



## 1. Justification of map flow design

This map was designed with FlowMapper with changes and choices made to the symbology in regions, nodes, and flows. This was done to enhance the readability, emphasize key trade relationships, and show trade dynamics throughout South America.

### Base map/regions:

- A title, “Banana Trade in South America,” was added to clearly indicate the theme and geographic focus of the map.
- The manual classification breaks were tailored to match the range of the Net Flow Ratio variable, which spans from -1 to 1. The chosen breaks (−1 to −0.5, −0.5 to 0, 0 to 0.5, and 0.5 to 1) create a meaningful visual distinction between countries with strong net imports, moderate imports, moderate exports, and strong net exports.
- opacity was increased to make the color differences bolder, and stroke width was thickened to help country borders remain visible beneath overlapping flow lines and node symbols.

### Nodes symbology:

- Manual breaks for the nodes were updated to provide a better distribution across the Total Flow values, which ranged from approximately 450 to over 476,000 tons. This

adjustment allowed smaller trading nations to be represented visually while ensuring that large exporters like Ecuador and Argentina remained prominent.

- The minimum and maximum radius values were modified to balance the visibility of both large and small nodes.
- Stroke width was slightly increased to help outline smaller nodes, making them easier to distinguish against the base map and flow lines.
- The node color was kept black to provide strong contrast, and the legend title was updated to “Total Banana Trade Volume (tons, 2019)” to clearly reflect the data being shown.

### **Flow symbology:**

- The manual breaks for flow lines were refined to better represent the full range of flow volumes, which spanned from near zero to over 240,000 tons. The new breaks (1,000; 10,000; 50,000; 100,000; 250,000) helped highlight small but significant flows, distinguish medium flows, and display the largest flows without overwhelming the map.
- The flow arrows were colored dark green, a visually appropriate choice for agricultural commodities.
- The opacity of the arrows was reduced slightly to improve layering and visibility, especially in areas with overlapping elements.
- Flow width was increased to make thinner flows more noticeable, and stroke width was also adjusted to improve the clarity of arrow outlines.
- The legend title was updated to “Banana Trade Flow (in tons)” to better describe the data visualized.

## **1. Interpretation of flow patterns**

The major banana exporters in this map include Ecuador and Argentina. This is evident in their large node sizes and the number and thickness of outgoing flow lines directed toward neighboring countries. Colombia and Paraguay also play significant roles as secondary exporters, showing high total flows despite having smaller economies. After analyzing more, Brazil and Chile are the largest importers of bananas, particularly Brazil, which receives high-volume flows from various countries. Bolivia and Uruguay also serve as moderate importers, as reflected in their node sizes and incoming flows.

The general flow pattern follows a clear north-to-south direction. Many banana exports originate in the northwestern part of the continent, especially Ecuador and Colombia, and are sent southward to countries like Argentina, Chile, and Uruguay. There are also strong regional

exchanges in the southern cone, suggesting a network of inter-country trade between Argentina, Bolivia, and neighboring nations.

There's a clear connection between trade roles and the map's symbology. Darker orange nodes indicate net exporters, while lighter orange nodes mark net importers. This matches real-world patterns: countries with strong export roles usually have ideal growing conditions for bananas, whereas larger economies or those with less suitable land import to meet demand. By aligning flow direction, node size, and choropleth color, the map presents a coherent picture of trade dynamics. Combining a diverging choropleth base, variable-sized nodes, and scaled flow arrows lets the map convey complex banana-trade patterns without clutter. Custom symbology for each layer highlights key routes, shows supply and demand relationships, and tells a clear cartographic story of bananas moving across South America.