Deforestation, Food Security and Environmental Sustainability in South-west, Nigeria, 1960-2015

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Abstract
The forest region of Nigeria—especially the south-western agrarian, and other non-farming communities have witnessed ruthless deforestation either for urbanization or other consumerist purposes, since the past few decades. This anomie constitutes a major challenge in the drive towards achieving sustainable food production from the agrarian areas as well as environmental sustainability. Deforestation is a major threat to the ecosystem and agricultural activities in Nigeria. This article examines the relationship between deforestation, food insecurity and environmental sustainability in South-western Nigeria. Social, economic and environmental historians in Nigeria have overlooked the impact of the phenomenon on food security and environmental sustainability in Nigeria. The study adopts the historical methodology and uses the vent-for surplus theory to show that food insecurity, substandard human quality of life, low life expectancy, epidemics and changes in the biodiversity in southwest Nigeria are results of deforestation and environmental mismanagement. The paper recommends that reducing the growing de-agrarianization, food shortage, and environmental challenges in Nigeria, requires the need to reinvent the wheel by strengthening institutional regulations, including non-state agencies monitoring the use of the environment and conservation of biodiversity. Traditional environmental protection mechanisms, such as taboos, myths, superstitions may also help to reduce the alarming rate of environmental mismanagement.

Keywords: Deforestation, Food Security, Environmental sustainability, South-west, Nigeria

Introduction

Food insecurity and environmental degradation are closely connected, often in a self-perpetuating negative spiral in which hunger and low quality of life creates poverty while simultaneously affecting productivity and the environment. Nigeria faces acute food shortage because government and millions of people, living in the rural areas, have exploited natural resources in irrational ways to promote consumerism, urbanization, industrialization and modernity. In effect, diminishing quality of life, disappearing livelihood and food insufficiency constitute one of the major problems facing people in rural agricultural communities as well as low

income earners in the urban sectors in Nigeria. This however, cannot be separated from the growing rate of deforestation caused by human desire to achieve rapid urbanization and industrialization. African food insecurity crises are caused by a number of factors, prominent among which is the alarming rate of deforestation in Nigeria.

Between 1990 and 2015 the world lost over one hundred and twenty nine million hectares of forest, an area the entire size of South Africa. Since the 1990s, several forest resources such as trees, land and other endowments in South-western Nigeria have been subjected to intense clearing and deforestation for industrial, housing and non-agrarian commercial activities. Meanwhile, rural forest resources constitute an important factor in engendering food security, rural livelihoods and environment sustainability. Today, there are over 180 million people in Nigeria with over 70 per cent lacking both physical and economic access to food, thereby suffering from severe deficiencies. In the southwest region of Nigeria, there are over five million people relying on forest resources for their livelihood. The Food and Agricultural Organization [FAO] quoted in a World Bank (2011) report notes that there are 20 countries in sub-Saharan Africa (SSA) which periodically face food crises as a result of intensive deforestation.

It is important to note that prior to the advent of colonial rule in Nigeria, forest lands were conserved chiefly for agricultural activities. The Yoruba, for instance, nurtured and sustained the environment, especially the forest lands within their immediate communities for agrarian purposes, especially food production and environmental conservation. Historically, the Yoruba had a number of strategies to prevent mismanagement of forest resources. For instance, the great respect accorded *Orisa Oko,* a prominent Yoruba deity associated with agriculture, food surplus and fertility generally prevented people from encroaching into forest or destroying vital natural resources in a way that would affect humanity and the environment (Willie, 2005).

Forest land available in each social formation was maximised solely for the production of agricultural products such as yam, cassava, plantain, kolanut, palm products among others for the purposes of sustaining food security. In fact, farming and hunting were specifically the major occupations of the people. Even though felling of trees for domestic use, as well as lumbering activities were rampart, these could not degenerate into wide range deforestation owing to myriad of traditional environmental laws invented to prevent mismanagement of forest resources and other relations of production (Ogunremi et al; 1996).

This article discusses the effect of deforestation on food security and the environment in South-west Nigeria since 1960. There is a paucity of historical research on the effect of deforestation on food security and the environment in Western Nigeria. Existing historical studies on environmental sustainability in Nigeria have particularly focused on the Niger Delta area and overlooked the escalating impact of deforestation on the food security and environmental sustainability in other parts of Nigeria. The article is divided into five parts. The first section is the introduction; the second contains the review of literature on agriculture, food security and environmental sustainability. The third section explains the vent-for-surplus theory; the fourth part historicizes food security and environmental management in South-western Nigeria, while the last section highlights the effect of deforestation on food security and the environment in South-western Nigeria and the suggestions to arrest the trend.

Food Security

The concept of Food Security has undergone changes and reconstruction since the past few decades. Changes in household production, mode of distribution and consumption in addition to rapid urbanization and global food consumerist culture have redefined the ontological nature of the concept. Food Security can be defined as access to adequate and quality food at the individual, household, national and international levels at every given time. The Food and Agricultural Organization (1997), states that Food Security exists when all people, at all times and all levels have access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life.

Food security, according to the United States Department of Agriculture (USDA), connotes a steady supply of safe and nutritious food for human consumption. An assured ability to acquire acceptable food in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing or other coping methods or strategies).Food security is associated with food intake at the individual level and its availability at household, sub- national and national levels (World Bank, 1996). A food secured household can be defined as a home which has adequate food for the required intake of its members. Availability of food at the household level depends on many variables. These include, net food production, land, labour, capital, knowledge and technology, food prices and food supply in the market, cash flow, farm rents, and per capita income of consumers (FAO, 1997).

Agriculture, Deforestation and Food Security

The central role of environmental management and the effect of its mismanagement especially in oil endowed areas have been documented in landmark studies on environmental sustainability. A major limitation of the literature on the environment in historical studies is that most of them focused on the oil exploration in the Niger Delta region. Existing works on environmental sustainability and its impact on agriculture emphasised the economic strategies of agricultural planning but overlooked the effect of deforestation on food security and environmental sustainability. In order to demonstrate the gap in extant literature in relation to deforestation, food security and environmental degradation, a literature review will be undertaken.

The first category of works centres on agriculture and food security. Oluwasanmi (1966) establishes that agriculture is the cardinal means of attaining food security in Nigeria. Oluwasanmi shows how over seventy per cent of Nigeria's population in the pre independence and the immediate post-independence era engaged in agriculture, livestock rearing, forestry and fisheries which accounted for over sixty per cent of the national income. Oluwasanmi argues that since improved agriculture is essential to industrial development and national wealth, the underutilization of forestry endowment will hinder the possibility of achieving industrialization and food security. He argues that all lands must be productively channelled towards cash crop exports and food production in order to achieve economic growth. However, he overlooked the negative effect that deforestation poses on sustainable food production and the environment.

Adetiloye (1978) examines the various aspects of credit and guarantees in food security in Nigeria. The paper observes that in spite of Western countries campaign for the removal of subsides from agriculture in developing countries, they have sustained the same. He notes that credit to the agricultural sector has dwindled and continues to dwindle in percentages terms. He argues that the livestock sector has gained more but the cultivation of cash crop has improved significantly. The only challenge has been the delay in settlement of guaranteed credits. Finally, it is concluded that Nigeria's food security situation is not assured, as higher population demand higher increase of food imports. His recommendations include education and enlightenment campaigns to improve the understanding of farmers and would-be farmers. He also believes that the new incentives of the Linkage Banking Group and Interest Drawback scheme will increase the patronage of peasant farmers, reduce the default rate of agricultural loans and encourage lenders to provide more credit. The oil boom of the 1970s

according to him led to widespread decline of agrarian activities. This necessitated the need to revamp the economy in the 1980s.

Agboola (1979) discusses the nature of agriculture and the challenge of increased production in the colonial and postcolonial era in Nigeria. He discusses the spatial distribution of crops and livestock. The study also examines how drought orchestrated high prices of food crops and the decrease in the agricultural export production that should necessitate aggressive programme of action for agricultural production in Nigeria. New institutions were established to cater for agricultural, rural, social and economic aspects of Nigerian lives. The core of the research is the clear understanding of the agricultural environment in the colonial and postcolonial Nigeria.

Fabiyi (2006) discusses the changes in urban land uses since the urban explosion of the 1970s when people started moving from the rural hinterland to the cities en masse in anticipations of gainful employment and to benefit from urban economy. He evaluated urban temporal changes in a typical traditional settlement in Ibadan, Nigeria. It was observed that there are considerable dynamic changes in Ibadan metropolis and that the major contributors are the vegetal cover, low density and sprawl development. He suggested ways to control haphazard urban growth that characterizes Ibadan and other major urban settlements in Nigeria.

In *Good Intentions Are Not Enough*, Idachaba (2006) focuses on the factors that led to the creation of Agricultural Development Project (ADPs) and its impact on small scale farmer and rural infrastructure. The author enumerates a number of factors that led to the failure of these programmes. These include increase in the demand for food amidst rural-urban migration, petrol-centric economy and ineffective forestry agricultural extension systems. These lapses, according to Idachaba necessitated the Agricultural Development Programmes such as the extension schemes in Funtua, Gusau and Gombe in 1975 followed by Lafia, Bida, Ilorin, Ekiti-Akoko and Oyo North in 1978/79 and subsequent schemes in Bauchi, Kano, Sokoto and Kaduna between 1981 and 1984. Idachaba departs from the conventional belief in the efficiency of large scale farming over small scale farming. He reveals how pre-colonial and colonial agriculture in some areas depended on small scale farming with the use of inorganic technologies. This he notes is more sustainable, economically, nutritionally and environmentally friendly to man and the society than the modern mechanized systems.

Nworgu (2006) discusses in details the prospects and problems of agricultural production in Nigeria. He examines the efforts made by various Nigerian Governments to boost agricultural productions as well as the roles of some non-governmental organizations and highlights possible solutions to the challenges of Nigerian agricultural production. Nworgu's work, therefore, provides a deep insight into the impact of government impact on agriculture generally in Nigeria. Despite the rapid pace of urbanization taking place in Nigeria, half of Nigerians still live in rural areas (Liverpool-Tasie et al; 2011). The growing numbers of these rural inhabitants have veered into petty trading and non-agric businesses. To him, farming retains its key role in the economic performance of the Nigerian state and food sustainability. He however, observes that there has been a gross insufficiency in the output of agricultural production as a result of the prevailing small scale farming in Nigeria, the lack of appropriate governmental interventions, infrastructural deficits, and required capital.

Oghenovo (2009) discusses food security as it relates to the status of food supply to people in a defined territory, ability to feed a proportion of given population of a nation and the value of seeds as sacrifice of today for a better tomorrow.

The Structural Adjustment Policy (SAP) in Nigeria is remarkable because of the effect of liberalization policies on food production in Nigeria. Shuhei (1999) argues that there are ample evidences to show that SAP brought unprecedented change to agricultural businesses both at the rural and national bases. To him, there was a remarkable growth of mechanized food production.

Kassali and Ayandele (2009) did not focus on deforestation, food security and environmental management, they however, connect the effects of farm location on food farmer's technical efficiency. While the study was carried out in the Oke-Ogun Area of Oyo state, three Local Government Areas (LGAs) were purposively selected and a multistage random sampling technique was used to collect data from farmers. They show that the majority of farmers travelled an average of six kilometres between the farm location and the villages where most of them reside. They further explain that the food producers were full-time farmers, practising mostly crop diversification and exploiting an average of 14.61 acres of land. The result of the study shows that there is a significant effect of the farm distance to the farmers' place of residence, farmer's gender, experience, extension contact, access to credit, and rate of lands to tubers and fertilizer use on food farmers' technical efficiency. Meanwhile, the level of involvement in farming, the diversification index, and farm size had no significant effect on farmer's

productivity. Kassali and Ayandele (2009) suggest that there is no negative impact of farm distance on food farmer's productivity. They however show the strategic importance of credit and extension services to food farmers.

Iyagba (2010) enumerates a number of factors constituting impediment to the development of agriculture in the country. These include weed infestation which he sees as one of the constraints the small scale farmers in Nigeria must contend with in the cultivation of root and tree crops. The effects of weeds on the cultivation and yield losses in root and tuber crops are discussed. The concepts of weed control and weed management are differentiated in the paper. The approaches in weed management include cultural method mainly by hand weeding at different weeding seasons for various crops, biological method using low growing crops, chemical method using various herbicides. He suggested ways of overcoming the constraints on herbicide use and integrated weed management practices such as applying herbicides with cultural and biological practices. While the above studies have analyzed explicitly the processes, challenges and factors affecting the growth or decline of agriculture generally in Nigeria, very little has been done to situate them within the context of the ongoing debate on sustainable food security and the environment

The Vent-for-Surplus Theory

Vent for surplus is the name given to the growth pattern identified by Myint in which substantial growth output is possible by using underemployed resources rather than a process of reallocating resources between different uses. This model contends that surplus land, labour and other utilized resources can be used to produce and supply raw materials to the metropolitan countries (Britain in the case of Nigeria) and generate foreign exchange for national development (Berry, 1975). Further, it is predicated on the British colonial capitalist philosophy of promoting export crops for the benefits of European market and food security.

The central argument of the vent-for surplus theory is that land, including forest resources, could be efficiently used for the maximization of agricultural production and food security without degrading the environment. For instance, the British colonial government adopted this model at the beginning of colonial rule in Nigeria in early twentieth century to accelerate the development of cocoa, rubber, palm kernel and palm oil cultivation. The introduction of cocoa cultivation in Western Nigeria for instance, came about as a result of the experimentation with the "staple theory" and the "vent for surplus theory".

Historicizing Food Security and Environmental Management in South-western Nigeria

The people of south-western Nigeria had a fascinating system of food security and environmental management from the earliest times. Culturally, the Yoruba of Southwestern Nigeria are constantly conscious of ensuring food security as a vital means of preserving their environment. The basic principle underlying the efforts at ensuring food security and environmental management among the Yoruba is the acknowledgement of God's (Olodumare) divine lordship over the universe. Idowu (1987) notes that the Yoruba lived in constant consciousness and acknowledgement of God's divine lordship over the whole earth. They also believe that "man is a tenant on God's earth". Hence, the human efforts to plough and not plunder the earth. The Yoruba were careful in their interaction with their environment in the process of meeting their needs. In pre-colonial Yorubaland, the people were the custodian of their own environment. They interacted with the environment through diverse agricultural and ecological daily activities in order to conserve their livelihood. Many were farmers (*agbe*), hunters (*ode*), herbalists (*onisegun*) traders (*onisowo*) tree cutters *(agbegilodo*); drivers (*awaako*) and a host of others.

These numerous activities have had both positive and negative impacts on the sustainability of the environment. In other parts of West Africa, the connection between food security and environmental management has been raised to a higher level. Among the Berekum group in Ghana, Samuel (2014) notes that:

> In God's creation, there are things that can be used (destroyed) and other cannot be used, so the destruction of such things constitutes a sin. Even those that can be used have the right time for their use. Anything short of this is considered as a sin in our tradition. This is to ensure that we make sustainable use of natural resources.

The goal of food security and environmental management in Africa during the 1970s, and for most of the 1980s, was to ensure national food sufficiency while managing the environment (Onyekpe, 2016). Food insecurity, hunger, and malnutrition that ravaged most parts of Africa such as Tanzania, Liberia, Somalia, South Africa to mention but a few suggest the need to pay attention to food security while conserving the environment. A particular point in view is the case of Tanzania which was the only food sufficient independent African country between 1961 and 1966. The tide of history was to change following the two years drought (1973-1975) when the importation of grains especially maize became essential for relief during the crisis years. As a result, a campaign tagged

"*Kilimo cha kufanakupona*" (Agriculture as a matter of life and death), was embarked upon. In addition, the World Bank financed national maize programme also helped to reposition Tanzania as a producer of sufficient food as well as an exporter of maize in 1978.

Faluyi (2003) has critically analysed the basis of food security and environmental management in early Yorubaland. He argues that agriculture was the major commercial activity of all Yoruba towns or kingdoms' before the onset of colonialism and industrialization.[1] Agriculture was the basis of food sustainability and income generation from sales of yam-flour, yam, cassava, rice, sorghum and others. In this connection, yam and cocoyam were produced primarily in Ijesha, Ekiti, Igbomina, Ilorin and Akoko areas; rice and cassava also featured prominently in Egba and Oyo areas. In the Yoruba rain-forest regions of Ijesa, Ife, Ekiti, Ijebu and Ibadan, Kolanut (*Obi*) was dominant while tobacco (*Taba*) was grown on a larger scale the Yoruba Savannah belt. The Yoruba people in the coastal belt (areas covering Badagry-Lagos-Ijebu-Lekki-Epe-Ogun-Waterside-Ilaje-Esodo-Itsekiri in Delta State) engaged in fishing and other water-related trade. Cocoa planting as a lucrative commercial business was popular among the Yoruba before the end of 19th century.

In addition, pre-colonial Yorubaland depended largely on indigenous foodstuff. However, gathering of wild grains, vegetables, fruits, nuts, snails, mushrooms and other forest products served as additional sources of food to them (Adelaja, 2016). Complementing this view, Ikpe (1994) argues that the Yoruba of South-western Nigeria made meaningful efforts towards securing food production in order to ensure sustainability. Hence, it would be right to suggest that the Yoruba of South western Nigeria, during the period under consideration, managed their environment so well in order to cater for their basic needs, such as food, clothing and shelter The history of food security and environmental management in pre-colonial South-western Nigeria was raised to a spiritual level with the reference to the role of the gods. As earlier indicated, the African traditional religion acknowledges the supremacy of the gods over the universe. Hence, the belief in and respect for the gods as the owner of the entire universe among the Yoruba of South-western Nigeria. They believe that all the beings in nature were created and placed there for a specific purpose, which among other things is to create a healthy, sustaining and beautiful habitat for human beings. Awolalu et al (1979) posit that the forest and other natural habitats serve as abode for the ancestors and divinities. These include the numerous hills, mountains, rivers, rocks, caves, trees, brooks and thick forests. In this regard, Oke-Ibadan (Ibadan Hill), Olumo Rock,

Osun Oshogbo River and Ogun River all performed this function in the cosmology of the Yoruba people of the pre-colonial era. Alagbede, (2016) argues that the environment, food and people are in close relationship in Yoruba traditional religion. It is also important to note that diverse foods were offered to the deities in Yorubaland. Indeed, the life and culture of the Yoruba are closely tied to a knot (Some, 1999) where the natural meets the supernatural and where ancestors and the divine intersect with the people. The fear of the gods as the creator of the entire universe is engraved in the heart of the people. Logical to this view is the words attributed to Orunmila by the Yoruba.

Orunmila fehinti o wotiti,
Oni, "Eyin erookun
Eyin eroosa
Eyin o mope, ise Olodumare tobi?

Meaning:
Orunmila leaned back, gazing contemplatively
He said, "you travellers to the sea,
You travellers to the Lagoon,
Don't you perceive that the works of God are marvellous?

Koopman (1997) argues that food insecurity in Africa has been as a result of restriction of certain food production to men to the detriment of the women. Certain aspects of food security and sustainable environment from planting, weeding, transportation, storage, packaging, marketing, feeding of animals, cleaning of pens and cages and watering, are allocated to women. Yoruba men, for their own part, were responsible for land acquisition, clearing, preparation, construction of barns and a host of others. The job differentiation has been attributed to the entrenchment of patriarchy in various Yoruba societies.

It is important to note and appreciate the 'taboos in Yoruba culture which were appropriated to express the link between man, food security and his environment. In the first category are taboos guiding against waste of resources. One popular one is *A kogbodo da iyo sinu ina, ki ara eni ma baa fin patapata* (we must throw salt into fire so that the person's body may not become speckled) (Bewaji, 2016). This taboo aims at ensuring food security while managing the environment. Salt was a scarce commodity in Yorubaland such that the colonial masters that brought salt to the shores of Nigeria exchanged it for slaves. One of the taboos to regulate

human activities within the environment was captured in one of the corpus of Ifa thus:

Ofun-sa:
Otoro! Aiyeja
Ogbara! Aiye la kanle
Bi aiyeba ti owoeni baje
Aimowahuwani

Meaning:
Otoro! The world has flown off its hook into space
Ogbara! The earth is rent asunder to its core
If the world becomes unliveable in our time
It is because we no longer know how to behave properly. (Ilesanmi, 2016)

One major effect of colonialism on Nigeria is the change in the trend of food security and environmental sustainability. The government ameliorated the problem of food insecurity through the provision of transport facilities and great emphasis on agricultural growth. To this, the observation that 95% of the Nigerian population had dietary deficiencies, as reported by N.B. Nicol, the Nutrition Adviser in 1947, compelled the need to ensure food security and environmental management. In an attempt to find lasting solution to the problem, animal protein as well nutritious rice were made available in the Southern parts of Nigeria. More importantly, the government introduced improved seedlings resistant to diseases such as cassava mosaic, cowpeas resistant to root knots and new varieties of yams and seed multiplication in order to preserve the environment.

The view that African countries at the dawn of independence, beginning in 1957 and stretching up to 1980s, enjoyed surplus food and maximum food security had been criticised by many African scholars. At one end of this spectrum are Bohannan and other anthropologists who affirmed that Africa enjoyed a high degree of food security and environmental sustainability. For instance, the prevalence of anaemia among half the population of Nigeria on the eve of the Biafra war was widely recognised. The evidence of food insecurity and environmental decay was clearly seen during the civil war period when many children in the rebel enclave suffered from Kwashiorkor. Okonkwo (2010) argues that the widespread starvation and loss of thousands of lives attracted international attention which ameliorated the situation through the provision of charity food relief bankrolled mainly by the Catholic Caritas organisations. These included

rice, corn, stock fish, salt, canned foods, assorted beverages and wheat flour. The failure to effectively manage the environment led to the outbreak of crop epidemics throughout the 1970s. In an attempt to foster food security, the Nigerian government introduced the Structural Adjustment Programme (SAP) in 1986 for the agricultural sector. The major objectives were to achieve a sustained increase in domestic food and local raw materials production in order to reduce substantially the degree of dependence on foreign supplies; to achieve a sustained increase in the production of exportable cash crops in order to diversify the economy's export base; and to increase the level of rural employment and income. In contemporary times, the efforts so far made in Southwest Nigeria to ensure food security and environmental sustainability is noteworthy.

However, their other activities such as deforestation, bush burning, air and water pollution, among others have resulted in food insecurity and environmental decay. Meanwhile, the Yoruba of Southwest Nigeria like other people in Nigeria, have continued to explore diverse food and environmental strategies that will usher them into the era of technology and modernization with the attendant effect on self-environmental sufficiency and food security. The table below, for example, shows the output of agriculture in Nigeria since 1981.

Table 1.1: Agriculture value to Gross Domestic Product, 1981-2000

Year	Agriculture, value added (% of GDP)	Year	Agriculture, value added (% of GDP)
1981	28.52	2001	33.75
1982	32.41	2002	48.57
1983	35.47	2003	42.71
1984	39.92	2004	34.21
1985	39.21	2005	32.76
1986	40.33	2006	32.00
1987	37.26	2007	32.71
1988	41.65	2008	32.85
1989	32.16	2009	37.05
1990	31.52	2010	23.89
1991	31.22	2011	22.29
1992	27.27	2012	22.05
1993	33.90	2013	21.00
1994	38.81	2014	20.24
1995	32.06	2015	20.86

1996	31.13		
1997	34.03		
1998	39.05		
1999	35.31		
2000	26.03		

Source: *World Bank Development Indicators (2016)*

Deforestation, Food Security and Environment Management in Southwest Nigeria

Forest and trees constitute integral parts of food security and sustainable environment from time immemorial. Indeed, they have contributed immensely to maintaining environmental conditions required for agricultural growth. They condition and stabilise the soil, thereby preventing erosion while enhancing the land's capacity to store water and moderate air and soil temperatures. In the same vein, human and non-human activities as they relate to deforestation such as climate change and global warning, hurricanes, agricultural expansion, cattle ranching, logging, mining and oil extraction, construction of dams have contributed to food insecurity and environmental degradation in Southwestern Nigeria Other factors include poor agricultural policy, land tenure arrangements, inefficient land regulatory mechanism and poor incentives among others (Olagunju, 2015). For illustration, Table 1.2 shows Nigeria's forest cover according to states.

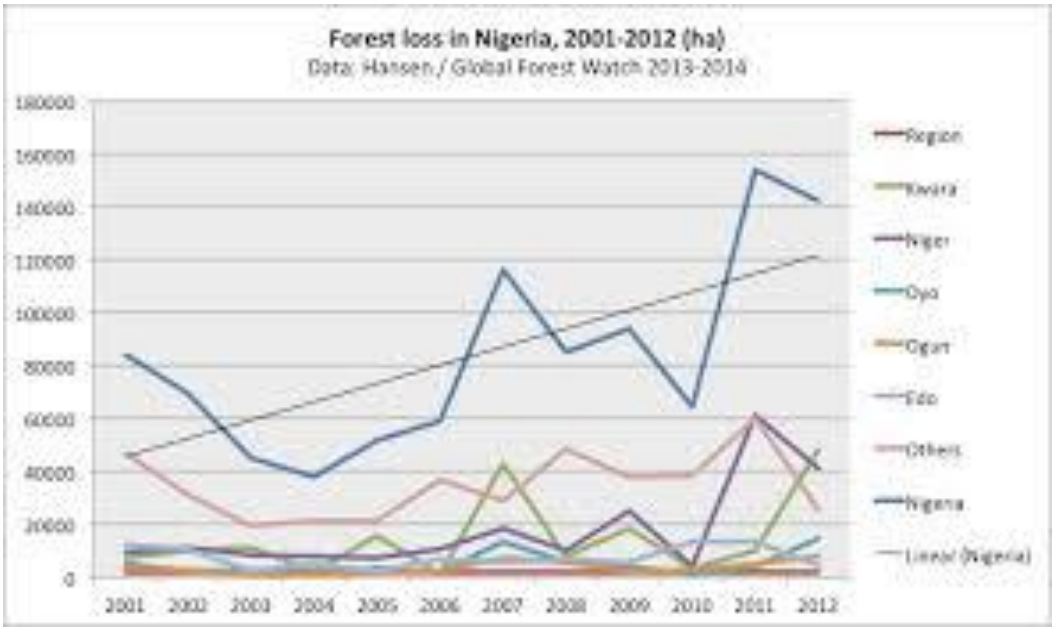
Table 1.2: Forest cover by states in Nigeria,

	Total forest area		Dense forest area		Forest gain		Forest loss		Total land area
	>10% tree cover (ha)	% total land cover	>50% tree cover (ha)	% total land cover	2001-2012 (ha)	% total forest cover	2001-2012 (ha)	% total forest cover	(ha)
Abia	460163	97.4%	10235	2.2%	1068	0.2%	9750	2.1%	472226
Adamawa	1477236	43.4%	18219	0.5%	137	0.0%	19310	1.3%	3401093
Akwa Ibom	656993	98.4%	17538	2.6%	743	0.1%	11124	1.7%	667419
Anambra	410958	90.7%	6156	1.4%	55	0.0%	2505	0.6%	453138
Bauchi	940313	19.2%	28	0.0%	10	0.0%	18134	1.9%	4903058
Bayelsa	931701	98.6%	598018	63.3%	911	0.1%	6238	0.7%	944940
Benue	2179773	69.9%	6812	0.2%	25	0.0%	7101	0.3%	3118602
Borno	204711	3.1%	0	0.0%	0	0.0%	1509	0.7%	6607588
Cross River	2042140	97.5%	888051	42.4%	4969	0.2%	26351	1.3%	2094534
Delta	1575968	96.9%	554278	34.1%	7291	0.5%	24983	1.6%	1625818
Ebonyi	435527	70.4%	1830	0.3%	132	0.0%	1914	0.4%	618646
Edo	1923060	98.3%	467270	23.9%	30405	1.6%	89575	4.7%	1956740

Ekiti	517058	98.9%	227894	43.6%	176	0.0%	7148	1.4%	523026
Enugu	703056	91.3%	3423	0.4%	19	0.0%	2661	0.4%	770092
Federal Capital Territory	584691	79.7%	178	0.0%	14	0.0%	14366	2.5%	733613
Gombe	132318	7.4%	0	0.0%	9	0.0%	11995	9.1%	1798939
Imo	517689	97.6%	15840	3.0%	937	0.2%	15347	3.0%	530389
Jigawa	5795	0.2%	0	0.0%	0	0.0%	50	0.9%	2396817
Kaduna	1637020	37.0%	243	0.0%	11	0.0%	11005	0.7%	4419400
Kano	70194	3.5%	0	0.0%	0	0.0%	75	0.1%	1982358
Katsina	10426	0.4%	2	0.0%	0	0.0%	204	2.0%	2364473
Kebbi	300962	8.5%	20	0.0%	1	0.0%	10399	3.5%	3531054
Kogi	2734500	95.2%	29661	1.0%	220	0.0%	35965	1.3%	2873052
Kwara	3288716	93.1%	7955	0.2%	47	0.0%	178456	5.4%	3534147
Lagos	232828	75.6%	10721	3.5%	365	0.2%	7951	3.4%	308003
Nassarawa	1745020	66.6%	246	0.0%	31	0.0%	34410	2.0%	2621138
Niger	3782277	54.3%	815	0.0%	68	0.0%	215459	5.7%	6966616
Ogun	1565404	97.6%	83533	5.2%	4258	0.3%	43730	2.8%	1603939
Ondo	1431897	98.9%	489272	33.8%	4617	0.3%	32970	2.3%	1447729
Osun	902362	98.4%	408523	44.5%	205	0.0%	9573	1.1%	917464
Oyo	2618392	95.7%	31459	1.2%	234	0.0%	59652	2.3%	2734793
Plateau	730219	26.5%	721	0.0%	36	0.0%	3244	0.4%	2755650
Rivers	806103	96.6%	153995	18.4%	1509	0.2%	10215	1.3%	834731
Sokoto	22104	0.7%	1	0.0%	0	0.0%	174	0.8%	3162145
Taraba	4513905	75.5%	681877	11.4%	1812	0.0%	77599	1.7%	5975340
Water body	164781	32.8%	1	0.0%	0	0.0%	492	0.3%	502871
Yobe	28732	0.6%	15	0.0%	0	0.0%	864	3.0%	4553076
Zamfara	265375	7.7%	12	0.0%	0	0.0%	2064	0.8%	3448834
Nigeria	42550368	47.2%	4714839	5.2%	60318	0.1%	1004559	2.4%	90153488

Source: *researchsmarter/semanticscholar.org/https://rainforests.mongabay.com/20nigeria.htm, accessed 27th November, 2017*

One major effect of deforestation on food security and environmental management is the loss of biodiversity. In Southwest Nigeria, deforestation has contributed to extinction of forest and biodiversity loss. Even when the deforested area is reforested, it always depletes the biodiversity of its natural value. With the disappearance of the forest, a considerable species of plants and animals go into extinction while others loose a great deal of their genetic diversity and variation. In this connection, major forests in Ibadan, Ilesha, Ekiti, Ikare and other parts of Southwest Nigeria have fallen victims of loss of biodiversity prior to deforestation. The extent of urbanization in Ilesha (the capital city of the Ijesa people) has led to felling of trees for human habitation." (Daramola, 2016). This singular action has contributed to loss of biodiversity and extinction in the area.



Graph showing the rate of deforestation in Nigeria between 2001 and 2012
Source: *https://www.google.com.ng/search/graph/showing+deforestation++in+Nigeri accessed: on 28/11/2017*

The high incidence of erosion prior to deforestation has featured prominently among the Yoruba of South-western Nigeria during the period of study. Deforestation enhances soil erosion which affects agriculture and food security. Deforestation no doubt, considerably increases the rate of soil erosion largely through series of rainfall runoff and decreased ground debris. This is further compounded by the increasing aridity of the unprotected soils and the absence of vegetation and roots which function to hold the soil together. This impedes agricultural development, food security and contributes to environmental degradation. Consequently, Atanlusi (2016) is of the opinion that deforestation in Ekiti and other South-western regions of Nigeria need to be checked in order to prevent high incidence of erosion which have affected the people and the environment adversely.

Closely related to the above is the increasing global warming. This constitutes a serious threat to agricultural production, food security and environmental sustainability. Trees play a decisive role in controlling global warming and they utilize the greenhouse gases to restore the balance in the atmosphere. To this end, deforestation has a profound effect on the climatic elements and geography of

South-western Nigeria and Nigeria at large. Deforestation leads to fewer forests. This makes larger amounts of greenhouse gases to enter the atmosphere and worsen the severity of global warming. Given this fact, it is therefore important for the Yoruba of South-western Nigeria and the global community to reawaken the consciousness of a food secure and sustained environment. In addition, deforestation has had considerable impact on water supply for the growth of both plants and humans. Thus, temperature increases and more sporadic rainfall results from global warming. Table 1.3 shows Geospatial changes in vegetation across Nigeria since the 1980s.

O. Fashae et al. Geospatial Analysis of Changes in Vegetation Cover over Nigeria

Table. 1. Spatial extent of vegetation cover of Nigeria

Years	No vegetation (km^2)	Sparse vegetation (km^2)	Dense vegetation (km^2)
1981	312,640.8	252,598.0	358,534.2
1985	343,769.6	243,739.3	336,264.2
1990	359,764.6	253,213.2	310,795.2
1995	417,715.7	217,039.9	289,017.4
2000	426,943.6	219,623.7	277,205.7
2005	455,242.4	205,474.3	263,056.3
2010	474,436.4	228,728.6	220,608.0
2020	501,504.9	214,456.1	207,812.0
2030	501,504.9	224,964.4	127,730.0

Source: Fashae, O, Olusola, A and Adedeji, O (2017). Geospatial Analysis of Changes in Vegetation Cover over Nigeria. *Bulletin of Geography. Physical Geography Series*, No. 13 (2017): 17-28 http://dx.doi.org/10.1515/bgeo-2017-0010

Healthy forests absorb greenhouse gases and carbon emission that are caused by human civilization and contribute to global climate change. Without trees, more carbon and greenhouse gases enter the atmosphere. In the process of deforestation, trees become carbon sources when they are cut, burnt or removed. According to Synder (2010), deforestation has been responsible for the eventual alteration in surface temperatures. Increase in temperature will occur, if forests are substantially converted to non-forest land due to the reduction in evaporative cooling. If such change is abrupt and the rainfall pattern is altered, crop harvest

will be reduced. This is true of the Yoruba people of South-western Nigeria who now depend largely on their northern counterparts for food supply.

Another effect of deforestation on food security and environmental management in Southwest Nigeria is the destruction of natural habitat of wild animals, destruction of vegetable species, fruits trees and trees of medicinal value. The disruption of essential microbial ecosystems has been attributed to deforestation and environment mismanagement. As earlier indicated, the reduction in biodiversity occasioned by deforestation has affected the food supply and health status of the people of the area of study who largely depend on the forest for fruits, vegetables, medicine, and meat to mention but a few. On the whole, the effects of deforestation on food security and the environment can be seen in the loss of biodiversity, carbon emissions, high incidence of soil erosion, climate change, destruction of natural habitats of wild animals and crops, and the disruption of essential microbial ecosystems to mention but a few.

Conclusion

The growing rate of deforestation in south western Nigeria is a major obstacle to the goal of achieving food security and environmental sustainability. The consequences include low quality of life, low life expectancy, epidemics, hunger, poverty and climate change. If the current rate of deforestation is allowed to continue, it will take less than a century to destroy the entire rain forest of Yorubaland.

To reduce the growing rate of food shortage and environmental challenges in Nigeria, there is need to reinvent the wheel by strengthening institutional regulations, including the creation of non-state agencies to monitor the use of the environment. Traditional environmental protection mechanisms, such as taboos, myths, and superstitions can be employed to reduce the alarming rate of environmental degradation. The need to preserve the forest in favour of agriculture is essential in achieving food security and environmental sustainable in Nigeria. Government agencies, National Environmental Standards and Regulation Enforcement Agency (NESREA) and non-state institutions involved in agriculture and land use must forcefully introduce and implement policies that will guide citizen's relationship with the environment. Land use acts in the rural agrarian areas must take cognisance of the preservation of forest resources and habitat. Scholars in the humanities should also contribute greatly to the global debate on climate change and environmental sustainability. On the whole, the central argument of this article is anchored on the vent-for-surplus thesis that land,

including forest resources could be efficiently used for the maximisation of agricultural production and food security without degrading the environment.

References

Adekunle, A. K. (1978). *Agricultural Financing in Nigeria: An Assessment of the Agricultural Credit Guarantee Scheme Fund (ACGSF) For Food Security in Nigeria*.

Agboola, S. A. *An Agricultural Atlas of Nigeria* (Oxford: Oxford University Press, 1979).

Awolalu, J.O. & Dopamu, P.A. (1979). *West African Traditional Religion* (Ibadan: Onibonoje Publishers).

Berry, S. S. The Concept of Innovation and the History of Cocoa Farming in Western Nigeria. *Journal of African History* 15(3)

_____ (1975). *Migrant farmers: Cocoa, custom and socio-economic changes in rural Western Nigeria* (London: Oxford University Press).

Christiana, O. (1991). Achieving Self-reliance in Food Production in Nigeria: Maximising the Contribution of Rural Women. *Journal of Social Development in Africa* 6(2): 33-52.

Dopamu, A. Mankind's threatened environment. An Unpublished Article, Ilorin, 5.

Faluyi, K. (2003). African traditional economy. In Olukoju, Ayodeji (ed.), *Fundamentals of Economic History* (Lagos: First Academy Publishers, 25-43).

Fasasi, A. R. (2007). *Technical Efficiency in Food Crop Production in Oyo State, Nigeria*.

Food and Agriculture Organization (1997). "TeleFood fact sheets: FAO activities and prospects. (Rome: Food and Agriculture Organization of the United Nations)

Govereh, J., Jayne, T. S. *Cash cropping and food crop productivity: synergies or trade-offs on Agricultural Economics,* Agricultural Research, Vol. 28, I No 1,

Idachaba, F. S. *Building institutional capacity for agricultural research in sub-Saharan Africa* (Ibadan: University Press).

Idachaba, F. S. (2006). *Good intentions are not enough: Agricultural research, uncertainty and diversification* (Ibadan: University Press).

Idachaba, F. S. *The Agricultural economist as preacher: Essay in policy advocacy on rural development and Nigerian agriculture,* Vol. 2 (Ibadan: Spectrum Books Limited).

_____ (2006). *Good Intentions are not enough: Agricultural Research, Uncertainty and Diversification.*

Ikpe, E.B. (1994). *Food and society in Nigeria: A history of food customs, food economy and cultural change, 1900-1989* (Germany: Steiner).

Ikpe, E.B. *Food and Society in Nigeria: A History of Food Customs, Food Economy and Cultural Change, 1900-1989*.

Ilesanmi, T.E. (2015). Crime, court and prison in colonial Ilesha, 1861-1960. M.A Thesis, Department of History and Strategic Studies, University of Lagos, Akoka, Lagos.

Iwuchukwu, J. C. & Igbokwe, E.M. (2012). Lessons from agricultural policies and programmes in Nigeria. *Journal of Law, Policy and Globalization* 5.

Iyagba, A. G. (2010). Root and tuber crop production and their weed management among small scale farmers in Nigeria on ARPN. *Journal of Agricultural and Biological Science* 5(4).

Kassali, R., Ayanwale, A. B. et al. (2009). Farm location and determinants of agricultural productivity in the Oke-Ogun area of Oyo State, Nigeria. *Journal of Sustainable Development in Africa*, 11 (2).

Koopman, Y. (1997). The hidden roots of the African food problem: Looking within the rural household. In Folrbre, N. Bergmann, B., Agarwal, B. & Flors, M. (eds.), *Women's work in the world economy* (New York: New York University), 82-103.

Myint, H. The theory of international trade and the underdeveloped countries. *The Economic Journal* 68: 317-337.

Eicher, C.K, (1991). The dynamics of long term agricultural development in Nigeria. *Journal of Economics* 49(5): 1164-1170.

Berry S. S. (1975). Cocoa, custom and socio-economic change in rural Western Nigeria.

Nworgu, F. C. (2006). *Prospects and Pitfalls of Agricultural Production in Nigeria* (Ibadan: University of Ibadan,).

Nyamekye, S. A. (2014). Awuah. *Managing the Environmental Crisis in Ghana: The Role of African Tradition Religion and Culture with Special Reference to the Berekum Traditional Area* (Newcastle: Cambridge Scholars Publishing, 2014), 26.

Fabiyi, O. O. (2006). Urban land use change analysis of a traditional city from remote sensing data: The case of Ibadan Metropolitan Area. *Nigeria on Humanity & Social Sciences Journal* 1(1): 42-64.

Oghenovo, A. M. (2009). *Best seeds of the best crop varieties: A basis for Nigeria's food security* (Ibadan: University of Ibadan).

Ogugu, C.A. Worth. (2004) *Food Preservation: the art, the science and the technology* is a 17th Interdisciplinary Research.

Ogunremi, G.O. (1996). The structure of pre-colonial economy. In Ogunremi, G. O. & Faluyi, E.K. *An economic history of West Africa since 1750.* (Ibadan: Rex Charles Publication).

Okonkwo, Uche Uwaezuoke (2010). The African food revolution: An historical appraisal. *Pakistan Journal of Social Science* 7(6).

Olagunju, T. E. (2015). Impact of human induced deforestation, forest degradation and fragmentation on food security. *New York Science Journal*, 8 (1): 10.

Olusegun, E. O. (2007). Too much food for thought, but very little for the table. Inaugural Lecture on Thursday, 13 December, 2007, (Ibadan: University Press)

Oluwasanmi, H. A. (1966). *Agriculture and Nigerian economic development* (Ibadan: Oxford University Press).

Oral Interview with Adelaja Adeshina (Farmer) 64, Iyana-Iyesi, Sango Otta, Ogun State, 31st September, 2016.

Oral Interview with Ademisoye Adeleke (Trader) 65, Odo-Oro Market, Ilesha, Osun State, 30th September, 2016.

Oral Interview with Alagbede Alawiye (Farmer) 69, Okeyin Ilesha, Osun State, 30th September, 2016.

Oral Interview with Bewaji Olamiji (Trader) 53, Iyana- Iyesi, Sango Otta, Ogun State, 31st September, 2016.

Oral Interview with Daramola Kolade (Trader) 71, Odo-Oro Market, Ilesha, Osun State, 30th September, 2016.

Oral Interview with Onyekpe Nkem, Lecturer (Department of History, University of Lagos) 57, Akoka, Yaba, Lagos. 4th October, 2016

Oral Interview with Pa Ayoola Atanlusi (Businessman) 57, Olora Estate, Ado-Ekiti, Ekiti State, 3rd October, 2016.

Saweda, Liverpool-Tasie Lenis, Kuku, Oluyemisi et al (2011). Agricultural productivity, social capital and food security in Nigeria. In Nigeria Strategy Support Program (NSSP) *NSSP Working Paper* No. 21,

Trincheria, J., De Craufurd, P., Harris, D.., Mannke, F., Nyamangara, Rao, J. K.P.C. & Filho, W. Leal Adapting agriculture to climate change by developing promising strategies using analogue locations in Eastern and Southern Africa: A systematic approach to develop practical solutions. In Walter, L.F. et al, *Climate change management: Adapting African agriculture to climate change* (Germany: Springer)

Shuhei, S. (1999). A study of increased food production in Nigeria: The effect of the Structural Adjustment Program on the local level. *African Study Monographs* 20(4): 175-227.

Snyder, P. (2010). *The influence of tropical deforestation of the Northern Hemisphere Climate by atmosphere teleconnections*. (Earth Interactions).

Some, M.P. (1999). *The Healing Wisdom of Africa: Finding Life Purpose through Nature, Ritual and Community* (New York: Penguin Inc.)

Willie, F., & Davis, R. H. (2005). *Encyclopaedia of African History and Culture*, Vol 1 (Learning Source Book)

World Bank, (2011). Africa Development Indicators, Report 20433 (Washington DC)

The World Bank. (1996). *Poverty reduction and the World Bank progress and challenges in the 1990s*. The World Bank, Washington, DC.