CLIMATE CHANGE, AGRICULTURE AND FOOD MANAGEMENT IN NIGERIA

Ibrahim, M. K.
Department of Agricultural Economics & Extension
Kogi State University, Anyibga, Nigeria
E-mail: kebitex@yahoo.co.uk

David, A. M.
Department of Agricultural Economics
University of Nigeria, Nsukka, Enugu State, Nigeria

Okpanachi, G. U.
Department of Animal Production, Kogi State University, Anyibga, Nigeria

ABSTRACT

This paper aimed at providing hypothetical analyses of the preceding assertion that Nigeria, like many countries within the semi-arid regions of Africa, has been beset by several climatic anomalies during the last century. In particular, the weather variations experienced since the late 1960s through early 1970s to date have impacted on various environmental processes and human activities like Agriculture. Based on this, the study recommended among others that: farmers should be encouraged to adopt new farming approaches such as mushroom farming, planting of more fruit tree orchards and the use of improved varieties.

Keywords: *climate, variations, agriculture, century, weather, environmental.*

INTRODUCTION

According to the Intergovernmental Panel on Climate Change (IPCC), climate change may be defined as statistically significant variations that persist for an extended period, typically decades or longer. It includes shifts in the frequency and magnitude of sporadic weather events as well as the slow continuous rise in global mean surface temperature. The earth's climate system has been demonstrated to change on global and regional scales since the pre-industrial era, with some of these changes attributed to human activities. Emissions of greenhouse gases (GHGs) and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate. Crop and livestock responses to changing climate are initial consequences that may lead to changes in agricultural production and food security in Nigeria (Gwary, 2008).

IMPACTS OF CLIMATE CHANGE ON NIGERIAN AGRICULTURE

Climate change and agriculture are interrelated processes, both of which take place on a global scale. On a global scale, changes are expected in temperature (4.43^{o}C) and precipitation (0.07mm/d) on farm area weights by 2080s (Table 1). Climate plays an important role in agriculture by setting up limits for crop production. The main climatic elements in agriculture are temperature, moisture, sunlight, wind and evaporation. Most crops are sensitive to episodes of high temperature. Air temperatures between 45 and 55°C that occur for at least 30 minutes directly damage crop leaves in most environments (Fitter and Hay, 1987).It is as a result of variations in climate that certain crops perform well in some regions than the others. For instance in Nigeria, onion does not do well in the southern part of the country as in the northern part. Agriculture is the main source of food, industrial raw materials in Nigeria employing about 60 per cent of the population. It is predominantly a rain-fed system and hence vulnerable to climate change (NFNC, 2003). Similarly, livestock production mainly raised in the dry lands of Nigeria is heavily dependent on rainfall and therefore equally vulnerable. This agricultural vulnerability has been defined by the Intergovernmental Panel on Climate Change (lPCC, 2007) as the risk of negative consequences of climate change that are difficult to ameliorate through adaptive measures.

Types of vulnerability include risk of large yield reductions that may result from small changes in climate, risk of profitability loss, risk of economic decline and risk of hunger for people with limited access to food or means to

acquire it. The effects of extreme weather events on crops will be either direct or indirect or both. Higher temperatures increase moisture stress on crops directly by increasing evapotranspiration as well as the atmospheric holding capacity for water vapour. Indirectly, higher temperatures has caused the breakdown of organic matter in soils, leading to lower levels of soil organic matter culminating in less soil moisture retention and additional crop moisture stress, which have direct and indirect effects on crop yields.

Increased rainfall variability would lead to frequent floods and drought resulting in variability in crop yields in different ecological zones. Higher rainfall in the southern part of the country coupled with sea-level rise would lead to crop losses due to water logging, loss of arable land and increased pest infestation. This would lead to numerous social problems such as forced migration, unemployment and poverty (NFNC, 2003). Drought conditions, brought about by lower amount of precipitation will have several consequences on both crop and livestock production. Crop yields would suffer if dry period occur during critical developmental stages such as reproduction.

Livestock production, an important agricultural sector is valuable to climate change. A decrease in rainfall in the Sudan Savanna and the Sahel would reduce available pastureland, surface water resources and increase salinity at watering points because of increasing temperature and evaporation. Drought diminishes rangeland productivity; it also adversely affects feed quality and species diversity. If drought continues to the extent of rangeland classification, pastoralists abandon the area (Squires and Sidahmed 1998). In the arid and semi-arid zones, livestock density is above the potential carrying capacity most of the year and these are the area where desertification takes place. The excessive heat due to warming in dry lands of Nigeria resulting from changing weather and climate will also reduce the feed intake, feed conversion efficiency and weight gain of the livestock. The consequences of this are changes in milk and meat production and reduced reproduction. This will have a negative feedback in the economy when supplies of protein and hides and skin are reduced.

CLIMATE CHANGE AND FOOD MANAGEMENT STRATEGIES IN NIGERIA

Nigeria, being more than 90% dependent on rain-fed Agriculture is highly at risk especially in the areas of food sufficiency and nutrition security, poverty and hunger reduction, economic development and the attainment of the Millennium Development Goals. In response to the overwhelming issues of

climate change, global warming and in order to halt the threats of rising food prices and to ensure increased production of staple food commodities in Nigeria in the short term, the country has released assorted grains for sale at subsidized prices from the National Strategic Reserve. Nigeria has temporarily removed tariff on rice importation, initiated the accelerated completion of storage facilities, distributed increased quantity of fertilizers and seeds at subsidized rate, and syndicated special funds at very low interest rate, long term moratorium and repayment period for rice processing and marketing (Yar'Adua, 2008).

In addition to increased budgetary allocation, the federal government of Nigeria allocated 1.68% of its funds in the federation account as a special intervention fund for agricultural development in the next four years with a takeoff fund of about $700m. The special intervention programme has taken an agricultural value chain approach, covering production, processing, and storage and market development in an integrated fashion with the strengthening of Research & Development capabilities (Gwary, 2008). Nigeria is also set to mitigate global warming effects through aforestation and reforestation, integrated water management and the promotion of biofuels using *Jatropha* and cassava as feedstock. The country is currently the World's largest producer of cassava and concerted efforts is also made in promotion of *Jatropha* plantations (BNRCC, 2007).

CONCLUSION AND RECOMMENDATIONS

Nigeria has a vast population of about 140 million people and has a big responsibility of feeding this population even under a changing climate. In response to these overwhelming issues of climate change, global warming and in order to halt the threats of rising food prices and to ensure increased production of staple food commodities, the country needs to put some measures in place. The following recommendations would assist in this direction. Development of more drought-resistant crops would assist in better management of water resource, more efficient food storage systems, improved processing methods and better pest management. 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. Farmers should be encouraged to adopt new farming approaches such as mushroom farming and planting more fruit tree orchards and the use of improved varieties. Overgrazing remains the greatest cause of degradation of

grasslands, therefore improved pasture management and integrated agro-forestry systems are effective ways to conserve the environment and mitigate climate change.

Table 1: Percentage change in Agricultural Production from selected countries

Countries	Recardian	Crop Model	Weigthed w/oCF	Average w/CF
India	-49.20	-27.00	-38.10	-28.80
China	3.80	-12.60	-7.20	6.80
S. Central	-18.80	-12.60	-14.60	-1.80
Mexico	-35.90	-35.10	-35.40	-25.7
Nigeria	-12.10	-24.90	-18.50	-6.30
South Africa	-47.00	-19.80	-33.40	-23.40
Ethiopia	-31.40	-31.10	-31.30	-20.90
Canada	0	-4.30	-2.20	12.50
Spain	-4.50	-11.10	-8.90	4.80
Germany	13.80	-11.10	-2.90	11.70

Source: William (2007).

REFERENCES

Building Nigeria's Response to Climate Change (BNRCC) (2007). Climate Change Information on Nigeria Agriculture, Food Security, Land Degradation, Forestry and Bio-Diversity: Vulnerability, Impact and Adaptation to Climate Change in Nigeria. Retrieved on 19th September, 2008 from *http://www.nigeriaclimatechange.org/page4.php.*

Fitter, A. H. and **Hay, R. K. M.** (1987). *Environmental physiology of plants* (2nd ed). London: Academic Press Limited.

Gwary, D. (2008). Climate change, food security and Nigeria agriculture. Department of crop protection, University of Maiduguri. Retrieved on 12th September, 2008 from *www.tribune.com.ng/03062008/Management.html.*

IPCC (2007) *Summary for Policy makers.* In Parry M. L., Canziani O. F., Palutikof J. P., Van der Linden P. J. and Hanson C. E. (Eds.) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge: University Press.

Nigeria First Communication Commission (NFNC) (2003) under the United Nations Framework Convention on Climate Change.

Squires, V. R. and **Sidahmed A. E.** (1998). Sustainable use of rangelands into the twenty-first century. Retrieved on 14th October, 2008 from *http://www.hoffmansbookshop.com/ap*.

Yar'adua, M. U. (2008). Statement of President Umaru Musa Yar'adua, Federal Republic of Nigeria to the High-Level Conference on World Food Security: The Challenges of Climate Change and Bioenergy, 3rd - 5th June, 2008, Rome, Italy. Retrieved on 15th October, 2008 from *http://www.fao.org/fileadmin/user_upload/foodclimate/statements.*