Transdisciplianry Journal of Education and Sustainable Development Studies, *Vol. 2, No. 1,April 2026*
A publication of the Department of Education Geography & Sustainable Development Studies, University of Calabar, Nigeria. ISSN: 1595-8051 EISSN: 3092-9571

Rural Electrification and Food Security Programmes in Tourism-Oriented Rural Development and Environmental Sustainability in Cross River State, Nigeria

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Abstract

The study is on Rural Electrification and Food Security Programmes in Tourism-Oriented Rural Development and Environmental Sustainability in Cross River State, Nigeria. The study examined Rural Electrification and Food Security Programmes with particular emphasis on their relevance to tourism development and environmental conservation. The population of the study comprised residents of selected communities across the three education zones of Cross River State, while a sample was drawn using stratified and accidental sampling techniques to ensure adequate representation of respondents. A survey research design was adopted, and data were collected using a structured questionnaire titled "Environmental Sustainability through Rural Electrification and Food Security Programmes Questionnaire (ESREFSPQ)". Data obtained were analyzed using simple regression at 0.05 level of significance. Findings from the study revealed that all the rural development programme variables exhibited relatively high mean values, indicating widespread implementation and perceived relevance within the study area. Hypothesis testing results revealed that there is a significant relationship between tourism-oriented rural development programmes such as Rural Electrification and Food Security Programmes and environmental sustainability in Cross River State. These findings imply that effective implementation of rural development programmes can enhance environmental quality, preserve natural

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

attractions, and support sustainable tourism development in the study area. The study concluded that tourism-oriented rural development programmes such as Rural Electrification and Food Security Programmes afford important role in promoting environmental sustainability and enhancing the viability of tourism resources in Cross River State, Nigeria. Based on the findings, the study recommended among other that Rural electrification initiatives should prioritize renewable energy sources, such as solar and wind power, to reduce dependence on fossil fuels and mitigate environmental degradation. This can help ensure sustainable energy access for rural communities

Keywords: Rural Electrification, Food Security Programmes, in Tourism-Oriented Rural Development, Environmental Sustainability**.**

Introduction

Developmental challenges remain a persistent reality across the globe, particularly in rural communities where a significant proportion of the population resides, many of which possess rich tourism potentials. These areas are often situated far from urban centres and are characterized by limited access to basic infrastructure and essential social services needed to support tourism development. As a result, rural livelihoods largely depend on the immediate natural and cultural resources, many of which also serve as attractions for tourism activities. However, the lack of adequate infrastructure such as accessible roads, quality accommodation, safe water supply, sanitation, healthcare, and security significantly constrains both rural development and tourism growth. In many rural communities, these limitations reduce their capacity to attract tourists and to harness tourism as a viable tool for economic diversification and livelihood improvement. Furthermore, as global attention shifts toward sustainable tourism and environmental conservation, rural areas are increasingly recognized as both key destinations and vulnerable ecosystems. The dependence on natural attractions for tourism, when not properly managed, can intensify environmental degradation and resource depletion, thereby undermining sustainability efforts (United Nations, 2021)..

Like in most developing countries of the world, Nigeria and indeed Cross River State recognizes the importance of sustainable development in its rural areas and has implemented various programs and initiatives to promote rural development and environmental sustainability. These efforts are not only aimed at developing the rural communities but also preserving the state's rich biodiversity and improving the livelihoods of rural communities while ensuring a greener, more resilient future. One of the key policy frameworks driving environmental sustainability in Cross River State is the Nigerian Biodiversity Action Plan (BAP) which the Cross River State Government has also adopted and carved out the Cross River State Biodiversity Strategy and Action Plan. This plan, developed in collaboration with

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

ISSN: 1595-8051 EISSN: 3092-9571

local communities and stakeholders, focuses on conserving and sustainably managing the state's unique biodiversity. It emphasizes the protection of the Cross River tropical forest resources including the National Park, the Afi and Mbe Mountain Sanctuaries and other pristine natural landscape rich in biodiversity that are crucial habitats for numerous plant and animal species (Oke & Oyetagum, 2018).

Cross River State, located within the south-south geopolitical region of Nigeria, the state like every other state within the tropical forest belt is endowed with rich biodiversity and natural resources. The state is known for its lush rainforests, diverse wildlife, and unique ecosystem, making it one of the most ecologically sensitive regions in West Africa. However, rapid population growth, inadequate infrastructure, and unsustainable agricultural practices have led to increased pressure on the environment and biodiversity of the state. Despite these natural and cultural assets, the state faces numerous challenges in its rural areas, including limited access to basic services and infrastructural facilities, high levels of poverty, and food insecurity (Bonsarts, 2019).

According to FAO, (2015) rural development programplay a crucial role in promoting environmental sustainability and addressing critical issues such as poverty, food security, and access to basic amenities, social welfare and improved rural livelihoods. In the context of Cross River State, Nigeria, this is to assess the effectiveness of rural development policies in achieving environmental sustainability, with a specific focus on rural poverty alleviation and food security.

Adebayo et al. (2019) that investigated the impact of rural electrification on environmental sustainability in rural communities of Osun State, Nigeria. The findings revealed that rural electrification significantly promoted environmental sustainability by reducing carbon emissions and enhancing the use of clean energy. The study's results have implications for policy and practice, highlighting the importance of investing in rural electrification to promote environmental sustainability. By providing access to reliable and clean energy, rural electrification can help reduce environmental degradation. The study's findings are consistent with previous research, which has shown that access to electricity can have numerous benefits for the environment. This research on zero hunger and food security is anchored on the Nigerian Agriculture Promotion Policy document 2016-2020 and Rural Development In Nigeria. According to Ojong and Anam, (2018) the major crux of agriculture in Nigerian economic development cannot be over emphasized. It is the economic mainstay of the rural activities. In an attempt to enhance and strengthen the agricultural sector, the administration of President Buhari came up with the Agriculture Promotion Policy 2016-2020, also known

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

as the Green Alternative driven by the engagement of various stakeholders including the marketplace participants, farmers, states, investors, financial institutions, and communities. This policy arose as a result of the failure of previous policies formulated to bring about sustainable agriculture and food security in Nigeria. This policy is also formulated based on the Sustainable Development Goal 2, which advocates for zero hunger and food security. The policy trust before now was to halve hunger by 2015, but since this could not be universally achieved, it was then changed to sustainable development goals from millennium development goals (Fatokun, 2015).

With the stark reality that the millennium development goals (MDG) were not achieved by 2015, the United Nations turned from the MDG into 17 sustainable development goals to be achieved before 2030. Following the arrangements of the sustainable development goals to be achieved by countries, the Sustainable Development Goal (SDG) 2 for global development agenda, calls for concerted actions to "end hunger'', achieve food security and improved nutrition and promote sustainable agriculture". In particular, target 2.a devotes a specific attention to "Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries and in particular least developed countries.

To end hunger, concerted efforts must be made by countries and the global community to encourage sustainable agriculture. Following the indicators guiding the achievement of the SDGs, chapter 14 of Agenda 21 specifically dwelt on promoting sustainable agriculture and rural development (SARD). According to Oyaniran, (2020) and Madu, (2022), the main objective of sustainable agriculture and rural development is to increase food production in a sustainable way and enhancing food security. This aim involves educational initiatives, utilizing economic incentives and developing appropriate and new technologies to ensure constant and stable supply of adequate food with the right nutrition, access to those supplies by vulnerable groups and production for local and urban markets. This method should also create employment and income generation to alleviate poverty and boost local economy. This system too should encourage natural resources management and environmental protection and sustainability within the rural communities

Olabode and Falola (2021) examined the relationship between rural electrification and environmental sustainability in Ekiti State, Nigeria. The results showed that rural electrification had a positive impact on environmental sustainability, particularly in reducing deforestation and promoting renewable energy use suggesting that rural electrification can

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

ISSN: 1595-8051 EISSN: 3092-9571

play a crucial role in promoting environmental sustainability. Madu, (2022) stated that the main objective of sustainable agriculture and rural development is to increase food production in a sustainable way and enhancing food security. This aim involves educational initiatives, utilizing economic incentives and developing appropriate and new technologies to ensure constant and stable supply of adequate food with the right nutrition, access to those supplies by vulnerable groups and production for local and urban markets. This method should also create employment and income generation to alleviate poverty and boost local economy. This system too should encourage natural resources management and environmental protection and sustainability within the rural communities.

Elver, (2018) observed that international human right laws makes provision for the dignity and respect for human lives, food is an essential aspects of human rights and a necessity to human livelihoods, so concerted efforts is needed to make life meaningful. This author further posited that in suing every means to make food security a guarantee, efforts should also be made to encourage environmental sustainability through sustainable agricultural practices, especially through the use of organic and green agriculture and not through the use of inorganic chemicals and genetically modified organism

Statement of the problem

In Cross River State, several rural development programmes have been introduced since the 1960s to stimulate economic growth and improve quality of life. These include initiatives such as Operation Feed the Nation (OFN), Green Revolution, National Poverty Eradication Programme (NAPEP), Rural Electrification Programme (REA), Directorate for Food, Roads and Rural Infrastructure (DFRRI), Better Life for Rural Women, Conditional Cash Transfer schemes, afforestation and reforestation programmes, Water, Sanitation and Hygiene (WASH) initiatives, National Fadama Programmes, and soil restoration programmes. While these programmes were primarily designed to improve rural livelihoods, they also have implications for tourism development, particularly in areas endowed with natural attractions and cultural heritage.

Rural development remains central to the achievement of the Sustainable Development Goals (SDGs), particularly in enhancing livelihoods, promoting environmental sustainability, and supporting tourism development in resource-rich rural areas. Across the world, governments have made concerted efforts to improve rural living conditions, especially in developing countries where rural communities serve as custodians of natural and cultural tourism assets

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Despite these efforts, many rural communities continue to face developmental challenges, raising concerns about the effectiveness of these programmes in transforming rural economies and sustaining the environment. Human needs are unlimited, while environmental resources remain finite, leading to increasing pressure on land, forests, water bodies, and biodiversity many of which constitute the backbone of rural tourism. In many cases, rural dwellers exploit natural resources for survival without adequate consideration for conservation, resulting in environmental degradation that threatens both sustainability and tourism potential. The rate of resource exploitation often exceeds the rate of regeneration, thereby posing serious risks to ecological balance and the long-term viability of tourism attractions. This situation raises critical questions about the sustainability of ongoing rural development efforts, especially in the face of increasing demand for food security, poverty reduction, infrastructure development, and tourism expansion.

Furthermore, while programmes such as rural infrastructural development, poverty alleviation, efforts are expected to support both environmental sustainability and tourism development, their actual impact remains unclear. There is limited empirical evidence on how these programmes have influenced environmental sustainability and enhanced tourism potential in rural communities of Cross River State. The persistence of environmental degradation, poor infrastructure, and underdeveloped tourism facilities suggests a possible gap between policy intentions and actual outcomes. Consequently, it becomes necessary to critically examine the extent to which these rural development programmes have contributed to environmental sustainability and tourism development in the study area. It is against this backdrop that this study seeks to assess the influence of tourism-oriented rural development programmes such as Rural Electrification and Food Security Programmes on environmental sustainability in Cross River State, Nigeria.

Purpose of the study

Specifically sought to:

1. Ascertain the extent to which rural electrification programmes relate with environmental sustainability
2. Evaluate the extent to which zero hunger/food security programmes relate with environmental sustainability.

Research hypotheses

The following hypotheses were formulated to guide the study:

1 There is no significant relationship between rural electrification programs and the environmental sustainability

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

ISSN: 1595-8051 EISSN: 3092-9571

2 There is no significant relationship between zero hunger/food security programs and the environmental sustainability.

Methods

This study adopted a survey research design to answer the research questions of this study. To successfully carry out the study, two hypotheses were formulated in line with the objectives of the study. The study examined Rural Electrification and Food Security Programmes with particular emphasis on their relevance to tourism development and environmental conservation. The population of the study comprised residents of selected communities across the three education zones of Cross River State, while a sample was drawn using stratified and accidental sampling techniques to ensure adequate representation of respondents. A survey research design was adopted, and data were collected using a structured questionnaire titled "Environmental Sustainability through Rural Electrification and Food Security Programmes Questionnaire (ESREFSPQ)". Data obtained were analyzed using simple regression at 0.05 level of significance.

Results

This section presents the results of statistical analysis of the research questions and hypotheses during the study. In doing so, each research question and hypotheses was first stated in its original form, this was followed by the presentation of the statistical analysis technique, before the final interpretation of the results. Each interpretation was done under .05 level of significance with 85 degrees of freedom.

HO_1

There is no significant relationship between rural electrification programmes and environmental sustainability in Cross River State. The independent variable is rural electrification programmes while the dependent variable is environmental sustainability in Cross River State. To test this hypothesis, simple regression statistical analysis was used and the result as presented in Table 1. The analysis in Table 1 showed that the Adj R^2 is 0.021. This implies that 2.1% of the variance in the dependent variable (environmental sustainability) could be accounted for by rural electrification programmes. However, though the percentage contribution is small, a careful observation of the table indicated that F-value of 14.115 ($p<.05$) is significant at .05 level and 1 and 808 degrees of freedom. Equally, since p(.000) is less than p(.05), it implies that There is no significant relationship between rural electrification programmes and environmental sustainability in Cross River State. Therefore, the stated null hypothesis is rejected.

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

Table1: Simple regression analysis of relationship between rural electrification programmes and environmental sustainability in Cross River State (N=410)

Source of variation	SS	Df	MS	F	Sig.
Regression	61.091	1	61.091	14.115	.000[b]
Residual	3267.736	808	4.398		
Total	3328.827	809			

*Significant at .05 level; R=.152; R^2=.0.023; R^2Adj=.021

HO_2

There is no significant relationship between zero hunger/food security programmes and the environmental sustainability in Cross River State. The independent variable is zero hunger/food security programmes while the dependent variable is environmental sustainability in Cross River State. To test this hypothesis, simple regression statistical analysis was used and the result as presented in Table 2. The analysis in Table 2 showed that the Adj R^2 is 0.037. This implies that 3.7% of the variance in the dependent variable (environmental sustainability) could be accounted for by zero hunger/food security programmes in Cross River State. However, though the percentage contribution is small, a careful observation of the table indicated that calculated F=27.133 (at p<.05) is significant at .05 level and 1 and 808 degrees of freedom. Also, since p(.000) is less than p(.05), it implies that there is a significant relationship between zero hunger/food security programs and the environmental sustainability. Therefore, the stated null hypothesis is rejected.

Table 2: Simple regression analysis of relationship between zero hunger/food security programmes and environmental sustainability in Cross River State (N=810)

Source of variation	SS	Df	MS	F	Sig.
Regression	116.607	1	116.607	27.133	.000[b]
Residual	3212.230	808	4.323		
Total	3328.827	809			

* Significant at .05 level; R=.187; R^2=.035; R^2Adj=.034

Discussion of findings

The results and findings of the study is discussed in these sections. Effort was made by the researcher to do this based on the variables under study hypothesis-by-hypothesis

Rural electrification programmes and environmental sustainability

The result of hypothesis three showed there is a significant relationship between poverty alleviation programs and the environmental sustainability. The conclusion was based on the

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

ISSN: 1595-8051 EISSN: 3092-9571

fact that the Adj R^2 is 0.057. This implies that 5.7% of the variance in the dependent variable (environmental sustainability) could be accounted for by poverty alleviation. However, though the percentage contribution is small, a cursory look at the table showed that F=14.115 (p<.05) is significant. Also, since p(.000) is less than p(.05), it implies that Poverty alleviation has a significant relationship with Environmental sustainability in Cross River State. Therefore, the stated null hypothesis is rejected.

The present conclusion is in line with the work of Adebayo et al. (2019) that investigated the impact of rural electrification on environmental sustainability in rural communities of Osun State, Nigeria. The findings revealed that rural electrification significantly promoted environmental sustainability by reducing carbon emissions and enhancing the use of clean energy. The study's results have implications for policy and practice, highlighting the importance of investing in rural electrification to promote environmental sustainability. By providing access to reliable and clean energy, rural electrification can help reduce environmental degradation. The study's findings are consistent with previous research, which has shown that access to electricity can have numerous benefits for the environment.

The result is equally in line with Olabode and Falola (2021) that examined the relationship between rural electrification and environmental sustainability in Ekiti State, Nigeria. The results showed that rural electrification had a positive impact on environmental sustainability, particularly in reducing deforestation and promoting renewable energy use. The study's findings suggest that rural electrification can play a crucial role in promoting environmental sustainability. The study's results have implications for policy and practice, highlighting the importance of investing in rural electrification to achieve environmental sustainability goals. By providing access to reliable and clean energy, rural electrification can help reduce environmental degradation. The study's findings are consistent with previous research, which has shown that access to electricity can have numerous benefits for the environment. Rural electrification programmes can be a key strategy for achieving sustainable development and improving the lives of rural communities. The study's findings suggest that rural electrification can contribute to improved environmental outcomes.

Zero hunger and food security and environmental sustainability

The result of hypothesis four showed that there is a significant relationship between zero hunger/food security programs and the environmental sustainability . The conclusion was based on the fact that the Adj R^2 is 0.037. This implies that 3.7% of the variance in the dependent variable (environmental sustainability) could be accounted for by zero hunger/food security programmes in Cross River State. However, though the percentage contribution is

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

small, a careful observation of the table indicated that calculated F=27.133 (at p<.05) is significant. Also, since p(.000) is less than p(.05), it implies that there is a significant relationship between zero hunger/food security programs and the environmental sustainability. Therefore, the stated null hypothesis is rejected.

The present conclusion is in line with the work Madu, (2022) who sated that the main objective of sustainable agriculture and rural development is to increase food production in a sustainable way and enhancing food security. This aim involves educational initiatives, utilizing economic incentives and developing appropriate and new technologies to ensure constant and stable supply of adequate food with the right nutrition, access to those supplies by vulnerable groups and production for local and urban markets. This method should also create employment and income generation to alleviate poverty and boost local economy. This system too should encourage natural resources management and environmental protection and sustainability within the rural communities.

The result also affirmed the research of Elver, (2018) who observed that international human right laws makes provision for the dignity and respect for human lives, food is an essential aspects of human rights and a necessity to human livelihoods, so concerted efforts is needed to make life meaningful. This author further posited that in suing every means to make food security a guarantee, efforts should also be made to encourage environmental sustainability through sustainable agricultural practices, especially through the use of organic and green agriculture and not through the use of inorganic chemicals and genetically modified organism

Conclusion

Conclusionsively, the study established that rural electrification programmes have a significant relationship with environmental sustainability in Cross River State, Nigeria, although the level of contribution is relatively small. The findings further revealed that zero hunger/food security programmes also have a significant relationship with environmental sustainability, indicating that both initiatives play important roles in shaping environmental outcomes. Therefore, tourism-oriented rural development programmes, particularly rural electrification and food security interventions, are important pathways for promoting environmental sustainability in the study area

DOI: https://doi.org/10.60787/tjesds.vol2no1.85

ISSN: 1595-8051 EISSN: 3092-9571

Recommendations

Based on the findings of the study, the following recommendations were made:

1 Rural electrification initiatives should prioritize renewable energy sources, such as solar and wind power, to reduce dependence on fossil fuels and mitigate environmental degradation. This can help ensure sustainable energy access for rural communities.

2 Food security initiatives should promote sustainable agriculture practices, such as organic farming and agroforestry, to enhance food security while minimizing environmental degradation. This can help ensure sustainable food systems for rural communities.

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