AgriGrow: Crop Recommendation and Yield Predictor

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Abstract—**Agriculture is a key pillar of Bangladesh's economy, yet many farmers struggle to choose suitable crops for their land, resulting in low yields and losses. This project introduces a machine learning–based decision support system that recommends optimal crops and predicts yield using soil and environmental data. By leveraging agricultural datasets and ensemble models, the system aims to provide actionable insights that help farmers improve productivity and ensure sustainable farming practices.**

Index Terms—**Crop recommendation, yield prediction, machine learning, agriculture, ensemble model**

I. INTRODUCTION

Choosing the right crop is vital for farmers' productivity and income. In Bangladesh, diverse soil types, climatic zones, and unpredictable weather make this decision challenging. Relying solely on traditional experience often results in poor yields and financial loss. To address this, we propose a data-driven, machine learning–based system that provides intelligent crop recommendations and yield predictions, enabling farmers to make informed, scientific decisions.

The main objectives of this project are:

1) Develop a **crop recommendation model** that suggests the most suitable crop based on soil and environmental conditions.
2) Build a **yield prediction model** to estimate potential crop output in specific regions and seasons.
3) Compare multiple machine learning algorithms to determine the most effective approach.

II. PROPOSED DATASET(S)

A. Dataset 1: Agricultural Dataset Bangladesh (44 Parameters)

- **Key Features:** Nitrogen (N), Phosphorous (P), Potassium (K), pH, soil moisture, rainfall, temperature, humidity, and other crucial soil health indicators.
- **Target Variable:** Crop Name.
- **Source:** Kaggle Agricultural Dataset (Bangladesh, 44 Parameters).

B. Dataset 2: Crop Yield Dataset Bangladesh

- **Key Features:** District, Year, Season, Crop, Area (Hectare).
- **Target Variable:** Production (Tonnes).
- **Source:** Kaggle Crop Yield Dataset (Bangladesh).

III. LITERATURE REVIEW

Leave it for Phase 02.

IV. METHODOLOGY

Visit the following website and choose any algorithm that you prefer: https://scikit-learn.org/stable/index.html
(You don't have to describe the methodology right now; just mention the algorithms.)

Algorithms selected:

- Linear Regression
- Decision Tree
- Random Forest

V. RESULTS AND ANALYSIS

Leave it for Phase 02/03.

VI. CONCLUSION

Leave it for Phase 02/03.

VII. REFERENCES

Please add the references here!