Project Initialization and Planning Phase

Date	23 July 2025
Team ID	
Project Title	Predicting plant growth stages with environmental and management data using power bi
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

Project Overview	
Objective	This project aims to analyze critical environmental and input variables influencing plant growth and create an interactive visualization platform to support precision agriculture. By enabling efficient data collection, analysis, and visualization, the system will help users identify optimal growing conditions and adopt improved cultivation strategies. Ultimately, it seeks to bridge the gap between data insights and field practices, enhancing both productivity and sustainability.
Scope	This project involves the complete development of a plant growth monitoring system, encompassing data collection, preprocessing, analysis, visualization, and reporting. It will integrate datasets related to soil type, irrigation schedules, temperature, humidity, and sunlight exposure. The system will also feature modules for evaluating fertilizer performance and tracking growth milestones under varying conditions. Key deliverables include interactive dashboards, automated reports, a recommendation engine, and evaluation tools. Real-time sensor integration, AI-driven forecasting, and mobile app deployment are excluded from this phase and will be considered in future upgrades.

Problem Statement	
Description	Modern agriculture produces vast amounts of data on soil conditions, irrigation schedules, weather patterns, and crop performance. Yet, much of this information remains underutilized due to poor structuring, limited analytical tools, and a lack of intuitive visualization platforms. Key growth factors—such as soil type, irrigation frequency, humidity, temperature, and sunlight—are rarely analyzed in combination, leading to gaps in understanding their collective impact on plant development in diverse environments. Furthermore, there is no unified platform that enables stakeholders to track trends, compare inputs like fertilizers, or receive timely alerts when environmental thresholds are exceeded.
Impact	The absence of an intelligent monitoring system limits opportunities to enhance agricultural efficiency and productivity. Farmers risk overusing water, applying unsuitable fertilizers, or cultivating crops in less-than-ideal soil conditions without recognizing the impact. These practices can reduce yield and quality while wasting resources and harming the environment. The proposed solution addresses these challenges by providing data-driven insights that enable informed decision-making. It supports precision agriculture, improves resource utilization, and promotes sustainability and profitability throughout the farming lifecycle.
Proposed Solution	
Approach	The project will adopt a modular, sprint-based development approach, progressing through distinct phases: • **Data Collection & Preprocessing:** Acquire and prepare datasets related to environmental factors and plant growth milestones. • **Data Analysis:** Perform statistical and comparative analysis to uncover patterns, correlations, and key growth influencers. • **Dashboard Development:** Build interactive Power BI dashboards to deliver clear and actionable visual insights. • **Feature Implementation:** Incorporate comparison tools, alert mechanisms, and data export capabilities. • **Evaluation & Feedback:** Assess system performance and refine features based on stakeholder input and user experience.

Key Features	The system will include a range of features designed to support data-driven decision-making in agriculture. Interactive dashboards will allow users to view and compare metrics like humidity, temperature, and sunlight across different soil and water conditions. Growth influencer analysis will highlight the impact of various inputs such as fertilizer type and irrigation frequency. Users will also be able to track environmental trends over time and receive condition-based recommendations for optimizing plant health. Reports can be exported in Excel or PDF format for record-keeping or sharing. In future phases, the platform may include real-time alerts to notify users of unfavorable environmental conditions, further enhancing its role as a smart farming assistant.

Resource Requirements

Resource Type	**Description**	**Specification/Allocation**
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	e.g., 2 x NVIDIA V100 GPUs
Memory	RAM specifications	8–16 GB RAM per machine; cloud compute with 16 GB RAM for dashboard rendering
Storage	Disk space for data, models, and logs	e.g., 512 GB SSD
Software		
Frameworks	Backend/data frameworks	Power BI (for dashboard), Python (optional: Flask or Streamlit for custom tools)
Libraries	Analytical and data processing libraries	pandas, numpy, scikit-learn, matplotlib (for preprocessing or modelling)

Development Environment	IDE, version control	e.g., Power Bi Desktop , Github
Data		
Data	Source, size, format	Kaggle dataset, Local agricultural datasets, CSV/Excel format, ~50 MB; expandable to cloud feeds