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THE EFFECT OF ENVIRONMENTAL TAX POLICIES ON SUSTAINABLE ECONOMIC DEVELOPMENT IN NIGERIA

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ABSTRACT

This study investigated the effect of environmental tax policies on sustainable economic development in Nigeria, focusing on environmental sustainability, green economic growth, and sustainable public revenue generation and utilization. A cross-sectional survey research design was adopted, and structured questionnaires were distributed to stakeholders in taxation, public finance, and economic development across the thirty-six states of Nigeria and the Federal Capital Territory (FCT), Abuja. Of the 555 questionnaires distributed, 528 were returned and analysed, yielding a response rate of 95.1%. A multi-stage sampling technique was employed, combining nationwide coverage with purposive selection of professionally relevant respondents. Data were analysed using descriptive statistics and multiple regression analysis at the 5% level of significance. The findings revealed that the three environmental-tax-policy dimensions jointly had a significant positive relationship with sustainable economic development in Nigeria. Based on the internally reconciled ANOVA sums of squares, the model explained approximately 71.1% of the variance in sustainable economic development ($R^2 = 0.711$). The individual standardized effects of environmental sustainability ($\beta = 0.196$, $p < 0.001$), green economic growth ($\beta = 0.301$, $p < 0.001$), and sustainable public revenue generation and utilization ($\beta = 0.231$, $p < 0.001$) were positive and statistically significant, with green economic growth exerting the strongest influence. The study concludes that environmental taxation can support both environmental protection and sustainable economic development in Nigeria, although its effectiveness is constrained by weak enforcement, limited institutional capacity, and inadequate public awareness. It recommends stronger environmental tax administration, greater transparency in revenue utilization, institutional capacity building, and sustained public awareness to improve compliance and developmental impact.

Keywords: Environmental taxation, Sustainable development, Green economy, Environmental sustainability, Fiscal policy, Nigeria.

1 INTRODUCTION

Industrialization, urbanization, and unsustainable consumption are placing increasing pressure on natural systems, making environmental sustainability a major global policy challenge. Governments worldwide are implementing environmental tax policies to reduce pollution, promote resource efficiency, and support sustainable economic growth. These instruments, commonly associated with Pigouvian taxation, impose economic costs on polluting or environmentally harmful activities, thereby internalizing external costs that markets fail to account for [1]. Environmental taxes can both reduce environmental harm and generate revenue that may be used to finance environmental protection and other public priorities. In advanced economies, carbon pricing, energy taxes, and emissions charges have become important components of climate and green-growth policy [2]. Such instruments are also consistent with the polluter-pays principle, under which polluters should bear the costs of measures required to prevent and control pollution [3].

Nigeria faces significant environmental challenges, including oil spills, gas flaring, deforestation, industrial pollution, and inadequate waste management, all of which threaten long-term sustainable development [4, 5]. The country's environmental policy framework involves fiscal authorities and environmental institutions, including the Federal Inland Revenue Service (FIRS, at the time of the study), the Federal Ministry of Environment, and the National Environmental Standards and Regulations Enforcement Agency (NESREA). Despite existing environmental policies, regulations, charges, penalties, and related fiscal measures, implementation and coordination remain uneven, limiting their capacity to deliver environmental and economic benefits.

Against this background, two related problems motivate the study. First, although environmental taxation is increasingly recognized globally as a sustainability instrument, Nigeria continues to experience substantial environmental degradation alongside weak and fragmented implementation of environmental fiscal measures. Pollution-intensive activities in sectors such as oil and gas, manufacturing, and transport remain important environmental concerns, while applicable taxes, charges, penalties, and regulatory instruments may not fully reflect the social costs of environmental harm. Second, empirical evidence on the simultaneous environmental, economic, and fiscal dimensions of environmental taxation in Nigeria remains limited. Much of the literature examines environmental or economic outcomes separately rather than assessing the integrated relationship between environmental taxation and sustainable development. This creates a need for a stakeholder-based evaluation of the relationship between environmental tax policies and sustainable economic development in Nigeria.

In light of this background, the aim of the study is to assess the effect of environmental tax policies on sustainable economic development in Nigeria. Specifically, the study examines the effect of environmental tax policies on environmental sustainability, determines the extent to which environmental tax policies influence green economic growth, and assesses their effect on sustainable public revenue generation and utilization. The study contributes to the literature by examining fiscal-policy instruments as mechanisms for pursuing environmental protection and economic development simultaneously and by capturing the perceptions of tax administrators, environmental regulators, fiscal policymakers, corporate stakeholders, and public-finance experts across Nigeria. The findings are relevant to fiscal and environmental institutions, as well as development partners supporting Nigeria's environmental sustainability and climate-change mitigation efforts.

1.1 Statement of the Problem

Environmental problems in Nigeria remain severe despite the existence of fiscal and regulatory instruments intended to discourage pollution and finance environmental protection. Environmental levies and related instruments may be weakened by limited enforcement capacity, low compliance, inadequate monitoring systems, and tax or charge structures that do not fully reflect the social costs of environmental damage. Under such conditions, environmental taxation may function more as a revenue instrument than as an effective deterrent to pollution or incentive for green investment. Nigerian studies have also tended to examine environmental regulation, economic growth, corporate behaviour, or fiscal outcomes separately, limiting understanding of the interaction among environmental sustainability, green economic growth, and sustainable public revenue generation and utilization. This study addresses that gap by empirically assessing the relationship between environmental tax policies and sustainable economic development in Nigeria using primary survey data from relevant stakeholders.

1.2 Aim and Objectives

The aim of this study is to assess the effect of environmental tax policies on sustainable economic development in Nigeria. The specific objectives are to:

- examine the effect of environmental tax policies on environmental sustainability in Nigeria;
- determine the extent to which environmental tax policies influence green economic growth in Nigeria; and

- assess the effect of environmental tax policies on sustainable public revenue generation and utilization in Nigeria.

1.3 Research Questions

- What is the effect of environmental tax policies on environmental sustainability in Nigeria?
- To what extent do environmental tax policies influence green economic growth in Nigeria?
- What is the effect of environmental tax policies on sustainable public revenue generation and utilization in Nigeria?

1.4 Research Hypotheses

- $H0_1$: Environmental tax policies have no significant effect on environmental sustainability in Nigeria.
- $H0_2$: Environmental tax policies have no significant effect on green economic growth in Nigeria.
- $H0_3$: Environmental tax policies have no significant effect on sustainable public revenue generation and utilization in Nigeria.

2 LITERATURE REVIEW

2.1 Conceptual Review

Environmental tax policies are fiscal interventions designed to influence environmentally relevant behaviour by imposing taxes or charges on activities, products, or tax bases associated with pollution or environmental damage. These instruments internalize environmental externalities by requiring polluters or users of environmentally harmful resources to bear more of the social cost of their activities, consistent with Pigou's [1] market-correction principle. The Organisation for Economic Co-operation and Development (OECD) [6] defines an environmentally related tax by reference to a tax base that has a proven, specific negative impact on the environment. Recent scholarship has extended this framework to the transition toward green economies, with evidence that environmental taxes can support renewable-energy adoption and sustainable-development pathways [7]. Examples include carbon, energy, transport, pollution, waste, and resource-related taxes and charges. Their potential effects are both regulatory—by increasing the cost of environmentally harmful behaviour—and fiscal—by generating public revenue that can support environmental and broader development priorities [8].

Sustainable economic development is the outcome variable in this study. It refers to development that meets present needs without compromising the ability of future generations to meet their own needs, while integrating economic progress, environmental protection, and social well-being [9]. In this study, the construct is reflected in environmental quality, green investment, economic stability, inclusive growth, and compatibility between economic growth and environmental protection. Environmental tax policies are expected to influence sustainable economic development through three interrelated channels: environmental sustainability, including pollution reduction and ecological balance; green economic growth, including investment in renewable energy and environmentally friendly production; and sustainable public revenue generation and utilization, including the contribution of environmental revenues to infrastructure and development financing.

Despite this conceptual relevance, environmental taxation has received less attention in Nigeria as an integrated fiscal instrument for sustainable development than conventional taxes such as value-added tax and companies income tax. This limits understanding of how environmental fiscal measures may support green investment, institutional accountability, and long-term ecological and economic outcomes. This is the gap addressed by the present study.

2.2 Theoretical Framework

This study is anchored on three complementary perspectives: Pigouvian Tax Theory, the Polluter-Pays Principle, and the Environmental Kuznets Curve (EKC). According to Pigouvian Tax Theory [1], environmental degradation represents a negative externality where social costs exceed private costs, encouraging excessive pollution-producing activity. A corrective tax set with reference to marginal external damage can help internalize this market failure and provides the theoretical basis for instruments such as carbon taxes and pollution charges. In developing economies such as Nigeria, however, implementation is complicated by difficulties in measuring environmental damage, administrative constraints, and limited enforcement capacity.

The Polluter-Pays Principle [3] provides an important policy rationale for environmental taxation by requiring polluters to bear the costs of pollution-prevention and control measures. In Nigeria, the principle is relevant to environmental fiscal and regulatory measures affecting pollution-intensive sectors, including oil and gas, manufacturing, and transport, although enforcement and institutional coordination can limit effectiveness.

The Environmental Kuznets Curve, associated with Grossman and Krueger [10], proposes an inverted U-shaped relationship between income and some forms of environmental degradation: environmental pressure may initially rise with economic development and later decline after a certain income level as structural change, stronger institutions, public demand for environmental quality, and cleaner technologies emerge. Environmental tax policies may help accelerate this transition by discouraging pollution-intensive activity and redirecting investment toward cleaner production. However, the turning point is not automatic and depends on institutional quality, technology, policy design, and consistency.

The three perspectives are complementary. Pigouvian Tax Theory explains the efficiency rationale for correcting environmental market failure; the EKC provides a longer-run perspective on structural change in the growth–environment relationship; and the Polluter-Pays Principle provides a normative basis for allocating pollution-control costs. Figure 1 illustrates the conceptual framework of the study, in which environmental tax policies are examined in relation to sustainable economic development through the dimensions of environmental sustainability, green economic growth, and sustainable public revenue generation and utilization.

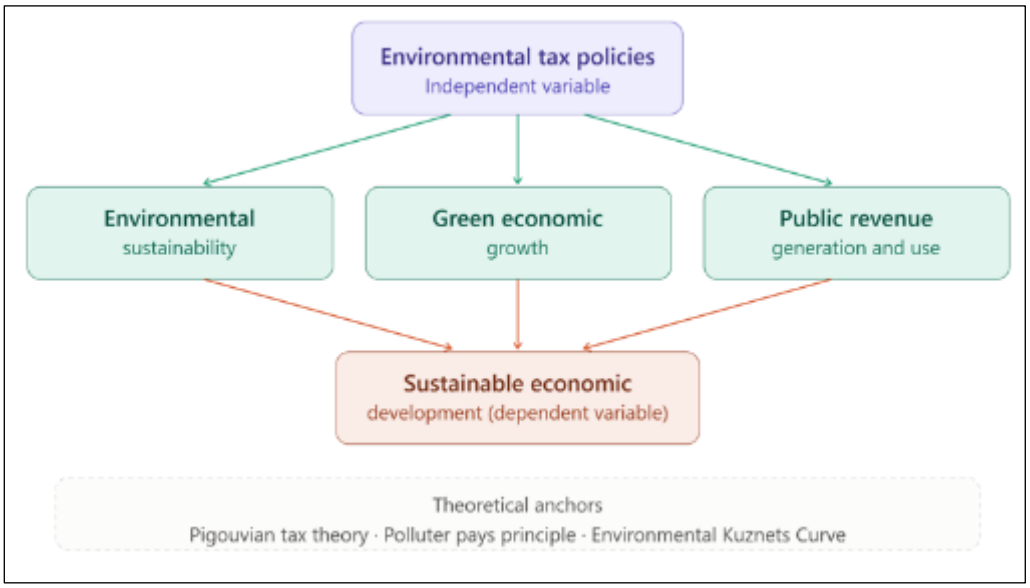


Figure 1: Conceptual framework linking environmental tax policies to sustainable economic development.

2.3 Empirical Review

Empirical evidence on environmental taxation spans developed, developing, and African economies, but findings vary with policy design, income level, and institutional quality. Using a panel of 121 countries, Kohlscheen et al. [2] found that a US$10 increase in carbon taxes per tonne of CO_2 reduced per-capita CO_2 emissions by about 1.3% in the short run and 4.6% in the long run. Andersson [11] similarly found that Sweden's carbon tax significantly reduced transport-sector emissions. Konradt and di Mauro [12] reported that carbon taxes in Europe and Canada reduced emissions without generating the inflationary effects often feared. Stameski et al. [13] found that the effects of environmental tax revenues on economic development in Nordic countries were heterogeneous and depended on the tax category and economic conditions. In contrast, Tchapchet-Tchouto et al. [14] found that higher environmental taxes were associated with lower economic growth across 31 European countries, with stronger negative effects in lower-income countries.

Beyond emissions and growth effects, environmental taxation has also been linked to green innovation. Zheng et al. [15] found that environmental taxation and research-and-development tax incentives can promote enterprise green innovation, while Gao et al. [8] showed that tax-policy design and environmental concern jointly influence emission-reduction outcomes. Khoruzhy et al. [16] placed environmental taxation within a broader sustainable-development and governance framework, emphasizing the importance of monitoring, administrative capacity, and emerging digital technologies. These considerations are particularly relevant to enforcement-constrained economies such as Nigeria.

Evidence from African and other developing economies presents a more complex picture. Tchapchet Tchouto et al. [17] analysed 17 African countries and found that environmental tax regulation had an overall negative effect on industrialization, although the effect varied with income level. This suggests that environmental-tax design should account for differences in industrial structure and institutional capacity. By contrast, Okombi and Ndoum Babouama [18] found that environmental taxation promoted inclusive green growth in developing countries and that the effect was strengthened by institutional quality, including control of corruption, government effectiveness, regulatory quality,

and the rule of law. Occhiali [19], using interviews with public officials in six sub-Saharan African countries, identified data limitations, overlapping institutional mandates, and concerns about regressivity and industrial competitiveness as important barriers to environmental-tax adoption.

Evidence from Nigeria is more limited. Bala et al. [20], using 792 firm-year observations, examined the relationship among green innovation, green taxation, board structure, and cosmetic accounting practices in Nigeria. Their findings indicate that corporate-governance characteristics influence firms' accounting responses in the context of green taxation. The study reinforces the broader African evidence that the developmental effectiveness of environmental taxation depends not only on the existence of tax instruments but also on governance and institutional quality.

Overall, the empirical literature indicates that environmental taxes can reduce emissions, influence innovation, and generate public revenue, but their economic effects are not uniformly positive. Outcomes vary with tax design, income level, institutional quality, enforcement capacity, revenue recycling, and the broader policy environment. This variation is especially important in African and other developing-economy contexts, where administrative and institutional constraints may be more pronounced than in OECD economies.

Table 1: Summary of reviewed empirical studies

Author(s) / Year	Focus and context	Method	Key finding
Kohlscheen et al. (2025) [2]	Carbon taxes and CO_2 emissions, 121 countries	Dynamic panel regression	A US$10 increase in carbon tax per tonne of CO_2 reduces per-capita emissions by about 1.3% in the short run and 4.6% in the long run.
Andersson (2019) [11]	Carbon tax and emissions, Sweden	Case study, transport-sector data	Carbon pricing produced substantial transport-emission reductions
Konradt & di Mauro (2023) [12]	Carbon taxation and inflation, Europe and Canada	Panel econometric analysis	Carbon taxes reduced emissions without triggering feared inflationary effects
Stameski et al. (2024) [13]	Environmental tax revenue and economic development, Nordic countries	Panel data analysis	Environmental-tax effects on economic development are heterogeneous across tax categories and economic conditions.
Tchapchet-Tchouto et al. (2022) [14]	Environmental taxes and economic growth, European countries	Panel regression	Environmental taxes were associated with lower economic growth across the sampled European countries, with stronger negative effects in lower-income countries.
Zheng et al. (2023) [15]	Environmental tax, R&D incentives, and green innovation	Empirical firm-level analysis	Environmental tax combined with R&D tax incentives significantly stimulates green innovation
Gao et al. (2019) [8]	Tax policy, environmental concern, and emission reduction	Empirical policy analysis	Tax policy design and environmental concern jointly determine emission-reduction outcomes
Khoruzhy et al. (2022) [16]	Environmental taxation and sustainable development	Conceptual/policy analysis	Environmental taxation's developmental contribution depends on integration with monitoring and digital enforcement capacity
Tchapchet Tchouto et al. (2024) [17]	Environmental tax regulation and industrialization, 17 African countries	Panel regression (OLS), Driscoll-Kraay, GMM	Environmental tax regulation had a negative effect on industrialization overall, weaker in upper-income African economies
Okombi & Ndoum Babouama (2024) [18]	Environmental taxation and inclusive green growth, developing countries	Panel regression	Environmental taxation promotes inclusive green growth; institutional quality strengthens the effect.

Occhiali (2024) [19]	Obstacles to environmental tax adoption, sub-Saharan Africa (6 countries)	Qualitative, 16 stakeholder interviews	Data limitations, overlapping institutional mandates, and perceived regressivity are the main adoption obstacles
Bala et al. (2024) [20]	Green taxation, board structure, and earnings behavior, Nigeria	Logistic regression, (n= 792 firm-years)	Firms manage earnings around green tax exposure, but strong board oversight curtails this behavior

Source: Author's compilation from reviewed literature, 2025.

2.4 Gap in Literature

Existing studies demonstrate substantial potential for environmental taxation to improve environmental outcomes, but evidence on economic outcomes is mixed as shown in table 1. Many developed-economy studies rely on secondary macroeconomic or panel data, while African studies often focus separately on industrialization, corporate behaviour, institutional quality, or barriers to implementation. In Nigeria, there remains limited primary evidence using a stakeholder-perception approach to examine environmental sustainability, green economic growth, and sustainable public revenue generation and utilization as interconnected dimensions through which environmental tax policies relate to sustainable economic development. This integrated empirical gap is addressed by the present study.

3 MATERIALS AND METHODS

3.1 Research Design

The study employed a cross-sectional survey research design. The design was considered appropriate because it enabled the collection of primary data directly from stakeholders on taxation and sustainable-development outcomes, supported structured quantitative measurement, and facilitated analysis of relationships among variables within a geographically dispersed population. This approach is consistent with established methodological principles for survey-based social-science research [21].

3.2 Population and sampling

The target population comprised stakeholders in taxation, public finance, environmental regulation, and economic development in Nigeria, including tax administrators, accountants, economists, financial analysts, business owners, and tax policymakers. The study covered all 36 states and the Federal Capital Territory, Abuja. A multi-stage sampling approach was adopted: nationwide coverage was first established across the states and FCT, after which purposive sampling was used to select respondents with relevant professional knowledge of taxation and fiscal policy. A sample of 555 respondents was adopted for the survey. Of the 555 questionnaires distributed nationwide, 528 were returned and analysed, yielding a response rate of 95.1%.

3.3 Instrumentation

Primary data were collected using a structured questionnaire measured on a five-point Likert scale ranging from strongly disagree to strongly agree. The instrument contained a demographic section and four constructs, each measured with five items: environmental tax policy and environmental sustainability; environmental tax policy and green economic growth; environmental tax policy and sustainable public revenue generation and utilization; and sustainable economic development. Content and face validity were assessed by specialists in taxation, economics, and research methodology, consistent with established survey-research practice [22]. Reliability was assessed using Cronbach's alpha [23]. The overall coefficient was 0.912, exceeding the commonly accepted 0.70 benchmark for internal consistency [24].

3.4 Model specification

Data were analyzed using descriptive analysis (frequencies, mean, and standard deviations) and multiple regression analysis to test the hypotheses [25, 26]. The regression model is set up as:

$$\mathbf{SEDEV = \beta_0 + \beta_1(ETPES) + \beta_2(GEG) + \beta_3(SPRGU) + \varepsilon}$$

where:

- **SEDEV** = Sustainable Economic Development
- **ETPES** = Environmental Tax Policy and Environmental Sustainability
- **GEG** = Green Economic Growth

- **SPRGU** = Sustainable Public Revenue Generation and Utilization
- $\boldsymbol{\beta_0}$ = Intercept
- $\boldsymbol{\beta_1}$ - β_3 = Regression coefficients
- $\boldsymbol{\varepsilon}$ = Error term

The hypotheses were tested at the 5% significance level and variables that had a p value less than 0.05 were deemed to have a statistically significant impact on sustainable economic development.

4 RESULTS

4.1 Demographic Characteristics of Respondents

The demographic profile of the 528 respondents is presented in Table 2. The sample included both male and female respondents and participants with varied age, educational, and professional-experience profiles, providing a broad stakeholder base for the perception data analysed.

Table 2: Demographic characteristics of respondents (N = 528)

Variable	Category	Frequency	Percent
Gender	Male	305	57.8
	Female	223	42.2
Age bracket	18–30 years	113	21.4
	31–40 years	192	36.4
	41–50 years	132	25.0
	51 years and above	92	17.2
Educational qualification	OND/NCE	84	16.0
	HND/B.Sc	236	44.7
	Master's degree	144	27.2
	PhD	64	12.1
Years of tax experience	Below 5 years	126	23.8
	5–10 years	210	39.8
	11–15 years	116	22.0
	Above 15 years	76	14.4

Source: Field survey, 2025.

4.2 Environmental Tax Policies and Environmental Sustainability

Table 3: Environmental tax policy and environmental sustainability

S/N	Item	Mean	SD	Remark
1	Environmental tax policies help reduce environmental pollution	3.95	1.16	Agreed
2	Environmental taxation improves air and water quality	3.95	1.15	Agreed
3	Environmental taxes encourage eco-friendly production methods	3.96	1.16	Agreed
4	Environmental tax policies promote better waste management	3.94	1.16	Agreed
5	Environmental taxation contributes to ecological balance	3.98	1.16	Agreed

Source: Field survey, 2025.

Table 3 presents respondents' perceptions of environmental tax policies and environmental sustainability. All five items recorded mean scores above the 3.00 benchmark, indicating general agreement that environmental taxation can

contribute to pollution reduction, improved environmental quality, eco-friendly production, better waste management, and ecological balance in Nigeria.

4.3 Environmental Tax Policies and Green Economic Growth

As shown in Table 4, all items recorded mean scores above the 3.00 benchmark, ranging from 3.96 to 4.01. This indicates general agreement that environmental tax policies can support renewable-energy investment, green-industry development, environmentally friendly businesses, clean-technology innovation, and sustainable economic growth.

Table 4: Environmental tax policy and green economic growth

S/N	Item	Mean	SD	Remark
6	Environmental tax policies encourage investment in renewable energy	3.96	1.16	Agreed
7	Environmental taxation promotes development of green industries	4.01	1.13	Agreed
8	Environmental tax incentives support environmentally friendly businesses	3.99	1.15	Agreed
9	Environmental taxes stimulate innovation in clean technologies	3.97	1.15	Agreed
10	Environmental taxation contributes to sustainable economic growth	3.98	1.16	Agreed

Source: Field survey, 2025.

4.4 Environmental Tax Policies and Sustainable Public Revenue Generation and Utilization

Table 5 shows that all items recorded mean scores well above the 3.00 benchmark, indicating general agreement that environmental taxation can contribute to government revenue, public infrastructure, fiscal sustainability, and development financing. Respondents also expressed positive perceptions regarding the efficiency and transparency of environmental-tax revenue utilization.

Table 5: Environmental tax policy and sustainable public revenue generation and utilization

S/N	Item	Mean	SD	Remark
11	Environmental taxes significantly increase government revenue	3.95	1.15	Agreed
12	Revenue from environmental taxation is efficiently utilized for development	3.99	1.15	Agreed
13	Environmental tax revenue supports public infrastructure development	3.97	1.15	Agreed
14	Environmental taxation improves fiscal sustainability	4.00	1.15	Agreed
15	Environmental tax funds are transparently managed	3.98	1.15	Agreed

Source: Field survey, 2025.

4.5 Sustainable Economic Development

Table 6 shows generally positive respondent perceptions of sustainable economic development in Nigeria. Mean scores ranged from 3.97 to 4.01, with the highest means recorded for the items on increasing environmental sustainability of economic development and achieving a balance between economic growth and environmental protection.

Table 6: Sustainable economic development in Nigeria

S/N	Item	Mean	SD	**Remark**
16	Nigeria's economic development is becoming more environmentally sustainable	4.01	1.13	**Agreed**
17	Environmental policies contribute to long-term economic stability	3.99	1.14	**Agreed**
18	Sustainable development improves living standards	3.97	1.15	**Agreed**
19	Environmental taxation supports inclusive economic growth	3.99	1.15	**Agreed**
20	Nigeria is achieving a balance between growth and environmental protection	4.01	1.15	**Agreed**

Source: Field survey, 2025.

4.6 Reliability of the Instrument

As shown in Table 7, the overall instrument and each individual construct demonstrated strong internal consistency, with Cronbach's alpha coefficients exceeding the commonly accepted 0.70 threshold [24].

Table 7: Reliability statistics

Construct	Cronbach's alpha	Number of items
Overall instrument	0.912	20
Environmental tax policy and environmental sustainability	0.874	5
Environmental tax policy and green economic growth	0.886	5
Environmental tax policy and sustainable revenue generation and utilization	0.892	5
Sustainable economic development	0.883	5

Source: Field survey, 2026.

4.7 Inferential Statistics

The model summary and ANOVA results in Table 8 indicate a strong positive multiple correlation between the predictors and sustainable economic development (R = 0.843). Based on the reported regression and total sums of squares, the coefficient of determination is approximately 0.711, indicating that the three predictors collectively explain about 71.1% of the variance in sustainable economic development. The ANOVA degrees of freedom and F-statistic have been arithmetically reconciled to the stated sample size of 528 and three predictors.

Table 8: Model summary and ANOVA

Model summary	R	R^2	Adjusted R^2	Std. error of estimate
	0.843	0.711	0.709	0.44827

ANOVA	Sum of squares	df	Mean square	F	Sig.
Regression	258.614	3	86.205	428.985	< 0.001
Residual	105.298	524	0.201		
Total	363.912	527			

Predictors: environmental sustainability, green economic growth, sustainable revenue generation and utilization. Dependent variable: sustainable economic development. Source: Field survey, 2025.

The regression coefficients and the results of the hypothesis testing are shown in Table 9. All three predictors had positive and statistically significant coefficients; thus all three null hypotheses were rejected.

Table 9: Regression coefficients and hypothesis testing

Variable	B	Std. error	Beta (β)	t	Sig.	Decision
Constant	0.512	0.138	—	3.710	< 0.001	—
Environmental sustainability ($H0_1$)	0.184	0.034	0.196	5.412	< 0.001	Rejected
Green economic growth ($H0_2$)	0.273	0.039	0.301	7.000	< 0.001	Rejected
Sustainable revenue generation and utilization ($H0_3$)	0.215	0.041	0.231	5.244	< 0.001	Rejected

Green economic growth recorded the strongest standardized effect (β = 0.301), followed by sustainable public revenue generation and utilization (β = 0.231) and environmental sustainability (β = 0.196); all were statistically significant at $p < 0.001$.

Green economic growth recorded the strongest standardized effect (β = 0.301), followed by sustainable public revenue generation and utilization (β = 0.231) and environmental sustainability (β = 0.196), all significant at $p < 0.05$.

5 DISCUSSION

The results indicate that the three environmental-tax-policy dimensions jointly have a significant positive relationship with sustainable economic development in Nigeria, with green economic growth showing the strongest standardized association. This pattern suggests that stakeholders perceive environmental taxation as capable of influencing investment in renewable energy, cleaner production practices, and green industrial development rather than functioning solely as a punitive fiscal measure. This finding is broadly consistent with Stameski et al. [13], who documented links between environmental tax revenues and economic-development indicators in Nordic countries, although effects varied across tax categories and conditions. It also aligns with Zheng et al. [15], who found that environmental taxation combined with R&D incentives can stimulate green innovation.

The positive coefficient for environmental sustainability suggests that respondents associate environmental taxation with pollution reduction and ecological improvement. This is consistent with Gao et al. [8] and Khoruzhy et al. [16], who emphasized the importance of tax design, environmental concern, monitoring, and institutional capacity for environmental outcomes. However, the standardized effect of environmental sustainability ($\beta = 0.196$) is the smallest of the three predictors in the present model. This caution is consistent with evidence from Tchapchet Tchouto et al. [17], who found that environmental tax regulation can constrain industrialization in African economies, particularly where economic and institutional conditions are less supportive.

The positive effect of sustainable public revenue generation and utilization suggests that stakeholders view environmental taxation not only as a mechanism for discouraging pollution but also as a potential source of development finance. However, the literature cautions that the developmental value of environmental taxation depends on policy design and the use of revenues. Konradt and di Mauro [12] found that carbon taxation in Europe and Canada reduced emissions without producing the feared inflationary effects, while Kohlscheen et al. [2] found that stronger carbon pricing reduced per-capita CO_2 emissions across a broad international sample. In sub-Saharan Africa, Occhiali [19] identified data limitations, overlapping institutional mandates, and concerns about regressivity and competitiveness as important constraints. The present study's positive stakeholder perceptions should therefore be interpreted alongside these implementation challenges.

The reconciled model ($R^2 \approx 0.711$) indicates that the three measured dimensions account for a substantial proportion of variation in respondents' perceptions of sustainable economic development. This finding is consistent with Okombi and Ndoum Babouama [18], who found that environmental taxation can promote inclusive green growth in developing countries, particularly where institutional quality is stronger. Bala et al. [20] likewise showed that corporate-governance characteristics shape firm responses in the context of green taxation in Nigeria. Taken together, the findings suggest that the relationship between environmental tax policies and sustainable economic development is conditioned by governance, institutional capacity, enforcement, and policy design. From the perspective of the Environmental Kuznets Curve [10], environmental fiscal measures may support a transition toward cleaner development, but such a transition is not automatic and depends on complementary institutional and technological conditions.

6 CONCLUSION

The study finds that environmental tax policies are positively and significantly associated with sustainable economic development in Nigeria as reflected in environmental sustainability, green economic growth, and sustainable public revenue generation and utilization. Green economic growth emerged as the strongest measured channel, highlighting the perceived contribution of environmental taxation to renewable-energy investment, cleaner production, and green industrial development. The effectiveness of environmental taxation in Nigeria is, however, constrained by weak enforcement, inadequate institutional capacity, and limited public awareness, challenges also identified in the wider African literature. Well-designed, effectively implemented, and consistently monitored environmental tax policies can therefore provide a viable fiscal-policy instrument for balancing Nigeria's economic-development aspirations with environmental-protection objectives.

Recommendations

Based on the findings, the following recommendations are proposed:

- It is recommended that the Federal Government further refine and implement coherent environmental fiscal policies, including appropriate carbon-pricing, pollution-charge, and related instruments, to strengthen their environmental and revenue effects.
- Proceeds from environmental taxes and charges should be transparently accounted for and, where policy design permits, strategically directed toward renewable energy, environmental protection, green

infrastructure, and other sustainable-development priorities to strengthen public confidence and developmental impact.

- Institutional capacity and environmental tax administration should be strengthened through digitalization, improved data systems, and closer coordination among fiscal authorities and environmental regulatory agencies, thereby addressing coordination and enforcement weaknesses identified in the African literature.
- Sustained public awareness and education programmes are needed to improve understanding of environmental taxation, encourage compliance, and address concerns about regressivity by clearly communicating policy objectives, safeguards, and the use of revenues.

Limitations of the Study

Several limitations should be considered when interpreting the findings:

First, the cross-sectional survey design captures stakeholder perceptions at a single point in time and is less suited to establishing causality than longitudinal or quasi-experimental designs. Second, the data are based on self-reported perceptions and may therefore be affected by common-method and social-desirability biases, particularly among respondents from tax-administration and regulatory institutions. Third, although the study achieved geographic coverage across all 36 states and the Federal Capital Territory, purposive selection of respondents with relevant expertise means that the findings primarily reflect informed stakeholder perceptions rather than those of the general public or all firms affected by environmental fiscal measures. Fourth, the perception-based composite instrument does not incorporate actual tax rates, collections, emissions, or enforcement metrics, limiting the precision with which individual policy instruments can be evaluated. Finally, as a single-country study, the findings may not be directly generalizable to developing economies with different institutional, regulatory, and industrial structures.

Suggestion for Further Research

Future research should extend this survey-based evidence using time-series, panel, or quasi-experimental designs incorporating actual environmental tax or charge collections, emissions, and enforcement data from relevant Nigerian fiscal and regulatory authorities. More disaggregated analysis of specific instruments—for example, carbon-pricing measures, gas-flaring penalties, pollution charges, or waste-related levies—would help identify which approaches are most effective in the Nigerian context. Future studies should also examine institutional quality, governance, and enforcement capacity as moderators of the relationship between environmental taxation and sustainable development. Comparative analysis between Nigeria and other African economies, including South Africa, could provide additional insight into institutional and policy conditions associated with stronger developmental outcomes. Mixed-method designs incorporating interviews with affected firms and regulators could further explain compliance and behavioural responses that are not fully captured by quantitative perception data.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The author declares no conflict of interest.

Statement of Ethical Approval

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and with institutional requirements for research involving human participants. Participation was voluntary, informed consent was obtained, and no personally identifiable information was collected.

Statement of informed consent

The ethical principles of voluntary participation, informed consent, anonymity and confidentiality were followed and all data was used strictly for academic purposes.

Data Availability Statement

The data presented in this study will be available from the corresponding author upon reasonable request, with assurances of confidentiality provided to the respondents at data collection.

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