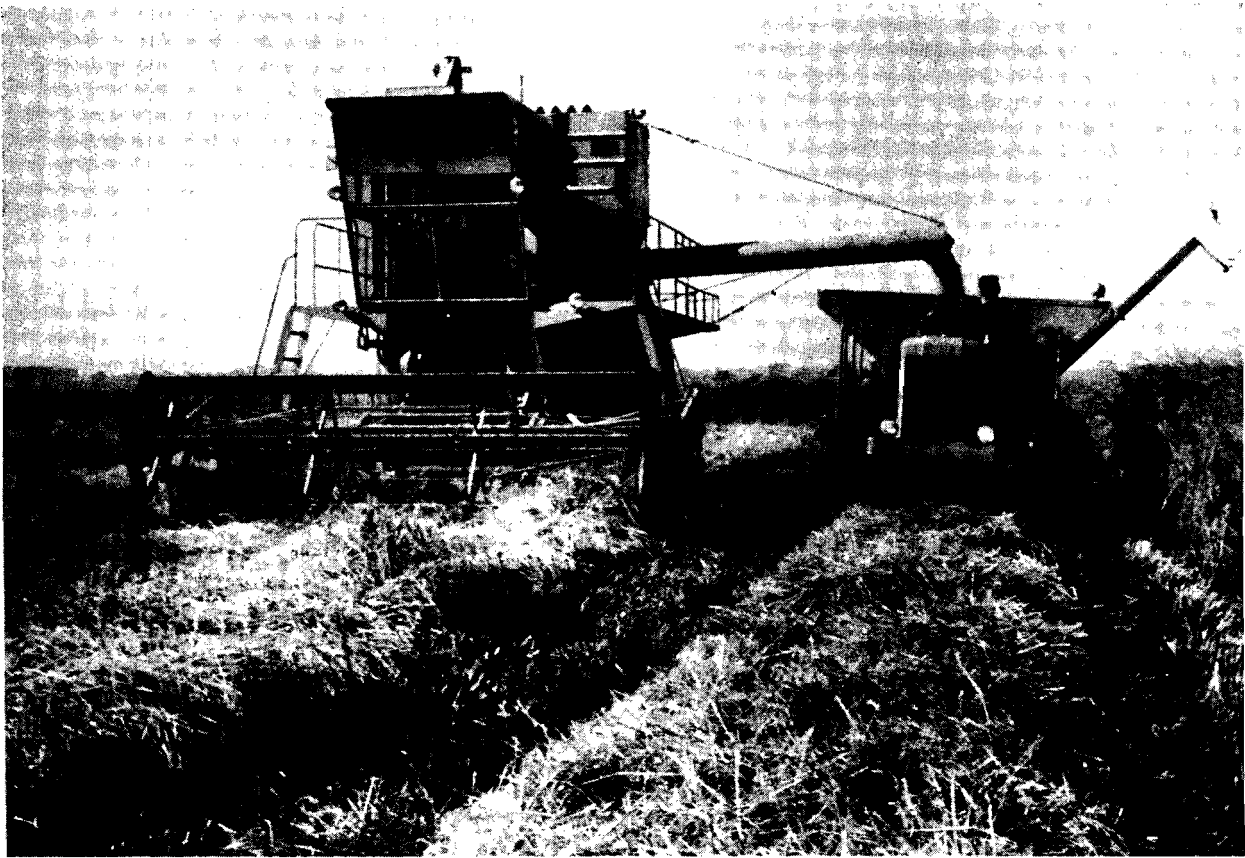


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RICE PRODUCTION COSTS

Colusa, Glenn and Yolo Counties

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October 1972

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This University of California Agricultural Extension Service county publication was prepared by Marlin Brandon, Rice Farm Advisor, Colusa, Glenn and Yolo Counties. He was assisted by Philip S. Parsons, Extension Economist, University of California, Davis, and rice growers representing areas within Colusa, Glenn and Yolo Counties. Appreciation is expressed to these growers who contributed their time and knowledge in making this study possible.

* * * * *

Additional copies of this publication may be obtained from the University of California Agricultural Extension Service.

Colusa County
P. O. Box 180
Colusa, Calif. 95932
Phone: 458-2105

Glenn County
P. O. Box 697
Orland, Calif. 95963
Phone: 865-4487

Yolo County
P. O. Box 879
Woodland, Calif. 95696
Phone: 666-8435

RICE PRODUCTION AND COSTS

Rice production in Colusa, Glenn and Yolo Counties accounts for a substantial part of the total agricultural income in these counties. Rice acreage in this tri-county area has become rather stable at one hundred fifty-three thousand acres (153,000) in the past two years. This acreage is approximately forty-six percent of the total California acreage. Assuming an average yield of fifty-four hundred (5400) pounds of dry rice per acre and a \$5.00 price per one-hundred weight, the rice crop produces a gross income of approximately 43.2 million dollars annually in the tri-county area. These figures do not include income of allied rice industries necessary for profitable rice production. If rice generated income to the agri-business sector was added to the gross income the total would be considerably higher. These gross returns are impressive, but of even greater importance to rice growers are the net returns after paying production costs. This sample cost of production study is an attempt to provide generalized information about costs to produce rice. It is hoped this publication will stimulate growers to evaluate their own operations and to budget for future operations.

The production costs, materials and rice yields shown in this study are not averages for rice operations in the area. Neither are these items intended to constitute recommendations for production practices. These production costs do reflect the costs of representative rice enterprises in Colusa, Glenn and Yolo Counties. The data is based upon a 400 acre planting of rice with an additional

300 acres of land planted to crops in which much of the equipment necessary for rice production can be utilized. Rice production is separated from the other farming enterprises in this study because there is no typical rotation or farming system in the rice area, other than perhaps a predominance of grain crops.

Individual grower costs will vary from those given here. Items of cost that are overlooked by some growers are included in this study. These include equipment depreciation, interest on investment in land and equipment, taxes and management. A column is provided in this study for growers to list their own costs of production which will reflect more accurately their individual operation.

Cost of production figures shown in this study do not include values placed on rice units. Neither do they include investment or rent for land acreage that may be necessary for a rotational program or for other reasons. To simplify information it is sometimes necessary to use trade names of products. No endorsement of named products is intended, nor is criticism implied of similar products not mentioned in this study.

We regularly prepare and mail a Rice Newsletter to those in the rice industry interested in receiving it. Its purpose is to inform the readers of new rice technology as well as to present information of timely and special local interest. Should you like to receive the newsletter, please contact our office so you may be added to the mailing list.

RICE CALENDAR OF OPERATIONS

This calendar of operations shows in detail the timing of typical cultural operations used in rice production in Colusa, Glenn and Yolo Counties. In years when rains do not begin until late November or December, and atmospheric ventilation

conditions permit, rice residue is burned and the first deep tillage is accomplished in late fall. Usually all heavy tillage and levee-making operations are completed on fallowed fields before October 1, with only light tillage work needed just pre-

vious to planting the next year. Spring field preparation for rice production usually does not begin until March in years of "normal" rainfall. Initial spring field work may be delayed until April in high rainfall years on the more poorly drained rice soils. When late spring rains occur the calendar of operations throughout the season is changed so that all rice operations will be performed later. Field preparation is usually completed in time to permit seeding between April 20 and May 15. Timing sequence of individual operations may deviate from the period indicated here.

Days available for actual field operations within these time periods depend upon rainfall levels and distribution, atmos-

pheric conditions and soil physical properties that influence drainage. These variables determine days available for field operations. The figures suggested here are projected from a basis of expected days of precipitation and soil drying rates. The amount of capital invested in equipment should be related to these considerations.

The rice growth stage shown in this calendar indicates the sequential development of the individual rice plant. Field development will vary considerably from this time sequence; the degree of variability will depend upon variety, planting dates, climatic conditions, water temperatures, inherent physiological factors and soil fertility.

RICE CALENDAR OF OPERATIONS

<u>Month and Period</u>	<u>Available Field Days</u>	<u>Stage of Rice Growth</u>	<u>Typical Field Activity</u>
<u>January</u> 1 - 31	4		Repair and rebuild equipment Office and management
<u>February</u> 1 - 28	4		Repair and rebuild equipment Office and management
<u>March</u> 1 - 10 11 - 20 21 - 31	2 5 7		<u>Seedbed Preparation</u> Plow, disc Landplane Survey, mark and pull levees
<u>April</u> 1 - 10 11 - 20 21 - 30	7 7 8		Three wheel plane and fertilize Preplant molinate application Disc or harrow, close levees Flood Treat, soak seed and seed
		Seeded	
<u>May</u> 1 - 10 11 - 31	8 19	Seedling Emergence	Rice stand establishment Continued irrigation Tadpole shrimp control Post-flood molinate application Algae control
<u>June</u> 1 - 10 11 - 20 21 - 30	9 9 10	Tillering	Rice leafminer control Continue irrigation

Month and Period	Available Field Days	Stage of Rice Growth	Typical Field Activity
<u>July</u>			
1 - 10	10	Internode elongation	Broadleaved weed control Nitrogen fertilization when needed
11 - 31	21	Boot	Prepare and check fallow fields Continue irrigation
<u>August</u>			
1 - 31	31	Heading and Flowering	Continue irrigation Prepare and check fallow fields
<u>September</u>			
1 - 30	28	Grain Formation	Drain fields and open checks Seed vetch cover crop
<u>October</u>			
1 - 31	25	Maturity	Harvest, bankout and haul to drier
<u>November</u>			
1 - 30	19		Residue disposal and disc
<u>December</u>			
1 - 31	10		Maintenance and repair of equipment and office

* * * * *

EXPLANATION OF TERMS

Cultural costs represent cash expenditures for labor, fuel, repairs, and materials and services during the preharvest period. This category is further divided into various field operations, with subtotal costs shown for simplicity of presentation.

Labor includes wages, Social Security, compensation insurance and other fringe benefits. Some growers include health and retirement plans, housing, vacation and transportation. The following labor wage rates are used in this study:

Skilled	- \$2.50 per hour
Harvester Operator	- 4.00 per hour
Bankout Operator	- 3.80 per hour
Supervisory	- 4.00 per hour (permanent)

The supervisory labor represents foremen or managers who are permanently employed. These labor rates should not be interpreted as the prevailing wage, but rather indicative of wages that include the above fringe benefits paid by some growers.

Fuel and Repairs include fuel lubricant and repair cost for machinery.

Material and Services include the cost of materials, application of these materials and the cost of other custom operations. Fertilizer, herbicide and pesticide costs reflect current retail prices. Averages have been used in determining these figures. The application rates of fertilizers, herbicides and pesticides shown in this study are not to be considered a recommendation because of differing conditions. Irrigation water cost is an average of the costs of established water districts in the rice area. Irrigation costs may be considerably higher in areas where wells are used or in high water cost districts. Many water districts charge on a "flat rate" basis, but this has been converted to cost per acre-foot of water for clarity.

It is rather typical in sections of the rice area for growers to make various soil amendments to increase rice yields. Many soils in the tri-county area are highly alkaline, zinc deficient soils that require applications of zinc containing ma-

materials to produce a normal rice crop. Some soils also are phosphorus deficient so that application of this plant nutrient is necessary for optimum yields. Growers who include these additional practices in their operation should increase their cultural costs as follows: \$6.30 per acre for zinc containing materials and application; \$7.19 per acre for phosphorus materials and application. Those who find it necessary to control blackbirds, coots, etc., should add approximately \$1.50 to \$2.00 per acre to their costs.

Harvest Costs represent operations under normal harvest conditions. They do not reflect the higher costs encountered in extremely wet weather. The combine and bankout costs shown in this study reflect operation between contour levees, as do other operational costs. Operational efficiency is decreased in such a confined area of operation as compared to more direct movement in large rectangular checks, or checks that have low levees that are passable by equipment.

Cash Overhead reflects the costs of office, use of pickup truck, insurance, interest on operating capital and other costs necessary to the business. This cost is calculated

as 6% of the total cultural and harvest costs. Taxes on land and equipment are included in this category.

Management Cost is not a cash cost but is charged to indicate a return to the grower for management of the enterprise. A charge of 5 percent of the gross sale value of the crop is made to represent management.

Investment Overhead indicates the interest and depreciation of equipment, buildings and other structures. Field establishment is designated here and includes surveying, levee installation, etc. The life of an established rice field is considered three years.

Interest on investment is figured at 7% of one-half the original cost, except land is figured at full 7% of value. Investment in equipment is based upon current market prices for new equipment shown in the equipment inventory. Depreciation is based upon the following useful life: Crawlers and landplane 15-year life; combine 8-year life; new and used pickup trucks 5-year and 3-year life respectively; buildings 30-year life; and all other items on a 10-year life.

* * * * *

SAMPLE COSTS TO PRODUCE RICE

Colusa, Glenn and Yolo Counties - 1972

Based on 400 acres of rice on a 700 acre farm with a rice yield of 5400 pounds dry rice (14% moisture) per acre

Operation	Hours Per Acre	Labor and Cash Costs Per Acre				Total Costs Per Acre	Growers Actual Cost
		Labor	Fuel & Repairs	Materials & Services	Cost		
		\$	\$		\$	\$	
CULTURAL							
Field Preparation							
Chisel, Plow or Disc	0.3	.75	1.64			2.39	
Plow (moldboard or stubble disc	0.6	1.50	3.27			4.77	
Disc (each operation)	0.3	.75	2.02			2.77	
Three wheel plane	0.2	.75	1.03			1.78	
Close & Maintain Levees	0.1	.25	.30			.55	
Subtotal...		4.00	8.26			12.26	
Fertilization							
Nitrogen @ 105 lbs./ac				500# Ammonium Sulfate	10.50	10.50	
				Application (Aerial)			
Incorporate fertilizer (Disc or Harrow	0.3	.75	1.31	\$1/cwt.	5.00	5.00	
Subtotal...		.75	1.31		15.50	17.56	
Irrigation							
Flood & Irrigate	1.0	2.50		7.2 ac/ft 1.53 ea	11.00	13.50	
Subtotal...		2.50			11.00	13.50	
Seed and Seeding							
Seed				150 lbs. @ 7.25	10.88	10.88	
Soak, fungicide treatment and handle				Soak and treatment \$1.35; haul - \$.17	1.52	1.52	
				Application (Aerial)			
				\$1.35/cwt.	2.03	2.03	
Subtotal...					14.43	14.43	
Insect Control							
(Tadpole shrimp and/or leafminer				Parathion 1/10 lb/ac.	.18	.18	
				Application (Aerial)	1.75	1.75	
Subtotal...					1.93	1.93	

Operation	Hours Per Acre	Labor and Cash Costs Per Acre				Total Costs Per Acre	Growers Actual Cost
		Labor	Fuel & Repairs	Materials & Services	Cost		
		\$	\$			\$	\$
Weed Control				Herbicide (Molinate @ 3 lbs/ac)	12.60	12.60	
Barnyardgrass-preplant or postplant)				Application (Aerial)	1.50	1.50	
Broadleaved weeds				Herbicide (MCPA-16 oz)	1.44	1.44	
				Application (Aerial)	2.00	2.00	
	Subtotal...				17.54	17.54	
Transportation				Two crawlers, two moves each \$25 per move)	.25	.25	
Move crawler tractor (Con- tract based on 50% of acreage)							
Miscellaneous (includes super- visory labor for cultural practices).	1.0	4.00	2.50 (pickup)			6.50	
	Subtotal...	4.00	2.50		.25	6.75	
TOTAL CULTURAL COSTS		11.25	12.07		60.65	83.97	
HARVEST							
Drain and open levees	0.2	.50	.57			1.07	
Combine	0.7	3.15	10.40			13.55	
Bankout	0.6	2.28	1.62			3.90	
Haul to drier	1.0	2.50	5.00			7.50	
Dry 6033 lbs. Paddy-contract				27¢/cwt. @ 23% moisture	16.29	16.29	
Move harvesters-\$25 per move (2 harvesters, 2 moves each- contract)					.25	.25	
Supervisory Labor	0.5	2.00	.75			2.75	
	Subtotal Harvest Costs...	10.43	18.34		16.54	45.31	
TOTAL CULTURAL AND HARVEST COSTS		21.68	30.41		77.19	129.28	

CASH OVERHEAD

Misc. office, insurance, travel
communications, etc.

Taxes (land, headquarters and equipment)

7.76

11.78

Subtotal...

19.54

TOTAL CASH COSTS

148.82

Management (5% of 5400 lbs. of rice @ \$5/cwt. = \$270)

13.50

INVESTMENT

	<u>Per Acre</u>	<u>Depreciation</u>	<u>Interest</u>
Land	\$500.00	----	\$35.00
Headquarters (shop & equipment, storage)	20.00	.67	.70
Equipment	355.84	34.67	12.49
Field establishment (land plane, survey, mark contours, pull levees-boxes & installation) based on 3-year life of levees	6.15	2.05	.22
Drains and boundary roads	2.00	.20	.07
Subtotal...	<u>\$883.99</u>	<u>\$37.59</u>	<u>\$48.48</u>

\$86.07

TOTAL COSTS OF PRODUCTION (CASH + FIXED COSTS)

\$248.39

Cost per 100 lbs. to produce rice

\$4.60

TABLE 1.

EQUIPMENT INVESTMENT FOR RICE

(Based on 700 acre farm of which 400 acres is in rice)

Item	No Of Items	Cost	Annual Use (Acres)	Cost Per Acre	Life (Yrs)	Depre- cia- tion	Inter- est	Cash Costs Per Hour		
								Fuel	Repairs	Total
		\$		\$		\$		\$	\$	\$
<u>Tractor</u>										
Crawler (85-97 hp)	1	62,000	700	88.57	15	5.90	3.10	.88	3.10	3.98
Crawler (60-70 hp)	1	18,500	700	26.42	15	1.76	.92	.54	1.85	2.39
Blade		6,000	400	15.00	20	.75	.53	---	.45	.45
<u>Implements</u>										
Moldboard Plow 6-16" 1 way	2	4,200	700	6.00	10	.60	.21	---	1.47	1.47
Chisel Plow 16'	1	1,700	700	2.43	10	.24	.09	---	.85	.85
Offset Stubble Disc 12'	1	6,144	700	8.78	10	.88	.31	---	2.76	2.76
Offset Disc Harrow 18'	2	8,400	700	12.00	10	1.20	.42	---	2.75	2.75
Spiketooth Harrow (heavy duty 20')	1	1,000	700	1.43	10	.14	.05	---	.40	.40
Float (Drag) 16'	1	600	550	1.10	10	.11	.04	---	.05	.05
3-Wheel Plane	1	4,000	400	10.00	10	1.00	.35	---	1.05	1.05
Landplane 12 x 60	1	7,350	700	10.50	15	.70	.37	---	2.20	2.20
Pull Grader (used)	1	1,600	400	4.00	10	.40	.14	---	.48	.48
Spray Rig (200 gals)	1	1,300	700	1.86	10	.19	.07	---	.65	.65
Tools & Small Equipment		4,500	700	6.43	10	.64	.23	---	---	---
<u>Harvesters & Accessories</u>										
Harvester SP 16' (includes Tracks, Cab & Air Conditioner)	2	60,000	550	109.10	8	13.64	3.82	1.00	9.00	10.00
Bankout Wagon SP (150 cwts)	1	11,000	550	20.00	10	2.00	.70	.50	2.20	2.70
<u>Trucks</u>										
Truck, 2 ton	2	13,600	700	19.43	10	1.94	.68	.75	1.25	2.00
Pickup, 3/4 ton (4 wheel drive)	1	5,100	700	7.29	5	1.46	.26	.50	1.28	1.78
Pickup, 3/4 ton (used)	1	1,500	700	2.50	3	.82	.09	.50	2.00	2.50
Equipment Carrier	1	2,100	700	3.00	10	.30	.11	---	.20	.20
Total		220,594		355.84		34.67	12.49			

TABLE 2.

ALLOCATION OF CASH COSTS BY MONTHS

Operation	Total	Month											
		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Cultural Costs													
Disc or chisel	2.39			1.20	1.19								
Plow or stubble disc	4.77			2.38	2.39								
Disc	2.77			1.38	1.39								
Three-wheel plane	1.78				1.78								
Fertilize and incorporate	17.56				11.70	5.86							
Close & Main. Levees	.55				.55								
Move crawlers	.25			.13	.12								
Flood & irrigate	13.50				6.75	6.75							
Seed & Seeding	14.43				7.22	7.21							
Insect control	1.93					.97	.96						
Weed control BL&WG	17.54				7.05	7.05		3.44					
Misc.	6.50			1.63	1.63	1.62	1.62						
Harvest Costs													
Drain & Open levees	1.07							.54	.53				
Combine	13.55								3.39	10.16			
Bankout	3.90								.97	2.93			
Haul to drier	7.50								1.88	5.62			
Drying	16.29								4.07	12.22			
Move harvesters	.25									.25			
Supervisory labor	2.75								.92	1.83			
Cash Overhead													
Miscellaneous	7.76											3.88	3.88
Taxes	11.78				5.89							5.89	
TOTAL CASH COST	148.82			6.72	47.66	29.46	2.58	3.44	.54	11.76	33.01	9.77	3.88

TYPICAL MONTHLY CASH FLOW

The monthly cash flow is a distribution of cash costs over a twelve month period. The distribution of cash costs is shown in Table 2 and graphically illustrated in Figure 1. This distribution is a reflection of cash costs that result from cultural practices shown in the rice calendar of operations. Consequently, this suggested typical distribution will shift from one period to another as a result of alterations in rice operations. Such uncontrollable factors as early fall or late spring rains, water shortages, etc., will delay rice cultural operations. Conversely, dry falls and springs and high ambient temperatures in early spring will accelerate rice cultural operations. A distribution of cash costs such as the one shown may be of some value in planning for months of peak capital demand and cash flow.

Figure 1. MONTHLY CASH FLOW

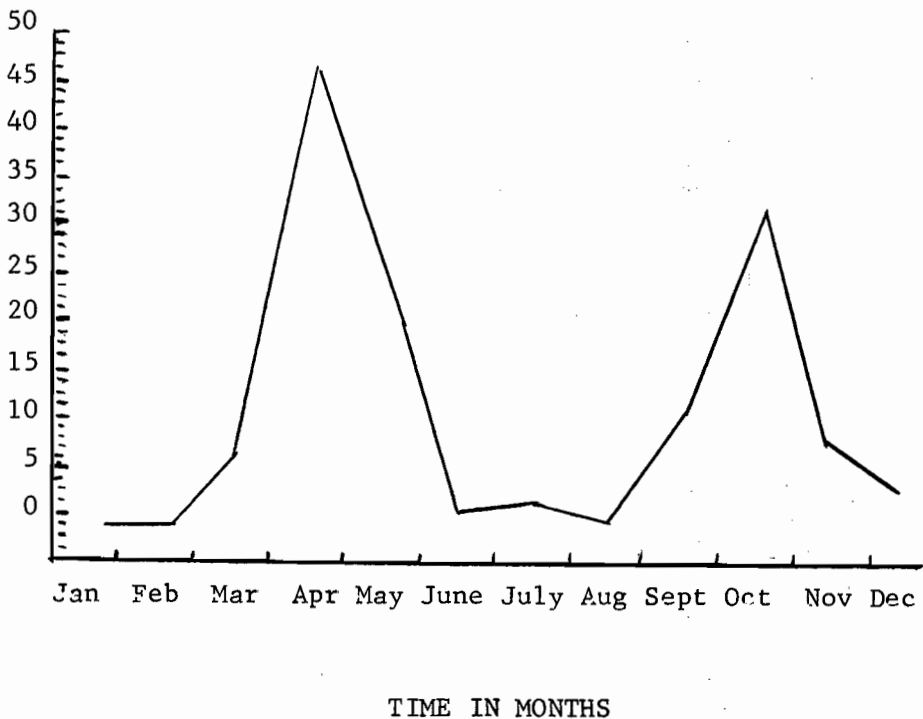


TABLE 3.

NET INCOME PER ACRE AT VARIOUS YIELDS AND PRICES*

Yields Dry Rice Per Acre	Prices of a Hundredweight of Rice				
	\$3.50	\$4.00	\$4.50	\$5.00	\$5.50
Cwt.	\$	\$	\$	\$	\$
40	-95.34	-76.34	-54.34	-38.24	-19.34
45	-81.04	-59.67	-34.29	-15.92	+ 4.46
50	-66.50	-43.00	-19.25	+ 4.50	+28.25
54	-59.39	-32.39	- 5.39	+21.51	+48.51
55	-52.45	-26.33	- 0.20	+25.92	+52.05
60	-37.66	- 9.66	+18.84	+47.34	+75.84
65	-23.87	+ 7.00	+37.88	+68.75	+99.63
70	- 9.59	+23.66	+56.91	+90.16	+123.41

*Cultural, harvest and other production costs are adjusted for yield and price so that total costs per acre increase or decrease progressively as yields and prices increase or decrease from the base yield of 5400 pounds per acre dry paddy rice and a base price of \$5.00 per one-hundred weight.

LEASING RICE LAND AND UNITS

There is a significant acreage of land and/or rice units leased in the tri-county area for rice production. Large fixed investments, which are common to rice farms, may make additional rice acreage desirable in some cases to improve operational efficiency. Many rice growers lease this additional acreage. Furthermore, a substantial number of growers rent most of the land and/or units to produce rice. It is hoped the allocation of costs in Table 4 clearly shows a typical division of costs. There are many different leasing arrangements used in the rice industry which are satisfactory to both parties. Common land lease arrangements may vary from a 20/80 share lease to a 40/60 share lease, depending upon the desirability of the land for rice culture and what the landlord furnishes, including the rice "units" or rights to grow rice. Rice land usually is not rented on a cash basis. The landlord usually furnishes the water, plus his share of soil amendments, insecticides, herbicides and also the drying costs of his share of the crop. There are many satisfactory leasing arrangements which are different from the arrangement used below and it is not implied that this arrangement is more or less desirable than others.

Table 4. ALLOCATION OF TENANT-LANDLORD COSTS CALCULATED ON THE BASIS OF A 33/67 SHARE LEASE ARRANGEMENT

Item	(Sample*)		
	Tenant Cost	Landlord Cost	Total Cost
Cultural	\$	\$	\$
Labor	19.18		19.18
Fuel and repairs	25.41		25.41
Hauling and drying	15.94	7.85	23.79
Subtotal...	60.53	7.85	68.38
Materials and Services			
Fertilizer	10.39	5.11	15.50
Water		11.00	11.00
Seed treatment and seeding	14.43		14.43
Insecticide	1.29	.64	1.93
Herbicide	11.75	5.79	17.54
Transportation of equipment	.50		.50
Subtotal...	38.36	22.54	60.90
Investment Overhead			
Land		35.00	35.00
Taxes		8.12	8.12
Headquarters	1.37		1.37
Equipment	47.16		47.16
Field establishment		2.54	2.54
Subtotal...	48.53	45.66	94.19
Miscellaneous Overhead			
Misc.-office	7.76		7.76
Management	13.50		13.50
Taxes (equipment)	3.66		3.66
Subtotal...	24.92		24.92
TOTAL EXPENSES.....	172.34	76.05	248.39

*Based on 5400 pounds per acre dry yield at costs shown in this study.

The 33/67 share lease arrangement for land and rice units is widely used in the tri-county area. The lessor usually provides land, water, and 33 percent of the rice units, chemical costs and hauling and drying costs under this arrangement. The lessor receives 33 percent of the revenue produced from the crop for his contributions and the lessee receives the remaining 67 percent for his greater contributions. Common lease arrangements for rice units may vary from a 15/85 share lease to a 25/75 share lease in the tri-county area. The lessor's contribution under these arrangements is only the rice units and his share of the crop is figured on the total dry crop yield. However, leasing of rice allotments only is not as common as the leasing of land for rice production.

The returns from a 33/67 share lease arrangement for land and rice units are given in Table 5. These returns are calculated on the basis of costs shown in this study with a rice yield of 5400 pounds of dry rice per acre at a price of \$5.00 per one-hundred weight. Analysis of costs and returns at this yield level and price shows returns of only \$8.56 per acre for the lessee and \$13.05 per acre for the lessor. These figures would be expected to vary greatly between rice farms because of various factors that affect costs and net returns.

TABLE 5. TENANT AND LANDLORD NET RETURNS CALCULATED ON THE BASIS OF A 33/67 SHARE LEASE ARRANGEMENT FOR LAND AND RICE UNITS

(Sample)

Item	Tenant	Landlord	Total
	\$	\$	\$
Gross Income	180.90	89.10	270.00
Production Costs	172.34	76.05	248.39
Net Return per Acre	+8.56	+13.05	+21.61

* * * * *

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2. Leasing on California Farms, Agricultural Economics, U. S. Department of Agriculture, July 1971.
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