

HONEY BEE PRODUCTION

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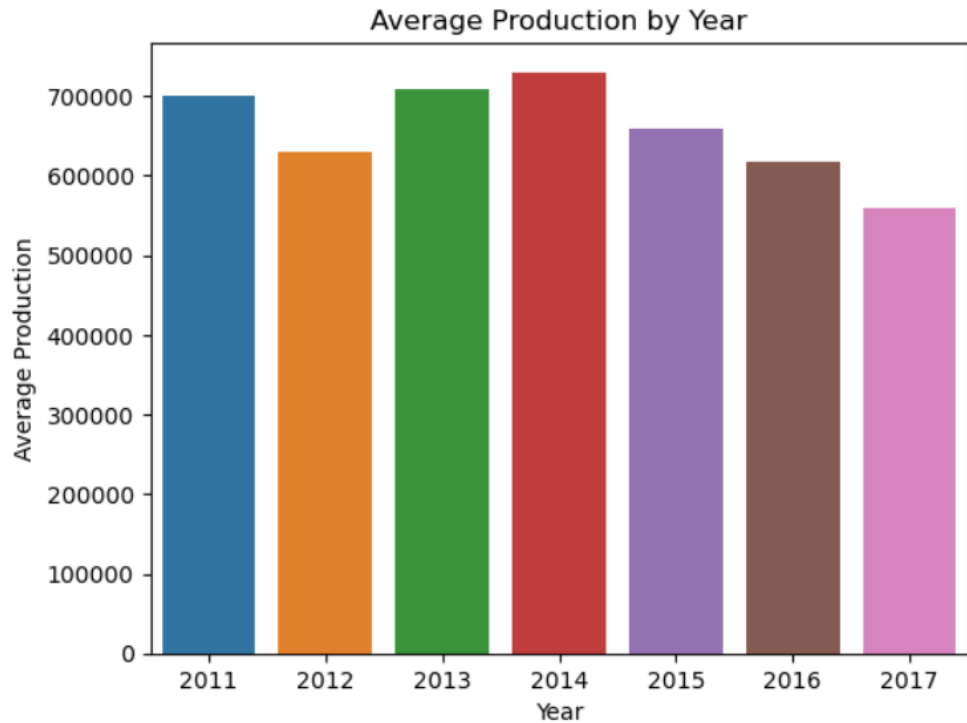
	year	season	state	total annual loss	beekeepers	beekeepers exclusive to state	colonies	colonies exclusive to state
0	2011	Annual	Alabama	0.139	21	0.905	459	0.961
1	2012	Annual	Alabama	0.27	25	0.960	582	0.997
2	2013	Annual	Alabama	0.551	36	0.944	777	0.637
3	2014	Annual	Alabama	0.443	33	0.939	1083	0.386
4	2015	Annual	Alabama	0.48	28	0.964	504	0.985

QUESTIONS

- Is there a trend in colony loss over the years? And is there a loss in beekeepers over the years as well?
- How much honey is produced each year, and is there a loss of production over the year?
- What is the average trend in price each year and do colony numbers affect that?

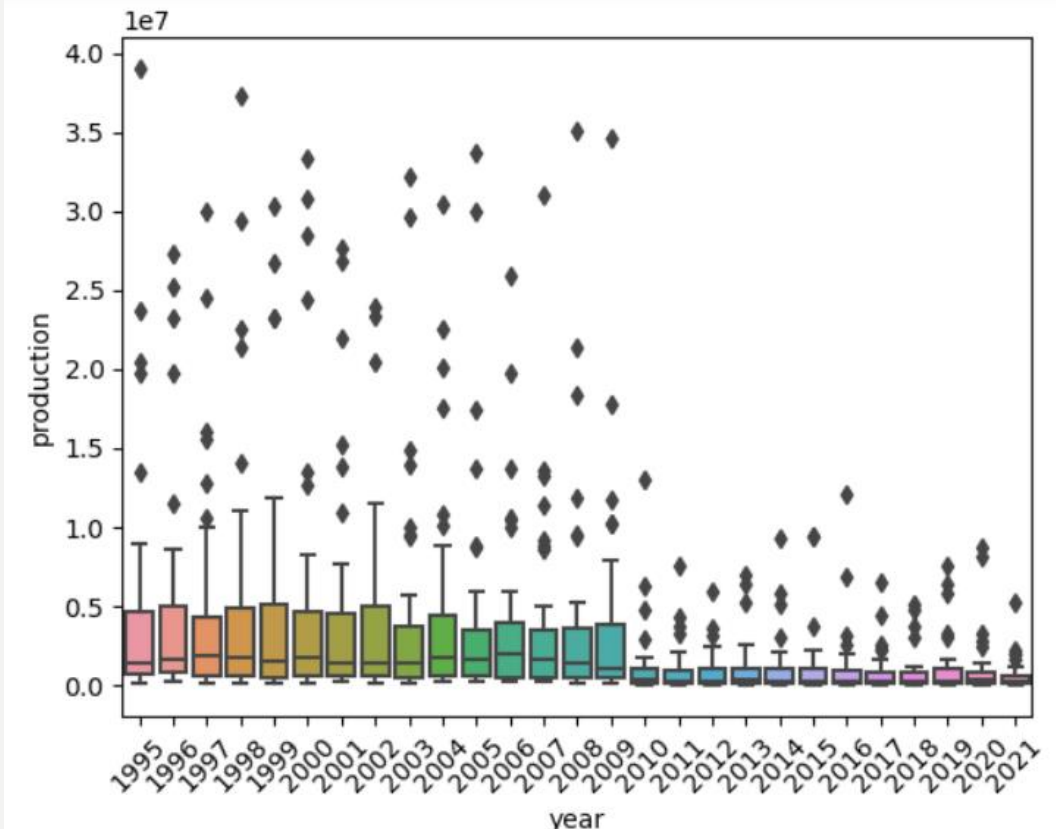
	label	state	colonies_number	yield_per_colony	production	stocks	average_price	value_of_production	year
0	676	Alabama	9000	50	63000	63000	251	1130000	2011
1	716	Alabama	8000	54	65000	65000	247	1067000	2012
2	756	Alabama	7000	52	55000	55000	285	1037000	2013
3	795	Alabama	7000	53	26000	26000	353	1310000	2014
4	835	Alabama	7000	47	13000	13000	383	1260000	2015

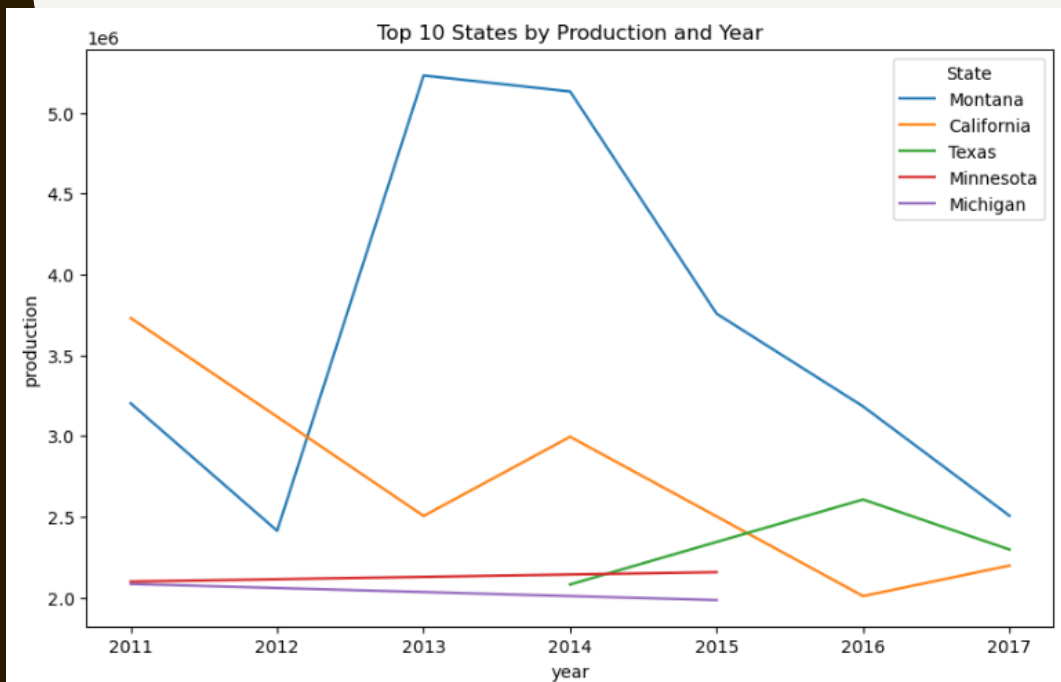
OBSERVATIONS- PRODUCTION



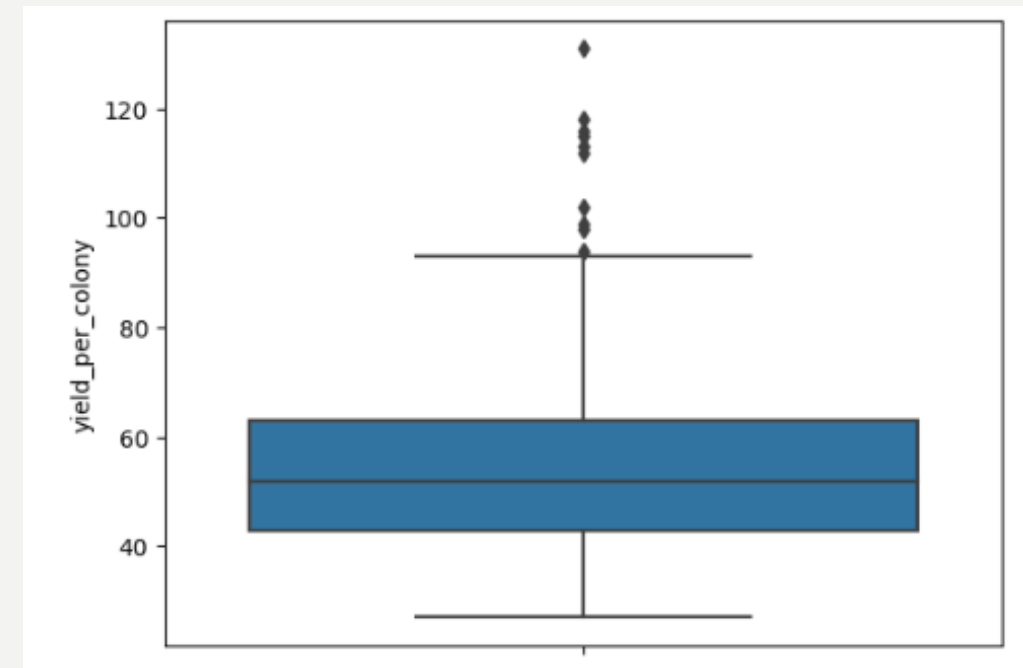
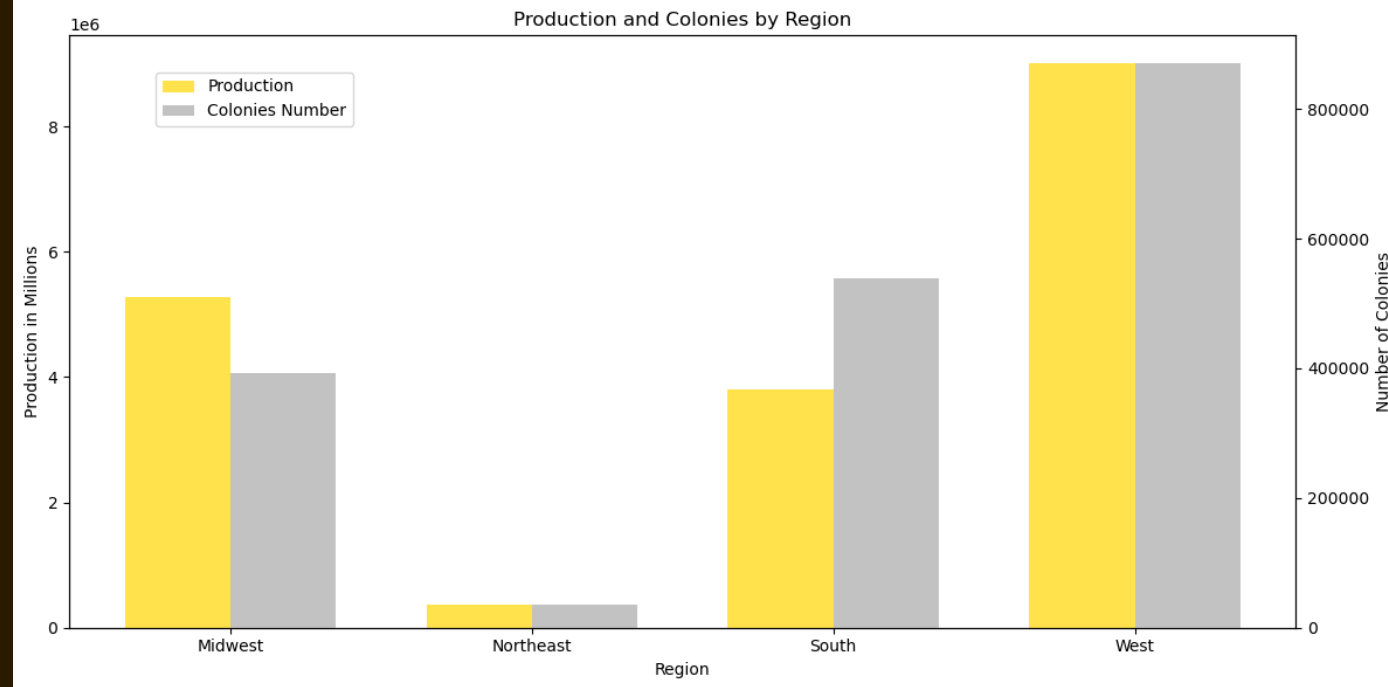
Production started strong with a dip in 2012. This then increases for 2013 and 14. You then start to see a trend downward for the next 3 years at a consistent pace.

Looking at production per year totals you can see that from 1995-2009 production was steady. In 2010 production dropped greatly but has stayed steady at a low amount till 2021 with another drop.

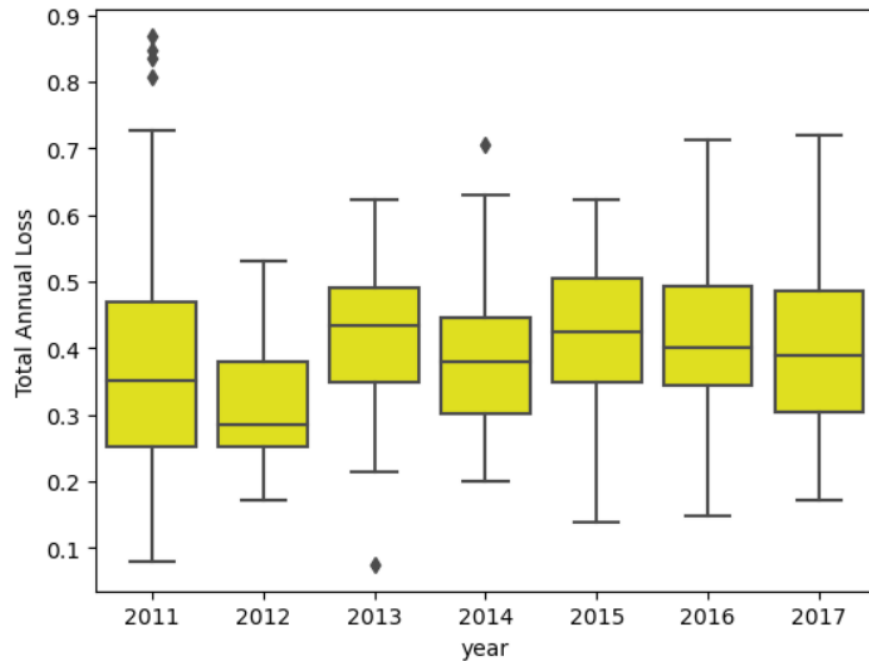




The top 10 producing states by year are Montana, California, Texas, Minnesota, and Michigan. You can see that California, while on a steady decline from 2014-16, started making an increase in production in 2017. The other states show to be on a decline. It can be noted that the trend for production per colony does vary by region with the Mid West as the highest.

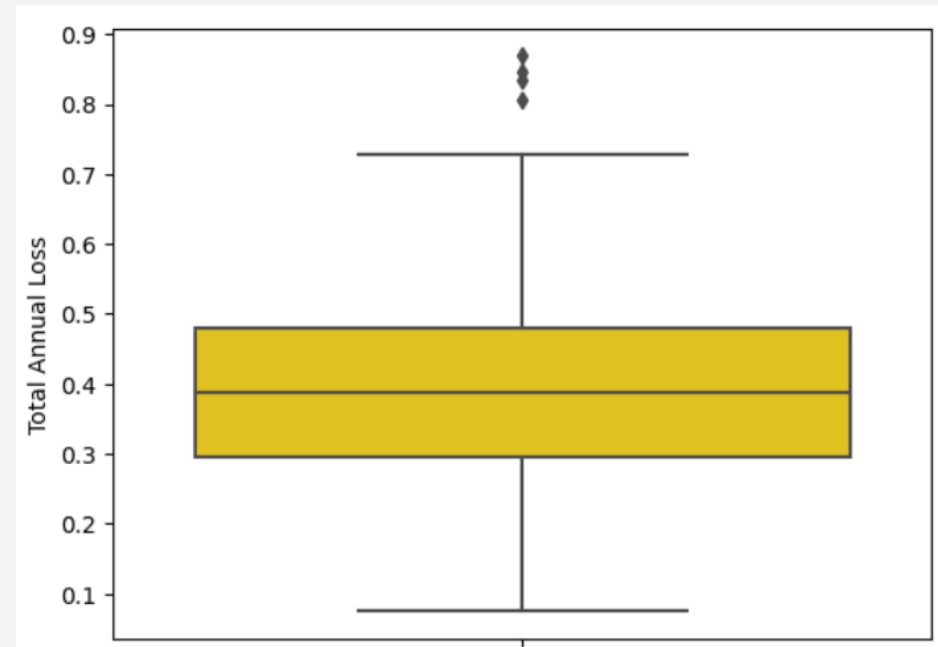


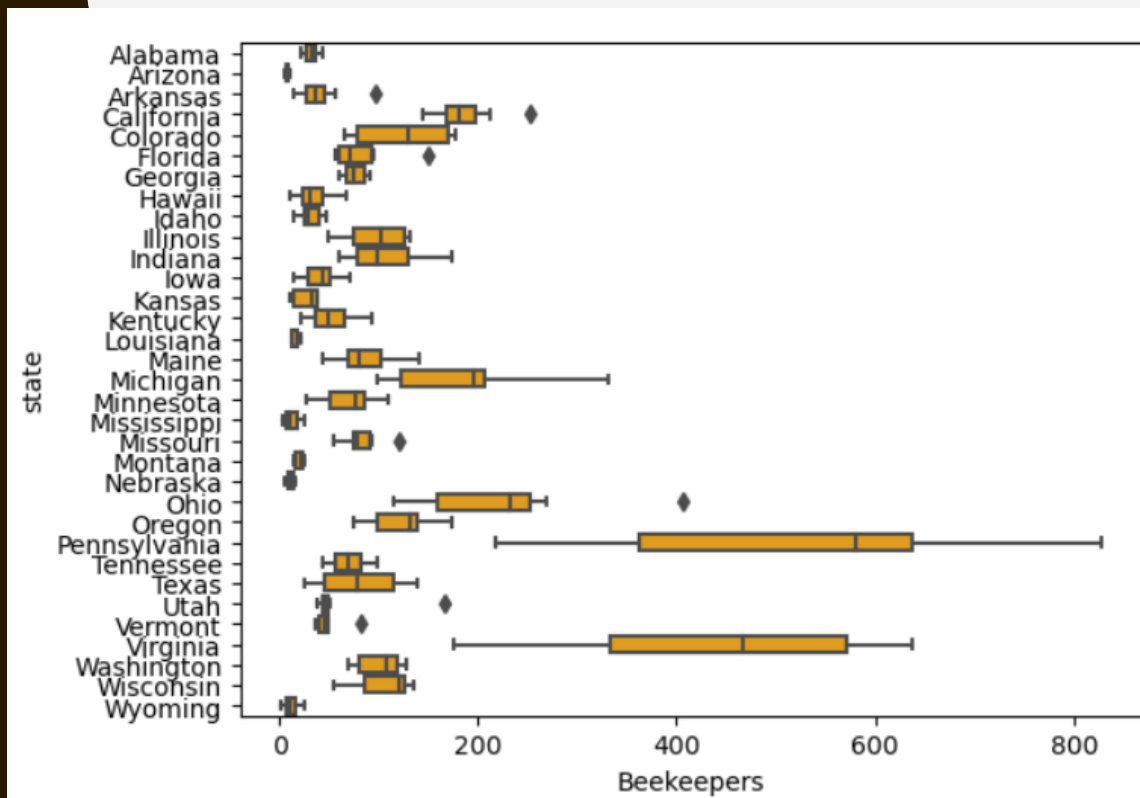
OBSERVATIONS - LOSS



Total annual loss percentage by year shows that there were some dips in the beginning years and then slowly started decreasing from 2015 -17.

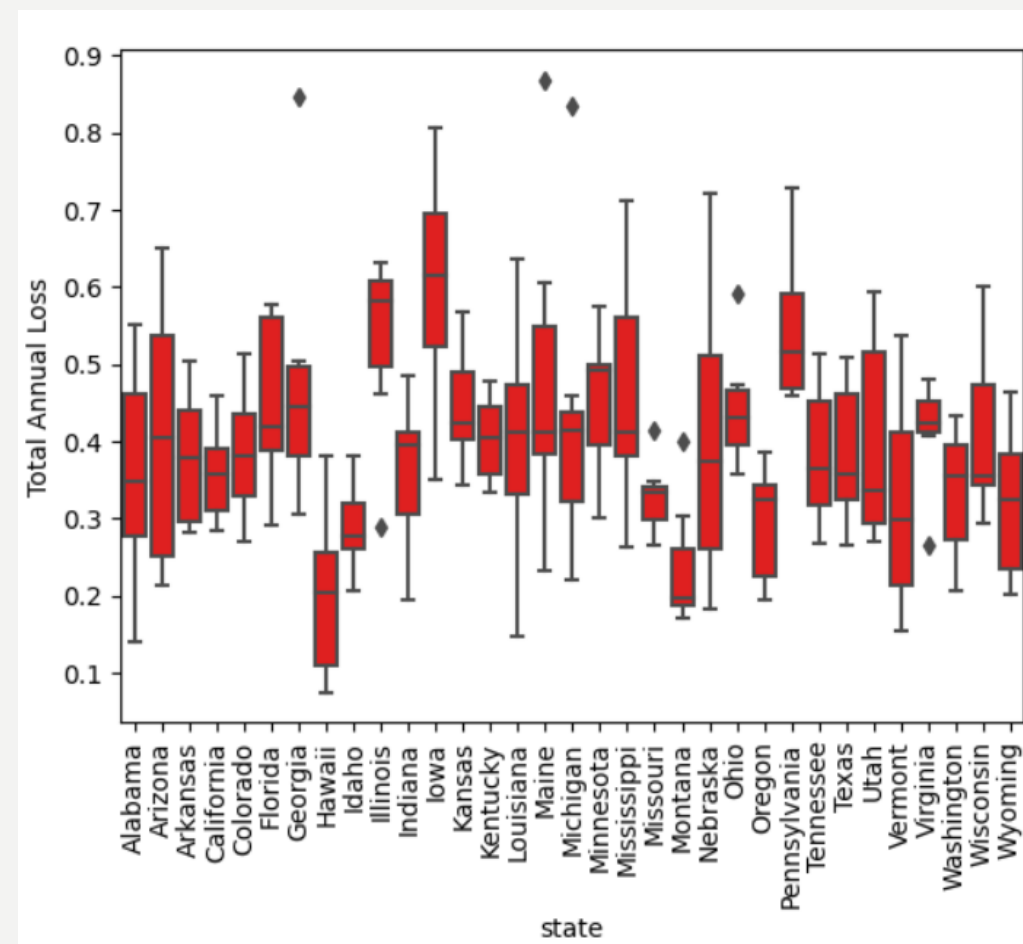
The total annual loss combined shows an average of around 40% overall. This is a big percentage.

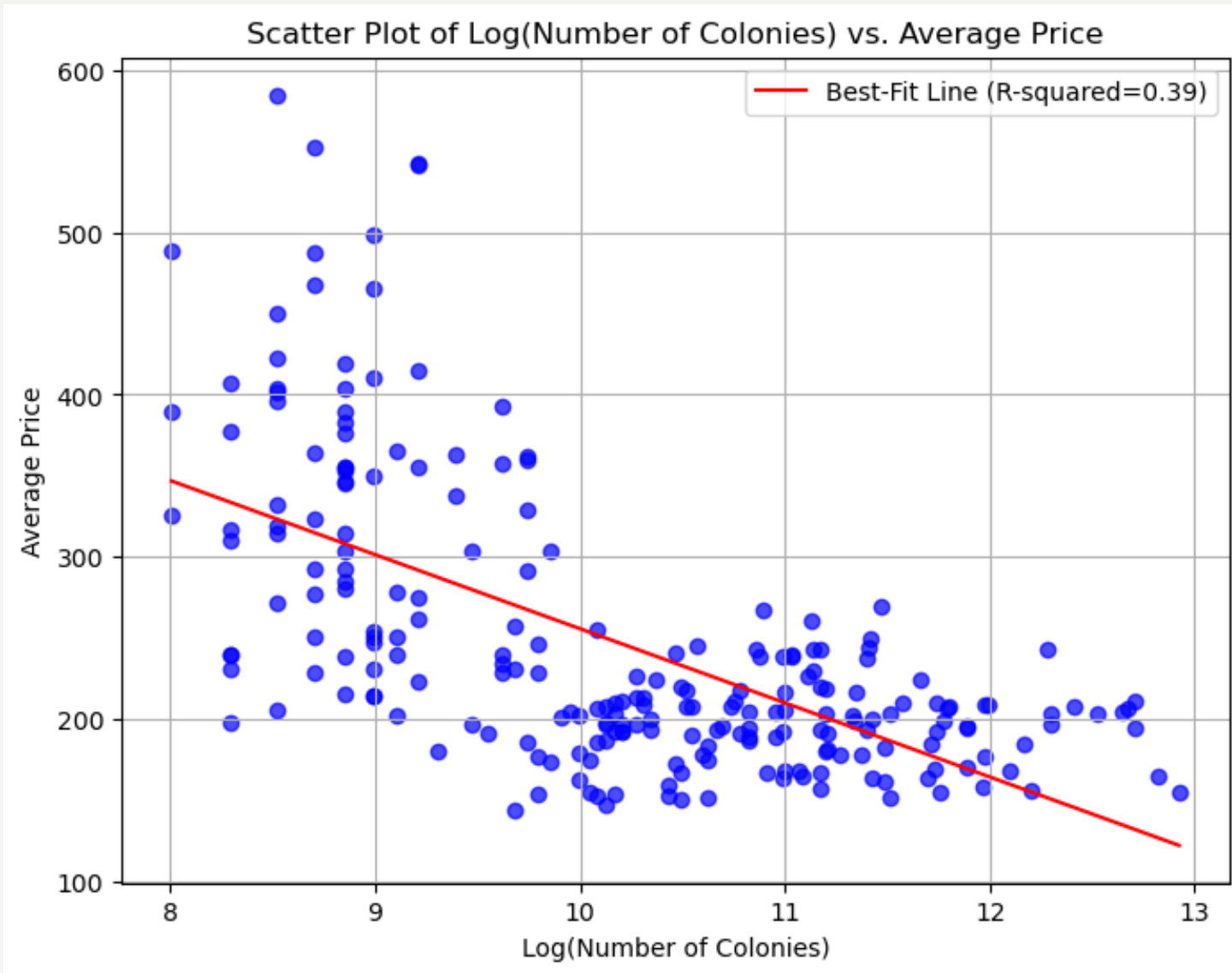




If you compare beekeepers per state, you can see that PA and VA have the highest number of keepers but only PA matches with the higher loss. VA is slightly above the average but close to the rest.

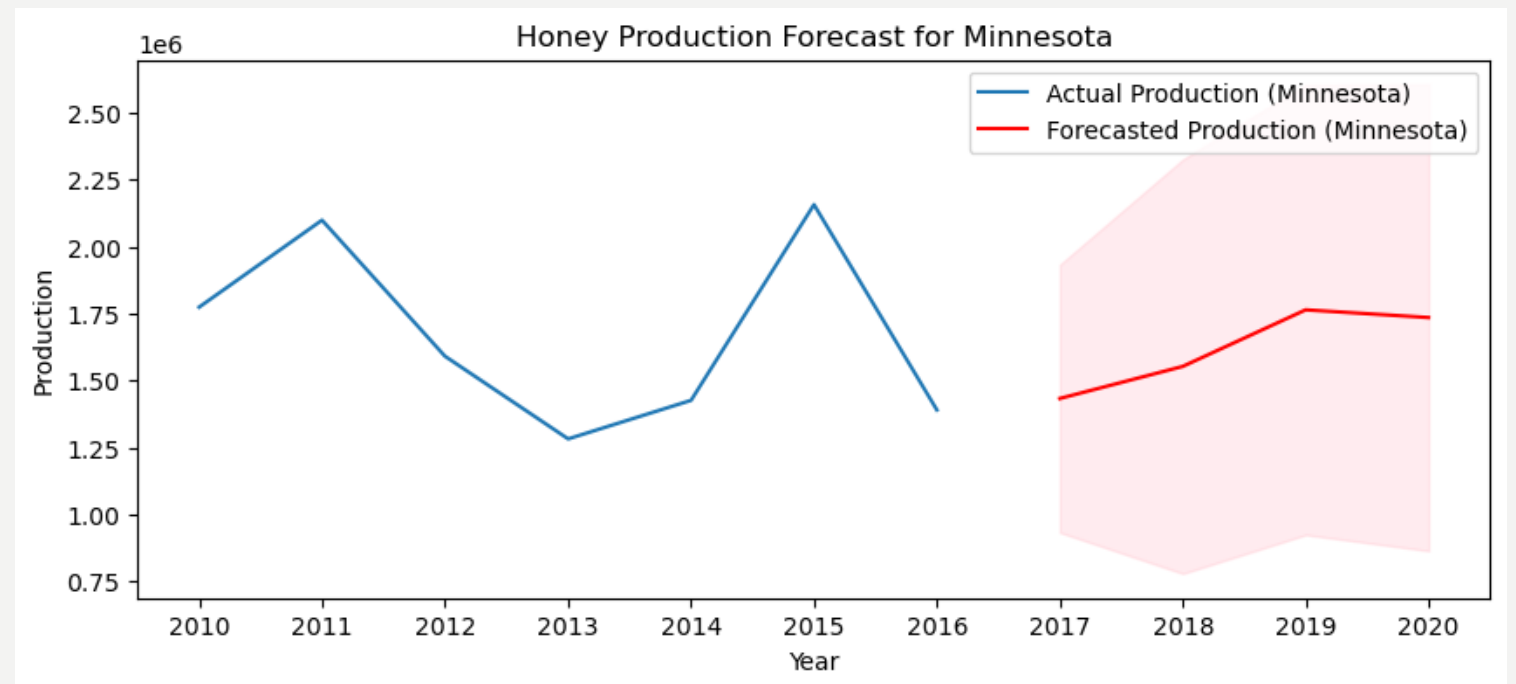
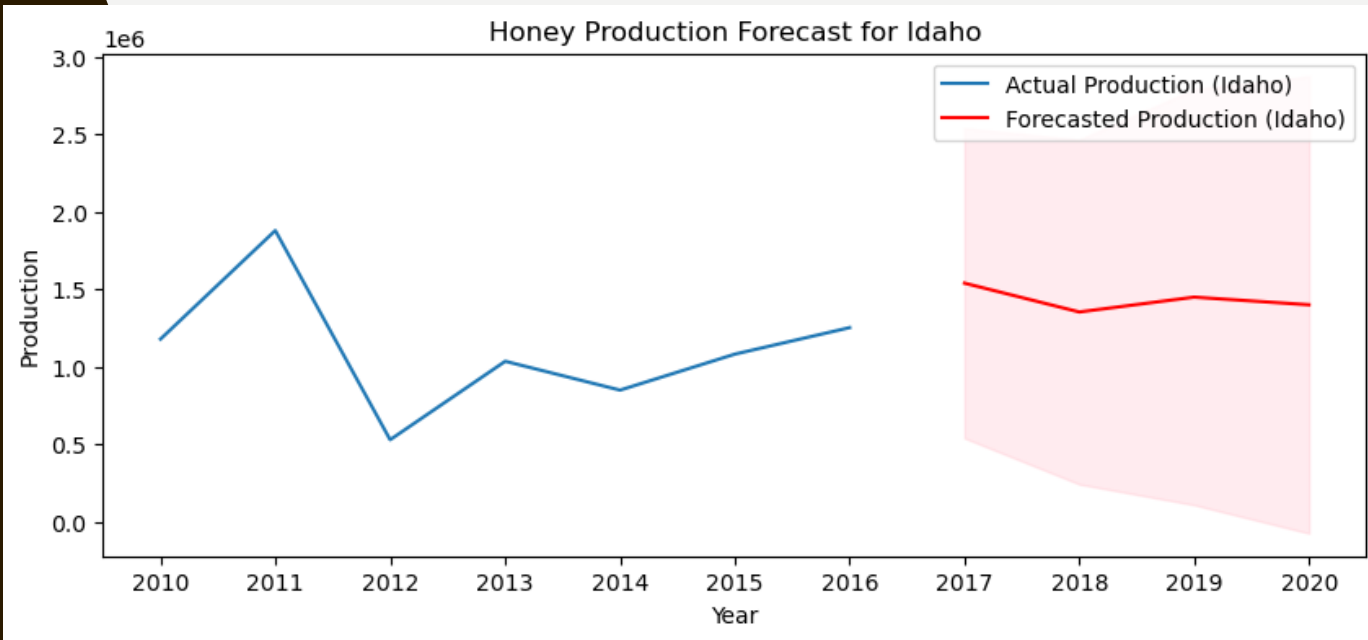
Displaying the loss by state shows that the loss is spread to each state with an average above a 30% loss annually

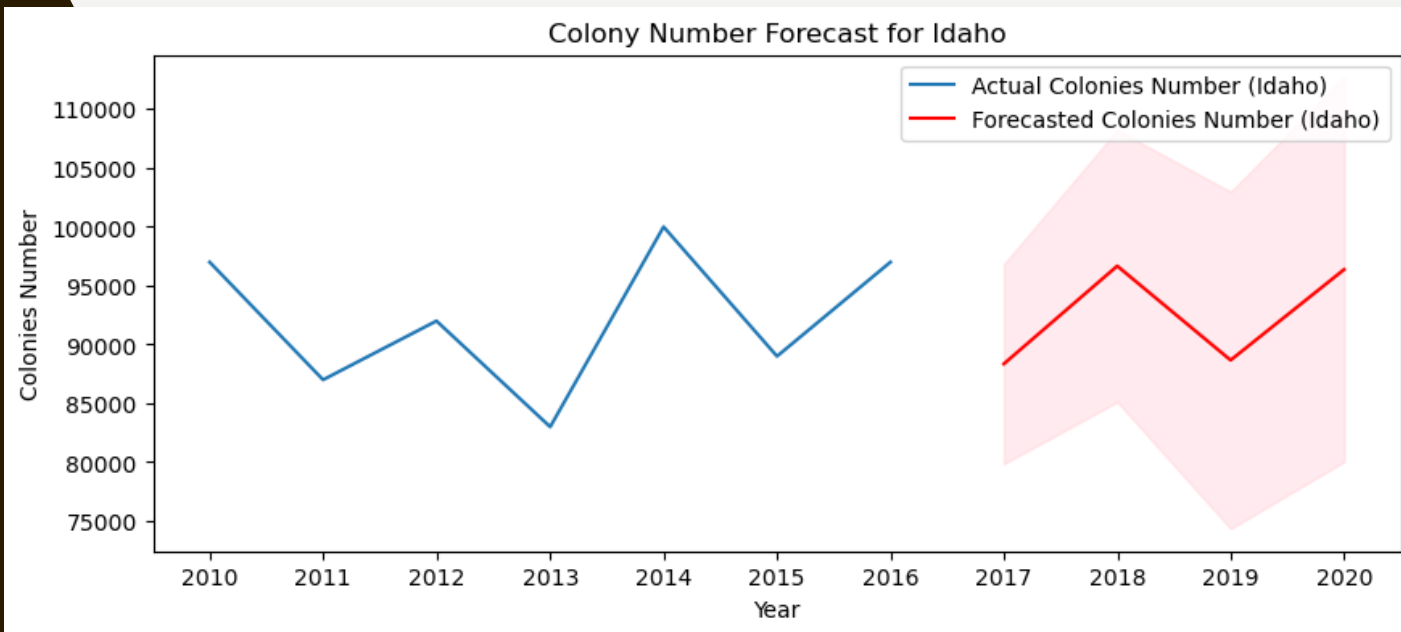




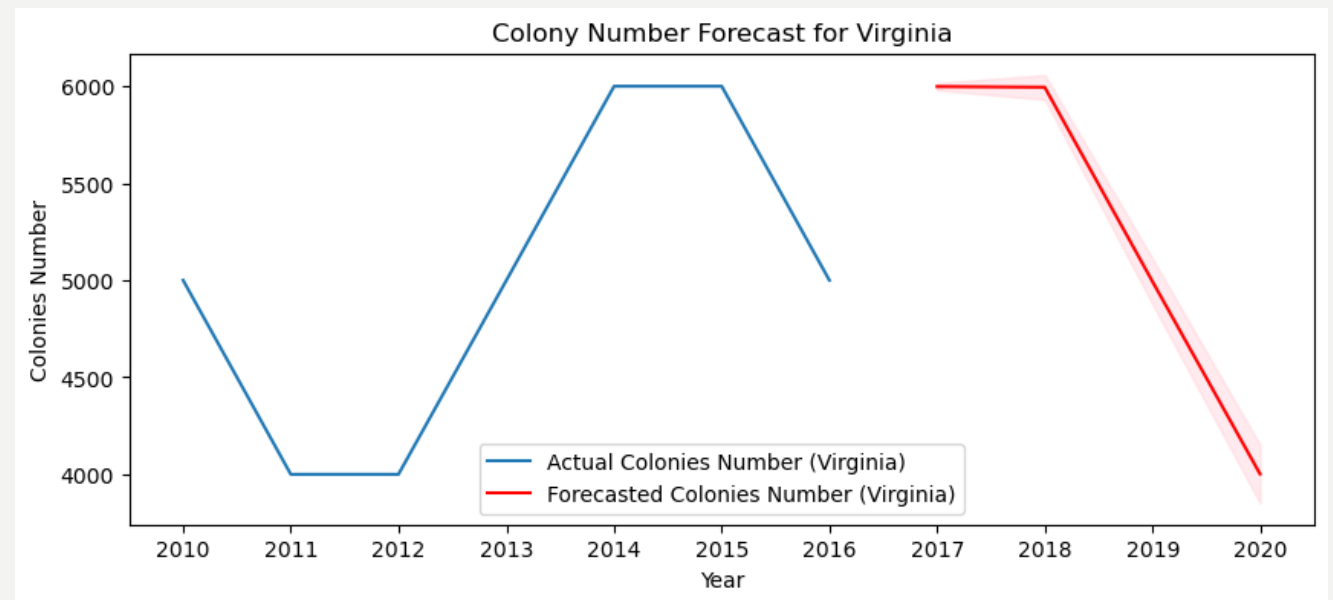
Here you can see that as colony numbers increase the average price decreases for honey sales.

FORECASTING FOR HONEY PRODUCTION

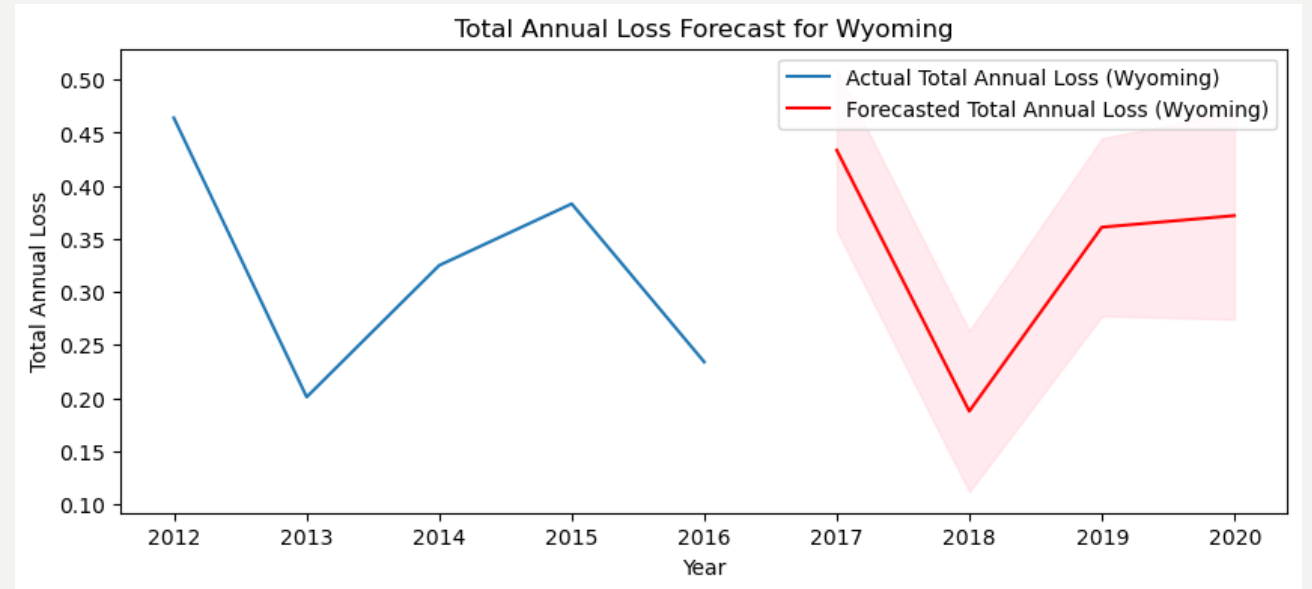
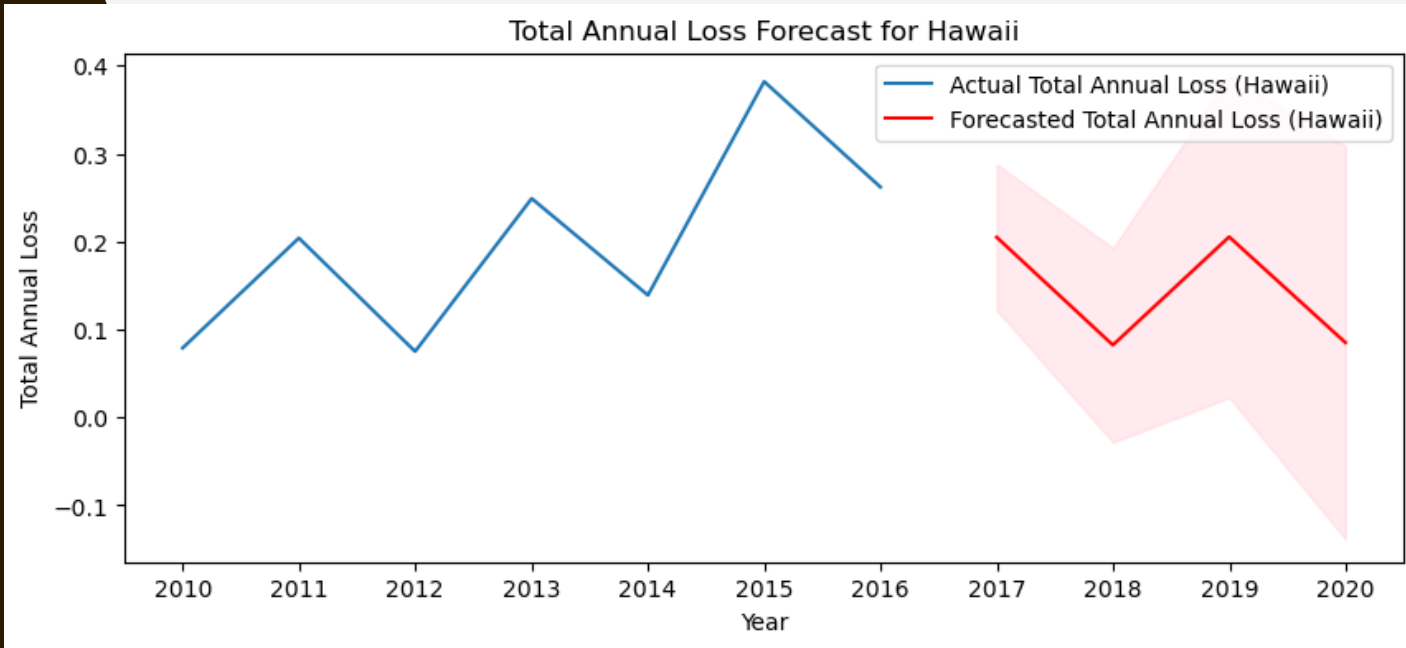




FORECASTING FOR COLONY TOTAL NUMBERS



FORECASTING FOR COLONY LOSS PERCENTAGE



REFERENCE

- Bee image
 - <https://www.jppestservices.com/pest-library/stinging-pests/honey-bee>
- Data Sets
 - <https://www.kaggle.com/datasets/mohitpoudel/us-honey-production-19952021>
 - <https://www.kaggle.com/datasets/thedevastator/beekeepers-in-the-united-states-report-colony-lo>