AGRICULTURE (INDIA) DATA ANALYSIS

High Level Design

Abstract

This project explores India's agricultural growth over five decades, focusing on key metrics such as fertilizer consumption, agricultural productivity, livestock production, and food production. The analysis highlights significant trends and growth patterns, identifying periods of rapid development and subsequent slowdowns.

By leveraging Power BI, the project creates interactive dashboards that visualize historical insights and annual growth rates, offering a comprehensive understanding of India's agricultural progress. These insights are designed to assist policymakers and stakeholders in addressing challenges related to productivity, sustainability, and resource allocation in the agricultural sector.

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Document Version Control

Date	Version	Description	Author
26-Nov-2024	1.0	Initial version of the HLD	Shivam Kushwaha

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1. Introduction

- **Purpose**: The dashboard provides insights into India's agricultural performance between 1961 and 2022, focusing on fertilizer consumption, food production, livestock production, and agricultural value added per worker. By visualizing these trends, stakeholders can:
  - Identify long-term patterns.
  - Understand annual growth rates.
  - Aid policy formulation for agricultural development.

- **Scope**: The dashboard is intended for policymakers, agricultural economists, and analysts. It covers:
  - Historical trends and annual growth rates.
  - Yearly KPIs using cards for instant metrics display.
  - Year-over-year growth using matrix tables.

2. General Description

- **Problem Statement**:

  The growth patterns of four key agricultural parameters in India: fertilizer consumption, agricultural value added per worker, livestock production, and food production. The goal is to calculate and visualize two key metrics: **average annual growth rate** and **year-over-year growth** for each parameter. The project seeks to create an interactive Power BI dashboard that presents these growth patterns, highlighting both long-term trends and annual variations. The insights will help stakeholders understand how these metrics have evolved over time, providing valuable information for decision-making and policy development in the agricultural sector.

- **Tools Used:**
  - **Power BI**: Visualization and reporting.
  - **SQL/Excel**: Data pre-processing and storage.

3. Design Details

- **Functional Architecture**:
    - **Data Sources**:
        - Dataset:

          datahttps://api.worldbank.org/v2/en/country/IND?downloadformat=csv
        - Yearly indices for Food and Livestock production - (1961-2022).
        - Agriculture, forestry, and fishing, value added per worker (constant 2015 US$) - (1991-2022)
        - Fertilizer consumption (kilograms per hectare of arable land) - (1961-2022).

    - **Flow**:
        - Data → Transformation (Excel & Power Query) → Modelling (Power BI) → Visualization.

    - **Outputs**:
        - KPI cards.
        - Line graphs for trends.
        - Growth matrix.
        - Time slicers for custom date range analysis.

- **Optimization Techniques**:
    - Aggregate data before visualization to minimize processing load.
    - Optimize slicers and filters to improve dashboard responsiveness.

4. Key Performance Indicators (KPIs):

- Fertilizer Consumption (2018):   176.1 kg/ha
- Agricultural Value Added Per Worker (2019): $2,012
- Food Production Index (2018):   114
- Livestock Production Index (2018):   118
- AAGR of Each Parameter for Selected Period

5. Deployment

- **Hosting**: Power BI Service.
- **Access**: Role-based access for secure sharing.