



The Climate Periscope
Save the climate, save the world

Impacts of Climate Change



Although the global climate has fluctuated unevenly through the ages, the rate of change of the climate and warming that the earth has experienced from the final decades of the 20th Century till date has been completely unprecedented compared with previous changes over the past thousands of years. According to the World Meteorological Organisation, the past eleven years (2015-2025) have been the hottest years on record, with 2024 recording the hottest year in recorded history with an average global temperature of about 1.55°C above pre-industrial levels.

In Nigeria, a pattern of increasing temperature has been observed since 1901. This increase was gradual until the early 1970s when the country began to record a spike in temperature which has continued till recent years. Between 1901 and 2005 there was an increase of about 1.1°C in the average temperature in Nigeria. If this warming trend continues, Nigeria is projected to experience an increase of between 2.5°C and 4.5°C in its average temperature by the year 2100.

A 2014 World Climate Change Vulnerability Index published by the global risk analysis company Verisk Maplecroft classifies Nigeria as one of the ten most vulnerable countries to climate change in the world, while a study conducted by the United State Department for International Development concluded that barring a strong mitigation and adaptation response climate change will cost Nigeria between 6% and 30% of its GDP by the year 2050. This is estimated to be worth between \$100 billion and \$460 billion.

The above raises a great cause for concern because climate change has impacts on ecosystems, coastal systems, fire regimes, food and water security, health, infrastructure and human security. The impacts will vary from one region to another, with developing countries like Nigeria being the most vulnerable to the effects of climate due to a general lack of capacity to adapt to the impacts of climate change as a result of poverty and low technological advancement.

The following are in specific terms the observable impacts of climate change in the world.

- **Rise in Sea Levels**

As the world gets warmer, the temperature in the ocean also increases. This increased warming causes thermal expansion, which is the expansion of ocean and sea water as they warm. As the sea water warms, it expands itself to occupy more space, causing abnormal rise in sea levels.

Also, increasing atmospheric temperature causes glaciers and polar ice caps to melt at an increasing rate. This melting ice run off into the oceans and also lead to rising sea levels due to the fact that the ice is melting at a rate that is beyond the natural capacity of the sea to contain.

Since around the year 1970 there has been a continuous rate of rise in the global sea level. Sea levels are reported to be rising at the rate of about 3.5mm or 0.15 inches per year, while it is projected that by 2100 sea levels are expected to rise by up to 2 meters or 6.6 feet.

Satellites monitoring the Antarctica show that Antarctica is losing about 200 billion tonnes of ice a year to the ocean as a result of melting. This is pushing up global sea levels by 0.6mm annually. Researchers say the losses are occurring predominantly in the West of the continent, where warm waters are getting under and melting the fronts of glaciers that terminate in the ocean. This is because the average global temperature is currently too warm for Antarctica. The temperature is said to be about half a degree Celsius warmer than the continent can withstand and is melting about five metres of ice from its base each year. This is what is triggering the increasing sea-level rises that we are seeing today.

If sea levels continue to rise at the present rate unabated, it is very likely to inundate many island states and low-lying delta regions leaving their population having no land to inhabit. About two-

thirds of the world's largest cities are located in low-lying coastal areas. This is home to an estimated 470 to 760 million people. Rising sea levels would completely submerge the land which these people live. In Nigeria it is predicted that a metre rise in sea levels would inundate coastal cities like Bonny, Lagos, Port Harcourt, Warri and Calabar which are less than 10m above sea level and displace tens of millions of people, while the Niger Delta's entire oil and gas infrastructure would be submerged. This constitutes a huge threat to Nigeria's economy because the oil and gas industry provides over 75% of Nigeria's export earnings and about 80% of Nigerian government revenue.

Rising sea levels can also cause the invasion and destruction of mangrove ecosystems (which serve as sanctuary for young fish to mature), coastal wetland and coastal beaches, while sea incursion due to rising sea levels can lead to the intrusion of salt water into fresh water.

- **Drought, Desertification and Extreme Weather Events**

As more greenhouse gases are released into the air, causing temperatures to increase, more moisture evaporates from land, lakes, rivers, and other bodies of water. In regions where there is ample water, such as oceans, a nearly unlimited supply means rising temperatures lead to increasing moisture and water vapour in the clouds, which increase the likelihood of heavy downpours and floods. But in dry regions where there is very little water to evaporate, increasing temperatures lead to drought.

This decreasing rate of rainfall and changing weather patterns also results in desertification. The Sahara Desert is reported to be expanding in all directions at the rate of 1-10km per year. Migrating sand dunes due to desertification are now common features of states like Yobe, Borno, Sokoto, Jigawa and Katsina in Nigeria. These sand dunes have buried massive expanses of arable lands, thereby affecting crop production.

When rainfall comes to drought-stricken areas floods most often occur because the drier soils make them less able to absorb the water. In Nigeria, there have been increasing incidences of flood and rainstorms in the coastal regions, while in the rest of the world there have been increasing cases of wild weather events such as tsunamis, hurricanes and cyclones. Scientists have predicted that increased global warming will increase the intensity of these extreme weather events worldwide.

- **Insecurity**

The increasing cases of drought and desertification leads to massive migration of people to areas less threatened by drought and desertification. In Nigeria, the herdsmen and farmers clashes which have claimed thousands of lives already can be linked to the impacts of climate change in northern Nigeria which has forced herdsmen to migrate southwards in search of pasture for their cattle. In

the process these herdsmen get into conflict with local farmers as they seek to graze on farmlands due to reducing space for grazing.

Climate change has also been linked to increased political instability across the world. Both the Somali and the Syrian civil wars have been linked to famine and drought which have been exacerbated by climate change. . In both cases, climate change acts as a "threat multiplier" worsening existing social, political, and economic vulnerabilities..

- **Water Scarcity**

The increased rate of global warming and decreasing rainfall has also led to frequent water crises as a result of droughts. The Lake Chad for example has shrunk by about 95% since the 1960s, while many rivers, especially in Northern Nigeria are in danger of disappearing due to decreasing rainfall. A United Nations report has predicted that access to water may be the single biggest cause of conflict and war in Africa in the next 20 years. It is also estimated that between 75million and 250 million people in Africa may be exposed to scarcity of water, environmental and food security stress due to climate change. These are all extreme events which can be directly and indirectly linked to the problem of climate change.

- **Health**

Climate change can have diverse negative effects on human health, especially in a developing country like Nigeria. The excessive heat, increasing water stress and other manifestations of climate change can result in increasing incidence of heat exhaustion, skin cancer as well as inflammatory and respiratory diseases. Flood due to rising sea levels can increase the vulnerability of the poor to malaria, typhoid fever, cholera and pneumonia while rising temperatures and changing rainfall dynamics is also capable of causing the spread of diseases such as meningitis, dengue fever, malaria and diarrheal diseases. For example, it was reported that within one week in 2009 over 209 people were killed by meningitis (a disease which can be triggered by rising temperatures) in Nigeria and Niger Republic. Changes in temperature, precipitation and rising sea levels can also have adverse effects on human health through injuries, illness, morbidity and mortality, while heat waves have also caused deaths in Europe and other parts of the world.

- **Agriculture**

Climate change has the potential to affect agriculture in ways that can result in the overall reduction in productivity. While the sea incursion due to rising sea levels is reducing available arable lands in the coastal areas, desert encroachment with its associated sand dunes is depriving farmers of farming and grazing lands. In Yobe State, in the northeast of Nigeria, it is reported that sand dunes

and desert encroachment have covered between 25,000 to 30,000 hectares of land. These are lands that could have been used for various agricultural purposes.

Rising temperatures also make the storage of root crops and vegetables difficult for those without refrigerators. Rising temperatures can equally lead to increase in diseases and high mortality rate among livestock in addition to retarded reproductive cycles, reduced meat and milk output and reduction of grazing lands due to desertification.

The impact of climate change on agriculture raises a cause for special concern due to the link between agriculture and poverty. Climate change if not curtailed will increase the incidence of rural poverty, and unless drastic action is taken in the fight against climate change, may lead to severe hunger and lack.

- **Energy**

Climate change has the capacity to negatively affect the supply of secure, affordable and sustainable energy. In Nigeria, hydropower is the energy source most susceptible to the negative impact of climate change due to its sensitivity to changing weather patterns and rising temperatures. A reduced flow in the river and higher temperatures can reduce thermal electric generation and transmission capacity. Also, excessive drought can lead to higher evapotranspiration that adversely affects water volume thereby reducing hydroelectric capacity. There is also the risk of damage to energy infrastructure like power plants, oil and gas platforms etc by extreme weather events, while higher temperatures can reduce the cooling efficiency of coal, gas and nuclear power plants. These and many more are the effects that climate change can have on energy.

- **Disappearance of Coral Reefs**

When water temperatures rise, corals become stressed and expel the symbiotic algae that live in their tissues, which provide them with food and color. This makes the coral turn white and become vulnerable to disease and starvation. When this situation is sustained, it eventually leads to the death or disappearance of the coral.

Another factor that causes the disappearance of coral reefs is ocean acidification. As the atmosphere absorbs more carbon dioxide, the ocean absorbs it too, which lowers the ocean's pH and makes it more acidic. This hinders corals' ability to build and maintain their calcium carbonate skeletons, which are crucial for their structure and growth, leading to weaker reefs and eventual death.

Bleaching and disappearance of corals due to sustained increase in ocean temperature poses a great danger to the ocean's ecosystem and many other species in the ocean that depend on coral reefs for their survival.

Coral reefs, which are also known as the rain forest of the sea support about 25% of all known marine life. They are home to more than 4,000 species of fish, 700 species of coral, and thousands of other plants and animals. As many as 1 billion people rely on fish that live in coral reefs as their main source of protein. It has been projected that unless something is quickly done to arrest the spiraling global average temperature coral reefs population will collapse by 2100 due to increased temperature and ocean acidification.

This is why it is very important for us to understand the mitigation and adaptation measures that can be adopted to fight against climate change.

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