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# **Members**

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| --- | --- | --- | --- |
| Professor | Project Topic | Project Team Members | Presentation Date |
| Dr. Amir Rastpour | How can we predict the Impact of Climate Change on Agricultural Productivity and investments | Taiwo Oyafajo  Yuanyu Liu  Gilda Moradzadeh  Vyom Patel | December 2nd, 2024 |

# **Introduction**

Climate change is one of the most global challenges of our time which has variety effects on everything, such as human livelihoods and ecosystem. Changing weather patterns has a direct impact on agriculture, crop growth and methods of farming. It is essential to know about its effects in order to protect food supplies.

In this project, we will be using a dataset we retrieved from Kaggle named “Climate Change Impact on Agriculture” which helps us to analyzes the relationship between climate change and agriculture. The dataset has 10000 observations and 15 variables providing a comprehensive foundation for our predictive analysis.

While government agencies and researchers have explored similar topics in the past, this project takes a unique approach by leveraging on current and robust datasets to capture ongoing impacts of climate change on agriculture. Our analysis incorporates predictive techniques to provide actionable insights that are relevant to the present and adaptable for the future.

The primary target audiences include policy makers and Agri-Tech companies with the goal of equipping them with data-driven insights which may inform their decision-making to mitigate the challenges posed by climate change on agricultural productivity and investments.

# **Objectives**

1. To Predict how changes in temperature and raining affect agricultural crop yields.
2. To understand the relationship between climate and crop productivity.
3. To assess the effectiveness of different climate adaptation strategies at socio-economic and environmental levels

# **Problem Statement**

Agricultural sector which is one of the backbones of food security and means of securing the basic necessities of life worldwide is now starting to be vulnerable to the side effects of climate change. The Changing temperatures and more frequent extreme weather patterns due to climate change are negatively affecting agricultural productivity thus making it difficult to predict farming practices for having a stable food production. (N.B: Farmers are losing productivity because of unpredictable climate)

Our aim as a group is to predict the influence of climate change on agricultural productivity using the dataset we have by developing predictive models that can help in decision making in this sector.

# **Data Cleaning Process**

The dataset we used for this project required minimal cleaning, as it was already well-prepared for analysis.

To verify the quality of the data, we performed a check for missing values using the following R query: sum (is.na (Yield\_data)) # Check total missing values.

The result of this query was 0, confirming that there were no missing values in the dataset. This allowed us to proceed directly to exploratory data analysis and modeling without extensive preprocessing.

# Best Model Recommendation

* Random Forest (Model 3) is the most accurate, with the lowest RMSE and robust handling of nonlinear relationships.
* Random Forest Model 3 achieved the best predictions, reducing variability and error significantly, making it ideal for agricultural policy modeling