

A Preliminary Estimate of 2020 Kansas Net Farm Income and a Projection for 2021

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Abstract

Kansas Farm Management Association (KFMA) farms are used to estimate 2020 and 2021 net farm income for grain farms in Kansas. The outlook for the year improved considerably during the year. In the spring, net farm income was forecast to fall by over 80% due to COVID-19 disruptions. Now, because of ad hoc government payments (CFAP) and higher than expected grain prices, net farm income for 2020 is expected to increase by 7%. If current future prices for 2021 are a good guide for farm prices, then assuming normal yields, 2021 net farm income is forecast to increase again.

Introduction

In May of 2020, an initial estimate of KFMA net farm income was produced. At the time, COVID-19 was starting to spread across the U.S. and the economic effect on much of the country was devastating. Agricultural prices for both grains and livestock had dropped, leading to questions about how severe the crisis might be for farmers. The initial analysis by the Department of Agricultural Economics used KFMA farms as a baseline to predict a drop in net farm income of 87%.

Since that initial prediction however, the profitability outlook for farmers has changed considerably. First, the USDA announced programs to help both livestock and grain producers affected by COVID-19. The Coronavirus Food Assistance Program (CFAP) provided \$23.6 B to producers through the first two rounds of the program. Second, grain prices rebounded during the summer and are now at levels higher than before the pandemic. To provide producers some guidance about how the 2020 net farm income outlook has changed, this article provides an analysis of projected net income and expenses for Kansas grain farms.

This particular article discusses both the expected net farm income for Kansas grain farms for 2020 and then projects net farm income for 2021 based on current grain future prices and normal yields. Even though KFMA has not released 2020 results yet, predicting net for income for this year is a much simpler process as state yields and prices are known. Net farm income predictions for 2021 are much less certain as the

only guide to prices is crop futures and both yields and prices are influenced by weather variability. Because most of the 2021 crop is not even planted yet, net farm income estimates could easily change considerably before the end of the year.

Methods

A future AgManager article will provide a more detailed look at the forecasting methodology employed here. In this particular article a general overview is provided. Like the spring analysis in 2020, KFMA farms are used as a baseline. In order to ensure a farm's production history is incorporated into the analysis, only grain farms with a minimum of three years of history are included in the analysis. This requirement reduced the number of farms that were analyzed, but there were still 588 grain farms that provided data.

There were seven major areas that were addressed in the forecast model: yields, prices, crop acres, expenses, crop insurance, government payments from the farm bill, and ad hoc government payments (CFAP). Each of these areas was projected down to the farm level to estimate net farm income for each of the 588 KFMA grain farms for 2020 and 2021.

Yields - State yields are projected down to the farm level based on the historical relationships between state yields, crop reporting district yields, county yields, and farm yields. For 2020, only the state yield is known as of the date of this article. However, county level yields should be known soon and will be incorporated into future estimates. For 2021, average yields are assumed but these will be adjusted as forecasts become available.

Prices - Monthly state grain prices are used if available, otherwise futures prices are used. Like the yields, relationships between national, state, and farm prices are used to estimate the farm level price. For 2020, monthly grain prices are available for Kansas for all months except December. For 2021, future prices are used to estimate farm prices with an adjustment from O'Brien to account for anticipated basis.

Crop acres - State crop acres for 2020 are available from NASS. 2020 saw a 16% increase in soybean acres, a 5% decrease in corn acres, a 7% decrease in wheat acres, and a 6% increase in sorghum acres. Acreage allocation for 2021 is assumed to be the same as 2020.

Expenses - KFMA provides detailed expenses but only at the farm level. Because expenses vary by crop grown, a change in the acreage mix means that farm expenses need to be allocated at the enterprise level in order to better estimate the overall expense change. KFMA does provide detailed enterprise reports for the state and these were used to allocate the total expense item back to the farm enterprise level. The last five years of KFMA state crop enterprise reports were averaged by crop to determine the item expense ratio relative to that expense item of soybeans. For example, based on the KFMA enterprise reports, the corn fertilizer expense is five times the soybean fertilizer expense. These ratios were then used to calculate a farm's expense item at the farm enterprise expense level. Because a farm's own expenses were used, the total farm expense didn't change but some farms had higher specific costs than other farms. The ratio of the specific expense among crops was consistent among farms though.

Crop insurance - Crop insurance was estimated under the assumption of farmers choosing Crop Revenue Coverage (CRC) with the Harvest Price Option. Not all farmers chose this option and the level of coverage varies by farm so this calculation was adjusted based on the three years of known data. For example, first the potential crop insurance payout was calculated using a 70 percent coverage level and then the payout was adjusted downward by a discounting factor to reflect what farms actually received. The discounting factor that best fit the three years of known data was then applied to the estimates of 2020 and 2021.

Prevented planting payouts were also incorporated into the analysis of crop insurance. The FSA provides this information at the county level and it is updated multiple times during the year. Many counties in 2019 had a large number of prevent plant acres.

Farm bill government payments - Government payments are separated by regular government payments that are part of the 2018 farm bill and ad hoc government payments like MFP and CFAP payments. The current estimate of government payments for 2020 and 2021 is based on assuming all farms chose PLC. Given that nearly all the payments received were PLC payments in 2020, this assumption is not currently limiting. However, future versions of this forecast will incorporate ARC acres as well.

PLC payments are estimated based on county base acres, county yield history, and estimated payments per bushel that the Department of Agricultural Economics provides. Since the FSA provides crop base acres at the county level, an average PLC

payment can be estimated for the county for an average acre of land in the county. Thus the model used in this analysis assumes that a farm within a particular county has similar characteristics of the county average. That is, the base acreage mix of the individual farm matches the county average of base acres and farm yields are the same as county yields.

Ad hoc government payments - These payments could be the most difficult to estimate. Fortunately, KFMA has kept track of these. The ad hoc government payment in the 2019 results are Market Facilitation Program (MFP) payments. The 2020 estimated ad hoc payments are rounds one and two of the Coronavirus Food Assistance Program (CFAP). Round one for grain producers was based on unpriced grain inventory as of January 15, 2020. KFMA does keep track of ending inventories but there is no way to reliably calculate the percentage that is unpriced.

To estimate the CFAP 1 payment, a backdoor approach was used. The USDA provides the state payout for each of the crops receiving a payment. The payment rate is also known and NASS provides an estimate of total bushels produced of each crop from the state average yield and number of crop acres. From this information, it is possible to calculate the percentage of the 2019 crop that was unpriced and subject to the CFAP 1 payment. For corn and soybeans, this calculation shows approximately 25 percent of 2019 production was unpriced. For grain sorghum, approximately 20% was unpriced.

The livestock CFAP payment was calculated in a similar fashion. The state livestock payout was compared to the beef cow inventory from NASS for the state to get a payment per cow. While the CFAP payment is actually based on different animal types, relating these back to cow inventory should be a realistic estimate as long as the KFMA farm mix is similar to the livestock farms in the state.

Specific expense adjustments - These were based on the price indexes provided by NASS. Most expenses showed modest adjustments from 2019. A few of the more notable expenses are discussed here. Gas, fuel, and oil expenses are forecast to fall 8% in 2020 and then rise 5% in 2021. Fuel prices actually declined more than this in 2020, but farmers likely had purchased much of their spring fuel before prices started to decline. Similarly, fuel prices will likely rise more than 5% in 2021 but farmers have already purchased some of their fuel for this year.

Fertilizer prices didn't decline as much as first anticipated likely because grain prices started to increase during the summer. Fertilizer prices are a function of both past oil prices and current corn prices (see <https://www.agmanager.info/production-economics/prices-and-price-forecasts/predicting-fertilizer-prices>). Based on current corn prices, a 10 percent or more increase in fertilizer costs for 2021 would not be unexpected.

Seed prices declined by 2% in 2020 but are likely to increase in 2021. A 5% increase in seed prices is forecast for 2021 but this estimate is likely low. Cash rents were predicted to remain steady in 2020 but could start to see some increases in 2021 if current net farm income predictions hold.

Results

Table 1 shows the average actual revenues and expenses for 588 KFMA grain farms for 2018 and 2019. The table also shows the estimated 2020 revenues and expenses and the predicted 2021 revenues and expenses. Net farm income is expected to increase by 7% in 2020, from \$128,000 to \$137,000. Net farm income could potentially increase by another 35% in 2021 to \$185,000. However, that last estimate is still very uncertain as higher future prices have to translate to higher farm prices and rainfall amounts have to be around normal for yields to hold at average values.

Figure 1 shows the average and median as well as the 25th and 75th percentile of net farm income for 2017 through the estimated 2021 values. The average is higher than the median as some of the larger farms help to raise the overall average.

Figure 2 shows a cumulative distribution for the 2019, 2020, and 2021 estimated net farm incomes. At any given NFI amount, the graph shows the percentage of farms that have that particular level of NFI or lower. The 50-percentile point is the median level of NFI. Normally a cumulative distribution shows a line from 0 to 100 percent to represent the entire distribution of farms. However, because there is such a wide variation in NFI, the tails have been trimmed to highlight the main area of the graph.

Conclusions

This estimate of 2020 net farm income has changed dramatically since the original estimate was first created in May of 2020. While it originally appeared that COVID-19 was going to play havoc with net farm income, the average grain farm at least will come

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through the year with higher profitability. If this year turns out as currently predicted, net farm income will have increased for five straight years. Certainly not all farms will weather COVID-19 as well as the average grain farm. CFAP 1 and 2 has helped many producers and the prospect of higher grain prices is also beneficial to grain farmers.

The potential exists for a big increase in net farm income again for grain producers in 2021. However, much uncertainty exists with that estimate as higher future prices are no guarantee of what farmers will actually receive. Also, with the western U.S. in the middle of a La Nina drought, average yields are still questionable as well. Finally, higher grain prices tend to lead to higher expenses for fuel, fertilizer, and seeds.

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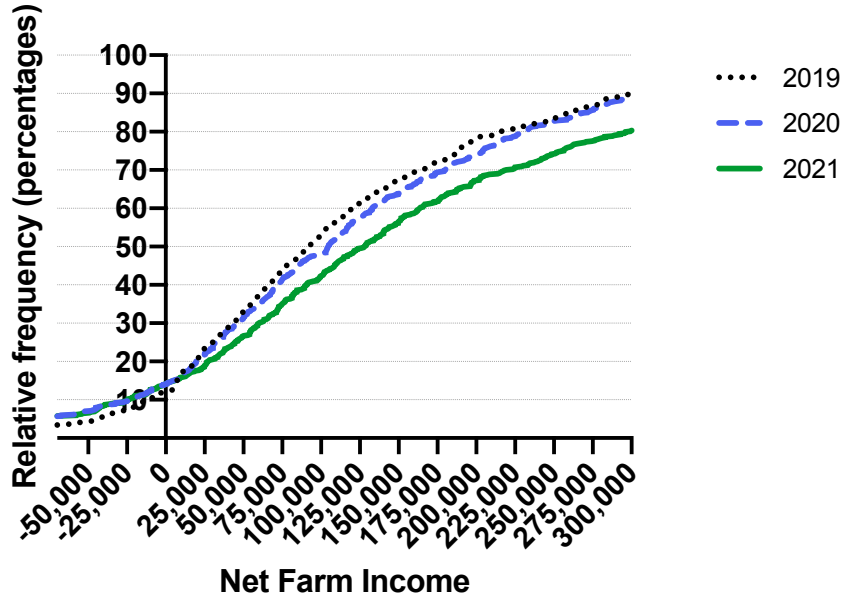


Figure 1. The 25th Percentile, the Median, the Average, and the 75th Percentile of Net Farm Income From 588 KFMA Grain Farms

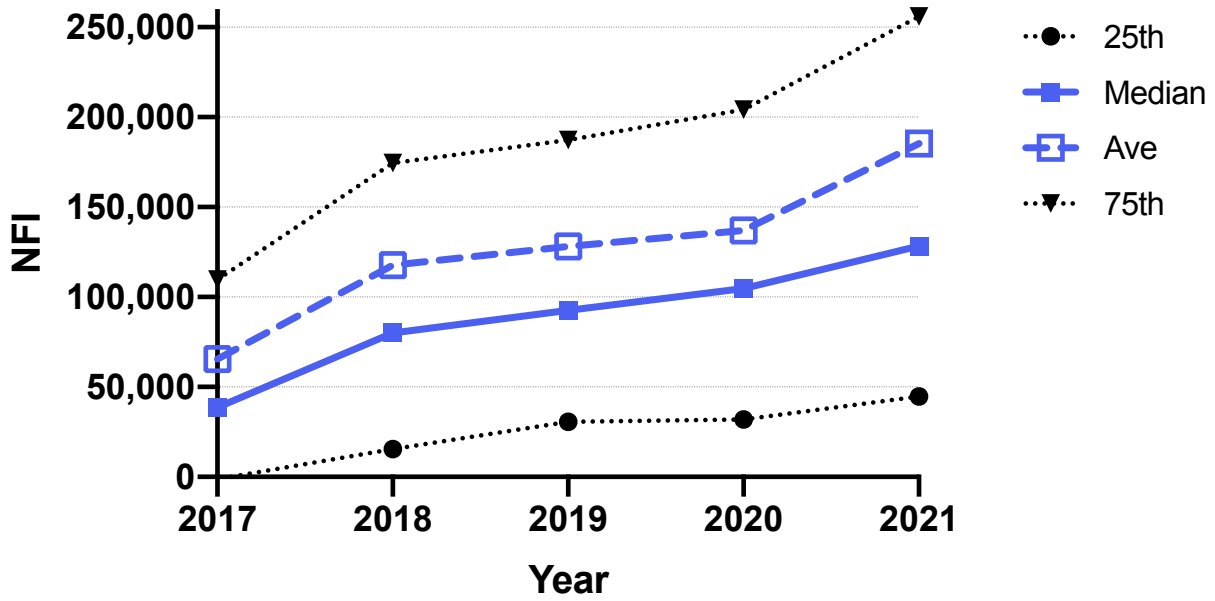


Figure 2. Comparison of 2019 NFI and Predicted 2020 and 2021 NFI for KFMA Grain Farms

Table 1. 2018, 2019, Predicted 2020, and Estimated 2021 KFMA Net Farm Income

	2018	2019	2020(p)	Est 2021
Income				
Beef	\$ 57,523	\$ 56,359	\$ 54,669	\$ 58,495
Dairy-livestock	182	177	177	177
Dairy-milk	732	171	171	171
Sheep	50	49	49	49
Swine	1,914	1,806	1,444	1,733
Poultry and eggs	224	244	244	244
Other livestock	773	1,491	1,506	1,521
Custom feeding	4,696	4,550	4,413	4,722
Ad hoc pmt - Livestock	-	-	18,431	-
<i>minus Feed purchased</i>	<u>17,152</u>	<u>17,365</u>	<u>17,365</u>	<u>19,101</u>
<i>Livestock VFP</i>	\$ <u>48,943</u>	\$ <u>47,481</u>	\$ <u>63,739</u>	\$ <u>48,011</u>
Corn	171,175	199,019	191,789	271,164
Grain sorghum	30,209	29,939	41,783	27,350
Soybeans	191,359	192,369	244,682	315,854
Sunflowers	1,113	1,109	-	-
Wheat	76,919	73,823	66,945	90,867
Hay and forage	18,819	16,511	16,842	17,178
Other crop	-	-	-	-
Govt payment (farm bill only)	21,636	22,210	34,159	-
Ad hoc pmt - Crops	46,868	70,899	25,654	-
Crop ins proceeds	29,432	28,285	24,672	14,161
Machine work	17,337	15,476	15,631	15,787
Other income and hedging	34,028	29,547	29,843	30,439
<i>Crop VFP</i>	\$ <u>638,895</u>	\$ <u>679,187</u>	\$ <u>691,999</u>	\$ <u>782,801</u>
TOTAL VFP	\$ <u>687,838</u>	\$ <u>726,668</u>	\$ <u>755,738</u>	\$ <u>830,812</u>
Expenses				
Hired Labor	24,417	24,620	26,234	26,759
Machinery Repairs	46,194	50,676	54,245	55,329
Irrigation Repairs	2,104	1,915	1,953	1,992
Building Repairs	2,438	2,914	2,973	3,032
Seed/Other Crop Expenses	75,241	78,674	83,043	87,195
Crop Insurance	19,380	21,182	21,874	21,874
Fertilizer-Lime	79,336	88,120	89,882	98,871
Machine Hire	22,908	24,338	25,403	25,657
Organization Fees, Publications	5,245	5,210	5,534	5,534
Vet-Med-Drugs	3,727	3,833	3,871	3,910
Misc Crop Expense	4,368	3,332	3,480	3,515
Misc Livestock Expense	2,316	2,511	2,562	2,613
Dairy Expense	102	9	9	9
Gas-Fuel-Oil	29,396	27,381	26,547	27,874
Irrigation Energy	3,387	2,839	3,123	3,435
Real Estate Taxes	10,561	11,544	11,544	11,660
Personal Property Taxes	2,494	2,641	2,802	2,802
General Farm Insurance	13,567	13,730	14,573	14,573
Utilities	6,956	6,733	7,282	7,355
Cash Farm Rent	46,661	48,188	48,188	50,598
Herbicide-Insecticide	69,409	77,049	81,415	83,858
Conservation	1,253	737	809	809
Auto Expense	907	892	929	938
Other expenses	13	(75)	(75)	(75)
<i>Total Operating Expenses</i>	\$ <u>472,379</u>	\$ <u>498,993</u>	\$ <u>518,201</u>	\$ <u>540,117</u>
Interest paid	27,529	28,941	29,810	31,300
Depreciation - machinery	63,030	63,508	63,508	66,684
Depreciation - buildings	7,206	7,143	7,143	7,286
Total Farm Expenses	\$ <u>570,144</u>	\$ <u>598,586</u>	\$ <u>618,661</u>	\$ <u>645,386</u>
Net Farm Income	\$ 117,694	\$ 128,082	\$ 137,077	\$ 185,426