**PROJECT SUMMARY:**

**Problem Statement:**

This project analyzes Indian agriculture using district-wise and year-wise data. The dataset includes detailed information on crop areas, production, and yields across different districts and years. Our goal is to use Power BI for interactive visualizations that uncover trends and disparities in agricultural practices. This analysis helps stakeholders in making informed decisions for sustainable farming and resource allocation.

**Goal:** Create a data visualization platform that integrates agricultural data from different states and districts in India.

1. **Understanding the data**

**Area**: The land area used for cultivating a crop measured in thousand hectares (ha).

**Production**: The quantity of crop harvested from the cultivated area measured in thousand tons.

**Yield**: The efficiency of crop production, representing the amount of crop harvested per unit area of land typically measured in kilograms per hectare (Kg/ha).

A screenshot of a computer

AI-generated content may be incorrect.

**2.Data Pre-processing**

* Check Missing Value: Their is no missing value in data
* Standardize the column names by removing special character and capital letters.
* Normalize the value by making the negative values as Zero.
* Create file for each tables.
* The dataset consists of 1617 rows and 80 columns, covering information from 20 states and 311 districts.
* The dataset spans from 1966 to 2017, providing a total of 52 years of data.
* There are 29 crop columns in the dataset, including:

Rice, Wheat, Kharif Sorghum, Rabi Sorghum, Sorghum, Pearl Millet, Maize, Finger Millet, Barley, Chickpea, Pigeonpea, Minor Pulses, Groundnut, Sesamum, Rapeseed and Mustard, Safflower, Castor, Linseed, Sunflower, Soybean, Oilseeds, Sugarcane, Cotton, Fruits, Vegetables, Fruits and Vegetables, Potatoes, Onion, Fodder.

**3.Exploratoray Data Analysis (EDA)**

* Analyzing the trends in the cultivation of major crops, including rice, wheat focusing on changes in area, production, and yield
* The 3.32 million hectares allocated to major crops, with a production output of 6.57 million tons, signify a strong agricultural output and positive growth trends.
* **Rice & Wheat Area:**

Uttar Pradesh, Madhya Pradesh, Punjab show significant cultivation areas for Wheat werein WestBengal, Uttar Pradesh, Orissa contributes for rice indicating their dominance in crop production. Conversely, Chhattisgarh, Uttarakhand, and Jharkhand have smaller cultivation areas, suggesting potential areas for agricultural expansion.

* **Rice & Wheat Yield:**

Regarding crop yield, Uttar Pradesh, Madhya Pradesh, Rajasthan demonstrate higher production for Wheat while Uttar Pradesh, Karnataka, Punjab for rice, reflecting effective farming practices or favourable conditions, while Chhattisgarh exhibits lower production, possibly indicating areas for improvement in agricultural productivity.

* **Rice & Wheat Production:**

Major production for Wheat is in Uttar Pradesh, Punjab and Haryana meanwhile rice is produced more in West Bengal, Uttar Pradesh and Punjab. Due to difference in climate and the landscape we see very less production in Himachal Pradesh.

**4. General Analysis**

* **Production Trend:**

The production trends highlight a significant rise in **Rice** production over the years, with wheat also showing consistent growth, whereas other crops demonstrate relatively lower and stable production levels after the year 2002.

* **Yield Trend:**

The yield trends suggest variations among the crops, with sugarcane generally exhibiting higher yields compared to wheat and rice, implying potential differences in crop management or environmental factors affecting yield outcomes.

* **Production Low but Yield is high**:

Crops like Barely, Groundnut, Chickpea etc are having less production but comparatively high yield indicates efficient farming methods. This means that farmers are getting more output per unit of land, possibly due to effective agricultural practices.

* Top 5 Rice producing state:
  + West Bengal
  + Uttar Pradesh
  + Punjab
  + Andhra Pradesh
  + Tamil Nadu
* Top 5 Wheat producing state:
* Uttar Pradesh
* Punjab
* Haryana
* Madhya Pradesh
* Rajasthan
* Farmers can plan to cultivate groundnut as the production of groundnut has significantly increased from 1985 which will help farmers to achieve a greater profit.

**5. Recommendations:**

* **Diversify Crops:** Encourage farmers to grow a variety of crops beyond staples like rice and wheat, focusing on high-value options like fruits, vegetables, and millets**.**
* **Adopt Modern Practices:** Support farmers in using modern techniques like precision farming and drip irrigation to boost productivity and sustainability.
* **Improve Storage and Transport**: Enhance post-harvest infrastructure to minimize wastage and ensure quality, alongside strengthening market connections for better prices**.**
* **Offer Training Services:** Provide farmers with training and extension services to learn about effective crop management and pest control methods.
* **Invest in Research:** Allocate resources for agricultural research to develop resilient crop varieties and sustainable farming practices tailored to local conditions.
* **Encourage Organic Farming:** Promote organic farming practices to meet growing consumer demand for chemical-free produce and improve soil health in the long term.
* **Enhance Market Access:** Establish farmer producer organizations and strengthen market linkages to enable farmers to access wider markets and obtain fair prices for their produce.