Data Analysis Report

on

# Literacy Rate Inflation GDP in Bangladesh Dataset - RAW BIAnalysis

Prepared by

**Saad Bin Manjur Adit**

# Contents

# Dataset

**File name:** Literacy Rate inflation GDP in Bangladesh Dataset - RAW BIAnalysis.csv
**Format:** CSV

## A Brief Information of Dataset:

```
RangeIndex: 101 entries, 0 to 100
Columns: 118 entries, Year to Percent
dtypes: float64(26), object(92)
```

## Glimpse of Statistical Metrics:

For the first few features only

| | Year | Literacy Rate(%) | Net Migration Rate | GNI (Billion USD) | Number of Private Vehichles | Death Rate | Life Expectancy (years) | Urban Population % of Total | Crime Rate (Per 100K Population) | Murder/Homicide Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| **count** | 44.000000 | 44.000000 | 43.000000 | 44.000000 | 0.0 | 44.000000 | 44.000000 | 44.000000 | 19.000000 | 19.000000 |
| **mean** | 2001.500000 | 48.115455 | -2.162070 | 120.265000 | NaN | 8.180159 | 64.452955 | 26.127045 | 2.647895 | 2.647895 |
| **std** | 12.845233 | 16.600579 | 1.028741 | 133.834785 | NaN | 2.988621 | 6.756697 | 7.512243 | 0.211702 | 0.211702 |
| **min** | 1980.000000 | 26.000000 | -4.542000 | 18.480000 | NaN | 5.531000 | 52.480000 | 14.850000 | 2.190000 | 2.190000 |
| **25%** | 1990.750000 | 33.125000 | -2.721500 | 33.437500 | NaN | 5.654750 | 58.460000 | 20.147500 | 2.555000 | 2.555000 |
| **50%** | 2001.500000 | 48.750000 | -2.113000 | 57.450000 | NaN | 6.811000 | 65.820000 | 24.430000 | 2.680000 | 2.680000 |
| **75%** | 2012.250000 | 59.325000 | -1.338500 | 149.825000 | NaN | 10.275500 | 70.497500 | 32.182500 | 2.815000 | 2.815000 |
| **max** | 2023.000000 | 76.800000 | -0.452000 | 493.930000 | NaN | 14.768000 | 73.570000 | 40.470000 | 2.920000 | 2.920000 |

# After Cleaning:

44 rows and 68 columns

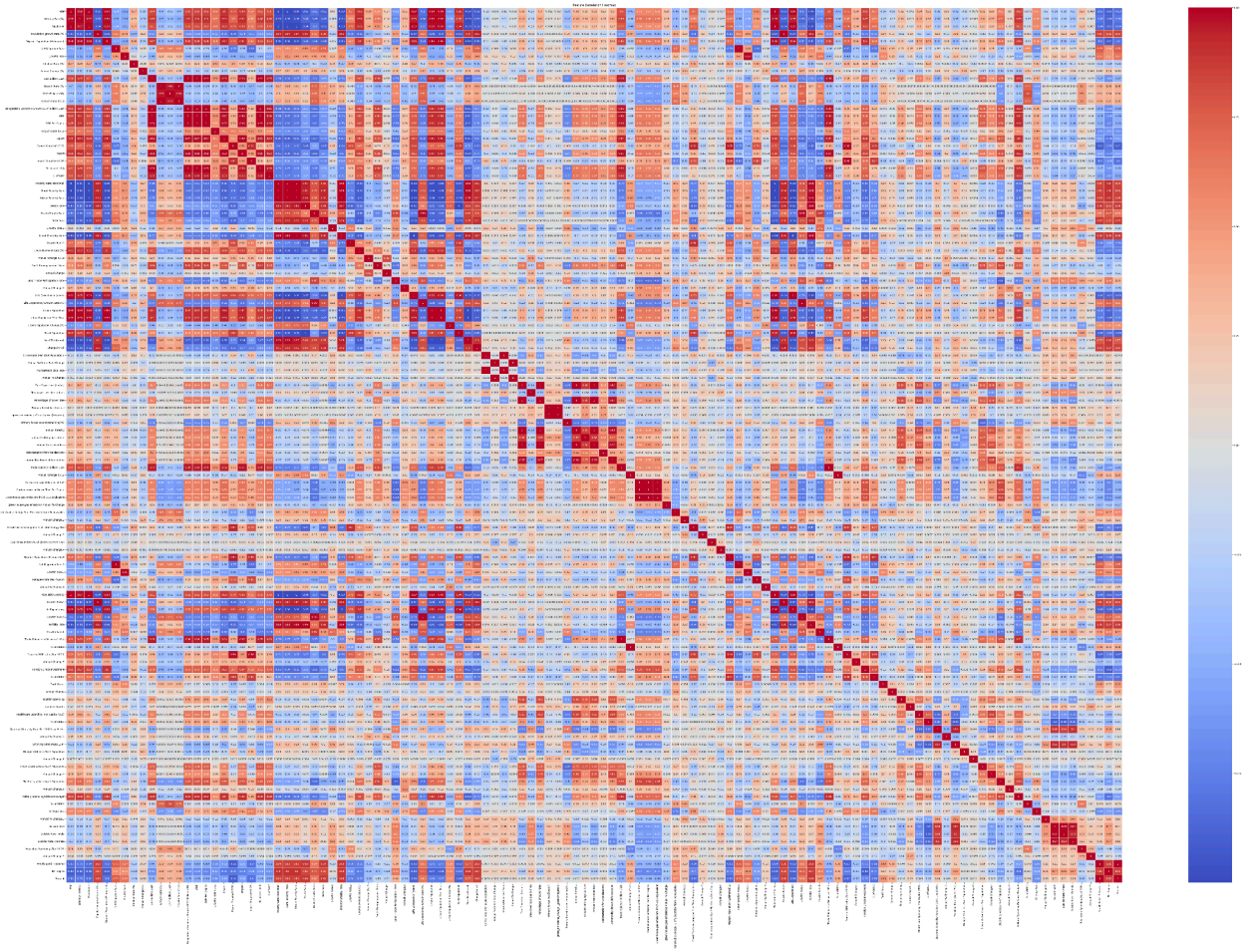
```
RangeIndex: 44 entries, 0 to 43
Data columns (total 68 columns):
 #   Column                                          Non-Null Count  Dtype
---  ------                                          --------------  -----
 0   Year                                            44 non-null     int64
 1   Literacy Rate(%)                                44 non-null     float64
 2   Population growth rate (%)                      44 non-null     float64
 3   Migrant Population (Estimated)                  44 non-null     int64
 4   Net Migration Rate                              44 non-null     float64
 5   Growth Rate                                     44 non-null     float64
 6   Inflation Rate (%)                              44 non-null     float64
 7   GNP (Billion USD)                               44 non-null     float64
 8   Bangladesh Economic Growth GDP (Billion USD)    44 non-null     float64
 9   GDP Per Capita                                  44 non-null     int64
 10  Export                                          44 non-null     float64
 11  Export Growth(%GDP)                             44 non-null     float64
 12  Import                                          44 non-null     float64
 13  Import Growth(%GDP)                             44 non-null     float64
 14  Poverty Rate (National)                         44 non-null     float64
 15  Urban Poverty Rate                              44 non-null     float64
 16  Death Rate                                      44 non-null     float64
 17  Death Growth Rate                               44 non-null     float64
 18  Birth Rate                                      44 non-null     float64
 19  Infant Mortality Rate                           44 non-null     float64
 20  Unemployment Rate (%)                           44 non-null     float64
 21  Youth Unemployment Rate                         44 non-null     float64
 22  Annual Change                                   44 non-null     float64
 23  Labor Force Participation Rate                  44 non-null     float64
 24  Life Expectancy (years)                         44 non-null     float64
 25  Life Expectancy Growth Rate (%)                 44 non-null     float64
 26  Urban Population                                44 non-null     int64
 27  Urban Population Change (%)                     44 non-null     float64
 28  Rural Population                                44 non-null     int64
 29  Change(rural)                                   44 non-null     float64
 30  Crime Rate (Per 100K Population)                44 non-null     float64
 31  Annual % Crime Rate Change                      44 non-null     float64
 32  Tree Cover Loss(hector)                         44 non-null     float64
 33  Tree cover loss due to fires                    44 non-null     float64
 34  Primary forest loss(hector)                     44 non-null     float64
 35  gross_emissions_co2e_all_gases(Megaton)         44 non-null     float64
 36  Primary forest extent remaining(%)              44 non-null     float64
 37  annual shifting agriculture                     44 non-null     float64
 38  deforestation for urbanizations                 44 non-null     float64
 39  commodity driven deforestation                  44 non-null     float64
 40  Trade Balance (Billion USD)                     44 non-null     float64
 41  Carbon emissionKilotons of Co2                  44 non-null     float64
 42  green house gas emissions Annual % Change       44 non-null     float64
 43  renewable energy % of Electricity from Renewables  44 non-null  float64
 44  Fossil Fuel consumption % of Total Energy Use   44 non-null     float64
 45  Coal consumption % of Electricity from Coal     44 non-null     float64
 46  Refugees Granted Asylum                         44 non-null     float64
 47  Population Density                              44 non-null     float64
```

# Data Analysis

## List of Top 40 Correlated Features

| | | |
|---|---|---|
| GDP Per Capita | Bangladesh Economic Growth GDP (Billion USD) | 0.999700 |
| Bangladesh Economic Growth GDP (Billion USD) | GDP Per Capita | 0.999700 |
| Life Expectancy (years) | Infant Mortality Rate | 0.999372 |
| Infant Mortality Rate | Life Expectancy (years) | 0.999372 |
| Poverty Rate (National) | Population Density | 0.998727 |
| Population Density | Poverty Rate (National) | 0.998727 |
| | Year | 0.998512 |
| Year | Population Density | 0.998512 |
| Poverty Rate (National) | Urban Poverty Rate | 0.998054 |
| Urban Poverty Rate | Poverty Rate (National) | 0.998054 |
| Year | Poverty Rate (National) | 0.997426 |
| Poverty Rate (National) | Year | 0.997426 |
| Rural Population | Death Rate | 0.996970 |
| Death Rate | Rural Population | 0.996970 |
| Primary forest loss(hector) | gross_emissions_co2e_all_gases(Megaton) | 0.996937 |
| gross_emissions_co2e_all_gases(Megaton) | Primary forest loss(hector) | 0.996937 |
| Population Density | Urban Poverty Rate | 0.995432 |
| Urban Poverty Rate | Population Density | 0.995432 |
| Infant Mortality Rate | Urban Poverty Rate | 0.995213 |
| Urban Poverty Rate | Infant Mortality Rate | 0.995213 |
| Life Expectancy (years) | Population Density | 0.994367 |
| Population Density | Life Expectancy (years) | 0.994367 |
| Life Expectancy (years) | Urban Poverty Rate | 0.994247 |
| Urban Poverty Rate | Life Expectancy (years) | 0.994247 |
| Poverty Rate (National) | Life Expectancy (years) | 0.993632 |
| Life Expectancy (years) | Poverty Rate (National) | 0.993632 |
| Export | Import | 0.993586 |
| Import | Export | 0.993586 |
| Fertility Rate | Infant Mortality Rate | 0.993186 |
| Infant Mortality Rate | Fertility Rate | 0.993186 |
| Death Rate | Fertility Rate | 0.992936 |
| Fertility Rate | Death Rate | 0.992936 |
| Poverty Rate (National) | Infant Mortality Rate | 0.992928 |
| Infant Mortality Rate | Poverty Rate (National) | 0.992928 |
| | Population Density | 0.992570 |
| Population Density | Infant Mortality Rate | 0.992570 |
| Urban Poverty Rate | Year | 0.991620 |
| Year | Urban Poverty Rate | 0.991620 |
| Migrant Population (Estimated) | Urban Population | 0.991398 |
| Urban Population | Migrant Population (Estimated) | 0.991398 |

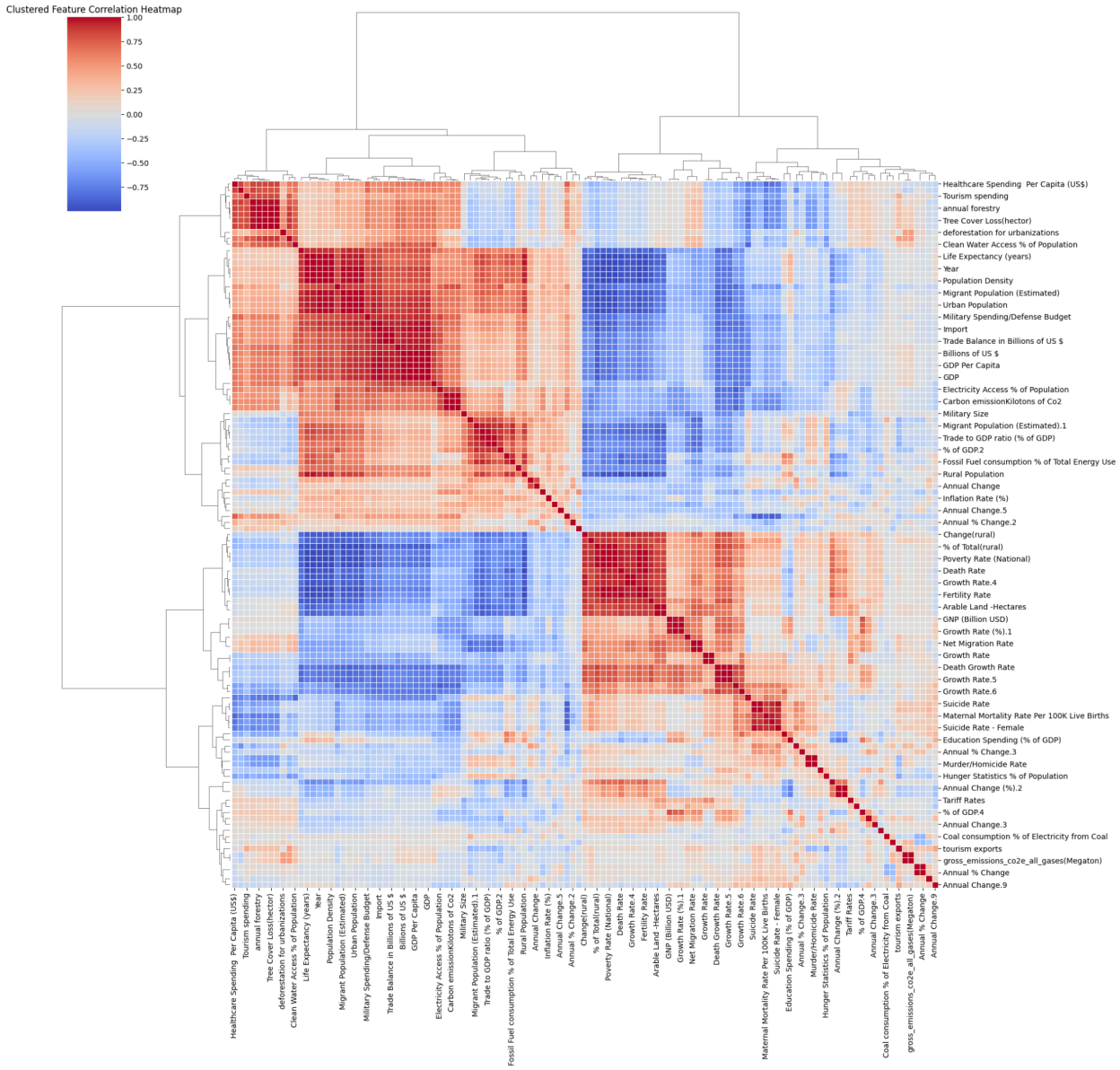
# Features Correlation Heatmap



Due to the high number of features the correlation heatmap of all variables is hard to interpret

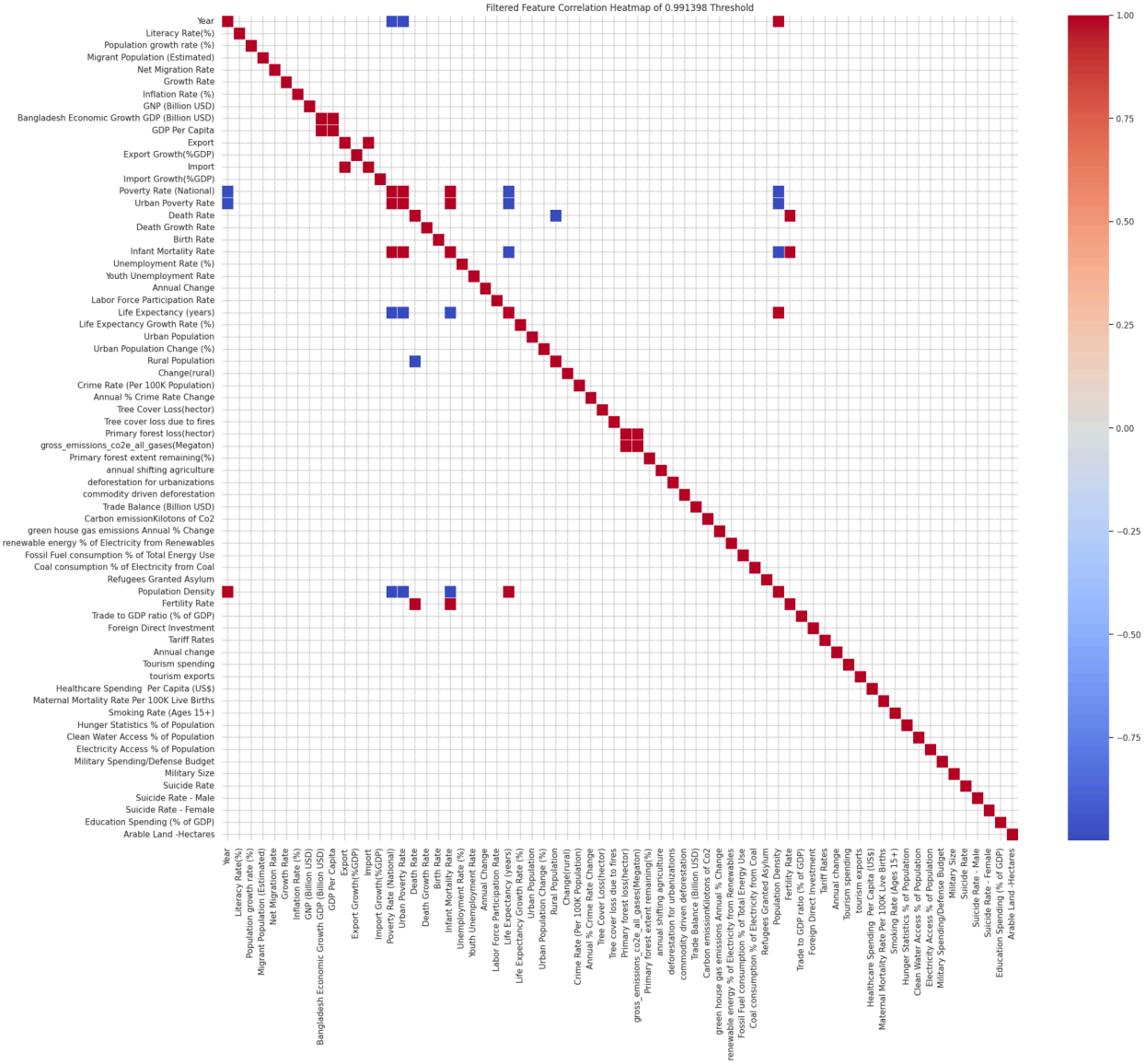
# Visualization

## Clustered Correlation Matrix



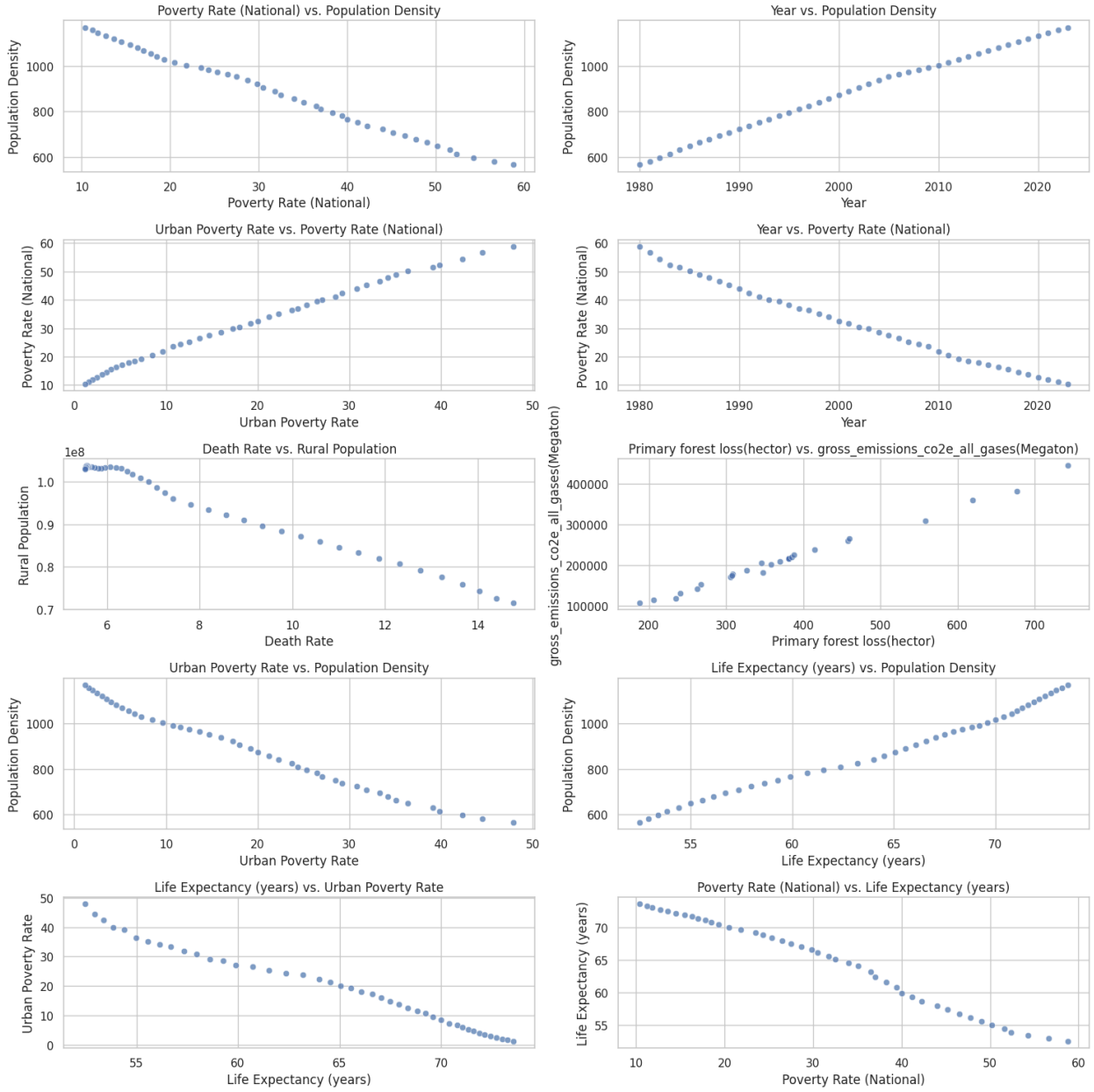

The clustered matrix of correlation splits the features into 4 different quartiles and built a relationship among them

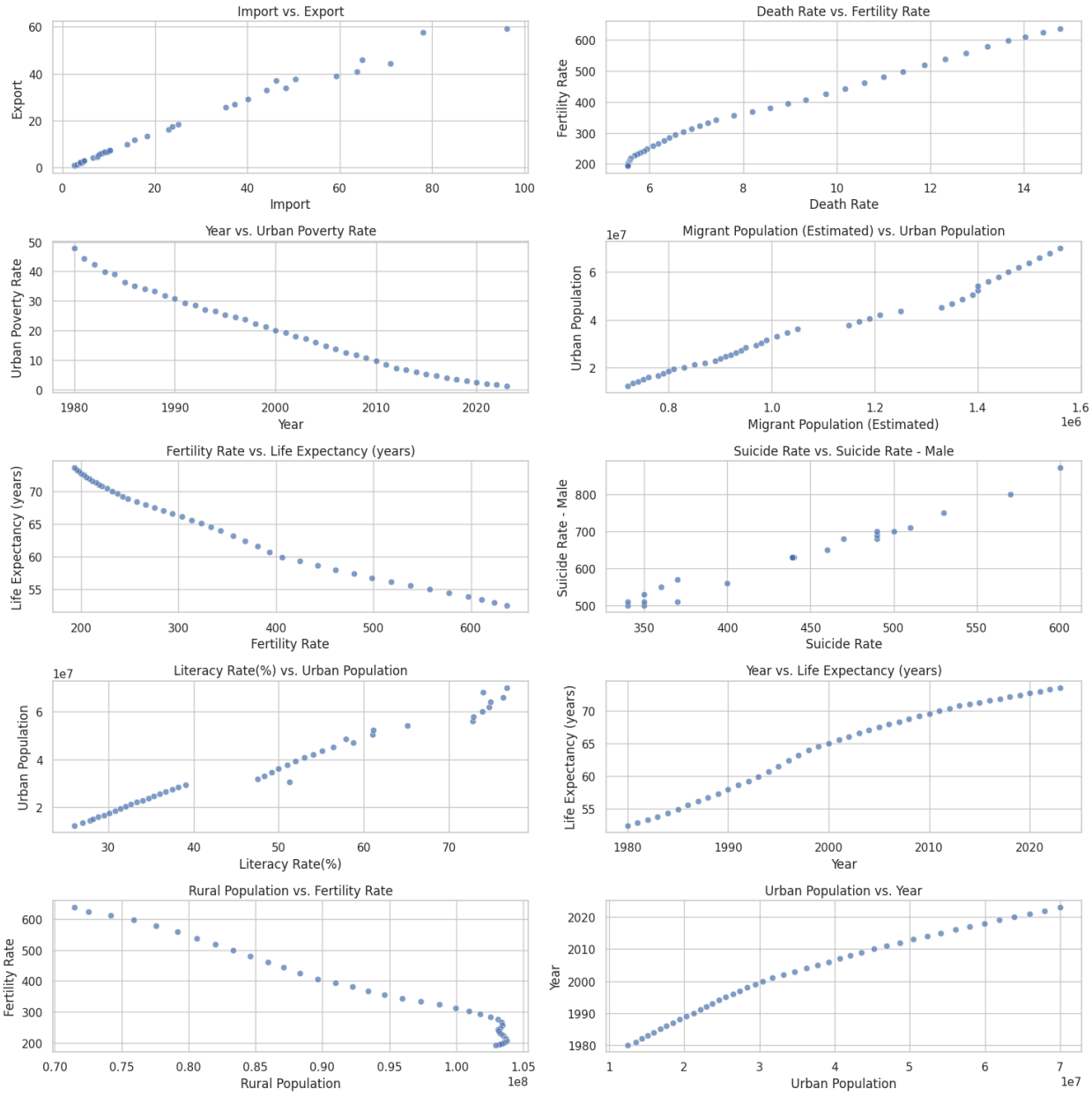
# The Top 40 Correlated Features Matrix




The above correlation matrix shows the threshold 0.991398 which is the 40th temperature of correlated features

# Subplots of Correlated Top 40 Features



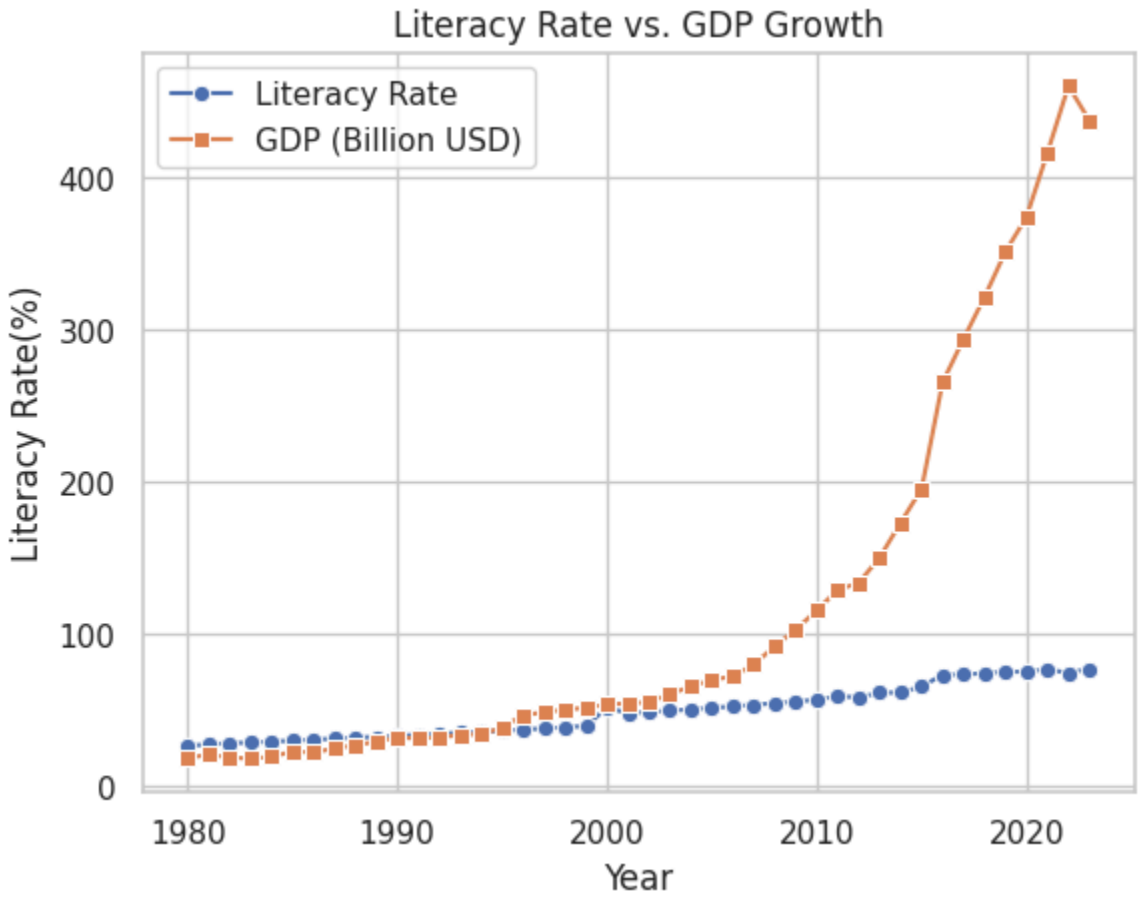



The above 2 scattered subplots visualize a glance at the top 40 correlated features where some are positively correlated (i.e. Year vs. Population Density, Death Rate vs. Fertility Rate, etc.) and some are negatively correlated (i.e. Poverty Rate vs. Life Expectancy (years), Rural Population vs. Fertility Rate etc.)

# Insight

## Literacy Rate vs. GDP Growth

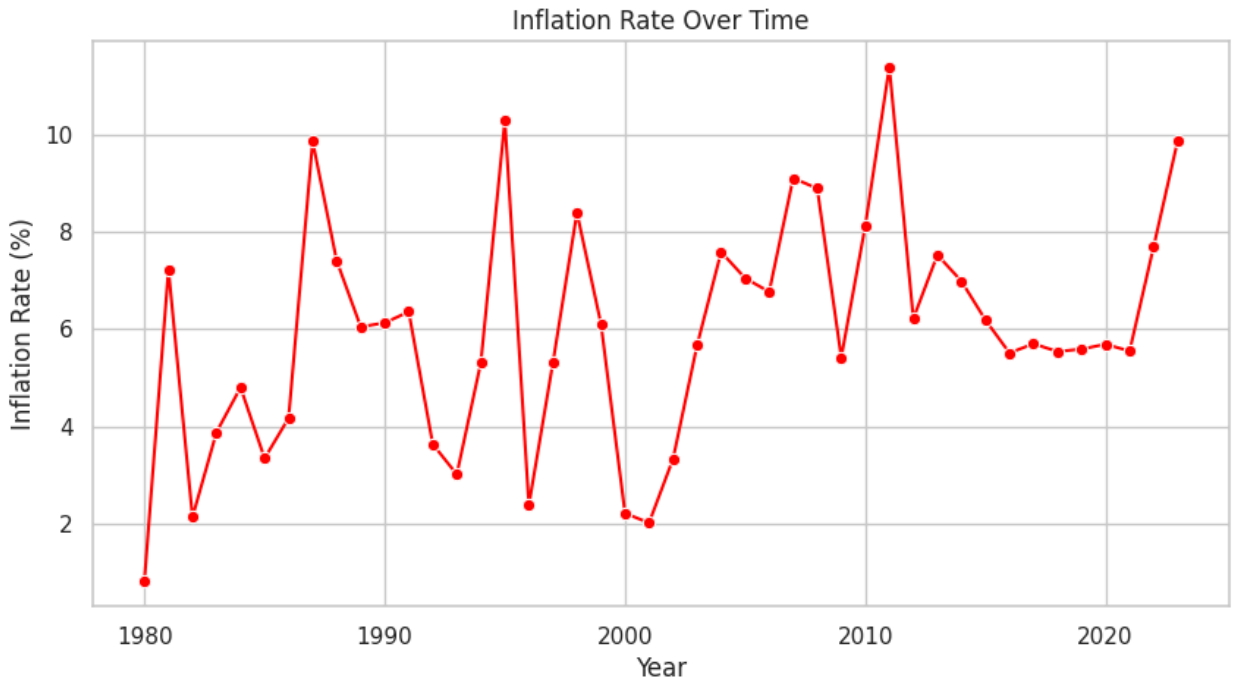
The line chart shows how the literacy rate correlates with economic growth




The line chart shows the GDP raised massively after the year of 2010 when the Literacy Rate is slightly increased in terms of GDP

## Inflation Rate Trends

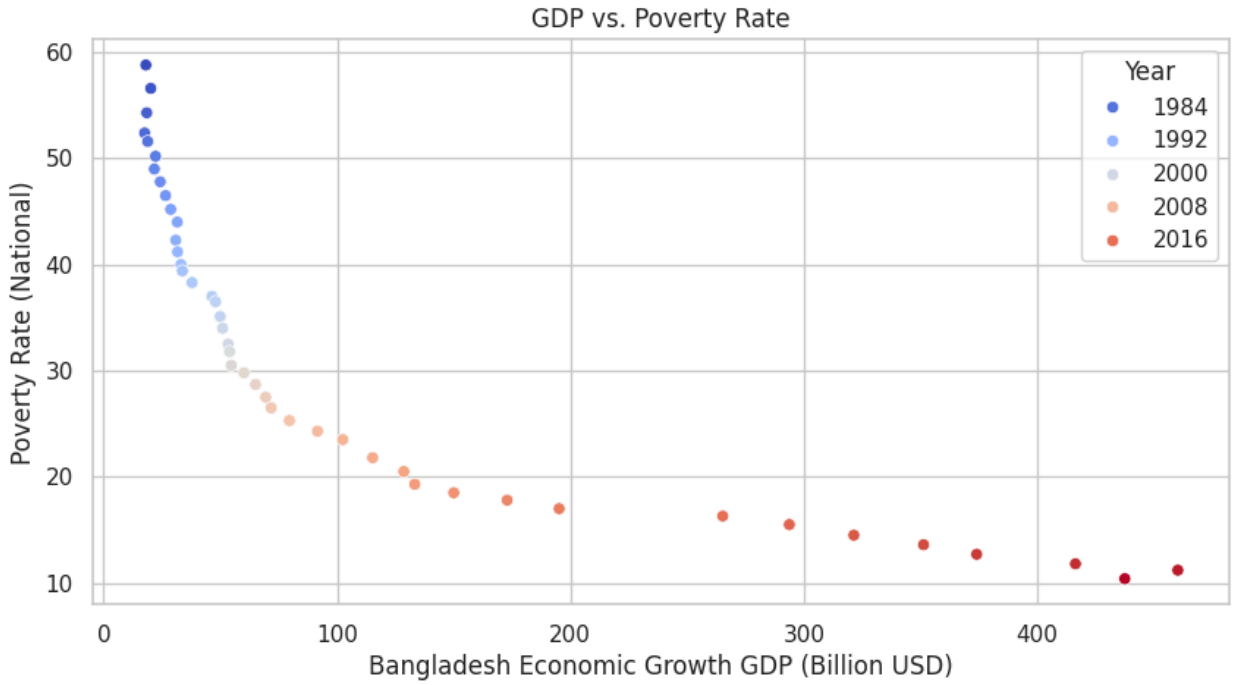
This observes how inflation fluctuates over time.




By observing the trend we can from 1980-2000 these 20 years had many peaks and falls but not the highest one after 2010 happened. Then before 2020, it stayed stable and rose after 2020.

## Poverty Rate vs. GDP

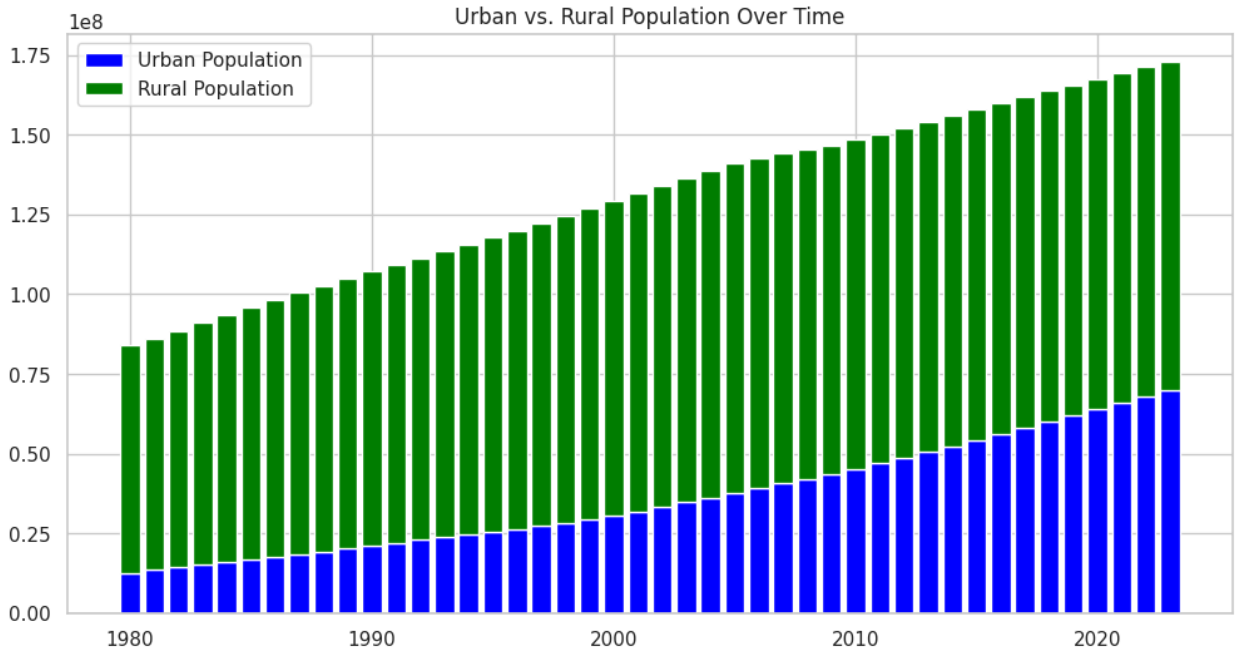
It checks if GDP growth reduces poverty levels.




There is a good sign on the above scattered plot that from 1984 the GDP raised over 400B after 2016. On the other hand, poverty rate decreased to 10.

# Urban vs. Rural Population Trends

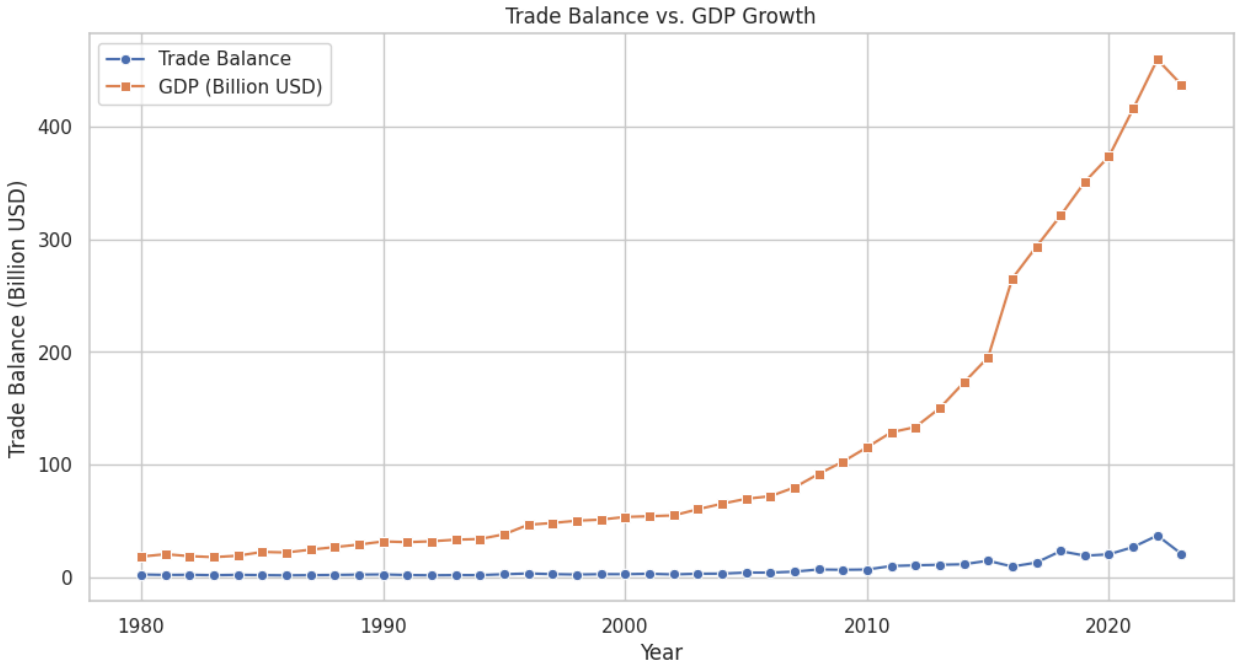
This will examine urbanization trends.




The stacked bar chart shows there is a static linear move of urban and rural populations over time. Where rural areas are more populated than urban areas.

## Trade Balance vs. GDP

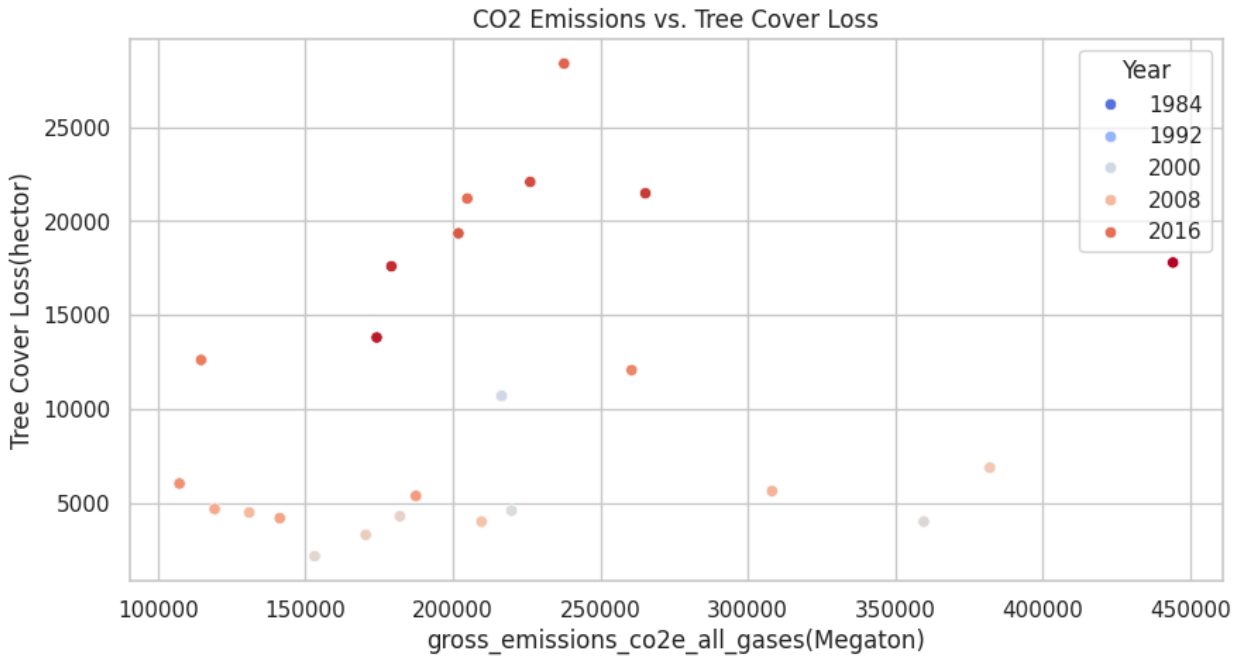
It will determine the impact of trade on GDP.




The line chart shows the GDP raised massively after the year of 2010 where Trade Balance growth is less significant in terms of GDP.

## CO2 Emissions & Deforestation

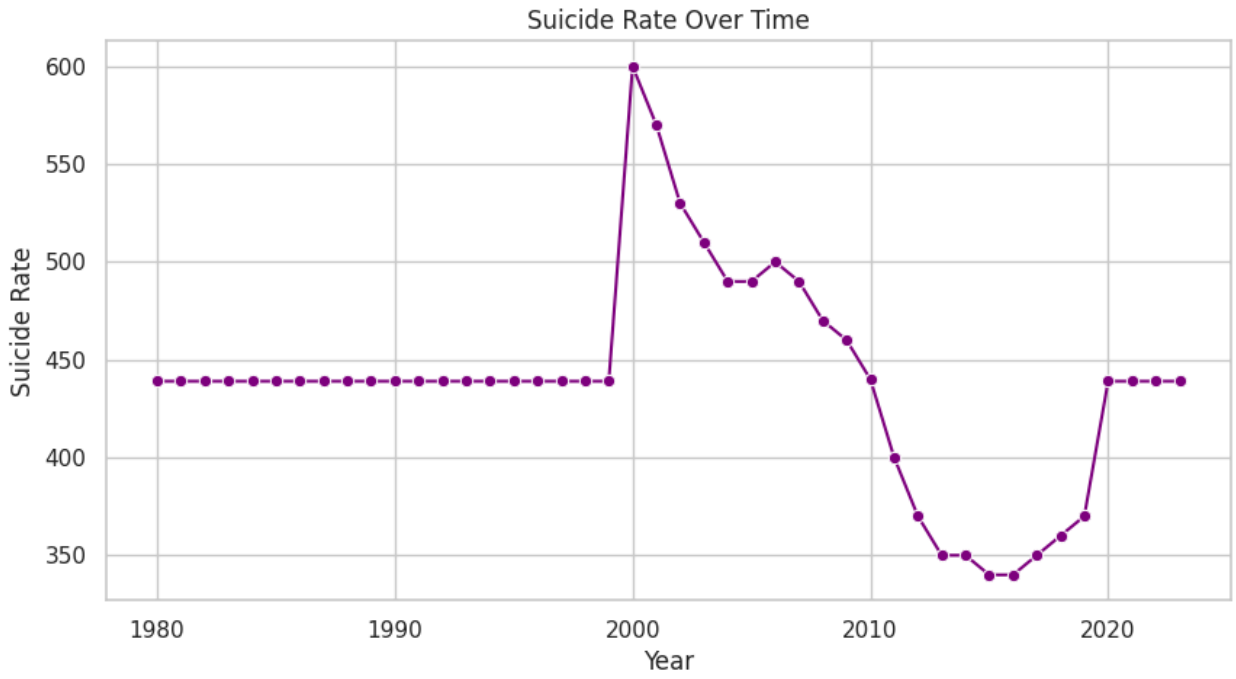
This will check the environmental impact of economic growth.




By cutting down trees or setting fire to forests CO2 emissions rose overtime. Deforestation has a proportional impact on CO2 emissions as we can see from the above plot

## Suicide Rate Trends

This will help to keep track of mental health trends over time.




The suicide rate trend was stable from 1980 to just before 2000. In 2000 we see a spike and after a few years it falls later it started to decay after 2005. Then raised in 2020.