

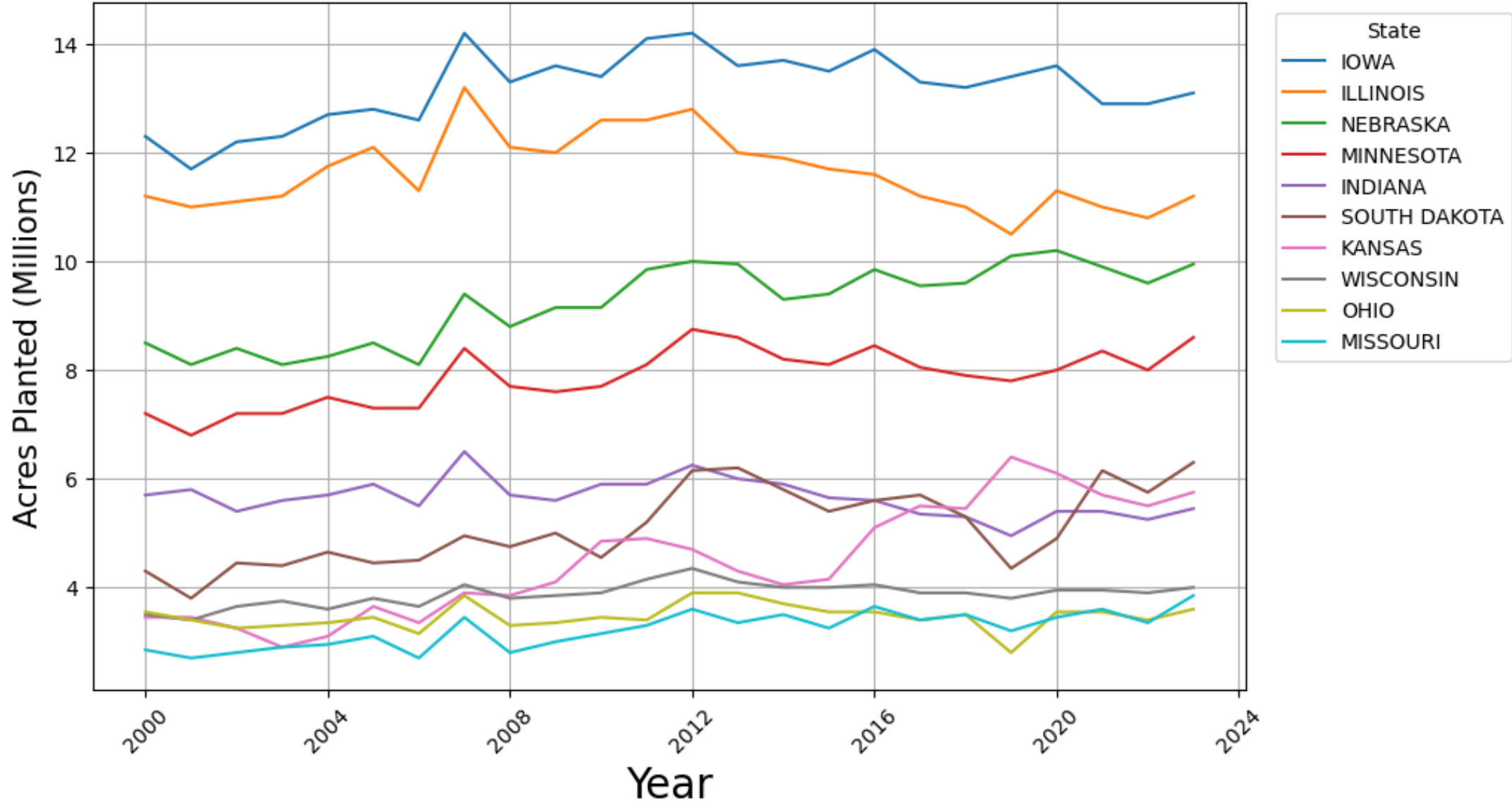
An aerial photograph of a vast, green agricultural field, likely corn or soybeans, with a tractor visible in the center. The field is divided into long, straight rows of crops. The tractor is a large, dark-colored vehicle with a long, horizontal implement attached to its rear, possibly a harrow or a similar field preparation tool. The sun is shining from the upper right corner, creating a bright, golden glow over the field and casting long, soft shadows. The overall scene is one of a busy, productive agricultural landscape.

Harvesting Insights: The Economic Impact of Corn and Soybeans on Rural America

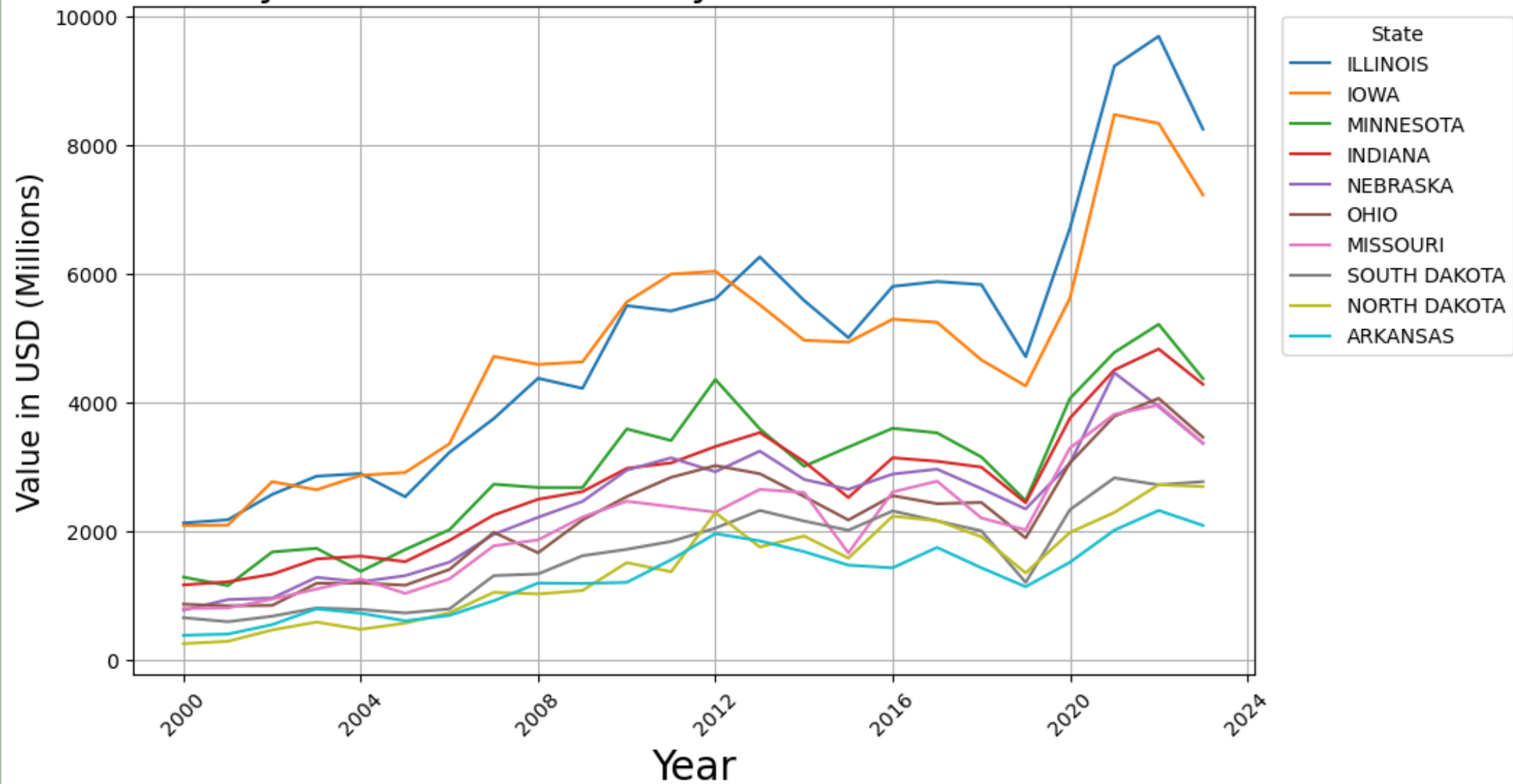
Analyzing 15 Years of Crop Trends
to Predict Economic Outcomes from
Corn and Soybean Production

Exploratory Data Analysis

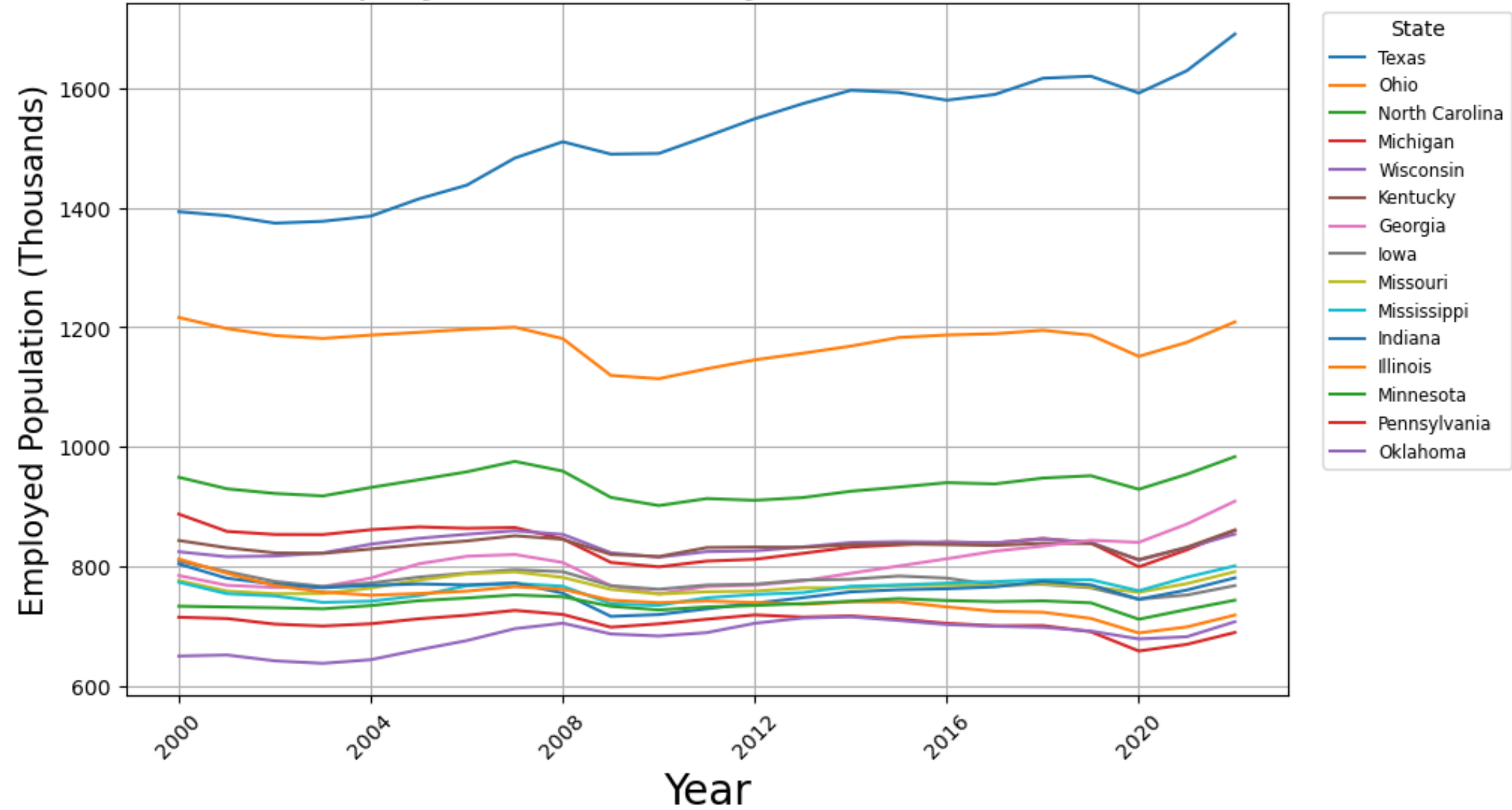
Corn Farm Acreage Trends by State From 2000-2023



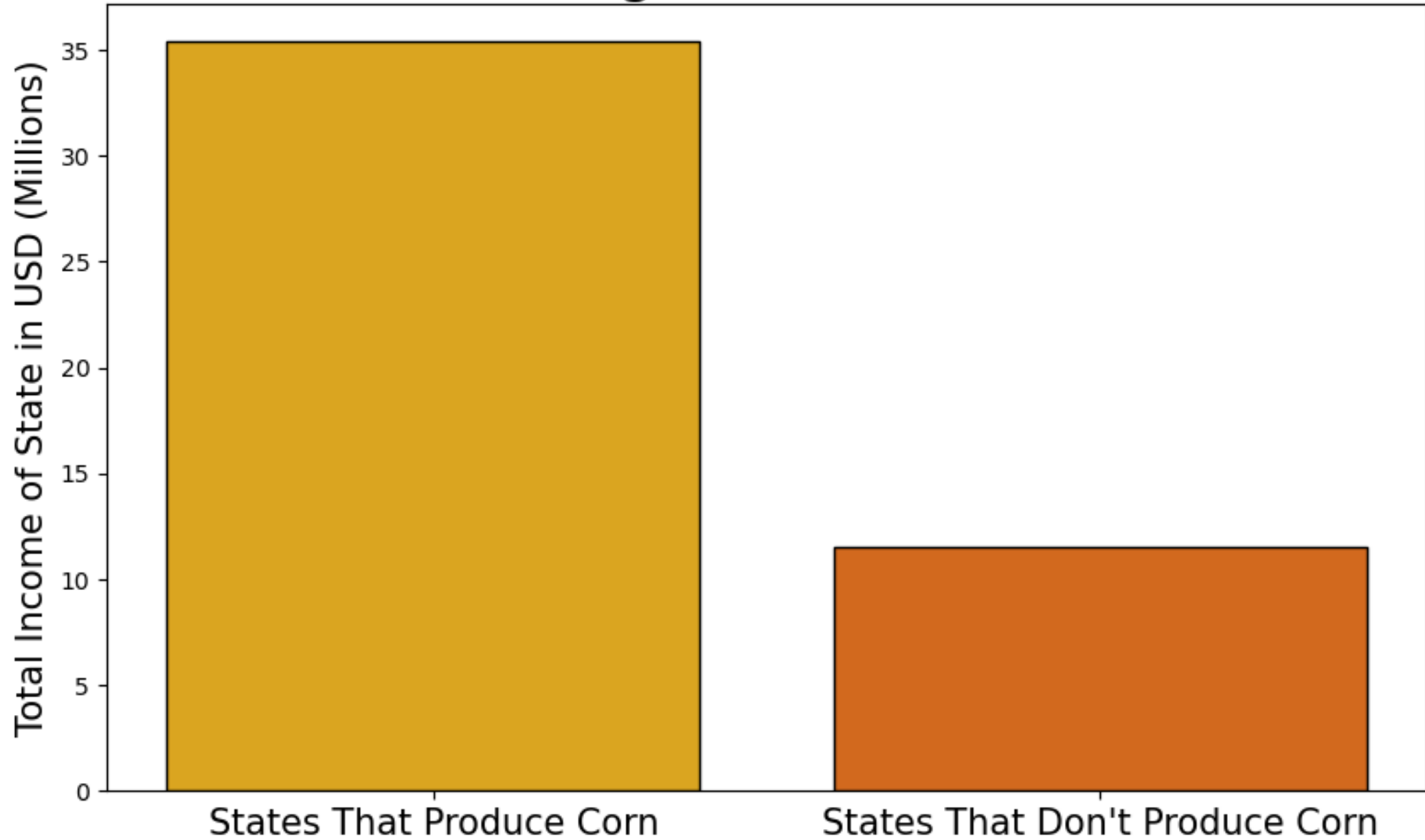
Soy Production Trends by State From 2000-2023



Rural Employment Trends by State From 2000-2023



Average Total Income



Corn Industry in 2023

GDP

\$62 billion contributed

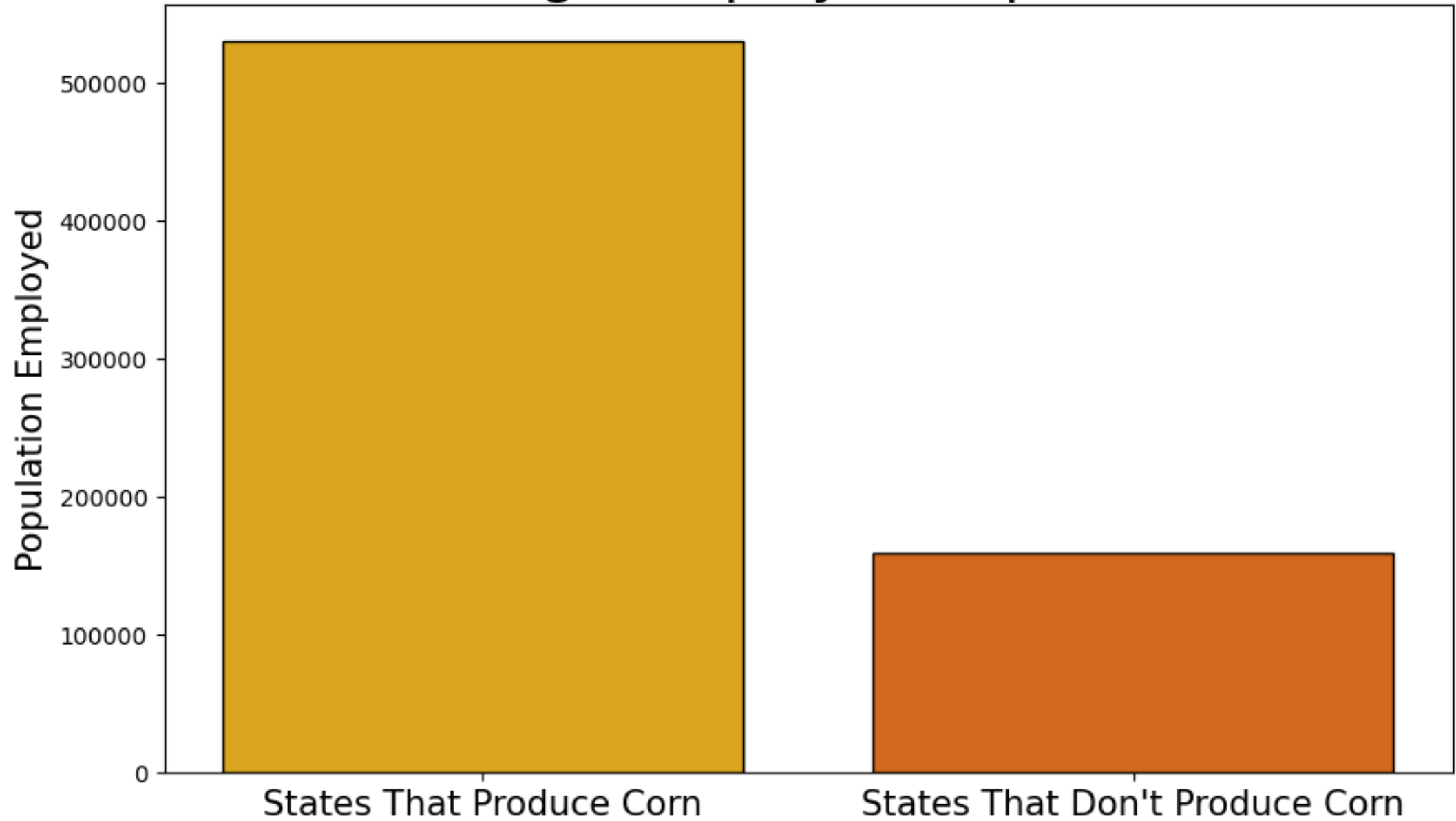
Jobs

600,000 nationwide

Economic Output

\$151 billion

Average Employed Population



Positively Correlated Factors

Corn & Soy Farm Acreage, Production, & Value ——— 0.26 ——— Personal Rural Income

Corn & Soy Farm Acreage, Production, & Value ——— 0.42 ——— Rural Employment

EDA Summary

Production:

Corn & soy production is trending upwards.

Employment:

Agriculture jobs are stabler than other industries.

Economic Impacts:

Intertwined nature of agricultural productivity, economic stability, and employment.



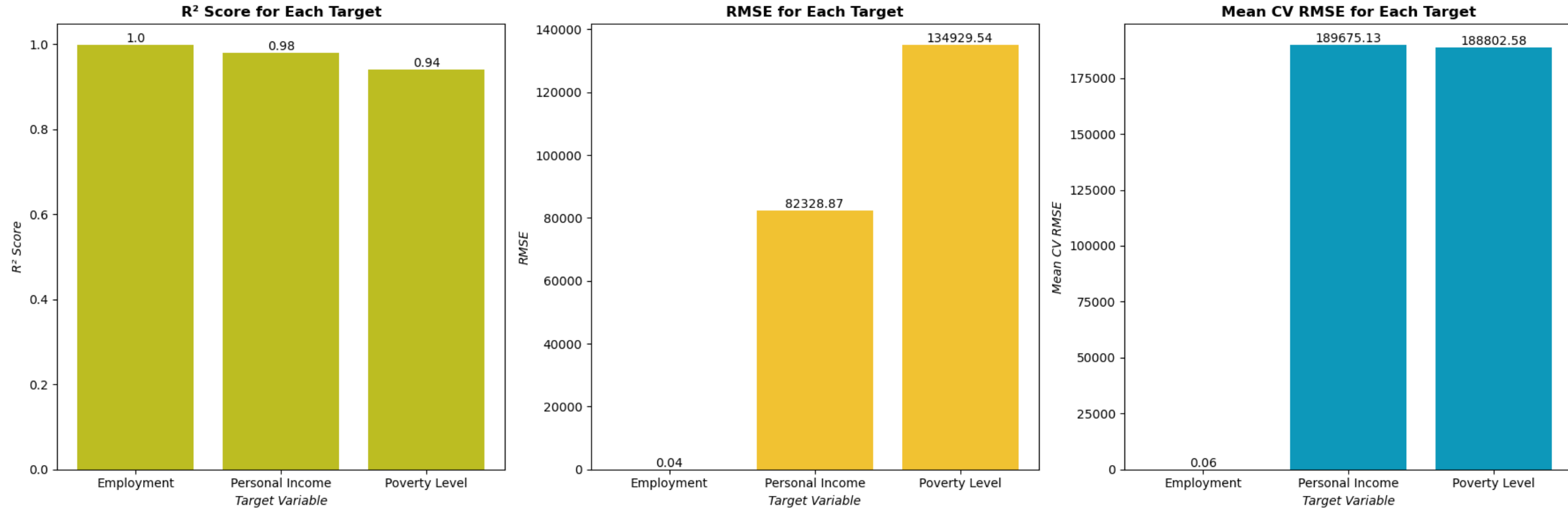
Preprocessing Data

Getting Data Ready for Modeling

1. Merging Data
2. Handling Missing Values
3. Removing Duplicates
4. Renaming / Categorizing Columns
5. Scaling & Normalization
6. Feature Selection & Engineering
7. Dealing with Collinearity

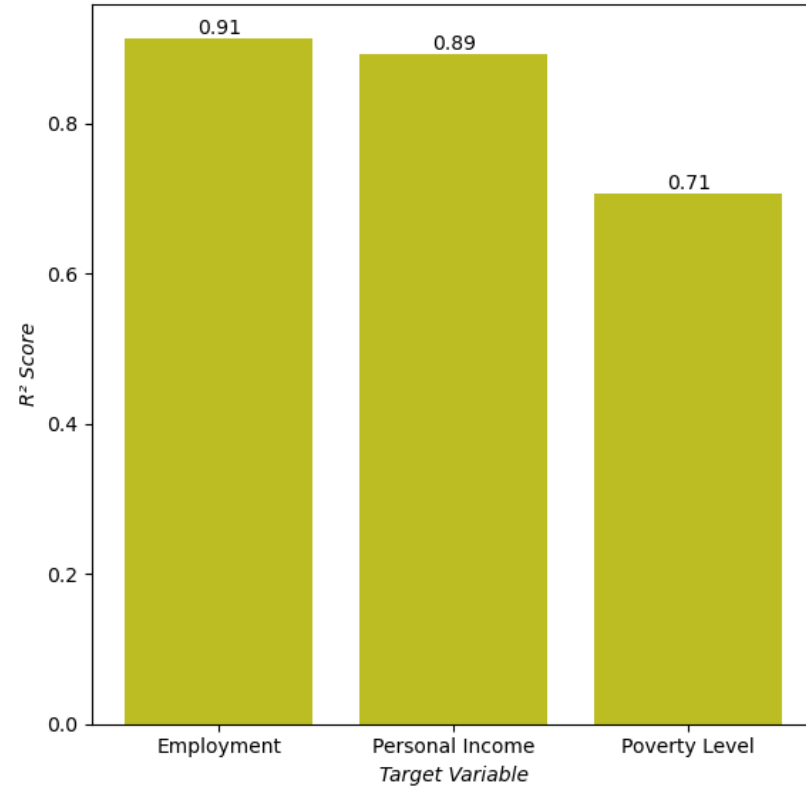
Predictive Modeling

Ridge Regression Model Results

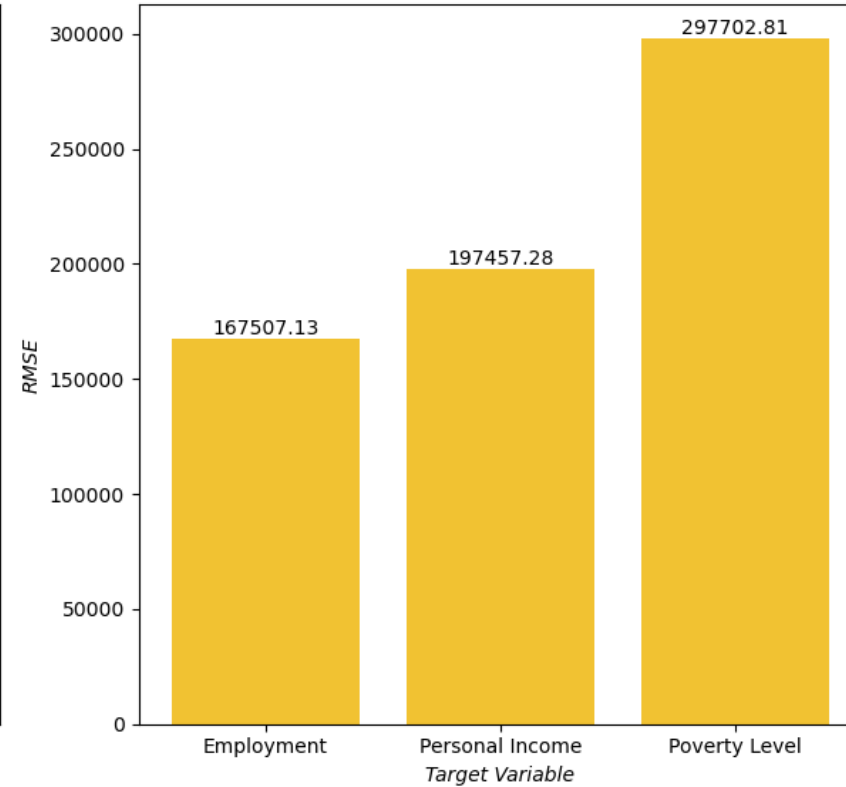


Decision Tree Model Results

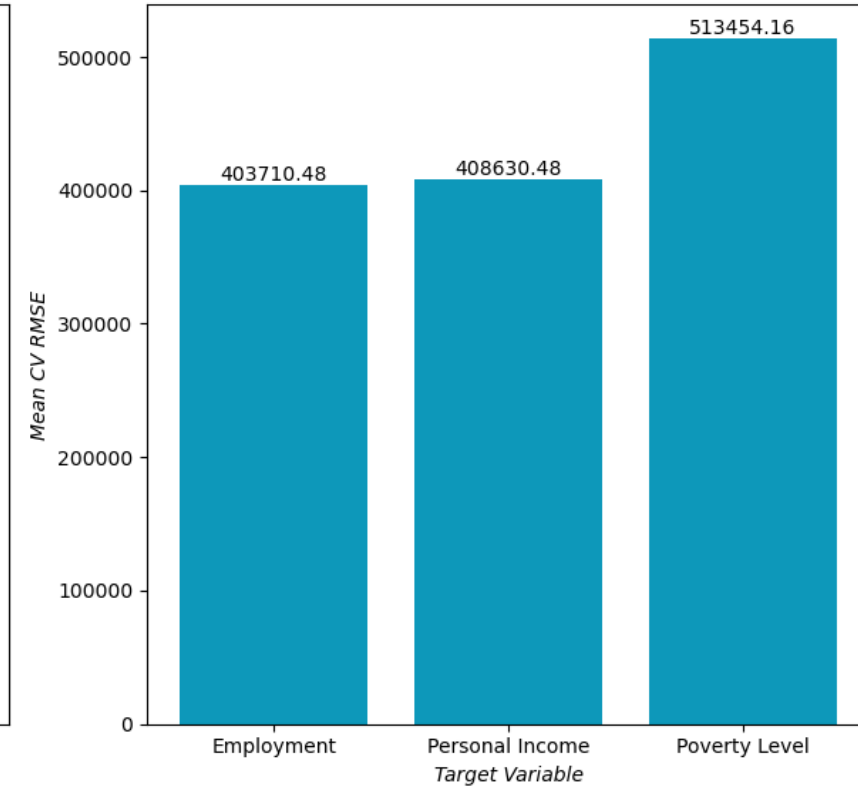
R² Score for Each Target



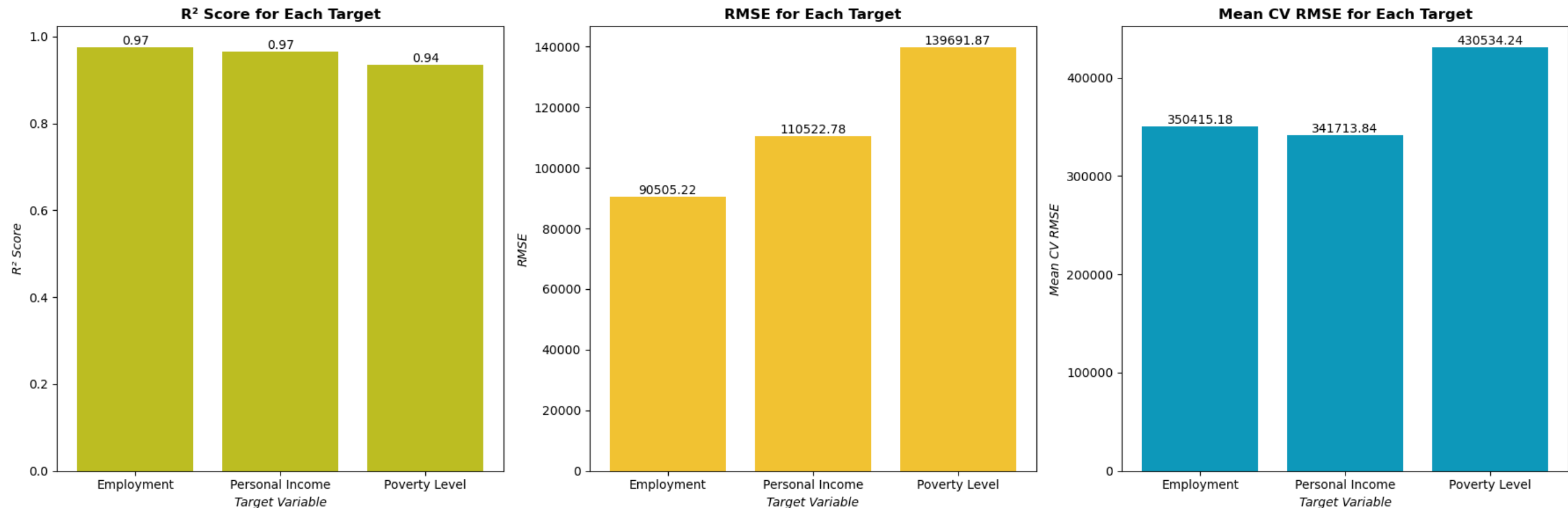
RMSE for Each Target



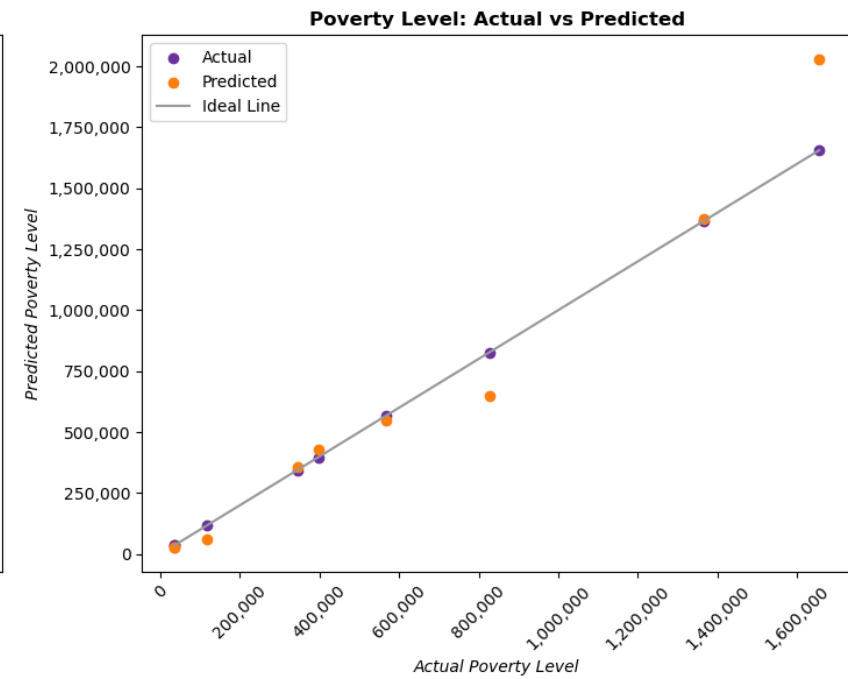
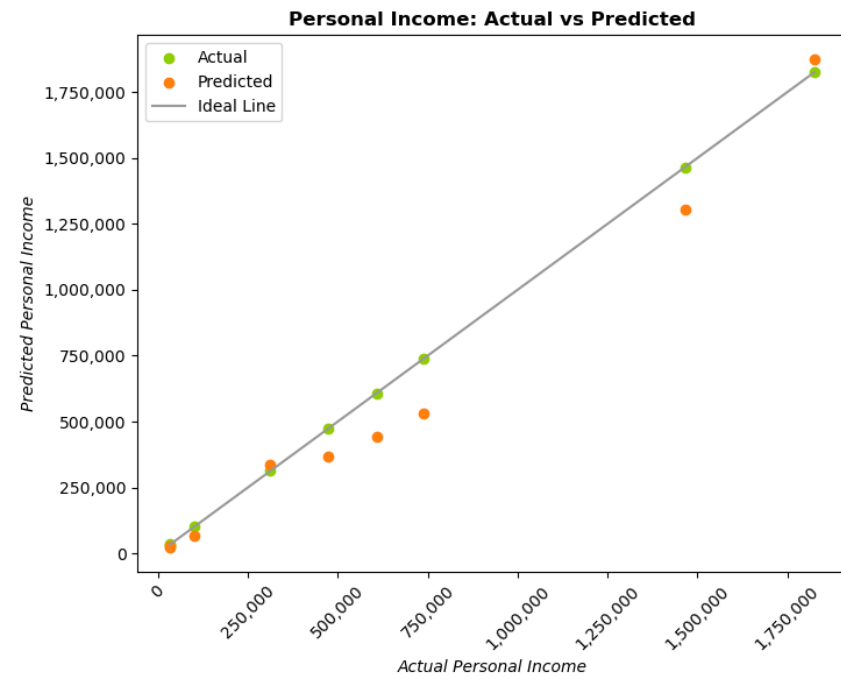
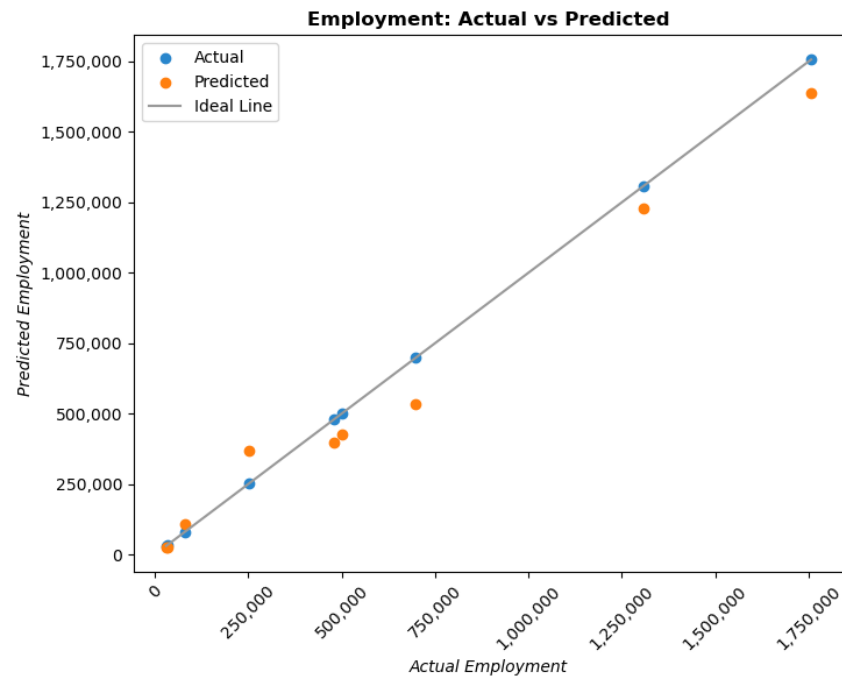
Mean CV RMSE for Each Target



Random Forest Model Results



Best Model: Random Forest



Conclusion

EDA

- Corn and soy farming are significant contributors to the U.S. economy, their economic influence is felt beyond just farming communities, raising incomes in corn-producing regions.
- Following a recession, the corn and soy industries are resilient and dependable due to their necessities in maintaining a stable country.
- Income and employment show positive correlations with corn and soybean production metrics.

Modeling

- Corn and soybean production data have strong predictive potential for employment and moderate potential for personal income in rural areas because they are likely closely tied to the agricultural sector, making crop production trends good indicators of rural employment and income.
- Poverty levels, seem to be influenced by more complex factors beyond crop productivity like policy, local economic conditions, and demographic factors.
- Future research could explore integrating other datasets like government assistance programs and local economic policies.