

## **Data Visualization Report**

Data visualization plays a crucial role in transforming raw plant growth data into meaningful insights. In this project, multiple visualizations were developed in Power BI to analyze the relationship between environmental factors and plant growth milestones. Each visualization was carefully selected to address a specific analytical requirement and business question, ensuring clarity, accuracy, and ease of interpretation.

The visualizations collectively help stakeholders understand how soil type, water frequency, temperature, humidity, fertilizer type, and sunlight hours influence plant growth outcomes.

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### **1. Growth Milestone Count**

This visualization represents the total number of growth milestones achieved across all records in the dataset. Displayed using a KPI card, it provides a quick overview of overall plant growth performance and serves as a key indicator for evaluating the effectiveness of environmental and management practices.

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### **2. Growth Milestone Count by Soil Type**

A bar chart is used to compare growth milestone counts across different soil types. The visualization clearly shows how soil quality impacts plant growth, with loam soil generally recording higher growth milestones compared to sandy and clay soils. This insight supports informed soil selection decisions in agriculture.

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### **3. Growth Milestone Count by Fertilizer Type**

This visualization compares growth milestone counts based on fertilizer type. It highlights that plants treated with organic fertilizer tend to achieve higher growth milestones than those using chemical fertilizers or no fertilizer. The chart supports sustainable farming practices by demonstrating the effectiveness of organic inputs.

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### **4. Growth Milestone Count by Humidity Level Description**

A column chart illustrates growth milestone counts across different humidity level descriptions (low, moderate, high). The visualization indicates that moderate humidity levels are most favorable for plant growth, emphasizing the importance of maintaining balanced moisture conditions.

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## **5. Growth Milestone Percentage by Water Frequency**

This visualization presents the percentage of growth milestones achieved under different watering schedules. By using a column or bar chart, it becomes evident that consistent watering frequencies, such as daily or bi-weekly watering, result in higher growth success rates. This insight is valuable for optimizing irrigation strategies.

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## **6. Average Temperature by Temperature Range Description**

A bar chart displays the average temperature values grouped by temperature range descriptions. This visualization helps identify the temperature ranges in which plants perform best, revealing that moderate temperature ranges are associated with improved growth outcomes.

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## **7. Average Humidity by Humidity Level Description**

This visualization shows average humidity levels across different humidity categories. It helps assess environmental stability and confirms that balanced humidity conditions support better plant growth.

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## **8. Average Sunlight Hours by Soil Type**

A column chart is used to represent average sunlight hours received by plants across different soil types. This visualization helps understand how sunlight exposure interacts with soil conditions and contributes to plant development.

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## **9. Water Frequency According to Its Soil Type**

This visualization analyzes watering patterns across various soil types. It helps identify which soil types require more frequent watering and how water frequency varies depending on soil characteristics, supporting efficient water management.

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## **10. Temperature and Its Description According to Plant Growth**

This visualization links temperature values and their descriptive ranges with plant growth outcomes. It enables users to understand how temperature conditions influence growth milestones and supports environmental planning in greenhouse or controlled farming environments.

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## **11. Average Humidity, Average Temperature, Average Sunlight Hours**

Displayed using KPI cards, these visualizations provide a summarized view of key environmental averages. They allow users to quickly assess overall environmental conditions affecting plant growth without deep analysis.

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### **Overall Visualization Insights**

- Environmental factors such as temperature, humidity, and sunlight play a significant role in determining plant growth success.
- Loam soil combined with consistent watering schedules results in higher growth milestone achievement.
- Organic fertilizer shows a positive impact on plant growth outcomes.
- Interactive filters and slicers allow users to analyze specific scenarios and combinations of conditions effectively.
- The combination of summary KPIs and detailed charts ensures both high-level monitoring and in-depth analysis.