

FACTS ON CLIMATE IN NIGERIA #4 REPERCUSSIONS FOR AGRICULTURE, FOOD SECURITY, LAND DEGRADATION, FORESTRY AND BIODIVERSITY

Climate change has become our new reality. It brings with it changes in weather patterns that can have serious repercussions for all of us, upsetting seasonal cycles, harming ecosystems and water supply, affecting agriculture and food production, causing sea-levels to rise. Climate Change causes floods, landslides, drought and famine. As weather becomes fiercer and storms increase in frequency and intensity, serious socio-economic consequences result. Malnutrition and disease become common occurrences. Climate change has a cumulative effect on natural resources and the balance of nature.

Its effects are already visible in Nigeria. This series of Fact Sheets identifies present and future challenges and suggests ways of managing and adapting to the climate change process. (For a full picture of climate change in Nigeria, refer to the other four Fact Sheets: #1, Health and Human Settlements; #2, Water Resources, Wetlands, and Freshwater Ecology; #3, Energy, Industry, Commerce, and Financial Services; and #5, Coastal and Marine Ecosystems.)

What's the problem?

A variety of food crops are produced in Nigeria, all dependent on rainfall, so that where rain is abundant (in the Middle Belt, for example) crops dependent on rain are planted, and in drier parts of the country, crops that do not require much rain are cultivated. Food production on the whole, however, has not kept pace with Nigeria's population increase.

Climate Change can seriously affect agricultural production and therefore, food security (availability of food). Nigeria, at present, does not enjoy food security so is very vulnerable to the effects of climate change.

Land degradation reduces the quality and productivity of land. Many factors can affect it, and climate change can be one underlying cause, resulting in water and wind erosion of land, drought and the creation of deserts, acid and salt accumulation, depletion of minerals, and heavy-metal contamination. All forms of land degradation in Nigeria occur in different scales, but no part of the country is safe from it. The low-lying nature of Nigeria's 800 km coastline makes it prone to coastal erosion and flooding, all of which are climate change-induced forms of land degradation. In the Sahelian zone of Nigeria's north, the most pronounced climate change-related forms of land degradation are wind erosion and related sand dune formation, drought and desertification. Sheet erosion—which results in the complete removal of arable land—is Nigeria's biggest threat to agriculture, especially in the sandy soil regions of south-eastern Nigeria.

Prevailing climate is critical in controlling the ecosystem structure. Forests provide important goods and services, which include food, non-timber forest products, timber, firewood, the natural regulation of biochemical cycles, genetic resources, soil and water conservation, carbon

reservoirs, recreation, cultural and spiritual values. Forests play a key role in the functioning of the biosphere and indirectly affect the provision of many other goods and services. Changes in climatic and atmospheric composition will likely help to diminish Nigeria's forests. The upper limits of the tropical rainforest are already receding. Given the sensitive nature of the forest ecosystems, forest resources have become highly vulnerable to even slight changes in climate systems. Changes in temperature, precipitation and water cycle dynamics, therefore, can lead to remarkable forest-cover loss.

Bio-diversity—a natural treasure—can be disastrously affected by climate change. Yet to date, the vulnerability of bio-diversity to climate change has barely been given any heed in Nigeria. Researchers believe that the cumulative impact of climate change on bio-diversity is one potentially disastrous contemporary event with no historical precedent. The impact is much greater on micro-organisms and plants than on humans or animals. In fact, some unique and threatened systems may be irreversibly harmed by climate change.

Pre-existing problems will only worsen with climate change.

What will happen here if Climate Change is not addressed?

Climate change affects agriculture in a number of ways. Extreme weather events such as thunderstorms, heavy winds, and floods devastate farmlands and can lead to crop failure. Pests and crop diseases migrate in response to climate variations (e.g. the tsetse fly has extended its range northward) and will potentially pose a threat to livestock in the drier northern areas.

Food security is vulnerable to extreme weather events such as drought and floods. When the Sahelian zone suffered drought in the 1970's and 1980's, harvest failure was remarkable throughout the region. Close to one million livestock were lost, affecting meat and dairy supply throughout the country. Flood hazards in both the north and south of the country consistently posed a danger to farmlands and hence, to food security. Food security is dependant on rainfall and rainfall amount, and is affected by the age-long ability of farmers to predict when to plant their crops. Unpredictable changes in the onset of rains in the last 20 to 30 years have led to situations where crops planted with the arrival of early rains get smothered in the soil by an unexpected dry spell that can follow early planting. That, and the late arrival of rains due to climate variability, results in harvest failures in ecosystems that rely on rain-fed agriculture.

The proliferation of pests and crop diseases (again originating with climate change) can hinder storage when the need arises because of temperature increases. The pests, in turn, attack crops and animals. The current warming trend hinders livestock production and reproduction by reducing animal weight gain and dairy production. As well, livestock are usually subjected to long treks to find water and grass in the more southerly areas of the country during the dry seasons. Warming trends also affect the growth of grain crops such as maize, guinea corn, millet, and rice, and makes storage of root crops and vegetables difficult.

Indicators of land degradation due to climate change are already apparent in Nigeria. Deforestation, characterized by the quickly disappearing forest cover, is one symptom made worse by human intervention. Changes in temperature, rainfall and water cycle dynamics can induce other problems. Scorched and retreating forests, reduced soil productivity in some places due to the removal of soil nutrients by massive soil erosion and flooding, farmlands devastated by heavy rainfall-induced soil erosion, as in the southeastern ecozone, are but a few. Changes in climatic conditions can also modify tree growth and development, reducing the availability of non-timber forest products such as spicy vegetables and mushrooms. Climate change can increase the incidence of pests and diseases (see Fact Sheet #1, Health and Human Settlements) that attack and decimate forest trees; it can lead to species extinction in the various ecozones of Nigeria (and already has; for example, the Iroko and oil bean in the southeast; various mahogany species in southwest; the baobab and the locust bean in the northwest; gum arabic in the northeast; and the list goes on!).

Bio-diversity is terribly vulnerable to climate change. Many species of plants and animals are rapidly becoming extinct. Tree density and floristic richness is decreasing. Rarely are new species of plants and animals showing up in the ecosystems. The fruiting intensity of some trees is diminishing; aberrations in animal mating habits and

changes in bird and animal migratory patterns (due to the need for new habitats or new food sources) are evident. Fish spawning patterns have changed; the extinction of rare and endangered species of plants and animals has increased.

How do humans add to the problem?

Human activities are probably what drive both land degradation and climate change. Deforestation, for example human activity is a well-known factor causing land degradation by erosion. Nigeria's forests are being reduced by 600,000 hectares annually. Also contributing to the problem are population pressures (urban populations are growing and contributing to environmental decay and pollution), failure to implement appropriate technologies (the burning of fossil fuels and firewood is prevalent), poverty, constraints imposed by recent international trade agreements, and local land-use policies.

Humankind is guilty of decreasing forest density and floristic richness. While changes in climate conditions affect forest productivity overall, illegal logging in Nigeria has exacerbated the decline in both density and floristic richness of the forests. With the progressive and rapid disappearance of the most popular indigenous timber species, attention has now shifted to virtually every other tree species to meet the rising demand for wood.

What can we do about it?

Agricultural production could be increased by doubling the crop areas or by investing in agriculture management and technology. Producing more drought-resistant crops would help, as would better management of water resource, more efficient food storage systems, improved processing methods and better pest management. Government policies favourable to the agriculture "industry" could be instituted (for example, providing all-season access and feeder roads and establishing markets for products). The agriculture industry can alter its ways of doing things and adopt strategies to increase agricultural productivity in Nigeria. Farmers can learn (and be encouraged) to exercise discretion in planting with the arrival of the earliest rains in the season. Water reservoirs can be created in dry areas such as the Sahel. Mixed farming practices can be introduced.

Individuals and communities need to adopt behaviours or policies geared at restoring and conserving the environment. Increased self-reliance, avoiding unregulated forest exploitation, planting appropriate tree species, protecting water sheds, using agroforestry and organic farming techniques and maintaining adequate food supplies will lessen the vulnerability of the food supply sector. So, too, will maintaining water levels so that fish can spawn, planting drought-resistant crops, draining wetlands for rice cultivation, and reforming land tenure and land management policies. Government

initiatives (such as greater support for research, improving transportation, offering subsidies and other protective trade regulations devices, making soil and water conservation a high priority) can help the adaptation process along. At a local level, erecting contour bunds around farmlands as a safeguard against soil erosion and flooding; using organic manure instead of the more preferred chemical fertilizers; establishing wood lots with fast-maturing plant species that yield domestic fuel wood for community members; reducing bush-burning; using disease-resistant, quick-maturing crop and plant species (cassava sticks, fruits and nuts); properly preserving seeds and plant seedlings to ensure healthy germination in the succeeding farming season; and disseminating research findings to farmers, would help mitigate the affects of climate change. As well, limiting access to eroded and erosion-prone areas, and initiating and stringently enforcing anti-erosion laws will act as human deterrents.

Other adaptation measures could include: adopting new farming approaches (such as mushroom farming and planting more fruit tree orchards), using improved varieties; setting up gene banks; identifying and conserving threatened and endangered species of plants and animals in zoological gardens; and raising public awareness on the importance of bio-diversity.

But perhaps the most effective method of staving off the negative effects of climate change is educating the public on the menace of land erosion and the public's role in tackling the problem, and educating Nigerians overall on how climate change will affect all of human activity.

What's preventing us from doing all this?

Perhaps the biggest obstacle is lack of awareness and knowledge. Nigerians need to be educated and informed about climate change and how it can change our lives drastically.

Change is difficult, and that is probably the main reason for not taking action. Taboo and tradition may keep some of us from making the necessary changes to the way we do things in Nigeria. Southern farmers, for example, believe that fertilizer defiles the ground. Industries have been manufacturing with environmentally-unfriendly methods for years and changing to new methods can seem to be impractical and more costly. These new methods may not be common knowledge, either. The existing land tenure and management systems, and current government policies, are not complimentary to adaptation strategies.

There is also a heavy dependence on forest resources in Nigeria, and a dependence on environmentally-unfriendly energy sources. Lack of universal public awareness and education prohibit the country from adapting to climate change.

There is a dearth of public policies that target adaptation, and those that do exist are inadequate. Change will require sufficient funding and political will, all of which are currently lacking in Nigeria.

Why should we concern ourselves?

There are hundreds of reasons to be concerned. Increased poverty, unplanned urbanization, deforestation, over-cultivation of grasslands and agricultural lands, loss of flora and fauna the list goes on and on and on. In a nutshell, all economic activity is affected by climate change, as is quality of life. It is obvious that unless we concern ourselves now, it will be too late to help Nigerian society take preventative measures and we will end up being ill-equipped to deal with our new reality. The scientific community must be involved in studying climate change and forecasting weather, and then transmitting this information to all sectors of Nigerian society, industry and economy so that these sectors can adapt and be ready to meet a very different future than the present. The Nigerian government, especially, must adopt strategies and policies that will encourage improved farming and agricultural methods, and that will protect our cherished forests and the bio-diversity of this great country.