

# IMPACT OF CLIMATE CHANGE ON GLOBAL FOOD SUPPLY

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# *Discussion Today*

## **THINGS WE'LL TALK ABOUT**

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# INTRODUCTION

Droughts, fires, storms, and floods have become vigorous and more periodical, these repercussions of climate variability have become progressively visible. The global ecosystem is changing, including the environmental resources and cultivation on which we are heavily dependent. Hence climate change has become one of the most prominent challenges faced by humanity.

# OBJECTIVE

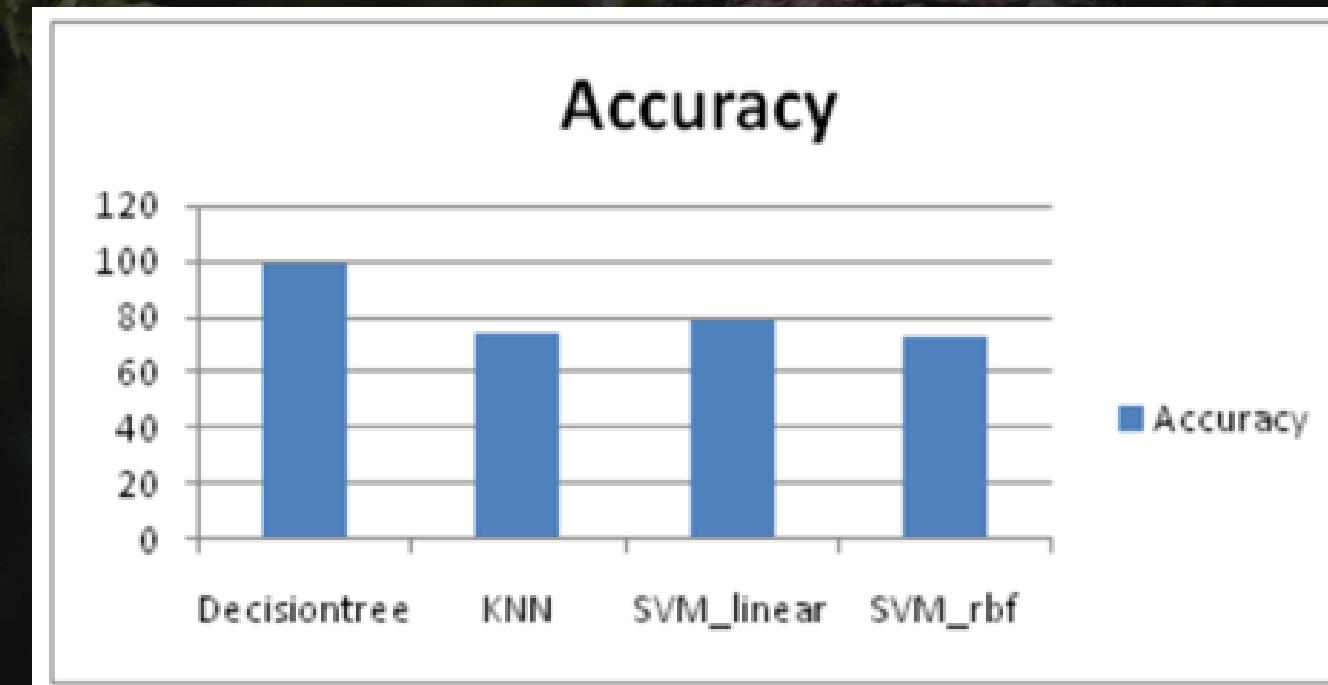


- **Given that climate change has become one of the most prominent challenges faced by humanity, we, as machine learning enthusiasts, aim to play our part in it.**
- **Our primary goal is to understand the changing climate and understand its effect on the global food supply/production.**
- **We'll use statistical methods to understand the effect of climate variability on global food production/supply in greater depth and propose solutions to tackle the adverse effects caused by climate change and extreme meteorological events.**

# RELATED WORK

- Botanists and agrarian researchers in Pakistan led a few examinations and observed that there is a negative connection between pesticide use and harvest yield. Dealing with that, there are many proposed procedures to make a framework to attempt to control crop yield utilizing AI.
- A yield forecast adaptation was proposed to utilize the digging methods for classification and expectation, in this model, they entered information and boundaries, for example, land area, soil type, crop name, bug data, environment, and so on, therefore to this, the model anticipated the plant infections, plant yield, and so on

- This statistical study uses Supervised Machine Learning Algorithms like Decision Trees, K-Nearest Neighbor (KNN), and Support Vector Machine (SVM) to estimate soil fertility based on macronutrients and micronutrients levels found in the dataset.
- The performance of these algorithms was evaluated a range of evaluation metrics like Mean absolute error, cross-validation, and correctness. The result of this analysis reveals that the best accuracy of 99 percent is achieved by using a decision tree with a very low mean square error (MSE).



# *Proposed Methodology*

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## Gathering Data & Cleaning Data

Information for crop yield was assembled from FAOSTAT, which offers worldwide insights on food and agribusiness.

## Data Exploration

Exploring the relationship between the attributes of the dataset

## Data Preprocessing

Using One-Hot encoder for encoding categorical attributes and using MinMax Scaler for scaling values

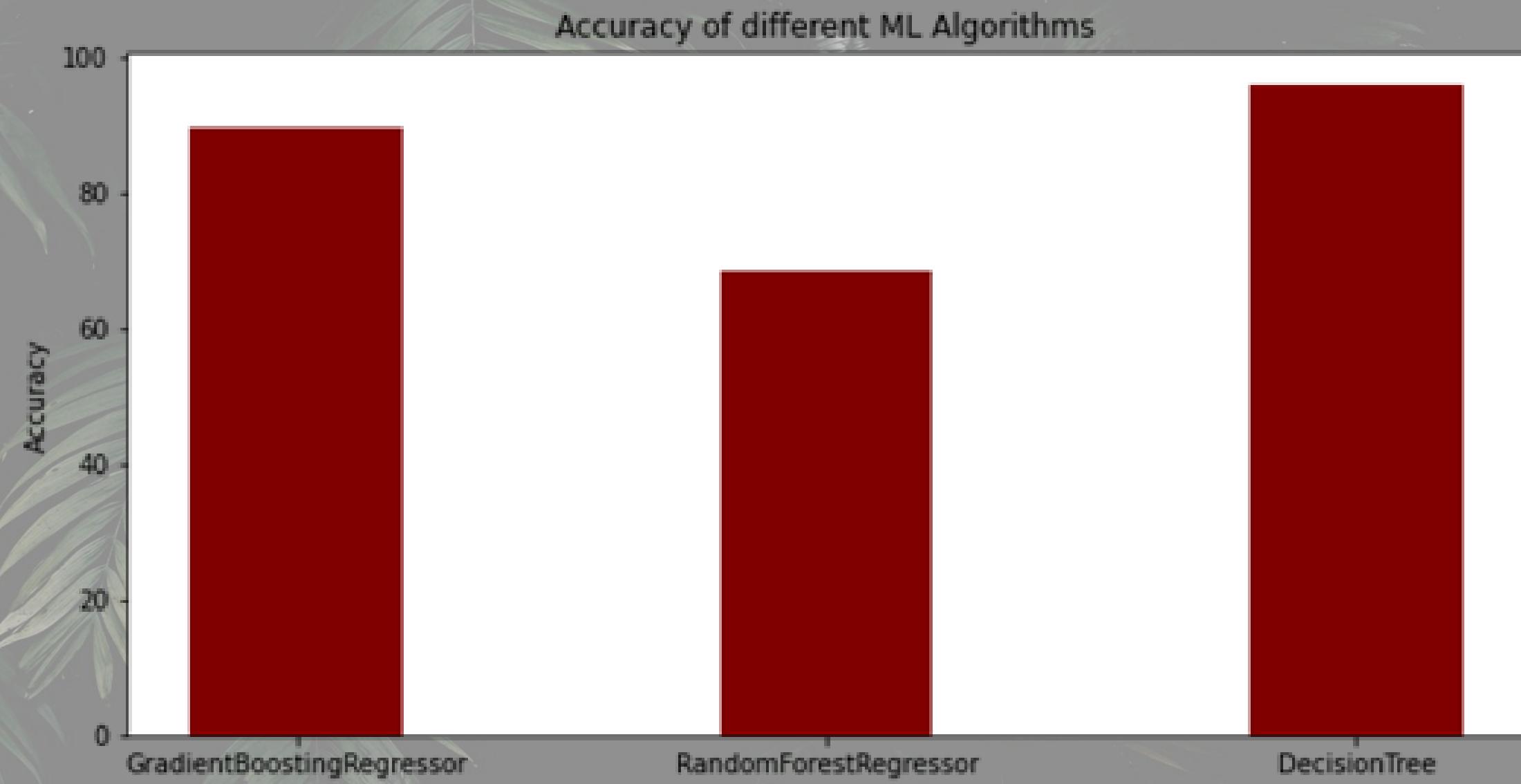
## Model Comparison & Selection

- Comparing the performance of the given Models:-
- Gradient Boosting
  - Random Forest
  - SVM
  - Decision Tree

# Experiment Results

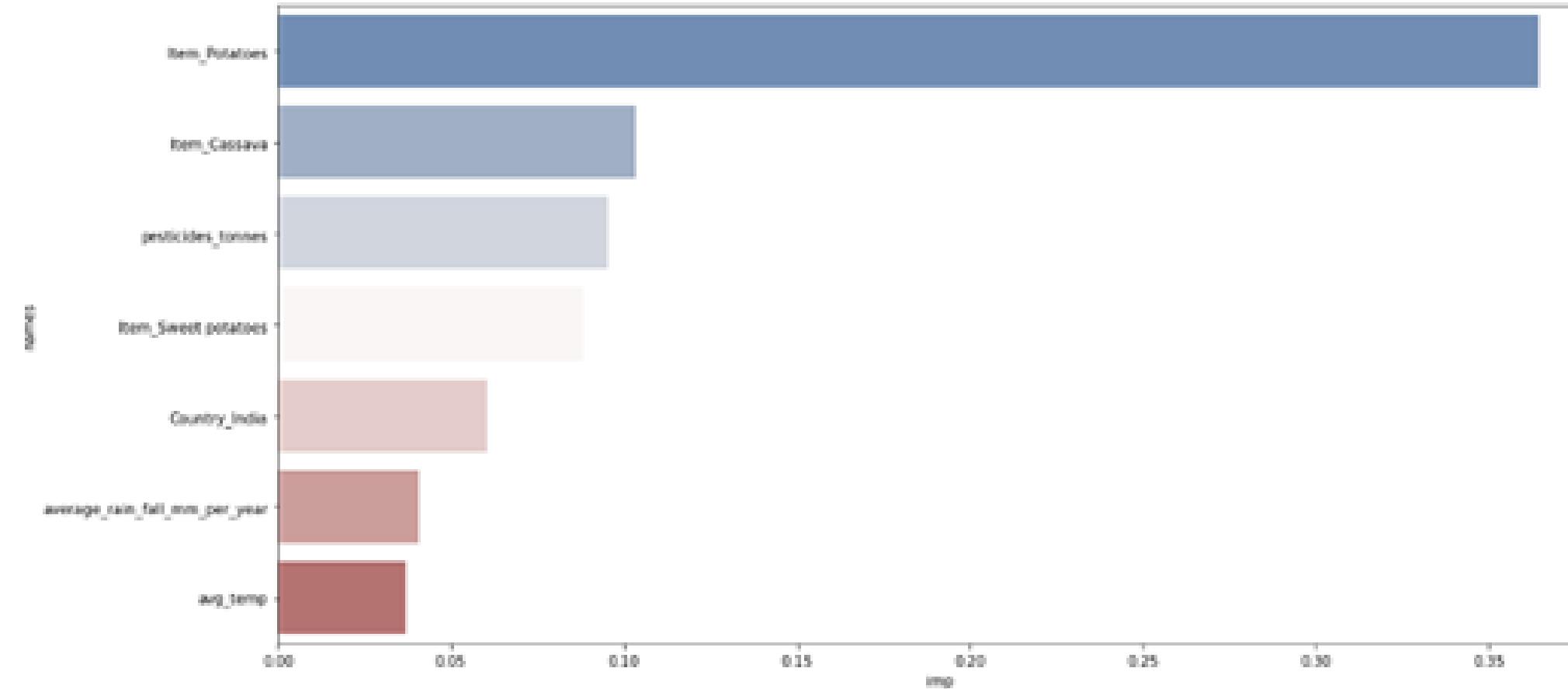
- Gradient Boosting Regressor was the Machine learning classifier that was used for accuracy, comparison, and prediction along with Random Forest, SVM and Decision Tree.
- These three classifiers were trained on the dataset and a comparison graph was plotted to showcase the performance of the models.

```
['GradientBoostingRegressor', 0.8965731164462923]
['RandomForestRegressor', 0.6842532317855172]
['SVR', -0.20353376480360752]
['DecisionTreeRegressor', 0.9600505886193001]
```



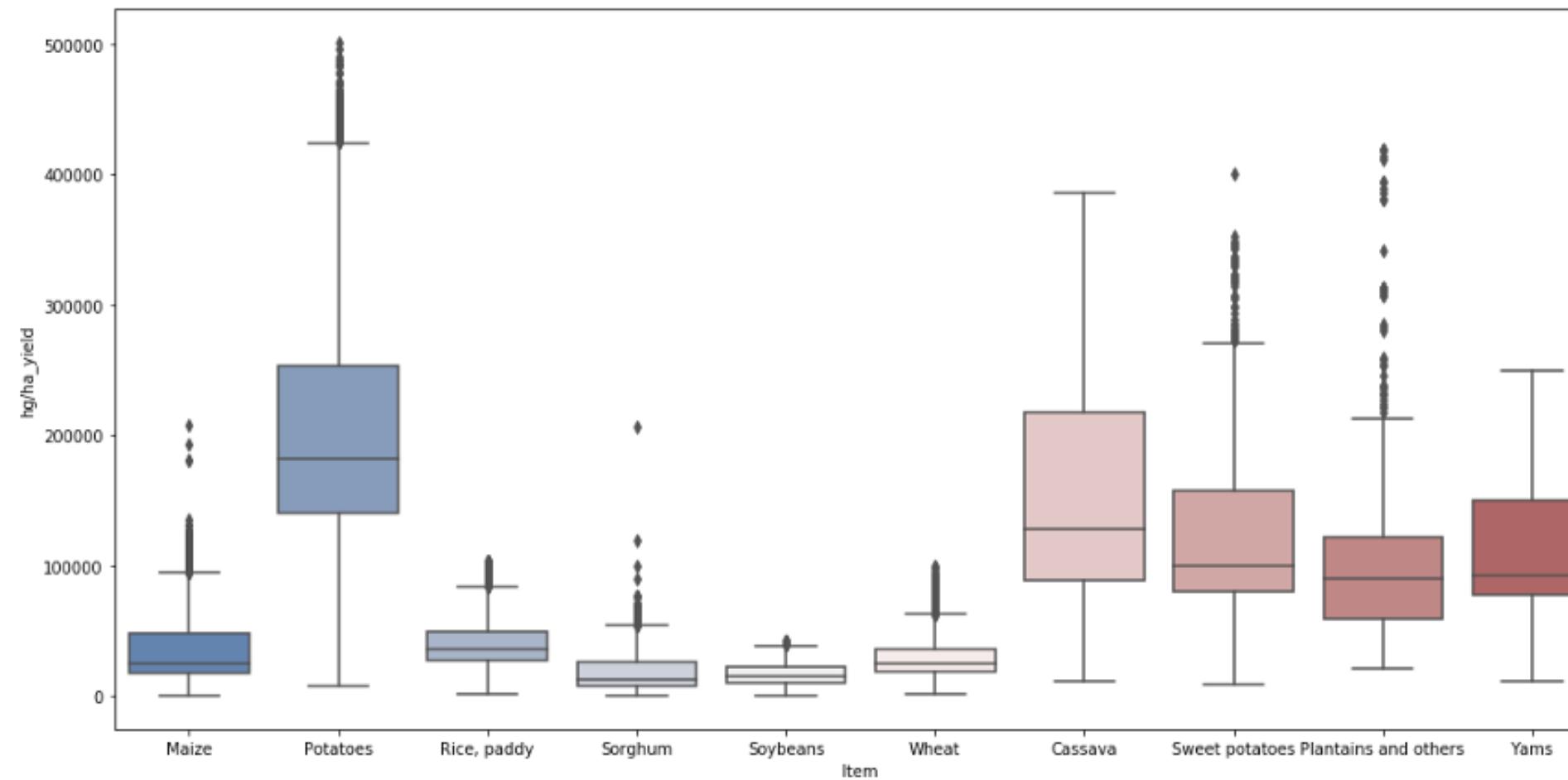
The figure showcases the performance. Of the three classifiers used, Decision Tree Regressor resulted in high accuracy.

# Findings of Project



- The yield of potatoes gives the most elevated significance in the model for making the decision.
- Cassava too, then as expected we see the effect of pesticides, where it's the third most important feature, and then if the crop is sweet potatoes, we see some of the highest crops in features importance in the dataset.

- If the crop is grown in India, it makes sense since India has the largest crops sum in the dataset. On the off chance that the collection is filled in India, it looks good since India has the greatest yields total in the dataset.
- Then comes rainfall and temperature. The first assumption about these features was correct, where they all significantly impact the expected crops yield in the model.



## CONCLUSION

Under this study, we were able to see that climate change has a significant impact on crop yield in just more ways than one. The impact of rising temperature on food production around the world is significant but it is auxiliary when compared to other environmental factors such as rainfall and soil fertility. In this study, we also saw that linear regression models are less accurate at capturing the variability of crop yield than linear models.

# References

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