CLIMATE CHANGE

TABLEAU PROJECT

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CLIMATE CHANGE PROJECT(TABLEAU PART)

Since this is the last part of SQL+TABLEAU CLIMATE CHANGE analysis project you need to go through the Roadmap and previous SQL part to get the backdrop of this project. We are directly jumping into the timeline and will start this presentation explaining each and everything along the way we progress

IF want to checkout the roadmap kindly refer to this
LINK: CLICK HERE (ROADMAP OF THE PROJECT)
IF want to checkout SQL part kindly refer to this
LINK: CLICK HERE (SQL PART OF THE PROJECT)

1 CHOOSING THE FILE TO MAKE DASHBOARD

main_climate_change

This is the combined data made in SQL by combining 7 different dataset using UNION

Climate Change Dataset: Column Descriptions

Record ID

A unique identifier assigned to each individual climate data record.

Date

The specific date when the climate observation was recorded.

Geographic Columns

Country

The nation where the climate data was collected.

City

The specific urban location where the data was gathered.

Climate and Environmental Metrics

Temperature (°C)

Measurement of the ambient air temperature in degrees Celsius.

Humidity (%)

The amount of water vapor present in the air, expressed as a percentage.

Precipitation (mm)

The total amount of rainfall or water equivalent measured in millimeters.

Air Quality Index (AQI)

A numerical scale that indicates the level of air pollution and potential health risks.

Extreme Weather Events

Significant and unusual meteorological occurrences such as hurricanes, heatwaves, or droughts.

Classification and Contextual Columns

Climate Classification (Koeppen)

A scientific system for categorizing global climate types based on temperature and precipitation patterns.

Climate Zone

A broad classification of the ecological climate characteristics of a specific region.

Biome Type

A large-scale biological community defined by its distinctive plant and animal species and environmental conditions.

Meteorological Columns

Heat Index

A combined measure of air temperature and relative humidity that represents how hot it actually feels.

Wind Speed

The rate of air movement measured at the location.

Wind Direction

The compass direction from which the wind is blowing.

Season

The specific time of year when the data was collected.

Impact and Vulnerability Columns

Population Exposure

The number of people potentially affected by the observed climate conditions.

Economic Impact Estimate

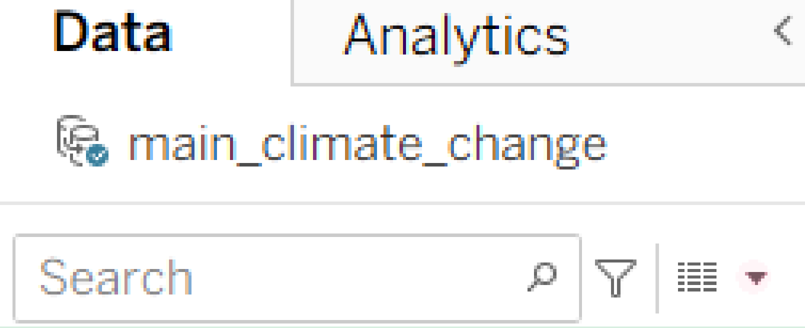
A monetary valuation of the potential economic consequences related to the climate conditions.

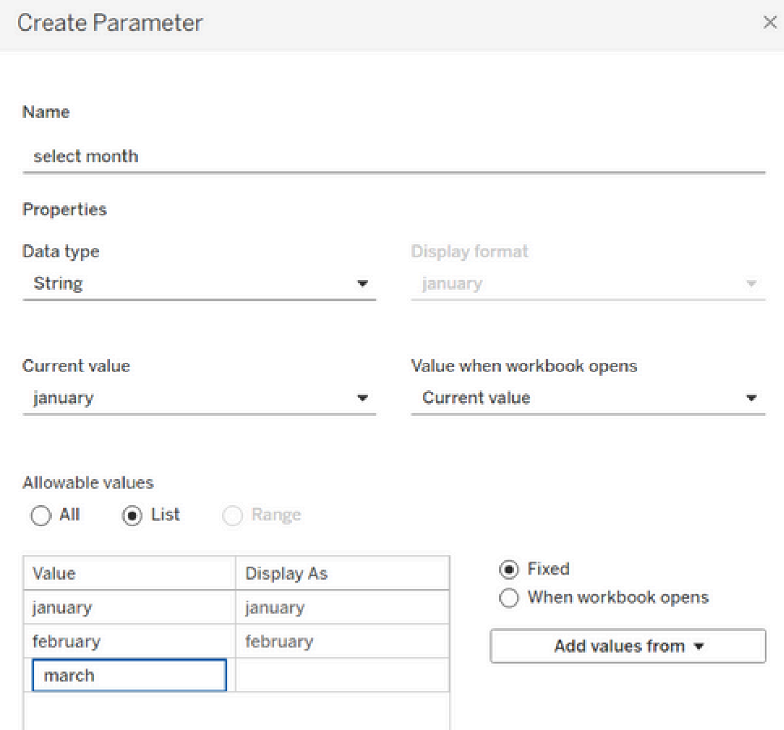
Infrastructure Vulnerability Score

A numerical rating that assesses the potential risk and susceptibility of infrastructure to climate

2 GETTING DONE WITH VISUAL CARDS

Make a parameter based of which one can select whichever month they want to see for doing this go the left hand side data panel and u can see a inverted small arrow click on it and select parameter





Create a parameter like this and save

Then Create calculated column by this following step

STEP 1- CALCULATED COLUMN NAME Count of EWE

IF [Extreme Weather Events] <> "None" THEN 1 ELSE
0
END

STEP 2- CALCULATED COLUMN NAME Current Month EWE

IF DATENAME('month', [Date]) = [Select Month] THEN
[Count of EWE]
END

STEP 3- CALCULATED COLUMN NAME Previous Month EWE

IF DATENAME('month', [Date]) =
case [Select Month]
WHEN 'January' THEN 'December'
WHEN 'February' THEN 'January'
WHEN 'March' THEN 'February'
WHEN 'April' THEN 'March'
WHEN 'May' THEN 'April'
WHEN 'June' THEN 'May'
WHEN 'July' THEN 'June'
WHEN 'August' THEN 'July'
WHEN 'September' THEN 'August'
WHEN 'October' THEN 'September'
WHEN 'November' THEN 'October'
WHEN 'December' THEN 'November'
END
THEN [Count of EWE]
END

After step 3 create a new sheet and do the rest thereon

Month of D..	Count..	Previ..	Curre..
January	266.00		
February	233.00		
March	268.00		
April	233.00		
May	264.00		
June	238.00		
July	254.00		
August	273.00		
September	248.00		
October	261.00		
November	227.00	227.00	
December	258.00		258.00

STEP 4- CALCULATED COLUMN NAME % Difference EWE

(SUM([Current Month EWE]) - SUM([Previous Month EWE])) / SUM([Previous Month EWE])

STEP 5- CALCULATED COLUMN NAME Bad Percentage EWE

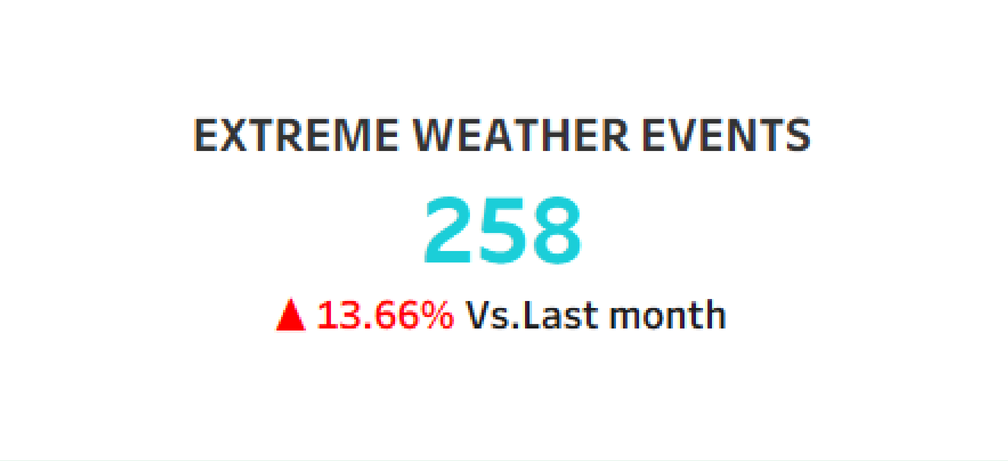
IF [% Difference EWE] > 0 THEN "▲ " + STR(ROUND([% Difference EWE] * 100, 2)) + "%"
ELSE
""
END

STEP 6- CALCULATED COLUMN NAME Good Percentage EWE

IF [% Difference EWE] < 0 THEN "▼ " + STR(ROUND([% Difference EWE] * 100, 2)) + "%"
ELSE
""

END

AFTER ALL THIS PUT STEP 1, STEP 5 AND STEP 6 CALCULATED COLUMN ON TEXT MARKS AND THE EDIT THE TEXT MARK MANAGE THE TEXT SIZE COLOUR AND VISIBILTY AAND THE END RESULT WILL BE SOMETHING LIKE THIS



NOW TO THE SAME FOR AVERAGE AQI METRIC

STEP 1- CALCULATED COLUMN NAME Avg AQI

```
AVG([Air Quality Index])
```

STEP 2- CALCULATED COLUMN NAME Current Month AQI

```
IF DATENAME('month', [Date]) = [Select Month] THEN
{FIXED DATENAME('month', [Date]) : AVG([Air Quality
Index])}
END
```

STEP 3- CALCULATED COLUMN NAME Previous Month AQI

```
IF DATENAME('month', [Date]) =
case [Select Month]
WHEN 'January' THEN 'December'
WHEN 'February' THEN 'January'
WHEN 'March' THEN 'February'
WHEN 'April' THEN 'March'
WHEN 'May' THEN 'April'
WHEN 'June' THEN 'May'
WHEN 'July' THEN 'June'
WHEN 'August' THEN 'July'
WHEN 'September' THEN 'August'
WHEN 'October' THEN 'September'
WHEN 'November' THEN 'October'
WHEN 'December' THEN 'November'
END
THEN {FIXED DATENAME('month', [Date]) : AVG([Air
Quality Index])}
END
```

TEMPERATURE VARIABILITY
15.84 °C
▼ -0.06% Vs Last Month

from
here
on
new
sheet

STEP 4- CALCULATED COLUMN NAME % Difference AQI

```
(AVG([Current Month AQI]) - AVG([Previous Month AQI])) /
AVG([Previous Month AQI])
```

STEP 5- CALCULATED COLUMN NAME Bad Percentage AQI

```
IF [% Difference AQI] >= 0.03
THEN
IF [% Difference AQI] > 0
THEN "▲ " + STR(ROUND([% Difference AQI] * 100, 2)) + "%" // Increase (bad)
ELSE "▼ " + STR(ROUND([% Difference AQI] * 100, 2)) + "%" // Decrease (bad)
END
ELSE
""
END
```

AQI INDEX
263
▲ 3.94% Vs Last Month

STEP 6- CALCULATED COLUMN NAME Good Percentage AQI

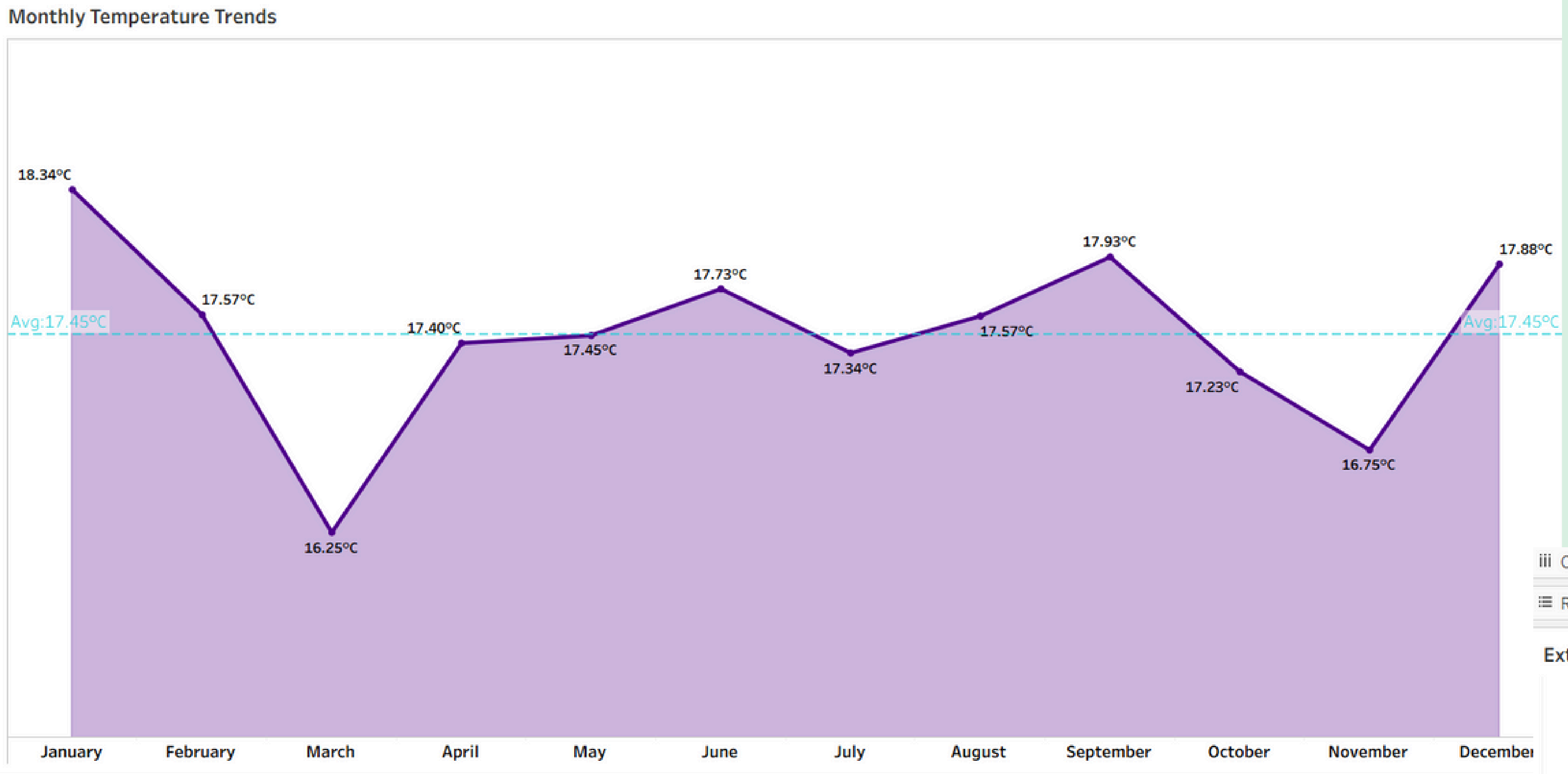
```
IF [% Difference AQI] < 0.03
THEN
IF [% Difference AQI] > 0
THEN "▲ " + STR(ROUND([% Difference AQI] * 100, 2)) + "%" // Increase
(good)
ELSE "▼ " + STR(ROUND([% Difference AQI] * 100, 2)) + "%" // Decrease
(good)
END
ELSE
""
END
```

NOW, do the same process for rest PRECIPITATION INTENSITY, AVERAGE TEMPERATURE, TEMPERATURE VARIABLITY

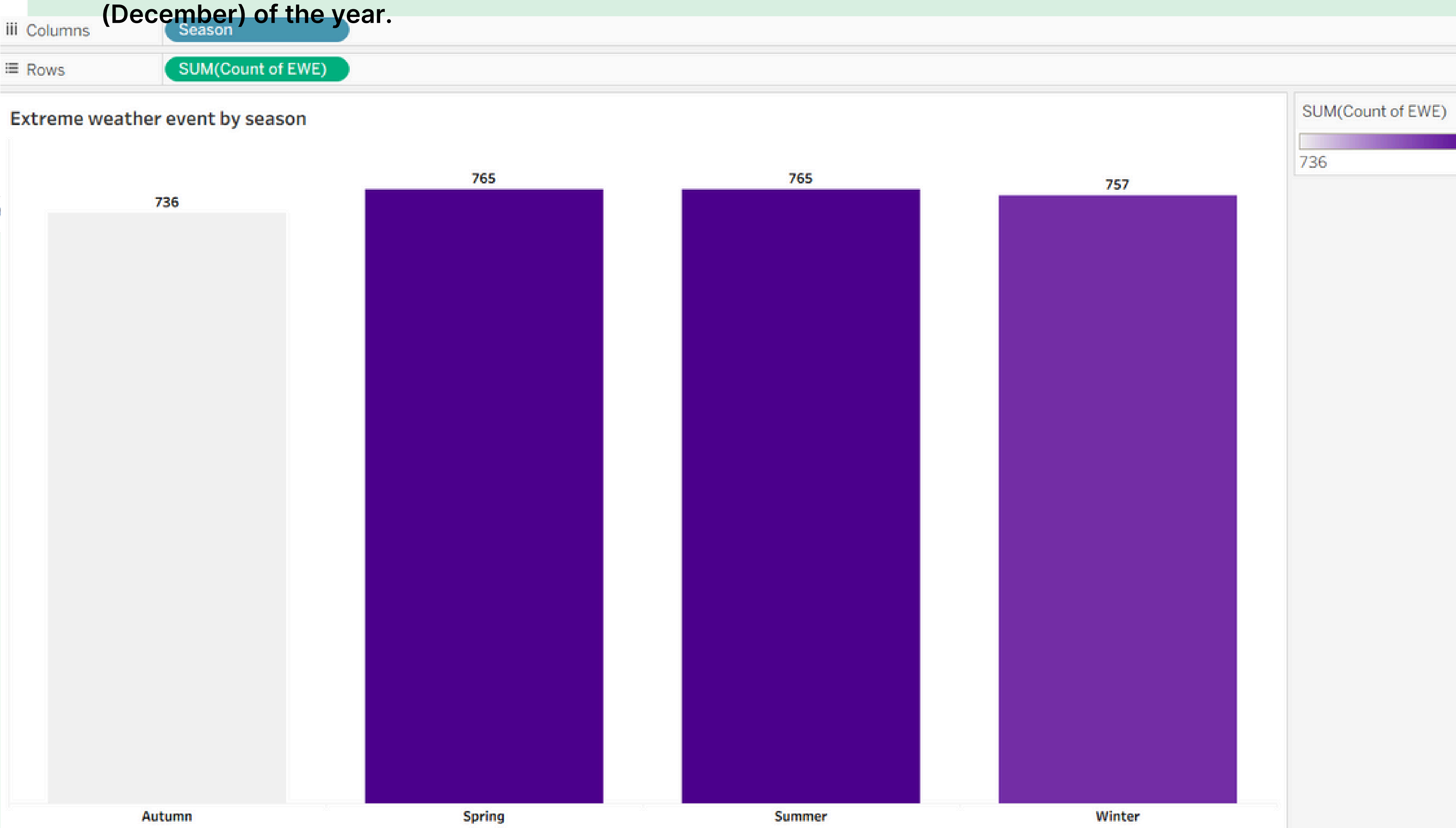
PRECIPITATION INTENSITY
100.4
▼ -2.41% Vs Last Month

AVERAGE TEMPERATURE
17.45
▲ 6.76% Vs Last Month

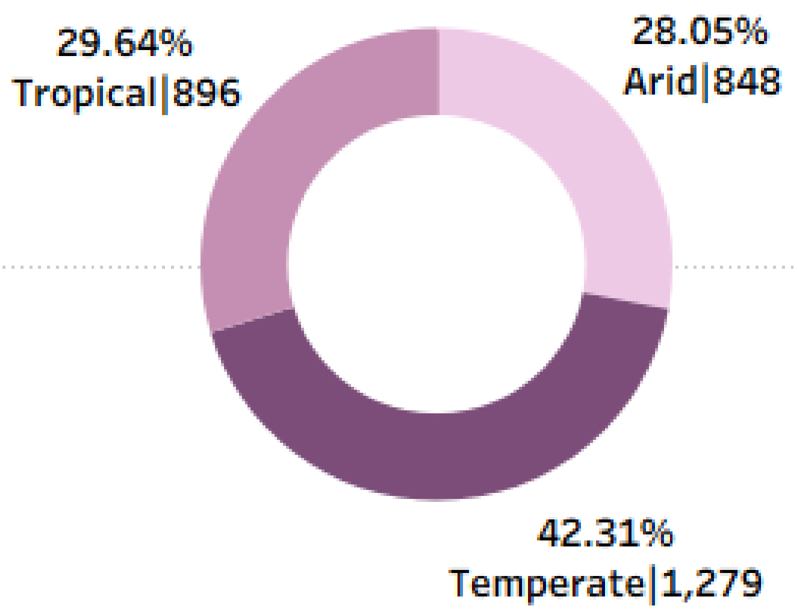
3 INDIVIDUAL VISUALS AND INSIGHTS



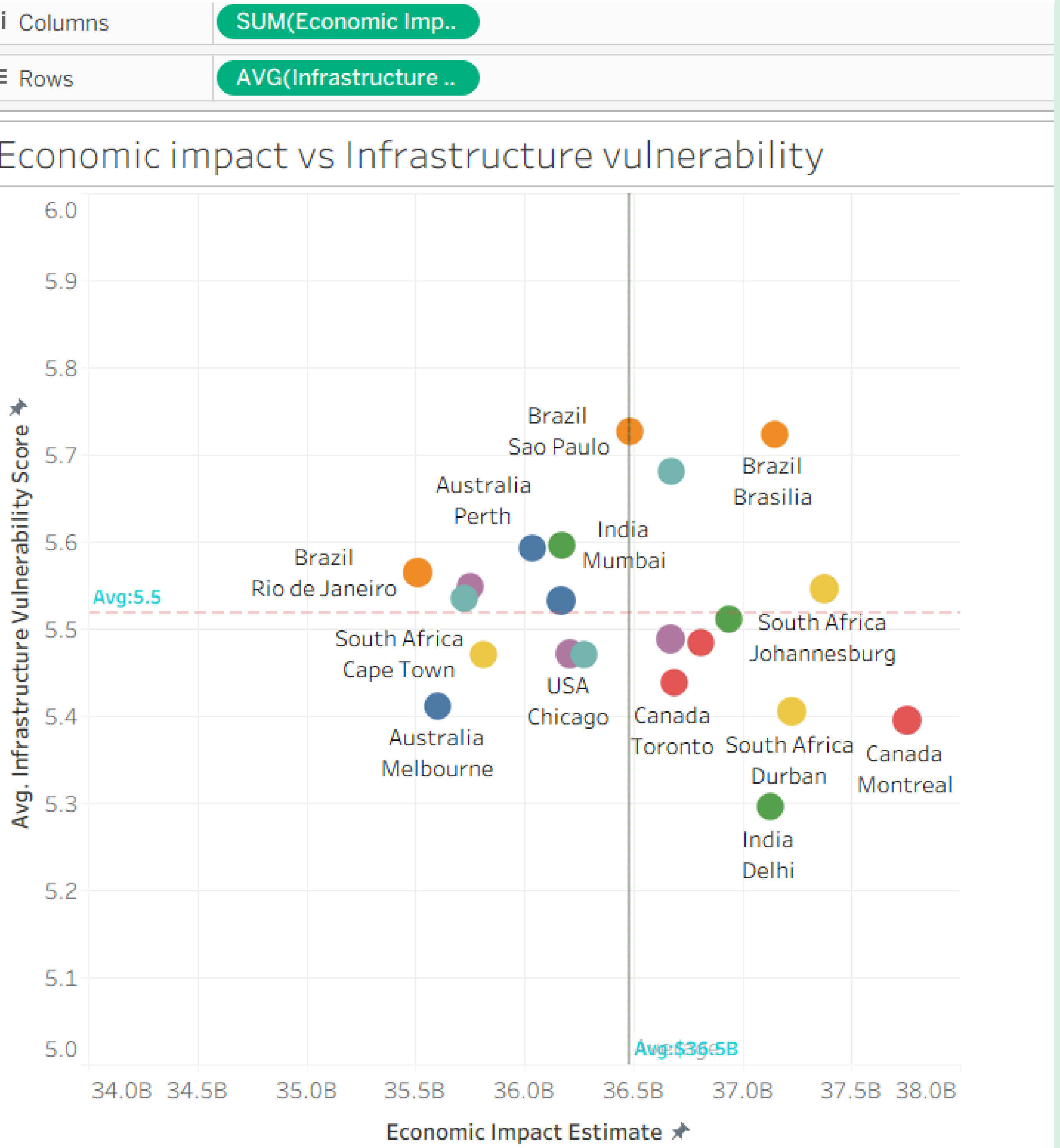
- Highest Temperature: January recorded the highest monthly average temperature at 18.34°C, notably above the calculated yearly average of 17.45°C.
- Lowest Temperature: March experienced the lowest temperature at 16.25°C, significantly below the average.
- Fluctuations: There are marked dips in March (16.25°C) and November (16.75°C), with both months registering well below the average.
- Temperature Stability: From April to October, monthly averages remain relatively close to the annual average, generally staying within a narrow range around 17.4°C–17.9°C.
- Above Average Months: January, June, September, and December all had temperatures exceeding the annual average.
- Below Average Months: March, April, July, October, and November were below the average, revealing potential seasonal patterns or influences.
- Seasonal Trends: There is a cyclical pattern, with cooler months (March and November) after the start and before the end of the year, and warmer peaks at the beginning (January) and near the end (December) of the year.



- Spring and Summer Have the Highest Number of Events
- Both Spring and Summer seasons recorded the highest number of extreme weather events, each with 765 events.
- Autumn Has the Lowest Number
- Autumn saw the fewest extreme weather events, with a count of 736.
- Winter Is Slightly Lower Than Peak Seasons
- Winter had 757 extreme weather events, just slightly less than Spring and Summer, but still more than Autumn.
- The distribution of events across Spring, Summer, and Winter is relatively close (within 8 events of each other), but Autumn is a clear outlier on the lower side.
- The data suggests that extreme weather events are slightly more common in Spring and Summer. Autumn appears to be a less active season for extreme weather events.
- The colors of the bars represent the frequency: the more intense (darker) the color, the higher the count of extreme events. Autumn is the lightest, in line with its lower event count.
- Summary Most extreme weather events occur in Spring and Summer, while Autumn experiences the least. The difference between seasons is not drastic but is observable in the data.



- Temperate Regions Dominate
- The largest share of observations comes from temperate regions, accounting for 42.31% (1,279 occurrences). This suggests that temperate climates are a primary focus or are more commonly represented in the dataset.
- Tropical and Arid Regions Are Nearly Equal
- Tropical areas make up 29.64% (896), while arid regions represent 28.05% (848). The difference between these two climate types is minimal, indicating a relatively balanced representation.
- Distribution Indicates Balanced Climatic Focus
- Overall, the chart shows a reasonably even distribution among tropical, arid, and temperate regions, though temperate leads noticeably.
- Temperate/Tropical Are Together Over 70%
- When combined, temperate and tropical types constitute 71.95% of the dataset, highlighting their prominence in the sample.



- High Economic Impact & High Vulnerability (Top-Right): Cities like Brasilia, Johannesburg, and Sao Paulo face the greatest risk due to significant economic exposure and weak infrastructure. These cities are prime candidates for urgent risk mitigation and resilience-building investments.
- High Economic Impact & Lower Vulnerability (Bottom-Right): Cities such as Montreal and Durban have substantial economic exposure but are relatively less vulnerable, suggesting a need for economic risk management while infrastructure remains somewhat robust.
- Lower Economic Impact & High Vulnerability (Top-Left): Cities including Perth and Mumbai are more vulnerable structurally but face lower economic risks. They may benefit most from strengthening infrastructure to prevent future economic damages.
- Low Economic Impact & Low Vulnerability (Bottom-Left): Cities like Melbourne and Cape Town experience comparatively less overall risk, both economically and structurally.
- Brasilia, Johannesburg, and Sao Paulo stand out as critical hotspots with both high vulnerability and high economic impact, marking them as priorities for resilience efforts.
- Chicago and Toronto fall near average values on both axes, reflecting moderate risk.

NOW SOME ALL THE POINTS INTO A DASHBOARD 4

CLIMATE CHANGE DASHBOARD

City
(All)

Country
(All)

Climate Classification
(All)

Climate Zone
(All)

Season
(All)

Year of Date
(All)

Month of Date
(All)

Quarter of Date
(All)

AVERAGE TEMPERATURE
17.45
▲ 6.76% Vs Last Month

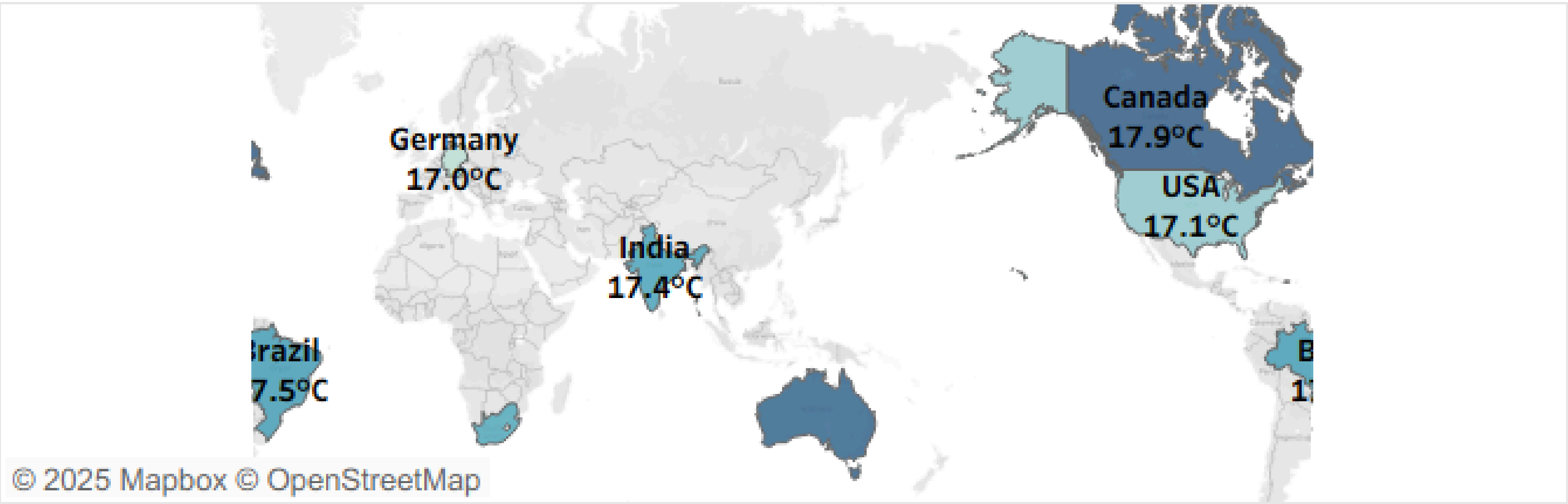
TEMPERATURE VARIABILITY
15.84 °C
▼ -0.06% Vs Last Month

PRECIPITATION INTENSITY
100.4
▼ -2.41% Vs Last Month

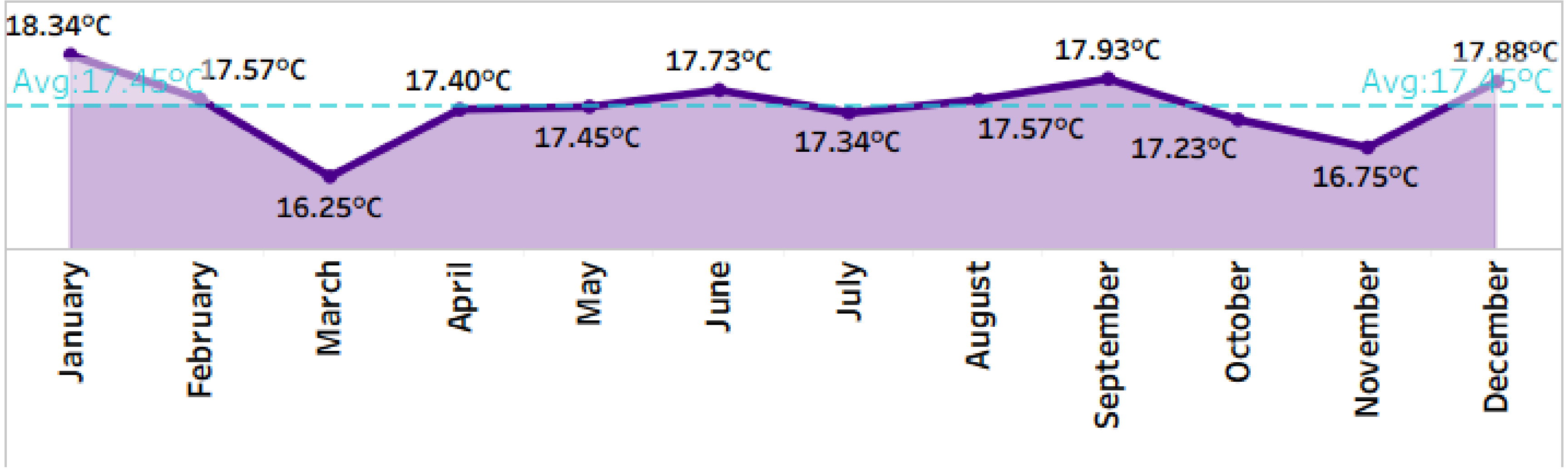
AQI INDEX
263
▲ 3.94% Vs Last Month

EXTREME WEATHER EVENTS
258
▲ 13.66% Vs.Last month

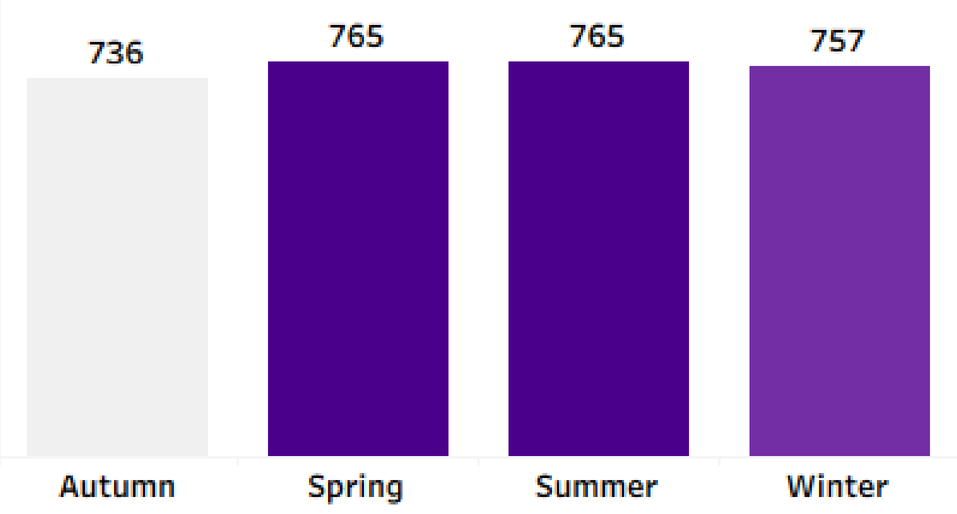
Temperature by country



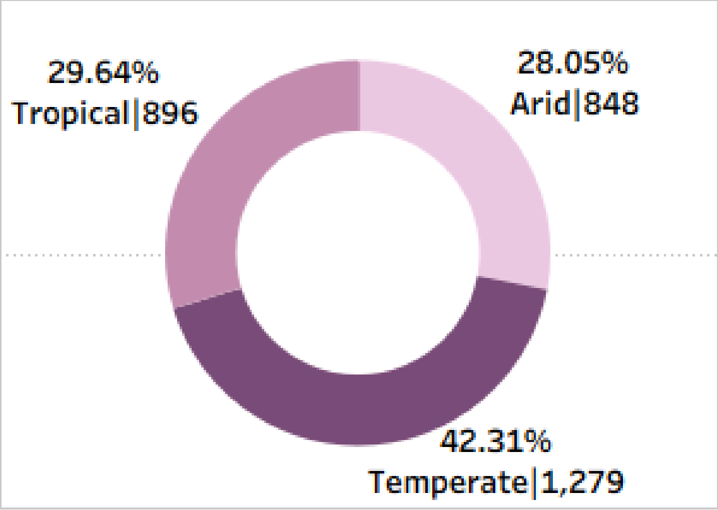
Monthly Temperature Trends



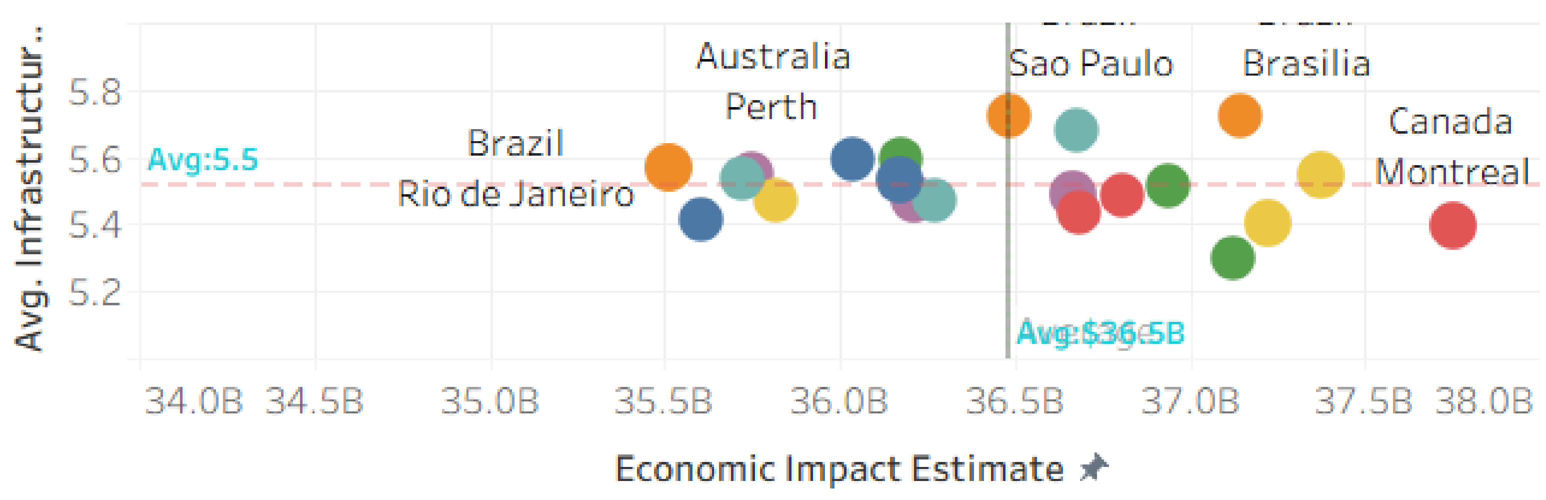
Extreme weather event by season



Extreme weather by climate zone



Economic impact vs Infrastructure vulnerability



5 STRATEGY FOR IMPROVEMENT

- Cities above the vulnerability score average (5.5) should target infrastructure improvements to reduce susceptibility.
- Cities above the economic impact average ($36.5B) require strategies to manage high economic consequences of potential extreme events.

General Strategic Recommendations

- Holistic Urban Planning: Foster integrated approaches combining infrastructure resilience, land-use policy, emergency preparedness, and sustainable development.
- Climate Adaptation and Mitigation:
  - Adaptation: Reinforce systems (drainage, cooling centers, storm shelters), particularly in cities exceeding the average vulnerability score (5.5).
  - Mitigation: Promote renewable energy, sustainable mobility solutions, and green building standards in cities with high economic impact (over $36.5B).
- Cross-Country Collaboration: Since cities tend to cluster by national context, facilitate collaborative action at the regional or national level for knowledge exchange, standardized resilience metrics, and joint infrastructure projects.
- Best Way to Improve Climate Change Response
- Prioritize Investments Where Risk Is Highest: Direct resources and technical support to cities with both high economic impact and infrastructure vulnerability.
- Adapt Strategies to Climate Type: Customize climate response measures for temperate, tropical, and arid zones.
- Strengthen Policy and Community Engagement: Implement robust climate policies, encourage community participation in disaster planning, and foster a culture of sustainability.
- Accelerate Green Transitions: Invest in clean energy, nature-based solutions, and low-carbon technologies across all climate zones and cities, targeting both mitigation and long-term resilience.

THANK YOU

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