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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2004

**SAMPLE COSTS TO PRODUCE**  
***RICE***



**SACRAMENTO VALLEY**  
**Rice Only Rotation**

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# INTRODUCTION

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

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or explanation of calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, California, 530-752-2414 or the Colusa County 530-458-0570, and Butte County 530-538-7200 UC Cooperative Extension offices.

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Sample Cost of Production studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, 530-752-4424. Current studies, those produced during the last five years, can be obtained from selected county UC Cooperative Extension offices or downloaded from the department website <http://coststudies.ucdavis.edu>.

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## ASSUMPTIONS

The following assumptions pertain to sample costs to produce rice in the Sacramento Valley. Practices described should not be considered recommendations by the University of California, but represent production procedures considered typical for this crop and area. Some of the costs and practices may not be applicable to your situation or used during every production year. Other practices not indicated may be needed. Cultural practices and costs to produce rice will vary by grower and region, and can be significant. The practices and inputs used in this cost study serve as a sample or guide, only. The costs are presented on an annual, per acre basis. **The use of trade names 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.**

**Farm.** This report is based on a hypothetical 720-acre farm. The grower owns 250 acres and rents 470 acres. Rice is grown on 700 acres and 20 acres (7 owned acres and 13 rented acres) are roads, irrigation systems, and farmstead. 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 involved for moving equipment between fields, but are not included in this study. No other crops are grown in rotation with the rice. Both the grower-owned and rented land have a rice base and are eligible for farm program benefits. All operations are done on 100% of the acres unless noted.

## CULTURAL PRACTICES AND MATERIAL INPUTS

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

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

**Irrigation.** The grower purchases the majority of the irrigation water from an irrigation district and growers may supplement this with well water. The grower pays the water costs on both the rented and grower owned land. Irrigation districts in the valley were surveyed for water cost, and rice acres in the district to obtain a weighted average water cost. The seasonal cost of irrigation water for this study is \$54.13 per surface acre.

**Fertilization.** Aqua ammonia at 120 pounds of N per acre is applied preplant with an aqua fertilizer injector 4 to 6 inches deep. At the same time, a "starter" fertilizer, ammonium phosphate (16-20-0) at 200 pounds per acre, is applied by air and incorporated with the aqua rig or roller. Zinc sulfate is applied by air to 50% of the acres. In July 33% of the acres are topdressed with ammonium sulfate at 26.25 pounds of N or 125 pounds of material per acre.

**Pest Management.** The pesticides and rates mentioned in this cost study are listed in UC *Integrated Pest Management Guidelines, Rice*. For more information on pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). Written recommendations are required for many pesticides, and are made by licensed pest control advisors. For information on pesticide use permits, contact the local county agricultural commissioner's office.

*Weeds.* Broadleaf and grass weeds are controlled with separate aerial and ground applications. A grass herbicide is applied on 90% of the acres by air in May. An application is made in June to control the remaining broadleaf, sedges, and grass weeds. Two herbicides are usually mixed and are applied on 45% of the acres by ground. The herbicides used are propanil (Super Wham or Stam) and Grandstand.

*Insects and Algae.* Rice water weevil control begins in May after planting, by treating 15% of the acres, which includes the field borders or edges, levees, and field area adjacent to these areas with Warrior insecticide. In May, after planting, copper sulfate is applied to 50% of the acres to control shrimp and algae. Armyworms are controlled with one insecticide application of Warrior in July on 10% of the acres.

*Diseases.* Blast and aggregate sheath spot are controlled July through August with one application of Quadris on 25% of the acres.

**Harvest.** The rice crop is harvested at 22% kernel moisture (green rice) using one combine with a cutter-bar header. The grower also owns a self-propelled bankout wagon. The grain is dumped from the combine into the bankout wagon that hauls the grain to bulk grain trailers for transport to the dryer.

Growers may choose to own harvesting equipment, purchased either new or used, or hire a custom harvester. Many factors are important in deciding which harvesting option a grower uses. These considerations and appropriate method of analysis are discussed in "*Acquiring Alfalfa Hay Harvest Equipment: A Financial Analysis of Alternatives*".

**Transportation.** The grower pays the transportation of green rice from the field to the drier. Hauling grain from the drier to storage may be considered a processing or marketing expense, but is a cost and is reflected in the price returned to the grower. In this study, the cost of transporting the rice from the field to the drier is included, but the hauling cost between the drier and warehouse is not. The cost of transporting rice is based on a green weight of 95.34 hundredweight (cwt) per acre and a \$0.33 per cwt field pickup and hauling charge. In this study, green weight is the calculated weight of the harvested rice at 22% moisture, including 'invisible shrink' (see below).

**Drying and Storage.** Drying charges increase with moisture content and 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 ranges from about 2% to 6%. Together, these losses are called 'shrink'. Rice is assumed to be dried to 13% moisture. The drying rate charge is multiplied by the green weight calculated above. The current cost of drying the rice in this study \$0.734 per cwt. Storage is charged at \$0.57 per cwt on the dry weight and is similarly increased to estimate future power costs. Most of the drying cost is related to natural gas prices, and the storage cost to electricity prices.

**Yields.** The crop yield used in this study is 80 cwt per acre at 13% moisture. Yields have varied over the years in the Sacramento Valley and are shown in Table A.

Table A. Average Sacramento Valley rice yields by county

County	1998	1999	2000	2001	2002
	cwt/acre				
Butte	69.0	73.8	84.6	86.6	90.2
Colusa	72.0	75.0	80.0	83.0	82.0
Glenn	70.0	75.0	86.6	88.0	85.4
Placer	70.0	62.0	73.6	78.0	79.4
Sacramento	74.0	86.0	80.0	82.0	88.0
Sutter	68.0	75.0	87.4	82.6	85.4
Tehama	63.0	66.0	45.0	43.0	38.0
Yolo	69.6	74.2	71.8	79.2	76.2
Yuba	69.0	69.0	84.0	78.0	79.6
Weighted Average	69.9	74.1	82.9	83.7	84.2

Source: County Crop Reports, 1998-2002.

**Returns.** A selling price of \$8.00 per cwt of medium grain rice is used to estimate market income. This study includes additional revenue received by rice growers from the Direct Payment (DP) and the Counter Cyclical Payment (CCP), but not the Marketing Loan Program (MLP) of the Farm Security and Rural Investment Act of 2002 administered by the United States Department of Agriculture's (USDA), Farm Service Agency (FSA). Marketing loan gains and Counter-Cyclical Payments rise when market price falls to roughly offset the losses from lower market prices so total revenue is less vulnerable to declines in market price than without these programs. Limits apply on the DP, CCP, and MLP paid to each actively engaged individual associated with the farm. Here we assume that these limits are binding on the farm. Individual farms' program income will vary depending on each farm's acreage base and other factors. For more information on these aspects and other programs or on meeting minimum requirements to comply with the programs please contact the USDA FSA or visit the website <http://www.ers.usda.gov/briefing/FarmPolicy/programProvisions.htm>.

**Direct Payments.** The total farm DP income is calculated by taking 85% of the payment yield multiplied it by the payment rate and the individual farm's base acreage. In this study the Direct Payment yield is assumed to be 68.20 cwt per acre (2003 value for California) and the Direct Payment rate is \$2.35 per cwt. Per acre program support is calculated as  $0.85 \times \$2.35/\text{cwt} = \$1.997/\text{cwt}$ . In practice, approximately 95% of the rice grown receives full payment; therefore, in this study the calculated payment is multiplied by 95% to reflect the less than 100% payment. The formula  $(.85 \times \$2.35 \times .95)$  calculates the \$1.898 return shown in Table 2. More information on Direct Payments is available at the USDA website <http://www.ers.usda.gov/briefing/FarmPolicy/DirectPayments.htm>. Farms are not required to grow rice to receive the Direct Payments, but almost all rice farms do collect this revenue and most Direct Payments go to farms that continue to grow rice.

**Counter-Cyclical Payments.** Counter-Cyclical Payments are only made to growers when the market price or national average loan rate is less than the target price. The payment rate is equal to the target price minus the Direct Payment rate minus the higher of the commodity price or loan rate. The target price for rice through 2007 is \$10.50 per cwt. The Direct Payment rate is \$2.35 and the loan rate is \$6.50. In this study the CCP rate is  $\$10.50 - \$2.35 - \$6.35 = \$1.65$ . The CCP rate is set at a maximum of \$1.65 per cwt, but can be set lower depending on several factors. The USDA internet site <http://www.ers.usda.gov/briefing/FarmPolicy/CounterCyclicalPay.htm> delves into the detail of the target price, payment rate, payment limits, timelines, and calculations. It also uses 85%

of the individual farmer's base acreage as a constant. The CCP the payment yield is assumed to be 70.41 cwt per acre (2003 value for California). The Counter-Cyclical Payment is calculated as individual farmer's base acreage X .85 X CCP rate. In this study the CCP per cwt is determined as  $0.85 \times \$1.65/\text{cwt} = \$1.40/\text{cwt}$ . It is also assumed that only 95% of the acreage receives the CCP so the payment is \$1.33 per cwt. Counter-Cyclical Payments are usually made in several annual installments in order to assess the market price for the year. Farms are not required to grow rice to receive the CCP, but almost all rice farms do receive this revenue and most Counter-Cyclical Payments go to farms that continue to grow rice.

**Marketing Loan Gains and Loan Deficiency Payments.** Rice farmers are eligible to receive a loan from the government by putting up their production as collateral. The loan rate for rice in 2004 is \$6.50 per hundredweight. When market prices fall below the loan rate, farmers can repay the loans at a lower loan repayment rate resulting in a benefit to producers. The loan repayment rate for rice is the average world price for rice calculated weekly by the government. The difference between the loan rate and the average world price is called a Marketing Loan Gain. Alternatively, eligible farmers can choose to receive direct loan deficiency payments equivalent to the Marketing Loan Gain without having to take out the loan and then repay it. In this study we assume that the world price is above the loan rate and so marketing loan gains are not an additional source of revenue.

**Assessments.** Under a state marketing order a mandatory assessment fee is collected and administered by the California Rice Research Board. This assessment of \$0.05 per dry cwt pays for rice research in California. In addition, the California Rice Commission assesses the grower and handler a combined \$0.0764 per dry cwt for marketing activities.

**Straw Management.** Post-harvest operations for straw management are usually done using a single or combination of four methods. The most commonly used operations are 1) burning (up to 25% of acres with disease), 2) chopped, disced, and flooded, 3) chopped and flooded, and 4) flooded and rolled. In this study a combination of methods 1 and 4 are used.

Rice straw burning is done on 20% of the acres in the fall and/or spring for disease control. Burning permits and fees vary for each air pollution control district. For this study, a one time \$15 burn permit is charged to the farm and additional \$2.00 per acre is charged for each acre burned. Check with the air pollution control office in your county for burning regulations and fees. On 80% of the acres the paddy is flooded and the rice straw is rolled with a cage roller. Winter water costs for single and continuous flooding vary by district or may be rain fed.

**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.

**Labor.** Labor rates of \$14.17 per hour for machine operators and for non-machine workers includes payroll overhead of 45%. The basic hourly wages are \$9.77 for machine operators and for non-machine labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops (code 0171), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2004 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 and 4 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

## CASH OVERHEAD

**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 include property taxes, interest on operating capital, office expense, liability and property insurance, rents, and investment repairs. Cash overhead costs are included in Tables 1, 2, 3 and 4.

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

*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 6.89% per year. It is assumed that all cash operations are financed. A nominal interest rate is the typical market cost of borrowed funds. The costs of postharvest operations are discounted back to the harvest month using a negative interest charge.

*Insurance.* Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$990 for the entire farm or \$1.38 per acre.

*Office Expense.* Office and business expenses are estimated at \$21.50 per acre. These expenses include office supplies, telephones, bookkeeping, accounting and legal fees, road maintenance, and miscellaneous business expenses.

*Rent.* Cash rents range from \$180 to \$300 per producing acre. The grower in this study rents 470 acres of which 457 are producing or planted acres and the grower pays \$225 per rented producing acre to the landlord. The rent cost is charged to the entire farm (700 acres) at \$147 per producing acre. The non-producing acres are roads, irrigation system, and equipment yard.

*Investment Repairs.* Annual cash maintenance or repair costs are associated with investments under non-cash overhead. Repairs to the fuel tanks and pumps, shop building, shop tools, irrigations system, tool carrier, and fuel wagon are calculated at 10% of new cost distributed over the investment life.

## Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. This study shows the current purchase price for new equipment and then adjusts the price to 40% of new cost to indicate a mix of new and used equipment. Annual ownership costs for equipment and investments are shown in Tables 1, 2, and 4 as the capital recovery cost on an annual per acre basis.

*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). Put another way, 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 calculation for the annual capital recovery costs is as follows:

$$\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Capital Recovery Factor} + \text{Salvage Value} \times \text{Interest Rate}}$$

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wearout life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is equal to the purchase price because land does not depreciate. The purchase price and salvage value for certain equipment and investments are shown in Table 5.

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

*Interest Rate.* The interest rate of 6.23% used to calculate capital recovery cost is the United States Department of Agriculture-Economic Reporting Service’s (USDA-ERS) ten year average of California’s agricultural sector long-run real rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector, not including inflation. In other words, the next best alternative use for these resources is in another agricultural enterprise.

*Land.* Land values range from \$3,100 to \$3,800. The grower in this study owns 250 acres of land that is valued at \$3,250 per acre or \$3,342 per producing acre. The cost is charged to the entire farm (700 acres) at \$1,161 per producing acre. Farmstead, roads, and the irrigation system are on 7 of the 250 owned acres.

*Irrigation System.* The irrigation system in this study is a portable PTO powered low lift pump. The water delivery system or returns system is not calculated as a cost in this study.

**Equipment.** 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. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 5 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

*Repairs, Fuel and Lube.* Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.45 and \$1.88 per gallon, respectively.



**Rented Equipment.** A 200 HP 4WD tractor and a chisel are rented for one month (200 hours). The tractor is used to chisel 700 acres one time. In addition, the remaining available tractor time was used to triplane a portion of the acres. The operating expenses are included in the fuel, lube, and labor items in Table 2.

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

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Table 1.

UC COOPERATIVE EXTENSION  
COSTS PER ACRE TO PRODUCE RICE  
SACRAMENTO VALLEY - 2004

Labor Rate: \$14.17/hr. machine labor  
\$14.17/hr. non-machine labor

Interest Rate: 6.89%  
Yield per Acre: 80.0 CWT

Operation	Operation Time (Hrs/A)	----- Cash and Labor Costs per Acre -----					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
<b>Cultural:</b>								
Maintain Drains	0.10	2	1	0	0	3		
Maintain and Rework Levees	0.05	1	1	0	0	2		
Chisel 2X	0.33	5	4	4	7	20		
Plow - 10% Of Acreage	0.02	0	1	0	0	1		
Disc 2X	0.28	5	7	0	0	12		
Triplane Fields	0.20	5	2	1	5	13		
Laser Level - Once every 7Years	0.00	0	0	0	11	11		
Fertilize - 16-20-0 @ 200 Lbs/Acre	0.07	1	2	27	9	39		
Insect Control – Rice Weevil on 15% of Acreage	0.00	0	0	1	1	2		
Fertilize - Aqua Ammonia @ 120 Lbs N/Acre	0.15	3	4	42	3	51		
Roll Final Seedbed	0.07	1	2	0	0	3		
Fertilize - Zinc on 50% of Acre	0.00	0	0	12	4	16		
Irrigate	1.00	14	0	54	0	68		
Soak and Deliver Seed	0.00	0	0	0	5	5		
Plant @ 150 Lbs/Acre	0.00	0	0	29	12	41		
Insect Control - Shrimp on 50% of Acreage	0.00	0	0	4	4	8		
Weed Control - Grasses on 90% Acreage	0.00	0	0	60	7	67		
Weed Control - Broadleaf & Grasses on 45% of Acreage	0.00	0	0	29	6	35		
Fertilize - Topdress on 33% of Acreage	0.00	0	0	1	2	2		
Insect Control - Armyworm on 10% Acreage	0.00	0	0	1	1	2		
Disease Control - Fungus on 25% of Acreage	0.00	0	0	10	2	12		
Pickup Truck Use	<u>0.41</u>	<u>14</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>18</u>		
<b>TOTAL CULTURAL COSTS</b>	<b>2.69</b>	<b>50</b>	<b>28</b>	<b>277</b>	<b>77</b>	<b>433</b>		
<b>Harvest:</b>								
Combine Rice – Cutterbar Header	0.39	7	18	0	0	24		
Bankout Rice	0.21	4	5	0	0	8		
Haul Rice To Dryer	0.00	0	0	0	31	31		
Dry & Store Rice	0.00	0	0	0	116	116		
Rice Research Board Assessment	0.00	0	0	4	0	4		
California Rice Commission Assessment	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>0</u>	<u>6</u>		
<b>TOTAL HARVEST COSTS</b>	<b>0.59</b>	<b>10</b>	<b>22</b>	<b>10</b>	<b>147</b>	<b>189</b>		
<b>Postharvest:</b>								
Burn Permit & Fees for 20% of Acre	0.00	0	0	0	0	0		
Fall/Spring Burn - 20% of Acres	0.28	4	0	0	0	4		
Mow Levees - 41% Levee Acres	0.01	0	0	0	0	0		
Flood & Roll - 80% of Acres	<u>0.07</u>	<u>3</u>	<u>2</u>	<u>5</u>	<u>0</u>	<u>10</u>		
<b>TOTAL POSTHARVEST COSTS</b>	<b>0.36</b>	<b>7</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>14</b>		
Interest on Operating Capital @ 6.89%	0.07					12		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>67</b>	<b>52</b>	<b>293</b>	<b>224</b>	<b>648</b>		
<b>TOTAL OPERATING COSTS/CWT</b>						<b>8.09</b>		
<b>CASH OVERHEAD:</b>								
Land Rent						147		
Office Expense						22		
Liability Insurance						1		
Property Taxes						15		
Property Insurance						10		
Investment Repairs						<u>3</u>		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>197</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>845</b>		
<b>TOTAL CASH COSTS/CWT</b>						<b>10.56</b>		

## UC COOPERATIVE EXTENSION

Table 1. continued

NON-CASH OVERHEAD:			
	Per producing	-- Annual Cost --	
	<u>Acre</u>	<u>Capital Recovery</u>	
Investment			
Land	1,161	72	72
Fuel Tanks & Pumps	15	1	1
Shop Building	59	5	5
Shop Tools	17	1	1
Irrigation System	9	1	1
Tool Carrier	21	2	2
Fuel Wagon	5	1	1
Backhoe	12	1	1
Equipment	<u>369</u>	<u>47</u>	<u>47</u>
TOTAL NON-CASH OVERHEAD COSTS	1,667	132	132
TOTAL COSTS/ACRE			977
TOTAL COSTS/CWT			12.21

Table 2

UC COOPERATIVE EXTENSION  
COSTS AND RETURNS PER ACRE TO PRODUCE RICE

SACRAMENTO VALLEY - 2004

Labor Rate: \$14.17/hr. machine labor  
\$14.17/hr. non-machine labor

Interest Rate: 6.89%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS <sup>§</sup></b>					
Rice	80.00	Cwt	8.00	640	
Direct Payment	68.20	Cwt	1.898	129	
Counter-Cyclical Payment	70.41	Cwt	1.33	94	
<b>TOTAL GROSS RETURNS FOR RICE</b>				<u>863</u>	
<b>OPERATING COSTS</b>					
Rent:					
Tractor 200 HP 4WD	0.29	Hour	35.00	10	
Chisel Plow 16'	0.15	Hour	8.75	1	
Fertilizer Rig	1.00	Each	3.00	3	
Fuel:					
Diesel Fuel	3.73	Gal	1.45	5	
Lube:					
Lube	0.32	Acre	0.63	0	
Custom:					
Laser Leveling	0.14	Acre	80.00	11	
Air Application - Dry Fertilizer	2.41	Cwt	4.50	11	
Air Application - Warrior	0.25	Acre	7.00	2	
Air Application -Zinc Dry	0.50	Acre	7.00	4	
Soaking - Seed	1.50	Cwt	2.25	3	
Delivery - Seed	1.80	Cwt	0.67	1	
Air Application - Seed	1.80	Cwt	6.75	12	
Air Application - Copper	0.50	Acre	7.00	4	
Air Application - Ordram	0.90	Acre	8.00	7	
Ground Application	0.45	Acre	12.50	6	
Air Application - Quadris	0.25	Acre	8.00	2	
Fertilizer:					
16-20-0	200.00	Lb	0.137	27	
Aqua Ammonia	120.00	Lb N	0.35	42	
Zinc Sulfate 36%	25.00	Lb	0.487	12	
Ammonium Sulfate	8.66	Lb N	0.08	1	
Insecticide:					
Warrior T	0.77	Fl Oz	3.05	2	
Copper Sulfite Fine	5.00	Lb	0.862	4	
Irrigation:					
Water	1.00	Acre	54.13	54	
Water - Straw Management	0.50	Acre	10.00	5	
Seed:					
Seed - Rice	1.50	Cwt	19.50	29	
Herbicide:					
Ordram 15G	30.00	Lb	2.00	60	
Grandstand	4.42	Fl Oz	1.24	5	
Super Wham CA	2.70	Qt	8.87	24	
Fungicide:					
Quadris	3.08	Fl Oz	3.18	10	
Contract:					
Hauling	95.34	Cwt	0.33	31	
Drying Charge	95.34	Cwt	0.734	70	
Storage Charge	80.00	Cwt	0.57	46	
Assessment:					
Rice Research Foundation	80.00	Cwt	0.05	4	
California Rice Commission	80.00	Cwt	0.076	6	
Burn Permit:					
Burn Permit	0.20	Acre	0.021	0	
Burning Fees	0.20	Acre	2.00	0	
Labor (machine)	3.11	Hrs	14.17	44	
Labor (non-machine)	1.64	Hrs	14.17	23	
Fuel - Gas	1.63	Gal	1.88	3	
Fuel - Diesel	22.68	Gal	1.45	33	
Lube				5	
Machinery repair				11	
Interest on operating Capital @ 6.89%				<u>12</u>	
<b>TOTAL OPERATING COSTS/ACRE</b>				648	
<b>TOTAL OPERATING COSTS/CWT</b>				<u>8.09</u>	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<u>216</u>	

UC COOPERATIVE EXTENSION

Table 2. continued

CASH OVERHEAD COSTS:	
Land Rent	147
Office Expense	22
Liability Insurance	1
Property Taxes	15
Property Insurance	10
Investment Repairs	<u>3</u>
TOTAL CASH OVERHEAD COSTS/ACRE	197
TOTAL CASH COSTS/ACRE	845
TOTAL CASH COSTS/CWT	10.56
(CAPITAL RECOVERY)	
Land	72
Fuel Tanks & Pumps	1
Shop Building	5
Shop Tools	1
Irrigation System	1
Tool Carrier	2
Fuel Wagon	1
Backhoe	1
Equipment	<u>47</u>
TOTAL NON-CASH OVERHEAD COSTS/ACRE	132
TOTAL COSTS/ACRE	977
TOTAL COSTS/CWT	12.21
NET RETURNS ABOVE TOTAL COSTS	-114

<sup>§</sup> Total returns will vary across farms because of differing support under government programs.

UC COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE RICE  
SACRAMENTO VALLEY - 2004

Table 3.

Beginning FEB 04	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	TOTAL
Ending JAN 05	04	04	04	04	04	04	04	04	04	04	04	05	
<b>Cultural:</b>													
Maintain Drains	3												3
Maintain and Rework Levees			2										2
Chisel 2X			20										20
Plow - 10% Of Acreage			1										1
Disc 2X			12										12
Triplane Fields			13										13
Laser Level - Once every 7Years			11										11
Fertilize - 16-20-0 @ 200 Lbs/Acre			39										39
Insect Control – Rice Weevil on 15% of Acreage				2									2
Fertilize - Aqua Ammonia @ 120 Lbs N/Acre			51										51
Roll Final Seedbed			3										3
Fertilize - Zinc on 50% of Acre			16										16
Irrigate				14	14	14	14	14					68
Soak and Deliver Seed				5									5
Plant @ 150 Lbs/Acre				41									41
Insect Control - Shrimp on 50% of Acreage				8									8
Weed Control - Grasses on 90% Acreage				67									67
Weed Control - Broadleaf & Grasses On 45% of Acreage					35								35
Fertilize - Topdress on 33% of Acreage						2							2
Insect Control - Armyworm on 10% Acreage						2							2
Disease Control - Fungus on 25% of Acreage						12							12
Pickup Truck Use	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>18</u>
<b>TOTAL CULTURAL COSTS</b>	<b>4</b>	<b>2</b>	<b>170</b>	<b>139</b>	<b>50</b>	<b>31</b>	<b>15</b>	<b>15</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>433</b>
<b>Harvest:</b>													
Combine Rice - Cutterbar Header								24					24
Bankout Rice								8					8
Haul Rice To Dryer								31					31
Dry & Store Rice									116				116
Rice Research Board Assessment									4				4
California Rice Commission Assessment									<u>6</u>				<u>6</u>
<b>TOTAL HARVEST COSTS</b>								<b>64</b>	<b>126</b>				<b>189</b>
<b>Postharvest:</b>													
Burn Permit & Fees for 20% of Acre									0				0
Fall/Spring Burn - 20% of Acres									4				4
Mow Levees - 41% Levee Acres									0				0
Flood & Roll - 80% of Acres									<u>10</u>				<u>10</u>
<b>TOTAL POSTHARVEST COSTS</b>									<b>14</b>				<b>14</b>
Interest on Operating Capital @ 6.89%	0	0	1	2	2	2	2	3	-1	0	0	0	12
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>4</b>	<b>2</b>	<b>171</b>	<b>140</b>	<b>52</b>	<b>33</b>	<b>18</b>	<b>82</b>	<b>141</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>648</b>
<b>TOTAL OPERATING COSTS/CWT</b>	<b>0.05</b>	<b>0.02</b>	<b>2.14</b>	<b>1.76</b>	<b>0.65</b>	<b>0.42</b>	<b>0.22</b>	<b>1.02</b>	<b>1.76</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>8.09</b>
<b>OVERHEAD:</b>													
Land Rent									147				147
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	21
Liability Insurance								1					1
Property Taxes			7								7		15
Property Insurance					5							5	10
Investment Repairs	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>2</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>2</b>	<b>3</b>	<b>149</b>	<b>2</b>	<b>9</b>	<b>7</b>	<b>197</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>6</b>	<b>4</b>	<b>181</b>	<b>142</b>	<b>54</b>	<b>40</b>	<b>20</b>	<b>85</b>	<b>289</b>	<b>4</b>	<b>11</b>	<b>8</b>	<b>845</b>
<b>TOTAL CASH COSTS/CWT</b>	<b>0.08</b>	<b>0.04</b>	<b>2.26</b>	<b>1.78</b>	<b>0.68</b>	<b>0.5</b>	<b>0.24</b>	<b>1.06</b>	<b>3.62</b>	<b>0.04</b>	<b>0.14</b>	<b>0.11</b>	<b>1056</b>

Table 4.

UC COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
SACRAMENTO VALLEY - 2004

ANNUAL EQUIPMENT COSTS								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		
						Insur- ance	Taxes	Total
04	200 HP 4WD Tractor	149,113	10	44,046	17,175	653	966	18,794
04	90 HP Utility Tractor	41,764	16	7,480	3,912	166	246	4,325
04	Bankout SP 150 Cwt	79,365	10	14,035	9,848	316	467	10,630
04	Chisel - 21'	14,260	10	2,522	1,769	57	84	1,910
04	Combine - No Head	199,500	7	54,291	29,607	858	1,269	31,734
04	Disc - Offset 21'	24,231	10	4,285	3,007	96	143	3,246
04	Disc Ridger - 12'	6,345	10	1,122	787	25	37	850
04	Header - Conventional. 18'	24,675	7	6,715	3,662	106	157	3,925
04	Mower - Sicklebar 7'	3,885	10	687	482	15	23	520
04	Pickup - 1/2 Ton	24,100	7	9,142	3,271	112	166	3,550
04	Pickup - 3/4 Ton	26,900	7	10,204	3,651	125	186	3,962
04	Plow 5 Bottom 16'	16,800	10	2,971	2,085	67	99	2,250
04	Roller Rice 22'	10,000	20	1,768	841	40	59	940
04	Triplane 16'X30'	20,914	10	3,698	2,595	83	123	2,801
04	V Ditcher	4,419	20	230	386	16	23	425
<b>TOTAL</b>		<b>646,271</b>		<b>163,196</b>	<b>83,079</b>	<b>2,736</b>	<b>4,047</b>	<b>89,862</b>
40% of New Cost *		258,508		65,278	33,232	1,094	1,619	35,945

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead -----			Total
					Insur- ance	Taxes	Repairs	
<b>INVESTMENT</b>								
Backhoe	8,115	15	812	814	30	45	405	1,294
Fuel Tanks & Pumps	10,500	20		933	35	53	290	1,311
Fuel Wagon	3,478	10	348	452	13	19	100	584
Irrigation System	6,300	20		560	21	32	0	612
Land	812,500	40	812,500	50,619	5,493	8,125	0	64,236
Shop Building	41,216	20		3,661	139	206	785	4,791
Shop Tools	11,897	20	1,190	1,025	44	65	238	1,373
Tool Carrier	14,418	20	1,442	1,242	54	79	120	1,495
<b>TOTAL INVESTMENT</b>	<b>908,424</b>		<b>816,292</b>	<b>59,305</b>	<b>5,830</b>	<b>8,624</b>	<b>1,938</b>	<b>75,696</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	457	Acre	225.00	102,825
Liability Insurance	720	Acre	1.38	994
Office Expense	700	Acre	21.50	15,050



Table 5.

UC COOPERATIVE EXTENSION  
 HOURLY EQUIPMENT COSTS  
 SACRAMENTO VALLEY - 2004

Description	----- COSTS PER HOUR -----							
	Actual Hours Used	Capital Recovery	- Cash Overhead - Insur- ance	Taxes	Repairs	----- Operating ----- Fuel & Lube	Total Oper.	Total Costs/Hr.
200 HP 4WD Tractor	725.9	9.46	0.36	0.53	2.58	19.35	21.93	32.29
90 HP Utility Tractor	84.7	18.48	0.79	1.16	1.18	7.37	8.55	28.98
Bankout SP 150 Cwt	158.8	24.81	0.80	1.18	0.10	20.01	20.11	46.90
Chisel - 21'	107.7	6.57	0.21	0.31	2.00	0.00	2.00	9.09
Combine - No Header	297.1	39.86	1.15	1.71	9.89	29.03	38.92	81.65
Disc - Offset 21'	196.0	6.14	0.20	0.29	2.62	0.00	2.62	9.24
Disc Ridger - 12'	35.0	9.00	0.29	0.43	0.68	0.00	0.68	10.40
Header - Conventional 18'	270.1	5.42	0.16	0.23	2.67	0.00	2.67	8.49
Mower - Sicklebar 7'	7.0	27.62	0.89	1.31	1.07	0.00	1.07	30.89
Pickup - 1/2 Ton	284.9	4.59	0.16	0.23	1.18	4.32	5.50	10.48
Pickup - 3/4 Ton	284.9	5.13	0.18	0.26	1.32	4.32	5.64	11.20
Plow -5 Bottom 16'	14.1	58.97	1.89	2.80	3.10	0.00	3.10	66.76
Roller - Rice 22'	155.4	2.25	0.09	0.14	0.72	0.00	0.72	3.20
Triplane 16'X30'	141.4	7.34	0.24	0.35	2.12	0.00	2.12	10.05
V Ditcher	70.0	2.21	0.09	0.13	0.74	0.00	0.74	3.17

Table 6.

UC COOPERATIVE EXTENSION  
RANGING ANALYSIS WITH USDA PAYMENTS  
SACRAMENTO VALLEY - 2004

COSTS PER ACRE AT VARYING YIELD TO PRODUCE RICE <sup>§</sup>							
	YIELD (CWT/ACRE)						
	65.0	70.0	75.0	80.0	85.0	90.0	95.0
OPERATING COSTS/ACRE:							
Cultural Cost	433	433	433	433	433	433	433
Harvest Cost	154	166	177	189	201	213	225
Postharvest Cost	14	14	14	14	14	14	14
Interest on operating capital	12	12	12	12	12	11	11
TOTAL OPERATING COSTS/ACRE	612	624	636	648	659	671	683
TOTAL OPERATING COSTS/CWT	9.42	8.91	8.48	8.09	7.76	7.46	7.19
CASH OVERHEAD COSTS/ACRE							
TOTAL CASH COSTS/ACRE	809	821	833	845	856	868	880
TOTAL CASH COSTS/CWT	12.45	11.73	11.10	10.56	10.08	9.65	9.26
NON-CASH OVERHEAD COSTS/ACRE							
TOTAL COSTS/ACRE	941	953	965	977	989	1,000	1,012
TOTAL COSTS/CWT	14.48	13.62	12.87	12.21	11.63	11.12	10.66

<sup>§</sup> Total returns will vary because of government support programs.

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR RICE <sup>§</sup>									
PRICE (DOLLARS/CWT)			YIELD (CWT/ACRE)						
Rice			65.0	70.0	75.0	80.0	85.0	90.0	95.0
	Direct Pay		68.2	68.2	68.2	68.2	68.2	68.2	68.2
	CCP		70.41	70.41	70.41	70.41	70.41	70.41	70.41
6.50	1.425	1.33	34	54	75	96	116	137	158
7.00	1.508	1.33	66	89	112	136	159	182	205
7.50	1.592	1.33	99	124	150	176	201	227	253
8.00	1.676	1.33	131	159	187	216	244	272	300
8.50	1.676	1.33	164	194	225	256	286	317	348
9.00	1.676	1.33	196	229	262	296	329	362	395
9.50	1.676	1.33	229	264	300	336	371	407	443

NET RETURN PER ACRE ABOVE CASH COST FOR RICE <sup>§</sup>									
PRICE (DOLLARS/CWT)			YIELD (CWT/ACRE)						
Rice			65.0	70.0	75.0	80.0	85.0	90.0	95.0
	Direct Pay		68.2	68.2	68.2	68.2	68.2	68.2	68.2
	CCP		70.41	70.41	70.41	70.41	70.41	70.41	70.41
6.50	1.425	1.33	-164	-143	-122	-102	-81	-60	-39
7.00	1.508	1.33	-131	-108	-85	-62	-38	-15	8
7.50	1.592	1.33	-99	-73	-47	-22	4	30	56
8.00	1.676	1.33	-66	-38	-10	18	47	75	103
8.50	1.676	1.33	-34	-3	28	58	89	120	151
9.00	1.676	1.33	-1	32	65	98	132	165	198
9.50	1.676	1.33	31	67	103	138	174	210	246

UC COOPERATIVE EXTENSION

Table 6. continued

NET RETURNS PER ACRE ABOVE TOTAL COST FOR RICE <sup>§</sup>

PRICE (DOLLARS/CWT)			YIELD (CWT/ACRE)						
Rice			65.0	70.0	75.0	80.0	85.0	90.0	95.0
	Direct Pay		68.2	68.2	68.2	68.2	68.2	68.2	68.2
		CCP	70.41	70.41	70.41	70.41	70.41	70.41	70.41
6.50	1.425	1.33	-296	-275	-254	-234	-213	-192	-172
7.00	1.508	1.33	-263	-240	-217	-194	-171	-147	-124
7.50	1.592	1.33	-231	-205	-179	-154	-128	-102	-77
8.00	1.676	1.33	-198	-170	-142	-114	-86	-57	-29
8.50	1.676	1.33	-166	-135	-104	-74	-43	-12	18
9.00	1.676	1.33	-133	-100	-67	-34	-1	33	66
9.50	1.676	1.33	-101	-65	-29	6	42	78	113

<sup>§</sup> Total returns will vary because of government support programs.

Table 7.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS/BREAKEVEN ANALYSIS  
 SACRAMENTO VALLEY - 2004

COSTS AND RETURNS - PER ACRE BASIS							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Rice	863	648	216	845	18	977	-114

COSTS AND RETURNS - TOTAL ACREAGE							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Rice	604,162	453,252	150,910	591,221	12,941	683,770	-79,608

BREAKEVEN PRICES PER YIELD UNIT					
CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
			----- Breakeven Price To Cover -----		
			----- \$ per Yield Unit -----		
Rice	80.0	Cwt	6.00	7.83	9.05

BREAKEVEN YIELDS PER ACRE					
CROP	Yield Units	Base Price (\$/Unit)	Operating Costs	Cash Costs	Total Costs
			----- Breakeven Yield To Cover -----		
			----- Yield Units / Acre -----		
Rice	Cwt	\$8.00	60.0	78.3	90.5

Table 8.

UC COOPERATIVE EXTENSION  
 DETAILS OF OPERATIONS TO PRODUCE RICE  
 SACRAMENTO VALLEY - 2004

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Maintain Drains	February	90 HP Utility Tractor	V Ditcher			
Maintain and Rework Levees	April	200 HP 4WD Tractor	Disc Ridger - 12'			
Chisel 1X	April	200 HP 4WD Tractor	Chisel - 21'			
Chisel 1X	April	200 HP 4WD Tractor	Chisel - 21'			
Plow - 10% Of Acreage	April	200 HP 4WD Tractor	Plow 5 Bottom 16'			
Disc 2X	April	200 HP 4WD Tractor	Disc - Offset 21'			
Triplane Fields	April	200 HP 4WD Tractor	Triplane 16'X30'			
Laser Level - Once every 7 Years	April			Contract	0.14	Acre
Fertilize - 16-20-0 @ 200 Lbs/Acre	April	200 HP 4WD Tractor	Roller Rice 22'	Air Application 16-20-0	200.00	Lbs
Insect Control - Rice Weevil on 15% of Acreage	May			Air Application Warrior T	0.46	Fl Oz
Fertilize - Aqua Ammonia @ 120 Lbs N/Acre	April	200 HP 4WD Tractor		Aqua Rig 20-0-0	120.00	Lbs N
Roll Final Seedbed	April	200 HP 4WD Tractor	Roller Rice 22'			
Fertilize - Zinc on 50% of Acre	April			Air Application Zinc Sulfate	25.00	Lbs
Irrigate	May	Labor		Water	0.20	Acre
	June	Labor		Water	0.20	Acre
	July	Labor		Water	0.20	Acre
	August	Labor		Water	0.20	Acre
	September	Labor		Water	0.20	Acre
Soak and Deliver Seed	May			Soak Seed	1.50	Cwt
				Deliver Seed	1.80	Cwt
Plant @ 150 Lbs/Acre	May			Air Application Rice Seed	1.50	Cwt
Insect Control - Shrimp on 50% of Acreage	May			Air Application Copper Sulfite Fine	5.00	Lbs
Weed Control - Grasses on 90% Acreage	May			Air Application Ordram 15G	30.00	Lbs
Weed Control - Broadleaf & Grasses On 45% of Acreage	June			Ground Appl. Grandstand	4.42	Fl Oz
				Super Wham CA	2.70	Qt
Fertilize - Topdress on 33% of Acreage	July			Air Application Ammonium Sulfate	8.66	Lb N
Insect Control - Armyworm on 10% of Acreage	July			Air Application Warrior T	0.31	Fl Oz
Disease Control - Fungus on 25% of Acreage	July			Air Application Quadris	3.08	Fl Oz
Combine Rice - Cutterbar Header	September	Combine - No Head	Header - Conv. 18'			
Bankout Rice	September	Bankout SP 150 Cwt				
Haul Rice To Dryer	September			Hauling	95.34	Cwt
Dry & Store Rice	October			Drying Charge	95.34	Cwt
				Storage Charge	80.00	Cwt
Burn Permit & Fees for 20% of Acre	October			Burn Permit	0.20	Acre
				Burning Fees	0.20	Acre
Fall/Spring Burn - 20% of Acres	October	Labor				
Mow Levees - 41% Levee Acres	October	90 HP Utility Tractor	Mower - Sicklebr7'			
Flood & Roll - 80% of Acres	October	200 HP 4WD Tractor	Roller Rice 22'	Water	0.50	Acre
Pickup Truck Use	Annual	Pickup - 1/2 Ton	Pickup - 3/4 Ton			