Evaluation of Crop Rental Arrangements in the Louisiana Rice Producing Region of the United States

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Abstract

Rising production costs have forced many rice producers to renegotiate their crop rental agreements with their landlords as a means of increasing producer net returns per acre. By evaluating different share rental agreements and the degree in which production costs are shared, equitable crop rental arrangements can be achieved for all parties with a vested financial interest in the crop. The purpose of this paper is to identify the overall affect that alternative rental arrangements have on landlord and tenant profitability. Different gross and net share rent scenarios are presented, each with the allocation of production costs dependent upon the grower's financial contribution to their crop and risk preference. The optimal rental arrangement can be identified between the grower and landlord so that the agreement is profitable to both parties. A financial simulation model was constructed to examine net returns while comparing the risk for each party for common share rental arrangements in Louisiana.

Keywords: rice production, crop rental arrangements

Introduction

A total of 182,183 hectares of rice were produced in Louisiana in 2009 (LSU Agricultural Center, 2009). Leading rice-producing parishes in the state included Jefferson Davis (31,795 hectares), Acadia (32,146 hectares), Vermilion (16,614 hectares), Evangeline (17,168 hectares), Morehouse (18,728 hectares) and St. Landry (10,707 hectares). Average rice yield per harvested hectare for the state in 2009 was 7,057 kilograms.

In Louisiana, rental arrangements for rice production are predominately share rent with the landlord possibly sharing in some expenses. However, in recent years, rice producers have been renegotiating rental arrangements in response to increased variable costs and declining net returns. Energy-related inputs, which require a large appropriation from the total rice farm operating budget, have seen the largest increase in per unit costs to date.

Typical rental arrangements for rice production in the area include crop share arrangements with the landlord in some cases paying the irrigation pumping costs as well as a share of other major variable production costs. Landlords would receive a specified share of crop revenue proceeds as gross income. In addition, landlords might also pay the fuel costs for rice irrigation pumping, as well as a share of some other production expenses as specified in the rental agreement. Net income to the landlord for leasing land for rice production would be the gross rental income received less the production expenses paid by the landlord.

Many rice producers in Louisiana are renegotiating their crop share rental arrangements away from traditional cost-shares (i.e., a gross share arrangement) and towards a predetermined net share percentage. Under this method, landlords do not share in paying any of the costs of producing the rice crop and receive a “net” share payment negotiated to be approximately equal to what net income would have been in the standard gross share arrangement. The magnitude of this “net crop share percentage” of the crop’s market return, which is paid to the landlord in exchange for land and/or water rights, can influence the degree of risk borne by the producer. By comparing the equity of a traditional cost share rental arrangements in terms of the degree to which returns are shared relative to production cost contribution(s) against those of paying a determined percentage of the crop, a producer can better evaluate their risk level. Current irrigation pumping costs and which party pays that expense has resulted in a distribution of net returns between grower and landlord which is not proportional to the contribution of inputs for many rental arrangements. A study was conducted to evaluate rice share rental arrangements and to estimate the impact of critical factors on net returns to both grower and landlord.

Background

Land tenure is a primary factor influencing the allocation of resources and the net profitability of crop production. Many family farms have expanded farm size over the years to reduce fixed production expenses per farm acre. National data from 2001 on U.S. farms reported that approximately 80 percent of the large family farms in the country leased some or all of the agricultural land farmed (Hoppe and Korb 2004). The “part owner” tenure group accounts for over two-thirds of all medium farm sales in the U.S. (Hoppe et al 2007). The

decoupled nature for U.S. farm program payments influences cash rental rates for agricultural land (Roberts 2005).

Agricultural land lease arrangements are generally of two basic types: cash rent or share rent. Hence, contract type substantially affects the tenant/landlord relationship, e.g. sharing of revenue, costs, risk, and managerial responsibilities (Rainey et al 2005). Share rent arrangements involve the landowner and tenant operator sharing in the proceeds from crop production, generally in a similar proportion to the contribution of production inputs. Equitable crop share arrangements identify all contributions made separately by a landowner and the tenant. Income is then shared in that same proportion. Leasing allows farm operators to control more acreage with less equity, carries lower financial risk, and allows for greater managerial flexibility than purchasing land with debt financing (Rainey et al 2005). Equitable lease theory suggests that returns to land are similar to the returns to non-land inputs. Thus, shares received by each party need to change as relative input contributions change (Dhuyvetter et al 1999).

The contribution of land as a production input is the central issue in determining an equitable cropland lease arrangement. The land charge can be evaluated and addressed in the enterprise budget in three ways: (1) what it would cost to cash rent similar land, (2) the net cost of a share-rent lease for this crop on similar land, and (3) for owned land, the opportunity cost of the capital invested (Kay et al. 2004). These three methods can generate different land value estimates relative to the current rural real estate land markets. From an investment perspective, a lending institution's interest rate will also influence the attraction of a land investment.

Typically, irrigation pumping cost is the most common rice production expense that may be paid in-full or in-part by the landlord. Other production expenses such as seed, fertilizer, chemical, and drying may or may not be shared by the grower and landlord in the same percentage that the crop proceeds are shared. Since landlord income is dependent upon variable crop yields and market prices, share contracts warrant additional financial and managerial compensation and are typically negotiated to induce landlords to utilize these types of contracts/arrangements (Rainey et al 2005).

Rising energy prices incurred by rice farming to power irrigation pumping systems have resulted in land tenure renegotiations over the past few years in efforts to reach equitable rental arrangements for both grower and landlord. Variable production costs associated with rice production have increased significantly this decade. Variable production costs for Louisiana rice production in 2010 were projected to total $1,423.70 to $1,540.72 per hectare, dependent upon variety planted (Salassi and Deliberto, 2010). The projected fuel and fertilizer component of rice production alone accounts for 40.8 percent of the total variable expenses per hectare in 2010. Table 1 reports direct operating expenses for Clearfield (CL) rice grown in southwest Louisiana from 2007 to 2010 Input price volatility in the agricultural production sector from 2007 to 2009, resulted in larger operating budget appropriations of fertilizer, fuel and seed. During that time interval, per hectare costs of fertilizer and farm diesel increased by 43 percent and 38 percent, respectively.

Irrigation pumping costs and which party pays that production expense has resulted in a distribution of net returns between grower and landlord which is not proportional to the contribution of inputs for many rental arrangements. Returns to both parties are calculated with 2010 projected rice production expenses coupled with a $0.33 per kilogram rice price and a 6,949 kilogram per hectare yield. (Figure 1) These estimates are for traditional/customary rental arrangements in southwestern Louisiana. In the sections that follow, a more detailed description of the proportional cost sharing strategies is presented.

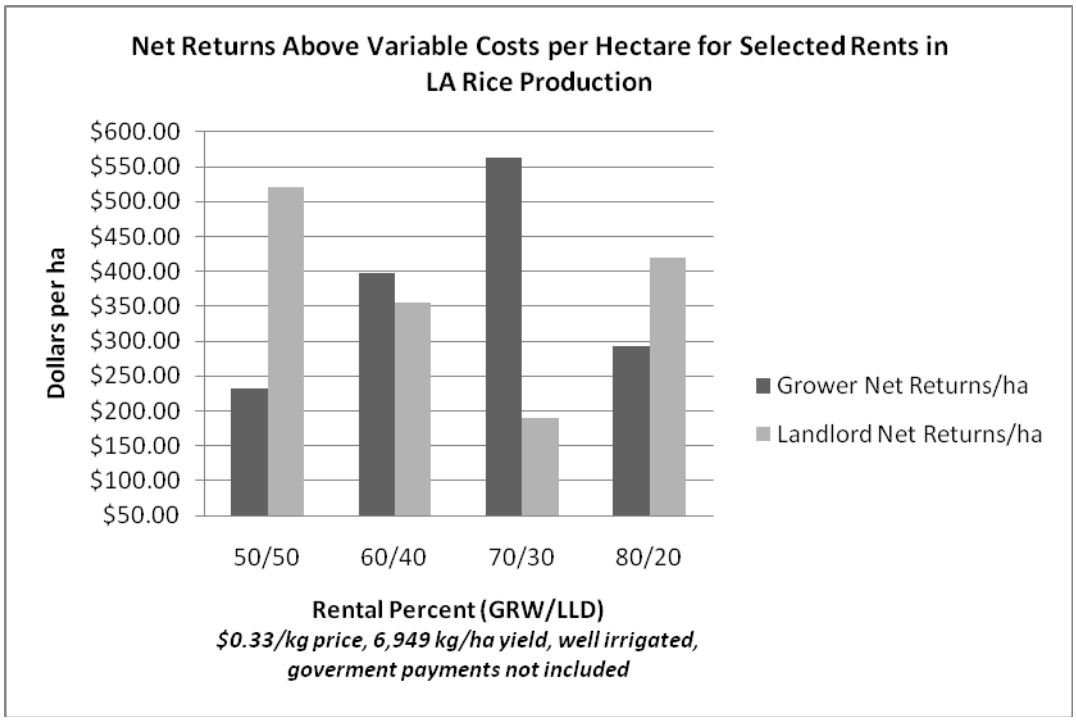

Figure 1. Grower and landlord net returns under common share rental percentages in Louisiana using 2010 production expenses.

Table 1. Variable production expenses per hectare for Clearfield rice produced in southwest Louisiana.

	Amount per hectare			
Expense Category	2007	2008	2009	2010
Custom Activities[1/]	$160.00	$167.17	$167.17	$205.96
Drying	$144.56	$144.56	$144.56	$151.23
Fertilizers	$181.87	$270.33	$368.43	$244.63
Chemicals	$176.53	$173.49	$181.43	$199.61
CL Seed	$111.20	$123.55	$155.68	$217.45
Diesel Fuel	$350.52	$484.15	$367.25	$383.95
Other[2/]	$149.87	$158.05	$164.20	$137.89
Total Costs	$1,274.55	$1,521.30	$1,548.71	$1,540.72

[1/] Custom field activities include spraying, fertilizer application, planting, and hauling expenses.
[2/] Other costs include irrigation supplies (excluding fuel), labor, repairs, and interest on capital.

Materials and Methods

Following Dillman, 2000, a survey conducted in 2008 identified the variability of rental percentage paid for land and water rights in Louisiana rice production. A questionnaire was mailed to 1,128 rice contacts in the major rice producing parishes of the state to solicit the type of rental arrangement, rent mechanism, planted rice acreage, and the percentage of variable production costs paid by the landlord on a per tract basis. Data on

variable production costs shared by producers and landlords included: irrigation pumping, seed, fertilizer, chemicals, and drying. Parishes surveyed included Acadia, Calcasieu, Evangeline, Jefferson Davis, Morehouse, and Vermilion. The purpose of this study was to identify current rice rental arrangements. The results showed that lease rates varied throughout of the state. The landlord may or may not contribution a proportional share of selected production inputs relative to his portion of the crop.

Of the 202 respondents, 158 reflected standard land tenure systems for rice. Another 44 survey respondents were not usable due to operator retirement or death, change of address, movement away from rice farming activities, termination of lease, and/or loss of cropland. The 158 respondents represented a 14.0 percent sample response rate. Of those respondents, 146 were from the southwestern rice-producing parishes while only eight were from the northeastern part of the state. Four of the questionnaires were from an unidentified origin within the state. In total, 487 land tracts were reported of which 100 were rented on a cash basis, 350 were share rented, and 37 tracts had an unidentified rent mechanism.

The reported crop share rental percentages (percent of crop going to pay for land and water) on 334 rice tracts varied greatly, with the majority in the 20 to 40 percent range. (Figure 2) Low crop percentage arrangements were generally associated with payment for land only, with the producer paying the irrigation pumping cost. Notably, 31.4 percent of the sample utilized a 20 percent crop share agreement. A 40 percent arrangement was followed by 17.4 percent of the sample; the 30 percent share agreement by 9.6 percent; the 25 percent share agreement by 8.1 percent; the 16.7 percent by 5.4 percent; and 33 and 50 percent crop shares accounted for 5.1 percent each of the share rented respondents, respectively. These arrangements represented 82.1 percent of all reported share rent tracts. Recently, several lease arrangements have been renegotiated to require the grower to pay the irrigation costs, particularly where relatively low cost surface water is the irrigation water source. In crop lease agreements in which the grower is paying less than 30 percent as a lease payment, irrigation costs are paid by the rice grower. Most lease arrangements in which the landlord crop share is 30 percent or more, the landlord is paying the irrigation pumping costs. (Figure 3)

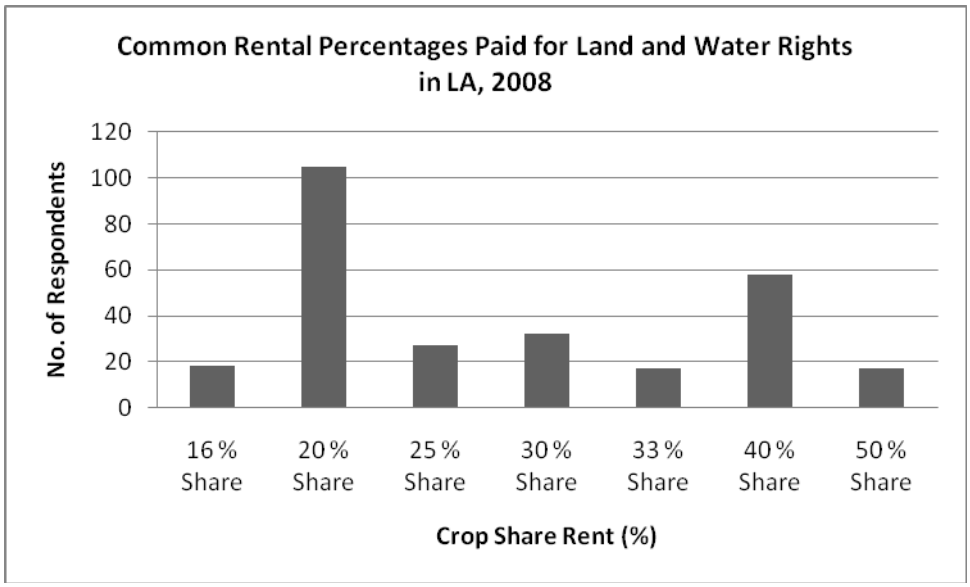

Figure 2. Common share rental percentages paid for land and water privileges, southwestern Louisiana 2008.

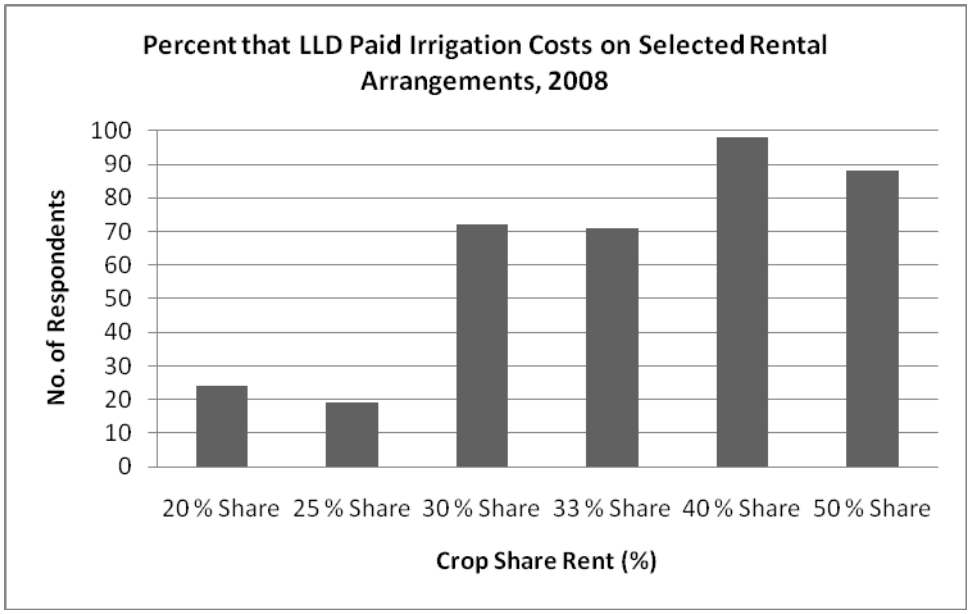

Figure 3. Landlord contribution to irrigation pumping cost expense in selected share rental arrangements.

In order to evaluate grower net returns for common share rental arrangements, as indicated by the survey responses, a rice production financial simulation model was developed to evaluate the impact of alternative rental arrangement parameters, along with price and yield level and variability, on grower net returns above variable cost. The simulation model incorporated provisions of crop share rental arrangements, as well as crop income and production expenses on a per acre of rice planted basis. U.S. farm program price support payments for rice were included in the model with direct and counter-cyclical program provisions in effect for the 2010 crop year (USDA, FSA, 2008). Rice net returns above variable production costs per acre of rice for the grower were simulated over 1,000 iterations in the financial simulation model under various scenarios and parameters. The basic structure of the financial simulation model is presented below.

The basic structure of the financial simulation model is present below.

*[1] grwmktinc = (mktprc*yld1*grwshr) + (mktprc*ratoon*yld2*pctrat*grwshr2)*

*[2] grwpginc = (dp*pyld*(0.85/pctplt)*grwshr) + (ccp*pyld*(0.85/pctplt)*grwshr)*

[3] grwinc = grwmkinc + grwpginc

[4] grwvcost = (grwirrg1 + grwirrg2 + grwfert1N + grwfert1P + grwfert1K + grwfert2N + grwchem1 + grwchem2 + grwappl + grwfuel1 + grwfuel2 + grwdry1 + grwdry2 + grwhaul + grwothr1 + grwothr2)

[5] grwnetvc = (grwinc - grwvcost)

Total grower gross income (*grwinc*) is the sum of market income from rough rice sales and income from federal commodity price support programs. Grower market income from rough rice sales (*grwmktinc*) is a function of:

mktprc = the market price of rough rice, in dollars per kilogram,
yld1 = rice yield from the first crop harvest, in kilograms per hectare,
grwshr = grower's share of first crop proceeds relative to rental arrangement, in percent,
ratoon = binary variable for ratoon crop production,
yld2 = ratoon crop yield, in kilograms per hectare,
pctrat = ratoon crop acreage harvested as a percent of first crop acreage,
grwshr2 = grower's share of ratoon crop proceeds relative to rental arrangement, in percent.

Income received by the grower from government farm commodity price support programs for rice (*grwpginc*) is the sum of direct and counter-cyclical payments from those respective programs where:

dp = direct program payment, in dollars per kilogram,
pyld = established program rice yield, in kilograms per hectare,
pctplt = percent of rice program base acres planted, in percent,
ccp = counter-cyclical program payment, in dollars per kilogram.

Grower net income above variable production costs (*grwnetvc*) is defined as the sum of market and program income less the grower's share of variable production costs. Variable rice production costs paid by the grower (*grwvcost*) include, in dollars per hectare:

grwirrg1 = grower's share of first crop irrigation pumping cost,
grwirrg2 = grower's share of ratoon crop irrigation pumping cost,
grwfert1N = grower's share of first crop nitrogen fertilization cost,
grwfert1P = grower's share of first crop phosphorus fertilization cost,
grwfert1K = grower's share of first crop potassium fertilization cost,
grwfert2N = grower's share of ratoon crop nitrogen cost,
grwchem1 = grower's share of first crop herbicide, fungicide and insecticide cost,
grwchem2 = grower's share of ratoon crop herbicide, fungicide and insecticide cost,
grwappl = grower's share of input application cost,
grwfuel1 = grower's share of first crop fuel cost,
grwfuel2 = grower's share of ratoon crop fuel cost,
grwdry1 = grower's share of first crop drying cost,
grwdry2 = grower's share of ratoon crop drying cost,
grwhaul = grower's share of harvested rice hauling cost,
grwothr1 = grower's share of other first crop variable costs,
grwothr2 = grower's share of other ratoon crop variable costs.

Random numbers were obtained using the SIMETAR software package for each selected farm input by following the procedure outlined in Richardson et al 2008. There were six variables incorporated into the model: rough rice price per hundredweight, farm diesel price per gallon, nitrogen fertilizer price per pound, phosphorus fertilizer price per pound, potash fertilizer price per pound, and average first crop yield per planted hectare. Values were based on historical data from 1999-2008. The detrended mean values for the variables were selected as the "means" for the random number generation. These values resembled current and expected market conditions for variable estimation. Our analysis was for the 2010 marketing year, therefore trends in the price, yield, and input values were removed. The model conducted 1,000 iterations per input. Mean values used for the simulation period were: a $0.33 rice price ($/kg), $0.61 diesel price ($/l), $0.93 nitrogen price ($/kg), $0.86 phosphorus price ($/kg), a $1.06 potash price ($/kg), and a crop yield of 6,949 kilograms per hectare.

Rice farm level simulation parameters evaluated in the study are shown in Table 2. Four typical rice share rental arrangements were analyzed, with the landlord crop share ranging from 20 percent to 50 percent. Irrigation pumping costs were assumed to be paid by the grower on the 80/20 rental arrangement and by the landlord on the other three arrangements (70/30, 60/40 and 50/50). Both deep well and surface irrigation water sources were included in the analysis. The landlord was assumed to pay his share of fertilizer, chemicals, drying, and hauling expenses. The ratoon (second) crop rice yield was assumed to be 30 percent of the first crop yield and ratoon crop acreage scenarios of 0, 25 and 50 percent were included in the simulation analysis.

Table 2. Assumptions made for typical cost share rental arrangements for rice in southwestern Louisiana.

Rent Share (GRW/LLD)	Irrigation Pumping Financed by	Production Costs Shared Relative to Arrangement Percentage
50/50	LLD	Applications, Chemicals, Drying, Fertilizers, and Hauling
60/40	LLD	Applications, Chemicals, Drying, Fertilizers, and Hauling
70/30	LLD	Applications, Chemicals, Drying, Fertilizers, and Hauling
80/20	GRW	Drying and Hauling

A "gross" rent model evaluated grower/landlord (GRW/LLD) rice crop share rental arrangements of 50/50, 60/40, 70/30, and 80/20 percent shares. In this scenario, the landlord receives as rent a gross percentage share of the crop proceeds and also shares in paying some of the variable production expenses. The farm is assumed to plant 85% of base acreage in rice while electing to remain in the direct and counter-cyclical revenue payment programs. The grower and landlord each receive their share of program payments relative to the agreed upon crop rental percentage. Net returns above variable production costs (NRAVC) measured farm profitability per arrangement. Risk under each arrangement was based on the coefficient of variation (as a percent of income) within the farm model simulation.

As an alternative to the common share rent arrangement, a "net" rent model was constructed. In this scenario, the landlord receives a crop proceed share, roughly equivalent to what would have been received net of the

landlord's share of variable expenses, and does not pay any variable production expenses. The landlord's net returns, in terms of percent of total income to both parties under a traditional crop share served as the net percentage number determining the landlord's rent payment. Similar to the "gross" rent model, the same farm inputs were varied. However, in this model the landlord received a flat percentage of the crop and contributed no production costs in exchange for land privileges. Similar to the gross model, grower and landlord each receive their share of program payments corresponding to the net rental percentage. Net landlord crop share percentages evaluated in this analysis in comparison to the 50/50, 60/40, 70/30 and 80/20 gross share arrangements were 21%, 15%, 8% and 18%, respectively. In the net share arrangement percentage of 18%, to be compared with a gross share arrangement of 80/20, the grower is assumed to pay the irrigation pumping cost, whereas in all other arrangements the landlord is assumed to pay irrigation pumping costs.

Results and Discussion

Results from the farm simulation model per rental percentage are presented in Tables 3 through 6. These indicate that growers benefit from higher gross income levels under a "net" rental model. It is once again noted that the net percentage rate is calculated as the equivalent percentage of the landlord's net returns above variable costs under a traditional cost-share agreement. However, since the landlord pays no production expenses the grower's production risk increases significantly compared to the traditional gross rent model. This is evident by the significant increase in coefficients of variation for the 50/50, 60/40 and the 70/30 models. The grower is financing the entire production expense of the crop including the irrigation pumping charge. For the 80/20 gross arrangement, the landlord contributes 20% of the drying and hauling expenses only. Therefore the grower under this agreement bears additional production risk through a greater financial investment in the crop compared to the other gross rental models where irrigation costs are paid by the landlord.

Gross income variation or risk, is the same for both parties since gross income is calculated as the rental percentage of the crop's yield times the rice price plus the rental percentage share of farm program payments per rental rate examined. Net returns above variable costs (NRAVC) will shift risk, in all cases, as the "net" rental model assumes the complete production expense is borne by the grower compared to the proportional cost sharing in the "gross" model.

Simulation results for first crop rice production (no ratoon crop) are shown in Tables 3 through 6 for a deep well irrigation water source. Table values represent the party's net returns above variable production costs and percent deviation from the mean return value (coefficient of variation). Results indicate that for rice farms with deep well irrigation water, crop lease arrangements with high landlord participation are more favorable from a grower perspective than arrangements with relatively low landlord participation. With the grower paying irrigation pumping costs in the 80/20 arrangement, the net returns declined. Although the 70/30 arrangement resulted in the highest average returns for the grower ($776.87/ha), this particular lease arrangement was least advantageous for the landlord ($199.34). With increased diesel prices, landlords paying rice irrigation pumping costs would prefer a lease arrangement paying them more than 30% to adequately cover land and irrigation costs.

Table 3. Grower and landlord returns under a 50/50 gross rental arrangement versus a 21% net rental arrangement for rice production under deep well irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$1,269.85	7.9	$2,006.37	7.9
Grower Costs	$835.83	2.2	$1,563.46	3.5
Grower NRAVC	$434.02	21.9	$442.89	31.5
Landlord Income	$1,269.85	7.9	$533.33	7.9
Landlord Costs	$727.65	5.3	--	0
Landlord NRAVC	$542.20	16.0	$533.33	7.9

[1] Landlord receives a 21% net share of crop proceeds with no sharing in production expenses.

Table 4. Grower and landlord returns under a 60/40 gross rental arrangement versus a 15% net rental arrangement for rice production under deep well irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$1,523.82	7.9	$2,158.73	7.9
Grower Costs	$918.37	2.4	$1,563.46	3.5
Grower NRAVC	$605.53	19.0	$595.28	25.4
Landlord Income	$1,015.87	7.9	$380.96	7.9
Landlord Costs	$645.09	5.8	--	0
Landlord NRAVC	$259.58	18.4	$380.96	7.9

[1] Landlord receives a 15% net share of crop proceeds with no sharing in production expenses.

Table 5. Grower and landlord returns under a 70/30 gross rental arrangement versus an 8% net rental arrangement for rice production under deep well irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$1,777.80	7.9	$2,336.53	7.9
Grower Costs	$1,000.92	2.5	$1,563.46	3.5
Grower NRAVC	$776.87	17.3	$773.04	21.3
Landlord Income	$761.90	7.9	$203.17	7.9
Landlord Costs	$562.56	6.5	--	0
Landlord NRAVC	$199.34	25.7	$203.17	7.9

[1] Landlord receives an 8% net share of crop proceeds with no sharing in production expenses.

Table 6. Grower and landlord returns under a 80/20 gross rental arrangement versus an 18% net rental arrangement for rice production under deep well irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$2,031.75	7.9	$2,082.55	7.9
Grower Costs	$1,523.33	3.6	$1,563.46	3.5
Grower NRAVC	$508.44	27.9	$519.09	28.0
Landlord Income	$507.95	7.9	$457.41	7.9
Landlord Costs	$40.13	2.7	--	0
Landlord NRAVC	$467.79	8.6	$457.41	7.9

[1] Landlord receives an 18% net share of crop proceeds with no sharing in production expenses.

For rice farms with surface irrigation sources, the 70/30 arrangement was again the most favorable type of rental arrangement for the grower. The landlord's net return was again less favorable, but substantially greater (92%) than the return generated by the deep well irrigated system. This increase can be attributed to the fact that surface irrigation system costs are roughly 40 percent of the pumping costs associated deep well systems.

Therefore, the type of irrigation method is crucial in determining the rental percentage, especially across tracts that have different irrigation technologies e.g. well versus surface sources.

The production of a ratoon (second) crop of rice impacted on grower net returns for all crop share arrangements evaluated. Grower and landlord net returns and percent variation in mean return values are presented in Tables 7 through 10. Two ratoon crop options evaluated assumed 25 and 50 percent of the first crop rice acreage harvested again as a ratoon crop. The production of a ratoon crop generates a greater increase in grower net returns relative to the marginal increase in the landlord's net return. For instance, in the 70/30 well-irrigated rental arrangement the expected mean return for the grower increases by $81.59 and $163.19 per hectare compared to $12.33 and $24.64 increases in landlord return with 25% and 50% ratooned, respectively. The result is that the decision to produce a ratoon crop can be a major factor to consider in determining equitable rice crop lease arrangements.

Table 7. Grower and landlord returns under a 50/50 gross rental arrangement versus a 21% net rental arrangement for rice production under surface irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$1,442.03	8.0	$2,278.41	8.0
Grower Costs	$901.96	2.3	$1,720.02	3.7
Grower NRAVC	$540.44	20.2	$558.38	28.6
Landlord Income	$1,442.03	8.0	$605.65	8.0
Landlord Costs	$818.07	5.7	--	0
Landlord NRAVC	$623.96	15.9	$605.65	8.0

[1] Landlord receives a 21% net share of crop proceeds with no sharing in production expenses.

Table 8. Grower and landlord returns under a 60/40 gross rental arrangement versus a 15% net rental arrangement for rice production under surface irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$1,730.45	8.0	$2,451.45	8.0
Grower Costs	$990.37	2.4	$1,720.02	3.7
Grower NRAVC	$740.08	17.8	$731.43	23.7
Landlord Income	$1,153.63	8.0	$432.61	8.0
Landlord Costs	$729.65	6.1	--	0
Landlord NRAVC	$423.96	18.5	$432.61	8.0

[1] Landlord receives a 15% net share of crop proceeds with no sharing in production expenses.

Table 9. Grower and landlord returns under a 70/30 gross rental arrangement versus an 8% net rental arrangement for rice production under surface irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$2,018.85	8.0	$2,653.34	8.0
Grower Costs	$1,078.76	2.5	$1,720.02	3.7
Grower NRAVC	$940.06	16.4	$933.32	20.2
Landlord Income	$865.21	8.0	$230.72	8.0
Landlord Costs	$641.26	6.8	--	0
Landlord NRAVC	$223.98	26.4	$230.72	8.0

[1] Landlord receives an 8% net share of crop proceeds with no sharing in production expenses.

Table 10. Grower and landlord returns under a 80/20 gross rental arrangement versus an 18% net rental arrangement for rice production under surface irrigation.

	Gross Rental Arrangement		Net Rental Arrangement[1]	
	Dollars per hectare	Risk Measure (%)	Dollars per hectare	Risk Measure (%)
Grower Income	$2,307.24	8.0	$2,364.94	8.0
Grower Costs	$1,673.86	3.8	$1,720.02	3.7
Grower NRAVC	$633.40	25.6	$644.92	25.8
Landlord Income	$576.82	8.0	$519.14	8.0
Landlord Costs	$46.16	2.7	--	0
Landlord NRAVC	$530.66	8.7	$519.14	8.0

[1] Landlord receives an 18% net share of crop proceeds with no sharing in production expenses.

Summary

The relative proportion of costs and returns from a rice share rental arrangement standpoint will determine the risk preference for both the grower and the landlord. With irrigation water as a major production input, irrigation water source and which party incurs that expense is a major factor in determining equitable crop share rental arrangements for rice production. In addition, the production of a ratoon crop impacted the relative split of net returns between grower and landlord. This rental analysis examines the returns to variable costs only. As an alternative to traditional gross cost shares, net percentage paid as rent were calculated based on the landlord's net returns under a traditional gross rent scenario. Therefore, returns are consistent under both rental regimes to invested parties for the purpose of isolating the degree to which risk is shifted. Results from the analysis indicate that the grower increases his net return risk by electing to pay a flat percentage of the crop as rent for land and water compared to a traditional cost share agreement.

By evaluating different share rental agreements and the degree in which production costs are shared, equitable crop rental arrangements can be achieved for parties with a vested financial interest in the rice crop. Crop rental arrangements differ in terms of specific year(s) of land use, frequency and methods of payment, price and yield shares (i.e. risk allocation), sharing of production expenses, authority in making farm management decisions, rotational crop mapping, and adjustments made to price and yields relevant to conditions determined by the market. A producer must consider his risk preference, current financial situation, technology adoption rate, resource proportionality being contributed, compensation for unused portion of investments, and management methods in order to determine an optimal agreement while still remaining profitable.

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