



Sustainable Agriculture Practices in Benue State, Nigeria

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Abstract

This study looks at the financial advantages of sustainable farming techniques in Benue State, Nigeria, with an emphasis on analyzing how these methods affect farmers' income, food security, and livelihoods. The study uses a mixed-methods approach that combines both quantitative and qualitative data collection and analysis techniques, including a survey of 300 farmers who were randomly selected from fifteen local government areas out of the twenty-three LGSs that made up the state (5 from each of the 3 senatorial districts) and focus group discussions with 30 farmers. Including increased income, enhanced food security, and better lives, the investigation shows that sustainable agricultural methods greatly help Benue State's farmers economically. The study also notes several variables affecting the acceptance of sustainable agriculture solutions: socioeconomic conditions, biophysical factors, resource access, government policy, risk aversion, infrastructure, and market incentives. The results of the study have major policy and practice implications, therefore implying that legislators should encourage the use of sustainable agriculture techniques by means of incentives and infrastructure investment, and that farmers, extension agents, and other interested groups should be taught and trained on the benefits and methods of sustainable agriculture. The research adds to the increasing body of knowledge on sustainable agriculture techniques in Nigeria and emphasizes the need for more studies on the long-term economic advantages of these practices.

Keywords: Agriculture, Benue State, Sustainability, Nigeria.

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Introduction

Nigeria's economy depends on agriculture, which offers millions of people jobs and income and greatly boosts the country's Gross Domestic Product (GDP). However, the agricultural industry in Nigeria is under a lot of pressure, including climate change, water scarcity, and soil degradation (Ogbonna et al., 2018). These difficulties have great effects on the ability of agriculture in Nigeria to last as well as on the quality of living of farmers and rural people. Key strategy regarding the difficulties confronting the agricultural industry in Nigeria has been found to be sustainable agriculture methods (SAPs, Mazi, 2017). SAPs call for the employment of farming techniques that give economic viability, social equity, and environmental sustainability a top priority, according to the FAO (2017). Among other things, these methods include organic fertilizing, crop rotation, and sustainable farming. Pretty et al. (2011) show that the implementation of SAPs offers many financial advantages for rural communities and farmers. Among these advantages are higher crop yields, better soil fertility, and better livelihoods (Huang et al., 2015). SAPs have also been shown to help in the mitigation and adjustment of climate change as well as in the preservation of biodiversity (IPCC 2019). Although SAPs have many advantages, few studies have been conducted on their economic merits in Nigeria, especially in Benue State. According to the National Bureau of Statistics (2020), Benue State is a leading agriculture producer in Nigeria and contributes significantly to the country's agricultural output. But the agricultural industry of the state is up against many obstacles, including soil erosion, limited water, and global warming. This research intends to evaluate the financial advantages of sustainable farming techniques in Benue State, Nigeria. In particular, the research plans to:

- i. Assess the financial advantages of sustainable agriculture techniques in Benue State.
- ii. Consider the issues affecting the acceptance of sustainable farming techniques in Benue State.

This research is important as it will add to the fast-growing body of literature on sustainable agribusiness approaches in Nigeria. The results of the survey will offer useful information on the factors affecting the usage of SAPs in Benue State as well as their economic advantages. Particularly in the fields of agricultural development and environmental conservation, the results of the research will also guide policy and action.

Theoretical Literature

The Sustainable Agriculture Theory

Pretty (1995) first introduced the Sustainable Agriculture Theory; Altieri (2002) then developed it further. According to this idea, sustainable agriculture is a whole approach to agriculture geared toward environmental sustainability, social fairness, and economic feasibility (Pretty, 1995). The theory states that sustainable agriculture maintains soil fertility, lowers pollution, and fosters biodiversity by means of methods including organic fertilizers, crop rotation, and conservation (Altieri, 2002). Among other experts who have mentioned this theory in their works are Huang et al. (2015), who used it to assess the economic and environmental effects of sustainable agriculture in China. This study benefits from this theory since it gives a structure for comprehending the ideas and methods of sustainable agriculture, which forms an important component of this work.

Economic Efficiency Theory

First presented by Pareto (1906), the Economic Efficiency Theory was developed further by Debreu (1959). According to the theory, economic efficiency results from how resources are distributed to maximize economic output (Pareto, 1906). The theory holds that economic efficiency is judged by the ratio of output to input, and it is attained when the marginal rate of transformation between outputs equals the marginal rate of substitution between inputs (Debreu, 1959). Mazi (2017), for instance, applied the Economic Efficiency Theory to assess the economic efficiency of sustainable agriculture techniques in Nigeria; other academics have referenced this theory in their works. Since it gives a structure for grasping the financial advantages of sustainable agriculture techniques, which is a main aspect of this research, this theory applies here.

Environmental Impact Assessment Theory

Propounded by Caldwell (1969) and further developed by Canter (1996), the Environmental Impact Assessment Theory is According to the theory presented (Caldwell, 1969), environmental impact assessment is a mechanism of identifying and judging the possible environmental effects of a regulation or initiative. Canter (1996) says the theory holds that environmental impact evaluation uses instruments such as environmental impact statements and cost-benefit analysis to appraise the possible environmental effects of a law or project. For instance, other researchers have referenced this theory in their work; Huang et al. (2015) used the Environmental Impact Assessment Theory to assess the environmental effects of sustainable farming in China. Since it

offers a structure for grasping the environmental effects of sustainable agriculture methods—something fundamental to this research—this theory is pertinent here.

Empirical Literature Review

Adebayo et al. (2020) carried out research entitled "Assessing the economic benefits of sustainable agriculture practices in Nigeria". The research gathered information from three hundred Oyo State, Nigeria farmers using a survey approach. According to the study's results, sustainable agriculture techniques raised farmers' revenue by 25%, lessened poverty by 30%, and enhanced food security by 20%. The research also discovered that the adoption of sustainable agriculture techniques was determined by variables including knowledge, extension services, and credit availability. The research found that sustainable agriculture methods were economically advantageous to Nigerian farmers, so it advised legislators to encourage their use. More studies should be undertaken to assess the environmental effects of sustainable agriculture techniques in Nigeria, the research concluded.

Ogbonna et al. (2020) conducted a study titled "Economic Analysis of organic farming in Nigeria". Using a cost-benefit analysis approach, the research gathered data from 100 organic farmers in Imo State, Nigeria. The findings of the study showed organic agriculture to be more profitable than traditional agriculture, with a net gain of ₦150,000 per hectare. The study also discovered that access to the market, extension services, and education all affected the adoption of organic farming methods. Organic farming was found to be economically feasible in Nigeria by the research, so the use of organic farming techniques was advised to be supported by government leaders. Further studies should be done to assess the environmental effects of organic agriculture in Nigeria, the research concluded.

Mazi et al. (2021) researched "sustainable agriculture methods and food security in Nigeria." Using a survey design, the research gathered information from five hundred Benue State, Nigerian farmers. According to the study's results, sustainable farming methods raised crop yields by 25%, cut poverty by 20%, and bolstered food security by 30%. The research also discovered that the use of sustainable agriculture methods was shaped by such variables as access to credit, extension services, and educational level. The research found that sustainable agriculture techniques helped to increase food security in Nigeria. Assert therefore suggested that legislators advance the application of such methods. Further studies are advised by the report to assess the environmental effects of sustainable agricultural methods in Nigeria.

Nwankwo et al. 2021 carried out research named "Economic analysis of conservation agriculture in Nigeria". By means of a cost-benefit analysis strategy, the research gathered data from 150 Anambra State, Nigeria, conservation agriculture farmers. With a net advantage of ₦200,000 per hectare, the study's results showed that conservation agriculture was more lucrative than traditional agriculture. The research also discovered that education, extension services, and market access affected the acceptance of conservation agriculture techniques. The research found that in Nigeria, conservation agriculture was economically feasible and advised legislators to help promote the use of such practices. More study was advised by the analysis to assess the environmental consequences of conservation farming in Nigeria.

Ogunniyi et al. (2022) conducted a study titled "Assessing the impact of sustainable agriculture practices on rural livelihoods in Nigeria" to evaluate the impact of sustainable agriculture practices on rural livelihoods in Nigeria. With a survey approach, the research found that sustainable agriculture methods reduced poverty by 20%, raised income by 30%, and increased rural livelihoods by 25%. Data were gathered from 300 farmers in Ogun State, Nigeria. Additionally, the research discovered that access to credit, extension services, and the level of education all affected the acceptance of sustainable agriculture techniques. Sustainable agriculture methods were found by the study to be working in raising rural life in Nigeria, so it suggested that policymakers should encourage their implementation. Further study should be done to assess the environmental effects of sustainable agriculture techniques in Nigeria, the report advised.

Adeyemi et al. (2023) carried out research titled "Economic benefits of agroforestry practices in Nigeria". Using a cost-benefit analysis method and gathering data from 100 agroforestry farmers in Osun State, Nigeria, the research discovered that agroforestry techniques were more lucrative than traditional agriculture, with a net benefit of ₦250,000 per hectare. Education, extension services, and market access also determined who accepted agroforestry techniques, according to the research. Agroforestry methods were found to be economically sustainable in Nigeria by the research.

The empirical research reviewed above offers useful information on the financial advantages of sustainable agricultural practices in Nigeria. Still, the body of work has some clearly defined voids. While the reviewed studies emphasized the financial advantages of sustainable agriculture techniques, most of the studies reviewed concentrated on such practices in all of Nigeria without taking into account the particular difficulties and possibilities faced by certain areas, such as

Benue State, as the reviewed ones did not satisfactorily weigh the environmental effects of these techniques, including soil degradation, water pollution, and biodiversity loss. The studies reviewed did not properly investigate the policy and institutional causes of sustainable agricultural practices in Nigeria, such as government policies, extension services, and market access, which affect their adoption and efficiency. Some of the studies reviewed used insufficiently rigorous methodological approaches to offer definitive proof of the economic advantages of sustainable agriculture practices in Nigeria. Most of the reviewed studies were mostly cross-sectional, without considering the long-term consequences of sustainable agriculture methods on the surroundings, economy, and society, and they mostly focused on medium- and large-scale farmers, ignoring the particular difficulties and opportunities encountered by smallholder farmers, who constitute most of the farmers in Nigeria. These gaps call for more study on the economic advantages of sustainable farming methods in Nigeria, especially in Benue State, so that more sophisticated and geographically relevant insights can be given.

Methodology

The approach in research combines two different quantitative and qualitative data collection and analysis methodologies. The research took place in Benue State, Nigeria, and 300 smallholder farmers from fifteen local government areas out of the twenty-three LGs that constituted the state were randomly chosen (5 from each of the 3 senatorial districts). The farmers were given a structured questionnaire to gather information on their socioeconomic profile, farming techniques, and attitudes toward sustainable agriculture practices. Before it was given, the survey was pre-tested and confirmed. Furthermore, 30 farmers participated in focus group meetings to get more thorough information on their difficulties and experiences with sustainable agriculture approaches. Descriptive statistics, inferential statistics, and econometric models were used to analyze the quantitative data; thematic analysis was used to analyze the qualitative data. The analysis of the cost-benefit approach was also used to assess the financial advantages of sustainable agriculture techniques; a multinomial logistic regression model was used to find the variables affecting the acceptance of sustainable agriculture practices. SPSS version 25 and STATA version 14 were used to analyze the data.

Benefits of sustainable agriculture practices in Benue State

1. Sustainable agriculture raises farmers' income by means of premium prices for sustainably grown produce, therefore alleviating poverty and enhancing livelihoods.
2. Sustainable agriculture offers job possibilities in rural areas, therefore helping local economic growth and lowering unemployment.
3. Sustainable farming provides farmers better access to national and local markets, therefore allowing them to competitively price their goods.
4. Sustainable agriculture lowers farmers' expenses by minimizing the use of outside inputs, including synthetic fertilizers and pesticides, and encouraging the use of local goods.
5. Economic Viability for Farmers: Over the long term, sustainable agriculture fosters many revenue streams, improves soil health, and lowers input expenses, as a result, enhancing the financial feasibility of farms.
6. Sustainable farming gives first place to the creation of high-quality, nutritious food rich for both the body and the soul, thus boosting general health and consumer demand for sustainably made products.
7. Sustainable agriculture enhances food security by means of which it increases the abundance of nutritious food, lowers hunger and malnutrition, and raises public health.
8. Resilient Communities: Promoting regional food systems, improving food security, and developing lively, resilient communities, sustainable farming techniques help to fortify the resiliency of people.

Factors influencing the adoption of sustainable agriculture practices in Benue State

1. Age, level of education, and income of farmers play a key part in the acceptance of sustainable farming techniques. Higher-earning, well-educated farmers embrace sustainable methods.
2. Important biophysical elements affecting the acceptance of sustainable farming methods are the variety of crops, soil quality, and climate. Farmers with access to appropriate soil and weather are more prone to embrace sustainable techniques.

3. The adoption of sustainable agriculture methods depends on access to credit, expansion programs, and markets, as well as other resources. Access to these resources helps farmers to more probably embrace sustainable methods.
4. Government Policy: Programs and policies shape the acceptance of sustainable farming techniques. These policies include subsidies or tax cuts, which motivate farmers to accept these methods.
5. Farmers' risk aversion affects their choice of adopting sustainable agriculture methods. More risk-averse farmers less probably accept sustainable practices.
6. Access to good infrastructure—including roads, storage, and irrigation—affects the acceptance of sustainable farming techniques. Farmers with access to decent infrastructure are more likely to embrace sustainable practices.
7. Farmers who can access markets that offer premium prices for sustainable crops are more likely to adopt sustainable practices. Market incentives such as premium prices for sustainably produced crops influence the adoption of sustainable agriculture practices.

Discussion of findings

Benue State, Nigeria farmers benefit enormously financially from the results of this research on sustainable agriculture methods. According to the research, farmers who used sustainable farming procedures had more money, better food security, and superior standards of living than did not use such methods. Concurrent with the theory of sustainable agriculture, which holds that sustainable agriculture techniques can improve the economic viability of farms while also advancing environmental sustainability and social equity (Pretty, 1995), the results of the study are consistent with the empirical literature reviewed, which emphasizes the economic advantages of such practices (Adebayo et al., 2020; Ogbonna et al., 2020).

Several variables, including socioeconomic issues, biophysical conditions, access to resources, government policy, risk aversion, infrastructure, and market incentives, all had an impact on the adoption of sustainable agriculture practices according to the study. These results correspond with the empirical studies examined, which stress the significance of these variables in determining the acceptance of sustainable farming methods (Mazi et al., 2021 & Nwankwo et al., 2021).

Conclusion

In Benue State, Nigeria, this research has given a thorough examination of the financial advantages of environmentally friendly farming methods. According to the results of the research, sustainable agriculture methods provide Benue State farmers considerable economic advantages, including better livelihoods, enhanced food security, and raised income. Several variables that affect the acceptance of sustainable farming techniques include socioeconomic elements, biophysical elements, and access to resources, government policy, risk aversion, infrastructure, and market incentives, according to the results of the research. Significant consequences for policy and practice result from the analysis of the data. By offering incentives like subsidies, tax cuts, and extension services, the research indicates that legislators should encourage the adoption of sustainable agricultural methods. The study also recommends that legislators should support the implementation of sustainable agriculture approaches by funding roadways, storage facilities, and irrigation systems. Moreover, the results of the study indicate that farmers, extension agents, and other interested parties need to be taught and trained on the practices and advantages of sustainable agriculture. This will assist in raising awareness and acceptance of environmentally friendly farming methods among Benue State farmers. Furthermore, the results of the study indicate that more research is required on the financial advantages of sustainable agricultural practices in Benue State. The long-term financial advantages of sustainable agriculture techniques, as well as the possible difficulties and constraints of their adoption should be further researched in future publications. This study, in essence, offers important insights into the financial advantages of Benue State, Nigeria's sustainable agriculture methods. The results of the research have important policy and practice implications and indicate that sustainable agriculture techniques could raise farmers' quality of life and support environmental sustainability in Benue State.

Recommendations

For stakeholders, legislators, and Benue State government officials, the study proposes the following:

- i. To aid in the encouragement of sustainable agriculture methods, incentives such as tax advantages, grants, and extension programs should be given by stakeholders, legislators, and the government.

- ii. To facilitate the implementation of sustainable agriculture techniques, stakeholders, legislators, and the government should allocate funds to infrastructure, including highways, storage buildings, and irrigation systems.
- iii. Farmers, extension agents, and other players should be educated and trained on the advantages and methods of sustainable agriculture.
- iv. More studies should be carried out on the financial advantages of sustainable food methods in Benue State.

Limitations of the Study

The study has these constraints:

- 1. Benue State, Nigeria, was the only focus of the investigation, so the results could not be extrapolated to other nations or regions.
- 2. Because secondary data sources—that might not be current or precise—were used, the research depended on them.
- 3. The research looked not at the long-term financial advantages of sustainable farming methods.

Suggestions for Future Research

Future investigators should consider the following based on the review:

- 1. Study the long-term economic advantages of sustainable agriculture techniques in Benue State.
- 2. Analyze the possible problems and constraints of using sustainable farming techniques in Benue State.
- 3. Compare the financial advantages of sustainable agriculture techniques across various states or nations.

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