

2011-2012
Kansas State University

**AG
PROFITABILITY
CONFERENCE**

November 22, 2011

Harding Hall 4-H
Building
Rooks County Fairgrounds
Stockton, KS



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Purpose of land talks

- Develop an understanding of the underlying economic principles and management aspects of land ownership and leasing
- Trying to reduce decisions to numbers
- Two decision tools:
 - *KSU-Landbuy.xls*
 - *KSU-Lease.xls*

Related papers are found at
www.agmanager.info

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Factors/issues impacting land values

- Farm profitability
- Farm size
- Government programs
- Input costs (e.g., fuel and fertilizer)
- Interest rates
- Outside investors (i.e., stock market money)
- Recreation uses (e.g., hunting)
- Ethanol and bio-diesel / global demand for grain
- Section 1031 tax exchanges
- Technology (e.g., no-till, precision ag, bio-tech, DNA)
- Urban sprawl
- Weather (i.e., drought, flood)

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Factors impacting agricultural land values...

- Ag factors
 - Ag portion of land value has been diminishing (long term)
 - Reduced ability to cash flow traditional land loans with value of agricultural production
- Non-ag factors
 - Urbanization, recreational use of land, etc. -- more related to the condition of overall economy
- While agricultural land may continue to be a good investment, producers need to decide if they want to tie up equity in land versus other assets
- Increasingly difficult to analyze/evaluate land purchases/prices

4

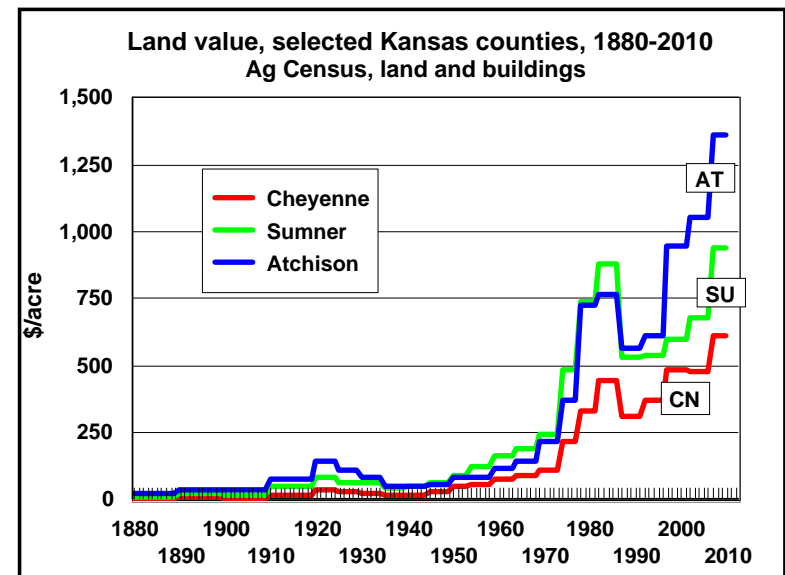
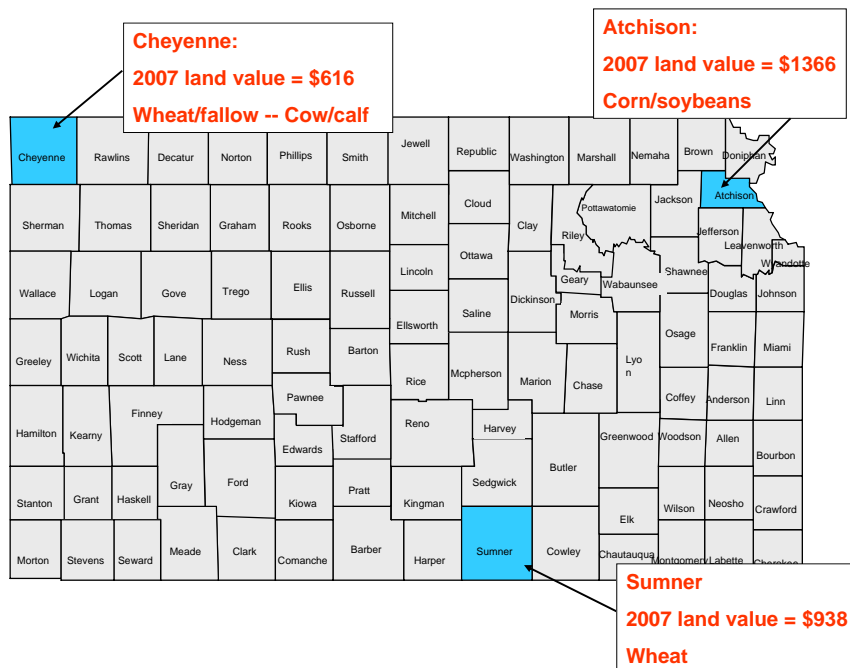
Land is Unique

- Most fixed of farming assets
 - Residual claimant
 - Capitalizes government subsidies
- Often is taxed
 - Favorably or unfavorably
- Has non-ag benefits that may be pecuniary
- Has non-pecuniary benefits
- A long term investment involving long term expectations – history is a guide

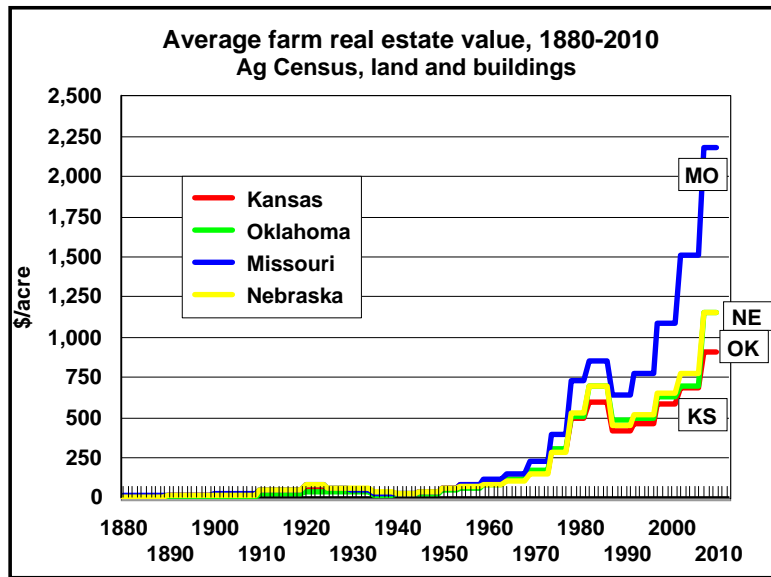
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Historical land values and growth

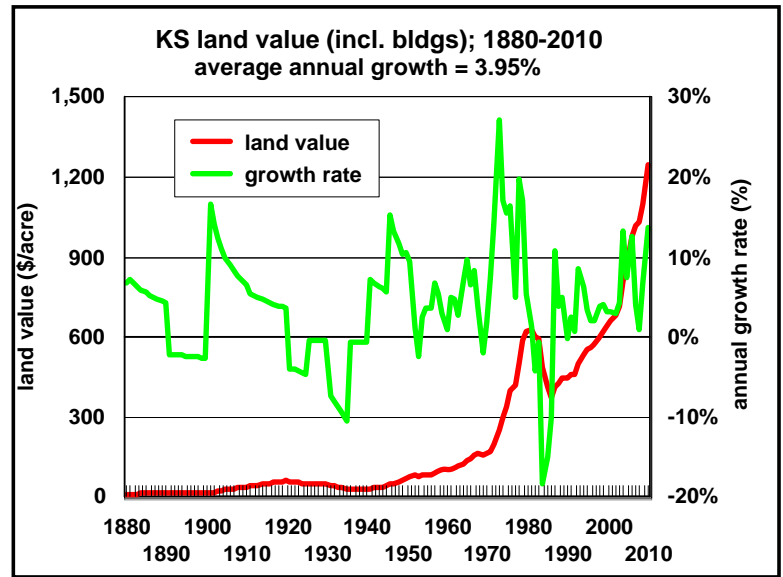
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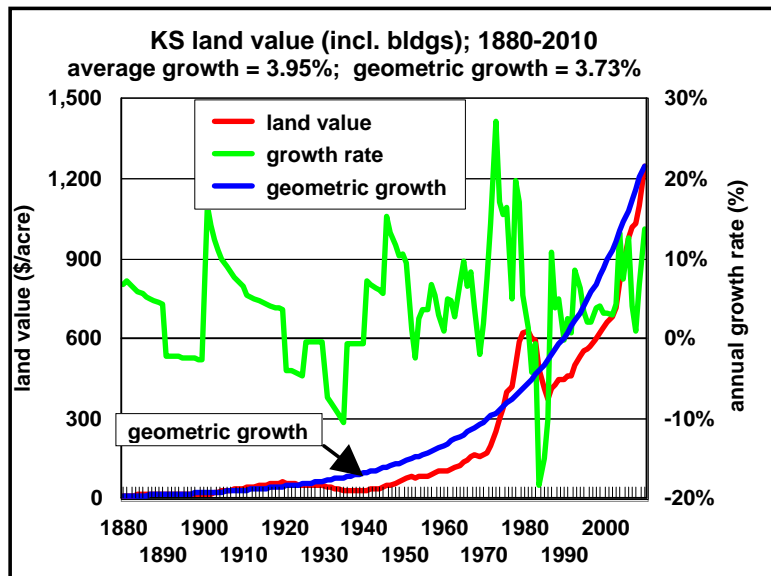
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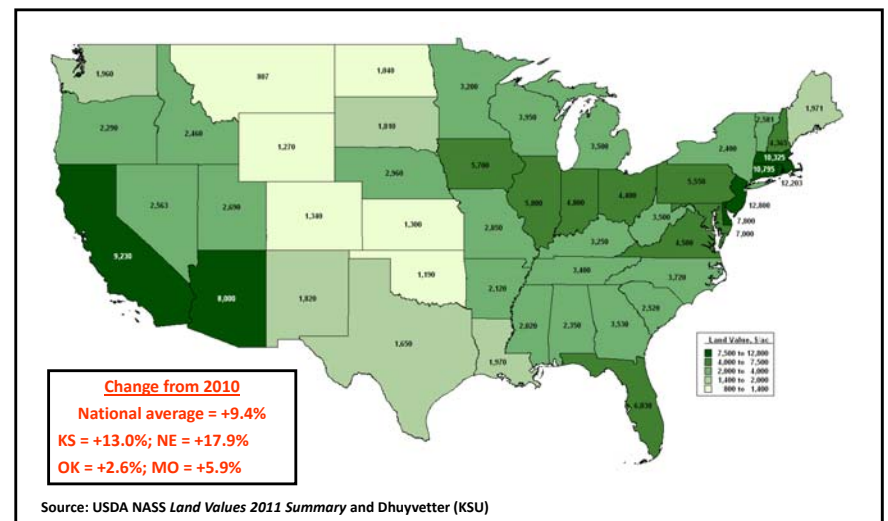
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1879 starting land value for Kansas was \$10.30

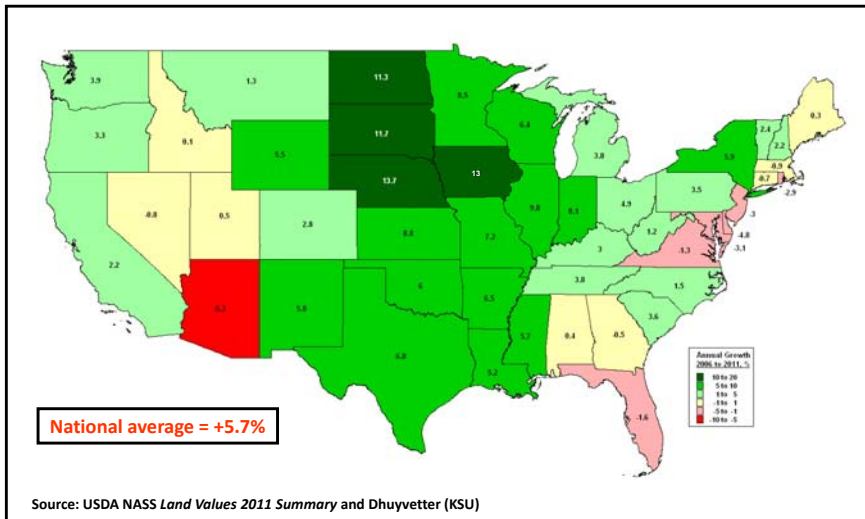
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Crop Land Average Value per Acre January 1, 2011

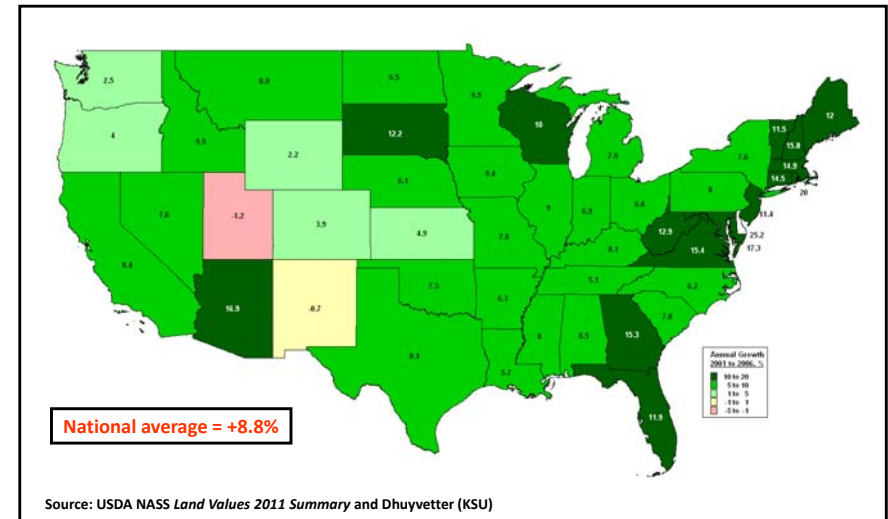


* Corresponding changes in pasture land values were US=+1.9%; KS=+2.5%; NE=+9.5%; OK=+2.0%; and MO=+2.4%.

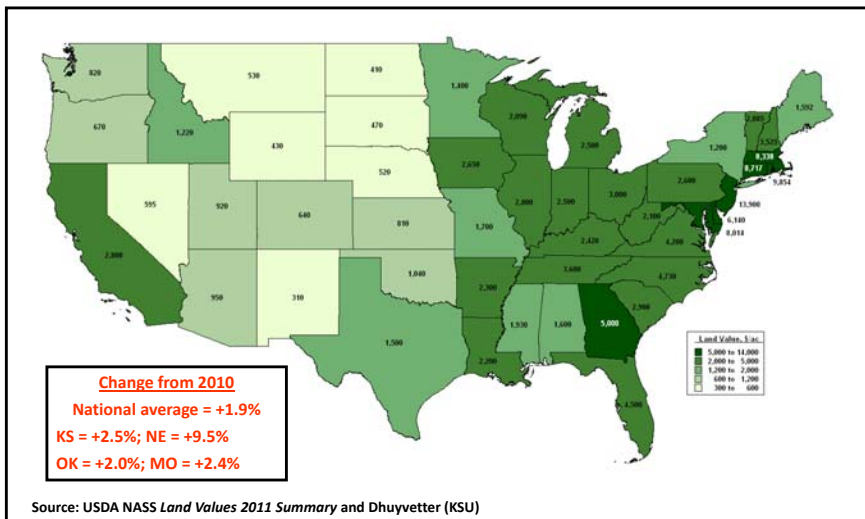
**Crop Land Average Annual Growth Rate
Jan 1, 2006 to Jan 1, 2011, percent (geo mean)**



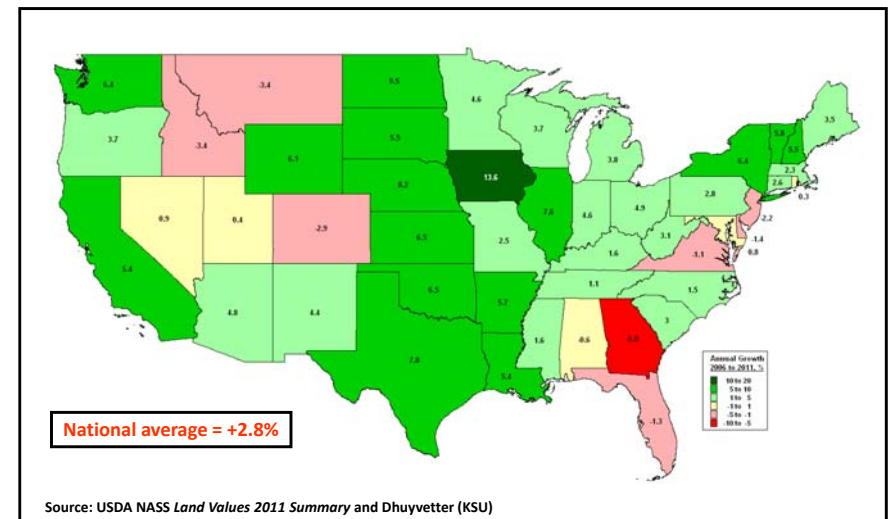
**Crop Land Average Annual Growth Rate
Jan 1, 2001 to Jan 1, 2006, percent (geo mean)**



**Pasture Land Average Value per Acre
January 1, 2011**

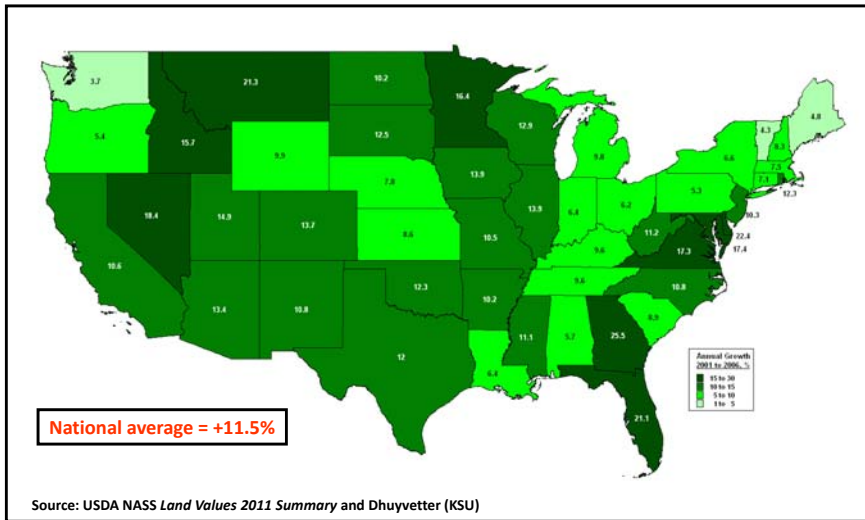


**Pasture Land Average Value Annual Growth Rate
Jan 1, 2006 to Jan 1, 2011, percent (geo mean)**

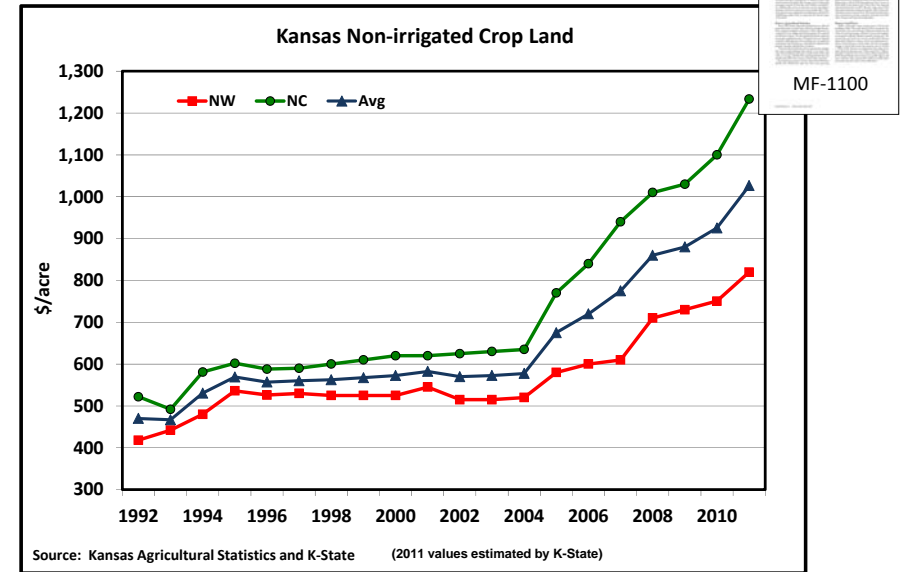


* Corresponding changes in crop land values were US= +9.4%; KS=-13.0%; NE=+17.9%; OK=+2.6%; and MO=+5.9%.

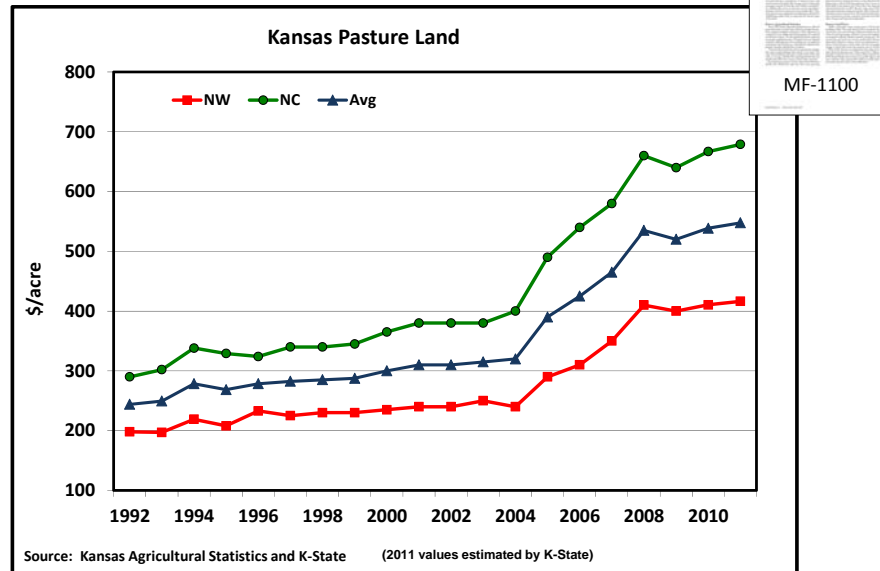
Pasture Land Average Value Annual Growth Rate Jan 1, 2001 to Jan 1, 2006, percent (geo mean)



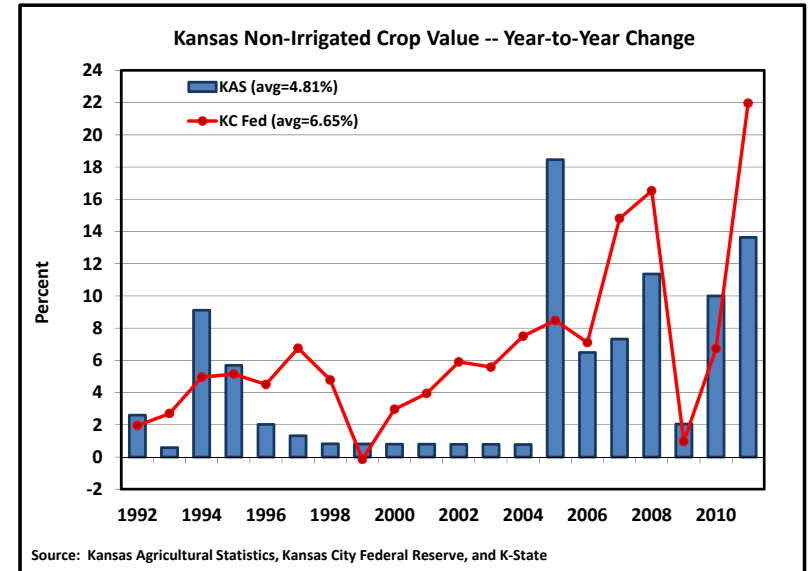
Crop land values at regional level as reported by KAS



Pasture land values at regional level as reported by KAS

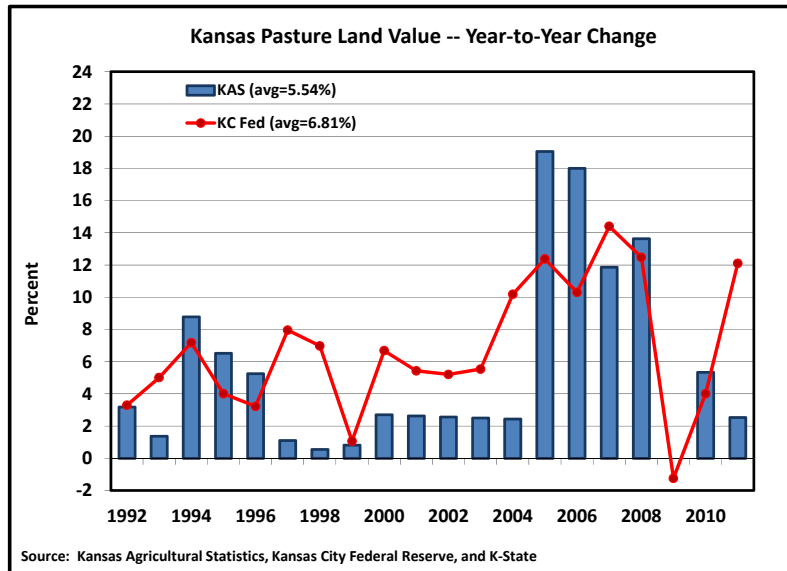


Percent change in crop land values from two sources*



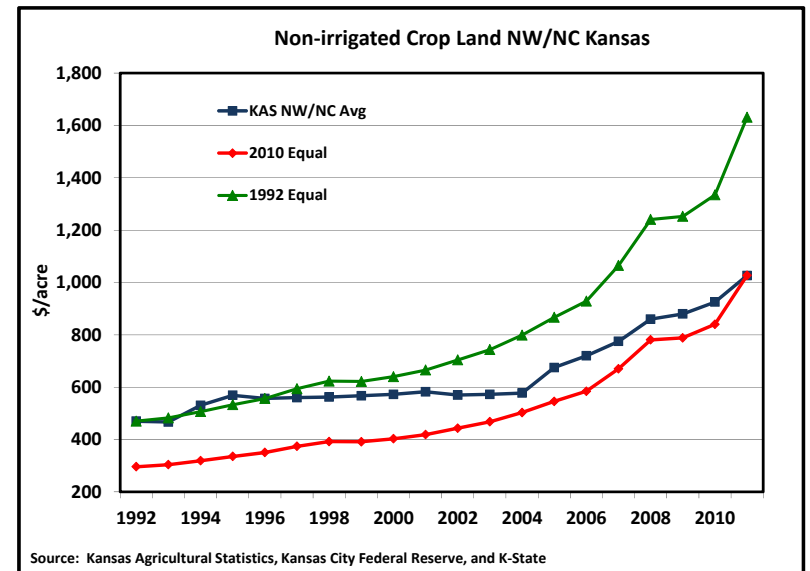
* Kansas City-Tenth Federal Reserve District includes CO, KS, NE, OK, WY, 1/2 of NM and 1/3 of MO

Percent change in pasture land values from two sources*

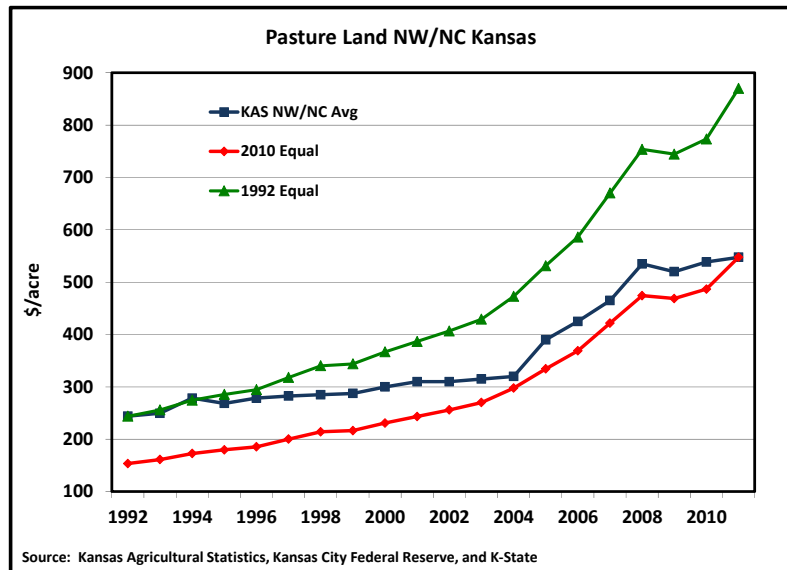


Kansas City-Tenth Federal Reserve District includes CO, KS, NE, OK, WY, 1/2 of NM and 1/3 of MO

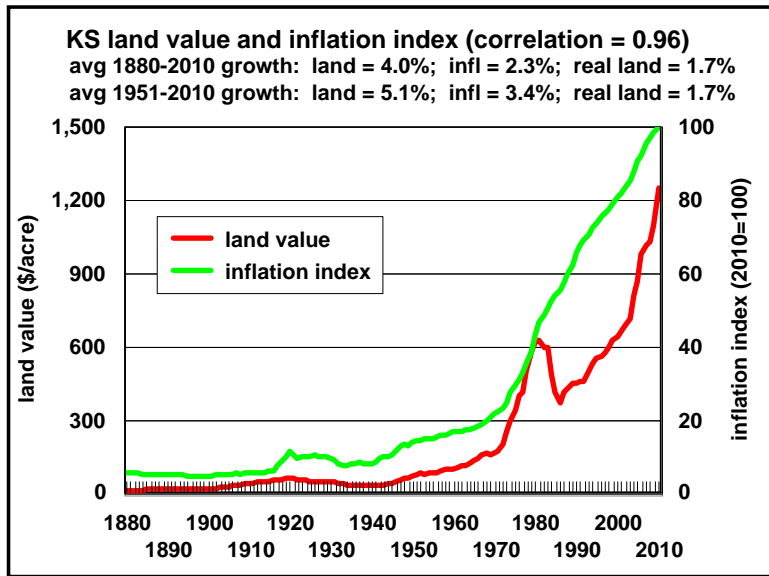
KAS values versus imputed values from KC Fed % changes...



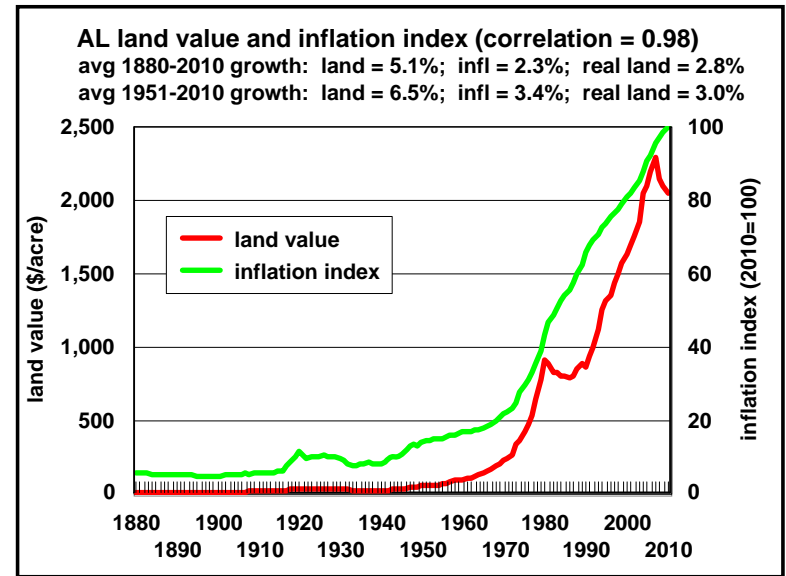
KAS values versus imputed values from KC Fed % changes...



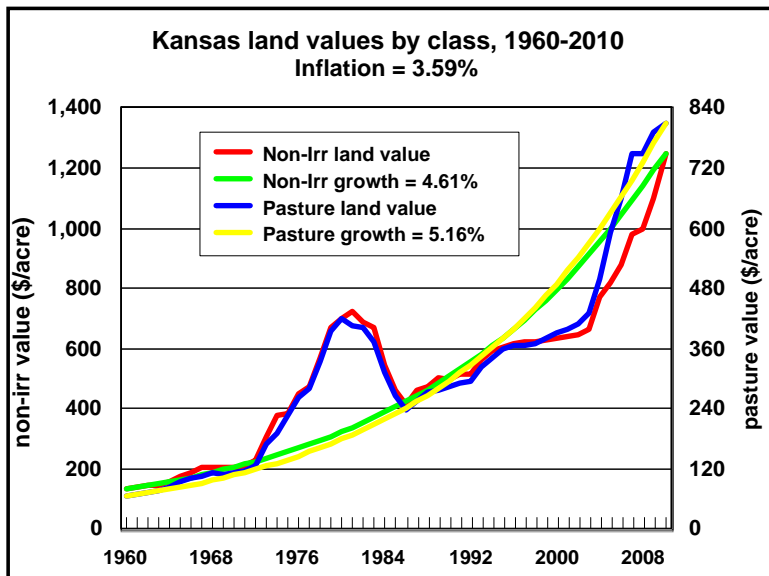
Land growth rates vs. inflation



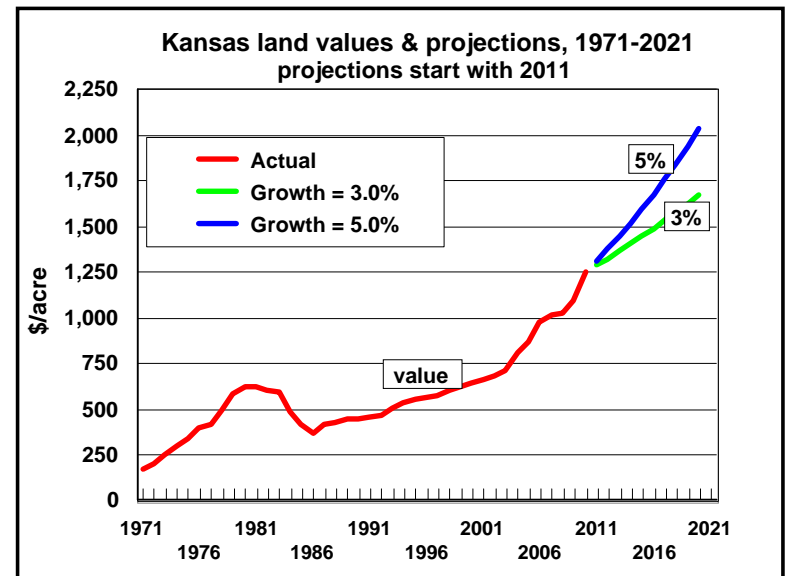
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Returns to land

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Returns to land

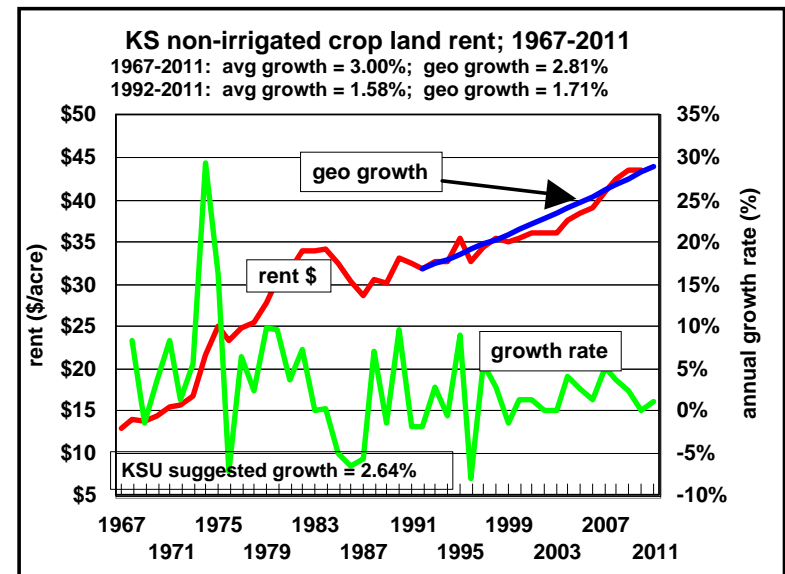
- Capital gains (growth)
- Cash returns (rent)
- The two returns to land are similar to other investments such as the stock market (capital gains and dividends)

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Rent

- KFMA farms with > 100 crop acres (2008-2010 avg)
 - 88% of KFMA farms use rented crop land (range across six regions, 81%-93%)
 - 61% of crop acres farmed by KFMA members are rented (range across six regions, 52%-71%)
- For owner-operators rent is the “profit” assigned to land after all other opportunity costs are considered

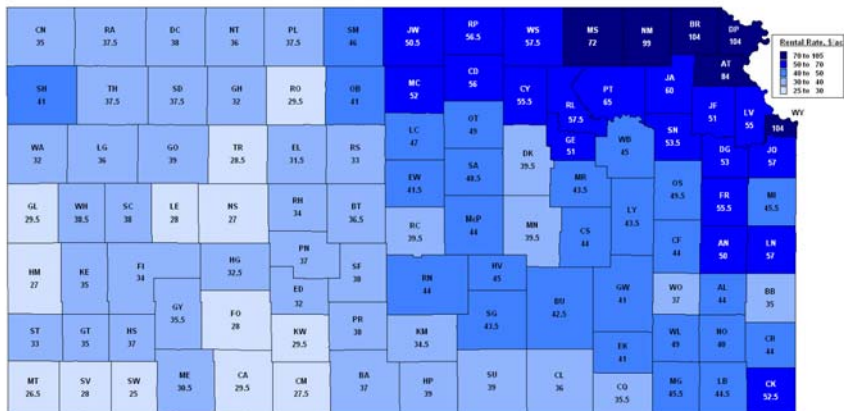
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If grain demand continues, expectation for growth might need to be raised

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Kansas Nonirrigated Cash Rents, 2011*

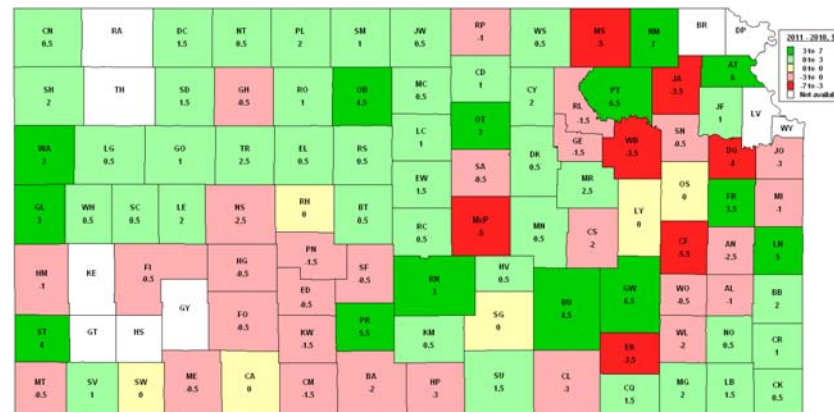


* Cash rent values as reported by USDA NASS and Kansas Agricultural Statistics (KAS).

KAS did not report values for BR, DP, GT, KE, RA, TH and WY counties – values for these counties were filled in with multi-county averages.

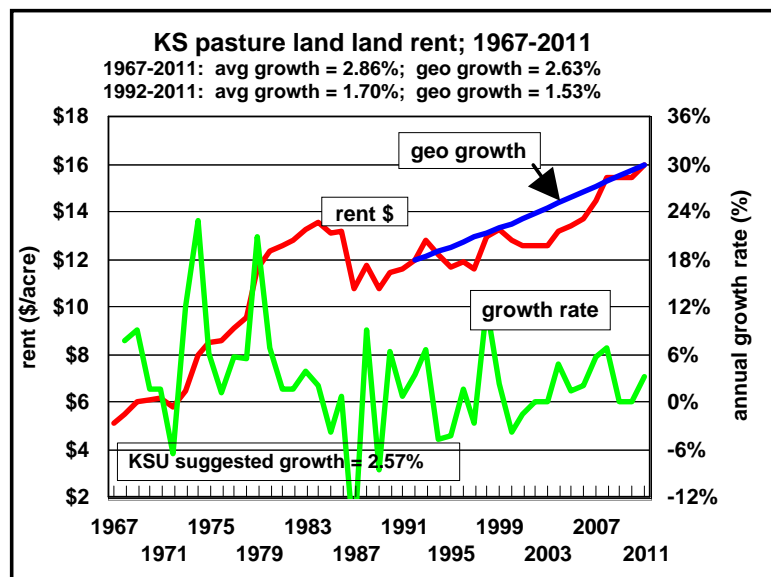
State average = \$44.00 compared to \$43.50 in 2010 (+1.1%)

Non-irrigated Cash Rent – 2011 change from 2010, \$/ac



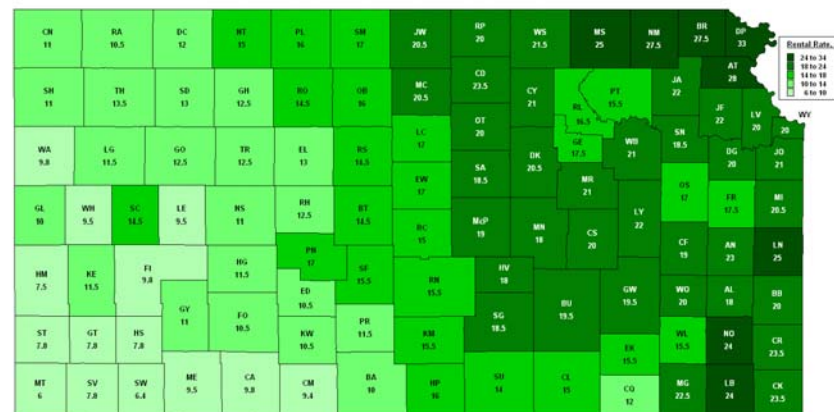
Of 95 counties with data in both 2010 and 2011, 35 (36.8%) decreased, 54 (56.8%) increased, and 6 did not change.

Average change = \$0.43 (ranged from -\$5.50 to +\$7.00)



If grain demand continues, expectation for growth might need to be raised

Kansas Pasture Cash Rents, 2011*

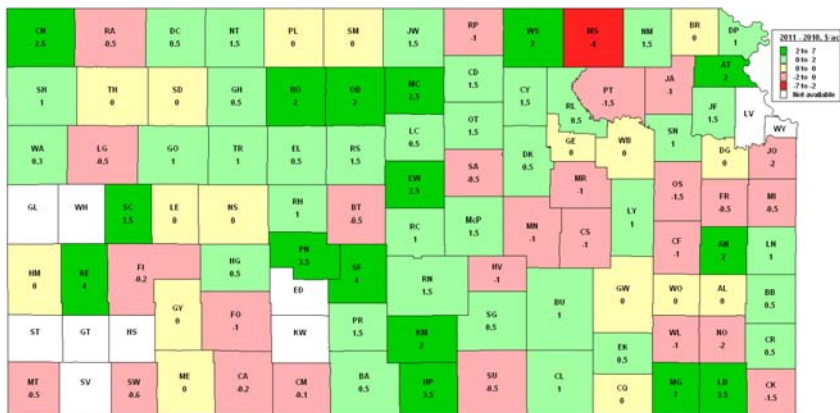


* Cash rent values as reported by USDA NASS and Kansas Agricultural Statistics (KAS).

KAS did not report values for ED, GT, HS, KW, LV, ST, SV and WY counties – values for these counties were filled in with multi-county averages.

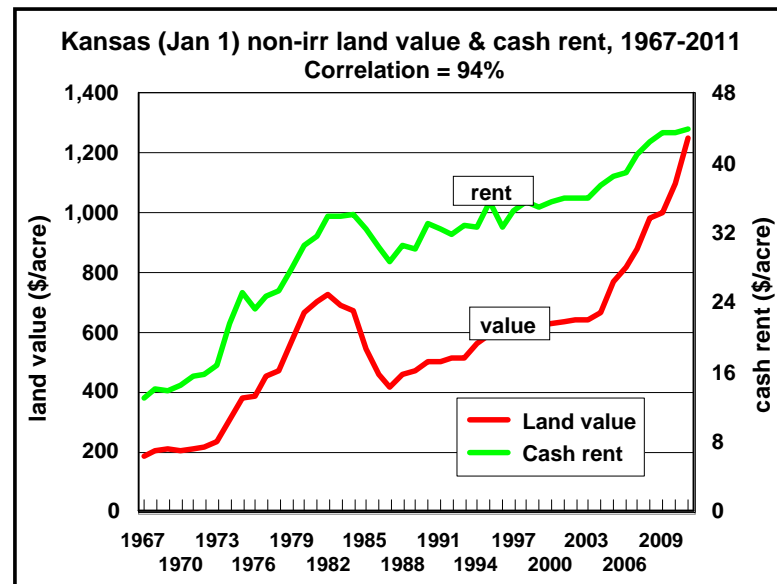
State average = \$16.00 compared to \$15.50 in 2010 (+2.4%)

Pasture Cash Rent – 2011 change from 2010, \$/ac



Of 95 counties with data in both 2010 and 2011, 27 (28.4%) decreased, 51 (53.7%) increased, and 17 did not change.

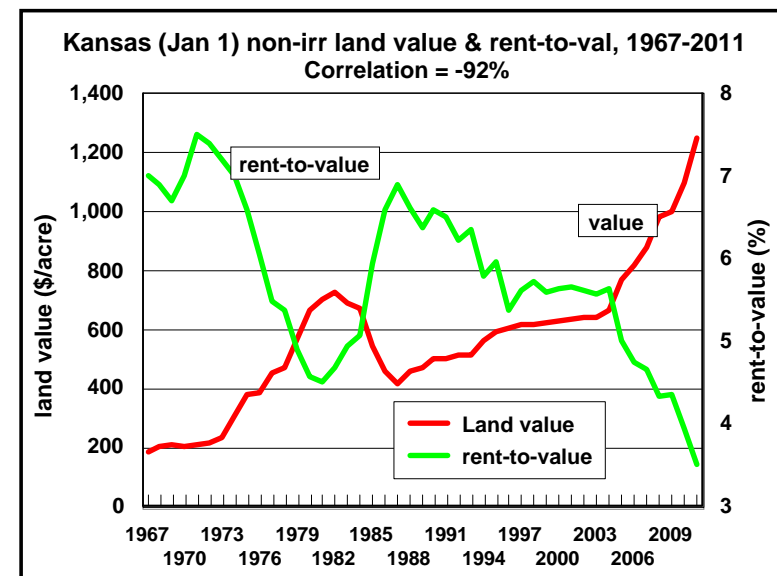
Average change = \$0.59 (ranged from -\$4.00 to +\$7.00)



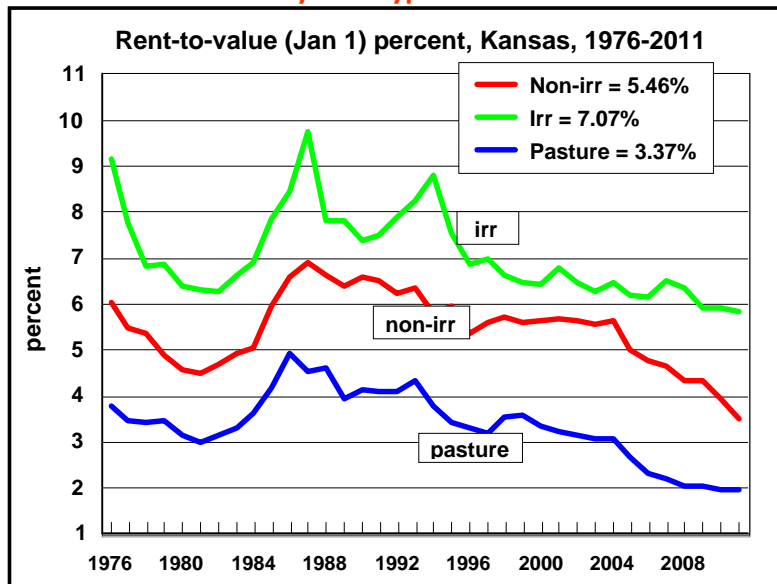
Capitalization Formula

$$Value = \frac{Annual\ land\ income}{Capitalization\ rate}$$

$$Cap\ rate\ (rtv) = \frac{Annual\ land\ income}{Value}$$



Rent-to-value varies by land type...



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Why are Rents Lower on Pasture than on Farmland?

- People just love cows and pasture
- Security more important in cattle production
- Imperfect markets/sticky prices
 - share rents would adjust to technology faster
 - share rents would keep cash rents in line
 - little share renting in pasture
 - landlord management small (tenant power)
- Less desirable pastures are rented
 - size, shape, location, grass quality, water, fences
- Non-ag influence (greater on pasture than crop)

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Land as an Investment

Buying and owning land – ideas

- Total return = rent + capital gain
- Land doesn't cash flow when purchased
 - i.e, rents don't cover a 100% loan
- Cash flow is not the same as profitability
- Rents grow, loan payments don't
 - land eventually cash flows
- Income tax and capital gains tax rates matter
- Long-term investment means time value of money matters

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Buying Land – How much can I afford?

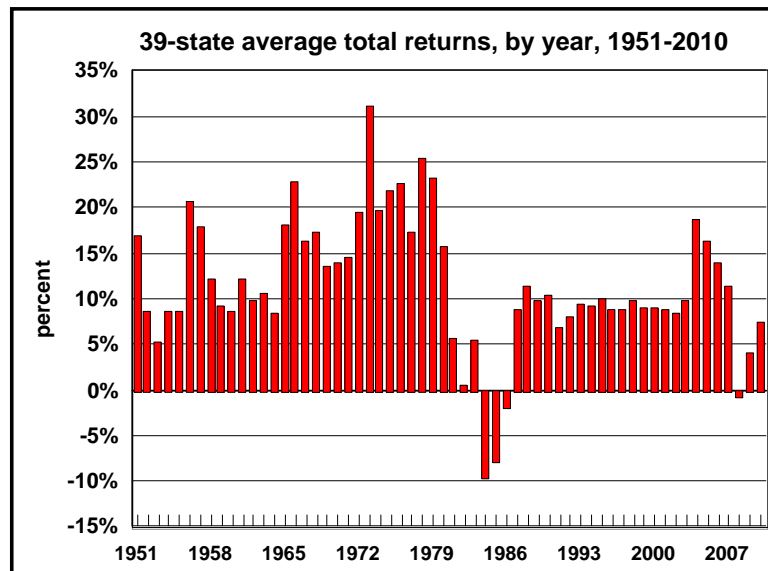
- Valuing the capital gains portion
 - Pick a “selling point,” say 30 years from now
 - What will the land be worth then?
 - Assume some annual capital gain % -- ag and non-ag
 - What is left after “sell” & pay cap gains tax?
 - What is that amount worth today?
- Valuing the rent portion
 - What is cash rent today, ag and non-ag?
 - How will rents evolve (grow) over time?
 - What is the future stream of rents worth today?
- Maximum bid = today’s value of the capital gain + today’s value of the rent stream

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Non-ag Considerations

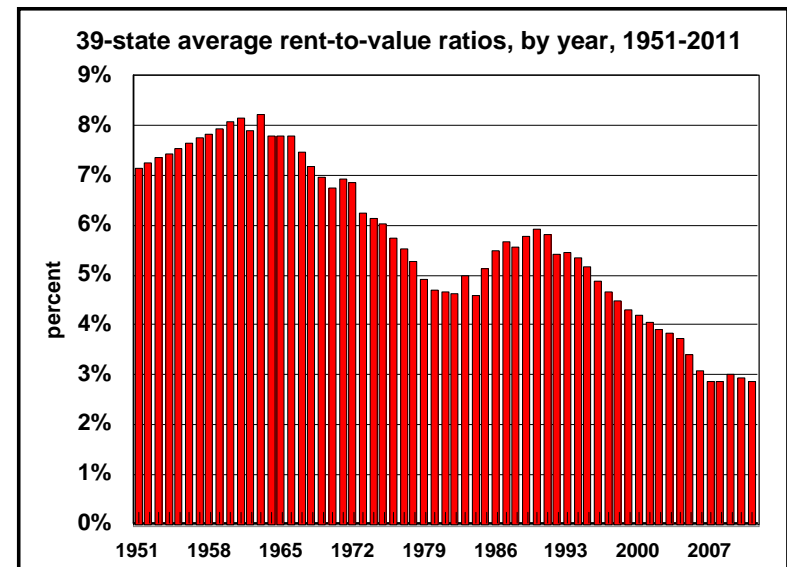
- There could be a non-ag rent:
 - e.g., leasing your land to hunters
- There could be a non-ag land value growth:
 - e.g., expectations of future development
- *KSU-Landbuy.xls* allows for both
- But first some historical information

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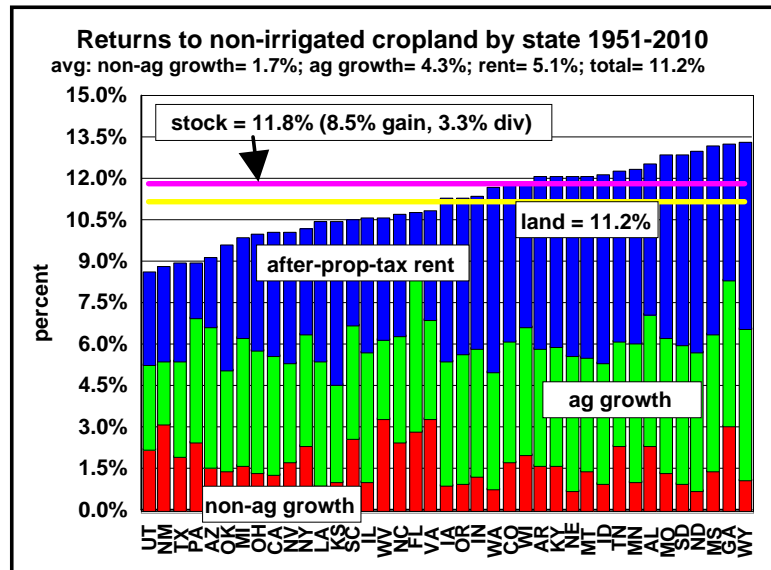


High farming profit in 2008 didn't make it to rents or end-of-year land values

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Sidebar

Land returns vs. farm returns

- **Kansas Farm Management Associations**
 - 2,000+ farms per year 1973 – 1999
 - Less farms if require multi-year presence
 - Calculated an after-tax ROE (ATROE)
 - Converted ATROE to pre-tax according to:
 $PTROE = ATROE / (1 - 0.35)$
- Kansas farm returns are compared to Kansas land returns and to the S&P

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Sidebar

1973-1999 annual returns

- **S&P fund**
15.2% avg and 16.7% std
- **Land portfolio**
10.1% avg and 10.7% std
- **Portfolio of average farms (138 farms)**
8.3% avg and 10.5% std
- **Portfolio of “top-third” farms (46 farms)**
13.9% avg and 14.8% std
- **Portfolios of farms, or land, or stock have lower risk than individual farms, parcels, or stocks**

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Analyzing a Land Purchase

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Land purchases often made with gut-feel

- Often get caught up in:
 - the emotion of bidding
 - local or national price bubbles
 - the fallacy of “comp” sales
 - over (or under) valuing certain attributes (e.g., distance)
 - “tired of missing opportunities of the past”
 - “tired of looking – must buy something now”
- Consistent procedures can help
 - every potential purchase viewed as an investment with an expected cash and growth return
 - unemotionally separates good from bad buys
- We routinely observe individual sales ranging from 75% to 175% of “market,” especially today
 - Were such purchases actually rational economically?
 - What the heck IS the market?

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KSU-Landbuy.xls spreadsheet for land investment decisions

KSU-Landbuy.xls -- A spreadsheet program to analyze land purchase prices and land values in general.

Version -- 10.12.11

INPUTS vs CALCULATED VALUES
 In the KSU-Landbuy sheet all blue numbers in shaded cells are inputs and all other numbers are calculated from these inputs. The spreadsheet automatically recalculates every time an additional input is entered. Thus, it is important to wait until all data have been entered and reviewed before interpreting any of the calculated results (i.e., black numbers).

DESCRIPTION OF INPUTS
 Several resources exist to aid in the use of this spreadsheet: 1) The paper titled *Valuing and Buying Farmland* (paper at www.agmanager.info/farmmg/land_land_buy) serves as a user's guide and provides a more detailed documentation of the concepts and formulas used in this spreadsheet. 2) The input cells (i.e., blue numbers) have a red diamond in the upper right hand corner of the cell (if the comments do not appear go to View / Comments on the Excel menu). By moving your mouse cursor over this diamond, a brief description of the input will be displayed on the screen. 3) A video file (*KSU-Landbuy.wmv*) and an audio file (*KSU-Landbuy.mp3*) -- available at www.agmanager.info/farmmg/land_land_buy -- can be played on your computer providing a brief explanation of the inputs and outputs line by line.

Developed by: Terry L. Kastens, Professor Emeritus, Kansas State University; Kevin C. Dhuyvetter, Extension Agricultural Economist, Kansas State University.

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 website: www.agmanager.info; website: www.agmanager.info

Links to supporting materials: [Valuing and buying farmland](#) (on www.agmanager.info); [KSU-Landbuy.wmv](#); [KSU-Landbuy.mp3](#)

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Blue values are user inputs – all other values are calculated

Inputs				Print report			
KS	KS	KS	KS	KS	KS	KS	KS
120	35	5	190	Average			
\$1,111	\$517	\$0	\$946	Ac			
\$1,200	\$550	\$0	\$1,020	MP_0			
\$50.00	\$15.50	\$0.00	\$40.89	PP			
\$4.44	\$2.07	\$0.00	\$3.79	aR			
\$0.00	\$0.00	\$0.00	\$0.00	Ptx			
30	30	30	30	nR			
43%	43%	43%	43%	T			
16%	16%	16%	16%	ltx			
6.50%	6.50%	6.50%	6.50%	Ctx			
40.0%	40.0%	40.0%	40%	I			
2.64%	2.53%	0.00%	2.63%	gA			
0.00%	0.00%	0.00%	n/a	gNR			
3.95%	3.95%	0.00%	3.95%	g			
1.28%	1.38%	0.00%	1.28%	gNW			

Calculated Outputs			
3.71%	3.71%	3.71%	3.71%
\$26.87	\$7.46	\$0.00	\$21.16
\$666.47	\$193.46	\$0.00	\$542.17
\$0.00	\$0.00	\$0.00	\$0.00
\$3,552	\$1,682	\$0	\$3,026
\$2,428	\$1,093	\$0	\$2,063
\$1,074	\$499	\$0	\$915
\$753	\$340	\$0	\$640
\$1,741	\$893	\$0	\$1,457
62%	77%	n/a	81%
82%	39%	n/a	-----
\$829.52	\$175.87	\$0.00	\$610.81
\$540.53	\$142.54	\$0.00	\$436.58
9.41%	8.16%	n/a	9.26%
11.35%	9.28%	n/a	11.10%

Label (refers to notation in *Valuing and Buying Farmland* publication)

- State where land is located (enter as two letter abbreviation, e.g., Kansas = KS)
- Land classification (e.g., cropland, pasture, woods)
- Enter the acres of each class of land (used to calculate weighted average)
- Market price of land, \$/acre
- Purchase price (PP -- amount you pay), \$/acre
- Ag rent--cash or cash equivalent in \$/acre today
- Real estate (property) tax in \$/acre today
- Non-ag rent in \$/acre today
- Time horizon in years land is held (less than or equal to 100 years)
- Income tax rate (on last dollar of taxable income -- include SE tax if relevant)
- Capital gains tax rate
- Interest rate on land loans (discount rate)
- Percent of purchase price that is financed (only needed for return on equity calculations)
- Growth rate on ag rent and ag portion of land value (see column G in Guidelines)
- Growth rate on non-ag rent (normally >= inflation rate)
- Growth rate on total (ag and non-ag) land value (see column I in Guidelines)
- Calculated non-ag growth rate on land value

l(1-ltx) After-tax interest rate on land loans (discount rate)

After-tax rent, \$/acre (now property taxes are removed as well)

PVRA Discounted value of all future after-tax ag rents

PVNR Discounted value of all future after-tax non-ag rents

Projected land value in 30 years, based on market price and ag & non-ag growth

Projected land value in 30 years, based on market price and only ag growth

PVS Discounted value of land sale in 30 years (after capital gains tax)

PVSA Discounted value of land sale in 30 years (after capital gains tax) -- if only ag growth

PVL Present value of land purchase

AMVP Ag market value percent implied by non-ag rent and growth inputs

Ag market value percent implied by Ag Rent-to-Value (column J of Guidelines) and after-tax cash

Present value less market price


Present value less purchase price

Approximate pre-tax rate of return on assets

Approximate pre-tax rate of return on equity

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For more information and decision tools related to farm management, marketing, and risk management go to www.AgManager.info



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If interested in receiving weekly *AgManager.info Update* or any of our other Ag Econ newsletters via email, please let me know.