

# Climate Change Data Analysis Report

## Based on World Bank Data

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Github link :

<https://github.com/kavithasub/uh-study-modules/tree/main/applied-data-science/assignment/assignment-2>

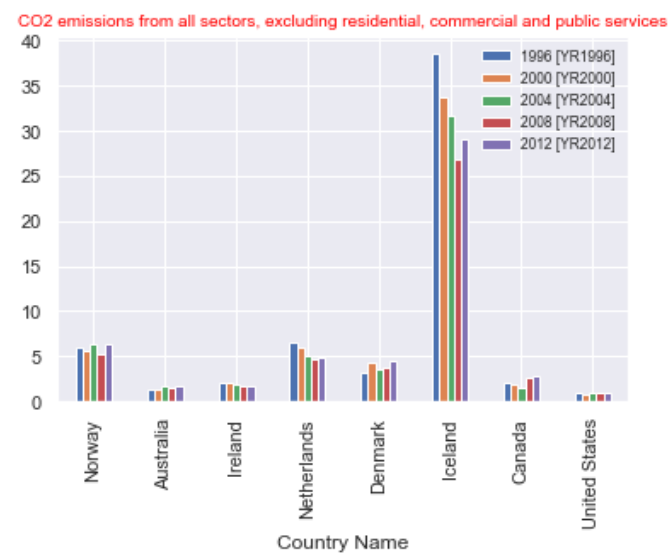
### **Abstract**

This analysis is based on the interrelation of factors selected from climate change data of the world data bank. Eleven(11) developed countries were selected from the developed countries list and data collected for the year from 1992 to 2020 and filtered data using python script according to requirement.

This study found some correlations between the factors and causes behind them were analyzed. The main factors selected are 'Industry annual growth' and 'CO2 emissions from all sectors excluding residential, commercial and public services' but also some other factors considered to investigate interrelations and comparisons.

Overall conclusion is CO2 produced(on main factor selected) and Industry annual growth by developed countries are not strongly correlated but few countries have positive correlation to other CO2 emission factors as well as urban population.

Climate change Data Analysis for Industrial annual growth and CO2 emissions from all sectors excluding residential, commercial and public services



Above bar graph on factor -CO2 emission from all sectors excluding residential and services by countries was constructed with available data from 1996 to 2012 in a five year increment. Iceland is the biggest producer of CO2 emission but seems to have a downward trend which doesn't reflect much on their industrial annual growth as seen on the plot in right top.

Below table derived for Urban population annual growth by country between 1996 to 2012. This proves that urban population growth decreased slowly but there are some ups and downs.

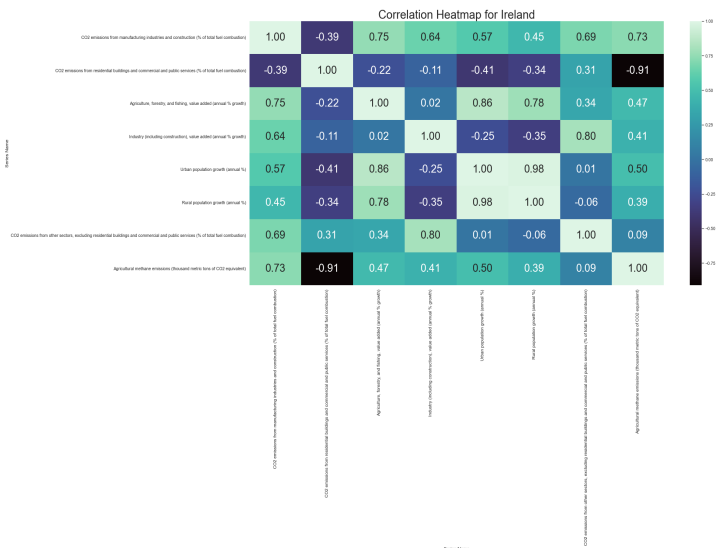
	1996 [YR1996]	2004 [YR2004]	2012 [YR2012]
Norway	7.138	4.75	2.936
Australia	3.411	3.066	3.374
Ireland	25.309	21.968	22.92
Netherlands	21.426	17.429	18.034
Iceland	1.794	0.881	1.075
Canada	17.985	16.134	13.719
United States	11.782	10.375	9.712

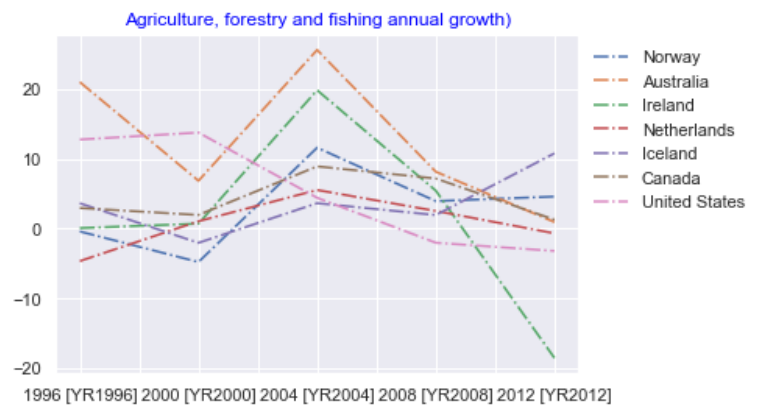
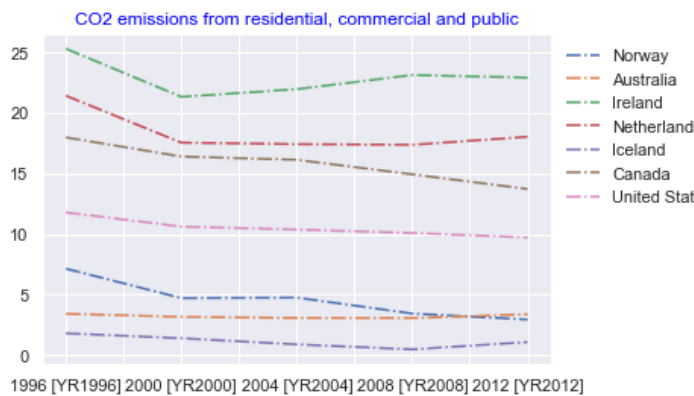
Correlation heatmap on right for Ireland shows high positive correlation between 'CO2 emission from all sectors excluding residential, commercial, public services' against Industrial growth comparatively. However, urban population annual growth doesn't have a positive impact on industrial annual growth and therefore it can be deduced that urban population did not contribute to CO2 emission from industrial growth.



From these two bar graphs, it can be seen that CO2 emission is somewhat related to industrial annual growth but not in an increasing way. Also 'Industry annual growth' graph shows Australia, Ireland and the United States having upward growth but 'CO2 emission' is less or controlled compared to other countries.

Though Ireland has strong correlation there is a sudden fall in industrial growth from 2008 to 2012 and this could have considerable impact on the CO2 emission correlation matrix.

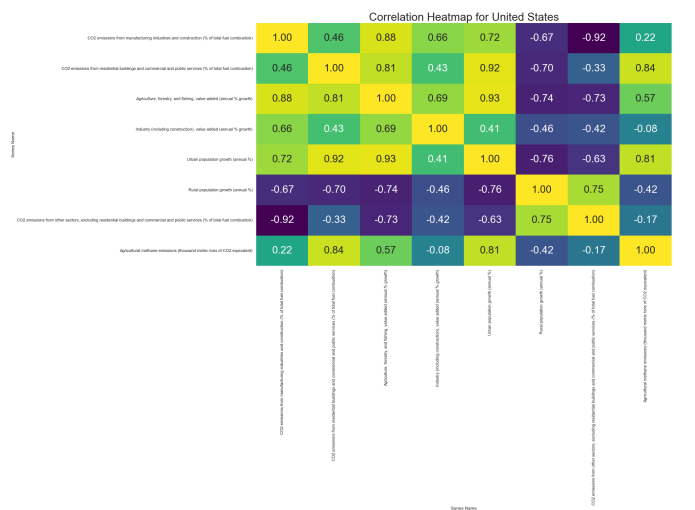




Ireland urban population annual (%)growth is higher than other countries comparatively even though it has down growth and it has led to 'CO2 emissions from residential building, commercial and public services' and Netherland is in second position to release CO2 in this category.

Annual growth of agriculture, forestry and fishing industries developed well in Australia in 2004 but, after a peak it fell down and the United States has downwards growth. These have positive correlation to urban population annual growth.

Considering Australia and Iceland it shows industrial annual growth(bar chart2) having interrelationship with 'Agriculture, forestry and fishing annual growth'.



The heatmap on United States data shows no definite correlation between 'CO2 emission from all sectors excluding residential and services' and any other factors except Rural population growth. However, 'CO2 emissions from residential, commercial and public services' and 'Agriculture, forestry, and fishing annual growth' are closely correlated with urban population growth.

CO2 emissions from manufacturing and construction industries of Iceland is closely related to Industry annual growth but it has no interrelation with urban population. Moreover, industry annual growth has negative correlation with Agriculture, forestry, and fishing which shows that the country is not investing much on Agriculture, forestry, and fishing industry but into manufacturing or building industries which can cause high CO2 release.