# A Preliminary Estimate of 2021 Kansas Net Farm Income and a Projection for 2022

*Gregg Ibendahl and Dan O'Brien*


## Abstract

Kansas Farm Management Association (KFMA) farms are used to estimate 2021 and 2022 net farm income for grain farms in Kansas. Many farms in the state will see record net farm income for 2021 although about 10% of farms will have negative net farm income. Still, the state average net farm income should be the highest it's been since the KFMA program started keeping computerized records. However, farmers will likely see a steep drop in net farm income in 2022 as many inputs costs have increased substantially over the last year and the likelihood of government payments is low. There is much uncertainty entering this year so these projections are likely to change during the year.


## Introduction

Farmers face much uncertainty about expected net farm income due to the volatility of grain prices, yields, and input prices. This uncertainty is even greater this year with a dramatic rise in fertilizer prices, higher inflation, and issues with supply chains just some of the factors affecting farm profitability. Thus, an estimate of net farm income should help farmers with planning for the next year. Lenders and others working with farmers should also benefit from estimates of net farm income as that guide their planning as well.

This particular article discusses both the expected net farm income for Kansas gain farms for 2021 and then projects net farm income for 2022 based on current grain future prices and normal yields. Even though KFMA has not released 2021 results yet, predicting net farm income for 2021 is a much simpler process as state yields and prices are known. Also the government payouts for 2021 are know. Net farm income predictions for 2022 are much less certain as the only guide to prices is crop futures and both yields and prices are influenced by weather variability.

A compounding factor for these estimates is the large increases in input costs that occurred during 2021. Fertilizer, especially has risen to levels that most farmers were not expecting. When these inputs were purchased will greatly affect how much of the price increase will show up in the 2021 estimate vs the 2022 estimate. This allocation of input cost increases is also complicated by farmer's ability to use cash accounting. Cash


| | | |
|---|---|---|
| Gregg Ibendahl | email: ibendahl@ksu.edu | twitter: @ibendahl |
| Dan O'Brien | email: dobrien@ksu.edu | twitter: @KSUGrains |

accounting allows for an input cost to be counted as a cost when purchased. Thus, net farm income for 2021 could well be lower if farmers purchased much of their 2022 fertilizer needs in 2021. Such actions would also help improve net farm income for 2022. The two-year net farm income forecast could very well be correct in total even if the allocation between 2021 and 2022 changes.

## Methods

In this particular article a general overview of the net farm income projection procedure is provided. Like the analyses from previous years, 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. 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 2021 and 2022.

*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 2021, 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 2022, average yields are assumed but these will adjusted as forecasts become available.

*Prices* - Monthly state grain prices are used if available, otherwise the futures prices are used. Like the yields, relationships between national, state, and farm prices are used to estimate the farm level price. For 2021, monthly grain prices are available for Kansas for all months except December. For 2022, future prices are used to estimate farm prices.

*Crop acres* - State crop acres for 2021 are available from NASS. 2021 saw a 1% increase in soybean acres, a 7% decrease in corn acres, a 11% increase in wheat acres, and a 20% increase in sorghum acres. Acreage allocation for 2022 is based on the assumption that fertilizer availability and higher prices might be a factor for farmers. Thus, soybean acres are projected to be 5% higher while corn and grain sorghum acres are projected to be lower.

*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 that 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 of 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 2021 and 2022.

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. Prevented plantings have not been a large factor the last couple of years.

*Farm bill government payments* - Government payments are separated by regular government payments that are part of the 2018 farm bill and special ad hoc government payments like MFP and CFAP payments. The current estimate of government payments for 2021 and 2022 is based on actual FSA data for ARC and PLC. Given the year delay of data used in the calculation and the payout to farmers, this reported number should be very close to the actual farm bill government payment.

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 is 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.

*Special government payments* - There was one more round of Coronavirus Food Assistance Program (CFAP) received by producers in early 2021. This payment was estimated based on $20/acre. For 2022, no ad hoc payments are anticipated.

*Specific expense adjustments* - These were based on the price indexes provided by NASS. Most expenses showed a 5% to 10% increase for 2021 and again in 2022. Fertilizer costs are expected to show a 30% increase on farmer's income statements in 2021. While fertilizer has increased more than this in 2021, farmers likely purchased at least a portion of their 2021 fertilizer in 2020 and even their 2021 purchases occurred before the run up in prices that occurred in the fall of 2021. Fertilizer expenses to farmers in 2022 are expected to be 50% higher than their 2021 levels. The rapidly changing fertilizer prices and when farmers actually make their fertilizer purchases greatly complicates this estimation. If farmers decided to make more fertilizer purchases in the fall of 2021 than normal, despite the high prices, net farm income is likely to be lower than forecast in 2021 which would then mean 2022 forecast net farm income could be higher.

Diesel and other fuels are expected to be 30% higher in 2021 with a further 30% increase in 2022. The timing of when farmers make their fuel purchases relative to when diesel prices actually increased is the reason the fuel costs are spread out over two years. Seed costs are forecast to be 5% higher in 2021 but rise an additional 20% in 2022. Pesticides are expected to increase 3% and 8% respectively over the next two years. There are certainly exceptions to this as some herbicides are more than doubled in price.

## Results

Table 1 shows the average actual revenues and expenses for 588 KFMA grain farms for 2019 and 2020. The table also shows the estimated 2021 revenues and expenses and the predicted 2022 revenues and expenses. Net farm income is expected to increase by 39% in 2021, from $187,000 to $261,000. Net farm income then is forecast to fall by 65% in 2022 to $90,000. 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. If farmers have purchased more fertilizer than normal in 2021 to offset the high net farm income, then forecast NFI in 2021 could be lower and NFI in 2022 might be higher.

Figure 1 shows the average and median as well as the 25th and 75th percentile of net farm income for 2018 through the estimated 2022 values. The average is higher than the median as some of the larger farms help to raise the overall average. As forecast, 2022 projections look a lot like 2018. As this figure shows, 25% of the farms in 2022 are expected to have a negative net farm income.

Figure 2 shows a cumulative distribution for the 2020, 2021, and 2022 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

Most grain farmers in Kansas should have a very profitable year in 2021. However, the rapidly increasing input costs will catch up to farmers in 2022. Higher expenses and the potential end of ad hoc government payments means that net farm income will drop substantially. Most farms should still be profitable at levels last seen in 2018. The major worry going into 2022 is that 30% of Kansas grain farms could have negative net farm income. This could result in farms increasing their debt levels at a time when interest rates could be rising

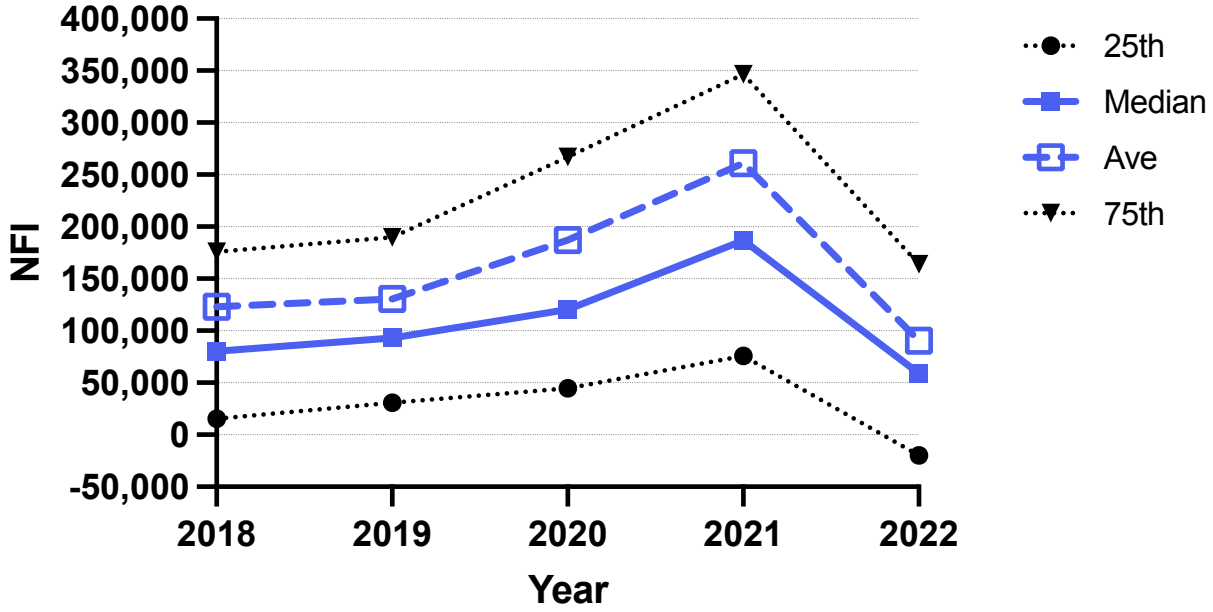


Figure 1. The 25th Percentile, the Median, the Average, and the 75th Percentile of Net Farm Income From 588 KFMA Grain Farms

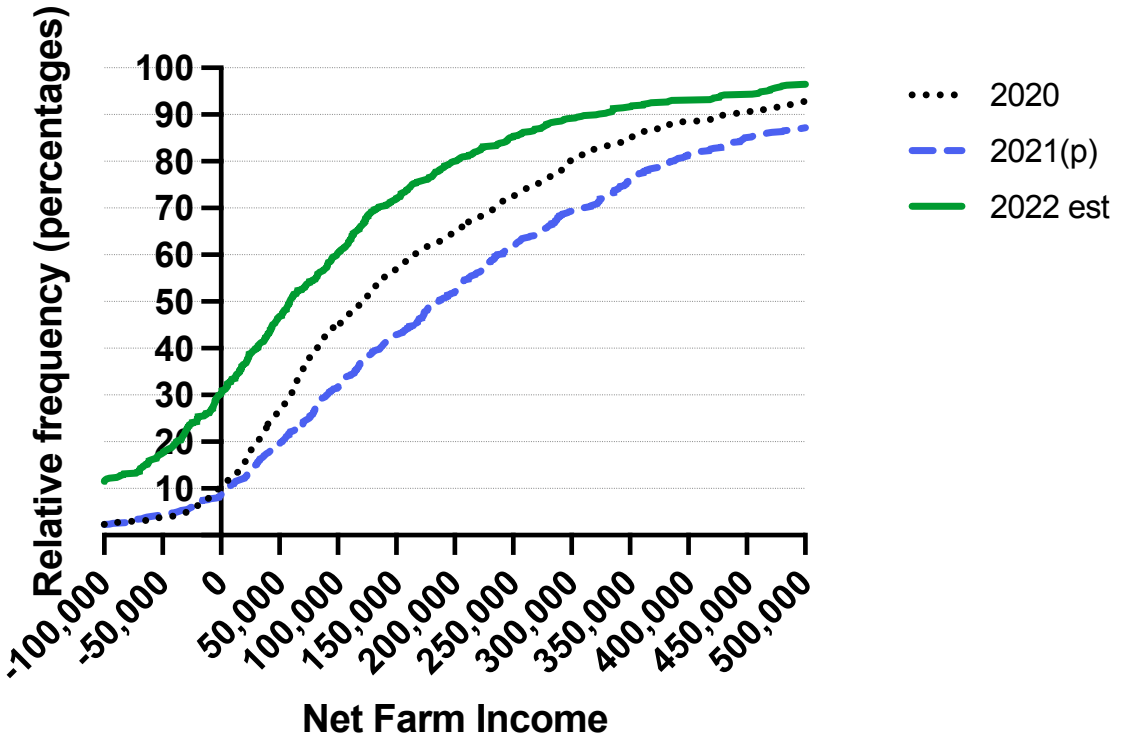


Figure 2. Comparison of 2020 NFI and Predicted 2021 and 2021 NFI for KFMA Grain Farms

## Table 1. 2019, 2020, Predicted 2021, and Estimated 2022 KFMA Net Farm Income

| | 2019 | 2020 | 2021(p) | Est 2022 |
|---|---|---|---|---|
| **Income** | | | | |
| Beef | $ 61,453 | $ 58,806 | $ 65,863 | $ 69,156 |
| Dairy-livestock | 113 | 143 | 150 | 157 |
| Dairy-milk | - | - | - | - |
| Sheep | 63 | 67 | 67 | 67 |
| Swine | 2,428 | 1,598 | 2,077 | 2,077 |
| Poultry and eggs | 244 | 212 | 212 | 212 |
| Other livestock | 1,427 | 1,820 | 1,838 | 1,838 |
| Custom feeding | 5,118 | 5,580 | 5,971 | 5,971 |
| Ad hoc pmt - Livestock | - | 13,757 | 3,615 | - |
| *minus Feed purchased* | 21,307 | 25,058 | 31,322 | 34,454 |
| *Livestock VFP* | *$ 49,540* | *$ 56,925* | *$ 48,471* | *$ 45,025* |
| Corn | 228,823 | 241,000 | 327,759 | 329,377 |
| Grain sorghum | 30,408 | 50,869 | 66,878 | 55,953 |
| Soybeans | 183,768 | 229,655 | 273,557 | 268,002 |
| Sunflowers | 1,028 | 2,321 | - | - |
| Wheat | 77,459 | 73,158 | 115,740 | 142,922 |
| Hay and forage | 16,791 | 12,164 | 12,408 | 12,408 |
| Other crop | - | - | - | - |
| Govt payment (farm bill only) | 25,025 | 28,017 | 10,571 | - |
| Ad hoc pmt - Crops | 70,738 | 52,387 | 44,389 | - |
| Crop ins proceeds | 27,630 | 22,514 | 22,999 | 20,190 |
| Machine work | 15,570 | 15,261 | 15,414 | 16,184 |
| Other income and hedging | 31,090 | 42,673 | 44,807 | 45,703 |
| *Crop VFP* | *$ 708,331* | *$ 770,019* | *$ 934,522* | *$ 890,739* |
| ***TOTAL VFP*** | **$ 757,870** | **$ 826,944** | **$ 982,993** | **$ 935,763** |
| **Expenses** | | | | |
| Hired Labor | 27,346 | 28,025 | 30,058 | 33,301 |
| Machinery Repairs | 50,938 | 56,614 | 64,389 | 68,199 |
| Irrigation Repairs | 1,938 | 2,398 | 2,638 | 3,033 |
| Building Repairs | 2,999 | 3,562 | 3,740 | 4,114 |
| Seed/Other Crop Expenses | 80,705 | 84,273 | 88,894 | 108,703 |
| Crop Insurance | 22,330 | 20,879 | 23,637 | 24,805 |
| Fertilizer-Lime | 93,146 | 92,842 | 123,743 | 176,975 |
| Machine Hire | 25,652 | 26,330 | 27,625 | 30,464 |
| Organization Fees, Publications | 5,392 | 5,495 | 5,939 | 6,305 |
| Vet-Med-Drugs | 4,013 | 4,133 | 4,464 | 4,910 |
| Misc Crop Expense | 3,540 | 4,990 | 5,283 | 5,797 |
| Misc Livestock Expense | 2,387 | 2,400 | 2,640 | 2,772 |
| Dairy Expense | - | - | - | - |
| Gas-Fuel-Oil | 28,134 | 23,306 | 31,242 | 41,006 |
| Irrigation Energy | 4,303 | 5,788 | 6,945 | 8,334 |
| Real Estate Taxes | 11,837 | 12,638 | 12,891 | 13,535 |
| Personal Property Taxes | 2,589 | 2,613 | 2,741 | 2,832 |
| General Farm Insurance | 14,193 | 14,564 | 15,716 | 16,708 |
| Utilities | 6,708 | 6,680 | 6,899 | 7,359 |
| Cash Farm Rent | 52,382 | 53,026 | 55,678 | 61,245 |
| Herbicide-Insecticide | 78,194 | 79,930 | 84,810 | 92,240 |
| Conservation | 779 | 2,025 | 2,120 | 2,186 |
| Auto Expense | 905 | 793 | 906 | 953 |
| Other expenses | (9) | (147) | (147) | (147) |
| *Total Operating Expenses* | *$ 520,399* | *$ 533,158* | *$ 602,852* | *$ 715,632* |
| Interest paid | 31,999 | 31,973 | 34,531 | 37,293 |
| Depreciation - machinery | 64,388 | 66,404 | 76,365 | 84,001 |
| Depreciation - buildings | 8,072 | 8,201 | 8,365 | 8,365 |
| ***Total Farm Expenses*** | ***$ 624,858*** | ***$ 639,735*** | ***$ 722,112*** | ***$ 845,291*** |
| **Net Farm Income** | ***$ 133,012*** | ***$ 187,209*** | ***$ 260,881*** | ***$ 90,472*** |