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Federal Programs for Agricultural Risk Management

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Federal Programs for Agricultural Risk Management

Dylan Turner, Francis Tsiboe, Katherine Baldwin, Brian Williams, Erik Dohlman, Gregory Astill, Sharon Raszap Skorbiansky, Vidalina Abadam, Adeline Yeh, and Russell Knight

Abstract

This report provides a broad overview of the Federal programs that are designed to help agricultural producers manage risks to income or profitability caused by natural and economic forces. This report refers to these programs as “risk management programs.” Focus is given to risk management programs that are available under the Agriculture Improvement Act of 2018 (i.e., 2018 Farm Bill). Thus, this publication serves as an update to previous work (Motamed et al., 2018), which focused on programs available under the Agricultural Act of 2014 (i.e., 2014 Farm Bill). Although each title of the Farm Bill contains programs that attenuate risk indirectly, most current targeted risk management programs are authorized under Title I: Commodity Programs or Title XI: Crop Insurance. Accordingly, this report primarily focuses on programs for crop and livestock producers that are available under these two titles. Available policies for managing production and price risk are discussed with recent trends in program enrollment and outlays provided.

Keywords: Farm Bill, risk management, crop insurance, ad-hoc disaster assistance, Agriculture Risk Coverage (ARC), Price Loss Coverage (PLC)

About the Authors

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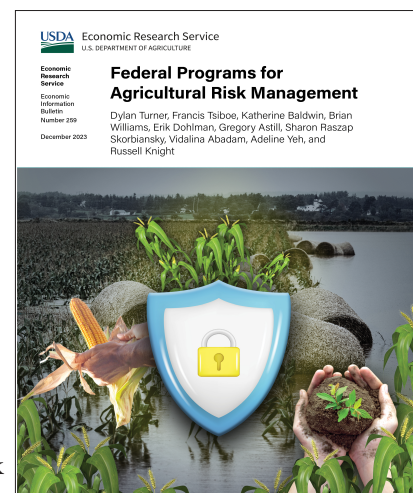
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What Is the Issue?

A variety of Federal programs exist that help agricultural producers manage risks to yields, revenues, and profit margins. These programs vary over time and provide a diverse suite of options to mitigate risk in a variety of market conditions and production situations. The risk management tools that are most appropriate for a given producer often depend on the producer's unique production characteristics, including what agricultural outputs are being produced, location, input prices, and enrollment in other Federal programs. This report provides an overview of Federal risk management programs and discusses the mechanics of each program, including eligibility criteria, payment calculations, interaction with other risk management programs, and the implications of various market conditions on select programs' risk reduction potential.



What Did the Study Find?

- The Agriculture Risk Coverage-County Option (ARC-CO) and Agriculture Risk Coverage-Individual Option (ARC-IC) programs provide farmers with financial protection from declines in revenue, while the Price Loss Coverage (PLC) program provides financial protection for price declines. Following the 2018 Farm Bill, enrollment in ARC-CO decreased substantially, while enrollment in PLC increased. Participation in PLC relative to ARC subsequently declined in 2021 and 2022. By 2022, ARC-CO again had more enrolled base acres than PLC and ARC-IC.
- Marketing assistance loans (MALs), which provide interim financing to producers at harvest time to meet cash flow needs, are heavily used only by producers of a few specific commodities (primarily cotton and peanuts). Between the 2018/19 and 2020/21 crop years, marketing loan benefits (loan deficiency payments and marketing loan gains) averaged \$60.27 million annually, peaking at \$222.28 million in 2019/20 (mostly to cotton).

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

- The Dairy Margin Coverage (DMC) program provides dairy operations with risk management coverage when margins fall below a selected coverage level. In 2021, payments to dairy operations under the DMC program totaled \$1.188 billion, about a fivefold increase from 2020, due to higher feed costs and greater program participation. Additional retroactive payments were made for 2021 and 2022 through Supplemental DMC provisions.
- Among the standing disaster assistance programs for livestock producers—Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP) and Livestock Forage Disaster Program (LFP)—disbursed more aid in 2021 relative to recent years as a result of these programs, covering additional drought-related losses that have affected much of the United States since mid-2020.
- The majority of crop insurance liabilities are associated with individual revenue protection policies, followed by individual yield protection policies. Area and index-based plans represent a minority of insured liabilities.
- Insured acreage within the Federal Crop Insurance Program (FCIP) has grown steadily since 2016—driven primarily by the adoption of insurance policies for Pasture, Rangeland, and Forage (PRF).
- Supplemental crop insurance policies and endorsements can be combined with traditional policies to achieve a greater level of protection or mitigate a specific risk. Several new supplemental crop insurance policies and endorsements have been introduced since the passage of the 2018 Farm Bill, including the Enhanced Coverage Option (ECO), Hurricane Insurance Protection – Wind Index (HIP-WI), and the Post-Application Coverage Endorsement (PACE). Among supplemental policies that were introduced in the 2014 Farm Bill (Supplemental Coverage Option (SCO) and Stacked Income Protection Plan (STAX) for upland cotton), SCO saw notable increases in endorsed acres following the 2018 Farm Bill, while STAX saw a decline in endorsed acres. However, supplemental policies still represent a small portion of total insured acres.
- The Noninsured Crop Disaster Assistance Program (NAP) is small relative to the Federal Crop Insurance Program (FCIP) and offers protection for producers engaging in animal grazing and forage, along with specialty crop producers who otherwise may not have access to agricultural insurance.

How Was the Study Conducted?

Data on program enrollment and outlays were obtained from the USDA, Farm Service Agency and USDA, Risk Management Agency and used to create summary statistics and metrics to measure program participation and outlays.

Federal Programs for Agricultural Risk Management

Introduction

Agriculture is inherently characterized by risk and uncertainty. Producers must contend with a host of factors that are inherently unpredictable by nature and outside of their control yet have the potential to adversely influence yields and revenues. Adverse weather conditions can prevent timely planting or damage existing crops. Increases in the cost of key inputs, such as fertilizer for commodity producers or feed for livestock operations, can diminish profit margins. Disease or pest infestations can reduce the market value of crops or, in some cases, cause total losses. Even a good harvest can be subject to price volatility, which can lead to low revenues.

Consequently, strategies to mitigate declines in income or profitability, or decrease variability in either income or profitability (generally referred to as risk management strategies), play an important role in agricultural producers' ability to withstand unpredictable shocks and maintain long-term financial stability. Producers can, to some degree, implement strategies to counteract the natural perils that may affect the producers' fields. For example, irrigation can be used to mitigate drought risk, and cover crops can be planted to suppress certain diseases and pests and improve soil moisture holding capacity. Similarly, futures markets, options contracts, and the use of storage facilities can manage the risk of volatile prices throughout the season.

Many agricultural producers supplement private approaches to risk mitigation¹ by drawing from a suite of programs that are administered by the Federal Government to attenuate income losses stemming from either low yields or prices. Many of these programs are in Title I or Title XI of the Agriculture Improvement Act of 2018 (Public Law 115–334, 2018) (2018 Farm Bill). Overall, the programs offered under Title I and Title XI provide a safety net that is broad in scope and adaptable to the unique needs of each producer. However, the decision can be complex over which programs to enroll in and which program-specific options to choose to best manage a given risk. These decisions are often dependent on prevailing market conditions, along with the unique characteristics of the farm.

This report provides information on Federal programs that are designed to compensate agricultural producers that experience adverse effects to income or profitability caused by natural and economic forces. These programs are referred to as “risk management programs” by this report and emphasis is given to programs in effect after the enactment of the 2018 Farm Bill. The mechanics of each program are discussed with details on eligibility conditions and methods for calculating payments. Trends in enrollment and outlays are presented in the context of recent market conditions. Table 1 provides an overview of the risk management programs covered in this report.

A number of recent USDA, Economic Research Service reports have provided indepth analysis of various Federal risk management programs, including Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC) (Boussios & O'Donoghue, 2019; O'Donoghue et al., 2016), Margin Protection Program² for Dairy (MPP-Dairy) producers (Mark et al., 2016), risk management programs for specialty crop producers (Hungerford et al., 2017; Raszap Skorbiansky et al., 2022), and various aspects of the Federal Crop Insurance

¹ For a discussion on the use of futures and options contracts as a method of risk management, see Prager et al. (2020).

² The Margin Protection Program has been discontinued and replaced by the Dairy Margin Coverage program.

Program (FCIP) (Hungerford & O’Donoghue, 2016; O’Donoghue, 2014). Additionally, Motamed et al. (2018) provide an overview of the risk management programs available prior to the 2018 Farm Bill. This report builds on the synthesis provided by Motamed et al. (2018) in light of new data and new policy developments.

Table 1
Summary of risk management programs

Protection type	Crop programs	Livestock and dairy programs
Price protection	<ul style="list-style-type: none"> Price Loss Coverage Marketing assistance loans/loan deficiency payments 	<ul style="list-style-type: none"> Livestock Risk Protection Insurance policies
Yield protection/compensation for physical losses	<ul style="list-style-type: none"> Yield protection insurance policies Noninsured Disaster Assistance Program 	<ul style="list-style-type: none"> Livestock Indemnity Program Livestock Forage Disaster Program Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP)
Revenue protection	<ul style="list-style-type: none"> Agricultural Risk Coverage Revenue protection insurance policies 	<ul style="list-style-type: none"> Dairy Revenue Protection insurance policies
Margin protection		<ul style="list-style-type: none"> Dairy Margin Coverage program Livestock Gross Margin Insurance policiess
Other protection	<ul style="list-style-type: none"> Area and index based insurance policies Prevented planting coverage 	

Source: USDA, Economic Research Service using data from USDA, Farm Service Agency and USDA, Risk Management Agency.

Title I Support Programs

Commodity Programs

Several risk management programs are available as part of Title I of the Farm Bill. These programs include the ARC and PLC programs, marketing assistance loans (MALs), and the Noninsured Crop Disaster Assistance Program (NAP). With the exception of the NAP, which is discussed in a later section due to its similarities with the FCIP, these programs are described in the remainder of this section.

Agriculture Risk Coverage and Price Loss Coverage

The Agricultural Act of 2014 (P.L. 113–79, 2014) (2014 Farm Bill) introduced several new commodity support programs, including the ARC and PLC programs, which were reauthorized under the 2018 Farm Bill (P.L. 115–334, 2018). At no premium cost to the producers, both ARC and PLC provide income support to mitigate revenue and price risk, respectively. If a payment is triggered under these programs, it is based on the farmer’s historical “base” acres³ by crop, which is fixed for the duration of the Farm Bill and not tied to current production. ARC has two variations: (1) payment rates are based on a county revenue per acre for

³ Base acres refer to a farm’s historical planted acres for a specific commodity and is used for administering USDA, FSA programs. Base acres do not necessarily represent a farm’s current planted acreage. Further, the number of base acres is static and does not change based on new plantings. Thus, additional base acres may only be obtained by acquiring land with existing base acres.

each covered commodity⁴ (Agriculture Risk Coverage-County (ARC-CO)); or (2) farm level revenues per acre (Agriculture Risk Coverage-Individual (ARC-IC)). For each farm, producers may participate (elect and enroll) in PLC or ARC-CO on a covered commodity-by-covered commodity basis or ARC-IC for all covered commodities on the farm. Thus, if low commodity prices, low yields, or a combination of both result in lower revenue relative to a benchmark level, ARC-CO or ARC-IC payments are triggered, whereas PLC payments are triggered if commodity prices fall below the reference price.

Payment calculations for both ARC and PLC are based on commodity-specific price thresholds, various measures of yields, and national average prices. Under PLC, producers receive a per acre payment equal to the difference between the effective reference price and the national marketing year average (MYA) price⁵ multiplied by their program yield (i.e., yields used for calculating payments under USDA's Farm Service Agency (FSA) programs, which are generally calculated as 90 percent of historical average per acre yield on planted acres⁶). The final payment is determined by multiplying the calculated per acre payment by 85 percent of enrolled base acres for the covered commodity. The PLC payment calculation is summarized in equations (1) and (2).

Under ARC-CO, payments are based on the benchmark revenue (equal to the 5-year Olympic average (OA)—omits the high and low values in the series—county yield,⁷ multiplied by the 5-year OA of MYA prices). A “revenue guarantee,” equal to 86 percent of the benchmark revenue, is then established. When actual revenue⁸ falls below the revenue guarantee, the ARC-CO payment rate is equal to the difference between the revenue guarantee and actual revenue (up to a maximum of 10 percent of the benchmark revenue). ARC-IC payments are generally calculated in a similar manner to ARC-CO payments, with the major differences being that ARC-IC revenue calculations are based on the yields of the farm, and payments are made on 65 percent of base acres (as opposed to 85 percent of base acres under ARC-CO). ARC-CO payment calculations are summarized in equations (3) through (6).

Under the 2014 Farm Bill, producers that chose to participate in ARC or PLC were required to make a one-time election into either program that would remain in effect for the entirety of the 2014 Farm Bill (USDA, FSA, 2014a). Under the 2018 Farm Bill, program election was only fixed for the first 2 years (2019 and 2020), after which the election became annual (USDA, FSA, 2019a).

The 2018 Farm Bill introduced effective reference prices (ERPs), which established covered commodity-specific support levels under ARC and PLC in the same way that reference prices established support levels under the 2014 Farm Bill. ERPs consider the Olympic average (OA) of the last 5 years of the national marketing year average (MYA) prices⁹ by setting the commodity-specific effective reference price equal to 85 percent of the OA price if that value is greater than the statutory reference price (up to a limit of 115 percent of the statutory reference price). The relationship between statutory reference prices, the national MYA price, and the effective reference prices are summarized in equations (7) and (8).

⁴ Covered commodities include wheat, oats, barley, corn, grain sorghum, rice, soybeans, sunflower seed, rapeseed, canola, safflower, flaxseed, mustard seed, crambe and sesame seed, dry peas, lentils, small chickpeas, large chickpeas, and peanuts.

⁵ In the event that the MYA price is below the national loan rate for a crop, the loan rate is substituted for the MYA price for purposes of payment calculation.

⁶ Under the 2014 Farm Bill, producers were given the option to update their program yields to 90 percent of the farm's 2008–12 average yield per planted acre. A similar option was offered under the 2018 Farm Bill that allowed producers to set their payment yield equal to 90 percent of their average 2013–17 per acre yield, multiplied by the ratio of their average 2008–12 per acre yield to their average 2013–17 yield.

⁷ Olympic average county yields are lagged by 1 year. For example, yields from the 2013–17 crop years are used for calculating Olympic average yields for program year 2019.

⁸ Defined as the current year county yield times the greater of the MYA price and nonrecourse marketing loan rate (NMLR).

⁹ For example, program year 2019 used an OA calculated from the average prices of marketing years 2013/14–2017/18.

PLC payment calculation:

$$\text{PLC payment rate} = \begin{cases} 0 & \text{if ERP} \leq \text{MYA price} \\ (\text{ERP} - \text{MYA Price}) \times \text{PLC yield} & \text{if NMLR} < \text{MYA price} < \text{ERP} \\ (\text{ERP} - \text{NMLR}) \times \text{PLC yield} & \text{if MYA price} \leq \text{NMLR}^{10} \end{cases} \quad (1)$$

$$\text{Final PLC payment} = 0.85 \times \text{Crop Base Acres} \times \text{PLC payment rate} \quad (2)$$

ARC-CO payment calculation:

$$\text{Benchmark revenue} = (\text{5year Olympic average of county yield}) \times (\text{Olympic average of MYA price}) \quad (3)$$

$$\text{Actual revenue (AR)} = \begin{cases} \text{County yield} \times \text{MYA Price} & \text{if MYA Price} \geq \text{NMLR} \\ \text{County yield} \times \text{MYA Price} & \text{if MYA Price} < \text{NMLR} \end{cases} \quad (4)$$

$$\text{ARC payment rate} = \begin{cases} 0 & \text{if AR} \geq (\text{BR} \times 0.86) \\ (0.86 \times \text{BR}) - \text{AR} & \text{if } (0.86 \times \text{BR}) > \text{AR} > (0.76 \times \text{BR}) \\ 0.1 \times \text{BR} & \text{if AR} \leq (0.76 \times \text{BR}) \end{cases} \quad (5)$$

$$\text{Final ARC payment} = 0.85 \times \text{Crop Base Acres} \times \text{ARC payment rate} \quad (6)$$

Calculation of Effective Reference Price:

$$\text{Reference price (RP)} = \text{commodity specific prices established in 2018 Farm Bill} \quad (7)$$

$$\text{Effective reference price (ERP)} = \begin{cases} \text{RP} & \text{if 85\% of Olympic average (OA) MYA Price} < \text{RP} \\ 85\% \text{ of OA Price} & \text{if RP} \leq 85\% \text{ of OA MYA Price} < 115\% \text{ RP} \\ 115\% \text{ of RP} & \text{if 85\% of OA MYA Price} \geq 115\% \text{ of RP} \end{cases} \quad (8)$$

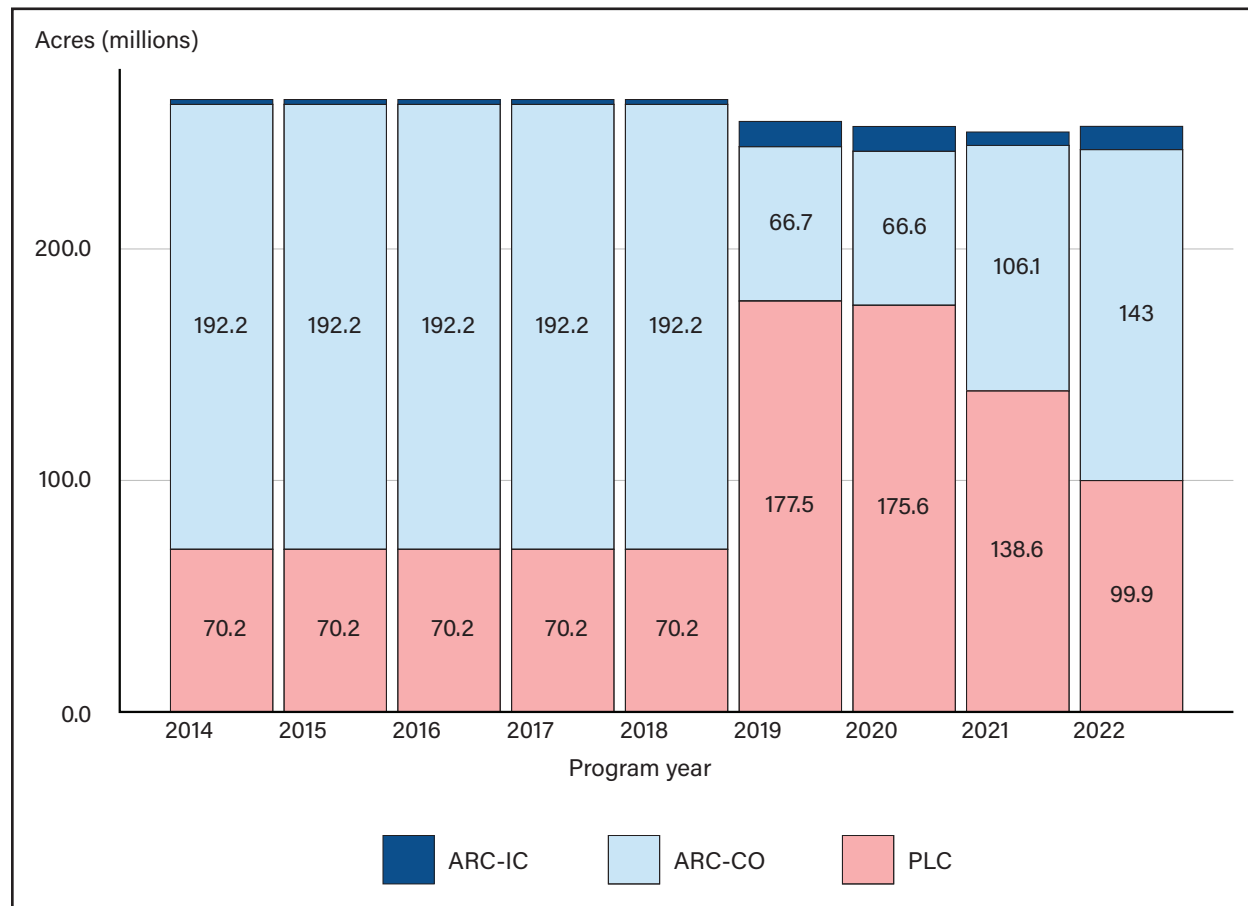
Figure 1 shows enrolled base acres in ARC and PLC from 2014 to 2022. Initial enrollment after the 2014 Farm Bill (represented by the 2014 program year) saw that most base acres were enrolled in ARC-CO (approximately 73 percent of enrolled base acres), with the remaining base acres being primarily allocated to PLC (approximately 27 percent of enrolled base acres). Only a small minority of producers selected ARC-IC (less than 1 percent of enrolled base acres). After the 2018 Farm Bill, the distribution of base acres between ARC and PLC shifted dramatically, with most producers choosing to enroll in PLC (approximately 70 percent of enrolled base acres for 2019). Since 2021, the distribution of base acres started to approach a similar distribution to that prior to the 2018 Farm Bill. For 2022, the majority of base acres were once again enrolled in ARC-CO (approximately 57 percent), followed by PLC (approximately 40 percent), with ARC-IC still representing a small minority of base acres (approximately 4 percent).

Although many factors influence the choice between ARC and PLC, the intricacies of how payments are calculated under each program can make one program comparatively more effective at managing risk in different market conditions. Producers may prefer PLC to ARC in periods where prices have been lower than normal, all else being equal. For example, since ARC payments are calculated based on observed revenue

¹⁰ The nonrecourse marketing loan rate (NMLR) is a nationally set, commodity-specific loan rate established in the 2018 Farm Bill.

relative to historical trending revenues, ARC payments may be less sensitive to price declines since higher yields can compensate for lower prices in terms of maintaining revenues that are on par with the benchmark revenue. Alternatively, PLC starts to make payments when the MYA price drops below the effective reference price, regardless of producer revenues.

Figure 1
Enrolled base acres in ARC and PLC, 2014–22

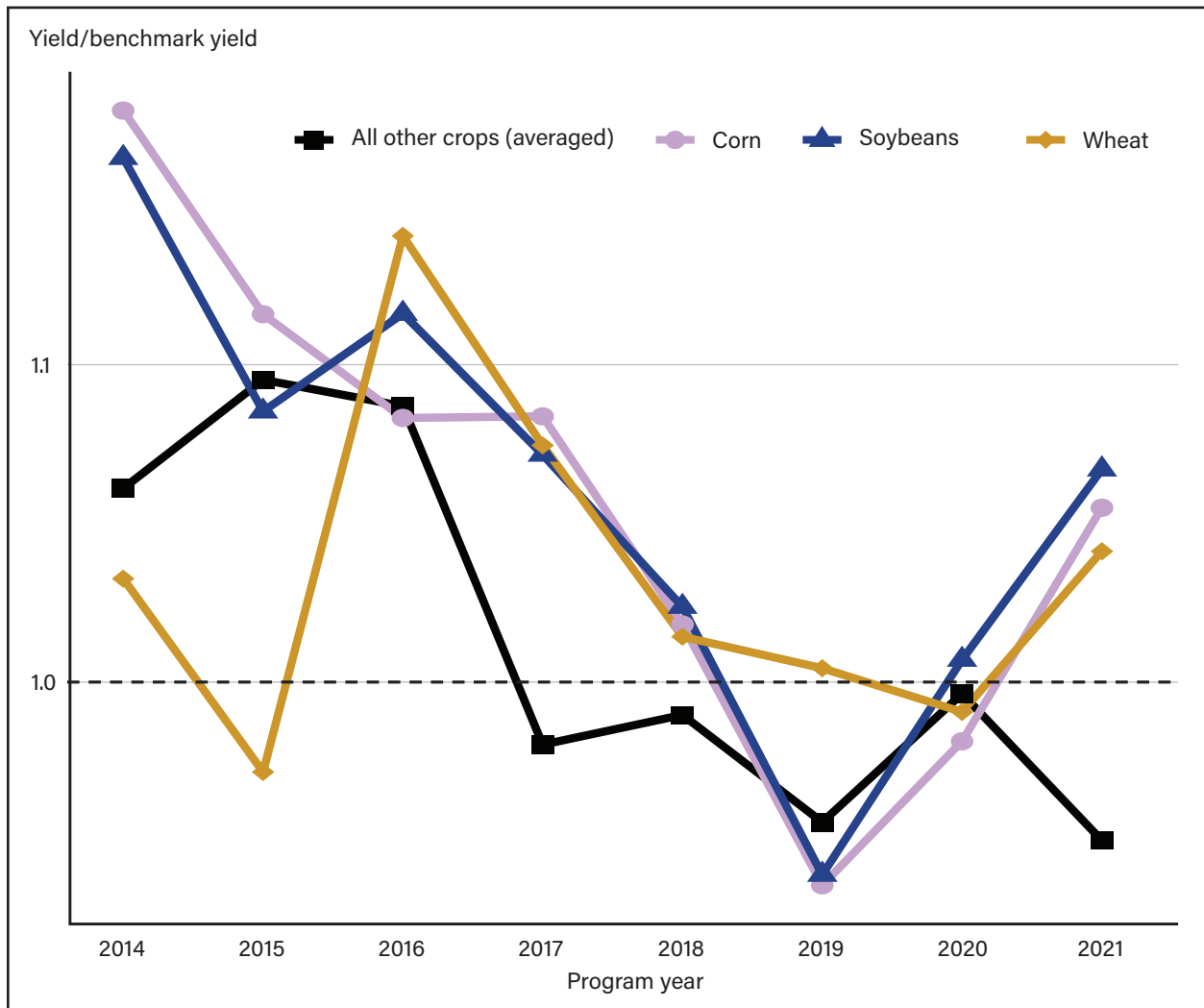


ARC-IC = Agriculture Risk Coverage-Individual Option; ARC-CO = Agriculture Risk Coverage-County Option; PLC = Price Loss Coverage.
 Source: USDA, Economic Research Service using data from USDA, Farm Service Agency.

Figure 2 shows the average observed county yields for several major commodities as a share of the benchmark county yield (i.e., the 5-year Olympic average of county yields used in the ARC benchmark revenue equation (equation 5)). On average, observed yields were generally above benchmark yields for 2014–18. With respect to prices (figure 3), corn and wheat prices were below the reference price for 2015–18, whereas soybean prices were above the reference price for the life of the 2014 Farm Bill. These market conditions meant that ARC payments per enrolled base acre were generally declining leading into the 2018 Farm Bill (figure 4). For 2018, PLC payments averaged¹¹ just under \$32 per enrolled base acre, while ARC-CO and ARC-IC averaged just \$9 and \$6 per enrolled base acre, respectively (all 2021 U.S. dollars).

¹¹ Average payments per base acre for PLC, ARC-CO, and ARC-IC are calculated by summing all payments made through each program and dividing by the total base acres allocated to each program for each program year.

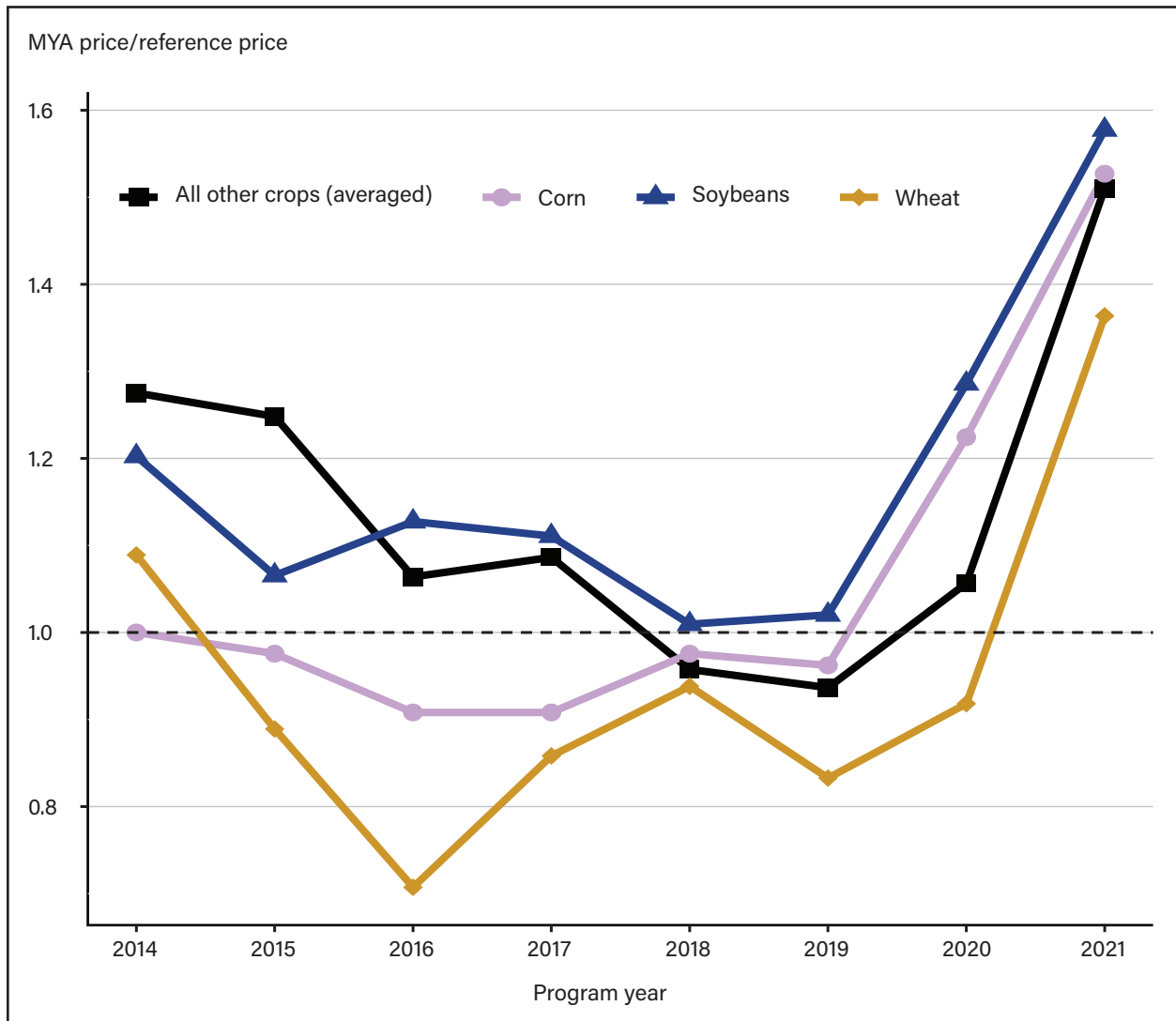
Figure 2
Actual county yields as a share of benchmark county yields, 2014-21



Note: Benchmark yield refers to the 5-year Olympic average of county yields used in the ARC benchmark revenue equation (equation 5). Values in the plot measure actual yields as a share of the benchmark yield, which is calculated by dividing current year county yields by the benchmark county yield. These county-crop level deviations from the historical trend are then averaged across all counties for each crop category. Values above 1.0 indicate that current year yields are above the historical trend, while values below 1.0 indicate current year yields are below the historical trend.

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

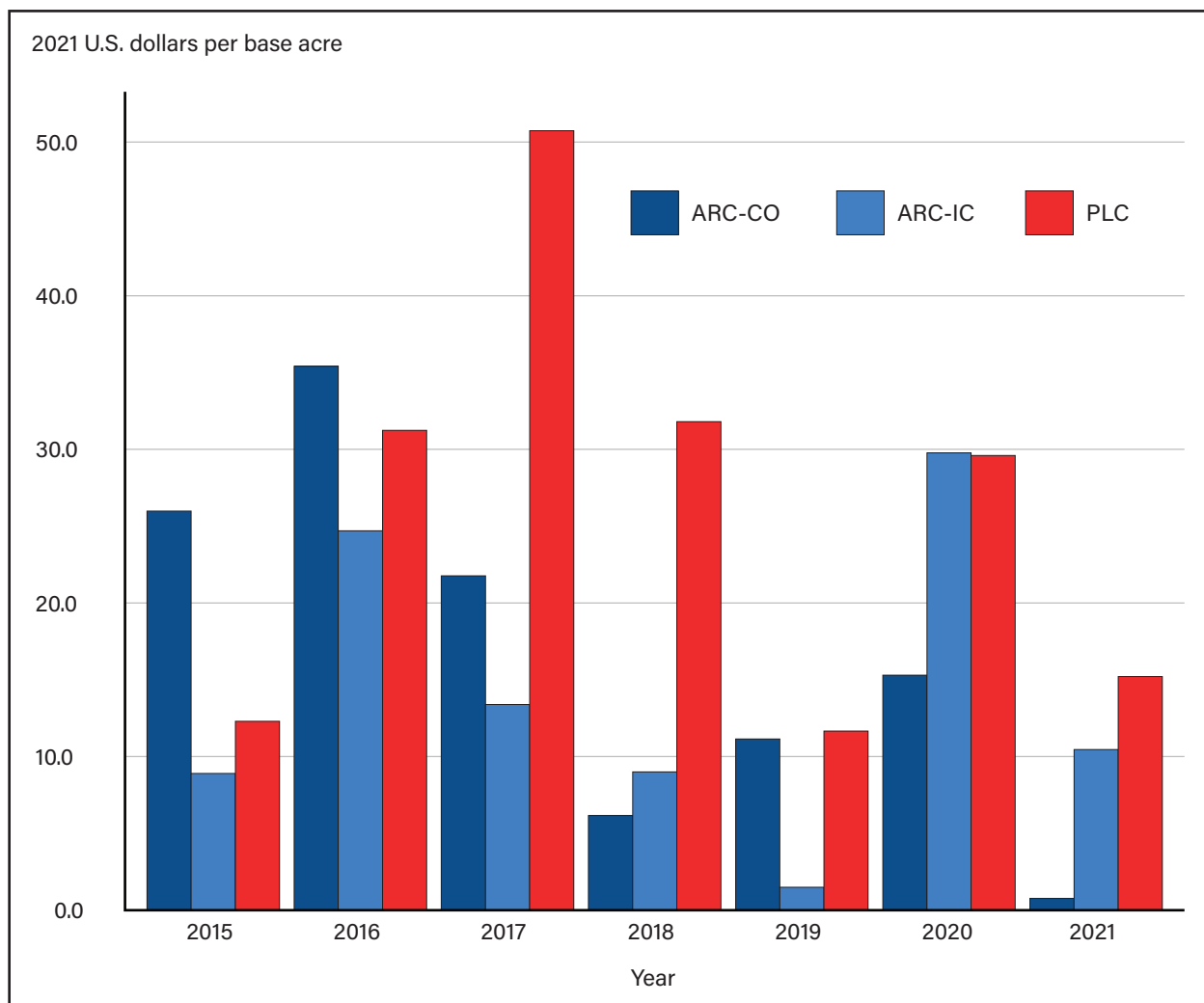
Figure 3
Marketing year average prices versus reference prices, 2014-21



Note: Values in the plot measure marketing year average (MYA) prices as a share of the relevant commodity-specific reference price (the statutory reference price for 2014-18 and effective reference price for 2019 onward), which is calculated by dividing current MYA prices by the reference price. Values above 1.0 indicate that current MYA prices are above the relevant reference price. Similarly, values below 1.0 indicate current MYA prices below the relevant reference price.

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

Figure 4
ARC and PLC payments per enrolled base acre



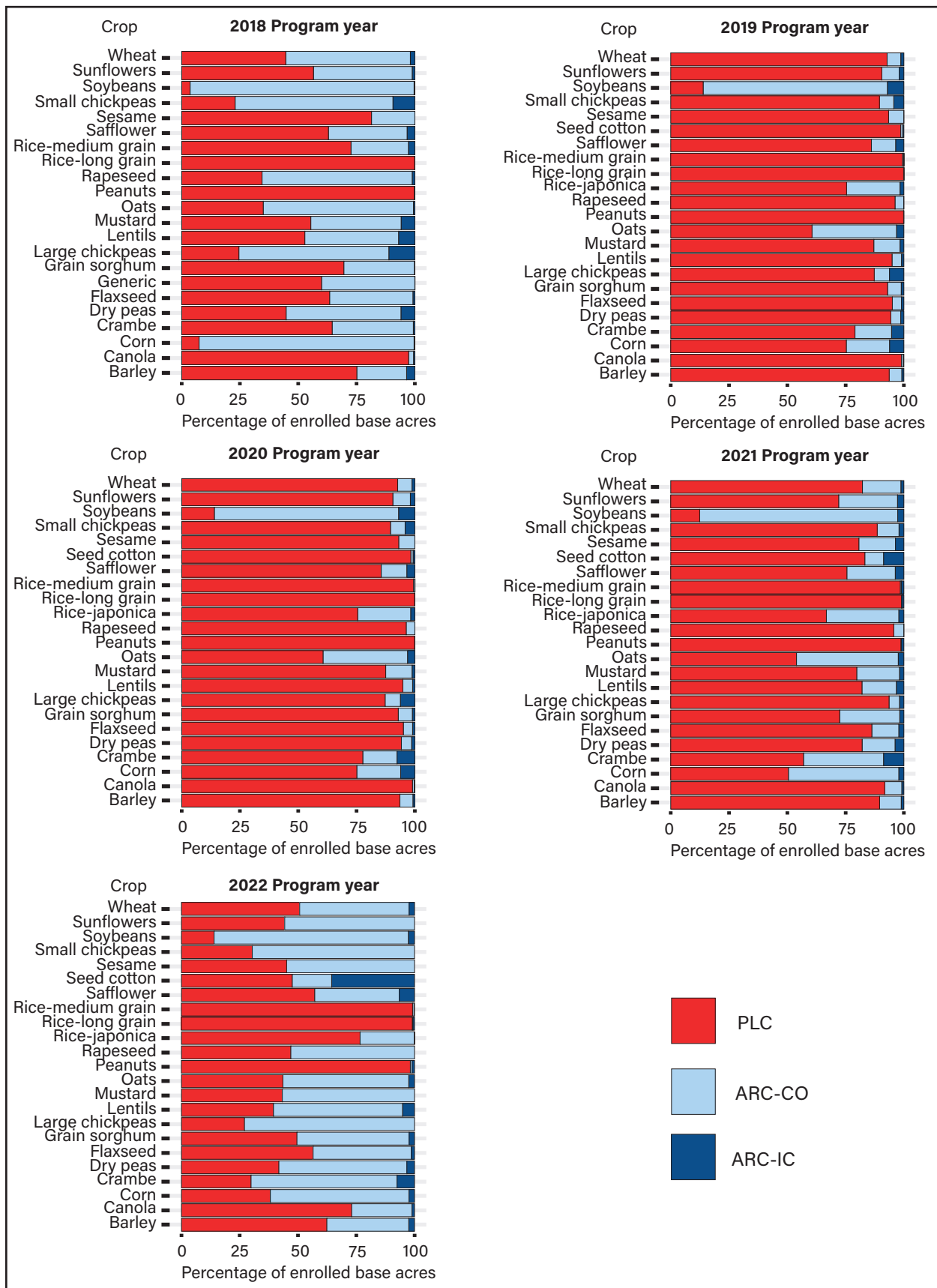
ARC = Agriculture Risk Coverage; PLC = Price Loss Coverage; ARC-CO = Agriculture Risk Coverage-County Option; ARC-IC = Agriculture Risk Coverage-Individual Option.

Note: The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from U.S. Bureau of Labor Statistics.

Source: USDA, Economic Research Service using data from USDA, Farm Service Agency and U.S. Bureau of Labor Statistics.

Consequently, producers entered 2019 with the option to update their ARC and PLC election, having just observed larger payments coming from the PLC program relative to the payments provided by ARC, which may have contributed to the general shift in the popularity of PLC. As noted previously, this was generally true but varied on a commodity-by-commodity basis. Figure 5 shows enrolled base acres in ARC and PLC by commodity for the 2018–22 program years. Producers with base acres of long-grain rice, peanuts, and canola (for example) have consistently opted for PLC since the program’s inception. Alternatively, the majority of soybean base acres remained enrolled in ARC-CO after the 2018 Farm Bill. Just as enrolled base acres into ARC and PLC vary on a commodity-by-commodity basis, total payments made through either ARC or PLC vary similarly. Figure 6 shows the total payments made via ARC-CO and PLC by commodity between 2014–20. Notably, payments to commodities significantly vary year to year due to the number of factors changing on an annual basis (e.g., ARC and PLC election decisions, commodity prices, yields).

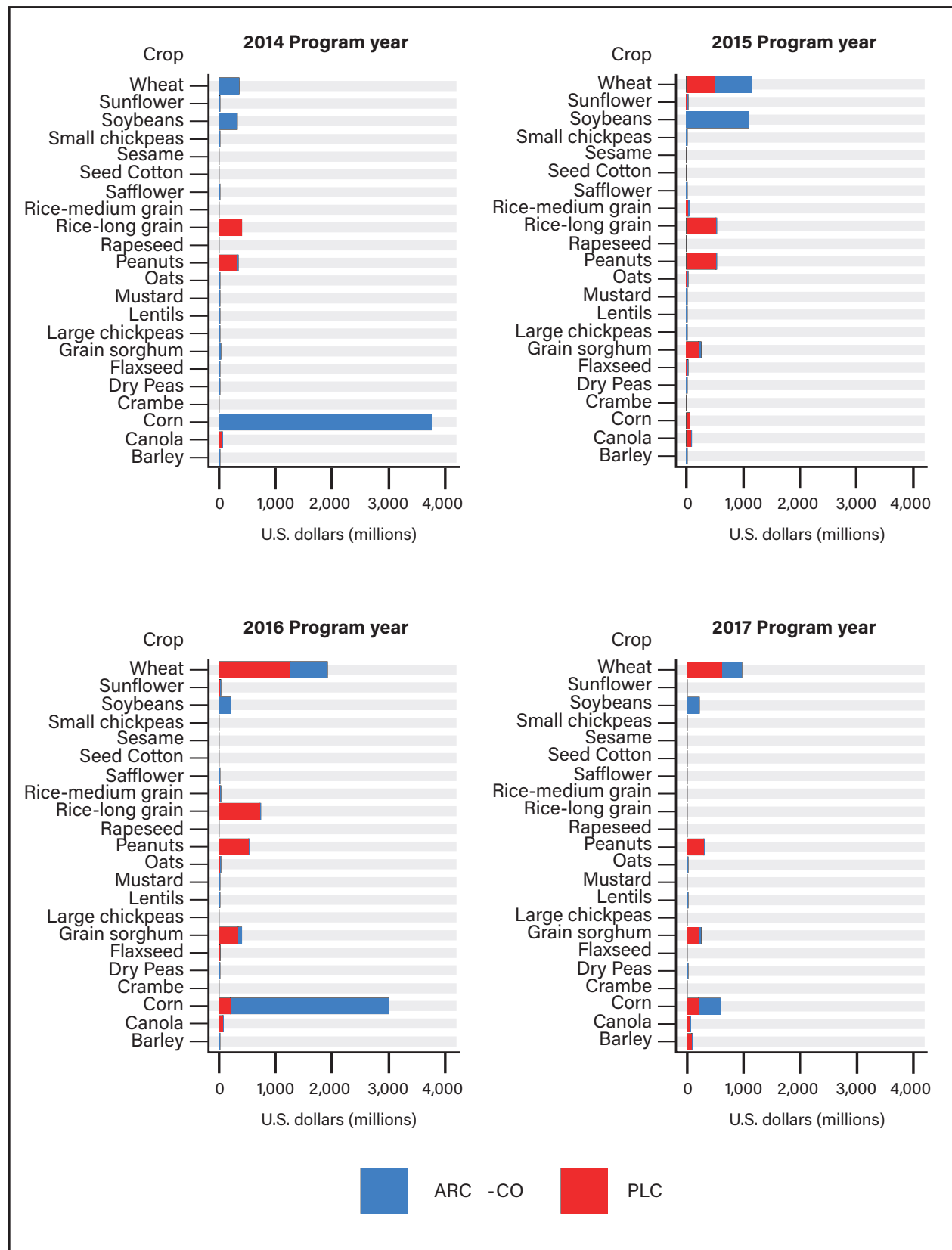
Figure 5
Enrolled base acres in ARC and PLC by commodity, 2018-22



ARC = Agriculture Risk Coverage; ARC-CO = Agriculture Risk Coverage-County; ARC-IC = Agriculture Risk Coverage-Individual Option; PLC = Price Loss Coverage.

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

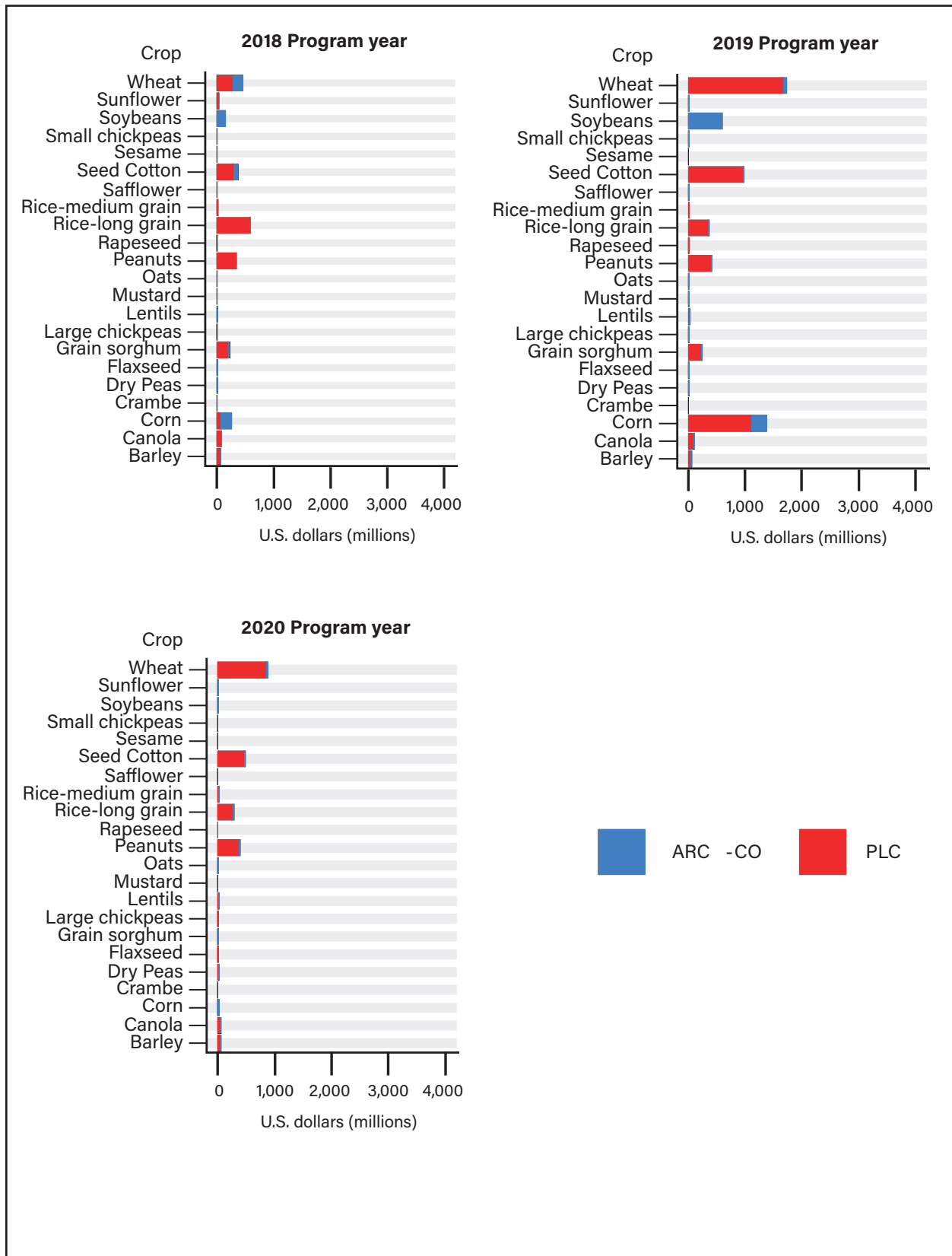
Figure 6
Total ARC-CO and PLC payments by commodity, 2014-20



continued on next page ►

Figure 6

Total ARC-CO and PLC payments by commodity, 2014-20—continued



ARC-CO = Agriculture Risk Coverage-County Option; PLC = Price Loss Coverage.

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

In addition to the previously mentioned factors that may have contributed to the dynamics in enrolled base acres under ARC and PLC, producers must contend with several other considerations when making their election decisions. First, since ARC-CO payments are based on county-level yields, the program is characterized by basis risk (i.e., the risk that an individual farmer experiences a decline in revenue, but the county average revenue does not decline to a level sufficient to trigger a payment). PLC payments also have potential basis risk since the payment trigger is based on the national MYA price. However, when payments are made through PLC, farm-specific program yields are used in the payment calculation, which may benefit producers who have historically had higher average yields relative to other farms in the same county.¹² ARC-IC, on the other hand, does not assign payments based on a group-level metric (either payment trigger or payment calculation) and thus does not have basis risk, which may make it preferable to some producers. Second, in recent years, a number of supplemental endorsements (i.e., additional coverage that can be purchased to supplement a traditional crop insurance policy) were introduced within the FCIP to cover losses that historically would not be large enough to surpass most crop insurance deductibles. Notably, base acres enrolled in ARC cannot be simultaneously insured under the Supplemental Coverage Option (SCO) while base acres enrolled in the Stacked Income Protection Plan (STAX) cannot be simultaneously enrolled in ARC or PLC. For more details on supplemental endorsements, see table 4.

Marketing Assistance Loans

Intra-year price volatility is a notable concern for crop producers. Market prices for commodities can vary over the course of a typical crop year in accordance with the planting and harvesting cycles. Generally, the supply of a commodity is highest right after harvest, which can create downward price pressure in that commodity's market. Postharvest is also the period when crop producers will need to begin repaying the creditors who financed the producers' farming activities. As a result, at least some producers may feel pressure to sell their production at a time when crop prices may be at seasonal lows to generate cash flow. Marketing assistance loans (MALs) provide producers with interim financing at harvest time to meet cash flow needs without having to sell when market prices are typically at harvest-level low levels (Code of Federal Regulations, 2022). The MAL program offers producers of eligible commodities 9-month nonrecourse or recourse loans, depending on the crop,¹³ at a fixed commodity-specific loan rate for stored commodities placed under loan. MALs effectively function as postharvest operating loans that are used to varying degrees by producers of different commodities. As part of the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020 (P.L. 116–136, 2020), producers received 3-month repayment extensions for nonrecourse loans for crop years 2018, 2019, and 2020, effectively allowing those farmers to receive a 12-month loan.

With nonrecourse loans, producers pledge the commodity as collateral, meaning the commodity cannot be sold into the market while held as collateral. Upon loan maturity, the borrower has the choice to sell the commodity, which usually incurs marketing expenses, and then pay off the loan principal plus interest or deliver the pledged collateral (e.g., the stored commodity) to the Commodity Credit Corporation as full repayment for the loan. Recourse loans must be paid back in full and were reauthorized under the 2018 Farm Bill for certain lower quality commodities (e.g., high-moisture corn and seed cotton).¹⁴

¹² For example, if a producer has historically had yields that are higher than other producers in the same county, the producer's payment under ARC-CO will be based on the county average yield, which would underrepresent the actual revenue loss. Under PLC, the use of program yields would better reflect the increased yields in the final payment amount.

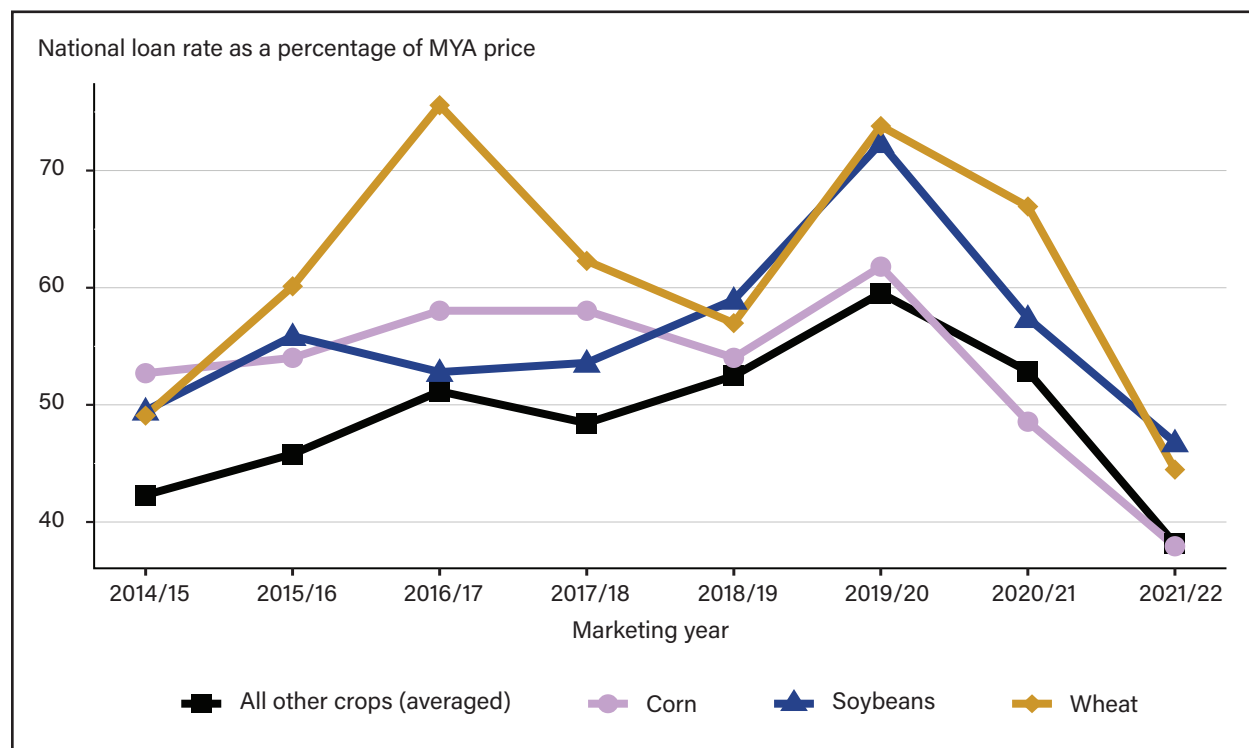
¹³ The following crops are eligible for nonrecourse marketing assistance loans: wheat, corn, grain sorghum, barley, oats, upland cotton, extra-long staple cotton, long-grain rice, medium-grain rice, soybeans, other oilseeds (including sunflower seed, rapeseed, canola, safflower, flaxseed, mustard seed, crambe, and sesame seed), dry peas, lentils, small chickpeas, large chickpeas, graded and nongraded wool, mohair unshorn pelts, honey, and peanuts (USDA, Farm Service Agency, 2022c).

¹⁴ Recourse loans provide access to interim financing for commodities that are harvested with moisture content too high to meet the quality standards to be eligible for nonrecourse loans.

In addition to having the option to utilize the interim financing available through a MAL to alleviate short-term cash constraints, for nonrecourse loans, the farmer may choose not to repay the loan and instead forfeit their harvested crop pledged as collateral. This option can benefit a producer if the market price of the commodity never rises above the loan rate.¹⁵ By forfeiting their loan collateral, a farmer essentially is selling their crop at the marketing loan rate. In effect, this means the MAL program also acts as a price floor since the farmer can obtain at least the price indicated by the marketing loan rate for the farmer's commodity. However, in practice, the design of the MAL program discourages forfeiture. In particular, it tends to be more advantageous for producers to keep the crop, take the marketing loan benefit (as in the form of a loan deficiency payments or commodity certificate exchange or repaying the loan at the loan repayment rate), and market the crop later than to simply forfeit the crop and take the marketing loan benefit.

Figure 7 displays national loan rates for several major commodities as a share of MYA prices. Since 2014, national loan rates have generally trended between 40 percent to 75 percent of MYA prices. The values in figure 7 represent the de facto price floor generated by the MAL program. For example, loan rates for soybeans in 2021 were 48 percent of the MYA price, meaning soybean prices would need to drop to below 48 percent of their market value before a producer would be better off by not repaying the loan for the harvested commodity.

Figure 7
National loan rate compared with marketing year average (MYA) prices, 2014/15–2021/22



Note: The All other crops (averaged) category was calculated by averaging the calculated national loan rate as a share of marketing year average prices for all crops other than corn, soybeans, and wheat.

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

¹⁵ In the context of the MAL program, the term “loan rates” refers to a specified dollar value per unit of the commodity that would be received by the producer if the commodity were placed under the loan (typically expressed in either U.S. dollars per bushels or U.S. dollars per hundredweight).

In some cases, when market prices deviate from the MAL loan rate, other options for settling the MAL become available. Even though producers always have the option of receiving the MAL loan rate for their commodity, repayment rates are regularly announced by USDA, which can vary from the MAL loan rate based on prevailing market conditions. For most crops (e.g., corn, soybeans, wheat), the repayment rates are set daily by county. For cotton and rice, a national loan repayment rate¹⁶ is established based on global market conditions and is announced weekly. If the producer repays the MAL when the repayment rate falls below the MAL loan rate, the producer gains a benefit equal to the difference between the MAL loan rate and the repayment rate. This is known as a marketing loan gain (MLG). Producers for most MAL-eligible commodities who choose not to apply for a loan may also receive a comparable payment called a loan deficiency payment (LDP). As with MLGs, an LDP is equal to the difference between the loan rate and the repayment rate. MLGs and LDPs are both referred to as marketing loan benefits.

Marketing loans have not been extensively used for most crops from 2018/19 to 2021/22, with the notable exceptions of cotton and peanuts. Among leading crops, the share of production put under a loan averaged 4.8 percent for corn, 3.2 percent for soybeans, 2.7 percent for wheat, and 17.2 percent for rice. As noted, MAL use was much higher for upland cotton at 56.2 percent, peanuts at 82.6 percent, and sugar at 26.9 percent (in the form of either raw cane sugar, refined beet sugar, or inprocess cane and beet sugars).¹⁷ Among the possible reasons MAL program use has historically been much higher for these crops are the prevalence of cooperative processing and/or marketing associations in these sectors, which need cash flow to pay producer members some portion of the expected crop receipts in advance of actual marketing.

During the 2018/19 to 2021/22 program years, marketing loan benefits averaged \$60.3 million annually, peaking at \$222 million in 2019/20, almost entirely for cotton. For the 2019/20 program year, the adjusted world price (AWP) for upland cotton (the alternative repayment rate when the AWP falls below the loan rate) fell as low as 42.63 cents per pound and averaged only 53.09 cents per pound for the entire crop year, just above the upland cotton loan rate of 52 cents per pound.¹⁸ Just 2 years later (2021/22), the AWP rose as high as 147.10 cents per pound and averaged 108.18 cents per pound for the entire crop year. Prior to the period of sustained price increases that began in the mid-2000s, grain and oilseed crops also received substantial marketing loan benefits, with aggregate benefits across all loan commodities exceeding \$6 billion annually in 1999, 2000, and 2001.

Livestock and Dairy Programs

Livestock and dairy producers typically face a different set of production characteristics and risks than commodity producers. As such, a different suite of risk management programs for livestock and dairy are available under Title I, as detailed in the remainder of this section.

Dairy Margin Coverage

The Dairy Margin Coverage (DMC) program was authorized in the 2018 Farm Bill as a replacement for the Margin Protection Program for Dairy (MPP-Dairy) producers that was established by the 2014 Farm Bill. All U.S. dairy operations are eligible for the voluntary program, but how the operations are registered varies by how a farm is structured. For example, a dairy operated by multiple producers will be registered as

¹⁶ This national loan repayment rate serves as an alternative repayment rate that is only applicable when it falls below the MAL loan rate.

¹⁷ Although sugar is not eligible for participation in the MAL program directly, similar nonrecourse sugar loans are available through the Sugar Program, which provides functionality equivalent to MALs.

¹⁸ The marketing loan rate for upland cotton can range between 45 and 52 cents per pound, depending on prevailing prices in the 2 preceding crop years, but the loan rate can never be lower than 98 percent of the previous year's loan rate.

a single operation, whereas multiple dairies operated by a single producer will be registered as distinct operations. (USDA, FSA, 2022a). DMC is a voluntary program that protects dairy producers when the difference between the U.S. all-milk price and a national feed cost value (as calculated by a formula) falls below a certain dollar amount selected by the dairy farmer.

For operations that were established prior to 2013, the historical production base to determine eligible quantities (production history) has been based on the highest milk production in 2011, 2012, and 2013 (USDA, FSA, 2022a). Newer dairy operations have other options for determining production history. For 2019, a dairy operation participating in the DMC program had the option to adjust its production history once to reflect an increase in national average milk production.¹⁹

The production history determined for a dairy operation participating in the DMC program may only be adjusted once to reflect any increase in the national average milk production (USDA, FSA, 2022a). Participating producers choose their covered production history (CPH) as a proportion of their eligible production history, with CPH ranging from 5 to 95 percent of eligible production history in 5 percent increments.

The Actual Dairy Production Margin (ADPM), as defined in the 2018 Farm Bill, is the difference between the U.S. all-milk price and a national feed cost, as calculated each month using a formula provided in the legislation (although the calculation is called an “actual” margin in the legislation, the calculation does not necessarily correspond to the margin experienced by individual dairy farmers). The national feed cost is a weighted sum of the price of corn, soybean meal, and alfalfa hay.²⁰ Each participating operation annually chooses a coverage level threshold (CLT), the dollar value of the ADPM as chosen by the farmer to trigger payments to be made through the program. For example, if an operation chooses a CLT of \$6.00 per hundredweight (cwt), the operation will receive an indemnity payment equal to the CLT minus the ADPM when the margin falls below \$6.00 per cwt. Available CLTs vary based on which of the two tiers a producer falls into, with the applicable tier being based on the production history of the operation (see table 2). Tier 1 CLTs range from \$4.00 up to \$9.50 while Tier 2 has a maximum CLT of \$8.00.

The DMC program offers:

- Catastrophic coverage (\$4.00 CLT)²¹ at no cost, other than an annual \$100 administrative²² fee.
- Greater coverage, at various levels, for a premium in addition to a \$100 administrative fee. The schedule of premiums is provided in table 2.

¹⁹ Currently, a dairy operation’s production history cannot be adjusted unless the operator establishes supplemental production history.

²⁰ Specifically, the national feed cost is calculated as: national feed cost = 1.0728 x corn price + 0.00735 x soybean meal price + 0.0137 x alfalfa price. The corn price is in U.S. dollars per bushel; alfalfa hay and soybean meal prices are in U.S. dollars per ton. The alfalfa hay price currently used is the price received for premium/supreme alfalfa hay in the five largest milk-producing States. Prior to November 2021, the alfalfa hay price was for 50 percent regular and 50 percent premium alfalfa.

²¹ Since the program’s inception, DMC milk margins have not dropped below a \$4.00 coverage level threshold.

²² Fee waivers are available for limited-resource, beginning, socially disadvantaged, or veteran farmers.

Table 2

Schedule of premiums for the Dairy Margin Coverage program (U.S. dollars per cwt)

Coverage level	Tier 1	Tier 2
	Premium per cwt for covered production history of 5 million pounds or less	Premium per cwt, all years for covered production history over 5 million pounds
4.00	None	None
4.50	0.0025	0.0025
5.00	0.005	0.005
5.50	0.030	0.100
6.00	0.050	0.310
6.50	0.070	0.650
7.00	0.080	1.107
7.50	0.090	1.413
8.00	0.100	1.813
8.50	0.105	NA
9.00	0.110	NA
9.50	0.150	NA

cwt = hundredweight; NA = not applicable.

Note: A dairy operation that made a one-time election of coverage level and coverage percentage that are applicable to each of calendar years 2019 through 2023 receives a 25-percent discount on premium rates. Tier 1 coverage is also applicable to the Supplemental Dairy Margin Coverage (SDMC) program.

Source: USDA, Economic Research Service using data from USDA, Farm Service Agency (2022a).

Generally, DMC offers many of the same features as MPP-Dairy. These features include coverage to producers based upon the difference between the all-milk price and a national composite feed cost, the ability to “buy up” to additional coverage levels, and coverage-level quantities based on a historical production base. With the introduction of DMC, several changes were also made to coverage level options and the premium rate structure. The 2018 Farm Bill raised the production limit for producers falling into Tier I of the program from 4 million pounds under the MPP to 5 million pounds under the DMC. The Tier I maximum coverage level also increased to \$9.50 under the 2018 Farm Bill. Available coverage under DMC is also changed from 25 to 90 percent under MPP to 5 to 95 percent under DMC. In addition, DMC also allows producers to enroll in Livestock Gross Margin (LGM) coverage, which was not allowed under MPP.

Additional changes have been made to DMC since the 2018 Farm Bill. In an administrative change in 2021, USDA’s FSA changed the formula for feed costs to use 100 percent premium/supreme alfalfa hay instead of the previous formula, including 50 percent regular and 50 percent premium/supreme alfalfa. The Consolidated Appropriations Act of 2021 allowed eligible DMC participants to create a supplemental production history and receive supplemental payments. Eligible dairy operations with less than 5 million pounds of established production history were allowed to enroll supplemental pounds based upon a formula using 2019 actual milk marketings. Supplemental Dairy Margin Coverage (SDMC) applies to calendar years 2021, 2022, and 2023. Enrollment in the SDMC was provided during the same period as the DMC enrollment for 2023 (October 17, 2022, through January 31, 2023). Established SDMC production history will be included in future DMC contracts and requires no additional action from the dairy operation.

Table 3 reports enrollment and payments for DMC from 2019 to 2022. Enrollment in 2020 was particularly low, with enrolled operations totaling only 43 percent of licensed dairy herds, as forecasts and futures markets during the enrollment period pointed to expectations of relatively high margins in 2020. However, due to supply chain problems during the pandemic, margins dipped to a low point of \$5.16 per hundredweight in

May of that year (figure 8). Although milk prices have trended higher through much of late 2021 and into 2022, feed prices have also climbed higher over the same period. Figure 9 shows the monthly national feed cost over the course of the DMC program, along with the individual component's contribution to the total feed cost. Corn comprises the largest component of the national feed cost, while soybean meal and alfalfa trade places for the remaining share, depending upon the month.

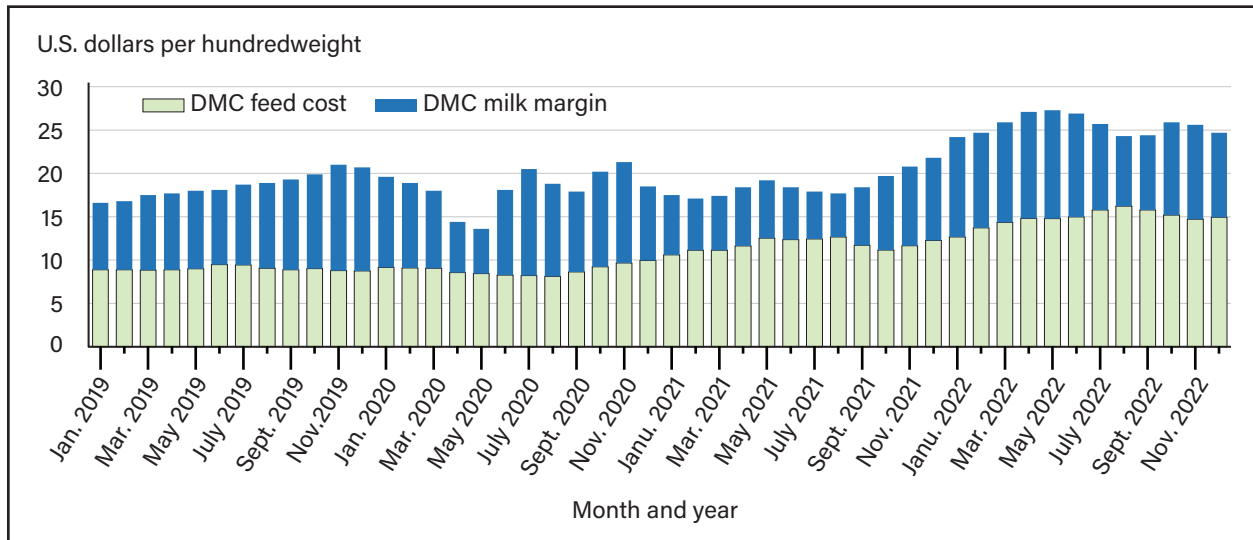
Table 3
Dairy Margin Coverage enrollment and payments, 2019–22

	Licensed dairy herds	Number of enrolled dairy operations	Percent enrolled	National milk production	Production history enrolled	Percent of milk production	Total payments	Average received per operation enrolled
Program year	Number	Number	Percent	Million pounds	Million pounds	Percent	Million dollars	dollars
2019	34,207	23,377	68	218,441	178,327	81.6	452	19,322
2020	31,652	13,499	43	223,309	121,024	54.2	234	17,334
2021	29,842	19,071	64	226,293	162,485	71.8	1,188	62,293
2022	27,932	17,966	64	226,462	160,408	70.8	84	4,675

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service and USDA, Farm Service Agency.

In 2021, the DMC participation rate increased to 64 percent. Due to relatively high feed prices, the average payment per participating operation in 2021 was about \$62,000, more than 3.5 times the average in 2020. DMC payments for 2021 totaled \$1.188 billion, up from \$452 million in 2019 and \$234 million in 2020. DMC enrollments for 2022 was similar to 2021; however, higher margins in 2022 led to total payments dropping to \$84 million. Participating operations with less than 5 million pounds of established production history were eligible to receive additional retroactive payments for 2021 and 2022 under SDMC. Retroactive payments were also issued due to a change in the feed cost formula for 2020, 2021, and 2022.

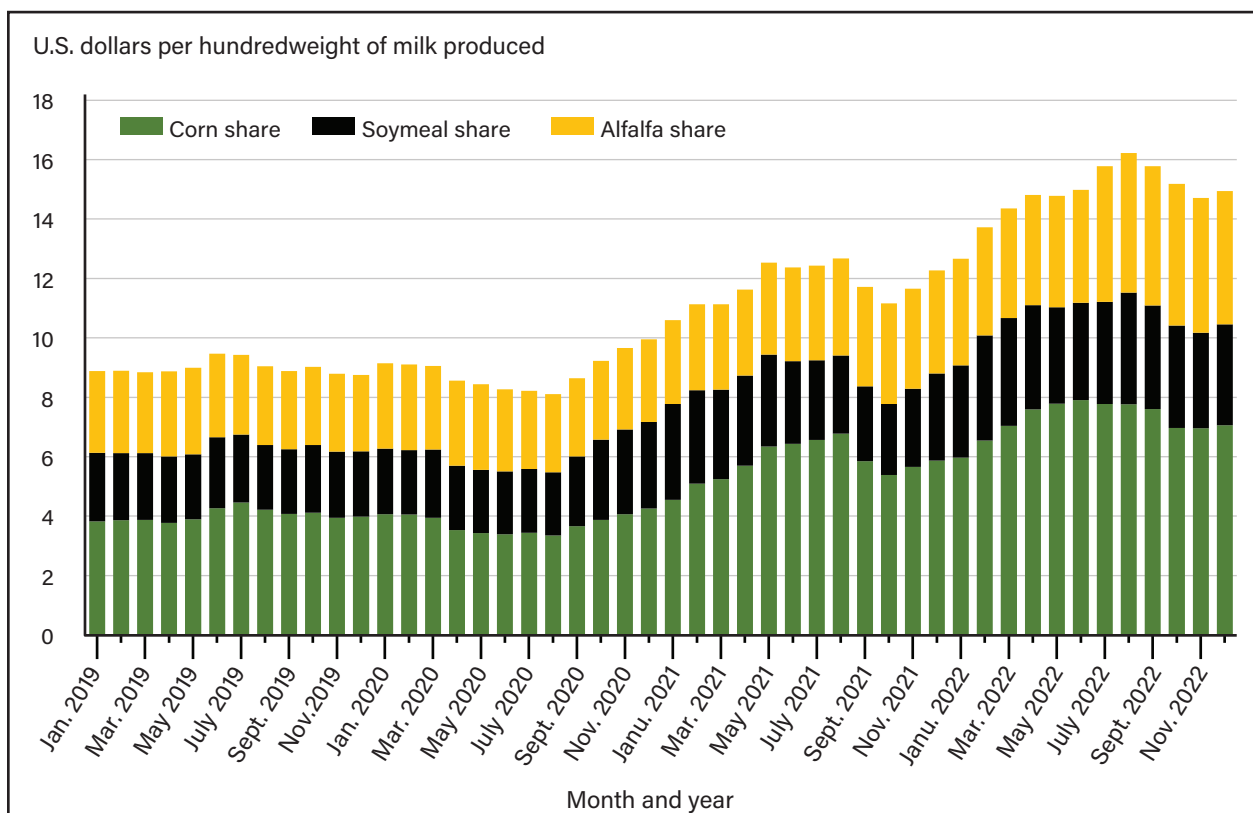
Figure 8
U.S. all-milk price, as a sum of Dairy Margin Coverage (DMC) feed cost and milk margin, January 2019–December 2022



Note: Feed costs in 2021 and after are adjusted to account for the formula change in which prices for only premium alfalfa hay are used. Feed costs in 2020 and earlier used the original formula, with 50 percent premium hay and 50 percent regular hay.

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

Figure 9
Dairy Margin Coverage national average feed cost estimate per 100 pounds of milk, January 2019–December 2022



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

Livestock Forage Disaster Program

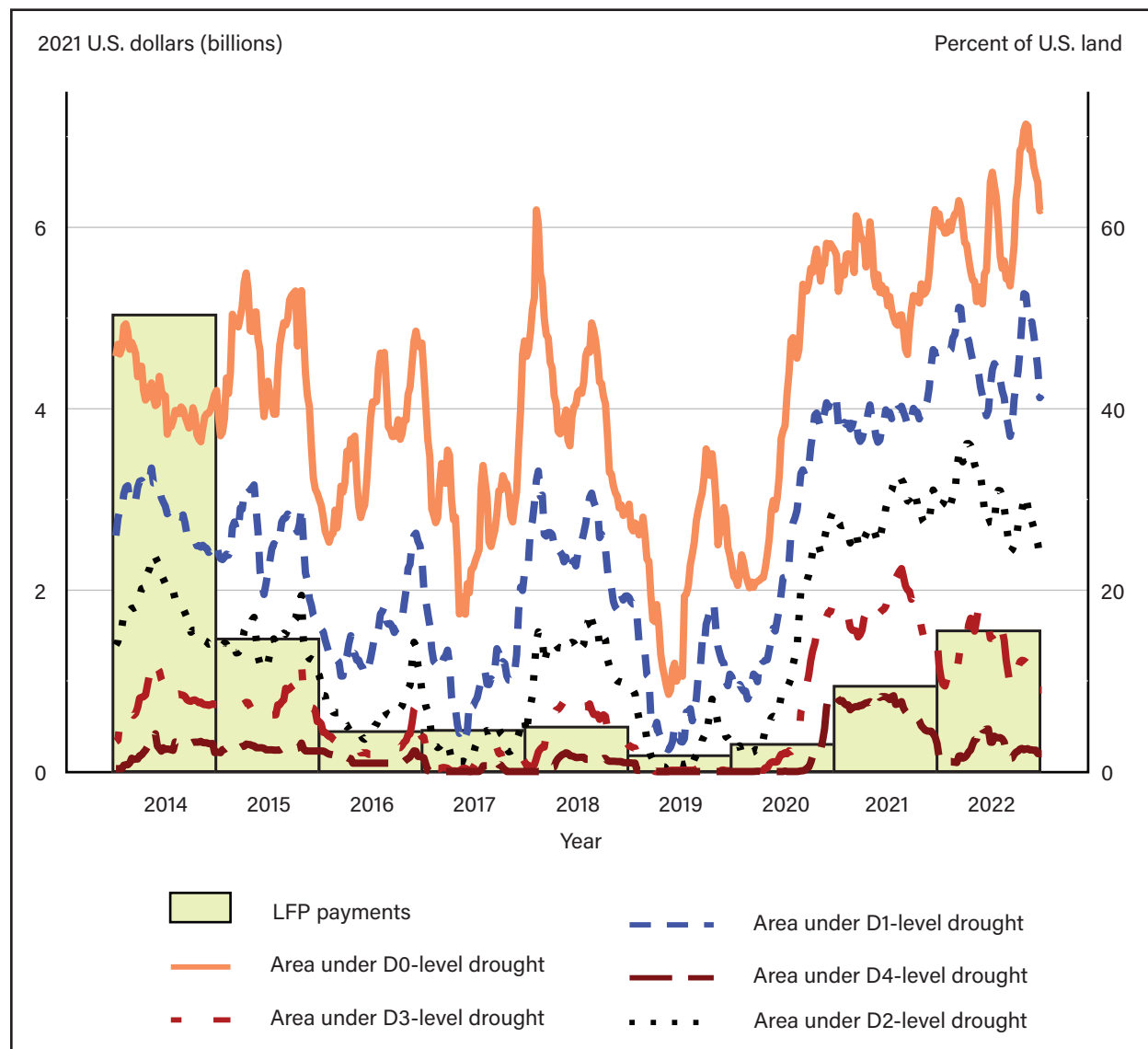
Livestock producers have access to several Federal risk management programs that offer protection against perils that are unique to raising livestock. The Livestock Forage Disaster Program (LFP), the largest of three disaster assistance programs, specifically targets livestock production and was permanently authorized as part of the 2014 Farm Bill.

LFP offers assistance to livestock producers that graze forage and incur forage losses as a result of drought. Eligible losses must have occurred on native or improved pastureland that has permanent vegetative cover or is planted to a crop for the specific purpose of grazing. Assistance is also available for producers that typically graze federally managed land but are temporarily prohibited from doing so due to a qualifying fire (USDA, FSA, 2023). Payment calculations are based upon the monthly feed cost for all covered livestock, assuming a normal carrying capacity on the grazing land suffering from a qualifying event. Payments for losses are calculated as 60 percent of the producer's costs for purchased feed intended to replace the feed lost due to the qualifying event, plus the value of any mechanically harvested forage or feed used to replace the lost feed.

Payments are commensurate with the length of time the county in which the livestock are grazing has been in a D2 drought²³ or higher during the normal grazing period, as reported in the U.S. Drought Monitor (National Drought Mitigation Center, 2022). For a producer to receive an amount equal to a 1-month payment, the area must be in a D2 drought for 8 consecutive weeks, while a 2-month payment requires the area to be in a D3 drought for any length of time, and a 3-month payment is issued in areas that have been under a D3 drought for any amount of time. Similarly, a 4-month payment is issued if a D3 drought is observed for 4 weeks or a D4 intensity drought occurs for any amount of time. A D4-level drought that spans at least 4 weeks results in a 5-month payment (the maximum a producer can receive under LFP). Figure 10 depicts payments made under LFP for 2014–21 (left axis) and shows drought severity as measured by the percentage of U.S. land area under various drought levels at weekly intervals (right axis).

²³ The U.S. Drought Monitor classifies drought conditions into five categories, ranging from D0 (abnormally dry) up to D4 (exceptional drought). For more information on drought classifications, see the U.S. Drought Monitor's documentation (National Drought Mitigation Center, 2022).

Figure 10
Livestock Forage Disaster Assistance Program payments and prevailing drought conditions, 2014–21



LFP = Livestock Forage Disaster Assistance Program.

Note: The U.S. Drought Monitor classifies drought conditions into five categories, ranging from D0 (abnormally dry) up to D4 (exceptional drought). For more information on drought classifications, see the U.S. Drought Monitor’s documentation (National Drought Mitigation Center, 2022).

The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from the U.S. Bureau of Labor Statistics. The left axis represents LFP payments in the year the payments were disbursed and may not necessarily be an accurate representation of when losses occurred that prompted disaster assistance. The right axis represents the percent of U.S. land area under the stated drought level or higher-level drought.

Source: USDA, Economic Research Service calculations using data from USDA, Farm Service Agency, U.S. Drought Monitor, and U.S. Bureau of Labor Statistics.

Due to modifications in the 2014 Farm Bill, payments made in 2014 are notably higher than any subsequent year at just over \$5 billion (2021 U.S. dollars), as payments in 2014 were retroactive and covered losses back to October 1, 2011 (USDA, FSA, 2014b). Payments made in 2015, although small relative to 2014, were still notably high at \$1.46 billion (2021 U.S. dollars), driven mostly by prevailing drought conditions during 2014. At least 10 percent of U.S. land area was classified by D3 level drought or higher (a sufficient condi-

tion for LFP payments) for 20 weeks in 2014 and for 10 weeks in 2015. From 2016 through 2019, there were no weeks when more than 10 percent of U.S. land was classified as D3 or higher, which yielded relatively low levels of LFP assistance. Drought conditions returned in late 2020 when D3 drought covered at least 10 percent of the United States for 17 weeks, and the entirety of 2021 registered 10 percent or more of the country being classified as being in D3 drought or higher.²⁴ Payments associated with the drought conditions of 2021 are expected to be reflected in disbursement made primarily in the 2022 calendar year.

Livestock Indemnity Program

The Livestock Indemnity Program (LIP), like LFP, also received permanent authorization status as part of the 2014 Farm Bill (USDA, FSA, 2014a). LIP offers assistance to producers who experience abnormally high livestock death rates (i.e., deaths in excess of expected mortality rates) due to adverse weather, disease, and animal attack. Eligible loss events are a necessary condition for LIP payment eligibility; however, additional evidence is needed that an eligible loss condition led to livestock deaths that are in excess of normal mortality rates.

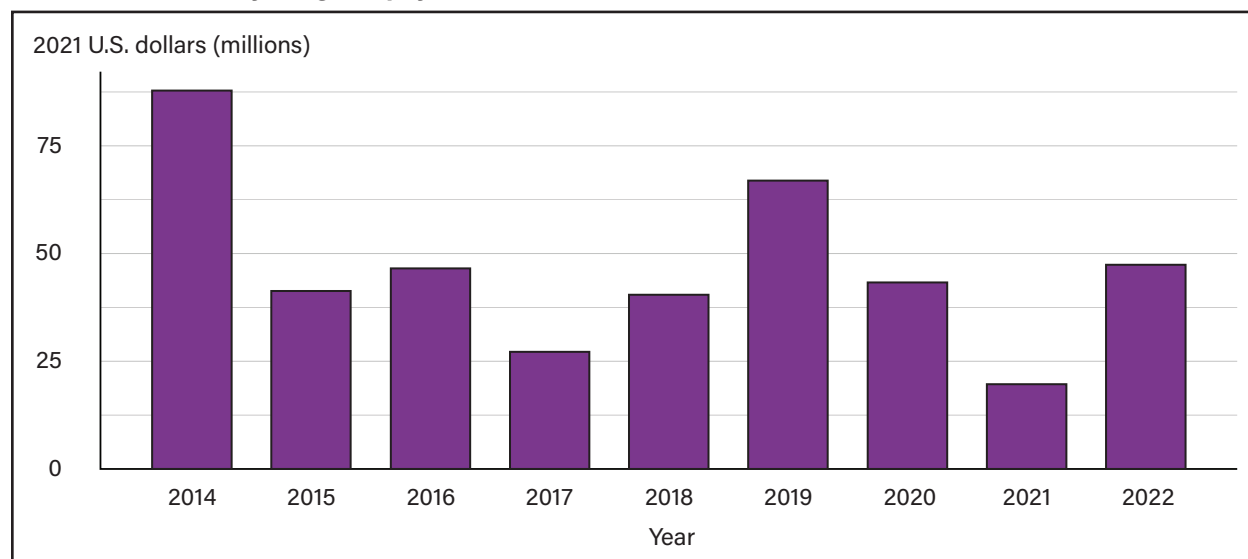
Producers who suffer losses are eligible to receive payments equal to 75 percent of the market value of the animals. Each year, the USDA, FSA estimates a national payment rate for each livestock category based on the fair market value of the livestock. Eligible producers receive a payment equal to the national payment rate, multiplied by the number of livestock lost as a result of the adverse event. Payments are not limited solely to producers who lose livestock to death, however. Producers who sell their livestock for a reduced price receive a payment that is calculated by multiplying the applicable payment rate by the number of livestock sold at a reduced price, minus the amount received when the injured livestock are sold (USDA, FSA, 2021b). This final value is multiplied by the producer's ownership share of the livestock.²⁵ If the selling price is greater than the national payment rate, the producer will not receive a payment (USDA, FSA, 2022b). Figure 11 depicts payments made under LIP from 2014–22. In addition to winter weather, the large number of LIP payments in 2014 are due to LIP covering losses retroactively (just like LFP) back to October 1, 2011 (USDA, FSA, 2014b). LIP payments in 2019 were also notably high, which were also attributable to winter weather in the early part of the year.

²⁴ Although the area of the United States that is subject to various drought conditions correlates with LFP payments, the correlation is imperfect since where the drought is occurring ultimately dictates the level of payments. For example, large areas of the United States that are under severe drought conditions may not result in large LFP outlays if the drought primarily occurred in areas that do not raise livestock.

²⁵ If producers do not fully own the livestock, the producers will receive a payment that is proportional to their shares. For example, a producer with a 50-percent ownership share would receive a payment half as large compared with if the producer's ownership share were 100 percent.

Figure 11

Livestock Indemnity Program payments



Note: The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from the U.S. Bureau of Labor Statistics. Payments are recorded in the year the payments were disbursed and may not necessarily be an accurate representation of when losses that prompted the disaster assistance occurred.

Source: USDA, Economic Research Service using data from USDA, Farm Service Agency and U.S. Bureau of Labor Statistics.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program

The Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP) provides emergency financial assistance for events that are not covered by LFP and LIP. Like LFP and LIP, ELAP was initially authorized in the 2008 Farm Bill (and received permanent authorization status as part of the 2014 Farm Bill). ELAP is designed to compensate eligible producers of livestock, honey bee, and farm-raised fish for losses incurred from diseases, most extreme weather events, and water shortages.

For honey bee producers, colony loss payments are equal to 75 percent of the market value of lost colonies (\$100 per colony for 2021) in excess of the normal 22-percent mortality rate. Similarly, hive loss payments are equal to 75 percent of the market value of lost hives (\$200 per hive for 2021). Honey bee feed loss payments are equal to 60 percent of the actual cost of any damaged feed supplies or feed purchased in excess of what is normally required to sustain the apiary. Farm-raised fish producers face similar payment calculations. Fish loss payments are equal to 75 percent of the market value of any fish lost beyond typical mortality rates, while feed loss payments are again equal to 60 percent of the cost of any ruined feed.

In addition to feed loss payments, livestock producers may also receive payments for grazing losses, water transport costs, and treatment of cattle tick fever. Grazing loss payments are calculated as 60 percent of the lesser of the value of feed costs incurred multiplied by lost grazing days (limited to 150 lost grazing days), or the value of normal carrying capacity (i.e., the amount of grass on the land under normal weather conditions) multiplied by lost grazing days, limited to 150 lost grazing days. Water cost reimbursements are 60 percent of the lesser of the cost to transport water for a maximum of 150 days or the cost to transport water for the program year. Finally, cattle tick fever payments are equal to 60 percent of the number of livestock treated or inspected multiplied by an average per-head cost to gather livestock that is established by USDA, FSA.

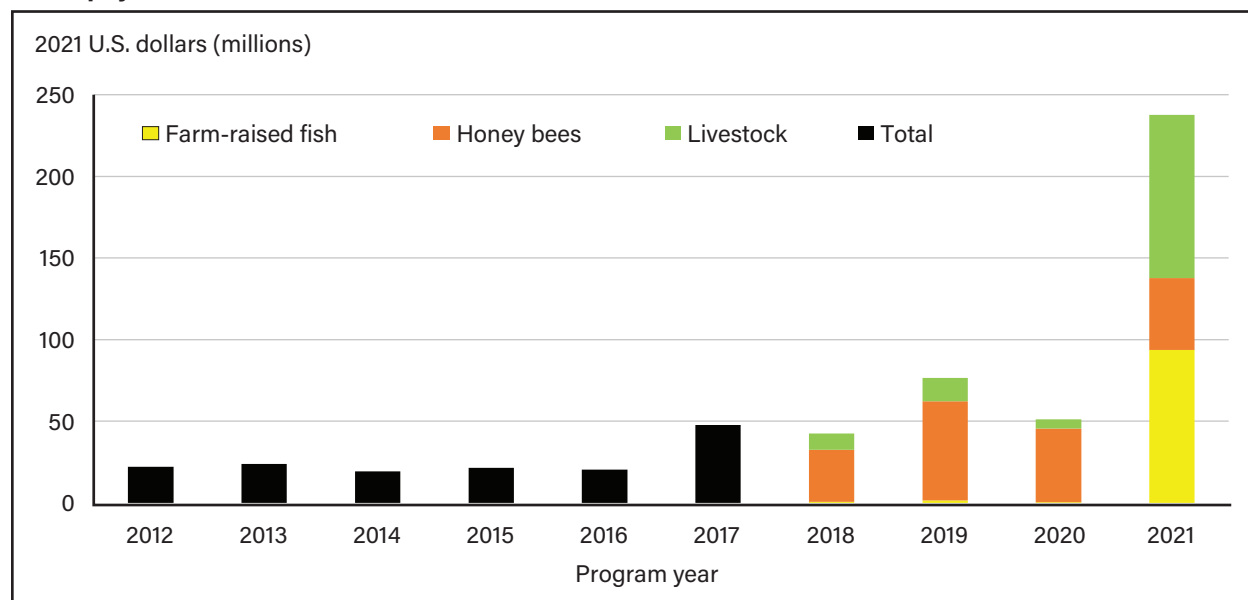
The 2018 Farm Bill made several changes to ELAP that broadened ELAP's scope, including covering the cost associated with gathering livestock to inspect for cattle tick fever (in addition to the cost related to the treatment of cattle tick fever that was previously included) and the inclusion of a new reimbursement rate of 90

percent for socially disadvantaged, limited-resource, beginning, or veteran farmers or ranchers (USDA, FSA, 2021a). ELAP payments were also removed from the combined payment limitation that was previously in place for ELAP and LFP payments.²⁶

In 2021, ELAP was expanded to cover the costs of transporting feed for grazing livestock (or transporting livestock to feed) in response to pervasive drought conditions across the United States. This benefit was offered retroactively for 2021 and made available for 2022 and subsequent program years. Also in 2021, aquaculture losses due to major winter storms that affected States along the Gulf Coast prompted a new provision that made fish raised for food and other aquatic species eligible for ELAP death loss benefits; previously, only farm-raised game and bait fish were eligible. Payments were made for losses in 2021 and were authorized for subsequent program years.

ELAP funding was capped at \$50 million per year under the 2008 Farm Bill and at \$20 million under the 2014 Farm Bill. The 2018 Farm Bill removed the funding cap, effective starting with the 2017 program year. Figure 12 shows that ELAP payments ranged from \$16 million to \$20 million from 2012 to 2016 and have increased substantially in recent years.

Figure 12
ELAP payments, 2012-21



ELAP = Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program.

Note: The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from the U.S. Bureau of Labor Statistics. Prior to 2019, the ELAP program year was based on a fiscal year (October 1 to September 31). As part of the 2018 Farm Bill (enacted on December 20, 2018), reporting of program expenditures was changed to a calendar year basis (January 1 to December 31) for 2020 and subsequent years for consistency with the other disaster assistance programs (Livestock Forage Disaster Program, Livestock Indemnity Program, and Tree Assistance Program). Data to decompose payments by category are not available prior to 2018.

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

²⁶ A stipulation remains, though, that a person or legal entity with an average adjusted gross income that exceeds \$900,000 is not eligible to receive ELAP payments.

In 2021, ELAP payments totaled approximately \$237 million, with the bulk of payments providing compensation for the recently authorized feed transportation costs for grazing livestock affected by drought and for farm-raised fish deaths due to the Gulf Coast storms. In contrast, at least 75 percent of the total annual payments were made to honey bee producers who incurred colony, hive, and/or feed losses in 2018, 2019, and 2020.

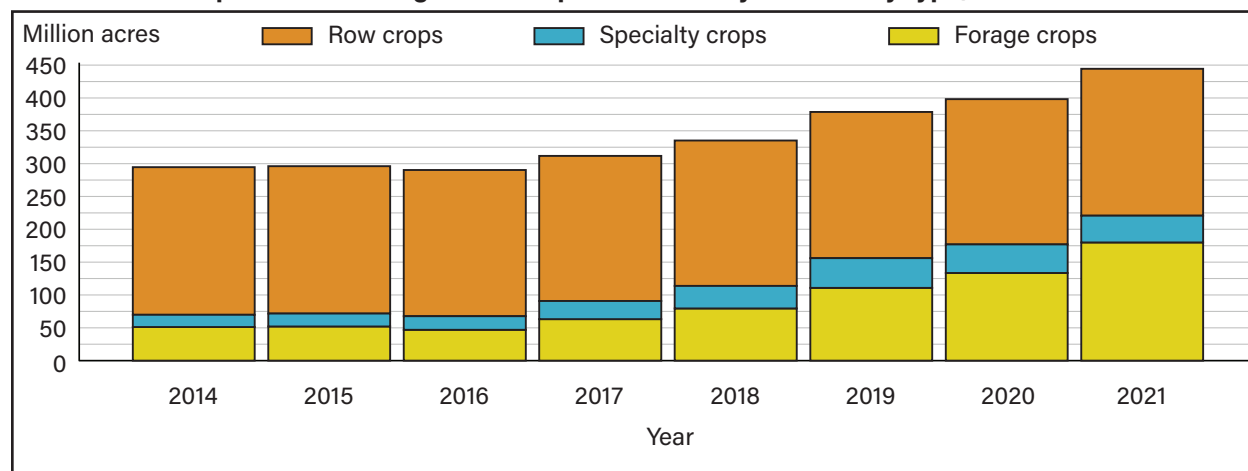
Title XI Support Programs and Noninsured Crop Disaster Assistance Program

Title I of the Farm Bill offers a suite of risk management policies aimed at providing support in the face of systematic (i.e., national or countywide) declines in farm revenue or price. However, producers still face some level of risk that is specific to their unique operating environment. Consequently, on-farm losses may not correlate with aggregate-level trends that trigger most Title I support programs. Agricultural insurance that is available through USDA’s FCIP and supported via title XI of the Farm Bill (P.L. 115–334, 2018; Rosch, 2021) helps fill this void.²⁷

The FCIP is governed by the USDA, Federal Crop Insurance Corporation (FCIC), which is managed by USDA, Risk Management Agency (RMA) and provides crop insurance products that help producers deal with multiple perils affecting U.S. farmers and ranchers. From 2000 to 2020, FCIP offered financial and administrative support for 120 unique agricultural commodities, covering an average of 287 million acres annually (representing an average of 87 percent of all U.S. principal cropland²⁸ over the past two decades). In recent years, the program has grown substantially, insuring more than 300 million acres for the first time in 2017 (figure 13) and reaching 444 million insured acres for the 2021 crop year.

Figure 13

U.S. Federal Crop Insurance Program net reported acres by commodity type, 2014–21



Note: Row crops include dry peas, barley, grain sorghum, buckwheat, corn, cotton, cultivated wild rice, hybrid corn seed, hybrid sorghum seed, oats, peanuts, rice, soybeans, wheat, and hybrid seed rice. Specialty crops includes all other crops not explicitly listed under row crops and not grown for purposes of forage or grazing. Federal Crop Insurance Program data are based on USDA, Risk Management Agency’s (RMA) Summary of Business as of January 19, 2023.

Source: USDA, Economic Research Service using data from USDA, RMA.

²⁷ The private sector also offers limited access to crop insurance, with most private sector options being limited to a single peril. The vast majority of crop insurance policies sold in the United States originate from the FCIP.

²⁸ Principal crops for area planted calculations are corn, sorghum, oats, barley, rye, winter wheat, Durum wheat, other spring wheat, rice, soybeans, peanuts, sunflower, cotton, dry edible beans, chickpeas, potatoes, sugarbeets, canola, and proso millet (USDA, National Agricultural Statistics Service, 2022).

Traditional Policies

A large variety of insurance products are available under the FCIP for producers wanting to insure a single commodity. Most insurance policies fall into one of three protection types. Yield-based policies offer protection against a decline in production but do not offer any recourse in the event of unfavorable price volatility. Alternatively, revenue-based policies calculate indemnity payments commensurate with the producer's decline in revenue, meaning these policies inherently offer protection from low yields and low output prices simultaneously. In some cases, margin protection policies are available that provide coverage against a decrease in operating margin (i.e., revenue minus input costs); however, the ability to offer these policies is dependent on sufficient data to accurately track input prices which is not always available.²⁹

Within each class of protection type, policies are further defined by the type's indemnity trigger. Individual-based policies issue indemnity payments conditional on farm-level outcomes. Producers participating in individual-based policies can elect to insure 50–85 percent (in 5 percent increments) of the producers' expected yield or revenue.³⁰ Alternatively, some policies are defined at the group level, meaning indemnity payments are based on the outcomes of a collection of individual farms. Producers participating in group-based policies can insure 50–95 percent (in 5 percent increments) of their group's expected yield, revenue, or margin. It is worth noting that producers who choose to insure using a policy with a group-level indemnity trigger face the risk that the producers personally experience either adverse declines in yield, revenue, or margin—but the group-level index that the producers' policy is based on does not reach a critical threshold to warrant an indemnity payment, a phenomenon known as “basis risk.”

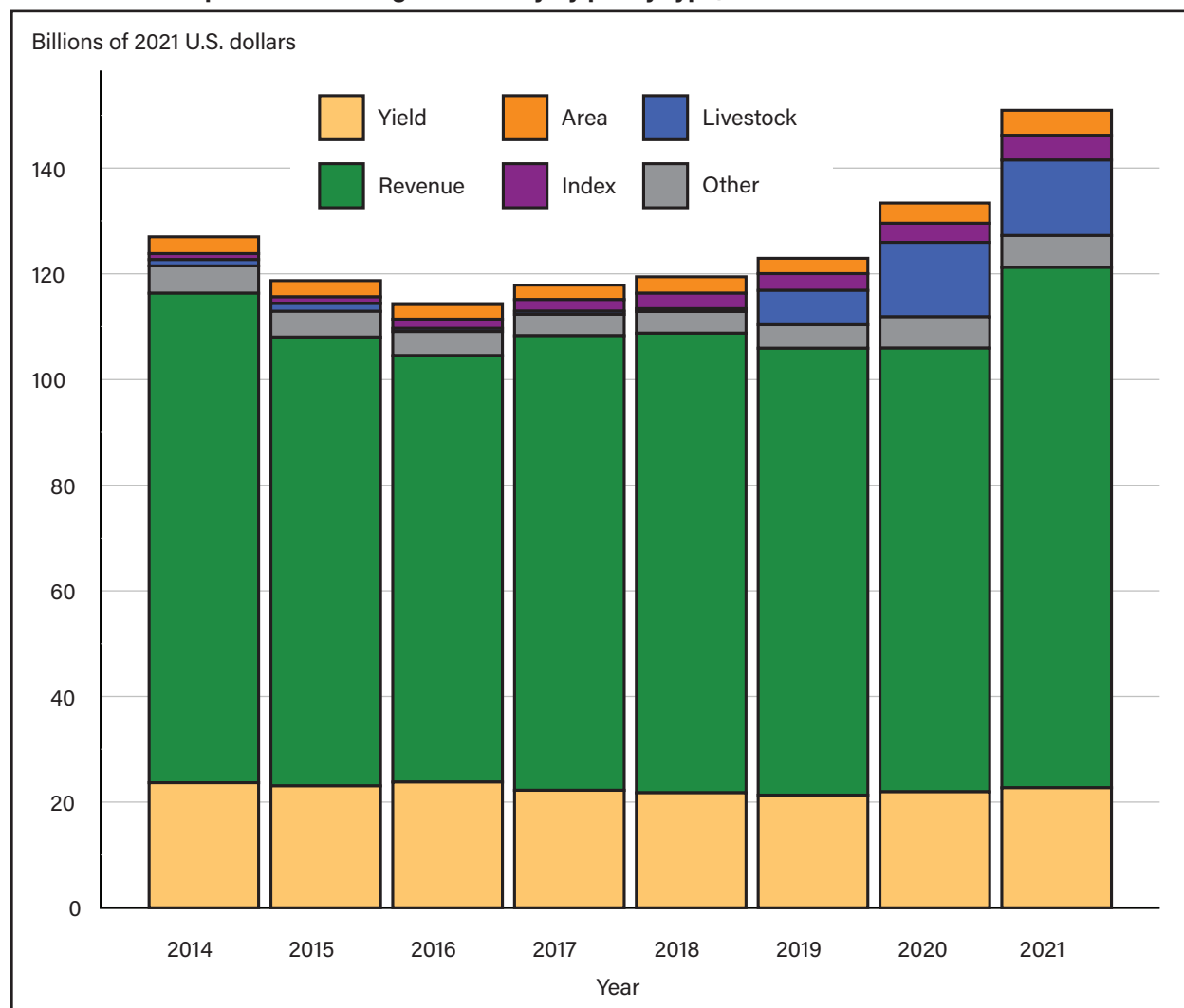
Figure 14 shows insured liability under each policy type from 2014–21. Individual revenue-based insurance is the dominant form of protection within the FCIP (which averaged 73 percent of annual insured liability between 2014–21), followed by individual yield-based insurance (which averaged 19 percent of insured liability between 2014–21). Group-level policies (both yield and revenue) have always represented a minority of insured liability. Since 2014, group-level policies have consistently made up between 7 and 9 percent of total annual insured liability.

²⁹ As of 2022, margin protection insurance was available for only corn, rice, soybeans, and wheat in select counties.

³⁰ All coverage level choices are not universally offered. Available coverage levels are dependent on the crop being insured and the county where production is taking place.

Figure 14

U.S. Federal Crop Insurance Program liability by policy type, 2014-21



Note: Policies classified as yield protection plans include Actual Production History (APH), Production Revenue History-Yield (PRH-Y), and Yield Protection (YP). Policies classified as revenue protection plans include Adjusted Gross Revenue (AGR), Adjusted Gross Revenue-Lite (AGR-L), Actual Revenue History (ARH), Production Revenue History-Plus (PRH-P), Production Revenue History-Revenue (PRH-R), Pecan Revenue (PRV), Revenue Protection (RP), Revenue Protection with Harvest Price Exclusion (RPHPE), and Whole Farm Revenue Protection (WFRP).

Policies classified as area plans include: Area Revenue Protection (ARP), Area Revenue Protection with Harvest Price Exclusion (ARP-HPE), Area Yield Protection (AYP), Enhanced Coverage Option-Revenue Protection (ECO-RP), Enhanced Coverage Option-Revenue Protection with Harvest Price Exclusion (ECO-RPHPE), Enhanced Coverage Option-Yield Protection (ECO-YP), Hurricane Insurance Protection-Wind Index (HIP-WI), Margin Protection (MP), Margin Protection with Harvest Price Option (MP-HPO), Supplemental Coverage Option-Revenue Protection (SCO-RP), Supplemental Coverage Option-Revenue Protection with Harvest Price Exclusion (SCO-RPHPE), Supplemental Coverage Option-Yield Protection (SCO-YP), Stacked Income Protection Plan-Revenue Protection (STAX-RP), Stacked Income Protection Plan-Revenue Protection with Harvest Price Exclusion (STAX-RPHPE), and Vegetation Index (VI).

Policies classified as index plans include Rainfall Index (RI).

Policies classified as other protection include Aquaculture Dollar (AQDOL), Dollar Amount Of Insurance (DO), Fixed Dollar Amount of Insurance (FD), Tree Based Dollar Amount Of Insurance (TDO), and Yield Based Dollar Amount Of Insurance (YDO).

Data in the chart represent USDA, Risk Management Agency's (RMA) Summary of Business files as of January 19, 2023. The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from the U.S. Bureau of Labor Statistics (BLS).

Source: USDA, Economic Research Service using data from USDA, RMA and BLS.

Given that insured crop insurance liability takes into account commodity prices, crops that belong to market segments that face different prices can potentially end with crop insurance guarantees that don't accurately reflect the price the producer receives. This finding is particularly relevant for organically grown crops, which typically command a price premium over conventionally grown commodities. The 2014 Farm Bill required USDA's RMA to expand organic price election³¹ by 2015. In 2014, the agency also introduced the contract price option, allowing organic and transitioning producers to use personal contract prices as their price election. As a result, the use of crop insurance by organic growers increased, although at a lower rate than conventional growers. As of 2022, organic price elections are available for most crops eligible for insurance (84 distinct organic price elections).³² Organic acreage covered by crop insurance has increased on an annual basis, reaching almost 2 million acres covered by 2021. Insured acres under organic transition peaked in 2020 at 145,000 acres but fell by 18 percent in 2021. To incentivize organic transition and crop insurance use, USDA's RMA Transitional and Organic Grower Assistance (TOGA) Program will provide crops in transition with a premium assistance of 10 percentage points and an additional \$5 per insured acre of organic grain and feed crops for reinsurance year 2023.

In recent years, efforts have been made to introduce policies that offer more comprehensive protection that are not unique to each commodity being produced or the production practices employed. Following the passage of the 2014 Farm Bill, USDA's RMA introduced the Whole-Farm Revenue Protection (WFRP) insurance product in 2015 to provide a risk management safety net for all commodities on the farm under one insurance policy. WFRP offers protection to producers with up to \$17 million in insured revenue, including farms with specialty or organic commodities (both crops and livestock) or those marketing to local, regional, farm-identity preserved, specialty, or direct markets. From 2015–21, the total WFRP insured liabilities were equivalent to approximately 1.7 percent of total FCIP liabilities. In 2022, USDA's RMA also introduced Micro Farm insurance. Like WFRP, Micro Farm insurance also provides coverage for all commodities on the farm under one insurance policy. This insurance is predominately designed for small farms producing one or more commodities with up to \$350,000 in approved revenue.³³ Unlike WFRP, Micro Farm insurance also accommodates the inclusion of postproduction and value-added costs in the approved revenue determination.

Although the FCIP primarily provides insurance policies for crop producers, several options are offered for managing risks associated with livestock production. The current insurance plans available under the FCIP for livestock producers include Livestock Risk Protection, Livestock Gross Margin, and Dairy Revenue Protection. The Livestock Risk Protection policy provides coverage for producers of feeder cattle, fed cattle, and swine and protects against declining market prices. Producers select a coverage level and time period (measured in weeks, up to a maximum of 52) that the policy will remain in effect. Indemnity payments are triggered when the actual value of the livestock at the end of the policy period is below the insurance guarantee established by the producer's chosen coverage level and expected price at the time of the policy's purchase.

Livestock Gross Margin policies guarantee gross margins (value of livestock minus feed costs) and are available for cattle, dairy cattle, and swine. Policy details vary slightly (based on the livestock being produced), but generally, a margin guarantee is established based on prevailing market prices and a formula for feed costs.

³¹ "Organic price election" refers to the insured organic crop being assigned a price that explicitly accounts for the fact that the commodity was grown organically.

³² Nineteen crops did not receive an organic price election, either due to no known organic production, limited data hindering RMA's ability to create an actuarially sound product (e.g., peppers), or the crop not receiving an organic price premium. Limited data in organic markets have limited RMA's ability to introduce new organic policies. As a response, RMA created the Production and Revenue History Plan (PRH), which considers producers' own revenue history. RMA plans to use PRH to introduce organic coverage for crops with limited data, such as peppers.

³³ Producers who purchased Micro Farm insurance in the prior year can have up to \$400,000 in approved revenue (USDA, Risk Management Agency, 2022).

Producers can then choose a deductible, which determines how much their realized margins can be below the margin guarantee before an indemnity payment is issued.

Finally, the Dairy Revenue Protection program, initially offered starting at the end of 2018, mitigates declines in revenue for milk producers. Revenue guarantees are based on regional-specific futures prices for milk and a coverage level chosen by the producer. When actual revenue falls below the revenue guarantee, indemnity payments are equivalent to the difference between the established revenue guarantee and actual revenue. Historically, livestock policies have represented a small share of liability insured by the FCIP. Between 2014 and 2018, liability insured by livestock policies averaged less than 1 percent of total liability insured in the FCIP. In 2019,³⁴ which corresponded with the introduction of the Dairy Revenue Protection (Dairy-RP) program, liability insured under livestock policies jumped to 5.3 percent of total FCIP liability, with Dairy-RP representing 5 percent of total liability by itself. Insured liability under livestock policies represented 9.5 percent of the total liability for 2020 and 10.5 percent for 2021 (almost all of which was attributable to increased participation in the Dairy-RP program).

Endorsements and Special Provisions

Supplemental Policies and Endorsements

In addition to the traditional crop insurance policies offered within the FCIP, a number of endorsements and special provisions are available, which are typically characterized as additional coverage that can be “stacked” with a traditional policy to achieve a greater level of protection or mitigate a specific risk. Traditional crop insurance policies at the individual level are typically offered with coverage levels between 50 and 85 percent in 5 percent increments,³⁵ meaning that even at the highest level of coverage, a loss equal to 15 percent of the value of the farm’s harvested commodity (i.e., the deductible) must be incurred before a traditional policy will trigger an indemnity payment. To address this issue, the 2014 Farm Bill introduced two new supplemental endorsements. Supplemental endorsements have gained popularity in recent years and provide additional protection on top of the protection offered by an underlying traditional policy, or the endorsements provide protection against specific perils that may not be covered under a traditional policy. Table 4 summarizes and compares the currently available supplemental policies.

³⁴ Prior to 2019, FCIC expenditures on livestock programs were capped at \$20 million (a stipulation of the Agricultural Risk Protection Act of 2000). This cap was subsequently removed as part of the 2018 Bipartisan Budget Act.

³⁵ However, all available coverage levels are not available for all plans and commodities, meaning not all producers have the option to insure at the highest levels of coverage.

Table 4

Title XI supplemental policies

Endorsement	Supplemental Coverage Option (SCO)	Stacked Income Protection Plan (STAX)	Enhanced Coverage Option (ECO)	Hurricane Insurance Protection-Wind Index (HIP-WI)
First crop year available	2015	2015	2021	2020
Underlying policy requirements	Requires a current YP, RP, or RP-HPE policy	Can be purchased as standalone policy or combined with YP, RP, RP-HPE, ARPI, WFRP	Requires a current YP, RP, or RP-HPE policy	Requires a current policy under the FCIP Basic Provisions
Crop availability	52 crops	Upland cotton only	31 crops	70 crops
Restrictions	Cannot be combined with ARC-CO or ARC-IC	Farm cannot have seed cotton enrolled in ARC/PLC	Cannot be combined with HIP-WI, STAX, Margin Protection, or ARPI	Available in 750 counties on the East Coast, Gulf of Mexico, and Hawaii
Subsidy rate ⁴	65 percent of premium	80 percent of premium	51 percent of premium for YP (44 percent for RP)	65 percent of premium
Payment trigger	County revenue (or yield if underlying policy is YP) falls below 86 percent of its expected level	Area ¹ revenue falls below chosen percent (can choose between 75 and 90 percent) of its expected level	County revenue (or yield if underlying policy is YP) falls below 95 percent or 90 percent ² of its expected level	Sustained hurricane force winds in county or adjacent county
Payment calculation	Assuming 75 percent RP companion policy: $(0.86 - 0.75) \times$ expected revenue	Assuming 75 percent coverage: County revenue - $(0.90 \times$ expected county revenue) \times protection factor	Assuming 95 percent coverage: $(0.95 - 0.86) \times$ expected crop value ³	Assuming 75 percent underlying policy and 80 percent HIP-WI coverage level: $(0.95 - 0.75) \times 0.8$
Maximum payment condition	County revenue drops to the coverage level of the underlying policy	County revenue drops to a percentage of expected revenue equal to the coverage level chosen by the producer	County revenue drops below 86 percent of expected county revenue	Full payment is disbursed if sustained hurricane force winds are detected in the county or adjacent county (no partial payments are possible)

YP = Yield Protection; RP = Revenue Protection; RP-HPE = Revenue Protection - Harvest Price Exclusion; FCIP = Federal Crop Insurance Program; ARPI = Area Risk Protection Insurance; WFRP = Whole-Farm Revenue Protection; ARC-CO = Agriculture Risk Coverage-County Option; ARC-IC = Agriculture Risk Coverage-Individual Option.

¹ "Area" generally refers to the county of the insured crop but can also include other counties or practices if necessary to obtain a sufficient amount of data to establish credible expected yields.

² The producer has the option to choose either 95 percent or 90 percent as the chosen level that the indemnity trigger is based on.

³ Crop value is equal to the (Trend Adjusted Actual Production History Yield) \times (the higher of the projected price or harvest price) \times (chosen coverage level - .86). If the underlying insurance policy is yield-based, actual county revenue and expected county revenue are replaced with actual county yield and expected county yield in the payment calculation.

⁴ The subsidy rate indicates the share of the total premium that is not paid by the producer. For example, if a producer's total insurance premium was \$10, of which the producer paid \$4, the subsidy rate would be 60 percent.

Source: USDA, Economic Research Service using data from USDA, Risk Management Agency.

The first of these, the Supplemental Coverage Option (SCO), is available as an endorsement to an existing individual crop insurance policy (i.e., Yield Protection (YP), Revenue Protection (RP), or Revenue Protection with Harvest Price Exclusion (RP-HPE)), meaning the producer must purchase a traditional crop insurance policy to take advantage of SCO. SCO mimics the protection of the underlying policy held by the producer (i.e., SCO offers protection against low yields or revenues, depending on if the underlying individual policy is yield- or revenue-based). Like traditional crop insurance policies, the premium for SCO coverage is conditional on the crop, county, coverage level, and type of protection (yield or revenue) associated with the policy. SCO begins to

provide indemnity payments when county revenue (or yield if the underlying policy is yield based) falls below 86 percent of its expected level. Payments are equal to the difference between 86 percent and the coverage level of the underlying policy, multiplied by the expected farm revenue. Thus, for producers with high coverage levels on their underlying policy, SCO offers limited additional benefit, as a 14-percent deductible still exists under SCO coverage. Notably, a producer with SCO coverage cannot also enroll in ARC.³⁶

The second supplemental policy introduced in the 2014 Farm Bill is the Stacked Income Protection Plan (STAX), which functions similarly to SCO in the sense that both types of protection can be used to mitigate losses that would typically not be large enough to surpass the deductible of a traditional crop insurance policy. However, STAX is exclusively offered to producers of upland cotton. Effectively, STAX offers protection on between 5 and 20 percent of the producer's deductible (depending on the producer's choice of STAX coverage). Unlike SCO, STAX can operate as a stand-alone policy or can be bundled with an underlying companion policy. Producers opting for STAX coverage select an upper and lower bound of losses that can be indemnified. The "area loss trigger," which serves as the upper bound, can be selected in 5 percent increments between 75 and 90 percent of expected county revenue. A lower bound is also selected, which must be greater than 70 percent and not less than the coverage level of a bundled companion policy. STAX payments are disbursed when area revenue drops below the percentage of its expected level, defined by the chosen area loss trigger. The maximum STAX payment is received when area revenue drops to the coverage level chosen by the producer.

The 2018 Farm Bill did not directly authorize any new supplemental policies or endorsements. However, USDA's RMA has subsequently introduced several new products under its discretionary authority via the 508(h) process for new product development.³⁷ One of these new products, the Enhanced Coverage Option (ECO), was added for crop year 2021 and serves as an additional option for producers wanting to further limit the size of their crop insurance deductible beyond what is possible with SCO (USDA, RMA, 2020a). Like SCO, ECO offers protection for losses that would not meet most traditional policy's deductible threshold, must be combined with a companion policy that determines the coverage type (yield or revenue), and has a payment trigger based on reductions in county revenue or yield. Unlike SCO, ECO offers coverage for a different range of loss magnitudes. While SCO offers protection when outcomes fall below 86 percent of expected outcomes (meaning farmers must still pay a deductible of 14 percent), ECO offers protection for losses between 86 percent and either 90 or 95 percent (depending on the level chosen by the producer) of the expected outcome. Effectively, ECO provides coverage for 4 or 9 percent of the producer's deductible for the 90- and 95-percent coverage levels, respectively. ECO cannot be combined with other area risk protection insurance, STAX, or a margin protection policy but can be bundled with an SCO policy to effectively reduce the producer's deductible to 5 or 10 percent. Additionally, unlike SCO, a producer can simultaneously hold ECO coverage while being enrolled in ARC.

Most supplemental policies and endorsements (i.e., STAX, SCO, and ECO) are multi-peril policies and provide protection against a host of hazards (including drought, excess moisture, damaging freezes, hail, wind, disease, and price fluctuations). However, due to the unique susceptibility of producers in the Gulf of Mexico and Atlantic (as well as in Hawaii) to hurricane-induced losses, USDA's RMA introduced an area-based named peril policy in those regions for the 2020 crop year—Hurricane Insurance Protection-Wind Index (HIP-WI) (USDA, RMA, 2021b).

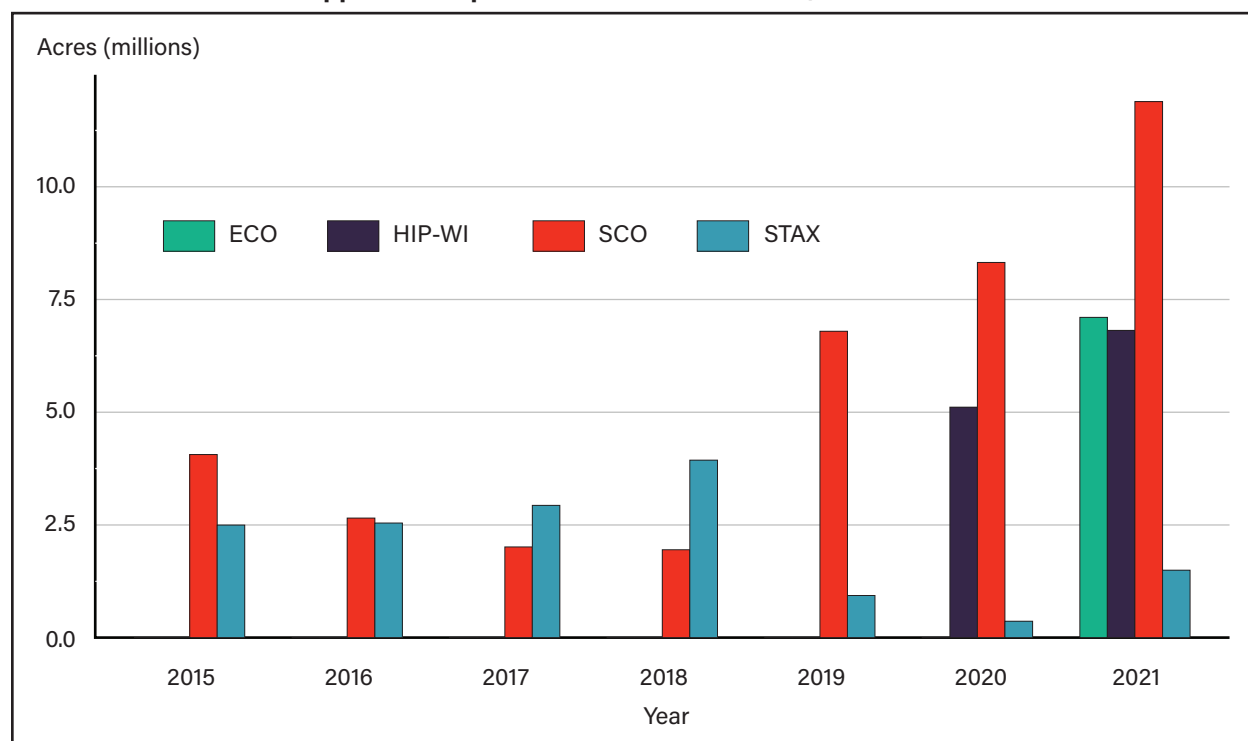
³⁶ Due to similarities in the payment mechanisms, simultaneous coverage under ARC and SCO would potentially provide compensation for the same peril twice.

³⁷ The 508(h) process allows private sector individuals or groups to propose new insurance products, which are then considered and reviewed by the FCIC Board of Directors.

Producers opting for HIP-WI coverage can add the coverage as an endorsement to a policy defined under the FCIP basic provisions. HIP-WI provides coverage for losses between the underlying policy coverage limit and 95 percent of the expected crop value (known as the hurricane coverage range). Producers must also select a coverage level between 1 and 100 percent, which is multiplied by the hurricane coverage range to obtain their “hurricane protection amount.” The full value of this amount is disbursed when sustained hurricane force winds from a named storm occur in the producer’s county or an adjacent county.

The number of acres enrolled in supplemental policies and endorsements has generally increased since the inception of the product class (figure 15). Following the 2014 Farm Bill, initial enrollment in SCO and STAX totaled approximately 4 million and 2.5 million acres, respectively. For reference, total insured acres totaled approximately 300 million acres for crop year 2015, meaning supplemental programs were adopted by a small share of producers.³⁸ Between 2015 and 2018, acres endorsed under SCO declined each year, while acres in STAX increased over the same period. Following the 2018 Farm Bill, acres endorsed under SCO increased dramatically, from approximately 2 million acres for the 2018 crop year to 6.8 million acres in 2019. This increase is potentially attributable to the 2018 Farm Bill allowing producers to alter their election into ARC or PLC and the resulting shift in acreage out of ARC-CO and into PLC. Given that SCO cannot be combined with ARC, all acreage that was moved from ARC to PLC became eligible for SCO, whereas that acreage was not eligible for SCO prior to the 2018 Farm Bill.

Figure 15
Endorsed acres under supplemental policies and endorsements, 2015-21



ECO = Enhanced Coverage Option; HIP-WI = Hurricane Insurance Protection-Wind Index; SCO = Supplemental Coverage Option; STAX = Stacked Income Protection Plan.

Note: Acres enrolled in one supplemental program do not necessarily disallow those same acres from being enrolled in an additional supplemental program. Thus, summing endorsed acres across all supplemental programs in a given year does not convey an accurate representation of total acres enrolled in all supplemental programs.

Source: USDA, Economic Research Service using data from USDA, Risk Management Agency.

³⁸ Although the 2.5 million acres endorsed under STAX represent a small share of the FCIP, it represents approximately 30 percent of the 8.2 million acres of cotton insured during crop year 2015.

Endorsed acres under SCO continued to grow in 2020 (to 8.3 million acres) and 2021 (to 11.9 million acres). This growth coincided with the introduction of new supplemental programs HIP-WI and ECO. HIP-WI was first available for the 2020 crop year and initially endorsed just over 5 million acres. Finally, for 2021, ECO was introduced with initial enrollment totaling 7.1 million acres. Despite substantial growth in acres endorsed under supplemental programs, these programs still represent a minority of all insured acreage. For 2021, 445 million acres were insured under other crop insurance policies, meaning that the largest supplemental program in 2021 (SCO) still only represented less than 3 percent of total insured acreage.

Conservation and Climate Smart Production Practice Incentives

In recent years, USDA's RMA has introduced two new programs that provide incentives for producers to adopt or maintain conservation practices. In addition to providing positive environmental benefits, many conservation efforts can also reduce risk for producers. Cover crops, for example, which are crops typically planted in the off-season for purposes of improving soil quality as opposed to being planted for harvest, provide a variety of risk mitigating effects. These effects include the capture and preservation of soil moisture (Qi & Helmers, 2010; Sharma & Steiner, 2018; Villamil et al., 2006), weed and pest impairment (Masilionyte et al., 2017; Sharma & Steiner, 2018), and increased soil organic matter (McDaniel et al., 2014).

Aside from the environmental benefits of cover crops, all of these properties have the potential to improve yields and may make the farm more resilient against adverse weather events (Fageria et al., 2005). However, although some studies have found cover crops to increase yields, the effects of cover crops on yields have been shown to be contingent on cover crop practice decisions (seeding rates, planting timing, termination methods, etc.) (Wayman et al., 2015). The risk reduction potential of cover crops can also vary based on regional climatology and the primary source of crop peril. For example, Won et al. (2023) found that cover crop use correlates with decreased prevented planting losses, which are usually the result of excess precipitation. Alternatively, many studies exist showing reductions in yield following planting of cover crops in semi-arid environments (Nielsen et al., 2016).

The Pandemic Cover Crop Program (PCCP)—first offered under USDA's Pandemic Assistance for Producers initiative—helped producers maintain their cover crop systems amid financial constraints during the Coronavirus (COVID-19) pandemic. The program was offered for the 2021 and 2022 crop years and provided premium support of \$5 per acre (but no more than the full premium due) to eligible insured producers who planted on acreage where a qualifying cover crop was planted. Most crop insurance policies are eligible for PCCP support, but there are a few exceptions related to policies that already provide the benefit through underlying coverage. PCCP is not available for Post-Application Coverage Endorsement (PACE), ECO, HIP-WI, or SCO, and not available for STAX or margin protection policies if an underlying policy exists. Producers who purchased crop insurance received \$59.7 million in additional PCCP premium support for the 2021 crop year and \$48.5 million for the 2022 crop year.

The second new conservation incentive offered by USDA's RMA is the Post-Application Coverage Endorsement (PACE). PACE is a pilot program offered to non-irrigated corn producers in select counties for the 2022 crop year. PACE offers insurance coverage for producers who “split-apply” nitrogen. The split application of fertilizer is the practice of applying fertilizer in multiple smaller disbursements throughout the growing season. This practice reduces the chances of fertilizer runoff and nutrient leaching, which keeps fertilizer out of susceptible ecosystems but also has the potential to lower input costs for the producer.

The PACE endorsement requires an underlying policy (YP, RP, or RP-HPE) and that the producer practices the split application of nitrogen. The producer may select a coverage level between 75 and 90 percent in 5 percent increments, which may differ from the underlying policy's coverage level. Payments occur when a

producer is unable to complete a postplanting application of nitrogen due to eligible adverse weather conditions. The exact amount of the indemnity is dependent on the underlying policy, chosen PACE coverage election, and the percent of nitrogen applied postplanting. In general, PACE indemnities increase as the share of total nitrogen that was planned to be applied postplanting increases.

Prevented Planting

Both standard crop insurance policies and supplemental policies provide financial protection if a crop is planted and subsequent natural causes reduce the value of the harvest. However, in some cases, financial burdens are incurred prior to a crop being planted. This primarily occurs when a producer makes upfront financial investments in preparation for planting but, due to adverse weather conditions, is unable to plant on time (or at all). In such a case, prevented-planting payments serve as a valuable risk management tool. Other than situations where a specific policy provision does not include prevented-planting coverage, insured producers become eligible for a prevented-planting payment if the producers are unable to plant the insured crop by the final planting date for their county and insured commodity.³⁹ If a producer does become eligible for a prevent-plant payment, the producer must decide among several options for how to continue the season.

First, a producer can abandon planting the insured crop, leave the prevented acreage idle, and receive a full prevented-planting payment. The prevented-planting payment will be the product of the producer's underlying crop insurance policy guarantee and an adjustment factor that varies by crop based on an estimate of preplanting costs. Producers can also get an extra 5 percent on top of the regular adjustment factor if the producer elects a 5-percent buy-up option.⁴⁰ Alternatively, the producer may forgo any prevent-plant payments and plant the insured crop during the late planting period (typically defined as 25 days after final planting date). Doing so reduces the crop insurance protection guarantee for the remainder of the season by 1 percent each day after the final planting date before the crop is ultimately planted. Planting may also take place after the late planting period; however, the crop insurance protection guarantee will be further reduced to the prevented-planting coverage level (typically 55 or 60 percent for most crops).

Producers may also plant a cover crop in lieu of the prevented insured crop and receive a full prevented-plant payment, provided that the cover crop is not harvested for grain or seed (USDA, RMA, 2021a). Finally, a second crop may be planted after the late planting period for the prevented crop. A prevented-planting payment will still be issued in this case but will be reduced to 35 percent of the full value (USDA, RMA, 2021a).

Producers that make a prevented-planting claim receive a per acre indemnity on eligible acreage that is equal to the initial crop insurance guarantee, multiplied by the prevented plant coverage factors. Coverage factors are determined on a crop-by-crop basis and are calculated to cover only the expected preplanting costs of each commodity. Because of these factors, producers may not always opt for a prevented-planting payment even if the producers are eligible, particularly if market conditions have resulted in high enough prices that the revenue received from a late planted crop is preferable to the prevented-planting payment (Sowell et al., 2022; Wu et al., 2020).

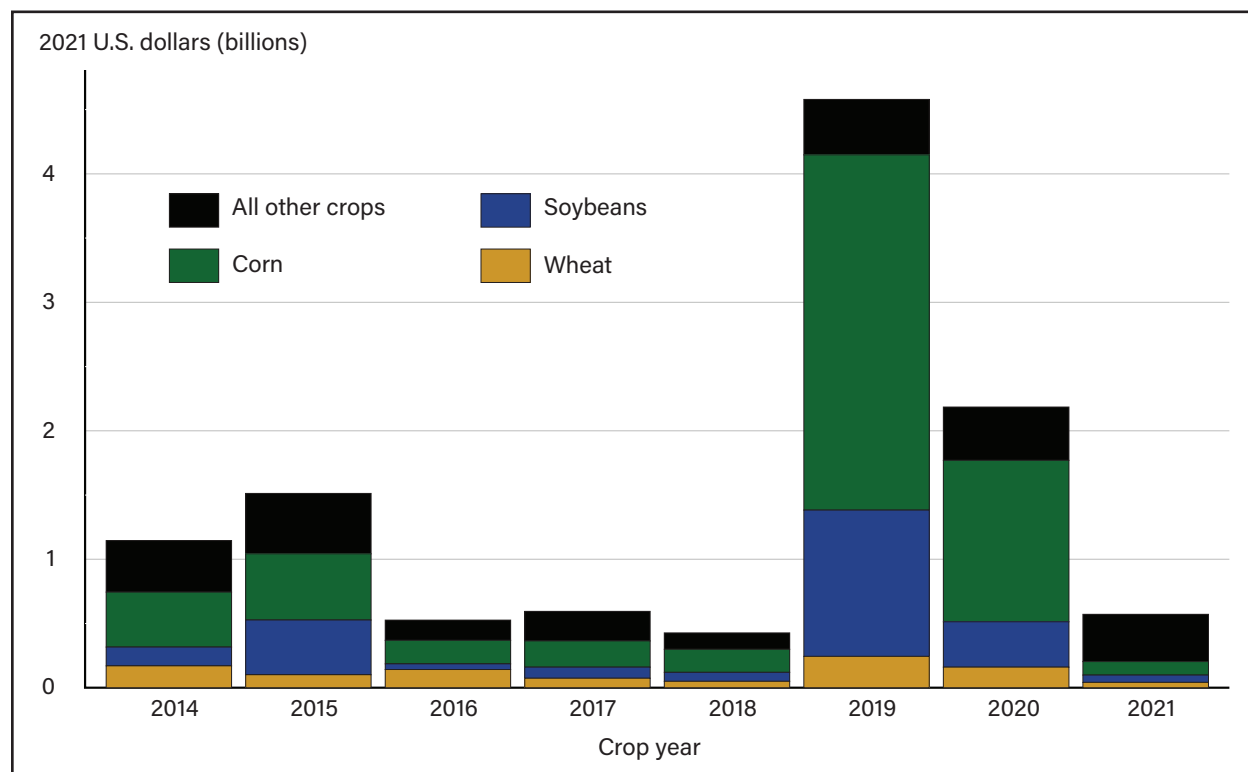
Since 2014, acreage indemnified with a prevent-plant payment has typically been between 2 and 7 million acres (less than 2 percent of total insured acreage). The notable exceptions to this coverage were in 2019 and 2020, which saw adverse spring weather conditions that led to prevent-plant payments on roughly 30 million acres

³⁹ Prevent-plant eligibility is also subject to the stipulation that the acreage must be planted, insured, and harvested at least once in the last 4 crop years to be eligible for prevent-plant coverage.

⁴⁰ For example, given that guarantee adjustment factor for corn is 60 percent, a corn producer with an insurance guarantee of \$100 an acre will receive a prevented-planting payment of \$60 (or 60 percent of the guarantee) if the producer is unable to plant and decides to collect prevent-plant payment. With the 5-percent buy-up option election, the producer will receive a prevented-planting payment of \$65 (or 65 percent of the guarantee).

(2019 and 2020 combined). This pattern is also evident in the levels of prevented-plant indemnity payments (figure 16), which averaged \$841 million (2021 U.S. dollars) annually for the 2014–18 crop years before rising to \$4.58 billion (2021 U.S. dollars) and \$2.19 billion (2021 U.S. dollars) in 2019 and 2020, respectively.

Figure 16
Prevented-planting indemnities, 2014–21



Note: Insured acres with prevented-plant claims are taken from USDA, Risk Management Agency's (RMA) Cause of Loss data files. Data in the chart represent the agency's Summary of Business files and Cause of Loss files as of January 19, 2022.

Source: USDA, Economic Research Service using data from USDA, RMA.

The Pasture, Rangeland, and Forage Insurance Plan (PRF)

It has been estimated that 35 percent of U.S. land area is either grassland pasture and range, cropland pasture, or grazed forest land (Bigelow & Borchers, 2017). However, for most of the FCIP's existence, options for insuring pasture, rangeland, and forage (PRF) have been limited. Some complexities in developing an insurance product for PRF are the differences in the growing season for different species and the production systems used to even out forage supply throughout the year. Particularly, forage growth differs depending on location, and the same pasture or rangeland can be grazed or cut multiple times in the year, which complicates when and how production is measured for insurance purposes.

The Pasture, Rangeland, Forage insurance plan (PRF) under the FCIP was first launched as a pilot product in 2007 (Belasco & Hungerford, 2018) and provides protection for producers when a loss of forage for grazing or harvested for hay is experienced due to a single peril (e.g., lack of precipitation). The PRF uses a rainfall index to determine precipitation for coverage purposes and does not measure the actual on-farm production

or loss of production the PRF protects.⁴¹ The index is normalized such that 100 is approximately equal to the historical average of rainfall from 1948 to the past year. Unlike other area plans of insurance, PRF uses a grid system rather than a county value. Particularly, the index is based on National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC) data, with grids of 0.25 degrees latitude by 0.25 degrees longitude (approximately 17 by 17 miles at the equator).⁴²

To insure production under PRF, producers must make three primary choices: (1) a coverage level from 70 to 90 percent for the county, crop, intended use, and production practice (e.g., organic and irrigation); (2) at least two (up to six) index intervals representing nonoverlapping 2-month periods when precipitation is most important to a producer's operation; and (3) one productivity factor from 60 to 150 percent to match the amount of protection to the productive capacity of the producer's acres. At the extensive margin, producers can insure some or all of their total number of insurable acres.

Indemnities and premium rates are determined by using NOAA CPC data for the grid(s) and index intervals that were chosen to insure. For the case of indemnities, if the final grid index falls below the policy's "trigger grid index" (i.e., the expected grid index (100) times the coverage level), the producer may receive payment.

While other FCIP on-farm production history-based insurance plans for forages exist (Actual Production History (APH), Area Yield Protection (AYP), Dollar Plan, Vegetation Index, SCO, ECO), about 95.3 percent of all the insured acreage for forages from 2014 to 2021 were enrolled in PRF. Figure 13 shows that the insured acreage for forages has increased 350 percent since 2014 and exceeded 180 million insured acres in 2021. Forage crops, despite representing a large share of total insured acreage, have relatively low monetary values and represented only 1.6 percent of total liability from 2014 to 2021.

PRF and LFP are similar in the sense that both programs provide payments for forage loss, and both define payment triggers using an area index. However, even though both programs use a precipitation-based index, there are notable differences between the two. LFP defines payment eligibility using county-level drought conditions (as defined by the U.S. Drought Monitor), while PRF uses subcounty or cross-county units (as defined by the previously mentioned 0.25 degree square grid). Additionally, LFP does not have a specified time for when the drought conditions must occur—achieving the specified drought conditions in the county at any point during the normal grazing period is sufficient to be eligible for payments (USDA, FSA, 2023). In contrast, PRF participants must specify 2-month blocks that the participants wish to insure. Thus, for a given producer, sufficient conditions for LFP payments to be issued do not necessarily mean the conditions have been meant for PRF payments to be issued (or vice versa). Between 2014 and 2021, LFP payments totaled \$3.91 billion (2021 U.S. dollars), while PRF indemnity payments totaled \$2.99 billion over the same period.⁴³

Noninsured Crop Disaster Assistance Program

Crop insurance is available to many producers through the FCIP under Title XI of the Farm Bill. However, FCIP insurance policies are only available in counties and for commodities with sufficient production and price data to maintain an actuarial sound product⁴⁴ (Raszap Skorbiansky et al., 2022). For producers

⁴¹ Since coverage is based on expected precipitation during specific intervals, it is worth noting that PRF is not designed to insure against ongoing or severe drought. There is also the issue of basis risk, which is the risk from the lack of correlation between indemnity payments and on-farm actual losses (Elabed et al., 2013; Keller & Saitone, 2022; Yu et al., 2019).

⁴² Coverage is based on the experience of the entire grid and not on specific farms/ranches or specific weather stations in the general area.

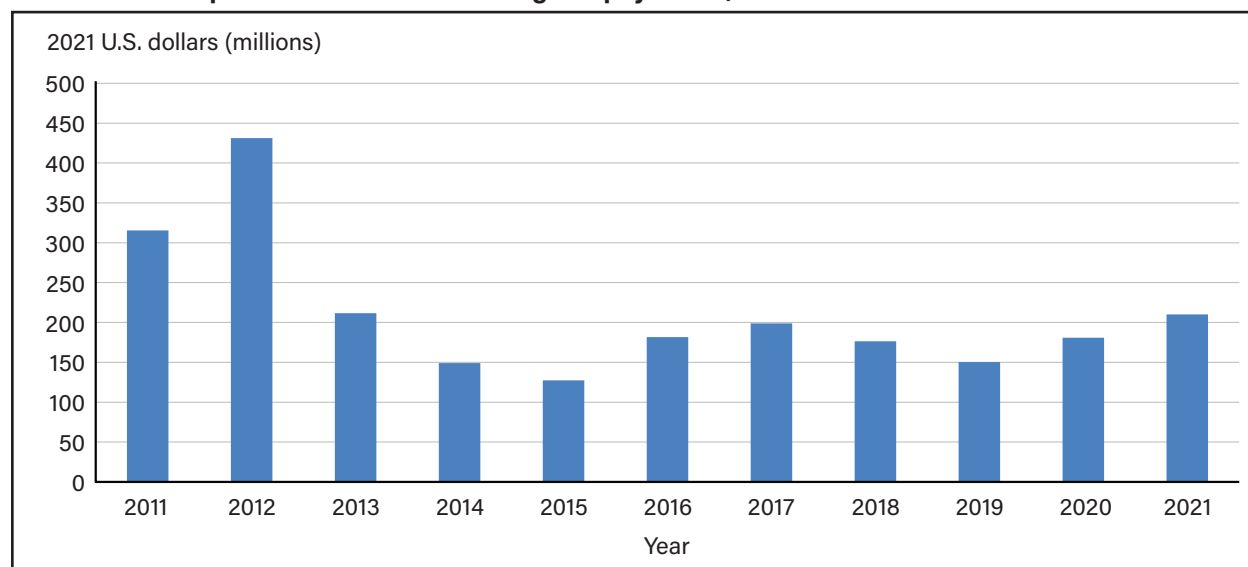
⁴³ Since LFP does not require farmers to pay a premium, to make a more apt comparison, Belasco and Hungerford (2018) use PRF net indemnity payments (i.e., indemnity payments minus farmer-paid premiums). Net PRF indemnities totaled \$186 million (2021 U.S. dollars) between 2014–21 (i.e., indemnities were \$186 million more than collected premium payments). According to a USDA, RMA contracted report on the review of PRF (Coble et al., 2020), while the program collects enough premiums to cover its indemnities, the high indemnification rate coupled with the significant premium subsidy means that PRF coverage is likely to frequently pay indemnities above the subsidized premium.

⁴⁴ Premium rates are calculated to produce total premiums equal to expected indemnity payments based on actual production and price risks.

growing a crop in a county where FCIP policies are not offered, USDA, FSA’s Noninsured Crop Disaster Assistance Program (NAP) serves as a government-supported risk management tool for managing risk associated with adverse weather and other natural hazards. NAP, which was amended in Title XII of the 2014 Farm Bill and in Title I of the 2018 Farm Bill, is not directly related to FCIP but offers some crop insurance features similar to those covered under Title XI.

Producers who obtain NAP coverage receive a payment in the case of a sufficient yield loss caused by an eligible natural cause. From 2011 to 2021, U.S. farmers and ranchers received \$2.3 billion in NAP payments for losses associated with adverse weather and natural disasters, or \$206 million per year on average. The NAP program is small compared with the crop insurance program—NAP payments were about 2 percent the size of FCIP payments from 2011 to 2021.

Figure 17
Noninsured Crop Disaster Assistance Program payments, 2011–21



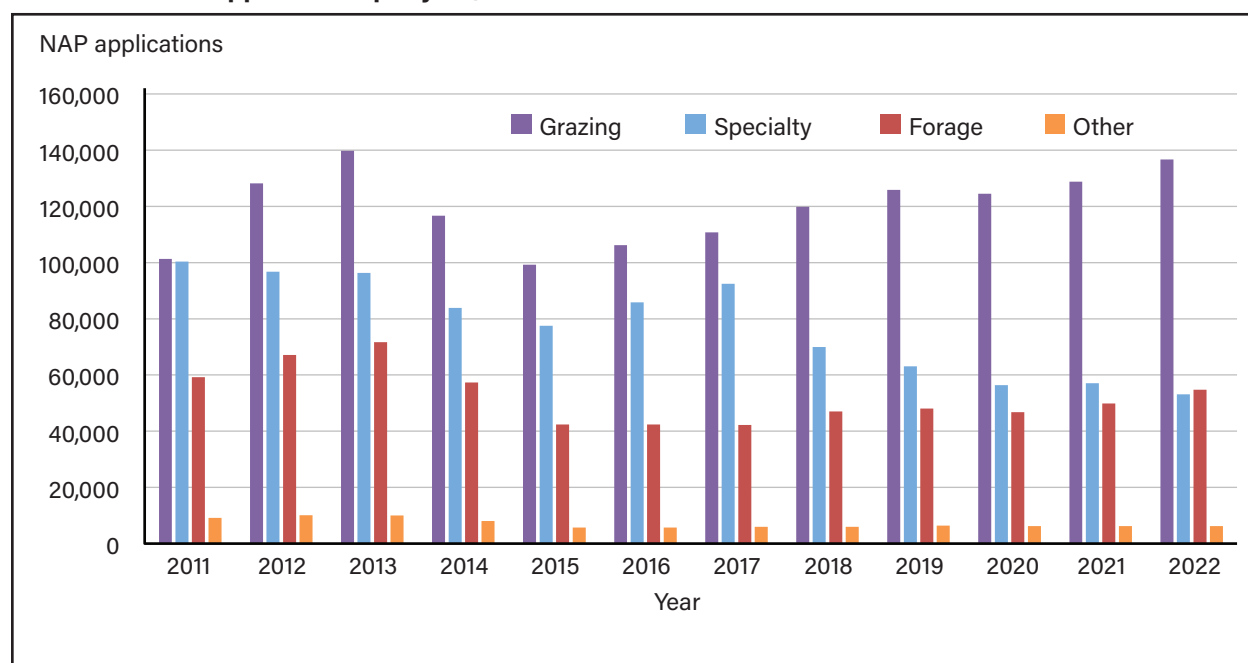
Note: The authors inflated past payments to 2021 values using the Consumer Price Index for All Urban Consumers (CPI-U) from the U.S. Bureau of Labor Statistics (BLS).

Source: USDA, Economic Research Service using data from USDA, Farm Service Agency and BLS.

The most common types of crops to be covered by NAP are crops used for animal grazing (117,000 applications annually on average; figure 18), specialty crops like fruits and vegetables (82,000 applications annually), and crops used for animal forage (54,000 applications annually).⁴⁵ A small portion of NAP applications cover other agricultural products, including commodity crops not used for grazing or forage and eligible animal products like fish and shellfish (7,000 annually). The most common crops to appear on NAP applications are grass for grazing and forage (37 percent of applications during 2011–22), mixed forage (13 percent), sorghum forage (4 percent), wheat (4 percent), peppers (3 percent), squash (3 percent), greens (2 percent), oats (2 percent), peas (2 percent), millet (2 percent), and watermelon (2 percent).

⁴⁵ The FCIP products currently available for pasture or forage crops are index type insurance products. NAP cannot be combined with permanent crop insurance policies but can be purchased in addition to pilots and index types of insurance.

Figure 18
Number of NAP applications per year, 2011–22



NAP = Noninsured Crop Disaster Assistance Program.

Note: NAP applications most commonly cover grass, mixed forage, and sorghum among forage crops; grass, mixed forage, and wheat for grazing crops; peppers, squash, and greens for specialty crops; and millet, sunflowers, and soybeans for other crops and other agricultural products. One-hundred-sixty-one different specialty crops appeared on NAP applications, including 29 different forage crops, 27 different grazing crops, and 42 different other crops or other agricultural products.

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

NAP was first introduced in the Federal Crop Insurance Reform and Departmental Reorganization Act of 1994 (P.L. 103–354, 1994) and is authorized by USDA’s Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104–127, 1996) (1996 Farm Bill). The 2014 Farm Bill amended NAP coverage from a single catastrophic coverage level to include buy-up options (USDA, FSA, 2014c). In its current iteration, basic NAP coverage pays 55 percent of the average market price for yield losses that exceed 50 percent of the approved yield. A NAP buy-up pays 100 percent of the average market price for yield losses that exceed up to 65 percent of the approved yield. Eligible producers electing to participate in NAP pay a fixed service fee to obtain basic coverage that is capped at \$825 for producers operating in a single county and \$1,950 for producers with operations in multiple counties. In addition to the service fee, NAP buyers pay a premium equal to 5.25 percent of the coverage level, approved yield, and average market price multiplied together.

Service fee waivers and 50-percent premium reductions were introduced in 2014 for beginning, limited-resource, or socially disadvantaged farmers and ranchers. The 2018 Farm Bill added U.S. military veterans transitioning to agriculture to the category of farmers eligible for fee waivers and premium reductions. To increase the number of producers eligible for the program, adjusted gross income (AGI) limits were changed from \$500,000 for nonfarm income to \$900,000 for total farm and nonfarm income. The change in AGI allowed more producers of uninsurable crops under FCIP to qualify for NAP.⁴⁶

⁴⁶ In 2020, large-scale family farms had a median (mean) total income from both farming and off-farm sources of \$375,000 (\$438,000). Very large farms had a median (mean) total income of \$1.1 million (\$2 million) (Whitt et al., 2021).

More recently, NAP underwent further modifications in 2020 as a result of provisions in the 2018 Farm Bill (USDA, FSA, 2020). Buy-up coverage levels became permanent, and the payment limit for buy-up coverage was increased from \$125,000 to \$300,000 per producer. NAP buy-up coverage was changed to require that producers document at least 1 year of successfully producing at least 50 percent of the county expected yield (unless an eligible cause produced a loss greater than 50 percent). Hemp was also added as an eligible NAP crop, though most hemp growers were initially limited to basic coverage due to the recent emergence of U.S. commercial hemp production. In 2022, there were almost 300 NAP hemp applications, 80 percent of which were for basic coverage.

If a producer is eligible for a NAP payment from a loss that also produced benefits under another Federal program, multiple benefit exclusions typically require that producers choose only one payment. After 2020, Whole-Farm Revenue Protection (WFRP) became exempt from this exclusion. Only the amount of NAP payments in excess of the WFRP deductible is now counted toward revenue under the WFRP policy (USDA, FSA, 2014c).

Conclusion

Agricultural production is fundamentally a risky prospect, with natural forces and market dynamics continually threatening to impact farmer revenues. Federal risk management programs such as those in Title I and Title XI of the Farm Bill provide producers with additional options for addressing farm risk. With some exceptions, the 2018 Farm Bill generally preserved the status quo of risk management options available under the 2014 Farm Bill. Within Title I, the Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC) programs remain prominent forms of mitigating revenue and price risks.

A host of other Title I programs offer other tools that help certain types of producers to mitigate production or revenue risk, including:

- The Noninsured Crop Disaster Assistance Program offers risk management protection for producers for which crop insurance is not available.
- Marketing assistance loans provide producers interim financing at harvest time to meet cash flow needs without having to sell when market prices are typically low.
- The Dairy Margin Coverage program was introduced in the 2018 Farm Bill, superseding the Margin Protection Plan, and provides revenue coverage for dairy producers.
- A suite of standing disaster assistance programs offers compensation for livestock producers, including the Livestock Indemnity Program; the Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program; and the Livestock Forage Disaster Program.

Title XI, which supports the Federal Crop Insurance Program (FCIP), remained fundamentally unchanged following the 2018 Farm Bill. Individual revenue protection policies continue to be the predominant form of coverage for most producers, followed by individual yield protection policies. Area and index plans continue to represent a small amount of total insured liability. Recent years have seen the advent of a number of supplemental endorsements, which can be stacked on a standard crop insurance policy and help provide coverage for losses that are too small to meet a standard crop insurance policy deductible. Demand for supplemental endorsements has grown substantially since 2018 but still represents a small portion of the FCIP. USDA's RMA has also introduced two initiatives that encourage the adoption of environmentally sustainable practices.

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