FINAL PROJECT REPORT

US Foreign Aid Visualization

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Dataset Description

- This dataset provides a structured overview of U.S. foreign aid allocations across countries, regions, sectors, and funding agencies over multiple fiscal years.

- It combines both categorical and quantitative information to support informed analysis of foreign assistance trends and priorities.

- To support clearer analysis and visualization, the original detailed data — which included a wide range of funding agencies and allocation categories — was logically grouped. This helped make the patterns in the data easier to interpret while preserving important details across sectors and regions.

Visualization Tasks

Aim: Explore how the funding amount is distributed among various regions and countries, allocated among different categories and sectors and how different funding agencies impact this distribution.

Tasks

1. Which countries receive U.S. foreign aid?

2. How much foreign aid does each region/country receive relative to others?

3. How is U.S. foreign aid divided among different funding groups?

4. How is U.S. foreign aid distributed across major allocation categories?

5. How do funding groups contribute to different allocation categories, and how can categories be traced back to their funding sources?

6. How are funding groups and allocation categories further broken down into sub-groups and sub-categories to provide a deeper understanding of aid distribution?

Design Evolution

Visualization Design and Development

Our design process began with a comprehensive analysis of the dataset, which includes U.S. foreign aid allocations categorized by country, region, sector, funding agency, transaction type, and fiscal year. To guide our visualization strategy, we classified attributes into categorical (e.g., Country, Region), quantitative (e.g., Amount), and ordinal (e.g., Fiscal Year).

We explored multiple design iterations:

Initial Concept

This approach combined a geographical map with overlaid pie charts to display transaction type distributions. However, this design suffered from visual clutter, scaling issues during zoom, and difficulty comparing values across regions.
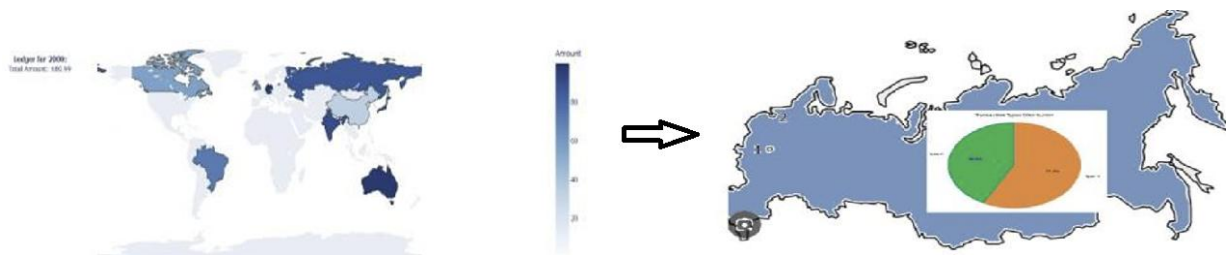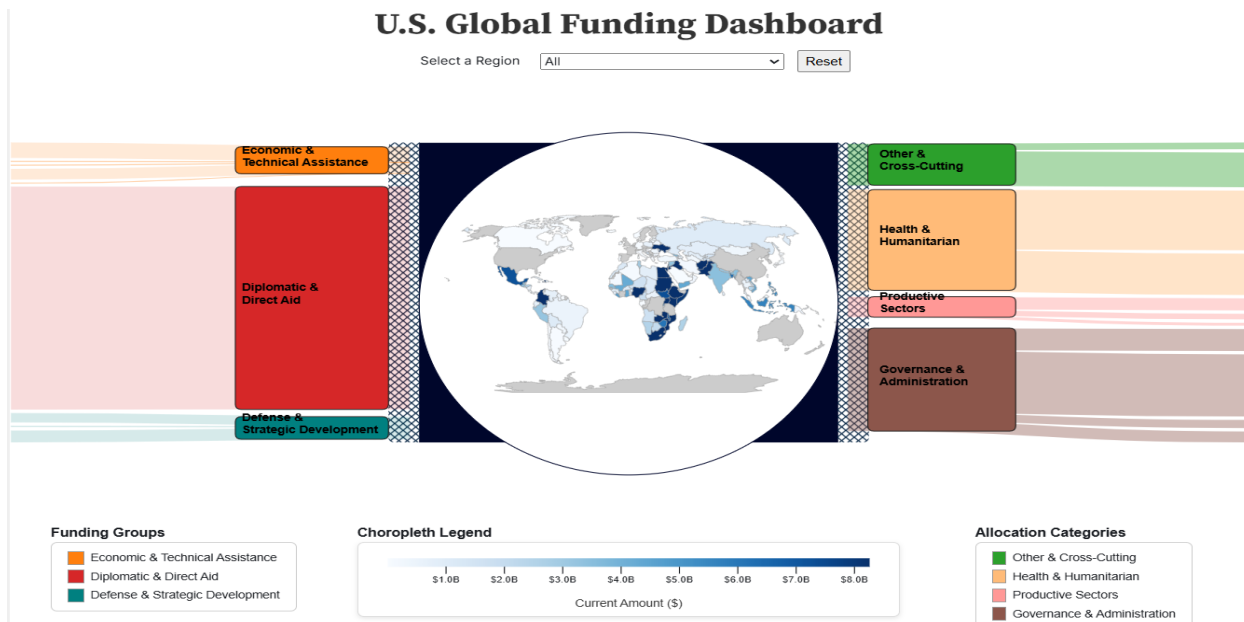

Second Concept

This design featured a central map, an inner pie chart (transaction types), outer arcs (funding categories), and radial bar charts (sector distributions). While it offered a compact multi-faceted view, challenges such as visual density, overlapping elements, and difficulty in comparing radial bar lengths led us to reconsider.
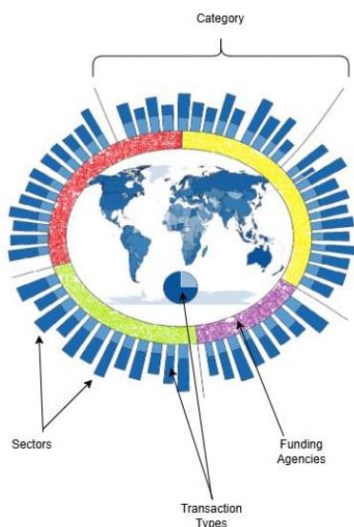
Detailed Description of Visualization:

Our final visualization integrates three coordinated components into a custom dashboard: two Sankey charts (left and right) and a central geo map enclosed in a circular frame. This circular framing was an intentional design choice to evoke the appearance of a globe, reinforcing the global nature of U.S. foreign aid.

Layout and Flow

- Left Sankey Chart: Displays the flow of funds from Funding Agencies to Funding Groups (e.g., Economic, Humanitarian, Health).

- Right Sankey Chart: Breaks down the funding further from Categories into Allocation Types (or other detailed classifications depending on filter).

- Middle Geo Map: Shows a spatial distribution of foreign aid across countries, color-coded based on funding amount. The map responds to filters and zooms in when a region is selected.

This design effectively answers the key question: "How does U.S. foreign aid flow from agencies to categories, and how is it distributed across different parts of the world?"

Functional Elements

- Region Dropdown: Allows users to focus on specific regions (e.g., Sub-Saharan Africa, South & Central Asia). Selecting a region zooms the map to that area and updates both Sankey charts.

- Reset Button: Deselects any filters and returns the dashboard to an aggregated global view.

- Tooltip Interactions: Hovering over nodes or links in any chart provides exact dollar amounts and descriptions, enhancing data exploration without cluttering the interface.

- Legends and Color Scales: Help users understand how funding amounts are encoded through color intensity.

Logical Grouping and Drill-Down

To maintain a balance between overview and detail, we introduced second-level connections in both Sankey charts. For instance:

- Users can see which specific funding agencies fall under broader groups.

- Similarly, on the category side, users can see specific program types or allocation channels within broader funding categories.

This drill-down feature preserves detail without overwhelming the user upfront.

Visual Encoding Choices

We used several marks and encoding channels to present the data clearly:

- Marks: Flows (links in Sankey), areas (countries), and rectangles (Sankey nodes).

- Channels:

  - Color: Encodes funding amounts on the map and category groupings in the Sankey charts. Palette types used include Funding Groups – Categorical (Tableau10), Categories – Categorical (Tableau10), and Geospatial Funding Map – Sequential (Blues).

  - Size/Width: Width of Sankey flows correspond to the funding volume.

  - Position: Horizontal arrangement of charts mirrors the funding flow — left (source), center (geographic distribution), right (destination).

  - Shape: Circular clipping on the map gives a focused, globe-like appearance.

Interactivity for Data Exploration
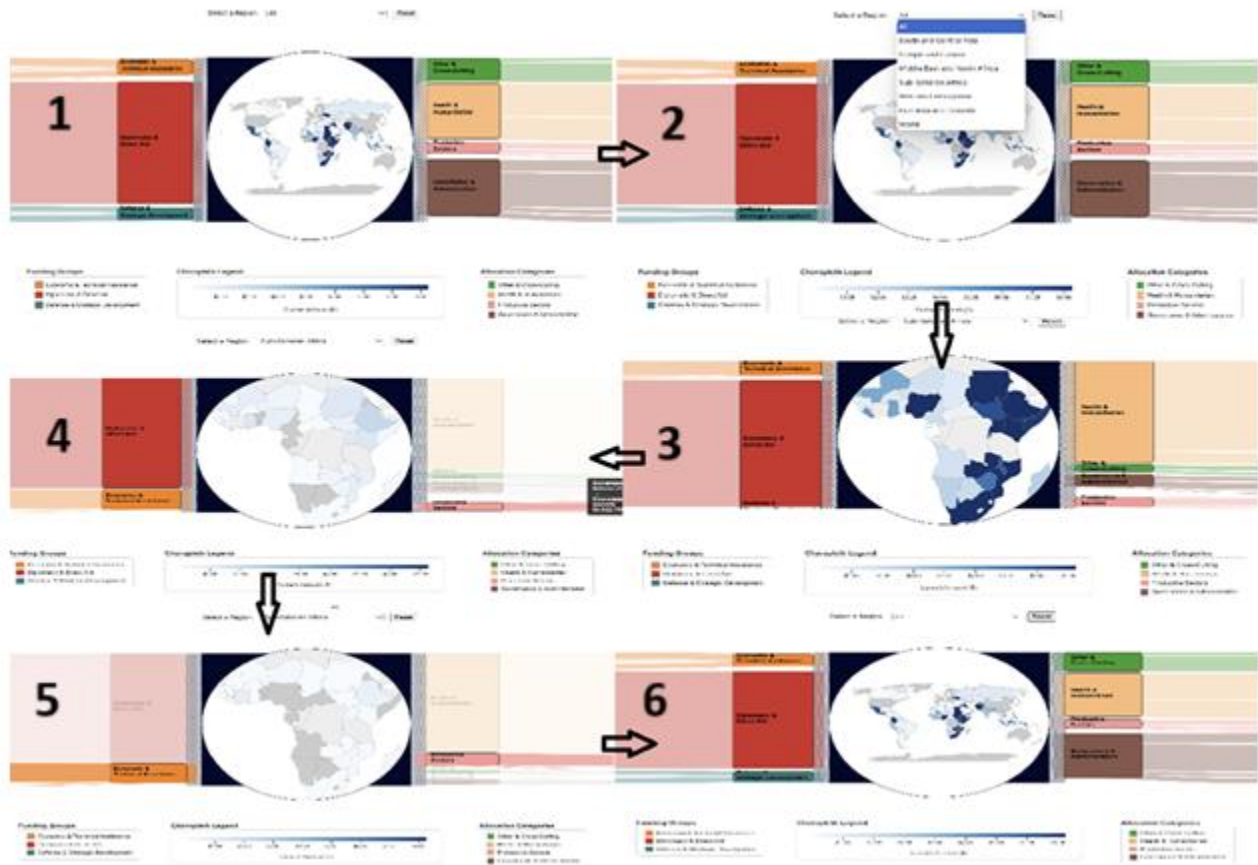
This visualization enables users to explore funding distribution dynamically through a series of intuitive interactions. Below is a walkthrough of an example exploration sequence, as illustrated in the above Figure:

1. **Initial View**: The dashboard loads with a global overview, showing total foreign aid distributions by funding agency (left Sankey), geographic allocation (choropleth map), and spending categories (right Sankey).

2. **Region Selection – Sub-Saharan Africa**: The user selects *Sub-Saharan Africa* from the dropdown. The map zooms in, highlighting the region, and updates to display relative funding intensity among countries—darker shades indicate higher aid levels.

3. **Filtering by Allocation Group**: The user narrows the view to a specific **allocation group**, such as the *Productive Sector*. The map recolors to show only funding related to that group. For example, while South Africa and Ethiopia initially appeared similar in total funding, we now see **Ethiopia receives much more aid in this sector**.

4. **Updated Right Sankey (Allocation Categories)**: The right Sankey chart reflects the filtered data, showing how aid is divided within the selected allocation group. This helps users understand which categories (e.g., Agriculture, Economic Growth) are prioritized.

5. **Left Sankey – Funding Agencies Update**: The left Sankey updates to show only agencies contributing to the current allocation group within the selected region. This allows users to trace which institutions are most active in specific areas.

6. **Agency Group Filter – Economic and Technical Assistance**: Further filtering by agency group (e.g., *Economic and Technical Assistance*) refines the view again. The choropleth map changes, often showing lighter shades or blanks in some countries— **for instance, Angola receives no aid from this group**.

7. **Dynamic Value Comparison**: Hovering over elements such as countries, bars, or flows provides exact funding amounts. This makes it easy to **compare values at a glance** and uncover differences not visible in raw totals.

8. **Reset or Continue Exploration**: Users can reset filters to return to the global view or continue drilling down into other regions, sectors, or agencies—enabling flexible, insight-driven exploration.

Summary

This project visualizes U.S. foreign aid distribution across countries, regions, sectors, and agencies using a rich, interactive dashboard. The final design combines two Sankey diagrams and a central geo map to show how funds flow from agencies to allocation categories, and where they are distributed globally. Key interactive features—such as region selection, filters, and tooltips—allow users to explore both broad patterns and detailed insights. The result is a balanced, user-driven tool for analyzing foreign aid across multiple dimensions.

References

- **CSV Data Source**:
  https://s3.amazonaws.com/files.explorer.devtechlab.com/us_foreign_budget_complete.csv

- **Project Dashboard**: https://observablehq.com/d/71e7acdca5d76e55

- **GitHub Repository**: https://github.com/MSufiyanAG/U.S.-Global-Funding-Dashboard