated to be $25 per acre. This includes expenses such as managing paperwork for regulatory compliance of water quality programs such as waste discharge requirements. This would also include farm evaluation and nitrogen management plan reporting as well as miscellaneous administrative costs that accompany the compliance paperwork. These tasks can be performed by the grower or are contracted to a consultant.

Office Expense. Office and business expenses are estimated at $50 per acre. These expenses include office supplies, telephones, bookkeeping and accounting fees for the whole farm. The cost is a general estimate.

Reclamation Fee. The Reclamation District manages the main drainage canals. There are several districts in the region and fees vary between districts. In this study reclamation fees are included in the land rental cost.

Investment Repairs. Annual repairs on investments or capital recovery items that require maintenance are calculated as two percent of the purchase price. This includes repair on all investments except for land.

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 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 ((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 (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 and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wearout life, as given by ASABE 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. The purchase price and salvage value for equipment and investments are shown in Table 6.

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 6.50 percent 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 September 2022.

Building. The metal buildings are on a cement slab and total approximately 5,000 square feet. The buildings are used for shops and equipment storage.

Fuel Tanks. Two 500-gallon fuel tanks are on metal stands in cement containment meeting federal and state regulations.

Shop/Field Tools. Includes shop equipment and tools and small tools and/or small hand equipment used in the field.

Field Establishment. Field costs to establish a permanent rice field are used to determine capital recovery expenses, depreciation and interest on investment for the production years. Establishment cost is the sum of the land preparation and related cash costs. The costs are amortized over the 5 years the field is expected to be in production. Refer to Table 1 for establishment costs.

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% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 6. 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. SAMPLE COSTS TO ESTABLISH A RICE FIELD

DELTA REGION (San Joaquin & Sacramento Counties) 2022

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:								
Disk 2X - Stubble Disc & Roll	0.47	13	50	17	0	0	81	
Landplane	0.00	0	0	0	0	30	30	
Apply Roundup	0.25	7	3	1	34	0	45	
GPS Level & Build Levees	0.50	14	54	13	0	250	332	
Install Boxes, Risers, & Pipe	0.04	12	0	0	0	250	263	
Chisel Plow - 16 inches	0.50	14	54	15	0	0	84	
Winter Flooding	0.00	4	0	0	0	0	4	
TOTAL PRE-PLANT COSTS	1.76	66	162	46	34	530	838	
Interest on Operating Capital at 7.00%							5	
TOTAL OPERATING COSTS/ACRE	2	66	162	46	34	530	843	
CASH OVERHEAD:								
Liability (3 Months)							0	
Office (3 Months)							13	
Land Rent							400	
Property Taxes							2	
Property Insurance							0	
Investment Repairs							4	
TOTAL CASH OVERHEAD COSTS/ACRE							419	
TOTAL CASH COSTS/ACRE							1,263	

Table 2. COSTS PER ACRE TO PRODUCE RICE

DELTA REGION (San Joaquin & Sacramento Counties) 2022

Operation	Operation Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:								
Drain Field (Winter Flooding)	0.00	0	0	0	0	0	0	
Weed: Mow Levees 2X & Levee Repair	0.03	1	1	0	0	0	2	
Rice Box & levee Repair	0.00	6	0	0	0	0	6	
Soil Sampling (PCA)	0.00	0	0	0	0	0	0	
Disk 2X (Stubble Disk)	0.11	3	12	4	0	0	19	
Disk 1X (Finish Disk)	0.16	5	17	5	0	0	27	
Roll 1X (Clod Roller)	0.09	3	10	3	0	0	15	
Roll 2X (Brillion Roller)	0.07	2	7	2	0	0	11	
Plant Seed & Fertilize 11-52-0	0.28	12	11	4	126	0	153	
Flat Roll	0.07	2	7	2	0	0	11	
Weed: (Roundup) 25% of Acreage	0.10	4	2	1	9	0	16	
Weed: (Regiment, Sandea, Prowl, Super Wham)	0.17	6	4	1	134	0	146	
Fertilize 20-0-20: Broadcast @ 4th leaf	0.03	1	1	0	165	17	184	
Flood	0.27	8	3	1	0	0	12	
Fertilize Leaf Analysis (PCA)	0.00	0	0	0	0	0	0	
Fertilize: Topdress 40-0-0-5S by air	0.00	0	0	0	53	17	70	
Insect: Worms (Intrepid) 20% of Acreage	0.00	0	0	0	13	2	15	
Flood & Drain	0.13	4	2	1	0	0	6	
Pickup ½ ton	0.10	3	1	0	0	0	5	
Pickup ¾ ton	0.10	3	1	1	0	0	5	
TOTAL CULTURAL COSTS	1.70	63	80	24	499	36	702	
Harvest:								
Combine Rice	0.14	4	22	25	0	0	51	
Bankout Rice	0.19	5	5	2	0	0	13	
Transport/Shipping Cost	0.00	0	0	0	0	114	114	
Dry & Store Rice	0.00	0	0	0	0	170	170	
Assessments	0.00	0	0	0	14	0	14	
TOTAL HARVEST COSTS	0.33	9	27	27	14	284	363	
Post-Harvest:								
Weed: Mow Levees 2X & Levee Repair	0.03	1	1	0	0	0	2	
Flail Mow & Roll	0.20	6	21	7	0	0	34	
Flood for Winter	0.00	0	0	0	0	0	0	
TOTAL POST-HARVEST COSTS	0.22	7	22	7	0	0	36	
Interest on Operating Capital at 7.00%							21	
TOTAL OPERATING COSTS/ACRE	2	79	130	58	514	320	1,122	
CASH OVERHEAD:								
Liability Insurance							1	
Office Expense							50	
Crop Insurance							11	
Land Rent							400	
Compliance & Administration							25	
Property Taxes							8	
Property Insurance							1	
Investment Repairs							4	
TOTAL CASH OVERHEAD COSTS/ACRE							500	
TOTAL CASH COSTS/ACRE							1,623	
NON-CASH OVERHEAD:		Per Producing Acre		Annual Cost Capital Recovery				
Buildings 5000sqft		160		12			12	
Field Establishment		843		203			203	
Fuel Tanks 2-500g		10		1			1	
Shop Tools		25		2			2	
Equipment		484		71			71	
TOTAL NON-CASH OVERHEAD COSTS		1,522		289			289	
TOTAL COSTS/ACRE							1,912	

Table 3. COSTS AND RETURNS PER ACRE to PRODUCE RICE

DELTA REGION (San Joaquin & Sacramento Counties) 2022

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Rice	85	Cwt	21.50	1,828	
TOTAL GROSS RETURNS	85	Cwt		1,828	
OPERATING COSTS					
Fertilizer:				**281**	
11-52-0	100.00	Lb	0.63	63	
20-0-20	300.00	Lb	0.55	165	
40-0-0-5S	100.00	Lb	0.53	53	
Herbicide:				**136**	
Roundup PowerMax	1.00	Pint	8.50	9	
Regiment	0.20	FLOz	37.23	7	
Prowl H20	5.50	Pint	7.25	40	
Super Wham	6.00	Qt	8.33	50	
Sandea	0.80	FLOz	35.00	28	
UAN-32	1.50	LB N	1.11	2	
Insecticides:				**13**	
Intrepid	6.40	FlOz	2.00	13	
Adjuvant:				**7**	
MSO	1.00	Pint	6.88	7	
Seed:				**63**	
Seed – M-206	1.50	Cwt	42.00	63	
Custom:				**36**	
Ground Application-Fertilizer	1.00	Acre	17.00	17	
Air Application-Dry Fertilizer	1.00	Acre	17.00	17	
Air Application-Helicopter	0.20	Acre	10.00	2	
Irrigation:				**0**	
Water (No Cost)	4.50	AcFt	0.00	0	
Water (Winter)	3.00	AcFt	0.00	0	
Contract:				**284**	
Hauling	1.00	Acre	114.00	114	
Drying & Storage	85.00	Cwt	2.00	170	
Assessment:				**14**	
California Rice Research Board	85.00	Cwt	0.07	6	
California Rice Commission	85.00	Cwt	0.10	9	
Labor				**79**	
Equipment Operator Labor	2.71	hrs	23.93	65	
Non-Machine Labor	0.64	hrs	22.48	14	
Machinery				**188**	
Fuel-Gas	1.50	gal	5.20	8	
Fuel-Diesel	21.59	gal	5.65	122	
Lube				19	
Machinery Repair				39	
Interest on Operating Capital @ 7.00%				21	
TOTAL OPERATING COSTS/ACRE				1,122	
TOTAL OPERATING COSTS/CWT				13	
NET RETURNS ABOVE OPERATING COSTS				705	

Table 3. CONTINUED

DELTA REGION (San Joaquin & Sacramento Counties) 2022

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Liability Insurance				1	
Office Expense				50	
Crop Insurance				11	
Land Rent				400	
Compliance & Administration				25	
Property Taxes				8	
Property Insurance				1	
Investment Repairs				4	
TOTAL CASH OVERHEAD COSTS/ACRE				500	
TOTAL CASH OVERHEAD COSTS/CWT				6	
TOTAL CASH COSTS/ACRE				1,623	
TOTAL CASH COSTS/CWT				19	
NET RETURNS ABOVE CASH COSTS				205	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings 5000sqft				12	
Field Establishment				203	
Fuel Tanks 2-500g				1	
Shop Tools				2	
Equipment				71	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				289	
TOTAL NON-CASH OVERHEAD COSTS/CWT				3	
TOTAL COST/ACRE				1,912	
TOTAL COST/CWT				22	
NET RETURNS ABOVE TOTAL COST				-85	

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 4. MONTHLY CASH COSTS PER ACRE to PRODUCE RICE

DELTA REGION (San Joaquin & Sacramento Counties) 2022

	MAR 22	APR 22	MAY 22	JUN 22	JUL 22	AUG 22	SEP 22	OCT 22	NOV 22	DEC 22	JAN 23	FEB 23	Total
Cultural:													
Drain Field	0												0
Weed: Mow Levees 2X/levee	2												2
Box/Levee Repair	6												6
Soil Sampling (PCA)													0
Disk 2X (Stubble Disk)		19											19
Disk 1X (Finish Disk)		27											27
Roll 1X (Clod Roller)		15											15
Roll 2X (Brillion Roller)		11											11
Plant (Seed/11-52-0)			153										153
Flat Roll			11										11
Weed: (Roundup) 25% of Acreage			16										16
Weed: (Regiment, Sandea, Prowl, Super Wham)			146										146
Fertilize (20-0-20)			184										184
Flood				6	6								12
Fertilize Leaf Analysis (PCA)													0
Fertilize (40-0-0-5S)					70								70
Insect: Worms (Intrepid) 20% of Acreage					15								15
Flood & Drain						6							6
Pickup 1/2 ton	0	0	0	0	0	0	0	0	0	0	0	0	5
Pickup 3/4 ton	0	0	0	0	0	0	0	0	0	0	0	0	5
TOTAL CULTURAL COSTS	9	73	510	7	92	7	1	1	1	1	1	1	702
Harvest:													
Combine Rice							51						51
Bankout Rice							13						13
Transport/Shipping Cost							114						114
Dry & Store Rice							170						170
Assessments								14					14
TOTAL HARVEST COSTS	0	0	0	0	0	0	348	14	0	0	0	0	363
Post-Harvest:													
Weed: Mow Levees 2X/levee								2					2
Flail Mow & Roll								34					34
Flood for Winter								0					0
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	0	36	0	0	0	0	36
Interest on Operating Capital @7.00%	0	0	3	4	4	4	6	0	0	0	0	0	21
TOTAL OPERATING COSTS/ACRE	9	73	514	10	96	11	355	51	1	1	1	1	1,122
CASH OVERHEAD													
Liability Insurance	1												1
Office Expense	6	6	6	6	6	6	6	6					50
Crop Insurance							11						11
Land Rent	400												400
Compliance & Administration													25
Property Taxes												8	8
Property Insurance												1	1
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL CASH OVERHEAD COSTS	408	7	7	7	7	7	18	6	0	0	0	9	500
TOTAL CASH COSTS/ACRE	417	80	520	17	102	18	373	57	1	1	1	10	1,622

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 5. RANGING ANALYSIS

DELTA REGION (San Joaquin & Sacramento Counties) 2022

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE RICE

	YIELD (cwt/acre)						
	55.00	65.00	75.00	85.00	95.00	105.00	115.00
OPERATING COSTS/ACRE:							
Cultural	702	702	702	702	702	702	702
Harvest	297	319	341	363	384	406	428
Post-Harvest	36	36	36	36	36	36	36
Interest on Operating Capital @ 7.00%	21	21	21	21	21	22	22
TOTAL OPERATING COSTS/ACRE	1,057	1,079	1,101	1,122	1,144	1,166	1,188
TOTAL OPERATING COSTS/CWT	19.22	16.60	14.67	13.20	12.04	11.10	10.33
CASH OVERHEAD COSTS/ACRE	500	500	500	500	500	500	500
TOTAL CASH COSTS/ACRE	1,557	1,579	1,601	1,623	1,645	1,666	1,688
TOTAL CASH COSTS/CWT	28.32	24.29	21.35	19.09	17.31	15.87	14.68
NON-CASH OVERHEAD COSTS/ACRE	289	289	289	289	289	289	289
TOTAL COSTS/ACRE	1,847	1,868	1,890	1,912	1,934	1,956	1,977
TOTAL COSTS/CWT	34.00	29.00	25.00	22.00	20.00	19.00	17.00

Net Return per Acre Above Operating Costs for Rice

PRICE ($/cwt)	YIELD (cwt/acre)						
Rice	55.00	65.00	75.00	85.00	95.00	105.00	115.00
15.50	-204	-71	62	195	328	462	595
17.50	-94	59	212	365	518	672	825
19.50	16	189	362	535	708	882	1,055
21.50	126	319	512	705	898	1,092	1,285
23.50	236	449	662	875	1,088	1,302	1,515
25.50	346	579	812	1,045	1,278	1,512	1,745
27.50	456	709	962	1,215	1,468	1,722	1,975

Net Return per Acre Above Cash Costs for Rice

PRICE ($/cwt)	YIELD (cwt/acre)						
Rice	55.00	65.00	75.00	85.00	95.00	105.00	115.00
15.50	-705	-572	-438	-305	-172	-39	94
17.50	-595	-442	-288	-135	18	171	324
19.50	-485	-312	-138	35	208	381	554
21.50	-375	-182	12	205	398	591	784
23.50	-265	-52	162	375	588	801	1,014
25.50	-155	78	312	545	778	1,011	1,244
27.50	-45	208	462	715	968	1,221	1,474

Net Return per Acre Above Total Costs for Rice

PRICE ($/cwt)	YIELD (cwt/acre)						
Rice	55.00	65.00	75.00	85.00	95.00	105.00	115.00
15.50	-994	-861	-728	-595	-461	-328	-195
17.50	-884	-731	-578	-425	-271	-118	35
19.50	-774	-601	-428	-255	-81	92	265
21.50	-664	-471	-278	-85	109	302	495
23.50	-554	-341	-128	85	299	512	725
25.50	-444	-211	22	255	489	722	955
27.50	-334	-81	172	425	679	932	1,185

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

DELTA REGION (San Joaquin & Sacramento Counties) 2022

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Total
22	152HP MFWD	96,253	10	28,432	11,282	55	623	11,961
22	55HP MFWD	30,975	10	9,150	3,631	18	201	3,849
22	95HP 2WD	59,563	10	17,594	6,982	34	386	7,402
22	95HP 2WD 2	59,563	10	17,594	6,982	34	386	7,402
22	Disk Finish 26'	35,589	10	6,294	4,484	19	209	4,712
22	FertSpreader 50'	18,150	10	3,210	2,287	9	107	2,403
22	Mower-FlexRotary15	14,467	10	2,558	1,823	8	85	1,916
22	Pickup - 1/2 Ton	32,000	4	15,589	5,804	21	238	6,063
22	Pickup - 3/4 Ton	75,000	4	36,536	13,603	49	558	14,210
22	Spry2-150gTnk60'bm	7,000	10	1,238	882	4	41	927
22	95 HP 4WD Tractor	95,000	15	18,495	9,339	50	567	9,956
22	300 HP 4WD Tractor	300,000	8	104,697	38,881	179	2,023	41,084
22	Disk - Offset 26'	48,000	8	10,838	6,808	26	294	7,128
22	Roller/Stomper Heavy 18'	28,000	4	10,306	5,835	17	192	6,043
22	Rice Roller 24'	34,000	5	11,075	6,236	20	225	6,482
22	Combine Header 30'	80,000	7	21,771	12,032	45	509	12,586
22	Combine/Harvester	750,000	7	191,344	114,298	417	4,707	119,422
22	Bankout Wagon	41,000	8	9,257	5,815	22	251	6,089
22	Mower - Flail 15'	14,000	10	2,476	1,764	7	82	1,854
22	Drill 6" spacing 25' fold	46,200	6	13,318	7,658	26	298	7,982
	TOTAL	1,864,760	-	531,770	266,425	1,062	11,983	279,469
	60% of New Cost*	1,118,856	-	319,062	159,855	637	7,190	167,682

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Cash Overhead Price	Yrs. Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Buildings 5000sqft	160,000	30	0	12,252	71	800	3,200	16,323
Field Establishment	843,000	5	0	202,855	373	4,215	0	207,443
Fuel Tanks 2-500g	10,000	20	0	908	4	50	200	1,162
Shop Tools	25,000	20	0	2,269	11	125	500	2,905
TOTAL INVESTMENT	1,038,000	-	0	218,284	460	5,190	3,900	227,834

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	1000.00	Acre	1.48	1,480
Office Expense	1000.00	Acre	50	50,000
Crop Insurance	1000.00	Acre	11	11,000
Land Rent	1000.00	Acre	400	400,000
Compliance & Administration	1000.00	Acre	25	25,000

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 7. HOURLY EQUIPMENT COSTS

DELTA REGION (San Joaquin & Sacramento Counties) 2022

Yr.	Description	Rice Hours Used	Total Hours Used	Capital Recovery	Cash Overhead		Operating			Total Costs/Hr.
					Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	
22	152HP MFWD	104	1200	5.64	0.03	0.31	9.34	49.84	59.18	65.16
22	55HP MFWD	110	1600	1.36	0.01	0.08	3.09	15.26	18.35	19.79
22	95HP 2WD	241	1200	3.49	0.02	0.19	6.65	26.36	33.00	36.70
22	95HP 2WD 2	214	1200	3.49	0.02	0.19	6.65	26.36	33.00	36.70
22	Disk Finish 26'	159	200	13.45	0.06	0.63	5.74	0.00	5.74	19.88
22	FertSpreader 50'	34	120	11.43	0.05	0.53	6.95	0.00	6.95	18.96
22	Mower-FlexRotary15	50	200	5.47	0.02	0.26	6.85	0.00	6.85	12.60
22	Pickup - 1/2 Ton	499	500	6.96	0.03	0.29	4.33	13.00	17.33	24.61
22	Pickup - 3/4 Ton	100	500	16.32	0.06	0.67	7.54	13.00	20.54	37.59
22	Spry2-150gTnk60'bm	100	150	3.53	0.01	0.16	1.86	0.00	1.86	5.57
22	95 HP 4WD Tractor	235	800	7.00	0.04	0.43	5.69	26.36	32.05	39.51
22	300 HP 4WD Tractor	763	2000	11.66	0.05	0.61	22.68	98.37	121.06	133.38
22	Disk - Offset 26'	113	250	16.34	0.06	0.71	7.88	0.00	7.88	24.99
22	Roller/Stomper Heavy 18'	90	500	7.00	0.02	0.23	3.26	0.00	3.26	10.51
22	Rice Roller 24'	331	400	9.35	0.03	0.34	3.94	0.00	3.94	13.66
22	Combine Header 30'	141	300	24.06	0.09	1.02	13.60	0.00	13.60	38.77
22	Combine/Harvester	155	300	228.60	0.83	9.41	148.71	141.25	289.96	528.80
22	Bankout Wagon	189	250	13.96	0.05	0.60	5.62	0.00	5.62	20.24
22	Mower - Flail 15'	196	200	5.29	0.02	0.25	5.77	0.00	5.77	11.33
22	Drill 6" spacing 25' fold	94	250	18.38	0.06	0.71	12.96	0.00	12.96	32.11
22	Tender (loaned) 2	95	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Tender (loaned) 1	95	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Belt 30' (loaned) 2	95	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Belt 30' (loaned)	94	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Ball Tank (loaned)1	100	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Water Tank (loaned)1	67	500	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 8. OPERATIONS WITH EQUIPMENT & MATERIALS - PRODUCTION YEAR FOR RICE

DELTA REGION (San Joaquin & Sacramento Counties) 2022

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Drain Field	Mar			Non-Machine Labor	0.01	hour
Weed: Mow Levees 2X	Mar	95 HP 4WD Tractor	Mower-FlexRotary15	Equipment Operator Labor	0.03	hour
	Oct	95HP 2WD	Mower-FlexRotary15	Equipment Operator Labor	0.03	hour
Box/Levee Repair	Mar			Non-Machine Labor	0.28	hour
Soil Sampling (PCA)	Mar			No Cost		
Disk 2X (Stubble)	Apr	300 HP 4WD Tractor	Disk - Offset 26'	Equipment Operator Labor	0.14	hour
Disk 1X (Finish Disk)	Apr	300 HP 4WD Tractor	Disk Finish 26'	Equipment Operator Labor	0.19	hour
Roll 1X (Clod Roller)	Apr	300 HP 4WD Tractor	Roller/Stomper Heavy 18'	Equipment Operator Labor	0.11	hour
Roll 2X (Brillion Roller)	Apr	300 HP 4WD Tractor	Rice Roller 24'	Equipment Operator Labor	0.08	hour
Plant (Seed/11-52-0)	May	152HP MFWD	Drill 6" spacing 25' fold	Non-Machine Labor	0.19	hour
				Seed – M-206	1.50	Cwt
			Belt 30' (loaned)	11-52-0	100.00	Lb
		95HP 2WD	Tender (loaned) 1	Equipment Operator Labor	0.11	hour
			Tender (loaned) 2			
			Belt 30' (loaned) 2			
Flat Roll	May	300 HP 4WD Tractor	Rice Roller 24'	Equipment Operator Labor	0.08	hour
Weed: (Roundup) 25%	May	95HP 2WD	Spry2-150gTnk60'bm	Equipment Operator Labor	0.04	hour
				Roundup PowerMax	1.00	Pint
	May	95HP 2WD 2	Ball Tank (loaned)1	Non-Machine Labor	0.07	hour
	May	55HP MFWD	Water Tank (loaned)1	Equipment Operator Labor	0.04	hour
Weed: Regiment, Sandea	May	95HP 2WD	Spry2-150gTnk60'bm	Non-Machine Labor		
				Regiment	0.20	FLOz
				Prowl H20	5.50	Pint
				Super Wham	6.00	Qt
				Sandea	0.80	FLOz
				MSO	1.00	Pint
				UAN-32	1.50	LB N
	May	95HP 2WD 2	Ball Tank (loaned)1	Non-Machine Labor	0.07	hour
	May	55HP MFWD	Water Tank (loaned)1	Equipment Operator Labor	0.04	hour
Fertilize (20-0-20)	May	55HP MFWD	FertSpreader 50'	Equipment Operator Labor	0.04	hour
				20-0-20	300.00	Lb
				Ground Application-Fertilizer	1.00	Acre
Flood	June		Pickup - ½ Ton	Equipment Operator Labor	0.16	hour
				Water (No Cost)	1.50	AcFt
	July		Pickup - ½ Ton	Equipment Operator Labor	0.16	hour
				Water (No Cost)	1.50	AcFt
Fertilize Leaf Analysis	July			No Cost		
Fertilize (40-0-0-5S)	July			Air Application-Dry Fertilizer	1.00	Acre
				40-00-5	100.00	Lb
Insect: Worms (Intrepid)	July			Intrepid	6.40	FlOz
				Air Appl -Helicopter	0.20	Acre
Flood & Drain	Aug		Pickup -½ Ton	Equipment Operator Labor	0.16	hour
				Water (No Cost)	1.50	AcFt
Pickup 1/2 ton	Aug		Pickup - ½ Ton	Equipment Operator Labor	0.12	hour
Pickup 3/4 ton	Aug		Pickup – 3/4 Ton	Equipment Operator Labor	0.12	hour
Combine Rice	Sept		Combine Header 30'	Equipment Operator Labor	0.17	hour
			Combine/Harvester			
Bankout Rice	Sept	95 HP 4WD Tractor	Bankout Wagon	Equipment Operator Labor	0.23	hour
Transport/Shipping	Sept			Hauling	1.00	Acre
Dry & Store Rice	Sept			Drying & Storage	85.00	Cwt
Assessments	Oct			California Rice Research Board	85.00	Cwt
				California Rice Commission	85.00	Cwt
Weed: Mow Levees 2X	Mar	95 HP 4WD Tractor	Mower-FlexRotary15	Equipment Operator Labor	0.03	hour
	Oct	95HP 2WD	Mower-FlexRotary15	Equipment Operator Labor	0.03	hour
Flail Mow & Roll	Oct	300 HP 4WD Tractor	Mower - Flail 15'	Equipment Operator Labor	0.24	hour
			Rice Roller 24'			
Flood for Winter	Oct			Non-Machine Labor	0.02	hour
				Water (Winter)	3.00	AcFt