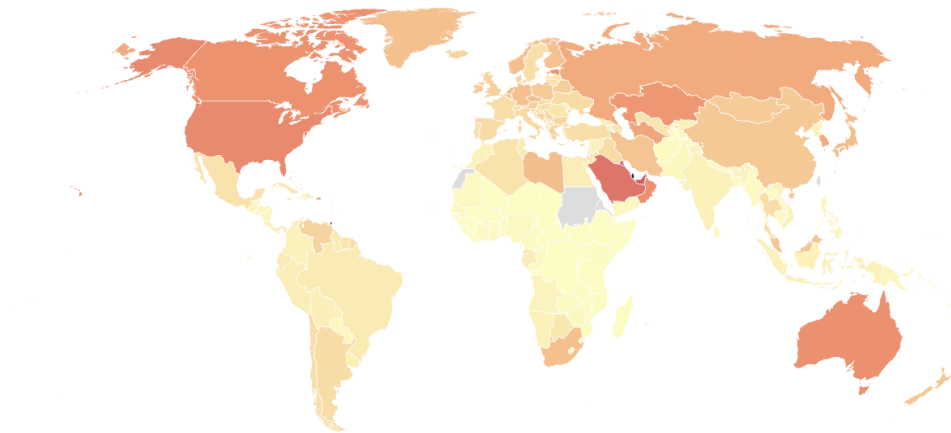


# Data Visualization Pitch

## Student Individual Assignment

### Global CO<sub>2</sub> Emissions per Capita (2019)



[Get the data](#) • Created with [Datawrapper](#)

## The Cost of Progress

*A Trend Analysis of Wealth, Health, and  
Environment  
(1960–2020)*

Student name: **Hanieh Mirzad**

Student ID: **923891**

Student e-mail address: **[h.mirzad@campus.unimib.it](mailto:h.mirzad@campus.unimib.it)**

## Research questions

### **Primary Research Question**

-How is economic growth related to quality of life and environmental impact across countries?

### **Secondary Research Questions**

- Is higher GDP per capita associated with higher life expectancy?
- Does economic development lead to higher CO<sub>2</sub> emissions?
- How do these relationships differ across world regions?

## About Data

### **Data Source**

World Development Indicators (World Bank), publicly available open data.

### **Selected Indicators**

GDP per capita

Life expectancy at birth

CO<sub>2</sub> emissions per capita

Population growth

### **Data Considerations**

The dataset is publicly available and shared under an open data license

Some missing values were present, especially for earlier years

Data is generally reliable but may reflect estimation methods used by the World Bank

### **Data Cleaning**

Missing values handling

Merging multiple indicators into a single dataset

Filtering years and countries

# Methodology

## **Data Collection:**

Data downloaded from the World Bank official website (CSV format)

## **Data Processing & Cleaning:**

Python (pandas, numpy) / Data merging and filtering / Handling missing values

## **Data Transformation:**

Multiple datasets were merged by country and year.

GDP per capita values were log-transformed for visualization to reduce skewness and improve interpretability.

Countries were mapped to world regions (Africa, Americas, Asia, Europe, Oceania) for regional comparison.

## **Visualization Tools & Techniques:**

Python libraries Seaborn (built on Matplotlib) were used to create a scatter plot exploring the relationship between GDP per capita and life expectancy.

Datawrapper was used to produce a choropleth map illustrating CO<sub>2</sub> emissions per capita across countries.

## **Use of AI Tools:**

ChatGPT was used to support textual explanation and report structuring.

## **Analytical Techniques:**

Descriptive statistics to examine distributions and ranges of key indicators.

Trend analysis to study long-term changes in CO<sub>2</sub> emissions over time.

Correlation analysis to explore relationships between economic, health, and environmental variables.

## **Reproducibility:**

Analysis can be replicated using the provided datasets and Python notebooks

## Insights from the Data

### Insights from the Data

Higher **GDP per capita** is associated with higher **life expectancy** across countries.

The GDP–life expectancy relationship shows **diminishing returns** at high income levels.

**CO<sub>2</sub> emissions per capita** increase with economic development, especially in industrialized regions.

Developing regions show **rapid growth in CO<sub>2</sub> emissions** over time.

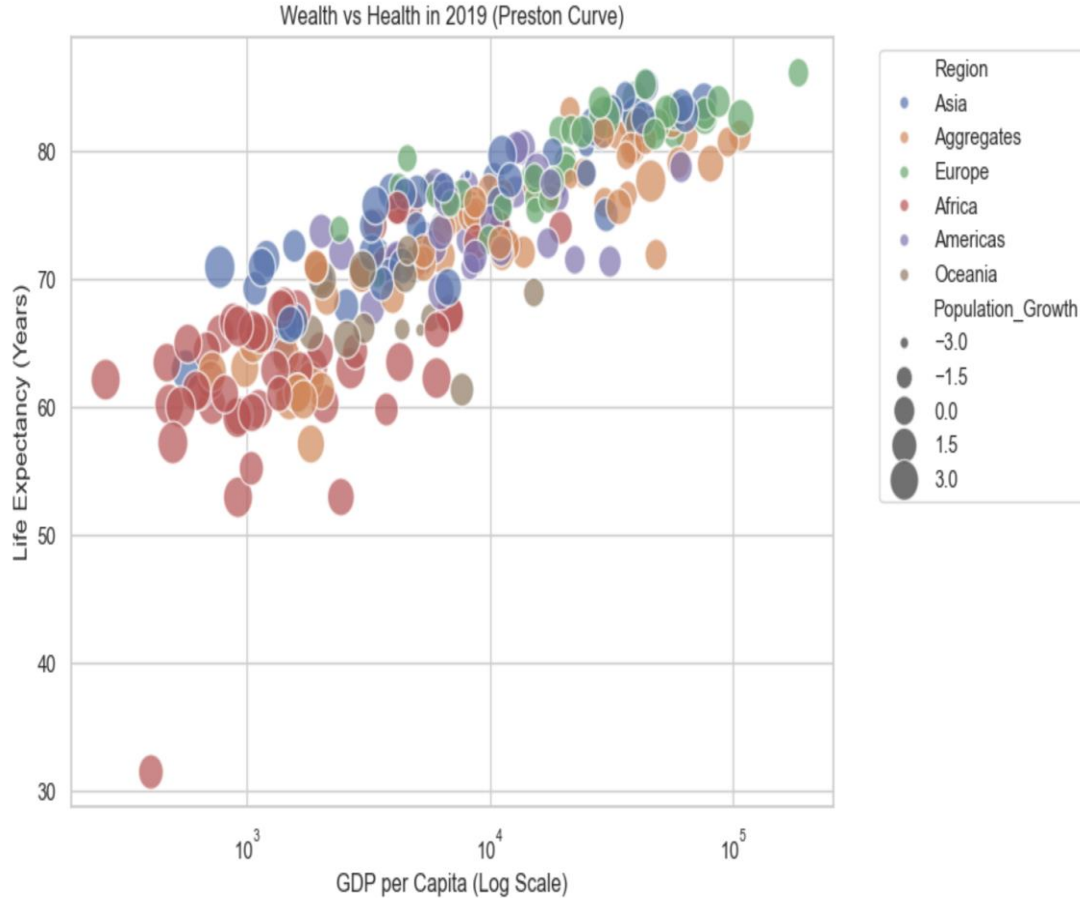
Higher population growth appears to be associated with lower life expectancy in several regions. Strong **regional differences** exist in economic, health, and environmental indicators.

### Analysis Methods Used

Descriptive statistics

Correlation analysis

Trend and comparative analysis



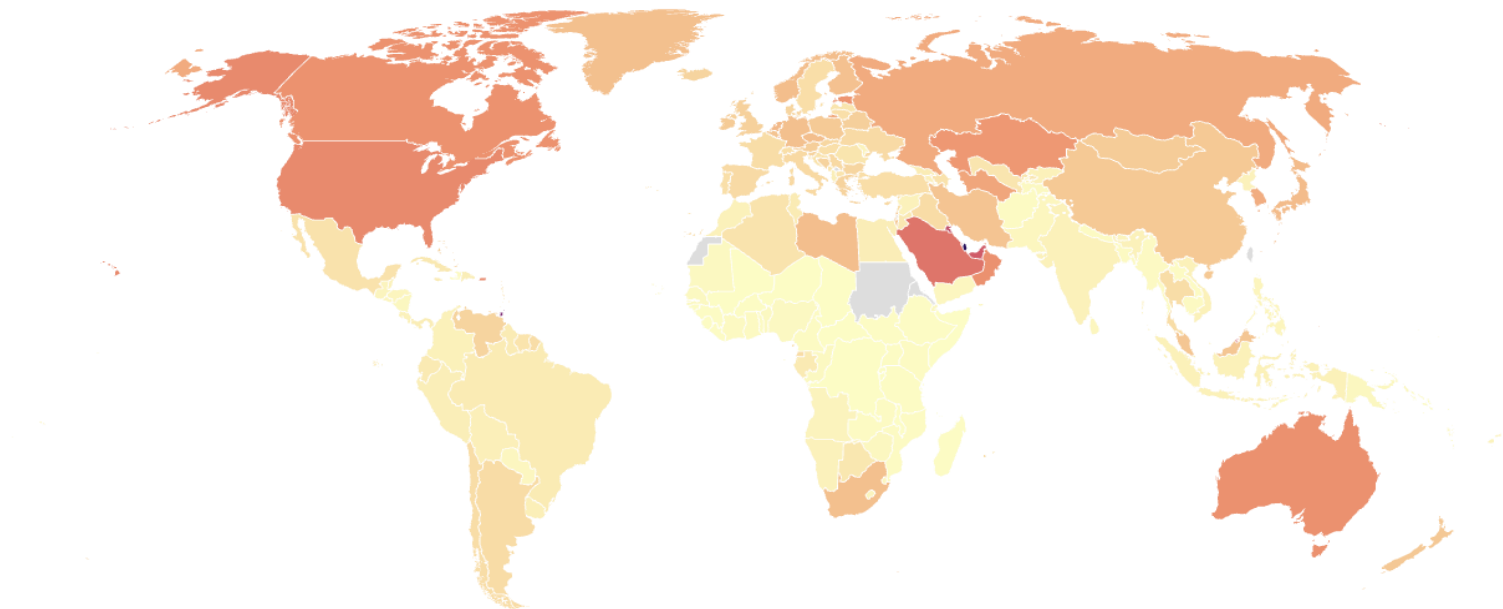
### Economic Growth and Health Outcomes

This visualization shows the relationship between GDP per capita and life expectancy in 2019.

A clear positive relationship emerges, although diminishing returns are observed at higher income levels.

# Global CO<sub>2</sub> Emissions per Capita (2019)

This map shows CO<sub>2</sub> emissions per capita by country in 2019, highlighting strong disparities across world regions. High-income and industrialized countries tend to display significantly higher per-capita emissions, while many developing countries contribute much less to global emissions on an individual basis.



These differences highlight the challenge of achieving economic growth while limiting environmental impact.

While economic growth is associated with improved quality of life, it also generates significant environmental pressure.

These findings highlight the challenge of achieving sustainable development that balances prosperity, health, and environmental responsibility.



## LICENCE

**Slides** are shared with the following license:

*The Cost of Progress* by Hanieh Mirzad  
is licensed under **Creative Commons Attribution 4.0 International (CC BY 4.0)**