DIVISION OF AGRICULTURE

RESEARCH & EXTENSION

University of Arkansas System

Trends for Arkansas Field Crop Yields, 2015-2024

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Table of Contents

Appreciation is extended to the **USDA National Agricultural Statistics Service (NASS)** for providing historical acreage and yield data.

Portions of this information were modified from earlier versions of *Trends for Arkansas Field Crop Yields* authored by **Archie Flanders, et al.**, University of Arkansas Cooperative Extension Service.

Trends for Arkansas Field Crop Yields, 2015-2024

Increasing yields are an indicator of improvements in crop production technology. Trajectories in average yields are driven by changes in crop management practices, crop genetic improvement through conventional breeding and genetic engineering, climate and interactions among these factors (Grassini, et al.). Producer profits increase as increased yield productivity led to greater revenue for each acre in production.

Environmental conditions in a single year may lead to deviations from a prevailing yield trend. A statistical measurement that accounts for annual yield volatility is useful for discerning long-term yield trends. This report utilizes annual crop yields in conjunction with Olympic average yields for evaluating Arkansas field crop yields during 2015-2024.

Annual Yields for Field Crops

Annual average yields reported by the National Agricultural Statistics Service (NASS) for principal field crops for the period 2015-2024 are presented in Figure 1 through Figure 6. Each figure includes the Olympic average for a rolling five-year period. Olympic averages are the average of three years after excluding the highest and lowest yielding years for each five-year period. For example, the Olympic average for cotton in 2024 is the average of yields in 2021 (1248 lbs./ac.), 2022 (1189 lbs./ac.), and 2023 (1298 lbs./ac.). Yields in 2020 (1179 lbs./ac.) and 2024 (1341 lbs./ac.) are excluded from calculating the Olympic average. This method of calculating averages reduces volatility that is caused by extremely low and high yields (i.e., less likely yield outcomes) that may be deviations from a prevailing trend.

Figure 1 shows Arkansas' Olympic average cotton yield on an increasing trend since 2016. Average annual cotton yields reported by NASS are also on an increasing trend over the past decade. However, yield volatility due to adverse weather has impacted the average yield trend. The historical maximum state-average cotton yield occurred in 2024 at 1341 lbs./ac. Figure 2 shows Olympic average corn yields in a more defined range of 180 to 184 bushels per acre over the past decade. The historical high corn yield occurred in 2024 at 187 bu./ac. Average state-average corn yields have been more stable, near 182 bu./ac., over the past five years, albeit with a high degree of volatility with yields ranging from 172-188 bu./ac.. Soybean yields in Figure 3 have an increasing trend for much of the 2015-2024 period. The Olympic average yield has increased eight (8) bu./ac. over the past ten years. The historical high soybean yield of 55 bu./ac. occurred in 2024. Interestingly, soybean Olympic average yields show a strong positive correlation ($r > .9$) with the NASS state-average soybean yields. Average rice yields in Figure 4 saw a sharp recovery in 2017 following a very challenging harvest in 2016 due to heavy rains. Olympic average rice yields have generally been between 166 and 167 bushels per acre over much of the previous ten years. The historical high rice yield occurred in 2024 at 169.8 bu./ac. In Figure 5, the previous decade high wheat yield of 58 bu./ac. occurred in 2021. The Olympic average wheat yield increased from 2021 to 2024. The recent uptrend reversed a four-year yield decline that occurred from 2016 to 2019, falling from a peak of 59 bu./ac. in 2015 to 53.7 bu./ac. in 2020.

Figure 1. Arkansas Cotton Yields, Annual and 5-Year Olympic Average, 2015-2024.

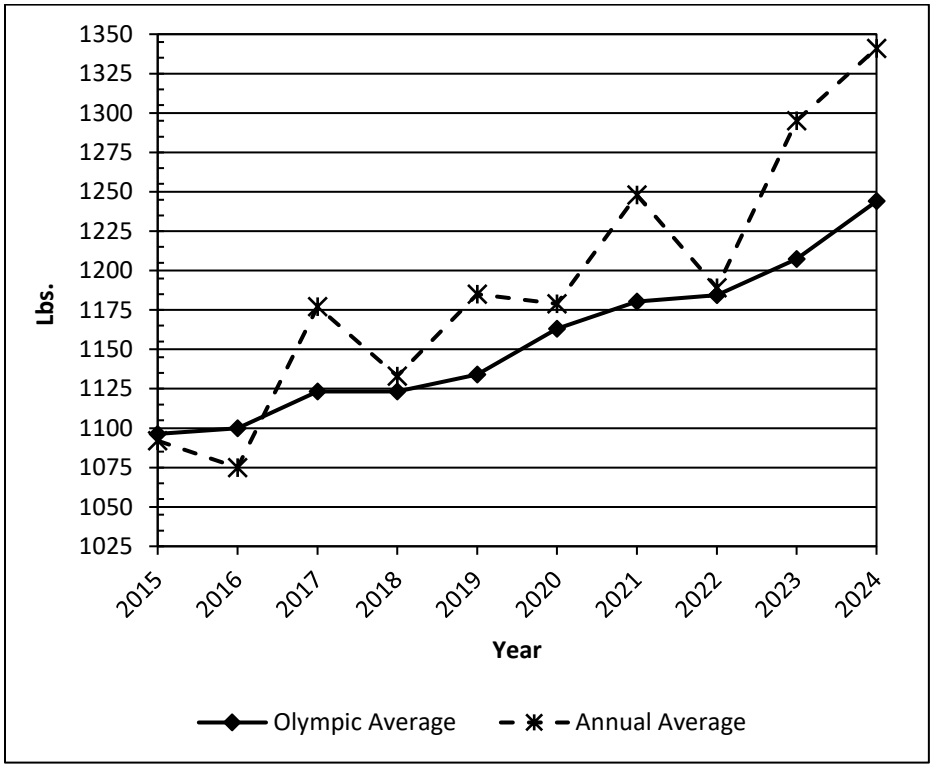


Figure 2. Arkansas Corn Yields, Annual and 5-Year Olympic Average, 2015-2024.

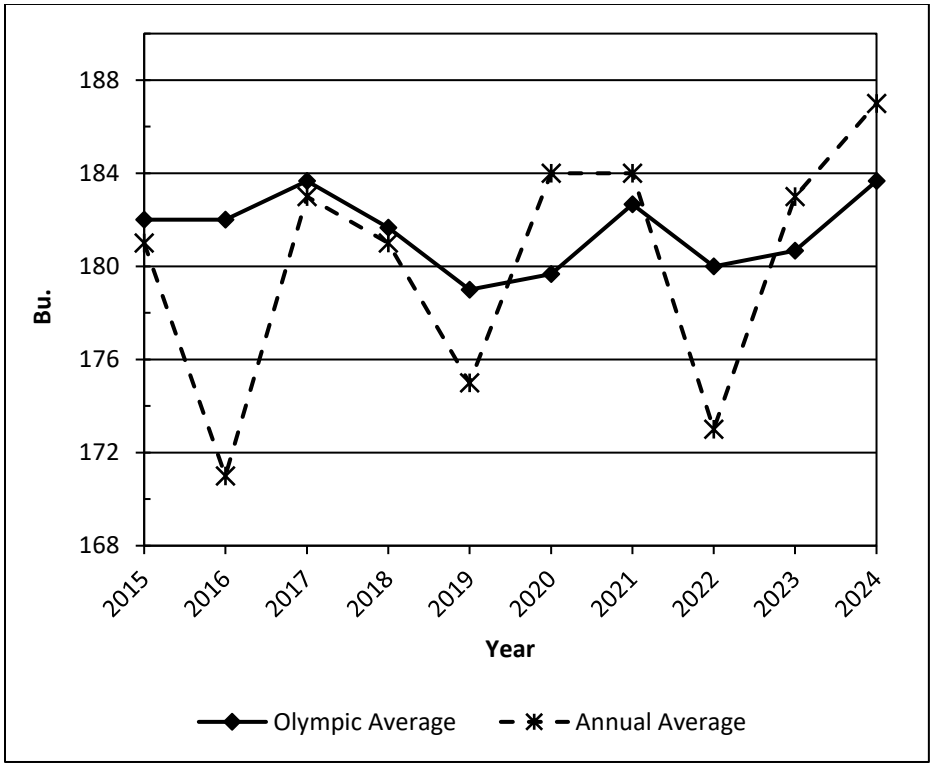


Figure 3. Arkansas Soybean Yields, Annual and 5-Year Olympic Average, 2015-2024.

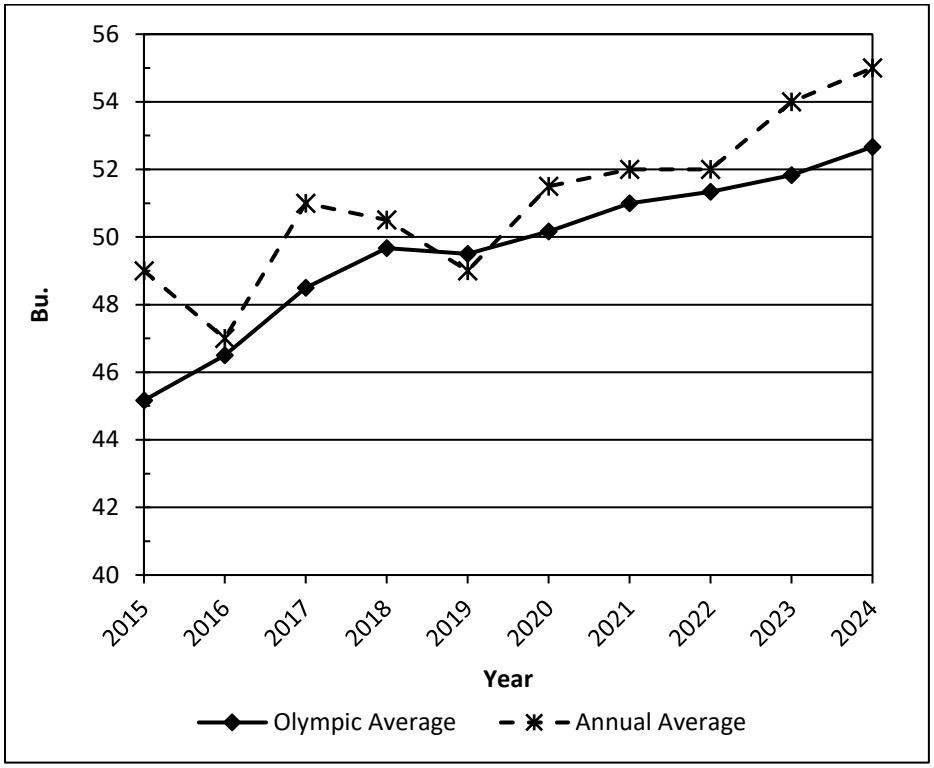


Figure 4. Arkansas Rice Yields, Annual and 5-Year Olympic Average, 2015-2024.

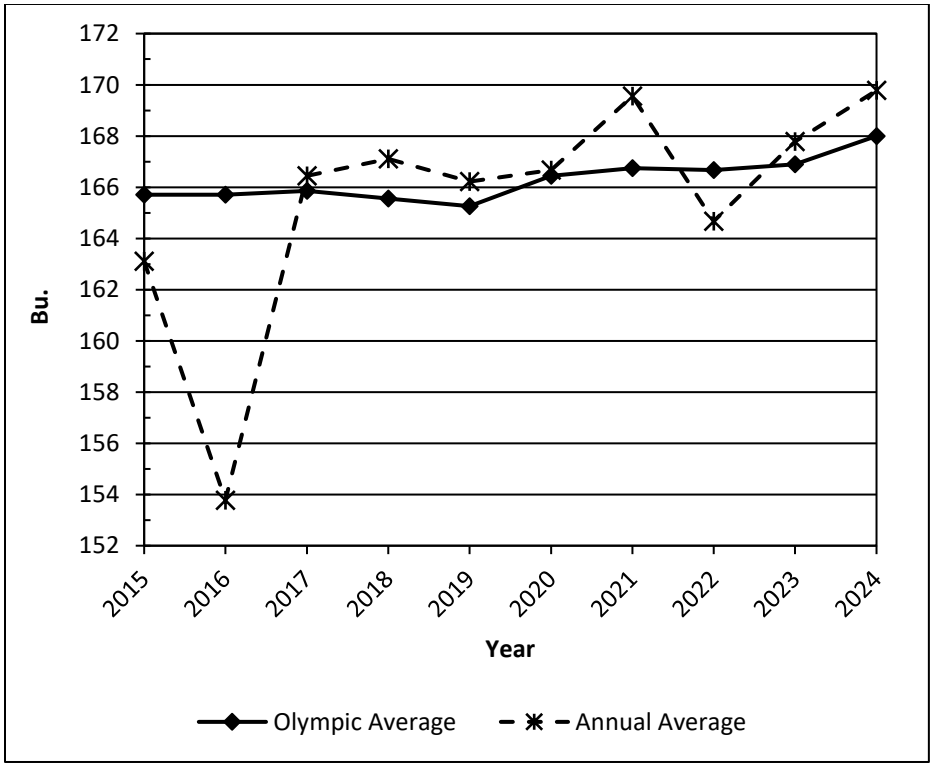
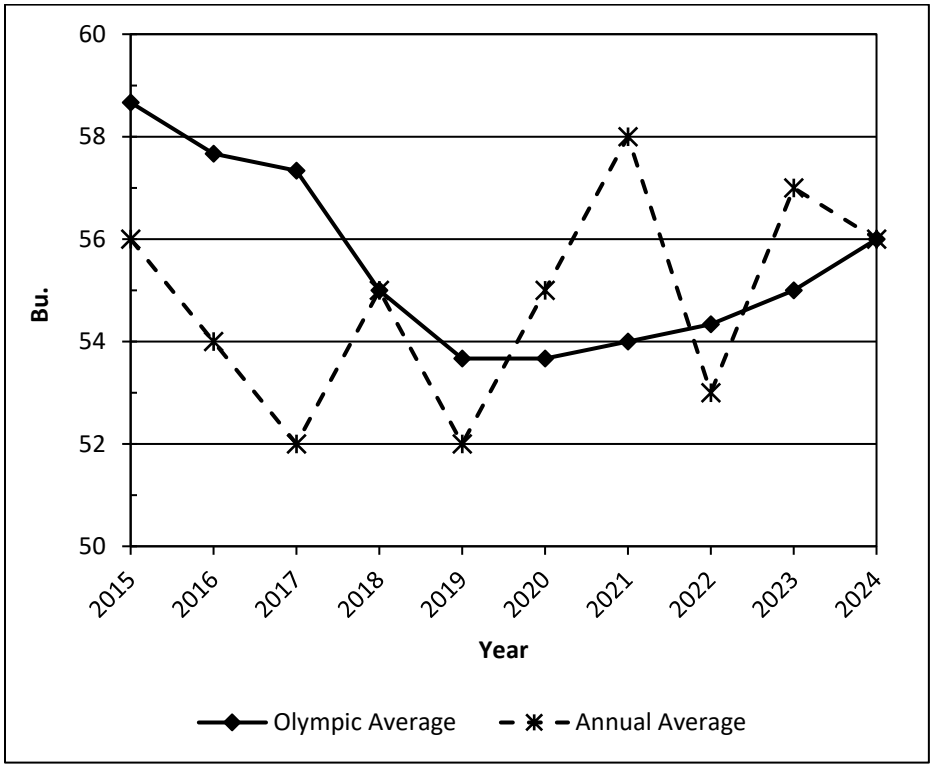


Figure 5. Arkansas Winter Wheat Yields, Annual and 5-Year Olympic Average, 2015-2024.



Comparing Trends in Arkansas and U.S. Yields

Graphs in the Appendix compare Olympic average yields for Arkansas and the aggregate of other U.S. producing states (USDA, NASS). Arkansas' cotton yields shown in Appendix A are increasing faster than the U.S. average. Since 2015, Arkansas' cotton yield averaged 332 lbs./acre, or 40%, more than other U.S. yields. The percentage of cotton acres under irrigation in Arkansas is relatively high. In 2024, 95% of cotton acres were irrigated (USDA, FSA). Corn yields in Appendix B show the difference between U.S. and Arkansas yields narrowing over the past six years on mostly favorable U.S. growing conditions. Like cotton, Arkansas has a high percentage of corn acres under irrigation. In 2024, 94% of corn acres in Arkansas were irrigated (USDA, FSA). This has contributed to the stability in Arkansas' corn yields over the past ten (10) years. Arkansas' soybean yield trend closely follows that of the U.S. average (Appendix C). However, over the past four years, Arkansas' average soybean yield has exceeded the U.S. average by 1 to 2 bushels per acre. Since 2015, Arkansas' soybean yields averaged one (1) bu./acre more than other U.S. yields. Appendix D shows the difference between Arkansas and other U.S. rice yields widening somewhat from 2021 to 2024. Over the period 2015–2024, the yield difference between Arkansas and the U.S. average has been 3 bu./acre, or 1.8% less than other U.S. rice yields. Appendix E illustrates an increasing trend in Arkansas winter wheat yields over the past five years as wheat acreage in the state has fallen to historic lows. In 2024, Arkansas' Olympic average yield exceeded the U.S. average by 5 bu./ac. The average yield difference over the past decade has Arkansas wheat yields exceeding the U.S. average by 7 bu./acre or 14%.

Summary

The foundation of agricultural productivity is sustained increases in crop yields. Arkansas' rates of yield increase for cotton and soybeans are decidedly linear over the past ten (10) years. However, some deceleration was found in the relative rate of increase in average yields of corn and rice during the 2015–2024 period. However, both corn and rice yields in Arkansas achieved record levels in 2024 along with cotton and soybeans. A steady yield decline in wheat was observed from 2015 to 2019. The last four years have seen a consistent uptrend in wheat yields.

Average yields in Arkansas are greater than other U.S. field crop yields for cotton, corn, and wheat. Average yields for soybeans in Arkansas began to exceed U.S. yields in 2021. This may be explained by the continued increase in irrigated soybean acres in Arkansas over the past decade as well as changes in production practices that favor earlier planting dates. Arkansas' "All" rice yields are less than other U.S. yields by 3 to 4 bu./ac. However, U.S. "All" rice yields include significant acres of relatively higher-yielding California medium-grain rice. Approximately 90% of Arkansas' rice acreage is planted to long-grain rice.

Yield trend analysis provides useful insight into the productivity of Arkansas crops over time. While NASS reports state-average yields on an annual basis, the Olympic average yield offers a more stable benchmark of expected yield, helping to explain large deviations in the NASS survey data. Analysis of crop yield trends and yield trajectories is beneficial in estimating future production and potential yield plateaus. Identifying these trends with a high degree of confidence can be useful to inform development of priorities for agricultural research.

References

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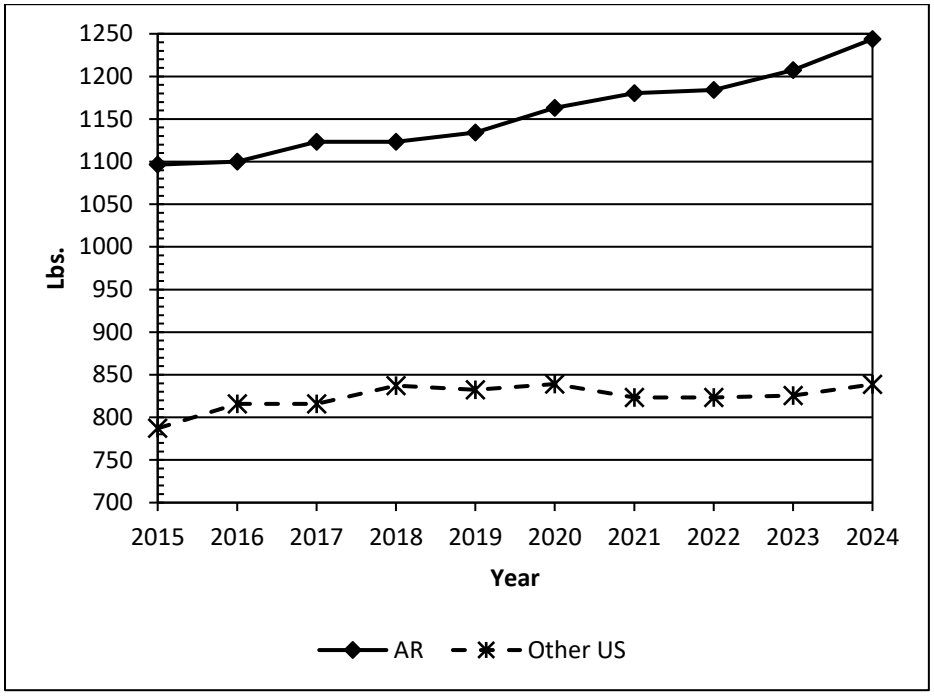
U.S. Department of Agriculture-National Agricultural Statistics Service (NASS). Internet site: https://www.nass.usda.gov/Statistics_by_Subject/index.php?sector=CROPS

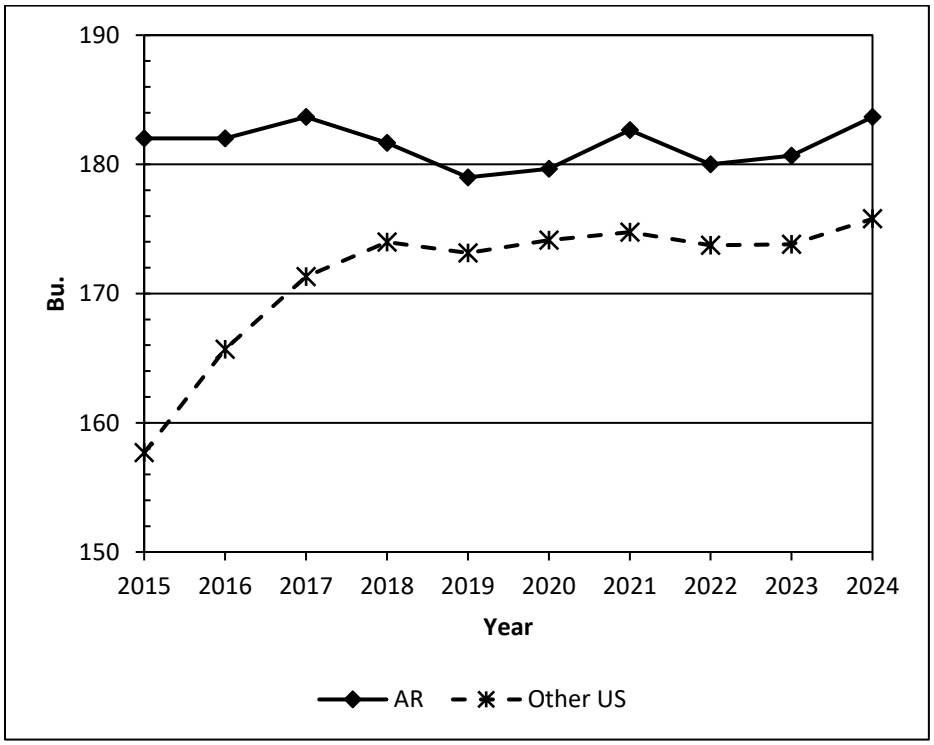
U.S. Department of Agriculture-Farm Service Agency (FSA). Internet site: https://www.fsa.usda.gov/news-room/efoia/electronic-reading-room/frequently-requested-information/crop-acreage-data/index

Appendix

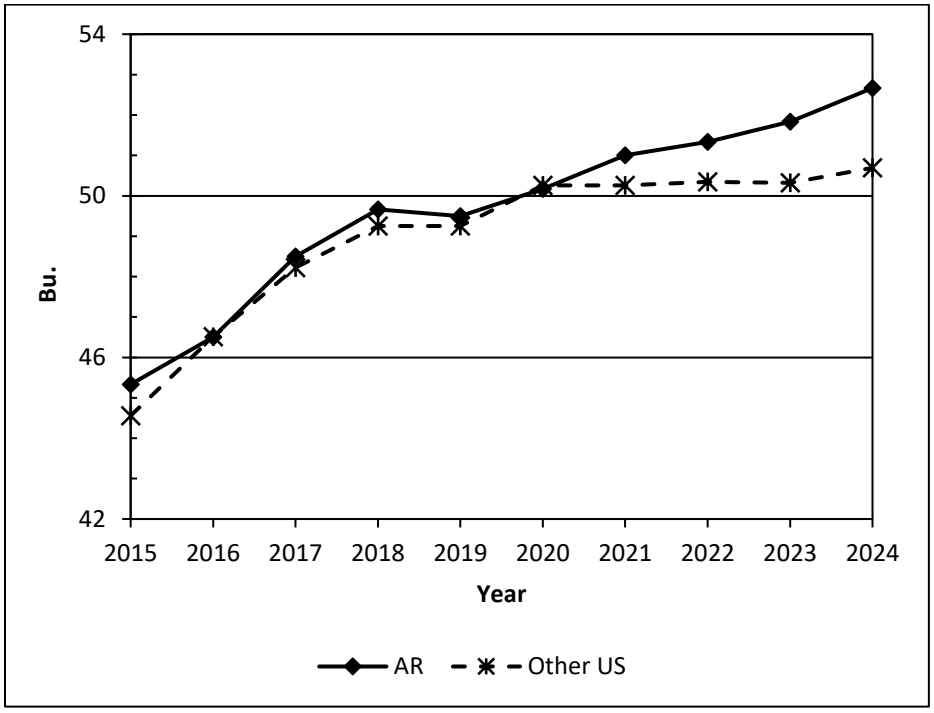
Appendix A. Arkansas and Other U.S. 5-Year Olympic Cotton Yields, 2015-2024.



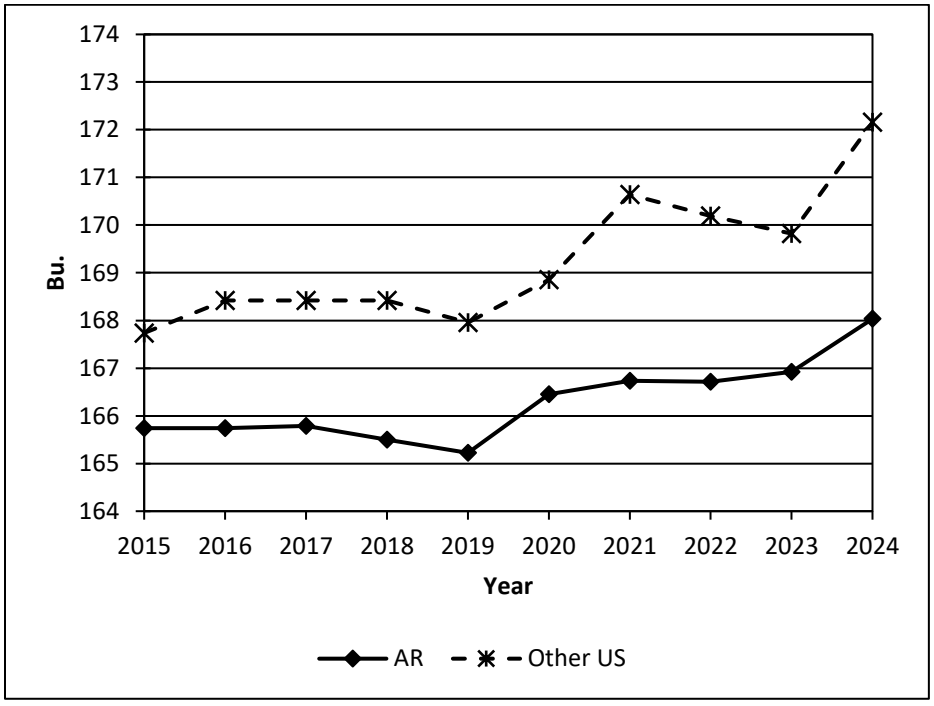
Appendix B. Arkansas and Other U.S. 5-Year Olympic Corn Yields, 2015-2024.



Appendix C. Arkansas and Other U.S. 5-Year Olympic Soybean Yields, 2015-2024.



Appendix D. Arkansas and Other U.S. 5-Year Olympic Rice Yields, 2015-2024.



Appendix E. Arkansas and Other U.S. 5-Year Olympic Winter Wheat Yields, 2015-2024.