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The Fate of Nigeria

In the 1950's an inquisitive scientist by the name of Charles Keeling established a machine on top of Mauna Loa, the largest volcano on earth. Located on the big island of Hawaii and said to be "one of the greatest achievements of modern science," this machine was the first devised technique able to measure the amount of carbon dioxide in the air. The result? There were (and still are) rapidly increasing levels of carbon dioxide within earth's atmosphere. Now, about 60 years later, we (scientists and those who acknowledge scientific evidence) not only know this to be certain, but are aware of the climate change, species extinctions, habitat and land destruction, and feedback loops it causes and their detrimental and lasting effects on almost every living thing on earth. This issue is particularly affecting the country of Nigeria, which is already vulnerable to the effects of climate change, because of its poverty, susceptibility to drought, low-lying geographical location, and 800 km coastline open to frequent coastal erosion and contamination of an already low fresh water supply. Nigeria, along with many other countries in the world, needs help in developing new adaptations to climate change in areas like agricultural practice, governmental policies, rising temperatures, ecological resilience to unpredictable weather, and the spread and transmission of zoonotic and botanic diseases. Humans have taken long enough to identify and accept this global crisis; our arguments have been copious and our actions few. It is time to change the way we do things and find solutions to unanswered questions, by moving past optional pursuits and halfway commitments and toward strict enforcement, education, and social responsibility.

Nigeria is a country plagued by severe corruption, poverty, and violation of human rights. Lagos, Nigeria's capital is considered the most dangerous city in West Africa. Interethnic fighting is the country's greatest social problem and one that is particularly hard to fix considering the Nigerian police are often the ones accused of the worst crimes. The highest class consists of wealthy politicians and businessmen who have a reputation of doing whatever it takes to stay in power. Poor education, corrupt politicians, ill health, few opportunities, and a lack of money for investments keep the poor in their place and void of advancement. Seventy percent of the population lives on less than N100 (\$0.70 US) per day. In some severe cases, there are even members of society treated as pariahs (social outcasts), whether it be because they're a minority or just of low socioeconomic status. Either way, Nigeria has some significant issues holding it back as a country.

Nigeria has been self-sufficient in producing enough food for its population up until the last couple of decades, when national resources began to flow toward new industries (particularly petroleum) at the expense of agriculture. The country is still somewhat self-sustaining, but relies heavily on imported chemicals, manufactured goods, and machinery. The economy has been based largely on oil production since the 1960's, when it became a leading member of the Organization of Petroleum Exporting Countries (OPEC). Prosperity did not last long, however, for corruption, poor economic management, and political instability pushed Nigeria back to the level it was at before independence. It has only recently begun to emerge as an economically sound country, but agriculture (whose sector still employs 70% of the labor forces) continues to fall second to the oil industry. Thirty-three percent of Nigeria's land is under cultivation and although large-scale farming is not common, smallholder farms constitute 80% of all farm holdings, even though their system is somewhat inefficient.

The typical subsistence farm family in Nigeria is large, poor, and based largely on tradition. It is very common to see polygamous families with many children, sometimes up to ten. Through the eyes of his fellow men, a Nigerian man is considered more successful the more wives and children he has. For the most part, the husband's job involves tending his crops, while his wives work processing palm oil, tending the family garden, or selling vegetables in the local market. The crops that are grown include groundnuts, yams, gum arabic, kolanut, cotton, cocoa, palm kernels, soybeans, rubber, beniseed, and cashews. Cocoa is the leading non-oil foreign exchange earner and rubber is second, but few agricultural products are produced for export. Since most Nigerians cannot afford to shop and eat at local supermarkets or restaurants, farmers produce only what they sell locally or eat themselves. Food is traditionally eaten by hand, but western influence has brought cutlery into some households. Traditional cuisine varies from region to region, but most consist of a few staple foods (in the south corn, yams, and sweet potatoes) and a palm oil based stew with whatever meats and vegetables might be on hand (chicken, beef, goat, tomatoes, okra, onions, etc.). Diet in the north is not much different, but grains such as millet, sorghum, and corn are commonly boiled into a porridge-like dish that forms the basis of that region's diet. Food is essential to the rituals and ceremonies of the vast majority of cultures in Nigeria.

As far as healthcare goes, Nigeria is a typical third world country. It suffers from widespread disease including HIV/AIDS, malaria, and parasitic infections. Childhood diseases are especially common. Although the country's extreme poverty contributes to its lack of healthcare, many rural families do not even trust western medicine, preferring to use more traditional medicine (juju). Ironically, their traditional medicine is often more effective with less side effects than western medicine. In contrast to their healthcare system, Nigeria has the largest higher education system in all of Africa. There are 43 government-run universities and 3 private run, with an additional 125 technical training schools that focus mainly on polytechnic and agricultural training. Unfortunately, the demand for higher education surpasses the capacity of the country's universities, and the adult literacy rate sits at 57%. Their lower education system is not as impressive for an African country. The government is supposed to provide access to local elementary schools for all Nigerian children, but attendance is not as high as the country would like; the number of boys in class far exceeds the number of girls. Many times families are reluctant to send their children to school, because it would mean losing their help around the house. As advanced as Nigeria's education is comparatively, it has much room for improvement.

Analyzed currently and on its own, Nigeria faces a variety of complications. However, considering recent patterns and predictions for its future, the country is in for some unfortunate changes thanks to global warming and its vast array of implications. These implications include an increase in average temperature, increase in rainfall, rise in sea level, soil erosion, decrease in availability of fertile soil, pests, and widespread diseases. Coastal regions and low lying islands, which are already experiencing constant erosion and floods, are the most vulnerable to climate change, leaving Nigeria in an unpleasant situation. This is not to mention the noted trend towards aridity in Sub Saharan West Africa. As a result of these factors, this coastal country will most likely encounter even more problems with crops, livestock, food production, income, exports, and water resources.

Being that Nigeria is located within the tropics, it experiences high temperatures all year round. Its average temperature overall is about 27 degrees Celsius (86 degrees Fahrenheit), varying throughout the country's ecological zones. However, the average temperature is predicted to increase even more due to climate change. The Sudan-Sahel zone (the savanna and semi-arid regions of Nigeria) already experiences highly variable temperatures and has had severe desertification and drought due to its decrease in annual rain, particularly since the 1960's.

Temperature increases of around 0.2 - 0.3 degrees Celsius (0.36 – 0.54 degrees Fahrenheit) per decade have already been observed throughout the country and are continually rising. Nighttime temperatures are predicted to increase even more rapidly, which can alter crop and plant growth or cause extinction for those that require low temperature conditioning. Rising temperatures will also cause more evaporation and produce more droughts, affecting cultivation, water, and biodiversity. Even the world's oceans will undergo rising temperatures, which in turn will cause more severe tropical storms and natural disasters.

Two of the most predicted outcomes of global warming are the increase in precipitation and rising temperatures, both of which react with one another to create unfavorable climate circumstances, particularly for agriculture. One would think that with more precipitation would come fewer droughts and wetter soil, but with increased temperatures, it actually produces the opposite effect and this is exactly where Nigeria is headed. The rise in average temperature escalates the evaporation rate, which reduces the effectiveness of the increasing amount of precipitation, thus allowing many droughts and other problems to occur. For example, the savannas of northern Nigeria are predicted to experience less rainfall in the future, which, combined with increased temperatures, would reduce the availability of moist soil. Or, take the humid, tropical zone of southern Nigeria that is already too hot and too wet; even higher temperatures and more precipitation would push this already fragile ecosystem over the edge.

Yet another critical impact of climate change on Nigeria is the rising sea level, which will affect several coastal countries around the world. According to recent studies, the sea level has risen between 10 and 25 cm's over the past 100 years. The future is predicted to hold similar trends. This gradual but devastating process would result in rapid deterioration of land cover, loss of biodiversity, and depletion of water availability due to dilapidation of aquifers and areas in which rain enters bodies of freshwater. The lowlands along the coast of Nigeria are the more favorable spots for farmers; it is the land currently used for agriculture. Unfortunately, these precious areas would be the first to go in the incident of rising ocean waters. They already experience soil erosion in cataclysmic proportions because of floods and other events, but the increase in rainfall would exacerbate the degradation of these lands even more. Overall, it would lead to issues concerning environmental management, sustainability, and resource shortages.

One of the most daunting impacts of global warming – although indirect – is the escalating amount of pests and diseases. Past research and changing weather patterns have scientists anticipating an expansion in pest distribution in Nigeria, which would have significant effects on agriculture productivity and socioeconomic problems. Some of these insects include the rice weevil, soybean pod borer, tobacco cutworm, and rice stinkbug. Hotter and moister weather would intensify the growth of bacteria and mold on many types of stored food, which would result in frequent food spoilages and food borne disease. Such incidents would be detrimental to a country with severe poverty and poor healthcare, and one that relies so heavily on agriculture to feed its people.

Despite everything, Nigeria still has hope as a country. Its dictatorial president, Umaru Yar'Adua, recently passed away and has been replaced by President Jonathan, who took office in May of this year. Nigerians and the New York Times have described him as “by far the freest and fairest in Nigeria's history.” The country has been planning significant economic advances and has been called an emerging world economy as of recently, but oil and petroleum are still its main sources of national earnings. Thanks in part to President Jonathan, schools, clinics and water points are now being built around the country. The country also plans to market a variety of its agricultural products and manufactured goods, while technologies continue to spread outside major cities. However, the unfortunate truth lies in the fact that one man can only do so

much for a country in so much time, particularly with about half the country's opposition. Nigeria is deeply split between the predominantly Christian and economically dominant south (responsible for the 60% of votes in favor of Jonathan) and the largely Muslim, heavily impoverished and isolated North, who went on a rampage killing 100 people after President Jonathan's win. The north has long been run by religiously conservative political elite and is now beginning to turn on its once most revered institutions, killing even the most respected and powerful Muslim leader of Nigeria, the Sultan of Sokoto. Jonathan is not only one of the most democratic leaders of Nigeria, but the first president who does not come from the 3 largest ethnic groups. Intense conflict involving interethnic fighting and religious division is still rampant throughout the country and half its people are without electricity despite its successful reputation in oil production. The way he chooses to run the country will heavily determine Africa's future as well as Nigeria's.

With the threat of global warming now in sight and the various political and social obstacles President Jonathan must deal with, Nigeria has more than enough on its plate, but climate change is an unavoidable issue. Around 15% of Nigeria's population is already affected by sea level rise and climatic variation. According to certain analyses, about 50-60% of Nigeria is presently at (direct) risk due to sea level rise and climate change, making the country much more susceptible to high amounts of environmental refugees, which could reach up to 92 million in the coming years. However, especially notable is the vulnerability of the country's agriculture as mentioned earlier. Premature ripening and lower yields in crops are likely to arise due to acceleration of crop growth, hotter days, and reduction in rainfall and temperature in the south. Higher temperatures and more rain in the north will increase the rate of evaporation of land and water, resulting in dry soil and desertification, particularly in the Sudan-Sahel region. The majority of water resources along the coast will be polluted by invading salt water in the incident of ocean level rise and an increase in CO₂ and longer seasons will further decrease the productivity of crops. Nigeria's dependence on agriculture is in fact at stake.

So, is Nigeria inevitably doomed once and for all as a country? It may seem like it, but not just yet. As much of the world finally wakes up from its ignorant slumber and realizes and accepts global warming as a primary issue, brainstorming can begin. New ideas have been introduced on how to respond to climate change and what must be done to slow its pace. If Nigeria carefully considers these ideas, it has a fair chance at preventing even more destruction of agriculture, loss of natural resources, and socioeconomic problems. One such idea is "agroecology." Since the 1970's (during the Green Revolution) several countries have attempted higher yields in crop production by using harmful chemicals, like fertilizers, pesticides, and substances for genetically modified crops. Agroecology looks at using more organic techniques to produce the same results. Techniques would include using compost instead of fossil fuel-based fertilizers and natural symbioses to kill pests instead of chemical pesticides. A 2011 UN report stated that 20 projects in Africa resulted in a doubling of crop yields within 3-10 years with the use of agroecology. Harmful chemicals have long been a problem to the fragile ecosystems and biodiversity on earth. Many studies have been done proving its significant effects on animals and their environments. A recent study stated that Roundup, one of the most widely used herbicides, causes birth defects in animals and is a major public health concern. Various harmful chemicals have been found in streams and oceans and are killing wildlife and contaminating the ecosystems in which they live, which only further contributes to the changing environment and global warming. Any artificial chemical that is used to kill living things cannot be good for wildlife and humans, and we must move to a more natural approach.

Another recently developed method is the "Great Green Wall:" an approximately 4,831-mile-long and 9.3-mile-wide wall of trees from Senegal to Djibouti. The Great Green Wall (GGW) would

be a possible solution for Central and West African countries around the Sahara, where climate change has slowed rainfall “to a trickle,” by blocking southward spread of the Sahara. Not only would this act as a natural divide which would suck more of the plentiful CO₂ out of the atmosphere, but it would limit sand erosion. The idea was originally suggested by Thomas Sankara in the 1980’s, but was resurrected by former Nigerian President Olesegun Obasanjo in 2005. The wall would extend through 11 sub-Saharan countries and was approved by the African Union in 2006. The idea has not been perfected, for it still has the potential to introduce foreign species, deplete already low water supplies, and move existing communities.

It is easy to push aside problems that do not have immediate effects on us. Unfortunately, climate change is one of these problems. Nigeria and the rest of the world currently face a number of problems, including poverty, starvation, economic hardships, employment declines, war, political upheavals, etc. However, it is important to note that although these problems are at the forefront of our thoughts and planning, climate change will only exacerbate these issues and overwhelm us more if it is continually pushed aside and ignored. The global population continues to skyrocket, causing increased energy demand, water scarcity, and pollution, all of which accelerate the climate change processes. Poor subsistence farm families who rely on the natural climate patterns to produce food are among those hit worst as these problems escalate. Consumption is at an all time high as many countries (including the U.S.) overindulge themselves and continually forget the fact that we live on a planet with finite resources. If we become more environmentally conscious and work towards adapting to the changes that have already taken place, it will prevent further decline in all of the above issues.

There are many possibilities for adaptations and deterrents of climate change, but none of these can be enforced or enacted if people are not aware of the issue and how it will affect them. Number one on our list of goals should be to educate and spread awareness. As inactive and anti-progressive as it sounds, it must be the first step. There are still people who either have no idea how climate change is really affecting them and others, or who just do not care. This does not mean we cannot do more. The social and political quarrels and lack of enforcement regarding environmental issues have held countries stagnant and void of significant changes and advancements, not just for the “tree-hugging” liberals’ interests, but for the economically engrossed conservatives and everyone in between. Charles Keeling, the inventor of the carbon-measuring machine atop Mona Loa would agree. Even his wife Louise said Keeling would be disappointed in the political battle over climate change. “He was a registered Republican,” she said. “He just didn’t think of it as a political issue at all.” Keeling knew there was reason for concern and he did something about it. Now, we must act as well, but in a much broader sense. Richard Louv was right in quoting Martin Luther King Jr.’s idea that “any movement – any culture – will fail if it cannot paint a picture of a world that people will want to go to.” This is what we ought to do in order to produce the change we desire.

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