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Environmental and Sustainable Agricultural Development in Nigeria: Matters Arising and the Way Forward

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Abstract

The goal of achieving and maintaining sustainable farming system is rapidly becoming a top priority of agricultural and environmental policy makers in most developing countries particularly Nigeria. The paper attempts to examine Nigerian agriculture within the context of climate change and sustainable development. The findings of the study show that efforts to ensure self-sufficiency in food production and raw materials for industries and severe climate change are causing increased pressure on the resources of the Nigeria economy. Several socio-economic and other human activities such as; bush fallow, application of modern technologies in farming, increasing population, transhumance, overgrazing, deforestation and exploitation of mineral resources are causing severe and uncontrolled problems of sustainable agricultural development all over the country. The paper recommends proper exploitation of natural resources, government commitment through research and development and public enlightenment campaign among others.

Keywords: Agriculture, Environment, Nigeria, Sustainable Development

Introduction

Agricultural production derives its existence from the use of land, without productive land resources, no meaningful agricultural activity can take place. Agriculture is a sector of economic activity which provides human being with some of their most basic needs. Without food and raw materials, the economy cannot be fully developed. Most of the developing countries particularly in African countries, agriculture remained the major sector of their economies. Agriculture is the sector that provides food to all the people that live on the universe. Unfortunately, as food security continues to dominate global agenda for development; therefore, the world is facing important challenges of increasing food production without causing serious environmental harm. To feed the 8.9 billion people projected to exist in 2050, the world must produce, and distribute more food than has been produced since agriculture began about 10,000 years ago, and to do so in an environmentally sustainable manner (Food and Agriculture Organisation, (FAO), 2003).

It is paramount to know that those destroying the environment are not the people who will be paying for that damage but will be the future generation. As combination of increasing population, decreasing rainfall and soil fertility and a rise in food price has left most African countries including Nigeria vulnerable to famine (see Lele, 1990 and Oluwasanmi, 1996).

Agriculture has changed dramatically throughout the world, involving all forms of agricultural activities, especially since the end of World War II. The productivity and availability of food production has expanded due to application of modernised agricultural facilities all over the globe (Agricultural Sustainability Institute (ASI), 2006).

The modernised approach to food production in Nigeria and the rest of the world presents numerous problems. Mechanized ploughing and harrowing exposed the soil to erosion and this method needs expansion of land which need the conversion of virgin land and forest. Shortened fallow with loss of soil nutrient and organic matter, resulting in declining yields. Increase pressure on common property resources (woodlands and grazing) with breakdown of indigenous institution that regulate and manage these resources, leading to open access regimes and resource degradation. These human activities have led to environmental degradation creating pollutions

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of various types, acid rain, desertification, deforestation, ozone layer depletion and erosion (Titilola, 1992).

The past patterns of agriculture growth have sometime been associated with negative environmental effects and with inequalities that have pushed small farmers and landless persons to the margin of society. But this is not an inevitable outcome of agriculture growth. Rather, it reflects inappropriate economic incentives for managing modern inputs in intensive farming systems. The new priority for environmental sustainability that has emerged in the 1990s does not negate the need for agriculture to continue contributing to the growth, poverty alleviation and increased food security; it is just that agriculture is now required to do this in ways that do not degrade the environment.

Land degradation in many developing nations has constituted a major constraint to sustainable agricultural production and development in the last few decades. There is a growing awareness now that the attainment of global food security has gone beyond the question of availability of improved production technologies. The more important factor is that the natural resource base upon which crop production ultimately depends must be approximately managed and conserved. In this respect, government of various countries including Nigeria together with international organizations and non-governmental organisations (NGOs) are now actively involved in the development of workable natural resource conservation strategies in order to reverse the negative effects emanating from increased demographic pressure, environmental degradation and food insecurity (International Food Policy Research Institute, 1995 and Oyeshola, 2008).

Furthermore, climate change has recently been acknowledge as a factor mitigating the effort of achieving sustainable agriculture and environment in Nigeria due to it longitudinal effects in form of higher rainfall, flooding, increasing surface air temperature, soil erosion etc. these factors have varying degrees of impact on agricultural activities, depending upon time and region. Ladan (2014) stress that Nigeria is one of the most vulnerable countries to climate change in Africa due to her varied climatic zones, coastal regions and more people are carrying out various forms of agricultural activities in areas prone to climate change which in turn have a severe effects on their life and environment.

The paper is divided into seven sections. Following the introduction, in section 2, agriculture and environment in Nigeria is briefly discussed, section 3, focuses on land degradation and global crop losses. Ensuring sustainable agriculture and natural resource use are undertaken in section four and five respectively. Section 6, presents the recommendations of the study and conclusions are done in the last section.

2.0 Agriculture and the Environment in Nigeria

Agriculture and environment cannot be separated, this is because all agricultural activities are directly connected with the environment. Nigeria, being an agrarian economy, has over the years recorded high environmental problems associated to agriculture. It is further worsened due to lack of serious commitment from the policy makers especially in the recent years. Several studies have acknowledged the effect of agricultural activities on the environment in Nigeria. For instance, Titilalo (1992) opined that several agricultural activities are harmfulto environment in Nigeria through leaching of agrochemicals or to erosion of contaminated soil particles leading to a fall in production and productivity, a fall in the income generating capacity of the people and the nation. This can further cause low level of investment in the sector which in turn lower the level of employment opportunities.

An increasing demand for food is the most common root cause of over intensive cultivation of dry lands. Considering the high rate of population growth in virtually all countries, the implication is that more food would be needed to meet up with the growing population. This make most countries of the world to resort to modern agricultural through the use of pesticide, insecticide, fertilizers etc which in turn causes severe damage in different forms to the environment.

Over cultivation is a consequence of change in the application of traditional dry land methods and the introduction of inappropriate method develop in the environment, some authorities believe that over cultivation is the principal cause of dry land degradation. Several attributes of cultivation are seen to create problems. Shorter fallow periods lead to nutrient depletion which is a serious problem in African dry land. This lowers the potential for production and reduced yields. Cultivation of virgin land, leading to degradation because of the techniques or crop which is unsuitable for the newly cultivated areas has been effected in many part of the World, not from increasing population (Thomas and Middleton, 1994).

Pesticide, fertilizer and other modern agricultural practices are becoming increasingly acceptable in Nigeria leading to advancement in agricultural production and improvement in productivity particularly in the recent past. But unfortunately, this has raised concern over the effects of such practices on environment. For instance, the most common practices are application of pesticide and chemical fertilizer to kill harmful insects in the case of the former, and improve soil nutrient in the case of the latter has cause so much environmental problems like pollution and land degradation, and sometimes causing loss of life including harmless insects and birds.

Another worrisome issue especially in developing countries is that fuel wood is now taking from living trees all over Nigeria and some African countries instead of from the traditional collection of dead wood. The consequences of all these activities results to deforestation. Areas where trees are killed in the pursuit of fuel may well be stressed already through grazing pressure. This indicates both the difficulties of ascribing precise causes of land degradation and the way in which several human resources and environmental problems are entwined. The continuous cutting down of tress to supply urban fire wood results to desertification which reduces the productivity of the land (Winpenny, 1991).

On whole, improvement in infrastructure in agriculture must be accompanied by a strategy to sustain the resources base. Without adequate training, adequate investment, and adequate regulation in the maintenance of forest however, deforestation has become a major problem in most areas in Nigeria. In Latin America in the course of the 1980s alone over 8 million hectares were tilled for new farms for grazing land, for fire wood. In Asia, roughly 3.5 million hectares suffered lost each year. For the decade as a whole, then, one fifth of all tropical forest was destroyed, and the rate of deforestation has accelerated in recent years. Between 1980 and 2000 roughly 2 billion of the totals of 8.7 billion hectares of farmland, permanent pastures and forest/wood lands have been degraded through overgrazing, deforestation, and inappropriate agricultural practices, 50 to 10 million hectares per year become unusable and impossible to restore (Thomas and Middleton, 1994).

When agricultural activities are sustainably managed and practiced, they can help in maintaining, preserving and restoring habitats, soil health and quality water which are all essential ingredients for a better for all living organisms. On the other hand, when agriculture is not practice in sustainable manner, it can cause greatest threat to living organisms through habitat loss, contaminated water, soil erosion and degradation, pollution and other environmental problems.

Land Degradation and Global Crop Losses

Although estimates of the effects of land degradation on World's food production are somehow rare, available evidences have shown that the problem has seriously undermined agricultural production in many continents of the world. The table below reveals total land degradation of different regions of the world.

Table 1: Land Degradation by Type in Different Regions of the World

Land, Land Type/Region	*Total Area degraded (Million ha.)*	*Percentage of degraded Total land Area*	*Total Area Non-degraded (Million ha.)*	*Percentage of Total Region and Area*
Forest and woodland				
Latin America	177	8.0	825	48.1
Asia	344	12.4	929	33.3
Africa	130	7.8	553	33.3
Permanent pasture				
Latin America	78	4.6	494	28.8
Asia	197	7.1	781	28.0
Africa	243	14.6	550	33.1
Crop land				
Latin America	92	5.4	88	5.1
Asia	206	7.4	330	11.8
Africa	121	7.2	66	4.0

Source: FAO (2003)

Furthermore, FAO (2003) report shows that during the 1970s, one hectare of arable land supported an average of two people, and it was projected that by year 2020, given the present population growth, one hectare of land will be supporting four people. The report also show that in 1993, a hectare of arable land supported about four people. This implies that without addressing the situation, agriculture would lose about 15-30 percent of its potential yields by 2020. Consequently, hunger would continue to widen in dimension and global food security level would likely decrease.

Climate Change and Agriculture

The most severe problem facing majority of countries in the world today is climate change. Climate change continue to make agriculture unattractive. Oriola (2016) opined that the geographical location of Africa particularly Nigeria which is the largest country in Africa is believed to be most vulnerable because of the limited adaptive capacity exerbated by widespread poverty, illiteracy and low level of development. According to International Panel on Climate Change (IPCC), (2007) that various regions in Africa particularly West Africa is largely prone to vagaries of changes in climate.

The Nigerian situation is worrisome in the recent years. Oriola (2016) observed that the southern part of Nigeria is facing irregular rainfall, and temperature is gradually increasing in Savannah region of the country, in addition to desert encroachment bedevilling northern part of the country.

Moreover, agriculture in Nigeria heavenly rely on rainfall, as irrigation practice remains relatively low, such climatic changes is bound to affect agricultural productivity and environmental sustainability. In 2015, the IPCC predicted that by 2020 agricultural yield consisting all forms of agricultural related activities from rain-fed in some countries would decrease by 50 percent due to changes in seasonal and annual trends. It is clear that the issue of changes in climate has become a threat not only to sustainable agriculture and economic development but also to totally of human existence (Adejuwon, 2004 and Oriola, 2016).

Ensuring Sustainable Agricultural Activities

The basic challenge for sustainable agriculture is to make better use of available physical and human resource. This can be done by minimizing the use of external inputs, by regenerating internal resources more effectively, or by combining the two in various ways. This ensures the efficient and effective use of what is available and keeps any dependencies on external system to a reasonable minimum (Oyeshola, 2008 and Oriola, 2016).

In addition, Titus and Adefiyaso (2012) assert that a more sustainable agriculture is any food production system that systematically pursues the following goals:

A thorough integration of natural processes such as nutrient cycling, nitrogen, fixation, and pest-predator relationship into agricultural production processes, so ensuring profitable and efficient food production.

A minimization of the use of those external and non-renewable inputs with the potential to damage the environment or harm the health of farmers and consumers and targeted use of the remaining inputs used with a view to minimizing costs.

The full participation of farmers and other rural people in all processes of problem analysis and technology development, adaptation, and extension, leading to an increase in self-reliance among farmers and rural communities (participatory development).

A greater productive use of local knowledge and practices, including innovating approaches not yet fully understood by scientist or widely adopted by farmers.

The enhancement of wildlife and other goods of the country side.

Sustainable agriculture seeks the integrated use of a wide range of pest, nutrient soil, and water management technologies. It aims for an increased diversity of enterprises within farms combined with increased linkage and flows between them thereby, negative impacts on the environment are reduced, and positive contributions are made to regenerate natural resources.

Ensuring Sustainable use of Natural Resources

Nigeria has pursued with vigour the exploitation of her natural endowment with the purpose of maintaining its sustenance. Given the current international debt issues and associated problems; it has become increasingly difficult to generate enough resources required for

sustainable socioeconomic growth without exerting increased pressure on local resources for producing more food for local consumption and other agricultural products for export, in order to gain access to capital for further development (Titilola, 1992).

Achieving these tasks require investment and deployed practices that improve technical production efficiency in all the relevant sectors of the economy. As stated by WSSD (2002) from an energy perspective, agriculture has a double role: energy consumer and energy producer. All stage of the food chain-from land preparation to irrigation. Fertilization, mechanization, processing and conservation. Transport and consumption-require one forms of energy or another. In this regards, ensuring sustainable use of energy become necessary and important and is a stepping stone in achieving sustainable development.

Recommendations

The following recommendations are proffered for policy action:

Surveys of agriculture areas vulnerable to environmental problems should be routinely undertaken by relevant agencies to avoid unnecessary damages and ensure sustainability.

Government should embark upon training and public enlightenment campaign occupied particularly at understanding the vital role of agriculture to man's welfare and the importance of maintaining environment quality.

From time to time, there should be agricultural workshops and seminars to farmers so as to educate them on how to contribute toward maintaining a better environment.

Incentives and assistance should be granted to farmers who adopt sustainable agricultural technologies in their farming activities.

Climate change perhaps needs to be routinely studied and farmers should therefore be well informed about the condition from time to time to avoid unnecessary damages and harm to the environment.

Government should as a matter of urgency revitalize irrigation through repositioning of River Basin Development, creation of Dams and expansion of existing irrigation schemes in the country.

Conclusions

The study employed theoretical approach to analyse environmental challenges in achieving sustainable agricultural development in Nigeria. On the whole, there is need for sustainable agriculture in order to minimized environmental mismanagement. As stated earlier, the environment is the yard stick for agricultural activities therefore; it must be maintained for the future generation.

Additionally, the goal of achieving agricultural and environmental sustainability cannot be completely won without integrating climate condition, this is because in Nigeria, agriculture largely depends on climate conditions and changes on this condition can have severe impact on the agricultural activities. Climate change affect not only agricultural activities but to a large extent environmental conditions like water resources, land use among others. Achieving sustainable agricultural development and sustainable environment requires addressing climate change issues due to flexible climate change in various region of the country.

Furthermore, Titilalo (1992) stated that rational use of natural resources is the only means to maintain and improve human conditions. Concern over the environmental aspects of natural resources use and management emanates from an unprecedented rate of population growth, rising income and per capital demand.

There is no doubt that sustainable agriculture would help in giving people the ability to acquire sufficient food, healthy environment and can equally pave way for better rural societies especially in Nigeria where agriculture is mostly practice in rural areas.

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