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Examining The Effectiveness of Community-Based Projects in Fostering Environmental Stewardship and Promoting Local Sustainability Initiatives in Cross River State, Nigeria

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Abstract
The study examined the effectiveness of community-based projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State, Nigeria. The study was guided by three objectives, three research questions and three null hypotheses. A descriptive survey research design was adopted and it was carried out in Cross River State. The population for the study was 156 local community members, consisting of 85 adult males and 71 adult females selected from 15 communities in Cross River State. Structured questionnaire was used for data collection. The instrument was face validated by three lecturers in Educational Research Measurement and Evaluation Unit in the Department of Educational Psychology, University of Calabar, Cross River State. Cronbach alpha reliability method was used to ascertain the internal consistency of the instrument and a reliability coefficient of 0.81 was obtained. Data collection was carried out by the researcher and three trained research assistants. Mean, standard deviation and t-test were used to analyse the data collected. The findings revealed twelve (12) community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives; seventeen (17) impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives; and eighteen (18) strategies for enhancing community engagement in environmental stewardship

and local sustainability initiatives in Cross River State among others. Based on the findings, the study concluded that effective community-based projects play crucial roles in enhancing environmental stewardship and local sustainability initiatives. It was recommended that government, NGOs and community leaders should establish regular forums and workshops to promote dialogue among community members, ensuring grassroots participation in environmental stewardship and sustainability initiatives; communities should partner with universities and research institutions to facilitate research, capacity building, and the dissemination of best practices related to sustainability initiatives among others.

Keywords: Community-based Projects, Environmental Stewardship, Sustainability, Local Sustainability Initiatives, Cross Rivers State.

Introduction

Environmental stewardship has increasingly become a focal point in global discourse surrounding sustainability, particularly in developing regions where local communities are often at the frontline of environmental degradation. Cross River State is noted for its unique rainforest ecosystem, which holds immense value for biodiversity and as a buffer against the impacts of climate change (Okwu et al., 2020). However, the state faces severe environmental challenges, including deforestation, land degradation, and biodiversity loss, often attributed to unsustainable agricultural practices and urbanization (Ugbede et al., 2020). The community-based projects have emerged as significant interventions aimed at fostering environmental stewardship and promoting sustainable practices locally. The engagement of local communities through participatory governance and community-based natural resource management has become vital in addressing these challenges and ensuring sustainable use of resources (Ali, 2020). These initiatives often involve collective local action to manage natural resources, raise awareness about conservation, and empower communities to engage in sustainable development practices and environmental stewardship (Eze et al., 2021).

Environmental stewardship refers to the proactive management of the health of natural resources, ensuring they can sustain both ecological functions and human needs (Jones et al., 2020). It highlights the proactive nature of stewardship, stressing that it is not merely reactive or about compliance with regulations but involves active management practices aimed at sustaining natural resources. According to (U.S. Environmental Protection Agency (EPA) (2021), environmental stewardship is the responsible use and protection of the natural environment through conservation and sustainable practices. It emphasizes the dual role of stewardship- responsible use and protection. It suggests that stewardship is not only about safeguarding the environment but also about utilizing resources in a way that meets current

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needs without compromising future generations' ability to meet theirs. Thompson et al. (2020) opined that environmental stewardship encompasses the collective responsibility of individuals and organizations to manage and protect the environment and natural resources through collaborative efforts. It brings in the concept of collectivism, emphasizing that stewardship is not just an individual endeavour; rather, it requires cooperation among various stakeholders, including governments, businesses, non-profits, and local communities in order to enhance sustainability.

Sustainability is a multidimensional concept that encompasses social, economic, and environmental dimensions, aiming for intergenerational equity and well-being (Hák et al, 2016). The authors further stated that sustainability as an interlinked concept, where social equity, economic viability, and environmental health are critical for holistic advancement. According Doppelt (2017), sustainability is a dynamic process that requires continuous improvement and adaptation to changing environments and societal values. It acknowledges that sustainability is not a one-time goal but an ongoing process that necessitates regular reassessment and evolution. Sustainable practices should strive to improve quality of life while protecting ecosystems and promoting economic growth within the locality.

Local sustainability initiatives on the other hand are community-based efforts aimed at promoting environmental stewardship, economic prosperity, and social equity at the local level (Burch, 2020). It suggests that local initiatives take place within specific community contexts, striving to balance ecological health with economic growth and social justice. Dale (2021) referred local sustainability initiatives as collaborative strategies among local governments, businesses, NGOs, and community members aimed at addressing local sustainability challenges effectively. It underscores the importance of collaboration and partnership in tackling sustainability challenges. Local sustainability initiatives as noted by Olsson and Folke (2020) are strategic actions taken to enhance the resilience of communities against environmental, social, and economic shocks. It refers to a community's ability to adapt and thrive in the face of challenges. Some local sustainability initiatives can take the form of community gardens, local renewable energy projects, or waste reduction programs, often relying on grassroots participation (Burch, 2020). By bringing different stakeholders together, these initiatives can foster resource sharing, innovation, and collective action, thereby enhancing their overall effectiveness and sustainability impact (Dale (2021). Sustainable practices should strive to improve quality of life while protecting ecosystems and promoting economic growth. Also, for sustainability to be meaningful, the local people must be adequately involved. This can be achieved through community-based projects.

Community-based projects are defined as initiatives that actively involve local populations in planning, implementing, and managing development activities that affect their environment (Savin et al., 2021). Community-based projects according to Shamim et al (2021) are initiatives that actively involve community members in the planning, implementation, and evaluation of services or programmes that benefit them, fostering local empowerment and capacity building. Engaging community members in the decision-making process not only provides them with a sense of ownership but also ensures that the projects address the actual needs of the community. Göbel et al. (2022) viewed community-based projects as collaborative efforts that involve a diverse group of stakeholders, including community members, local organizations, and government agencies, working together towards a common goal. It emphasizes the importance of partnerships. By leveraging the strengths and resources of various stakeholders, projects can achieve more significant social impacts and sustainability. By fostering local ownership and stewardship over natural resources, these projects aim to enhance environmental governance, promote conservation awareness, and build community resilience against environmental shocks (Ekpo et al., 2021).

Some of the community-based environmental projects that aimed at fostering environmental stewardship and promoting local sustainability initiatives include community reforestation programmes, waste management and recycling initiatives, sustainable agriculture projects, community-based tourism initiatives, ecosystem restoration programmes, climate change awareness programmes, biodiversity conservation initiatives among others (Abia & Ekpe, 2021). Local communities can engage in waste management and recycling initiatives implementing programmes for waste segregation, collection, and recycling (Udo, 2020). These initiatives aim to reduce litter, promote recycling practices, and create job opportunities for community members. Also, community-based tourism initiatives are projects involved in promoting eco-tourism to attract visitors while educating them about the local environment and contributing to conservation efforts, thereby enhancing income for the community (Nwagbara & Akpan, 2022). According to Obu and Okwesili (2022), communities work on conserving local flora and fauna, often through the establishment of protected areas and awareness campaigns highlighting the importance of biodiversity.

There are many factors influencing the participation in community-based environmental projects. Ogbeibu and Arimoro (2021) stated that traditional beliefs and practices play a significant role in community-based environmental initiatives and stewardship. In Cross River State, indigenous knowledge about conservation can widen engagement among community members. Education and awareness programmes is a major factor that influencing community engagement in environmental stewardship. Oduro-Frimpong, M.

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(2020) pointed out that educational initiatives aimed at raising awareness about environmental issues lead to informed communities capable of taking actionable steps towards stewardship. Economic benefits such as incentives also play vital role in enhancing community engagement in environmental stewardship. Financial support and economic incentives, such as grants for conservation projects or sustainable agricultural practices, encourage communities to engage more actively in environmental stewardship (Nkamnebe, 2022). Again, community leadership and participation is a strong factor that influences community engagement in environmental stewardship. Eze and Chikwe (2020) buttressed that effective community leadership fosters participation and promotes environmental initiatives. Influential local leaders can mobilize communities towards collective action.

In spite of these factors, community-based environmental projects play crucial roles in enhancing environmental awareness and sustainability in Cross River State. Egbuna et al. (2021) noted that community-based projects enable local populations to engage directly in environmental management. This engagement fosters a sense of ownership over local resources, leading to greater long-term commitment to environmental sustainability. Also, Nwankwo et al. (2022) emphasized that community-based projects often incorporate local traditions and knowledge, helping to bridge the gap between modern environmental science and indigenous practices. This culturally informed approach facilitates collective action for environmental preservation. In addition, community-based projects help in empowerment of local leaders in the community. Akan et al. (2021) maintained that community leaders often take on roles in these projects, which not only strengthens their authority but also educates them on environmental issues. Empowered leaders can influence community norms and behaviours related to environmental stewardship. Furthermore, community-based projects enhance collaborations and partnership. Obioha et al. (2020) contended that many community-based projects in Cross River collaborate with non-governmental organizations (NGOs), and other local and foreign agencies thereby enhancing resource availability for environmental education. These partnerships often result in increased technical expertise and funding, which boost project success.

Despite the crucial roles of community-based projects in fostering environmental stewardship and promoting local sustainability initiatives, its implementation in Cross River State has not fully gained recognition. There is paucity of research findings on focusing on the interplay between community involvement and environmental programme success presents (Ogunyi et al., 2020). By addressing this research gap, the study aimed at examining the effectiveness of community-based projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross River State, Nigeria by providing insights

into the mechanisms through which community-based projects can effectively enhance environmental stewardship and contribute to sustainable development in Cross River State. The findings would contribute to academic discourse and also help to inform policy and practice, thereby supporting more effective local environmental initiatives.

Statement of the Problem

Environmental degradation and unsustainable practices have become critical challenges across the globe, particularly in developing regions such as Cross River State, Nigeria. Community-based projects, which actively involve local populations in environmental stewardship, are gaining recognition as viable strategies to address these challenges (Scholz et al., 2020). These projects are designed not only to empower communities but also to promote local sustainability initiatives. However, the effectiveness of these projects in fostering genuine environmental stewardship remains inadequately studied, particularly within the context of Cross River State.

While several studies highlight the role of community engagement in environmental management (Hawkins et al., 2021; Thapa et al., 2022), there is a notable gap in understanding how these initiatives translate into long-term changes in behaviour and practices that lead to sustainable development. For instance, Hawkins et al. (2021) emphasize participatory approaches in conservation but do not thoroughly assess the outcomes of these interventions in local contexts like Cross River State. Similarly, Thapa et al. (2022) focused on community resilience but lacked comprehensive analysis of environmental stewardship metrics tied to specific community-based projects.

Furthermore, existing research often overlooks the complex socio-cultural, economic, and political factors that influence community attitudes and behaviours towards environmental stewardship in Nigeria. The lack of localized studies that critically evaluate the interplay between community involvement and environmental programme success presents a significant oversight (Ogunyi et al., 2020; Ijaiya & Onabanjo, 2021). Hence, there is an evident need for an in-depth examination of the effectiveness of community-based projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross River State, Nigeria.

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Research Objectives

The main objective of this study is to examine the effectiveness of community-based projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross River State, Nigeria. Specifically, the study examined the:

1. Community-based environmental projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross River State;
2. Impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State;
3. Strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State.

Research Questions

The study was guided by the following research questions:

1. What are the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State?
2. What are the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State?
3. What are the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the mean responses of adult males and adult females' local community members on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State.
2. There is no significant difference in the mean responses of adult males and adult females' local community members on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State.
3. Significant difference exists in the mean responses of adult males and adult females' local community members on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State.

Research Methodology

The study adopted a descriptive survey research design. It was carried out in rural communities in Cross River State, Nigeria. The population for the study was 156 local community members, consisting of 85 adult males and 71 adult females randomly selected from 15 communities in Cross River State. Purposive sampling technique was adopted in selecting 5 communities in each Senatorial District in Cross River State, making it a total of 15 communities, while accidental sampling technique was adopted in sampling the respondents (adult males and adult females from the selected local communities).

The instrument for data collection was a structured questionnaire. The questionnaire has parts 1 and 2. Part 1 was designed to collect data on personal information about the respondents while Part 2 contained a total 47 items and was divided into 3 different sections (A to C). Section A contained 12 question items and collected data on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State; Section B has 17 question items and collected data on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State; while C contained 18 question items and collected data on strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. The questionnaire items had a four-point response option of Strongly Agree (S.A), Agree (A), Disagree (D) and Strongly Disagree (SD) with corresponding values of 4, 3, 2, and 1 respectively. The instrument was face validated by three lecturers in Educational Research Measurement and Evaluation Unit in the Department of Educational Psychology, University of Calabar, Cross River State. The validated copy of the instrument was trial tested on 25 respondents (15 adult males and 10 adult females) selected from two local communities in Ebonyi State, Nigeria. Cronbach Alpha coefficient was utilized to analyse the data obtained from the trial testing and the result yielded 0.81 reliability coefficient value. This implied that the instrument was reliable and effective to collect the desired data for the study.

Data collection was carried out by the researcher and three trained research assistants. A total of 156 questionnaires was distributed to the respondents in their various local communities. Both the researcher and the trained research assistants participated fully in administering and retrieving of the questionnaires from the respondents. After the questionnaire were retrieved and collated, it was noted that some were not properly rated or ticked by the respondents and they were not used for the final analysis whereas few others were not retrieved from the respondents. Only the responses of 148 respondents, comprising 77 adult males and 71 adult

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females' local community members were used for data analysis. This implied that 8 of the questionnaires were not used for data analysis.

Mean, standard deviation and t-test statistic were used to analyse the data collected from this study. Mean was used to answer the three (3) research questions; standard deviation was used to find out how close or far the responses of the respondents were to the mean; while t-test statistic was used to test the three null hypotheses at 0.05 level of significance. The decision rule for mean was that any mean response whose value is 2.50 and above was "agreed" while any one whose mean value is below 2.50 was "disagreed" by the respondents; whereas the decision rule for t-test analysis was that any null hypothesis whose p-value is less than 0.05 level of significance was rejected and regarded as significant, while any null hypothesis whose p-value is equal to or greater than 0.05 level of significance was accepted and regarded as not significant. All the analyses were done via the use of Statistical Package for Social Sciences (SPSS) software version 25.

Presentation of Results

Table 1: Mean responses and standard deviation analysis on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State

S/N	Community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives include:	$\bar{X}$	SD	Rmks
1	Community tree-planting events to improve air quality and enhance local ecosystems	3.10	0.84	Agreed
2	Waste-to-energy plants project to reduce landfill waste and promote renewable energy	3.30	0.87	Agreed
3	Community recycling programmes and composting to educate and reduce landfill waste	3.11	0.73	Agreed
4	Community-based environmental monitoring projects for ensuring sustainable environmental practices	3.10	0.89	Agreed
5	Shared solar power systems project that allow residents to access renewable energy collectively	3.05	0.70	Agreed
6	Community green infrastructure development project to reduce green gas emission.	3.15	0.89	Agreed
7	Community-based wildlife monitoring programmes to ensure the conservation of local flora and fauna	3.20	0.55	Agreed

8	Community-based forest management programmes for proper management and utilization of forest and forest resources	3.32	0.78	Agreed
9	Community clean-up projects such as cleaning parks, rivers, or neighbourhoods to foster environmental stewardship.	3.22	0.76	Agreed
10	Sustainable agricultural practices projects to reduce environmental degradation and promote food security	3.10	1.05	Agreed
11	Climate change awareness and mitigation project to reduce greenhouse gas emissions and promote sustainable development	3.40	0.81	Agreed
12	Environmental conservation project to protect biodiversity for maximum sustainability	3.01	0.88	Agreed

Key: $\bar{X}$ **=** Mean; SD = Standard Deviation, Adult Males = 77, Adult Females = 71; Total = 148

The data presented in Table 1 revealed the mean responses and standard deviation the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State. The results indicated that all the 12 items obtained mean values ranging from 3.01 to 3.40 which is above the cut-off point of 2.50. This indicated that the respondents agreed that all the items are the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State. The corresponding standard deviation to each of the items ranged from 0.55 to 1.05 showing that the opinions of the respondents were very close to each other.

Table 2: T-test analysis on the mean responses of adult males and adult females' community members on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State

S/N	Respondents	N	Mean (X)	SD	df	tcal	P-value	Remarks
1	Adult Males	77	3.15	0.81	146	-3.111	0.055	N.S
2	Adult Females	71	3.14	0.79				

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Key: N = No of respondents, $\underline{X}$= mean, SD = standard deviation, df = degree of freedom, t-cal = calculated value, p-value = probability value, N.S = Not significant.

Table 2 showed the result of t-test analysis on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State. The result revealed that the p-value is 0.055 which is greater than 0.05 (P > 0.05). This showed that there was no significant difference in the mean responses of adult males and adult females' community members on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State. Therefore, the null hypothesis is upheld.

Table 3: Mean Responses and Standard Deviation Analysis on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State

S/N	Impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives include:	$\bar{X}$	SD	Rmks
1	Community involvement in local initiatives fosters relationships and builds social capital among residents	3.10	0.79	Agreed
2	Residents may adopt more sustainable practices due to increased awareness and education	3.17	0.75	Agreed
3	Enhancing resource availability for environmental education	3.12	0.70	Agreed
4	Enhancing local ecosystems can improve the community's resilience to climate-related hazards	3.05	0.80	Agreed
5	Restoration and conservation initiatives can lead to improved local biodiversity in ecosystems	3.19	0.81	Agreed
6	Active participation in environmental stewardship can foster a sense of pride and ownership among residents	3.10	0.94	Agreed
7	Local initiatives can stimulate the economy through job creation and the promotion of local businesses	3.00	0.75	Agreed
8	Projects aimed at reducing waste and promoting clean-up efforts can result in lower pollution levels	3.14	0.78	Agreed
9	Initiatives improving local waterways can lead to better water quality for humans and wildlife	3.12	0.71	Agreed
10	Active projects can raise awareness about environmental issues and sustainable practices	3.02	0.75	Agreed

11	Projects that promote renewable energy and reduce waste contribute to decreased greenhouse gas emissions	3.11	0.90	Agreed
12	Residents who engage in environmental stewardship often develop the skills and confidence to advocate for environmental issues	3.10	0.81	Agreed
13	Community projects provide experiential learning that builds environmental education among participants	3.01	0.84	Agreed
14	Sustainable practices create a framework for long-term stewardship, benefiting future residents	3.11	0.99	Agreed
15	Successful initiatives can inspire other communities to adopt similar projects	3.15	0.55	Agreed
16	Well-maintained parks and unique local projects can attract visitors, benefiting local businesses	2.90	0.59	Agreed
17	Successful local initiatives can influence policymakers to support environmental regulations and initiatives	2.89	0.88	Agreed

Key: $\bar{X}$ **=** Mean; SD = Standard Deviation, Adult Males = 77, Adult Females = 71; Total = 148

The data presented in Table 3 revealed that all the 17 items on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State got mean values ranging from 2.89 to 3.19 which is above the cut point of 2.50. This implied that the respondents agreed that all the items are the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State. The standard deviation to each of the items ranged from 0.55 to 0.99 showing that the opinions of the respondents were very close to each other.

Table 6: T-test Analysis on the mean responses of adult males and adult females' community members on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State

S/N	Respondents	N	Mean (X)	SD	df	tcal	P-value	Remarks
1	Adult Males	77	3.10	0.76	148	0.203	0.126	N.S
2	Adult Females	71	3.06	0.79				

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Key: N = No of respondents, $\underline{X}$= mean, SD = standard deviation, df = degree of freedom, t-cal = calculated value, p-value = probability value, N.S = Not significant.

Table 4 revealed the result of t-test analysis on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State. The t-test result showed that the p-value is 0.126 and is greater than 0.05 (P > 0.05) implying that there was no significant difference in the mean responses of adult males and adult females' community members on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State. Therefore, the null hypothesis is accepted.

Table 5: Mean responses and standard deviation analysis on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State

S/N	strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives are:	$\bar{X}$	SD	Rmks
1	Building alliances with local organizations, businesses, and government entities to leverage resources	3.22	0.85	Agreed
2	Offering training sessions to empower community leaders with skills in project management and environmental education	3.15	0.70	Agreed
3	Providing easy access to information, tools, and materials needed for participation in projects	3.10	0.87	Agreed
4	Creating channels for community feedback to adapt and improve initiatives based on resident input	3.10	0.82	Agreed
5	Ensuring projects involve diverse community members (different ages, backgrounds, and abilities)	3.15	1.00	Agreed
6	Establishing transparent metrics to assess the success and impact of projects over time	3.00	0.89	Agreed
7	Fostering partnerships and collaborations between community stakeholders and external organizations.	3.42	0.69	Agreed
8	Hosting regular events (fairs, festivals, or meetings) to engage residents and raise excitement about initiatives	3.02	0.77	Agreed
9	Creating reward systems for volunteers to recognize their contributions and boost participation.	3.11	0.76	Agreed

10	Using online platforms to foster communication, share success stories, and encourage involvement	3.01	0.88	Agreed
11	Offering funding opportunities for community members to propose and lead their sustainability initiatives	3.04	0.88	Agreed
12	Providing monitoring and evaluation framework to track the project of community projects	3.02	1.03	Agreed
13	Building on local cultural and traditional practices to enhance project relevance and acceptance	2.96	0.87	Agreed
14	Pairing experienced environmental advocates with new volunteers to guide their involvement	3.02	0.88	Agreed
15	Conducting surveys to understand community priorities and areas for improvement	3.03	0.81	Agreed
16	Utilizing apps and tech platforms to track project progress and engage residents	3.08	0.76	Agreed
17	Identifying sustainable funding sources to support community-based environmental projects	3.50	0.94	Agreed
18	Implementing environmental education awareness strategies to promote sustainable practices	3.30	0.53	Agreed

Key: $\bar{X}$ = Mean; SD = Standard Deviation, Adult Males = 77, Adult Females = 71; Total = 148

Table 5 revealed the mean responses and standard deviation of the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. The result indicated that all the 18 items recorded mean responses above 2.50 cut of point, indicating that the respondents agreed that the items are the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. Also, the corresponding standard deviation for all the items ranged from 0.53 to 1.03, indicating that the respondents were very close to the mean and one another in their responses.

Table 6: t-test Analysis on the Mean Responses of adult males and adult females' community members on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State

S/N	Respondents	N	Mean (X)	SD	df	tcal	P-value	Remarks
1	Adult Males	77	3.06	0.81				
					146	0.144	0.612	N.S

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2	Adult Females	71	3.10	0.84

Key: N = No of respondents, $\underline{X}$= mean, SD = standard deviation, df = degree of freedom, t-cal = calculated value, p-value = probability value, N.S = Not significant.

Table 6 showed the result of t-test analysis on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. The result showed that the p-value is 0.612 which is higher than 0.05 (P > 0.05) indicating that there was no significant difference in the mean responses of adult males and adult females' community members on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. Hence, the null hypothesis null hypothesis is accepted.

Discussion of Findings

The findings presented in Table 1 identified twelve (12) community-based environmental projects in fostering environmental stewardship and promoting local sustainability initiatives in Cross River State. They include: community tree-planting events to improve air quality and enhance local ecosystems; waste-to-energy plants project to reduce landfill waste and promote renewable energy; community recycling programmes and composting to educate and reduce landfill waste; community-based environmental monitoring projects for ensuring sustainable environmental practices; shared solar power systems project that allow residents to naccess renewable energy collectively; community green infrastructure development project to reduce green gas emission; community-based wildlife monitoring programmes to ensure the conservation of local flora and fauna; community-based forest management programmes for proper management and utilization of forest and forest resources; climate change awareness and mitigation project to reduce greenhouse gas emissions and promote sustainable development among others. The corresponding null hypothesis result showed that there was no significant difference (P > 0.05) in the mean responses of adult males and adult females' community members on the community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross Rivers State. The finding is in line with Abia & Ekpe (2021) local communities can engage in planting native tree species to combat deforestation and enhance biodiversity. According to the authors, such programmes often include educational workshops to teach sustainable practices and the importance of trees in natural ecosystems. Large-scale tree-planting initiatives can restore degraded lands and promote environmental sustainability. Also, the finding is in support of Udo (2020) who noted that local communities can engage in waste

management and recycling initiatives implementing programmes for waste segregation, collection, and recycling. Implementing waste-to-energy plants can reduce landfill waste and promote renewable energy. These initiatives aim to reduce litter, promote recycling practices, and create job opportunities for community members. Furthermore, the finding aligns with Akinwunmi (2021), who pointed out that local people can participate in climate change and environmental awareness programmes, and this can be organized through workshops and training sessions to educate communities about climate change impacts and adaptation strategies, fostering a proactive approach to environmental stewardship. Environmental education awareness strategies promote sustainable farming practices and environmental stewardship. This approach can be achieved through environmental education from the grassroots level.

The results on the impacts of community-based environmental projects for fostering environmental stewardship and promoting local sustainability initiatives in Cross River State presented in Table 3 found seventeen (17) impacts. The impacts are: community involvement in local initiatives fosters relationships and builds social capital among residents; enhancing local ecosystems can improve the community's resilience to climate-related hazards; enhancing local ecosystems can improve the community's resilience to climate-related hazards; restoration and conservation initiatives can lead to improved local biodiversity in ecosystems; active participation in environmental stewardship can foster a sense of pride and ownership among residents; projects aimed at reducing waste and promoting clean-up efforts can result in lower pollution levels; projects that promote renewable energy and reduce waste contribute to decreased greenhouse gas emissions among others. The supporting null hypothesis indicated that there was no significant difference ($P > 0.05$) in the mean responses of on the impacts of community-based environmental projects for fostering adult males and adult females' community members on environmental stewardship and promoting local sustainability initiatives in Cross River State. The result show support to Ihitabor et al. (2021) who buttressed that community-based projects targeting biodiversity conservation, such as reforestation initiatives, help in raising awareness about the importance of maintaining healthy ecosystems. Community involvement in such projects fosters a deeper understanding of local biodiversity and its threats. The finding also strengthens Obioha et al. (2020), who maintained that many community-based projects in Cross River collaborate with non-governmental organizations (NGOs), thereby enhancing resource availability for environmental education. These partnerships often result in increased technical expertise and funding, which boost project success. The finding is in accordance with Utul et al. (2020) who stated that community-based projects often promote sustainable livelihoods that reduce pressure on environmental resources. By providing alternative income sources that do not

harm the environment, awareness of the interplay between economy and ecology is enhanced. Also, the finding is in accordance with Utibe (2025) who observed that community-based projects foster community cohesion and resilience through inclusive approaches to resource management, accountability, and ownership, promoting collective action and community empowerment.

The findings presented in Table 5 revealed eighteen (18) strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. The strategies discovered include: building alliances with local organizations, businesses, and government entities to leverage resources; offering training sessions to empower community leaders with skills in project management and environmental education; providing easy access to information, tools, and materials needed for participation in projects; creating channels for community feedback to adapt and improve initiatives based on resident input; ensuring projects involve diverse community members (different ages, backgrounds, and abilities); fostering partnerships and collaborations between community stakeholders and external organizations; creating reward systems for volunteers to recognize their contributions and boost participation; offering funding opportunities for community members to propose and lead their sustainability initiatives; conducting surveys to understand community priorities and areas for improvement; identifying sustainable funding sources to support community-based environmental projects among others. The t-test result presented in Table 6 showed that there was no significant difference ($P > 0.05$) in the mean responses of adult males and adult females' community members on the strategies for enhancing community engagement in environmental stewardship and local sustainability initiatives in Cross River State. The finding show support with Okafor and Onu (2020) who contended that offering training sessions to empower community leaders with skills in project management environmental monitoring, and data collection can empower them to take active roles in environmental projects. Capacity building and training programmes can enhance community members' skills and knowledge in environmental management. This approach can promote community ownership and participation in environmental decision-making. Workshops and continuous education can enhance local expertise. The finding is also in support of Udo and Ezeogwu (2021), who opined that building strong partnerships with local government agencies and NGOs can improve resource availability and technical support. Collaborative frameworks can enhance project legitimacy and operational efficiency. In addition, the result is in line with Okwuosa and Adebayo (2021) who noted that providing reward and recognition programme in form of incentives for individuals and groups excelling in environmental stewardship encourages ongoing participation. Recognizing efforts publicly can foster pride and motivation within communities. The

finding also concord with Fagbohun and Adebayo (2020) who contended that setting up robust monitoring and evaluation systems can help in tracking project progress and impact. Community members should be involved in evaluation efforts to foster a sense of responsibility and enable adaptive management.

Conclusion

Community-based projects play a vital role in promoting environmental stewardship and local sustainability initiatives in Cross River State, Nigeria. By empowering local communities to take ownership of environmental conservation, these projects can help mitigate the impacts of climate change, promote sustainable development, and improve livelihoods. The findings indicate that successful community projects can significantly enhance environmental awareness, promote sustainable practices, and empower local communities. There is, however, a need for sustained commitment from both local and governmental bodies to ensure resources, education, and infrastructural support align with the aspirations of grassroots initiatives. Addressing the socio-economic challenges faced by these communities is essential for the long-term success of such projects. In conclusion, effective community-based projects play crucial roles in enhancing environmental stewardship as well as promoting local sustainability initiatives.

Recommendations

Based on the findings, the following recommendations are made:

1. Government, NGOs and community leaders should establish regular forums and workshops to promote dialogue among community members, ensuring grassroots participation in environmental stewardship and sustainability initiatives.
2. Government, NGOs and community leaders incorporate indigenous practices and local knowledge systems into project designs to ensure cultural relevance and sustainability in environmental initiatives.
3. Government, NGOs and community leaders develop educational campaigns to increase awareness of environmental issues, demonstrating the importance of stewardship and sustainable practices in daily life.
4. Community heads should establish clear metrics and frameworks for assessing the impact of community-based projects, allowing for adaptive management and improvement over time.
5. Communities should partner with universities and research institutions to facilitate research, capacity building, and the dissemination of best practices related to sustainability initiatives.

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