

Crop Production Prediction Project

1. Overview of the Project

This project aims to develop a machine learning model to predict crop production based on factors such as Area, Crop, Year, and Season. The model was trained using a cleaned dataset and deployed through a user-friendly Streamlit application for practical usage.

2. Insights of the Project

- The production of crops is influenced by multiple variables such as geographical location, year, and season.
- Missing and inconsistent data can impact prediction accuracy.
- Random Forest Regressor performed well, achieving a high R^2 score.
- Cleaned and encoded data resulted in significantly better model performance.

3. Explanation of the Project

1. Data was preprocessed to remove missing values and encode categorical variables.
2. Features used: Crop, Area, Season, Year
3. Model: Random Forest Regressor, selected for its robustness and ability to handle non-linear data.
4. The model was trained and saved using joblib, then deployed on Streamlit.
5. Users can input values in the web app and receive predictions instantly.

4. Impact If Prediction Is Not Made

- Lack of prediction can lead to overproduction or underproduction.
- Economic losses due to poor planning and storage.
- Difficulty for farmers and policymakers to make data-driven decisions.
- Food supply chain disruptions and wastage.

5. Advantages and Disadvantages

Advantages	Disadvantages
Accurate predictions with less human bias	Depends heavily on data quality
Easy to use with Streamlit interface	May not adapt to sudden weather changes

Crop Production Prediction Project

Supports decision-making in agriculture	Needs technical deployment support
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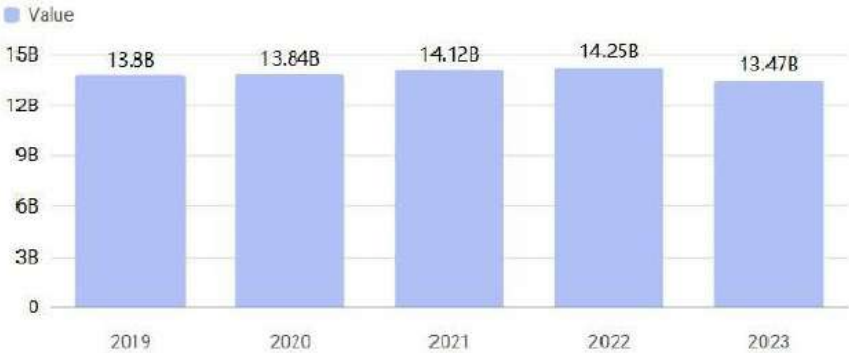
6. Ideas for Betterment of Crop Production

- Integrate weather data (rainfall, temperature) into the model.
- Use satellite imagery or soil sensors for real-time inputs.
- Educate farmers through mobile apps and language localization.
- Predict not just quantity but also crop suitability for next season.

7. Conclusion of the Project

The crop production prediction project demonstrates how machine learning can transform agriculture by providing accurate and actionable insights. With further data and model improvements, such solutions can help ensure food security, reduce waste, and enhance farmer productivity.

Total Production Trend by Year



Key Insights

- Production rose steadily from 13.8 B in 2019 to a peak of 14.25 B in 2022, marking a cumulative 3.3% increase over four years
- A notable 5.4% drop occurred in 2023, bringing output down to 13.47 B after two years of growth
- The 2022–2023 decline interrupts the upward trend, signaling potential operational or market challenges