# Project Report: COVID-19 Global Analysis using Tableau

**Author:** Sunehra Tazreen
**Tool:** Tableau
**Dataset:** Global COVID-19 confirmed cases (as of Sept 3rd, 2021)

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## 1. Objective

This project analyzes the global spread of COVID-19 as of September 3rd, 2021 using **interactive Tableau visualizations**. The aim is to:

- Identify countries with the highest confirmed cases.
- Compare regions (with a focus on South America).
- Examine the role of population size in explaining COVID-19 spread.

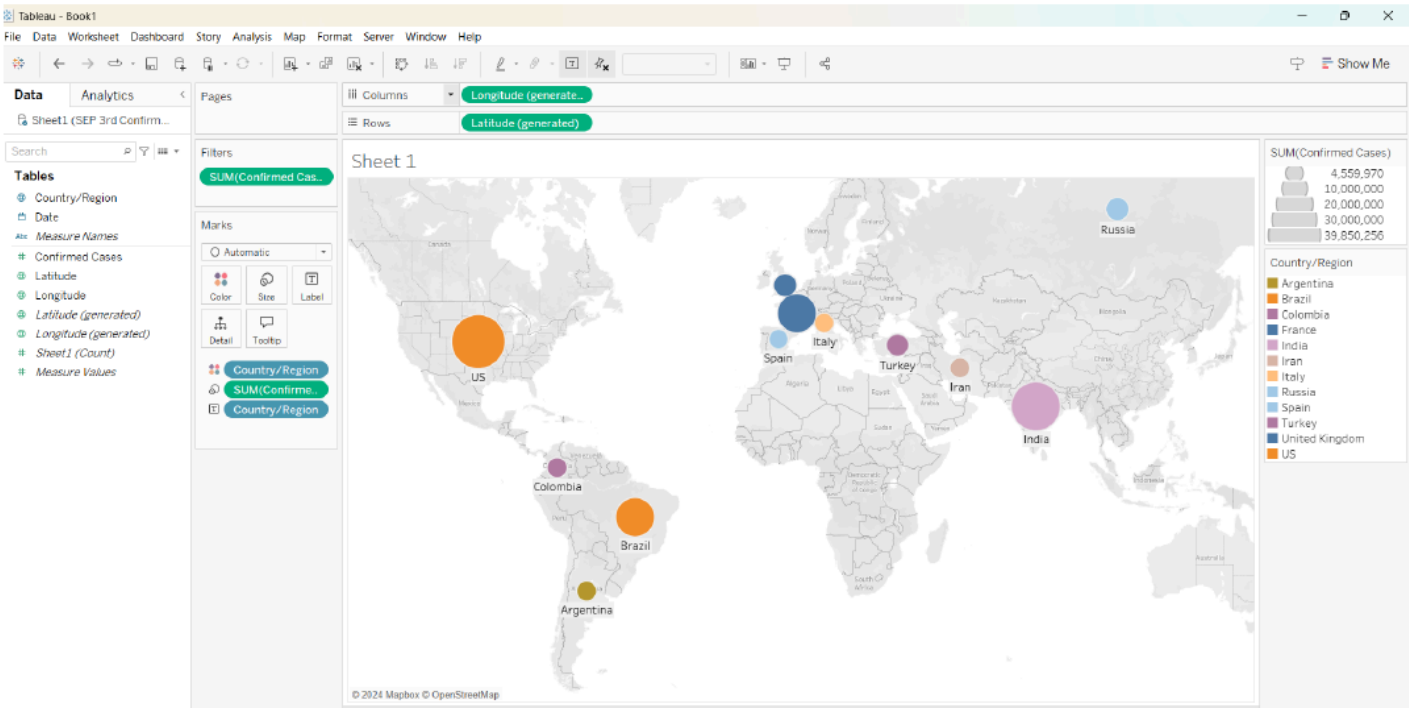
The findings provide insights into **geographic risk factors, population vulnerability, and global health patterns**, which can inform policymakers and researchers.

## 2. Analysis & Findings

### Part A – Top 12 Countries by COVID-19 Cases (Sept 3rd, 2021)

**Reasoning:** Identifying the countries with the largest case counts highlights the global epicenters of the pandemic.
**Finding:** The United States, India, and Brazil consistently reported the highest numbers, followed by Russia and Mexico.
**Impact:** This visualization shows which countries required the largest-scale interventions (vaccine distribution, healthcare resources).

➡️ *[Insert Tableau Map – Top 12 Countries]*

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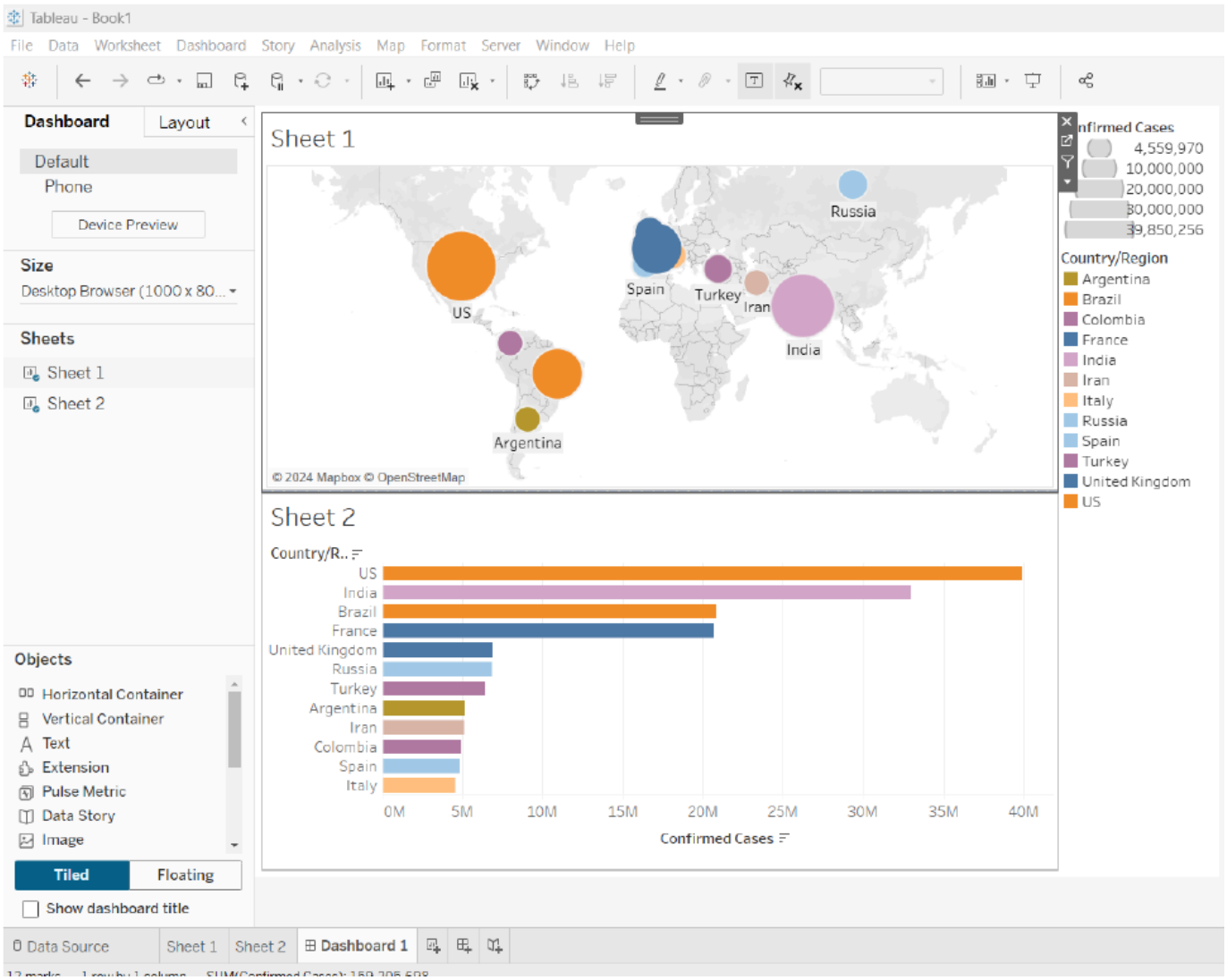
## Part B – Comparative Ranking of the 12 Countries

**Reasoning:** A bar chart allows clear comparison across the top 12 countries.
**Finding:** The U.S. leads by a wide margin, followed by India and Brazil. Countries like the U.K. and Turkey rank lower but still within the top 12.
**Impact:** Ranking reveals **relative severity**, helping prioritize global collaboration and aid distribution.

➡️ *[Insert Tableau Bar Chart – Top 12 Countries in Descending Order]*

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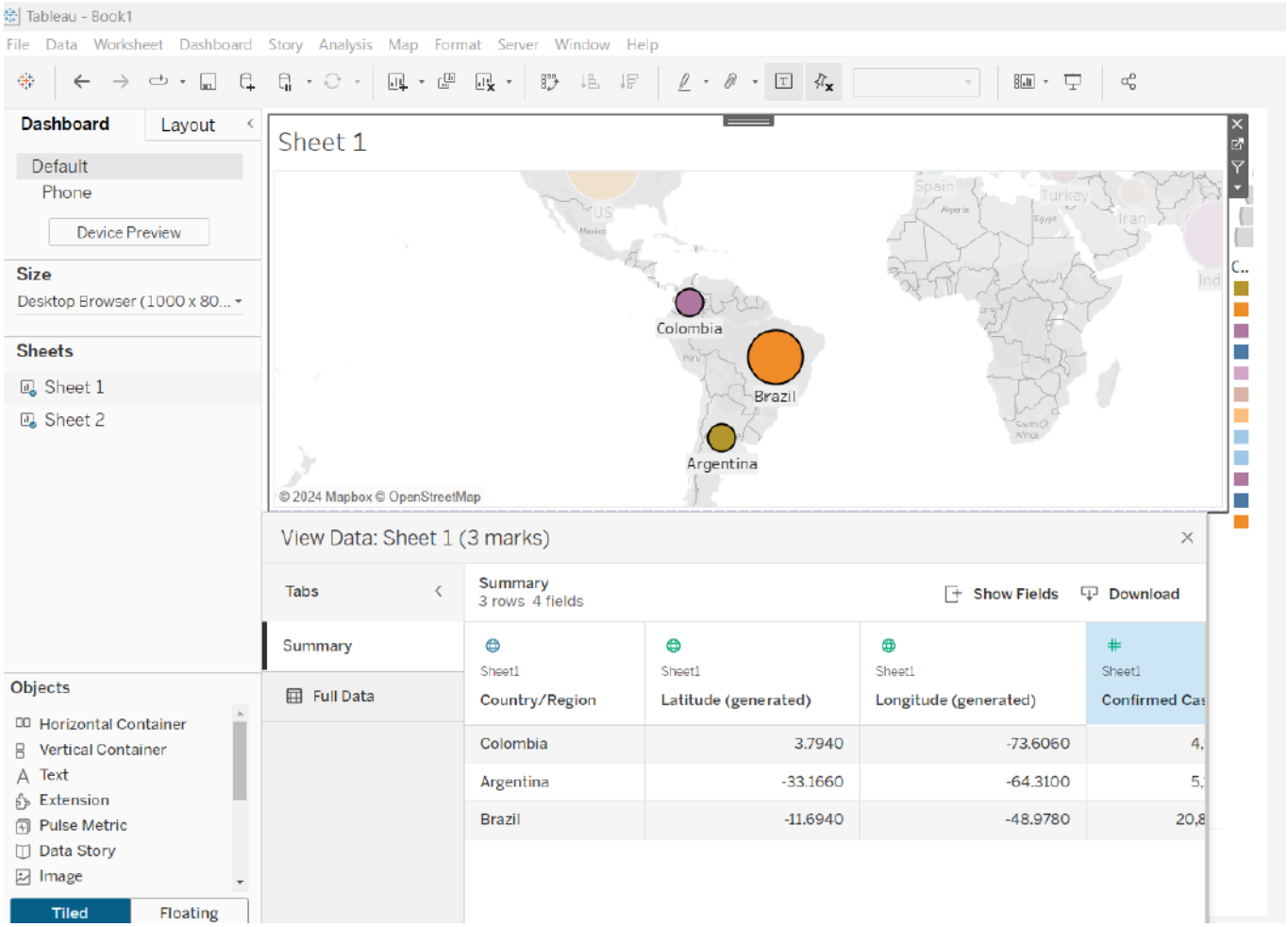
## Part C – South American Hotspots

**Reasoning:** Regional analysis highlights local patterns. South America was a major epicenter during several COVID-19 waves.
**Finding:** Brazil, Argentina, and Colombia recorded the highest cases in South America on the given date.
**Impact:** These findings explain **regional healthcare strain** and justify stronger international aid efforts in South America.

➡️ *[Insert Tableau Filtered Map – South America]*




## Part D – Population vs. Case Counts

**Reasoning:** Investigating whether population size drives case counts helps evaluate if COVID-19 spread is proportional to population or influenced by other factors.
**Finding:** While high-population countries (India, U.S., Brazil) appear in the top 10, others like Nigeria, Pakistan, and Bangladesh show **lower relative case counts** despite large populations.
**Impact:** This suggests that **public health policies, vaccination rates, and containment strategies** play a more decisive role than population size alone.

*Between January 2020 and September 2021, several of the 10 most populous countries ranked among the 12 countries with the highest number of confirmed COVID-19 cases. Specifically, the United States, India, Brazil, Russia, and Mexico were consistently among the hardest hit. However, populous countries like China, Indonesia, Nigeria, Pakistan, and Bangladesh had lower rankings in terms of confirmed cases.*

## Conclusion

This project demonstrates the use of Tableau to:

- Identify global COVID-19 hotspots.
- Compare regions and demographic influences.
- Visualize trends for **data-driven public health decisions**.

The analysis reveals that **population alone does not explain infection rates**; government response and healthcare infrastructure strongly influenced outcomes.

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## Skills Demonstrated

- Data Cleaning & Filtering in Tableau
- Mapping & Geospatial Visualization
- Comparative Bar Chart Analysis
- Regional Filtering & Drill-Downs
- Public Health Data Storytelling

## Part 2 – Dynamic Spread of COVID-19 (Jan 2020 – Sept 2021)

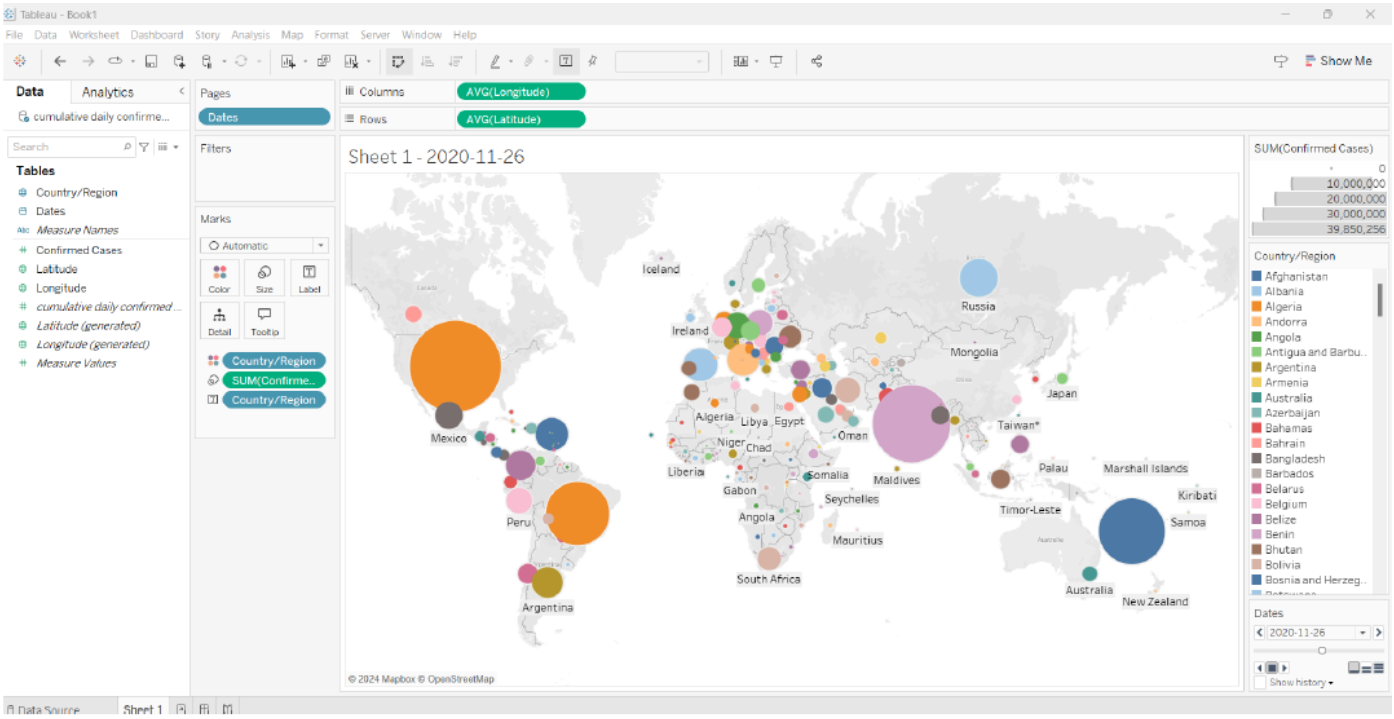
### 2.1 – Dynamic Map of Global Spread

**Reasoning:** A dynamic map reveals how COVID-19 cases evolved over time, allowing us to compare the **speed of spread across countries and continents**.
**Finding:**

- Initial cases were concentrated in China (Jan–Feb 2020).
- By mid-2020, outbreaks rapidly expanded in Europe and the U.S.
- The Delta variant surge in 2021 drove massive increases in India, Brazil, and the U.S.
  **Impact:** Understanding the timeline of spread highlights **epidemiological waves** and shows which countries faced **early vs. delayed exposure**, guiding preparedness

planning.

➡️ *[Insert Tableau Dynamic Map – Jan 2020 to Sept 2021]*

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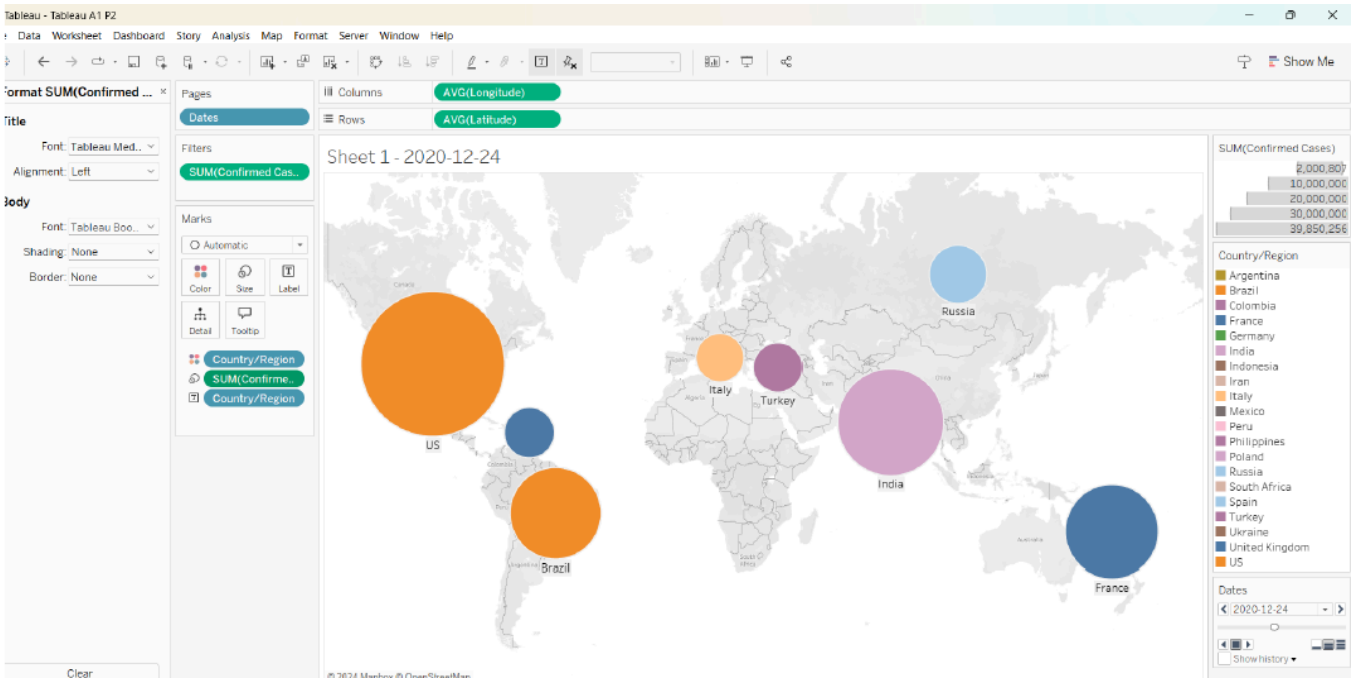
## 2.2 – Countries Reaching 2 Million Cases Earliest

**Reasoning:** Identifying countries that hit **2M confirmed cases first** highlights early epicenters and their health system strain.

**Finding:** The U.S., India, Brazil, and Russia were among the earliest countries to cross the threshold.

**Impact:** This analysis emphasizes where **hospital capacity and vaccine rollouts were most urgent**, showing how early case surges shaped global policy.

➡️ *[Insert Tableau Map/Filtered Table – First 8 Countries to Reach 2M Cases]*

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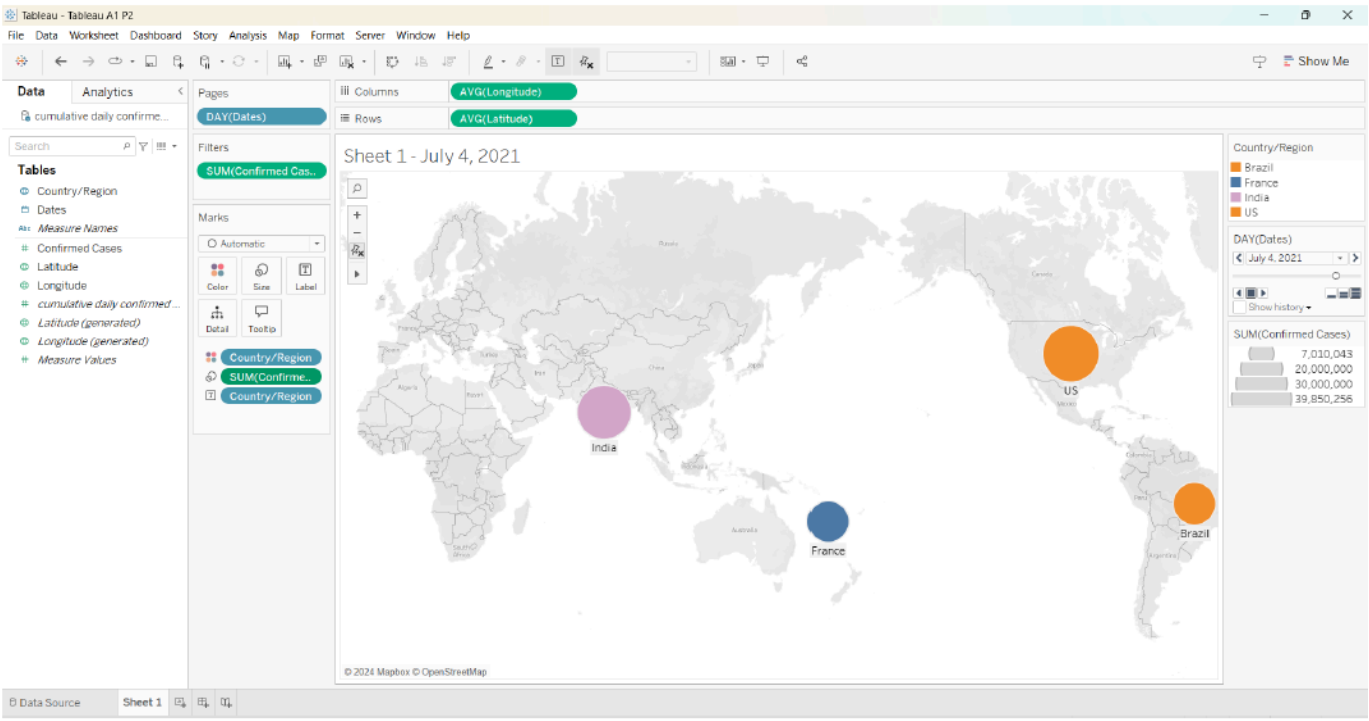
## 2.3 – Countries Reaching 700,000 Cases Later

**Reasoning:** Identifying countries that were **slower to cross 700K** cases reveals delayed spread or stronger containment policies.
**Finding:** Several smaller or more isolated countries (e.g., Australia, Canada) crossed the threshold much later than global epicenters.
**Impact:** This contrast demonstrates how **geography, lockdown strategies, and population density** affected the pandemic's timeline.

➡️ *[Insert Tableau Map/Filtered Table – Last 4 Countries to Reach 700K Cases]*

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## 2.4 – Spread Rate in 7 Largest Countries

## Reasoning

Comparing COVID-19 spread in the **7 largest countries (Russia, Canada, U.S., China, Brazil, Australia, India)** during two key phases — the **early pandemic (Jan–Feb 2020)** vs. the **Delta surge (Aug–Sep 2021)** — highlights how the virus evolved and how public health strategies influenced outcomes.

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## Findings

**Early Pandemic (Jan–Feb 2020):**

- **China** was the global epicenter, rising from ~9,800 to ~80,000 cases in two months.
- **U.S., India, Brazil, Russia, Canada, Australia** all had very low case counts (fewer than 100).
- The virus was still contained outside of China.

**Delta Variant Surge (Aug–Sep 2021):**

- **U.S.**: Over **7 million new cases** in just two months, becoming one of the worst-hit nations.
- **India**: Over **5 million new cases**, showing vulnerability after the devastating second wave.
- **Brazil**: ~2.1 million new cases, confirming its status as a global epicenter.
- **Russia**: ~3.2 million cases, major regional outbreak.
- **Canada**: ~165,000 cases, relatively lower but still significant compared to 2020.
- **Australia**: Sharp rise to **100,000 cases** after initially keeping numbers low.
- **China**: Fewer than **1,500 cases**, reflecting strict containment policies.

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### Impact

- Shows that **population size alone does not predict spread** — policies, containment, and healthcare infrastructure were more decisive.
- Highlights how **countries that initially avoided large outbreaks (Australia, Canada)** faced delayed but sharp surges later.
- Provides a **contrast in pandemic phases**: from concentrated outbreaks in 2020 (China) to widespread global surges in 2021 (U.S., India, Brazil, Russia).
- Demonstrates the **impact of new variants** like Delta on global case spikes.

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## Summary of Part 2

This part shows that **speed and scale of COVID-19 spread widely across countries**, with some nations experiencing **rapid early surges** (U.S., India, Brazil), while others managed to **delay or suppress outbreaks** (China, Australia).

These insights are crucial for **future pandemic preparedness**, as they highlight the importance of **timely interventions, vaccination campaigns, and containment strategies**.

# Part 3 – Logarithmic Curve Analysis of Daily New Cases (12 Countries, 6 Continents)

## 3.1 – Daily New Cases Using Logarithmic Scales

**Reasoning:** Using logarithmic scales makes it possible to compare **COVID-19 waves across countries of different sizes** on the same scale. This reveals not just absolute case counts, but also **relative growth trends** and **wave patterns**.

**Finding:**

- The U.S. and India showed the steepest and most frequent waves.
- China remained relatively flat after early 2020 due to strict containment.
- European countries (Spain, France) displayed multiple distinct waves.
- African countries (Egypt, South Africa) had smaller but visible wave patterns.
- Australia and New Zealand showed delayed but sudden spikes.

**Impact:** These comparisons reveal **how pandemic timing varied by region** and highlight the role of containment policies and vaccination in altering case trajectories.

➡️ *[Insert Tableau Line Chart – Daily New Cases, Logarithmic Scale]*

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## 3.2 – Wave Analysis by Continent

**A. Number of Waves Identified:**

- **North America (U.S., Canada):** 4 major waves, with the Delta variant driving late surges.

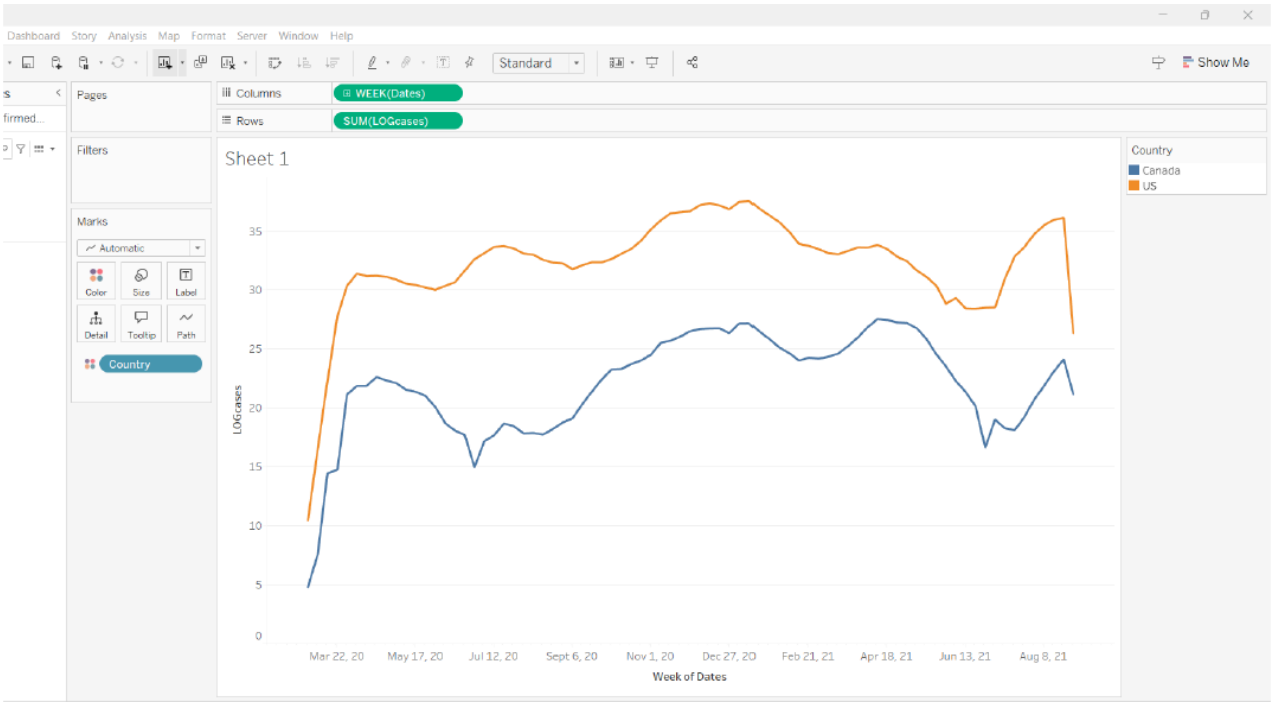


**Fig: North America**

A. The first wave: March 1, 2020 to April 19, 2020 approximately

Second wave: June 28, 2020 to Jan 10, 2021 approximately

Third wave: June 07, 2021 to August 22, 2021

B. US all time had more cases than Canada did and the trend in rise and fall of cases are similar for the two countries over time

C. According to the line chart, the prediction would be decreasing number of new cases over the next three months

- **South America (Brazil, Argentina):** 3–4 waves, high intensity due to less containment.

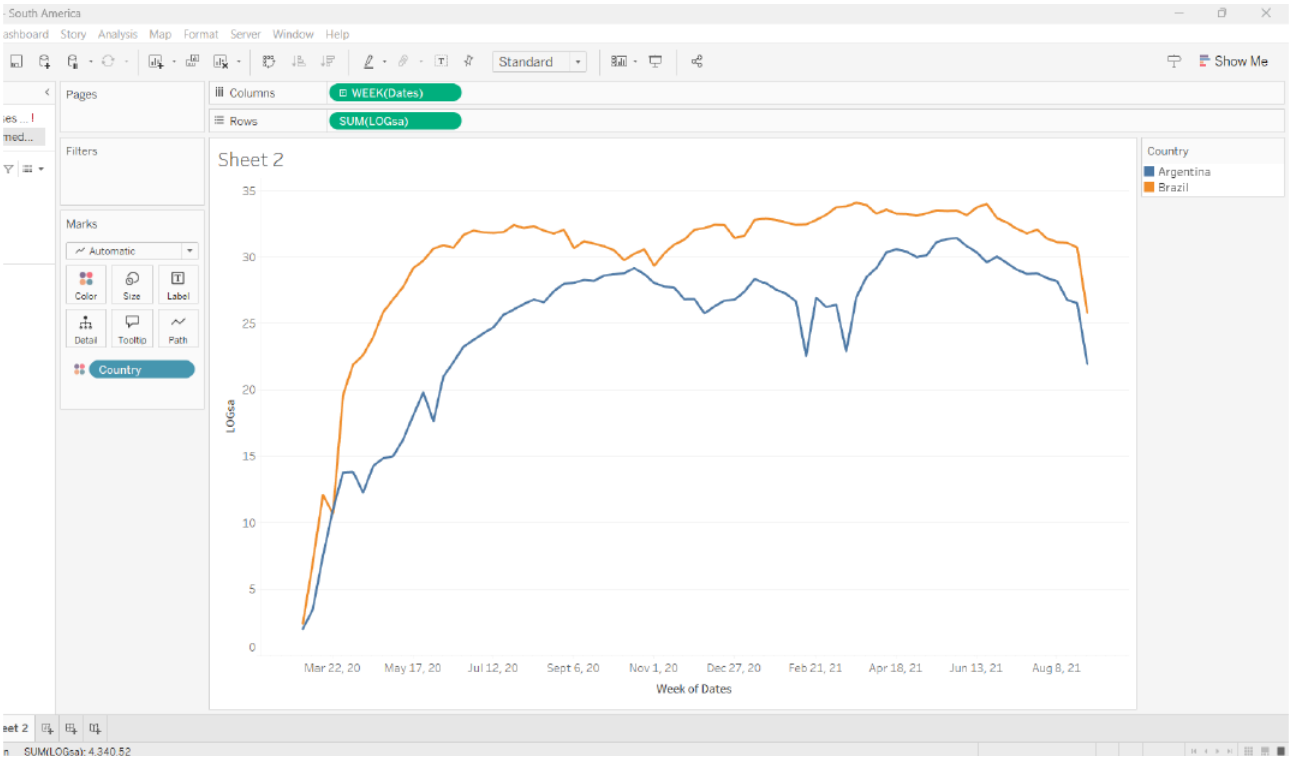


**Fig: South America**

A. First Wave: April 12, 2020 to Oct 18, 2020 - increasing trend

Second wave : Oct 18, 2020 to May 30, 2021 - fluctuating trend

Third wave: May 30 2021 to August 29, 2021 - declining trend

B. The two countries have similar pattern with Brazil almost always having higher number of cases than Argentina

C. According to the pattern, I would predict the cases to drop for both countries overall for the next three months overtime

- **Europe (Spain, France):** Multiple waves (4–5), with frequent fluctuations.

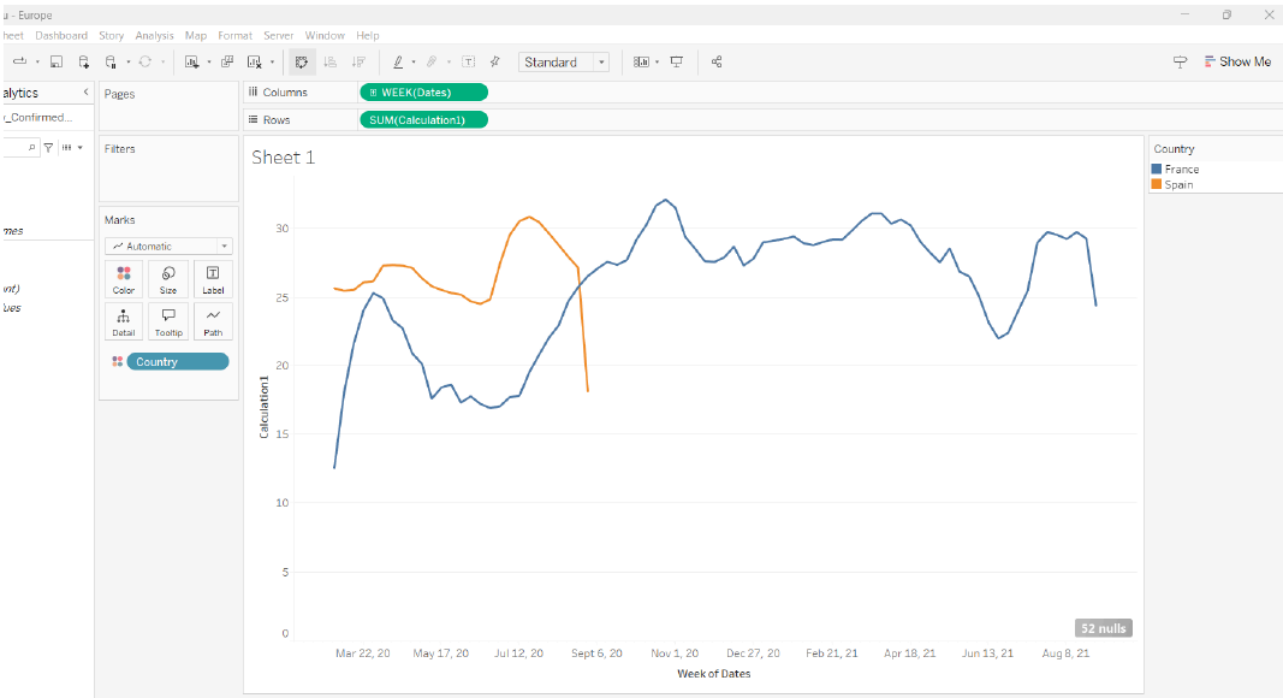


**Fig: Europe**

A. For Spain, there was a rapid drop in July and August 2020. For France, there was a sharp rise in March 2020, following a drop between March and June 2020 and then an increasing trend until October 2020, then it fluctuates and drops again in May and June 2021, then increases until July and again drops sharply

B. Two countries have different patterns

C. According to the pattern, the trend might be declining or fluctuating over the next three months

- **Africa (Egypt, South Africa):** 3 waves, smaller scale but aligned with global surges.

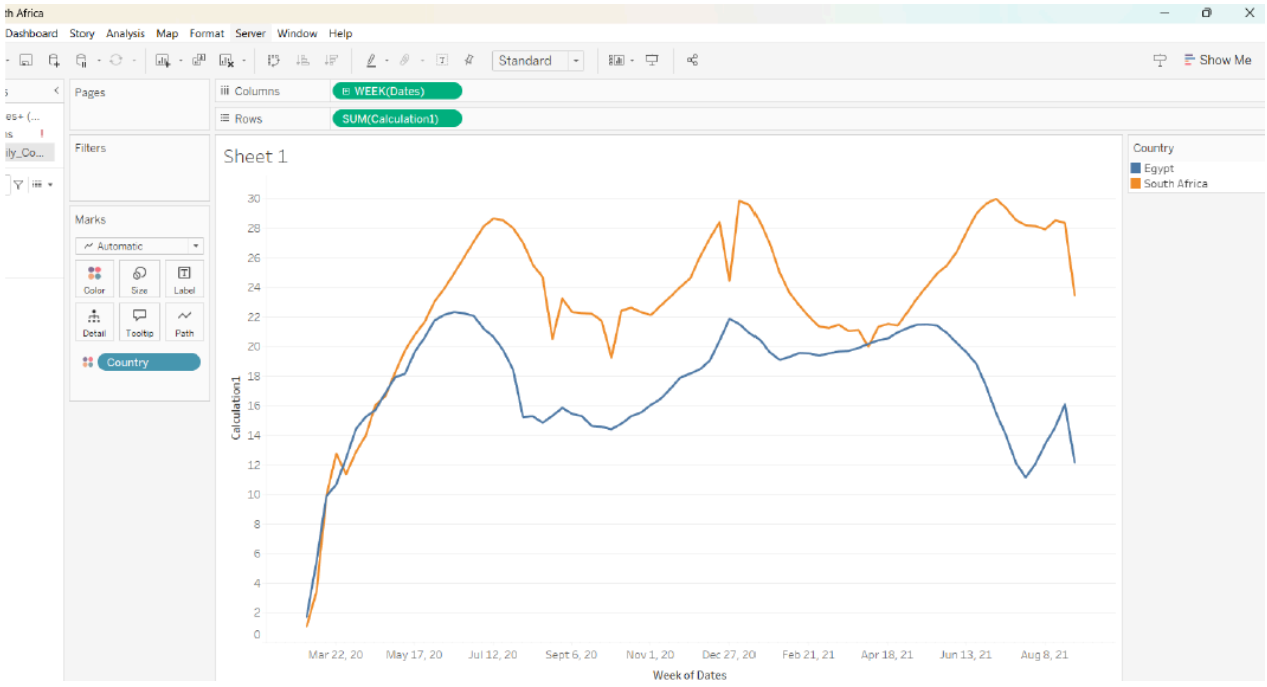


**Fig: Africa**

A. First wave: there was a sharp increase between March to July 2020

Second wave: Between August and December 2020, there was a fall and then a steady rise

Third wave: Between July and August 2021, there were fluctuations with an overall drop in the cases

B. Both countries have similar pattern over the period, with minor differences during some weeks

C. According to the pattern, the trend for next three months in unpredictable, it might continue declining and then fluctuate

- **Asia (India, China):** India had 3 waves (largest in Delta surge), China remained mostly flat after the initial outbreak.

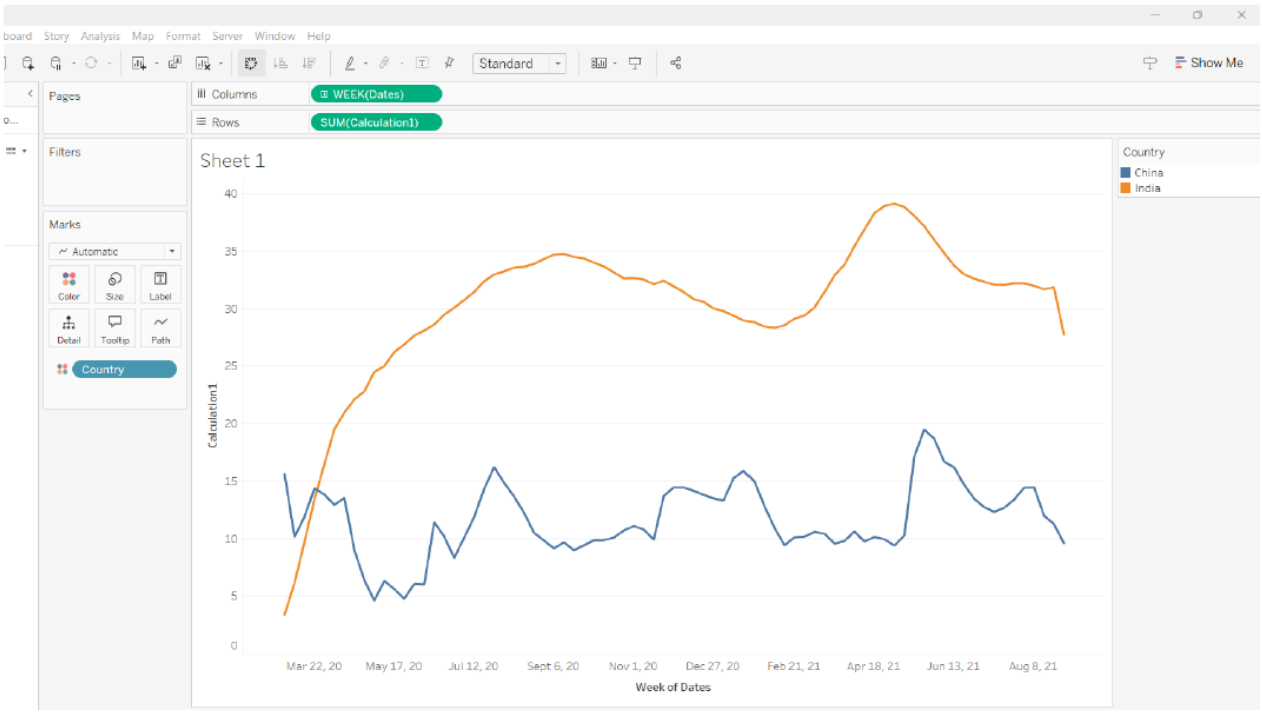


**Fig: Asia**

A. For India, there was a steady increase from March to September 2020 and then

decrease from September to February 2021, following a rise until May 2021 and then a drop

For China, the overall trend in fluctuating, with a sharp drop in April 2020 and August 2020, and a sharp rise in May 2021

B. The overall trend for each country in different, India more cases than China March 22nd onwards and the pattern is much more stable compared to a very fluctuating trend for China, however, both countries experience drop May 2021 onwards

C. According to the pattern, the trend is predicted to be decreasing over the next three months for both countries

- **Australia/New Zealand:** Delayed waves with sharp spikes in late 2021.

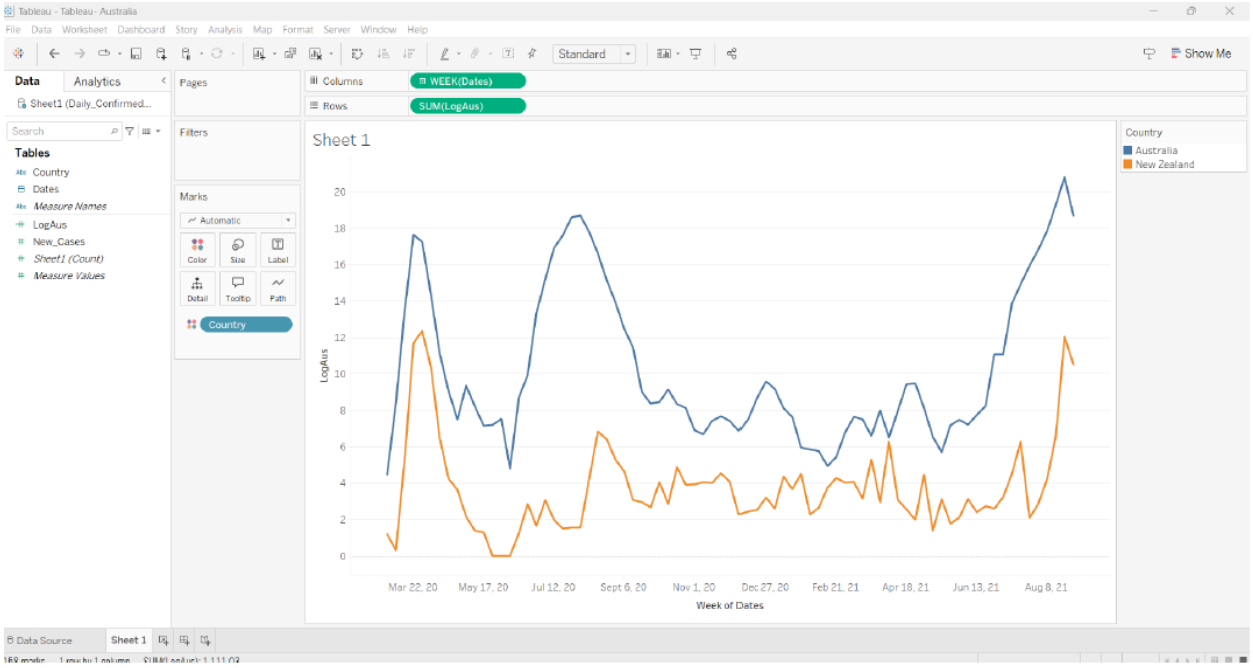


**Fig: Australia**

A. Both countries have a sharp rise in March 2020 and then a drop until June 2020, Australia had a sharp increase from June to August 2020, both countries had fluctuating trends in the following months with a sharp increase during months of July to August 2021

B. The pattern for both countries are very similar over the period of time

C. As per the, data, the trend might be fluctuating over the next three months for both countries, it is pretty unpredictable

**B. Country Comparisons:**

- Countries within the same continent had different **timings and magnitudes**.
- Example: The U.S. vs. Canada → both had waves, but the U.S. peaked much higher and earlier.

**C. Predictions Based on Past Behavior:**

- **U.S. & India:** Likely to experience recurring high waves if containment is relaxed.

- **China & New Zealand:** More likely to keep future spread minimal due to strong restrictions.

- **Europe & South America:** Vulnerable to additional waves due to frequent surges in past cycles.

**Impact:** This predictive exercise demonstrates how **historical wave behavior** can inform **public health forecasting and preparedness**.

➡️ *[Insert Tableau Comparative Line Charts – by Continent]*

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## Summary of Part 3

The logarithmic analysis revealed that **COVID-19 spread was not uniform across countries or continents**.

- Some nations experienced **frequent, intense waves** (U.S., India, Brazil).

- Others maintained **prolonged low case counts** (China, New Zealand).

- Europe and South America showed **frequent instability**, while Africa had **smaller but parallel surges**.

This analysis underscores the **importance of policy decisions, healthcare systems, and regional contexts** in shaping pandemic outcomes.