

## 2022 Kansas County-Level Cash Rental Rates for Non-Irrigated Cropland - Revision

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### Purpose of these KSU Non-Irrigated Cash Rent Estimates

Determining cash rental rates is an important decision for nearly every farmer in the state since over 90 percent of Kansas farmers rent at least some of their farmland. Cash leases are often determined by competitive local markets, which may or may not reflect the ability of the land to support “going” market rental rates. This publication provides non-irrigated cash lease breakeven estimates that incorporate land productivity to provide renters and landowners another perspective when negotiating lease rates.

A **tenant’s residual method** is used to **estimate non-irrigated county breakeven cash rents for 2022** – incorporating county yield histories, recent grain prices, and KFMA farm expenses. These breakeven cash rent estimates can help farmland renters and owners determine equitable cash rentals rates for specific farms.

These Kansas State University estimates for 2022 county-level non-irrigated breakeven cash rental rates are found in Figure 7 and Tables 1, 2, and 3 at the end of this publication. These estimates represent a revision to the earlier 2021/22 estimates.

### Intended Use of Breakeven Cash Rental Rate Estimates

**The rental rate estimates provided in this publication are intended for the 2022 crop year.** These estimates include an expectation of 2021 and 2022 farm profitability. Because the estimate is based on average yields for the county, actual lease rates could be higher or lower depending on actual yield history. Estimates are also a function of USDA-NASS cash rental rate surveys from 2021 to help smooth out the estimate – anchoring the numbers to recent cash rental rate history.

These breakeven cash rent estimates are intended to cover all expenses and not only the cash or direct cost of crop production. As such, these non-irrigated cash rental rate estimates represent what farm operators can pay and cover full economic cost of production with no extra profits. *IF* a crop producer’s crop yields, production costs or selling prices vary from these crop budget assumptions, *THEN* the full economic cost breakeven cash rental rate that can be paid in 2022 will vary from these estimates.

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Given the assumptions involved in calculating them, it holds true that these non-irrigated cash rental rate estimates are also NOT an endorsement for what a tenant should actually pay to a landlord. Instead, they are provided to give a starting point in lease negotiations, with care and attention given to the yield, production cost, and price estimates that these breakeven cash rental rate estimates have used.

Any lease that a tenant and landlord willingly agree to in which they have both utilized the best information they have available to them in making a decision, is considered here to be a “fair” and/or “equitable” lease.

### **Changes Made to the Earlier 2021/22 Estimates.**

In July, an estimate of 2021/22 cash rental rates for non-irrigated cropland was published. This paper now replaces those previous estimates. The primary reason for this update is that USDA-NASS county cash rental rates for 2021 were published in August. The estimate provided here now incorporates those NASS numbers. In addition, expense estimates for counties along a CRD border were adjusted by using a ratio of the expenses between the home CRD and the bordering CRD. Finally, revisions to cash rental rates were capped at a 50 percent increase from the NASS 2021 estimate.

### **Background – Estimating Farmland Cash Rental Rates**

Farmers across the U.S. make extensive use of farmland leasing to provide a base of farmland for their operations. As shown in **Figure 1**, the median percentage of land rented is about 75% of the total cropland base on a farm (the red line on the figure). There are very few crop and livestock producing farming operations in the United States that do not involved at least some rented cropland and/or pasture. Note that the blue line in **Figure 1** shows that less than 10% of farms have no rented land. The data for **Figure 1** comes from an analysis of Kansas Farm Management Association (KFMA) farm records for the last 50 years. KFMA data is also used in the estimates of expenses that help determine the county level cash rents.

Part of the reason that so many farmers lease at least a portion of their farmland is the non-depreciable nature of farmland. Not only is land not depreciable but it typically appreciates in price. It is not unusual for half or more of a farm’s real net returns to occur as land appreciation. These characteristics of farmland result in an asset that will very seldom ever cash flow (Oltmans, 1995). That is, when a farmer purchases farmland, the income provided from that land will not cover the principle and interest payments. Thus, in order for a farmer to cashflow any new farmland purchase, the income from other land is needed to cover the cashflow needs.

There are at least two main approaches of estimating cash lease rates. The *first approach* is based on either **formal or informal surveys** of what others are paying.

Discussions with neighboring farmers would be a type of an informal approach. A more formal approach is a survey like the type USDA-NASS uses to estimate cash lease rates each year. The main issues with the survey approach are whether responses are accurately reported, the delay in time to collect a survey (resulting in outdated lease rates), and whether the stated lease rate is actually something a tenant can pay and still cover all cash and non-cash expenses.

The *second approach* is to **estimate breakeven cash lease rates** based on soil productivity and market prices. These estimation methods have the advantage of looking forward rather than just using past experience. Also, a tenant can be more certain of covering all expenses if the calculations are developed correctly. The major disadvantage is that any forward projections are uncertain, and much more information is needed in order to develop an accurate cash lease estimate.

There are at least six methods of estimating a cash lease using the productivity approach. These are: 1) Average yields; 2) Corn suitability rating; 3) Share of gross crop value or revenue; 4) Return on investment; 5) Crop share equivalent; and 6) Tenant's residual. Iowa State University Extension has a publication detailing all of these methods and approaches (Plastina and Edwards, File C2-20).

NASS has been performing surveys of producers for cash rent expenses at the state level since 1995. They also have cash rent survey for individual counties but for a much shorter timeframe. **Figure 2** plots this state rental data for both irrigated and non-irrigated cropland.

Cash rental rates are correlated with farm profitability to some extent as shown by the net farm income per crop acre for western, central, and eastern Kansas. These net farm income numbers per crop acre are shown in **Figures 2, 3, and 4**. Net farm income increased from 2005 until about 2013 before starting to decline. A visual inspection of cash rents from NASS also show an increase in rates although there is some apparent delay and the rental rates are stickier, not increasing nor decreasing as quickly as net farm income changes.

### Approach

In this paper, the **tenant's residual approach** is used to estimate how much income the tenant has available for rent payments *after* subtracting all the tenant's costs associated with producing the crop. These costs include variable costs of production along with fixed costs of depreciation and interest, a charge to operator labor, and a management fee. Also needed is the expected revenue for the farm. Once all the costs have been accounted for, the remaining amount that is available is assumed to be allocated for the payment of cash rent.

All of these calculations are taken down to the per acre basis for both irrigated and non-irrigated estimates. This paper estimates the **breakeven non-irrigated cash rental amount** using the tenant's residual approach method on a county basis for Kansas. A future companion paper will examine irrigated cropland breakeven cash rental rates on a county basis in Kansas.

### *Income*

To calculate gross revenue an estimate is needed of crop yields and crop prices for the county as well as an estimate of the government payments per acre. Because estimates are developed for both irrigated and non-irrigated cropland, yields need to be specified for both irrigated and non-irrigated crops. NASS used to provide this information but for the last several years, they only provide a single yield estimate per crop per county. Fortunately, the FSA does have this information by irrigated and non-irrigated crop per county. FSA also has the number of crops acres in a county.

### *Yields and prices and acres*

Because yields are expected to generally follow a trendline over time, the last five years of FSA yields were used to estimate the average yield per crop per year. With only 5 years of data, a true trend could not be estimated but the trendline yield over time should not vary much from the simple average for the most recent 5-year period.

Acres and crop prices do not follow a discernible trend pattern over the last 5 years. Thus, while the last 5 years of data were used, a weighted average approach was incorporated so that more recent years had more weight. Once the gross crop revenue was calculated, the revenue per acre was calculated based on the number of crop acres. For this analysis of Kansas non-irrigated cropland, only corn, soybeans, wheat, and grain sorghum were used in the calculation.

### *Expenses*

KFMA (Kansas Farm Management Association) crop enterprise data was used to estimate crop production expenses in this approach. Crop production expenses per crop were estimated at the Crop Reporting District (CRD) level. While KFMA has detailed whole farm numbers, the enterprise level data is limited. To get around this limitation, a similar approach to the estimate of net farm income was used (see <https://www.agmanager.info/farm-management/farm-profitability/may-2021-estimate-2021-kansas-net-farm-income-and-projection-2022>).

An entire farm's expense data from the KFMA database was used. However, these expenses were allocated to a specific crop by using the ratios of the KFMA state level enterprise summaries. This procedure not only gave an expense item per crop, but it also allows for the calculation of total non-irrigated crop expenses. Any "extra" crop

acres that were not part of the four major crops were rolled into extra soybean acres when calculating a cost per acre per crop per farm.

The next step was to calculate a representative cost per crop per Kansas CRD. With 1,000 KFMA farms in the KFMA database, there are adequate numbers of crop farms by CRD for these calculations to be credible. At this point the median expense per crop is calculated from those farms within that CRD. Government payments were estimated in a similar manner. As discussed above in revision section, counties along a CRD border had their crop expenses and government payment per acre blended with the neighboring CRD by using a ratio of two-thirds weight from a county's home CRD and one-third weight from the neighboring county's CRD. This last change helped to smooth the crop expenses per acre when moving from one CRD to a neighboring CRD.

### ***Revenue***

At this point, with gross revenue per crop per acre, government payments per acre, and expenses per crop per acre, a net income per acre can be calculated for each year. Because all expenses need to be accounted for, 75% of unpaid operator labor is included as well as a 2% management charge based on gross revenue. Only 75% of unpaid operator labor is used to account for other farm activities not related to crop production. The 2% management fee is for both management and the interest charge for any machinery equity on the farm.

As discussed above, yields are a 5-year average while the rest of the inputs to the model are a weighted average. 2019 and 2020 have a weight of 0.25 each. 2018 and 2017 have weights of 0.2 and 0.1 respectively. Although numbers don't exist for 2021 yet, an earlier estimate of 2021 net farm income is predicting a 25% increase in net farm income. Thus, this 25% increase is used for the 2021 part of this model. The 2021 estimate is given a 0.2 weight.

The tenant's residual per acre calculated is further adjusted by incorporating a relationship to the NASS 2021 reported county cash rent. If the calculated residual is above the 2021 estimate, then the final per acre number is halfway between the NASS 2021 estimate and the calculated value. If the calculated residual is below the NASS number, then the NASS number is used. This residual calculation is further constrained to be no more than a 50 percent increase from the 2021 reported NASS number.

The final step in estimating a tenant's residual was to adjust for land use intensity. In western Kansas, there are fallow acres and in southeast Kansas there are double crop acres. To adjust for this, all KFMA farms within a CRD are used to calculate a land use percentage by dividing the number of harvested crop acres by the total number of

physical crop acres. This fraction is multiplied by the previous tenant's residual to get the final value.

### ***Range for tenant's residual***

A range of values was estimated to account for various crop yield differences within a county. Using the same mix of farms by CRD, a net farm income per crop acre was calculated. The 25th and 75th percentiles were calculated in the crop reporting district, which were then compared to the estimated tenant's residual value. These differences were used to calculate a low and high range for each county.

The calculated difference really represents two sources of variation; variation within a county and variation between counties. It was assumed that the two sources of variation were equal and thus the calculated percent difference was divided in two.

## **Results**

**Tables 1, 2, and 3**, along with **Figure 7** show the results of estimating a potential breakeven cash rent for 2022 using a Tenant's residual method. The 2021 NASS cash rental rate survey estimate is shown along with the predicted KSU value and the potential ranges for cash rents.

**Figure 7** shows the predicted KSU value on a color-coded state map of Kansas counties. The figure is capped at the ends so any county with a predicted cash rent above \$150 per acre shows the darkest color and any county with a predicted rent below \$40 per acre shows the lightest color.

**Figure 6** shows the 2021 reported NASS survey estimates of cash rental rates for the state on a color-coded map similar to Figure 7. Given that KSU values incorporate the NASS survey numbers, producers should be interested in seeing these survey results.

## **Discussion**

Net farm income has been rising for 5 years in a row, so it should be expected that cash rents have been trending upward as well. While these estimates are calculated with full costs in mind, tenants and landlords sometimes likely also have other economic and some non-economic considerations in mind when negotiating leases.

For example, rented cropland located adjacent to a farmer might have more value to a particular farmer just because of location. Likewise, a landlord may have developed trust in a particular tenant and adjusts rent accordingly.

Communication and full information are needed in any discussion of cropland leases. This publication has been developed to help both tenants and landlords make as fully

informed decisions as possible when negotiating cash rental rate agreements for the 2022 year.

### References

- Oltmans, A W. 1995. Why farmland cannot, will not and should not pay for itself. *Journal of the American Society of Farm Managers and Rural Appraisers*, 59(1): 57–67.
- Plastina, A, and W. Edwards. 2021. “Computing a Cropland Cash Rental Rate.” File C2-20. <https://www.extension.iastate.edu/agdm/wholefarm/pdf/c2-20.pdf>

### Renting in Kansas

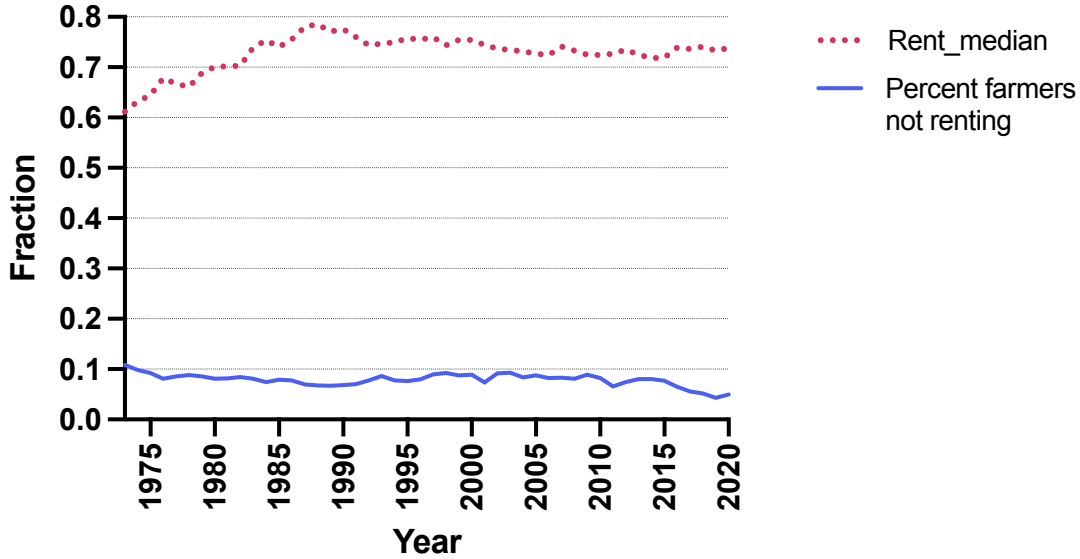


Figure 1. Percentage of Land Rented by Farm and the Percentage of Farms with no Rented Land

### State Cash Rents

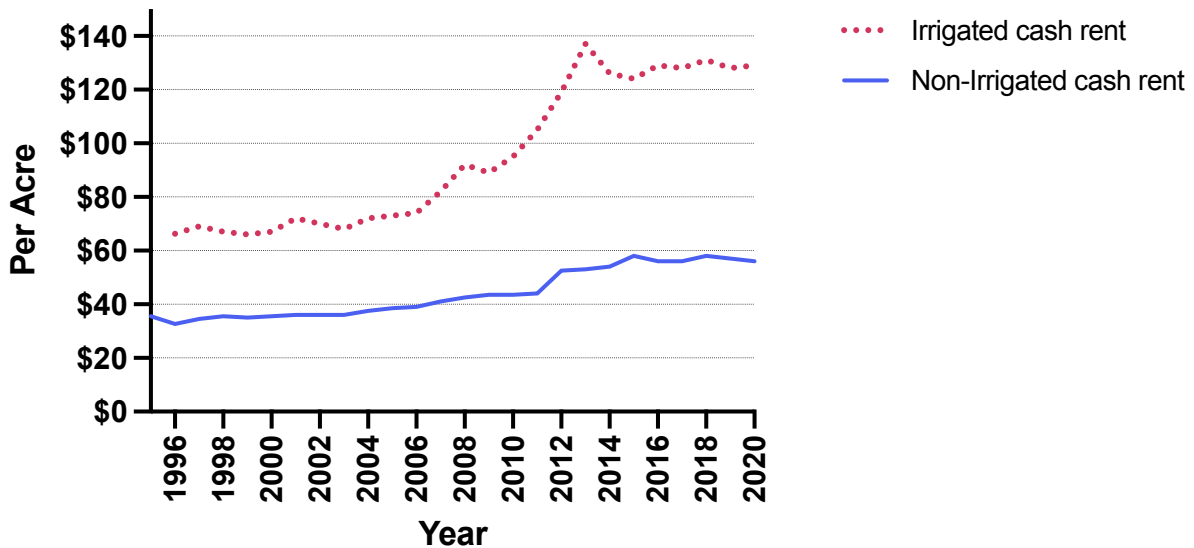


Figure 2. USDA-NASS Estimate of Kansas Irrigated and Non-Irrigated Cash Lease Rates



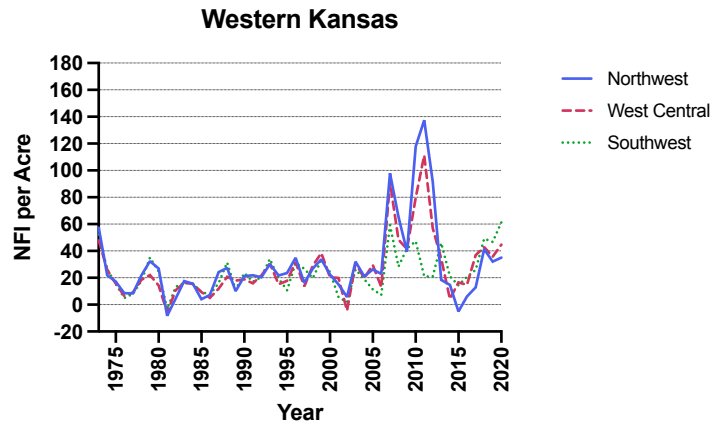


Figure 3. Net Farm Income per Crop Acre for Western Kansas

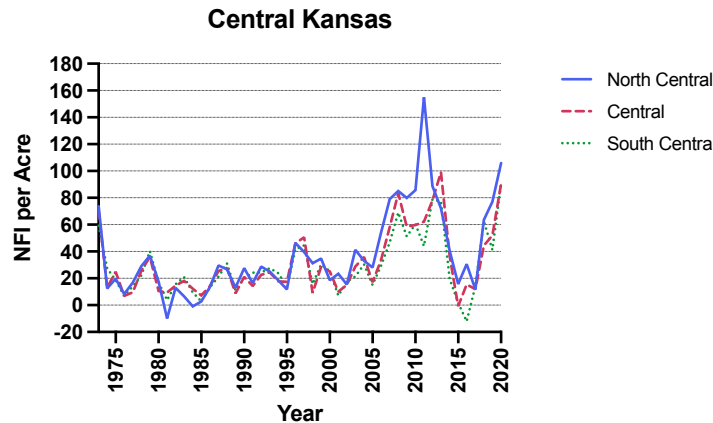


Figure 4. Net Farm Income per Crop Acre for Central Kansas

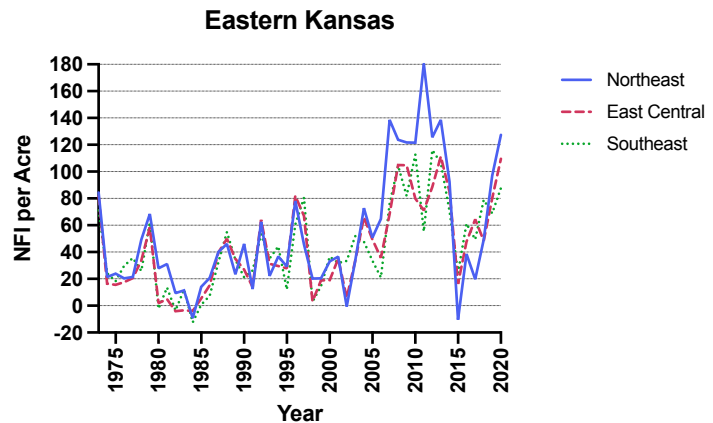


Figure 5. Net Farm Income per Crop Acre for Eastern Kansas

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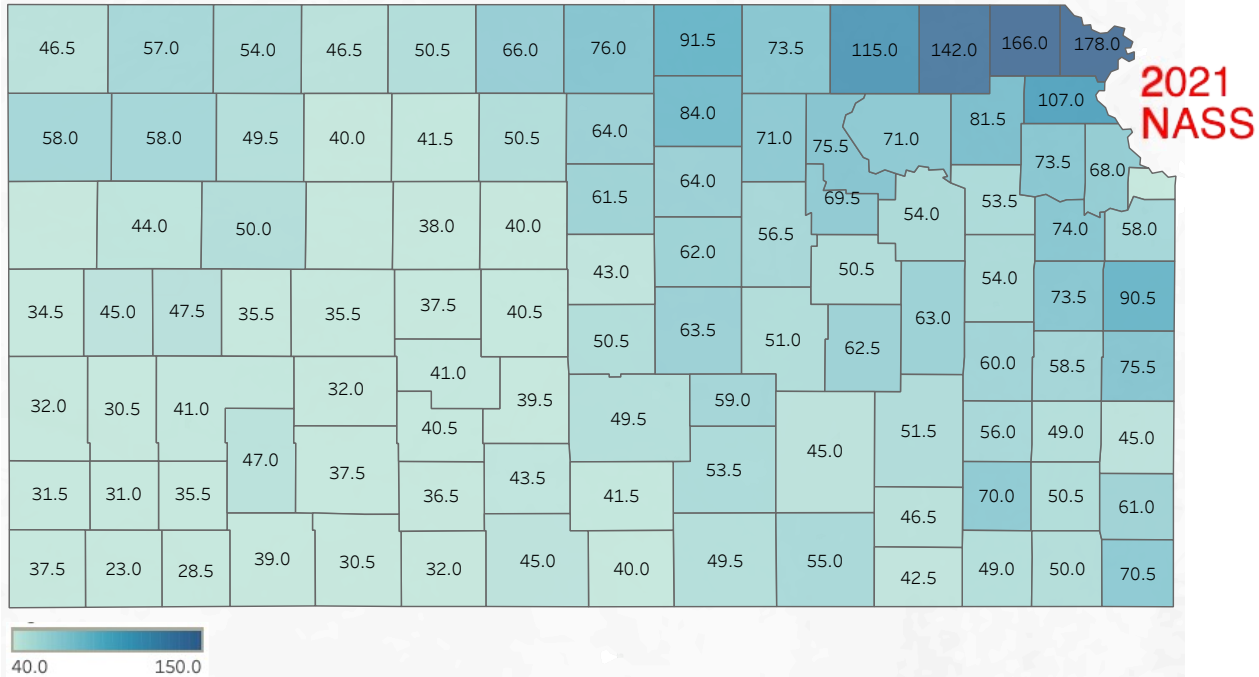


Figure 6. 2021 USDA-NASS Cash Lease Survey Results for Non-Irrigated Crop Land in Kansas. Color Code by (\$/ac).

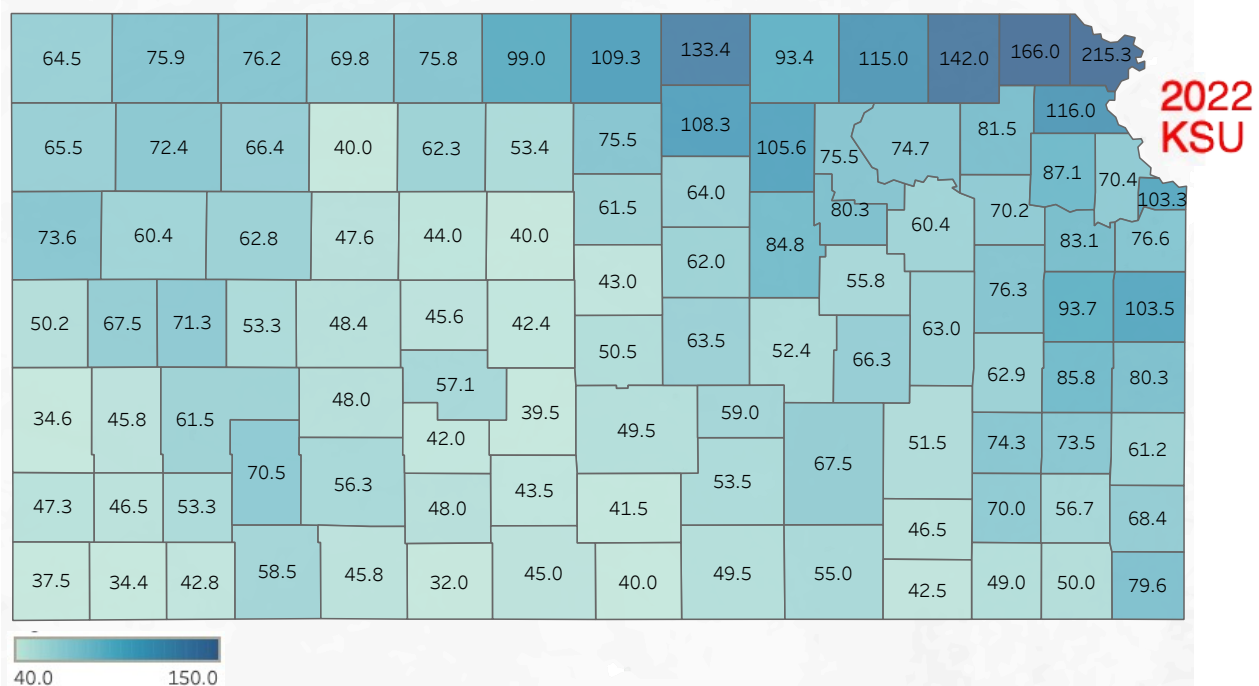


Figure 7. 2022 KSU Cash Lease Estimates for Non-Irrigated Crop Land in Kansas Using Tenant's Residual Approach. Color Coded by (\$/ac).

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Table 1. Estimated Cash Rental Rates for Non-Irrigated Cropland in Western Kansas

Region	County	2020	2021	2022	25th	75th
		NASS	NASS	KSU*	Percentile	Percentile
Northwest	Cheyenne	46	47	64	40	92
	Decatur	49	54	76	48	108
	Graham	37	40	40	25	57
	Norton	48	47	70	44	99
	Rawlins	54	57	76	47	108
	Sheridan	47	50	66	42	94
	Sherman	50	58	65	41	93
	Thomas	54	58	72	45	103
West Central	Gove	45	50	63	40	85
	Greeley	30	35	50	32	68
	Lane	40	36	53	34	72
	Logan	42	44	60	39	82
	Ness	33	36	48	31	66
	Scott	43	48	71	46	97
	Trego	36	0	48	30	65
	Wallace	41	0	74	47	100
	Wichita	47	45	68	43	92
Southwest	Clark	30	31	46	33	56
	Finney	35	41	62	44	75
	Ford	34	38	56	40	69
	Grant	41	31	47	33	57
	Gray	44	47	71	50	86
	Hamilton	29	32	35	25	42
	Haskell	35	36	53	38	65
	Hodgeman	33	32	48	34	58
	Kearny	34	31	46	33	56
	Meade	35	39	59	42	71
	Morton	26	38	38	27	46
	Seward	29	29	43	31	52
	Stanton	32	32	47	34	58
	Stevens	25	23	34	25	42

\* - KSU numbers are estimates of the tenant's residual approach to cash lease rates. NASS numbers are survey results

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Table 2. Estimated Cash Rental Rates for Non-Irrigated Cropland in Central Kansas

Region	County	2020	2021	2022	25th	75th
		NASS	NASS	KSU	Percentile	Percentile
North Central	Clay	74	71	106	89	122
	Cloud	83	84	108	91	126
	Jewell	79	76	109	92	127
	Mitchell	70	64	75	63	87
	Osborne	47	51	53	45	62
	Ottawa	63	64	64	54	74
	Phillips	45	51	76	64	88
	Republic	86	92	133	112	155
	Rooks	42	42	62	52	72
	Smith	64	66	99	83	115
	Washington	80	74	93	78	108
Central	Barton	43	41	42	34	52
	Dickinson	61	57	85	68	104
	Ellis	34	38	44	35	54
	Ellsworth	40	43	43	34	53
	Lincoln	59	62	62	49	75
	Marion	51	51	52	42	64
	McPherson	58	64	64	51	78
	Rice	48	51	51	40	62
	Rush	36	38	46	37	56
	Russell	39	40	40	32	49
	Saline	57	62	62	50	76
South Central	Barber	37	45	45	37	56
	Comanche	33	32	32	26	40
	Edwards	39	41	42	35	53
	Harper	38	40	40	33	50
	Harvey	62	59	59	49	74
	Kingman	45	42	42	34	52
	Kiowa	38	37	48	40	60
	Pawnee	42	41	57	47	71
	Pratt	42	44	44	36	54
	Reno	49	50	50	41	62
	Sedgwick	49	54	54	44	67
	Stafford	39	40	40	32	49
	Sumner	46	50	50	41	62

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Table 3. Estimated Cash Rental Rates for Non-Irrigated Cropland in Eastern Kansas

Region	County	2020	2021	2022	25th	75th
		NASS	NASS	KSU	Percentile	Percentile
Northeast	Atchison	101	107	<b>116</b>	90	149
	Brown	167	166	<b>166</b>	128	213
	Doniphan	176	178	<b>215</b>	166	276
	Jackson	77	82	<b>82</b>	63	104
	Jefferson	59	74	<b>87</b>	67	112
	Leavenworth	71	68	<b>70</b>	54	90
	Marshall	106	115	<b>115</b>	89	147
	Nemaha	125	142	<b>142</b>	110	182
	Pottawatomie	77	71	<b>75</b>	58	96
	Riley	75	76	<b>76</b>	58	97
Wyandotte	0	0	<b>103</b>	80	132	
East Central	Anderson	64	59	<b>86</b>	68	102
	Chase	51	63	<b>66</b>	53	79
	Coffey	57	60	<b>63</b>	50	75
	Douglas	67	74	<b>83</b>	66	99
	Franklin	71	74	<b>94</b>	75	112
	Geary	60	70	<b>80</b>	64	96
	Johnson	54	58	<b>77</b>	61	91
	Linn	71	76	<b>80</b>	64	96
	Lyon	61	63	<b>63</b>	50	75
	Miami	89	91	<b>103</b>	82	123
	Morris	57	51	<b>56</b>	44	67
	Osage	56	54	<b>76</b>	61	91
	Shawnee	59	54	<b>70</b>	56	84
	Wabaunsee	53	54	<b>60</b>	48	72
Southeast	Allen	49	49	<b>74</b>	54	98
	Bourbon	50	45	<b>61</b>	45	81
	Butler	53	45	<b>68</b>	49	90
	Chautauqua	35	43	<b>43</b>	31	56
	Cherokee	67	71	<b>80</b>	58	106
	Cowley	46	55	<b>55</b>	40	73
	Crawford	64	61	<b>68</b>	50	91
	Elk	51	47	<b>47</b>	34	62
	Greenwood	52	52	<b>52</b>	38	68
	Labette	51	50	<b>50</b>	36	66
	Montgomery	52	49	<b>49</b>	36	65
	Neosho	51	51	<b>57</b>	41	75
	Wilson	66	70	<b>70</b>	51	93
	Woodson	43	56	<b>74</b>	54	99