

## **ADJUSTING IRRIGATION LEASE ARRANGEMENTS TO REFLECT EQUIPMENT OWNERSHIP**

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### **INTRODUCTION**

Crop share leasing arrangements are widely used on irrigated lands in the Central Plains and are intended to help landlords and tenants share both the risk and returns to irrigated crop enterprises. A basic principle of share lease arrangements is that the share of revenues received by each party should be proportional to the value of resources contributed by each side toward production. That is, as one party's relative contribution to production increases, their share of the proceeds should increase in similar fashion.

Irrigated crop production in the Central Plains may see a variety of ownership arrangements with regard to the well, pump and gearhead, power unit, and the sprinkler system. Likewise, a range of sharing practices are also observed regarding who pays for inputs such as fertilizer, chemicals, machinery and tillage, crop insurance, and so on. This article describes a method for calculating those resource contributions and illustrates a number of sharing practices commonly used.

We are particularly interested in the case where a retired producer begins to lease their land and irrigation system to a tenant who initially owns none of the irrigation equipment, but over time assumes ownership of more major components of the system. The final step in this progression is the case where the tenant eventually has drilled another well and also owns the rest of the irrigation equipment. We estimate how fair crop shares would adjust under these various scenarios.

### **ESTABLISHING A CROP SHARE ARRANGEMENT**

Irrigated cropping in the Central Plains involves significant investment in land, irrigation equipment, machinery, labor, management, and a wide variety of inputs. When production is done under a lease arrangement, the landlord and tenant must agree as to the production factors contributed by each party, as well as how the ultimate crop output is shared. Many different arrangements are possible, depending on the needs, interests, and abilities of the parties involved. University extension economists have long recommended several principles to guide the development of an equitable lease arrangement. These include:

- Variable expenses that increase yields should be shared in the same percentage as the crop is shared.
- Share arrangements should be adjusted to reflect the effect new technologies have on relative costs contributed by both parties.
- The landowner and operator should share total returns in the same proportion as they contribute resources.
- Operators should be compensated at the termination of the lease for the undepreciated balance of long-term investments they have made.
- Good, open, and honest communication should be maintained between the landowner and operator (North Central Farm Management Extension Committee, p. 2).

Our attention here will focus on the first three principles. Regarding the first principle, fertilizer is the input we most commonly see shared between landlord and tenant. The sharing rule encourages a more optimal level of input use. In irrigated crop production, pumping costs are also directly yield-increasing and are usually shared in similar fashion.

The wide adoption of no-till systems in the past 20 years calls our attention to the second principle, with chemicals and spray applications replacing tillage passes through the field. Landlords and tenants have used a variety of approaches in how these costs might be shared, and we show different options below.

The third principle is our “fairness” rule and guides us as to how total returns should be shared. Our method shown below is a budgeting approach that lists all the inputs used in the production of the crop and tallies the value contributed by both the landlord and tenant.

The share of the resources contributed by each party determines how the crop output should ultimately be shared. We will see how this becomes particularly important when we consider how ownership of the irrigation assets may change over time.

## **IRRIGATED CORN PRODUCTION IN WESTERN KANSAS**

**Tables 1a and 1b** below show Kansas State University 2018 budget projections for irrigated corn production in Northwest and Southwest Kansas - developed by faculty from the KSU Department of Agricultural Economics. These and other irrigated and non-irrigated crop production budgets are available on the *AgManager.info* website.

**Table 1a. 2018 Center-pivot Irrigated Corn Budget for NW KS (Average Yield)**

<b>2018 Irrigated Corn (center-pivot) Cost-Return Budget</b> ---- Northwest Kansas (ave yields) <i>Gregg Ibendahl, Dan O'Brien, Lucas Haag, John Holman</i>						
item	unit	price	qty	amt	Sub-total	Your farm
<b>INCOME</b>						
Product						
Corn - Northwest KS	bu	\$ 3.55	240.0	\$ 852.00	\$ 852.00	_____
Other						
Govt payments, indemnity payments, etc.						_____
<b>-TOTAL INCOME-</b>				\$ 852.00		_____
<b>DIRECT EXPENSES</b>						
Fertilizers						
B - DAP (18-46-0) (with planter)	lb	\$ 0.21	183.8	\$ 39.06		
B - Urea	lb	\$ 0.15	346.4	\$ 50.23	\$ 89.29	_____
--- ACTUAL LBS - 192 N, 85 P, 0 K						
Herbicides						
A - 2, 4-D LV Ester (1)	oz	\$ 0.14	8.0	\$ 1.13		
A - Dicamba	oz	\$ 0.34	12.0	\$ 4.04		
A - Glyphosate generic	oz	\$ 0.10	32.0	\$ 3.20		
B - Atrazine 4L (1)	qt	\$ 3.56	1.5	\$ 5.34		
B - Covrus	oz	\$ 6.01	5.6	\$ 33.63		
C - Glyphosate generic (.5)	oz	\$ 0.10	16.0	\$ 1.60	\$ 48.95	_____
Insecticides						
Hero (.5)	oz	\$ 1.41	5.2	\$ 7.28	\$ 7.28	_____
Seeds						
Corn - triple stack	1K seeds	\$ 3.56	32.0	\$ 113.92	\$ 113.92	_____
Crop insurance						
Corn_NW_Irr	acre	\$ 32.43	1.0	\$ 32.43	\$ 32.43	_____
Miscellaneous						
Corn_NW_Irr	acre	\$ 10.00	1.0	\$ 10.00	\$ 10.00	_____
Fungicides						
Headline (.3)	oz	\$ 2.68	1.6	\$ 4.22		
Quilt,Xcel	oz	\$ 1.33	1.6	\$ 2.09	\$ 6.31	_____
Crop consulting						
Corn_NW_Irr	acre	\$ 6.50	1.0	\$ 6.50	\$ 6.50	_____
Labor (beyond custom field operations)						
Additional labor	hour	\$ 15.00	1.2	\$ 18.00		
Irrigation labor	hour	\$ 15.00	0.6	\$ 9.00	\$ 27.00	_____
Custom Field Operations						
DRY-Drying corn (includes fuel, electricity, labor) -	bu	\$ 0.06	240.0	\$ 14.16		
HARVEST-Corn (base)	acre	\$ 27.11	1.0	\$ 27.11		

**Table 1a. 2018 Center-pivot Irrigated Corn Budget for NW KS (continued)**

<b>2018 Irrigated Corn (center-pivot) Cost-Return Budget</b> ---- Northwest Kansas (ave yields) Gregg Ibendahl, Dan O'Brien, Lucas Haag, John Holman						
Item	unit	price	qty	amt	Sub-total	Your farm
HARVEST-Corn (extra charge for yields above 76 t	bu	\$ 0.23	164.0	\$ 37.24		
HAUL-Corn - hauling	bu	\$ 0.17	240.0	\$ 41.30		
PLANT-Corn, reg-till planting	acre	\$ 17.20	1.0	\$ 17.20		
SPRAY-Ground herbicide	acre	\$ 5.61	2.5	\$ 14.02		
SPRAY-Ground insecticide	acre	\$ 5.65	0.8	\$ 4.52		
TILL-Cultivating ridge-till	acre	\$ 18.65	1.0	\$ 18.65	\$ 174.20	
<b>Natural Gas</b>						
Well, pump, and gearhead	ac-in	\$ 3.21	15.0	\$ 48.14	\$ 48.14	
<b>Repair &amp; Maintenance</b>						
Well, pump, and gearhead	ac-in	\$ 0.33	15.0	\$ 4.95	\$ 4.95	
<b>Other</b>						
Crop consulting, drying, etc.						
Interest on operating capital	6% on direct expenses				\$ 17.07	
<b>-TOTAL DIRECT EXPENSES-</b>					\$ 586.05	
<b>FIXED EXPENSES</b>						
<b>Depreciation</b>						
Irrigation - Center Pivot	acre	\$ 22.43	1.0	\$ 22.43		
Power unit	acre	\$ 17.60	1.0	\$ 17.60		
Well, pump, and gearhead	acre	\$ 36.64	1.0	\$ 36.64	\$ 76.67	
<b>Interest on durable equipment</b>						
Irrigation - Center Pivot	acre	\$ 28.04	1.0	\$ 28.04		
Power unit	acre	\$ 3.70	1.0	\$ 3.70		
Well, pump, and gearhead	acre	\$ 27.48	1.0	\$ 27.48	\$ 59.22	
<b>Cash rent</b>						
All crops_NW_Irr	acre	\$ 145.00	1.0	\$ 145.00	\$ 145.00	
<b>-TOTAL FIXED EXPENSES-</b>					\$ 280.89	
<b>-TOTAL SPECIFIED EXPENSES-</b>					\$ 866.93	
<b>RETURNS ABOVE DIRECT EXPENSES</b>					\$ 265.95	
<b>RETURNS ABOVE TOTAL SPECIFIED EXPENSES</b>					\$ (14.93)	
12 acre-inches of water applied 300 foot well depth \$ fuel cost per acre-inch of water applied Mcf of natural gas per acre-inch of water applied \$ per Mcf for cost of natural gas 0 Mcf of fuel used in total						
Department of Agricultural Economics - Kansas State University - Agmanager.info						

**Table 1b. 2018 Center-pivot Irrigated Corn Budget for SW KS (Average Yield)**

<b>2018 Irrigated Corn (center-pivot) Cost-Return Budget</b> ----- Southwest Kansas (ave yields) Gregg Ibendahl, Dan O'Brien, Lucas Haag, John Holman						
item	unit	price	qty	amt	Sub-total	Your farm
<b>INCOME</b>						
Product						
Corn - Southwest KS	bu	\$ 3.81	225.0	\$ 857.25	\$ 857.25	_____
Other						
Govt payments, indemnity payments, etc.						_____
<b>-TOTAL INCOME-</b>				\$ 857.25		_____
<b>DIRECT EXPENSES</b>						
Fertilizers						
B - DAP (18-46-0) (with planter)	lb	\$ 0.21	173.0	\$ 36.76		
B - Urea	lb	\$ 0.15	327.0	\$ 47.42	\$ 84.18	_____
--- ACTUAL LBS - 182 N, 80 P, 0 K						
Herbicides						
A - 2, 4-D LV Ester (1)	oz	\$ 0.14	8.0	\$ 1.13		
A - Dicamba	oz	\$ 0.34	12.0	\$ 4.04		
A - Glyphosate generic	oz	\$ 0.10	32.0	\$ 3.20		
B - Atrazine 4L (1)	qt	\$ 3.56	1.5	\$ 5.34		
B - Covrus	oz	\$ 6.01	5.6	\$ 33.63		
C - Glyphosate generic (.5)	oz	\$ 0.10	16.0	\$ 1.60	\$ 48.95	_____
Insecticides						
Hero (1)	oz	\$ 1.41	10.3	\$ 14.57	\$ 14.57	_____
Seeds						
Corn - triple stack	1K seeds	\$ 3.56	32.0	\$ 113.92	\$ 113.92	_____
Crop insurance						
Corn_SW_Irr	acre	\$ 21.38	1.0	\$ 21.38	\$ 21.38	_____
Miscellaneous						
Corn_SW_Irr	acre	\$ 10.00	1.0	\$ 10.00	\$ 10.00	_____
Fungicides						
Headline (.3)	oz	\$ 2.68	1.6	\$ 4.22		
Quilt,Xcel	oz	\$ 1.33	1.6	\$ 2.09	\$ 6.31	_____
Crop consulting						
Corn_SW_Irr	acre	\$ 6.50	1.0	\$ 6.50	\$ 6.50	_____
Labor (beyond custom field operations)						
Additional labor	hour	\$ 15.00	1.2	\$ 18.00		
Irrigation labor	hour	\$ 15.00	0.6	\$ 9.60	\$ 27.60	_____
Custom Field Operations						
DRY-Drying corn (includes fuel, electricity, labor) -	bu	\$ 0.06	225.0	\$ 13.28		
HARVEST-Corn (base)	acre	\$ 27.11	1.0	\$ 27.11		

**Table 1b. 2018 Center-pivot Irrigated Corn Budget for SW KS (continued)**

<b>2018 Irrigated Corn (center-pivot) Cost-Return Budget</b> ---- Southwest Kansas (ave yields) Gregg Ibendahl, Dan O'Brien, Lucas Haag, John Holman						
Item	unit	price	qty	amt	Sub-total	Your farm
HARVEST-Corn (extra charge for yields above 76 t	bu	\$ 0.23	149.0	\$ 33.84		
HAUL-Corn - hauling	bu	\$ 0.17	225.0	\$ 38.72		
PLANT-Corn, reg-till planting	acre	\$ 17.20	1.0	\$ 17.20		
SPRAY-Ground herbicide	acre	\$ 5.61	2.5	\$ 14.02		
SPRAY-Ground insecticide	acre	\$ 5.65	1.3	\$ 7.35		
TILL-Cultivating ridge-till	acre	\$ 18.65	1.0	\$ 18.65	\$ 170.16	
<b>Natural Gas</b>						
Well, pump, and gearhead	ac-in	\$ 3.21	16.0	\$ 51.35	\$ 51.35	
<b>Repair &amp; Maintenance</b>						
Well, pump, and gearhead	ac-in	\$ 0.33	16.0	\$ 5.28	\$ 5.28	
<b>Other</b>						
Crop consulting, drying, etc.						
Interest on operating capital	6% on direct expenses			\$ 16.81		
<b>-TOTAL DIRECT EXPENSES-</b>					\$ 577.00	
<b>FIXED EXPENSES</b>						
<b>Depreciation</b>						
Irrigation - Center Pivot	acre	\$ 22.43	1.0	\$ 22.43		
Power unit	acre	\$ 17.60	1.0	\$ 17.60		
Well, pump, and gearhead	acre	\$ 36.64	1.0	\$ 36.64	\$ 76.67	
<b>Interest on durable equipment</b>						
Irrigation - Center Pivot	acre	\$ 28.04	1.0	\$ 28.04		
Power unit	acre	\$ 3.70	1.0	\$ 3.70		
Well, pump, and gearhead	acre	\$ 27.48	1.0	\$ 27.48	\$ 59.22	
<b>Cash rent</b>						
All crops_SW Irr	acre	\$ 113.00	1.0	\$ 113.00	\$ 113.00	
<b>-TOTAL FIXED EXPENSES-</b>					\$ 248.89	
<b>-TOTAL SPECIFIED EXPENSES-</b>					\$ 825.89	
<b>RETURNS ABOVE DIRECT EXPENSES</b>					\$ 280.25	
<b>RETURNS ABOVE TOTAL SPECIFIED EXPENSES</b>					\$ 31.36	
12 acre-inches of water applied 300 foot well depth \$ fuel cost per acre-inch of water applied Mcf of natural gas per acre-inch of water applied \$ per Mcf for cost of natural gas 0 Mcf of fuel used in total						

## IRRIGATED CORN CROP SHARE LEASE SCENARIOS FOR WESTERN KANSAS

**Tables 2, 3, and 4** below show calculations of equitable leasing percentage shares for irrigated corn in western Kansas. These tables show the effect that a combination of alternative irrigation equipment ownership scenarios and crop input share arrangements between landlords and tenants can have on equitable crop share leasing arrangements in Western Kansas. They also show how variation in the value of irrigated farmland – the primary fixed resource owned and contributed to irrigated leasing arrangements by landowners – impacts equitable shares for Landlords and Tenants.

**Table 2** shows the results on Landlords' and Tenants' equitable shares of the following irrigation equipment ownership scenarios. The current market average cost of irrigated cropland in western Kansas of \$2,800 per acre is figured into the Landlord's contribution.

Both "net share" arrangements and "crop input share" scenarios were examined for this equipment ownership scenario. Landlords would only pay for a portion of crop insurance costs under "net share" arrangements. Under "crop input share" arrangements landlords would pay a percentage share for yield increasing inputs such as fertilizer and irrigation energy, along with their share of crop insurance share.

- Scenario A: *Landlords* owning the irrigated cropland, well, pump and gearhead. *Tenants* owning the power unit and the center-pivot irrigation system and have paid for the associated underground electrical lines and pipe.
- Scenario B: *Landlords* owning the irrigated cropland, well, pump, gearhead, and power unit. *Tenants* own the center-pivot irrigation system and have paid for the associated underground electrical lines and pipe.
- Scenario C: *Landlords* owning the irrigated cropland, well, pump, gearhead, power unit, and the center-pivot irrigation system and have paid for the associated underground electrical lines and pipe. *Tenants* own none of the irrigation equipment.

These results show that variation in alternative irrigation equipment ownership scenarios between Landlords and Tenants has an important impact upon calculated equitable crop shares. An equitable share for a Landlord owning only cropland, well pump and gearhead and paying for no crop inputs other than crop insurance is estimated to be 34.1%, with the Tenant receiving 65.9%. With the selective sharing of 30% of fertilizer, irrigation fuel, and crop insurance, the equitable share for Landlords becomes 38.7%, with the Tenant receiving 61.3% of the crop at harvest.

This compares to the other extreme in which the Landlord owns all irrigation equipment including both power unit and the center pivot systems, and has paid for the underground wiring and pipe to the pivot tower. In this scenario, under a net share arrangement the Landlord would merit 44.5% of the crop, with the Tenant receiving 55.5% with the Landlord paying 20% of the fertilizer and irrigation fuel costs. The inclusion of the power unit among the assets owned by the Landlord calculates to a 36.6% share under a "net share" lease, but to 40.4% share when the Landlord is sharing 25% of the fertilizer and irrigation fuel expense.

**Table 2. Center Pivot Irrigation Crop Share Leases (Western KS Corn)\* Sample Landlord Tenant Share Arrangements - Average Irrigated Cropland Price**

					Scenario A - Landlord contributes only Land, Well, Pump & Gearhead - with both "Net Share" & "Shared Inputs" options												
					Scenario B - Landlord contributes only Land, Well, Pump, Gearhead & Power Unit - with both "Net Share" & "Shared Inputs" options						Scenario C - Landlord contributes Land, Well, Pump, Gearhead, Power Unit, & CP Irrigation System - with both "Net Share" & "Shared Inputs" options						
					Alternative Landlord / Tenant Scenarios for Sharing Irrigation Equipment & Crop Inputs												
					Scenario A - Net Share		Scenario A - Share Inputs		Scenario B - Net Share		Scenario B - Share Inputs		Scenario C - Net Share		Scenario C - Share Inputs		
					Landowner: Land, Well, Pump, Gearhead, with NO crop inputs		Tenant: Power Unit, CP System, with ALL crop inputs		Landowner: Land, Well, Pump, Gearhead with SOME crop inputs		Tenant: Power Unit, CP System, with MOST crop inputs		Landowner: Land, Well, Pump, Gearhead, Power Unit with NO crop inputs		Tenant: CP System, with ALL crop inputs		
Line	Item	Entire Circle	Per Acre	Rate	Per Acre Annual Charge	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant		
1	Irrigated Cropland (undeveloped)	\$352,800	\$2,800	6.00%	\$168.00	\$168.00		\$168.00		\$168.00		\$168.00		\$168.00			
2	Irrigated Cropland Real Estate Tax			0.50%	\$18.54	\$18.54		\$18.54		\$18.54		\$18.54		\$18.54			
3	Land Development																
4	Dev. Real Estate Tax																
5	Well (300' depth) - Interest Cost	\$54,382	\$432	6.00%	\$25.90	\$25.90		\$25.90		\$25.90		\$25.90		\$25.90			
6	Well (300' depth) - Depreciation			25	\$28.77	\$28.77		\$28.77		\$28.77		\$28.77		\$28.77			
7	Pump - Interest Cost	\$49,905	\$396	6.00%	\$23.76	\$23.76		\$23.76		\$23.76		\$23.76		\$23.76			
8	Pump - Depreciation			25	\$26.40	\$26.40		\$26.40		\$26.40		\$26.40		\$26.40			
9	Gearhead - Interest Cost	\$10,221	\$81	6.00%	\$4.87	\$4.87		\$4.87		\$4.87		\$4.87		\$4.87			
10	Gearhead - Depreciation			25	\$5.41	\$5.41		\$5.41		\$5.41		\$5.41		\$5.41			
11	Power Unit/Meter - Interest Cost	\$15,398	\$122	4.50%	\$5.50	\$5.50		\$5.50		\$5.50		\$5.50		\$5.50			
12	Power Unit/Meter - Depreciation			7	\$17.46	\$17.46		\$17.46		\$17.46		\$17.46		\$17.46			
13	CP Irrig System + UG pipe/wire - Int.	\$93,461	\$742	6.00%	\$44.51	\$44.51		\$44.51		\$44.51		\$44.51		\$44.51			
14	CP Irrig System + UG pipe/wire - Depr.			25	\$22.25	\$22.25		\$22.25		\$22.25		\$22.25		\$22.25			
15	Irrigation Equipment Repair	\$660	\$41	16.00%	\$5.24	\$5.24		\$5.24		\$5.24		\$5.24		\$5.24			
16	Irrigation Equipment Insurance		\$4	0.25%	\$4.43	\$2.43	\$2.00	\$2.43	\$2.00	\$2.91	\$1.52	\$2.91	\$1.52	\$4.43	\$0.00		
17	Non-machinery Labor	\$80	\$5	16.00%	\$0.63	\$0.63		\$0.63		\$0.63		\$0.63		\$0.63			
18	Custom field operations				\$57.22	\$57.22		\$57.22		\$57.22		\$57.22		\$57.22			
19	Crop Machinery Depreciation				\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00			
20	Machinery Repairs & Insurance				\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00			
21	Seed (excluding separate Technology Fees)				\$38.08	\$38.08		\$38.08		\$38.08		\$38.08		\$38.08			
22	Fuel for Cropland Fieldwork				\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00			
23	Miscellaneous Costs				\$10.00	\$10.00		\$10.00		\$10.00		\$10.00		\$10.00			
24	Operating Interest (6 months / year)			6.0%	\$3.47	\$3.47		\$3.47		\$3.47		\$3.47		\$3.47			
25	COST SUBTOTAL				\$510.45	\$304.09	\$206.36	\$304.09	\$206.36	\$327.53	\$182.92	\$327.53	\$182.92	\$401.04	\$109.40		
26	SUBTOTAL % INPUTS CONTRIBUTED					59.6%	40.4%	59.6%	40.4%	64.2%	35.8%	64.2%	35.8%	78.6%	21.4%		
<b>Other Crop Inputs that may be shared:</b>																	
27	% Share of Other Selected Crop Inputs					0.0%	100.0%	30.0%	70.0%	0.0%	100.0%	25.0%	75.0%	0.0%	100.0%	20.0%	80.0%
28	Seed Technology Fee				\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		
29	Fertilizer				\$84.18	\$84.18	\$25.25	\$58.93	\$84.18	\$21.05	\$63.14	\$84.18	\$16.84	\$67.34	\$0.00		
30	Herbicide				\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$0.00		
31	Insecticide + fungicide				\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$0.00		
32	Irrigation Fuel				\$51.35	\$51.35	\$15.41	\$35.95	\$51.35	\$12.84	\$38.51	\$51.35	\$10.27	\$41.08	\$0.00		
33	Crop Insurance				\$21.38	\$6.41	\$14.97	\$6.41	\$14.97	\$5.35	\$16.04	\$5.35	\$16.04	\$4.28	\$17.10		
34	Custom Harvest				\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$0.00		
35	Drying				\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$0.00		
36	Custom Hauling				\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$0.00		
37	Consulting				\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$0.00		
38	Operating Interest on lines 27-36				\$10.39	\$0.19	\$10.19	\$0.19	\$8.97	\$0.16	\$10.23	\$0.18	\$9.21	\$0.13	\$10.26	\$0.94	
39	TOTAL CROP PRODUCTION COSTS				\$867.01	\$310.69	\$556.32	\$352.57	\$514.44	\$333.03	\$533.98	\$367.93	\$499.08	\$405.45	\$461.56		
40	Farm Management Responsibility Charge (% Total Costs)			5.0%	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35	\$43.35		
41	TOTAL PRODUCTION & FARM MANAGEMENT COSTS				\$910.36	\$310.69	\$599.67	\$352.57	\$557.79	\$333.03	\$577.33	\$367.93	\$542.43	\$405.45	\$504.91		
42	Percent Share of all Crop Inputs and Crop Share					34.1%	65.9%	38.7%	61.3%	36.6%	63.4%	40.4%	59.6%	44.5%	55.5%		

**Table 3** shows the results on Landlords' and Tenants' equitable shares of the following irrigation equipment ownership scenarios, AND with a 25% higher market average cost of irrigated cropland in western Kansas. Irrigated cropland is valued at \$3,500 per acre as part of the Landlord's contribution – up 25% from the average irrigated farmland value of \$2,800 per acre in **Table 2**.

These results in Table 3 show that variation in alternative irrigation equipment ownership scenarios between Landlords and Tenants still has an important impact upon calculated equitable crop shares. With higher irrigated cropland values for Landlords, equitable share for a Landlord owning only cropland, well pump and gearhead and paying for no crop inputs other than crop insurance is estimated to be 37.2%, with the Tenant receiving 62.8% of the crop. With the selective sharing of 30% of fertilizer, irrigation fuel, and crop insurance, the equitable share for Landlords becomes 41.5%, with the Tenant receiving 58.5% of the crop at harvest.

As was the case earlier in Table 2, in **Table 3** this compares to the other extreme in which the Landlord owns all irrigation equipment including both power unit and the center pivot systems, and has paid for the underground wiring and pipe to the pivot tower. In this scenario, under a net share arrangement the Landlord would merit 47.1% of the crop, with the Tenant receiving 52.9% with the Landlord paying 20% of the fertilizer and irrigation fuel costs. The inclusion of the power unit among the assets owned by the Landlord calculates to a 39.5% share under a "net share" lease, but to 43.1% share when the Landlord is sharing 25% of the fertilizer and irrigation fuel expense.

**Table 4** also shows the results on Landlords' and Tenants' equitable shares of the following irrigation equipment ownership scenarios, BUT with a 25% lower market average cost of irrigated cropland in western Kansas. Irrigated cropland is valued at \$2,100 per acre as part of the Landlord's contribution – down 25% from the average irrigated farmland value of \$2,800 per acre in **Table 2**.

These results in Table 4 show that variation in alternative irrigation equipment ownership scenarios between Landlords and Tenants continues to have an important impact upon calculated equitable crop shares. With lower irrigated cropland values for Landlords, equitable share for a Landlord owning only cropland, well pump and gearhead and paying for no crop inputs other than crop insurance is estimated to be 30.7%, with the Tenant receiving 69.3%. With the selective sharing of 30% of fertilizer, irrigation fuel, and crop insurance, the equitable share for Landlords becomes 35.6%, with the Tenant receiving 64.4% of the crop at harvest.

As was the case earlier in Tables 2 and 3, in **Table 4** this compares to the other extreme in which the Landlord owns all irrigation equipment including both power unit and the center pivot systems, and has paid for the underground wiring and pipe to the pivot tower. In this scenario, under a net share arrangement the Landlord would merit 45.0% of the crop, with the Tenant receiving 55.0% with the Landlord paying 20% of the fertilizer and irrigation fuel costs. The inclusion of the power unit among the assets owned by the Landlord calculates to a 33.3% share under a "net share" lease, but to 37.4% share when the Landlord is sharing 25% of the fertilizer and irrigation fuel expense.

**Table 3. Center Pivot Irrigation Crop Share Leases (Western KS Corn)\* Sample Landlord Tenant Share Arrangements - "High" Irrigated Cropland Average Price (Plus 25%)**

					Scenario A - Landlord contributes only Land, Well, Pump & Gearhead - with both "Net Share" & "Shared Inputs" options											
					Scenario B - Landlord contributes only Land, Well, Pump, Gearhead & Power Unit - with both "Net Share" & "Shared Inputs" options						Scenario C - Landlord contributes Land, Well, Pump, Gearhead, Power Unit, & CP Irrigation System - with both "Net Share" & "Shared Inputs" options					
					Alternative Landlord / Tenant Scenarios for Sharing Irrigation Equipment & Crop Inputs											
					Scenario A - Net Share		Scenario A - Share Inputs		Scenario B - Net Share		Scenario B - Share Inputs		Scenario C - Net Share		Scenario C - Share Inputs	
					Landowner: Land, Well, Pump, Gearhead, with NO crop inputs	Tenant: Power Unit, CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead with SOME crop inputs	Tenant: Power Unit, CP System, with MOST crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit with NO crop inputs	Tenant: CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit with NO crop inputs	Tenant: CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit, CP System with NO crop inputs	Tenant: ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit, CP System with NO crop inputs	Tenant: ALL crop inputs
Line	Item	Value Entire Circle	Per Acre	Rate	Per Acre Annual Charge	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	
1	Irrigated Cropland (undeveloped)	\$441,000	\$3,500	6.00%	\$210.00	\$210.00		\$210.00		\$210.00		\$210.00		\$210.00		
2	Irrigated Cropland Real Estate Tax			0.50%	\$22.04	\$22.04		\$22.04		\$22.04		\$22.04		\$22.04		
3	Land Development															
4	Dev. Real Estate Tax															
5	Well (300' depth) - Interest Cost	\$54,382	\$432	6.00%	\$25.90	\$25.90		\$25.90		\$25.90		\$25.90		\$25.90		
6	Well (300' depth) - Depreciation			25	\$28.77	\$28.77		\$28.77		\$28.77		\$28.77		\$28.77		
7	Pump - Interest Cost	\$49,905	\$396	6.00%	\$23.76	\$23.76		\$23.76		\$23.76		\$23.76		\$23.76		
8	Pump - Depreciation			25	\$26.40	\$26.40		\$26.40		\$26.40		\$26.40		\$26.40		
9	Gearhead - Interest Cost	\$10,221	\$81	6.00%	\$4.87	\$4.87		\$4.87		\$4.87		\$4.87		\$4.87		
10	Gearhead - Depreciation			25	\$5.41	\$5.41		\$5.41		\$5.41		\$5.41		\$5.41		
11	Power Unit/Meter - Interest Cost	\$15,398	\$122	4.50%	\$5.50	\$5.50		\$5.50		\$5.50		\$5.50		\$5.50		
12	Power Unit/Meter - Depreciation			7	\$17.46	\$17.46		\$17.46		\$17.46		\$17.46		\$17.46		
13	CP Irrig System + UG pipe/wire - Int.	\$93,461	\$742	6.00%	\$44.51	\$44.51		\$44.51	\$44.51	\$44.51	\$44.51	\$44.51	\$44.51	\$44.51	\$44.51	
14	CP Irrig System + UG pipe/wire - Depr.			25	\$22.25	\$22.25		\$22.25	\$22.25	\$22.25	\$22.25	\$22.25	\$22.25	\$22.25	\$22.25	
15	Irrigation Equipment Repair	\$660	\$41	16.00%	\$5.24	\$5.24		\$5.24	\$5.24	\$5.24	\$5.24	\$5.24	\$5.24	\$5.24	\$5.24	
16	Irrigation Equipment Insurance		\$4	0.25%	\$4.43	\$2.00	\$2.43	\$2.00	\$2.91	\$1.52	\$1.52	\$4.43	\$0.00	\$4.43	\$0.00	
17	Non-machinery Labor	\$80	\$5	16.00%	\$0.63	\$0.63		\$0.63	\$0.63	\$0.63	\$0.63	\$0.63	\$0.63	\$0.63	\$0.63	
18	Custom field operations				\$57.22	\$57.22		\$57.22	\$57.22	\$57.22	\$57.22	\$57.22	\$57.22	\$57.22	\$57.22	
19	Crop Machinery Depreciation				\$0.00	\$0.00		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
20	Machinery Repairs & Insurance				\$0.00	\$0.00		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
21	Seed (excluding separate Technology Fees)				\$38.08	\$38.08		\$38.08	\$38.08	\$38.08	\$38.08	\$38.08	\$38.08	\$38.08	\$38.08	
22	Fuel for Cropland Fieldwork				\$0.00	\$0.00		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
23	Miscellaneous Costs				\$10.00	\$10.00		\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	
24	Operating Interest (6 months / year)			6.0%	\$3.47	\$3.47		\$3.47	\$3.47	\$3.47	\$3.47	\$3.47	\$3.47	\$3.47	\$3.47	
25	COST SUBTOTAL				\$555.95	\$349.59	\$206.36	\$349.59	\$206.36	\$373.03	\$182.92	\$373.03	\$182.92	\$446.54	\$109.40	
26	SUBTOTAL % INPUTS CONTRIBUTED					62.9%	37.1%	62.9%	37.1%	67.1%	32.9%	67.1%	32.9%	80.3%	19.7%	
<b>Other Crop Inputs that may be shared:</b>																
27	% Share of Other Selected Crop Inputs					0.0%	100.0%	30.0%	70.0%	0.0%	100.0%	25.0%	75.0%	0.0%	100.0%	
28	Seed Technology Fee				\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
29	Fertilizer				\$84.18	\$84.18	\$25.25	\$58.93	\$84.18	\$21.05	\$63.14	\$84.18	\$16.84	\$67.34	\$67.34	
30	Herbicide				\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	
31	Insecticide + fungicide				\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	
32	Irrigation Fuel				\$51.35	\$51.35	\$15.41	\$35.95	\$51.35	\$12.84	\$38.51	\$51.35	\$10.27	\$41.08	\$41.08	
33	Crop Insurance				\$21.38	\$6.41	\$14.97	\$6.41	\$14.97	\$5.35	\$16.04	\$5.35	\$16.04	\$4.28	\$17.10	
34	Custom Harvest				\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	
35	Drying				\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	
36	Custom Hauling				\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	
37	Consulting				\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	
38	Operating Interest on lines 27-36				\$10.39	\$0.19	\$10.19	\$1.41	\$8.97	\$0.16	\$10.23	\$1.18	\$9.21	\$0.13	\$10.26	
39	TOTAL CROP PRODUCTION COSTS				\$912.51	\$356.19	\$556.32	\$398.07	\$514.44	\$378.53	\$533.98	\$413.43	\$499.08	\$450.95	\$461.56	
40	Farm Management Responsibility Charge (% Total Costs)			5.0%	\$45.63	\$45.63	\$45.63	\$45.63	\$45.63	\$0.00	\$45.63	\$45.63	\$45.63	\$0.00	\$45.63	
41	TOTAL PRODUCTION & FARM MANAGEMENT COSTS				\$958.14	\$356.19	\$601.94	\$398.07	\$560.07	\$378.53	\$579.60	\$413.43	\$544.70	\$450.95	\$507.19	
42	Percent Share of all Crop Inputs and Crop Share					37.2%	62.8%	41.5%	58.5%	39.5%	60.5%	43.1%	56.9%	47.1%	52.9%	

**Table 4. Center Pivot Irrigation Crop Share Leases (Western KS Corn)\* Sample Landlord Tenant Share Arrangements - "Low" Irrigated Cropland Average Price (Minus 25%)**

Scenario A - Landlord contributes only Land, Well, Pump & Gearhead - with both "Net Share" & "Shared Inputs" options																			
Scenario B - Landlord contributes only Land, Well, Pump, Gearhead & Power Unit - with both "Net Share" & "Shared Inputs" options																			
Scenario C - Landlord contributes Land, Well, Pump, Gearhead, Power Unit, & CP Irrigation System - with both "Net Share" & "Shared Inputs" options																			
Alternative Landlord / Tenant Scenarios for Sharing Irrigation Equipment & Crop Inputs																			
Line Item	Value		Rate	Per Acre Annual Charge	Scenario A - Net Share		Scenario A - Share Inputs		Scenario B - Net Share		Scenario B - Share Inputs		Scenario C - Net Share		Scenario C - Share Inputs				
	Entire Circle	Per Acre			Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant	Landowner	Tenant			
				Landowner: Land, Well, Pump, Gearhead, with NO crop inputs	Tenant: Power Unit, CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead with SOME crop inputs	Tenant: Power Unit, CP System, with MOST crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit with NO crop inputs	Tenant: CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit with NO crop inputs	Tenant: CP System, with ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit, CP System with NO crop inputs	Tenant: ALL crop inputs	Landowner: Land, Well, Pump, Gearhead, Power Unit, CP System with NO crop inputs	Tenant: ALL crop inputs				
1 Irrigated Cropland (undeveloped)	\$264,600	\$2,100	6.00%	\$126.00	\$126.00	\$126.00		\$126.00		\$126.00		\$126.00		\$126.00					
2 Irrigated Cropland Real Estate Tax			0.50%	\$15.04	\$15.04	\$15.04		\$15.04		\$15.04		\$15.04		\$15.04					
3 Land Development																			
4 Dev. Real Estate Tax																			
5 Well (300' depth) - Interest Cost	\$54,382	\$432	6.00%	\$25.90	\$25.90	\$25.90		\$25.90		\$25.90		\$25.90		\$25.90					
6 Well (300' depth) - Depreciation			25	\$28.77	\$28.77	\$28.77		\$28.77		\$28.77		\$28.77		\$28.77					
7 Pump - Interest Cost	\$49,905	\$396	6.00%	\$23.76	\$23.76	\$23.76		\$23.76		\$23.76		\$23.76		\$23.76					
8 Pump - Depreciation			25	\$26.40	\$26.40	\$26.40		\$26.40		\$26.40		\$26.40		\$26.40					
9 Gearhead - Interest Cost	\$10,221	\$81	6.00%	\$4.87	\$4.87	\$4.87		\$4.87		\$4.87		\$4.87		\$4.87					
10 Gearhead - Depreciation			25	\$5.41	\$5.41	\$5.41		\$5.41		\$5.41		\$5.41		\$5.41					
11 Power Unit/Meter - Interest Cost	\$15,398	\$122	4.50%	\$5.50	\$5.50	\$5.50		\$5.50		\$5.50		\$5.50		\$5.50					
12 Power Unit/Meter - Depreciation			7	\$17.46	\$17.46	\$17.46		\$17.46		\$17.46		\$17.46		\$17.46					
13 CP Irrig System + UG pipe/wire - Int.	\$93,461	\$742	6.00%	\$44.51	\$44.51	\$44.51		\$44.51		\$44.51		\$44.51		\$44.51					
14 CP Irrig System + UG pipe/wire - Depr.			25	\$22.25	\$22.25	\$22.25		\$22.25		\$22.25		\$22.25		\$22.25					
15 Irrigation Equipment Repair	\$660	\$41	16.00%	\$5.24	\$5.24	\$5.24		\$5.24		\$5.24		\$5.24		\$5.24					
16 Irrigation Equipment Insurance		\$4	0.25%	\$4.43	\$2.43	\$2.43		\$2.91	\$1.52	\$2.91	\$1.52	\$4.43	\$0.00	\$4.43	\$0.00				
17 Non-machinery Labor	\$80	\$5	16.00%	\$0.63	\$0.63	\$0.63		\$0.63		\$0.63		\$0.63		\$0.63					
18 Custom field operations				\$57.22	\$57.22	\$57.22		\$57.22		\$57.22		\$57.22		\$57.22					
19 Crop Machinery Depreciation				\$0.00	\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00					
20 Machinery Repairs & Insurance				\$0.00	\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00					
21 Seed (excluding separate Technology Fees)				\$38.08	\$38.08	\$38.08		\$38.08		\$38.08		\$38.08		\$38.08					
22 Fuel for Cropland Fieldwork				\$0.00	\$0.00	\$0.00		\$0.00		\$0.00		\$0.00		\$0.00					
23 Miscellaneous Costs				\$10.00	\$10.00	\$10.00		\$10.00		\$10.00		\$10.00		\$10.00					
24 Operating Interest (6 months / year)			6.0%	\$3.47	\$3.47	\$3.47		\$3.47		\$3.47		\$3.47		\$3.47					
25 COST SUBTOTAL				\$464.95	\$258.59	\$206.36		\$258.59	\$182.92	\$282.03	\$182.92	\$355.54	\$109.40	\$355.54	\$109.40				
26 SUBTOTAL % INPUTS CONTRIBUTED					55.6%	44.4%		55.6%	44.4%	60.7%	39.3%	60.7%	39.3%	76.5%	23.5%				
<b>Other Crop Inputs that may be shared:</b>																			
27 % Share of Other Selected Crop Inputs					0.0%	100.0%		30.0%	70.0%	0.0%	100.0%		25.0%	75.0%	0.0%	100.0%		20.0%	80.0%
28 Seed Technology Fee				\$0.00	\$0.00	\$0.00		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00	\$0.00
29 Fertilizer				\$84.18	\$84.18	\$25.25	\$58.93	\$84.18	\$21.05	\$63.14	\$84.18	\$16.84	\$67.34	\$84.18	\$16.84	\$67.34		\$84.18	\$67.34
30 Herbicide				\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95	\$48.95	\$0.00	\$48.95		\$48.95	\$48.95
31 Insecticide + fungicide				\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88	\$20.88	\$0.00	\$20.88		\$20.88	\$20.88
32 Irrigation Fuel				\$51.35	\$51.35	\$15.41	\$35.95	\$51.35	\$12.84	\$38.51	\$51.35	\$10.27	\$41.08	\$51.35	\$10.27	\$41.08		\$51.35	\$41.08
33 Crop Insurance				\$21.38	\$6.41	\$14.97	\$6.41	\$14.97	\$5.35	\$16.04	\$5.35	\$16.04	\$4.28	\$17.10	\$4.28	\$17.10		\$21.38	\$17.10
34 Custom Harvest				\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95	\$60.95	\$0.00	\$60.95		\$60.95	\$60.95
35 Drying				\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27	\$13.27	\$0.00	\$13.27		\$13.27	\$13.27
36 Custom Hauling				\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72	\$38.72	\$0.00	\$38.72		\$38.72	\$38.72
37 Consulting				\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50	\$6.50	\$0.00	\$6.50		\$6.50	\$6.50
38 Operating Interest on lines 27-36				\$10.39	\$0.19	\$10.19	\$1.41	\$8.97	\$0.16	\$10.23	\$1.18	\$9.21	\$0.13	\$10.26	\$0.94	\$9.44		\$10.39	\$9.44
39 TOTAL CROP PRODUCTION COSTS				\$821.51	\$265.19	\$556.32	\$307.07	\$514.44	\$287.53	\$533.98	\$322.43	\$499.08	\$359.95	\$461.56	\$387.87	\$433.65		\$821.51	\$433.65
40 Farm Management Responsibility Charge (% Total Costs)			5.0%	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08	\$41.08		\$41.08	\$41.08
41 TOTAL PRODUCTION & FARM MANAGEMENT COSTS				\$862.59	\$265.19	\$597.39	\$307.07	\$555.52	\$287.53	\$575.05	\$322.43	\$540.15	\$359.95	\$502.64	\$387.87	\$474.72		\$862.59	\$474.72
42 Percent Share of all Crop Inputs and Crop Share					30.7%	69.3%		35.6%	64.4%	33.3%	66.7%		37.4%	62.6%	41.7%	58.3%		45.0%	55.0%

## CONCLUSIONS

These results illustrate the impact of varying irrigation equipment ownership scenarios, sharing of selected crop inputs, and variation in irrigated cropland values upon estimates of equitable crop shares for irrigated corn in Western Kansas.

Other irrigation equipment ownership scenarios could be considered, especially on in which the Landlord owns the land, well, pump, gearhead and underground wiring and pipe, with the tenant owning the “above ground” power unit and center pivot. In the 2018 CPIC presentation of this paper that scenario will be examined for its impact on equitable irrigated crop shares. Alternative percentage shares of the selected fertilizer and irrigation energy costs can and should also be examined in this analysis.

This information on irrigated cropland leasing arrangements will be available in the [www.AgManager.info](http://www.AgManager.info) site by March 2018.

## REFERENCES

North Central Farm Management Extension Committee. *Crop Share Rental Agreements for Your Farm*. North Central Regional Cooperative Extension Service. NCFMEC-02, December 2011.