

Socioeconomic development and sustainable development in Nigeria: the roles of poverty reduction and social inclusion

Sustainable
development in
Nigeria

265

Hauwah K.K. Abdulkareem, Sodiq Olaiwola Jimoh and
Olatunji M. Shasi

*Department of Economics and Development Studies, Kwara State University,
Malete, Nigeria*

Received 16 October 2021
Revised 17 February 2022
19 April 2022
4 July 2022
24 August 2022
29 August 2022
Accepted 29 August 2022

Abstract

Purpose – This study examines the roles of poverty reduction and social inclusion as socioeconomic factors in achieving sustainable development (SD) in Nigeria from 1970 to 2019.

Design/methodology/approach – Vector error correction model (VECM) is adopted as the analytical technique. Three groups of factors are employed when determining SD: economic (per capital gross domestic product [GDP] and the inflow of foreign direct investment [FDI]), social (life expectancy, school enrollment, poverty and the proportion of women in parliament) and environmental (CO₂ emission and natural resource endowment).

Findings – The findings reveal that the economic factors (GDP per capita and the inflow of FDI to the GDP ratio) and two of the social determinants (life expectancy and school enrollment) have a positive effect on SD while the remaining two social determinants (poverty gap and the proportion of women in parliament) and the environmental determinants (CO₂ emission and natural resource endowment) have a negative influence on SD in Nigeria during the period under study.

Originality/value – First, this study integrates social inclusion into the poverty–SD nexus in the same study framework for a thorough analysis given that social inclusion has been identified as one of the leading variables affecting sustainability. Second, this study fills a gap in the literature by accounting for economic, social and environmental factors that influence SD, as opposed to the majority of existing studies that only employed environmental variables when examining the relationship between poverty and sustainability.

Keywords Poverty, Social inclusion, Sustainable development, SDG, Nigeria

Paper type Research paper

1. Introduction

Poverty remains a worldwide global challenge. Despite various national and international initiatives to combat the menace, poverty remains pervasive and on the rise, especially in Nigeria. Although the rate of extremely poor people decreased by 26% between 1990 and 2015, the ravaging COVID-19 pandemic is threatening the meager progress made over the decades, with the possibility of 500 million people falling into poverty globally, according to the United Nations University World Institute of Development Economics Research (UNU WIDER) (Sumner *et al.*, 2020). Nigeria, which is the focus of this study, ranks 152 on the Human Development Index (HDI), with 50% of Nigerians not only being income poor but multidimensionally poor and 30% living in absolute multidimensional poverty.

© Hauwah K.K. Abdulkareem, Sodiq Olaiwola Jimoh and Olatunji M. Shasi. Published in *Journal of Business and Socio-economic Development*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>



Journal of Business and Socio-
economic Development
Vol. 3 No. 3, 2023
pp. 265-278
Emerald Publishing Limited
e-ISSN: 2635-1692
p-ISSN: 2635-1374
DOI 10.1108/JBSED-10-2021-0137

Poverty and social inclusion are intertwined even though they are two different socioeconomic concepts; not everyone who is socially excluded is poor; however, being socially excluded exacerbates poverty (UN, 2016). In terms of poverty alleviation, increased productivity and greater participation in inclusive development (Dugarova, 2015), social inclusion involves an active and valued participation in the process of human development and borders on deprivation (Mitchell and Shillington, 2002). Nigeria ranks 118th out of 134 countries, according to the Gender Equality Index (World Bank, 2018), with 90% of people with disability living in poverty (Birchall, 2019). According to the World Bank, social exclusion stunts talent, while also depriving people of their sense of dignity, security and productive opportunities. Human capital loss due to gender inequality is \$160.2 tn, with the Afro-descendant ethnic minority being 2.5 times more likely to be poor (World Bank, 2020). As a result, poverty reduction and social inclusion are required, not only as socioeconomic means to sustainable development (SD) but also as socioeconomic ends that influence sustainability (Rafindadi and Mika'Ilu, 2019).

Interestingly, poverty is the fundamental hindrance to achieving the Sustainable Development Goals (SDGs) (Padda and Hameed, 2018; Cheng *et al.*, 2018). The same can be said about social exclusion, especially when women, ethnic minorities, the elderly and the disabled, among others, have limited access to welfare-improving amenities and productive resources. Nevertheless, the trade-off between poverty reduction, and hence social exclusion, and SD has remained a subject of debate in the existing literature. According to Plieninger *et al.* (2015), there is a close association between the eco-environment and poverty. Baloch *et al.* (2020) argued that processes in economic production and output would result in higher levels of carbon dioxide (CO₂) emissions, which would harm human well-being and impede SD. In contrast, Khan and Khan (2009) discovered no connection between poverty and resource dependency (Cheng *et al.*, 2018). Moreover, natural catastrophes, CO₂ emissions and extreme climate change have all been found to negatively influence poverty and human development, both directly and indirectly (Arouri *et al.*, 2015; Ajibade and McBean, 2014).

Conversely, poverty reduction and social inclusion do not necessarily have to conflict with SD; they are, in fact, two similar but distinct complementary socioeconomic goals for achieving SD. This is because unsustainable development, especially in developing countries like Nigeria (Yan and Qian, 2004), is primarily caused by a vicious cycle of poverty, social exclusion and environmental deterioration. Poor people frequently rely on the environment for sustenance, resulting in deforestation, soil erosion and contamination, and air and water pollution (Cheng *et al.*, 2018). Because of the conflicting views in the literature coupled with the scarcity of studies in this area for Nigeria, this study stands out in terms of significance and policy implications.

The main objective of this study is, therefore, to examine the effect of poverty reduction and social inclusion as socioeconomic factors in attaining SD in Nigeria from 1970 to 2019. This study is of significant contribution in two strategic areas: First, despite the existence of a myriad of studies on the poverty–sustainability nexus such as Ajibade and McBean (2014), Arouri *et al.* (2015), Cheng *et al.* (2018), Rai (2019) and Baloch *et al.* (2020), to the best of the authors' knowledge, none of these studies have considered poverty, social inclusion and SD in the same contextual framework. However, as indicated by Yan and Qian (2004), social inclusion is one of the leading variables affecting sustainability and hence cannot be disregarded in the analysis of sustainability. In Nigeria, related studies have dwelled on social inclusion and SD (Essien, 2016), poverty reduction and SD (Idike *et al.*, 2020), and poverty and SD (Deinne and Ajayi, 2021). However, the major point of departure for our study lies in the assessment of the tripartite variables of poverty, social inclusion and SD at the national level, which was not previously tackled in a single study context.

Second, this study fills a gap in the literature by accounting for economic, social and environmental factors that influence SD. Many existing studies on poverty and sustainability

have focused solely on the environmental determinants of sustainability (see [Khan and Khan, 2009](#); [Ajibade and McBean, 2014](#); [Arouri et al., 2015](#); [Plieninger et al., 2015](#); [Cheng et al., 2018](#)). However, SD is complex and multidisciplinary ([Cheng et al., 2018](#)) and is therefore affected by the interactions of several humans, economic, social and environmental factors. To effectively pursue SD goals, it is critical to assess the relationship between poverty, social exclusion and SD using a multivariable approach.

The paper is structured into five sections: the first of which is the introduction. [Section 2](#) reviews relevant literature while [Section 3](#) presents the methodology. [Section 4](#) presents and discusses the findings, whereas [Section 5](#) concludes with policy implications.

2. Literature review

Almost all the existing definitions of social inclusion are conceptually centered on the interconnections of individuals, groups or institutions within a wider social system and how their relationships are maintained and strengthened in a harmonious way ([Dugarova, 2015](#)). Similarly, the [Commonwealth of Australia \(2012\)](#) defines social inclusion as the ability of all citizens to have equal resources, opportunities and capabilities needed to learn, work, engage and have a voice. It is crucial to highlight that poverty and social exclusion are not synonymous, as an individual or group might be excluded without being poor or poor without being excluded. The factors determining social exclusivity vary by country and include, among other things, race, religion, gender, age and disability ([Warschauer, 2003](#)).

[European Commission \(2007\)](#) defines poverty as “persons, families, and groups of persons whose resources are limited and cannot afford the minimum acceptable way of life in the country in which they belong”. Some scholars define poverty statistically, using figures, numbers and percentages ([Saunders, 2004](#)). According to the World Bank’s statistical definition of poverty, individuals are considered to be in poverty if they earn less than \$1.25 per day in the poorest countries and \$2 per day in poor developing countries ([Noble et al., 2001](#)). The prominent expert-derived definitions of poverty are household subsistence level (HSL), household effective level (HEL), Human Poverty Index (HPI) and HDI, among others ([Ratcliffe, 2007](#)). The HSL uses an electronic model to determine the minimum income required for a household to survive while the HEL captures household necessities that were excluded in the HSL, offering a more robust measure of poverty than the HSL. Both HPI and HDI use a composite index to measure poverty across three basic dimensions: knowledge, a decent standard of living and a healthy life. However, they differ in that, while the HPI captures deprivations, the HDI reflects average achievements in the three dimensions recorded by the index ([Nyasulu, 2010](#)).

In terms of theoretical underpinnings, several theories have been proposed as foundations for SD including modernization, dependency, world systems and globalization theories. According to the modernization theory, there exist two types of societies – traditional and modern with the former being characterized by norms, values and beliefs that deter development ([Tipps, 1976](#)). Therefore, to achieve development and improve citizens’ well-being, traditional societies must imitate the practices of modern societies in terms of capital accumulation, technological advancement, large-scale manufacturing as well as sustainable use of natural resources ([Mensah, 2019](#); [Huntington, 1976](#)). The dependency theory, on the other hand, posits that developed economies are taking advantage of developing countries by exploiting their abundant resources ([Webster, 1984](#)). The world systems theory complements the dependency theory and regards the global world as a pyramid of unbalanced exchange interrelationships between the periphery and the core ([Reyes, 2001](#)).

Lastly, the globalization theory postulates that economic and cultural integrations are necessary for progress ([Mensah, 2019](#)). This theory heavily relies on economic, sociocultural, technological and political factors ([Parjanadze, 2009](#)). Hence, the ultimate goal of

globalization hinges on maintaining and advancing global and domestic societies, environments and economic systems in a sustainable manner that improves the welfare of all, which is the foundation of SD. Consequently, the globalization theory appeals to this study due to its applicability to the concept of SD as it relates to the eradication of poverty, changes in social structures and sustainable use of natural resources within the environment (Mensah, 2019). The globalization theory is the theoretical foundation for the study's objectives as it hypothesizes poverty reduction and social inclusion as complementary agendas for SD.

Empirically, Sobczak *et al.* (2021) analyzed the challenges associated with the ending poverty goal in the context of SDGs in the Visegrád Group (V4) of Poland, Hungary, Czech Republic and Slovakia by employing spatio-temporal comparative analysis of poverty indicators and descriptive econometric models. They found that countries experience higher levels of SD as a result of reduced poverty incidence, with the Czech Republic ranking first in the region, followed by Slovakia. This is in line with Cuaresma *et al.* (2018) who examined how current and future poverty levels may affect the achievement of the SDGs by assessing global poverty trends under varied scenarios. The analytical technique incorporated a combination of the Beta-Lorenz curves for estimating global historical income levels and gross domestic product (GDP) and demographic and economic projections to create poverty scenarios till 2030. Poverty rates are estimated to vary from 4.5 to 6% by 2030, with Sub-Saharan Africa having the highest poverty levels and a lower possibility of attaining the SDGs' first goal.

Padda and Hameed (2018) investigated multidimensional poverty in Pakistan's rural areas using the Pakistan Rural Household Survey (PRHS) 2013 data. By employing principal component analysis, they determined a negative relationship between poverty and SD, recommending the need to address poverty reduction from a multidimensional approach to achieve SD. Likewise, Schleicher *et al.* (2018) found a similar link between poverty and SD. To achieve SD, developing novel poverty indicators and metrics that capture the different values and components of the environment is needed. These findings complement that of Ogwumike and Ozughalu (2015), who demonstrated that energy poverty must be aggressively eliminated in Nigeria to achieve SD.

Focusing on SD, Kaimuri and Kosimbei (2017) used the autoregressive distributive lag (ARDL) model to investigate the determinants of SD in Kenya. Using annual data from 1991 to 2004, they found that both the unemployment rate and energy efficiency harm the attainment of SDGs in Kenya. This contrasts with the findings of Phimphanthavong (2014) who examined the determinants of SD in Laos. Using a regression analysis that includes air pollution, GDP, poverty reduction, deforestation and income inequality, he found that attaining SD requires economic growth, protection of natural resources and suitable environmental condition. Nevertheless, the main limitation of this study was its use of GDP as a measure of economic growth which could be better quantified by the per capita GDP.

Lupala (2014) examined SD from the social perspective of social inclusion, collecting data through interviews, desk reviews, and group discussions that were then analyzed descriptively. They found that social inclusion indicators need to be subsidized and addressed to improve SD. Gender equality was identified to be one of the primary drivers of SD (Tchouassi, 2012). More specifically, Tchouassi (2012) employed a cross-sectional analysis to examine the nexus between gender equality and SD in 11 Central African countries in 2010. The study used the multidimensional poverty index to measure poverty and found a positive association between gender equality and SD.

Focusing on Nigeria, Idike *et al.* (2020) examined the effects of human capital development and poverty reduction on SDGs' achievement in Ebonyi State, Nigeria. The study employed focus group discussions and in-depth interviews to gather data for thematic analysis. The findings revealed that poverty reduction schemes implemented by the Ebonyi State Government suffer from poor targeting, methodology and sustainability which impedes the

achievement of SD in the State. [Deinne and Ajayi \(2021\)](#) used both probabilistic and non-probabilistic techniques to analyze household data while studying the dynamics of poverty, inequality and SD in Delta State, Nigeria. The results revealed a significant geographical variation in inequality and poverty levels, posing huge risks to SD in the State. Furthermore, [Essien \(2016\)](#) investigated the role of civil society organizations (CSOs) in social inclusion and SD. Drawing on the available literature, the findings indicated that CSOs are not only inefficient but also contribute to social exclusion.

Building on the globalization theory, the following hypotheses are developed:

Ho1. Poverty reduction has no significant effect on SD in Nigeria.

HA1. Poverty reduction has a significant effect on SD in Nigeria.

Ho2. Social inclusion has no significant effect on SD in Nigeria.

HA2. Social inclusion has a significant effect on SD in Nigeria.

3. Methodology

3.1 Data sources and types

This study employs annual secondary data from the World Bank's World Economic Indicators database ([World Bank, 2021](#)). The sample ranges between 1970 and 2019 due to data availability. The description of all the variables used in this study is presented in [Table 1](#).

3.2 Model specification

To investigate the empirical relationship between poverty, social inclusion and SD in Nigeria, this study employs a vector error correction model (VECM). One of its advantages is its ability

Variables	Description/Measurement	A priori expectations
NS	Net adjusted savings and proxy for SD; it is equal to gross national savings less the value of consumption of fixed capital	
GDPPC	Per capita GDP which is used to measure the level of economic development and considered one of the economic determinants of SD	+/-
FDI	Inflow of foreign direct investment as a percentage of GDP and one of the economic determinants of SD	+/-
LE	Life expectancy at birth indicates the number of years a new born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life and considered one of the social determinants of SD	+/-
SE	Gender parity index for gross enrollment ratio in primary education is the ratio of girls to boys enrolled at primary level in public and private schools and considered one of the social factors	+/-
POV	This represents poverty gap at 1.90 US\$ per day	+/-
WIP	Women in parliament is the percentage of parliamentary seats in a single or lower chamber held by women and considered one of the social factors	+/-
CO ₂ emissions	CO ₂ emissions (kg per 2010 US\$ of GDP) and considered one of the environmental factors	+/-
NR	Total natural resource rent which is the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents and forest rents	+/-

Source(s): World Development Indicators (2021)

Table 1.
Description of
variables and sources

to estimate the long-run equilibrium relationship between variables and to use a corrective mechanism to adjust the short-term to the long-run equilibrium state (Ren *et al.*, 2020). It also treats all variables as endogenous to avoid endogeneity problems (Menezes *et al.*, 2012). Following Mohammadi and Ansari (2012) and Kaimuri and Kosimbei (2017), our VECM model is presented as follows:

$$\begin{aligned} \Delta \ln NS_t = & \sigma_1 + \sum_{j=1}^{k-1} \beta_j \Delta \ln CO2_{t-j} + \sum_{j=1}^{k-1} \gamma_j \Delta \ln NR_{t-j} + \sum_{j=1}^{k-1} \varphi_j \Delta \ln FDI_{t-j} \\ & + \sum_{j=1}^{k-1} \theta_j \Delta \ln GDPPC_{t-j} + \sum_{j=1}^{k-1} \tau_j \Delta WIP_{t-j} + \sum_{j=1}^{k-1} \vartheta_j \Delta CO2_NR_{t-j} + \sum_{j=1}^{k-1} \alpha_j \Delta Pov_{t-j} \\ & + \sum_{j=1}^{k-1} \vartheta_j \Delta LE_{t-j} + \sum_{j=1}^{k-1} \alpha_j \Delta SE_{t-j} \lambda_1 ECT_{t-1} + \mu_{1t} \end{aligned} \quad (1)$$

where σ_s represents the constant term, $\beta, \gamma, \varphi, \theta, \tau, \vartheta, \alpha$ are the coefficients of our endogenous variables, μ_s is the error term and ECT represents the speed of adjustment to equilibrium.

In Equation (1), $\ln NS$ is the dependent variable in the base model, represented by the natural log of net national savings, which is used to proxy SD in line with (Kaimuri and Kosimbei, 2017). The explanatory variables are grouped into three determinants of SD: economic determinants (per capita GDP [GDPPC] and inflow of foreign direct investment [FDI]), social determinants (life expectancy [LE], school enrollment [SE], poverty [POV] and proportion of women in parliament [WIP]) and environmental determinants (CO₂ emission and natural resource endowment [NR]). All the explanatory variables are included as logarithms except WIP and POV. These three groups are investigated to determine the impact of the level of poverty and social exclusion on SD in Nigeria. In addition, this study exploits the interaction between CO₂ emission and natural resources endowment to examine the impact of the richness of natural resources on the CO₂ emission and SD nexus in Nigeria.

3.3 Data analysis technique

This study uses vector autoregressive model estimates to examine the effect of poverty alleviation and social inclusion on SD in Nigeria. It represents an appropriate methodology given that all the variables used in this study are stationary at the first difference and cointegrated as shown in Tables 4 and 5.

4. Empirical analysis and findings

4.1 Preliminary data analysis

Table 2 presents summary statistics for the variables used in the model, including mean, standard deviation, minimum and maximum. Among all variables, GDPPC has the highest mean value while FDI has the lowest mean value. The table shows that the average per capita GDP in Nigeria is 273,819 US\$, while the average FDI as a percentage of GDP in Nigeria is 1.5%. The average life expectancy rate in Nigeria is 62.7 years, while 23.3% of the population is below the poverty line. The average WIP indicates that men occupy more seats in Nigerian parliaments than women. The standard deviation shows the dispersion of all variables from their respective means.

Table 2 also presents the correlation analysis which examines the significance of the relationships between all the variables used in this study. The highest significant correlation coefficient is between LE and NR (0.684) and the lowest correlation coefficient is between WIP

Variable	Obs	Mean Std	Dev	Min	Max
NS	50	15.52941	12.84734	1	39
GDPPC	50	273819.7	61102.16	199039.2	385349
FDI	50	1.504512	1.209569	-1.15086	5.790847
LE	50	62.74	16.71466	1	88
SE	50	92.14	41.7182	1	130
POV	50	23.274	6.201015	12.5	32.4
WIP	50	77.4	90.71237	1	187
CO ₂ emission	50	144.82	39.03462	1	177
NR	50	25.5	14.57738	1	50

	NS	GDPPC	FDI	LE	SE	POV	WIP	CO ₂ emission
NS	1							
GDPPC	0.0485	1						
FDI	0.0175	-0.122	1					
LE	0.684***	0.213	-0.0143	1				
SE	0.276	-0.179	0.261	0.263	1			
POV	0.175	-0.838***	0.265	-0.251	0.146	1		
WIP	0.492***	0.537***	0.0816	0.620***	0.120	-0.421**	1	
CO ₂ emission	0.0286	-0.409**	0.0468	0.0328	0.543***	0.386**	-0.326*	1

Source(s): Authors' computation (2021), *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$

Table 2. Summary statistics and correlation analysis

and CO₂ (-0.326). The result also suggests that there is no multicollinearity problem since none of the correlation coefficients is higher than 0.8.

Table 3 displays the unit root test used to examine the stationarity of the variables. The augmented Dickey-Fuller (ADF), Dickey-Fuller (DF-GLS) and the Philip-Peron (PP) tests are

Level	ADF	DF-GLS	PP
LFDI	-3.587***	-4.227***	-3.425**
LNS	-2.863**	-3.067**	-2.727*
LCO ₂ emission	-0.119	-1.331	-3.113*
LNR	-5.959***	-4.233***	-3.196**
LLE	-1.589	-5.711*	-3.182**
LSE	-3.614**	-2.290	-3.6360**
LGDPPC	-0.371	-0.833	-3.181*
LWIP	-0.822	-1.899	3.258**
LPOV	0.452	-1.119	4.225***
<i>First difference</i>			
LFDI	-2.660**	-3.365**	-11.033***
LNS	-2.226	-2.088	-6.475***
LO ₂ emission	-0.021	-1.433	-6.618***
LNR	-3.859**	-2.576*	-8.092***
LLE	-1.562	-1.821	-3.424**
LSE	-1.354	-0.174	-9.670***
LGDPPC	-0.807	-1.347	-3.235**
LWIP	-0.815	-1.877	-11.632***
LPOV	-5.205***	8.539***	-3.235**

Note(s): ***, ** and * denote significance at 1, 5 and 10%, respectively

Source(s): Authors' computation (2021)

Table 3. Unit root analysis

conducted both at levels and first difference. All variables (LFDI, LNS, LCO₂ emission, LNR, LLE, LSE, LGDPPC, WIP and POV) are found to be stationary at the first difference. Thus, all the variables are integrated at I (1).

To determine the vector autoregressive (VAR) optimal lag length, we conduct the optimal lag selection criteria based on the Akaike information criterion (AIC), Hannan–Quinn information criterion (HQIC) and structural Bayesian information criterion (SBIC). SBIC is considered the optimal lag length selection method because it asymptotically selects more parsimonious than AIC (Menla Ali and Hunter, 2014). According to Table 4, the optimal lag length is 2 based on SBIC.

Table 5 presents the Johansen co-integration result, which examines the long-run relationship between the variables used in this study. Since the trace statistics are greater than the 5% critical values for rank zero to rank three, the model can have a maximum rank of four co-integrating equations.

Tables 6 and 7 present the short- and long-run estimations of the impact of poverty reduction and social inclusion on SDGs attainment in Nigeria. In Table 6, the ECT term, denoting the speed of adjustment, is negative and significant as expected. This implies that a 25% convergence rate is being corrected every year to attain equilibrium. In the short run, LNS, LCO₂, LFDI and CO₂_nr have a negative and significant impact on SD, while LLE and LNR have a positive and significant impact on SD in Nigeria.

Selection-order criteria									
Sample: 1978–2019									
lag	LL	LR	df	p	FPE	AIC	Number of obs = 42		SBIC
							HQIC		
0	-158.544				0.027018	7.74021	7.80087	7.9057	
1	-45.572	225.94	16	0.000	0.000268	3.12248	3.42578	3.94994	
2	36.8628	164.87	16	0.000	0.000012	-0.041083	0.504852	1.44835*	
3	64.9254	56.125	16	0.000	6.90E-06	-0.615496	0.173077	1.5359	
4	76.6617	23.472	16	0.102	9.50E-06	-0.41246	0.618752	2.40091	
5	93.8996	34.476	16	0.005	0.000011	-0.471411	0.802439	3.00393	
6	119.984	52.168	16	0.000	9.40E-06	-0.9516	0.564888	3.18571	
7	159.058	78.148	16	0.000	5.40E-06	-2.05036	-0.291237	2.74892	
8	205.054	91.993*	16	0.000	3.3e-06*	-3.47877*	-1.477*	1.98248	

Table 4.
Optimal lags criteria

Source(s): Authors' computation (2021)

Trend: Constant						
Sample: 1972–2019						
Maximum						
Rank	Parms	LL	Eigenvalue	Number of obs = 48		
				Lags = 2		
				Trace 5% critical		
				Statistic	Value	
0	72	-1511.4518		287.2362	156	
1	87	-1466.4107	0.84691	197.1539	124.24	
2	100	-1433.0332	0.75111	130.3989	94.15	
3	111	-1405.5856	0.68135	75.5037	68.52	
4	120	-1386.7501	0.54379	37.8328*	47.21	
5	127	-1378.2792	0.29739	20.8909	29.68	
6	132	-1370.5547	0.2752	5.442	15.41	
7	135	-1368.6924	0.07466	1.7174	3.76	
8	136	-1367.8337	0.03515			

Table 5.
Johansen
co-integration test

Source(s): Authors' computation (2021)

Variables	Coef	Std. Err	<i>z</i>	<i>P</i> > <i>z</i>	[95% Conf	Interval]
ECT	-0.25352	0.072918	-3.48	0.001	-0.3964352	-0.1106
LD.LNS	-0.39605	0.12832	-3.09	0.002	-0.6475485	-0.14454
LD.LGDPPC	-2.00836	2.234899	-0.9	0.369	-6.388679	2.371965
LD.LFDI	-0.54075	0.205539	-2.63	0.009	-0.9435959	-0.1379
LD.LLE	7.328518	3.881354	1.89	0.059	-0.278796	14.93583
LD.WIP	0.006069	0.005234	1.16	0.246	-0.0041891	0.016327
LD.LSE	0.003806	0.003191	1.19	0.233	-0.0024478	0.01006
LD.POV	-0.05533	0.061453	-0.9	0.368	-0.1757743	0.065116
LD.LCO ₂	-4.24571	1.35999	-3.12	0.002	-6.911245	-1.58018
LD.LNR	1.691382	0.408199	4.14	0.000	0.891327	2.491436
LD.CO ₂ _nr	-1.51823	0.339373	-4.47	0.000	-2.183388	-0.85307
Cons	-0.05112	0.135447	-0.38	0.706	-0.3165878	0.214353
Obs	48					

Source(s): Authors' computation (2021)

Table 6.
Short-run estimates of
the vector
autoregressive model

Beta	Coef	Std. err	<i>z</i>	<i>p</i> values
LGDPPC	-4.36179	1.165975	-3.74	0.000
FDI	-1.18952	0.19519	-6.09	0.000
LLE	-15.3633	1.102432	-13.94	0.000
WIP	0.029052	0.00314	9.25	0.000
LSE	-0.00872	0.003325	-2.62	0.009
POV	0.27199	0.04002	6.8	0.000
LCO ₂	6.852144	1.531008	4.48	0.000
LNR	21.59565	1.90666	11.33	0.000
CO ₂ _nr	-19.3764	1.712249	-11.32	0.000
_cons	21.19272			

Source(s): Authors' computation (2021)

Table 7.
Johansen
normalization
restriction imposed

Table 7 examines the long-run impact of economic, social and environmental factors on SD. The coefficients are interpreted as elasticity because of the natural log associated with the variables and are analyzed in reverse order to normalize the vector. This is accomplished by multiplying the coefficients by -1 to obtain the long-run coefficients (Menla Ali and Hunter, 2014). By reversing the sign of the coefficient, the per capita GDP in Nigeria has a positive association with SD. A one percent increase in GDPPC leads to a 4.3% increase in SD achievement. Although this is in line with the expectation, it contradicts the findings of Kaimuri and Kosimbei (2017) who showed no significant association between economic development and SD. By implication, the level of economic development in Nigeria contributes to the attainment of SD. In addition, the coefficient of inflow of FDI to GDP ratio produces a positive and significant impact on SD. A one percent increase in the inflow of FDI raises SD by 1.18%. This finding is in line with those of Aust *et al.* (2019) and Shittu *et al.* (2022), who found a positive association between FDI and SD scores in Africa. The positive effect of FDI on SD in Nigeria may be attributed to the availability of some basic infrastructures and energy, which have environmental consequences.

Among the social determinants of SD, life expectancy and school enrollment show a positive relationship with SD in Nigeria, whereas the poverty gap (poverty depth) and the proportion of women in parliament exhibit a negative one. A one percent increase in life expectancy rate and school enrollment increases SD by 15.3 and 0.008%, respectively.

However, a one percent increase in the poverty gap and the proportion of women in parliament reduces SD by 0.27 and 0.029%, respectively. The negative association between women in parliament and SD could be the result of the abysmally low representation of women in politics and key decision-making positions. Women hold only 7% of seats in the Nigerian parliament in 2020 (World Bank, 2021), which is a reflection of the high gender inequality in Nigeria. This is consistent with Tchouassi (2012)'s study, which found a positive association between gender equality and SD. Additionally, the negative impact of the poverty gap on SD is in line with our prior expectations given the substantial depth of poverty in Nigeria, explaining why poverty reduction is one of the topmost targets of the year 2030 SD agenda. It could also imply that some poverty alleviation programs implemented both at the national and state levels failed to assist the poor to sustainably rise above the poverty level, as the majority of these programs are poorly conceived, poorly targeted and poorly executed. For instance, government interventions, such as N-POWER and trader money, are not sustainable.

Furthermore, CO₂ emission shows a negative relationship with the achievement of SDGs in Nigeria. A one percent increase in carbon dioxide emissions reduces the achievement of SD goals by 6.8%. This is in line with the findings of Baloch *et al.* (2020) who discovered a negative association between carbon dioxide emissions and SD. As an oil-producing nation and supplier of many commodities, carbon dioxide is expected to be released from the burning of fossil fuels and the manufacture of cement, threatening human health and impeding the attainment of the SDGs. Moreover, natural resource endowment has a negative effect on SD, contradicting the findings of Khan and Khan (2009) who showed no relationship between resource dependency and SD. Although contradicting our expectations, the negative relationship between natural resources and SD is not surprising, given Nigeria's abundant natural resources which have been poorly managed for many years. The result supports the resource curse hypothesis, showing that the country is exploiting its natural resources in an unsustainable manner and is unable to exploit them for national development.

Finally, the interaction of CO₂ emissions and natural resources has a positive impact on SDGs achievement. A one percent increase in the interaction terms raises SD achievement by 19.3%, implying that natural resource abundance can help to mitigate the harmful effect of CO₂ emission on SD in the country. This may be partly because well-managed natural resources have the potential to offer alternative sources of clean energy, on the one hand, and provide additional funding for renewable energy investment and deployment through natural resource rent, on the other hand. Thus, for Nigeria to achieve SD, well-managed natural resources and a coordinated environment are required.

Consequently, the results reveal that all of the variables used in this study have a significant and long-run impact on the attainment of SD in Nigeria. The Breusch–Pagan/Cook–Weisberg test is performed to test for the existence of heteroscedasticity. The probability value of the Breusch–Pagan test is greater than 0.05, indicating that the variance of the residuals is constant across explanatory variables. The variance inflation factor (VIF) is used to test for multicollinearity and the result indicates no evidence of multicollinearity among the explanatory, as variables are within the range of normal (VIF<5).

5. Conclusion and policy implications

This study postulates that without a concerted effort to achieve socioeconomic development, particularly in terms of reducing poverty and social exclusion, Nigeria's chances of meeting the SDGs are bleak. This reflects the country's actual reality, where poverty and social exclusion are widespread, with Nigeria earning the unenviable title of the world's poverty capital. This is due to over 90 million of its citizens living below the poverty line coupled with high levels of exclusion caused by ethnic fractionalization, various dimensions of insecurity

and internal displacement, all of which have a direct and indirect association with socioeconomic development and by extension, SDG achievement.

Further conclusions indicate that, in terms of the environmental aspect, mitigating CO₂ emissions has practical implications for Nigeria's SD. This is reinforced by Rafindadi (2016a) who found that CO₂ emissions influence a vast range of development indicators for economic, social and environmental progress. Hence, mitigating CO₂ emissions is critical not only for achieving sustainable cities and communities (SDG 11) and climate action (SDG 13) but also for achieving other economic and well-being goals such as no poverty (SDG 1), zero hunger (SDG 2), good health and well-being (SDG 3), affordable and clean energy (SDG 7), and responsible consumption and production (SDG 12). This is especially true as CO₂ emissions endanger human health, as well as the productivity, operations and efficiency of the economy.

Finally, Nigeria requires deliberate and rigorous effort to manage its natural resource effectively and efficiently to change the current resource curse into a resource blessing. This can be achieved through formulating and implementing policies that promote the reduction, recycling and reuse of natural resources, as well as the widespread deployment of renewable energy. The adoption of renewable resources, products and technologies should be supported at all levels of government, starting with government ministries, agencies and parastatals. Selective taxation and imposition of the financial levy as an environmental management mechanism (Rafindadi, 2016b) can also be adopted to mitigate CO₂ emissions in Nigeria.

Consequently, the government needs to intensify its socioeconomic development efforts, notably in terms of poverty alleviation and social inclusion, if SD is to be achieved. There is a need for the design and implementation of women-targeted and rural-focused programs, as these groups represent the majority of the poor and socially excluded groups in Nigeria. These programs must be well conceived, coherent and coordinated. These measures would not only curb poverty and social exclusion but would also accelerate progress toward the SDGs, particularly no poverty (SDG 1), zero hunger (SDG 2), gender equality (SDG 5) and sustainable cities and communities (SDG 12), all of which are of direct relevance to the study's stance. Overall, this study provides substantial evidence that poverty reduction and social inclusion are critical to Nigeria's attainment of the SDGs, and coordinated efforts to tackle the menace are development priorities as they constitute necessary conditions for Nigeria to meet the SDGs by 2030.

This study is by no means exhaustive and has some limitations. Hence, future research in the field could broaden the scope of the current work. A panel analysis can be used to examine the nexus between poverty reduction, social inclusion and SD in Africa and Asia, which are home to the greatest proportion of extremely poor people with a high risk of social exclusion (Katayama and Wadhwa, 2019). Comparative analysis can also be conducted for Nigeria and other developing countries, regional blocs or intergovernmental groups.

References

- Ajibade, I. and McBean, G. (2014), "Climate extremes and housing rights: a political ecology of impacts, early warning and adaptation constraints in Lagos slum communities", *Geoforum*, Vol. 55, pp. 76-86, doi: [10.1016/j.geoforum.2014.05.005](https://doi.org/10.1016/j.geoforum.2014.05.005).
- Arouri, M., Nguyen, C. and Ben Youssef, A. (2015), "Natural disasters, household welfare, and resilience: evidence from rural Vietnam", *World Development*, Vol. 70, pp. 59-77.
- Aust, V., Morais, A. and Pinto, I. (2019), "How does foreign direct investment contribute to Sustainable Development Goals? Evidence from African countries", *Journal of Cleaner Production*, Vol. 245, doi: [10.1016/j.jclepro.2019.118823](https://doi.org/10.1016/j.jclepro.2019.118823).
- Baloch, M.A., Danish, Khan, S., Ulucak, Z.Ş. and Ahmad, A. (2020), "Analyzing the relationship between poverty, income inequality, and CO₂ emission in Sub-Saharan African countries", *Science of the Total Environment*, Vol. 20 No. 740, doi: [10.1016/j.scitotenv.2020.139867](https://doi.org/10.1016/j.scitotenv.2020.139867).

- Birchall, J. (2019), "Overview of social exclusion in Nigeria", K4D Helpdesk Report, Institute of Development Studies, Brighton.
- Cheng, X., Shuai, C., Wang, J., Li, W., Shuai, J. and Liu, Y. (2018), "Building a sustainable development model for China's poverty-stricken reservoir regions based on system dynamics", *Journal of Cleaner Production*, Vol. 176, pp. 535-554.
- Commonwealth of Australia, A. S. I. B. (2012), Social inclusion in Australia: how Australia is faring, 2nd ed., available at: http://apo.org.au/files/Resource/388607_72752_si_how_australia_is_faring.pdf.
- Cuaresma, J.C., Fengler, W., Kharas, H., Bekhtiar, K., Brottrager, M. and Hofer, M. (2018), "Will the Sustainable Development Goals be fulfilled? Assessing present and future global poverty", *Palgrave Communications*, Vol. 4 No. 1, doi: [10.1057/s41599-018-0083-y](https://doi.org/10.1057/s41599-018-0083-y).
- Deinne, C.E. and Ajayi, D.D. (2021), "Dynamics of inequality, poverty and sustainable development of Delta State, Nigeria", *Geo Journal*, Vol. 86 No. 1, pp. 431-443, doi: [10.1007/s10708-019-10068-4](https://doi.org/10.1007/s10708-019-10068-4).
- Dugarova, E. (2015), "Social inclusion, poverty eradication and the 2030 agenda for sustainable development", Working paper 2015-14, prepared for the UNRISD project on post-2015 development agenda, UNRISD, Geneva.
- Essien, E. (2016), "Sustainability, NGOs and the UK food industry", Doctoral dissertation, University of Greenwich.
- European Commission (2007), *Joint Report on Social Protection and Social Inclusion. Social Inclusion, Pensions, Healthcare and Long Term Care*, Office for Official Publications of the European Communities, Luxembourg.
- Huntington, S. (1976), *The Change to Change: Modernization, Development and Politics*, 30-31(45), Free Press, New York.
- Idike, A.N., Ukeje, I.O., Ogbulu, U., Aloh, J.N., Obasi, V.U., Nwachukwu, K., Osuebi, K. and Ejem, E.E. (2020), "The practice of human capital development process and poverty reduction: consequences for sustainable development goals in Ebonyi State, Nigeria", *Public Organization Review*, doi: [10.1007/s11115-020-00482-5](https://doi.org/10.1007/s11115-020-00482-5).
- Kaimuri, B. and Kosimbei, G. (2017), "Determinants of sustainable development in Kenya", *Journal of Economics and Sustainable Development*, Vol. 8 No. 24, pp. 17-36.
- Katayama, R. and Wadhwa, D. (2019), "Half of the world's poor live in just 5 countries", *World Bank Blogs*, available at: <https://blogs.worldbank.org/opendata/half-world-s-poor-live-just-5-countries>.
- Khan, S.R. and Khan, S.R. (2009), "Assessing poverty-deforestation links: evidence from Swat, Pakistan", *Ecological Economics*, Vol. 68, pp. 2607-2618.
- Lupala, J.M. (2014), "The social dimension of sustainable development: social inclusion in Tanzania's Urban Centres", *Current Urban Studies*, Vol. 02 No. 04, pp. 350-360, doi: [10.4236/cus.2014.24033](https://doi.org/10.4236/cus.2014.24033).
- Menezes, R., Andreia, D. and Hassani, H. (2012), "On the globalization of stock markets: an application of Vector Error Correction Model, Mutual Information and Singular Spectrum Analysis to the G7 countries", *The Quarterly Review of Economics and Finance*, Vol. 52 No. 4, pp. 369-384.
- Menla Ali, F. and Hunter, J. (2014), "Money demand instability and real exchange rate persistence in the monetary model of USD-JPY exchange rate", *Economic Modelling*, Vol. 40, doi: [10.1016/j.econmod.2014.03.019](https://doi.org/10.1016/j.econmod.2014.03.019).
- Mensah, J. (2019), "Sustainable development: meaning, history, principles, pillars, and implications for human action: literature review", *Cogent Social Sciences*, Vol. 5 No. 1, 1653531, doi: [10.1080/23311886.2019.1653531](https://doi.org/10.1080/23311886.2019.1653531).
- Mitchell, A. and Shillington, R. (2002), "Poverty, inequality and social inclusion", *Perspectives on Social Inclusion*, LaidLaw Foundation, Toronto.
- Mohammadi, F. and Ansari, A. (2012), "The major determinants of sustainable development in selected Pacific, East and west Asian countries the major determinants of sustainable development in selected Pacific, East and west Asian countries", *International Economic Studies*, Vol. 39, pp. 55-62.

- Noble, M., Wright, G. and Cluver, L. (2001), "Conceptualising, defining and measuring child poverty in South Africa: an argument for a multidimensional approach", *Monitoring Child Well-Being*, pp. 53-72.
- Nyasulu, G. (2010), "Revisiting the definition of poverty", *Journal of Sustainable Development in Africa*, Vol. 12 No. 7, pp. 147-158.
- Ogwumike, F. and Ozughalu, U. (2015), "Analysis of energy poverty and its implications for sustainable development in Nigeria", *Environment and Development Economics*, Vol. 1, pp. 1-18, doi: [10.1017/S1355770X15000236](https://doi.org/10.1017/S1355770X15000236).
- Padda, I. and Hameed, A. (2018), "Estimating Multidimensional poverty levels in rural Pakistan: a contribution to sustainable development policies", *Journal of Cleaner Production*, Vol. 197, doi: [10.1016/j.jclepro.2018.05.224](https://doi.org/10.1016/j.jclepro.2018.05.224).
- Parjanadze, N. (2009), "Globalisation theories and their effect on education", *IBSU Scientific Journal*, Vol. 2 No. 3, pp. 77-88.
- Phimphanthavong, H. (2014), "The determinants of sustainable development in Laos", *International Journal of Academic Research in Management*, Vol. 3 No. 1, pp. 51-75.
- Plieninger, T., Kizos, T., Bieling, C., Le Dü-Blayo, L., Budniok, M.-A., Bürgi, M., Crumley, C.L., Girod, G., Howard, P. and Kolen, J. (2015), "Exploring ecosystem-change and society through a landscape lens: recent progress in European landscape research", *Ecology and Society*, Vol. 20, pp. 60-62.
- Rafindadi, A.A. (2016a), "Does the need for economic growth influence energy consumption and CO2 emissions in Nigeria? Evidence from the innovation accounting test", *Renewable and Sustainable Energy Reviews*, Vol. 62, pp. 1209-1225, doi: [10.1016/j.rser.2016.05.028](https://doi.org/10.1016/j.rser.2016.05.028).
- Rafindadi, A.A. (2016b), "Revisiting the concept of environmental Kuznets curve in period of energy disaster and deteriorating income: empirical evidence from Japan", *Energy Policy*, Vol. 94, pp. 274-284, doi: [10.1016/j.enpol.2016.03.040](https://doi.org/10.1016/j.enpol.2016.03.040).
- Rafindadi, A.A. and Mika'Ilou, A.S. (2019), "Sustainable energy consumption and capital formation: empirical evidence from the developed financial market of the United Kingdom", *Sustainable Energy Technologies and Assessments*, Vol. 35, pp. 265-277, doi: [10.1016/j.seta.2019.07.007](https://doi.org/10.1016/j.seta.2019.07.007).
- Rai, J. (2019), "Understanding Poverty-environment relationship from sustainable development perspectives", *Journal of Geography, Environment and Earth Science International*, Vol. 19, pp. 1-19, doi: [10.9734/jgeesi/2019/v19i130077](https://doi.org/10.9734/jgeesi/2019/v19i130077).
- Ratcliffe, A. (2007), "The Measurement of poverty in South Africa: key issues", Retrieved January 23, 2008.
- Ren, X., Shao, Q. and Zhong, R. (2020), "Nexus between green finance, non-fossil energy use, and carbon intensity: empirical evidence from China based on a vector error correction model", *Journal of Cleaner Production*, Vol. 277, 122844.
- Reyes, G.E. (2001), "Four main theories of development: modernization, dependency, world-system, and globalization. *Nómadas*", *Revista Crítica de Ciencias Sociales y Jurídicas*, University of Pittsburgh, USA, Vol. 4 No. 2, pp. 109-124.
- Saunders, P. (2004), "Towards a Credible poverty framework: from income poverty to deprivation", SPRC Discussion Paper, (131).
- Schleicher, J., Schaafsma, M. and Vira, B. (2018), "Will the Sustainable Development Goals address the links between poverty and the natural environment?", *Current Opinion in Environmental Sustainability*, Vol. 34, pp. 43-47, doi: [10.1016/j.cosust.2018.09.004](https://doi.org/10.1016/j.cosust.2018.09.004).
- Shittu, W., Musibau, H.O. and Jimoh, S. (2022), "The complementary roles of human capital and institutional quality on natural resource-FDI-economic growth nexus in the MENA region", *Environment Development and Sustainability*, Vol. 24 No. 1, pp. 7936-7957, doi: [10.1007/s10668-021-01767-5](https://doi.org/10.1007/s10668-021-01767-5).
- Sobczak, E., Bartniczka, B. and Raszkowski, A. (2021), "Implementation of the no poverty sustainable development goal (SDG) in visegrad group (v4)", *Sustainability*, Vol. 13 No. 3, pp. 1-21, doi: [10.3390/su13031030](https://doi.org/10.3390/su13031030).

-
- Sumner, A., Ortiz-Juarez, E. and Hoy, C. (2020), "Precarity and the pandemic: COVID-19 and poverty incidence, intensity, and severity in developing countries", *United Nations University World Institute for Development Economics Research*.
- Tchouassi, G. (2012), "Does gender equality work for sustainable development in Central Africa countries? Some empirical lessons", *European Journal of Sustainable Development*, United Nations, Vol. 1 No. 3, pp. 383-398.
- Tipps, D. (1976), *Modernization Theory and the Comparative Study of Societies: A Critical Perspective*, Free Press, New York, pp. 65-77.
- United Nations (2016), "Leaving no one behind: the imperative of inclusive development", *Economic and Social Affairs*, United Nations, available at: <https://www.un.org/esa/socdev/rwss/2016/full-report.pdf>.
- Warschauer, M. (2003), *Technology and Social Inclusion: Rethinking the Digital Divide*, MIT Press, Cambridge, MA.
- Webster, A. (1984), "Theories of Underdevelopment", *Introduction to the Sociology of Development*, Palgrave, London. doi: [10.1007/978-1-349-17667-0_4](https://doi.org/10.1007/978-1-349-17667-0_4).
- World Bank (2018), *Nigeria Systematic Country Diagnostic: Transitioning to a Middle-Class Society*, World Bank, Washington, DC.
- World Bank (2020), *Global Growth: Modest Pickup to 2.5% in 2020 amid Mounting Debt and Slowing Productivity Growth*, World Bank Press Release, Washington, DC.
- World Bank (2021), "World development indicators", *World Bank*, Washington, DC, available at: <https://data.worldbank.org/indicator/SG.GEN.PARL.ZS?locations=NG>.
- Yan, T. and Qian, W.Y. (2004), "Environmental migration and sustainable development in the upper reaches of the Yangtze River", *Population and Environment*, Vol. 25, pp. 613-636.

Further reading

- Blok, V., Long, T.B., Gaziulusoy, A.I., Ciliz, N., Lozano, R., Huisingh, D., Csutora, M. and Boks, C. (2015), "From best practices to bridges for a more sustainable future: advances and challenges in the transition to global sustainable production and consumption", *Journal of Cleaner Production*, Vol. 108, pp. 19-30.

Corresponding author

Sodiq Olaiwola Jimoh can be contacted at: sodiqjimoh7@gmail.com