Overview and Motivation:
Our project visualizes nutritional supply trends in North and South America using FAOSTAT data. The goal is to make it easier to compare nutrients across countries and understand how values change over time. The dashboard begins with a scatterplot which helps users compare nutrients, observe changes between years, and explore differences across countries. Users can then focus on more specific patterns in the line chart by choosing both a country and a nutrient to view trends across all years. The bar chart shows protein supply by food group for a selected country, to compare how different food categories contribute to overall protein levels.

Related work:
Our project design was guided by ideas we learned from the course resources, especially Shneiderman's *Visual Information–Seeking Mantra* (starting with a lot of information then reducing carnality). This shaped our dashboard since the scatterplot was made to fit the mantra, being unaggregated and having all marks for the chosen years. acts as the overview, and clicking a point gives details in the bar chart and line chart.

We also followed basic visualization principles from the course lectures. Scatterplots work well for comparing two numerical values, bar charts are effective for comparing categories, and line charts are best for showing trends over time. These examples from the lectures helped us choose chart types that match our data and support the interactions we need**ed.**

Questions:
Our project began with broad questions because it started with the scatterplot which covered all the dataset. As we explored the data and made the other visualizations, our questions became more focused and shaped the design of each visualization.

Initial Questions
- How have Nutrition Supply Trends in the Americas Changed from 2010 to 2022?
- How do nutrient levels compare across countries?
- Which nutrients changed the most between 2010 and 2022?

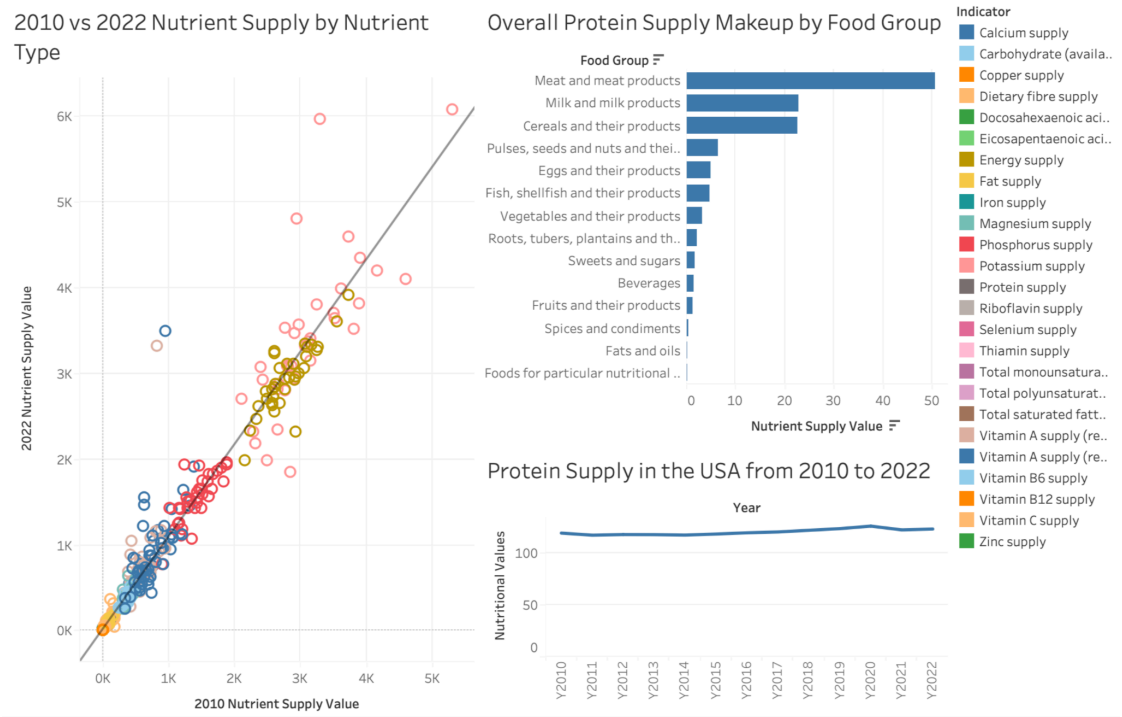
Evolving Questions
- How does a specific country's nutrient supply change across all years?
- Which food groups contribute most to protein levels?

Data:
Our dataset comes from the FAOSTAT Food and Agriculture Organization (FAO) nutritional supply records for countries in North and South America. It includes nutrient values such as protein supply, energy supply, and other dietary indicators across multiple years.

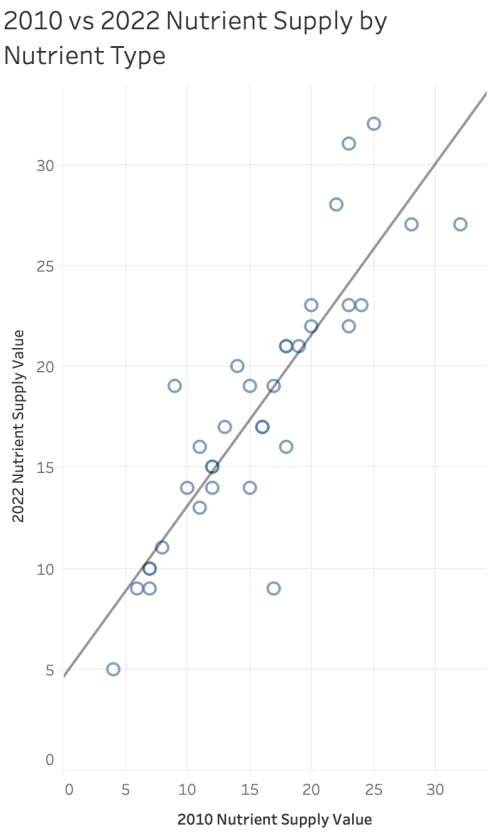
Exploratory Data Analysis:
We started by exploring the dataset to understand which nutrients, years, and countries were included. Simple plots helped us see how nutrient values varied and which indicators changed the most over time. The scatter plot was chosen for the first visualization to better show the Visual Information-Seeking Mantra showing overall changes by country, but not how values changed over time or why certain countries stood out. This led to the line chart for year-to-year trends and the bar chart to break down protein supply by food group. The types of visualizations were kept for this prototype but made more interactive and visually appealing.

Design Evolution:
Our design changed as we explored the dataset and applied the feedback we received. The original scatterplot used many colors to show different nutrient types, but this quickly became cluttered and hard to read. We simplified it by allowing users to choose one nutrient at a time and comparing its 2010 and 2022 values without extra color encoding. This made the overview much clearer.
We also adjusted our second and third visualizations. Instead of having two separate protein-focused charts, we redesigned the line chart so users can select a country and nutrient to see yearly trends. The bar chart still focuses on protein, but now highlights how different food groups contribute to protein supply for a chosen country. These changes created a clearer flow: a broad overview, a detailed country trend, and a breakdown of food groups.

Implementation:
After presenting our initial proposal, we revisited our design based on the feedback provided.The main issues being the second and third visualization which both went into more detail about the protein supply. Both needed the use of interactions and the last visualization needed re thinking of the design and purpose.



The first issue we addressed was the use of too many colors in the indicator. In the original scatterplot, every nutrient type was assigned a different color. which overwhelmed the graphic and made many marks indistinguishable due to overlapping categories. Although we kept the general scatterplot structure, we removed the color-coded indicator to make things clearer.



We updated our prototype to work properly on GitHub Pages by fixing the file organization and correcting how the data was loaded. The dataset was renamed for shortness and the scatterplot code was updated to match the new CSV name, correct column labels, and proper filtering. After these changes, the scatterplot displayed correctly from pages.

The line chart and bar chart scripts were completed later. The line chart lets you select a country and nutrient to see trends over time, while the bar chart shows protein supply by food group for a chosen country. They both use dropdowns for selection.

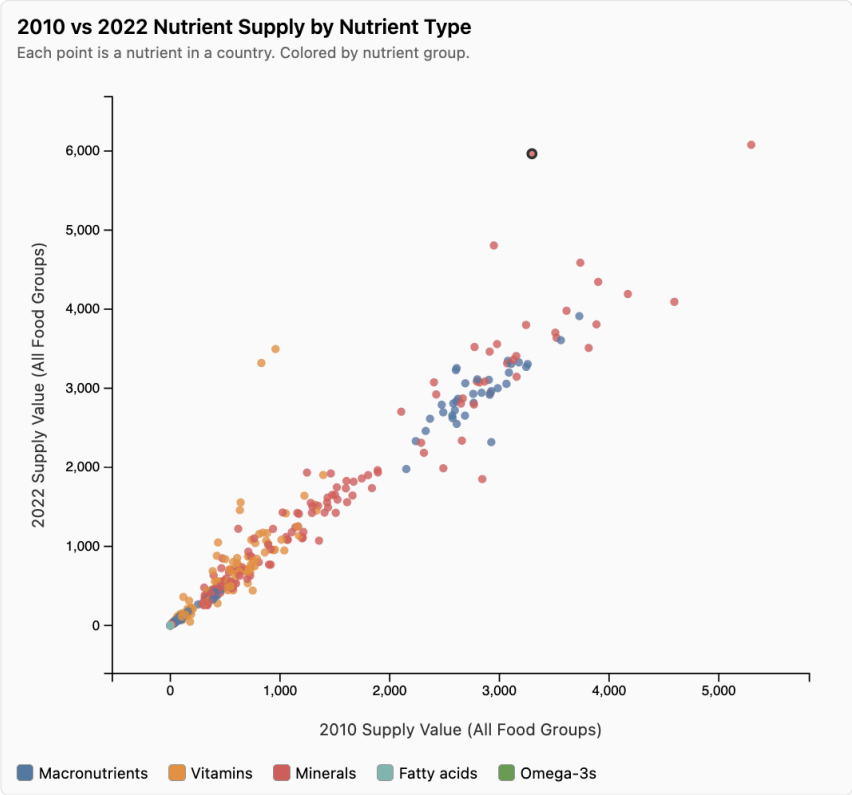
During development for the presentation it was discovered from feedback that our first visualization had become unintentionally aggregated because it used a nutrient dropdown. To address this, the scatterplot was un-aggregated, removing the dropdown and plotting all nutrient–country data points for the chosen years. Color encoding for nutrient groups was later implemented to support comparison across categories.

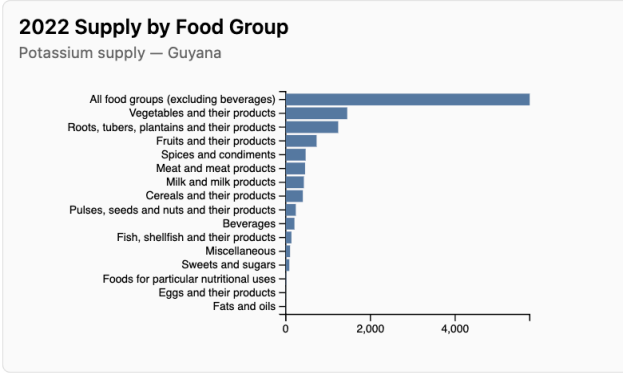
The bar chart and line chart also originally used dropdown menus. They were replaced with direct interactions. Instead of selecting from the drop down menus, clicking a point on the scatterplot will update the other two charts. The selected point is also outlined in black for visibility

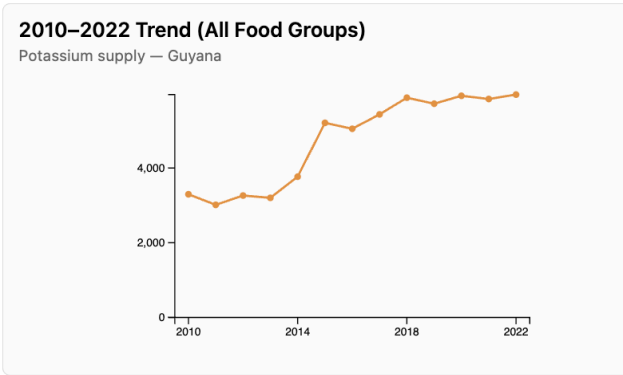
The flow currently works like this:

- Scatterplot: Shows all nutrient values for all countries. When you click a point, it selects that country and the nutrient.
- Bar Chart: Updates to show the 2022 supply by food group for the selected country.
- Line Chart: Updates to show the 2010–2022 trend for the same country and nutrient.

The dashboard has the same chart types as before (scatterplot, bar chart, line chart), but now they are linked and connected without dropdown menus.







Evaluation:
Through the milestones our group was able to better understand how nutrient supply differs across countries and how it changes over time. The three visualizations worked together well: the scatterplot gave a clear overall picture, and clicking on a point showed more details in the bar chart and line chart. This made it easier to explore individual countries and nutrient types during the presentation.

There were some limitations from all the milestones. The original scatterplot used too many colors because they were to every country and was difficult to tell from one another. The second milestone used dropdowns which were not ideal for interactability since you are not able to interact directly with the data.

The updated interaction design for the presentation, removing the dropdowns and replacing them with click-based interactions helped the dashboard feel more direct,

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Overall, the dashboard effectively supported our main goals, but refining the layout, labels, and interaction design would improve usability and polish.

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