GEOG30940

Population growth becomes an issue when the existing structures of states' are not able to provide adequate living condition for growing population in a sustainable manner.

While the global population continues to rise, many rich states are such as Europe, Japan, South Korea, China, and even the United States are experiencing very low fertility rates barely replacing themselves. Whereas, poorer countries such as Nigeria, Ethiopia, Kenya, and Tanzania are going through un unprecedented population growth. In this essay, Firstly I will look at the global population growth over time since as far back 1500. It will tell how the global expanded over time. Secondly, I will then look at the population patterns with figures, numbers, and geographic locations to understand how and where the population is distributed. As the Climate change effect impacts every aspect of human lives I will then look at the patterns of greenhouse gas emissions that had been emitted and will discuss uneven climate footprint and uneven climate impacts on the population. Finally, as Africa's population is growing rapidly and estimated to grow continuously I will look at specifically Nigeria and its overpopulation problems and some potential solutions.

Global population Growth overtime

Year	World Population
1500	461 million
1550	519 million
1600	553 million
1650	547 million
1700	603 million
1750	813 million
1800	989 million
1850	1.2 billion
1900	1.6 billion
1950	2.5 billion
2000	6.1 billion
2022	7.9 billion

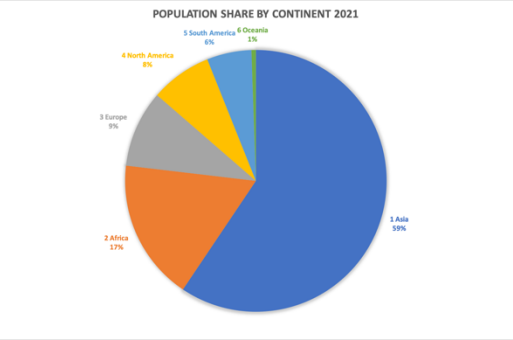
The table on the right shows the growth of the global population from 1500 to the present in 50 years intervals. This data is taken from our world data (world data, 2022). The world population growth was very slow and still below 1 billion until 1800. After 1800 it started to rise quite rapidly reaching 1.6 billion in 1900. In another 100 years, the population growth increased by more than three folds and reached 6.1 billion in 2000. Since then another 1.8 billion more people were added reaching 7.9 billion today.

It is projected the global population growth will continue to rise to around 9.7 billion in 2050 and 10.9 billion in 2100. Such growth was unprecedented in human history before the industrial era (Bongaarts, 2009). It is said that the dramatic population growth after the industrial revolution was due to a decline in the early death rate due to better and nutritious food, advancement in medicines, and overall economic development (Livi-Bacci, 2017). However, many studies have shown that in reverse the industrial developments have contributed to an unprecedented amount of greenhouse gas emissions to the earth's atmosphere that has accelerated global warming leading to various climate catastrophizes around the world today (Hertwich & Peters 2009) (Dodson, J.C. *et al*. 2020) (IPCC, 2014).

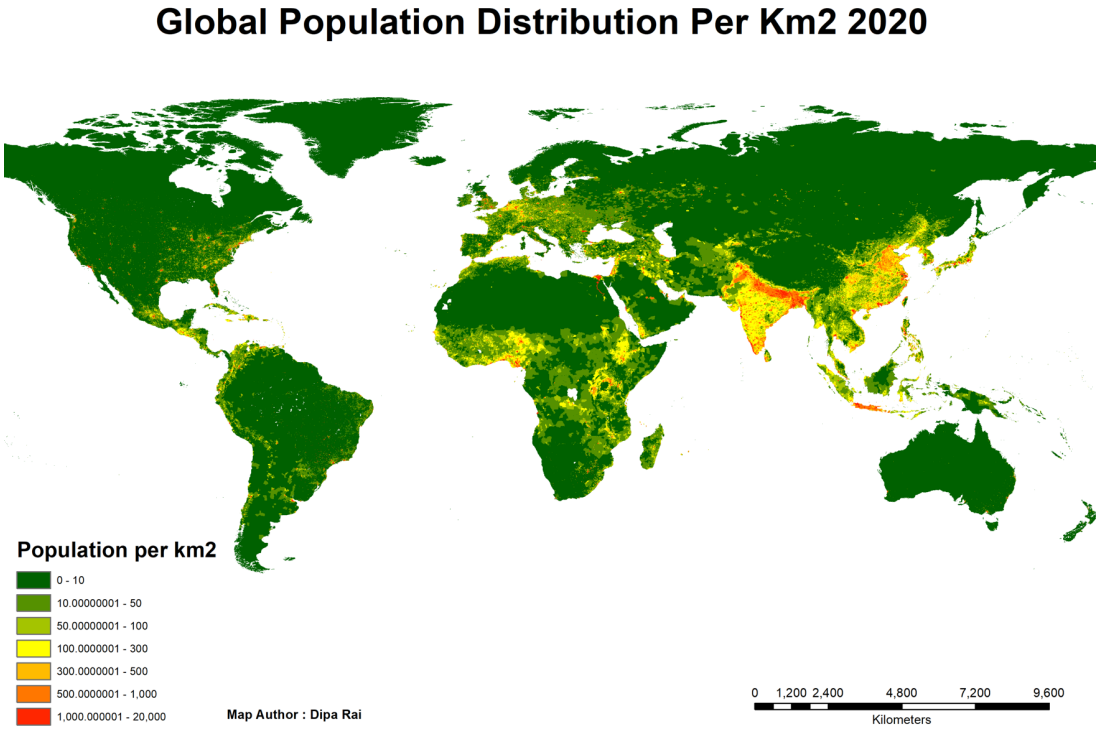
Population by Continent as per 2021

The population is unevenly distributed across continents. Most of this population is concentrated in two continents, Asia and Africa. The table and the chart below show the number and percentage of the people on different continents in 2021

Rank	Continent	Population 2021	Share %
1	Asia	4,679,660,580	59.42
2	Africa	1,373,486,472	17.44
3	Europe	747,747,396	9.5
4	North America	596,591,192	7.58
5	South America	434,260,138	5.51
6	Oceania	43,219,954	0.55
	World	**7,874,965,732**	

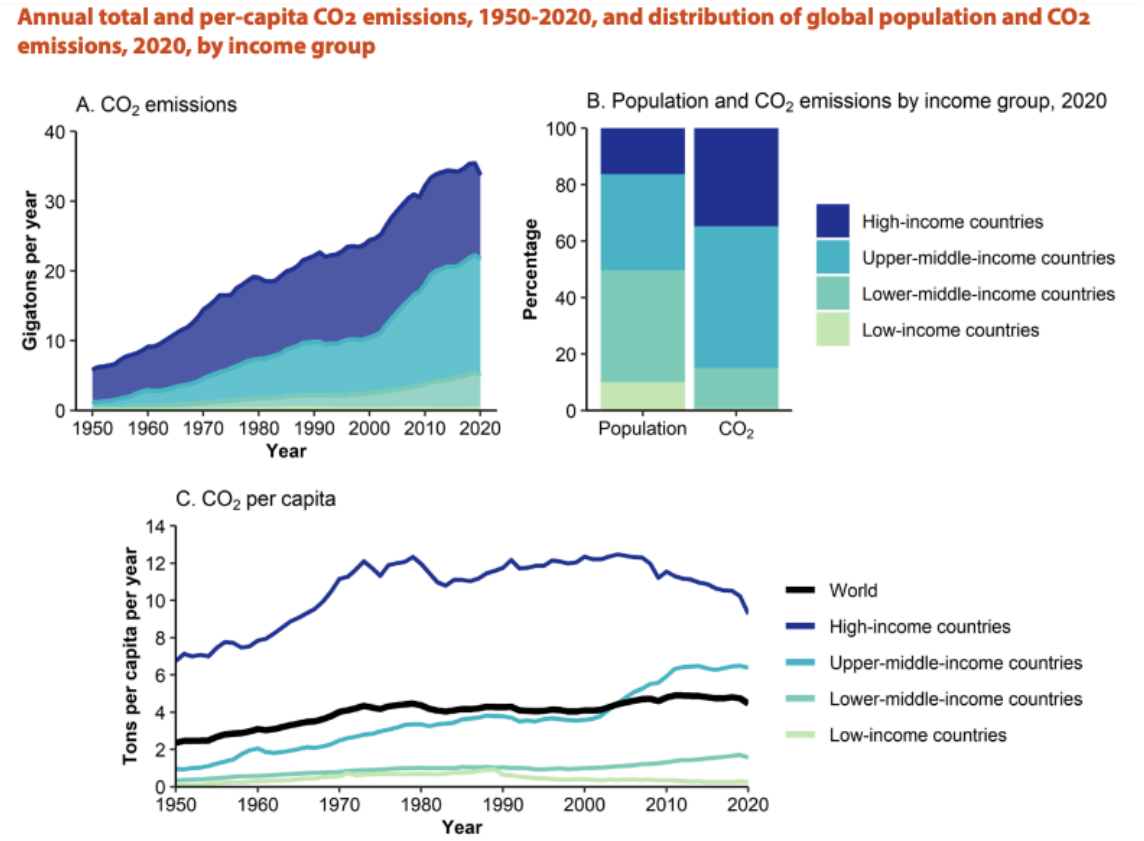


The data is taken from our world data (world data, 2022). It shows that in 2021, 4.67 billion people were in the Asian continent followed by 1.37 billion in the African continent. Together that is more than 6 billion or about 77% of the total global population is concentrated in only these two continents. Only about 23% of the entire population is in the rest of the continents such as in Europe 9.50%, North America 7.58, South America 5,51, and Oceania 0.55%. However, there are also many patterns and trends within the continents and within countries in the continent. It is because population growth is shaped by trends in fertility and mortality at national levels. Immigration also plays an important role (Livi-Bacci, 2017). The global population patterns are visualized in the map below per km2.



This map shows the population distribution by pre km2. It is created on ArcMap using gridded datasets from the Earth data (Earth data, 2020). According to world data globally the average population density is 61 people per km2. However, it is shown in the map above that actual distribution varies from country to country and within a country. The greener the areas the lesser the people and the redder areas the higher the population densities in the area. It shows that India, Bangladesh, and China are the most densely populated countries in Asia. whereas, in Africa Nigeria, Ethiopia, Kenya, and Tanzania. However, population growth is slowing down in both China and India due to government intervention on family planning such as the one-child policy in china between 1980 and 2016 and different phases of mass sterilization in India in the 1970s (Livi-Bacci, 2017). In contrast, African countries such as Nigeria, Ethiopia, Kenya have still very high birth rates (Hope, 2009). These already overpopulated and poor countries in Africa will lead to more catastrophe due to overpopulation and humane-induced climate change.

Studies show that there is a strong correlation between income and GHGs emissions within countries, as the lifestyles of the rich tend to be much more energy-intensive. GHGs are the drivers of global warming. In 1900, 90% of the emissions were produced in Europe and in the US (Hertwich, and Peters, 2009). However, as other countries move to become more developed they also produce more CO2 adding more to the US and Europe. In 2020, the US produced 4.71b.t (billion tons), China 10. 67 b.t, EU 27 2.60 b.t whereas entire Africa produced only 1.33 b.t (IPCC, 2021). But directly Africa suffers the most from the consequence of global warming (Hope Sr, K.R., 2009). The charts below show the uneven climate footprint between rich is poor countries. It is taken from the IPCC report 2021.

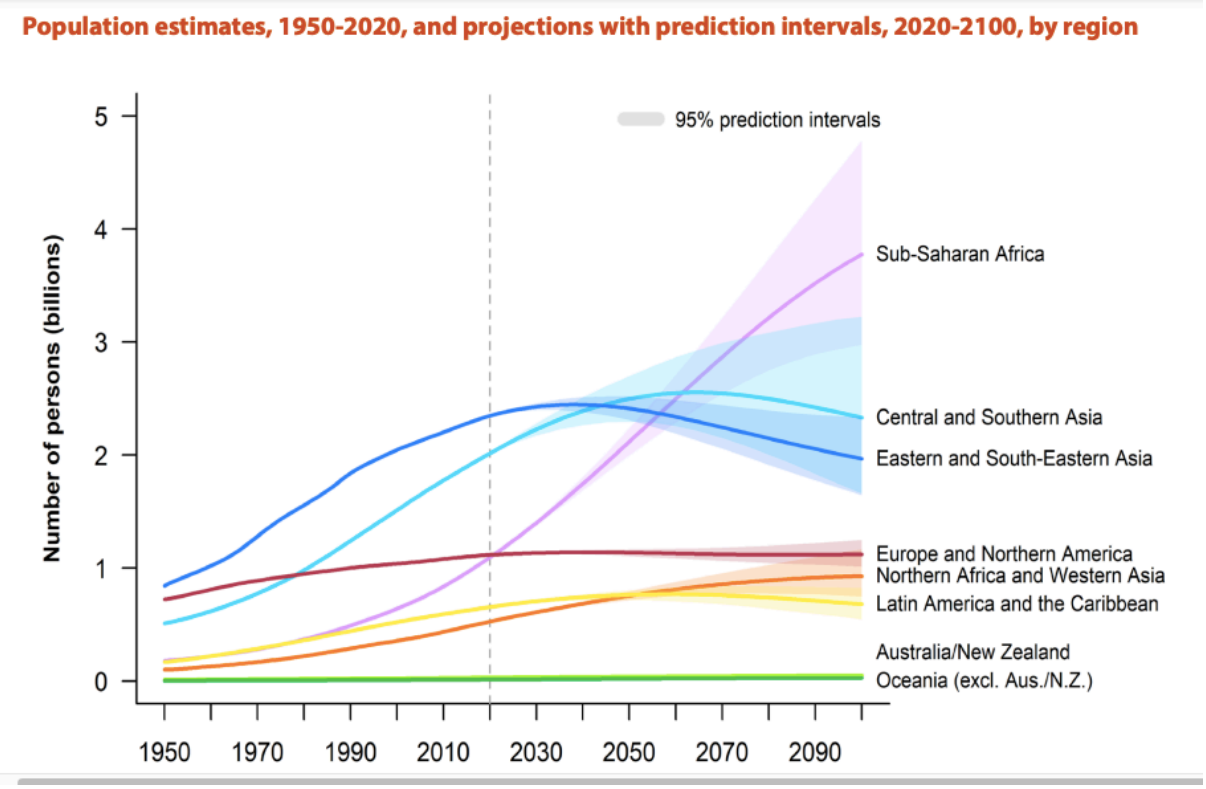


Source: United Nations Department of Economic and Social Affairs, 2021

The IPCC report 2021 shows the steady increase in carbon dioxide CO2 since 1950. Most have been contributed by today's high-income and upper-middle-income countries. The high-income and upper-middle-income countries, which together contain half the world's population, are responsible for about 85 percent of the CO2 added to the atmosphere each year. Lower-income and lower-middle-income countries, where most future population growth is projected to take place, have so far contributed significantly less (IPCC, 2021).
Most of those Low-income people are in Africa mainly Sub-Saharan countries where overpopulation is becoming increasingly the biggest challenge. For example in Ethiopia, Kenya, Tanzania, Congo, and Nigeria (world bank,2020). In these countries majority of the population relies on subsistence agriculture therefore they are directly exposed to climate change impacts such as water shortage and drought among others (Huho, J.M. *et al*. 2012). I will discuss furthermore towards the end below how overpopulation is a problem in Africa, particularly in Nigeria.

Population Growth in the Future

Over the past 70 years, in developed countries reductions in mortality levels at younger ages, have been sustaining the population growth. Factors that helped to reduce mortality are mainly innovation in technologies, economic growth, improvement in food production and nutrition, better education, advancement in medicine and health care, and so on. Such developments have led to healthier land longer life contributing to population growth (Livi-Bacci, 2017). However, it is still not the case for many developing countries, particularly in Sub-Saharan Africa.

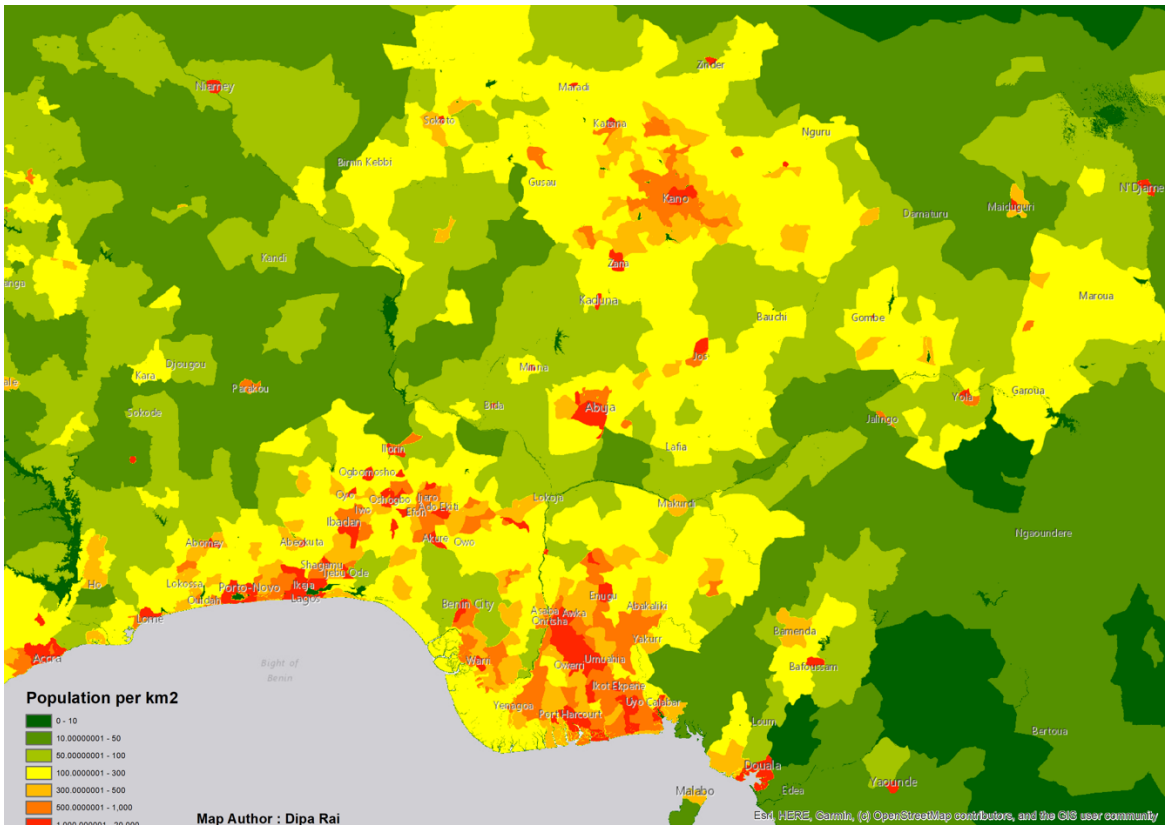


Source: United Nations Department of Economic and Social Affairs, 2021

While the global population continues to rise, the growth rates differ significantly across states. All the developed countries are experiencing big declines in the birth rate such as European states, the United States, Australia, Japan, Russia, South Korea, China are below the

replacement threshold. It is where the situation of fertility rate is less than 2.1 children per woman. The Asian population is expected to grow by 700 million by 2050, which is significantly low in comparison to its current population. Whereas, the African population is expected to double by 2050 (United Nations, 2021). The largest share of this population projection of Africa is due to Nigeria, which is on the path to becoming the third populous country after China and India. Population in Nigeria is increasing rapidly from 20.06 million in 1931 to 140 million in 2006 in 2020 it reached to 206 million today it is 214 million. Within 16 years 74 million more people were added between 2006 and 2022. It is forecasted that this number will grow to 400 million by 2050.

Population distribution in Nigeria 2020 per km^2



Nigeria's current fertility rate is 5.3 per woman. According to the (world bank 2019). In 2019, Nigeria's 40 % of the total population is almost 83 million people, living below the country's poverty line ($381.75) per year. The current speed of population growth could lead the country to a more poor state. This population growth is becoming a huge issue in Nigeria as the existing structures of the states are not able to provide adequate living conditions for its ever-growing population sustainably. In addition to overpopulation and poverty, environmental hazards like ocean surges, flooding, and drought have become more frequent and intense in years adding more devastation for the poor people (Ekoh, George, and Ejimkaraonye, 2020). The map above shows the population density is much higher along and near the coastline. These people are directly exposed to sea-level rise and coastal flooding.

How Nigeria Can Overcome its Overpopulation Issue.

Average education level, economic growth, urbanization, child mortality cultural factors including, social norms regarding ideal family size. Direct factors include the government family planning programs, availability and accessibility of contraception. Collectively, these factors would help determine fertility levels. However, access to information about contraceptives and services is essential. About 100 of all countries have brought their fertility rates to replacement rate or below through these direct and indirect factors (Dodson, J.C.*et al*. 2020)

For example, South Korea adopted a national family planning polity to reduce its annual population growth by 1% by 1971 through introducing and increasing contraceptive use by married couples. This family planning was a part of its long-term economic development plan (Kim and Ross, 2007). This population policy program was highly funded by the government. The program included educating people on the ground level about contraceptive methods and informing them about their associated benefits. The program had very strong political support at all levels (O'Sullivan, 2013). Korea then successfully achieved its target to decrease the annual population growth by 1% in one decade. Since then the population growth rate stayed between its replacement and below. These direct and indirect factors, certainly are more ethical, and effective ways of balancing population growth. If Nigeria seeks to reduce its annual population growth the South Korean population policy is certainly recommendable.

Conclusion

Even though the global population continues to grow, the growth varies from region to region and country to country. The most population is concentrated in Asia but the current growth rate is much less than in Africa. Africa is on the path to doubling its population by 2050, which will be a huge challenge for sustainability. Nigeria is one of the biggest contributors to the population growth in Africa could severe consequence of overpopulation and global warming impact. Global warming is driven GHGs emissions and these emissions are largely contributed by richer countries. Nigeria could overcome the overpopulation problem if it implement effective population policies as South Korea did.

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Data sources

https://ourworldindata.org/world-population-growth (Population growth data and graphs)

https://www.worlddata.info/greenhouse-gas-by-country.php (Carbon footprint)

https://sedac.ciesin.columbia.edu/data/collection/gpw-v4 (Global population distribution data source)

https://www.un.org/development/desa/pd/data-landing-page.
https://www.worldbank.org/en/programs/lsms/brief/nigeria-releases-new-report-on-poverty-and-inequality-in-country