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

2021
SAMPLE COSTS TO PRODUCE RICE



SACRAMENTO VALLEY
Rice Only Rotation, Medium Grain

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Sacramento Valley- 2021
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. It is intended as a guide only, and can be used to make production decisions, estimate potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but these same practices will not apply to every farming operation. The sample costs for labor, materials, equipment and custom services are based on June 2021 figures. A blank column titled “Your Cost”, is provided in Tables 2 and 3 for your convenience.

For an explanation of calculations used, refer to the section titled Assumptions. For more information contact Donald Stewart, Department of Agricultural and Resource Economics, UC Davis at 530-752-4651 or destewart@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. **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.** *The University is an affirmative action/equal opportunity employer.*

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.

Farm. The hypothetical farm consists of 840 non-contiguous 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, (which can be in different irrigation districts). Such costs are not included in this study. No other crops are grown in rotation with rice. All operations are done on 100 percent of the acres unless noted otherwise.

This study assumes the grower owns 10 acres, valued at \$12,500 per acre, and rents 830 acres at \$475 per acre. This study assumes 100 percent of farmed land is rented. For more details about owned and rented land, please refer to the “Cash Overhead” and “Non-Cash Overhead” sections.

Cultural Practices and Material Inputs

Pre-Plant Land Preparation. Most of the primary tillage, including chiseling, disking, land leveling, laser leveling, and rolling, is normally done from March through May. The permanent levees, which comprise 5 percent of the acres, are reworked, and drainage ditches 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 disking to break up large clods with a stubble disc, and then disced once more with a finish disc, which increases the soil’s drying surface. Precision, laser leveling is done to 50 percent of the acreage annually. The grower tri-planes the other 50 percent of the acreage to maintain even ground for water flow.

Aqua ammonia fertilizer is custom applied by ground, using an aqua rig. The starter fertilizer and zinc are custom applied with a ground rig. The ground is rolled by the grower with a corrugated roller prior to flooding and planting.

Fertilizer. Aqua ammonia is applied pre-plant at 130 pounds of N per acre with an aqua fertilizer injector ground rig, 3 to 4 inches deep. A starter fertilizer, 12-23-20 at 200 pounds per acre, is applied by ground and incorporated using a corrugated roller (can also be applied by air). Zinc sulfate is applied with the starter and is incorporated with those operations. In July, 75 percent of the acres are top dressed by air with 31.5 pounds of N, or 150 pounds of ammonium sulfate per acre.

Planting. Water seeding, in contrast to drill-seeding or dry-seeding, is the primary seeding method in California. The field is flooded and the seed is soaked in water, (see Pest Management, *Disease*) to begin germination and drained. The seed is broadcast by air into a few inches of water on the fields at a rate of 175 lbs./acre. Seeding rates vary from field to field and by variety. Most planting is done from April 20 to May 20.

Irrigation. The grower purchases the irrigation water from an irrigation district; however, growers may also use well water, (ground water) which will incur extra costs from pumping. The grower pays the water costs

on the farmed land, which varies widely between irrigation districts in the Sacramento Valley. The total seasonal-cost of irrigation water for this study is \$150.00 per acre. Typically, four to six acre-feet of water are applied during the growing season. This does not include the water needed for straw management.

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 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 PCA's 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 region, a written recommendation for fertilizer applications is currently not required.

Weeds. Grass weeds and broadleaf weeds are controlled with separate aerial and ground applications. Herbicides, (e.g. Butte, Clincher, Bolero, Granite GR, or a combination) to control grass weeds are applied to 100 percent of the rice shortly after planting. This study assumes that Butte is applied to 100 percent of the acres by air in May. 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 ground, as stated above, on 100 percent 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 percent 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.

Algae. After planting in May, Copper Sulfate is custom applied by air on 30 percent of the acres.

Insects. Seedling arthropod pests (rice water weevil/tadpole shrimp and rice seed midge) control begins in May after planting, by treating 30 percent of the acres, which includes the field borders or edges and levees with Lambda cyhalothrin insecticide. Armyworms are controlled with one insecticide application of Dimilin in July, on 25 percent of the acres.

Diseases. Rice seed is pre-soaked before planting in either a fungicide or chlorine treatment for control of bakanae diseases. Stem rot, aggregate sheath spot and blast are controlled July through August with one application by air of azoxystrobin on 75 percent of the acres.

Vertebrate Pests. Cannons, also known as zon guns are used to scare birds away from the crop, if needed. The guns run on propane and must be monitored daily. No charges are shown.

Endangered Species. It is important to know if your farm is located in an area where endangered species reside. Trapping and killing endangered species can result in fines. Contact your County Agricultural Commissioner for additional information.

Harvest, Yield, Revenue and Assessments

Harvest. The rice crop is harvested at 20 percent kernel moisture (green rice) using a combine with a cutter-bar header. The grower also owns a pull-type grain cart/bankout wagon. The combine can unload grain (while still harvesting) into the grain cart. The grain is transported out of the field, to bulk grain trailers for transport to the drying facility.

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. 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 102 hundredweight (cwt) per acre and a \$0.50 per cwt field pickup and hauling charge. Green weight is the calculated weight of the harvested rice at 20 percent moisture, including

‘invisible shrink’.

Table A. Average California Yields and Prices.

Year	Yield/Acre (cwt) (Medium Grain)	Revenue/Acre (\$/cwt) (Medium Grain)
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	21.50
2015	91.00	18.40
2016	90.00	14.30
2017	86.20	20.30
2018	88.10	21.30
2019	85.90	21.80
2020	89.20	18.90

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 percent moisture. The drying rate charge is based on a green weight of 102 cwt. The current cost of drying the rice 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 is related to electricity prices.

Yields. The crop yield used in this study is 9,000 pounds (90 cwt) per acre at 14 percent moisture. Yields vary over the years in California, see Table A.

Revenue. A selling price of \$21.50 per cwt. of grain rice (with an assumed loan value of \$7.00, or \$14.50 above loan value) is used to estimate market income. A range of yields and prices are presented in Table 4.

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](https://www.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-IC 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

The PLC Program provides payments when the effective price for a covered commodity falls below its effective reference price, which is \$14.50 per cwt for Temperate Japonica, as of 2020.

ARC Program is an income support program that provides payments when actual crop revenue declines below a specified guarantee level. The ARC-CO program provides income support tied to historical base acres, not current production, of covered commodities. ARC-CO payments are issued when the actual county crop revenue of a covered commodity is less than the ARC-CO guarantee for the covered commodity. 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 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: fsa.usda.gov/programs-and-services/arcplc_program/index.

Net Revenue. A grower will achieve a positive cash flow when net returns above cash costs (gross returns minus 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 minus 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.

Ranging Analysis. Table 4 has a range of return prices used for calculating net returns per acre at different yields. The yield range used for this study is 7,500 to 10,500 pounds (75-105 cwt) per acre with the price range from \$15.50 - \$27.50 per 100 pound sac (cwt).

Straw Management. Post-harvest operations for straw decomposition are usually done using a single or a combination of commonly used methods, including: 1) chopping, discing, and flooding, 2) chopping and flooding, 3) chopping, flooding and rolling (stomping) and 4) chopping and discing, then rolled (stomped).

The rice straw is chopped, disced, and then rolled (stomped) on 100 percent of the acres. The winter water availability and costs for single and continuous flooding vary by district, and may be rain-fed. Water for straw decomposition is commonly used, but is not used in this study.

Baling. Swathing, baling and hauling to a cogeneration plant (recycled energy) is done by growers that live within the region of the plants that make this method economically feasible.

Burning. Rice straw burning is becoming increasingly rare in the Sacramento Valley. The cost of burning stubble, burn permits and addition fees associated with this method are not included in this study.

Assessments. Producers pay two assessment fees.

California Rice Research Board (CRRB). Under a state marketing order a mandatory assessment fee is collected and administered by the CRRB. This assessment of \$0.07 per dry cwt pays for rice research funded by the CRRB. carrb.com/

The California Rice Commission (CRC). This commission 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. calrice.org/

Labor, Equipment and Operating Interest

Labor. Labor Rates are \$27.93 per hour for machine operators, \$22.05 for non-machine, hand labor and \$44.09 for an assistant supervisor irrigation labor. These rates include payroll overhead of 46.98 percent. The basic hourly wages are \$19.00 for machine operators, \$15.00 for non-machine, hand labor and \$30.00 for assistant supervisor irrigation labor. The overhead includes the employer's share of federal and California state payroll taxes (14.85%), workers' compensation insurance (15.71%) for field crops, and a percentage for other possible benefits (16.42%). These costs are based on the average industry final rate as of June, 2021.

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, June, 2021 data from the Energy Information Administration, are \$2.80 and \$3.90 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 1 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.

Owned Equipment. For a list of equipment included in the farms inventory and operating costs, see Tables 5 and 6.

Harvest/Header. The total revenue of the 840 acre farm does not support the purchase and operating costs of a new combine. The new combine could harvest as much as 1,200 acres in a season. The combine would be leased as a custom operation by neighboring farmers, creating additional income that would pay for the annual maintenance and repair costs. The grower could also own a used combine purchased at a much cheaper price.

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

Pickups. Business use of 30,000 miles per year is assumed for the ¾-ton pickup and 20,000 miles per year for the ½-ton pickup. The charges are shown under cultural operations.

Back Hoe/Road Grader/Implement Carrier/Truck 5-Ton. This equipment is listed under investments, "Non-Cash Overhead" section at replacement value. They are used sparingly for various tasks around the farm with no assigned costs. Some of this equipment would have been purchased previously and would be fully depreciated. Only operating and maintenance costs would be shown.

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 four percent per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post-harvest operations is discounted back to the last harvest month using a negative interest charge. The 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 June, 2021.

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 affects profitability and economic viability of agricultural production. Moreover, Table 4 reflects a ranging analysis of returns based on various assumptions which is therefore, hypothetical in nature. **It is important to realize that actual results may differ from the returns contained in this study.** Any returns above total costs are considered returns on risk and investment to management (or owners).

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.

The Williamson Act. California Land Conservation Act has helped preserve agricultural and open space lands since 1965. Local governments and landowners enter into voluntary contracts to restrict enrolled lands to agricultural and open space uses in exchange for property tax reductions. The impact of the Williamson Act on property taxes will vary from year to year and property to property. This is due to how it is annually calculated and then compared to its Proposition 13 (factored base year value). The lower of the two is used for the annual assessment.
boe.ca.gov/proptaxes/pdf/lta19029.pdf
boe.ca.gov/proptaxes/faqs/changeinownership.htm

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 \$1,461 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 Sacramento Valley, 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 \$18 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 \$350 to \$550 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 \$475 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.

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 (USDA surveys) 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 contracted to a consultant.

Office and Business Expense. Office and business expenses are estimated at \$50 per acre. These expenses include office supplies, telephone/internet, bookkeeping, accounting, and office utilities.

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 prices and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $[(Purchase\ Price - Salvage\ Value) \times Capital\ Recovery\ Factor] + (Salvage\ Value \times Interest\ Rate)$.

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 & Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out 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.

Capital Recovery Factor (CRF). The CRF can be interpreted as the amount of equal (or uniform) payments to be received for (n) years such that the total present value of all these equal payments is equivalent to a payment of 1 dollar at present, if interest rate is (i) (Boehlje and Eidman).

CRF is the amortization factor for an asset and is calculated as; $[i * (1 + i)^n] / [(1 + i)^n - 1]$ where *(i) is the interest rate and (n) the number of years the asset is held.

Interest Rate. An interest rate of 4.75 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 June 2021.

Land. Rice land values range from \$11,000 to \$14,000 per acre. This study uses a value of \$12,500 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, ten acres of land is assumed to be owned by the grower and not shown as an investment.

Irrigation System. The property has surface water delivered to the fields by a water district via a canal system from water stored in reservoirs. The fields have systems of lateral ditches and drainage ditches, and irrigation boxes in the fields to maintain water flow and depth. Pumping of ground water for irrigation is not used in this study.

Building. The metal building is on a cement slab with an attached pole barn with a fenced equipment yard.

Shop Tools. This includes shop machinery and tools.

Fuel Tanks. One 1,000-gallon diesel and one 500-gallon gasoline, fuel tanks, using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Global Positioning Systems, (GPS). The stationary GPS sending unit is mounted so that it can receive and send data to the tractors operating in the fields. The receiving units are mounted so that they are removable and interchangeable with several tractors.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60 percent to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the Whole Farm Annual Equipment, Investment, and Business Overhead Costs, Table 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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UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 1. COSTS PER ACRE TO PRODUCE RICE
 Sacramento Valley- 2021

Operation	Equipment		Cash and Labor Costs per Acre				Total Cost	Your Cost
	Time (Hrs./Ac)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Ground Preparation:								
Irrigation: Maintain laterals/Boxes/Drains	0.13	4	2	1	0	0	7	
Irrigation: Maintain Interior Levees	0.12	4	6	3	0	0	13	
Chisel 2x	0.28	9	16	5	0	16	46	
Stubble Disc	0.12	4	7	2	0	16	29	
Finish Disc	0.13	4	7	3	0	0	15	
Land Level: Tri-plane 50% Ac	0.13	5	7	3	0	0	15	
Land Level: GPS Laser 50% Ac	0.00	0	0	0	0	50	50	
TOTAL GROUND PREP COSTS	0.92	31	45	17	0	82	175	
Pre-Plant:								
Fertilize: NH ₄ OH @ 130lbs. N/Ac	0.12	4	6	2	72	25	109	
Fertilize: 12-23-20/Zinc Sulfate	0.00	0	0	0	50	20	70	
Finish Roll	0.12	4	2	1	0	0	7	
TOTAL PRE-PLANT COSTS	0.23	8	8	3	122	45	185	
Cultural:								
Irrigate: Water & Labor	0.00	44	0	0	150	0	194	
Seed: Soak & Deliver	0.00	0	0	0	57	5	62	
Planting: Seed - 175 lbs./Acre	0.00	0	0	0	0	21	21	
Weeds: Grasses (Butte)	0.00	0	0	0	128	12	140	
Insects: Midge/Shrimp/Weevil 25% Ac (Lambda cy)	0.00	0	0	0	3	3	6	
Weeds: Algae 30% Ac (Copper Sulfate)	0.00	0	0	0	6	4	10	
Weeds: Broadleaf (Grandstand/Super Wham)	0.00	0	0	0	71	20	91	
Weeds: Cleanup 80% Ac (Regiment)	0.00	0	0	0	24	16	40	
Fertilize: Top-Dress 75% Ac (NH ₄ SO ₄)	0.00	0	0	0	36	11	47	
Insects: Armyworms 25% Ac (Dimilin 2L)	0.00	0	0	0	3	3	6	
Disease: Fungus 80% Ac (Quadris)	0.00	0	0	0	11	10	21	
Truck: ½-Ton	0.47	16	5	2	0	0	22	
Truck: ¾-Ton	0.50	17	5	4	0	0	25	
TOTAL CULTURAL COSTS	0.97	76	9	5	490	105	686	
Harvest:								
Combine/Header 30'	0.33	11	26	47	0	0	84	
Bankout Grain	0.30	10	16	7	0	0	33	
Haul to Dryer & Storage	0.00	0	0	0	0	51	51	
Dry & Store Rice	0.00	0	0	0	0	167	167	
TOTAL HARVEST COSTS	0.63	21	42	54	0	218	335	
Assessments:								
Rice Research Board Assessment	0.00	0	0	0	6	0	6	
California Rice Commission	0.00	0	0	0	6	0	6	
TOTAL ASSESSMENTS COSTS	0.00	0	0	0	13	0	13	
Post-Harvest:								
Straw: Chop 100% Ac	0.25	8	4	3	0	0	14	
Straw: Disc 100% Ac	0.17	6	9	4	0	0	18	
Straw: Roll/Stomp 100% Ac	0.17	6	9	3	0	0	18	
TOTAL POST-HARVEST COSTS	0.58	20	21	10	0	0	51	
Interest on Operating Capital at 4.0 %							21	
TOTAL OPERATING COSTS/ACRE	3.33	156	126	89	625	450	1,466	

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 1. Continued
 Sacramento Valley- 2021

CASH OVERHEAD:			
Land Rent			475
Liability Insurance			2
Office Expense			50
Compliance & Administration			25
Crop Insurance			18
GPS System/Activation fee			2
Property Taxes			8
Property Insurance			1
Investment Repairs			14
TOTAL CASH OVERHEAD COSTS/ACRE			595
TOTAL CASH COSTS/ACRE			2,061
NON-CASH OVERHEAD:			
	Per Producing Acre	Annual Cost Capital Recovery	
Fuel Tanks (1-1,000/1-500 Gal)	22	2	2
Service Trailer	22	2	2
Shop Building/Pole Barn	183	14	14
Shop Tools	31	2	2
Implement Carrier	19	1	1
Backhoe	28	3	3
Road Grader	94	6	6
GPS Stationary Receiver/Sender	5	1	1
GPS Receiver/Tractor (2)	5	1	1
Truck: Bobtail 5 th -Wheel	90	8	8
Equipment	910	118	118
TOTAL NON-CASH OVERHEAD COSTS			158
TOTAL COSTS/ACRE			2,219

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE RICE
 Sacramento Valley- 2021

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Rice	90	Cwt	21.50	1,935	
TOTAL GROSS RETURNS				1,935	
OPERATING COSTS					
Fertilizer:				158	
Aqua Ammonia NH ₄ OH	130.00	Lb. N	0.55	72	
Starter 12-23-20	200.00	Lb.	0.23	45	
Zinc Sulfate 36%	10.00	Lb.	0.52	3	
Ammonia Sulfate 21-0-0	112.50	Lb.	0.32	36	
Herbicide:				205	
Butte	9.00	Lb.	13.05	117	
Grandstand	4.80	FIOz	1.40	7	
Super Wham	4.80	Qt	11.75	56	
Regiment	0.33	Oz	74.00	24	
Insecticide:				10	
Lambda Cyhalothrin	0.77	FIOz	0.85	1	
Copper Sulfate-Fine	3.00	Lb.	2.26	6	
Dimilin 2L	2.00	FIOz	1.42	3	
Fungicide:				11	
Quadris	8.80	FIOz	1.30	11	
Adjuvant:				21	
Crop Oil	2.05	Gal	10.00	20	
Adjuvant	3.50	FIOz	0.22	1	
Seed:				57	
Seed – Rice (Medium grain)	1.75	Cwt	32.50	57	
Custom:				200	
GPS Laser Leveling	0.50	Acre	100.00	50	
Fertilizer Rig - Aqua Ammonium	1.00	Acre	25.00	25	
Ground Application – Fertilizer	1.00	Acre	20.00	20	
Air Application - Dry Fertilizer	0.75	Acre	15.00	11	
Seed Soaking (Chlorine)	1.75	Cwt	2.25	4	
Seed Delivery	1.75	Cwt	0.70	1	
Air Application – Seed	1.75	Cwt	12.00	21	
Air Application - Butte	1.00	Acre	12.00	12	
Air Application – Lambda Cyhalothrin	0.25	Acre	12.00	3	
Air Application - Copper Sulfate	0.30	Acre	12.00	4	
Ground Application – Grandstand/Super Wham	1.00	Acre	20.00	20	
Ground Application - Regiment	0.75	Acre	20.00	16	
Air Application – Dimilin 2L	0.25	Acre	12.00	3	
Air Application – Quadris	0.80	Acre	12.00	10	
Irrigation:				150	
Water - Irrigation	1.00	Acre	150.00	150	
Contract:				218	
Hauling	102.00	Cwt	0.50	51	
Drying Charge	102.00	Cwt	0.95	97	
Storage Charge	90.00	Cwt	0.78	70	
Assessment:				13	
California Rice Research Board	90.00	Cwt	0.07	6	
California Rice Commission	90.00	Cwt	0.07	6	
Rent:				32	
Tractor 325 HP 4WD	0.40	Hour	80.00	32	
Labor:				156	
Equipment Operator Labor	4.00	Hour	27.93	122	
Irrigation Labor	1.00	Hour	44.09	44	
Machinery:				214	
Fuel-Gas	2.42	Gal	3.90	9	
Fuel-Diesel	41.50	Gal	2.80	116	
Lube				19	
Machinery Repair				70	
Interest on Operating Capital @ 4.00%				21	
TOTAL OPERATING COSTS/ACRE				1,466	
TOTAL OPERATING COSTS/CWT				16.29	
NET RETURNS ABOVE OPERATING COSTS				469	

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 2. Continued
 Sacramento Valley- 2021

	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS		
Land Rent	475	
Liability Insurance	2	
Office Expense	50	
Compliance & Administration	25	
Crop Insurance	18	
GPS System/Activation fee	2	
Property Taxes	8	
Property Insurance	1	
Investment Repairs	14	
TOTAL CASH OVERHEAD COSTS/ACRE	595	
TOTAL CASH OVERHEAD COSTS/CWT	6.61	
TOTAL CASH COSTS/ACRE	2,061	
TOTAL CASH COSTS/CWT	22.90	
NET RETURNS ABOVE CASH COSTS	-126	
NON-CASH OVERHEAD COSTS (Capital Recovery)		
Fuel Tanks (1-1,000/1-500 Gal)	2	
Service Trailer	2	
Shop Building/Pole Barn	14	
Shop Tools	2	
Implement Carrier	1	
Backhoe	3	
Road Grader	6	
GPS Stationary Receiver/Sender	1	
GPS Receiver/Tractor (2)	1	
Truck: Bobtail 5 th -Wheel	8	
Equipment	118	
TOTAL NON-CASH OVERHEAD COSTS/ACRE	158	
TOTAL NON-CASH OVERHEAD COSTS/CWT	1.76	
TOTAL COST/ACRE	2,219	
TOTAL COST/CWT	24.66	
NET RETURNS ABOVE TOTAL COST	-284	

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE RICE
 Sacramento Valley- 2021

	APR	MAY	JUN	JUL	AUG	SEP	OCT	Total
Ground Preparation:								
Irrigation: Maintain laterals/Boxes/Drains	7							7
Irrigation: Maintain Interior Levees	13							13
Chisel 2x	46							46
Stubble Disc	29							29
Finish Disc	15							15
Land Level: Tri-plane 50% Ac	15							15
Land Level: GPS Laser 50% Ac	50							50
TOTAL GROUND PREP COSTS	175							175
Pre-Plant:								
Fertilize: NH ₄ OH @ 130lbs. N/Ac	109							109
Fertilize: 12-23-20/Zinc Sulfate	70							70
Finish Roll	7							7
TOTAL PRE-PLANT COSTS	185							185
Cultural:								
Irrigate: Water & Labor		39	39	39	39	39		194
Seed: Soak & Deliver		62						62
Planting: 175 lbs./Acre		21						21
Weeds: Grasses (Butte)		140						140
Insects: Midge/Shrimp/Weevil 25% Ac (Lambda)		6						6
Weeds: Algae 30% Ac (Copper Sulfate)		10						10
Weeds: Broadleaf (Grandstand/Super Wham)			91					91
Weeds: Cleanup 80% Ac (Regiment)			40					40
Fertilize: Top-Dress 75% A c (NH ₄ SO ₄)				47				47
Insects: Armyworms 25% Ac (Dimilin 2L)				6				6
Disease: Fungus 80% Ac (Quadris)				21				21
Truck: ½-Ton	3	3	3	3	3	3	3	22
Truck: ¼-Ton	4	4	4	4	4	4	4	25
TOTAL CULTURAL COSTS	7	285	177	120	46	46	7	686
Harvest:								
Combine/Header 30'						84		84
Bankout Grain						33		33
Haul to Dryer & Storage						51		51
Dry & Store Rice							167	167
TOTAL HARVEST COSTS	0	0	0	0	0	168	167	335
Assessments:								
Rice Research Board Assessment							6	6
California Rice Commission							6	6
TOTAL ASSESSMENTS COSTS	0	0	0	0	0	0	13	13

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 3. Continued
 Sacramento Valley- 2021

	APR	MAY	JUN	JUL	AUG	SEP	OCT	Total
Post-Harvest:								
Straw: Chop 100% Ac							14	14
Straw: Disc 100% Ac							19	19
Straw: Roll/Stomp 100% Ac							18	18
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	51	51
Interest on Operating Capital @4.0 %	1.22	2.17	2.76	3.16	3.31	4.02	4.82	21.47
TOTAL OPERATING COSTS/ACRE	368	287	180	123	49	217	242	1,466
CASH OVERHEAD								
Land Rent							475	475
Liability Insurance							2	2
Office Expense	7	7	7	7	7	7	7	50
Compliance & Administration	4	4	4	4	4	4	4	25
Crop Insurance							18	18
GPS System/Activation fee							2	2
Property Taxes								8
Property Insurance								1
Investment Repairs	2	2	2	2	2	2	2	14
TOTAL CASH OVERHEAD COSTS	13	13	13	13	13	13	510	595
TOTAL CASH COSTS/ACRE	381	300	193	136	62	230	752	2,061

UC COOPERATIVE EXTENSION
AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS

Table 4. RANGING ANALYSIS

Sacramento Valley- 2021

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE RICE

	YIELD (CWT)						
	75.00	80.00	85.00	90.00	95.00	100.00	105.00
OPERATING COSTS/ACRE:							
Ground Prep	175	175	175	175	175	175	175
Pre-Plant	185	185	185	185	185	185	185
Cultural	686	686	686	686	686	686	686
Harvest	299	311	323	335	347	359	371
Assessments	11	11	12	13	13	14	15
Post-Harvest	51	51	51	51	51	51	51
Interest on Operating Capital @ 4.00%	21	21	21	21	22	22	22
TOTAL OPERATING COSTS/ACRE	1,428	1,440	1,453	1,466	1,479	1,492	1,505
TOTAL OPERATING COSTS/CWT	19.04	18.01	17.10	16.29	15.57	14.92	14.33
CASH OVERHEAD COSTS/ACRE	595	595	595	595	595	595	595
TOTAL CASH COSTS/ACRE	2,022	2,035	2,048	2,061	2,074	2,087	2,100
TOTAL CASH COSTS/CWT	26.97	25.44	24.10	22.90	21.83	20.87	20.00
NON-CASH OVERHEAD COSTS/ACRE	158	158	158	158	158	158	158
TOTAL COSTS/ACRE	2,181	2,194	2,207	2,219	2,232	2,245	2,258
TOTAL COSTS/CWT	29.08	27.42	25.96	24.66	23.50	22.45	21.50
Net Return per Acre above Operating Costs							
PRICE (\$/cwt)	YIELD (Cwt/acre)						
	Rice	75.00	80.00	85.00	90.00	95.00	100.00
15.50	-265	-200	-136	-71	-7	58	123
17.50	-115	-40	34	109	183	258	333
19.50	35	120	204	289	373	458	543
21.50	185	280	374	469	563	658	753
23.50	335	440	544	649	753	858	963
25.50	485	600	714	829	943	1,058	1,173
27.50	635	760	884	1,009	1,133	1,258	1,383
Net Return per Acre above Cash Costs							
PRICE (\$/cwt)	YIELD (Cwt/acre)						
	Rice	75.00	80.00	85.00	90.00	95.00	100.00
15.50	-860	-795	-731	-666	-601	-537	-472
17.50	-710	-635	-561	-486	-411	-337	-262
19.50	-560	-475	-391	-306	-221	-137	-52
21.50	-410	-315	-221	-126	-31	63	158
23.50	-260	-155	-51	54	159	263	368
25.50	-110	5	119	234	349	463	578
27.50	40	165	289	414	539	663	788
Net Return per Acre above Total Costs							
PRICE (\$/cwt)	YIELD (Cwt/acre)						
	Rice	75.00	80.00	85.00	90.00	95.00	100.00
15.50	-1,018	-953	-889	-824	-759	-695	-630
17.50	-868	-793	-719	-644	-569	-495	-420
19.50	-718	-633	-549	-464	-379	-295	-210
21.50	-568	-473	-379	-284	-189	-95	0
23.50	-418	-313	-209	-104	1	105	210
25.50	-268	-153	-39	76	191	305	420
27.50	-118	7	131	256	381	505	630

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND OVERHEAD COSTS
 Sacramento Valley- 2021

ANNUAL EQUIPMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insurance	Taxes	
Combine/Harvester	600,000	7	153,075	83,810	334	3,765	87,909
300 HP 4WD Tractor	300,000	10	88,615	31,253	172	1,943	33,368
95 HP 4WD Tractor	95,000	15	18,495	8,125	50	567	8,743
Combine Header 30'	80,000	7	21,771	11,006	45	509	11,560
Pickup: ¾-Ton	75,000	4	36,536	12,520	49	558	13,127
Disc - Offset 26'	48,000	8	10,838	6,207	26	294	6,527
Disc-Stubble 17'	45,000	8	10,160	5,819	24	276	6,119
Triplane 24' x 40'	38,000	10	6,720	4,321	20	224	4,564
Bankout Wagon	41,000	8	9,257	5,302	22	251	5,575
Rice Roller	34,000	10	6,013	3,866	18	200	4,084
Pickup: ½-Ton	32,000	4	15,589	5,342	21	238	5,601
Chisel 26'	24,000	7	6,123	3,352	13	151	3,516
Roller/Stomper Heavy 18'	28,000	10	4,952	3,184	15	165	3,363
Disc Ridger 12'	36,000	10	6,366	4,094	19	212	4,324
Mower - Flail 15'	14,000	10	2,476	1,592	7	82	1,682
V-Ditcher	6,700	15	643	604	3	37	644
TOTAL	1,496,700	-	397,629	190,397	839	9,472	200,708
60% of New Cost*	898,020	-	238,577	114,238	504	5,683	120,425

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks (1-1,000/1-500 Gal)	17,275	20	0	1,357	14	86	3,455	4,912
Service Trailer	17,500	20	1,225	1,337	8	94	350	1,789
Shop Building/Pole Barn	146,400	20	0	11,500	162	732	2,928	15,322
Shop Tools	25,000	20	1,750	1,909	51	134	500	2,595
Implement Carrier (straddle bug)	15,500	20	1,085	1,184	7	83	310	1,584
Backhoe	22,000	15	1,540	2,011	10	118	440	2,579
Road Grader	75,000	25	5,250	5,075	36	401	1,500	7,012
GPS Stationary Receiver/Sender	3,675	10	0	470	2	18	74	564
GPS Receiver/Tractor (2)	3,770	10	0	482	2	19	75	578
Truck: Bobtail 5 th -Wheel	72,000	15	5,040	6,582	34	385	1,440	8,441
TOTAL INVESTMENT	398,120	-	15,890	31,907	326	2,070	11,072	45,375

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	800	Acre	475	380,000
Liability Insurance	800	Acre	1.83	1,464
Office Expense	800	Acre	50	40,000
Compliance & Administration	800	Acre	25	20,000
Crop Insurance	800	Acre	18	14,400
GPS System/Activation fee	800	Acre	2.00	1,600

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 6. HOURLY EQUIPMENT COSTS
 Sacramento Valley- 2021

Description	Rice Hours Used	Capital Recovery	Cash Overhead		Operating		Total Costs/Hr.	
			Insurance	Taxes	Lube & Repairs	Fuel		Total Oper.
300 HP 4WD Tractor	1,101	11.72	0.06	0.73	15.29	48.75	64.04	76.56
95 HP 4WD Tractor	440	6.09	0.04	0.43	3.78	13.06	16.84	23.40
Bankout Wagon	200	12.72	0.05	0.60	5.71	0.00	5.71	19.09
Chisel 26'	227	7.06	0.03	0.32	5.17	0.00	5.17	12.58
Combine/Harvester	293	167.62	0.67	7.53	115.53	70.00	185.53	361.35
Combine Header 30'	267	22.01	0.09	1.02	14.00	0.00	14.00	37.13
Disc - Offset 26'	107	14.90	0.06	0.71	8.02	0.00	8.02	23.69
Disc Ridger 12'	93	12.28	0.06	0.64	5.94	0.00	5.94	18.91
Disc-Stubble 17'	227	250	13.97	0.06	0.66	7.52	0.00	7.52
Mower - Flail 15'	200	4.78	0.02	0.25	5.90	0.00	5.90	10.95
Pickup: 1/2-Ton	373	6.41	0.03	0.29	3.86	9.75	13.61	20.33
Pickup: 3/4-Ton	400	15.02	0.06	0.67	7.08	9.75	16.83	32.58
Rented 325 HP 4WD Tractor	249	0.00	0.00	0.00	7.92	52.81	60.73	60.73
Rice Roller	93	11.60	0.05	0.60	3.90	0.00	3.90	16.15
Roller/Stomper Heavy 18'	133	9.55	0.04	0.49	3.21	0.00	3.21	13.30
Triplane 24'x40'	108	8.64	0.04	0.45	5.84	0.00	5.84	14.97
V-Ditcher	107	2.73	0.01	0.17	1.83	0.00	1.83	4.73

UC COOPERATIVE EXTENSION
 AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS
Table 7. OPERATIONS WITH EQUIPMENT & MATERIALS
 Sacramento Valley- 2021

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Irrigation: Maintenance	Apr	95 HP 4WD Tractor	V Ditcher	Equipment Operator Labor	0.16	Hour
Irrigation: Maintenance	Apr	300 HP 4WD Tractor	Disc Ridger - 12'	Equipment Operator Labor	0.14	Hour
Chisel 2x	Apr	Rented 325 HP 4WD	Chisel - 26'	Equipment Operator Labor	0.14	Hour
				Tractor 325 HP 4WD	0.20	Hour
	Apr	300 HP 4WD Tractor	Chisel - 26'	Equipment Operator Labor	0.20	Hour
Stubble Disc	Apr	Rented 325 HP 4WD	Stubble Disc 17'	Equipment Operator Labor	0.14	Hour
				Tractor 325 HP 4WD	0.20	Hour
Finish Disc	Apr	300 HP 4WD Tractor	Disc - Offset 26'	Equipment Operator Labor	0.16	Hour
Land Level: Tri-plane	Apr	300 HP 4WD Tractor	Triplane 24' x 40'	Equipment Operator Labor	0.16	Hour
Land Level: GPS Laser	Apr			GPS Laser Leveling	0.50	Acre
Fertilize: Pre-plant	Apr	300 HP 4WD Tractor		Equipment Operator Labor	0.14	Hour
				Aqua Ammonia NH ₄ OH	130.00	Lb. N
				Fertilizer Rig - Aqua	1.00	Acre
Fertilize: Starter	Apr			12-23-20	200.00	Lb.
				Zinc Sulfate 36%	10.00	Lb.
				Ground Application-Fertilizer	1.00	Acre
Finish Roll	Apr	95 HP 4WD Tractor	Rice Roller	Equipment Operator Labor	0.14	Hour
Irrigate: Water & Labor	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
Seed: Soak & Deliver	May			Seed - Rice	1.75	Cwt
				Soaking (Chlorine) Seed	1.75	Cwt
				Delivery - Seed	1.75	Cwt
Planting: 175 lbs./Ac	May			Air Application - Seed	1.75	Cwt
Weeds: Grasses	May			Butte	9.00	Lb.
				Crop Oil	1.00	Gal
				Adjuvant	3.50	FIOz
				Air Application - Butte	1.00	Acre
Insects: Midge/Shrimp	May			Lambda Cyhalothrin	0.77	FIOz
				Air Application - Lambda Cy	0.25	Acre
				Crop Oil	0.25	Gal
Weeds: Algae 30% Ac	May			Copper Sulfate Fine	3.00	Lb.
				Air Application -Copper	0.30	Acre
Weeds: Broadleaf	June			Grandstand	4.80	FIOz
				Crop Oil	0.80	Gal
				Super Wham	4.80	Qt
				Ground Application - S/G	1.00	Acre
Weeds: Cleanup 80% Ac	June			Regiment	0.33	Oz
				Ground Application-Regiment	0.80	Acre
Fertilize: Top-Dress	July			21-0-0 Ammonia Sulfate	112.50	Lb.
				Air Application-Dry Fertilizer	0.75	Acre
Insects: Armyworms	July			Dimilin 2L	2.00	FIOz
				Air Application - Dimilin 2L	0.25	Acre
Disease: Fungus 80% Ac	July			Quadris	8.80	FIOz
				Air Application - Quadris	0.80	Acre
Truck 1/2 Ton	July		Pickup - 1/2 Ton	Equipment Operator Labor	0.56	Hour
Truck 3/4 Ton	July		Pickup - 3/4 Ton	Equipment Operator Labor	0.60	Hour
Combine/Header	Sept	Combine/Header 30'		Equipment Operator Labor	0.40	Hour
Bankout Grain	Sept	300 HP 4WD Tractor	Bankout Wagon	Equipment Operator Labor	0.36	Hour
Haul to Dryer & Storage	Sept			Hauling	102.00	Cwt
Dry & Store Rice	Oct			Drying Charge	102.00	Cwt
				Storage Charge	90.00	Cwt
Straw: Chop 100% Ac	Oct	95 HP 4WD Tractor	Mower - Flail 15'	Equipment Operator Labor	0.30	Hour
Straw: Disc 100% Ac	Oct	300 HP 4WD Tractor	Disc - Stubble 17'	Equipment Operator Labor	0.20	Hour
Straw: Roll/Stomp 100%	Oct	300 HP 4WD Tractor	Roller/Stomper Heavy 18'	Equipment Operator Labor	0.20	Hour