



2012 Kansas County-Level Land Values and Cash Rents for Non-Irrigated Cropland and Pasture

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The value of Kansas cropland and pasture land has been changing rapidly over the past few years. As a result, many people are interested in current estimates of the value of an average parcel of ground for their individual locations. Currently, the Kansas Agricultural Statistics Service (KAS) reports only state average values for irrigated, non-irrigated, and pasture land. These values are based upon an annual survey of agricultural producers and landowners asking for their estimate of the value of cropland and pasture land they own or operate. Historically, the survey was conducted such that values could be reported at the crop reporting district (CRD) level, of which there are nine in the state. While many people want values at a more disaggregated level than the CRD (e.g., county-level), this historical information did allow regional values and trends to be identified. Unfortunately, the CRD-level estimates reported by KAS were discontinued in 2009 and thus, no official government reported data exist of regional values.

In an effort to maintain information at the CRD-level, Dhuyvetter and Taylor have used historical relationships between the CRD and state averages to generate an estimate of CRD values from the currently reported KAS state-level estimate (see MF-1100 available at: <http://www.agmanager.info/farmmgt/fmg/land>). There are several potential problems with this method (referred to as KAS/KSU) of estimating land values. First, if the price relationship between CRD's has changed in recent years, relative to the past, the estimates will no longer accurately reflect current market conditions. Second, the source data for these estimates is a survey of people's opinions, which may not be highly attuned to the current land market. For example, the KAS data have typically lagged behind estimates based on market data, suggesting that changes in land values are moving faster than people not actively engaged in the land markets realize.

The current growth in land values and the many business and personal decisions affected by these values warrants more extensive analysis to obtain estimates that are less aggregated than either the state or CRD-level values available. To this end, sales transaction data were obtained

from the Kansas Property Valuation Department (PVD).¹ These data reflect agricultural land sales in Kansas from 2010 through 2012. To obtain estimates that reflect land sold for agricultural purposes in an “arm’s length” transaction, some observations were removed from the original dataset.² The sales data used in the analysis were limited to bare land (undeveloped) parcels of at least 40 acres in size. These filtered data were used in a regression analysis, referred to as PVD/KSU, to estimate county-specific values for non-irrigated cropland and pasture. The land value model used characteristics of the parcels sold to determine impacts on price. Characteristics such as parcel size, soil quality rating, percent of pasture and cropland within a parcel, and when a parcel was sold were all used to estimate county-level land values.

The county-level estimates and the average for each of the CRD’s are shown in table 1, where the CRD average is a simple average of the counties that fall within the region. Table 2 provides a comparison between the CRD values using the KAS/KSU data and the estimates using PVD transactions data (PVD/KSU). In all but one case (East Central region), the survey-based estimates are lower than the market-based estimates. For non-irrigated cropland, the analysis using PVD transactions data estimates a state-level average value of \$2,312/acre, 36.0% higher than the 2012 KAS reported value of \$1,700/acre. Across the nine CRD regions, the differences range from a 0.3% decrease from the KAS values in the East Central CRD to a 63.2% increase in the Northwest CRD. Pasture values are similarly understated by the survey method, with the transactions data estimate of \$1,497/acre for the state average. This estimate is 57.9% higher than the KAS reported value for pasture in 2012. Regional differences range from an increase of 20.2% in the Southeast to an increase of 133.3% over the KAS pasture value estimate for the Northwest CRD.

¹ The authors would like to thank Leah Tsoodle and Mike Dahlman for their assistance with data collection.

² “Arm’s length” refers to land sold through typical market channels and does not include intra-family transactions, court-ordered sales, or other transactions that may keep the sale from being considered a market-based transaction.

Table 1. Estimated Agricultural Land Values for 2012 using PVD Transactions Data

CRD	County	Non-Irrigated, \$/ac	Pasture, \$/ac	CRD	County	Non-Irrigated, \$/ac	Pasture, \$/ac	CRD	County	Non-Irrigated, \$/ac	Pasture, \$/ac
Northwest	Cheyenne	1,517	985	North Central	Clay	3,578	2,322	Northeast	Atchison	4,427	2,871
	Decatur	1,803	1,171		Cloud	3,248	2,111		Brown	5,546	3,601
	Graham	1,158	752		Jewell	2,558	1,663		Doniphan	4,929	3,198
	Norton	1,874	1,217		Mitchell	2,231	1,448		Jackson	3,089	2,005
	Rawlins	1,811	1,175		Osborne	1,892	1,228		Jefferson	3,567	2,312
	Sheridan	2,167	1,409		Ottawa	2,414	1,567		Leavenworth	4,512	2,923
	Sherman	1,484	964		Phillips	1,296	841		Marshall	3,956	2,571
	Thomas	2,284	1,484		Republic	3,683	2,392		Nemaha	3,994	2,595
				Rooks	1,382	895	Pottawatomie	2,909	1,889		
				Smith	1,937	1,256	Riley	4,432	2,879		
				Washington	3,193	2,074	Wyandotte*	--	--		
	Average:	1,762	1,145		Average:	2,492	1,618		Average:	4,136	2,684
West Central	Gove	1,534	997	Central	Barton	2,084	1,353	East Central	Anderson	2,417	1,566
	Greeley	1,530	992		Dickinson	2,813	1,828		Chase	1,695	1,100
	Lane	1,534	996		Ellis	2,204	1,432		Coffey	2,438	1,581
	Logan	1,462	950		Ellsworth	1,194	775		Douglas	5,284	3,430
	Ness	1,374	891		Lincoln	1,763	1,144		Franklin	3,385	2,196
	Scott	2,247	1,458		Marian	2,528	1,642		Geary	1,951	1,265
	Trego	1,308	849		McPherson	2,617	1,697		Johnson*	--	--
	Wallace	1,230	799		Rice	2,198	1,428		Linn	2,658	1,725
Wichita	1,851	1,201	Rush	1,220	791	Lyon	2,327	1,511			
				Russell	1,828	1,186	Miami	6,298	4,089		
				Saline	3,379	2,193	Morris	2,335	1,514		
	Average:	1,563	1,015		Average:	2,166	1,406		Average:	3,075	1,995
Southwest	Clark	1,751	1,134	South Central	Barber	2,626	1,707	Southeast	Allen	2,158	1,398
	Finney	1,257	816		Comanche	1,897	1,230		Bourbon	2,569	1,667
	Ford	1,707	1,108		Edwards	1,884	1,223		Butler	3,140	2,039
	Grant	1,057	687		Harper	2,282	1,483		Chautauqua	2,252	1,462
	Gray	1,371	890		Harvey	2,826	1,836		Cherokee	2,383	1,548
	Hamilton	927	602		Kingman	2,122	1,378		Cowley	2,068	1,343
	Haskell	1,175	763		Kiowa	1,806	1,172		Crawford	1,896	1,231
	Hodgeman	1,013	657		Pawnee	1,816	1,180		Elk	2,140	1,388
	Kearny	911	591		Pratt	1,600	1,038		Greenwood	2,434	1,581
	Meade	1,212	787		Reno	2,131	1,385		Labette	2,444	1,589
	Morton	895	581		Sedgwick	3,688	2,390		Montgomery	2,174	1,412
	Seward	1,519	985		Stafford	1,747	1,136		Neosho	2,333	1,514
	Stanton	754	489		Sumner	1,883	1,221		Wilson	2,090	1,356
Stevens	895	579				Woodson	2,512	1,631			
	Average:	1,175	762		Average:	2,178	1,414		Average:	2,328	1,511

* Land value for these counties were not estimated due to insufficient data available meeting the selection criteria of parcel sizes above 40 acres and bare ground.

Table 2. Comparison of CRD Average KAS/K-State Land Values and PVD Transactions Data Estimates for 2012

	Northwest	West Central	Southwest	North Central	Central	South Central	Northeast	East Central	Southeast	State
Non-Irrigated Value										
KAS/KSU	1,080	1,054	1,031	1,666	1,821	1,747	2,848	3,085	2,028	1,700
PVD/KSU	1,762	1,563	1,175	2,492	2,166	2,178	4,136	3,075	2,328	2,312
Difference, \$/ac	682	509	144	826	345	431	1,288	-10	300	612
Difference, %	63.2	48.3	13.9	49.6	19.0	24.6	45.2	-0.3	14.8	36.0
Pasture Value										
KAS/KSU	491	531	432	788	907	876	1,434	1,580	1,257	950
PVD/KSU	1,145	1,015	762	1,618	1,406	1,414	2,684	1,995	1,511	1,500
Difference, \$/ac	654	484	330	830	499	538	1,250	415	254	550
Difference, %	133.1	91.1	76.4	105.3	55.0	61.4	87.2	26.3	20.2	57.9

Note: Source of KAS/KSU CRD-level values is MF-1100 available at: <http://www.agmanager.info/farmmgmt/fig/land>

2012 Kansas County-Level Cash Rental Rates for Non-Irrigated Cropland

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In the wake of rapid changes in Kansas agricultural land values, many people are also wondering how rental rates for cropland have been affected. Historically, the ratio of cash rent to land value (i.e., rent-to-value ratio) has been in the range of 5 to 6 percent. This ratio indicates the annual return (before real estate taxes) that landowners can expect on their capital investment from renting the land out excluding capital gains. If that relationship still holds, then a state-level estimate for non-irrigated cropland of \$2,516/acre would imply cash rental rates ranging from approximately \$126 to \$151/acre. This range leaves a large amount of negotiating room for landowners and tenants, which prompts us to apply another method of estimating rental rates. Furthermore, if part of the land value increase in recent years has been due to “non-ag” reasons, then the historical rent-to-value ratio may not be appropriate to use in the current environment.

Rather than targeting a particular rate of return on non-irrigated cropland, which may or may not reflect the productivity of the land or current crop prices, cash rents were estimated employing a method of calculating revenue from a crop share arrangement. The decision aid used to guide these calculations is the *KSU-Lease.xls* Excel spreadsheet available at the AgManager.info website (<http://www.agmanager.info/farmmgmt/land/lease>). The basic premise of the approach in *KSU-Lease* is that a lease is considered to be equitable if the income from the lease is split proportionally to how the inputs (costs) are contributed.³

This spreadsheet requires input of production cost data for a given crop mix and expected commodity prices. The crop enterprise mix for each county was determined using planted acreage estimates for each county from the 2002 and 2007 USDA Census of Agriculture⁴. The crop mix was limited to wheat, corn, soybeans, and grain sorghum, where wheat was either summer-fallow or continuous. Yields for these crops were calculated using an 8-year historic average for each county. Information on costs of production and long-run commodity prices were taken from the 2012 updates of the Farm Management guides

³ For a further discussion of principles behind how leases are determined see publications NCFMEC-01 and NCFMEC-02 also available at AgManager.info

⁴ 2012 Census data is not yet available at time of publication.

(<http://www.agmanager.info/farmmgmt/fmg/nonirrigated>). The expected commodity prices, crop acreage mix, historic yields, and landowner's crop share percentage averaged to the regional level are presented in table 3. From the *KSU-Lease* spreadsheet, an estimate of the expected revenue to the landowner from an equitable crop share arrangement was obtained. The estimated crop share percentages used in the analysis range from 28.9% in the South Central region of the state to 41.9% in the Northeast region. The difference in crop share splits across the regions reflects the relative productivity, costs, and revenue potential of the farmland.

The estimated crop share split was applied to historical county-level yields as reported by KAS and the long-run commodity price forecasts shown in table 3 to determine an estimate of crop share revenue at the county level. Finally, the crop share revenue was discounted by a 20 percent risk premium to arrive at a cash rent estimate. The 20 percent discount reflects the lower risk faced by a landowner when they enter into a cash rent contract. Crop share revenues, while higher, are also more variable or risky than fixed cash rents. This is especially true in recent years with large fluctuations in commodity prices. In more stable years, the risk percentage may be lower. It should be noted that risk premiums were routinely close to zero, and negative in some cases, in the early in the late 1990's and early 2000's and thus this 20 percent risk premium is quite high by historical standards.

The county-level estimates of non-irrigated cropland cash rental rates are given in table 4. The first column of rental rates contains the survey-based values reported by USDA-KAS for 2012 (KAS). They are obtained in a similar fashion to the land values, via survey. A comparison of the rental rates from USDA-KAS and those estimated using the *KSU-Lease.xls* crop share approach adjusted for risk (KSU) reveals the USDA-KAS estimates are significantly lower, as was the case with the land value data.

Why would rental rates collected via survey be so much lower than risk-adjusted crop share estimates? The cost of production and commodity price information used in the KSU crop share lease method reflect the most current information available about what returns to non-irrigated farming would be under prices projected for the next 3-5 years (values would be even higher if they were based on expected prices for 2013). Therefore, if a contract between a landowner and

Table 3. Prices and Acreages Used to Estimate Cash Rental Rates

Region	Price, \$/bu	Crop Enterprise Mix, % of acres	8-Year Historic Average Yields*	Landowner's Crop Share
West				37.3%
Wheat	6.36	65.4	31.0	
Corn	5.17	9.4	55.2	
Soybeans	n/a	0.0	n/a	
Grain Sorghum	4.62	24.7	53.6	
North Central				34.6%
Wheat	6.05	63.2	36.7	
Corn	4.86	3.5	84.1	
Soybeans	10.48	10.7	29.6	
Grain Sorghum	4.68	22.6	80.2	
South Central				28.9%
Wheat	6.64	74.5	33.8	
Corn	5.00	2.9	71.2	
Soybeans	10.69	4.6	24.9	
Grain Sorghum	4.89	18.0	63.0	
Northeast				41.9%
Wheat	6.35	17.0	34.5	
Corn	5.03	29.3	106.1	
Soybeans	10.83	46.5	34.2	
Grain Sorghum	4.82	7.2	69.9	
Southeast				29.7%
Wheat	6.42	33.4	31.7	
Corn	4.94	17.4	97.8	
Soybeans	10.55	40.8	30.2	
Grain Sorghum	4.54	8.4	68.3	

* The yields and crop enterprise mix values presented here are averaged across the region. However, county-level values for both of these variables were used to calculate the county-level rental rates.

tenant were being negotiated today for the next 3-5 years, these rates should be very close to negotiated rates. If the lease was being negotiated for the 2013 season only, the rates likely would be higher yet. A potential problem with the USDA-KAS survey values is that they do not reveal the year in which the rental rate being reported was negotiated. If a contract has been in place for several years, with no change in the rental rate, then it is likely to be lower than a current contract reflecting higher crop prices. Another possible explanation for lower rental rates being reported on surveys is that not all contracts are negotiated solely based on returns to farming. If there are other aspects to the contract that provide value to the landowner, then perhaps the rental rate is reduced to reflect that non-pecuniary value. Finally, it is possible that the rates are simply being understated due to bias in the survey respondents.

The final piece of information that can be obtained from a comparison of non-irrigated rental rate estimates is a check of the consistency of historical rent-to-value rates across different information sources. Calculation of the rent-to-value ratio using the risk-adjusted crop share based rental rates (KSU) and the PVD/KSU land values for non-irrigated land result in a state-level estimate of 3.6%. The ratio suggests that even though land values have been increasing rapidly, returns to farming are expected to support returns of 3.6% over the next few years. The ratio is lower than the historic range of 5 to 6 percent, based on KAS data over the past 10 years. However, as compared to the historically low interest rates we are currently experiencing, a 3.6% rate of return is appealing and suggests that land markets could continue to be strong in the near future.

Table 5 reports the KAS survey values for pasture rental rates at the county level. There is not a comparable approach, as was done for non-irrigated crop rental rates (i.e., the risk-adjusted crop share approach), to estimate a “KSU” pasture rental rate. This is because stocking rate data, the parallel to crop yields, is not available at the county level. However, producers and landowners wanting another estimate of pasture rental rates for their unique situation can do so with the *KSU-Graze.xls* Excel spreadsheet or web dashboard available at the AgManager.info website (<http://www.agmanager.info/farmmgmt/land/lease>).

Table 4. Estimated Cash Rental Rates for Non-Irrigated Cropland in 2012

CRD	County	KAS Rental	KSU Rental	Difference,	CRD	County	KAS Rental	KSU Rental	Difference,	CRD	County	KAS Rental	KSU Rental	Difference,
		Rate, \$/ac*	Rate, \$/ac**	%			Rate, \$/ac*	Rate, \$/ac**	%			Rate, \$/ac*	Rate, \$/ac**	%
Northwest	Cheyenne	47.50	66.00	38.9	North Central	Clay	67.00	94.60	41.2	Northeast	Atchison	98.50	172.50	75.1
	Decatur	49.00	88.20	80.0		Cloud	60.00	89.20	48.7		Brown	160.00	202.90	26.8
	Graham	38.50	71.60	86.0		Jewell	56.50	92.40	63.5		Doniphan	143.00	229.60	60.6
	Norton	40.50	81.50	101.2		Mitchell	58.50	87.30	49.2		Jackson	59.50	150.20	152.4
	Rawlins	51.00	73.40	43.9		Osborne	50.50	76.90	52.3		Jefferson	51.00	161.80	217.3
	Sheridan	47.50	78.70	65.7		Ottawa	59.50	74.70	25.5		Leavenworth	61.50	149.20	142.6
	Sherman	41.00	64.80	58.0		Phillips	44.00	77.70	76.6		Marshall	87.00	143.20	64.6
	Thomas	52.50	70.00	33.3		Republic	73.50	95.50	29.9		Nemaha	119.00	164.00	37.8
Average:	45.94	74.28	61.7	Average:	58.09	85.87	47.8	Average:	90.90	164.66	81.1			
West Central	Gove	40.50	75.20	85.7	Central	Barton	40.00	60.40	51.0	East Central	Anderson	63.00	72.90	15.7
	Greeley	42.50	59.80	40.7		Dickinson	49.00	79.70	62.7		Chase	54.00	70.80	31.1
	Lane	35.00	60.60	73.1		Ellis	39.50	63.70	61.3		Coffey	57.50	71.30	24.0
	Logan	39.50	70.90	79.5		Ellsworth	39.50	70.80	79.2		Douglas	61.00	138.10	126.4
	Ness	27.00	63.50	135.2		Lincoln	49.50	75.60	52.7		Franklin	55.00	114.90	108.9
	Scott	54.50	79.80	46.4		Marian	44.50	64.10	44.0		Geary	50.50	117.90	133.5
	Trego	34.00	65.30	92.1		McPherson	54.50	67.80	24.4		Johnson	70.00	123.20	76.0
	Wallace	42.50	64.20	51.1		Rice	57.50	69.50	20.9		Linn	50.50	69.10	36.8
Average:	39.67	68.20	71.9	Average:	46.05	68.51	48.8	Average:	58.07	103.34	78.0			
Southwest	Clark	30.50	54.10	77.4	South Central	Barber	43.00	44.50	3.5	Southeast	Allen	43.50	64.70	48.7
	Finney	30.50	70.50	131.1		Comanche	32.00	39.90	24.7		Bourbon	47.50	64.80	36.4
	Ford	32.00	72.20	125.6		Edwards	45.00	53.00	17.8		Butler	42.00	70.30	67.4
	Grant	30.50	48.60	59.3		Harper	38.00	42.40	11.6		Chautauqua	35.50	51.20	44.2
	Gray	39.50	73.00	84.8		Harvey	54.50	66.90	22.8		Cherokee	58.50	69.20	18.3
	Hamilton	30.50	51.70	69.5		Kingman	44.50	45.90	3.1		Cowley	35.50	55.40	56.1
	Haskell	30.50	57.00	86.9		Kiowa	32.00	52.00	62.5		Crawford	59.00	71.50	21.2
	Hodgeman	32.00	65.00	103.1		Pawnee	43.50	61.80	42.1		Elk	41.00	63.60	55.1
Average:	31.32	59.04	88.5	Average:	42.88	52.40	22.2	Average:	46.68	63.81	36.7			

* KAS rental rates available at http://www.nass.usda.gov/Statistics_by_State/Kansas/index.asp

** KSU Rental Rate is based on using *KSU-Lease* and a risk-adjusted equitable crop share approach. *KSU-Lease.xls* is available at <http://www.agmanager.info/farmmg/land/lease/default.asp>

Table 5. Pasture Rental Rates Reported by Kansas Agricultural Statistics Service (KAS)

KAS Rental Rate,			KAS Rental Rate,			KAS Rental Rate,		
CRD	County	\$/ac*	CRD	County	\$/ac*	CRD	County	\$/ac*
Northwest	Cheyenne	11.50	North Central	Clay	19.00	Northeast	Atchison	22.00
	Decatur	12.00		Cloud	24.00		Brown	26.50
	Graham	14.50		Jewell	21.50		Doniphan	38.50
	Norton	14.50		Mitchell	23.50		Jackson	23.50
	Rawlins	11.50		Osborne	16.50		Jefferson	23.50
	Sheridan	13.50		Ottawa	21.50		Leavenworth	21.00
	Sherman	10.00		Phillips	17.00		Marshall	26.50
	Thomas	14.00		Republic	19.00		Nemaha	29.00
				Rooks	14.50		Pottawatomie	18.00
				Smith	19.00		Riley	17.50
			Washington	21.50	Wyandotte	26.50		
	Average:	12.69		Average:	19.73		Average:	24.60
West Central	Gove	12.00	Central	Barton	14.00	East Central	Anderson	22.50
	Greeley	10.50		Dickinson	19.00		Chase	21.50
	Lane	12.00		Ellis	16.00		Coffey	20.00
	Logan	10.50		Ellsworth	16.00		Douglas	25.00
	Ness	12.50		Lincoln	17.00		Franklin	21.00
	Scott	12.50		Marian	18.50		Geary	19.00
	Trego	12.50		McPherson	19.50		Johnson	23.00
	Wallace	9.20		Rice	15.50		Linn	23.00
Wichita	11.00	Rush		13.00	Lyon		23.00	
				Russell	12.00		Miami	19.00
			Saline	19.50	Morris	24.00		
					Osage	20.00		
					Shawnee	17.50		
					Wabaunsee	20.00		
	Average:	11.41		Average:	16.36		Average:	21.32
Southwest	Clark	9.20	South Central	Barber	10.50	Southeast	Allen	18.50
	Finney	8.90		Comanche	10.50		Bourbon	21.50
	Ford	12.00		Edwards	15.50		Butler	21.00
	Grant	8.90		Harper	14.50		Chautauqua	12.00
	Gray	12.50		Harvey	11.50		Cherokee	24.00
	Hamilton	7.60		Kingman	16.00		Cowley	15.00
	Haskell	8.90		Kiowa	11.50		Crawford	24.50
	Hodgeman	12.00		Pawnee	14.50		Elk	16.50
	Kearny	8.00		Pratt	11.50		Greenwood	19.00
	Meade	11.00		Reno	15.00		Labette	23.00
	Morton	5.10		Sedgwick	19.00		Montgomery	22.00
	Seward	5.70		Stafford	15.50		Neosho	26.00
	Stanton	8.90		Sumner	16.00		Wilson	18.00
Stevens	8.90			Woodson	20.50			
	Average:	9.11		Average:	13.96		Average:	20.11

* KAS rental rates available at http://www.nass.usda.gov/Statistics_by_State/Kansas/index.asp