

BANA 698 - Group 3
Initial Objectives & Research Questions

1. Objective: Assess the impact of environmental changes on public health outcomes.

- **Time Series Analysis:** How have the changes in CO2 emissions affected life expectancy and/or mortality rates over the past 4 years?
- **Time Series Analysis:** Has the rate of improvement in clean drinking water access been faster in high-GDP countries compared to low-GDP countries?
- **Hypothesis Testing:** Do countries with high percentages of renewable energy consumption have lower mortality rates than those that do not?
- **Hypothesis Testing:** Do countries with higher access to clean drinking water have lower poverty rates than those that do not?
- **Multiple Linear Regression:** How do greenhouse gas emissions, access to clean drinking water, and public debt levels predict life expectancy?
- **Classification:** Can countries be classified into high/low GDP growth groups based on access to clean drinking water, electricity, and renewable energy use?
- **Clustering:** Are there distinct clusters of countries based on water access, literacy rates and unemployment?
- **Neural Network:** Can a neural network predict poverty level based on historical data on water access, literacy rates and unemployment?
- **Neural Network:** Can unemployment rates based on education levels, electricity access and GDP growth be predicted by a neural network?

2. Objective: Assess the affect of debt, inflation and unemployment on economic growth

- **Time Series Analysis:** How does external debt, inflation and unemployment correlate with GDP over the past 4 years?
- **Hypothesis Testing:** Do countries with high government spending experience significant GDP growth compared to countries with lower spending?
- **Multiple Linear Regression:** How do external debt and inflation predict GDP growth?
- **Classification:** Can countries be classified into high/low GDP growth groups based on government spending/debt?
- **Clustering:** Are there distinct clusters of countries based on income inequality (Gini Index) and public debt levels?
- **Neural Network:** Can a neural network predict GDP growth based on historical data on public debt, inflation, and government spending?

3. Objective: Analyze the relationship between education, employment, and social mobility

- **Time series:** How have changes in adult literacy rates correlated with unemployment rates over the past years?

- **Hypothesis testing:** Do countries with higher youth literacy rates have significantly lower youth unemployment rates?
- **Multiple Linear Regression:** How do literacy rates, unemployment rates by education level, and GDP growth predict poverty levels?
- **Classification:** Can countries be classified into high/low employment stability groups based on debt levels, education, and inflation?
- **Clustering:** Are there distinct clusters of countries based on literacy rates, gender disparities in life expectancy, and youth unemployment?
- **Neural Network:** Can a neural network predict trade activity based on education levels, inflation rates, and economic inequality?

4. Objective: Analyze the impact of economic and social factors related to youth unemployment.

- **Time Series Analysis:** How have youth unemployment rates changed over the last 3 years, and how do they correlate with GDP growth and government spending on education?
- **Hypothesis Testing:** Do countries with higher literacy rates for youth have significantly lower youth unemployment rates?
- **Multiple Linear Regression:** How do inflation, government expenditure on education, and GDP growth predict youth unemployment rates?
- **Classification:** Can countries be classified into high and low youth unemployment groups based on education levels, inflation rates, and GDP growth?
- **Clustering:** Are there distinct clusters of countries based on youth literacy rates, employment rates, and public debt levels?
- **Neural Networks:** Can a neural network predict a country's youth unemployment rate based on historical economic and social indicators?

5. Objective: Investigate the impact of access to essential services on poverty reduction

- **Time Series Analysis:** How has access to electricity and clean drinking water changed over the last 3 years, and how do these trends correlate with poverty rates?
- **Hypothesis Testing:** Do countries with higher electricity access percentages have significantly lower poverty headcount ratios?
- **Multiple Linear Regression:** How do access to drinking water, electricity, and literacy rates predict poverty levels?
- **Classification:** Can countries be categorized into high- and low-poverty groups based on essential service access (electricity, clean water, and sanitation)?
- **Clustering:** Are there distinct clusters of countries based on access to electricity, water sanitation, and employment rates?
- **Neural Networks:** Can a neural network predict poverty headcount ratios based on historical infrastructure and social indicators such as electricity access, literacy rates, and employment levels?

6. Objective: Assess the relationship between economic and social indicators

- **Time Series Analysis:** How have national poverty rates changed over the past 3 years in relation to GDP growth, unemployment rates, and literacy rates across different countries?
- **Hypothesis Testing:** Does a higher literacy rate significantly reduce national poverty levels across countries?
- **Hypothesis Testing:** Is there a significant difference in poverty headcount ratios between countries with high government expenditure on public services and those with low government expenditure?
- **Multiple Linear Regression:** What is the combined effect of GDP growth, unemployment rates, and government expenditure on poverty headcount ratios?
- **Clustering:** Can countries be grouped into distinct clusters based on their economic and social indicators (GDP growth, unemployment rates, literacy rates, and life expectancy) to identify patterns in poverty levels?
- **Neural Network:** Can a neural network model accurately predict national poverty headcount ratios using economic (GDP growth, trade balance, government expenditure) and social (unemployment, literacy rate, life expectancy) indicators?

7. Objective: Evaluate the impact of environmental and public debt indicators on economic growth

- **Time Series Analysis:** How have CO2 emissions, renewable energy consumption, and public debt levels influenced GDP growth trends over the past 3 years in developing economies?
- **Hypothesis Testing:** Does an increase in external debt stocks negatively impact GDP growth across developing countries?
- **Hypothesis Testing:** Does an increase in renewable energy consumption significantly contribute to higher GDP growth rates over time?
- **Clustering:** Can countries be grouped into distinct clusters based on their environmental sustainability measures (CO2 emissions, renewable energy consumption, forest area) and their economic growth performance?
- **Neural Network:** Can a neural network model accurately predict GDP growth based on environmental indicators (CO2 emissions, renewable energy consumption) and public debt factors (external debt, total debt service percentage)?