

Analyzing the Relative Riskiness of Rice Yields

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Overview

Producers face at least two primary risks at any point in time: production and price risk. In agricultural crop production, excess rainfall, drought, and pest pressure all pose the threat of crop yield losses.

While all crops grown in the United States face these risks, the effect is not the same for all crops. Understanding production differences and risks specific to each crop is important for successful risk management, minimizing losses and stabilizing farm income year-to-year.

This fact sheet evaluates the relative riskiness of rice to other principal crops grown in the Mid-South region. It is meant to better inform a producer's risk management strategy and to provide implications for policymakers evaluating risk protection programs in the upcoming farm bill.

Coefficient of Variation

The relative yield risk of rice production is compared to corn, soybean and cotton production by considering the state-specific coefficient of variation (CV) for the yield of each crop as a measure of relative yield risk. The CV is a measure of how much yield varies across a given

state relative to the average yield of that state. The CV also allows us to make comparisons between different crops and counties to assess if one crop is more or less risky to grow in a specific state. State-level data¹ from 2007-2022 (USDA-NASS, 2023) are utilized and a linear time trend is removed from each state-average crop yield to account for changes in technology and production practices in each state over time.

Rice Relative Yield Risk is Lower than Competing Crops

Figure 1 gives the state-specific ratio of the CV for corn relative to the CV for rice. This ratio of two CVs tells us how much more, or less, risky corn yield is relative to rice yield. In Arkansas, the ratio of 1.62 implies that it is about twice as risky to grow corn relative to rice in that state. Figure 2 gives the state-specific ratio of the CV for soybeans relative to the CV for rice. Using Mississippi as an example, the ratio of 4.92 implies it is nearly 5 times riskier to grow soybeans than rice in that

¹ This fact sheet does not distinguish between irrigated and nonirrigated yields across time. USDA-NASS provides a breakdown of the shares of irrigated and nonirrigated acres in Table 34 of the 2017 Agricultural Census. The portions of acres irrigated in Arkansas for corn, soybeans, and cotton is 93%, 85%, and 93%, respectively. The same irrigated portions in Mississippi are 81%, 74%, 74%. The irrigated portions for Louisiana are 78%, 68%, 60%. The irrigated portions for Texas are 84%, 83%, and 52%.

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Figure 1. Ratio² of the CV for Corn Yield to the CV for Rice Yield (2007-2022)

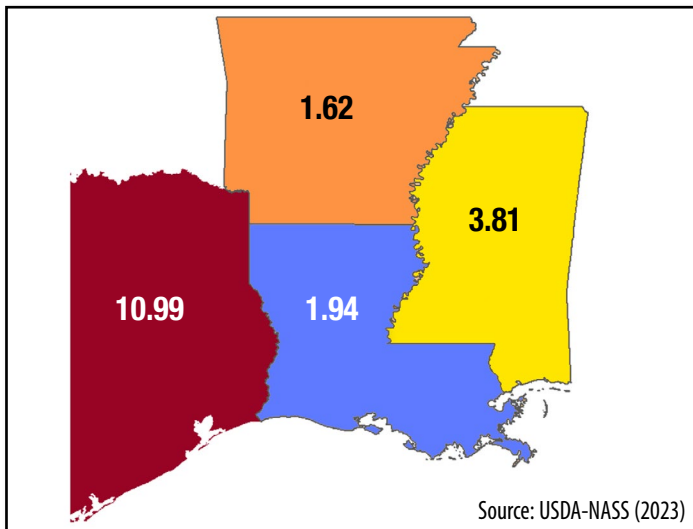
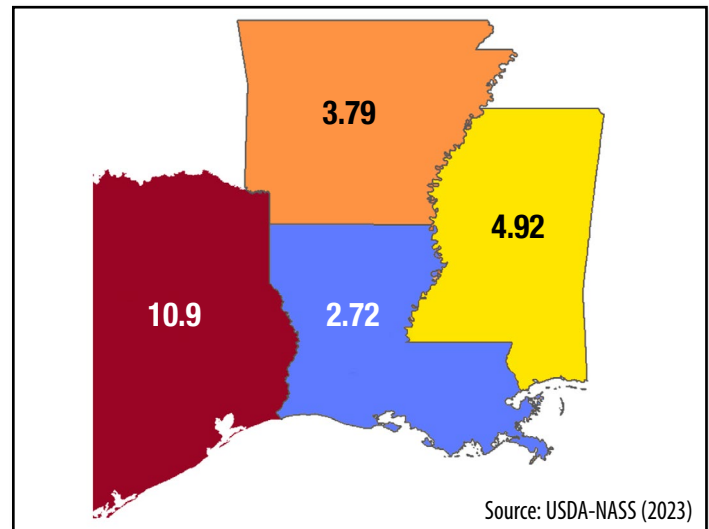


Figure 2. Ratio of the CV for Soybean Yield to the CV for Rice Yield (2007-2022)

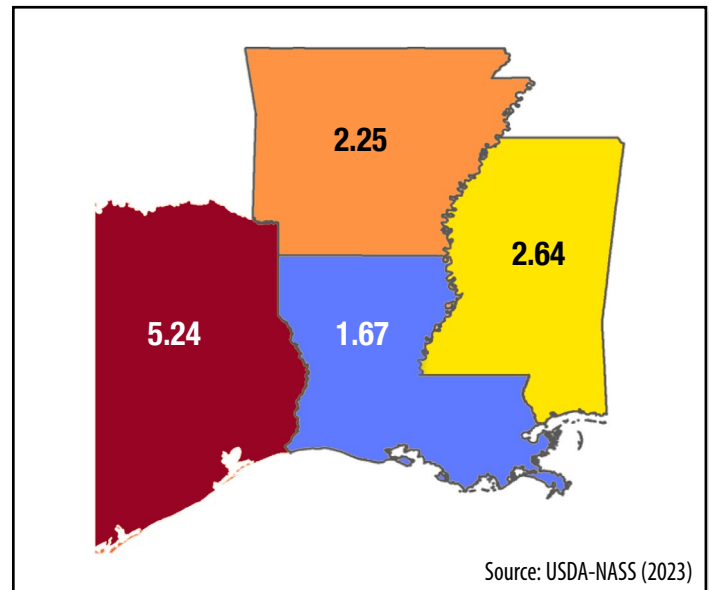


state. Finally, Figure 3 gives the ratio comparing CVs for upland cotton to CVs for rice with ratios ranging from nearly 2 to more than 5, indicating it is nearly 2-5 times more risky to grow cotton than it is rice in the states considered.

Implications for Risk Management

There are several other levels of relative riskiness across rice-producing counties in the midsouth, but the same message generally holds: rice yield risk is relatively lower than the yield risk of its competing crops in the midsouth. This becomes important when deciding between risk management strategies that focus on production risk or price risk. Due to lower rice yield risk, programs such as the Price Loss Coverage (PLC) may be more advantageous to rice producers than programs like the Agriculture Risk Coverage (ARC) program. Additionally, from the crop insurance options available it is important to consider choosing individual products such as Revenue Protection or Revenue Protection - Harvest Price Exclusion or area crop insurance products such as Supplemental Coverage Option and Enhanced Coverage Option.

Figure 3. Ratio of the CV for Upland Cotton Yield to the CV for Rice Yield (2007-2022)



References:

USDA-NASS. (2023, May 10). USDA-NASS 2017 Agricultural Census. Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/.

USDA-NASS. (2023, April 20). USDA-NASS QuickStats. Retrieved from <https://quickstats.nass.usda.gov/>.

² The Coefficient of Variation (CV) is the ratio of the Standard Deviation to the Mean of each state and crop yield distribution. The plots in Figures 1-3 gives the ratio of two CVs. The state-specific values plotted are not CVs.