EarthScope - Business Requirement Document (BRD)

Project Title:

EarthScope: A Data-Driven Worldview

Tool Used:

Power BI Desktop

Business Objective:

To build an interactive, visually engaging Power BI dashboard that provides a data-driven global overview. It enables users—such as researchers, policy makers, and educators—to analyze population metrics, environmental emissions, land distribution, and economic indicators across countries for informed global insights.

Project Scope:

- Import and clean global socio-economic and environmental data.
- Create key DAX measures to summarize metrics like population, emissions, and birth rate.
- Design a single-page Power BI dashboard using appropriate visuals.
- Enable filtering by country for focused analysis.
- Deliver useful insights through simple, interactive charts and KPIs.

EarthScope - Solution Implementation Document (Power BI)

Task 1: Data Import and Initial Cleaning

- Imported structured Excel-based global data into Power BI Desktop.
- Renamed columns for better readability and consistent formatting.
- Removed blank or unnecessary columns from the dataset.
- Handled null values by filling them with appropriate default values to ensure data completeness.
- Assigned correct data types (e.g., Text, Whole Number, Decimal) to each field.
- Documented each transformation step clearly in the **Applied Steps** pane of Power Query Editor.

Task 2: DAX Measures and KPIs

Created the following DAX measures for summarizing and analyzing the global dataset:

- Total Population

  Total Population = SUM(World[Population])
- Total Land Area

  Total Land Area = SUM(World[Land Area(Km2)])
- Total CO2 Emissions

  Total CO2 Emissions = SUM(World[Co2-Emissions])
- Avg Agricultural Land %

  Avg Agricultural Land % = AVERAGE(World[Agricultural Land(%)])
- Avg Birth Rate

  Avg Birth Rate = AVERAGE(World[Birth Rate])

- Avg Labor Force Participation

  Avg Labor Force Participation = AVERAGE(World[Population: Labor force participation (%)])
- Avg Physicians

  Avg Physicians = AVERAGE(World[Physicians per thousand])
- Avg Population Density

  Avg Population Density = AVERAGE(World[Density(P/Km2)])
- Avg Tax Revenue %

  Avg Tax Revenue % = AVERAGE(World[Tax revenue (%)])
- Avg Total Tax Rate

  Avg Total Tax Rate = AVERAGE(World[Total tax rate])
- Avg Unemployment Rate

  Avg Unemployment Rate = AVERAGE(World[Unemployment rate])
- CO2 per Capita

  CO2 per Capita = DIVIDE(SUM(World[Co2-Emissions]), SUM(World[Population]))
- Population per Km2

  Population per Km2 = DIVIDE([Total Population], [Total Land Area])
- Urbanization Rate

  Urbanization Rate = DIVIDE(SUM(World[Urban_population]), SUM(World[Population]))

Task 3: KPI Design

Used Power BI **card visuals** to present key global statistics prominently:

- Count of Countries
- Total Population
- Average Birth Rate
- Total Land Area

- Average Tax Revenue %
- Average Unemployment Rate

These indicators provide a quick high-level summary of the world data.

Task 4: Dashboard Design and Visualizations

The following visuals were used in the dashboard:

- **Bar Chart:** Displayed top 5 countries by total population.
- **Bar Chart:** Displayed top 10 countries with highest CO2 emissions.
- **Bar Chart:** Displayed top 7 countries by total land area.
- **Donut Chart:** Compared global urban vs rural population distribution.
- **Map Visual (Bubble Map):** Showed total population and average birth rate by country, geographically.
- **Slicer:** Country-level slicer added for interactive filtering.
- **Icon and Styling:** Used global icons, consistent green theme, and rounded cards for a professional look.

Task 5: Business Insights and Interpretation

- Vietnam ranks highest among the displayed countries with 96M population.
- China leads CO2 emissions with 9.9M units, followed by the US and India.
- Russia has the largest land area (17M), surpassing Canada and the US.
- Urban population makes up about half of the global population.

- Average global unemployment rate and tax revenue % are low (0.07%, 0.17%).
- The dashboard helps visualize both demographic and environmental trends at a glance.