Project Title: Plant Growth Milestones - Factors and Insights

1. Introduction

This Power BI project aims to analyze various environmental factors influencing plant growth. The dataset includes parameters such as soil type, water frequency, temperature range, humidity, and fertilizer type. The objective is to generate interactive visualizations to uncover key insights about plant growth conditions.

2. Dataset Overview

- **Data Source:** CSV/Excel dataset containing soil characteristics and environmental factors.
- **Key Columns:**
    - Soil_Type (Loam, Sandy, Clay)
    - Water_Frequency (Daily, Weekly, Bi-Weekly)
    - Water_Frequency_Category (High, Moderate)
    - Temperature_Range_Description (Warm, Moderate, Cold, Total)
    - Humidity_Level_Description (Humid, Moderate, Dry)
    - Fertilizer_Type (Organic, Chemical, None)
    - Growth_Milestone_Count

3. Visualizations Created

3.1 Matrix Visualization - Water Frequency Analysis

- **Objective:** Display water frequency based on soil type.
- **Implementation:**
    - Created a **Matrix Visual** with Soil_Type as rows and Water_Frequency_Category as columns.
    - Used conditional formatting to highlight higher values in green.
    - Enabled hierarchical expansion to show subcategories like daily, weekly, and bi-weekly watering.

3.2 Bar Chart - Average Temperature by Range

- **Objective:** Compare temperature changes across different ranges.

- **Implementation:**
    - Used **Clustered Bar Chart** with Temperature_Range_Description on the x-axis and Average_Temperature on the y-axis.
    - Implemented data labels and sorted bars in descending order.

3.3 Key Influencers Visualization

- **Objective:** Identify key factors affecting temperature changes.
- **Implementation:**
    - Used **Key Influencers visual** to determine which variable most impacts temperature variations.
    - Configured What influences Temperature to Decrease? filter.

3.4 Pie Chart - Growth Milestone by Fertilizer Type

- **Objective:** Show distribution of plant growth milestones based on fertilizer type.
- **Implementation:**
    - Used **Pie Chart** where Fertilizer_Type is the category and Growth_Milestone_Count is the value.
    - Applied data labels to show percentage distribution.

4. Data Transformations & DAX Calculations

- **Created a new column for Water Frequency Category**
- Water_Frequency_Category =
- IF('Table'[Water_Frequency] IN {"daily", "bi-weekly"}, "High", "Moderate")
- **Aggregated Total Water Frequency by Soil Type**
- Total_Water_Frequency = SUM('Table'[Water_Amount])

5. Insights & Business Impact

- **Loam soil with high water frequency** results in the highest total water consumption, suggesting it benefits from frequent watering.
- **Temperature range significantly affects plant growth**, with colder temperatures reducing growth.

- **Humidity level influences plant growth milestones**, requiring further optimization for better yield.
- **Organic fertilizers contribute to the highest growth milestones**, making them preferable for cultivation.

6. Conclusion & Future Enhancements

This Power BI dashboard effectively visualizes key factors influencing plant growth. Future enhancements could include:

- Integration with real-time sensor data for live updates.
- Adding predictive analytics using machine learning.
- Expanding analysis to include more environmental variables.
