



# COVID-19 Working Paper: Financial Assistance for Farm Operations and Farm Households in the Face of COVID-19

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## Abstract

On March 13, 2020, the U.S. Federal Government declared a national emergency based on the novel coronavirus (COVID-19) pandemic. The Government's response included providing assistance programs related to the economic impacts of COVID-19. This study estimates the total direct Government assistance to farm operations and farm households in calendar year 2020 from COVID-19 related programs, the Market Facilitation Program (MFP), and other existing Farm Bill (FB) programs. The insights from this study supplement the triannual U.S. Department of Agriculture (USDA) Economic Research Service (ERS) farm income forecasts by providing stakeholders more forecasting details, including information regarding the distribution of Federal payments and eligibility. This working paper further documents methodologies relevant for a timely update of similar payments in the future. Using data from the Small Business Administration, Bureau of Labor Statistics, and multiple sources within USDA, we find \$57.7 billion in total financial assistance was provided to farm operations and households in calendar year 2020. Programs specifically designed to address the economic impacts of COVID-19 in 2020 delivered an estimated \$35.2 billion, the assistance provided under non-COVID-19 related programs (other than net indemnity payments) delivered an estimated \$16.8 billion, and the net indemnity payments provided the remaining \$5.7 billion.

**Keywords:** CARES Act, Coronavirus, Coronavirus Food Assistance Program, COVID-19, Economic Impact Payment, Economic Injury and Disaster Loan, Farm Bill, Federal Pandemic Unemployment Compensation, Paycheck Protection Program, U.S. Farm Operations and Households.

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# Table of Contents

<b>Summary</b> .....	<b>5</b>
<b>Introduction</b> .....	<b>9</b>
<b>COVID-19-Related Assistance for Farm Operations</b> .....	<b>11</b>
<b>Coronavirus Food Assistance Programs</b> .....	<b>11</b>
Paycheck Protection Program.....	14
Economic Injury Disaster Loan and Loan Advance.....	16
<b>COVID-19-Related Assistance for Family Farm Households</b> .....	<b>17</b>
Economic Impact Payments .....	17
Federal Pandemic Unemployment Compensation.....	20
<b>Financial Assistance to Farm Operations Under Non-COVID-19-Related Programs</b> .....	<b>23</b>
Agriculture Risk Coverage and Price Loss Coverage .....	23
Environmental Quality Incentive Program.....	24
Market Facilitation Program.....	24
<b>Other Direct Government Payment Programs for Farm Operations</b> .....	<b>25</b>
<b>Net Commodity Insurance Indemnity Payments</b> .....	<b>26</b>
Total Federal Financial Assistance.....	26
<b>Conclusion</b> .....	<b>28</b>
<b>References</b> .....	<b>29</b>
<b>Appendix A. Calculations for the Economic Impact Payment</b> .....	<b>31</b>
<b>Appendix B. Calculations for expected Federal Pandemic Unemployment Compensation payment</b> .....	<b>32</b>

## ***Errata***

On November 4, 2021, the text and Table 2 were revised to clarify that the Paycheck Protection Program eligibility simulation was carried out on both commercial and intermediate farm operations. No other data or findings are changed.

# Financial Assistance for Farm Operations and Farm Households in the Face of COVID-19

## Summary

### What Is the Issue?

In December 2019, before the global spread of COVID-19, the Federal Reserve System projected U.S. gross domestic product (GDP) growth in 2020 to be 2 percent. In June 2020, this projection was revised to a negative 6.5 percent (Board of Governors of the Federal Reserve System, 2020). This shock in GDP growth caused by COVID-19 affected farm households and farm operations. The USDA Economic Research Service (ERS) February 2021 farm income forecast predicted a 4-percent decrease in 2020 farm cash receipts compared to the previous year's pre-pandemic forecast (February 2020). During this time, the change in cash receipts was not solely due to COVID-19. The agricultural markets experienced other non-COVID-19 shocks, including the consequences of continuing trade retaliation. Considering the significant downward revision of farm cash receipts, this paper provides an analysis of other aspects of the financial health of farm operations and farm households during this period, specifically the magnitude of Federal financial assistance.

In response to the economic turmoil from COVID-19 in 2020, Congress passed six economic relief and stimulus bills. Using the authority from one of the bills (CARES Act), the USDA created the Coronavirus Food Assistance Program (CFAP), specifically targeted to farm operations. Other Federal departments and agencies created more-general programs for which farm operations and family farm households were eligible. Although targeted to small businesses that employ fewer than 500 employees per location or meeting the industry size standard defined by the Small Business Administration (SBA), many farm operations were eligible for the Paycheck Protection Program (PPP) and the Economic Injury Disaster Loan Program (EIDL). Most family farm households were eligible for Economic Impact Payments (EIP), and family farm households that lost off-farm wages were eligible for the Federal Pandemic Unemployment Compensation (FPUC). Additionally, some farm operations received assistance from existing programs in the Agriculture Improvement Act of 2018 (popularly referred to as the 2018 Farm Bill).

This study provides insight into the amount of financial assistance directed toward farm operations and family farm households in calendar year 2020 and offers perspective regarding payment distribution and eligibility. The amount and distribution of funding provided to farm operations and family farm households

can be useful to policymakers as they seek to understand the economic health of the agricultural sector following the COVID-19 pandemic and other events of 2020.

This study also provides information on 2019 Market Facilitation Program (MFP) payments in 2020 and other existing USDA programs. The programs discussed in this paper provide a more comprehensive picture of assistance to farm operations and family farm households from the Federal Government for the 2020 calendar year than that provided by the ERS farm income forecast.

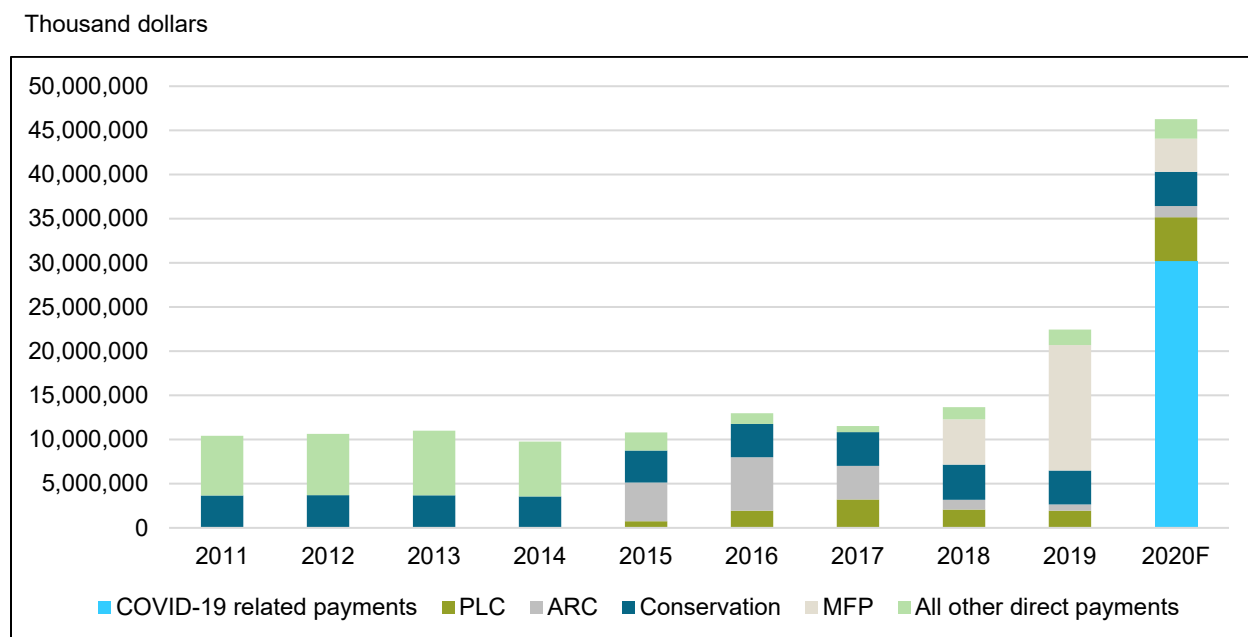
### What Are the Key Findings?

More than half of the total estimated payments that farm operations and family farm households received in 2020 came from new ad hoc programs responding to COVID-19. Additionally:

- Total direct payments (including COVID-19 and non-COVID-19 payments) to farm operations and family farm households in calendar year 2020 are estimated to total \$52 billion. If net indemnity payments (indemnity payments minus farmer-paid insurance premiums) from Federal commodity insurance programs are included, the total financial assistance received by farm operations and family farm households in 2020 is estimated to be \$57.7 billion.
- COVID-19-related direct payments to farm operations and family farm households in 2020 are estimated to total \$35.2 billion, with 84 percent or \$29.6 billion going to farm operations and the remaining 16 percent or \$5.6 billion going to family farm households.
- Non-COVID-19-related direct payments to farm operations are estimated to total approximately \$16.8 billion, with \$13.1 billion from recurring Farm Bill programs and \$3.7 billion from the MFP.

As figure 1 shows, the assistance provided to farm operations in 2020 represented a substantial increase in direct Government payments compared to previous years. Compared to 2019, there is an estimated \$23.8 billion increase in direct payments to farm operations.

Figure 1  
**Direct Government payments to farm operations, 2011-2020F**



Notes: 2020F = 2020 Forecasted values. COVID-19-related payments include Coronavirus Food Assistance Program 1 (CFAP 1), Coronavirus Food Assistance Program 2 (CFAP 2), and Paycheck Protection Program (PPP) payments. Amounts are presented in 2020 dollars. MFP stands for Market Facilitation Program; ARC stands for Agricultural Risk Coverage; and PLC stands for Price Loss Coverage.

Source: USDA, Economic Research Service (ERS) calculations using data from the ERS U.S. and State-Level Farm Income and Wealth Statistics, data as of February 5, 2021.

### How Was the Study Conducted?

We used administrative data for the total payments from the USDA programs under the 2018 Farm Bill and the MFP. The remaining programs, all enacted in response to COVID-19, relied on administrative data and were supplemented with the USDA Agricultural Resource Management Survey (ARMS) data from 2015 and 2019 to simulate eligibility in some cases. The payments calculated are consistent with the Government estimates included in the ERS U.S. and State-Level Farm Income and Wealth Statistics data product released on February 5, 2020. We used ARMS data to simulate the eligibility and expected- payment levels to farm operations and family farm households. Additional program data used in the estimates came from other USDA agencies, including the Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), the Risk Management Agency’s (RMA) Summary of Business Report (SOBR), Farm Production and Conservation Business Center (FPAC-BC), and ERS’s Farm Income and Wealth Statistics data product. The study also utilized the SBA’s PPP data and the Department of Labor’s (DOL) monthly unemployment data from the BLS.

## Acronyms Used

AGI: Adjusted Gross Income	FSA: Farm Service Agency
ARC: Agriculture Risk Coverage	GDP: Gross Domestic Product
ARMS: Agricultural Resource Management Survey	HOH: Head of Household
BLS: Bureau of Labor Statistics	LAUS: Local Area Unemployment Statistics
CA: Consolidated Appropriations	LDP: Loan Deficiency Payments
CARES: Coronavirus Aid, Relief, and Economic Security	LFP: Livestock Forage Program payments
CFAP: Coronavirus Food Assistance Program	LIP: Livestock Indemnity Program
COVID-19: Coronavirus Disease	MFP: Market Facilitation Program
CPRSA: Coronavirus Preparedness and Response Supplemental Appropriations	MLG: Marketing Loan Gains
DMC: Dairy Margin Coverage	NAICS: North American Industry Classification Series
DOL: Department of Labor	NAP: Noninsured Crop Disaster Assistance Program
EAMM: Emergency Animal Mortality Management	NRCS: Natural Resources Conservation Service
ECP: Emergency Conservation Program	PCP: Posted County Price
EFRP: Emergency Forest Restoration	PLC: Price Loss Coverage
EIDL: Economic Injury Disaster Loan Program	PPP: Paycheck Protection Program
EIP: Economic Impact Payments	PPPF: Paycheck Protection Program Flexibility
ELAP: Emergency Assistance for Livestock, Honeybees, and Farm-raised Fish	PPPHCE: Paycheck Protection Program and Health Care Enhancement
EQIP: Environmental Quality Incentive Program	RMA: Risk Management Agency
ERS: Economic Research Service	SBA: Small Business Administration
FCIC: Federal Crop Insurance Corporation	SOBR: Summary of Business Report
FCIP: Federal Crop Insurance Program	TAP: Tree Assistance Program
FFCRA: Families First Coronavirus Response Act, 2020	USDA: United States Department of Agriculture
FPAC- BC: Farm Production and Conservation Business Center	WHIP+: Wildfires and Hurricane Indemnity Program Plus
FPUC: Federal Pandemic Unemployment Compensation	



## Introduction

The COVID-19 pandemic generated significant disruptions to the U.S. economy, affecting both farm operations and family farm households. Farm operations have been impacted by pandemic-related demand and supply shocks, trade uncertainty, and adverse weather events. Pandemic-related supply shocks were primarily due to bottlenecks created in the supply chain from meat processing plants closures or slowdowns. Additionally, pandemic-related demand shocks were caused by reduced demand for food consumed away from home due to social distancing and restaurant and school closures, which were only partially offset by food purchased for in-home consumption. Furthermore, there was a short-term decrease in demand for certain commodities. For example, ethanol demand decreased significantly due to reductions in travel, reducing derived demand for corn. Demand and supply chain disruptions due to the pandemic contributed to declining commodity prices. In some cases, commodity prices had been negatively impacted by trade disruptions prior to the COVID-19 outbreak and were further exacerbated by the pandemic. Finally, most family farm households depend on off-farm income, and some may have experienced unemployment as a result of the pandemic affecting other sectors of the economy.

In 2020, six economic relief and stimulus bills, with a combined budgetary cost of more than \$3 trillion, were passed into law to mitigate pandemic-related influences on the overall U.S. economy. These six bills were: 1) the Coronavirus Preparedness and Response Supplemental Appropriations (CPRSA) Act, 2020 (Public Law No: 116-123 enacted on March 6, 2020);

2) Families First Coronavirus Response (FFCR) Act, 2020 (Public Law No: 116-127 enacted on March 18, 2020); 3) Coronavirus Aid, Relief, and Economic Security (CARES) Act, 2020 (Public Law No: 116-136 enacted on March 27, 2020); 4) Paycheck Protection Program and Health Care Enhancement (PPHCE) Act, 2020 (Public Law No: 116-139 enacted on April 24, 2020); 5) the Paycheck Protection Program Flexibility (PPPF), 2020 (Public Law No: 116-142 enacted on June 5, 2020); and 6) the Consolidated Appropriations (CA) Act, 2021 (Public Law N: 116-260 enacted on December 27, 2020).

In this working paper, we estimate the total Federal Government financial assistance received by all farm operations as well as assistance that the principal farm operator's household was eligible to receive in calendar year 2020. The estimates of assistance to farm operators in the study match the 2020 levels included in the USDA, Economic Research Service (ERS) Farm Income and Wealth Statistics data product published on February 5, 2021. The data product is updated three times a year and includes all USDA direct payments received by farm operations in calendar year 2020, including those made from the Market Facilitation Program (MFP), an ad hoc program created to mitigate the additional costs producers incurred due to retaliatory tariffs imposed by trading partners. It also includes payments made in the 2020

calendar year under existing Farm Bill programs.<sup>1</sup> In the data product, COVID-19 related assistance is reported in aggregate under “Supplemental and ad hoc disaster assistance.” This study provides disaggregated estimates of the total amount of direct payments for each of the programs.

The farm income forecast in the Farm Income and Wealth Statistics data product is not intended to capture payments to farm households unrelated to the farm operations. Instead, such payments are considered as part of farm household income. Household payments in 2020 related to COVID-19 include Federal Pandemic Unemployment Compensation and the Economic Impact Payments (popularly known as stimulus payments). The farm household income forecast published on February 5, 2021, in the USDA, ERS Farm Household and Income Characteristics data product did not include unemployment compensations but did include Economic Impact Payments. This working paper provides estimates of farm household unemployment compensation and the stimulus payments that contributed to the financial health of some family farm households.

We excluded payments from the Consolidated Appropriations Act, 2021 because payments did not occur in calendar year 2020. We compare the distribution of payments to the value of production for different commodity groups and provide information regarding eligibility for various programs. We also provide details of new methods developed to forecast farm household assistance. As data become available, we can rely on some of these methods to provide timely updates related to future farm income forecasts.<sup>2</sup>

Family farm household relief measures are only projected for the principal operator’s household due to limitations in the data; therefore, our totals are a conservative estimate of total relief received by households with a financial stake in a family farm. According to the 2020 America’s Diverse Family Farms (ADFF) report, in 2019 more than 2 percent of farm operations were nonfamily operations (Whitt et al., 2020), and there is no corresponding household relief forecast for these operations. We also do not include relief received by households who have a stake in family farms but do not belong to the principal operator’s household.

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<sup>1</sup> There might have been additional Federal dollars and benefits that farm operations and households received from state and local governments. Different bills provided funds to state and local governments, some of which might have been passed on to farm operations and households. Those payments are not included in this study.

<sup>2</sup> Additional background on the methods used to forecast revenue impacts within the farm income forecast can be found in Litkowski and Law (2020).

## COVID-19-Related Assistance for Farm Operations

Across the six economic relief and stimulus bills, farm operations received financial assistance from three programs in 2020: Coronavirus Food Assistance Program (CFAP), Paycheck Protection Program (PPP), and Economic Injury and Disaster Loans (EIDL) program. CFAP provided direct payments and was administered by the USDA, while the PPP and EIDL provided forgivable loans and forgivable advances, respectively, and were administered by the SBA.

### Coronavirus Food Assistance Programs

USDA developed and implemented two rounds of funding for the Coronavirus Food Assistance Program. In this paper, we refer to the original round as CFAP 1 and the second round as CFAP 2. Combined, both rounds of CFAP programs provided \$23.7 billion (\$10.6 billion from CFAP 1 and \$13.1 billion from CFAP 2) in direct payments to farmers and ranchers in 2020.

Under CFAP 1, direct payments were made to producers who faced price declines of 5 percent or more and experienced additional pandemic-related marketing costs (U.S. Department of Agriculture, 2020b). The payment rates varied by commodity and by the magnitude of price declines (in the first quarter).<sup>3</sup> Price changes were determined using futures market prices or Agricultural Market Service (AMS) prices for commodities that did not have futures contract data.<sup>4</sup> The deadline for the first round of CFAP applications was September 11, 2020.<sup>5</sup>

Under CFAP 2, direct payments were made to producers who faced additional market disruptions, production costs, and reduced farm-level prices (USDA, 2020a). CFAP 2 payments were made under three categories: 1) Major commodities that meet the 5-percent price reduction trigger, including corn; 2) Flat-rate crops, including rice; and 3) Specialty (sales-based) commodities, including nuts. The full list of commodities for each category, along with the payment rates, can be found at [farmers.gov](https://farmers.gov). Commodities that met the 5-percent price reduction trigger were based on the difference between the second and fourth

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<sup>3</sup> For more information about the payment rates and eligibility requirements, see U.S. Department of Agriculture (2020b).

<sup>4</sup> For commodities with neither futures contracts nor AMS price data. Request for Information was put in the CFAP 1 Notice of Funding Availability by the USDA to receive price data from different industries on whether more “niche” commodities had a price decline using the weekly average price from January 13-17 and April 6-10 (or a similar period if this exact period was not available).

<sup>5</sup> Deadline was extended to October 9, 2020, for certain producers in Louisiana and Texas due to Hurricane Laura.

quarters<sup>6</sup> when data was available. For the remaining two categories, producers were paid a flat per-acre rate based on their 2020 planted acres reported to the FSA and on five payment gradations based on the percentage of their 2019 sales, respectively.<sup>7</sup> Table 1 shows that an expanded scope for eligibility meant more commodities were covered by the CFAP 2 program.

Producers (either a person or legal entity) with an average adjusted gross income (AGI) of less than \$900,000 across tax years 2016, 2017, and 2018 or who received 75 percent or more of their AGI from farming, ranching, or forestry were eligible for CFAP payments. Based on the 2019 ARMS data, we estimated that more than 99 percent of total farm operations were eligible based on the AGI criteria. CFAP payments were limited to \$250,000 to an individual under each round, for a combined total of \$500,000 in payments from both CFAP 1 and CFAP 2. For each CFAP program, corporations, limited liability companies, or limited partnerships qualified for up to three times the individual payment limit (a maximum of \$750,000) if at least three members of the entity each provided at least 400 hours of active personal labor or active personal management for the farming operation.

We examined the distribution of CFAP 1 and CFAP 2 funds across the farm sector, using cash receipt data from the ERS Farm Income and Wealth Statistics data and FSA reports of CFAP payments. Table 1 shows a comparison of the crop and animal product cash receipts for each commodity group and the share of CFAP 1 and CFAP 2 funding for the same commodity group. The 5-year average from 2016 through 2020F for animal and animal products cash receipts was about \$171.4 billion (47 percent of total commodity cash receipts), and for crops it was \$196.6 billion (53 percent of total commodity cash receipts).

Several key observations can be gleaned from table 1. Table 1 shows that CFAP 2 was more comprehensive than CFAP 1; only 3 percent of commodities, measured in terms of cash receipts, were ineligible for CFAP 2 funding compared to the 18 percent ineligible for CFAP 1. This is because CFAP 2 expanded the ways in which a commodity may qualify beyond price decreases, which resulted in expected CFAP 2 payments that were more proportional to the distribution of cash receipts compared to CFAP 1 payments. Livestock production received a larger share from CFAP 1, totaling \$6.9 billion or 65

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<sup>6</sup> When available, the changes in mid-January and late July future prices were used. Futures contracts expiring in the fourth quarter of 2020 were used since futures contract prices vary by the month of expiration. Contract prices vary by the month of expiration. For details about price decrease for each commodity, see the USDA, Economic Research Service paper “Coronavirus Food Assistance Program 2, Cost-Benefit Analysis, September 15, 2020.”

<sup>7</sup> For more information about the payment rates and eligibility requirements, see U.S. Department of Agriculture (2020a)

percent of the total round 1 payments. Crop production received a larger share from CFAP 2, totaling \$8.4 billion or 64 percent of the total round 2 payments.

Table 1 shows that across both CFAP 1 and CFAP 2, 49 percent of the \$23.7 billion in total program payments were distributed to animal and animal product production and 51 percent to crop production. Payments reported on farmers.gov at the end of 2020 from both rounds of CFAP totaled \$11.6 billion for animal and animal products and \$12.1 billion for crop production.

Table 1

**Distribution of CFAP payments and cash receipts by animal and crop production and eligibility**

Category	Animal and animal products		Crops	
	Eligible	Ineligible	Eligible	Ineligible
CFAP 1- applications accepted from May 26, 2020, to September 11, 2020				
Share of all cash receipts	38	9	44	9
Share of total payments	65	0	35	0
CFAP 2- applications accepted from September 21, 2020, to December 11, 2020				
Share of all cash receipts	46	1	51	2
Share of total payments	36	0	64	0
CFAP 1 and CFAP 2				
Share of all cash receipts	46	1	51	2
Share of total payments	49	0	51	0

Note: The deadline for CFAP 1 applications for some producers in Louisiana, Oregon, and Texas was extended to October 9, 2020.

Source: USDA, Economic Research Service (ERS) calculations using data from the ERS U.S. and State-Level Farm Income and Wealth Statistics and farmers.gov.

## Paycheck Protection Program

The Paycheck Protection Program was intended to help small businesses, including farm operations, keep employees on the payroll and/or rehire furloughed or laid-off workers. It was administered by the SBA and supported by the U.S. Department of the Treasury.

For the purposes of the PPP, the SBA defined a small business as one with fewer than 500 employees per location or that met SBA's industry size standard if it employed more than 500 employees. Based on the 2019 ARMS data, we estimated that more than 99 percent of total farm operations were eligible based on the SBA's number of employee criteria. Although many farms did not have paid employees and thus no employee costs, some farm owners were eligible for PPP loans based on pass-through net cash farm income (which can be considered as the owner's and/or family members' wages plus profit). Farms having neither paid employee(s) nor positive net cash farm income in 2019 were not eligible to participate in the PPP. Table 2 shows the distribution of farm businesses (operations with gross cash farm income of more than \$350,000 or smaller operations where farming is reported as the operator's primary occupation) based on their ability to meet the eligibility criteria related to the employee payroll costs and positive income criteria. ARMS data for 2019 indicated 72 percent of all farm businesses would have been eligible to receive a PPP loan (table 2).

Under the PPP, the entire balance of the loan is forgiven if the loan was spent on eligible expenses during the 24-week period after the loan was disbursed. For the entire loan to be forgiven, at least 60 percent of the loan must have been used to cover payroll expenses. Any portion not meeting the criteria for forgiveness would have to be paid back. In this analysis, we assumed the entire balance of PPP loan amounts meet program forgiveness criteria.

To estimate the extent to which farm businesses could participate in the program, we used 2019 ARMS data to simulate loan applications across the population of farm businesses. Loan eligibility was simulated for four categories of farm businesses based on their net farm income and payroll. The first category was farm businesses with positive net farm income and positive payroll (16 percent of the total farm businesses). The second category was farm businesses with positive net farm income and no payroll (48 percent of the total farm businesses). The third category was farm businesses with negative farm income and positive payroll (8 percent of the total farm businesses). The final category was farm businesses with negative farm income and no payroll (28 percent of the total farm businesses). Farm businesses in the first three categories were eligible to receive a PPP loan. We distributed total PPP loans reported by SBA for the agriculture sector based on loan eligibility criteria.

To show the amount of PPP loans different types of farms were eligible to receive, we combined publicly available data from SBA on PPP loan disbursement for farm businesses based on their 6-digit North American Industry Classification Series (NAICS) code<sup>8</sup> with financial data for farm businesses. We matched the SBA data with farm financial data collected on operations for the same commodity specialization codes in ARMS. In December 2020, the SBA released all PPP loan data, which showed that total PPP loans across all operations amounted to \$5.9 billion. The 2019 ARMS was the source of data to determine the eligibility of farm businesses and forgivable loan amount across all farm businesses to simulate the distribution of total PPP loans. We used the 2019 ARMS to estimate the share of farm businesses by commodity specialization in each of the three aforementioned eligibility categories that would qualify for PPP loans. The simulated distribution of PPP loans was calculated by totaling the PPP loan data (using the NAICS codes) by commodity specialization then multiplying by the share of farm businesses within that specialization that met eligibility requirements.

The simulation indicated that the \$5.9 billion in total PPP loans could have been distributed in the following way (see table 2): 61 percent (\$3.6 billion) of payments to farm businesses with positive profits and payroll, 27 percent (\$1.6 billion) to farm businesses with positive profit and no payroll, and 12 percent (\$0.7 billion) to farm businesses with positive payroll but negative income. The simulation reported in table 2 assumes that eligible farm businesses within each specialization had an equal probability of participating in PPP. Since participation was not uniform across the sector's farm businesses within a given specialization, the actual distribution of PPP would have been narrower than represented in table 2 as those who chose to participate were fewer than those who were eligible. Using publicly released data from the SBA, we found the crop sector received \$3.8 billion (64 percent of the total), and the livestock sector received \$2.1 billion (36 percent of the total) in PPP loans.

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<sup>8</sup> We use PPP data reported by the Small Business Administration for loans to businesses with North American Industry Classification Systems (NAICS) codes of 111 (Crop Production) and 112 (Animal Production and Aquaculture). NAICS six-digit codes are used to identify a specific operation within the three-digit classification. Our calculations rely on the applicant's designation of their establishment's majority of revenues, which may not be in agreement with the establishment's designation by the U.S. Census Bureau for the collection, tabulation, presentation, and analysis of statistical data describing the U.S. economy.

Table 2

**Estimated PPP loan for four categories of farm businesses**

Categories of farm businesses	Share of operations (Percent)	Estimated PPP by farm type (Million dollars)
Positive income and positive payroll ( <i>Eligible</i> )	16	3,555
Positive income and no payroll ( <i>Eligible</i> )	48	1,599
Negative income and positive payroll ( <i>Eligible</i> )	8	708
Negative income and no payroll ( <i>Ineligible</i> )	28	0
<b>Total</b>	<b>100</b>	<b>5,862</b>

Notes: PPP = Paycheck Protection Program. Farm businesses have gross cash farm income of more than \$350,000 or are smaller operations where farming is reported as the operator's primary occupation.

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

## Economic Injury Disaster Loan and Loan Advance

The Economic Injury Disaster Loan and the Loan Advance (EIDL) program, like the PPP, was intended to extend financial assistance to small businesses. Agricultural operations with 500 or fewer employees were eligible to receive up to \$150,000 in low-interest non-forgivable loans through the EIDL program and up to \$10,000 (\$1,000 per employee) in forgivable loan advances from SBA. EIDL loans had a statutory interest rate of 3.75 percent for small businesses and 2.75 percent for nonprofits that could be extended to 30 years. The personal guarantee requirements were waived for the loans, but loans did require collateral if the amount exceeded \$25,000.

The loan and advance could be used to pay fixed costs, payroll, and other bills that could not be paid because of the pandemic. The money could not be used to provide bonuses or dividends or to repay stockholder loans, acquire additional assets, refinance long-term debt, or pay other SBA or Federal agency (including USDA) loans.

We assumed agricultural producers' participation in the EIDL was most likely minimal because it was a new program for agricultural producers and administered by a Federal agency other than USDA.

Additionally, EIDL opened later in 2020 and the forgivable loan advance had to be deducted from the PPP loan. Although there was initial uncertainty as to whether farm operations were eligible for EIDL, beginning on May 4, 2020, SBA opened EIDL applications exclusively for agriculture producers.

Although SBA did not provide industry-specific data on EIDL advances, PPP application data indicated farm operations claimed 736,451 agricultural employees. If all PPP applicants also claimed the maximum EIDL advance of \$1,000 per employee, EIDL advances could have totaled \$736.5 million. However, in



this scenario, the \$736.5 million would not have been in addition to the \$5.9 billion extended under the PPP program because the amount forgiven under the PPP was reduced by any EIDL advance amount.

## **COVID-19-Related Assistance for Family Farm Households**

Family farm households could receive COVID-related financial assistance from two main Federal sources: the Economic Impact Payments and the Federal Pandemic Unemployment Compensation. In the following sections, we estimated the total amount that family farm households of principal operators<sup>9</sup> received from each of these sources.

### **Economic Impact Payments**

Between April and May 2020, U.S. households received 159 million Economic Impact Payments (EIP), also known as stimulus payments, totaling more than \$266 billion (U.S. Department of the Treasury, 2020). These payments were meant to provide households with an immediate injection of cash to spur demand and mitigate the economic downturn. The full EIP amounted to \$1,200 for individuals or \$2,400 for couples filing jointly, and households with dependents received an additional \$500 per dependent. For the median farm household, EIP represented a significant increase in one month's income. According to the 2019 ARMS, the median married and unmarried household would have experienced an increase in one month's total household income of 30 percent and 24 percent, respectively, as a result of the stimulus payments.

To qualify for a full stimulus payment, joint filers, heads of household, and all other tax-filing individuals must have had an adjusted gross income (AGI) of less than \$150,000, \$112,500, and \$75,000, respectively, according to their 2018 or 2019 taxes. For individuals who made more than the income thresholds, their EIPs were reduced by 5 percent multiplied by the amount that their income exceeded the respective income threshold (U.S. Department of the Treasury Internal Revenue Service, 2020). The precise calculations are available in appendix A. We used the 2019 ARMS to simulate the EIP likely distributed to family farm households by approximating the household's AGI and their presumed filing status. The AGI was approximated using survey questions regarding farm and off-farm income, as well as

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<sup>9</sup> ERS defines the principal farm operator as the person who runs the farm, making day-to-day management decisions. The principal operator could be an owner, hired manager, cash tenant, share tenant, and/or a partner. We do not have employment data for other nonprincipal operator households involved in farming operations and exclude them from the subsequent analysis.

certain income adjustments. Filing status was determined using the respondent's marital status and the number of dependents.

Determining the number of dependents for respondents using the 2019 ARMS is not straightforward since there is no question in the survey explicitly asking about the number of children<sup>10</sup> in the household. However, the survey elicited information that could imply the number of children by asking how many people resided in the household. For respondents who were married, we assumed at least two residents. If more than two individuals resided in the household, they were considered unidentified and could be either dependents or non-dependents. For those who were unmarried, we expected at least one person to live in the household, and if there was more than one individual, the additional people were considered unidentified.

Because unidentified people in the household would increase the household's EIP by \$500 per person if they were dependents and \$1,200 per person if they were non-dependents, we carried out two scenarios using each assumption. In the first scenario, we assumed all unidentified people were dependents and assigned the \$500 benefit to each. For the second scenario, we assumed all unidentified people were non-dependents and assigned the \$1,200 benefit to each.<sup>11</sup> Neither scenario provided a definitive representation of payments made to family farm households, yet each simulation does bound the analysis. To fine-tune our estimation, we used demographic data contained in the 2015 version of ARMS, which included a question about the ages of the individuals living in the household. We applied the 2015 data's relationship regarding children residing in different types of households (i.e., married, unmarried, and by the age of operator)<sup>12</sup> to the 2019 survey's data concerning different types of households to approximate the number of children living in a household.

Since EIP income eligibility ceilings varied by the household's filing status, we needed to determine a person's most plausible filing status to estimate stimulus payments made to the family farm household.

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<sup>10</sup> While it is possible to have adult dependents living in a household, the most likely dependents are children.

<sup>11</sup> We assume that unidentified nondependents do not exceed income thresholds.

<sup>12</sup> The proportions of unidentified household members that are minors are as follows:  
For married household where the operator age is between 18 and 60: 0.690  
For unmarried household where the operator age is between 18 and 60: 0.186  
For married household where the operator age is greater than 60: 0.272  
For unmarried household where the operator age is greater than 60: 0.076.

Married respondents were assumed to be married filing jointly<sup>13</sup>. For unmarried individuals, they could file as either single or head of household (HOH). In order to qualify as HOH, a person must have met all three of the following criteria:

1. Must have been unmarried
2. Must have had a qualifying dependent who lived in the home for more than half the year,  
and
3. Must have paid more than half the cost of keeping up a home for the year.

We assigned marital status to each observation in the 2019 ARMS using the self-proclaimed marital status. For each farm household, we assigned any unidentified people as dependents or non-dependents using the calculation outlined above. Regarding the last criteria, while the survey did ask about household expenses, it did not specify the percentage of the total household upkeep that the respondent contributed. We, therefore, assumed that unmarried individuals with dependents satisfy the household expense requirement and filed as HOH. This assumption may have slightly overstated the stimulus payments received since the income threshold for eligibility was higher for head of households. However, only 2.2 percent of total farm households were unmarried with dependents and had an AGI greater than \$75,000. So, this 2.2 percent of respondents would have received a different EIP amount based on whether they would be classified as a single filer versus HOH. To present a broader sense of the household filing status, we found farm households that filed as married, and were assumed to be filing jointly, representing approximately 75 percent of all farm households. Based on our HOH assumptions, we inferred that heads of household are approximately 6 percent of farm households, and individuals filing as single represented the remaining 19 percent.

The expected EIP payments are summarized in table 3. The estimated median EIPs for farm households filing as married (filing jointly), HOH, and single were \$2,400, \$2,347, and \$1,200, respectively (table 3). These values reflected the median household in each category receiving full base payments and heads of

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<sup>13</sup> For most married couples, filing jointly reduces their tax liability since many tax benefits are only available to couples who file jointly. This is consistent with the data. The 2019 ARMS data show that approximately 75 percent of family farm households are married, and data from the Internal Revenue Service (IRS) show that 80 percent of tax returns are filed jointly (U.S. Department of the Treasury, Internal Revenue Service 2017).

household receiving additional money for dependent(s). The EIPs for these filing statuses demonstrated a sizable difference between the average payments for households filing as single (\$924) and as HOH (\$2,408). This disparity reflects the lower income thresholds for single households resulting in some not receiving the maximum EIP and others not receiving EIP at all, whereas HOH filers receive an additional \$500 for each dependent. Eighteen percent of single households were estimated not to receive any EIP, while 13 percent of joint households and 17 percent of HOH were found to receive no EIP. The average EIP payment for all farm households was \$2,167.

The total amount of EIP disbursed to farm households was estimated to be \$4.3 billion. The lower bound estimate, which assumed all unidentified individuals were dependents (resulting in households receiving \$500 for each dependent), totaled \$3.7 billion. The upper bound estimate, which assumed all unidentified individuals were non-dependents (resulting in each non-dependent receiving \$1,200), totaled \$4.4 billion. Looking at distributions of estimated EIP across tax filing statuses, we estimate that married farm households received the largest share (\$3.6 billion or 84 percent) of the total \$4.3 billion. This distribution is consistent with the fact that 75 percent of the farm household sample were married.

Table 3  
**Estimated economic impact payments for farm households**

Household filing status	Proportion of households receiving Economic Impact Payment	Median Adjusted Gross Income (dollars)	Median Economic Impact Payment (dollars)	Average Economic Impact Payment (dollars)	Total estimated Economic Impact Payment (billion dollars)
Joint	0.87	92,868	2,400	2,466	3.64
Single	0.82	56,028	1,200	924	0.35
Head of household	0.83	61,903	2,347	2,408	0.28
All farm households	0.86	78,418	2,400	2,167	4.27

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

## Federal Pandemic Unemployment Compensation

The CARES Act provided \$600 per week in Federal Pandemic Unemployment Compensation (FPUC) to those who were unemployed during COVID-19. These FPUC benefits were in addition to existing state unemployment benefits and were available to anyone who qualified for at least \$1 of unemployment benefit.

The COVID-19 pandemic was accompanied by higher unemployment rates across the United States. Farm households experienced unemployment shocks because of farm operators' and employees' reliance on off-farm employment. According to 2019 ARMS data, 71 percent of farm households had one or more household members who earned an off-farm salary or wages. Of these farm households with off-farm income, 89 percent of their total household income was attributed to off-farm sources. Even if we excluded off-farm occupation farms,<sup>14</sup> 57 percent of all other farms had some form of off-farm income, contributing 45 percent of total income.

To estimate the amount of FPUC that farm households might have received as a result of off-farm unemployment, we used county-level unemployment data from the BLS's Local Area Unemployment Statistics (LAUS) program and 2019 ARMS data regarding off-farm employment among farm households. Due to data limitations, our method assumed the unemployment rate was experienced uniformly across the county. Therefore, we were unable to consider county-level variation in unemployment by industry or occupation.

FPUC was available to individuals for up to 17 weeks, during the period from March 29 to July 25. Individuals were eligible for FPUC if they were unemployed during COVID-19 (U.S. Department of Labor, 2020b).<sup>15</sup> Both the timeframe and probability of experiencing COVID-19 related unemployment were factored into our calculation of expected FPUC payments to farm households dependent on off-farm income. The payment was weighted by the probability of becoming unemployed in a specific month. The calculation of expected FPUC payments, as well as a description of the seasonally adjusted probability of changes in employment status, are provided in Appendix B.

To calculate unemployment probability, we used data from LAUS (U.S. Department of Labor, 2020a). Unemployment rates by month were available at the county level. While unemployment rates differed by industry, details regarding industry composition were also available at the county level. 2019 ARMS provided us with data concerning farm households' exposure to increased unemployment probabilities. To calculate the expected FPUC, we used 2019 ARMS to identify members of farm households who

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<sup>14</sup> These are defined as small farms whose principal operators report a primary occupation other than farming.

<sup>15</sup> Individuals needed to certify that their unemployment was related to the COVID-19 pandemic. For a list of eligibility requirements, see Sect. 2102 (a) (3) (A) (ii) (I) of the CARES Act. Guidance for self-certification of COVID-19 reasons for unemployment can be found in published guidance from the Department of Labor (U.S. Department of Labor, 2020b).

indicated some reliance on off-farm employment for wages. Additionally, we used their county of residence to match each respondent to a calculated probability of unemployment.

Table 4 shows the estimated probability of a change in employment status each month from March through July of 2020. To offer some context for the unemployment probabilities faced by farm households, we presented COVID-19 related employment impacts for all households across the United States. The increase in unemployment from February to March of 2020 relative to 2019 (listed as the March probability) shows a marginal increase in the probability of becoming unemployed. The April probability was much higher, showing an 8.2 percent chance of a farm household experiencing off-farm unemployment as businesses shut down in response to the pandemic. In May, June, and July, as businesses began to reopen gradually, the trend reversed, showing a decrease in unemployment probability and a corresponding increase in the likelihood of employment. This return to employment resulted in an overall decrease in unemployment benefit expenditures in our model.

Table 4

**Estimated monthly probability of a change in employment status from the previous month for all U.S. counties and farm households with off-farm employment, 2020**

Month	Average estimated probability of a change in employment status across all U.S. counties	Average estimated probability of a change in employment status for farm households with off-farm income
March 2020	0.012	0.013
April 2020	0.077	0.082
May 2020	-0.026	-0.028
June 2020	-0.019	-0.022
July 2020	-0.002	-0.003

Note: Each month's probability is the change in the unemployment rate in 2020 differenced with the change in the unemployment rate for the same month in 2019. More details are provided in the appendix. Positive values reflect a probability of becoming unemployed, while negative values reflect the probability of returning to the workforce.

Source: USDA, Economic Research Service calculations using the U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

The results from these estimated probabilities show that for farm households with off-farm employment, their expected FPUC was approximately \$996 per household (table 5). The total amount of expected FPUC received by farm households was estimated at \$1.3 billion.

Table 5

**Expected Federal Pandemic Unemployment Compensation  $E[FPUC]$** 

Parameter	Value
Average $E[FPUC]$ for farm households with off-farm income	\$996
Total $E[FPUC]$ for farm households	\$1.3 billion

Note: FPUC=Federal Pandemic Unemployment Compensation.

Source: USDA, Economic Research Service calculations using Agricultural Resource Management Survey (ARMS) 2019, and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

## Financial Assistance to Farm Operations Under Non-COVID-19-Related Programs

Some farm operations received direct payments in 2020 under existing USDA programs authorized in the 2018 Farm Bill, as well as certain ad hoc programs authorized under other authorities. Some of these programs, such as Agriculture Risk Coverage (ARC), Price Loss Coverage (PLC), and Marketing Assistance Loans, have functioned as designed to provide support in response to market price fluctuations. Other Farm Bill programs that provided assistance in 2020 include the Environmental Quality Incentive Program (EQIP), which assisted with livestock supply chain disruptions, as well as the Dairy Margin Coverage (DMC) program and certain standing disaster programs. We also included payments from other ad hoc programs, such as MFP and the Wildfires and Hurricane Indemnity Program (WHIP). Finally, while the indemnities from Federal Crop Insurance Program are not direct Government payments, this paper accounts for these indemnities' impact on farm income.

### Agriculture Risk Coverage and Price Loss Coverage

The Agriculture Risk Coverage and the Price Loss Coverage programs are intended to support the income of farm operations via direct payments to producers with historical base acres of covered commodities. Producers need not grow the covered commodity to receive payments. ARC payments are triggered if county-level revenues for a covered commodity fall below a benchmark, and PLC payments are triggered if the effective market price for a covered commodity falls below the effective reference price. Payments under these programs are not made before October 1, after the end of the relevant marketing year. Almost all covered commodity prices were negatively impacted by COVID-19 as well as other market factors in 2020. As a result of lower prices, payments from price-sensitive Government programs such as ARC and PLC increased above previous estimates. The most recent data from FPAC-BC indicates that estimated

2020 ARC payments were \$1.3 billion or 86 percent more than the 2019 total of \$0.7 billion, and 2020 PLC payments were \$5 billion or 163 percent more than the 2019 total of \$1.9 billion.

## Environmental Quality Incentive Program

The Environmental Quality Incentive Program administered by USDA's Natural Resources Conservation Service (NRCS) provides financial and technical assistance to producers to address natural resource concerns and help deliver environmental benefits (U.S. Department of Agriculture, Natural Resource Conservation Service, 2020a). Hog producers, who had to depopulate because of the bottleneck created in the supply chain due to closure or reduced operations of meat processing and packaging plants, were eligible to get financial assistance to offset some of the associated costs. Through EQIP, the Emergency Animal Mortality Management practice offers assistance for the disposal of animal carcasses due to catastrophic events (U.S. Department of Agriculture, Natural Resource Conservation Service, 2020b). Based on the administrative data provided by the NRCS, the total payments made for depopulation under this program was \$429,250.

## Market Facilitation Program

The Market Facilitation Program aided producers, farmers, and ranchers affected by retaliatory tariffs resulting from trade actions during 2018 and 2019. The 2019 MFP payments were made in three tranches: the first tranche in August 2019 (50 percent of calculated payment), the second in November 2019 (25 percent of calculated payment), and the third tranche in 2020 (25 percent of calculated payment). According to FPAC-BC, producers received direct government payments of \$3.7 billion from the third tranche of the 2019 MFP in 2020.

The 2019 MFP payments were made to non-specialty crops, swine, cow's milk, and select specialty crops. To be eligible for the payments, producers (person or legal entity) must have had either an average adjusted gross income (AGI) of less than \$900,000 for tax years 2015, 2016, and 2017 or have had 75 percent or more of their income from farming or ranching. The limit on the total MFP payment for an individual or legal entity for non-specialty crops, dairy and hogs, and specialty crops separately was \$250,000 with a maximum cap from all sources at \$500,000 (U.S. Department of Agriculture, Farm Service Agency, 2019).



## Other Direct Government Payment Programs for Farm Operations

- Conservation programs include programs under the management of the FSA (mainly the Conservation Reserve Program) and those under the NRCS. Using data from NCRS and FPAC-BC, financial assistance to the producers, aside from the EQIP animal disposal costs discussed earlier, are estimated to be \$3.9 billion for 2020.
- Dairy Margin Coverage (DMC) provides payments to dairy producers when the difference between the national all milk price and a program-defined average feed price (the margin) falls below a certain dollar amount selected by the producer. Using data from FPAC-BC, we estimated DMC payments of \$0.2 billion to dairy operators in 2020 less the fees and premiums producers paid.
- Marketing Loan Gains (MLG) are part of the marketing loan assistance program, which provides short-term loans on farmer-owned harvested commodities. The loan rates function as a floor price for producers should market prices fall below that level. MLGs occur when the county loan rate specific to a commodity is above the county market price (known as the posted county price or PCP). In those cases, producers can repay their loan at the lower market price with the remaining interest waived. FPAC-BC indicates that MLGs provided \$0.2 billion in direct assistance in 2020.
- Loan Deficiency Payments (LDP) are an alternative form of support provided through the marketing assistance loan program. In lieu of a loan, producers may choose to take a payment for their unsold harvested commodity that is equivalent to the value of an MLG when the PCP for that commodity falls below the county loan rate. FPAC-BC indicates \$0.02 billion in LDP was paid in 2020.
- Other disaster and ad hoc payments are direct payment programs that include payments from Livestock Indemnity Program payments (LIP); Livestock Forage Program payments (LFP); Emergency Assistance for Livestock, Honey Bees and Farm-raised Fish (ELAP) payments; Tree Assistance Program (TAP) payments; Noninsured Crop Disaster Assistance Program (NAP); Emergency Conservation Program (ECP); and Emergency Forest Restoration (EFRP). We also included payments under the ad hoc Wildfires and Hurricane Indemnity Program Plus (WHIP+). According to FPAC-BC, the payments from these sources were \$2.5 billion.

## Net Commodity Insurance Indemnity Payments

Crop insurance provides a range of insurance products to protect producers against losses resulting from yield or revenue shortfalls (U.S. Department of Agriculture, Economic Research Service, 2019). About 83 percent of U.S. crop acreage was insured under the Federal Crop Insurance Program in 2020 (FCIP)<sup>16</sup>. Corn, cotton, soybeans, and wheat were the major insured crops in 2020, as defined by total insured acreage. In 2020, FCIP participating insurers issued more than 1.1 million crop insurance policies covering more than 398 million acres (U.S. Department of Agriculture, Risk Management Agency, 2020). Insurance products are available through the FCIP to indemnify producers against losses due to lower yield, lower crop revenue, lower than insured margin, and lower whole farm revenue due to natural disasters such as drought, freezes, floods, fire, insects, disease, and wildlife. FCIP is governed by the Federal Crop Insurance Corporation (FCIC) and administered by the Risk Management Agency. Using data from the RMA's Summary of Business Report (SOBR) and historical reports, we estimated net Federal commodity insurance indemnities at \$5.7 billion (compared to \$6.4 billion in 2019) for 2020, after subtracting the farmers paid premium.

## Total Federal Financial Assistance

The total estimated Federal Government assistance for farm operations and family farm households from standing, ad hoc farm programs, and COVID-19 related programs for calendar year 2020 was \$57.7 billion (table 6). Programs specifically designed to help businesses and households persevere through the pandemic provided the largest share of financial assistance. In fact, more than half of the estimated total direct payments, including forgivable loans, were estimated to have come from the COVID-19-related programs enacted in 2020. The largest contributors were farm-specific programs CFAP 1 and CFAP 2, which disbursed \$23.7 billion to farm operations. Among the existing farm programs, the Price Loss Coverage and net insurance indemnity payments were estimated to provide the largest payments. Price Loss Coverage payments are considered direct payments in ERS's farm income estimates methodology, while insurance indemnities are not. By including insurance indemnities in this paper, we were able to consider a broader range of financial assistance provided to farm operations. The amount of financial assistance reaching farm households through COVID-19 relief programs was estimated to be around \$5.6

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<sup>16</sup> This does not include land insured under the Pasture, Rangeland, and Forage policy.

billion in 2020, with the largest share coming from the economy-wide EIP stimulus payments received by the majority of farm households.

Table 6

**Direct Government payments and net indemnities to farm operations and households by program, 2020**

Program	Amount (billion dollars)
COVID-19-related direct payments to farm operations	
Coronavirus Food Assistance Programs (CFAP)	\$23.7
Paycheck Protection Program (PPP)	\$5.9
Economic Injury Disaster Loan Program (EIDL)	*
Emergency Animal Mortality Management (EAMM)	0**
<i>Sub-total COVID-19 related direct payments to farm operations</i>	<i>\$29.6</i>
COVID-19-related direct payments to farm households	
Economic Impact Payments (EIP) to farm households***	\$4.3
Federal Pandemic Unemployment Compensation (FPUC) to farm households***	\$1.3
<i>Sub-total COVID-19 related direct payments to farm households</i>	<i>\$5.6</i>
Non-COVID-19-related direct payments to farm operations	
Market Facilitation Program (MFP) (2020 payments)	\$3.7
Agriculture Risk Coverage (ARC)	\$1.3
Price Loss Coverage (PLC)	\$5.0
Conservation programs	\$3.9
Dairy margin coverage program	\$0.2
Marketing loan gains	\$0.2
Loan deficiency payments	0**
Other ad hoc disaster payments	\$2.5
<i>Subtotal Non-COVID-19- related direct payments</i>	<i>\$16.8</i>
<b>Total Direct Payments (COVID-19 + Non-COVID-19-related direct payments)</b>	<b>\$52.0</b>
Net indemnities †	\$5.7
<b>Total Assistance</b>	<b>\$57.7</b>

\*included in PPP

\*\* Appears as zero because actual amount is below \$0.05 billion (\$429,250 for EAMM and \$0.02 billion for Loan Deficiency Payments).

\*\*\* Only includes payments to households of principal-operator family farms.

† Net indemnities are not considered direct payments.

Source: USDA, Economic Research Service Farm Income and Wealth Statistics and simulations using Agricultural Resource Management Survey and U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

## Conclusion

COVID-19-related financial assistance for farm operations was estimated to total \$29.6 billion, whereas non-COVID-19-related direct payments to farm operations were estimated to be \$16.8 billion in 2020.

The payments came from programs designed to provide relief due to COVID-19, existing Farm Bill programs, and the 2019 MFP. Payments from some of the existing programs, such as ARC and PLC, have price components that triggered payments due to price declines in 2020. The 2019 MFP payments have a non-COVID-related purpose, but the last tranche of these payments was provided in 2020.

To provide context for the magnitude of the direct payments during the pandemic year 2020, figure 1 shows the direct payments to farm operations from 2011 to 2020. The direct payments made to farm operations in 2020, including forgivable loans (\$46.4 billion), represent an increase of almost \$24 billion compared to 2019 payments.

In addition to economic shocks directly impacting farm operations, family farm households also felt the effects of increased unemployment during 2020. Since off-farm income is an important source of income for farm households, we estimated the expected COVID-related unemployment compensation from the Federal Government for farm households as well as expected economic impact payments. These combined to total approximately \$5.6 billion distributed to farm households.

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## Appendix A. Calculations for the Economic Impact Payment

For each category of filer, the calculations are as follows:

Economic Impact Payment calculations for married couples filing joint returns:

$$EIP = \begin{cases} 2400 + 500d, I \leq 150,000 \\ 2400 + 500d - 0.05(I - 150,000), 150,000 < I \leq 198,000 + 10,000d \\ 0, I > 198,000 + 10,000d \end{cases}$$

EIP calculations for head of household filers:

$$EIP = \begin{cases} 1200 + 500d, I \leq 112,000 \\ 1200 + 500d - 0.05(I - 112,000), 112,000 < I \leq 136,000 + 10,000d \\ 0, I > 136,000 + 10,000d \end{cases}$$

EIP calculations for single filers:

$$EIP = \begin{cases} 1200, I \leq 75,000 \\ 1200 - 0.05(I - 75,000), 75,000 < I \leq 99,000 \\ 0, I > 99,000 \end{cases}$$

where:

$I$  is the household's adjusted gross income and

$d$  is the number of qualifying dependents.

## Appendix B. Calculations for expected Federal Pandemic Unemployment Compensation payment

The calculation for the expected FPUC payment was based on the following equation:

$$E[FPUC]_j = \sum_{t=1}^5 \widehat{P}_{jt} B_t$$

where  $j$  represents the county of residence,

$t$  represents the month when the payment is available (March =1, April=2, etc.),

$P_{jt}$  is the probability of becoming unemployed in month  $t$  for a person living in county  $j$ .

$B_t$  is the remaining benefit available for a given month.

The remaining benefit available for a given month ( $B_t$ ) was determined by how many days were remaining before the FPUC program expired, relative to the beginning of the month. For instance, it was possible for those unemployed in March to collect FPUC through July 25, which would amount to \$10,200. Anyone newly unemployed in April was unable to collect a March benefit,<sup>17</sup> so the benefits decreased over time. This allowed for employment rates to affect compensation in later months to factor into the calculation, where a decrease (increase) in the unemployment rate would result in a decrease (increase) in the expected unemployment compensation.

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<sup>17</sup>Benefit remaining at the beginning of each month:

- March- \$10,200
- April- \$9,942.86
- May- \$7,371.43
- June- \$4,714.29
- July- \$2,142.86



To calculate the probability of becoming unemployed in any month, we first calculated the change in the unemployment rate from the preceding month. The following equation represents the change in the unemployment rate in month  $t$ .

$$P_{jt} = (\text{Unemployment rate}_{jt} - \text{Unemployment rate}_{j(t-1)})$$

We further differentiated across the year to net out any seasonal variations since the data are not seasonally adjusted.

$$\widehat{P}_{jt} = (P_{jt} - P_{j(t-12)})$$

This estimation of the probability of becoming unemployed is lower than the observed unemployment rate in any given month, which accounts for the fact that those who were incidentally unemployed were not eligible for FPUC.