Environmental Analysis on African Subcontinent

Aman Khandelwal (2022201010)
Arun Das (2022201021)
Divyansh Negi (2022201014)
Nikhil Chawla (2022201045)
Nikhil Khemchandani (2022201042)
Piyush Singh (2022201032)

What are we doing ?

- **Objective**: Our main goal is to gain statistical insights into the factors and attributes influencing the African continent.

- **Data Visualization**: We are employing data visualization techniques to present the analyzed data in visually compelling ways, aiding in better understanding and interpretation.

- **Correlation Discovery**: Our primary focus is on identifying correlations among these diverse attributes to understand the complex interplay between them.

- **Predictive Analytics**: We are utilizing these correlations to make predictions about environmental factors that contribute to the degradation and deterioration of Africa's natural environment.

- **Interactive Website**: To achieve this, we are developing an interactive website that will serve as a platform to showcase and explore these insights.

Data and Methodology

We are Fetching **Real Time Data** From UN Website and collaborating them in our website :-

UN Data : One of our primary data sources is the United Nations data repository, accessible at https://data.un.org/default.aspx.

From this source and various other sources, we extracted valuable economic environmental factors such as GDP and essential social factors like population and population density.

https://www.esa.int/ESA_Multimedia/Images/2017/10/African_land_cover

https://data.world/datasets/africa

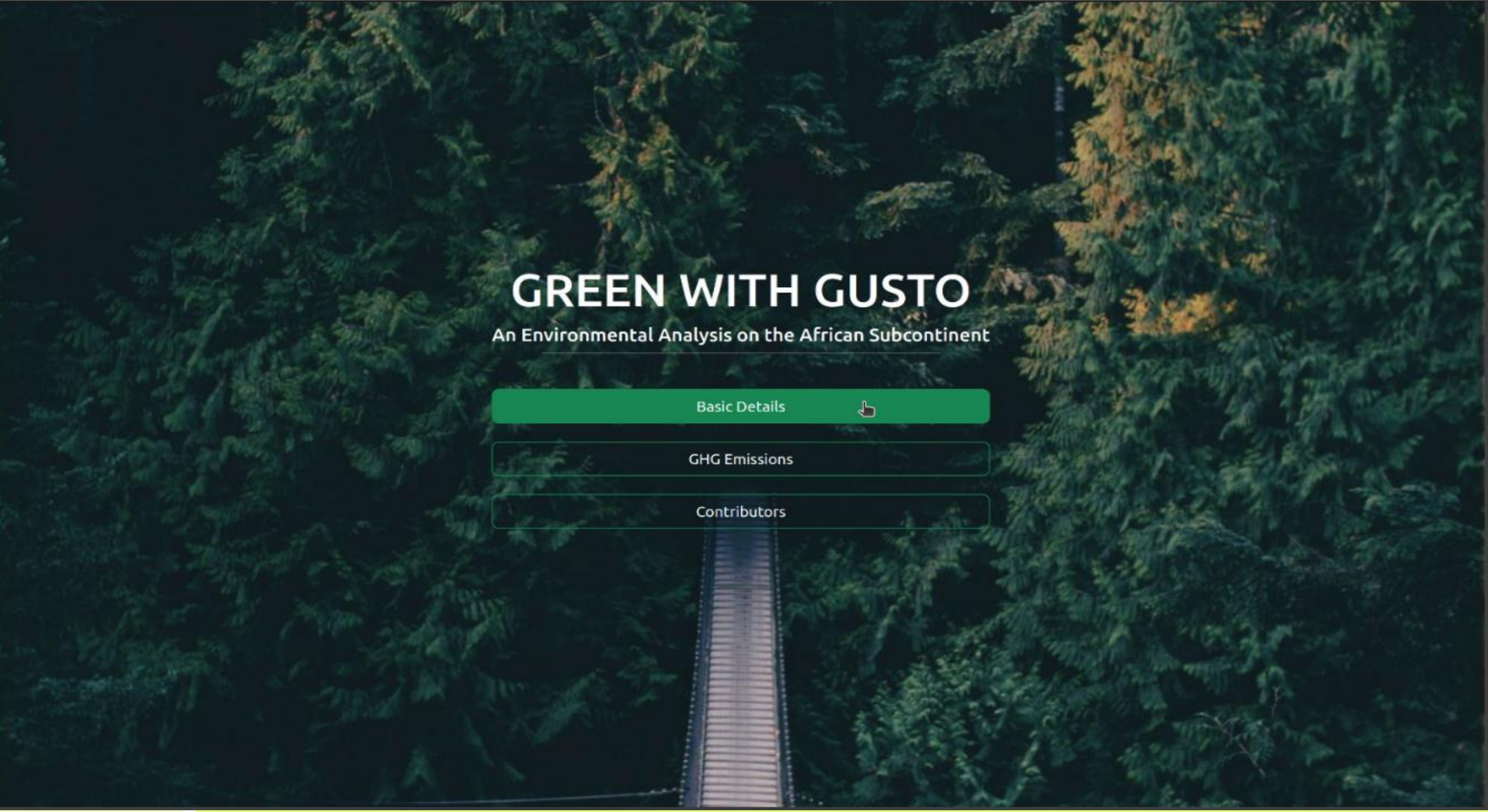
https://dataportal.opendataforafrica.org/data#menu=topic

https://www.nber.org/research/data/portal-public-use-datasets-sub-saharan-africa

https://opendatabarometer.org/3rdedition/regional-report/africa/

https://databank.worldbank.org/databases/africa

https://data.worldbank.org/country/ZG


GREEN WITH GUSTO
An Environmental Analysis on the African Subcontinent
Basic Details
GHG Emissions
Contributors

Country: Cameroon

Basic Details for Cameroon

Population (000, 2021)	99
Pop. density (per km2, 2021)	224.4
Capital city	Saint John's
UN membership date	11-Nov-81
Surface area (km2)	442
Sex ratio (m per 100 f)	93.4
National currency	E. Caribbean Dollar (XCD)
Exchange rate (per US$)	2.7
GDP: Gross domestic product (million current US$)	1662
GDP growth rate (annual %, const. 2015 prices)	3.4
GDP per capita (current US$)	17112.8
Population growth rate (average annual %)	0.9
Urban population (% of total population)	24.5
Fertility rate, total (live births per woman)	2
Life expectancy at birth (females/males, years)	77.9/75.7
Infant mortality rate (per 1 000 live births)	5.2

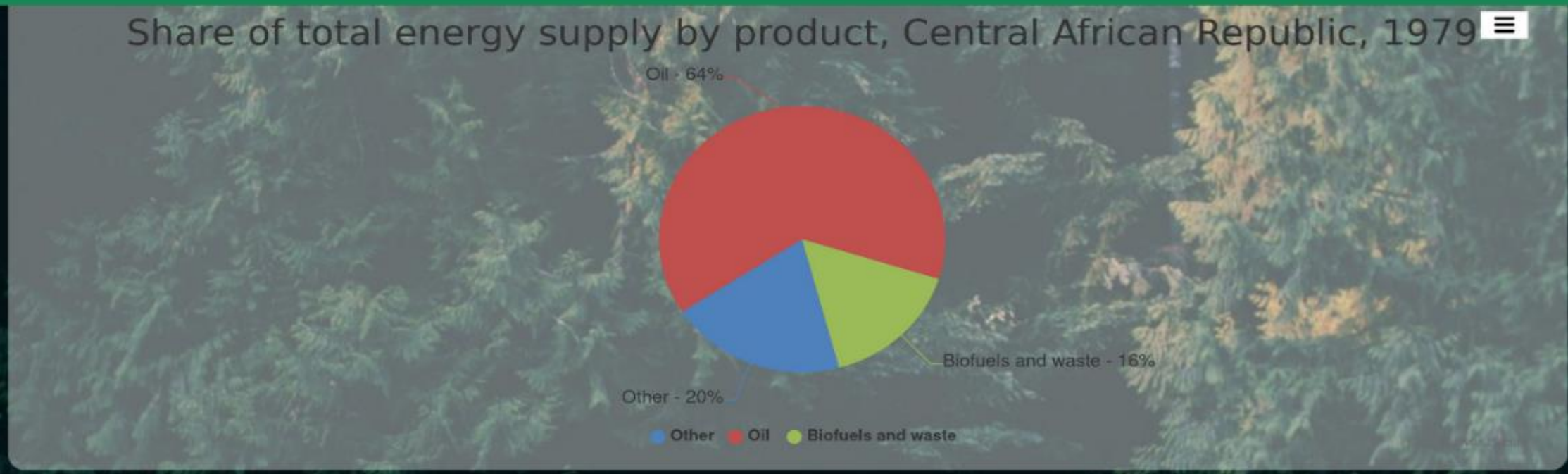
Country: Central African Republic

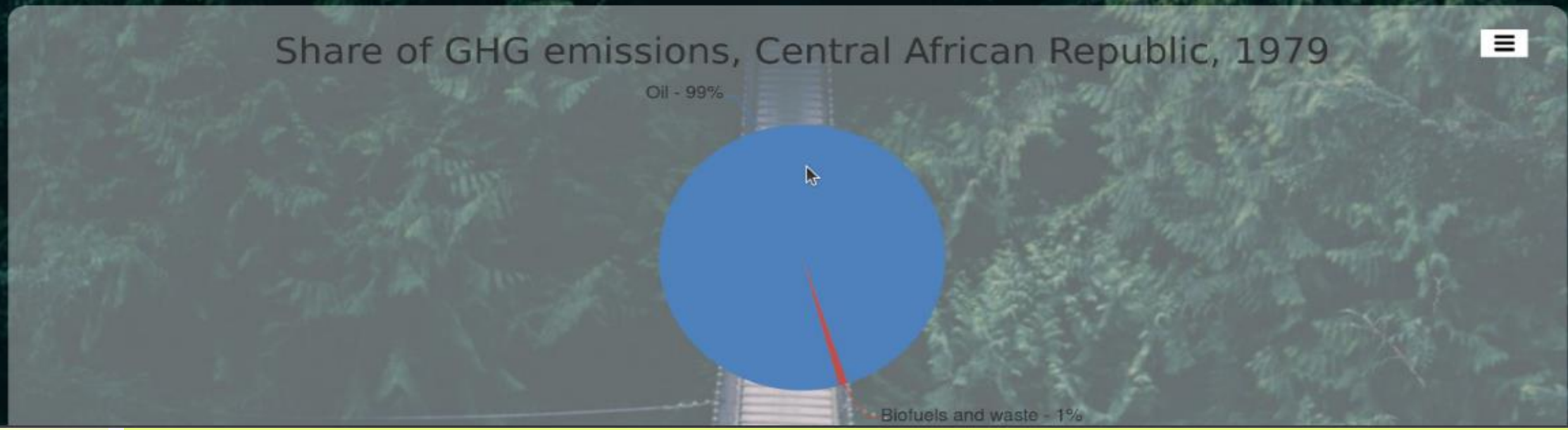
Year: 1979

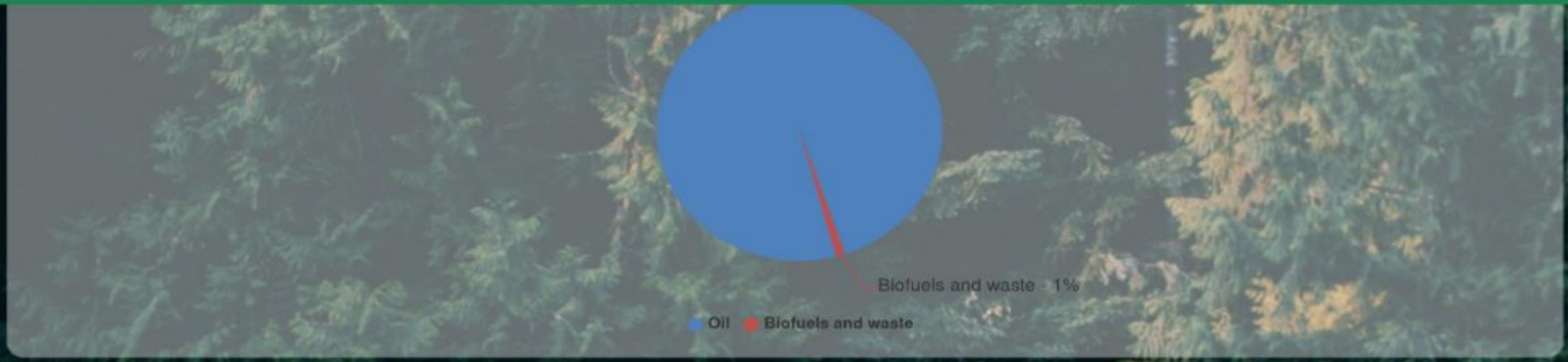
Key emissions figures for 1979, Central African Republic

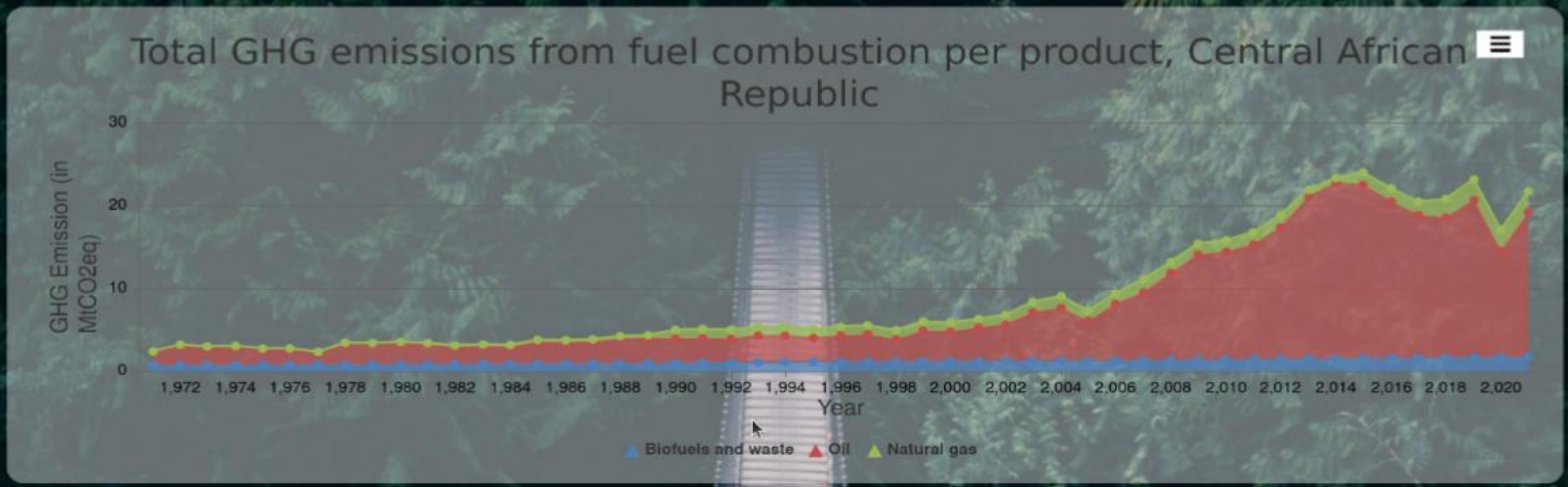
CO2 / population (tCO2 per capita)	1.618
CO2 / TES (tCO2 per TJ)	46.273
Total GHG emissions - Fuel Combustion (tCO2eq)	3.743907
CO2 / GDP PPP (kgCO2 per 2015 USD)	0.154
Total energy supply (Other)	372.9149
Total energy supply (Oil)	1203.9566
Total energy supply (Biofuels and waste)	296.2549
Total GHG emissions - Fuel Combustion (tCO2eq) (Oil)	3.687799
Total GHG emissions - Fuel Combustion (tCO2eq) (Biofuels and waste)	0.056107

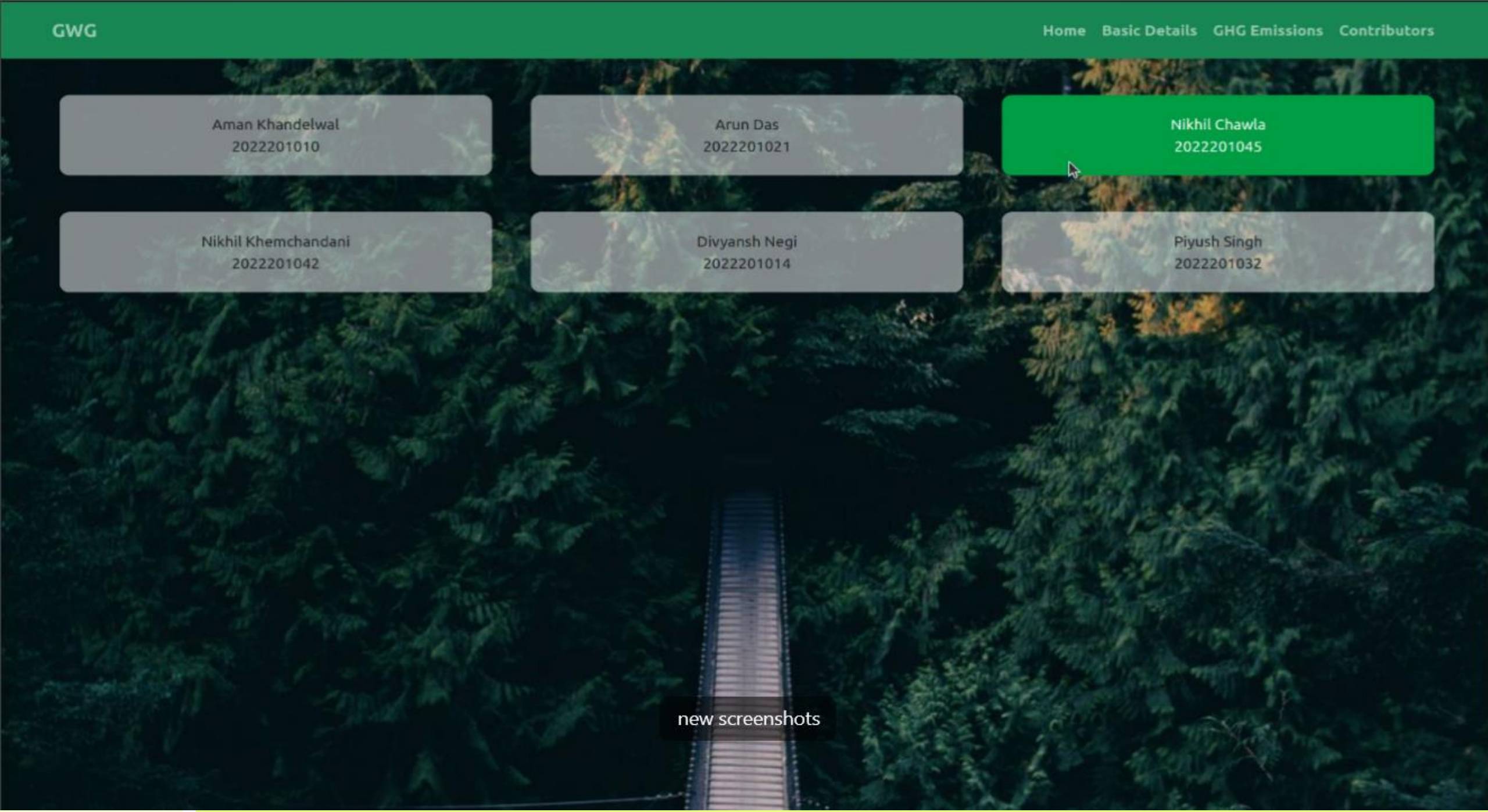
Share of total energy supply by product: Central African Republic, 1979


Share of total energy supply by product, Central African Republic, 1979
Oil - 64%
Biofuels and waste - 16%
Other - 20%
Other
Oil
Biofuels and waste


Share of GHG emissions, Central African Republic, 1979
Oil - 99%
Biofuels and waste - 1%


Biofuels and waste : 1%
Oil
Biofuels and waste


Total GHG emissions from fuel combustion per product, Central African Republic
GHG Emission (in MtCO2eq)
30
20
10
0
1,972 1,974 1,976 1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020
Year
Biofuels and waste
Oil
Natural gas


GWG
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new screenshots

Data and Methodology

Data Scraping : We found various open environmental datasets for Africa and the countries in Africa. These datasets contained statistics for carbon emissions, energy consumption, the number of threatened species, etc., over the span of a few years.

Data Cleaning and Processing : Once we had the raw data, we needed to clean it for processing by performing the following steps.

1. Handling Missing Values: Some of the values in the dataset were blank. We tried interpolating these values from the adjacent values or replaced them with the mean, depending on the dataset we were using.
2. Dealing with Outliers: We first understood why outliers might be present in the dataset. If they were due to erroneous sensor readings or some other error, we removed them.
3. Data Transformation:After cleaning the data, we found an appropriate representation for the machine learning model and the visualizations.

Exploratory Data Analysis : We used visual tools like bar charts, plots, etc., to find correlations between various parameters of the dataset. We refined our machine learning model by giving more weightage to parameters that were more correlated with our target parameter.

How the Data Looked

	T27	CO2 emission estimates	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5	Unnamed: 6
0	Region/Country/Area	NaN	Year	Series	Value	Footnotes	Source
1	8	Albania	1975	Emissions (thousand metric tons of carbon diox...	4,524	NaN	International Energy Agency, IEA World Energy ...
2	8	Albania	1985	Emissions (thousand metric tons of carbon diox...	7,145	NaN	International Energy Agency, IEA World Energy ...
3	8	Albania	2005	Emissions (thousand metric tons of carbon diox...	3,981	NaN	International Energy Agency, IEA World Energy ...
4	8	Albania	2010	Emissions (thousand metric tons of carbon diox...	4,074	NaN	International Energy Agency, IEA World Energy ...

	T26	Threatened species	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5	Unnamed: 6
0	Region/Country/Area	NaN	Year	Series	Value	Footnotes	Source
1	4	Afghanistan	2004	Threatened Species: Vertebrates (number)	31	NaN	World Conservation Union (IUCN), Gland and Cam...
2	4	Afghanistan	2010	Threatened Species: Vertebrates (number)	31	NaN	World Conservation Union (IUCN), Gland and Cam...
3	4	Afghanistan	2015	Threatened Species: Vertebrates (number)	31	NaN	World Conservation Union (IUCN), Gland and Cam...
4	4	Afghanistan	2019	Threatened Species: Vertebrates (number)	33	NaN	World Conservation Union (IUCN), Gland and Cam...

	T02	Population, density and surface area	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5	Unnamed: 6
0	Region/Country/Area	NaN	Year	Series	Value	Footnotes	Source
1	1	Total, all countries or areas	2010	Population mid-year estimates (millions)	6,985.60	NaN	United Nations Population Division, New York, ...
2	1	Total, all countries or areas	2010	Population mid-year estimates for males (milli...	3,514.41	NaN	United Nations Population Division, New York, ...
3	1	Total, all countries or areas	2010	Population mid-year estimates for females (mil...	3,471.20	NaN	United Nations Population Division, New York, ...
4	1	Total, all countries or areas	2010	Sex ratio (males per 100 females)	101.2	NaN	United Nations Population Division, New York, ...

	T24	Production, trade and supply of energy	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5	Unnamed: 6
0	Region/Country/Area	NaN	Year	Series	Value	Footnotes	Source
1	1	Total, all countries or areas	1995	Primary energy production (petajoules)	381,677	NaN	United Nations Statistics Division, New York, ...
2	1	Total, all countries or areas	2000	Primary energy production (petajoules)	412,291	NaN	United Nations Statistics Division, New York, ...
3	1	Total, all countries or areas	2005	Primary energy production (petajoules)	476,693	NaN	United Nations Statistics Division, New York, ...
4	1	Total, all countries or areas	2010	Primary energy production (petajoules)	530,014	NaN	United Nations Statistics Division, New York, ...

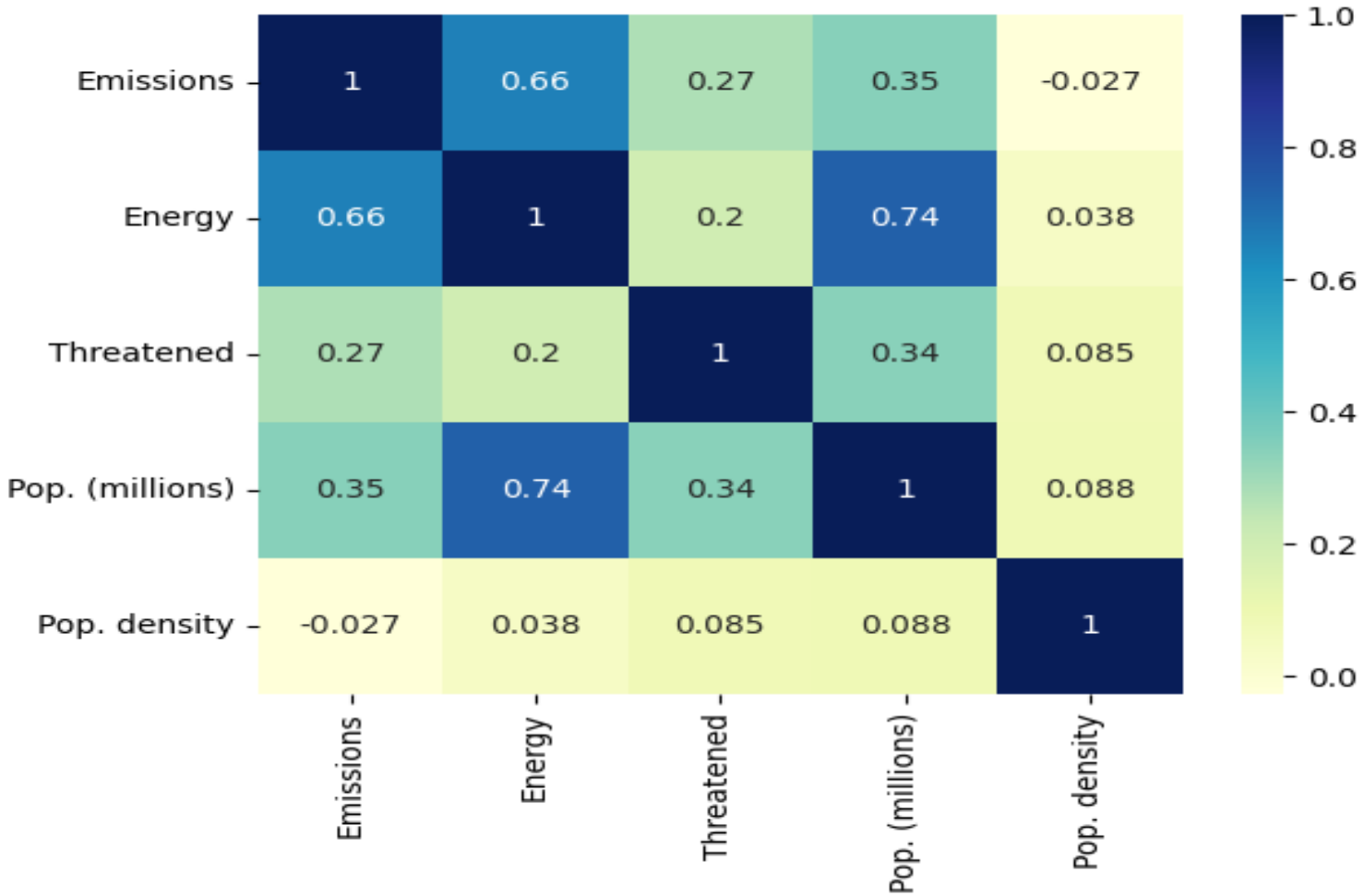
Data after Pre- Process

	Region/Country/Area	Year	Population mid-year estimates (millions)	Population density	Threatened Species: Total (number)
0	Algeria	2010	35.86	15.1	105
1	Algeria	2015	39.54	16.6	114
2	Algeria	2020	43.45	18.2	155
3	Algeria	2022	44.90	18.9	180
4	Angola	2010	23.36	18.7	117

	Region/Country/Area	Year	Emissions (thousand metric tons of carbon dioxide)	Threatened Species: Total (number)
0	Algeria	2005	78045	50
1	Algeria	2010	96452	105
2	Algeria	2015	131690	114
3	Algeria	2019	143586	145
4	Angola	2005	7510	76

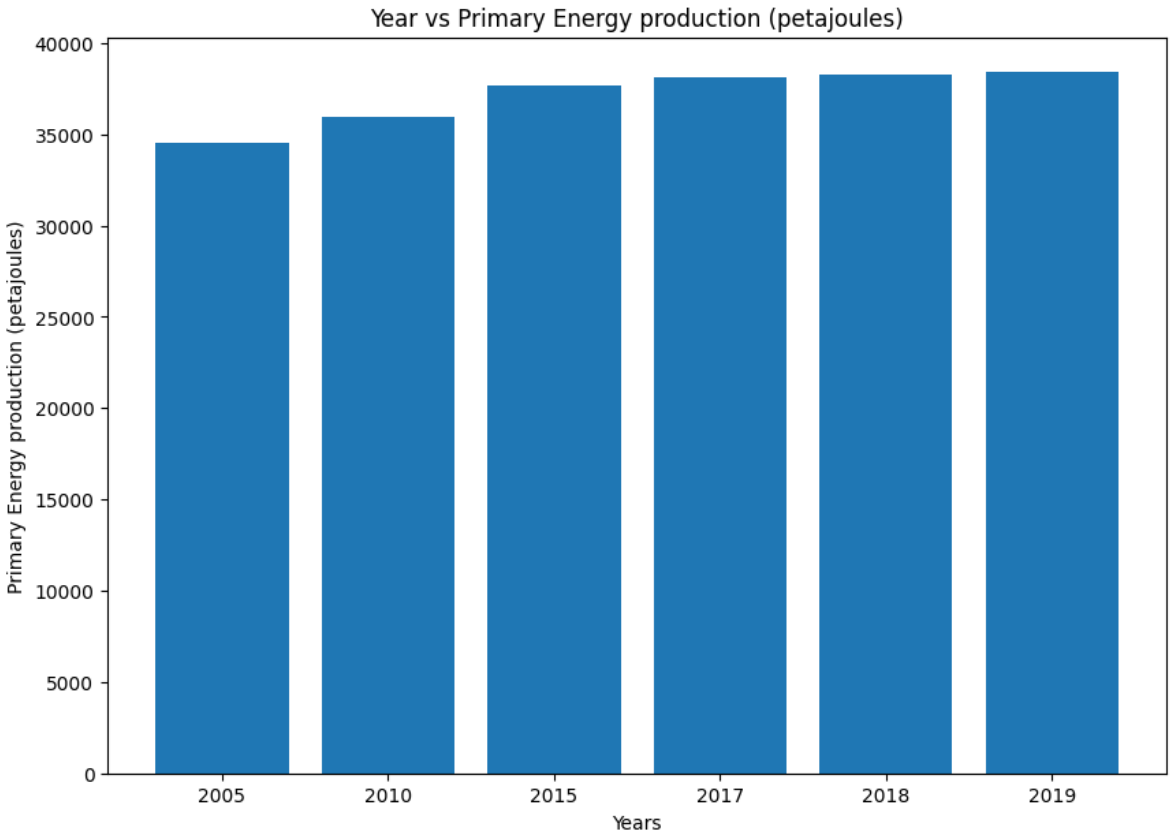
	Region/Country/Area	Year	Emissions (thousand metric tons of carbon dioxide)	Threatened Species: Total (number)
113	Zambia	2019	7566	98
114	Zimbabwe	2005	12551	43
115	Zimbabwe	2010	11753	55
116	Zimbabwe	2015	14514	60
117	Zimbabwe	2019	13882	103

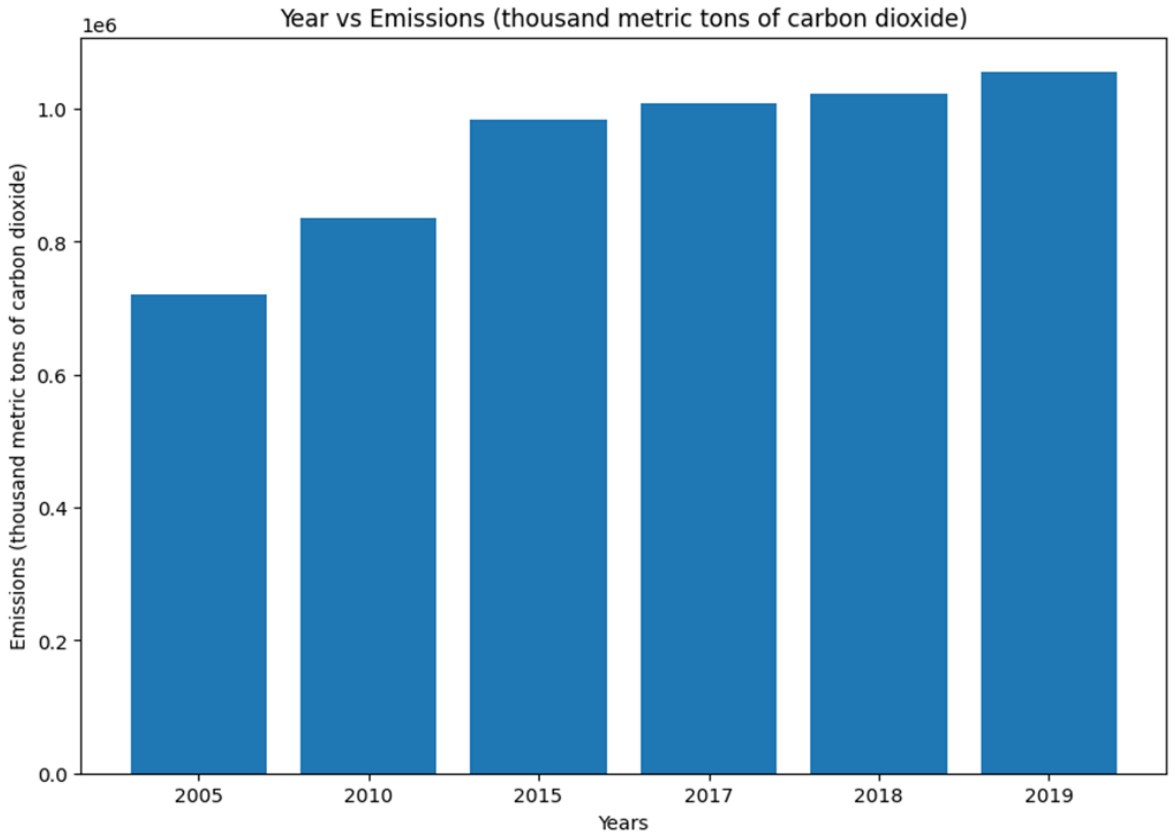
Correlation Among Different Attributes



This **Heat Map** is used by us to decide on the attributes that are affecting each other , and can be crucial in modelling and Predicting each other

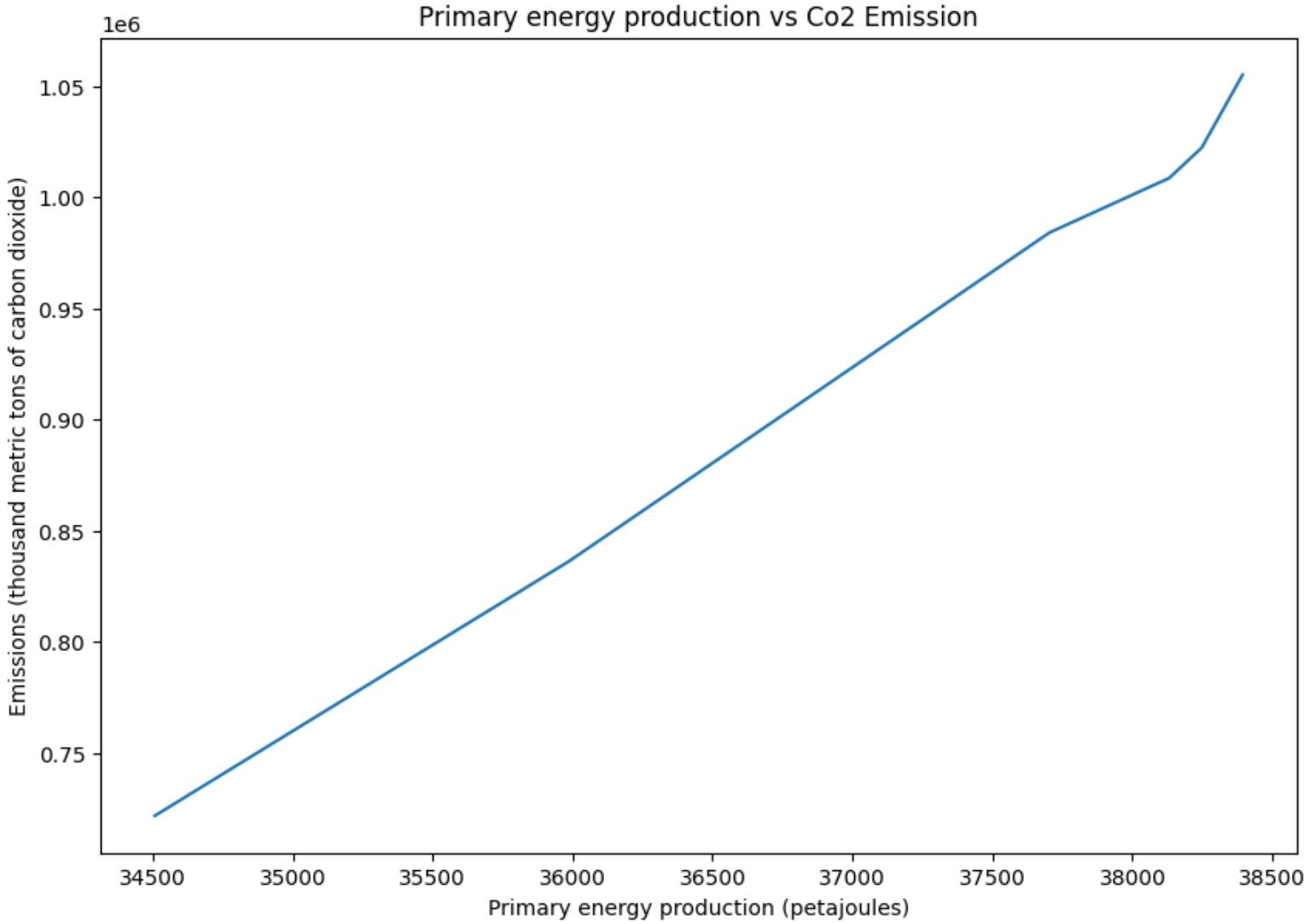
Insights





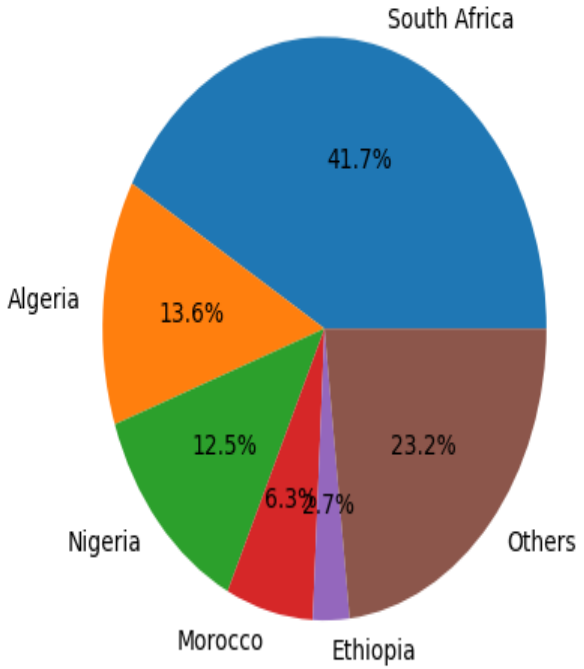
Inference : The Increase in **Production of Energy** is Linearly Increasing **CO2 Emission** in the Continent.

Graph Representing the Relation

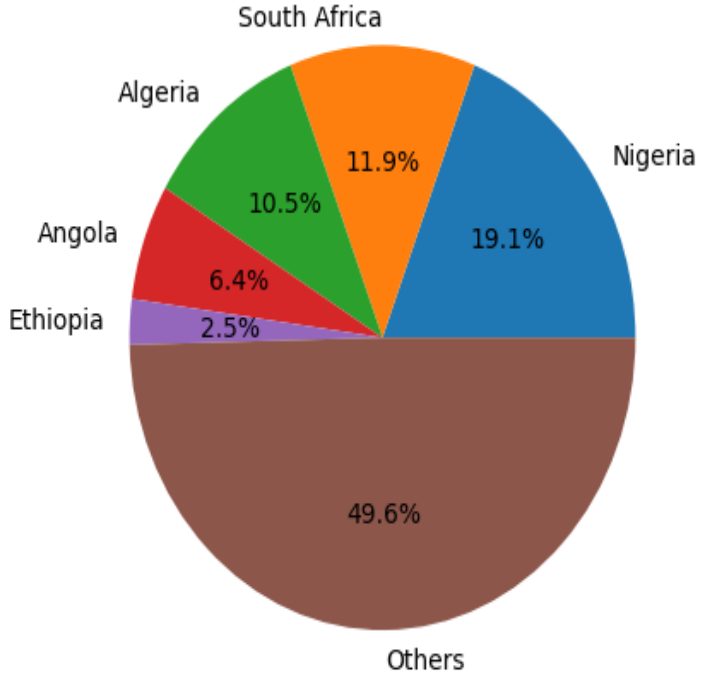


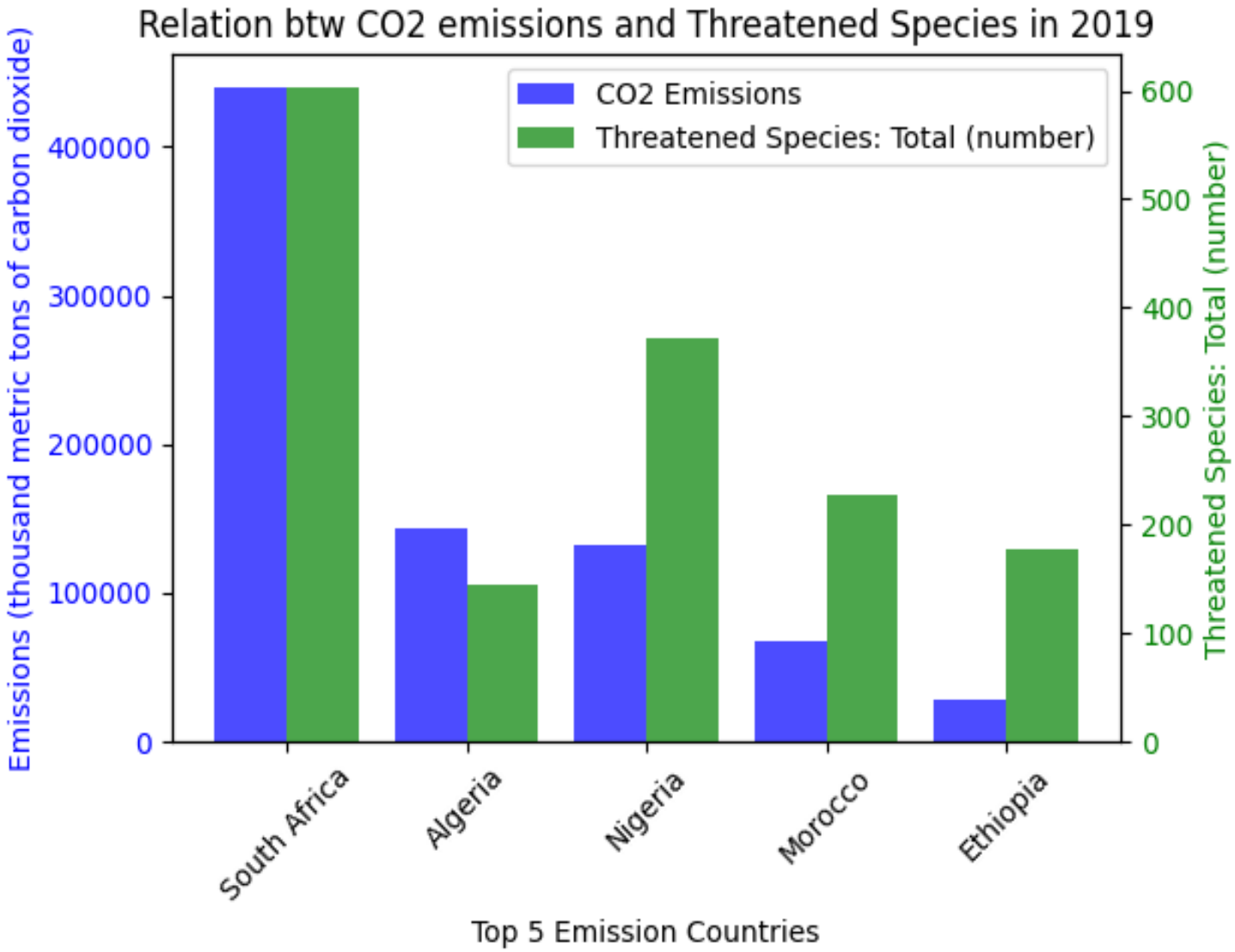
Insights

Top 5 African countries with most Emissions (thousand metric tons of carbon dioxide) and others



Top 5 African countries with most Primary energy production (petajoules) and others

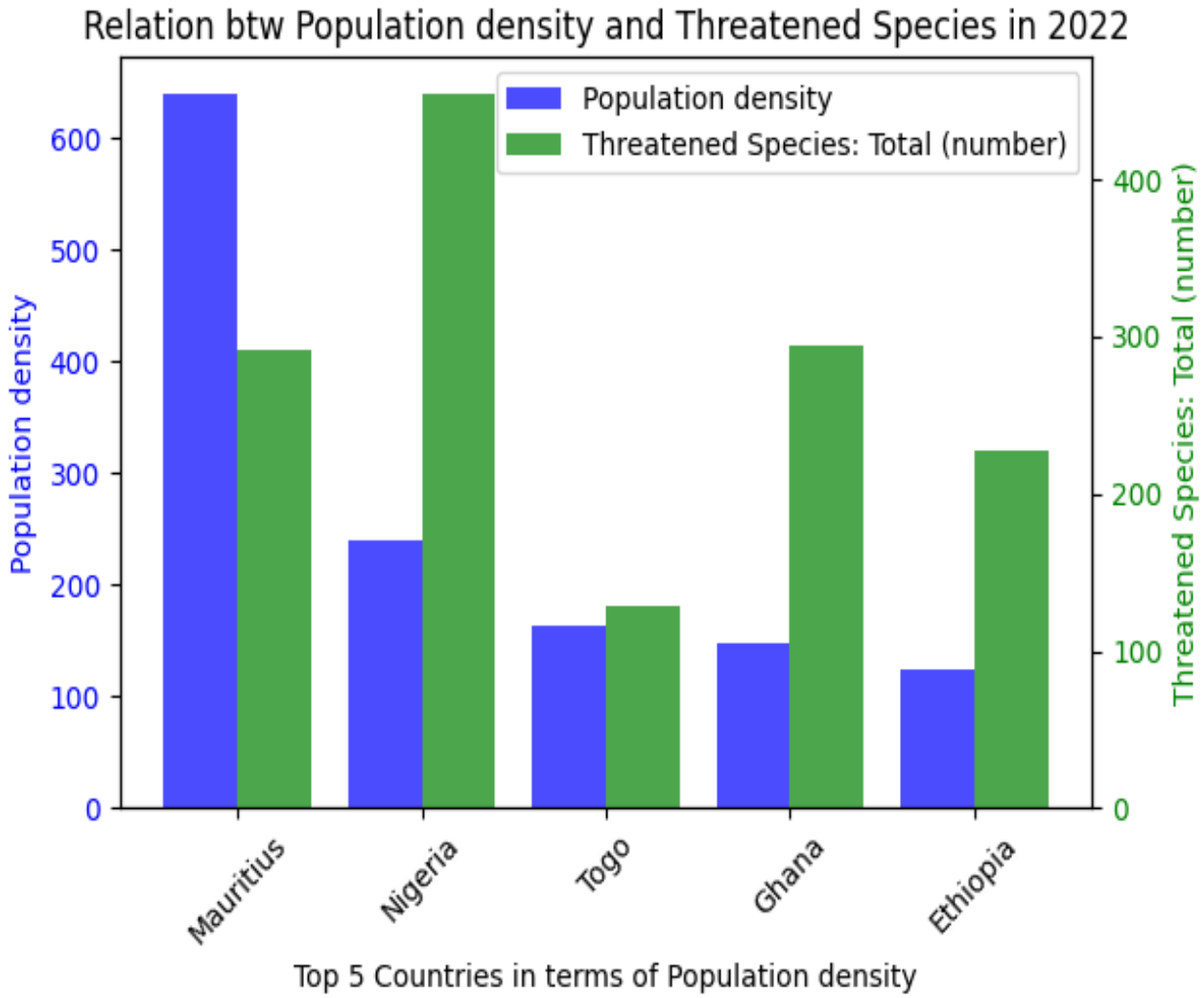




Co-relation

Inference : Number of Threatened Species is more in regions where CO2 emissions is more.

The case of Nigeria : Despite having less CO2 emission, the threatened species count is more due to excess mining in the area for oil.



Co-relation

Inference : More Population Density is having More Threatened Species.

The case of Nigeria : Despite having less population , the threatened species count is more due to more CO2

Emissions.

Timeline

- ✓ 06/09/23 :
  Relevant Data Collection .
- ✓ 17/09/23 :
  Data Cleaning and Transformation(I).
- ✓ 30/09/23 :
  Final Refined Data ,Understanding , Feature Generation(Visualization,Insights,Co-relation) , Transformation(II).

- ❑ 17/10/23 :
  ML Modelling and Observation(I) , Visualization(II).
- ❑ 05/11/23 :

  ML Modelling and Observation(II),Visualization(II),Documentation

THANK YOU