

2021 Kansas County-Level Cash Rental Rates for Non-Irrigated Cropland

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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 2021/22** – 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 2021/22 county-level non-irrigated breakeven cash rental rates are found in Figure 6 and Tables 1, 2, and 3 at the end of this publication.

Intended Use of Breakeven Cash Rental Rate Estimates

The rental rate estimates provided in this publication are intended for 2021 into 2022 crop year. These estimates include an expectation of 2021 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 2020 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 2021/22 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.

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.

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 2020 reported county cash rent. If the calculated residual is above the 2020 estimate, then the final per acre number is halfway between the NASS 2020 estimate and the calculated value. If the calculated residual is below the NASS number, then the NASS number is used.

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 6** show the results of estimating a potential breakeven cash rent for 2021/22 using a Tenant’s residual method. The 2020 NASS cash rental rate estimate is shown along with the predicted KSU value and the potential ranges for cash rents.

Figure 6 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.

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 2021/22 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

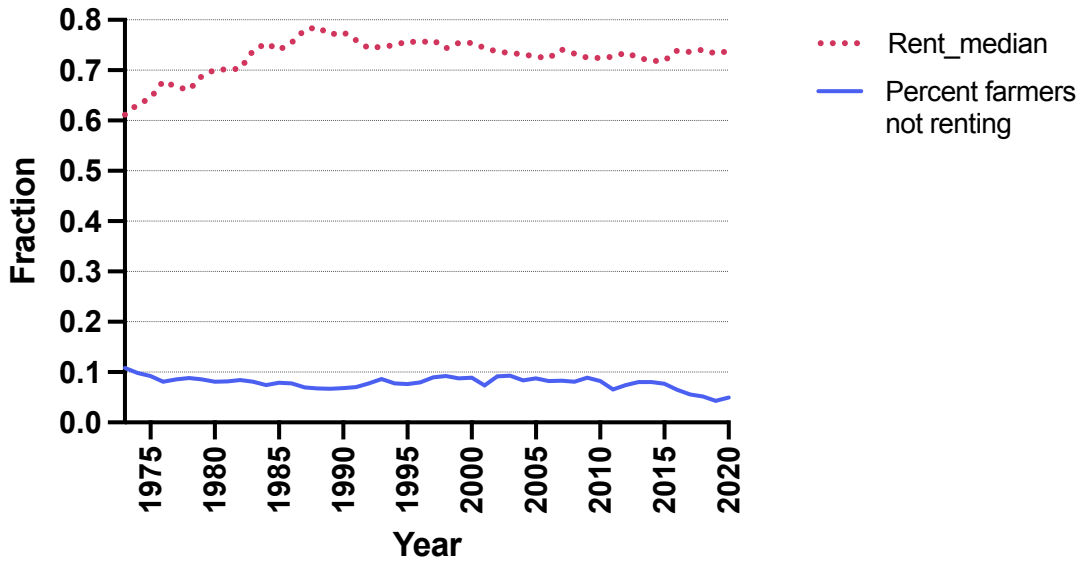


Figure 1. Percentage of Land Rented by Farm and the Percentage of Farms with no Rented Land

State Cash Rents

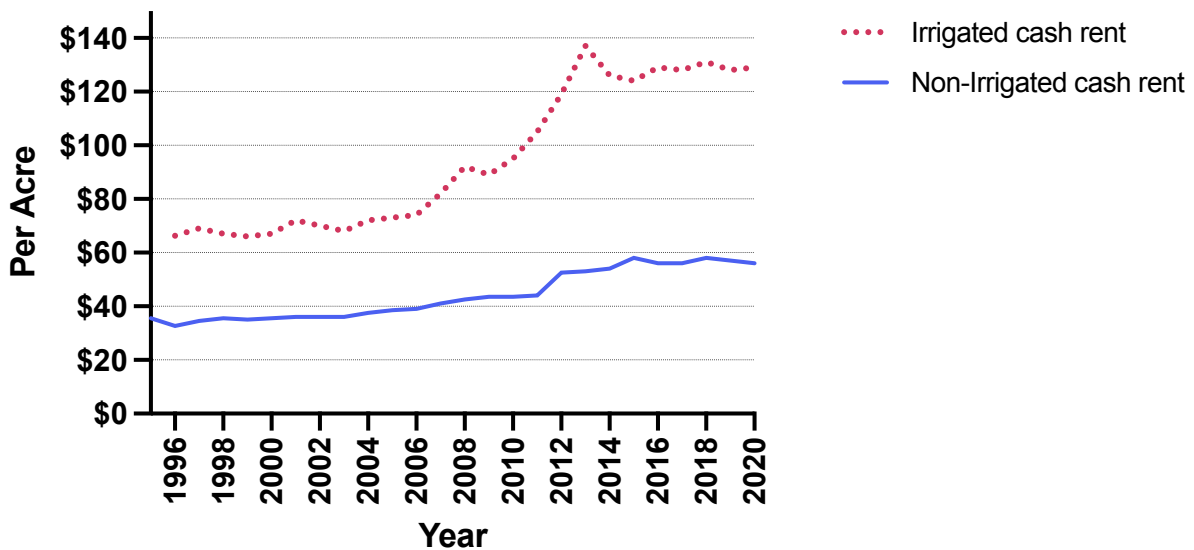


Figure 2. USDA-NASS Estimate of Kansas Irrigated and Non-Irrigated Cash Lease Rates

Western Kansas

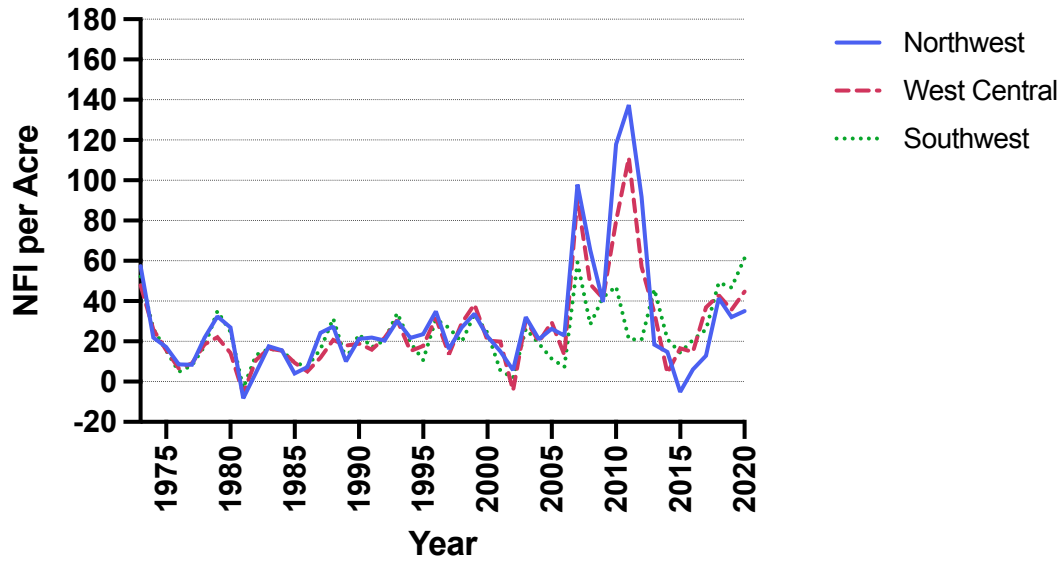


Figure 3. Net Farm Income per Crop Acre for Western Kansas

Central Kansas

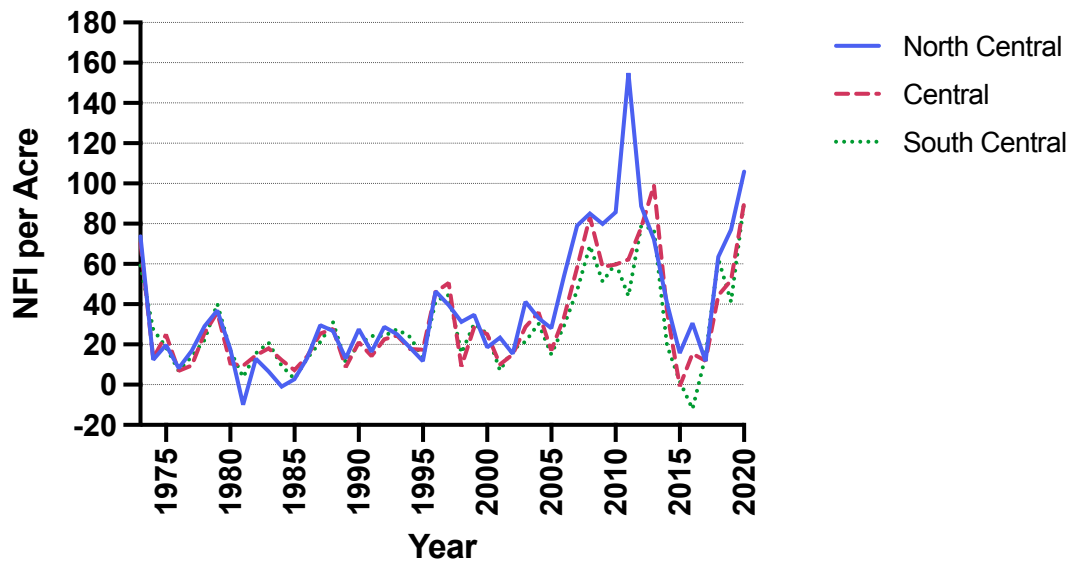


Figure 4. Net Farm Income per Crop Acre for Central Kansas

Eastern Kansas

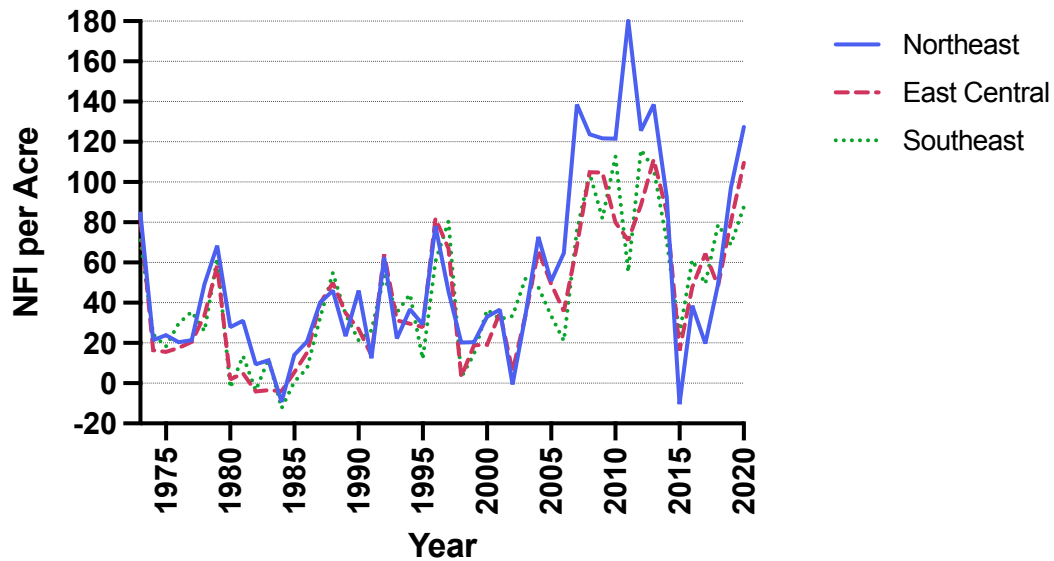


Figure 5. Net Farm Income per Crop Acre for Eastern Kansas

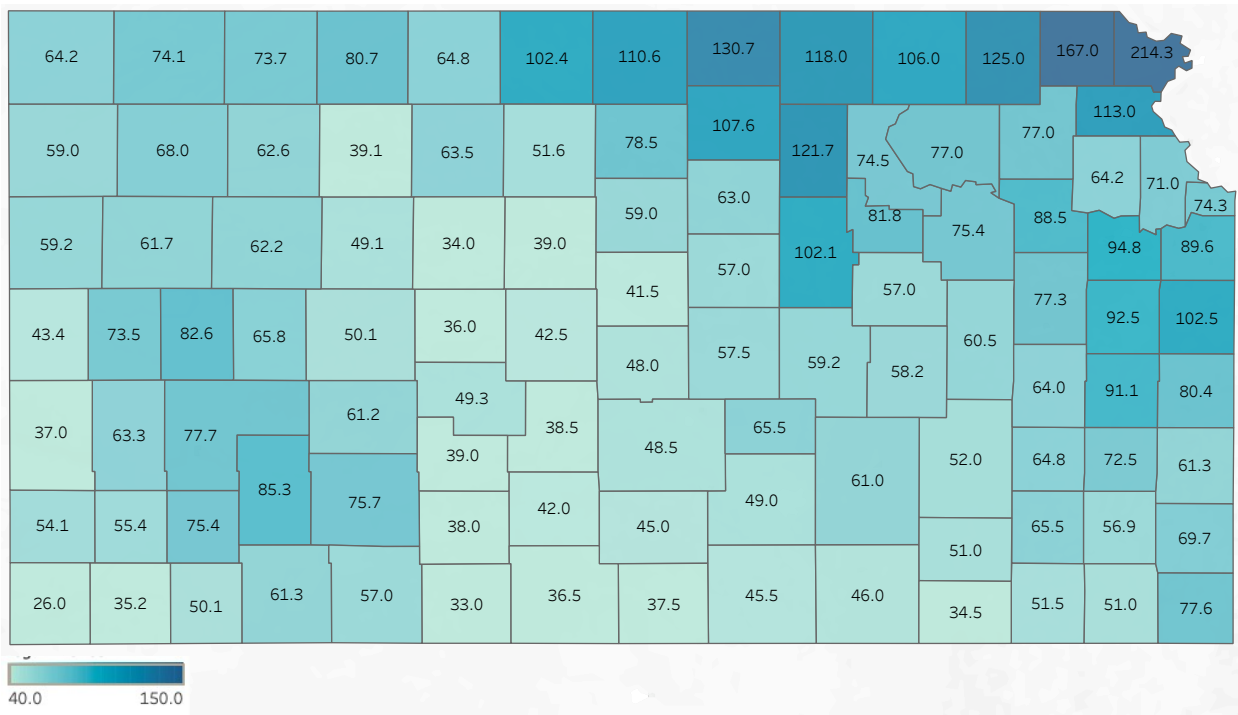


Figure 6. Color Coded Cash Lease Estimates for Non-Irrigated Crop Land in Kansas (\$/ac) for 2021/22.

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

Region	County	2019 NASS	2020 NASS	2021 KSU	25th Percentile	75th Percentile
Northwest	Cheyenne	46	46	64	40	91
	Decatur	40	49	74	46	105
	Graham	36	37	39	24	56
	Norton	47	48	81	51	115
	Rawlins	55	54	74	46	105
	Sheridan	47	47	63	39	89
	Sherman	46	50	59	37	84
	Thomas	58	54	68	43	97
West Central	Gove	50	45	62	40	84
	Greeley	33	30	43	28	59
	Lane	36	40	66	42	89
	Logan	42	42	62	40	84
	Ness	34	33	50	32	68
	Scott	44	43	83	53	112
	Trego	35	36	49	31	67
	Wallace	40	41	59	38	80
Wichita	46	47	73	47	100	
Southwest	Clark	29	30	57	41	69
	Finney	38	35	78	56	95
	Ford	36	34	76	54	92
	Grant	28	41	55	40	67
	Gray	45	44	85	61	104
	Hamilton	27	29	37	26	45
	Haskell	0	35	75	54	92
	Hodgeman	0	33	61	44	75
	Kearny	38	34	63	45	77
	Meade	40	35	61	44	75
	Morton	33	26	26	20	32
	Seward	25	29	50	36	61
	Stanton	35	32	54	39	66
	Stevens	0	25	35	25	43

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

Region	County	2019 NASS	2020 NASS	2021 KSU	25th Percentile	75th Percentile
North Central	Clay	81	74	122	102	141
	Cloud	0	83	108	90	125
	Jewell	78	79	111	93	128
	Mitchell	70	70	79	66	91
	Osborne	51	47	52	43	60
	Ottawa	69	63	63	53	73
	Phillips	0	45	65	54	75
	Republic	85	86	131	110	151
	Rooks	42	42	64	53	74
	Smith	66	64	102	86	119
	Washington	77	80	118	99	137
Central	Barton	44	43	43	34	52
	Dickinson	54	61	102	82	125
	Ellis	0	34	34	27	42
	Ellsworth	0	40	42	33	51
	Lincoln	58	59	59	47	72
	Marion	53	51	59	47	73
	McPherson	60	58	58	46	70
	Rice	50	48	48	38	59
	Rush	38	36	36	29	44
	Russell	44	39	39	31	48
	Saline	60	57	57	46	70
South Central	Barber	43	37	37	30	46
	Comanche	27	33	33	27	41
	Edwards	42	39	39	32	49
	Harper	39	38	38	31	47
	Harvey	60	62	65	54	82
	Kingman	45	45	45	37	56
	Kiowa	37	38	38	31	48
	Pawnee	39	42	49	41	62
	Pratt	44	42	42	35	53
	Reno	49	49	49	40	61
	Sedgwick	51	49	49	40	61
	Stafford	41	39	39	32	48
	Sumner	43	46	46	37	57

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

Region	County	2019	2020	2021	25th	75th
		NASS	NASS	KSU	Percentile	Percentile
Northeast	Atchison	116	101	113	87	145
	Brown	166	167	167	129	214
	Doniphan	183	176	214	166	275
	Jackson	0	77	77	60	99
	Jefferson	74	59	64	50	82
	Leavenworth	69	71	71	55	91
	Marshall	101	106	106	82	136
	Nemaha	135	125	125	97	160
	Pottawatomie	0	77	77	60	99
	Riley	77	75	75	58	95
	Wyandotte	0	0	74	57	95
East Central	Anderson	62	64	91	72	109
	Chase	61	51	58	46	69
	Coffey	60	57	64	51	76
	Douglas	66	67	95	75	113
	Franklin	66	71	92	74	110
	Geary	62	60	82	65	98
	Johnson	46	54	90	71	107
	Linn	64	71	80	64	96
	Lyon	48	61	61	48	72
	Miami	83	89	102	82	122
	Morris	57	57	57	45	68
	Osage	60	56	77	61	92
	Shawnee	71	59	89	70	106
	Wabaunsee	57	53	75	60	90
Southeast	Allen	52	49	73	53	96
	Bourbon	69	50	61	45	81
	Butler	51	53	61	44	81
	Chautauqua	0	35	35	25	46
	Cherokee	63	67	78	57	103
	Cowley	41	46	46	34	61
	Crawford	67	64	70	51	92
	Elk	52	51	51	37	68
	Greenwood	0	52	52	38	69
	Labette	45	51	51	37	68
	Montgomery	0	52	52	38	68
	Neosho	52	51	57	42	76
	Wilson	69	66	66	48	87
	Woodson	49	43	65	47	86