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DIVISION OF AGRICULTURE
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Impact of COVID-19 on Arkansas Field Crop Farms

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Abstract

The coronavirus (COVID-19) pandemic is disrupting the global economy in unprecedented ways, and the agricultural sector is no exception. Prices of most commodities decreased since the pandemic began, which are affecting farm revenues and production costs. We assess the impact of COVID-19 on Arkansas field crop farms using the Representative Farm models, calibrated to the latest baseline published by the Food and Agricultural Policy Research Institute. The results show that COVID-19 decreases the net cash farm incomes of all five farms, increases the probability of having a negative net cash farm income, and increases the cost of commodity programs. Payments under the Coronavirus Food Assistance Program (CFAP) effectively compensate for the revenue losses due to COVID-19 projected for the 2019 crop for the five farms.

Introduction

The coronavirus (COVID-19) pandemic has created major disruptions around the world and affects the global economy in unprecedented ways. The agricultural sector is no exception, and prices for most commodities have decreased, except for rice, which has seen an increase in prices in the global market.

COVID-19 has also affected input markets, most notably for agriculture, the energy and capital markets. Crude oil prices have plummeted [the spot price for West Texas Intermediate (WTI) crude oil decreased by a third in the first semester of 2020], which may have a positive impact on agriculture through lower production costs. Moreover, some countries have eased credit via lower interest rates and higher supply to cope with the economic downturn, which may facilitate increased access to capital and positively impact agricultural production.

In the U.S., some commodities have seen sharp decreases in prices since the pandemic began, most notably the price of cotton and corn decreased by 19% and the price of soybeans by 15% by the end of May relative to the first week of January 2020. On the other hand, the price of rice increased by around 10% by early May relative to the first week of January 2020, driven in part by the export restrictions imposed by large Asian exporters such as Vietnam and India because of the pandemic. COVID-19 is projected to have lasting effects beyond the 2020 crop sales of 2019 crop production, which will depend on the progress made to find an appropriate treatment for the virus.

The U.S. Government passed legislation to support the economy, most notably H.R. 748, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), which among other things, authorizes additional funding for the U.S. Department of Agriculture (USDA) to provide direct assistance to producers. On 21 May 2020, the USDA published the rules for the Coronavirus Food Assistance Program (CFAP), which provides direct relief to producers who faced price declines and additional

marketing costs due to COVID-19. The CFAP is funded by the CARES Act and the Commodity Credit Corporation (CCC).

The goal of this report is to assess the impact of COVID-19 on the economic situation of Arkansas field crop farms, including the effects of the CFAP program. We acknowledge that the findings are conditional on many assumptions about the short- and medium-term economic impacts of COVID-19, but consider it worth sharing these findings to inform stakeholders and help them plan their actions with more certainty.

Methodology

The five representative farm models used in this study are based on financial data files made available by the Texas A&M Agricultural and Food Policy Center (AFPC) developed with the assistance of the University of Arkansas System Division of Agriculture's Cooperative Extension Service. The representative Arkansas farms are located in Wynne, Stuttgart, Hoxie, McGehee, and Mississippi County, and were last updated in April 2017, February 2017, April 2016, March 2017, and February 2017, respectively. They range in size from 2,500 acres on the Wynne farm to 6,500 acres on the McGehee farm. Figure 1 shows the planted acres of each commodity on the five farm models.

The models include the safety net programs under the 2018 Farm Bill, in particular, the Price Loss Coverage (PLC) and Agricultural Risk Coverage-County (ARC-CO) programs. For this analysis, we assume that all rice, corn, cotton, and peanut acres are enrolled in PLC, while all soybean acres are enrolled in ARC-CO for the duration of the 2018 Farm Bill. This assumption is in line with national enrollment data that shows that 99% of the long-grain and medium-grain rice, cotton, and peanut base acres, and 75% of the corn base acres were enrolled in PLC in 2019, while 80% of the soybean base acres were enrolled in ARC-CO in 2019 (USDA, 2020).

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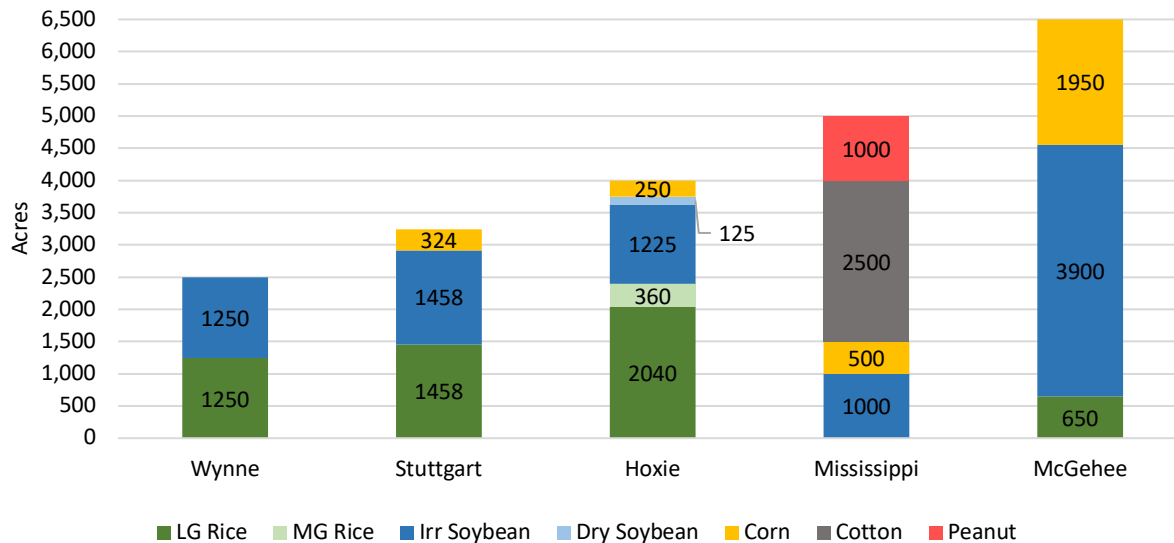


Fig. 1. Arkansas representative farms: planted acres of field crops.

We assume that each farm has a two-entity payment limit of \$250,000. We also assume that neither entity has an adjusted gross income higher than \$900,000. Each model and scenario was run stochastically 1,000 times based on yield and price variability. The mean values and probabilities for the selected variables reported in the Key Findings section are estimated from the stochastic model and scenario runs.

Definition of Scenarios

The Baseline scenario incorporates the commodity price projections estimated by the Food and Agricultural Policy Research Institute (FAPRI) in its 2020 U.S. Agricultural Market Outlook (FAPRI, 2020a), and the macroeconomic projections estimated by IHS Markit and used by FAPRI in its 2020 U.S. Agricultural Market Outlook.

The COVID-19 scenario incorporates the commodity price projections estimated by FAPRI in its Baseline Update for U.S. Agricultural Markets published in June 2020 (FAPRI, 2020b), and the updated macroeconomic projections estimated by IHS Markit and used by FAPRI in its baseline update. Figure 2 shows the difference in the U.S. indexes of prices paid by farmers for selected agricultural inputs between the baseline and the COVID-19 scenario.

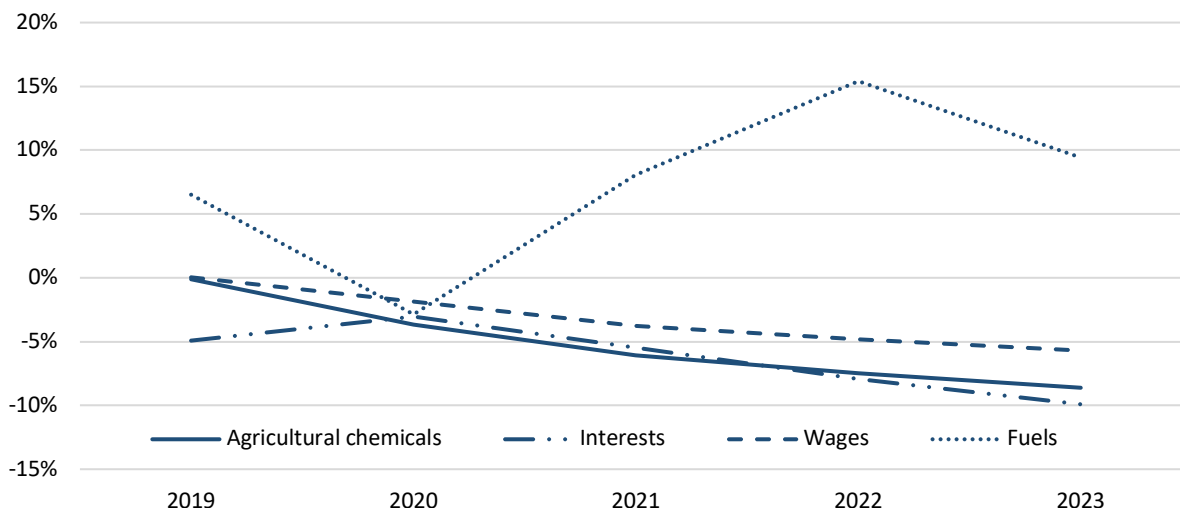
The updated price projections estimated by FAPRI assume no changes in international commodity markets and thus assess the domestic impact of COVID-19 on U.S. agriculture. While this assumption may not have major implications for most commodities, it is troublesome for rice since the international market is dominated by Asia; and the policy measures taken by Asian countries have significant impacts on the global and U.S. rice market. Considering the above, we use the Arkansas Global Rice Model (Wailes and Chavez, 2010) to estimate the impact of COVID-19 on the global and U.S. rice market under the main assumption that Cambodia, India, and Vietnam impose export bans in 2020 and 2021 that reduce their export volumes

by 50%, while the global economy slows down according to the projections published by the International Monetary Fund (IMF, 2020). The selection of the trade policies and exporting countries for this scenario follows their decision to ban rice exports temporarily during the early stages of the pandemic, and their ongoing struggles to resume their export activity as lockdown measures remain in place to cope with COVID-19.

Figure 3 shows the difference in commodity prices between the COVID-19 and baseline scenarios. The Food and Agricultural Policy Research Institute projects that all commodities will realize lower prices due to COVID-19 compared to the baseline for the coming years, with corn (-14.3%) and cotton (-13.7%) experiencing the largest decreases in prices in the short term. We project that, as a result of COVID-19, the price of long-grain rice in the U.S. will increase by 4.8% and 3.3% in 2020 and 2021, and decrease below the baseline thereafter, while the price of medium-grain rice in the U.S. increases slightly in 2020 and 2021, and decreases slightly thereafter.

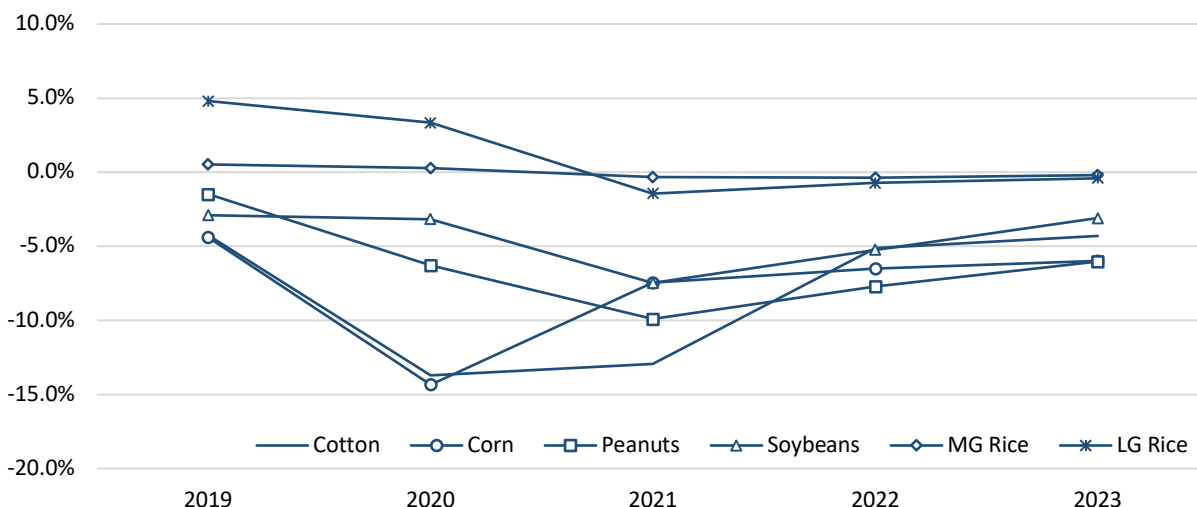
Since the impact of COVID-19 started being felt in 2020 after several months of 2019 crop sales, we estimated the commodity prices for the 2019 year as a sales-weighted value of the baseline and COVID-19 prices estimated by FAPRI (Table 1).

We use the 2019 crop sales as of January 2020 (USDA, NASS) to estimate the amount of the eligible 2019 crops considered in the estimation of payments under the Coronavirus Food Assistance Program (CFAP) according to the formula specified by USDA for non-specialty crops and available at <https://www.farmers.gov/cfap/non-specialty>. Thus, we considered 50% of the production of corn, 25% of soybean, and 28% of cotton for the estimation of CFAP payments. Payments are based on a maximum of 50% of a producer's 2019 total production or the 2019 inventory held as of 15 January 2020, whichever is smaller. Rice and peanuts do not qualify for CFAP payments since they have not suffered a 5% or greater price decline from mid-January to mid-April 2020 as a result of the COVID-19 pandemic.



Source: FAPRI, 2020a,b.

Fig. 2. U.S. indexes of prices paid by farmers for selected agricultural inputs.



Source: FAPRI, 2020a,b. Durand-Morat and Chavez, 2020.

Fig. 3. Percentage change in commodity farm prices due to COVID-19 relative to the 2020 baseline.

Table 1. Sales-weighted 2019 commodity price.

| | Corn (\$/bu.) | Soybeans (\$/bu.) | Cotton (\$/cwt) | Peanuts (\$/ton) | LG Rice (\$/cwt) | MG Rice (\$/cwt) |
|-------------------------------------------------|---------------|-------------------|-----------------|------------------|------------------|------------------|
| Baseline price | 3.78 | 8.80 | 61.60 | 416.77 | 12.20 | 12.20 |
| COVID-19 price | 3.61 | 8.54 | 59.00 | 410.60 | 12.79 | 12.26 |
| 2019 crop sales as of January 2020 ^a | 40% | 75% | 72% | 64% | 33% | 33% |
| Sales-weighted price | 3.68 | 8.73 | 60.88 | 414.54 | 12.60 | 12.24 |

^a Source: USDA NASS. Average 2016–2019 sales as a share of production.

Key Findings

1. All five farms will receive lower revenues and have lower net cash farm incomes due to COVID-19 in every marketing year considered in the projection (Fig. 4). The losses

are lower in the Wynne, Hoxie, Stuttgart farms since they have a large share of rice acres.

2. The CFAP payments issued for the 2019 corn, soybean, and cotton crops effectively compensate for the revenue loss due to COVID-19 for the five farms (Fig. 4)

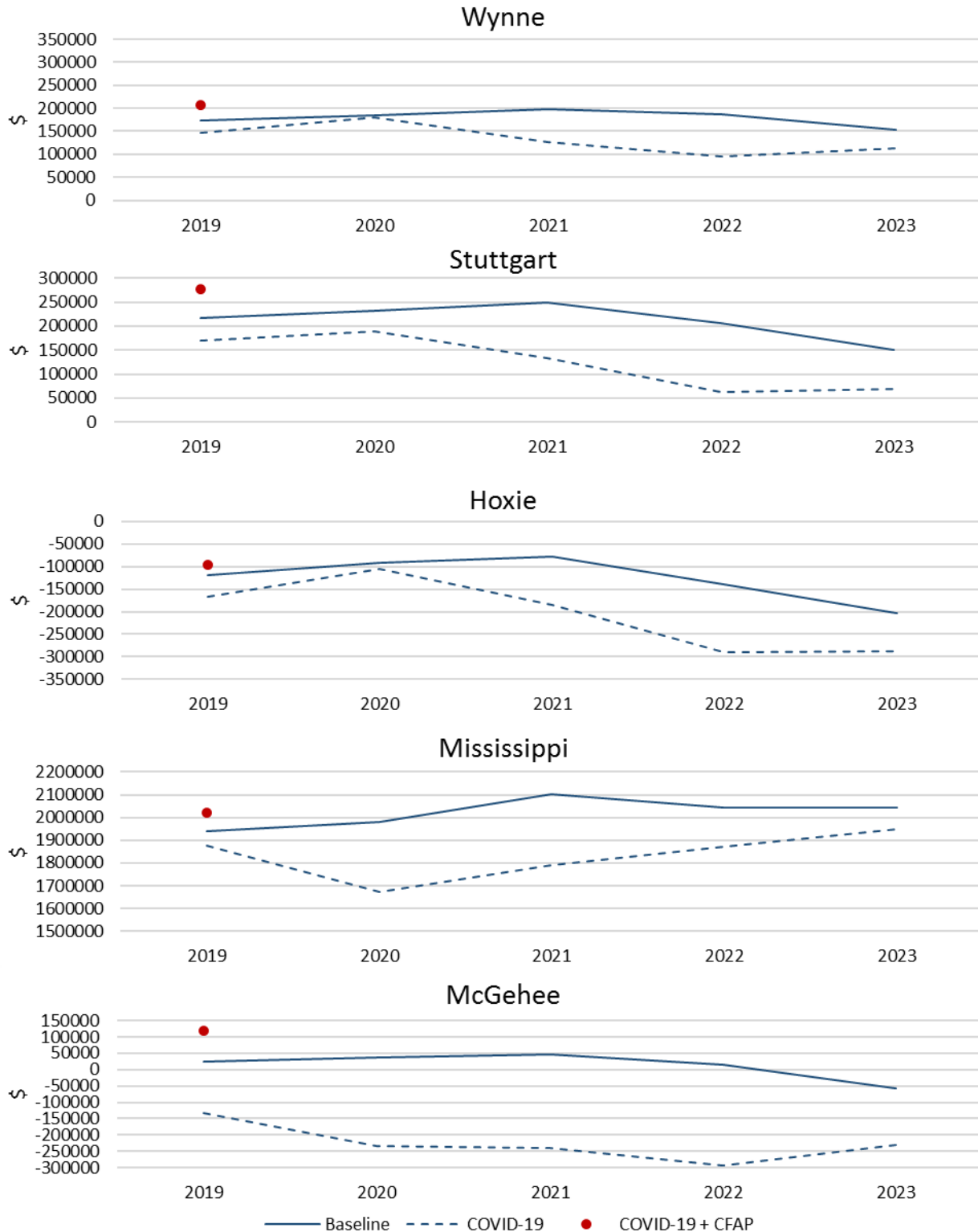


Fig. 4. Impact of COVID-19 on the net cash farm income of Arkansas representative farms, 2019–2023.

3. COVID-19 increases the probability of having a negative net cash farm income (Fig. 5). Over the 5-year period, the probability of having a negative cash farm income increases by 15% for Hoxie, 27% for McGehee, 39% for Wynne, and 61%

for the Stuttgart farm. COVID-19 reduces the probability of having a negative cash farm income for the Mississippi county farm, primarily due to the increase in commodity program payments that more than compensate for market losses.

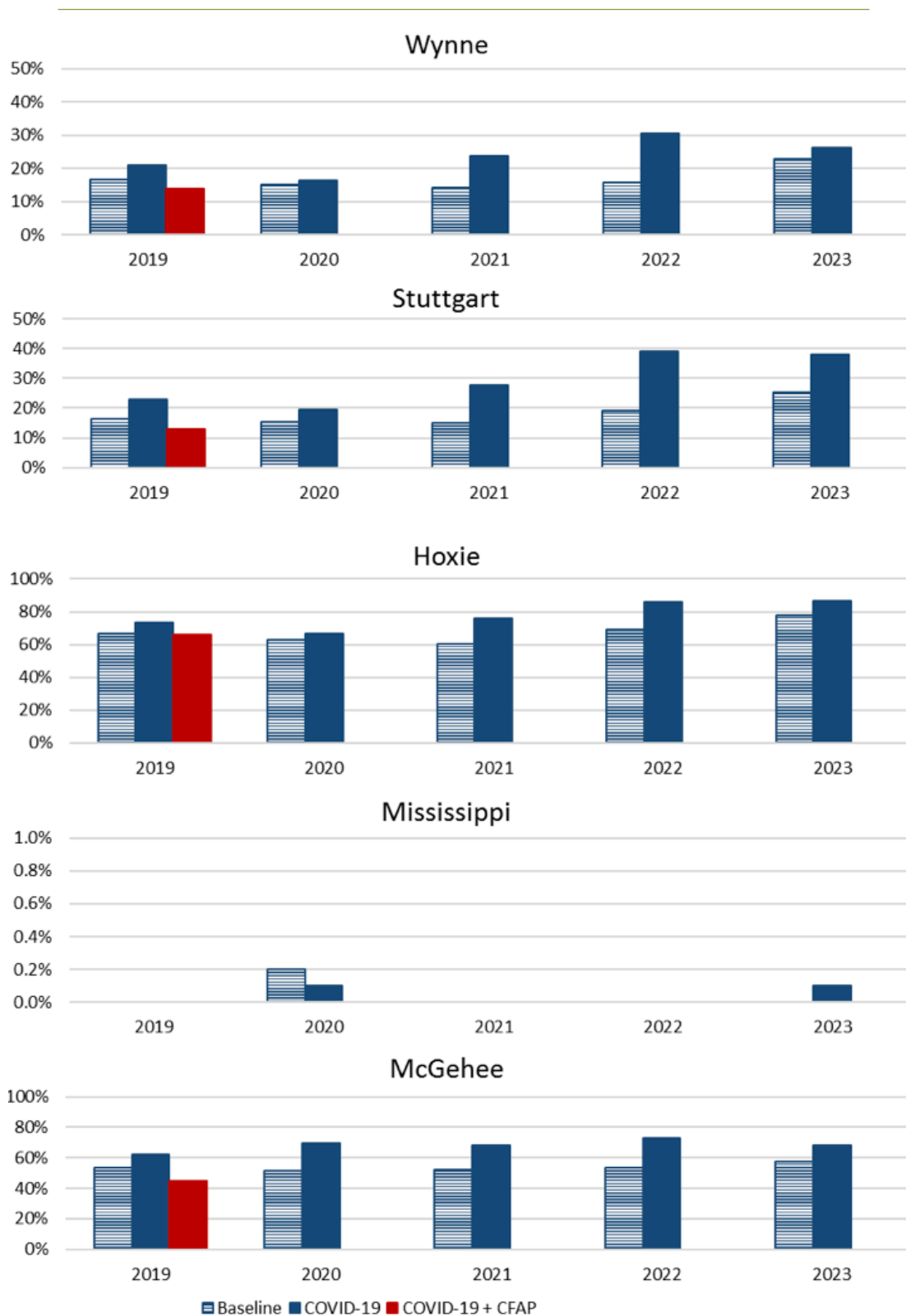


Fig. 5. Probability of having a negative net cash farm income by Arkansas representative farm and year, Baseline, COVID-19, and COVID-19+CFAP.

4. Over the simulated 5-year period, COVID-19 triggers 21% higher commodity program payments for the Mis-

issippi county farm but does not affect payments to the other four farms relative to the baseline (Fig. 6).

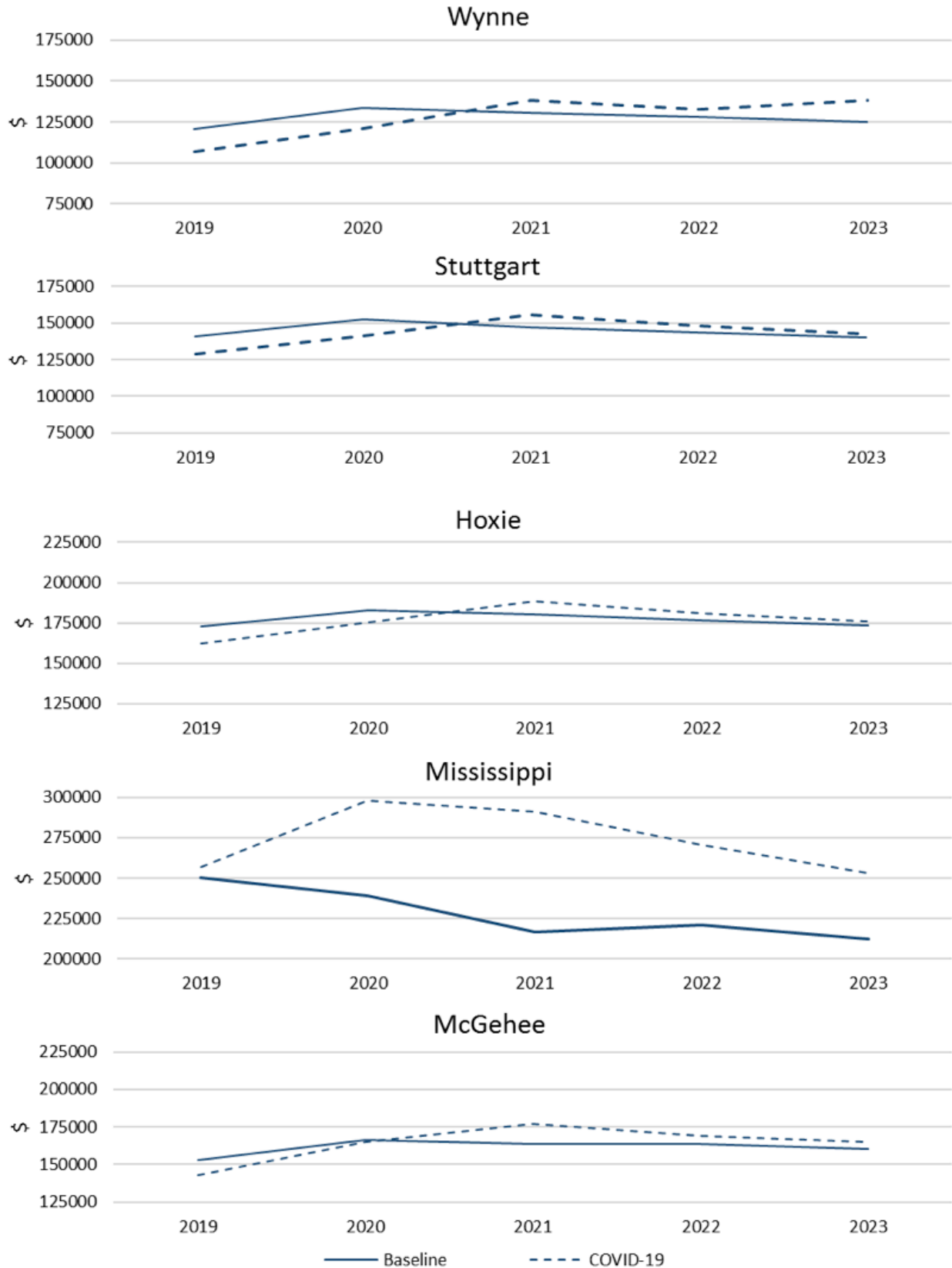


Fig. 6. Program payments by scenario, representative farm, and year, Baseline and COVID-19.

5. COVID-19 increases the PLC payment rate of corn, cotton, and peanuts due to lower than expected market prices, and decreases the payment rate for long-grain and medium-grain rice due to higher than expected market prices relative to the baseline (Fig. 7). On average over the simu-

lated 5-year period, the PLC payment rate increases by 46% for corn, 19% for seed cotton, and 28% for peanuts. The PLC payment rate for long-grain rice decreases by 3% while the PLC payment rate for medium-grain rice remains the same over the 5-year projected period.

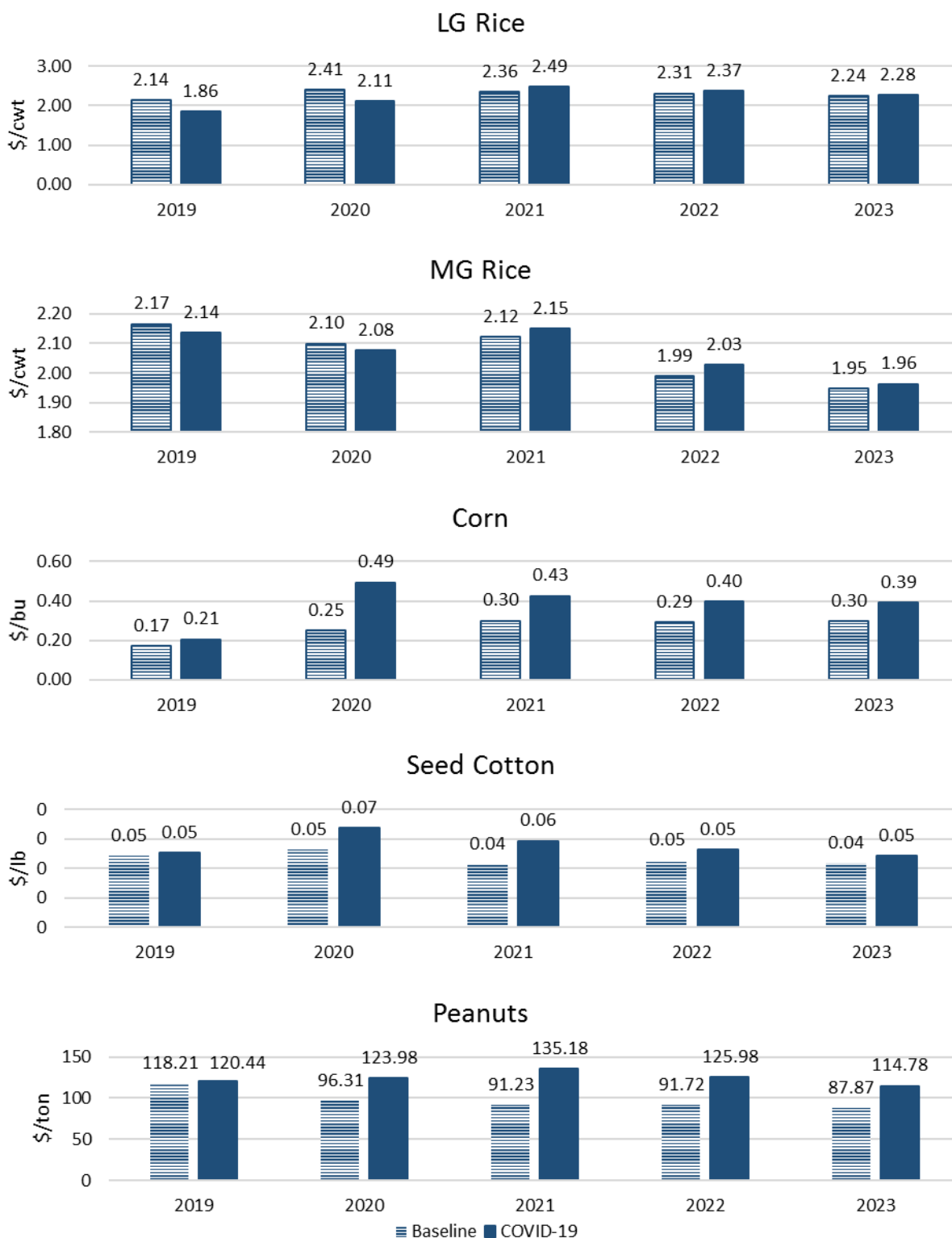


Fig. 7. Estimated Price Loss Coverage (PLC) payment rate by scenario, commodity and year, Baseline and COVID-19.

6. Similar to PLC, COVID-19 increases the ARC-CO payment rate for soybeans (the only commodity assumed to be enrolled in ARC-CO) across all farms and years (Fig. 8).

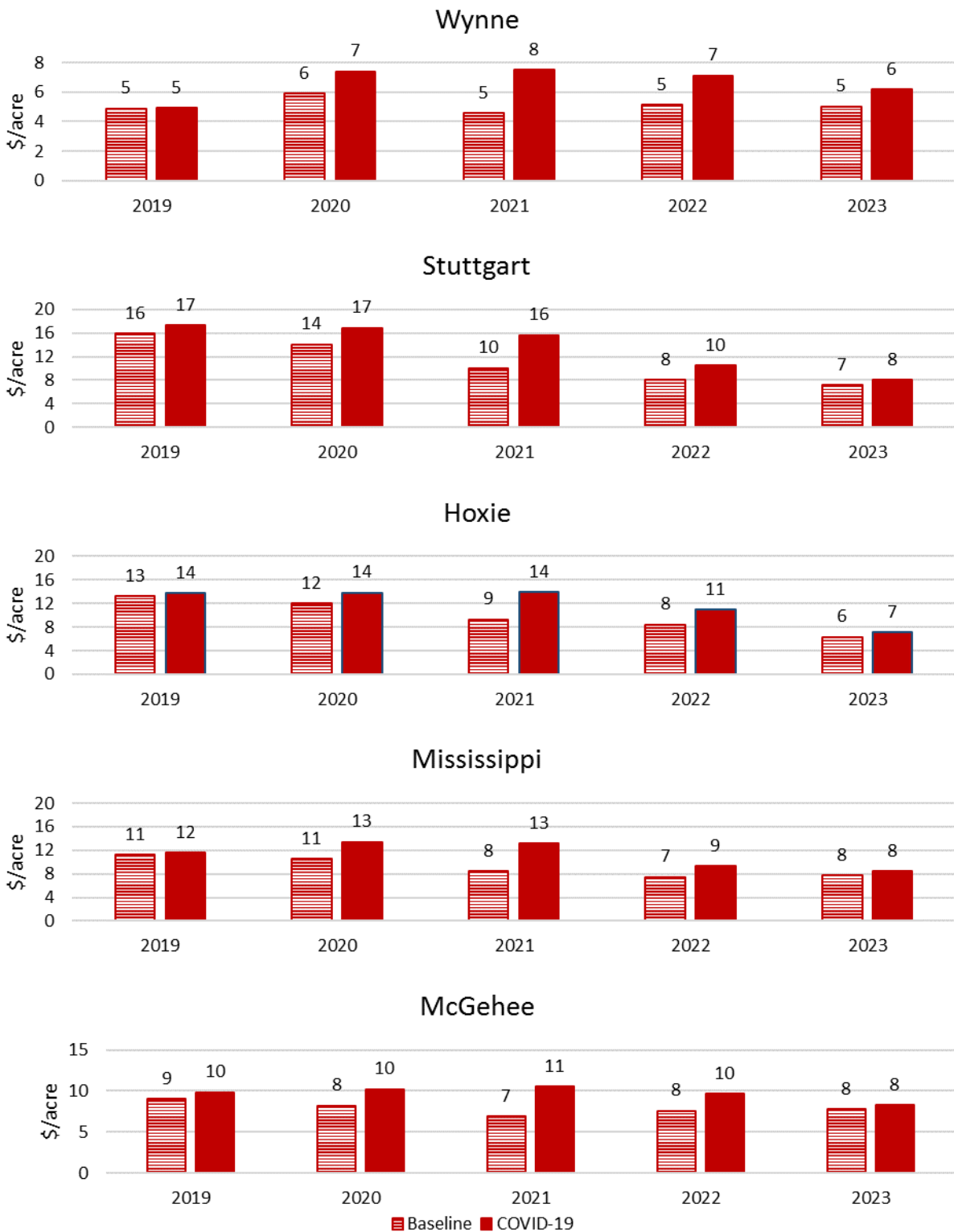


Fig. 8. Estimated Agricultural Risk Coverage-County (ARC-CO) payment rate for soybeans by scenario, farm and year, Baseline and COVID-19.

Literature Cited

- Durand-Morat, A. and E.C. Chavez. (2020). International Rice Outlook International Rice Baseline Projections, 2019–2029. Arkansas Global Rice Economics Program. Department of Agricultural Economics and Agribusiness, University of Arkansas. https://agribusiness.uark.edu/resources/pdf/Rice/International_Rice_Baseline_2020.pdf
- FAPRI. Food and Agricultural Policy Research Institute. (2020a). 2020 U.S. Agricultural Market Outlook. FAPRI-MU Report #01-20, University of Missouri. <https://www.fapri.missouri.edu/publication/2020-u-s-agricultural-market-outlook/>
- FAPRI. Food and Agricultural Policy Research Institute. (2020b). Baseline Update for U.S. Agricultural Markets. FAPRI-MU Report #03-20, University of Missouri. <https://www.fapri.missouri.edu/wp-content/uploads/2020/06/2020-June-Update.pdf>
- IMF. International Monetary Fund. (2020). World Economic Outlook, April 2020: The Great Lockdown. World Economic Outlook Reports. <https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020>
- USDA. 2020. U.S. Department of Agriculture. 2020. 2019 Enrolled Base Acres by Program by Commodity. Retrieved from: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/arc-plc/2019/excel/enrolled_base_2019.xlsx
- Wailes, E. and E. Chavez. (2011). 2011 Updated Arkansas Global Rice Model. University of Arkansas Department of Agricultural Economics and Agribusiness, Division of Agriculture Staff Paper 01-2011. <https://ageconsearch.umn.edu/record/102650>
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