



## INTEGRATION OF CLIMATE-SMART AGRICULTURE FOR SUSTAINABLE FOOD SECURITY IN NIGERIA

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**ABSTRACT:** Nigeria is currently experiencing the negative scourge of Climate Change in terms of massive flooding of arable farmland, erosion, water-logging, unprecedented high temperature, drought, desertification, heavy rains and tropical storms all of which is impacting on its capacity to produce food, livestock and fisheries and the damage to the ecosystem functioning. The adoption of Climate Smart agriculture which involves a sustainable increase in food production, resilience or adaption as well as reduction/removal of green house gases (mitigation) will not only contain the negative impacts of Climate-Change but will also ensure a sustained rapid food security for the ever-increasing population of Nigeria. Government policies aimed at proper training, research and granting of incentives should be given priority now, to rural farmers who are already at risk of losing millions of naira to the negative impacts of Climate-Change. Given the necessary policy, support, political will to implement such Climate Smart agricultural policies the adoption of Climate Smart-agriculture in Nigeria will be rapid, result-oriented and will boost food, livelihood and environmental sustainability and security respectively.

[Dr. C. I. Duruigbo **INTEGRATION OF CLIMATE-SMART AGRICULTURE FOR SUSTAINABLE FOOD SECURITY IN NIGERIA**. *Nat Sci* 2023;21(10):1-3]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature>. 01. doi:[10.7537/marsnsj211023.01](https://doi.org/10.7537/marsnsj211023.01).

**Key words:** Climate-Change, Flooding, Desertification, Erosion, Climate-Smart agriculture, Nigeria.

### INTRODUCTION

Climate Change is currently considered the most immediate and far-reaching threat to the natural environment. Climate variations and changes present major challenges for communities. These challenges manifest themselves through flooding, drought, desertification and high temperatures that can impact negatively on crop production, livestock rearing and fisheries respectively. These changes are compounded by and contribute to social, political and economic vulnerabilities of people and society. The degradation of biodiversity and ecosystem in Sub-Saharan Africa is threatening the survival of its biotic, terrestrial and aquatic heritage due to the negative impacts of climate change in the region (Boko, 2007).

In Nigeria, the environmental devastation arising from the impacts of climate change is becoming rampant in many parts of the country (Eze *et al*, 2012). For instance, the current perennial flooding in the Niger Delta region, massive erosion and landslide in the Southeastern States and desertification in most parts of Northern Nigeria attest to the reality of the negative effects of climate change in the country.

The dependence of over 80% of crop production in Nigeria on rainfall has serious consequences on crop productivity with the advent of climate change (Agbo, 2012). Acid rains, distortion of seasonal patterns and

changes in rainfall patterns are some of the incidences of climate change phenomenon observed by farmers in Nigeria (Agbo 2012).

Nigeria with a land area of 910.8 thousand square kilometers has 41.2% of it as arable land by 2008 (Essien, 2013). Climatic problems such as high wind, heavy rainfall, high temperature, tropical storms, floods, landslide, droughts and sea level rise. Flooding, erosion and droughts seem to be the most devastating problem that threaten the entire country. Nwogwugwu and Nwogwugwu (2013), reported that the menace of erosion no doubt represents a major economic challenge facing most states in Nigeria. The undue human interference in the natural ecosystem such as deforestation, soil excavation, construction activities and the stress of over population are some of the recognized factors that cause erosion while the increased occurrence of flood due to heavy rains is also likely to spark off incidences of water-borne diseases.

Eze *et al*, (2012) reported that the low-lying nature of Nigeria's 800kms coastline from Lagos to Calabar makes the region vulnerable to climate change, since it will be prone to water intrusion into coastal fresh water resources leading to negative impact on inland fisheries and aquaculture.

Food Security in Nigeria is already threatened by the negative impacts of climate change hence efforts

should be made to reduce the scourge of Climate Change in order to boost food production and security to the entire population. This paper shall review the integration of Climate-Smart Agriculture for Sustainable Food Security in Nigeria.

### **ROLE OF CLIMATE-SMART AGRICULTURE IN CLIMATE CHANGE REMEDIATION AND SUSTAINING FOOD SECURITY IN NIGERIA**

The need for a more sustainable approach to agriculture has led to suggestions that agriculture is the key and holds enormous potential to contribute to any strategy capable of adapting to Climate Change and reduce emissions especially in an African context (Beddington *et al*, 2011).

Climate-Smart agriculture (CSA) is one approach that has been proposed as the “holy grail” of agricultural development (Naess, 2011) ensuring that agriculture is key to climate change adaptation and mitigation (Wollenberg *et al* 2011, Bedding *et al* 201).

Climate Smart agriculture is derived from the acronym SMART, where S stands for specific, M stands for Measureable, A for Achievable R stands for reliable and T stands for timely (McCarthy *et al*, 2012). According to FAO (2010) CSA is a method of agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes green house gases (mitigation) while enhancing the achievement of national food security and development goals.

The three main objectives of Climate Smart agriculture namely: (i) the sustainable increase in agricultural productivity and incomes; (ii) adapting and building resilience to climate change and (iii) reducing/removing greenhouse gas emissions. Hence any agricultural system that meets these three core objectives is considered to be “Climate-Smart”. This concept is a better way of uniting the agenda of agriculture, development and climate change under one brand.

Duruigbo *et al*, (2011) critically examined the adoption of indigenous technologies for adaptation and mitigation of Climate Change in Sub-Saharan Africa and concluded that such technologies as; changing of planting dates, cover-cropping, mulching, zero tillage, conservation agriculture, use of emergency fodder and eco-farming systems are sustainable, culturally-acceptable and environmentally-friendly. These observations are part of the new approach to Climate Smart agricultural production systems, which will boost food security as well as environmental sustainability.

Climate Smart agriculture has been applied with positive results in some African societies namely Yatenga, Burkina Faso, Northern Cameroon and Egypt (FAO, 2010).

Establishing the potential applicability of Climate-Smart agriculture in the context of developing societies is critical to creating widespread acceptability by farmers in Nigeria. Also the political will required to motivate deep transformation within the policy sector is crucial.

The adoption of new and proven technologies to farming by farmers such as Climate Smart agriculture requires creating awareness as well as building a strong information and communication intervention strategy for Climate Change in Sub-Saharan Africa (Duruigbo *et al*, 2013). This approach which involves both indigenous communication networks, the mass media, electronic media, etc will go a long way in fast-tracking the adoption of Climate Smart agriculture within the rural farming setting in the Country.

For instance in Northern Nigeria Farmers relied to a large extent on astronomy information supplied and interpreted to them through opinion leaders for agricultural activities (Mahammed and Magaji, 1995). Based on such information there exists a local calendar in which the year is divided into four agricultural seasons each of which is in turn divided into seven periods of thirteen (13) days.

Traditionally farmers seek advice from local opinion leaders on when to plant and harvest their crops. These approach was found to be in accord with cropping calendar based on scientific research findings and meteorological data.

The adoption of Climate Smart agriculture practices in Nigeria will improve the existing indigenous agricultural systems as well as encourage the practice of agro-ecological agricultural systems (IAASTD, 2009).

The fundamental question that is needed is “To what extent can Climate Smart agriculture be said to be sustainable? It is necessary for this to be appraised in terms of its potential influence on the environment, its implications for sustainable development and the potential cultural and socio-economic consequences secondly the question of the site specific nature is needed in order to understand what are the enabling political, social and economic conditions needed for the adoption of Climate-Smart agriculture in Nigeria.

Policies relevant to the adoption of Climate Smart agriculture in Nigeria’s farming systems is needed urgently. Such policies should be highly demand-driven, inclusive and proactive in terms of building the required institutions and human resources at the disposal of government to boost farmers acceptance of the new Climate-Smart agricultural practices, increase food production and environmental sustainability in the long-run.

### **CONCLUSION**

The adoption of improved farming practices in line with the Climate-Smart agricultural production will boost small-scale farming, increase farmer's revenue base and enhance environmental security, economic prosperity and a food secure posterity in the country.

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9/22/2023