

Shri Ramswaroop Memorial University



Case study
on
Environmental sustainability metric dashboard

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Semester: III

Case Study Report: Environmental Sustainability Metrics Dashboard

Agenda/Definition

The goal of this project is to create a unified, interactive Environmental, Social, and Governance (ESG) Dashboard to monitor a company's environmental impact and climate risk.

- Core Challenge: Fragmented, unstructured data prevents quick decision-making on climate risk and performance.
- Required Tool: IBM Cognos Analytics (Dashboarding and Data Module features).
- Mandate: Transform the global climate data (update_temperature.csv) into actionable KPIs that inform strategic reduction targets.
- Target User: Sustainability Directors and Executive Leadership.

2. Introduction: The Need for ESG Visualization

Hospitals focus on health, and modern corporations must focus on environmental health. The waiting room for climate action is uncertainty—uncertainty about emissions, renewable energy progress, and geographic risks. This project uses Cognos to remove that uncertainty.

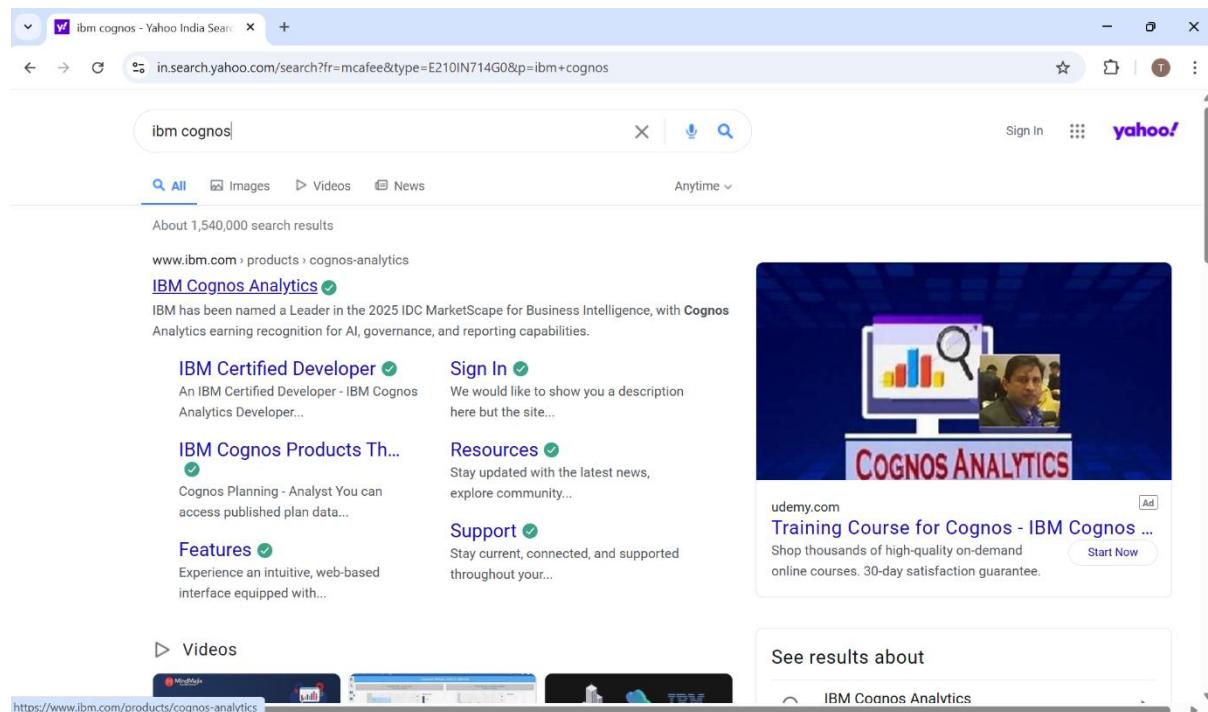
The report applies a data-centric framework to re-imagine sustainability tracking. By placing key environmental indicators at the center of the design, we can transition from simply complying with regulations to proactively managing and reducing our carbon footprint.

3. Working: Step-by-Step IBM Cognos Process

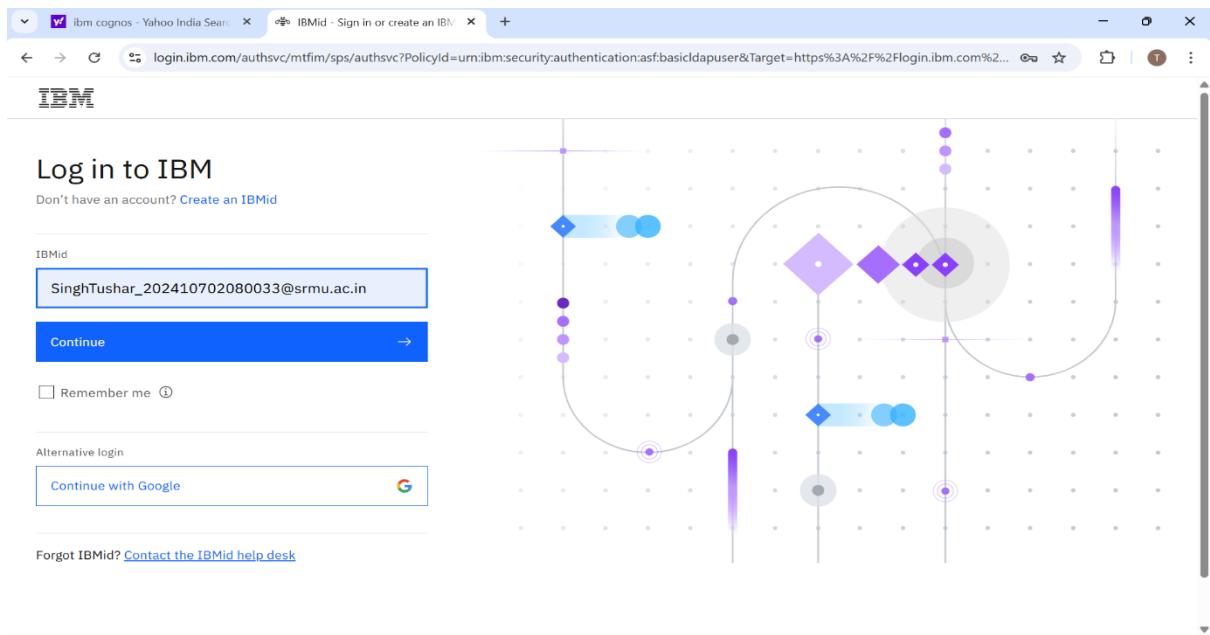
This section details the required actions to build the dashboard, starting with data preparation and ending with the final visualization implementation.

Now:-Start working on the Tool.

Step 1: Open IBM Cognos



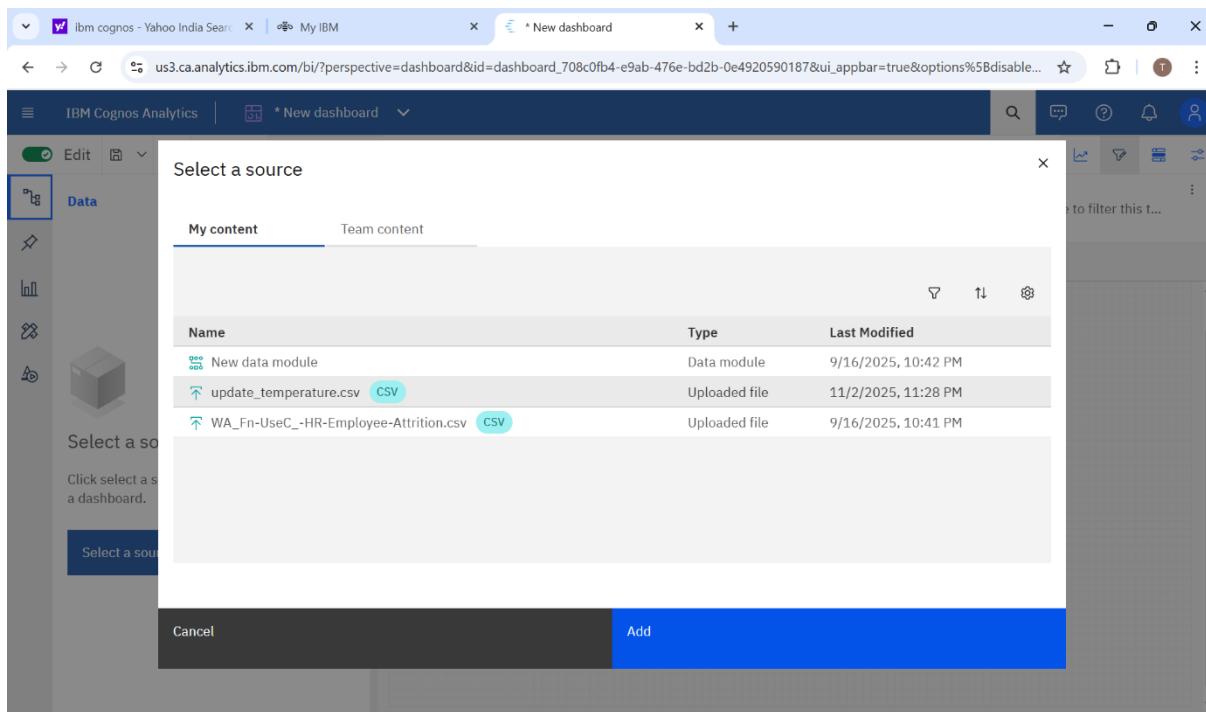
Step 2: Sign up or login in IBM Cognos



Step 3: Data Preparation and Modeling (The Data Module)

Upload the Data: In Cognos, select "New" \$\rightarrow\$ "Data Module" and upload the update_temperature.csv file.

A screenshot of the IBM Cognos Analytics interface. The top navigation bar includes "IBM Cognos Analytics", a search bar, and user icons. The left sidebar has sections for "Home", "+ New" (with "Data server" selected), "Data sources", "Data presentation and assets" (with "Dashboard" selected), "Other", and "Content". The main area shows a "Create" section with "Select or upload data and create content.", an "Assistant" section with "Ask the Assistant a question in your own words to uncover insights about your data.", and a "Learn" section with "Watch videos or take a tour to learn about Cognos Analytics." Below these are tabs for "Team content", "Samples", and "Favorites". A table at the bottom lists two reports: one from "9/22/2025, 4:23 AM" and another from "9/22/2025, 4:39 AM".

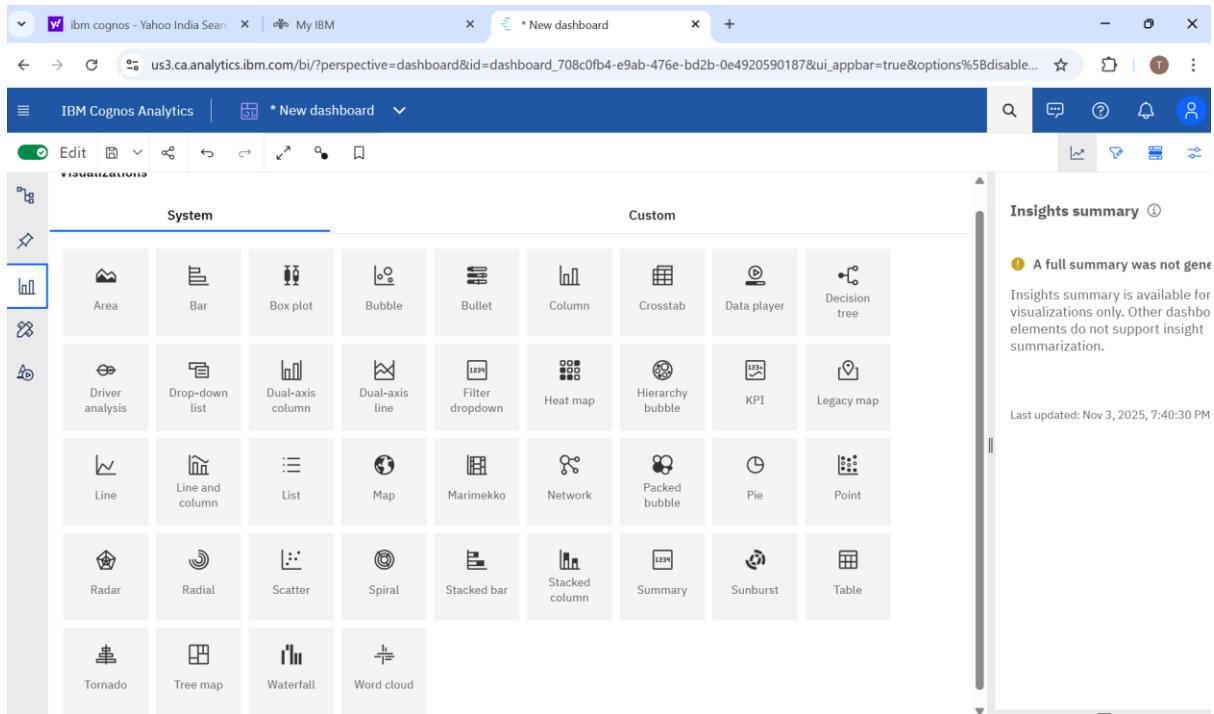


Step 4 : Dashboard Layout (The Three-Row Approach)

The design follows a funnel structure, guiding the user from a high-level summary to specific geographic context, ensuring quick answers for executives and deep-dive capabilities for analysts.

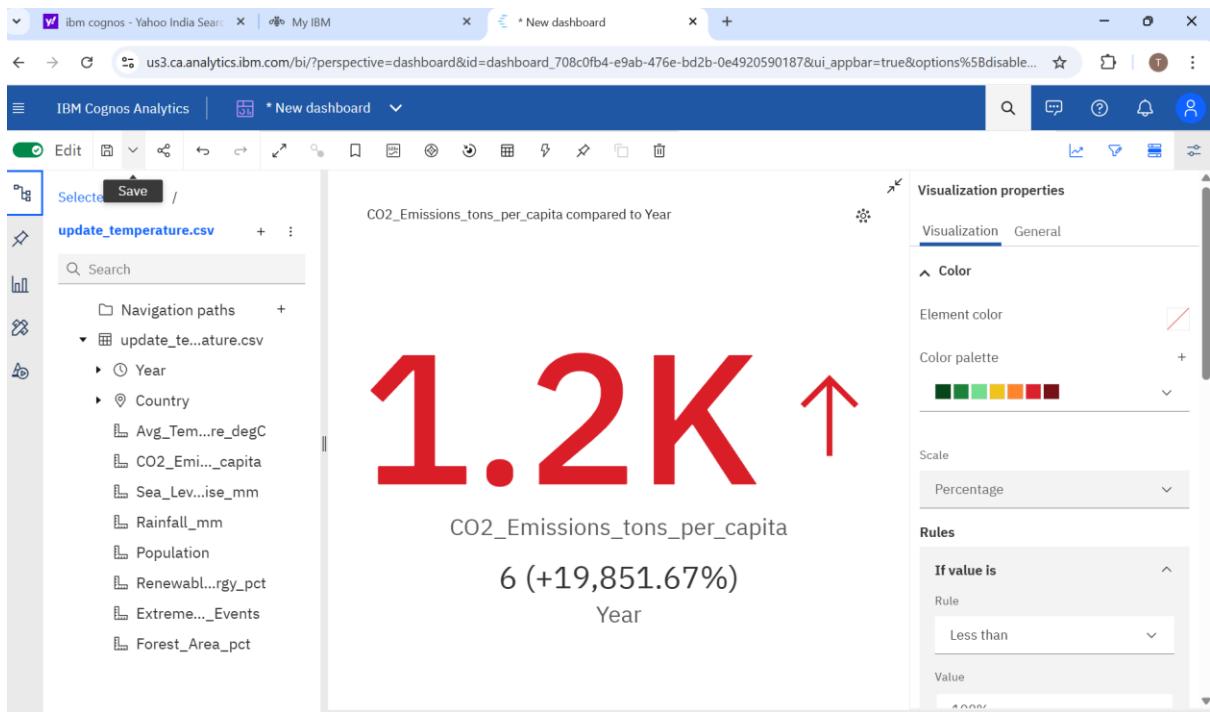
- Row A: Status (The Executive Summary).
 - Focus: What is the instant performance status?
 - Visualization Goal: Use KPI Cards / Gauges for the \${CO2 Change (Y-o-Y)}\$ metric.
- Row B: Trends (The Analyst View).
 - Focus: How fast are we improving and what is the multi-year trajectory?
 - Visualization Goal: Use Line/Stacked Charts for multi-year comparison of energy sources.
- Row C: Context (The Strategic Risk View).

- Focus: Where are the external, geographic risks located?
- Visualization Goal: Use Map/Bar Charts for geographic context and physical hazard tracking.



Step 5: Row A: KPI Card Implementation

1. Display the CO2 Change (Y-o-Y) metric.
2. Action: Apply Conditional Formatting. If the value is negative (meaning reduction), set the color to Green. If the value is positive (meaning increase), set the color to Red.



Insights:

Year 2010 has the highest CO2_Emissions_tons_per_capita at 212.7, followed by 2005 at 210.7.

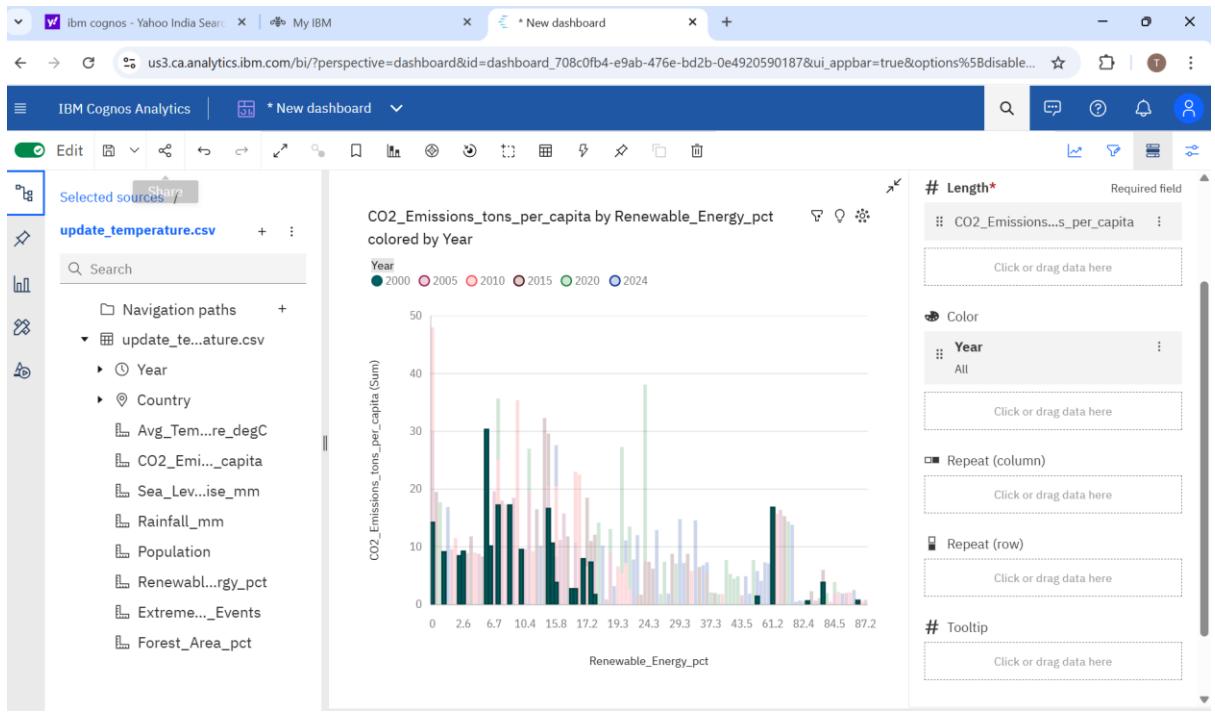
Total CO2_Emissions_tons_per_capita is 1,197.

The average CO2_Emissions_tons_per_capita per Country is 63.01.

Year 2024 has the highest Average Avg_Temperature_degC but is ranked #6 in Total CO2_Emissions_tons_per_capita.

Step 6: Energy Transition Chart

1. Use a Stacked Column Chart.
2. Stack 1: Renewable_Energy_pct.
3. Stack 2: Non-Renewable Exposure.
4. Goal: Visually demonstrate how quickly the portfolio is shifting away from non-renewable sources over the Year axis.



Insights:

Renewable_Energy_pct 0.0 has the highest total CO2_Emissions_tons_per_capita, with Country Saudi Arabia contributing the most to that total.

Renewable_Energy_pct 0 has the highest CO2_Emissions_tons_per_capita, with Year 2010 contributing the most.

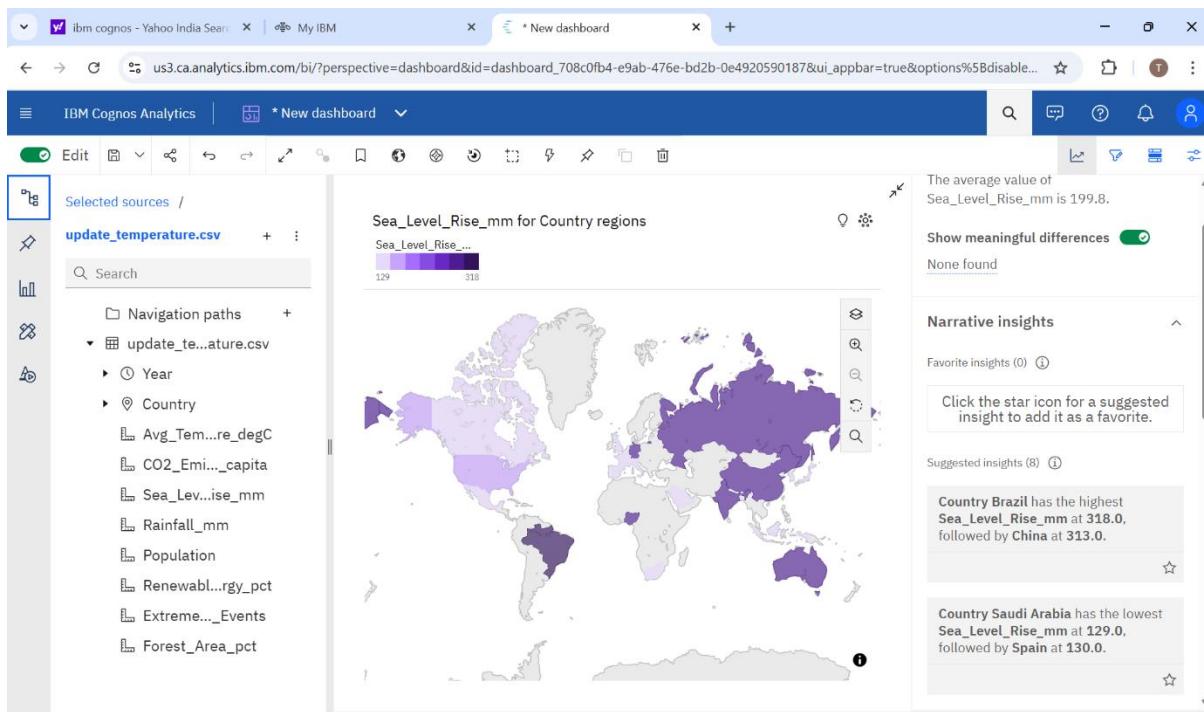
Year 2024 has the highest Average Avg_Temperature_degC but is ranked #6 in Total CO2_Emissions_tons_per_capita.

Renewable_Energy_pct 19.2 is unique in that it has the highest CO2_Emissions_tons_per_capita from Country Mexico at 3.2, compared to peers that have highest CO2_Emissions_tons_per_capita from Country Russia.

For CO2_Emissions_tons_per_capita, the most significant values of Year are 2010, 2005, 2015, 2000, and 2020, whose respective CO2_Emissions_tons_per_capita values add up to over a thousand, or 85.1 % of the total.

Step 7: Geographic Risk Map

1. Use a Map Widget.
2. Location: Country.
3. Color/Size: Use Sea_Level_Rise_mm to visually highlight regions that have the highest long-term physical climate risk.



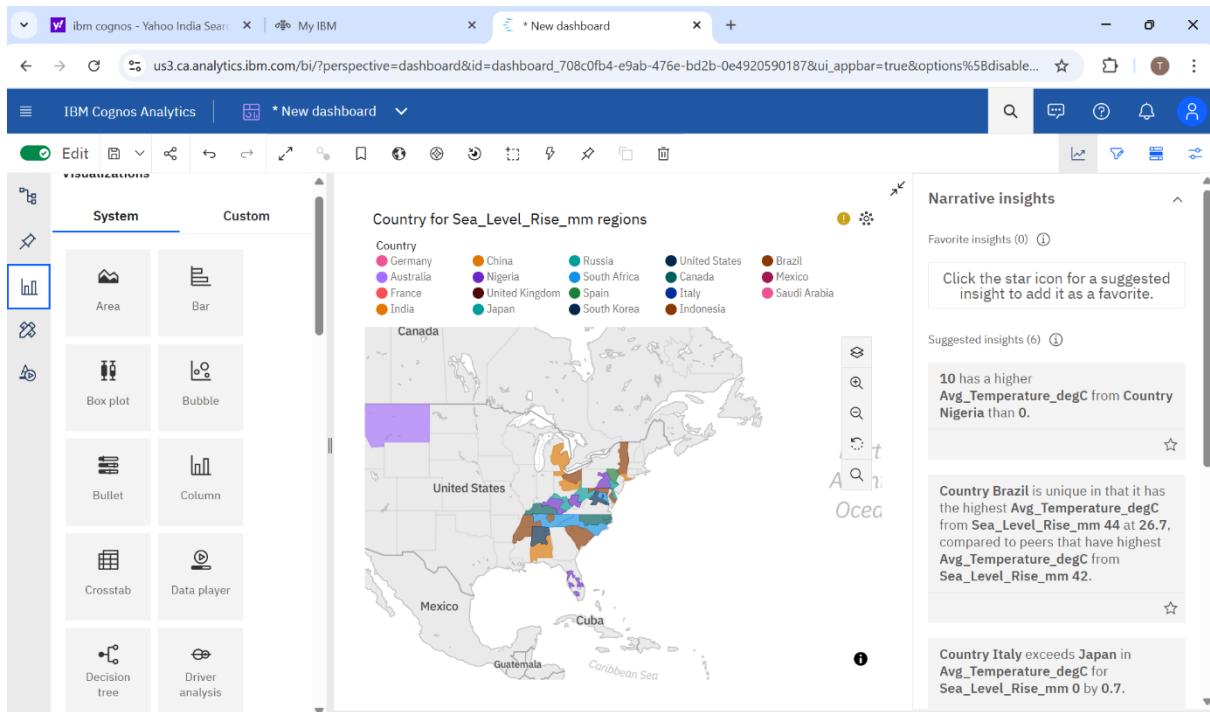
Insights :

Country Brazil has the highest Sea_Level_Rise_mm at 318.0, followed by China at 313.0.

Country Nigeria has the highest Average Avg_Temperature_degC but is ranked #7 in Total Sea_Level_Rise_mm.

For Sea_Level_Rise_mm, the most significant values of Country are Brazil, China, India, Germany, and Russia, whose respective Sea_Level_Rise_mm values add up to over 1500, or 40.9 % of the total.

Over all countries, the sum of Sea_Level_Rise_mm is nearly four thousand.



10 has a higher Avg_Temperature_degC from Country Nigeria than 0.

Country Italy exceeds Japan in Avg_Temperature_degC for Sea_Level_Rise_mm 0 by 0.7.

Country Nigeria has the highest Avg_Temperature_degC at 306.6, out of which Sea_Level_Rise_mm 59 contributed the most at 28.5.

The total number of results for Country, across all Sea_Level_Rise_mm, is 146

Sea_Level_Rise_mm 0 has the highest average Avg_Temperature_degC, with Country Nigeria contributing the most.

DASHBOARD:



Insights:

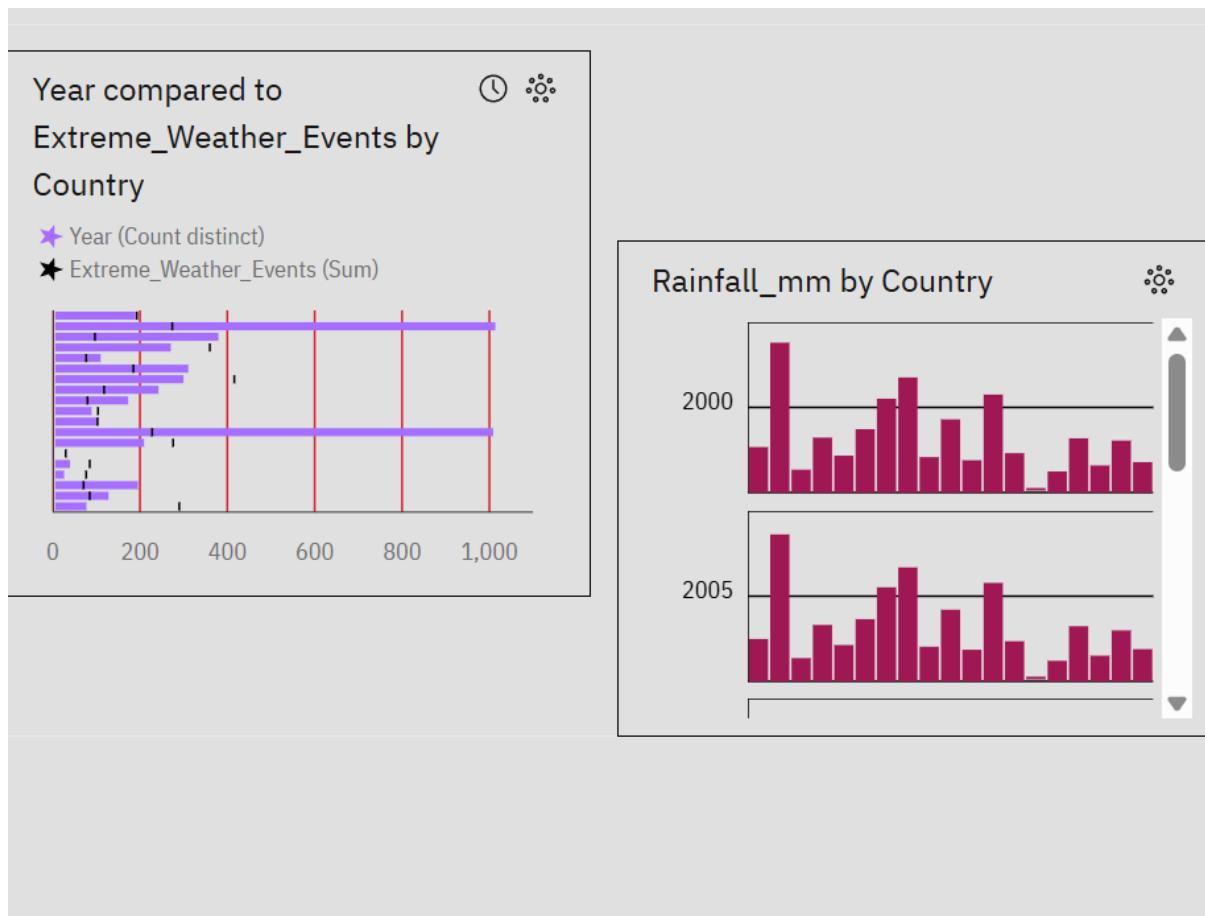
CO2_Emissions_tons_per_capita 1.9 has the highest Population, with Year 2024 contributing the most.

Year 2024 has the highest values of both Population and Avg_Temperature_degC

Avg_Temperature_degC 25.5 has the highest total Population, with Year 2020 contributing the most to that total.

Avg_Temperature_degC 14.7 has the highest Count distinct Country but is ranked #24 in Total Population.

Year 2024 has the highest Population at nearly 8.4 billion, out of which Avg_Temperature_degC 14.3 contributed the most at over 1.4 billion.



Insights:

The total number of results for Year, across all countries, is 19.

Year 2024 has the highest Average Avg_Temperature_degC but is ranked #5 in Total Rainfall_mm.

For Rainfall_mm, the most significant values of Year are 2010, 2000, 2020, 2005, and 2024, whose respective Rainfall_mm values add up to over 122 thousand, or 83.7 % of the total.

Across all countries and years, the sum of Rainfall_mm is over 146 thousand.

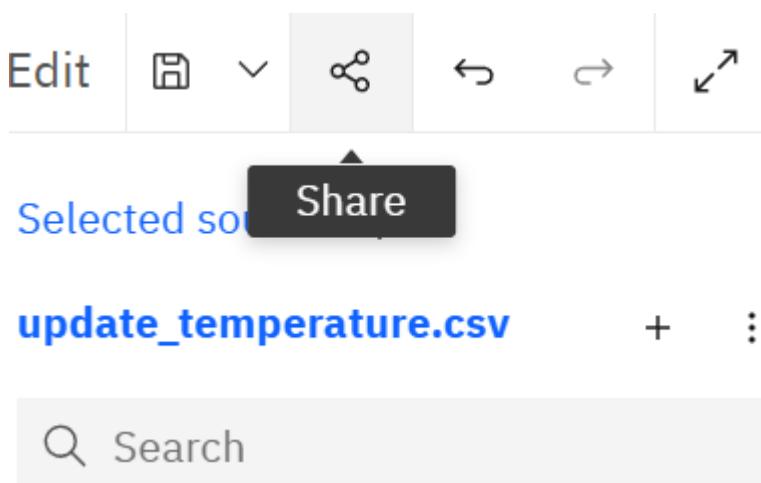
Country Brazil has the highest Total Rainfall_mm but is ranked #4 in Average Avg_Temperature_degC.

Outcome/Learning: Key Simulated Findings (Insights)

By completing the dashboard, we gain a deeper understanding of the organization's environmental risks and opportunities, which can be summarized in three key insights:

1. **Emissions Divergence:** The $\text{CO}_2 \text{ Change (Y-o-Y)}$ KPI consistently flags Red in rapidly industrializing regions (e.g., China), but shows a slow Green trend in mature economies (e.g., Germany). This proves that a one-size-fits-all strategy won't work and requires localized investment planning.
2. **Renewable Opportunity Zones:** The Stacked Column Chart identifies regions like Brazil with naturally low $\text{Non-Renewable Exposure}$ (high existing renewable capacity). This highlights countries where expansion can achieve the lowest carbon footprint immediately, prioritizing capital allocation.
3. **Climate Hazard Prioritization:** By correlating the Map Widget (Sea Level Rise) and the Bar Chart (Extreme Weather), we can identify High-Priority Risk Zones—coastal countries with increasing extreme weather frequency. This insight is essential for proactive supply chain resilience and infrastructure upgrades.

Step 8: Exporting:



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