US Honey Production, Demand, and How to Maximize Sales

DATA 230 Group 5 Project

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Dataset Introduction

USDA Honey Production Dataset (1995 - 2021)

Variables:

Colonies_number: Number of honey producing colonies.

Yield_per_colony: Honey yield per colony in pounds

Production: Amount (in pounds) of the honey produced by colonies.

Stocks: Amount of honey (in pounds) held by producers.

Average_price: Cost of honey per pounds in cents

Value_of_production: Value of honey produced for this year.

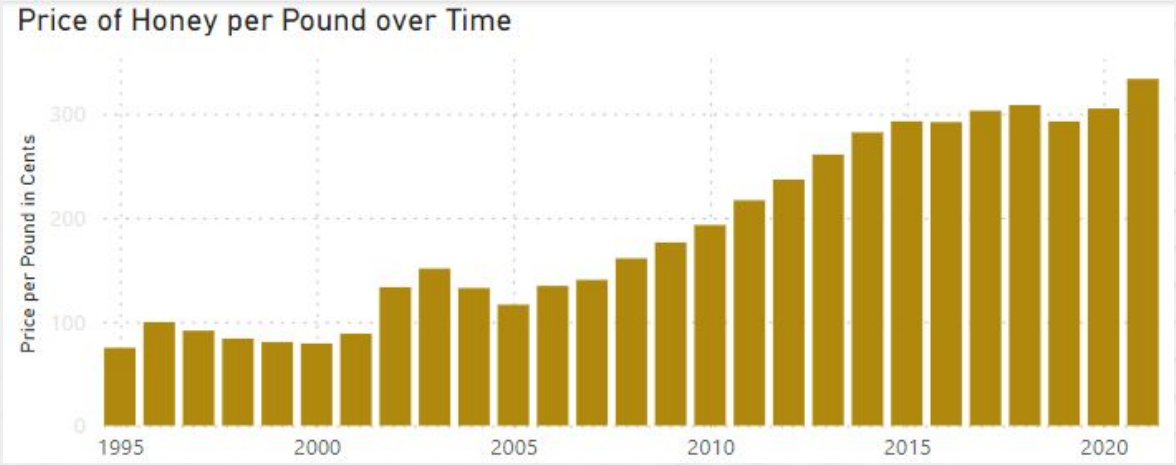
Year: Range is for 1995 to 2021

State: U.S. State

1.

Trends Overall

Over time, we see an overall increase in the *Price of Honey*



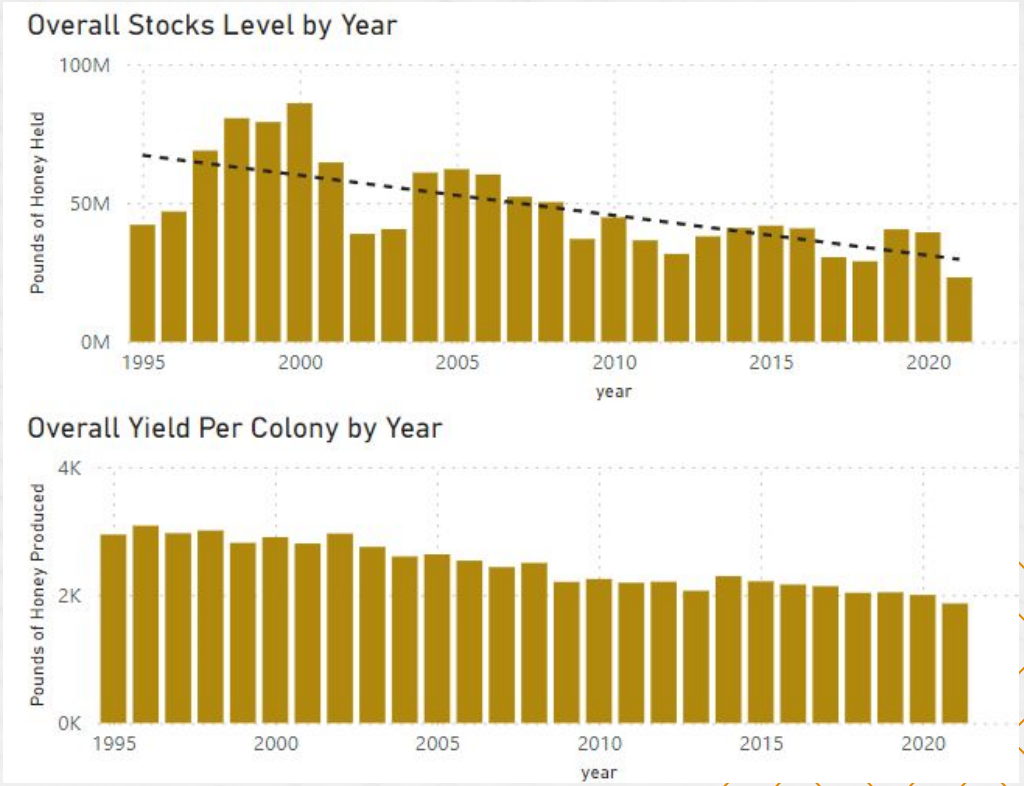
Price of honey has tripled from 1995 to 2021. If the price of honey scaled with inflation, it still would be an 87% increase in value (333.43¢ vs. 205¢ in 2021)

Decreases in Stocks held and Colony Yield over time

Colonies are giving less honey while honey reserves plummet.

Are states selling all of their stock to take advantage of the market, or do they simply not produce enough honey?

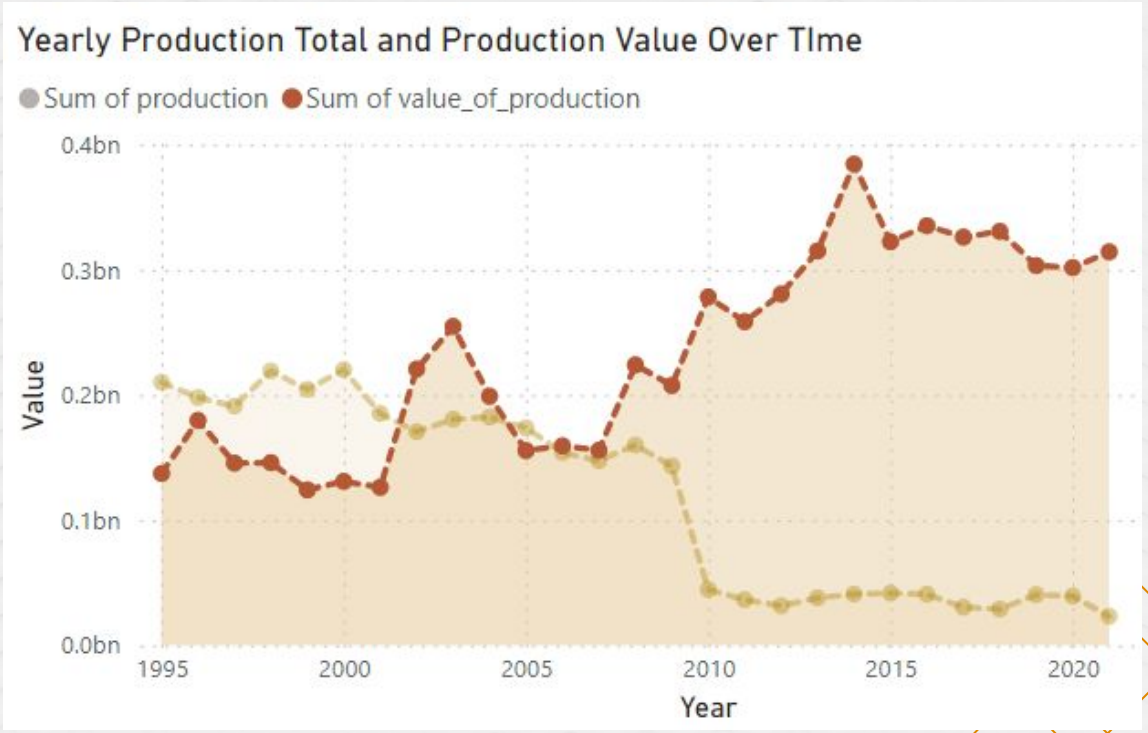
Graphs imply that yield and stock levels are correlated.



Inverse Relationship with Production Total and Production Value

Production decreases but Production Value increases.

Shows unmet demand for honey.



2.

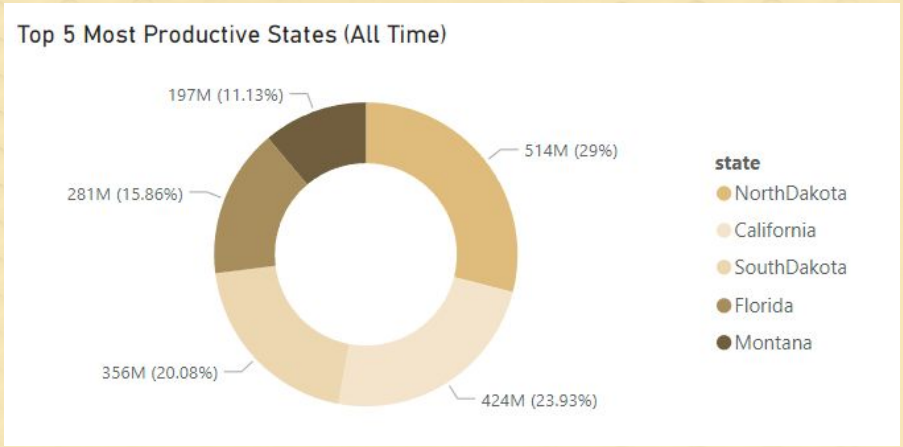
Trends by State

We can plot by state to see if there are any trends we might have missed in the data.

These states are the Top 5 Most Productive States from 1995y to 2021.

In particular, North Dakota and South Dakota have made almost 1 billion pounds of honey in total.

California reasonably makes a lot of honey, possibly due to having more beekeepers (and therefore colonies) because of population density.

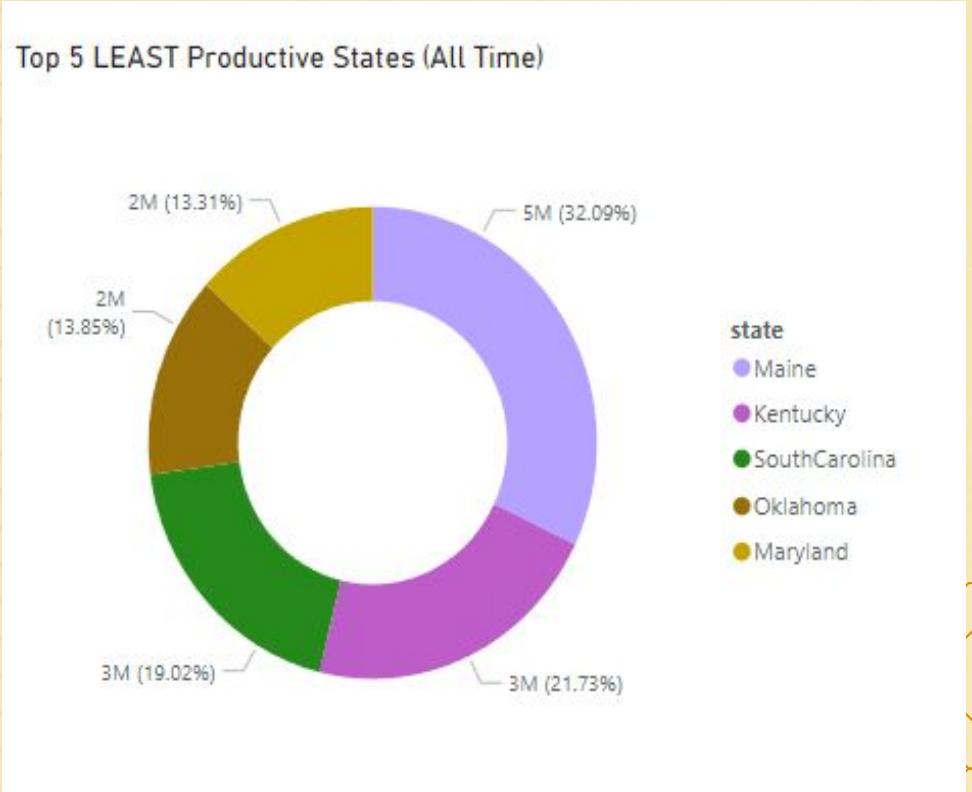


In contrast, these states are the least productive

Oklahoma has produced only 2 million pounds of honey in the past 25 years.

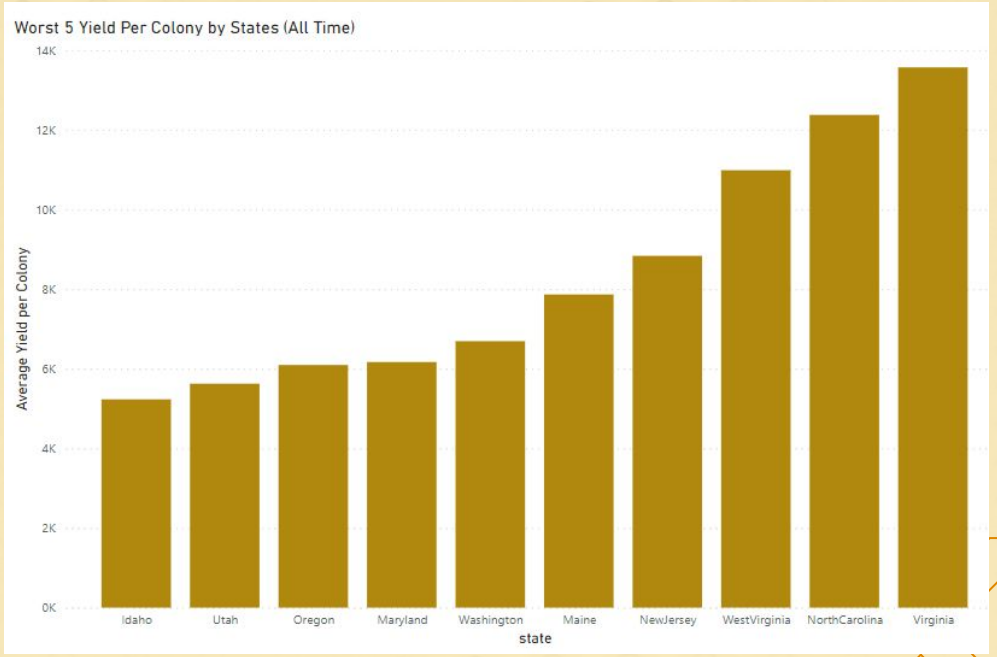
This is 0.03% of South Dakota's Production.

Clearly some states are MUCH better than others for bees.



Poor Production and Colony Production seem to be connected

Two of the least productive states also have the worst yield out of the states.



3.

Prescriptive Analysis

Recap:
What we know based off the data:

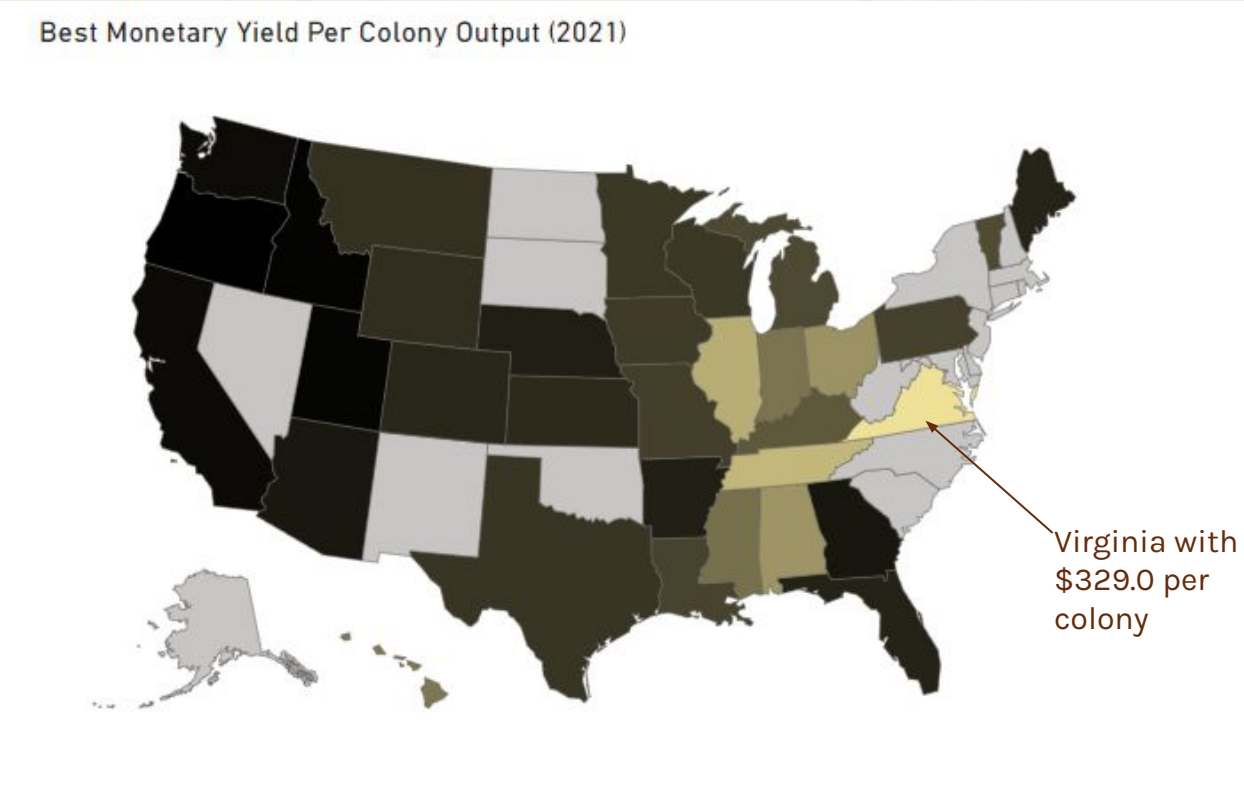
- Honey **Prices** continue to **rise**.
- Colony **Yield** continues to **decrease**.
- National **honey stocks** continue to **decrease**.
- In general, all states follow the overall trend.
    - However, some states are better than others
- What does this all mean for a hobbyist or honey farmer?
    - This is probably the best time to sell honey, but where?

To maximize the amount of money gained, we can make a new metric by multiply Average Price and Yield

The variable is designated as “Average Monetary Yield from one Colony”.

This provides a balance between yield and price.

Map of Best Economical Opportunity



Bonus: Predicting the Best Economical Opportunities

Using some basic moving-average time series, we can predict what states will be the most lucrative for honey farming.

Virginia still reigns supreme.

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Top 5 states with highest predicted values:
Virginia
Ohio
Illinois
Tennessee
Hawaii
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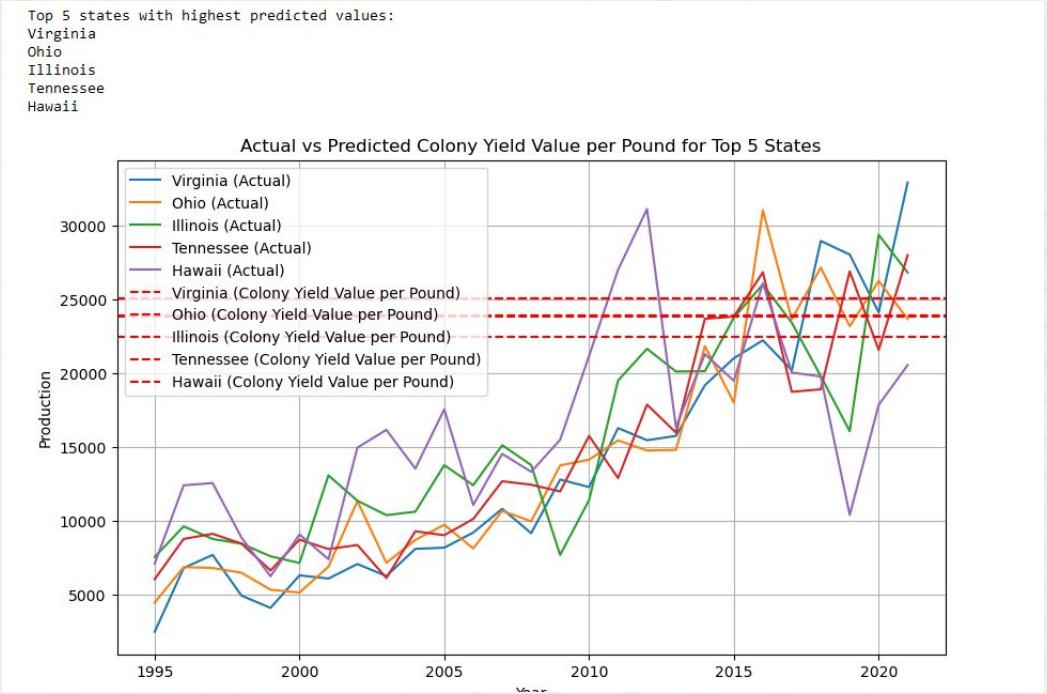
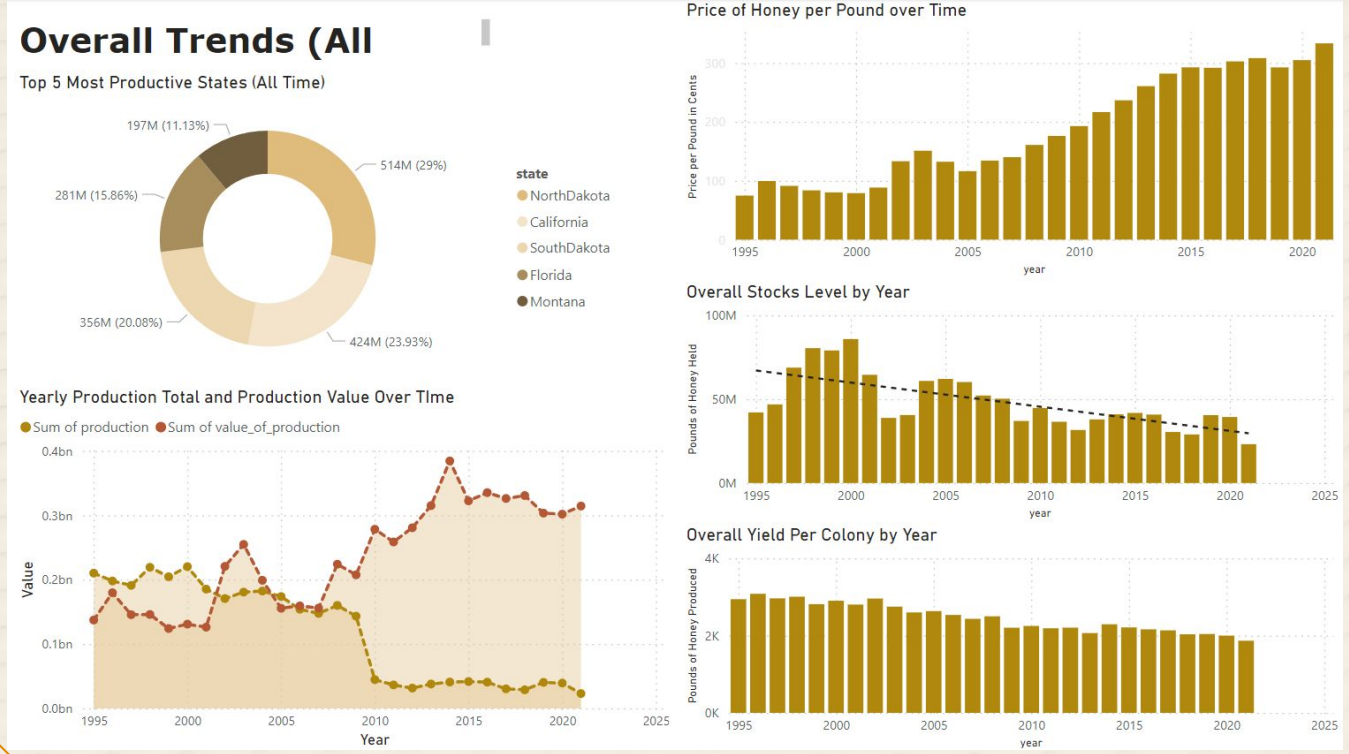
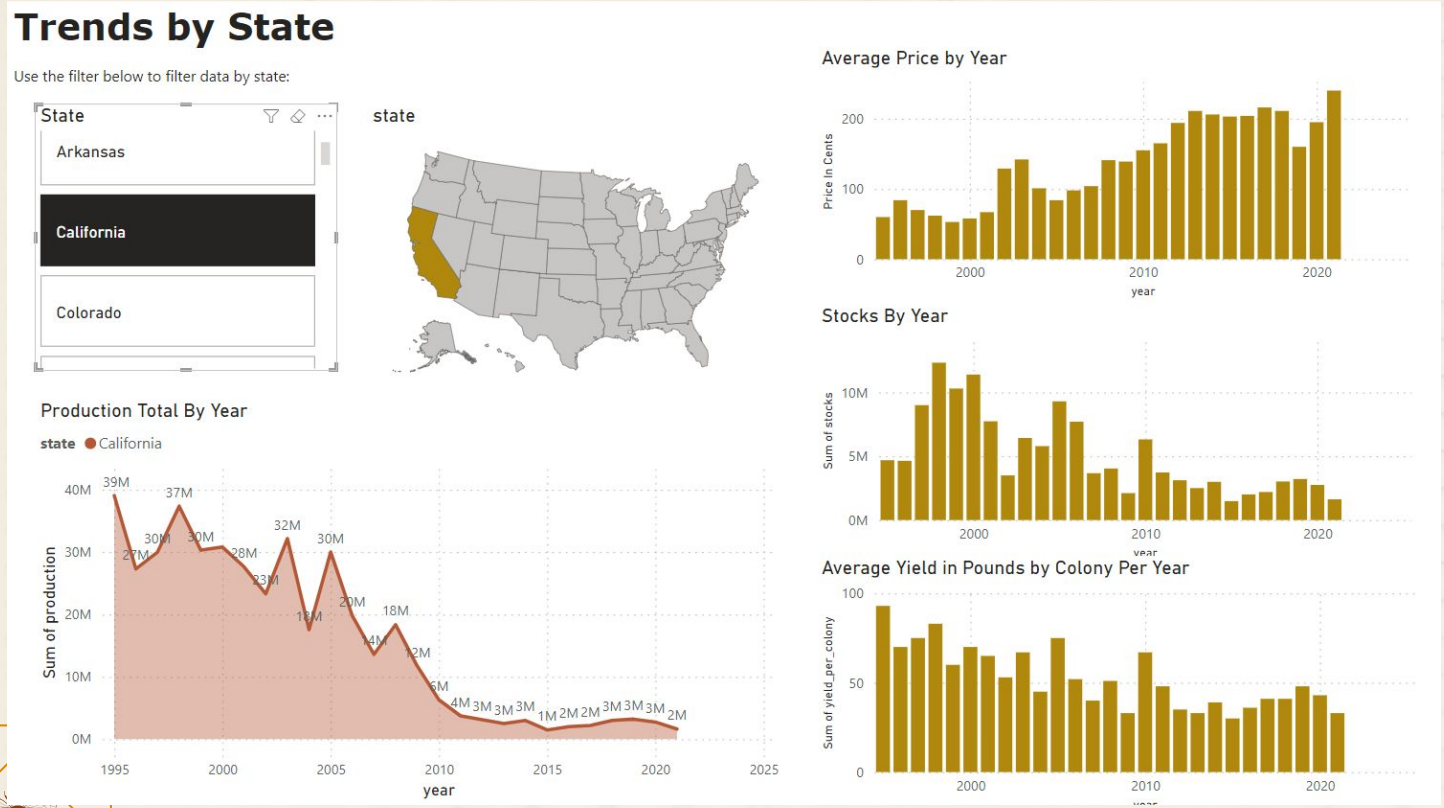


Dashboard: Overall Trends



Dashboard: Trends by State



Dashboard: Prescriptive Analysis

Optimal Honey Farming

Maximizing yield, average price, and and average colony yield are surprisingly different things.

In 2021, the states with the highest price per pound were ...

State	Average Price Per Pound of Honey
Virginia	823
NorthCarolina	684
Alabama	599
Illinois	583
SouthCarolina	532
Tennessee	500
WestVirginia	480
Kentucky	460

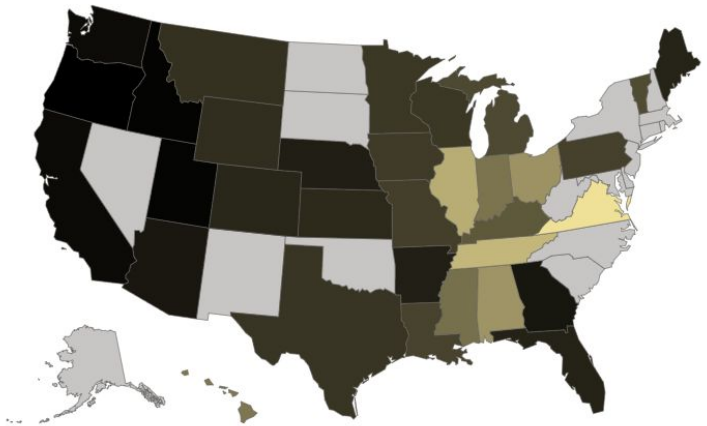
However, the states with the best yield were...

State	Yield in Pounds per Colony
Hawaii	93
Mississippi	71
Ohio	64
Louisiana	58
Wyoming	58
Minnesota	57
Montana	57
Tennessee	56

To maximize profits and figure out the most possible states, we can create a new metric called "**Average Monetary Yield**", composed of multiplying Average Price per Pound and Yield per Colony.

Plotting the 2021 data shows that the Mid-East section of the United States is the best place if you want to grow and sell honey.

Best Monetary Yield Per Colony Output (2021)



Link to Dashboard:

https://sjsu0-my.sharepoint.com/:u:/g/personal/minett_tran_sjsu_edu/ESZf4tfq4KdAmJVR_-gI5iQB4rXZT33B6A8k6VLGpFwHeQ?e=yoa1ul