2022 Markets in Review

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Fryar Price Risk Management Center of Excellence

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Dale Bumpers College of Agriculture Food & Life Sciences
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FRYAR PRICE RISK MANAGEMENT CENTER OF EXCELLENCE

UNIVERSITY OF ARKANSAS
DALE BUMPERS COLLEGE
OF AGRICULTURAL, FOOD & LIFE SCIENCES

About the Fryar Center

In 2020, the Fryar Price Risk Management Center of Excellence was established in the department of Agricultural Economics and Agribusiness at the University of Arkansas through a generous gift from Dr. Ed and Michelle Fryar. Dr. and Mrs. Fryar are both alumni of the department, and after receiving his Ph.D. in agricultural economics, Dr. Fryar returned to the department and served as a faculty member for 13 years.

The mission of the Fryar Center is to deliver a stakeholder-informed, internationally-recognized research programs in price risk management that improves decision making for farms and businesses, offers unparalleled educational opportunities for students, and enhances professional opportunities for faculty and staff.

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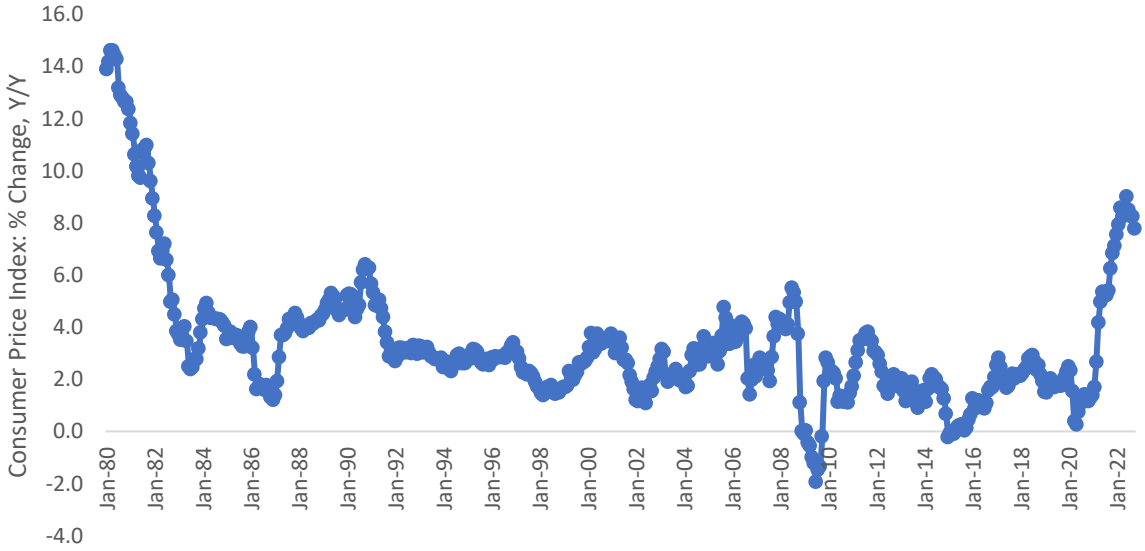
2022 Economic Overview

Andrew M. McKenzie, Eunchun Park, and John D. Anderson

Inflation was a major topic in 2022 and certainly not without reason. Figure 1 shows the year-over-year percentage change in the monthly Consumer Price Index (all urban consumers, all items in U.S. city average). Annual inflation topped out around mid-year at 9%, the highest rate of inflation since 1982 – a sharp increase in inflation relative to the pre-pandemic period.



Data Source: Federal Reserve Bank of St. Louis, Federal Reserve Economic Data.
Notes: Consumer Price Index for All Urban Consumers: All Items in U.S. City Average, Seasonally Adjusted.

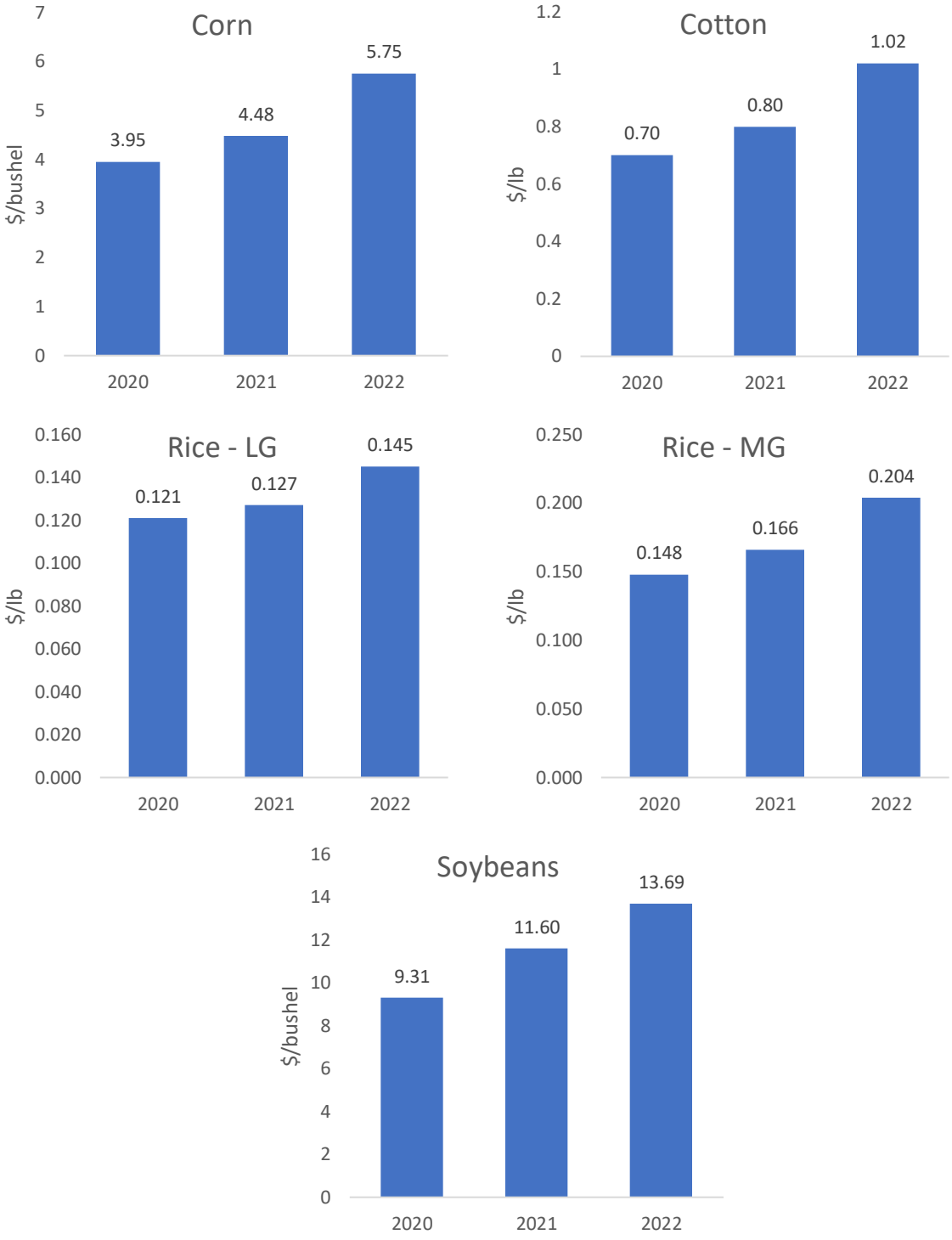
Figure 1. Consumer Price Index: Percent Change from a Year Ago

In agricultural markets, inflation was not a new topic in 2022. Sharply rising fuel and fertilizer prices had been a major concern for producers going back to about mid-2021. With the Russian invasion of Ukraine in late February, though, concerns over fertilizer and fuel prices were definitely heightened, given Russia's status as a major producer (and exporter) of both. Expectations going into planting season in 2022 were that this would likely be the most expensive crop most famers had ever produced. Indeed, an update of Arkansas crop budgets following the February/March jump in prices suggested that variable costs of production on the state's major crops would generally be 40% to 50% higher than just the prior year.[1]

Despite much higher costs of production, strong commodity prices overall provided room for optimism. The potential for favorable returns remained quite high. Projected prices for crop insurance products were at their highest level in at least a decade on most major crops. Figure 2 shows projected prices for

[1] Stiles, S., B. Watkins, and J. Anderson. 2022. The Impact of Fertilizer and Fuel Price Changes on Expected Costs and Returns for Arkansas Row Crops. University of Arkansas, Fryar Price Risk Management Center of Excellence, FC-2022-002. March.

corn, cotton, rice (long and medium grain), and soybeans for Revenue Protection on Arkansas crops for 2020 through 2022.



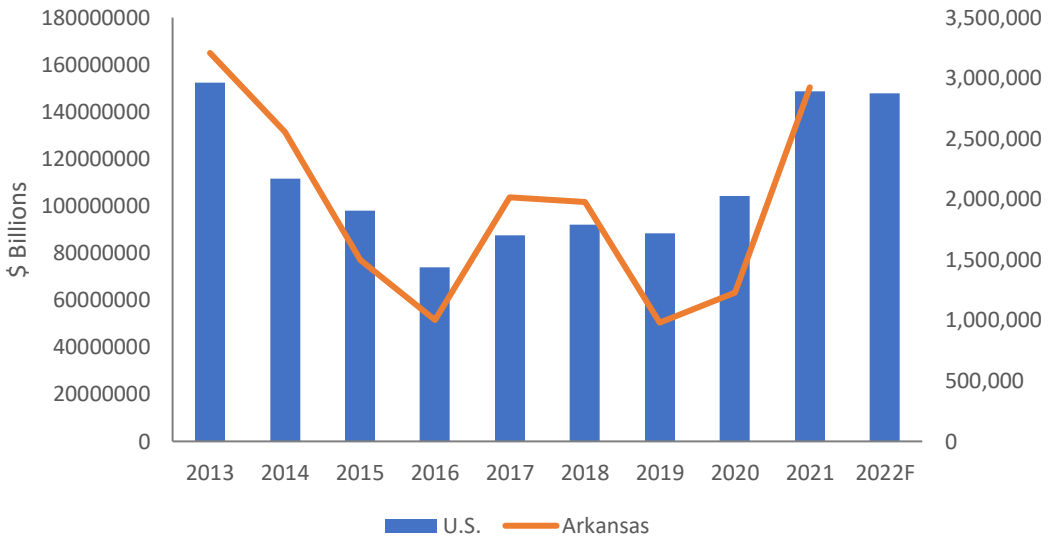
Data Source: USDA Risk Management Agency

Figure 2. Arkansas Crop Insurance Projected Prices: Selected Crops, 2020 – 2022

Projected prices on long-grain rice were the least-improved from 2021 but were still up by 14%, year-over-year. Projected prices on other major commodities were up from 18% (soybeans) to almost 30% (corn and cotton).

On the production side, 2022 turned out to be quite a difficult year. Widespread drought conditions challenged forage and row crop production over basically the entire state for much of the growing season. On the crop side, widespread use of irrigation – with increasingly sophisticated management technology and techniques – effectively mitigated major crop losses (see the following section of this report); however, with record-high fuel prices, irrigation was a very costly intervention.

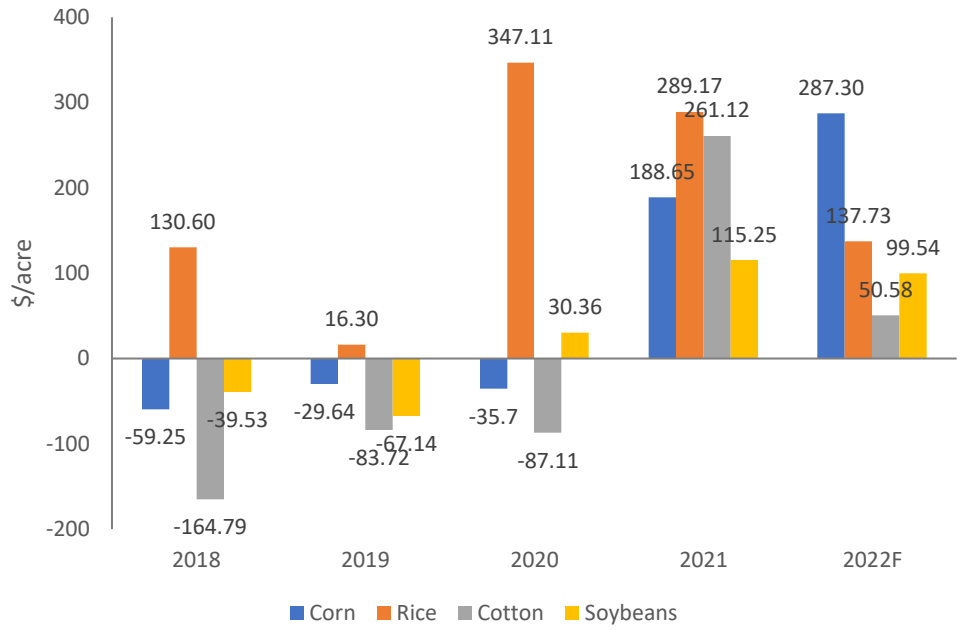
On balance, 2022 will likely work out to be a relatively high year for net farm income nationally. Although crop producers have faced higher input costs over the last 2 years, correspondingly higher output prices have resulted in the highest levels of U.S. net farm income levels since 2013, a year in which the effects of a major drought in 2012 resulted in record commodity prices. The high output prices reflect tight grain supplies coupled with strong global demand. USDA Economic Research Service's (ERS) September farm income forecast estimated real U.S. net farm income for 2022 at $147.7 billion – virtually unchanged from 2021. Figure 4 shows real U.S. and Arkansas NFI since 2013 (however, note that state-level estimates are not yet available for 2022).



Notes: F=forecast; inflation adjusted using gross domestic product chain-type price index: 2022=100.
Data Source: U.S. Department of Agriculture, Economic Research Service.

Figure 4. U.S. Net Farm Income: 2000-2022F

Figure 5 provides some additional detail related to farm income numbers for four of Arkansas' major crops. The figure charts estimated net returns per acre based on USDA Economic Research Service (ERS) cost of production estimates along with gross revenue estimates based on national average yields and harvest time prices for 2018 through 2022 (forecast). Like 2021, net returns for all four crops in 2022 are again expected to be in the black. Corn is expected to be the most profitable, registering its highest net returns over the last five years.



Data Source: USDA Economic Research Service and USDA World Agricultural Outlook Board

Figure 5: Estimated per Acre Net Returns for Selected Major Crops: US Data, 2018 – 2022 (forecast)

More than likely, Arkansas net returns by crop and farm incomes in 2022 will be lower than suggested by these national figures. As noted, costs of production for row crops were considerably higher than anticipated due to the high cost of maintaining extensive irrigation with record energy prices. Also, transportation disruptions on the Mississippi River due to low water levels – another effect of this year's drought – led to weak cash market prices during harvest this year. It is difficult to know how much unpriced grain was sold into that harvest time market, but without a doubt, the relatively weak market along the river in late summer/early fall was another unanticipated challenge for Arkansas farmers. Overall, despite the favorable national farm income estimates, 2022 has been a year that most Arkansas producers would probably prefer not to go through again.

Review of Arkansas Crop Markets in 2022

John D. Anderson, Hunter D. Biram, Eunchun Park, and Andrew M. McKenzie

The past year has been a challenging one for Arkansas' row crop farmers. The year began with unprecedented prices on key inputs, witnessed the development of a major drought through the summer, and ended with historically weak basis levels as barge traffic ground to a halt on the Mississippi due to low water levels. Any one of these events in a year would represent a major production challenge. The fact that farmers had to deal with all three in quick succession underscores just how difficult of a year 2022 was.

By way of review, fertilizer prices had generally begun to increase steadily in the summer of 2021 on expectations of relatively tight supplies and strong demand. Fuel prices had also been rising for much of 2021 due to strong demand recovery following the global pandemic. With the Russian invasion of Ukraine on February 24, 2022, both fertilizer and fuel prices rose even more sharply due to expectations of significant supply disruptions, given Russia's position as a major producer and exporter of both commercial fertilizer and petroleum products.[2]

With sharply higher input prices showing up just prior to planting, expectations for crop returns for 2022 changed significantly. Taking fertilizer and fuel price changes into account, projected variable costs on corn for 2022 were up by more than 60% compared to the five-year average. Projected variable costs for rice, cotton, and soybeans, were up by 50%, 30%, and 37%, respectively, from the previous five-year average. Due to strong crop price expectations, projected net revenues remained positive, though significantly lower than when planning for the 2022 crop had begun.[3]

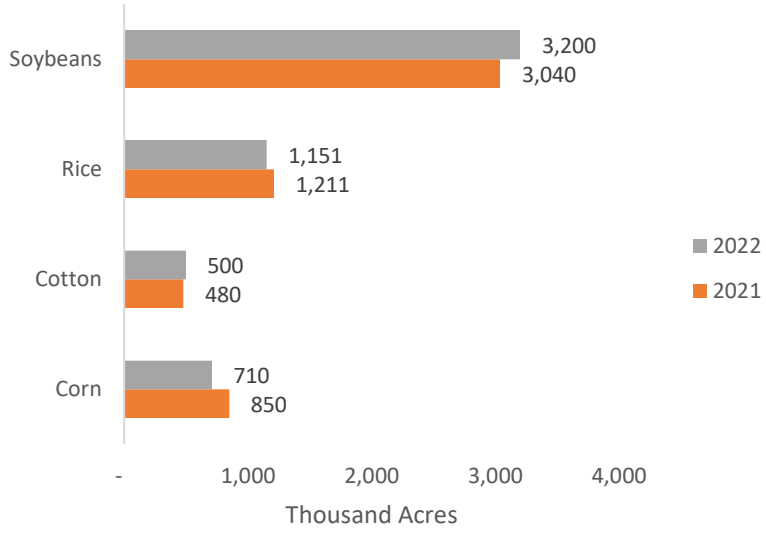


Figure 1a. Arkansas Planted Acres: 2021 vs. 2022, Selected Crops

Higher prices for fertilizer incentivized a significant shift in acreage away from corn and toward soybeans. This shift was evident in

[2] For a more detailed discussion of the impact of the Russia/Ukraine conflict on fertilizer prices, see Anderson, J.D. 2022. "The Russia/Ukraine Conflict and Farm Input Markets." *Southern Ag Today* 2(14.3): March 30.

[3] For additional discussion of the impact of early-2022 input price increases on expected costs and returns, see Stiles, S., B. Watkins, and J.D. Anderson. 2022. "The Impact of Fertilizer and Fuel Price Changes on Expected Costs and Returns for Arkansas Row Crops." Fryar Price Risk Management Center of Excellence, University of Arkansas. FC-2022-002, March.

both state and national data. Figure 1a and 1b show planted acreages for corn, cotton, rice and soybeans for Arkansas (1a) and the U.S. (1b). The drop in corn acreage was more pronounced in Arkansas than nationally, with state-level corn plantings falling by over 15% in 2022 compared to the prior year. Nationally, the decline in corn plantings was a little less than 4%.

The growing season was characterized by generally hot, dry weather. By mid-June, much of Arkansas' major crop-producing area was abnormally dry. Over the next month or so, drought

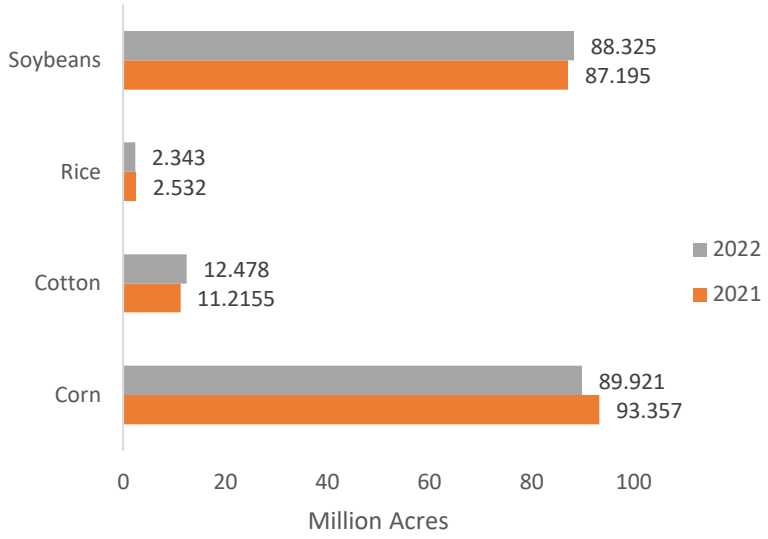
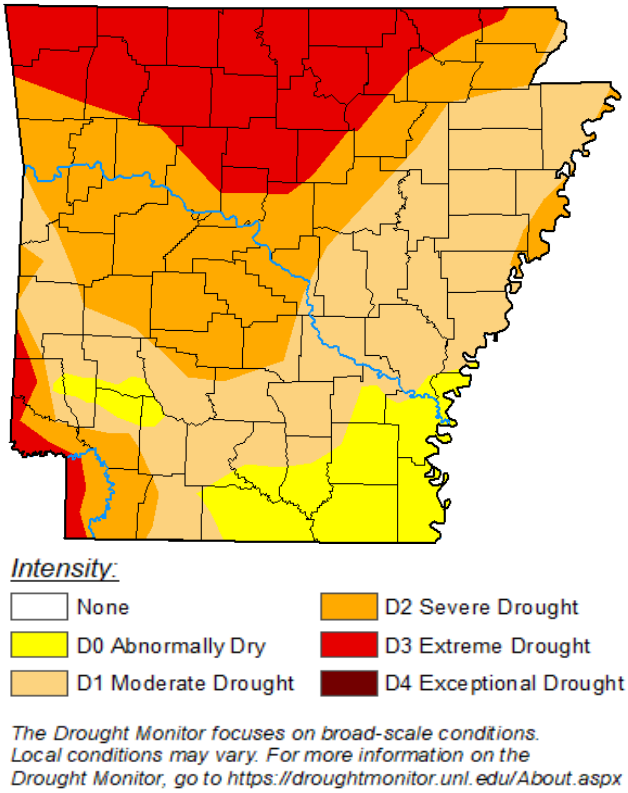


Figure 1b. U.S. Planted Acres: 2021 vs. 2022, Selected Crops



Source: Riganti, C. National Drought Mitigation Center. https://droughtmonitor.unl.edu.

Figure 2. U.S. Drought Monitor: Arkansas Map for July 26, 2022

conditions spread across the state so that by late July, the entire state was experiencing some level of drought. Figure 2 shows the U.S. Drought Monitor county level map of Arkansas for July 26, 2022. While it is evident that the most severe drought was experienced outside of major crop producing regions, the entire state – including the entire Delta and River Valley regions – suffered from significant drought conditions in 2022.

Drought-related losses totaled $10 million across corn, cotton, rice, sorghum, and soybeans, and Figure 3a shows the variation across counties in drought-related losses for these crops. Most of these losses were experienced by corn and soybean producers with $51 million in losses measured in total indemnities by USDA Risk Management Agency accounting for 3.4% of total purchased liability across corn and soybeans.

Somewhat surprisingly, given the prevalence of drought across the state, crop insurance losses attributed to drought were considerably smaller than prevented planting losses due to excessive rains during the planting season. Total indemnities triggered across corn, cotton,

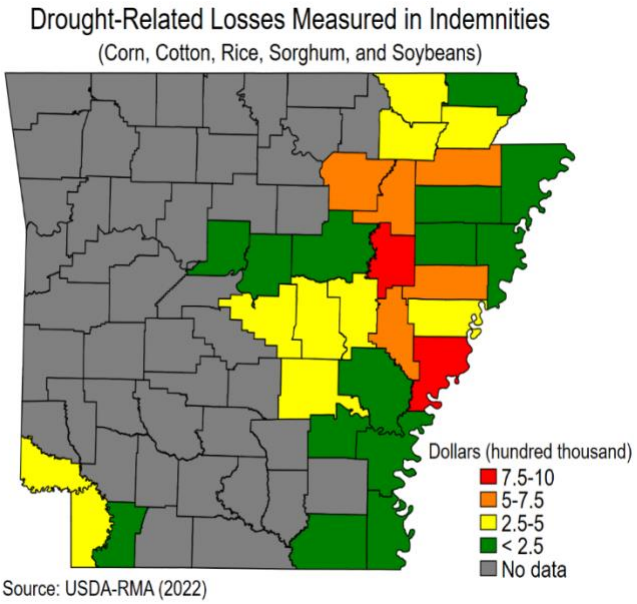


Figure 3a. Arkansas Drought-Related Losses Measured in Indemnities, 2022

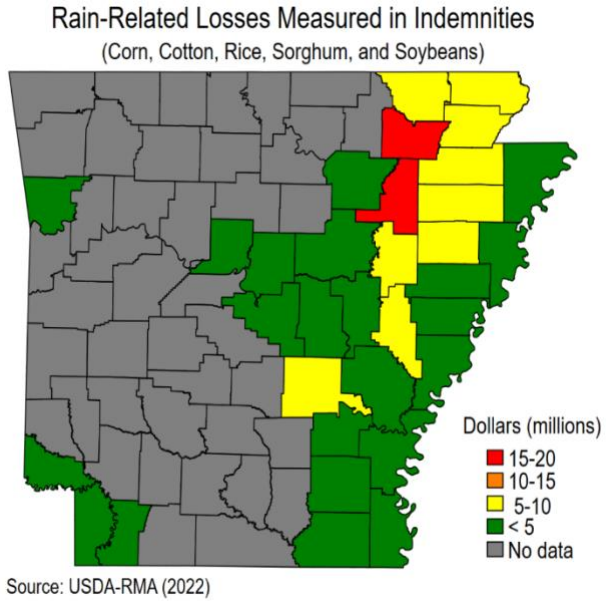


Figure 3b. Arkansas Prevent-Planted Losses Measured in Indemnities, 2022

rice, soybeans, and sorghum for prevented planting claims were valued at about $151 million accounting for 5.4% of total coverage. Figure 3b shows the distribution of these indemnities across the state's counties.

Despite the planting season problems and the relative severity of subsequent drought and heat stress this summer, Arkansas crops held up quite well. Figures 4a through 4d summarize weekly crop condition ratings for the state's corn, cotton, rice, and soybean crops. These figures present the weekly percentage of the crop rated as Good or Excellent in 2022 compared with the average Good + Excellent rating for that week over the previous five years.

Corn and cotton both went into harvest season six to eight percentage points below average in terms of the percentage of the crop rated Good to Excellent. On the other hand, soybean condition was about average at year's end, and rice condition appeared to be generally a good deal better than average by season's end.

Of course, a better way to assess droughts impacts at season's end is by looking directly at yields. Yields were down in 2022 on most major crops, though only modestly (on average) except for corn. Figures 5a through 5b show state average crop yields as reported by USDA National Agricultural Statistics Service for 2002 to 2022. Each chart also includes a 20-year trend yield estimate based on the twenty years of yield data from 2002 through 2021. The deviation of actual yield from this trend estimate provides a good assessment of the impacts of adverse growing season conditions. State average corn yield in 2022 was almost 9% below trend. That is the largest drop from trend yield since 2011. Cotton yields were off trend by 3.5% and rice by a little less than 3%. Soybean yields were basically right on trend despite this year's production challenges.

The relatively robust performance of this year's crops despite significant weather challenges largely reflects the fact that the state's major row crops are almost entirely irrigated. USDA does not report

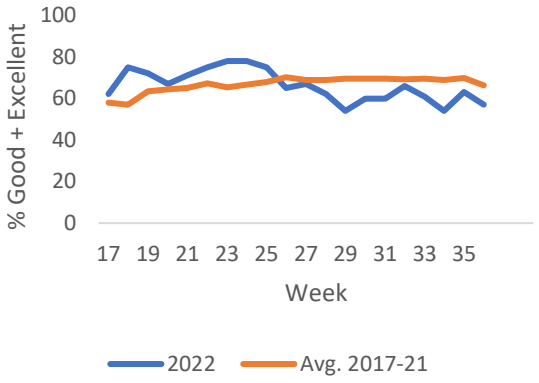


Figure 4a. Arkansas Corn Weekly Crop Condition: Percent Good + Excellent, 2022 v. 2017-21 Avg.

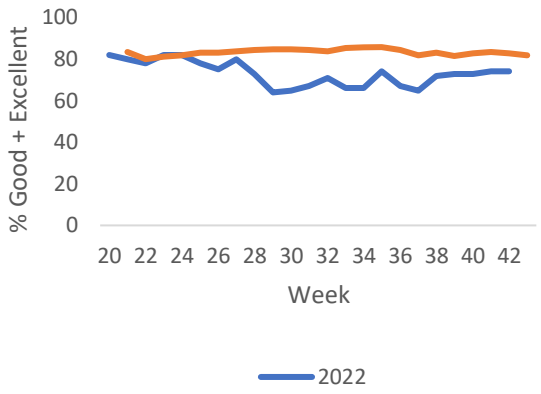


Figure 4b. Arkansas Cotton Weekly Crop Condition: Percent Good + Excellent, 2022 v. 2017-21 Avg.

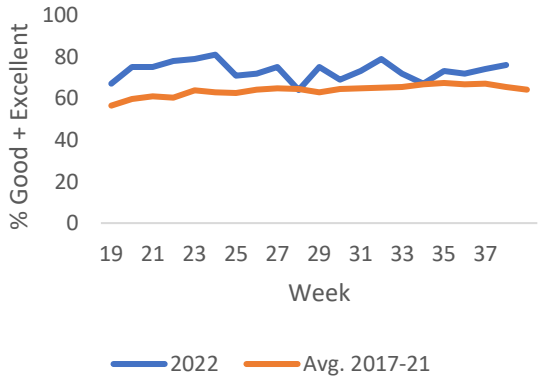


Figure 4c. Arkansas Rice Weekly Crop Condition: Percent Good + Excellent, 2022 v. 2017-21 Avg.

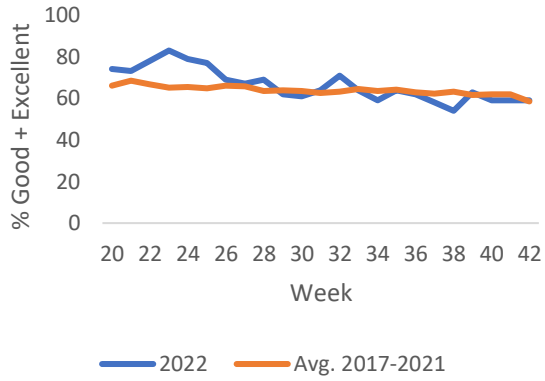


Figure 4d. Arkansas Soybeans Weekly Crop Condition: Percent Good + Excellent, 2022 v. 2017-21 Avg.

separate irrigated and non-irrigated acreage and yield for the state; however, crop insurance data does report irrigation practice on any insured acres. Figure 6 shows the percent of insured acres that were irrigated in Arkansas for 1999, 2010, and 2022. In 2022, well over 90% of insured acreage of corn, cotton, and peanuts were irrigated. Rice has always been fully irrigated. Soybeans are about 85% irrigated. For corn, cotton, and soybeans, the use of irrigation has increased substantially over the past couple of decades. In 1999, less than half of the state's corn and cotton acreage and less than a quarter of soybean acreage was irrigated. The widespread adoption of irrigation has made the state's crop production much more resilient to weather shocks such as occurred this year. The

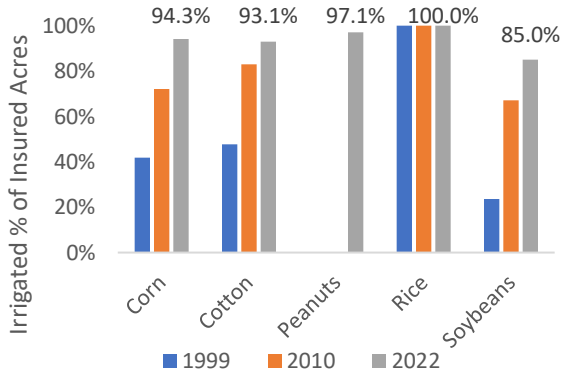


Figure 6. Arkansas Percent of Insured Acreage Irrigated: Select Crops and Years

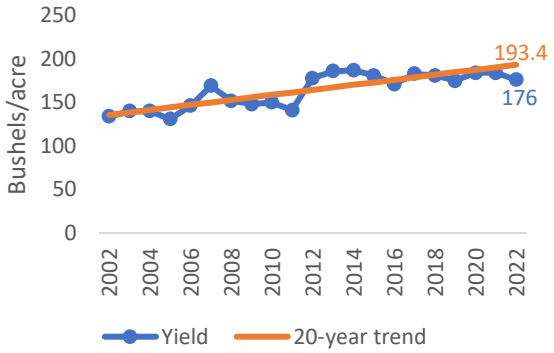


Figure 5a. Arkansas State Average Corn Yield: 2002 – 2022 with 20 Year Trend

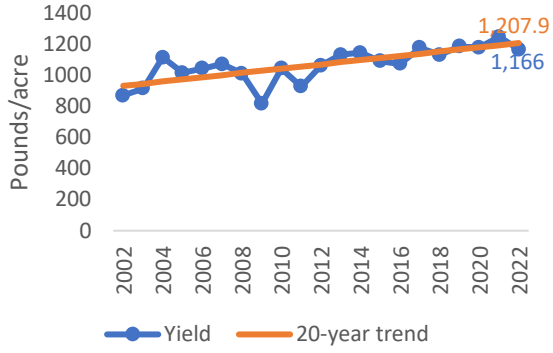


Figure 5b. Arkansas State Average Cotton Yield: 2002 – 2022 with 20 Year Trend

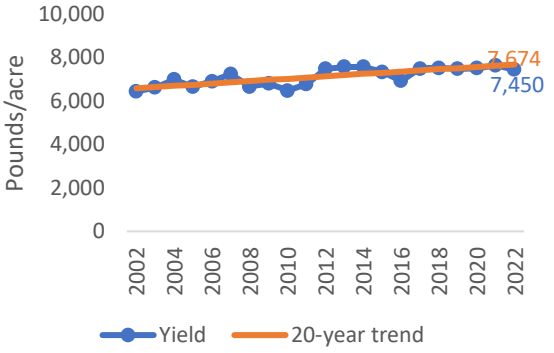


Figure 5c. Arkansas State Average Rice Yield: 2002 – 2022 with 20 Year Trend

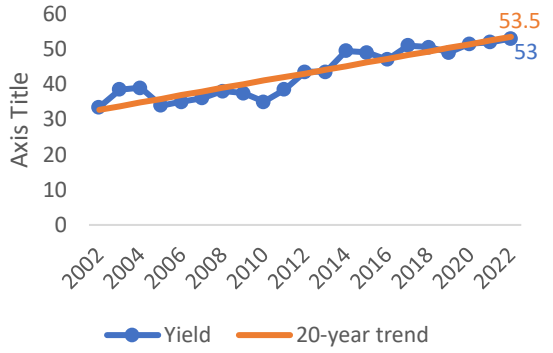


Figure 5d. Arkansas State Average Soybean Yield: 2002 – 2022 with 20 Year Trend

more significant damage from the drought was most likely on farm bottom lines. Pumping water all summer may have saved the crop, but it did not come cheap given the price of fuel this year. Profit margins that looked relatively slim after the late-February jump in fuel and fertilizer prices got even slimmer with the high cost of irrigation during the summer drought.

Of course, this year's drought did more than challenge crop production and raise fuel costs. The lack of water not just in Arkansas but across much of the country dramatically reduced the flow of the Mississippi River – to the point that barge traffic was disrupted during the busy harvest season. This presented not just a logistical challenge but a marketing challenge for Arkansas farmers. As reduced barge traffic made it more difficult for grain elevators to move grain down the river, they were less inclined to continue purchasing additional grain. This showed up in the market as a much weaker than normal basis, particularly at markets along the river. Grain that had not already been priced received much lower cash bids than would have been expected under normal market circumstances. This was really an adding-insult-to-injury situation, in that more grain than normal had remained unpriced because it was difficult for farmers to assess the yield impacts of the season's drought. No wanting to contract a price on more grain than they would end up producing, most farmers were relatively

conservative in their forward pricing due to the drought, meaning that weak cash bids probably took more of the season's crop than it would have in a normal year.[4]

In summary, 2022 was a year that most Arkansas farmers would probably just as soon forget. From record costs to a challenging production environment to a weak market in the middle of harvest, nothing came easy on the farm this year. Maybe the best that can be said is that it could have been worse. For the most part, prices remained at historically high levels, and though it was definitely not a cheap crop to produce, it was a better crop than most would have expected in an extreme weather year. Small consolation, perhaps, but better than nothing.

[4] For more detail on the impact of this year's drought on the Mississippi River market along with a thorough discussion of how basis behavior affects risk management outcomes, see Biram, H.D., S. Stiles, A.M. McKenzie, and J.D. Anderson. 2022. "Risk Management Tools and Strategies for Arkansas Corn and Soybean Producers: Implications of Mississippi River Transport Disruptions." Fryar Price Risk Management Center of Excellence, University of Arkansas. FC-2022-005, October. See also Episode 13 (Oct. 13, 2022) and Episode 16 (Nov. 1, 2022) of the Fryar Center's Relevant Risk Podcast.

Livestock and Poultry Market Review

James L. Mitchell

Overview

This was a challenging year for livestock and poultry industries. High input prices, including agricultural chemicals, farm labor, feed, and fuel, raised costs of production. Severe drought led to accelerated herd liquidation and poor hay production for cattle producers. Logistical and transportation issues continue to pressure agricultural supply chains. Highly pathogenic avian influenza (HPAI) has negatively impacted poultry and egg production. Despite these challenges, U.S. red meat and poultry production is projected to reach a record 107.5 billion pounds in 2022 (Table 1).

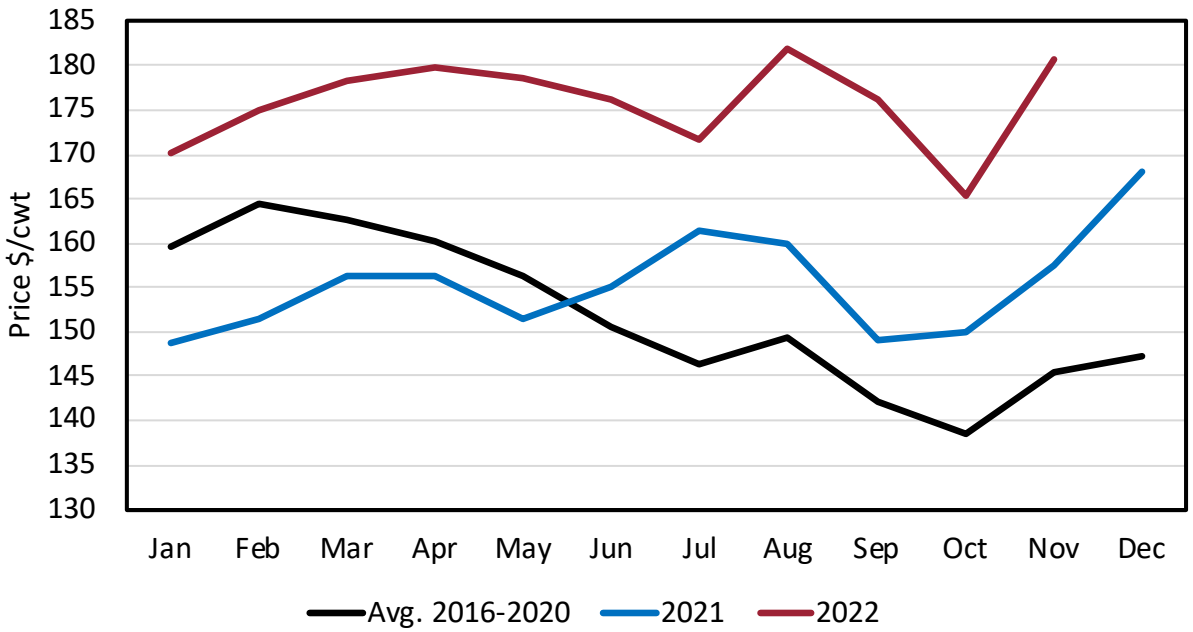
Cattle

The Livestock Marketing Information Center (LMIC) estimates 2022 cash costs for cow-calf producers at $963/cow or 13% higher year-over-year. The largest expenditure for cattle producers is harvested forage and feed. LMIC's 2022/2023 season-average hay price is $160/ton, an increase of 9% compared to the 2021/2022 season-average price. Poor growing conditions this summer and expensive inputs contribute to these record-high hay prices. LMIC's 2022/2023 average corn price is $7.00/bushel, an increase of $1/bushel compared to their 2021/2022 corn price. Feed costs tend to follow the corn market, and we will not see cheaper corn until at least the 2023/2024 marketing year.

Major cattle production regions have dealt with widespread drought since mid-2020. The Southeast has mostly avoided significant drought impacts. However, conditions this summer deteriorated rapidly. For example, in late June, only 15% of Arkansas pastures were rated as poor or very poor. By late July, USDA estimated that 75% of Arkansas pasture and range was poor or very poor. The rapid decline in pasture conditions brought large numbers of cows to market in the Southern Plains and Southeast.

Federally inspected beef cow slaughter will finish 12% higher year-over-year. Through 48 weeks, national beef cow slaughter totals 3.58 million head, and is the highest since 1996. Regionally, beef cow slaughter in Region 6 (AR, LA, NM, OK, & TX) totals 1.02 million head and represents 28% of the national total. These large slaughter totals will significantly affect cattle inventory numbers that USDA will release in January. We will see further tightening of cattle supplies and increasing prices in 2023.

Arkansas cattle markets improved in 2022 (Figure 1), reflecting a more favorable supply/demand balance for the cattle industry. In November, prices for 500-600 pound steers averaged $181/cwt or 8.8% higher year-over-year. The last time prices were that high was November 2015, when 500-600 pound steer prices averaged $187/cwt in Arkansas. The expectation is that prices will continue to increase in 2023. The magnitude of that increase, at least initially, will depend on spring/summer grazing prospects for stocker cattle and feedlot cost of gain.



Source: USDA-AMS. LMIC

Figure 1. Monthly Arkansas Steer Prices. Medium and Large Frame #1 Muscling. 500-600 Lbs.

Poultry

In the poultry industry, market and production dynamics are more straightforward. Through October, broiler prices increased by 30%, and broiler feed prices rose by 12%. As a broad indicator of profitability, the relative improvement in wholesale broiler prices in 2022 points to an increase in production. USDA expects broiler production to finish the year at 45.974 billion pounds or 2.4% higher (Table 1).

Table 1. Total U.S. Red Meat and Poultry Production (Mil. Lbs.)

	Beef	Pork	Broiler	Turkey	Red Meat & Poultry
2023[a]	26,275	27,345	46,825	5,580	106,738
2022[b]	28,347	27,121	45,974	5,188	107,366
2021	27,948	27,675	44,899	5,558	106,810
2023 vs. 2022	-7.3%	0.8%	1.9%	7.6%	-0.6%
2022 vs. 2021	1.4%	-2.0%	2.4%	-6.7%	0.5%

Source: USDA November *World Agricultural Supply and Demand Estimates* report.

[a]Forecast

[b]Projection

This year has been more challenging for the turkey industry. Through October, wholesale turkey prices increased 24%, and feed prices only increased 13%. Despite the relative improvement in wholesale prices, USDA expects production to finish at 5.188 billion pounds or 6.7% lower year over year. The decline in production reflects the ongoing challenge of HPAI, which has mainly impacted turkey and egg production.

The most recent outbreak of HPAI was first detected in the US in February 2022. Since the initial outbreak, 704 flocks have been tested and confirmed to have HPAI. Of the 704 confirmed cases, 301 are commercial flocks and 403 are backyard flocks. It is important to note that the incidence rate by flock type does not reflect the number of birds affected by HPAI. The total number of affected birds totals 57.33 million. Backyard flocks represent 55% of cases but less than 1% of affected birds.

It is difficult to determine whether HPAI will continue to disrupt poultry and egg production in 2023. Because HPAI is ongoing, it is also challenging to estimate the exact size and distribution of costs associated with managing and controlling HPAI. Based on estimates in Table 1, USDA expects turkey production to recover from HPAI and broiler production to remain unaffected by the disease.