Lettuce Growth Case Study Journal

Date: 31 Jan 2024	**Topic: Lettuce Growth Insights**
Goal:	Understand how the rates of growth in a single lettuce species are affected by various elements including: temperature, humidity, pH level of the soil, total dissolved solids in the soil, and number of growth days. Through a more thorough comprehension of how these variables affect growth rates, we can posit the ideal conditions for farmers to grow the ideal quantity of lettuce.
Strategy/tasks:	1. Start by taking a brief and cursory overview of all available data in Google Sheets, performing cursory analysis and data cleaning. 2. Identify overall trends in growth using R, taking note of significant outliers. Also keep track of all tasks in R Markdown journal. 3. Begin researching each group independently (high growth rate vs low) and see how trends track compared to overall 4. Create visualizations in R or Tableau (whichever is more applicable)
Conclusions:	To be made in .ppt
Deliverables:	1. Presentation of findings 2. Clear visualizations of data 3. Recommendations

Methods	**Topic: Lettuce Growth Insights**
Google Sheets	● Analyze and clean data at a surface level, ie: remove duplicates, delete blanks, correct typos, etc. ● Find significant outliers as well as averages for each field being analyzed ● Adjust .csv to only display a single specimen (for visualization purposes)
R	● Upload and import data from .csv, one of the fields contained a special character variable that had to be adjusted to be able to properly plot data ● Assign aliases to variables for consistency and easier navigation ● Search for averages and compare findings to averages found in sheets, they match ● Begin visualizing data using ggplot() to see how variables effects each others trends, and compare the range on outliers ● Adjust for data units and range ● Apply labels to each graph, giving credit to the original compiler and publisher of data ● Clean up .rmd and organize sections with #comments ● Knit document into .pdf for stakeholder viewing

Notes	Topic: Lettuce Growth Insights
Location:	Data source: Lettuce Growth Days (kaggle.com)
Organization:	Data is organized in spreadsheets from a larger database
Bias & Credibility:	**R**eliable: data is from a primary source **O**riginal: spreadsheets are original **C**omprehensive: there are 45 fields per specimen **C**urrent: ranges from august to september 2023 **C**ited: all sheets cited from source author on Kaggle
Findings:	• Each of the 70 lettuce specimens have and average of 45 days of growth data recorded from August 3rd to September 16th, giving us 6 weeks of data each • The lowest temperature recorded in this range was 18C, the highest was 33.5C, and the average was 28C • There are no plants that were harvested fewer than 45 days from the start of the growth data, but there are plants which took longer, which leads me to believe that the 45 day mark is the set harvest date regardless of whether or not the plants were fully grown before that. • There were no extreme outliers in the fields of humidity or pH, with highs and lows very close to the average. • I did have to look up what normal ranges of total dissolved soil values (TDS) were to gain a better understanding of the ranges, and I found that roughly 38% of dates recorded had *less* than the recommended level of TDSr, which could be worth investigating if growth rates are less than ideal. • Upon researching the ideal level of humidity for lettuce, I also found that 80% is considered beyond the upper recommended limit. After filtering through the data, I found that 33% of all growth dates reported higher than 70% humidity, which, according to Hort Americas' article, can lead to higher growth rates of mildew and botrytis. If product quality is lower than ideal, would recommend investigating ways of limiting humidity.