

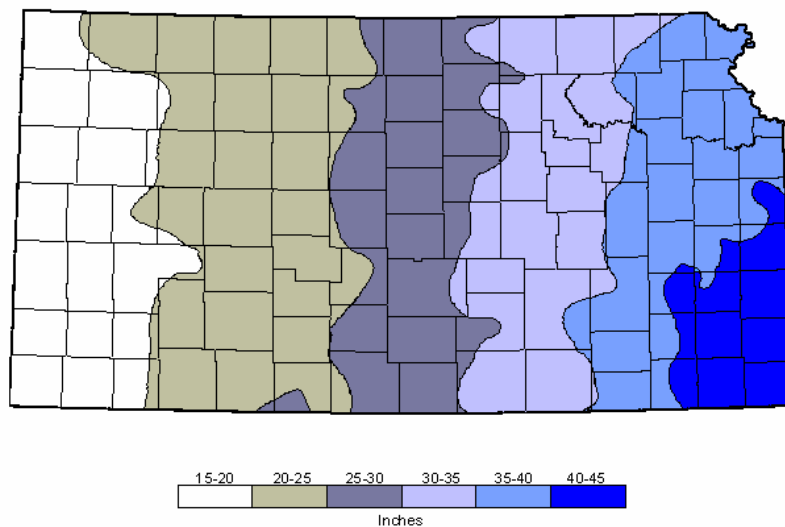
Current Economic Issues in Hay Production



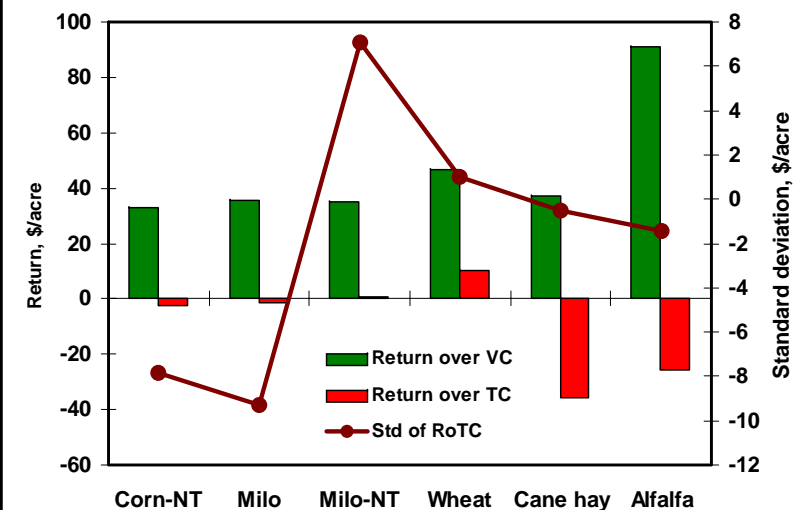
Background thoughts . . .

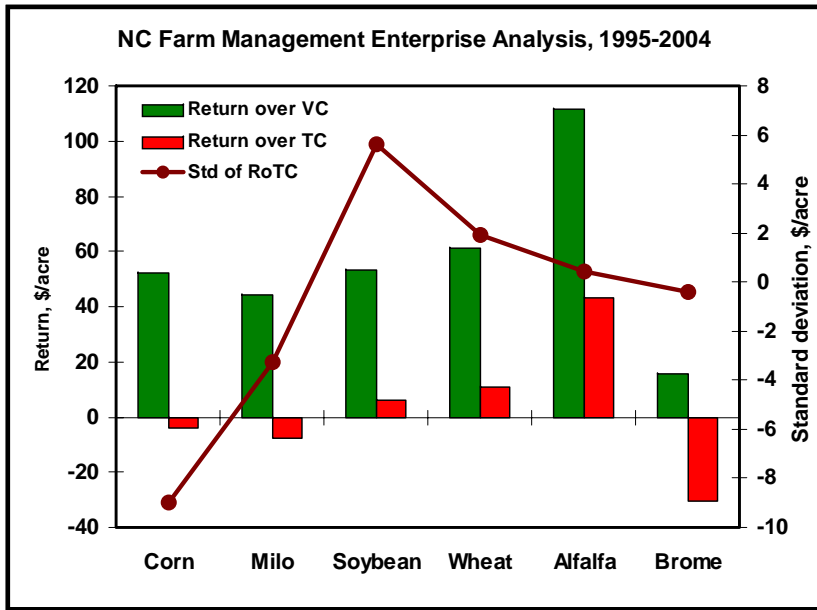
- We try to put numbers to your intuition – to give you new intuition
 - We learn a great deal from successful managers
- Hay production is quite profitable
- Hay is becoming a crop in its own right
- Competition will make better hay managers
- New technologies in hay machinery are coming fast
- Fuel prices matter
- DDGS impacts alfalfa price?

Kansas Annual Precipitation, 1961-90

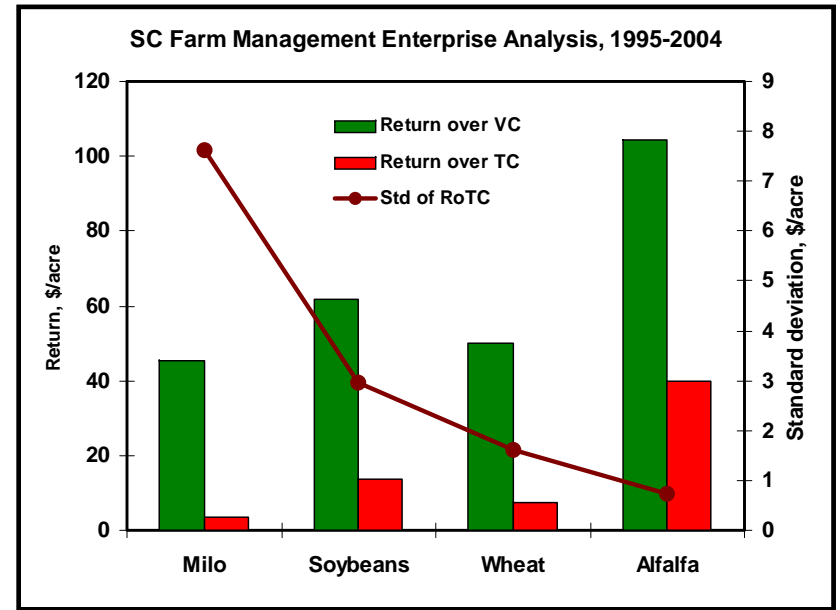


NW Farm Management Enterprise Analysis, 1995-2004

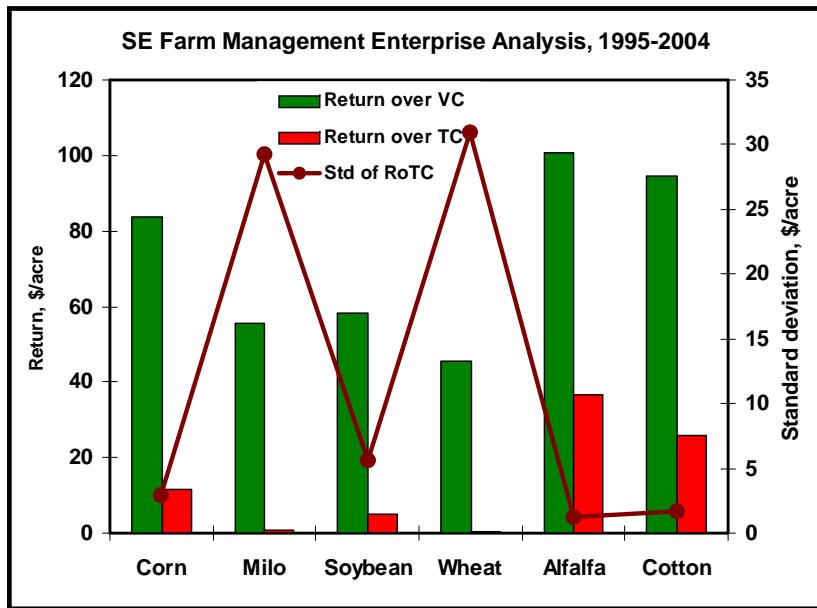




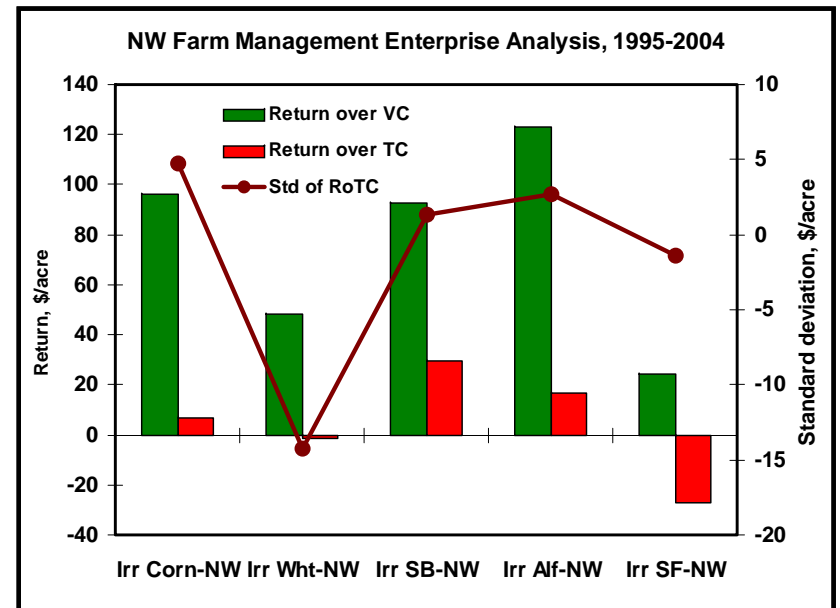
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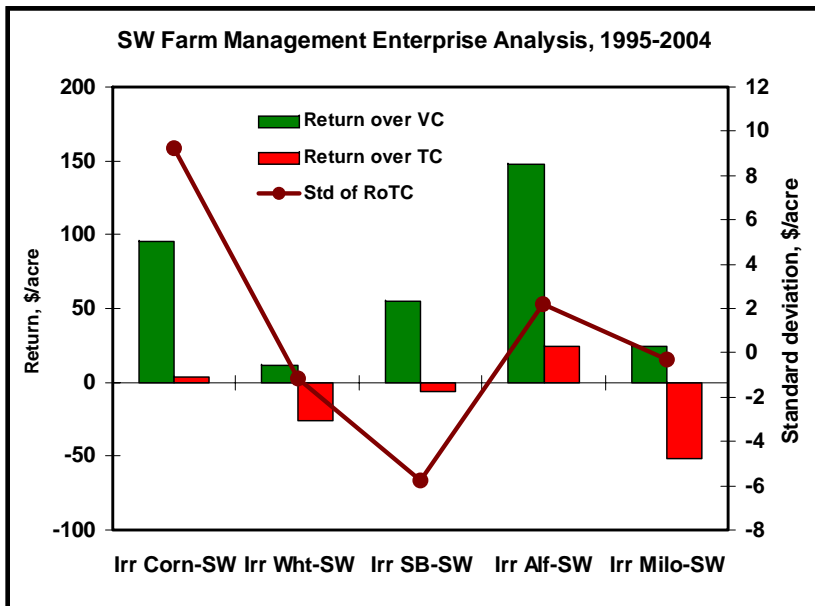
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Profitability of hay (1995-2004)

- **Short run:**
 - Alfalfa had the highest return over variable costs in 6 of 6 Kansas regions analyzed over the last 10 years
- **Long run:**
 - Alfalfa has been the most profitable crop (i.e., returns over total costs) in 4 of 6 Kansas regions analyzed over the last 10 years

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Why learn about machinery costs?

- **Selecting Profit-maximizing Crop Mix**
 - must prorate to crops
- **Dealing with Technological Change (no-till)**
 - alternative systems use machinery differently
- **Benchmarking**
- **Banking (tracking market value & deprec.)**
- **Minimizing Costs of Production**
 - owning vs. leasing vs. custom hire
 - optimal trade decisions
- **How do machinery costs impact revenue?**

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Machinery cost categories

- **Repair and maintenance**
- **Labor**
- **Depreciation (market, not tax depreciation)**
- **Interest (opportunity interest)**
- **Fuel and lubrication**
- **Taxes, insurance, and shelter**
- **Custom hire**

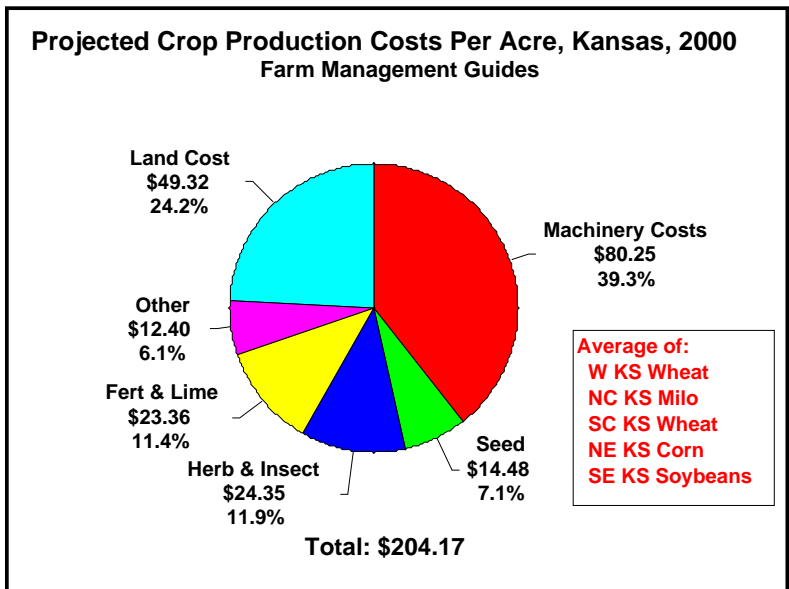
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How important are farm machinery costs for Kansas farmers?

Kansas Farm Management Association Enterprise Analysis						
Nonirrigated Crops -- State Averages, 2001-2003						
	Corn	Sorghum	Wheat	Soybean	Alfalfa	
Number of Farms	105	194	327	170	57	Total Ac
Average Acres	328	318	585	327	103	1,660
Costs, \$ per Acre						Wtd Avg
Seed	\$26.07	\$8.76	\$5.75	\$21.69	\$8.15	\$13.62
Fertilizer	32.42	20.12	17.08	3.86	8.75	17.57
Herb-Ins	22.35	18.78	4.55	16.93	10.73	13.61
Crop Ins	5.05	3.08	3.45	3.98	0.16	3.59
Machinery	68.90	53.39	54.88	62.21	79.03	60.30
Other	19.15	15.90	15.68	17.93	20.84	17.17
Land	35.40	17.39	20.50	25.31	39.05	24.94
Interest	17.90	12.52	11.17	14.83	16.06	13.78
Total Cost	\$227.24	\$149.93	\$133.05	\$166.74	\$182.76	\$164.59
Machinery, %	30.3%	35.6%	41.2%	37.3%	43.2%	36.6%

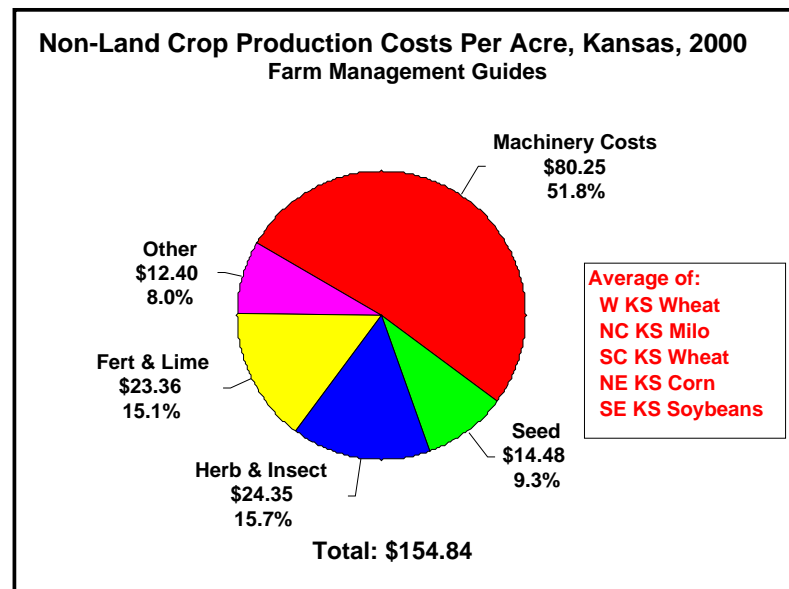
Note – A portion of interest cost should also be allocated to machinery costs
Costs reflect operator's costs on owned and rented land

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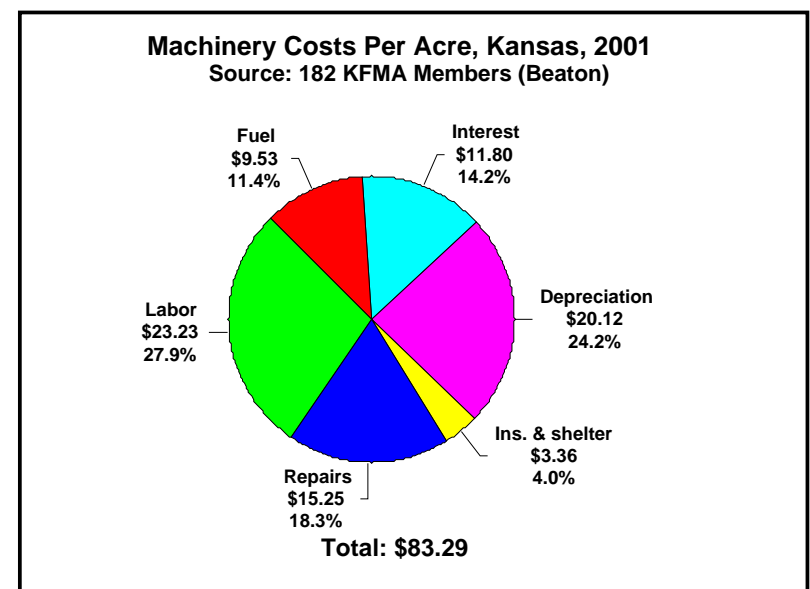
Last year machinery costs were split out in Farm Management Guides was 2000

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Last year machinery costs were split out in Farm Management Guides was 2000

15



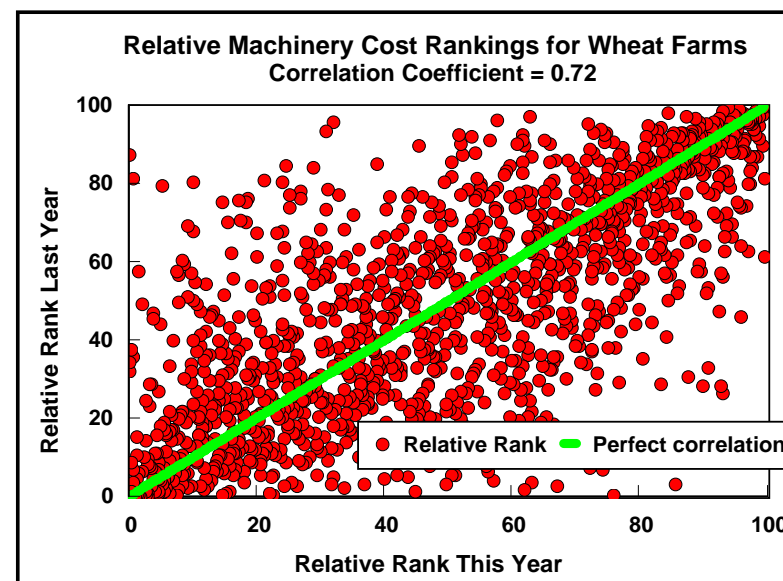
Custom hire cost has been allocated to individual categories

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Machinery costs are highly variable across farms ...

Kansas Farm Management Association Enterprise Analysis Nonirrigated Crops -- State Averages, 2001-2003						
	Corn	Sorghum	Wheat	Soybean	Alfalfa	
Number of Farms	105	194	327	170	57	
Average Acres						Total Ac
High profit farms	481	432	692	443	112	2,160
Mid profit farms	306	313	679	310	130	1,739
Low profit farms	196	208	382	228	66	1,080
Machinery Costs, \$/acre						Wtd Avg
High profit farms	\$54.32	\$42.85	\$47.58	\$50.04	\$61.30	\$49.35
Mid profit farms	\$60.73	\$51.68	\$49.26	\$60.38	\$76.77	\$55.76
Low profit farms	\$91.65	\$65.61	\$67.79	\$76.19	\$99.00	\$75.38
High less low, \$	-\$37.33	-\$22.76	-\$20.21	-\$26.16	-\$37.70	-\$26.03
High less low, %	-40.7%	-34.7%	-29.8%	-34.3%	-38.1%	-34.5%

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But, relative machinery costs are somewhat repeatable

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Machinery costs are important in explaining profitability differences across farms ...

Kansas Farm Management Association Enterprise Analysis Nonirrigated Crops -- State Averages, 2001-2003						
	Corn	Sorghum	Wheat	Soybean	Alfalfa	
Number of Farms	105	194	327	170	57	
Machinery Costs, \$/acre						Wtd Avg
High profit farms	\$54.32	\$42.85	\$47.58	\$50.04	\$61.30	\$49.35
Mid profit farms	\$60.73	\$51.68	\$49.26	\$60.38	\$76.77	\$55.76
Low profit farms	\$91.65	\$65.61	\$67.79	\$76.19	\$99.00	\$75.38
High less low, \$	-\$37.33	-\$22.76	-\$20.21	-\$26.16	-\$37.70	-\$26.03
High less low, %	-40.7%	-34.7%	-29.8%	-34.3%	-38.1%	-34.5%

Differences between high profit farms and low profit farms in ...

Total costs	-\$89.28	-\$62.37	-\$46.46	-\$57.36	-\$75.84	-\$61.92
Net returns	\$91.29	\$73.01	\$65.97	\$78.23	\$165.55	\$80.90
Cost/net returns	97.8%	85.4%	70.4%	73.3%	45.8%	76.5%
Mach/total costs	41.8%	36.5%	43.5%	45.6%	49.7%	42.0%
Mach/net returns	40.9%	31.2%	30.6%	33.4%	22.8%	32.2%

Machinery bigger part of costs for alfalfa relative to other crops. Managing costs really matters for corn – matters for alfalfa but revenue does too.

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Research comparing whole-farm costs with custom rates...

- Custom rates are an important benchmark
- Master's thesis – Aaron Beaton
- Based on KFMA database and cooperator surveys for the year 2001
- Excel spreadsheet (*KSU-MachCost*) that can be used to estimate and benchmark farm specific machinery costs
– at www.agmanager.info

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Summary Statistics

	Average	Low Quartile ¹	High Quartile ¹
Machinery costs			
Total crop machinery cost/acre (dollars)	\$83.29	\$53.92	\$121.74
Acres			
Harvested acres (acres)	1,188	1,405	982
Machinery cost components			
Machinery labor cost	25.0%	30.8%	24.6%
Insurance	0.9%	0.9%	0.8%
Shelter	1.8%	1.6%	2.0%
Repair	16.4%	15.9%	16.2%
Fuel, gas and oil	10.3%	10.7%	9.6%
Auto	1.0%	1.3%	0.9%
Depreciation	21.7%	14.0%	24.3%
Machine hire expense	10.2%	12.0%	9.5%
Opportunity interest	12.7%	12.8%	12.1%

¹ Quartiles when sorted by Total crop machinery costs per acre.

Note that 10.2% of machinery costs are net custom hire. Also big farms tend to be associated with lower costs.

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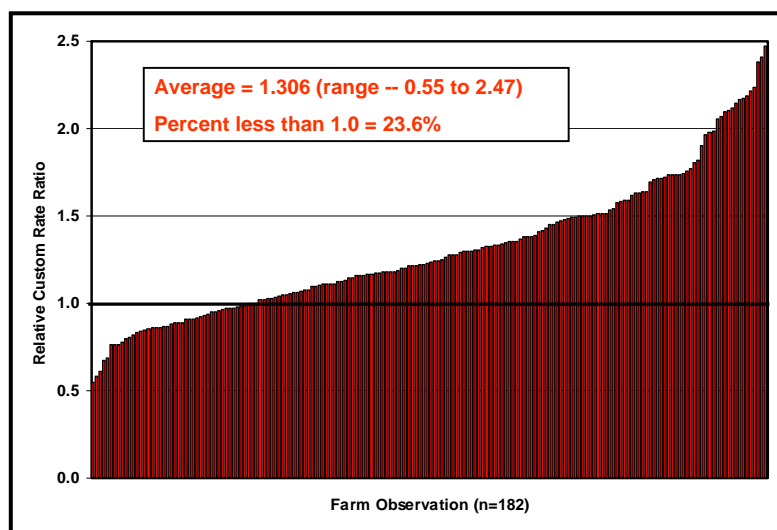
Farm costs vs. custom rates

Expected crop machinery cost at custom rates

- Sum of all operations performed on the farm multiplied by their respective custom rates
- Relative custom rate ratio developed
 - If > 1, then per unit costs are greater than custom rates
 - If = 1, then per unit costs are equal to custom rates
 - If < 1, then per unit costs are less than custom rates

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Relative custom rate ratio



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Beaton's conclusions

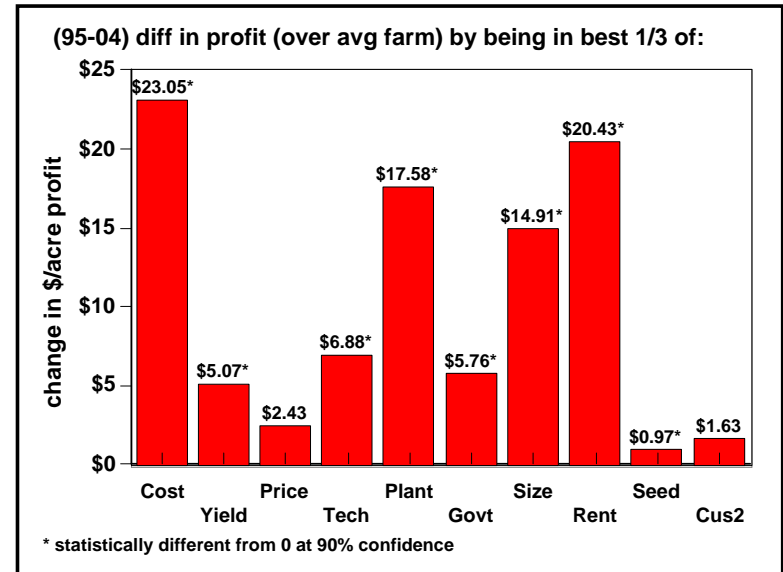
- Published custom rates need to be increased by approximately 25% (for a farm with 1,000 harvested acres)
- Economies of size exist (i.e., scale factor adjustment decreases as farm size increases)
- Thoughts...
 - Consider hiring it done
 - Consider the opportunity to do custom work

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Implications of this research?

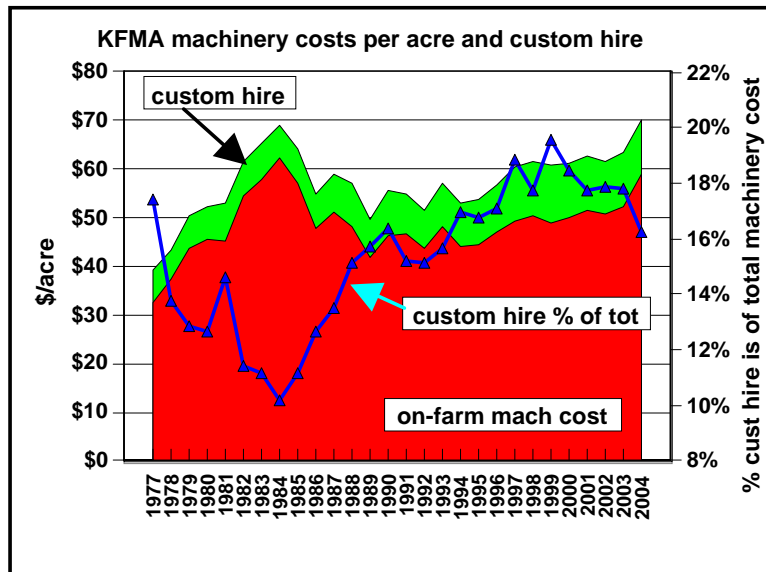
- It does appear many farms would be better off hiring farming operations rather than doing them in house
 - Is that really true?
- Are farms using more custom work today?
 - i.e., is the overall demand increasing?
- Are bigger or smaller farms hiring custom work?
 - Where is the best market segment?

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Cus2 is relative custom hire intensity (custom hire / total crop expense).
Custom hire doesn't of itself make you especially profitable.

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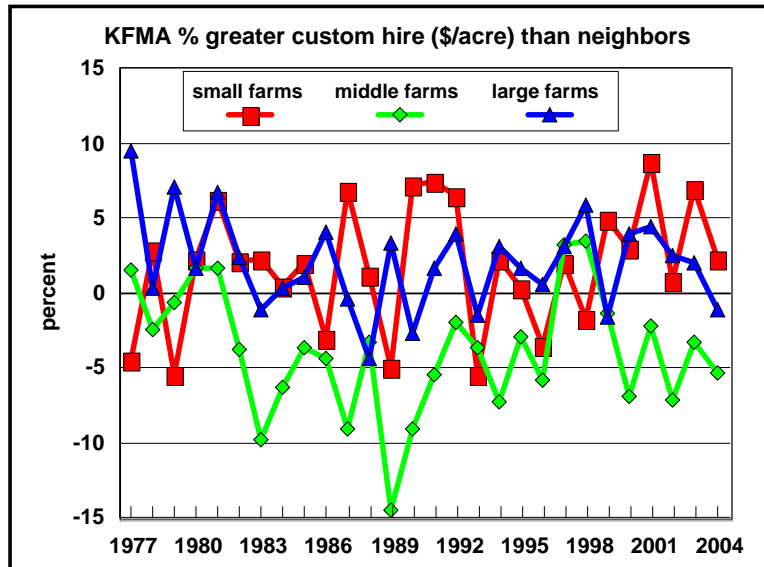
Maybe a slight temporal increase in demand for custom hire . . . not last 5 yrs

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Custom hire versus farm size?

- Some management features have showed trends over time related to big vs. small farmers
- Has that been true regarding custom hire?
 - Only conclusion is that small and large farms are the ones hiring custom services, not the middle-sized farms

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Small and large farms tend to spend more \$/acre in custom hire than avg size. 29

Additional thoughts on custom work

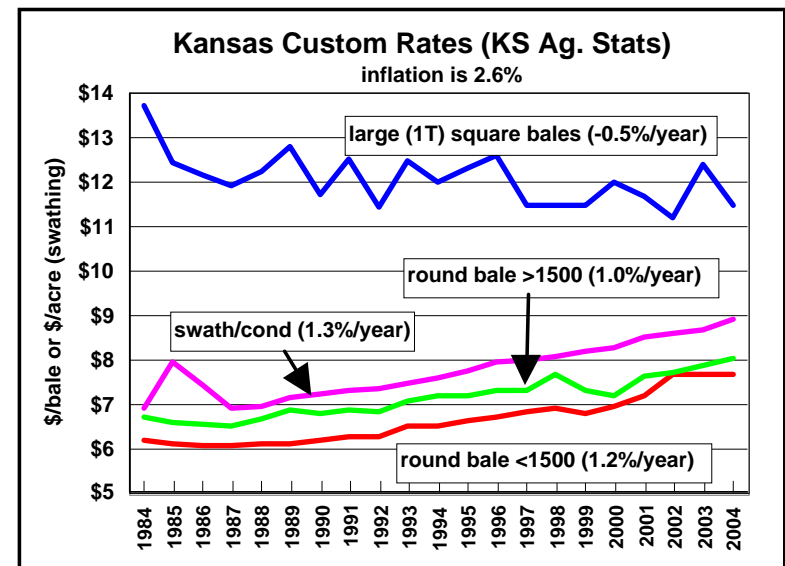
- **Doug Karre, Frenchman Valley Coop (12/8/04)**
 - Customers are small and big farms, not middle
 - Profitable in its own right; related seed and fertilizer sales is an added bonus
- **We're wondering. . .**
 - History showed custom hire by big and small farms
 - With increasing size-polarization of farms, the big and small will be all that's left – increased demand
- **Things to consider:**
 - Make custom services profitable in their own right
 - Not just machinery but also agronomic or other services
 - Keep thinking about bi-polarization

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Machinery cost categories

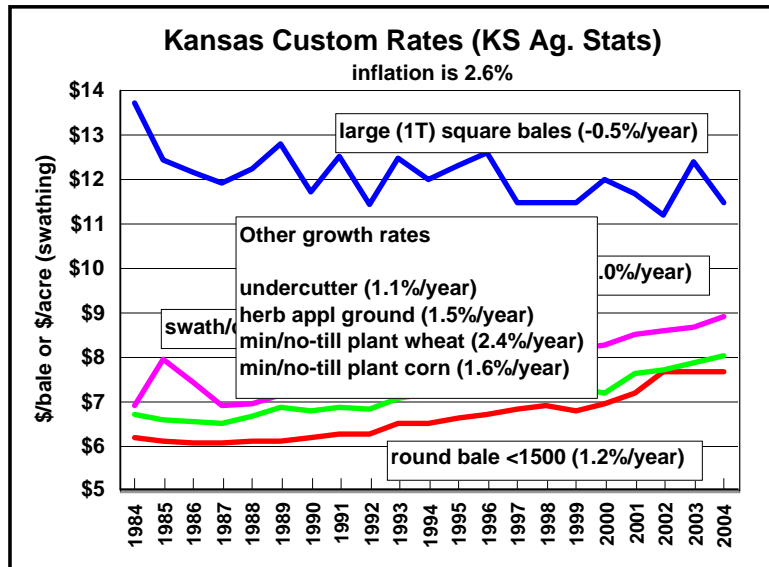
- Repair and maintenance
- Labor
- Depreciation (market, not tax depreciation)
- Interest (opportunity interest)
- Fuel and lubrication
- Taxes insurance and shelter
- Custom hire
 - Leads to published and “accepted” custom rates

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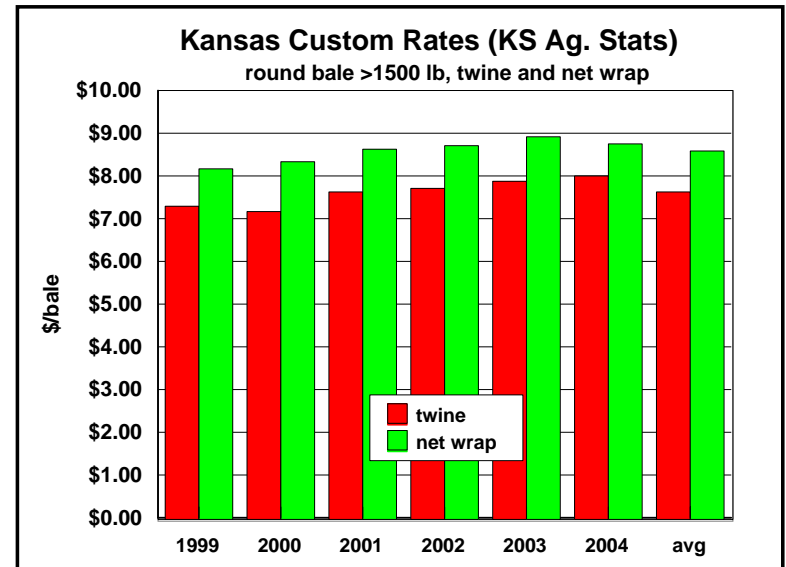


Inflation has been rising faster than machinery costs

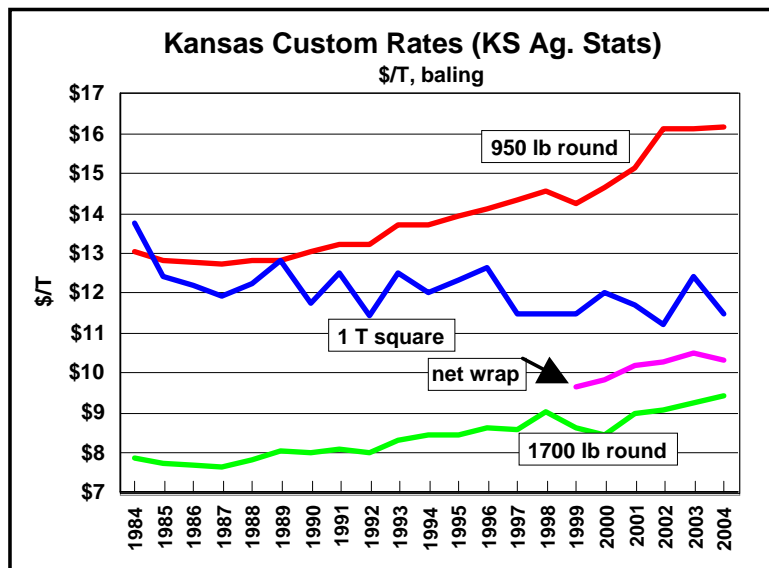
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Just for comparison purposes. . .



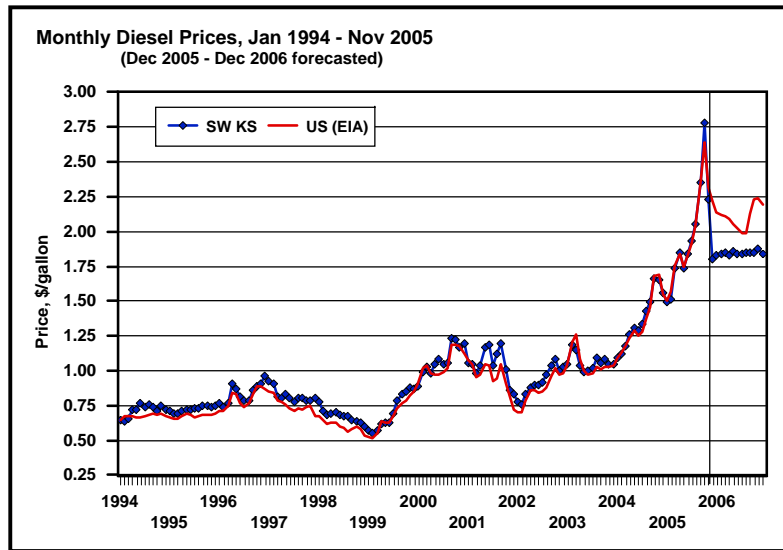
Net wrap costs about \$1/bale more (or hay producers willing to pay \$1 more)



2004 \$/ton: Big square (\$11.50); Big round w/twine (\$9.18); w/ net wrap (\$10.05)

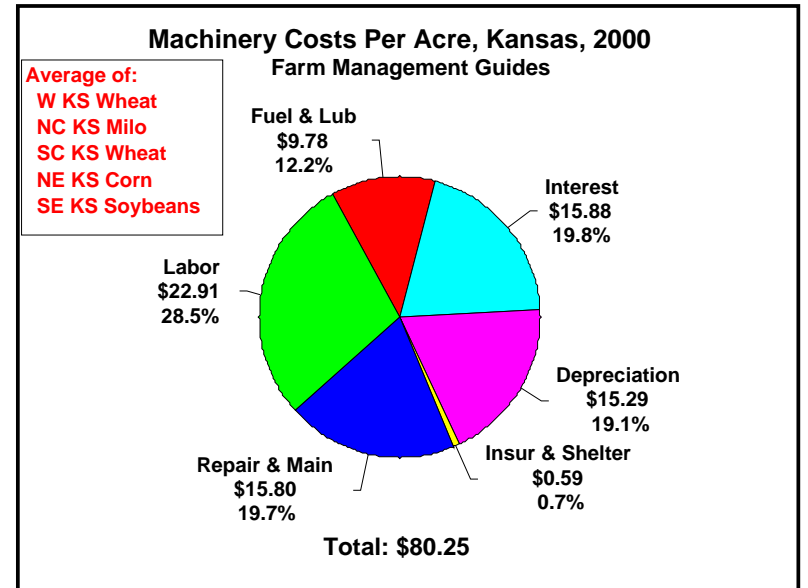
Fuel price and machinery costs

Diesel prices are at historically high levels...



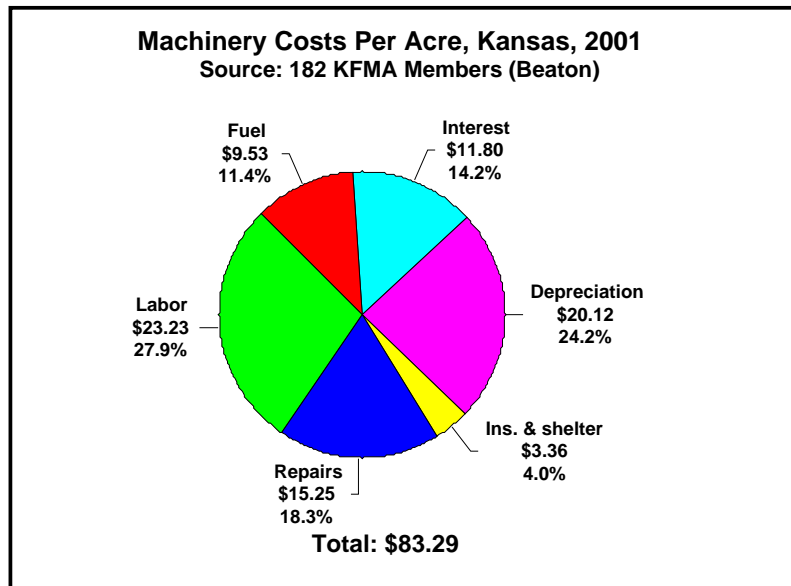
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Fuel prices are extremely high, but fuel costs represent one of the smaller cost categories...



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Fuel prices are extremely high, but fuel costs represent one of the smaller cost categories...



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

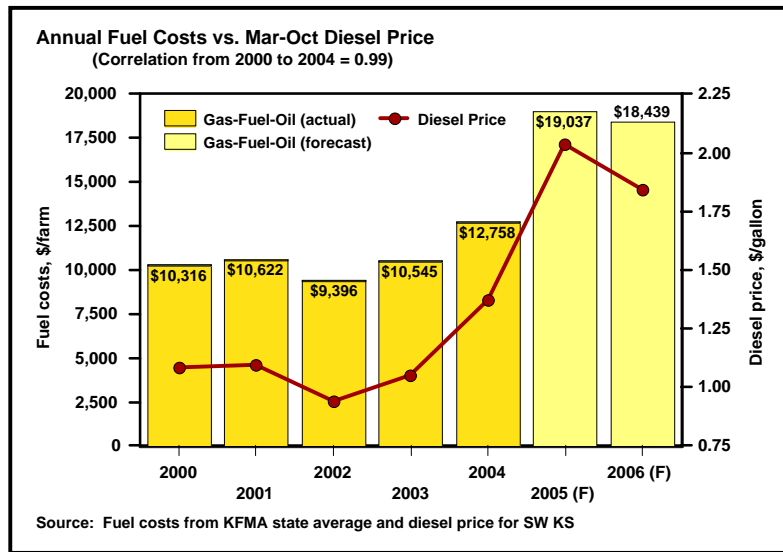
Diesel Prices

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)	\$1.85	\$2.08	\$1.96	-9.3%	3.1%	-3.1%
05 - Avg(00-04)	\$0.93	\$0.96	\$0.94	83.5%	90.2%	86.8%
06 - Avg(00-04)	\$0.74	\$1.02	\$0.88	66.4%	96.0%	80.9%

F = forecast

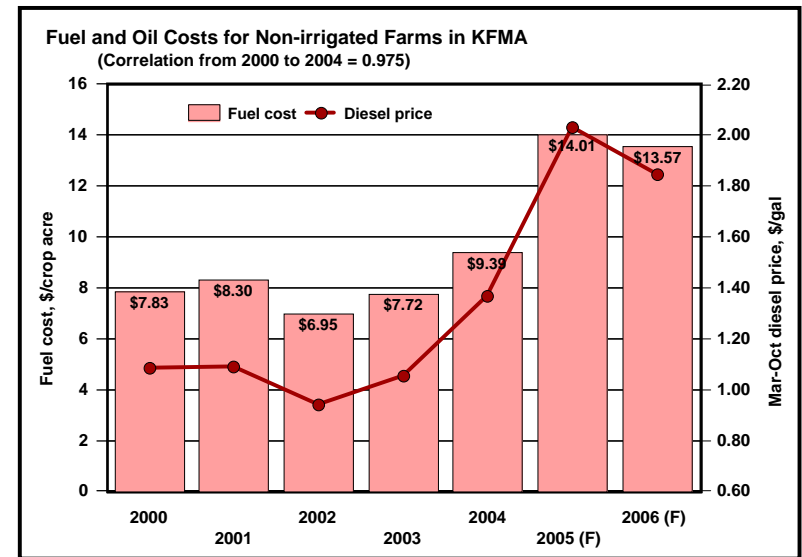
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Total farm fuel costs versus diesel prices...



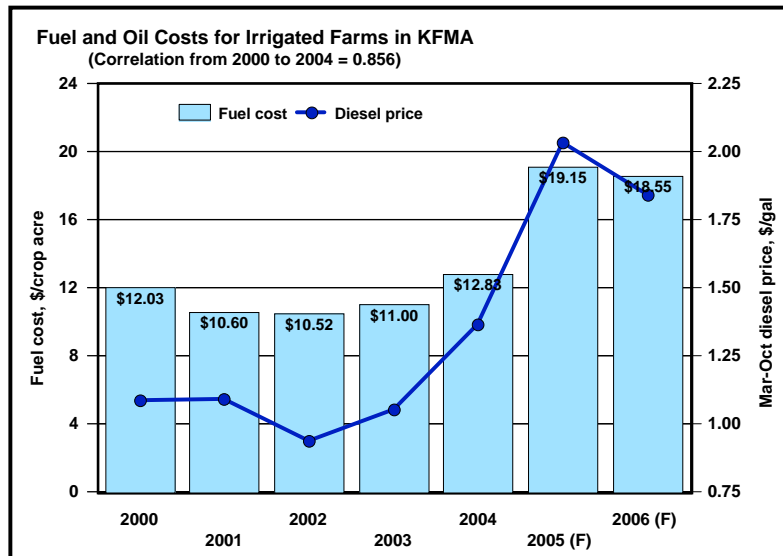
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Fuel costs per acre versus diesel prices...



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Fuel costs per acre versus diesel prices...



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Effect diesel prices has on machinery costs per acre based on fuel consumption...

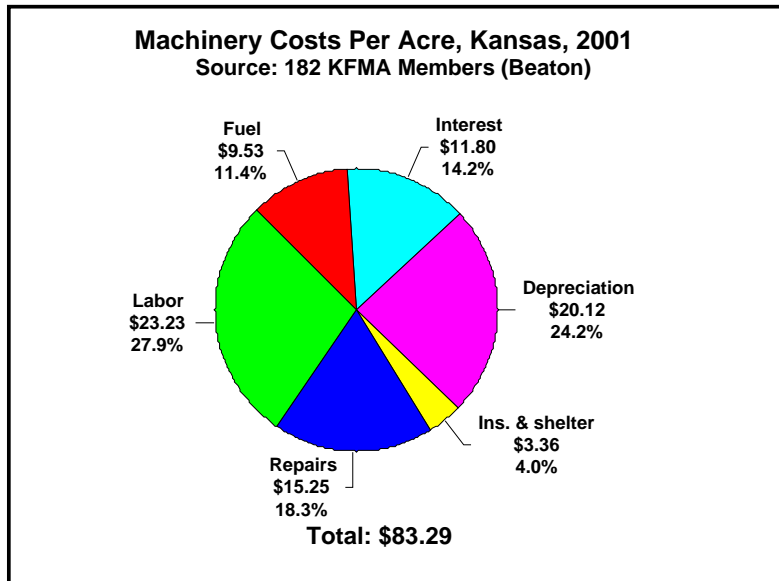
Fuel Consumption and Diesel Price Impact for Various Field Operations

Operation	Fuel use gallons/acre	Fuel price increase, \$/gallon				
		\$0.25	\$0.50	\$0.75	\$1.00	\$1.25
Increase in operation cost, \$/acre						
Chisel plow	0.64	\$0.16	\$0.32	\$0.48	\$0.64	\$0.80
Field cultivator	0.34	\$0.09	\$0.17	\$0.26	\$0.34	\$0.43
Tandem disk	0.49	\$0.12	\$0.25	\$0.37	\$0.49	\$0.61
Min-till planter	0.53	\$0.13	\$0.27	\$0.40	\$0.53	\$0.66
No-till drill	0.81	\$0.20	\$0.41	\$0.61	\$0.81	\$1.01
Sprayer	0.11	\$0.03	\$0.06	\$0.08	\$0.11	\$0.14
Swather-conditioner	0.42	\$0.11	\$0.21	\$0.32	\$0.42	\$0.53
Round baler	0.77	\$0.19	\$0.39	\$0.58	\$0.77	\$0.96
Combine--wheat	1.31	\$0.33	\$0.66	\$0.98	\$1.31	\$1.64
Combine--soybeans	2.02	\$0.51	\$1.01	\$1.52	\$2.02	\$2.53
Combine--corn	1.93	\$0.48	\$0.97	\$1.45	\$1.93	\$2.41

Source: Lazarus and Selley (abbreviated version)

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Fuel as percent of total machinery costs...



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Estimated effect diesel prices 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				
		\$0.25	\$0.50	\$0.75	\$1.00	\$1.25
Increase in custom rate, \$/acre						
Chiseling	\$7.96	\$0.21	\$0.42	\$0.63	\$0.85	\$1.06
Field cultivation	\$6.27	\$0.17	\$0.33	\$0.50	\$0.67	\$0.83
Disking	\$6.84	\$0.18	\$0.36	\$0.54	\$0.73	\$0.91
Min-till planter	\$10.29	\$0.27	\$0.55	\$0.82	\$1.09	\$1.37
No-till drill	\$10.72	\$0.28	\$0.57	\$0.85	\$1.14	\$1.42
Sprayer	\$4.03	\$0.11	\$0.21	\$0.32	\$0.43	\$0.53
Swather-conditioner	\$8.90	\$0.24	\$0.47	\$0.71	\$0.94	\$1.18
Round baler	\$8.03	\$0.21	\$0.43	\$0.64	\$0.85	\$1.07
Combine--wheat	\$14.48	\$0.38	\$0.77	\$1.15	\$1.54	\$1.92
Combine--soybeans	\$20.06	\$0.53	\$1.06	\$1.60	\$2.13	\$2.66
Combine--corn	\$20.09	\$0.53	\$1.07	\$1.60	\$2.13	\$2.67

* 2004 state average from Kansas Agricultural Statistics (assumes 14.4% of custom rate is fuel costs)
2004 Mar-Oct average price of diesel = \$1.36/gallon

Increase in custom rate **2.7%** **5.3%** **8.0%** **10.6%** **13.3%**

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OwnBaler.xls

A spreadsheet program to evaluate the economic cost of owning and operating a large square or large round baler

Puts numbers to some of your intuition – to give you new intuition

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OwnBaler.xls

- **Baler trading strategies**
 - Trade frequency
 - Age of baler purchased (new vs. used)
 - Usage rate
 - Income tax issues
 - Compare to renting/leasing
- **Twine vs. net wrap on round**
- **Round vs. square**
- **Production efficiencies**
 - Tractor hours to baler hours ratio
 - Labor hours to tractor hours ratio
- **Compare total costs with custom rates**
- **At www.agmanager.info (also a paper there)**

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Microsoft Excel - OwnBaler(Oct2005).xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

87%

A1

OwnBaler.xls --- A spreadsheet program to evaluate the economic costs of owning and operating a large square or large round hay baler.

Version 10-17-05

INPUTS vs CALCULATED VALUES
In the "User input" tab all blue numbers are inputs and all black numbers are calculated from these inputs.

DESCRIPTION OF INPUTS:
Several input cells (i.e., blue number) have a red diamond in the upper right hand corner of the cell. By moving your mouse cursor over this diamond, a brief description of the input will be displayed on the screen.

MACROS
This spreadsheet uses macros to print the three different pages, however printing can also be done manually by highlighting the desired range and using the menu print commands.

COMPANION PUBLICATION
For explanation of the inputs used in this spreadsheet see the supporting paper OwnBaler.pdf.

Developed by: Terry L. Kastens, Ph.D. Extension Agricultural Economist Kansas State University voice: (785) 532-5866 FAX: (785) 532-6925 email: tkastens@ksu.edu

Kevin C. Dhuyvetter, Ph.D. Extension Agricultural Economist Kansas State University voice: (785) 532-3527 FAX: (785) 532-6925 email: kcd@ksu.edu

Introduction User input Time and Tax (TT) Analysis summary Baler Models

Ready NLM 6:39 AM

Microsoft Excel - OwnBaler(Oct2005).xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

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User input and related calculations section (blue shaded cells are inputs)

Information pertaining to baler depreciation and repairs

Baler class	age	usage	RF1	RF2	useful life	
1 Large round baler	-0.061042	-0.001	0.65	1.80	2000	
2 Large square baler	-0.066337	-0.0025	0.25	1.80	2000	
Factors used in analysis =>	Large round baler	-0.061042	-0.001	0.65	1.80	2000

Information on baler considered for purchase

Baler class: big round = 1; big square = 2	1
Round bale only: percent of bales with net wrap	100%
Baler age in years	0
Accumulated number of bales on purchased baler	0
Bale width in inches	60
Bale height in inches (max. diameter if round bale)	72
Maximum bale length in inches (square bale only)	96
Estimated no. of hours on baler when purchase	0
Purchase price of baler w/o trade-in	\$29,000
Cash downpayment	\$12,000
Estimated new equivalent price (NEP) of baler	\$29,000
No. of seasons (years) before trade (maximum 20)	3

Information on bales you intend to make

Bale capacity: max. no. of cu. ft. in bale	141.37
Expected bale density in lb per cu. ft.	12.03
User input bale density in lb per cu. ft.	12.03
Diameter of round bale you will make in inches	72
Length of square bale you will make in inches	96
Cu. ft. of the bale you plan to make	141.37
Estimated weight of your bales in lb.	1700

Information on the scale of your operation

Average travel speed in mph when baling	6.5
Average swath width in feet when baling	29
Average crop yield in T/acre/operation	1.2
Bales per acre per cutting	1.41
Bales per hour	29.60
Acres per hour	21.07

Tractor, labor, and fuel information

PTO horsepower of tractor used on baler	150
Tractor rental rate in dollars per hp per hour	\$0.20
Tractor rental rate in dollars per hour/tractor hour	\$30.00
Tractor fuel consumption per hour/tractor hour (gal)	8
Average fuel price (\$/gallon)	\$2.25
Oil and lubrication percent of fuel cost	10%
Expected tractor-hours-to-baler-hours ratio	1.75
Used in baling operation	295.57
Tractor hour/tractor hour	2.00
Factor hour/tractor hour	\$13.00
Calculated after-tax discount rate	5.18%
State + U.S. marginal income tax rate (%)	2.0%
Self-employment tax (if corporation)	15.3%
Section 179 allowance (set by law)	\$105,000
Section 179 deduction desired (you determine)	\$0
Bonus depreciation allowed (%)	0%
Bonus 1st-yr dep. On new equip. (yes=1, no=0)	0
Calculated bonus yr-1 depreciation	\$0
Calculated net \$ amount to depreciate	\$29,000
1st year MACRS depreciation rate	10.71%
2nd year MACRS depreciation rate	18.13%
3rd year MACRS depreciation rate	15.03%
4th year MACRS depreciation rate	12.25%
5th year MACRS depreciation rate	12.25%
6th year MACRS depreciation rate	12.25%
7th year MACRS depreciation rate	12.25%

Enter the dollar amount expected to be paid in an outright deal for the baler being considered, that is, without a trade-in.

Introduction User input Time and Tax (TT) Analysis summary Baler Models

Cell F20 commented by dhuyvetter

Ready NLM 6:42 AM

Microsoft Excel - OwnBaler(Oct2005).xls

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Type a question for help

87%

A38

Bales per hour	29.60	6th year MACRS depreciation rate	12.25%
Acres per hour	20.97	7th year MACRS depreciation rate	12.25%
Tons per hour	25.16	8th year MACRS depreciation rate	6.13%
Expected no. of bales made by baler annually	5089	Calculated error check of depreciation rates	100.00%
Implied acres baled per year	35.42	Calculated after-tax NPV from TT section	\$9,747
Implied baler hours per year	168.90	Calculated after-tax amortized NPV from TT	\$3,591
Miscellaneous		Calculated pre-tax amortized NPV from TT	\$5,550
Annual inflation % on machinery prices	1.5%	Prorated to opportunity interest	\$2,114
Trade ding (% of market value lost in a trade)	6%	Prorated to market depreciation	\$1,234
Repair adjustment factor (0.8-1.2, usually 1) (RAF)	1.00	Prorated to repairs	\$1,006
Tax, insurance, & shelter (TIS % of value)	1.50%	Prorated to tax, insurance, & shelter (TIS)	\$396
Calculated after-tax amortization factor	0.3684		
Calculated 1-year after-tax discount factor	0.9508		

Twine and net wrap section

Information about twine

Cost of a 4,000 foot ball of square baler twine, \$	\$22.00	Section just below is for round bales using twine (twine tie)	
Cost of a 20,000 foot ball of round baler twine, \$	\$19.00	Twine spacing in inches	5
Cost of a 7,000 foot roll of round baler net wrap, \$	\$190.00	Number of inches from end of bale for first wrap	4
Cost of twine or net wrap per bale for selected bale	\$1.33	Number of extra wraps at each end of the bale	4

Section just below is for square bales only

Number of twines per bale	6	Total number of wraps per bale	19.40
Number of inches used for a knot	6	No. of bales per 20,000 ft. ball of twine	64.60
Feet of twine used per bale	N/A	No. of seconds stopped to tie bale	29.12
No. of bales per 4,000 ft. ball of twine	N/A	Minutes to make, tie, and eject a bale	2.35
Minutes to make a bale	N/A	Bales per hour	25.58
Bales per hour	N/A	Acres per hour	18.12
Acres per hour	N/A	Tons per hour	21.74
Tons per hour	N/A	Section just below is for round bales using net wrap	

Section just below is for round bales only

Baler belt speed in feet per minute	420	Number of wraps per bale	2.6
Seconds per wrap for baler	2.69	No. of bales per 7,000 ft. roll of net wrap	142.83
No. of seconds delay before wrapping begins	3	Total no. of seconds stopped to wrap bale	10.00
		Minutes to make, wrap, and eject a bale	2.03
		Bales per hour	29.60
		Acres per hour	20.97
		Tons per hour	25.16

Introduction User input Time and Tax (TT) Analysis summary Baler Models

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Type a question for help

70%

A1

Time and Tax (TT) section

Print

After-tax net present value of costs (NPV) => \$9,747

Year	after-tax discount factor	EOY* machine age	EOY* machine hours	est. machine value	opp. interest	market deprec.	tax deprec. rate	Sec. 179 and tax deprec.	or year of sale	loan interest	loan principal	downpmt or sale	TIS**	accum. repairs	annual repairs	tax savings	net cash out	discounted cash out
0	1.0000	0	0	\$29,000	\$0	\$0	10.71%	\$3,906	\$26,094	\$0	\$0	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0
1	0.9508	1	169	\$27,645	\$2,320	\$1,955	19.10%	\$5,549	\$20,346	\$1,360	\$0	\$0	\$4,305	\$779	\$779	\$4,61	\$2,867	\$2,330
2	0.9040	2	338	\$26,294	\$2,212	\$1,291	16.03%	\$4,269	\$18,886	\$1,360	\$0	\$0	\$4,151	\$2,753	\$1,974	\$1,619	\$2,862	\$1,897
3	0.8595	3	507	\$24,943	\$2,106	\$1,231	6.13%	\$1,776	\$14,211	\$1,360	\$17,000	-\$23,615	\$395	\$5,796	\$3,045	\$16,033	\$139	-\$1,895

* EOY = End of year
** TIS = Property tax, insurance, and shelter

Introduction User input Time and Tax (TT) Analysis summary Baler Models

Ready NLM 6:44 AM

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Baler analysis summary section

Analysis highlights:
 Baler class used Large round baler (using 0% twine and 100% net wrap)

Baler purchase price \$29,000
 Baler age when purchased 0
 Bales on baler when purchased 0
 Estimated hours on baler when purchased 0
 Average weight of bales in lb 1,700
 Bales made by baler per year 5,000
 Tons of hay baled per year 4,250
 Hours put on baler per year 168.90
 Hours put on tractor hourmeter per year 295.57
 Total acres baled per year 3,542
 Number of years baler will be used 3
 Baler value when sold \$23,615
 Accumulated repairs over lifetime \$5,798

Cost breakdown:

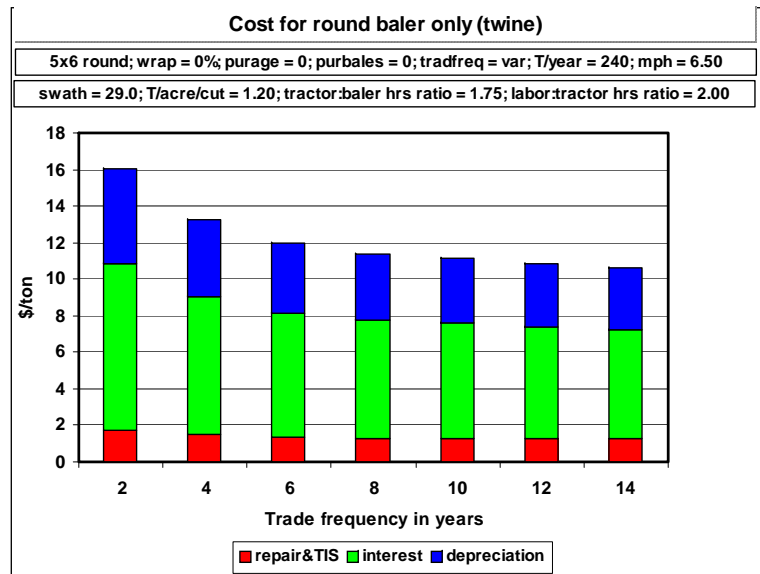
	\$/year	\$/bale	\$/ton	\$/hour	\$/acre
Opportunity interest	\$2,114	\$0.42	\$0.50	\$12.51	\$0.60
Market depreciation	\$1,234	\$0.25	\$0.29	\$7.31	\$0.35
Repair and maintenance	\$1,806	\$0.36	\$0.42	\$10.69	\$0.51
Tax, insurance, & shelter (TIS)	\$396	\$0.08	\$0.09	\$2.35	\$0.11
SUBTOTAL	\$5,550	\$1.11	\$1.31	\$32.86	\$1.57
Twine or net wrap	\$6,651	\$1.33	\$1.56	\$39.38	\$1.88
Tractor rental charge	\$8,867	\$1.77	\$2.09	\$52.50	\$2.50
Labor	\$7,685	\$1.54	\$1.81	\$45.50	\$2.17
Fuel and lubrication	\$5,852	\$1.17	\$1.38	\$34.65	\$1.65
SUBTOTAL	\$29,055	\$5.81	\$6.84	\$172.03	\$8.20
Total for baling operation²	\$34,606	\$6.92	\$8.14	\$204.89	\$9.77

¹ Can be compared to baler rental rates since tractor, labor, and fuel & lubrication are excluded.
² Can be approximately compared to custom rates for baling if cost of related vehicles such as pickups is added.

OwnBaler simulation assumptions

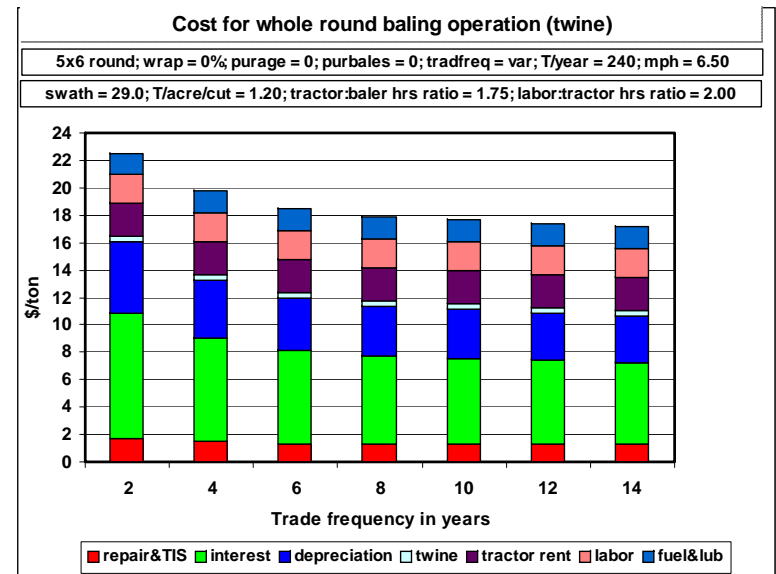
- Built valuation models from Blue Book data
- All based on Resale Cash Price (not trade premium)
 - Since repair formulas assume balers are "kept up"
 - Buy and sell at this market price
 - Assume old baler is sold and new is purchased outright
- 15.3% SE tax on top of 20% IRS+state rate
- New 5x6 round \$27,321 (\$30,321 w/ net wrap)
- New square 3x4 \$71,047; 4x4 \$86,000
- 150 hp tractor rents for \$30/hour; labor \$13/hour
- Left Sec. 179 at \$0

54



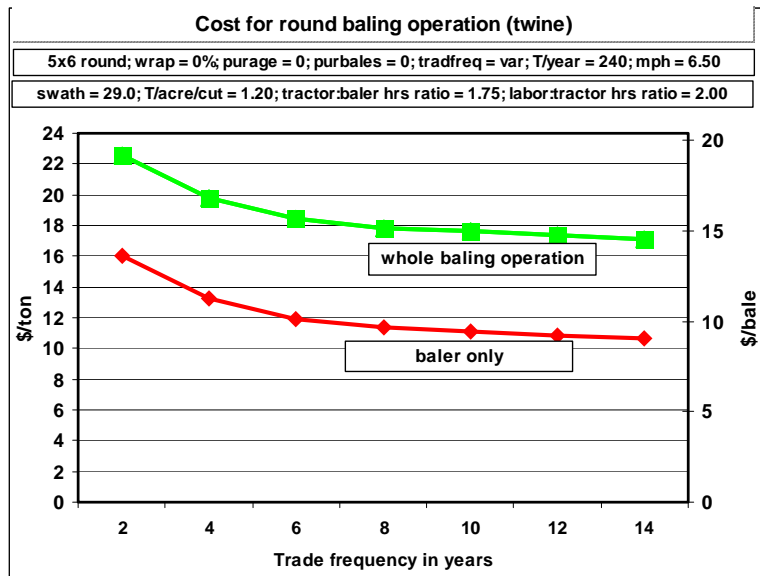
This is the baler only – not much gained holding baler more than 8 years or so

55

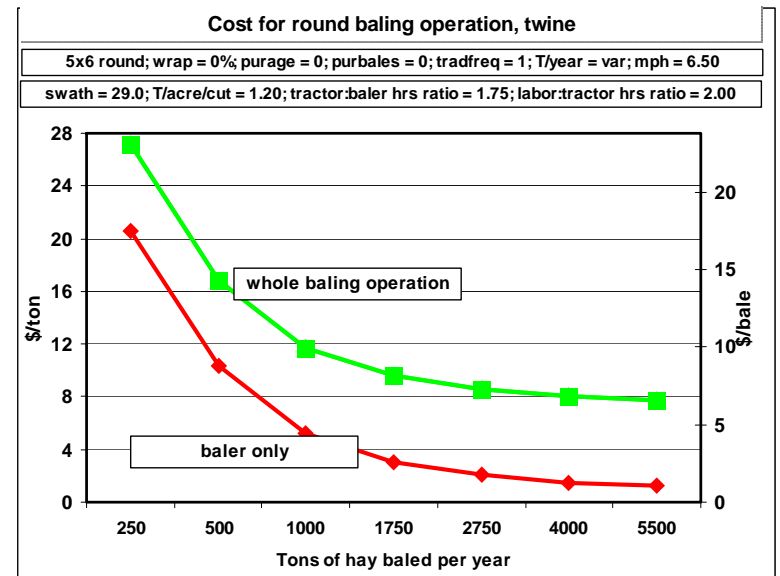


Costs seem high for this small (typical) hay operation starting with a new baler, but, really, sort of like Beaton's research showed.

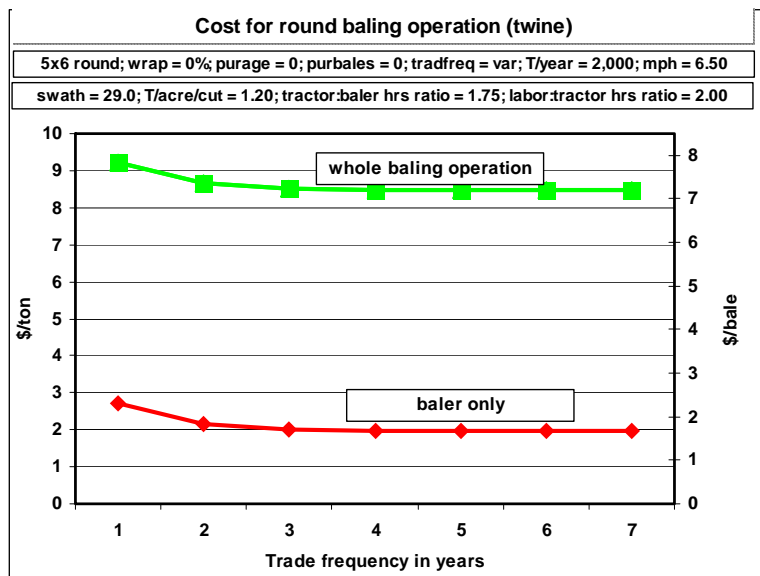
56



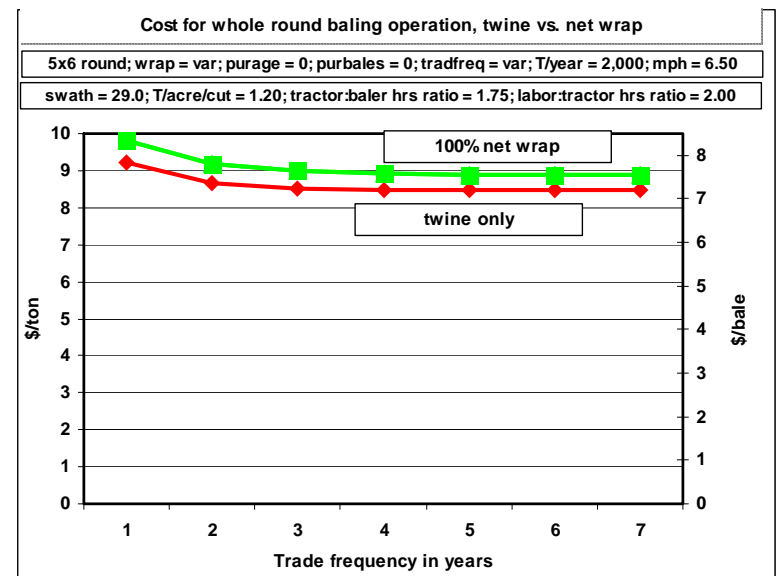
Same info, but shows that the baler part is larger than the non-baler part.



More intensive machinery operators nearly always have lower costs. But, small operators would be able to level the lines a little by buying older machinery.



New & used machinery market is generally fairly efficient. For this somewhat more intensive user, the baler part is smaller portion of the whole.

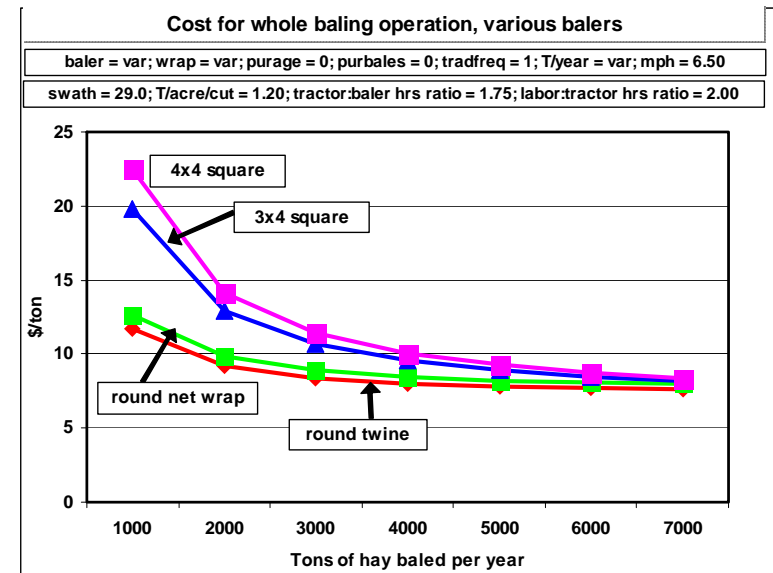


Baling with net wrap costs only \$0.50/bale more than with twine in this example.

This example of extra cost for net wrap over twine

	\$/ton
Repair & TIS	-\$0.03
Interest	\$0.11
Depreciation	\$0.06
Net wrap material	\$1.16
Tractor rent	-\$0.33
Labor	-\$0.28
Fuel & lub	-\$0.22
– Total \$/ton	<u>\$0.47</u>
• Total \$/bale	\$0.40

61



Matches approximately with custom rates in the 2000-4000 T/year range.

62

Other observations from simulation

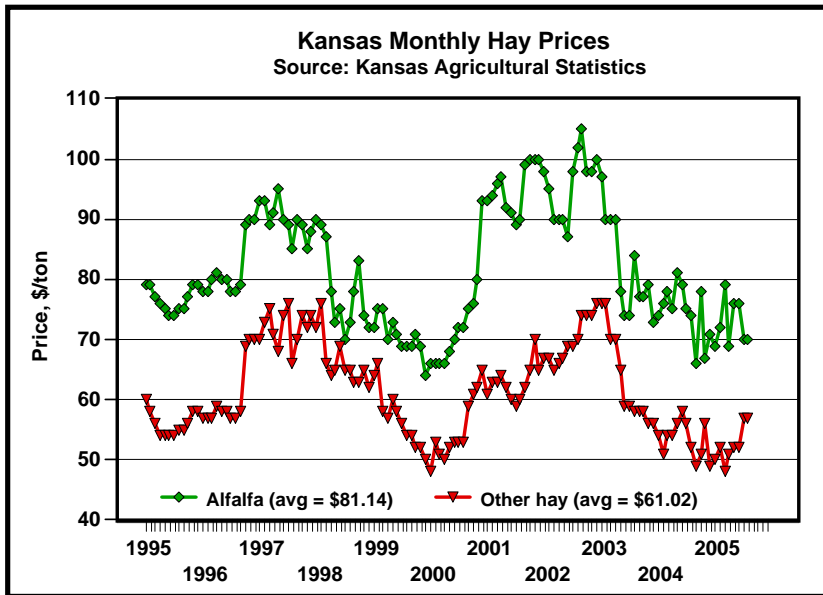
- 2500 T/yr 3x4 operator from graph = \$11.57/T
 - 14.5 ft swath rather than 29 ft = \$16.65/T
 - 10 mph rather than 6.5 but still 14.5 ft = \$13.08/T
 - Raking costs \$3.01/acre, here \$2.51/T
 - Going from an average 6.5 to 8 mph = \$10.63/T
 - Remember, your average “covering new ground” travel speed is much lower (e.g., 25%) than your “traveling down the windrow” speed
 - tractor:baler hrs ratio from 1.75 to 1.50 = \$10.87/T
 - Think about tradeoffs with trailering
- 5 vs. 4 cuttings adds \$3.73/T for s-r-b
- Odd stuff
 - Making ¾-dia round bales (twine tie):
 - \$0.64/T higher cost, \$2.94/bale lower cost

63

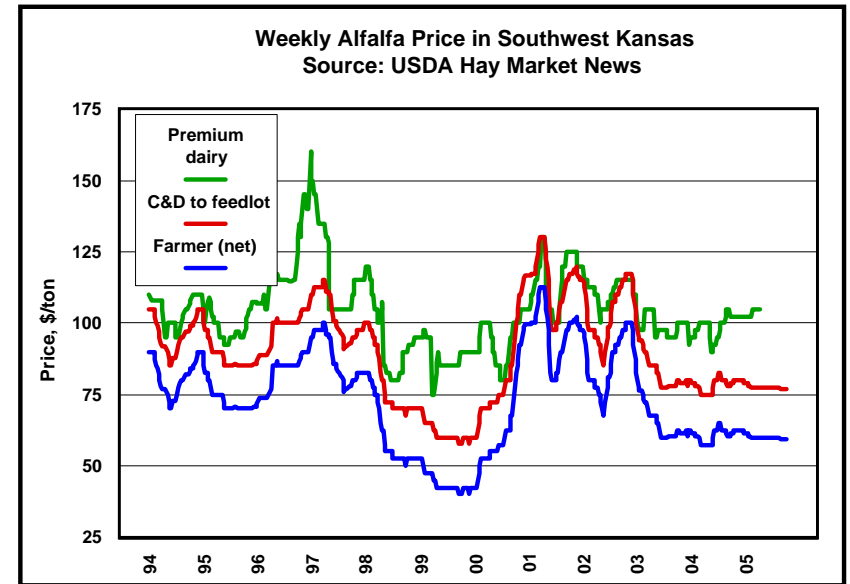
Hay Prices

(in relation to quality & packaging)

64

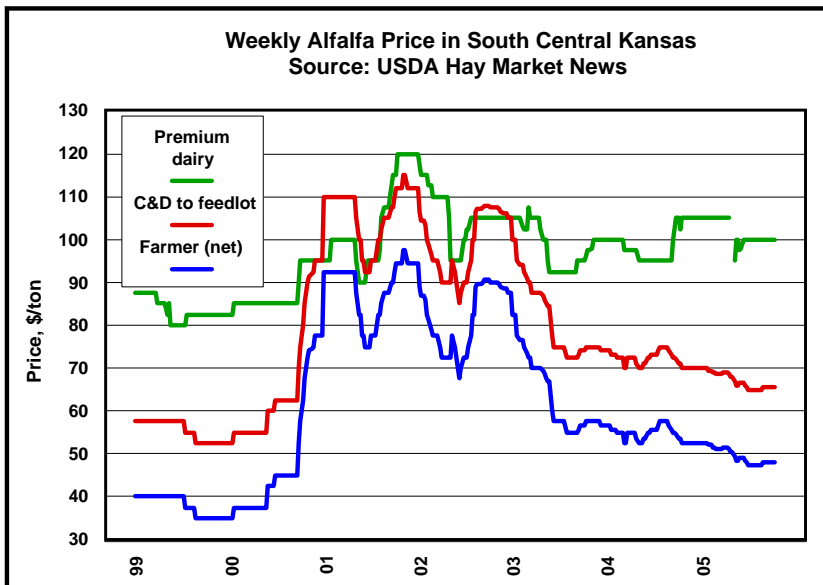


65



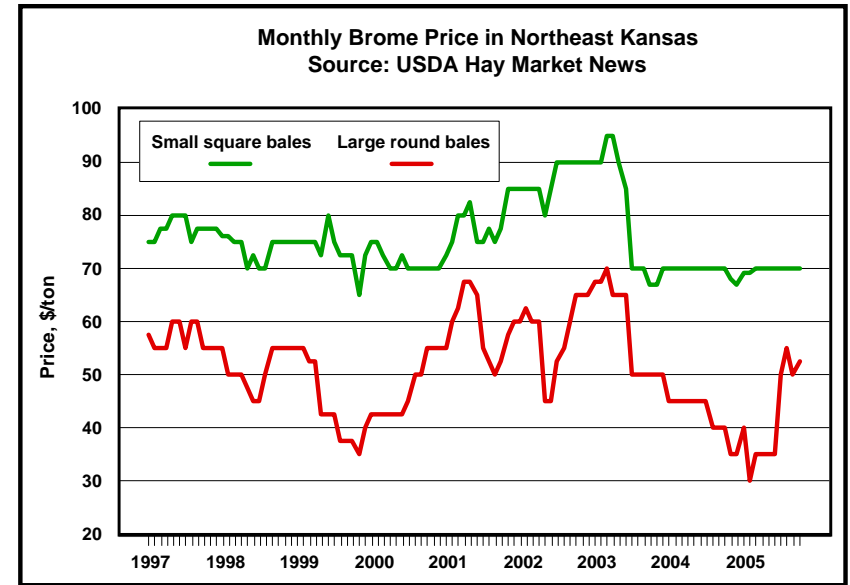
Averages – Premium dairy (\$103.83), C&D to feedlot (\$89.00), Net farmer (\$72.34).
Assumes \$15/T (before 1998) or \$17/T grinding and delivery charge.

66



Averages – Premium dairy (\$96.99), C&D to feedlot (\$78.51), Net farmer (\$61.01).
Assumes \$17/T grinding and delivery charge.

67



Averages – small square bales (\$75.75); large round bales (\$51.06).

68

Hay price thoughts . . .

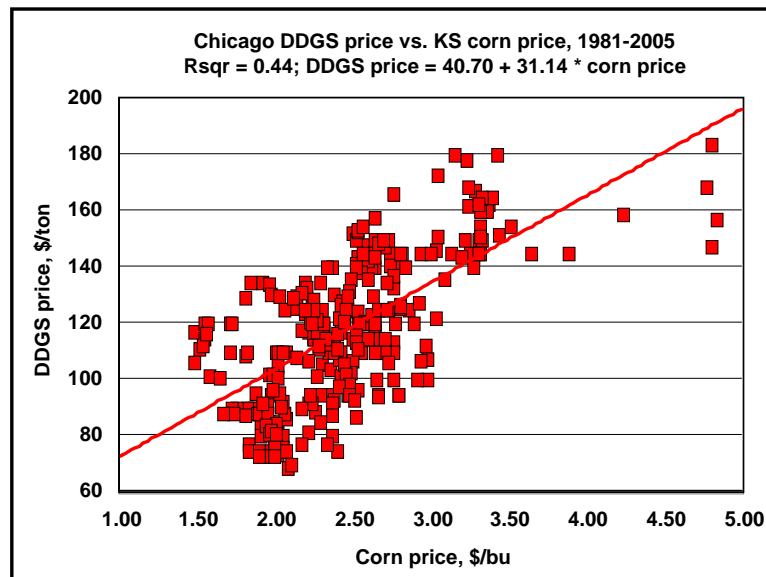
- From preceding slides:
 - Quality: dairy quality over grinder alfalfa = \$30/T
 - Package: small sq. over big round brome = \$25/T
- Steve Hessman (USDA Hay Market News) suggests:
 - Package: little sq. over big sq. alfalfa = \$15/T
 - Package: big sq. over big round alfalfa = \$10/T
 - Square over round spread can become much wider, perhaps \$15-\$20, due to local glut.
 - Grinders in W KS might prefer net-wrapped rounds or loose hay to big squares.

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Is ethanol affecting the grinder hay market?

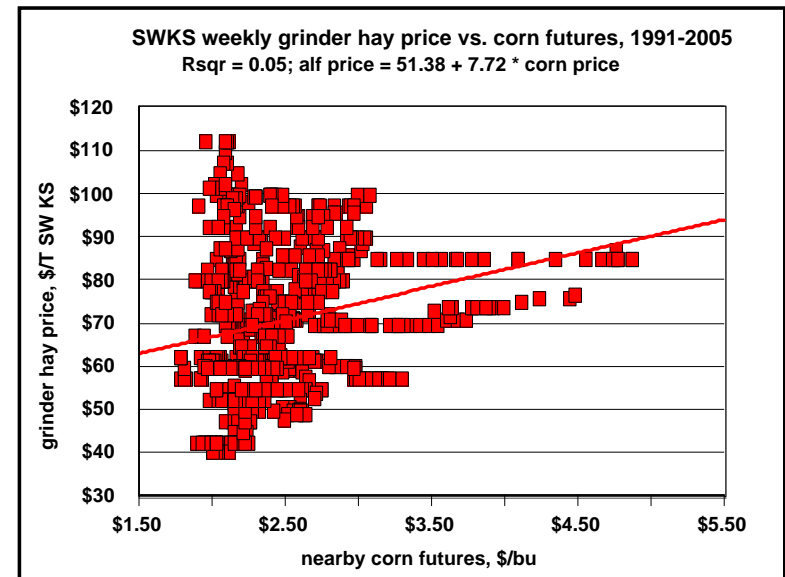
more to the point, distillers grains (DG)?

70



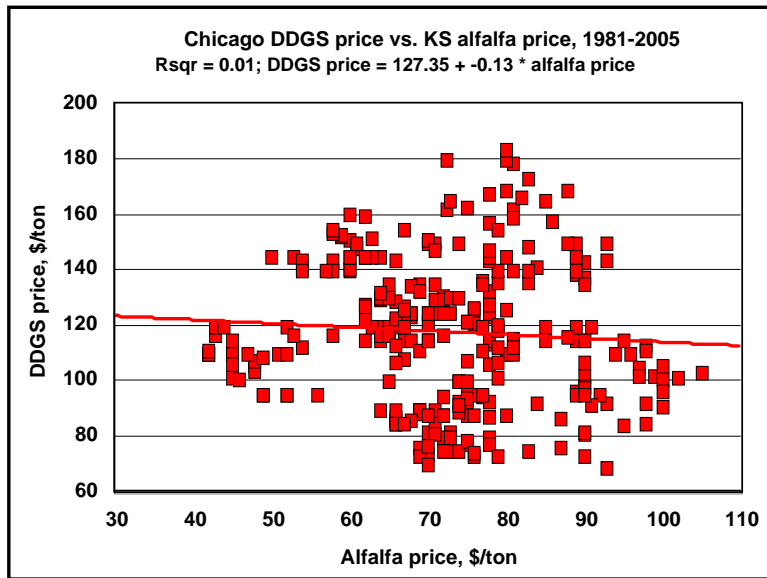
Significant relationship between DDGS price and corn price

71



Significant but weak relationship between grinder hay and corn price

72



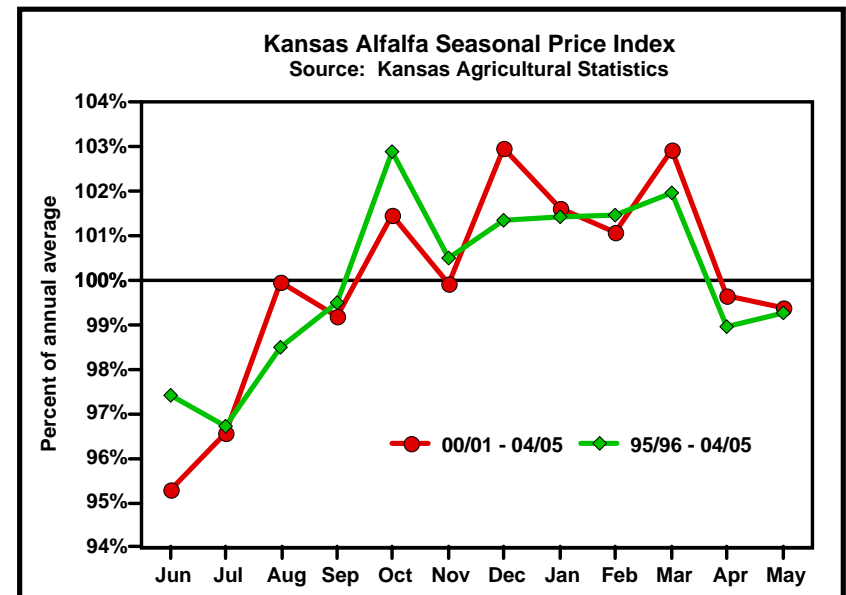
No relationship between DDGS price and alfalfa price

Ethanol and grinder hay price . . .

- **Dr. Brad Johnson, KSU Animal Science:**
 - Distillers' grains (DG) generally related to corn market (92% on dry matter basis)
 - Low starch in DG means less roughage required in feedlot ration (perhaps drop from 7% of ration to 4-5%)
- **Dhuyvetter/Kastens interpretation:**
 - Low feedgrain prices in late 2005:
 - Implies low short-term grinder hay prices
 - Increased DG use over time (more ethanol plants):
 - Implies relatively low long-term grinder hay prices
 - Will the usual \$30/T spread between dairy & grinder hay become \$50-\$60? Or, will alfalfa producers be more effective at producing dairy hay?

Hay Storage

(in relation to packaging)



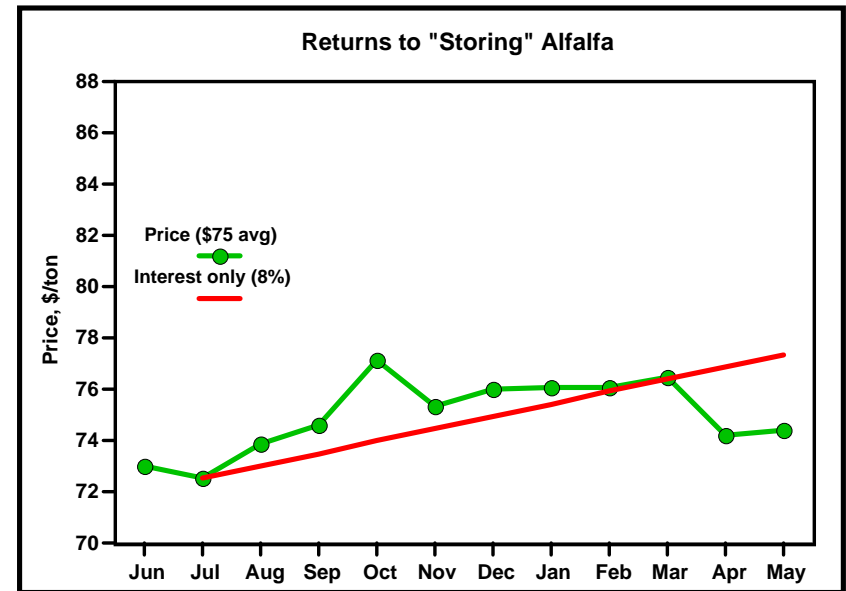
Effect of market timing

- Assume annual average price is \$75/T
 - June/July = 97.1% = \$72.81/T
 - Nov/Jan = 101.4% = \$76.06/T

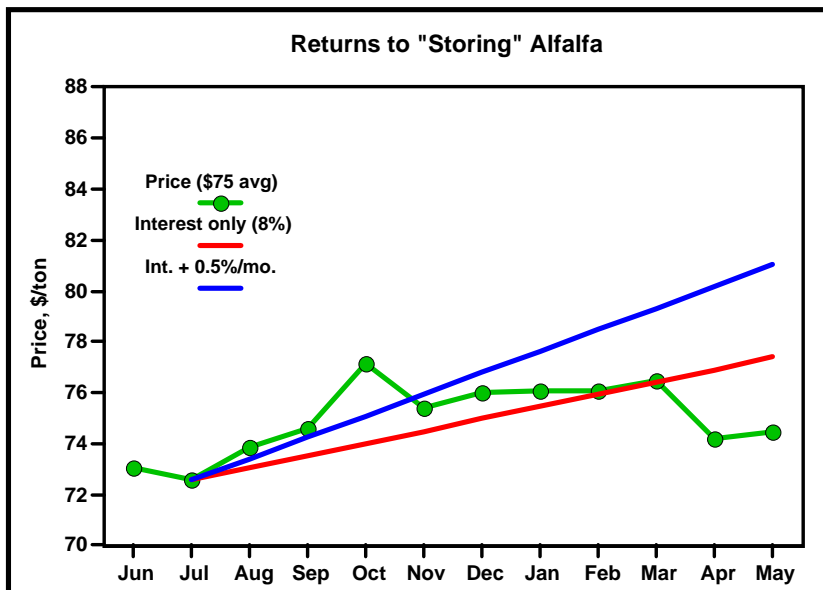
- Implies \$3.25/T premium to “storing” due to seasonality

- But, there are costs to storage
 - Interest
 - Shrink: water and dry matter
 - Perhaps quality loss

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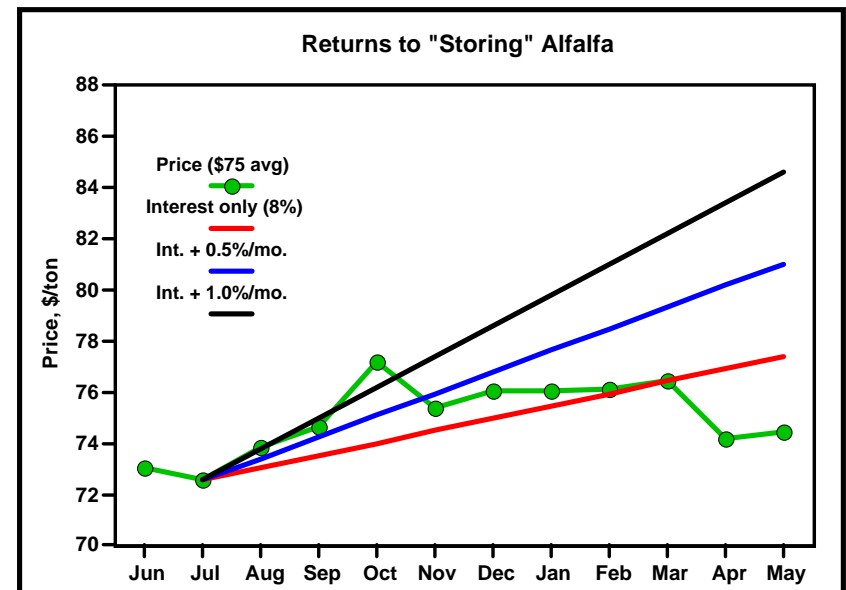


78



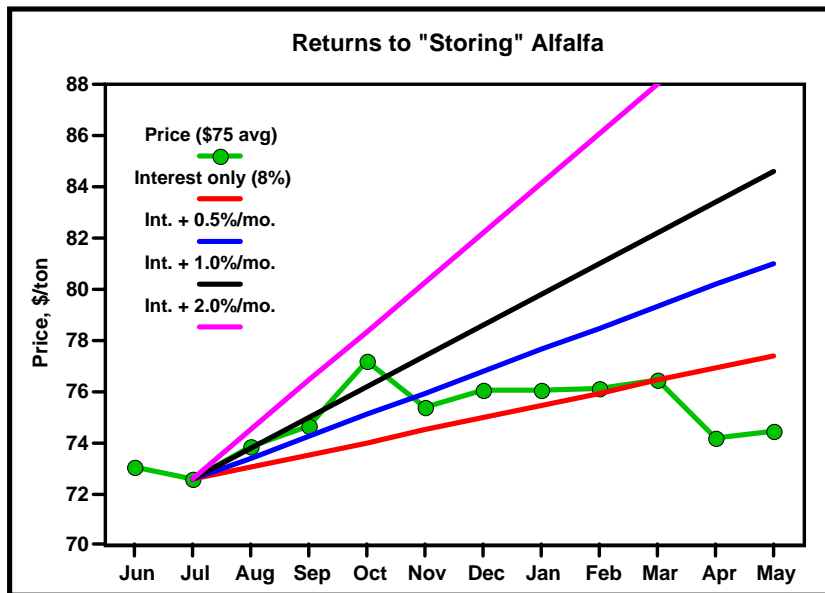
Blue line not too far off from in-barn shrink

79



We've seen black-line values w/ nicely net-wrapped bales outside-stored in NW KS

80



Many research numbers worse than pink line when hay is stored outside

81

Miscellaneous hay stuff. . .

- **Big square over big round: \$10.00/T+**
 - Higher baling cost: \$0.00-\$2.00/T
 - Tarping square bales: \$1.50-\$2.00/T ??
 - Net advantage to big squares: \$6.00-\$8.50/T

- **Questions:**
 - Net-wrapped rounds storage losses?
 - KY trial showed 11% vs. 18% for twine-tied (>\$5/T)
 - Likely that tarped squares are better than net-wrap
 - Can you capture the quality value with rounds?
 - Long distance hauling favors squares
 - What about grinder loss (not in price diff.)?
 - Research reports 3%-9%
 - Will baler slicers/pre-cutters help?

82

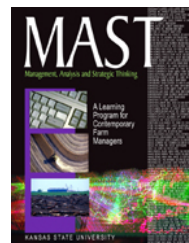
Questions ???

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