

Green Economy And Agriculture In Nigeria: A Synthesis From Literature

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Abstract: Green economy is related to sustainable development in developing countries like Nigeria and will impact positively on the people with good policies and institutional framework in place. It is well known that over dependence on crude oil had led to ecosystem degradation in the Niger Delta and a mono-economy in Nigeria. So, we need to diversify the Nigerian economy. We need to make the Nigeria economy green. Agriculture provides significant opportunities for growth, investment and jobs to help make it happen. Agriculture feeds our entire population and produce fiber for clothing, feed for livestock and bio-energy. In Nigeria, agriculture contributes significantly to GDP growth, leads the way in poverty reduction and accounts for the lion's share of employment opportunities, especially women. Agriculture also has one of the highest potentials for reducing carbon emissions and helping vulnerable people adapt to climate change.

[Tasie C.M, Nwosu C.S. and J.S. Orebiyi. **Green Economy And Agriculture In Nigeria: A Synthesis From Literature.** *J Am Sci* 2018;14(8):87-93]. ISSN 1545-1003 (print); ISSN 2375-7264 (online). <http://www.jofamericanscience.org>. 12. doi:[10.7537/marsjas140818.12](https://doi.org/10.7537/marsjas140818.12).

Key words: Green Economy, Sustainable Development, Climate change, Agriculture, Food Security, Poverty Alleviation

Introduction

Agriculture is the most important sector for many countries (e.g. Nigeria) in terms of its potential to influence a wide range of issues that are critically related to sustainable development, including: the economy, employment, food security, trade flows, poverty, human health, climate change, the use of natural resources (especially land and water), and biodiversity (UNEP, 2011). Nigeria has the ambition of diversifying her economy from crude oil dependency. The country also faces a food crisis problem with growing population becoming increasing dependent on imported foods (Nwajiuba, 2013). Agriculture is at the centre of a transition to a resource-efficient, low carbon Green Economy. Majority of the farmers are in rural areas and they are smallholders in terms of scale, and they rely on the earth's land, forests and water resources to contribute to the food supply. Working in challenging environments, on degraded land or with little agricultural technology, the rural poor still produce 60% of the country's food. (UNEP, 2011).

This means smallholders farmers are a key interface between the environment and agriculture. Supporting these farmers can lead to both economic and environmental benefits. Well-managed, sustainable agriculture can not only overcome hunger and poverty, but can address other challenges from climate change to loss of biodiversity (New Ag, 2012). Its value and its contribution to multiple economic, environmental and societal goals needs to be recognized in the income and employment prospects

for the entire smallholdings across the country. Much is not known about green agricultural economy in Nigeria. So, the objective of this paper is to examine the challenges and opportunities of Nigeria's transition to green economy. To achieve this objective, data were obtained from secondary sources such as database of United Nations Environmental Programme (UNEP), World Bank, Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), Farming First Coalition, Federal Ministry of Environment, etc.

The Concept Of Green Economy

The UNEP report "Towards a Green Economy: pathways to sustainable development and poverty eradication" defined a Green Economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest form, a Green Economy can be thought of as one which is low-carbon, resource efficient and socially inclusive. In a Green Economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. These investments need to be catalyzed and supported by targeted public expenditure, policy reforms and regulation changes. The development path should maintain, enhance and where necessary, rebuild natural capital as a critical economic asset and as a source of public benefits, especially for poor people whose livelihoods and security depend on nature.

The truth is that, the concept of Green Economy is vague in Nigeria. The phrase Green Economy is not certain and definite in meaning in Nigeria but Nigerians are conversant with the phrase sustainable development.

Green Economy is relevant to the Nigerian context, as it provides economic opportunities and growth potentials for African economies highly dependent on natural resources. Nigeria has no Green Economy policy in place, the issue of Green Economy is mainly addressed through the lens of climate change. Currently not very high on the political agenda (GIZ).

Also, according to Manish et al (2011), a Green Economy can be thought of as an alternative vision for growth and development; one that can generate growth and improvements in people's lives in ways consistent with sustainable development. It has been observed that Nigeria is well positioned in the transition to a green economy given her low carbon profit and natural resources endowment. Nigeria is basically characterized by low-levels of carbon emissions and relatively low investments in polluting technologies. The over dependence on crude oil has resulted to ecosystem degradation particularly the pollution and destruction of aquatic lives and arable lands in the Niger Delta region of Nigeria resulting to climate change. (Omuemu, 2013). Nigeria's transition to green economy is critical to improving human well-being, efficient utilization and preservation of resources for both present and future generation. Green economy is vital to Nigeria's realization of Vision 2020 and Millennium Development Goals, especially MDG 1, on food security and poverty and Federal Government Agricultural Transformation Agenda (ATA).

Green Economy and Sustainable Agricultural Development

Green economy is synonymous sustainable development. It is an economy that pursues growth and development objectives while also promoting sustainability through more efficient use of resources. It is the focus on growth and on efficiency that matters in green economy. For this to happen, innovations in biological science, in resource management, in agricultural practices will be essential.

In their contribution, New Ag. (2012), Agriculture is an important part of the green economy as a driver of rural development. Around two billion smallholder farmers living in developing countries produce about 60 percent of the world's food, and agriculture is estimated to provide jobs for 40 percent of the global population (NewAg, 2012) sustainable production of nutritious food with equitable access to natural resources is the basis of any economy, the basis of any society. If we can't feed ourselves, we don't have a future.

The concept of a green economy presents an opportunity to reconcile economic needs with environment concerns. Agriculture has immense potential in a green economy to address the unsustainable use of natural resources for food production. The key role of agriculture is to support much needed poverty reduction as well as food and nutrition security while improving efficiency of natural resources use.

There is the opportunity for agriculture to be involved in helping to sequester carbon through improved farm management practices. In agriculture, the green economy is all about doing more with fewer resources, decreasing our footprint per acre in terms of water, energy, soil and greenhouse gas emissions. These changes also lead to less pressure on land, helping us to preserve forests and bio-diverse rich areas.

Making Nigerian Agriculture Greener.

Green economy is related to sustainable development in developing countries like Nigeria and will impact positively on the people with good policies and institutional framework in place. It is well known that over dependence on crude oil had led to ecosystem degradation in the Niger Delta and a mono-economy in Nigeria. So, we need to diversify the Nigerian economy. We need to make the Nigeria economy green. Agriculture provides significant opportunities for growth, investment and jobs to help make it happen. Agriculture feeds our entire population and produce fibre for clothing, feed for livestock and bio-energy. In Nigeria, agriculture contributes significantly to GDP growth, leads the way in poverty reduction and accounts for the lion's share of employment opportunities, especially women. Agriculture also has one of the highest potentials for reducing carbon emissions and helping vulnerable people adapt to climate change.

Food security is a pressing concern in Nigeria. At the 2012 United Nations Conference on Sustainable Development (Rio + 20) which Nigeria participated fully, participants reaffirmed their commitment to enhancing food and nutrition security for present and future generations by developing strategies at all levels that align with the five Rome Principles for sustainable Global Food Security. To revive agriculture, it was agreed that investments are necessary in these areas: sustainable agricultural practices, rural infrastructure, storage capacities and related technologies, research and development on sustainable agricultural technologies, strong agricultural cooperatives and value chain and urban-rural linkages.

According to Nwajiuba (2013), a green agriculture in Nigeria has to confront the following key questions:

- Will Nigeria remains a largely agrarian country in terms of the share of agriculture in aggregate gross domestic production, employment generation, and income for majority of the people?

- Can agriculture be a primary driver of Nigeria's future growth and provide an increased proportion of her foreign exchange earning?

- Can a green agricultural economy become an opportunity for ordinary Nigerians to benefit from development, reduce unemployment, alleviate poverty and diffuse conflict?

The declared aims of Nigeria's national agricultural policy are to (i) attain food security; (ii) increase production and productivity (iii) generate employment and income, and (iv) expand exports and reduce food imports thereby freeing resources for critical infrastructure development and delivery of social services. The current government seems to attribute the unsatisfactory state of Nigeria's agriculture to a dominance of subsistence orientation. Today, we have witnessed a shift in policy concept, philosophy and approach to a business and commercial orientation. The focus of the transformation programme launched in August 2011 is on the role of agribusiness. Specifically, the Agriculture Transformation Action Plan (ATAP) seeks to develop value chain for five key commodities, that is, rice, cassava, sorghum, cocoa and cotton.

Major Constraints Facing Agriculture in Nigeria

According to GIZ report, Nigerian agricultural sector faces five major constraints: climate change, water scarcity, desertification and land degradation, energy, and sanitation. In another report, Nwajiuba (2013) asserts that there are two major challenges facing the Agricultural Sector in Nigeria. These challenges are population dynamics and climate change.

From these different reports, climate change is the re-occurring decimal, with its frequency and intensity of extremes events as temperature, rainfall, droughts, windstorms, floods, erosion likely to increase. To address this climate change challenge, Nigeria's agricultural sector must adopt the concept of climate smart agriculture (CSA).

Climate change and Nigeria's Agriculture

According to Nwaiwu et al (2014), the two major climate parameters that significantly affect the growth and productivity of most food crops are rainfall and temperature. In that study, temperature showed increasing trend with the highest temperature occurring in 2009 at 27.65°C and the lowest occurring in 1975 at 25.95°C. The above record was according to the statistical records of temperature in South East, Nigeria as recorded by Agromet unit of the National Root Crop Research Institute (NRCRI), Umudike from 1972-2011. Climate change with respect to

temperature is really changing and increasing. This assertion by Nwaiwu et al, 2014 is consistent with the findings of Nwajiuba and Onyeneke (2010) and Nwajiuba (2013) that temperature is positively and significantly increasing with time, hence global warming is real. Also according to Monteith (1981), if temperature continues to increase beyond a specific threshold, crops productive growing season could become shorter, thus reducing their yield.

Also, Nwaiwu et al (2014) showed an increasing trend in rainfall in South East between the period of 1972 -2011 with the highest occurring in 1996 and lowest occurring in 1983 with values of 2751.9mm and 1511.4mm and 1511.4mm respectively. This finding slightly disagrees with the observation of Nwajiuba and Onyeneke (2010) who reported a decreasing trend in rainfall. According to Falkenmark (1989) rainfall is the major limiting factor in the growth and production of crops worldwide and adequate moisture is critical for plants, especially during germination and fruit development.

Climatic change already has varying, mostly adverse effects on agriculture and therefore, food security in various parts of the country. Higher temperature result in decreased agricultural productivity and production, high evaporation rates and reduced soil moisture, lowering of the ground water table and shrinking of surface water. Heat stress reduces human labour use on farms, lowers labour productivity, lowers livestock productivity and leads to rapid deterioration and wastage of farm produce.

Changes in the amount of rain, increased rainfall intensity and changes in rainfall patterns lead to decreased resource productivity and production (crops and livestock's). Changing and erratic rainfall patterns make it difficult for farmers to plan their operations, may reduce the cropping season and can lead to low germination, reduced yield and crop failure. Erratic weather interferes with processing of produce (an example is sun drying of crops and smoking of fish). Increased frequency of major storms causes damaged to farm land, crops and livestock. Major storms can also cause road wash-outs, which make it difficult to access farms and to market products.

Climate Smart Agriculture within an inclusive Green Growth Framework

Many agencies have similar definitions for green economy and inclusive green growth. UNEP (2011) defined a green economy as "one that results in improved human well being and social equity, while significantly reducing environmental risks and ecological scarcity". OECD (2011) defined green growth as "fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies". The World

Bank (2012) defined green growth as economic growth that is environmentally sustainable: green in that it is efficient in use of natural resources; clean in that it minimizes pollution and environmental impacts, and resilient in accounting for natural hazards and the role of environmental management and natural capital in preventing physical disasters. For FAO the green economy embraces a vision that tries to steer economic development in the direction of sustainability, of which there are five key pillars; renewable energy and energy efficiency, waste management and minimization, sustainable use of natural resources, and green job creation.

Inclusive green growth and climate smart agriculture are complementary concepts, and are part of a broader sustainable development agenda. Inclusive green growth seeks to “operationalize” sustainable development by reconciling developing countries urgent need for rapid growth and poverty alleviation.

Challenges of transition to Green Economy in Agriculture

The transition to Green Agriculture must respond to the challenge of feeding about 170 million Nigerians, while protecting the environment and taking care of rural societies. It will be necessary to:

1. Eradicate hunger and ensure food security. Some production factors can be increased; cultivating more land, improving the access to scientific and technological progress, improving access to production credit, more research and development.

2. Protect the environment and mitigate the impact of human activities on the environment. The threats are known: salinization of soils; increase in sea levels and catastrophic floods; desertification; loss of tropical forests and of the associated biological diversity; overexploitation of farmland and pastures; water scarcity; urbanization and large-scale engineering works.

3. Take care of rural societies. The necessary increase in agricultural production must not ignore the implications for rural societies. A massive exodus from the countryside to the cities will cause enormous problems since cities, industries, and services cannot welcome rural people properly.

4. The transition to a green economy in agriculture requires supportive enabling environments that promote investments, entrepreneurship and innovation. It also requires a keen focus on inclusivity, ensuring that smallholder farmers and particularly women and youth are able to engage.

There must be a prospective approach to agricultural development:

1. The political process must strike an appropriate balance between peoples’ right to food security and free trade without frontiers; the science

and trade dynamics and the vulnerability of societies, as well as of the environment; the natural and cultural regional diversity and the trend towards the globalization of a model (after the globalization of exchanges).

2. Good practices must be identified and examples of successful agricultural development should be publicized. In other words, the agricultural models that will lead to sustainable development must be prioritized. The frequency and increased intensity of extreme climatic events, such as droughts and floods, have become additional challenges for global agriculture, which is already facing higher demand due to both population increase and new consumption habits of several developing countries. In order to respond to this challenge, the selection of drought-resistant crops is part of the solution. But this is not easy: the control of genes coding for water stress and extreme temperatures is very difficult; it is much more complex to develop these kinds of plants than pesticide-resistant crop varieties. Research in this area is in its initial stages and it targets crops with high economic potential, such as maize, and to a lesser extent, rice, sorghum, or millet, which play a smaller role in global trade, but which are nevertheless essential for feeding the populations of several developing countries like Nigeria. But improved seeds are just one element of crop systems. Farmers confronted with weather vagaries or climate change should be assisted in the improvement of irrigation systems that enable crops to improve their resistance to drought.

Green economy and improved rural livelihood and secure food supply

According to Farming First coalition, the transition to a green economy is fundamental for addressing the social, environmental, and economic pillars of sustainable development.

As a sector, agriculture is essential to the green economy. With a predicted 9 billion people by 2050, agricultural production will have to increase to meet new demands, for food, feed, fuel and fiber. Agriculture must not only meet demand – it must also do so while minimizing its environmental footprint and creating sustainable livelihoods for farmers and others along the supply chain.

In a time of food insecurity and with the largest share of its population in developing countries living in rural areas, the world cannot afford to ignore the potential of agriculture to achieve the triple goals of a secure food supply, poverty reduction through improved rural livelihoods, and environmental sustainability through reduced footprint of production and climate change adaptation.

Agriculture by nature represents a mosaic of solutions and practices, focused on farmer needs and

knowledge sharing. Sustainability is a moving target towards which farmers in different geographies and farming systems are already moving and they will need support to continuously improve.

Reducing Poverty

Agriculture can be a potent driver for poverty reduction. The World Bank estimates that GDP growth from agriculture generates at least twice as much poverty reduction than any other sector. Currently 65 percent of people in developing countries are involved in agriculture. 1.3 billion of them are small farmers, with limited access to inputs, infrastructure and markets. In countries where agriculture represents one of the primary livelihoods, concerted efforts to improve productivity through sustainable practices could change the lives of millions.

A dynamic and productive agriculture sector is also essential for the urban sector. Urban populations are dependent on the agricultural sector for most of their consumption, so improving local production and trade is crucial; but it also means a world of opportunities for farmers who can reach the urban market.

Making agriculture a dynamic sector will require the adoption of supportive frameworks and investment in infrastructure and markets. Farmers need to be able to access markets at the local, regional and global level in order to sustain a livelihood from their activities. In some areas, this means improving access to transport storage and market facilities.

Enhancing Sustainable Productivity

Improving the footprint of agriculture while increasing production needs a concerted effort in two areas: first closing the uptake gap of existing best practices and technologies by focusing on knowledge sharing and creating supportive extension services networks; and second investing in innovation and research to provide the solutions for tomorrow and ensure agricultural policies are science-based.

Enhancing sustainable productivity must be the centre of efforts to make agriculture both environmentally sound and economically dynamic- we need to achieve more crops per drop of water, per acre of land, per measure of inputs. This is essential to ensure the surface of land under cultivation does not expand, in order to preserve biodiversity and natural carbon sinks. Producers need to be integrated in value chains and new activities need to be developed in processing and other sectors to improve rural incomes and ensure that growth in productivity translates into better livelihoods.

Additionally, efforts should be increased to promote sustainable agric-food systems throughout the lifecycle. In 2010, FAO estimated that poorly developed systems for handling, storage, packaging,

transportation, and marketing of agricultural products in developing countries results in post harvest losses, ranging from 15% to a staggering 50%. Investment in food infrastructure and handling could reduce losses and improve food safety. Developed countries also face losses due to food waste from harvest, through delivery to food services, and in households. Waste is worst in fresh produce which delivers vital nutrients to humans around the globe.

Innovation, Research and Extension Services

Agriculture is a knowledge-intensive sector. Farmers need to have access to training, extension services, and sharing of traditional knowledge that can encourage the production of abundant and nutritious crops and mixed diets. Knowledge helps farmers adopt practices that maximize the efficiency of the inputs they use and help protect the natural resources they depend on. Training programmes should specifically involve women farmers in developing countries as essential gatekeepers for household nutrition and welfare.

Providing this education to rural communities in a systematic, participatory manner is essential to improving their production, income and quality of life. Extension services disseminate practical information related to agriculture; include correct use of improved seeds, fertilizers, tools, tillage practices, water management, livestock management and welfare, marketing techniques, and basic business skills to address poverty. Extension is also an essential pillar for rural community progress including support for the organizational capacity of farmers groups and the formation of co-operatives.

Modern extension services must increase their capacity for two-way information sharing between experts in research and farmers themselves who have essential information on farming. Research and extension should be functionally linked and there should be pluralism in the approaches to implementing this form of education. Mobilization of the scientific, donor, business, NGO, and farmer communities are needed to improve knowledge sharing, as well as local, reliable SME's such as agro-dealers to be able to adopt new practices and technologies.

Farmers must constantly adapt, and the challenge of climate change is making that need ever more acute. Investing in research and development, in both public and private sector, is essential to ensure farmers have the tools they need in the future and that the gains obtained in productivity and footprint are not undermined.

Targeted investment in research, combined with supportive frameworks for the roll out, diffusion and uptake of the products of research are essential to support continuous improvements in agricultural sustainability. In particular, research on the needs,

aspirations and knowledge of small holders in the developing world can help ensure agricultural solutions are appropriate for local conditions. Interdisciplinary research into agricultural production, supply chains and consumption needs to be supported to ensure a holistic approach to agricultural and sustainable development.

Conclusion and Recommendations

The fact that Nigeria does not have any policy framework as touching the Green deal initiative does not mean we cannot achieve the Green Economy status. Efforts should be made by both public and private concerns to make Nigeria's transition to Green Economy a reality.

Farming First Coalition provides a call to action for policy makers and practitioners to develop a locally sustainable value chain for agriculture in Nigeria, it emphasizes the need for knowledge networks and policies centered on helping subsistence farmers to become small scale entrepreneurs. The Farming First framework highlights six interlinked imperatives for sustainable development.

Safeguard natural resources

Land management should be improved through the widespread adoption of sustainable practices of land use.

- Conservation agriculture can be used to prevent soil erosion and land degradation.
- Manage watersheds and water use more efficiently.
- Protect wildlife habitat and biodiversity through an integrated ecosystems approach.
- provide incentives for improving ecosystem services.
- promote a sound management of chemical substances, including through the improvement of health and safety conditions for agricultural workers.

Share knowledge

While much of the knowledge needed to improve global agriculture already exists, including within remote indigenous communities, it often does not reach those farmers that could benefit most.

- Increase the level of education on crop and natural resource management for farmers and agricultural workers, including women.
- Take substantive measures to eliminate child labour and make sure children benefit from decent work conditions and access to education.
- Promote the development of village-based knowledge centres.
- Provide access to scalable information technologies for farmers, including women and young farmers, to receive weather, crop and market alerts, as well as other early warning systems to help them make the right decisions for sustainability and productivity.

- Establish open and transparent two - way exchanges that capture the voice of the farmer' in the process of policy formulation and implementation.

Build local access and capacity

Fundamental resources should be available to farmers, including women and young farmers, to help them manage their production process more reliably and at less cost.

- Secure access to land and water resources, especially for women farmers.
- Provide rural access to microfinance services, especially to microcredit.
- Build infrastructure – particularly roads to make supplies available to farmers.
- Establish training programmers' in infrastructure management, operations and maintenance for local and regional settings.
- Improve access to agricultural inputs and services, including mechanical tools, seeds, fertilizers, and crop protection materials.
- Encourage and co-ordinate multiple local actors to ensure information and supplies get into farmers hands.
- Invest in bio-energy to achieve energy security and rural development through sustainable, local production.

Protect harvests

In many of the poor countries like Nigeria, 20-40% of crop yields are lost because of inadequate pre and post harvest support. Likewise, vast quantities of food are squandered during the production and consumption phases of the food chain.

- build local storage facilities and transportation mechanism, including cold chain storage for food preservation.
- Localize the application of agronomic knowledge, pest-identification and meteorological information.
- Educate the public on sustainable consumption and production needs and behaviours, including the need to reduce food waste.
- Provide risk management tools to support farmers in managing weather and market variations.

Enable access to markets

Farmers need to be able to get their products to market and receive equitable price treatment when they do;

- Provide remote access to up to date market pricing information.
- Develop well functioning markets through transparent information, fair prices, sound infrastructure and reduced speculation.
- Encourage co-operative approaches to marketing for smallholders.
- Improve smallholder farmers marketing skills through entrepreneurship training.

- Reduce market distortion to improve opportunities for all strata of agriculture nationwide.

Prioritize research Imperatives

Achieving sustainable agriculture requires intensified, continuous research, prioritizing locally relevant crops, stewardship techniques, and adaptation to climate change.

- Conduct agronomic research related to water availability, soil fertility and post harvest losses, as well as climate change challenges.

- Conduct research into crop varieties needed by the poorest and most vulnerable regions.

- Promote farmer-centered research in accordance with their needs.

- Improve productivity through the responsible use of science and technology

- Establish public private research collaboration around integrated solutions.

- Increase investments from governments and business towards relevant research & development.

- Explore alternative uses for agriculture based by-products along the value chain.

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8/25/2018