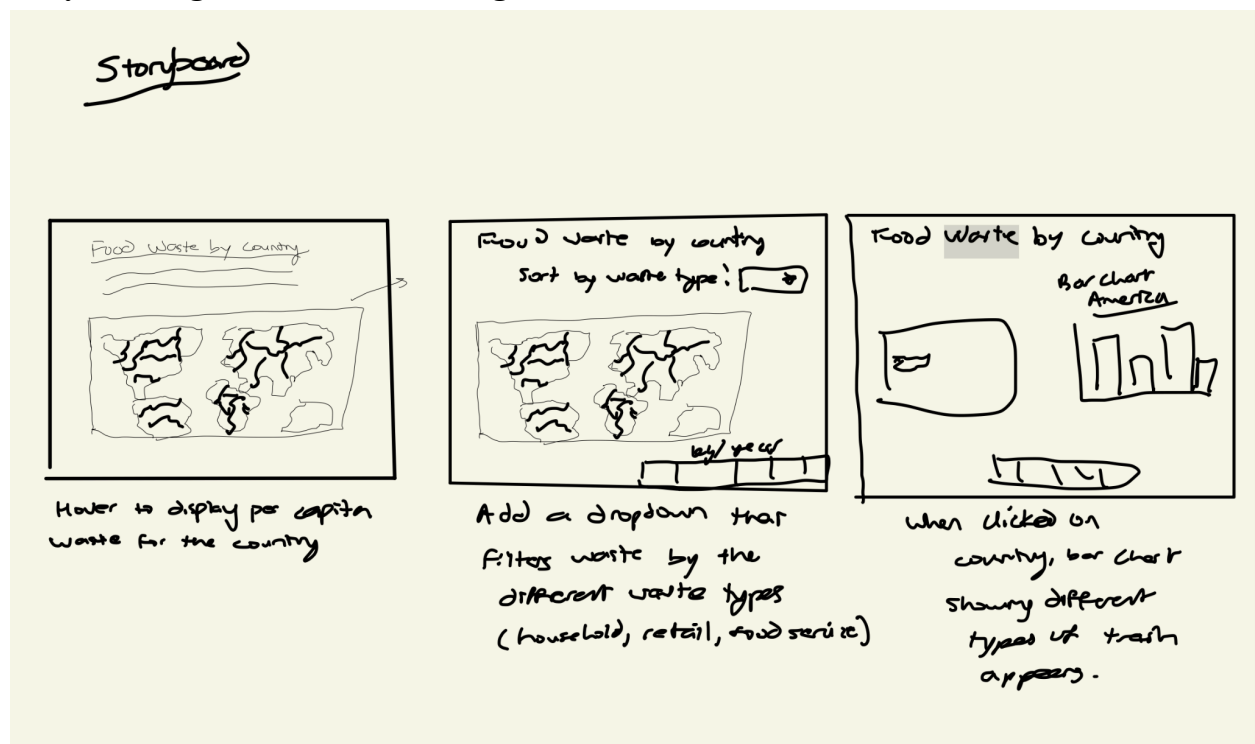


Final Report for HW 2

Data Description and Insights

For this project, I used a dataset that focuses on global food waste across various sectors: household, retail, and food service. It provides food waste estimates in kilograms per capita per year for different countries, allowing me to compare waste distribution worldwide. The key insights I gathered include identifying countries with the highest food waste per capita to inform policy decisions, comparing food waste contributions by sector to guide targeted interventions, and providing interactive exploration of food waste data to raise public awareness and drive behavioral change.

Storyboarding and Interaction Design



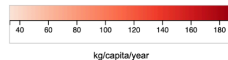
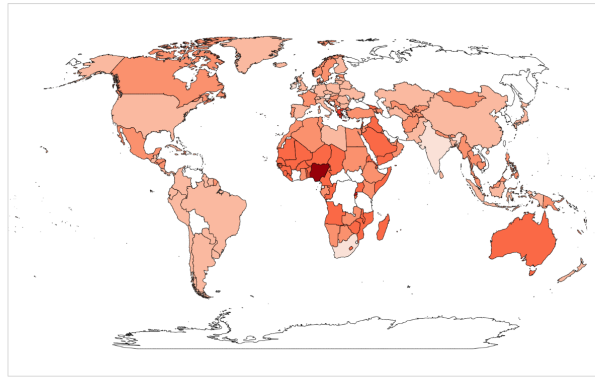
When designing the storyboard, I focused on initially just creating an interactive map that displays food waste data globally, using color coding to indicate the intensity of waste levels. I had the idea to include a dropdown menu to allow users to filter the visualization by total, household, retail, or food service waste. I also planned to implement hover interactions so that users can see specific waste data for each country, and a click function to reveal a breakdown of waste categories in a separate bar chart. After creating a few iterations of my code, I decided to add zooming and panning features to facilitate better navigation because some of the smaller countries were harder to see and select. I chose these interactions to hopefully make the data more accessible and engaging. The dropdown filter provides flexibility, while tooltips and click interactions prevent information overload. Zooming and panning make it easier to explore the data in detail.

Final Interactive Visualization

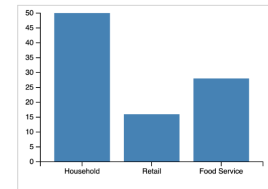
Global Food Waste by Country

This visualization displays the amount of food waste generated by different countries. You can use the dropdown menu below to select a specific type of waste to view, such as household, retail, or food service waste. Hover over a country on the map to see detailed waste data. Click on a country to view a breakdown of its waste by category.

Select Waste Type: Household Waste



India - Waste Breakdown



The final application consists of an interactive world map where countries are color-coded based on food waste levels. When users hover over a country, a tooltip appears showing specific waste values. Clicking on a country updates a bar chart, which breaks down the waste by category. I also included a dropdown menu so users can filter by waste type, including household, retail, food service, and combined waste. Zooming and panning allow for better exploration of the data, making the visualization dynamic and user-friendly.

Development Challenges and Mitigation Strategies

Throughout the development process, I encountered several challenges. One major issue was data granularity, as some countries lacked specific sector-wise waste data, leading to gaps in visualization. Another challenge was choosing the right map projection, as different projection methods balance accuracy and readability in different ways. Additionally, interactive elements like zooming and filtering needed to be optimized to ensure smooth rendering. To address these challenges, I implemented fallback mechanisms such as displaying "No Data" when information was unavailable. I also optimized the D3.js rendering to ensure smooth transitions and efficient interaction handling. Finally, I used a quantized color scale to ensure perceptual clarity without overwhelming users with too much variation.

Development Process and Trade-offs

As I developed the project, I made several changes from my initial storyboard to the final implementation. I also improved the tooltip system with better positioning logic to prevent overlap, and I refined the bar chart so that it only updates when a country is selected. Some trade-offs were necessary during development. I chose a map projection that provides global

coverage while maintaining usability. I adjusted stroke thickness to highlight selected countries more effectively. I also optimized the color scale for accessibility by using a gradient, ensuring clear differentiation without excessive contrast.

Work Breakdown and Contributions

Since I completed this project independently, I was responsible for all aspects of development. I spent approximately 12 hours on map visualization, interaction design, and D3.js implementation. Data cleaning and preprocessing, along with integrating the CSV data into D3.js, took about 1 hour. Storyboarding, UI design, documentation, and report writing required around 5 hours, while debugging, performance optimization, and final integration took another hour.