## Coding Challenge: Crop Yield Forecasting

### The Scenario

You are a data analyst for "Agro-Solutions," a company that provides data-driven insights to farmers. Your task is to develop a crop yield forecasting model for wheat. Your Analysis will help farmers make informed decisions about planting, harvesting, and resource allocation.

You've been given a dataset containing historical data on wheat crop yields from various farms. The dataset includes the following variables:

- FarmID: A unique identifier for each farm.
- Year: The year the data was recorded.
- Rainfall_mm: The total rainfall in millimeters for the growing season.
- Temperature_C: The average temperature in Celsius during the growing season.
- Fertilizer_kg/ha: The amount of fertilizer applied in kilograms per hectare.
- Pesticide_L/ha: The amount of pesticide applied in liters per hectare.
- SoilType: The type of soil (e.g., Clay, Loam, Sandy).
- Yield_Tons/ha: The actual wheat yield in tons per hectare (this is the target variable you need to predict).

### The Challenge Task

Your task is to use Excel to analyze this dataset and present your findings in a clear, actionable report.

---

### Task Requirements

- Part 1: Data Cleaning and Preparation:
    - Identify and handle any missing or inconsistent data (e.g., fill in missing values, correct typos).
    - Use a suitable Excel function, such as IF or VLOOKUP, to create a new column called Yield_Category. The categories should be "High Yield" (above 5 tons/ha), "Medium Yield" (3-5 tons/ha), and "Low Yield" (below 3 tons/ha).
    - Data Aggregation: Summarize the data by SoilType. Calculate the average rainfall, average temperature, and average fertilizer usage for each soil type.

- Part 2: Exploratory Data Analysis (EDA):
    - Create pivot tables to answer the following questions:
        - What is the average yield for each SoilType?
        - Which Yield_Category had the highest average Fertilizer_kg/ha?
        - What was the average yield per year, broken down by SoilType?
    - Use conditional formatting to highlight farms with a Yield_Tons/ha of over 6.
    - Create a clustered column chart to visualize the average Yield_Tons/ha for each SoilType alongside the average Fertilizer_kg/ha for that soil type.
- Part 3: Final Report and Recommendations:
    - Based on your analysis, create a summary report using text boxes in Excel. The report should answer the following questions:
        - Which SoilType appears to be the most productive? Provide data to support your conclusion.
        - What is the relationship between Fertilizer_kg/ha and Yield_Tons/ha? Do higher fertilizer amounts consistently lead to higher yields?
        - Are there any other variables that seem to have a strong impact on yield?

---

### Deliverables

Submit Excel workbook containing:

- The raw data sheet.
- A "Cleaned Data" sheet with all the preprocessing and the new Yield_Category column.
- A "Data Analysis" sheet with all the pivot tables, charts, and conditional formatting.
- A "Final Report" sheet with the written summary and recommendations based on their findings.