

Land Ownership and Leasing – Homework #2 (MAST 11-12)

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This homework is based on using the *KSU-Lease.xls* spreadsheet. This spreadsheet is available on the website: www.agmanager.info.

Disclaimer:

This homework is a fairly tough homework (i.e., it entails more data entry and requires you to move around in the *KSU-Lease* spreadsheet more than some of the other homework problems). Because of the larger number of inputs, a spreadsheet has been provided with values already pre-entered. However, you are encouraged to access the Farm Management Guide budgets and familiarize yourself with information that is available and what would be required so that you will feel comfortable entering data for your own situations in the future. You will likely find that while the initial effort may be somewhat painful, after working through an example or two using the *KSU-Lease* spreadsheet the process is really quite easy. Finally, you are reminded to rely upon the paper explaining the use of this spreadsheet that is available at www.agmanager.info/farmmgmt/land/lease/tools/KSU-Lease.PDF.

Situation:

You are a central Kansas producer and currently have the opportunity to rent 320 acres (315 tillable) from a retiring farmer. This expansion is consistent with your long term goals of increasing farm size and will not be a problem given your current labor and machinery resources. Of the total acres on this farm, 160 will be planted to wheat annually, 25 acres planted to corn, 50 acres planted to full-season soybeans, and 80 acres planted to grain sorghum (milo). The landowner is flexible with regard to the specific terms of the lease (e.g., crop share, cash, inputs shared), but he understands the concept of equitable leases and wants to make sure both parties are being treated “fairly” in the final lease agreement. Your job is to examine alternative leasing arrangements and make a proposal to the landowner.

Your first step to analyzing this lease is to develop crop budgets for each of the crops (i.e., identify all of the contributions). The following tables represent expected costs and returns for each of the crops on this farm. The inputs are “roughly” based on 2010 K-State projected budgets with updated values for fertilizer and other inputs which you and the landowner agree to use as a starting point for your analysis. The information in the “shaded” cells needs to be entered into the *KSU-Lease.xls* spreadsheet (i.e., the blue numbers) – if you have a copy of the *KSU-Lease-Homework.xls* file the inputs have already been entered.

TABLE 1. CROP BUDGETS SHOWING TOTAL COSTS AND RETURNS

Crop/System	Wheat	Corn	SB	Milo	DC SB	Alfalfa	Total	Per Acre	Per Acre
Planted acres of each crop	160.0	25.0	50.0	80.0	0.0	0.0	315.0		
Tillable acres per planted acre	1.00	1.00	1.00	1.00	0.00	1.00	315.0	Planted	Tillable
INCOME PER ACRE									
A. Yield per acre	44.0	75.0	28.0	75.0	20.0	3.3	---	---	---
B. Price per unit	\$6.00	\$3.75	\$9.00	\$3.60	\$9.00	\$110.00	\$83,471	---	\$264.99
C. Net government payments	\$14.00	\$14.00	\$14.00	\$14.00	\$0.00	\$14.00	\$4,410	\$14.00	\$14.00
D. Indemnity payments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0	\$0.00	\$0.00
E. Miscellaneous income	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0	\$0.00	\$0.00
F. Returns/acre ((A x B) + C + D + E)	\$278.00	\$295.25	\$266.00	\$284.00	\$180.00	\$371.50	\$87,881	\$278.99	\$278.99
COSTS PER ACRE									
1. Seed	\$15.00	\$77.28	\$46.20	\$15.69	\$49.50	\$12.30	\$7,897	\$25.07	\$25.07
2. Herbicide	6.29	28.87	14.95	34.10	9.08	6.24	5,203	16.52	16.52
3. Insecticide / Fungicide	27.90	0.00	0.00	0.00	0.00	3.00	4,464	14.17	14.17
4. Fertilizer and Lime	50.50	55.00	23.75	55.00	15.00	35.00	15,043	47.75	47.75
5. Crop Consulting	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00
6. Crop Insurance	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00
7. Drying	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00
8. Miscellaneous	6.25	6.25	6.25	6.25	5.00	6.25	1,969	6.25	6.25
9. Machinery Expense	113.12	93.16	76.63	100.88	63.32	124.58	32,330	102.63	102.63
10. Non-machinery Labor	9.75	9.75	7.80	10.40	6.50	16.25	3,026	9.61	9.61
11. Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00
12. Land Charge / Rent	55.00	55.00	55.00	55.00	0.00	55.00	17,325	55.00	55.00
G. SUB TOTAL	\$283.80	\$325.31	\$230.58	\$277.32	\$148.40	\$258.62	\$87,256	\$277.00	\$277.00
13. Interest on 1/2 Nonland Costs	6.68	8.37	5.25	6.60	4.45	5.67	2,069	6.57	6.57
H. TOTAL COSTS	\$290.49	\$333.68	\$235.82	\$283.92	\$152.85	\$264.28	\$89,325	\$283.57	\$283.57
I. RETURNS OVER COSTS (F - H)	(\$12.49)	(\$38.43)	\$30.18	\$0.08	\$27.15	\$107.22	(\$1,444)	(\$4.58)	(\$4.58)
J. TOTAL COSTS/UNIT (H/A)	\$6.60	\$4.45	\$8.42	\$3.79	\$7.64	\$81.32	---	---	---
K. RETURN TO TOTAL COST ((I+13)/G)	-2.05%	-9.24%	15.36%	2.41%	21.29%	43.65%	-1.62%	-1.62%	-1.62%

TABLE 2. Production Inputs Used for Budgets

ITEM	Wheat	Corn	SB	Milo	DC SB	Alfalfa	\$/unit
Seeding rate (lbs, seeds, etc)	100	24	140	4.67	150	3	
Seed price, \$/unit	\$0.15	\$3.22	\$0.33	\$3.36	\$0.33	\$4.10	
Fertilizer:							
82-0-0	25.0	50.0	0.0	50.0	0.0	0.0	\$0.450 /lb
N (dry/liquid)	25.0	10.0	0.0	10.0	0.0	0.0	\$0.650 /lb
P	24.0	28.0	25.0	28.0	20.0	40.0	\$0.750 /lb
K	0.0	0.0	0.0	0.0	0.0	0.0	\$0.650 /lb
Lime	500.0	500.0	500.0	500.0	0.0	500.0	\$0.010 /lb
Herbicide							
Finesse	0.3						\$17.62 /oz
+ Surfactant	1						\$1.00 /ac
Status		1					\$3.00 /oz
Bicep II Magnum		2		1.6			\$10.92 /qt
Buctril + Atrazine				2			\$6.30 /pt
Glyphosate		32	64	32	64		\$0.11 /oz
+ Ammonium Sulfate		1.5	4.5	1.5	6		\$0.34 /lb
Roundup Weather Max			22				\$0.29 /oz
Pursuit						1.2	\$5.20 /ac
xxx							\$0.00 /ac
Insecticide / Fungicide							
Force 3G							\$4.83 /lb
Capture 2EC							\$141.09 /lb
Headline	9						\$3.10 /oz
Warrior 1EC						3	\$1.00 /ac
Irrigation water, inches/acre							\$4.00 /in
Irrigation repairs, \$/acre-inch							\$0.50 /in
Drying cost, \$/unit (bu, cwt, etc)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	

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TABLE 3. Machinery and Land Resources Used for Budgets

ITEM	Wheat	Corn	SB	Milo	DC SB	Alfalfa	\$/unit
Drill/Plant, \$/acre	\$11.75	\$14.07	\$14.32	\$14.01	\$14.32	\$2.76	
Tillage and Chemical Applications:							
Chisel	1	0	0	0	0	0	\$11.01 /ac
Disk	1	0	0	0	0	0.2	\$9.20 /ac
Field cultivate	1	0	0	0	0	0.2	\$9.15 /ac
Harrow	0	0	0	0	0	0.4	\$8.23 /ac
Anhydrous application	1	1	0	1	0	0	\$10.99 /ac
Fertilizer application	0	1	1	1	0	1	\$4.96 /ac
Herbicide application	1	2	3	2	2	0.2	\$5.10 /ac
Insecticide/fungicide application	1	0	0	0	0	1	\$5.10 /ac
Harvest							
Base charge, \$/acre	\$22.27	\$27.01	\$26.76	\$23.68	\$26.76	\$49.11	
Charge for high yields, \$/unit	\$0.217	\$0.204	\$0.209	\$0.222	\$0.209	\$11.820	
High yield	22	74	28	36	28	0	
Hauling, \$/unit	\$0.205	\$0.181	\$0.189	\$0.203	\$0.189	\$0.000	
Non-machinery labor, hr/acre	0.75	0.75	0.60	0.80	0.50	1.25	\$13.00 /hr
Irrigation labor, hr/acre	0.00	0.00	0.00	0.00	0.00	0.00	\$13.00 /hr
Average land value, \$/acre /A	\$55	\$55	\$55	\$55	\$55	\$55	
Annual return to land, % /A							100.0%
Interest on capital, %							7.0%
Irrigation Equipment							
	Investment, \$		Years		Salvage value, %		
	Total	\$/wet ac					
Well, pump and gearhead value	\$0	n/a		25		0%	
Power unit and meter	\$0	n/a		7		0%	
Irrigation system	\$0	n/a		20		10%	

/A – The annual cost associated with land can either be entered as a Land Value x Rent-to-Value OR as a Cash Rent x 100%. For example, if cash rent in region is \$42 per acre, this can be entered as \$42 in row 94 and 100% in cell K95 OR as \$840 in row 94 and 5% in cell K95 [\$42 x 100% = \$840 x 5%].

TABLE 4. Alternative Yield and Price Scenarios (minimum of one must be entered)

Yield scenarios to consider							
	Wheat	Corn	SB	Milo	DC SB	Alfalfa	Use (Y=1, N=0)
Used in analysis above	44	75	28	75	20	3.25	1
Expected yields	44	75	28	75	20	3.25	1 (base)
Low yield scenario	38	60	22	65	12	2.5	0
Slightly lower than average	40	67	25	70	16	3	0
Slightly better than average	48	85	30	80	24	3.5	0
High yield scenario	52	100	35	90	28	4	0
Price scenarios to consider							
	Wheat	Corn	SB	Milo	DC SB	Alfalfa	Use (Y=1, N=0)
Used in analysis above	\$6.00	\$3.75	\$9.00	\$3.60	\$9.00	\$110.00	1
5-yr average harvest (local coop)	\$6.00	\$3.75	\$9.00	\$3.60	\$9.00	\$110.00	1 (base)
5-yr avg for region (mktg year)	\$5.97	\$4.13	\$9.82	\$3.93	\$9.82	\$114.00	0
10-yr avg for region (mktg year)	\$4.65	\$3.13	\$7.77	\$2.95	\$7.77	\$99.00	0
Current futures + basis (2011-2014)	\$6.60	\$5.50	\$11.25	\$5.00	\$11.25	\$110.00	0
Slightly better than average	\$6.00	\$4.25	\$10.00	\$4.00	\$10.00	\$120.00	0

Machinery cost adjustment (percent of values entered in Table 2)

115.0%

In the event you have chosen to manually enter data (good practice), to verify that you have entered all information correctly into the spreadsheet, the return over total costs should match that above: -\$1,444 (farm), -\$4.58 (planted acre), and -4.58 (tillable acre). If these numbers do not match, check that you have entered the inputs correctly.

Note: unless specified otherwise, shared inputs are to be shared equitably (i.e., in the same percentage as the income) which is accomplished by entering a -100% as the operator's share (the only place where inputs are not shared equitably, is miscellaneous costs where it is assumed 80% of those are from the operator and 20% from the landowner). Also, make sure that cell L4 in the "Shares" tab is set at 0 for your entire analysis.

Question #1:

Based on equitably sharing fertilizer (including lime), herbicides, insecticides & fungicides, and chemical applications, and the operator (you) paying 100% of all other costs except miscellaneous which is 80% for operator and 20% for the landowner, answer the following:

- a. What are the equitable crop share percentages for the landowner and the operator when land is valued at \$55/acre cash rent?
- b. Given a 0% risk adjustment factor (cell G92 in the Lease budgets tab), what is the average cash rent per tillable acre from the three methods across all crops on the farm at 5-year average prices?
- c. What is the implied risk premium associated with a \$55 per acre cash rent?

Question #2:

Continuing with your previous assumptions, only using current projected prices for the future rather than 5-year averages, answer the following:

- a. If you pay \$55/acre cash rent, what is the implied risk premium at these higher prices and assuming approximately a 70/30 crop share arrangement?
- b. How much could cash rent increase such that return over total costs (economic profit) is approximately \$20/acre?
- c. How does this higher cash rent impact the equitable crop share split assuming the same costs continue to be shared?

Question #3:

Continuing with your previous assumptions regarding cash prices and land rent at \$90/acre, answer the following:

- a. If the landowner's only expense is 20% miscellaneous (and their share on crop insurance and drying), what would the equitable arrangement be (i.e., what are the terms for a net share lease)?
- b. How does this compare to when land rent is \$55/acre?

Question #4:

Assuming that land rents increase to \$90 per acre in response to the higher commodity prices, what is the landowner's expected return to land (\$/tillable acre) under each of the following:

- a. Cash rent?
- b. Equitable crop share with landowner sharing fertilizer, chemicals, and chemical applications (i.e., same inputs as previously shared)?
- c. Equitable crop share with tenant paying all inputs except 20% of miscellaneous and landowner's share of crop insurance and drying (i.e., net share rent)?

Question #5:

What is the lease arrangement(s) you would propose to this landowner?