

Economic Impact of No-till and Energy Costs on Land Rental Arrangements

Kevin C. Dhuyvetter -- kcd@ksu.edu -- 785-532-3527

Troy J. Dumler -- tdumler@ksu.edu -- 620-275-9164

Terry L. Kastens -- tkastens@ksu.edu -- 785-532-5866



Department Agricultural Economics
Kansas State University
Cover Your Acres Winter Conference
Oberlin, KS February 2, 2006



Objective of talk

- Develop an understanding of how technological changes such as no-till, and macroeconomic factors such as energy prices can impact crop leases
- Trying to reduce decisions to numbers
- Decision tools:
 - *KSU-Lease.xls*
 - *KSU-Crop Budgets 2006.xls*
 - *KSU-Landbuy.xls*

In recent years, the majority of leasing questions received pertain to:

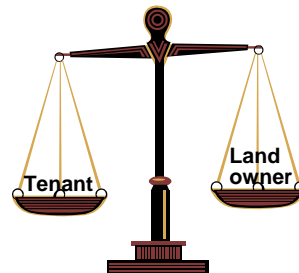
- **Impact of adopting new technologies**
- **Cash renting**
- **“Non-traditional” leases**
 - Net share rent
 - Flexible cash rent
 - Bushel rent
 - Combination cash/cropshare

... while current “hot topic” is slightly different, method of addressing questions has not changed.

3

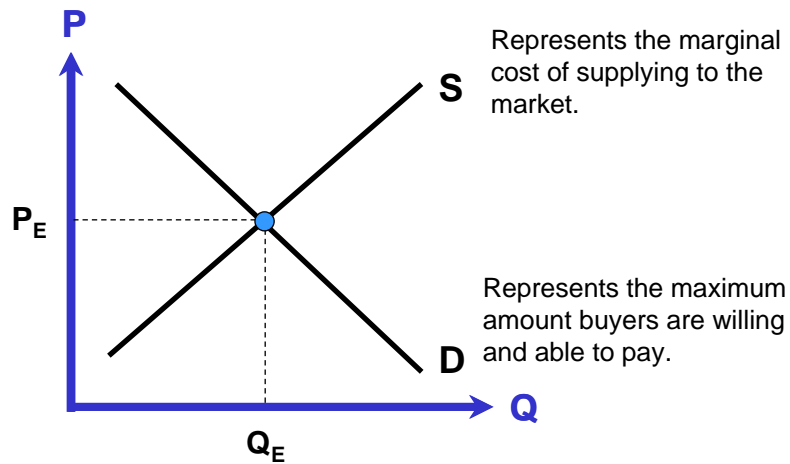
Determining the terms of a lease ...

How are cash lease rates or the terms of crop share leases established?



4

Market established rental rates ...



5

Market established rates...

- Land Use Value Project of the KSU Ag Econ Dept annually conducts one of four surveys (irrigated, non-irrigated, pasture, input costs)
- Kansas Agricultural Statistics (KAS) annually surveys landowners and producers regarding land values and cash rents
- Local and regional surveys of leasing practices
- With surveys there is often a trade-off between statistical validity and level of aggregation

Problem:

The market equilibrium prices we observe (when they are available) often do not reflect individual situations.

That is, they reflect averages, but nobody is average...

... so what can we do to arrive at a price that reflects an equilibrium?



Way to find acceptable lease rates (crop shares and cash rents) ...

While landowners and tenants (i.e., the market) ultimately determine terms of crop share and cash leases, we use the equitable concept to arrive at a starting point for negotiations.

A good crop share lease should follow five basic principles ...

1. Yield increasing inputs should be shared
2. Share arrangements should be adjusted as technology changes
3. Total returns divided in same proportion as resources contributed

4. Compensation for unused long-term investments at termination
5. Good landlord/tenant communications

9

**Principle #1:
Yield increasing inputs should be shared**

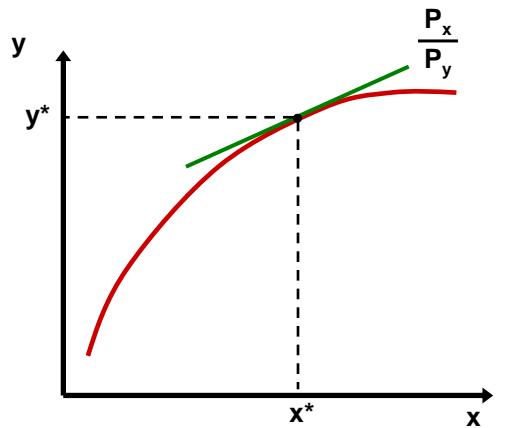
The reason it is recommended that yield increasing inputs should be shared is this provides the economic signal for the economic optimal amount of the input to be used.

10

Principle #1:
Yield increasing inputs should be shared

Examples of yield increasing inputs

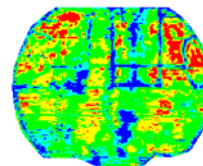
- Fertilizer
- Irrigation water
- Herbicides ???
- Seed ???



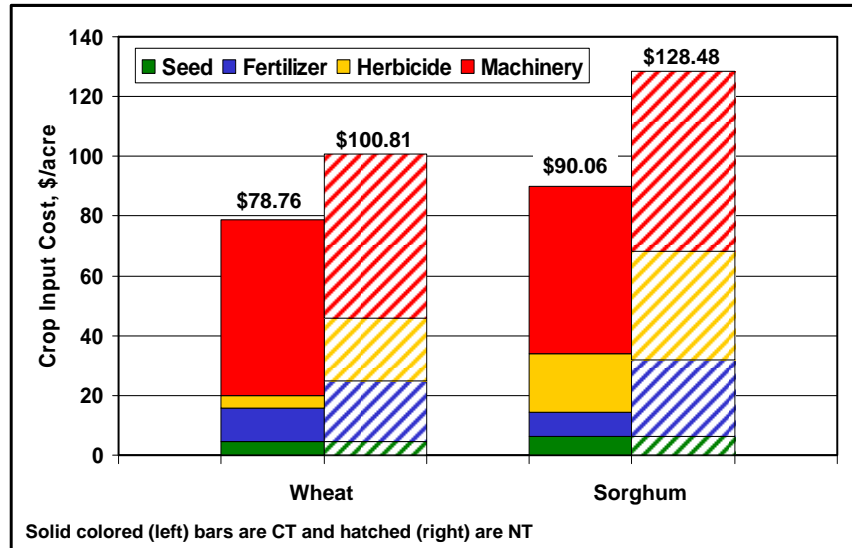
Principle #2:
Technology may affect share arrangements

Examples of technological change

- Reduced-/no-till
- New crops and/or rotations
- Center pivot irrigation
- Hybrid seed
- Bio-technology
- Precision agriculture (GPS)



Tribune WSF Crop Input Costs



Costs for wheat and sorghum increase 28% and 40%, respectively with NT.

17

Adoption of new technologies ...

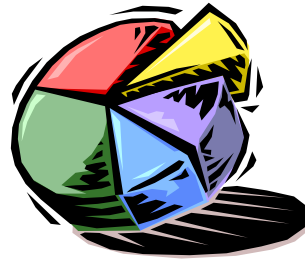
- ... tends to cause problems because traditional arrangements or rules-of-thumb are often not appropriate.
- ... should not be a problem if we follow basic principles of a good lease.
- ... if problems persist as to what is equitable, can lead to alternative leasing arrangements (e.g., cash lease).

18

Principle #3:
Returns divided in same proportion as resources contributed.

This requires annual contributions of both parties to be identified (budgeting type approach).

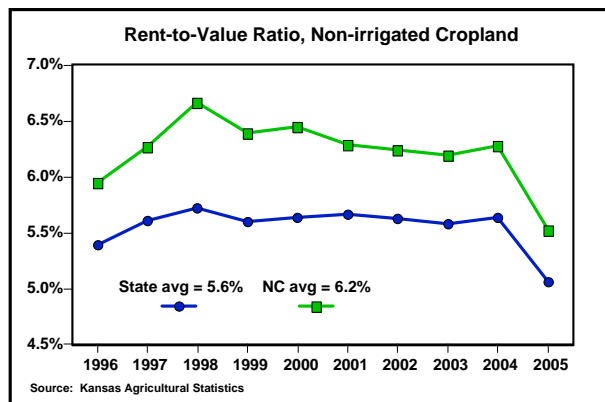
Valuing inputs can depend on whether the lease being developed is a one-year lease versus multiple-year lease.



19

Land contribution ...

The land contribution is typically based on an “average market value” for the land along with an historical average return to land.



20

Machinery contributions ...



Machinery contribution should be based on average costs. Two methods for estimating the machinery contribution:

- 1. Machinery investment approach - annual contribution is based on depreciation, interest, repairs, fuel and oil, and labor.**
- 2. Custom rates approach - annual contribution is based on reported custom rates and the typical operations.**



21

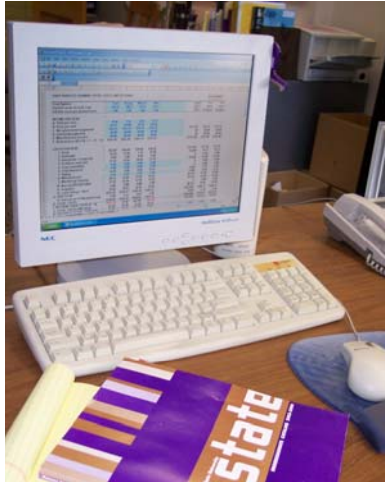
Crop production input contributions ...

The value of contributions for input expenses such as seed, herbicides, insecticides, fertilizer, etc. are generally valued at current market prices and represent “typical” production practices.

What is “typical” today? While current prices might not be what we expect long-term, can we afford to ignore them with regard to leases?

22

Using “KSU-Lease.xls” to determine equitable crop share and cash leases ...



Information/data required:

1. Crop rotation/mix
2. Income information
3. Production inputs
4. Machinery costs
5. Land value
6. Irrigation equipment
-
7. Contributor of input
8. Risk adjustment

23

Lease Examples of WF and WCF (based on 2005 Farm Management Guides)

Equitable Crop Shares with Wheat-Fallow vs. Wheat-Corn-Fallow Rotations							
Contributor --- (L=Landlord, T=Tenant, and S=Shared (equitably))							
Alternative Arrangements for Sharing Various Inputs							
<u>Crop Rotation</u>	<u>Wheat-Fallow</u>			<u>Wheat-Corn-Fallow</u>			
Land	L	L	L	L	L	L	L
Machinery	T	T	T	T	T	T	T
Fertilizer ¹	S	S	T	S	S	S	T
Herbicide (wheat) ¹	T	S	T	T	T	S	T
Herbicide (corn) ¹	---	---	---	T	S	S	T
Other	T	T	T	T	T	T	T
Contributions (L/T)	35.1/64.9	37.5/62.5	30.1/69.9	27.1/72.9	30.5/69.5	31.7/68.3	21.7/78.3
Net return, \$/ac	-\$25.14	-\$25.14	-\$25.14	-\$15.11	-\$15.11	-\$15.11	-\$15.11

¹ Application costs not included (accounted for in “Other”).

24

Lease Examples of WF and WSF (based on 2005 Farm Management Guides)

Equitable Crop Shares with Wheat-Fallow vs. Wheat-Sorghum-Fallow Rotations							
Contributor --- (L=Landlord, T=Tenant, and S=Shared (equitably))							
Alternative Arrangements for Sharing Various Inputs							
Crop Rotation	Wheat-Fallow			Wheat-Sorghum-Fallow			
Land	L	L	L	L	L	L	L
Machinery	T	T	T	T	T	T	T
Fertilizer ¹	S	S	T	S	S	S	T
Herbicide (wheat) ¹	T	S	T	T	T	S	T
Herbicide (corn) ¹	---	---	---	T	S	S	T
Other	T	T	T	T	T	T	T
Contributions (L/T)	35.1/64.9	37.5/62.5	30.1/69.9	29.2/70.8	33.1/66.9	34.5/65.5	23.3/76.7
Net return, \$/ac	-\$25.14	-\$25.14	-\$25.14	-\$17.42	-\$17.42	-\$17.42	-\$17.42

¹ Application costs not included (accounted for in "Other").

25

Principle #4: Compensation for unused long-term investments at lease termination.

It is generally recommended that landowners make long-term investments such as terraces, irrigation well, lime, alfalfa seed, etc.

If the tenant pays for long-term investments, or shares their cost, he should be compensated for his share of any value that remains when the lease is terminated

26

Does no-till impact rents (land values) . . .

- **What are the long-term impacts of NT on soil quality?**
 - organic matter (fertilizer provider)
 - soil structure (water holding capacity)
 - reduced erosion
- **Market rents early vs. late (extra N needed early?)**
- **Will tenants be compensated for improvements at lease termination?**

27

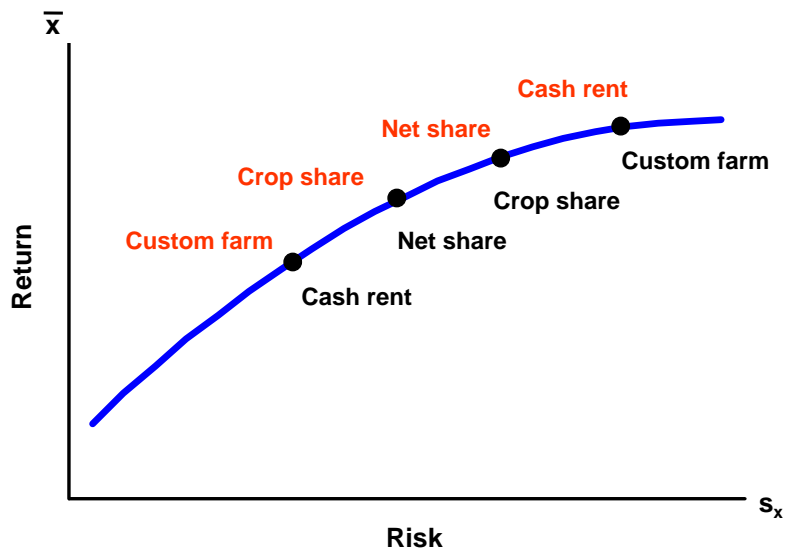
Principle #5: Good communications between the landlord and the tenant.

Because so many of the terms of a lease are based on negotiation between the landowner and the tenant, good communications are critical.

A lease is a legal contract in Kansas, thus it is suggested that terms of the lease agreed upon by both parties be put in writing. This becomes more important as the complexity of leases increases.

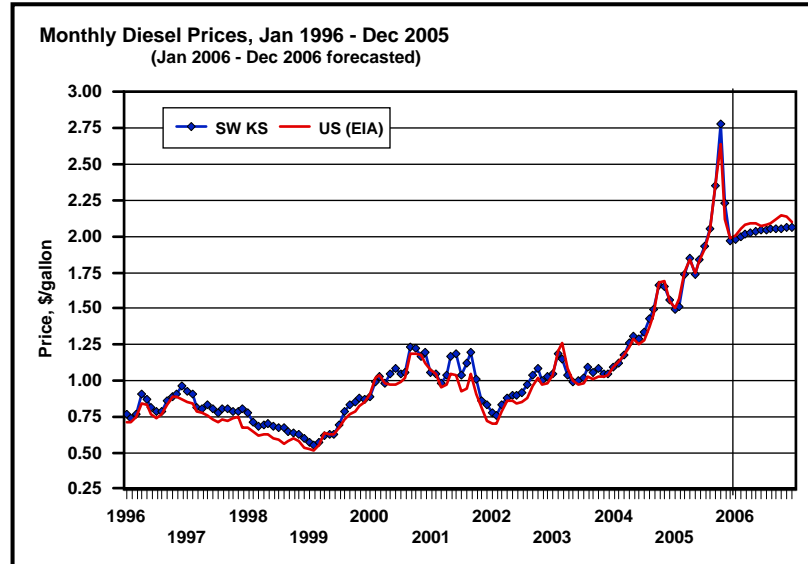
28

Landowner/producer risk-return tradeoff



Impact of high energy prices on leases

Forecasts for 2006 diesel prices are down from recent levels, but they are still at very high levels...



31

Historical and forecasted diesel prices during principal farming months...

Diesel Prices

Year	Mar-Oct Diesel Price			Year-to-year percent change		
	SW KS	US (EIA)	Average	SW KS	US (EIA)	Average
2000	\$1.09	\$1.04	\$1.07	----	----	----
2001	\$1.09	\$0.98	\$1.04	0.6%	-6.1%	-2.7%
2002	\$0.94	\$0.88	\$0.91	-14.1%	-10.0%	-12.1%
2003	\$1.05	\$1.05	\$1.05	12.1%	18.6%	15.3%
2004	\$1.37	\$1.34	\$1.36	30.0%	28.4%	29.2%
2005	\$2.04	\$2.02	\$2.03	48.5%	49.9%	49.2%
2006 (F)	\$2.04	\$2.10	\$2.07	0.3%	4.1%	2.2%
05 - Avg(00-04)	\$0.93	\$0.96	\$0.94	83.5%	90.2%	86.8%
06 - Avg(00-04)	\$0.93	\$1.04	\$0.98	84.0%	97.9%	90.8%

F = forecast

32

Estimated effect diesel price has on machinery costs per acre based on custom rates...

Fuel Consumption and Diesel Price Impact for Various Field Operations

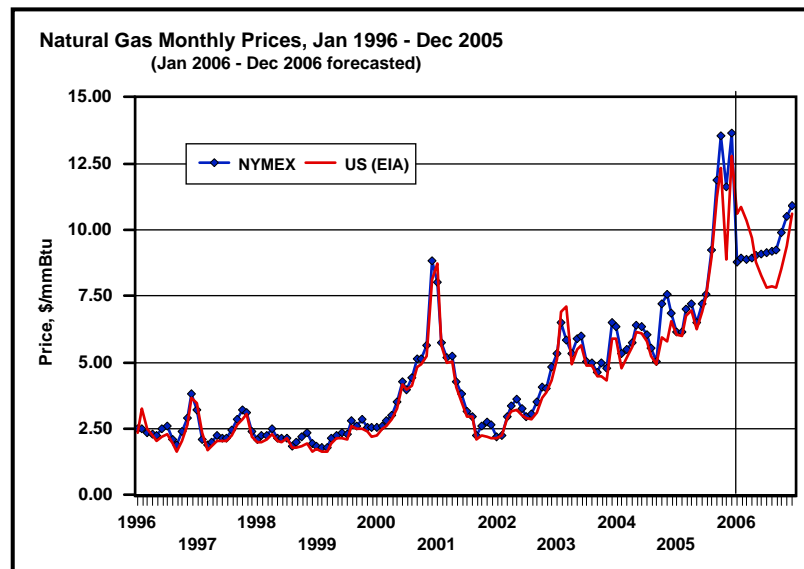
Operation	Custom rate*	Fuel price increase, \$/gallon				
		\$0.04	\$0.50	\$0.71	\$0.75	\$1.00
		Increase in custom rate, \$/acre				
Chiseling	\$7.96	\$0.03	\$0.42	\$0.60	\$0.63	\$0.85
Field cultivation	\$6.27	\$0.03	\$0.33	\$0.47	\$0.50	\$0.67
Disking	\$6.84	\$0.03	\$0.36	\$0.52	\$0.54	\$0.73
Min-till planter	\$10.29	\$0.04	\$0.55	\$0.78	\$0.82	\$1.09
No-till drill	\$10.72	\$0.05	\$0.57	\$0.81	\$0.85	\$1.14
Sprayer	\$4.03	\$0.02	\$0.21	\$0.30	\$0.32	\$0.43
Swather-conditioner	\$8.90	\$0.04	\$0.47	\$0.67	\$0.71	\$0.94
Round baler	\$8.03	\$0.03	\$0.43	\$0.61	\$0.64	\$0.85
Combine--wheat	\$14.48	\$0.06	\$0.77	\$1.09	\$1.15	\$1.54
Combine--soybeans	\$20.06	\$0.09	\$1.06	\$1.51	\$1.60	\$2.13
Combine--corn	\$20.09	\$0.09	\$1.07	\$1.51	\$1.60	\$2.13

* 2004 state average reported by Kansas Agricultural Statistics

Increase from 2004 = \$0.71/gallon, increase from 2000-04 average = \$0.98/gallon.

Increase in custom rate 0.4% 5.3% 7.5% 8.0% 10.6% 33

Natural gas prices are at historically high levels...



Historical and forecasted natural gas prices during principal farming months...

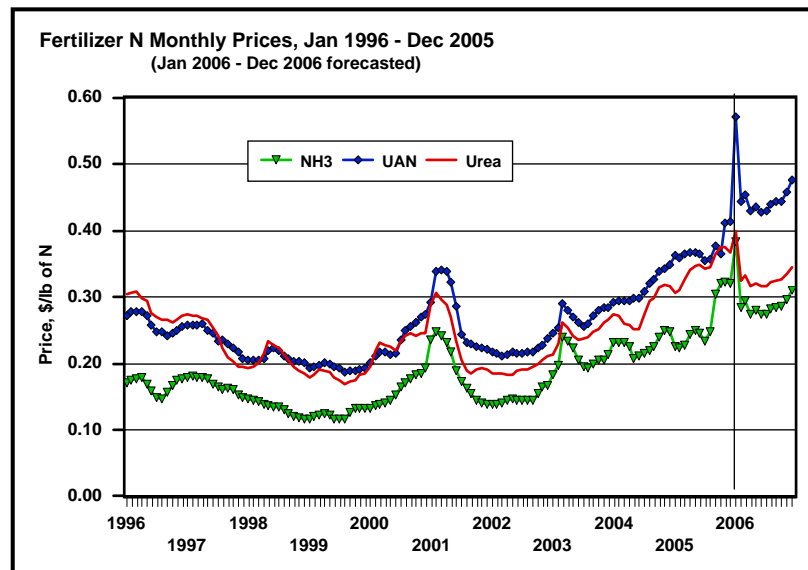
Natural Gas Prices

Year	Mar-Oct Natural Gas Price			Year-to-year percent change		
	NYMEX	US (EIA)	Average	NYMEX	US (EIA)	Average
2000	\$4.04	\$3.85	\$3.95	-----	-----	-----
2001	\$3.69	\$3.49	\$3.59	-8.6%	-9.3%	-9.0%
2002	\$3.35	\$3.12	\$3.23	-9.2%	-10.7%	-10.0%
2003	\$5.35	\$5.24	\$5.30	59.5%	68.2%	63.7%
2004	\$5.99	\$5.63	\$5.81	11.9%	7.5%	9.7%
2005	\$8.77	\$8.37	\$8.57	46.5%	48.6%	47.5%
2006 (F)	\$9.19	\$8.65	\$8.92	4.8%	3.3%	4.1%
05 - Avg(00-04)	\$4.28	\$4.11	\$4.20	95.5%	96.3%	95.9%
06 - Avg(00-04)	\$4.70	\$4.39	\$4.55	104.9%	102.9%	103.9%

F = forecast

35

Nitrogen fertilizer prices are at historically high levels...



36

Historical and forecasted fertilizer prices during principal fertilizing months...

Fertilizer Prices (Corn Belt)

Percent of total	40.0%	17.5%	17.5%	20.0%	5.0%	100.0%	
	Oct-May Fertilizer Price*						Year-to-year
Year	NH3 (82%)	UAN (32%)	Urea (46%)	- P -	- K -	Wtd Avg	% change
2000	0.136	0.204	0.205	0.211	0.148	0.175	-----
2001	0.217	0.305	0.272	0.193	0.148	0.234	33.2%
2002	0.141	0.218	0.187	0.201	0.144	0.175	-25.3%
2003	0.195	0.253	0.227	0.209	0.141	0.211	20.7%
2004	0.218	0.290	0.262	0.214	0.141	0.234	10.8%
2005	0.238	0.356	0.322	0.223	0.174	0.267	14.4%
2006 (F)	0.309	0.440	0.351	0.228	0.194	0.318	18.8%
05 - Avg(00-04)	\$0.057	\$0.103	\$0.092	\$0.017	\$0.029	\$0.061	29.9%
06 - Avg(00-04)	\$0.128	\$0.186	\$0.120	\$0.023	\$0.050	\$0.112	54.4%
* Oct-Dec of previous year (P = average of 10-34-0 and 18-46-0, K = muriate of potash)							
F = forecast							
06 vs Avg(00-04)	170.4%	173.3%	152.2%	111.2%	134.5%	154.4%	

37

Impact of high costs on leases ...

KSU-Lease.xls is a tool that can be used to analyze the impact of current costs have on equitable crop share leases as well as their cash-rent equivalents

The impact high costs have on leases will depend on each specific situation due to how producers change (or not change) production practices in response to these high prices

→ producers should “run their own numbers”

40

Dryland example assumptions ...

- 75% of land cropped annually (58.3% wheat and 41.7% milo) with other 25% fallow
- Equitably share all fertilizer on both crops (tenant pays application costs)
- Equitably share herbicide and application costs on milo
- Initial analysis is based on fuel and fertilizer costs at 2000-04 averages
- Examined impact on equitable crop share and cash rent equivalent with increased costs (all else held constant)

42

Dryland example summary* ...

	Equitable share	Cash rent	Profit
Base scenario	66.2 / 33.8	\$29.98	-\$2.99
Increased fertilizer costs	66.2 / 33.8	\$25.40	-\$13.36
Increased fuel costs	67.6 / 32.4	\$28.04	-\$7.47
Increased fuel and fert costs	67.6 / 32.4	\$23.50	-\$17.84

* Based on fertilizer and fuel price forecasts on 12/1/05

43

Irrigated example assumptions ...

- Rotation -- 67% corn and 33% soybeans
- Equitably share fertilizer, herbicides, insecticides, and irrigation energy (tenant pays application costs on fertilizer, shared on others)
- Tenant owns center pivot and motor, landowner owns well, pump and gearhead (tenant pays 75% of irrigation repairs, landowner 25%)
- Initial analysis is based on fuel and fertilizer costs at 2000-04 averages
- Examined impact on equitable crop share and cash rent equivalent with increased costs (all else held constant)

44

Irrigated example summary* ...

	Equitable share	Cash rent	Profit
Base scenario	74.9 / 25.1	\$62.41	-\$18.95
Increased fertilizer costs	74.9 / 25.1	\$51.64	-\$44.94
Increased pumping costs	74.9 / 25.1	\$37.16	-\$79.89
Increased fuel costs	75.6 / 24.4	\$58.87	-\$27.64
Increased costs (ALL)	75.6 / 24.4	\$23.03	-\$114.56

* Based on fertilizer, natural gas, and fuel price forecasts on 12/1/05

45

Summary ...

High input prices will have significant impact on crop returns in 2006

High diesel fuel prices will impact returns, but they have relatively minor impact on equitable crop share percentages

Crop share tenants will not be impacted nearly as much as those cash renting (assuming fertilizer and irrigation pumping expenses are being shared)

Producers cash renting need to negotiate with landowners to see if they will help “share the pain” (likewise for crop share tenants not sharing fertilizer or irrigation pumping costs)

46

Summary ...

Producers need to “do their homework” to make sure they understand the numbers before talking to their landowner(s)

Tenants need to think long-term when negotiating with landowners

- Impact of losing or giving up land?**
- Have “good times” been shared?**

Good landlord/tenant communications will be critical as we go through these tough economic times

47

AgManager: Providing Agricultural Economic Information on Crops, Livestock, Marketing and Outlo - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.agmanager.info/

about contributors useful links site map feedback Search

AG MANAGER.INFO
Kansas State Research & Extension

- ▼ Agribusiness
- ▼ Crops
- ▼ Energy Prices
- ▼ Farm Management
- ▼ Human Resources
- ▼ Income Tax & Law
- ▼ Livestock & Meat
- ▼ Policy
- ▼ Ag Econ News
- ▼ Contributors
- ▼ Programs
- ▼ Sponsors
- ▼ Upcoming Events

A Website Providing Information and Tools For The Competitive Business

www.agmanager.info

Questions ? MAST
Network with Successful Peers

Management Analysis and Strategic Thinking

Site Updates

Modifying Fertilizer Recs to Reflect Price
December 2, 2005 by Karlens et al.

Impact of Energy Prices on KS Farm Costs
December 2, 2005 by Dhuyvetter et al.

Livestock and Hay Charts
December 2, 2005 by Jim Mintert

Updated Cattle Databases
December 2, 2005 by Jim Mintert

Updated Crop Basis Tool
December 1, 2005 by Kevin Dhuyvetter

Monthly M3 and Diesel Price Forecasts
November 30, 2005 by Kevin Dhuyvetter

In The Cattle Markets
November 28, 2005 by Jim Mintert/LMIC

The U.S. Ethanol Industry
November 25, 2005 by Dhuyvetter et al.

Livestock Farm Management Update
November 18, 2005 by Rod Jones

Crop Basis Maps
November 18, 2005, by Kevin Dhuyvetter

Livestock Risk Protection
November 17, 2005 by Dhuyvetter and Mintert

Grain Outlook
November 17, 2005 by Mike Woolvetton

Cost Comparison of Silage Storage Alternatives
November 8, 2005 by Dhuyvetter et al.

Contact Us: Department of Agricultural Economics 342, Waters Hall, Manhattan, KS 66506 (785) 532-5823

Department of Agricultural Economics K-State Research & Extension College of Agriculture Kansas State University

start Internet 2:48 PM