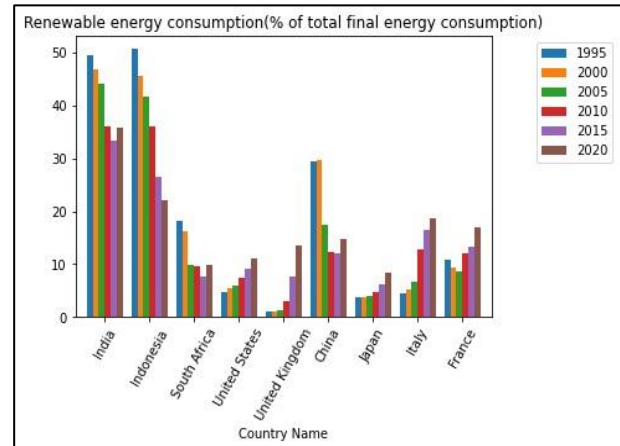
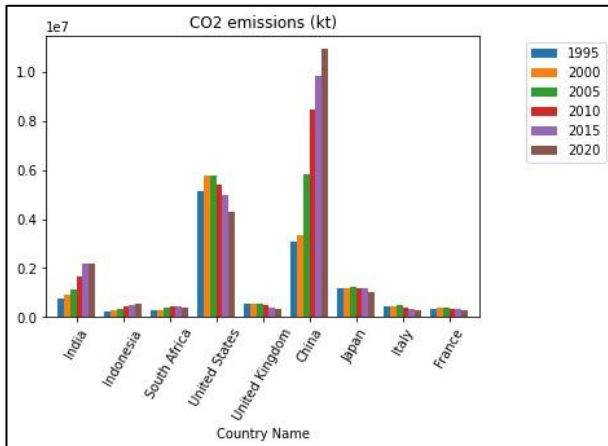


**Trend and Statistics project on Climate Change.**  
**Analysed by: Ukonu Chizoba. ID: 21089329. Github:**  
<https://bit.ly/41iAGJK>

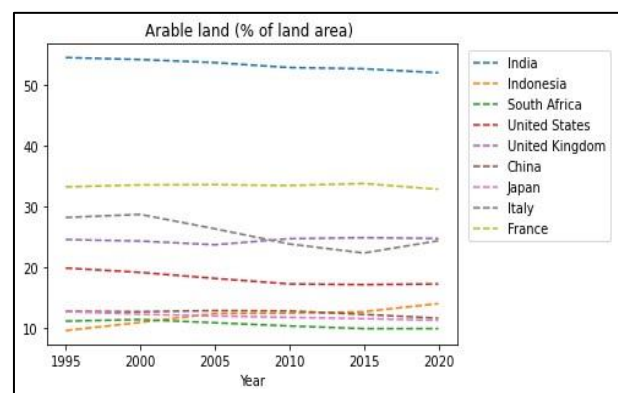
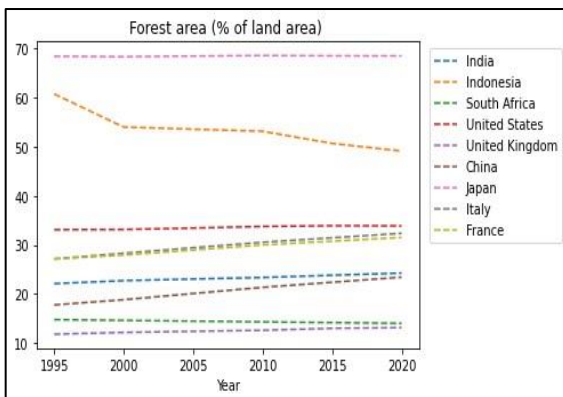
This project draws insight from the 10 selected countries and the connections of the following elements on climate change were analyzed: CO2 emissions (kt), Arable land (% of land area), Forest area (% of land area), Urban population (% of total population), Renewable energy consumption (% of total final energy consumption), and GDP growth (annual %).

The analysis bolsters the correlation among the above-listed elements and insights were generated.



China showed an astronomical growth in its CO2 emission followed by India. South Africa and Indonesia also showed a slight increase in their CO2 emission. The United States, United Kingdom, etc showed a downward trend in their CO2 emissions: CO2 emission is considered a major factor of climate change.

The 'renewable energy' and 'CO2 emission' plots show that the analyzed countries with an upward trend in their CO2 emission have a downward or somewhat flat trend in their renewable energy consumption whereas countries with a downward trend in their CO2 emission showed an upward trend in its Renewable Energy



Indonesia showed a noticeable decline in its forestland as compared to other countries that have either increased or managed their forestland. Japan has more than 68% of its land covered with forest.

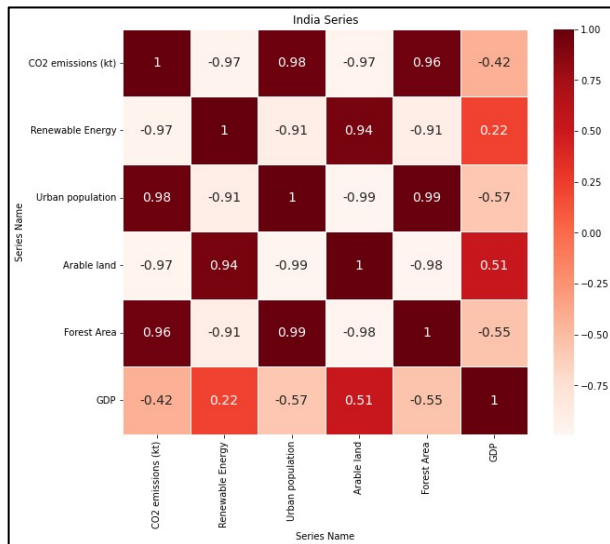
Only Indonesia showed a slight consistent increase in its Arable land. India had 58% of arable land in 1995 but declined to 52% by 2020.

	1995	2000	2005	2010	2015	2020
Country Name						
India	26.607	27.667	29.235	30.930	32.777	34.926
Indonesia	36.076	42.002	45.942	49.914	53.313	56.641
South Africa	54.486	56.891	59.536	62.218	64.828	67.354
United States	77.257	79.057	79.928	80.772	81.671	82.664
United Kingdom	78.353	78.651	79.915	81.302	82.626	83.903
China	30.961	35.877	42.522	49.226	55.500	61.428
Japan	78.016	78.649	85.978	90.812	91.381	91.782
Italy	66.922	67.222	67.738	68.327	69.565	71.039
France	74.912	75.871	77.130	78.369	79.655	80.975

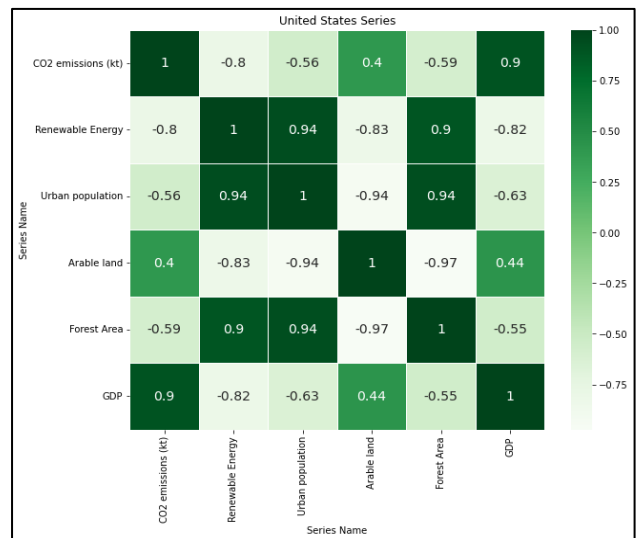
The above table shows the Urban population of the countries analyzed from 1995-2020 with China showing appr. 6% urban growth every 5 years.

Statistical properties of China Series						
Series Name	CO2 emissions (kt)	Renewable Energy	Urban population	Arable land	Forest Area	GDP
count	6.000000e+00	6.000000	6.000000	6.000000	6.000000	6.000000
mean	6.923110e+06	19.278333	45.919000	12.484520	20.659930	8.459080
std	3.343777e+06	8.143516	11.656621	0.483218	2.143737	3.472317
min	3.088620e+06	12.180000	30.961000	11.606259	17.795728	2.238638
25%	3.966051e+06	12.897500	37.538250	12.346662	19.167832	7.403520
50%	7.149774e+06	16.125000	45.874000	12.708466	20.739618	9.562982
75%	9.513192e+06	26.372500	53.931500	12.781363	22.141948	10.874434
max	1.094469e+07	29.630000	61.428000	12.852205	23.431323	11.394592

The above is the statistical analysis of the China Series. With the emphasis on its Urban Population, we can see that the mean and median (50%) are almost equal showing that the distribution is normal. This means that the growth rate in the urban population between 1995-2020 at 5-year intervals has remained somewhat the same.



From the above India heatmap, we can see that CO2 emission has a strong positive relationship with the Urban population and Forest Areas while maintaining a negative relationship with GDP. Arable land has a positive relationship with the GDP.



The United States heatmap shows a positive correlation between CO2 emission and GDP only, with no correlation with Arable land and a negative correlation with other indices. This shows that they are working on mitigating actions that increase CO2 while not hurting their GDP since industrialization and deforestation are major contributors to CO2 emission