**🌾 District-Level Agricultural Analysis – Power BI Project Report**

**1. Project Title:**

**District-Level Agricultural Performance Analytics Using Power BI**

**2. Executive Summary:**

This Power BI project aims to analyze district-level agricultural data to identify production trends, crop performance, irrigation coverage, and regional disparities in farming practices across Indian districts. The dashboard provides policymakers and researchers with a comprehensive view to support data-driven decisions for sustainable agriculture.

**3. Objectives:**

* Analyze crop-wise and district-wise production trends.
* Identify high and low-performing agricultural districts.
* Study irrigation coverage and land use patterns.
* Provide actionable insights for agricultural planning and resource allocation.

**4. Dataset Description:**

* **Source:** ICRISAT District-Level Dataset
* **Records:** Multi-year panel data for Indian districts
* **Key Fields:**
  + State, District
  + Year, Season
  + Crop, Area Sown, Production, Yield
  + Irrigated Area, Rainfall, Fertilizer Use, Population

**5. Data Preparation & Modeling:**

* Cleaned missing and inconsistent values using Power Query.
* Created a star schema with:
  + **Fact Table:** Crop Production Data
  + **Dimension Tables:** Districts, Crops, Time, Weather
* Created DAX measures including:
  + Total Production
  + Average Yield
  + Irrigation Ratio = Irrigated Area / Total Area
  + Fertilizer Usage per Hectare

**6. Dashboard Features:**

**🌱 Crop Production Overview**

* Line chart showing production trends over years by crop and state
* KPI indicators: Total Production, Avg. Yield, Irrigated Area %

**🗺️ District-Level Map Visualization**

* Choropleth map of India displaying:
  + Yield per hectare
  + Irrigation coverage
  + Fertilizer usage intensity

**🥦 Crop Comparison**

* Bar charts showing top crops by production and yield
* Multi-year performance trend lines

**🌦️ Weather Impact Analysis**

* Rainfall vs. Yield scatter plot
* Conditional formatting to show years of low rainfall and low yield

**7. Key Insights:**

* **Yield Variability:** Districts in southern India tend to have more stable yields over time.
* **Irrigation Gaps:** Some high-yield districts still rely on rainfed agriculture.
* **Crop Performance:** Rice and Wheat dominate production, but Maize and Pulses show promising yield increases.
* **Rainfall Dependency:** Certain crops exhibit strong yield sensitivity to rainfall fluctuations.
* **Fertilizer Impact:** Overuse of fertilizers is not strongly correlated with higher yields in all cases—optimal usage matters.

**8. Recommendations:**

1. **Target Irrigation Investment** in high-potential but low-irrigated districts.
2. **Promote Climate-Resilient Crops** in rainfall-dependent areas.
3. **Focus on Balanced Fertilizer Use** to optimize input cost vs. yield.
4. **Use Yield Data for Crop Diversification Planning** in mono-crop districts.
5. **Deploy Agricultural Extension Programs** in low-yield but high-resource districts.

**9. Conclusion:**

This Power BI dashboard offers a scalable and interactive solution for visualizing complex agricultural data at the district level. It equips stakeholders with real-time insights to drive policy, enhance productivity, and ensure sustainability in agriculture.