High Level Design Document

Introduction

This High Level Design (HLD) document outlines the architecture and core components for the **AgriMetrics - Crop Yield KPI Dashboard** project. The purpose of this project is to develop a Power BI dashboard that tracks and visualizes crop yield KPIs across different regions and seasons, leveraging DAX for data aggregation and trend analysis.

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1. System Architecture Overview

Architecture Description:
The system ingests crop yield data, processes and aggregates it, and presents interactive KPI dashboards to users via Power BI.

Component	Role/Function
Data Source	Stores raw crop yield data (e.g., Excel, SQL DB, CSV)
Data Ingestion Layer	Imports and refreshes data into Power BI
Data Model	Defines tables, relationships, and DAX calculations
Visualization Layer	Power BI reports and dashboards for KPI visualization
User Access Layer	Provides secure access to dashboards for stakeholders

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2. Component Interactions

Sequence Step	Interaction Description
1	Data Source provides raw crop yield data
2	Data Ingestion Layer imports and schedules data refreshes into Power BI
3	Data Model processes, aggregates, and calculates KPIs using DAX
4	Visualization Layer renders interactive dashboards and reports
5	Users access dashboards via Power BI interface

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3. Data Flow Overview

Source Component	Target Component	Data/Process Description
Data Source	Data Ingestion Layer	Raw crop yield data import
Data Ingestion Layer	Data Model	Structured data for modeling and calculations
Data Model	Visualization Layer	Aggregated KPIs, trends, and metrics

Visualization Layer	User Access Layer	Dashboard views and reports

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4. Technology Stack

Layer/Function	Technology/Framework
Data Storage	Excel, CSV, or SQL Database
Data Ingestion	Power BI Data Connectors
Data Modeling	Power BI, DAX
Visualization	Power BI Reports/Dashboards
Access & Security	Power BI Service

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5. Scalability & Reliability

- **Scalability:** Power BI supports incremental data refresh and can connect to scalable data sources (e.g., SQL databases) to handle growing data volumes.
- **Reliability:** Scheduled data refreshes and Power BI's cloud service ensure high availability and up-to-date dashboards.
- **Security:** User access is managed via Power BI's role-based access controls and organizational authentication.

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