

# Cashflow Outlook for Representative Farms

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The purpose of this paper is to project the cashflows for AFPC’s representative crop farms through 2020. The farms are assumed to have selected Agriculture Risk Coverage - County Coverage (ARC-County) or Price Loss Coverage (PLC), based on information provided by the farm panels. The farms are simulated starting in 2014 with 20% and 40% beginning debt to asset ratios. The August 2016 FAPRI baseline provides the price outlook for the analysis (<https://www.fapri.missouri.edu/wp-content/uploads/2016/08/Report-05-16.pdf>).

The Texas A&M Agricultural and Food Policy Center maintains a database of 64 crop farms. The farms are located in major production regions (Figure 1). The farms are representative of full-time commercial operations that are typical of moderate size farms in the county. In some locations, a second farm that is two to three times larger

than the moderate size farm is also analyzed.

Data to define the farms is developed in a consensus building interview process with 4-6 farmers of similar farm size, crop mix, and farming practices. The focus group panels are selected by local extension personal and other involved stakeholders. Many of the farm panels have been interviewed every two to three years since 1988. The farm panels provide information on: farm size, crop mix/rotation, fixed costs, variable costs by enterprise, machinery replacement, yields, farm program history, marketing strategy, and debt structure.

The representative farms are generally simulated in FLIPSIM for 2014-2020 under alternative farm program, macro economic, and debt assumptions. For this analysis, farm policy is assumed constant and only initial debt level is varied. The FAPRI baseline provides a stochastic

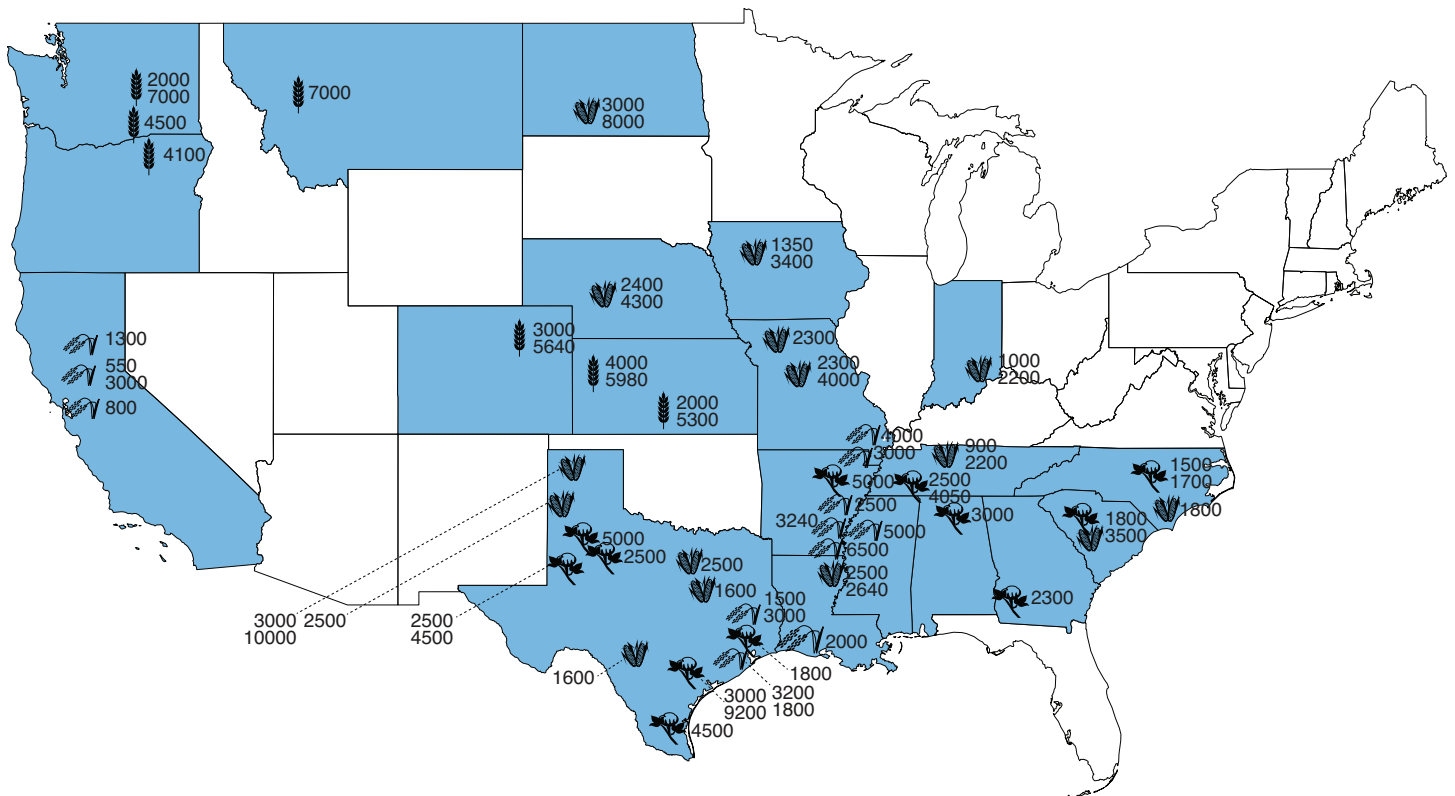


Figure 1. AFPC Representative Crop Farms.

**Table 1. Probability of Annual Cash Flow Deficits for Representative Feedgrain Farms Assuming 20% and 40% Initial Debt to Assets Ratios in 2014.**

Farms	20% Beginning Debt to Asset Ratio in 2014					40% Beginning Debt to Asset Ratio in 2014				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
IAG1350	99	99	99	98.8	99	99	99	99	99	99
IAG3400	56.2	49.8	43.2	40.8	42.8	99	97.8	94.8	95	95.2
NEG2400	76.2	69	66.2	70	73	98.4	94.2	91.6	91	94
NEG4300	88.8	87.4	85.6	85.4	85.2	99	99	99	98.8	99
NDG3000	81.2	76	73.4	69.8	71	99	96.6	94.2	92.6	93.8
NDG8000	61.2	52	44	36.6	37.6	99	98.6	97.2	95.6	96
ING1000	82.2	72	73.6	64.8	62.4	99	99	99	99	99
ING2200	99	97.6	95.8	95.2	95.4	99	99	99	99	99
MOCG2300	24.4	8.4	4.2	2.4	1.6	99	99	99	98.8	99
MOCG4200	1	1	1	1	1	64.6	34.8	25.4	20.6	14.8
MONG2300	27.4	24	24.2	24.6	27.4	99	99	99	99	99
LAG2640	91	83	81	77.6	76.6	97.6	93.6	89.4	87.6	88
LANG2500	85	58	42.8	34.8	34.6	99	99	99	99	99
TNG900	99	99	99	98.2	97	99	99	99	99	99
TNG2200	99	99	99	98.6	98	99	99	99	99	99
NCSP1800	99	99	99	99	99	99	99	99	99	99
SCG3500	94	83	79.2	74.6	74.2	99	99	99	99	99
TXNP3450	1	1	1	1	1	1.8	1	1	1	1
TXNP10640	2	1.8	1	1	1	55.8	38.6	29.4	22.8	22
TXPG2500	86.2	58.4	44.4	33	28.4	99	97	92.8	89.2	89.8
TXHG2500	99	99	99	99	99	99	99	99	99	99
TXWG1600	99	99	99	99	99	99	99	99	99	99
TXUG1600	37.2	35.2	40.8	37.8	50.4	80.4	59.8	62.8	58.2	66
<b>No. &gt; 50%</b>	17	16	13	13	14	22	20	20	20	20
<b>No. Farms</b>	23	23	23	23	23	23	23	23	23	23

projection of crop prices along with rates of inflation for inputs used for the representative farms. Stochastic crop yields are simulated using a multivariate empirical probability distribution.

The results of the cashflow analysis are summarized in Tables 1-4. The names for the representative crop farms consist of the state, crop, and number of acres, for example IAG1350 is an Iowa grain farm with 1,350 acres. The results in Tables 1-4 are provided in terms of the probability that the farm will experience a negative cashflow, assuming a 20% or a 40% beginning debt to asset (D/A) ratio in 2014. A negative cashflow (NCF) occurs when the farm's expenses for principal payments, income taxes, repayment of previous cashflow deficit loans, and family living exceed net cash income plus beginning cash reserves. The

FLIPSIM model handles cashflow deficits by creating a one-year extension of the operating loan that must be repaid in the next year.

Assuming a 20% beginning debt in 2014, the IAG1350 farm has a 99% chance of a NCF each year for 2016-2020 (Table 1). In contrast, the large Iowa grain farm (IAG3400) with a 20% initial debt has probabilities of a NCF ranging from 41 to 56% over the 2016-2020 study period. However, increasing the initial D/A to 40% on the IAG3400 farm results in a probability of NCF greater than 95% for 2016-2020 (Table 1). The northern Louisiana grain (LANG2500) farm has an 85% chance of a NCF in 2016 with an initial D/A of 20%, but the probability of NCFs decreases to 35% by 2020. Assuming a 40% D/A ratio in 2014 results in a 99% chance of NCF in all years for the LANG2500 farm. The LAG2640 farm has relatively high probabilities of

**Table 2. Probability of Annual Cash Flow Deficits for Representative Wheat Farms Assuming 20% and 40% Initial Debt to Assets Ratios in 2014.**

Farms	20% Beginning Debt to Asset Ratio in 2014					40% Beginning Debt to Asset Ratio in 2014				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
WAW2000	13.8	9.4	4.2	2.4	2.6	85.4	54.4	34.8	25.2	20.6
WAW8000	99	97.6	88.8	81.8	80	99	99	99	99	98.6
WAAW4500	99	99	99	99	99	99	99	99	99	99
ORW4100	99	94.6	83.8	80.4	76.6	99	99	99	99	99
MTW7000	22.8	2.2	1	1	1	98.8	84.2	63.6	43.4	36
COW3000	86.4	79.4	80.2	85	90.4	99	99	99	99	99
COW5640	99	99	99	99	99	99	99	99	99	99
KSCW2000	99	99	99	98.2	98.2	99	99	99	99	99
KSCW5300	43.4	29	21.6	16.4	14.6	99	92.2	80.4	69.8	64.8
KSNW4000	99	99	98.4	96.8	97	99	99	99	99	99
KSNW5980	99	99	99	99	99	99	99	99	99	99
<b>No. &gt; 50%</b>	8	8	8	8	8	11	11	10	9	9
<b>No. Farms</b>	11	11	11	11	11	11	11	11	11	11

**Table 3. Probability of Annual Cash Flow Deficits for Representative Cotton Farms Assuming 20% and 40% Initial Debt to Assets Ratios in 2014.**

Farms	20% Beginning Debt to Asset Ratio in 2014					40% Beginning Debt to Asset Ratio in 2014				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
TXSP2500	34.6	29.6	25	22.4	32	62.8	50.6	46.2	40.8	49.8
TXSP4500	32.4	25.8	25.6	23	27.6	69.6	57.4	55.2	50.4	50.2
TXEC5000	80.6	60	48.4	44.8	44.4	99	98.8	95.2	93.6	94
TXRP2500	99	99	99	99	99	99	99	99	99	99
TXMC1800	96.2	93	93	91.6	92	99	99	99	98	98.6
TXCB3000	36.2	26.6	29.4	34	39.2	70.6	59.8	62.6	67.4	71.2
TXCB9200	82	78.4	76	81	80.4	95	92.2	89.2	89.8	92.2
TXVC4500	29.6	17.8	10.2	11.2	12.8	95.8	83	74.4	72.4	74.2
TNC2500	3.8	4.6	1.6	2.4	2.6	38.2	18.2	11	10.4	8.4
TNC4050	98.8	97.4	94.6	91.8	91.4	99	99	99	99	99
ALC3000	99	99	99	99	99	99	99	99	99	99
GAC2300	99	97.4	95.2	93.6	93.6	99	99	99	99	99
SCC1800	94.2	89.8	87.2	83.6	80.2	99	99	99	99	98.6
NCC1700	99	99	98.4	97.8	98.2	99	99	99	99	99
NCNP1500	99	99	99	99	99	99	99	99	99	99
<b>No. &gt; 50%</b>	10	10	9	9	9	14	14	13	13	13
<b>No. Farms</b>	15	15	15	15	15	15	15	15	15	15

**Table 4. Probability of Annual Cash Flow Deficits for Representative Rice Farms Assuming 20% and 40% Initial Debt to Assets Ratios in 2014.**

Farms	20% Beginning Debt to Asset Ratio in 2014					40% Beginning Debt to Asset Ratio in 2014				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
CAR550	99	99	99	99	99	99	99	99	99	99
CAR3000	74.4	57	48.4	54.4	64.4	99	99	99	99	99
CABR1300	2.8	1	1	1	1	42.2	11	8.4	9	8
CACR800	26.8	12.2	8.6	10.4	13.4	99	99	99	99	99
TXR1500	44.4	13.6	12	25.2	33.2	99	90	85.2	96.8	96.6
TXR3000	20.2	12	10	14.6	40	73	55.4	42.4	50	77
TXBR1800	1	1	1	1	1	6	1	1	1	1
TXER3200	99	99	99	99	99	99	99	99	99	99
LASR2000	96	96.4	94.4	92.4	89.6	99	99	99	99	98.4
ARMR6500	99	99	99	99	99	99	99	99	99	99
ARSR3240	99	98.2	95.2	93	93.4	99	99	99	99	99
ARWR2500	99	99	99	99	99	99	99	99	99	99
ARHR4000	93.8	83.6	79.2	81.2	90.6	99	99	99	99	99
MSDR5000	22.4	23	28.2	28.2	35.2	98.8	98.2	97.2	97.6	98
MOBR4000	99	99	99	99	99	99	99	99	99	99
<b>No. &gt; 50%</b>	9	9	8	9	9	13	13	12	13	13
<b>No. Farms</b>	15	15	15	15	15	15	15	15	15	15

annual NCF for both initial D/A assumptions. Assuming a 20% D/A ratio in 2014, 17 of the 23 feedgrain farms have significant probabilities of NCF in 2016 (Table 1). If the farms started 2014 with a 40% D/A ratio, 20 of the 23 farms will have a high probability of a NCF over the entire 2017-2020 period (Table 1).

Eight of the 11 wheat farms have a significant cash flow problem in 2016-2020 if they started 2014 with a 20% D/A ratio (Table 2). Wheat farms with a 40% D/A ratio in 2014 are in much greater danger of NCF, with all 11 having more than a 50% chance of NCF in 2016 and 2017. Two of the wheat farms are able to improve their cash flows over the five-year period to the extent that they no longer exceed a 50% chance of NCF in 2020.

Ten of the 15 cotton farms have more than a 50% chance of a NCF in 2016, assuming a 20% initial D/A ratio and the situation does not improve for most of the farms by 2020 (Table 3). For cotton farms with a 40% beginning D/A ratio, the probability of a NCF is higher with 14 of the 15 having more than a 50% chance of NCFs by 2016 and the majority having more than a 90% chance of NCFs.

Nine of the 15 representative rice farms have more than a 50% chance of NCF in 2016, assuming a 20% D/A in 2014 (Table 4). If the representative rice farms started

2014 with a 40% D/A ratio, 13 of the 15 would have more than a 50% chance of a NCF in 2016 and the probability of avoiding a NCF does not improve by 2020.

The question that needs to be asked is: how much does annual net cash income have to increase for farms to overcome a negative cash flow in 2020? The next question is: how much does annual net cash income have to increase to insure no loss in real net worth in 2020? To address these two questions, the representative crop farms were simulated to calculate two net income adjustment (NIA) coefficients.

- NIA to maintain real net worth through 2020,
- NIA to insure a zero ending cash in 2020.

The NIA values are presented in Tables 5-8.

The Missouri grain farm (MOCG2300) needs to increase its annual net cash income \$24,310 (NIA) to avoid cash flow deficits if it initially had a 40% D/A (Table 5). If the initial D/A was 20%, the NIA is actually negative, as this farm's probability of a NCF decreases over the period (Tables 1 and 5). The Tennessee grain farm (TNG900) has an annual NIA of \$19,230 to maintain a zero ending cash position in 2020, under the 20% D/A scenario. To maintain real net worth in 2020, the TNG900

**Table 5. Annual Net Income Adjustments Necessary to Maintain Real Net Worth and to Achieve Zero Ending Cash Balance for Feedgrain/Oilseed Farms, 2014-2020, Assuming 20% and 40% Initial Debt to Assets Ratio.**

Farms	NIA to Maintain RNW		NIA for \$0 Ending Cash	
	20% Debt	40% Debt	20% Debt	40% Debt
	(\$s)	(\$s)	(\$s)	(\$s)
IAG1350	21.88	25.31	28.02	42.67
IAG3400	0	4.11	-1.63	17.67
NEG2400	2.12	4.4	5.29	14.74
NEG4300	6.15	10.45	9.53	27.26
NDG3000	4.02	6.58	4.69	15.63
NDG8000	-5.27	0	-2.88	18.94
ING1000	-6.57	-3.59	2.46	26.73
ING2200	0	5.32	13.12	42.81
MOCG2300	-24.12	-17.77	-16.93	24.31
MOCG4200	-33.65	-29.75	-35.36	-8.97
MONG2300	-3.89	1.71	-3.72	26.4
LAG2640	1.52	2.75	6.9	10.71
LANG2500	-6.31	0	-1.88	18.03
TNG900	6.24	12.85	19.23	37.8
TNG2200	5.5	1073%	21.75	41.5
NCSP1800	19.93	22.79	36.37	47.99
SCG3500	-1.31	4.85	4.3	21.06
TXNP3450	-24	-23.4	-32.28	-26.71
TXNP10640	-15	-12.91	-17.24	-5.8
TXPG2500	-9.06	-6.49	-2.99	6.56
TXHG2500	31.7	35.93	54.12	67.77
TXWG1600	22.09	24.85	34.28	44.6
TXUG1600	-2.6	-2.29	-0.13	1.74
<b>No. &gt; Zero</b>	12	16	13	20
<b>No. &gt; \$10,000</b>	4	7	7	18
<b>No. Farms</b>	23	23	23	23

farm needs to increase annual net income by \$6,240 and \$12,850 for the 20% and 40% initial D/A ratio scenarios, respectively (Table 5).

The annual NIA values to avoid a NCF in 2020 for the representative wheat farms are positive for seven of the 11 farms. The WAAW4500 farm has the largest NIA to achieve a zero ending cash position at \$47,930 (for 20% D/A) and \$66,120 (for 40% D/A) (Table 6). The annual NIA values, to avoid a decrease in real net worth, are greater than zero for seven of the 11 wheat farms if initial D/A was 20% and nine of the 11 if initial D/A was 40%. In many cases, the NIAs are small relative to farm's gross receipts, suggesting that the farms could make adjustments to avoid significant cashflow and equity issues.

Three of the representative cotton farms (TXRP2500, ALC3000, and NCNP1500) need to increase net income more than \$25,000/year (20%D/A) and more than \$34,000/year for 40% D/A to avoid cash flow deficits in 2020 (Table 7). Six of the farms are not likely to experience NCFs in 2020, but their NIA values are less than \$15,000 (25% D/A) so they do not have a healthy margin for error.

Three of the representative rice farms (CAR550, ARMR6500, and MOBR4000) have NIA's greater than \$20,000/year (20% D/A) to avoid NCFs in 2020 and six farms have NIA's more than \$20,000 if their initial D/A was 40% (Table 8). The remaining rice farms have cashflow NIAs that are closer to zero, indicating that presently the

**Table 6. Annual Net Income Adjustments Necessary to Maintain Real Net Worth and to Achieve Zero Ending Cash Balance for Wheat Farms, 2014-2020, Assuming 20% and 40% Initial Debt to Assets Ratio.**

Farms	NIA to Maintain RNW		NIA for \$0 Ending Cash	
	20% Debt	40% Debt	20% Debt	40% Debt
	(\$s)	(\$s)	(\$s)	(\$s)
WAW2000	-15	-12.5	-18.89	-8.36
WAW8000	1.12	4.25	7.33	21.33
WAAW4500	31.26	36.39	47.93	66.12
ORW4100	-2.11	2.21	-1.97	17.52
MTW7000	-18.1	-12.82	-20.78	-2.8
COW3000	15	22.63	13.38	55.26
COW5640	13.55	22.13	27.54	53.57
KSCW2000	12.15	16.07	24.4	42.26
KSCW5300	-10.62	-7.23	-10.25	4.3
KSNW4000	7.1	13.62	17.13	37.82
KSNW5980	19.1	27.53	32.16	56.99
<b>No. &gt; Zero</b>	7	8	7	9
<b>No. &gt; \$10,000</b>	5	6	6	8
<b>No. Farms</b>	11	11	11	11

**Table 7. Annual Net Income Adjustments Necessary to Maintain Real Net Worth and to Achieve Zero Ending Cash Balance for Cotton Farms, 2014-2020, Assuming 20% and 40% Initial Debt to Assets Ratio.**

Farms	NIA to Maintain RNW		NIA for \$0 Ending Cash	
	20% Debt	40% Debt	20% Debt	40% Debt
	(\$s)	(\$s)	(\$s)	(\$s)
TXSP2500	-10.15	-9.09	-4.27	1.24
TXSP4500	-8.03	-6.73	-5	0.6
TXEC5000	-5.23	-3.04	-1.13	7.05
TXRP2500	19.69	22.25	24.79	34.73
TXMC1800	6.37	8.4	10.3	17.58
TXCB3000	-2.15	-0.28	-2.17	4.64
TXCB9200	4.24	5.35	7.63	12.76
TXVC4500	-6.03	-2.81	-7.17	3.93
TNC2500	-12.05	-11.55	-15.62	-10.77
TNC4050	1.36	3.42	7.59	14.81
ALC3000	18.24	19.86	30.31	36
GAC2300	0	3.82	5.64	17.41
SCC1800	-1.31	\$3	5.95	16.07
NCC1700	11.01	14.24	19.46	31.12
NCNP1500	17.21	19.69	33.19	43.39
<b>No. &gt; Zero</b>	8	9	9	14
<b>No. &gt; \$10,000</b>	4	4	5	9
<b>No. Farms</b>	15	15	15	15



**Table 8. Annual Net Income Adjustments Necessary to Maintain Real Net Worth and to Achieve Zero Ending Cash Balance for Rice Farms, 2014-2020, Assuming 20% and 40% Initial Debt to Assets Ratio.**

Farms	NIA to Maintain RNW		NIA for \$0 Ending Cash	
	20% Debt	40% Debt	20% Debt	40% Debt
	(\$s)	(\$s)	(\$s)	(\$s)
CAR550	13.4	20.03	20.12	37.97
CAR3000	0	2.83	2.68	11.4
CABR1300	-14.12	-9.51	-18.4	-6.16
CACR800	0	4.89	-1.89	7.99
TXR1500	-4.96	-3.1	-1.46	7.04
TXR3000	-2.81	-2	-1.06	3.21
TXBR1800	-17.92	-17.44	-22.86	-19.13
TXER3200	8.13	9.97	12.05	17.91
LASR2000	-1.57	-0.19	6.27	11.24
ARMR6500	33.5	36.78	53.5	65.5
ARSR3240	3.7	7.33	9.84	20.41
ARWR2500	2.19	5.74	14.3	33.66
ARHR4000	3.8	\$7	6.26	20.56
MSDR5000	-6.04	-1.86	-2.73	17.13
MOBR4000	11.27	15.56	24.31	41.46
<b>No. &gt; Zero</b>	9	9	9	13
<b>No. &gt; \$10,000</b>	3	3	5	10
<b>No. Farms</b>	15	15	15	15

farms are projected to have small or no NCF deficits by 2020.

In summary, given the FAPRI August 2016 outlook for crop prices, the representative crop farm results indicate a significant number of farmers who had 20% D/A in 2014 will not be able to fully repay their operating loans in 2016. Sixty-eight percent of the farms have greater than a 50% chance of a NCF in 2020 assuming a 20% D/A in 2014. The situation does not improve greatly through 2020, with 63% of the farms projected to have more than a 50% chance of a cash flow deficit. For farmers who started 2014 with a 40% D/A, the results are significantly worse, with 94% of the farms having more than a 50% chance of a NCF in 2016, and 85% of the farms in 2020 will have more than a 50% chance of a NCF.

The net income adjustment analysis indicates that about a third of the representative farms that had a 20% D/A in 2014 need to increase annual net income more than \$10,000 to avoid a NCF in 2020. Seventy percent of the farms with 40% D/A in 2014 need to increase annual net income more than \$10,000 to avoid a NCF in 2020.

Debt to asset ratios in 2014 and how farmers managed their cash reserves in 2014 and 2015 directly affect the belt tightening/income increasing requirements to avoid NCF in 2016-2020. What can help this situation? Higher crop prices, lower costs of production, and, where possible, lower land rent. Farmers who cash rent cropland may see lower rents over time, but land owners will be hesitant to reduce rents, as the rents often are used as the main source of income for retired farmers.