Does Agriculture-led Environment Kuznets Curve Exist in the Agrarian Economy of Nigeria?

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Abstract

The quest for environmental sustainability is crucial to every serious government, most especially in the economies where environmental degradation poses greater threat to the path of growth. Thus, this study set out to investigate the agriculture-led environmental Kuznets curve in Nigeria to ascertain its validity. Data was sourced from the world-bank data from 1981 to 2019 for the purpose of estimation. The econometric procedure begins with the stationarity test which indicates a mixed order of integration. This suggests the adoption of the ARDL approach as the best method of estimation for the model of the study. The result revealed no evidence of agriculture-led environmental Kuznets curve in Nigeria. Further result indicates that FDI inflow into Nigeria is pure and does not cause any hurt to economic growth of Nigeria. Energy consumption is discovered to be the key promoter of carbon emission. Therefore, policy guide is provided for the policy makers for the need to expand the agriculture activities and to manage it more efficiently, thereby generating higher output. Alternative energy sources such as renewable energy are recommended for the economy of Nigeria for the purpose of averting pollution.

Keywords: Agriculture output, FDI inflow, energy consumption, carbon emission.

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Introduction

The quest to achieving environmental quality and sustainability is an unending one considering its role in determining the rate of economic expansion both in the developed and the emerging economies. It is not long news that environmental degradation is mostly caused by human activities for which agriculture and energy consumption are inclusive. First and foremost, the relationship between economic expansion and carbon emission is said to be inverse, implying as economic expansion grows the quality of environment will get worst day by day. However, the tide will turn to be positive when development is eventually achieved. More recent studies also lent their support to the ongoing EKC (Environmental Kuznets Curve) hypothesis. For instance, the study of Ulucak and Bilgili (2018) confirmed the EKC hypothesis, which implies that economic growth and carbon emission are inversely related as corroborated by (see Akadiri et al., 2019; Wang et al., 2018; Apergis & Payne 2010; Rufael 2010). Similarly, Chakravarty and Mandal (2016) also lent their support to the ongoing argument on the relationship between economic expansion and carbon emission. The study adopted the GMM method for the BRICS economies for which Brazil is one and found that economic expansion is achieved alongside its cost implication in the form of environmental degradation.

Similarly, there are several empirical claims in support of agriculture-led EKC hypothesis. This hypothesis asserts that agricultural activities help in driving carbon emission. According to Liu et al., (2017a) the report from food and agriculture organization of the united nation (FAO 2016) indicates that the agriculture sector contributes a significant proportion to carbon emission. The report further claimed that on the global scene, agriculture accounts for about 21% of the global total carbon emission, which also stood as the second highest contributor. The primary sources of emission from the agriculture sector includes activities from crop production, deforestation, soil, bush burning, among others. It is imperative to state that dependency on primary sector such as mining and agriculture are the distinguishing futures of the emerging economies. Most if not all of the emerging economies, for which Nigeria is one, still depend heavily on agriculture for self-sustenance and in some cases form the larger share of export. The activities of the primary sector without doubt drive economic expansion but at the detriment of the environmental quality. The physiocracy school of thought is of the opinion that agriculture sector serves as an engine through which long term economic expansion could be achieved, as reported by Sertoglu et al., (2017) and Higgs (1897). Empirical evidence abounds asserting that the said economic expansion is not without its consequences, particularly on the ecosystem, among which are the work of Katircioglu (2006a, b & 2008). The study of Katircioglu (2006a) maintains that agriculture drives economic

expansion as revealed by the feedback causal relationship between the variable for Cyprus economy. In the case of China, Li and Zhang (2009) investigate the agriculture-drive EKC and find that the sector is a driver of carbon emission. The same is true with the work of Katircioglu (2004). Recep and Faik (2018) submit that environmental degradation is caused by primary economic activities such as agricultural activities, extraction of natural resources, coupled with secondary economic activities like the industrial productive activities. Thus, there is a tradeoff between agriculture-driven economic growth and environmental degradation particularly for agriculture-intensive economies like that of Brazil. The implication is that either an economy chooses to advance at the detriment of the quality of the environment caused by carbon emission or otherwise. Empirical evidence shows that countries will choose to expand but strategize on how to correct the hazards from the economic activities.

Furthermore, from the traditional point of view, industrial sector is a large emitter of CO2, which is in connection with its high consumption of energy mostly generated from fossil fuel such as coal and natural gas, according to Gokmenoglu and Taspinar (2018). It is arguably established that the transition from primary mode of production to the modern industrial form by the top emerging economies like Brazil involves a trade-off between the quality of environment and economic productivity. In essence, achieving high economic output which is linked to the demand and usage of energy is the opportunity cost of keeping a quality environment, and vice versa. Similarly, Shahbaz et al., (2015) conducted a research by classifying the world into income level and submit that energy consumption and economic expansion promotes carbon emission accordingly. The study claims that an increase in energy consumption will increase economic expansion which will transcend into promoting carbon emission. This is consistent with the work of Sarkodie and Adams (2018) for South Africa. Destek and Sarkodie (2019) on the other hand found a two-way drive between energy consumption and economic growth. Bekun et al., (2019) submit that renewable energy causes an improvement in the quality of environment while economic expansion is a key driver of carbon emission.

In the case of Nigeria, agriculture is still one of the major contributors to economic growth despite the fact that the oil sector took over the dominant position. The country is known to be the largest agriculture-intensive economy in the Western sub-region of Africa and probably in the Africa as a whole, which by implication should represent the highest agriculture-induced emitter of carbon in the same region. Thus, it follows intuitively and logically that this characteristic described above makes the choice of Nigeria unique for the study. This is the strong novelty drive behind this study. Therefore, the outcome is expected to serve as a blue print to the sister economies which are agriculture driven. Further more, one of the key contributions

of the study to the existing literature is the fact that the study is the first of its kind in the case of Nigeria. The previous studies centered on the common kurznet curve theory, which did not capture the agriculture sector.

Empirical Review

Conceptual Review of Environmental Kuznets Curve

The effect of economic expansion on the quality of environment has since been viewed through the concept developed by Grossman and Krueger (1991) in an attempt to investigate the debate on the existence of an inverse link between per capital income and income inequality. Thus, the popular EKC hypothesis is grossly adopted to investigate the interaction between economic trajectory and the quality of environment. According to this concept, economic expansion worsens environmental quality at an early stage. But at a fully developed stage, the product turns out to be an improvement in environmental quality. It means that when an economy is developed to the maturity stage, any increase in per capital income will improve the quality of environment. Interestingly, the study of Balsalobre and Alvarez (2016a, b), and Alvarez et al., (2017) categorizes growth trajectory into three stages; the scale effect stage, the composition effect stage and the techniques stage. The first stage is characterized by dependency on primary sector such as agriculture and mining for sustainability, which is the true reflection of the developing economy without structural change. It is emphasized at this stage that there is an inverse link between the output and the state of the environment. In essence, an increase in economic output will mean a decrease in the quality of the environment (Danish et al., 2018). At the second stage, the creation of awareness and the need for clean environment give environmental quality an added advantage in the trade-off link between the variables of interest. This stage characterizes the features of the emerging economies like Brazil, where structural changes occurr particularly in a transition from agriculture to industrial and service sector where more of energy-efficient technologies with less environmental degradation inherent is implemented, as submitted by Munasinghe (1991) and Destek and Sarkodie (2019). The final stage is a trajectory stage where a threshold known as maximum level is achieved for per capital income, implying that a rise in per capital income will lead to a proportional increase in clean ecosystem. This stage is obtainable in the developed economies of the world, where there is a full awareness of clean and friendly energy sources such as the sun (Shahbaz and Sinha, 2018). These economies resort to the production of cleaner energy through the technical effect, which will transcend to improving the quality of environment (see Destek and Sarkodie 2019; Alvarez et al., 2017; Katircioglu and taspinar 2017; Danish et al., 2017) as supported by Dogan and Seker (2016).

For instance, Sarkodie and Strezov (2018) investigate the said hypothesis in the case of Australia by adopting the fully modified ordinary least square method. The revelation from the study confirms the EKC hypothesis for the Australia economy. In a related study, Solarin et al., (2017) investigate heaven's pollution hypothesis in Ghana by adopting the ARDL method to estimate the time series data from 1980 to 2012. The findings reveal a long term co-movement between the series in addition to the existence of the EKC hypothesis in Ghana. Balsalobre et al., (2018) examine the EKC hypothesis in the European Union 5 (EU-5) economies. The findings confirm an inverse relationship between economic expansion and carbon emission in the study area. The study reveals that additional variables incorporated such as renewable electricity consumption, natural resources and energy innovation promote quality environment, whereas, trade openness and the interaction between renewable electricity consumption and economic expansion contribute to carbon emission. Shahbaz et al. (2013) investigate the said hypothesis for single country case for Pakistan and find a U-shaped interaction between per capital income and the environmental degradation. It means that country is still within the first stage known as the scale effect stage as earlier described above, where the focus is on output at the detriment of environmental quality. Other single country-based studies that lend support to the ongoing debate include Saboori et al. (2012a, b), Esteve and Tamarit (2012a) He and Richard (2010), Baek and Kim (2013) for Malaysia, Spain, Canada and Korea respectively. The outcome is further supported by similar studies suchas Septon and Mann (2013), Nasir and Ur-Rehman (2011), Xuemei et al. (2011), and Kanjilal and Ghosh (2013). These studies find a short and distance future interaction between the series of interest. In a related study, Shahbaz et al. (2013) examine the income-induced carbon emission in Romania, in which the revelation shows the evidence of heaven pollution hypothesis in addition to the confirmation of the EKC hypothesis. Tiwari et al. (2013) adopt the granger causality test and find a one-way causal effect running only from the coal consumption to output level, confirming the EKC hypothesis in the case of India. The study concludes that coal consumption causes serious expansion in carbon emission. Katircioglu (2014) investigates the said hypothesis by incorporation tourism as a control variable for the Singapore economy, the result shows evidence of tourism-induced environmental degradation through the result from the granger causality running from the tourism to the carbon emission. Other similar studies with slight differences include Arouri et al. (2012) and Fodha and Zaghdoud (2010). The revelation from these studies indicates a linear relationship between carbon emission and economic expansion. Other studies could not ascertain the direction of the interaction between carbon emission and economic advancement. Instead, they find an N-shaped link between the series. These studies include Musolesi et al. (2010), and Ozturk and Acaravci (2010). Studies that do not

find the evidence of EKC hypothesis include Ozturk and Al-mulali (2015), Al-Mulai et al. (2015a), and Fodha and Zaghdoud (2010) for Cambodia, Vietinan and Tunisia. These studies falsify the said hypothesis. In the case of panel studies, the subject matter is still debatable. For instance, Sinha et al. (2017) examine the link between renewable/non-renewable energy consumption and environmental pollution, and find an N-shaped interaction in the area of study. This is similar to the work of Katircioglu et al. (2018). The study examines the effect of ecological footprint in 10 top tourists induce economies. The result from the study indicates that tourism is an agent that promotes environmental degradation. Unlike the study of Katircioglu et al. (2018) above, Liu et al. (2017a) find no evidence of the EKC curve in the ASEAN economies. Interestingly, the study finds that renewable energy consumption and agriculture discourage improves the quality of environment in the study area. This is similar to the work of Apergis (2016), Balsalobre and Alvarez (2016a, b), and Taspinar (2016). Other panel studies (Narayan and Narayan 2010; Ben Jebli et al. 2016; Arouri et al. 2012; Jounky 2011; Coondoo and Dinda 2002) all find the evidence of the EKC in their separate investigation. On the contrary, the work of Al-Mulali et al. (2015) augment the traditional EKC nexus with capital and labour in Vietnam. Adopting the ARDL approach, the study could not establish evidence of EKC in the study area. The work of Chang (2015) finds that the G-7 achieved cleaner environment than the BRICS economies. Sarkodei and Adam (2018) and Sarkodie and Strezov (2019) confirm the EKC hypothesis in South Africa and China/India respectively. Similarly, Gokmenoglu and Taspinar (2018), Dogan (2018), and Dogan (2016) confirm the agriculture-induced EKC hypothesis in their separate studies.

Conceptual Review of Agric-EKC

Generally, the EKC curve as postulated by Grossman and Krueger (1994) submits that the relationship between economic expansion and environmental degradation is a nonlinear one. According to them, the inverse interaction between per capital income and inequality applies to the case of per capital income and environmental degradation. It is not out of place to apply the same to show a tradeoff between agriculture-driven economic growth and environmental degradation. Empirical evidence abounds for the EKC hypothesis, while others oppose its reality. It has been empirically established that there exists agriculture-induced carbon emissions known as the agriculture-led EKC hypothesis. For instance, according to Liu et al., (2017a) the report from food and agriculture organization of the united nation (FAO 2016) indicates that agriculture sector contributes a significant proportion to carbon emission. The report further submits at a global level, agriculture accounts for about 21% of the total carbon emission, representing the second highest contributor. This is obtained from agricultural activities which includes crop production, deforestation, soil, bush burning, among others. Generally, the distinguishing features of the

emerging economies are dependent on mining and agriculture. Most if not all of the emerging economies still depend heavily on agriculture for self-sustenance, and in some cases form their larger share of export which contributes to promoting the course of economic expansion. The physiocracy school of thought is of the opinion that agriculture sector serves as an engine through which long term economic expansion could be achieved, as reported by Sertoglu et al., (2017) and Higgs (1897). However, empirical evidence shows that the said economic expansion is achieved amidst its consequences, particularly on the environmental quality, as submitted by the work of Katircioglu (2006a, b & 2008). Similarly, Katircioglu (2006a) maintains that agriculture drives economic expansion, as revealed by the feedback causal relationship between the variable for Cyprus economy. Li and Zhang (2009) investigate the agriculture-drive EKC and find that the sector is a driver of carbon emission in China, as supported by Katircioglu (2004). Recep and Faik (2018) submit that environmental degradation is caused by primary economic activities such as agricultural activities, extraction of the natural resources, coupled with secondary economic activities like industrial productive activities.

Model Specification and Method Use

Following the theoretical assertion linking agriculture output and carbon emission, this section presents a macroeconomic model that permit the simulation of influence of agriculture output on carbon emission in Nigeria. The model consist of one behavioural equation and five explanatory variables. Secondary data was obtained for the period from 2018 to 2019 to estimate the model. Autoregressive Distributed lag model (ARDL) is employed for purpose of estimation as informed by the mixed order of integration from the stationarity test. Thus, the equation is stated as follows:

$$\mathrm{CO2} = \beta_0 + \beta_1 \mathrm{GDPPC} + \beta_2 \mathrm{GDPPC2} + \beta_3 \mathrm{AGOUT} + \beta_4 \mathrm{FDI} + \beta_5 \mathrm{EC} + \varepsilon \ldots\ldots\ldots\ldots (1)$$

$$\mathrm{CO2} = \beta_0 + \beta_1 \mathrm{GDPPC} + \beta_2 \mathrm{GDPPC2}_{t-i} + \beta_3 \mathrm{AGOUT} + \beta_4 \mathrm{FDI} + \beta_5 \mathrm{EC} + ECT_{-1} \ldots\ldots (2)$$

Where:

CO_2 = Carbon Emission, GDPPC = Gross Domestic Product per Capital, GDPPC2 = Square, Gross Domestic Product per Capital, AGOUT = Agriculture Output, FDI = Foreign direct investment, EC = Energy Consumption

Result presentation and interpretation

This segment of the study presents the result and the analysis of the estimated model which begins with the stationarity test using the ADF and PP unit root methods. The unit root test is critical because most times macroeconomics variables are not

stationary at level and need to be subjected to unit root test to confirm their level of stationarity. This has greater influence on the choice of method of analysis for the estimation of the model to avoid spurious regression Joshua, Adedoyin and Sarkodie (2020). Thus, Table I presents the outcome from the unit root test which indicates that CO2, agriculture output (AGOUT) and foreign direct investment (FDI) achieved stationarity at level. However, after taken the first difference, energy consumption (EC), GDPPC and GDPPC2 turn out to be stationary. In general, this result represents the case of a mixed order of integration which informed the decision to adopt the ARDL method as the best approach for estimation of the model.

Table 1: Result of Stationarity (Unit Root) Test

Variables	Adf Statistics	P-Value	Order of Integration	Pp Statistics	P-Value	Order of Integration
LNCO2	-4.6564	0.003	I(0)	-4.5757	0.0041	I(0)
LNAGOUT	-3.0728	0.037	I(0)	-3.2613	0.0240	I(0)
LNEC	-2.6712	0.000	I(1)	-5.8896	0.0000	I(1)
LNFDI	-3.2428	0.091	I(0)	-3.3313	0.0766	I(0)
LNGDPPC	-1.7377	0.000	I(1)	-3.7969	0.0000	I(1)
LNGDPPC2	-1.7350	0.000	I(1)	-3.7722	0.0000	I(1)

Source: Researcher's Computation using E-views 10

Table II presents the summary of the results from the ARDL procedure for model of this study. The result indicates that agriculture output (AGOUT) is positively correlated with CO2 in both short run and long run. Specifically, a 1% increase in agriculture output will lead to a 0.1625% increase in emission (CO2), insignificantly in the short run and 0.186% increase in CO2, insignificantly in the long run. This shows a weak relationship between agriculture output and the CO2, invalidating the agriculture-induced environmental Kuznets' curve (EKC) hypothesis in the case of Nigeria. The implication is that emission from the agriculture sector does not pose any serious threat to environmental quality in Nigeria. Thus, the government as well as the private sector need to invest more in the agriculture sector to improve the performance of the sector as this does not damage the eco-system. This will help the government achieve one of its key macroeconomic objectives of diversifying the economy. On the contrary, the FDI inflow proved a negative relationship with the CO2 significantly in the short and long run. A 1% increase in FDI inflow will significantly reduce CO2 by 13% in the short run, and a 15% decrease in CO2 in the long run significantly. This implies that FDI that flow to Nigeria and are free from environmental degradation

contradict the work of Bakhsh et al. (2017), and Gökmenoğlu and Taspinar (2016). Energy consumption proves to be the key emitter among the variable included in the model as expected, which further confirm the work of Fauzel (2017). A 1% increase in energy consumption (EC) will generate a 186.5% increase in CO2 in the short run, while in the long run, it will generate 393.9% increase in CO2, indicating the case of an elastic relationship. This means that a little change in energy consumption will lead to a more than proportional change in CO2 in the same direction. Gross domestic product per capital (GDPPC) indicates a positive interaction with the CO2 as expected, meaning that a growing economy like Nigeria will emit through its growth path. Specifically, a 1% increase in GDPPC will generate 881.7% and a 1000% increase in CO2 in the short and long run respectively. The result further proves that, GDPPC2 demonstrates a negative and weak relationship with the CO2. In conclusion, the cointegration test was carried out to ascertain if there exists a long run relationship between the series as presented in table III. The finding proves that the null hypothesis is rejected, confirming the presence of long run relationship for the series. Similarly, the conintegration test (ECT) indicates that the speed of adjustment in the economy is 87%. This means that any form of deviation will be corrected in the nearest future and the economy will regain its equilibrium.

Table II. Long/short run relationship of the model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNCO2= *f(LNAGOUT, LNFDI, LNGDPPC, LNGDPPC2, LNEC)*				
Short Run				
LNAGOUT	0.001625	0.185090	0.008781	0.9931
LNFDI	-0.134216	0.038874	-3.452610	0.0021
LNGDPPC	8.817251	20.32530	0.433807	0.6683
LNGDPPC2	-0.354307	0.812452	-0.436096	0.6667
D(LNEC)	1.865430	1.204525	1.548685	0.1345
ECT (-1)	-0.874002	0.120386	-7.259967	0.0000
Long Run				
LNAGOUT	0.001860	0.211774	0.008781	0.9931
LNFDI	-0.153565	0.057232	-2.683223	0.0130
LNGDPPC	10.08837	23.66522	0.426295	0.6737
LNGDPPC2	-0.405384	0.945668	-0.428675	0.6720
LNEC	3.939405	1.472576	2.675180	0.0132

Source: Author's Computation 2022

Table III. ARDL Bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
			Finite sample: n=35	
F-statistic K	6.0236705	10%	2.831	3.879
		5%	3.353	4.5
		1%	4.849	6.511

Source: Author's Computation

To ensure that the model is reliable, accurate and fit for policy guide and direction, the model is subjected to a diagnostic test, which includes the normality test, the heteroscedasticity test, the serial correlation test, and the Ramsey reset test, as presented in table IV. The result proves that the series are normally distributed, no case of serial correlation, they are homoscedastic and that the model is well specified. Finally, the stability test as presented in Figure 1 shows that the model is stable and fit for policy implication as the blue line fall within the critical bond at 55 level of significance.

Table IV: Residuals of Diagnostics Tests

Tests	F-statistic	P. Value
χ2 NORMALITY	0.5040	0.7770
χ2 SERIAL	0.0110	0.9890
χ2 WHITE	1.8214	0.1222
χ2 RAMSEY	0.3734	0.5471

Source: Author's Computation

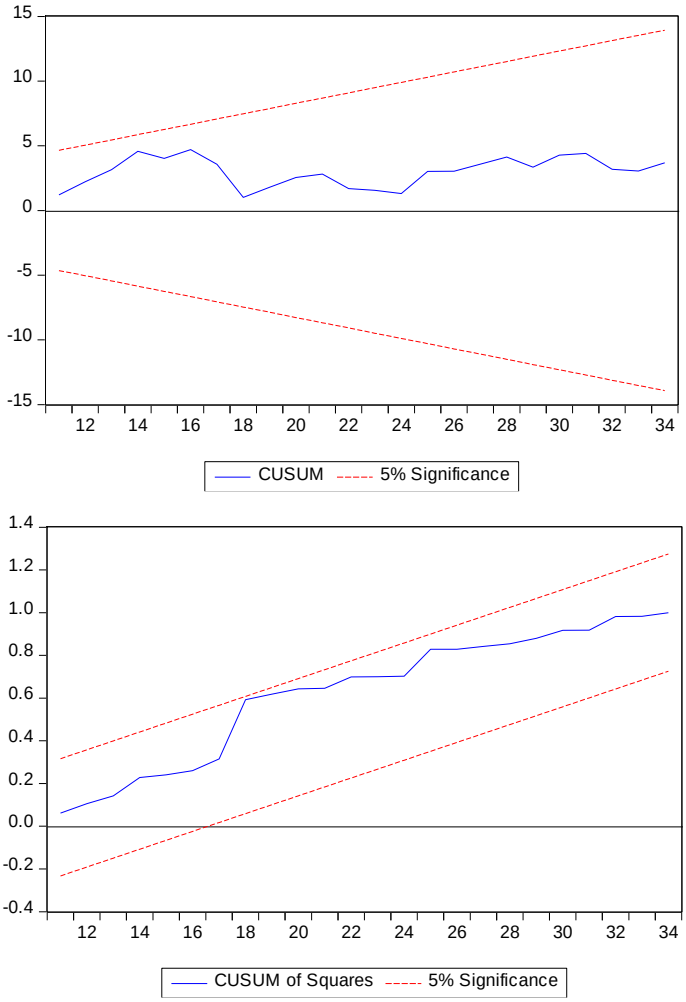

Figure 1 CUSUM and CUSUM of square plots

The outcome from the granger causality test is presented in Table V, which shows a bidirectional causal link between energy consumption and CO2. This means that the two variables are predictors of each other. Further result proves that FDI inflow is a predictor of carbon emission in Nigeria, as indicated by a one-way causal link flowing from FDI to CO2. Interestingly, a feedback causal relationship exists between GDPPC and carbon emission (CO2). This means that the two variables can influence each other direction of flow in Nigeria. A similar result is obtained between the GDPPC2 and CO2. A bidirectional link flows between GDPPC2 and CO2, proving that the two variables can influence each other. Another causal relationship proved to exist between GDPPC and energy consumption (EC), which confirm the energy-led growth hypothesis for Nigeria. Also, only FDI inflow granger causes GDPPC, as indicated by a

one-way causal link running from FDI inflow to GDPPC. Other similar causal relationships include a one-way link running from FDI to energy consumption (EC), and from GDPPC to energy consumption (EC).

Table V: Granger Causality Result

Null Hypothesis:	Obs	F-Statistic	Prob.
LNAGOUT does not Granger Cause LNCO2	34	0.88461	0.4874
LNCO2 does not Granger Cause LNAGOUT		0.80352	0.5345
LNEC does not Granger Cause LNCO2	30	2.30706	0.0918
LNCO2 does not Granger Cause LNEC		6.18264	0.0019
LNFDI does not Granger Cause LNCO2	34	2.20833	0.0971
LNCO2 does not Granger Cause LNFDI		0.59520	0.6694
LNGDPPC does not Granger Cause LNCO2	34	2.64269	0.0574
LNCO2 does not Granger Cause LNGDPPC		3.10210	0.0334
LNGDPPC2 does not Granger Cause LNCO2	34	2.64369	0.0573
LNCO2 does not Granger Cause LNGDPPC2		3.08121	0.0342
LNEC does not Granger Cause LNAGOUT	30	0.57132	0.6864
LNAGOUT does not Granger Cause LNEC		0.42881	0.7862
LNFDI does not Granger Cause LNAGOUT	35	0.88853	0.4846
LNAGOUT does not Granger Cause LNFDI		0.97995	0.4356
LNGDPPC does not Granger Cause LNAGOUT	35	0.96014	0.4458
LNAGOUT does not Granger Cause LNGDPPC		0.25288	0.9053
LNGDPPC2 does not Granger Cause LNAGOUT	35	0.96023	0.4458
LNAGOUT does not Granger Cause LNGDPPC2		0.25693	0.9028
LNFDI does not Granger Cause LNEC	30	2.24054	0.0992
LNEC does not Granger Cause LNFDI		2.05916	0.1226
LNGDPPC does not Granger Cause LNEC	30	2.74901	0.0554
LNEC does not Granger Cause LNGDPPC		0.11990	0.9739
LNGDPPC2 does not Granger Cause LNEC	30	2.75835	0.0548
LNEC does not Granger Cause LNGDPPC2		0.12120	0.9734
LNGDPPC does not Granger Cause LNFDI	35	1.72609	0.1745
LNFDI does not Granger Cause LNGDPPC		3.56226	0.0191
LNGDPPC2 does not Granger Cause LNFDI	35	1.72354	0.1751
LNFDI does not Granger Cause LNGDPPC2		3.59922	0.0183
LNGDPPC2 does not Granger Cause LNGDPPC	36	1.04562	0.4022
LNGDPPC does not Granger Cause LNGDPPC2		1.10172	0.3759

Source: Author's Computation

Conclusion, Policy Implication and Direction

The primary economic activities are presumed not to be without their environmental consequences, which differs from country to country. In recent time, the federal government in its quest to achieve a diversified economy has place significant priority on further improving the agriculture sector. Besides, Nigeria has been known to be an agrarian economy. Therefore, this informed the decision of this study to investigate the agriculture-induced environmental Kuznets'curve (EKC) hypothesis to ascertain its applicability in the case of Nigerian economy. Contrary to the appriori expectation of this study, the outcome invalidates the agriculture-induced environmental Kuznets curve, implying that the sector does not pose environmental threat to the growth process. Energy consumption is confirmed to be the key emitter of CO2 in Nigeria, which validate the initial expectation of this study. Further result proves the existence of the conventional EKC hypothesis for the Nigeria economy. In another vain, FDI inflow proves to be pure and free from environmental degradation.

In view of the above conclusion, this study recommends modern approaches to agriculture activities that will yield better results because it will still retain the quality of the ecosystem. More so, there is the need for the adoption of relevant policies to allow for more of energy-efficient technologies with less environmental degradation inherent. The economy could resort to the use of clean energy or renewable energy in an attempt to reduce environmental pollution. Attracting FDI inflow into the economy of Nigeria is key to achieving economic growth and maintaining clean environment. Therefore, such policies as tax holiday, free license for operation, and stable macroeconomics environment will help attract more FDI into the economy.

Research and Ethical Statement Information of the Article	
Author's Conflict of Interest Statement	The authors declare that they have no relevant or material financial interests that relate to the research described in this paper.
Author(s) Contribution Rate Statement	Author 1 conceptualized the idea, wrote the introduction, and made the estimation; Author 2 wrote the literature and the methodology, and interpreted the estimation; Author 3 wrote the conclusion and the policy guide.
Ethics Committee Approval Certificate	During the research/examination, no scientific method was used that required ethics committee approval.

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