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COVID-19 Working Paper: Unpriced Commodity Inventory and COVID-19 Pandemic Assistance

Noah Miller, Anil K. Giri, Dipak Subedi, and Ryan Williams

Abstract

The first round of the Coronavirus Food Assistance Program (CFAP 1) provided payments to agricultural producers adversely affected by marketing losses caused by the Coronavirus (COVID-19) pandemic. Since the only producers eligible to receive a CFAP 1 payment were those who held unpriced inventory, ERS researchers examined the level of unpriced inventory held post-harvest 2019. Administrative USDA, Farm Service Agency (FSA) data on CFAP 1 applications and payments, and farm-level data on unpriced inventory were drawn from the 2019 Phase 3 Agricultural Resource Management Survey (ARMS) to understand unpriced inventory held and CFAP 1 payments distributed to agricultural producers. For the majority of producers, significant levels of inventory existed post-harvest 2019. Since payments were made on the lower of 50 percent of production or the level of unpriced inventory, the majority of payments were made on production levels, from 58 percent of upland cotton payments to 81 percent of spring wheat payments. ERS researchers also analyzed the degree to which commodity-specific CFAP 1 rates reflected changes in county-average cash prices between January and April 2020 for corn, soybeans, and spring wheat. The share of counties in which the CFAP 1 rate exceeded 52.5 percent of the decline in cash prices ranged between 49.0 percent for corn and 99.9 percent for spring wheat.

Keywords: COVID-19, Coronavirus Food Assistance Program, pandemic assistance, unpriced inventory, cash markets

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About the Authors

Noah Miller and Anil K. Giri are research agricultural economists, Dipak Subedi is an agricultural econo-mist, and Ryan Williams is a geographer with USDA, Economic Research Service.

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Summary

What Is the Issue?

The Coronavirus (COVID-19) pandemic created numerous supply and demand shocks at the start of 2020, including reduced food demand due to domestic and global lockdown measures, disruptions to meat supply chains through plant closures, and disruptions to normal shipping patterns (Giri et al., 2021). These shocks directly affected farm operations through declines in commodity prices, as illustrated by the losses of between 4 percent (wheat) and 53 percent (lean hogs) in futures markets between January and April 2020 (Schnepf and Monke, 2020). Coronavirus Food Assistance Program: Round One (CFAP 1) made payments to offset price declines attributed to the pandemic. CFAP 1 payments were equal to the payment rate times the quantity of unpriced crop inventory as of January 15, 2020, or 50 percent of the producer's 2019 production (whichever was lower) to eligible nonspecialty (other than fruit and vegetables) crop producers.

Because marketing strategies differ across farm operations, this payment structure resulted in CFAP 1 payments that varied beyond differences in 2019 production levels. However, little is known about the levels of unpriced inventory held by farms at the beginning of 2020, because USDA does not routinely track data on unpriced inventory held by producers. Little is also known about the level of unpriced inventory that was used as loan collateral. Since CFAP 1 did not differentiate between producers who stored commodities as collateral for a loan and those who did not, the policy could have benefitted those who stored for a variety of reasons. Finally, the commodity-specific per unit payment rates set by CFAP 1 were based on Chicago Board of Trade, Minneapolis Grain Exchange, and Intercontinental Exchange futures prices when available. This implies that the program's ability to offset local price declines would differ across locations based on the change observed in local cash prices and basis relative to the change in futures prices.

What Did the Study Find?

In 2020, the first round of CFAP (i.e., CFAP 1) made payments to producers based on unpriced inventory held or 2019 production. We find that by September 2020—within 4 months of starting to take applications—the USDA, Farm Service Agency (FSA) had disbursed $10.3 billion (or approximately 87.3 percent of total CFAP 1 payments), with the majority of CFAP 1 applications and payments based on 2019 production levels. This implies that many who held unpriced inventory post-harvest did so at levels exceeding 50 percent of production.

Other findings:

- For the commodity groups analyzed, the share of operations that held unpriced inventory post-harvest was highest for corn operations (43.5 percent) and lowest for cotton operations (12.2 percent).
- The median quantity of inventory held increased with farm size for corn and soybean operations but not for wheat and cotton operations.
- For row crop producers (except for upland cotton), significant inventory levels existed post-harvest 2019. Since payments were made on the lower of 50 percent of the 2019 production level or the level of unpriced inventory, the majority of payments were made on production levels, from 58.2 percent of upland cotton payments to 80.9 percent of spring wheat payments.
- In 2019, the most recent year in which data on unpriced inventory was collected, a small share of producers who held unpriced inventory post-harvest used it as loan collateral. This share ranged from 16.7 percent for corn producers to 31.0 percent for cotton producers.

- The share of counties in which the CFAP 1 rate exceeded 52.5 percent of the decline in cash prices ranged between 49.0 percent for corn and 99.9 percent for spring wheat. This variation is accounted for by spatial differences and seasonal adjustments in local markets.

How Was the Study Conducted?

Monthly data from USDA's FSA were used to categorize CFAP 1 applications and payments as either production-limited (made on 50 percent of 2019's production level) or inventory (made on unpriced inventory level) applications and payments. Data drawn from the 2019 Phase 3 Agricultural Resource Management Survey (ARMS) was used to examine the distribution of unpriced inventory by commodity type and farm size typology, as well as to examine the amount of unpriced inventory that was used as collateral for (commercial and governmental) loans. Cash price data from GeoGrain's database and futures price data from Stevens Reference Futures were analyzed to show the changes in cash prices and basis between January and April 2020.

Introduction

The first round of the Coronavirus Food Assistance Program (CFAP 1) made payments to eligible agricultural producers who faced significant marketing costs induced by the pandemic. These costs came in the form of lower output prices in the first half of 2020, resulting from significant declines in demand, surplus production, and disruptions to shipping patterns and the orderly marketing of commodities (USDA, 2020). CFAP 1 payments were made at a per unit (bushel, pound, or hundredweight) statutory rate set at 52.5 percent of the decline in futures market prices between the weeks of January 13 and April 6, 2020 (USDA, 2020; Johansson et al., 2021).[1] CFAP 1 was unique in making payments contingent on unpriced inventory (Adjemian et al., 2021). A producer's CFAP 1 payment equaled the per unit rate times the lower of either the quantity of unpriced inventory of the commodity held on January 15, 2020, or 50 percent of the producer's 2019 production.[2] This payment structure meant that producers who did not hold unpriced inventory post-harvest did not receive payments from CFAP 1. Because marketing strategies differ across farm operations, this rule resulted in CFAP 1 payments that varied beyond differences in 2019 production levels. Additionally, changes in local cash markets may not have perfectly mirrored changes seen in futures prices during this period, implying that these payments had the potential to under- or over-compensate producers based on location.[3]

This report examines the distribution of CFAP 1 payments to producers of major row crops, the number of operations that held unpriced inventory, the levels of unpriced inventory held, and the extent to which CFAP 1 payments offset changes observed in local cash markets in early 2020. The USDA, Farm Service Agency's (FSA) data on CFAP 1 applications and payments were used to analyze the monthly rate of disbursement of CFAP 1 payments and the category in which payments were made. Farm-level data—including levels of unpriced post-harvest inventory—collected in the 2019 Agricultural Resource Management Survey's (ARMS) Cost and Returns Report were used to calculate a breakdown of applications and payments by payment type and to report eligible unpriced inventory and levels of inventory collateralization by farm typology. To analyze changes in cash markets, weekly average cash prices and the bases for corn, soybeans, and spring wheat (averaged at the county level) were compared with the commodity-specific rates set by CFAP 1.

CFAP 1 Payments

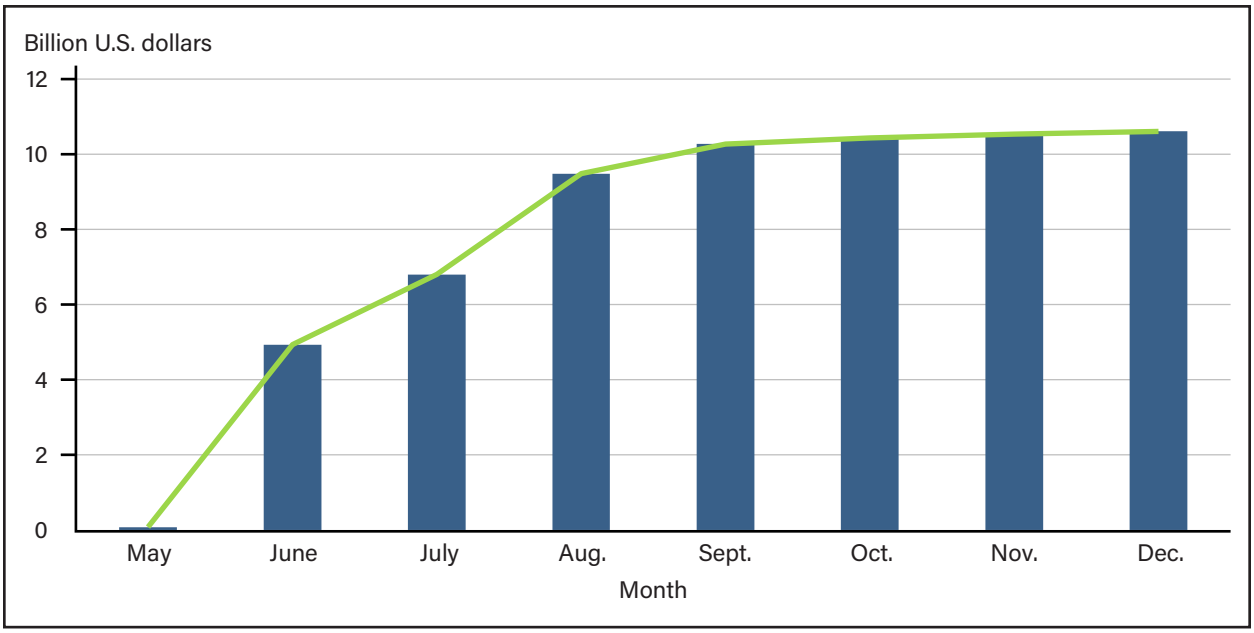
USDA announced CFAP 1 on April 17, 2020, with a more detailed announcement following on May 19, 2020 (USDA, 2020b). USDA's FSA began taking applications on May 26, 2020; the window for new application closed on October 9, 2020. As of August 2022, CFAP 1 made $11.8 billion in total payments (USDA, FSA, 2022). Figure 1 shows the cumulative payments made to the producers on a month-to-month basis under the CFAP 1 program in 2020. By September 2020, within 4 months of starting to take applications, USDA's FSA had disbursed $10.3 billion, or approximately 87.3 percent of total CFAP 1 payments. The speed at which payments were disbursed was unprecedented given the nature and scope of CFAP 1 and the administrative challenges brought on by the pandemic.

[1] The funding of CFAP 1 came from two sources: the Coronavirus Aid, Relief, and Economic Security (CARES) Act and the Commodity Credit Corporation (CCC). The CARES Act rate was set at 50 percent of the decline in futures prices between the weeks of January 13 and April 6, 2020. The CCC was set at 55 percent of the decline in futures prices for the same period. Since the shares in funding from the CARES Act and the CCC were equal, this resulted in a 52.5-percent average per-unit rate.

[2] For all commodities covered by CFAP 1, if a producer's quantity of unpriced inventory was lower than 50 percent of total 2019 production of that commodity, then the producer's CFAP 1 payment would be equal to the per unit statutory rate times the quantity of unpriced inventory.

[3] It is important to note that the use of futures prices was driven by the urgency of the situation and the need to roll out the program in a timely manner, and by the lack of cash price data for all commodities included in the CFAP 1 program.

Figure 1
Cumulative Coronavirus Food Assistance Program: Round One (CFAP 1) payments, 2020



Source: USDA, Economic Research Service, based on data from USDA, Farm Service Agency.

Corn, soybeans, cotton, and wheat were analyzed for this report because these crops accounted for more than half of total crop cash receipts in 2020 and the vast majority of CFAP 1 payments (table 1).[4] Among the four commodities, corn and soybeans accounted for 44.7 percent or $89.38 billion of total $198.78 billion crop cash receipts in 2020.

Table 1
CFAP 1 rates, total U.S. farm crop cash receipts in 2020, and share of total crop cash receipts (select commodities)

Commodity	CFAP 1 per-unit rate	Total U.S. farm crop cash receipts in 2020 (billion U.S. dollars)	Percent share of 2020 crop cash receipts
Corn	0.335 U.S. dollars/bushel	47.66	23.9
Soybeans	0.475 U.S. dollars/bushel	41.48	20.8
Cotton, upland	0.095 U.S. dollars/pound	5.51	2.8
Wheat, durum	0.195 U.S. dollars/bushel	8.85*	4.4*
Wheat, HRS	0.190 U.S. dollars/bushel		

CFAP 1 = Coronavirus Food Assistance Program: Round One; HRS = hard red spring.

* indicates all classes of wheat (U.S. farm cash receipts data do not distinguish across different classes of wheat).

Source: USDA, Economic Research Service, Farm Income and Wealth Statistics as of February 7, 2023, and USDA, Farm Service Agency.

[4] CFAP 1 payments also went to producers of other nonspecialty crops, specialty crops, livestock commodities, wool, and dairy (Schenpf, 2020).

CFAP 1 payments went only to producers who held both unpriced inventory and had positive production amounts in 2019 in one or more of the commodities covered by the program. However, since the payment was made based on either 50 percent of production or unpriced inventory (whichever was lower), the authors classified these payments into one of two types: 1) production-limited payments (50 percent of an operation's 2019 production was less than total unpriced inventory), or 2) inventory payments (total unpriced inventory was less than 50 percent of an operation's 2019 production). Production-limited payments, therefore, went to operations with high levels of unpriced inventory relative to production. Conversely, inventory payments went to those with low levels of unpriced inventory relative to production. Using this classification system, the authors analyzed the USDA, FSA data on CFAP 1 applications and payments to provide insight into the quantity of unpriced inventory that existed at the start of the pandemic.

Table 2 shows the breakdown between production-limited and inventory applications for the four commodities. For most commodities, more than two-thirds of applications were production-limited, which were particularly dominant for corn and spring wheat producers at 71.2 percent each. Upland cotton was an outlier due to the commodity's marketing system. A large percentage of cotton is typically stored and marketed through co-operatives, with title to the crop being passed on from the producer to the co-operative business at harvest (Isengildina and Hudson, 2001). However, the number of production-limited applications for upland cotton was non-trivial at 45.5 percent of total applications. Overall, the data indicate that for most operations that held unpriced inventory, the amount held exceeded 50 percent of 2019's production. This unpriced inventory represented a large amount of value at risk.

Table 2
Total CFAP 1 production-limited and inventory applications (select commodities), 2020

Commodity	Production-limited applications	Production-limited percent share of total applications	Inventory applications	Inventory percent share of total applications
Corn	169,778	71.2	68,551	28.8
Soybeans	127,514	67.1	62,584	32.9
Cotton, upland	10,323	45.5	12,351	54.5
Wheat, durum	1,160	70.4	487	29.6
Wheat, HRS	11,408	71.2	4,617	28.8

CFAP 1 = Coronavirus Food Assistance Program: Round One; HRS = hard red spring.

Source: USDA, Economic Research Service, based on data from USDA, Farm Service Agency.

Tables 3 and 4 show the total program payments, share of total payments, and the average payment received by an operation by payment type (inventory or production-limited) for the four commodities. Most payments paid to producers of corn (76.9 percent), soybeans (77.0 percent), durum wheat (79.9 percent), and spring wheat (80.9 percent) were production-limited. Combined, corn producers received the highest payments from CFAP 1 at $1.78 billion—$1.37 billion in production-limited payments and $0.41 billion in inventory payments. Soybean producers received $0.51 billion—$0.40 billion in production-limited payments and $0.12 billion in inventory payments. Durum and spring wheat producers received $42 million—$34 million in production-limited payments and $8 million in inventory payments from CFAP 1.

Table 3
Production-limited payments, CFAP 1 (select commodities), 2020

Commodity	Total payments (million U.S. dollars)	Production-limited payments, percent share of total payments	Average payment to farmers (U.S. dollars)
Corn	1,368	76.9	8,058
Soybeans	396	77.0	3,106
Cotton, upland	154	58.2	14,918
Wheat, durum	3	79.9	2,586
Wheat, HRS	31	80.9	2,717

CFAP 1 = Coronavirus Food Assistance Program: Round One; HRS = hard red spring.

Source: USDA, Economic Research Service, based on data from USDA, Farm Service Agency.

Table 4
Inventory payments, CFAP 1 (select commodities), 2020

Commodity	Total payments (million U.S. dollars)	Inventory payments, percent share of total payments	Average payment (U.S. dollars)
Corn	411	23.1	5,996
Soybeans	118	23.0	1,885
Cotton, upland	111	41.8	8,987
Wheat, durum	1	20.1	2,053
Wheat, HRS	7	19.1	1,516

CFAP 1 = Coronavirus Food Assistance Program: Round One; HRS = hard red spring.

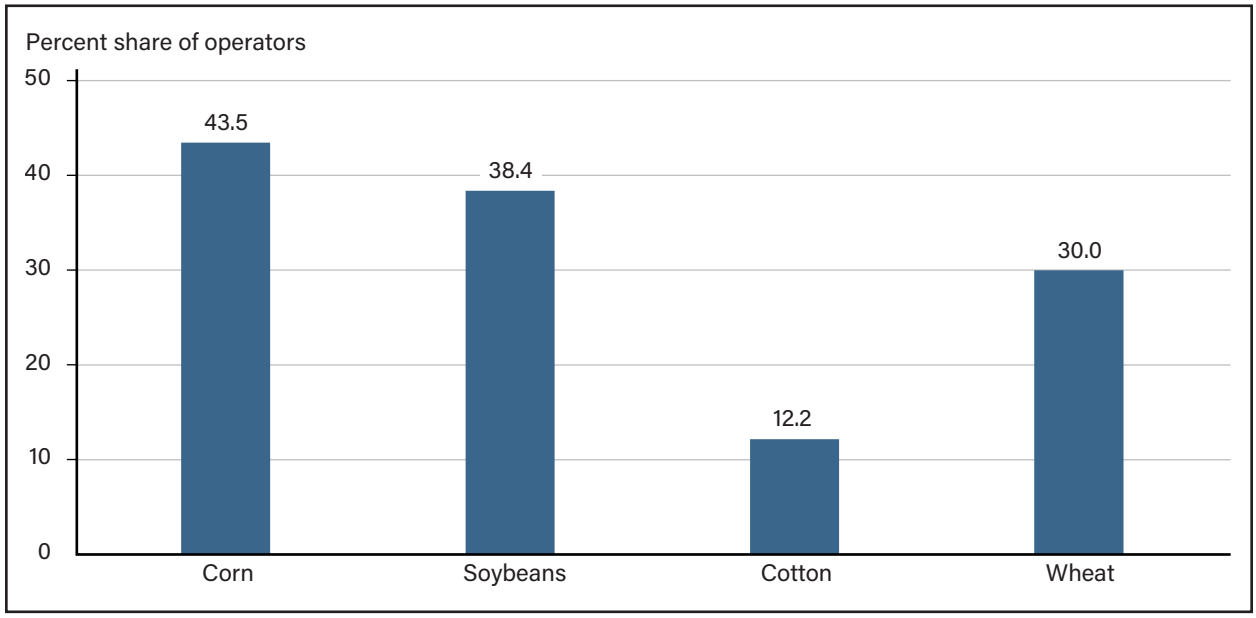
Source: USDA, Economic Research Service, based on data from USDA, Farm Service Agency.

Relative to the share of inventory applications, the share of inventory payments was lower. For example, only 41.8 percent of total payments for upland cotton were inventory payments, despite 54 percent of upland cotton applications being based on inventory. Average production-limited payments to upland cotton producers were $14,918, significantly higher than the average inventory payment of $8,987, though both ranked highest across crops. This was most likely due to the design of the program, which made payments on the lower of inventory or 50 percent of 2019 production. This suggests that on average, upland cotton operations had unpriced inventory that was less than 50 percent of 2019 production (the prominent use of cooperative marketing pools by cotton producers could have contributed to this payment differential). For some operations, the amount of inventory was far less than 50 percent of production. The average payment for other commodities was also higher for production-limited payments compared with inventory payments. The average production-limited payment to corn producers was $8,058 compared with $5,996 for inventory payments. Average production-limited payments for soybean producers was $3,106 compared with $1,885 for inventory-based payments. Tables 2, 3, and 4 show that for the five crops combined, approximately one-third of total applications and one-fourth of total payments were inventory payments. Since payments were made on the lower of either the quantity of unpriced inventory or 50 percent of 2019 production, this suggests total unpriced inventory was more than one-fourth greater than total 2019 production levels.

Unpriced Inventory, 2019–20

The 2019 ARMS included questions regarding the ownership and storage of unpriced inventory post-harvest (figure A.1). Specifically, 2019 ARMS asked producers of major row crops (including corn, soybeans, cotton, and wheat) to report the total quantity of unpriced inventory, regardless of storage location (on-farm or off-farm).[5] Using the responses from the 2019 ARMS for the four row crops differentiated by farm type, the authors analyzed the prevalence of unpriced post-harvest inventory. Figure 2 shows the share of operations that held unpriced inventory in 2019. Figure 3 shows the median quantities stored by these operations, by farm size, where size, a categorical variable, is measured by gross cash farm income (GCFI) for corn, soybeans, cotton, and wheat producers.

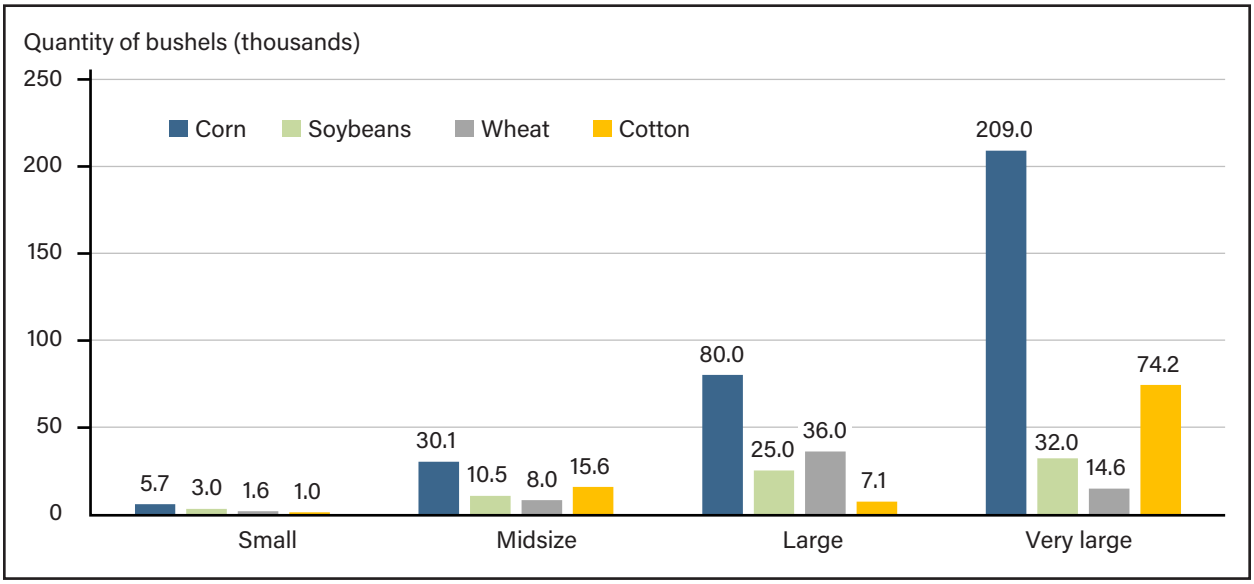
Figure 2
Share of operations with positive amount of unpriced inventory, post-harvest 2019



Source: USDA, Economic Research Service, using 2019 Agricultural Resource Management Survey data.

[5] Producers were asked to exclude from their reported storage amount any inventory that had been already placed under a marketing contract.

Figure 3
Median unpriced inventory quantity held by corn, soybeans, and wheat producers, by farm size, measured in gross cash farm income increments, post-harvest 2019



Note: Small family farms are those with gross cash farm income (GCFI) of less than $350,000. Midsize family farms are those with GCFI between $350,000 and $999,999. Large family farms are those with GCFI between $1,000,000 and $4,999,999. Very large family farms are those with GCFI of $5,000,000 or more.

Source: USDA, Economic Research Service using 2019 Agricultural Resource Management Survey data.

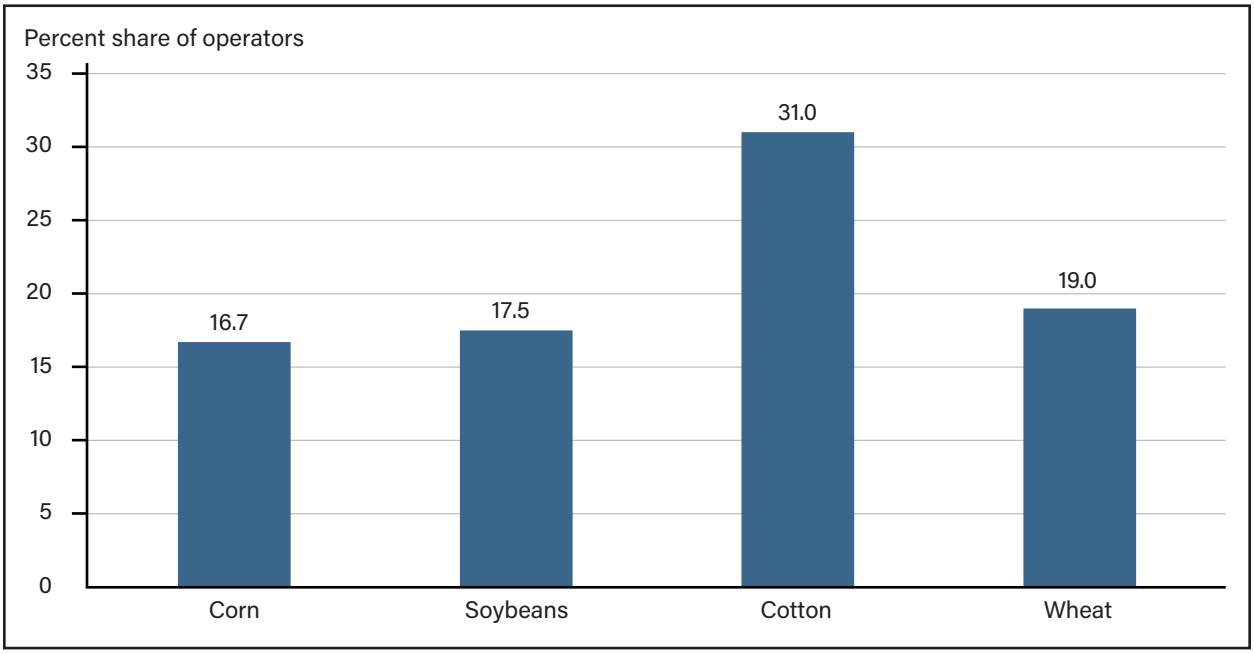
The highest share of producers who held unpriced inventory post-harvest were corn producers (43.5 percent), followed by soybean producers (38.4 percent). Corn producers also held larger quantities of unpriced inventory post-harvest than any other group of producers across all farm size categories. The median quantity of unpriced soybeans held averaged only 33.7 percent of the amount of corn held, across all farm size categories.. However, among very large producers, the median quantity of soybeans held (32.0 bushels) was only 15.3 percent the amount of corn (209.0 bushels). This figure compares reasonably well with Quarterly Grain Stocks report data for December 2019, which indicated on-farm unpriced and priced stocks of corn were approximately 7.2 billion bushels. On-farm stocks of soybeans were 1.5 billion bushels, resulting in an average 21.2-percent ratio of soybean stocks to corn stocks (USDA, NASS, 2020). Fewer cotton producers (12.2 percent) and wheat producers (30.0 percent) held unpriced inventory than soybean producers. However, for some farm size groups, the median quantity wheat producers held outnumbered the median quantity soybean producers held. Unlike both corn and soybeans, the median quantity held did not increase directly in line with farm size for cotton and wheat producers, suggesting that farm size alone could not account for levels of unpriced inventory held post-harvest.[6]

Farm operators may have a number of reasons for storing (on- or off-farm) unpriced inventory post-harvest. For example, a low-price environment at harvest may induce producers to hold onto their crops with the intention of selling them the following year for a marketing gain, as cash prices tend to improve in late winter and spring. Row crops, such as corn, are used for livestock feed, so maintaining unpriced inventory may be useful for mixed crop-livestock operations. Holding unpriced inventory may also be useful from an income tax perspective as commodities sold after the start of a new year would not be taxed until the following year, freeing up funds for immediate use.

[6] Though the data do not allow the authors to decompose wheat into spring and winter wheat inventories, readers should note that the post-harvest inventories of wheat discussed include both summer inventories (winter wheat) and fall inventories (spring wheat).

Producers can also use a portion of their unpriced inventory as collateral for a loan. The 2019 ARMS Survey questioned producers on this point. Figure 4 shows the percent share of producers who used some portion of their unpriced inventory as collateral for a loan.[7] Figure 5 presents the shares broken down by farm size. Shares ranged from 16.7 percent for corn producers to 31.0 percent for cotton producers. The high share of cotton producers who used inventory for collateral may be explained by the historically high degree of participation by cotton producers in the non-recourse marketing assistance loan program (Saak, 2003; Coppess et al., 2017). The data also show a relationship between the size of the operation and the use of inventory as collateral; however, relationships between size and collateral usage are crop-specific. For corn, soybeans, and wheat, larger scale operations tend more often to use inventory as collateral; for cotton the reverse is true. The share of corn operations that used unpriced inventory as collateral at small to very large farms rose 22.5 percentage points; for cotton operations, the share decreased by 48.3 percentage points.

Figure 4
Share of operators with unpriced inventory who used a portion as loan collateral, post-harvest, 2019

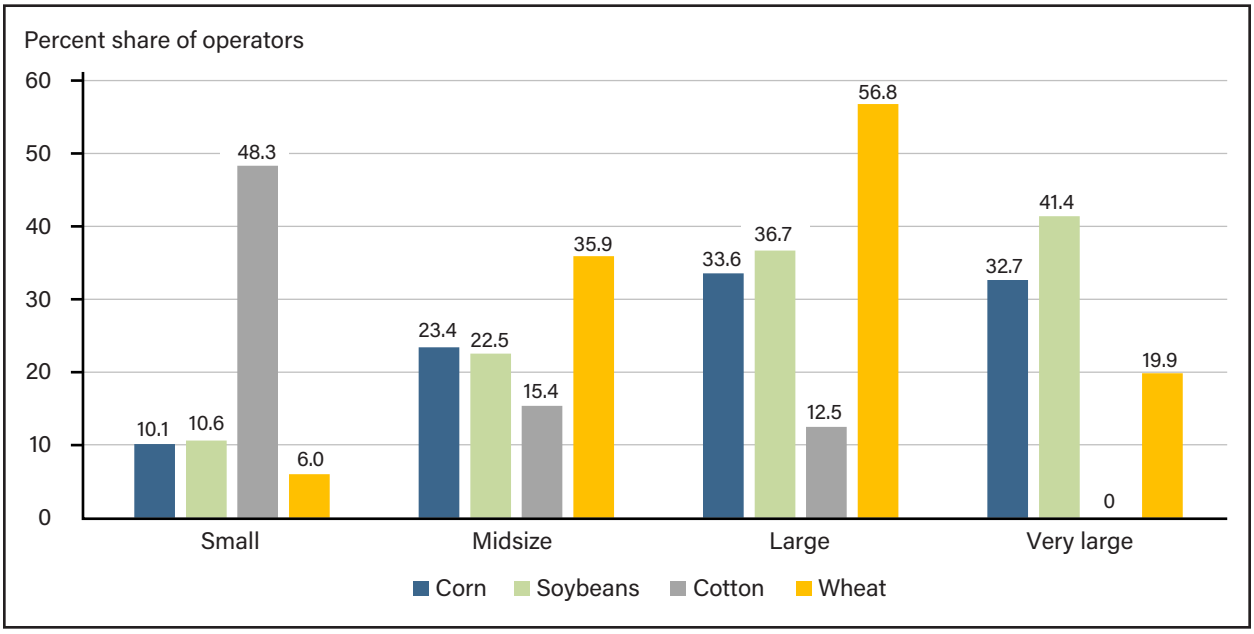


Source: USDA, Economic Research Service, using 2019 Agricultural Resource Management Survey data.

[7] This includes loans from both commercial and government lenders.

Figure 5

Share of operators with unpriced inventory who used a portion as loan collateral by farm size, measured in gross cash farm income increments, post-harvest, 2019



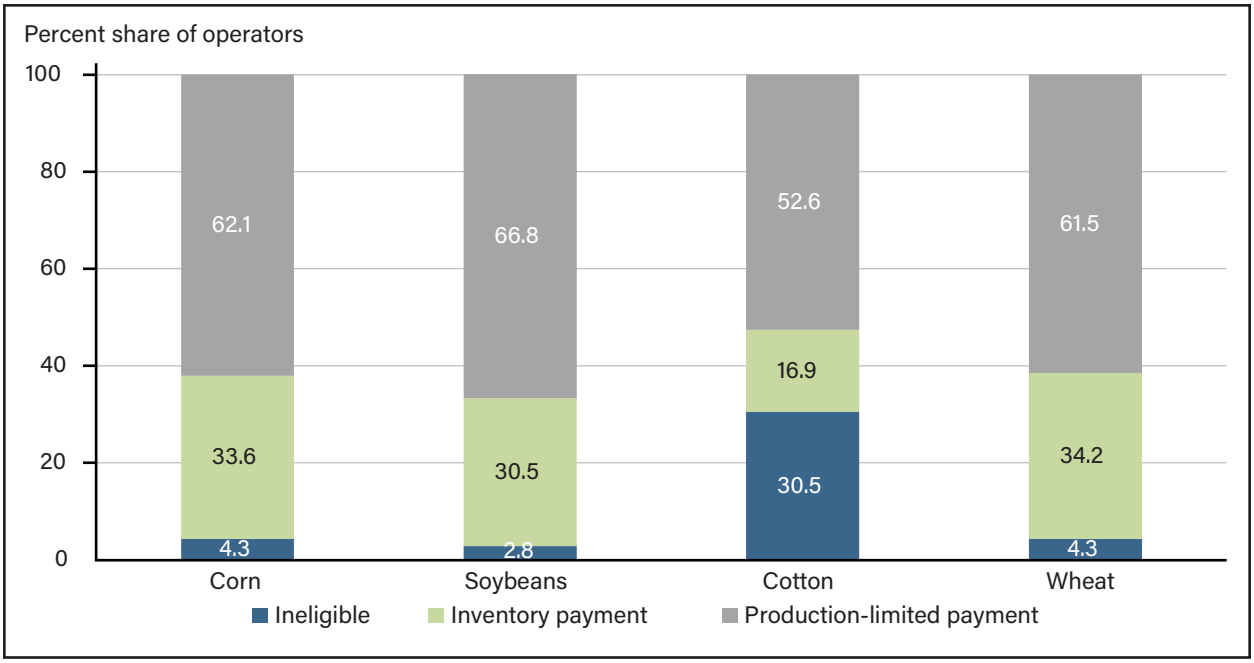
Note: Small family farms are those with gross cash farm income (GCFI) of less than $350,000. Midsize family farms are those with GCFI between $350,000 and $999,999. Large family farms are those with GCFI between $1,000,000 and $4,999,999. Very large family farms are those with GCFI of $5,000,000 or more.

Source: USDA, Economic Research Service, using 2019 Agricultural Resource Management Survey data.

The authors assessed the accuracy of the 2019 ARMS in capturing the level of unpriced, post-harvest inventory in the farm economy. With additional farm-level responses in ARMS on an operation's 2019 production levels and adjusted gross income, the share of farms that would have been eligible for a production-limited or inventory payment under CFAP 1 can be tallied. ARMS data can then be verified by comparing these numbers to USDA's FSA data. Authors calculated inventory-to-production ratios for each crop and used these ratios to classify farms as eligible for either a production-limited or inventory CFAP 1 payment, or ineligible for failing to meet the criteria.[8] Figure 6 shows the breakdown of CFAP 1 eligibility by crop. Except for cotton, over 95 percent of all unpriced inventory was eligible for a CFAP 1 payment. Across all commodities, the amount of unpriced inventory that was eligible for production-limited payments exceeded the amount eligible for inventory payments. Soybean producers had the largest share of unpriced inventory eligible for a production-limited payment at 66.8 percent; cotton producers had the lowest share at 52.6 percent. After removing operations that were ineligible for payments, the relative shares were comparable to USDA's FSA data, suggesting that ARMS accurately reflected unpriced inventory at the end of 2019.

[8] These additional criteria included a cut-off on operations with adjusted gross income in excess of $900,000.

Figure 6
Total unpriced inventory broken down by inferred CFAP 1 eligibility, post-harvest 2019



CFAP 1 = Coronavirus Food Assistance Program: Round One.

Source: USDA, Economic Research Service using 2019 Agricultural Resource Management Survey data.

Cash Market Impacts

The commodity-specific per-unit payment rates set by CFAP 1 were based off of declines to Chicago Board of Trade, Minneapolis Grain Exchange, and Intercontinental Exchange futures prices at the start of the pandemic. Using futures prices as benchmarks allowed the Government to assist farmers quickly, but the extent to which declines in futures prices reflected changes in underlying cash markets during the start of the pandemic is not well understood. Cash markets are where producers of major grain and oilseed crops typically sell their grain, and they usually display certain seasonal variation in price levels, not present in fixed contract futures prices. This variation is related to local supply, with cash prices lowest at harvest time and rising over the following year as local supplies dwindle. Seasonality in cash prices translates into seasonality in basis prices, as increases in cash prices (relative to futures prices) produces a stronger basis.

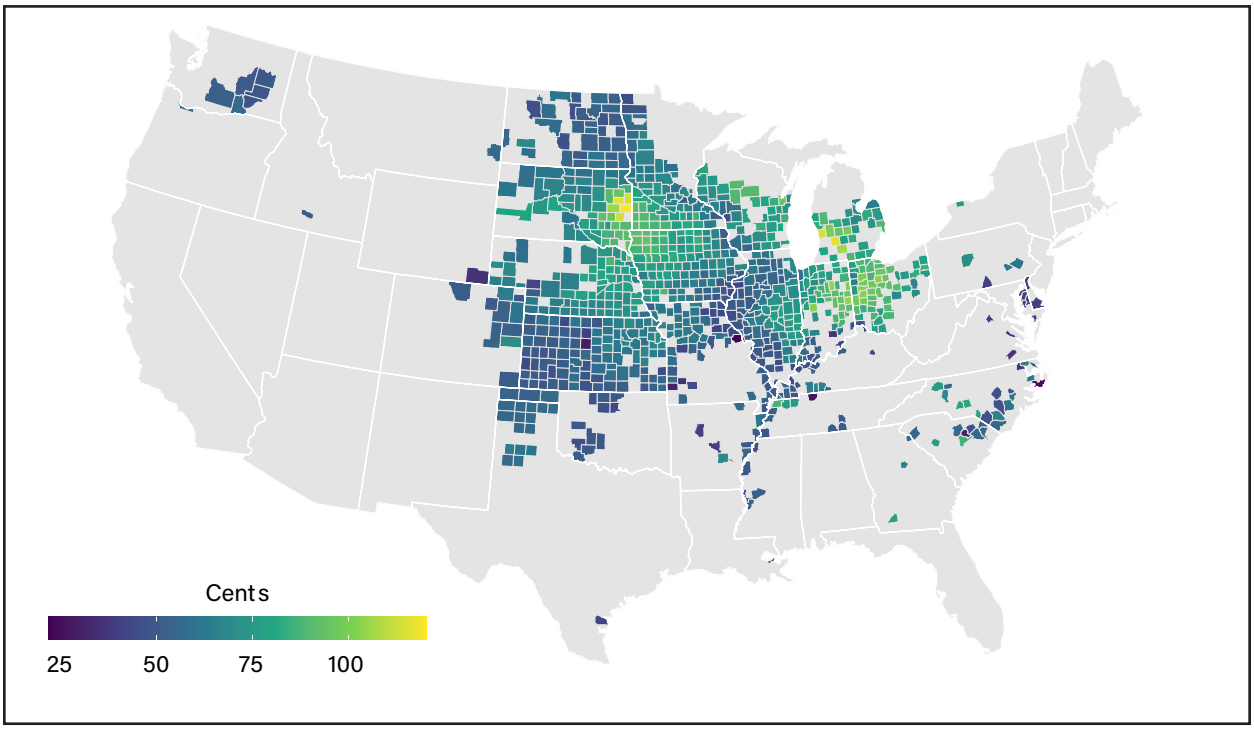
Any softening in cash markets (i.e., declines in cash prices and weakening of basis levels) caused by the pandemic would have directly affected a farm's ability to sell any unpriced commodity it held. The authors examined these changes for corn, soybeans, and spring wheat at the county level. Using the same points in time that CFAP 1 used (weekly average prices for the weeks of January 13^{t}, 2020, and April 6, 2020) to examine futures price declines, the authors could judge the extent that CFAP 1 payments offset losses at the local level. If the additional payment received for unpriced stored commodity was as large as the difference in observed cash prices between harvest and the writing of the CFAP 1 policy, then the payment would compensate producers who chose to store up to half of their 2019 production.

County averages of elevator-level cash prices for the second week of January and first week of April for 2017 through 2020 were obtained from the GeoGrain's database for corn, soybeans, and spring wheat. Daily May contract corn and soybeans futures prices at the Chicago Board of Trade were obtained from Stevens

Reference Futures; daily May contract spring wheat futures prices were obtained from the Minneapolis Grain Exchange. Weekly average futures prices for the second week in January and first week in April, 2017 through 2020, were created from the underlying daily futures prices. A weekly basis measure was created by subtracting the relevant futures prices from the cash price series.

Figure 7

Declines in county average corn cash prices (cents per bushel) between the weeks of January 13 and April 6, 2020

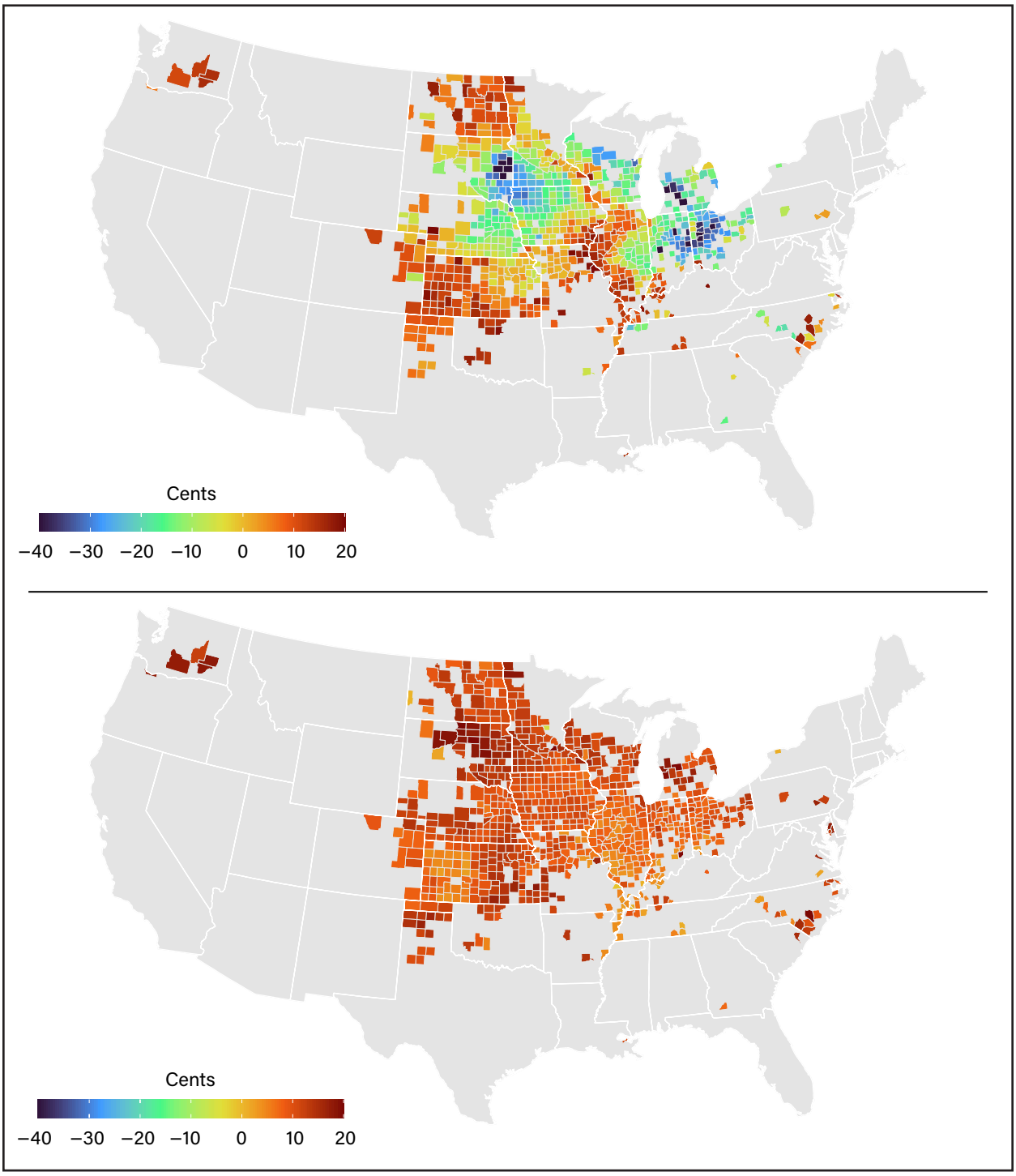


Source: USDA, Economic Research Service, based on information from GeoGrain's database.

National corn, soybean, and spring wheat cash prices in the second week of January 2020 averaged $3.83, $8.86, and $5.53 per bushel, respectively. By April, national corn, soybean, and spring wheat cash prices had fallen to $3.20, $8.23, and $5.34 per bushel respectively. County-level data indicated however that, particularly for corn, a wide degree of heterogeneity existed in cash price declines across the country. Corn cash prices fell anywhere from $0.22 to $1.20 per bushel depending on location, which represented a 6.3 percent to 31.4 percent decline in value from January to April (figure 7).

Figure 8

Change in the county average corn basis (cents per bushel) between the weeks of January 13 and April 6 (top panel: 2020; bottom panel: 2017–19 average)



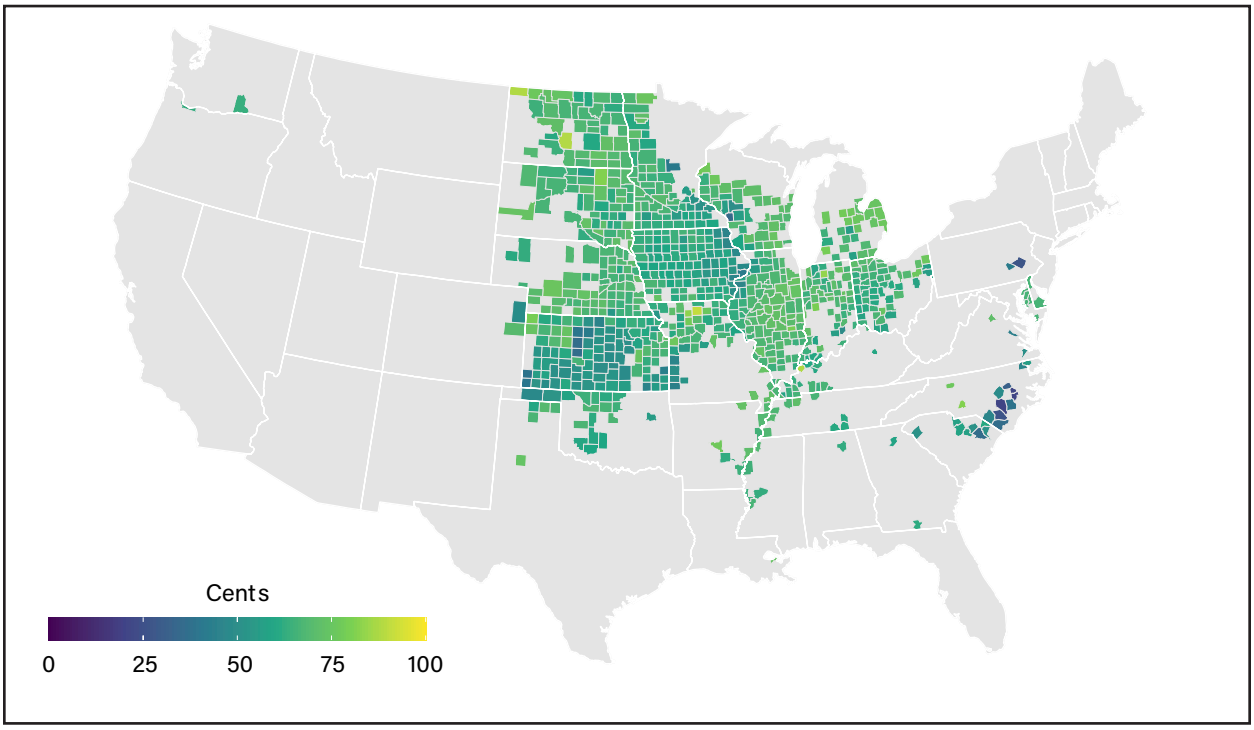
Source: USDA, Economic Research Service, based on information from GeoGrain's database and Nasdaq's Stevens Reference Futures.

A substantial portion of local corn demand is driven by ethanol production, and the sharpest decline in cash prices were in areas with a high concentration of ethanol plants. This suggests that disruptions to energy markets (Brewin, 2021) in the first 6 months of 2020 may have been responsible for some of the local heterogeneity present in declines to corn cash prices. In these places, cash prices fell much further than May contract futures prices (which fell $0.63 per bushel), resulting in a weakening basis. In other places, particu-

larly the far northern and southern extremes of the Corn Belt, where corn cash prices fell the least, basis strengthened (figure 8, top panel). This result can be compared with a historical average of the 3 preceding years, 2017–19 (figure 8, bottom panel). Historically, between January and April, corn basis strengthened across all locations (on average by $0.10); however, this strengthening was most pronounced in locations that saw corn basis weaken the most in 2020.

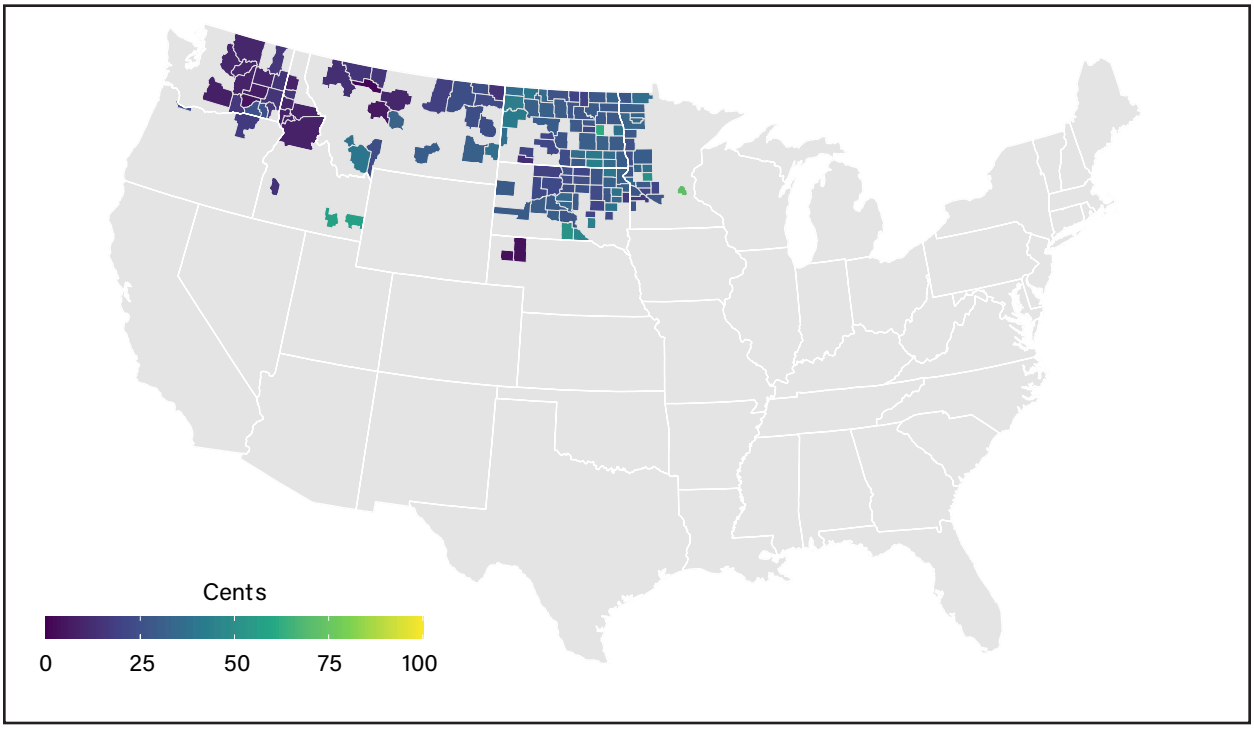
Figure 9

Declines in county average soybean cash prices (cents per bushel) between the weeks of January 13 and April 6, 2020



Source: USDA, Economic Research Service, based on data from GeoGrain's database.

Figure 10
Declines in county average spring wheat cash prices (cents per bushel) between the weeks of January 13 and April 6, 2020



Source: USDA, Economic Research Service, based on data from GeoGrain's database.

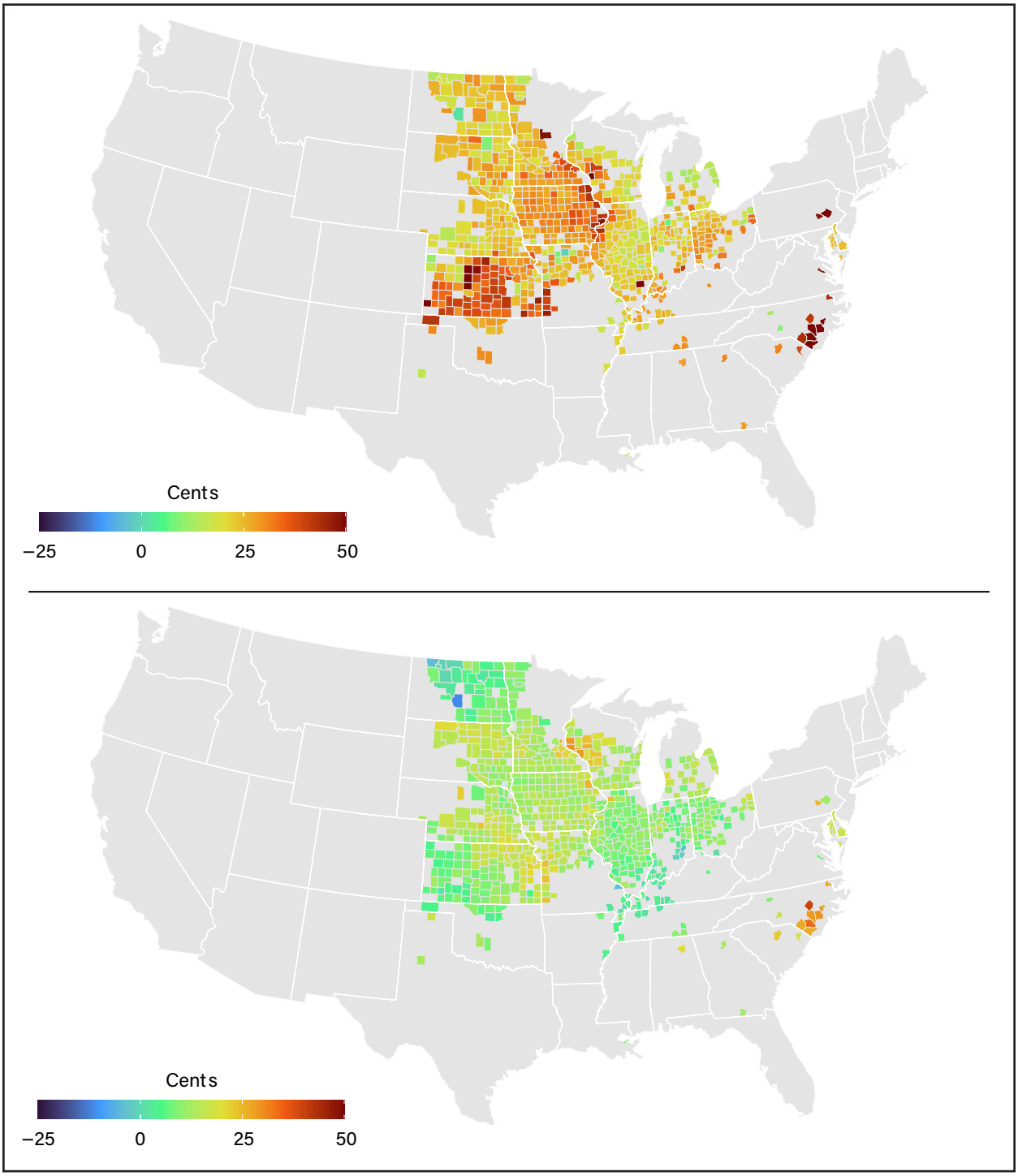
Though not as large, the variation in declines to soybean and spring wheat cash prices was also considerable (figures 9 and 10). Across locations, soybean cash prices decreased from $0.21 to $0.91 per bushel, or 2.4 percent to 10.4 percent in value. Spring wheat cash prices decreased from $.01 to $0.71 per bushel, or less than 1.0 percent to 12.9 percent in value. For soybeans, the May futures contract decreased further ($0.90 per bushel) than all but one cash price observation (Sullivan County, Missouri), resulting in a strengthening of basis across nearly all locations (figure 11, top panel). The magnitude of strengthening was, on average, larger than the previous 3-year average of change in soybean basis between January and April (figure 11, bottom panel). Soybean basis in 2020 strengthened on average $0.26 per bushel, while for the preceding 3-year average soybean basis strengthened by only $0.12 per bushel. As discussed by Adjemian et al. (2019), the lower magnitude for the preceding 3-year average may be indicative of increased local inventory due to reduced export demand following China's imposition of retaliatory tariffs in 2018.

As was the case for corn, declines in spring wheat cash prices led in some instances to a strengthening of basis (particularly in the Pacific Northwest) and in other instances to a weakening of basis (some locations in the Northern Plains), as the May futures contract fell $0.36 per bushel (figure 12, top panel).[9] This is broadly in line with the 3-year average spring wheat change in basis. However, there was greater spread between the change in values in 2020 than the change in the 3-year average. In some locations, basis decreased in 2020 by up to $0.30; in others, basis increased by up to $0.30. Over the preceding 3-year period, basis decreased on average by up to -$0.07 and increased on average by up to $0.19 (figure 12, bottom panel). The Pacific Northwest is a terminal market for spring wheat, and the strengthening of basis here may be due to draw-down of local stocks following the signing of the U.S.-China Phase One trade deal on January 15, 2020, and renewed exports to China.

[9] Note that basis tends to be stronger at market terminals, with major terminals for spring wheat being ports in the Pacific Northwest.

Figure 11

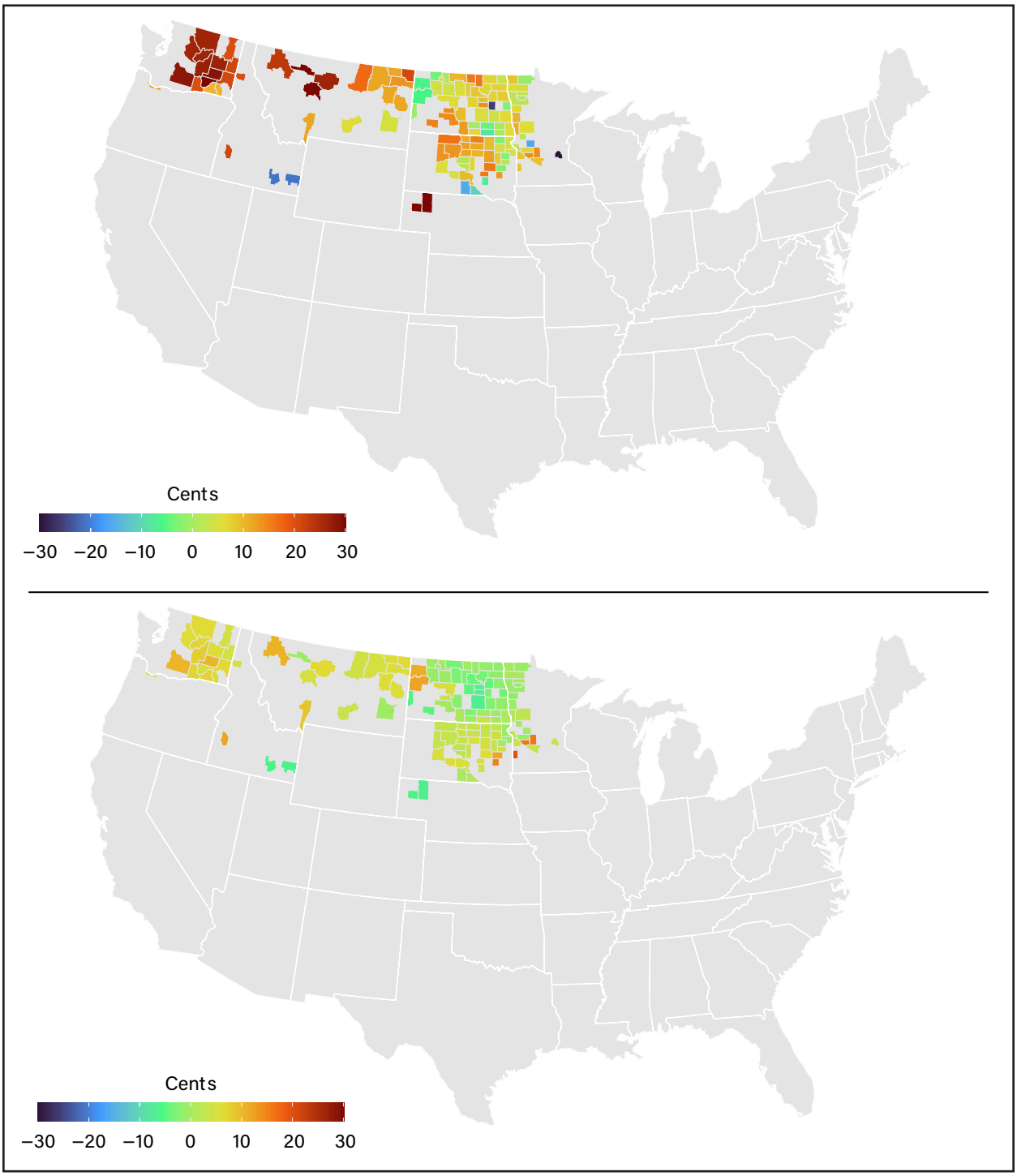
Change in the county average soybean basis (cents per bushel) between the weeks of January 13 and April 6 (top panel: 2020; bottom panel: 2017–19 average)



Source: USDA, Economic Research Service, based on data from GeoGrain's database and Nasdaq's Stevens Reference Futures.

Figure 12

Change in the county average spring wheat basis (cents per bushel) between the weeks of January 13 and April 6 (top panel: 2020; bottom panel: 2017–19 average



Source: USDA, Economic Research Service, based on data from GeoGrain's database and the Minneapolis Grain Exchange.

The authors examined the degree to which CFAP 1 offset cash price declines by comparing the CFAP 1 rates reported in table 1 to the cash price declines shown in figures 7, 9, and 10. Across county, average corn, soybean, and spring wheat cash price declines were approximately $0.63, $0.63, and $0.24 per bushel, respectively. It is important to note that due to seasonality in cash prices, these statistics likely underestimate incurred losses caused by cash price declines. Since the CFAP 1 rate was set at 52.5 percent of the decline in futures prices, the authors calculated the number of counties in which the CFAP 1 rate exceeded at least 52.5 percent of the decline in cash prices (table 5). This outcome occurred in 49.0 percent of all corn observations, 99.0 percent of all soybeans observations, and 84.6 percent of all spring wheat observations. For a subset of observations, the CFAP 1 rate exceeded 100 percent of the decline in cash prices. This subset was a minority of observations across all crops, but in the case of spring wheat this outcome was sizeable and occurred in 23.5 percent of all observations.[10]

Table 5
2020 cash price declines and CFAP 1 (select commodities)

Commodity (number of cash price observations)	Average cash price decline (U.S. dollars)	Percent share of counties where CFAP 1 rate exceeded 52.5% of cash price decline	Percent share of counties where CFAP 1 rate exceeded 100% of cash price decline
Corn (882)	$0.63	49.0	0.7
Soybeans (817)	$0.63	99.9	3.9
Wheat, HRS (149)	$0.24	84.6	23.5

CFAP 1 = Coronavirus Food Assistance Program: Round One; HRS = hard red spring.

Source: USDA, Economic Research Service, based on data from USDA, Farm Service Agency and GeoGrain's database.

[10] Note that the reported cash prices are posted prices and have not been seasonally adjusted and do not fully reflect incurred losses. Accounting for seasonality in prices would lead to, on average, larger cash price declines and a lower share of counties in which the CFAP 1 rate exceeded 52.5 percent and 100 percent of the seasonally adjusted price decline.

Conclusion

The CFAP 1 program was unique in its ability to swiftly distribute Government financial aid to farmers and in its innovative payment structure. The CFAP 1 program payment was based on the lower of an operation's 2019 production or its post-harvest unpriced inventory levels. Using USDA's FSA data on program applications and payments and 2019 ARMS data on unpriced inventory, the authors drew insights into the distribution of payments and the levels of unpriced inventory that producers held. The majority (except for cotton) of CFAP 1 applications and payments were production-limited applications and payments. This implies that producers who held unpriced inventory post-harvest did so at levels exceeding 50 percent of production. A large percentage of operations held unpriced inventory, with an increase in farm size generally associated with an increase in the amount of unpriced inventory held. Additional responses from ARMS indicated that across all crops examined, an average of 21.0 percent of unpriced inventory was used as loan collateral. Finally, analysis of GeoGrain's data found that the pandemic's impact on cash prices and basis levels was crop-specific and idiosyncratic. Apart from corn, the CFAP 1 rates exceeded 52.5 percent of cash price declines for a majority of locations. For corn, rates exceeded 52.5 percent of cash price declines less than half of the time, with a 49 percent share.

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Appendix

Figure A.1
Unpriced inventory module, Agricultural Resource Management Survey 2019

3. If your operation owned unsold crops and stored them post-harvest at any point in 2019, regardless of storage location, report the following: (Exclude crops produced under a marketing contract)

CROP	*What was the total quantity of unsold stored commodity in 2019, regardless of storage location?*			*Was any portion of the unsold stored commodity used as collateral for a loan?*			*Which policies were used to insure losses for any portion of the unsold stored commodity post-harvest?*				
		Amount	Unit		Yes	No		Property	Other	No Insurance	Don't Know
Corn	2760		Bu.	2761	1 ☐	3 ☐	2762	1 ☐	2 ☐	3 ☐	4 ☐
Cotton	2763		Lbs.	2764	1 ☐	3 ☐	2765	1 ☐	2 ☐	3 ☐	4 ☐
Rice	2766		Cwt.	2767	1 ☐	3 ☐	2768	1 ☐	2 ☐	3 ☐	4 ☐
Soybeans	2769		Bu.	2770	1 ☐	3 ☐	2771	1 ☐	2 ☐	3 ☐	4 ☐
Wheat	2772		Bu.	2773	1 ☐	3 ☐	2774	1 ☐	2 ☐	3 ☐	4 ☐
Others (please specify)											
	2775			2776	1 ☐	3 ☐	2777	1 ☐	2 ☐	3 ☐	4 ☐

Bu. = bushels; Cwt. = hundredweight; Lbs. = pounds.
Source: 2019 Cost and Returns Report (CRR) Phase 3 Questionnaire, Agricultural Resource Management Survey.