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Research article

WOMEN'S ENVIRONMENTAL LEADERSHIP AND COMMUNITY ADVOCACY FOR LOCALISING SUSTAINABLE DEVELOPMENT GOALS 3, 5 AND 6 IN IKOM EDUCATION ZONE, CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study examined how women's leadership and community advocacy roles relate to the attainment of Sustainable Development Goals (SDGs) 3, 5 and 6 in Ikom Education Zone of Cross River State, Nigeria. A correlational survey design was adopted. The population comprised 93,983 women aged 18-55 years, from which 400 respondents were selected through stratified random sampling; the regression output indicated 398 valid cases for analysis. Data were collected with the Leadership and Advocacy Roles of Women and Attainment of Sustainable Development Goals Questionnaire and analysed using simple linear regression. Women's leadership role showed a weak positive but non-significant relationship with SDG attainment ($R = 0.07$, $R^2 = 0.01$, $F(1,396) = 2.06$, $p = 0.15$). Women's advocacy role showed a weak but statistically significant relationship ($R = 0.13$, $R^2 = 0.02$, $F(1,396) = 7.16$, $p = 0.01$). SDG localisation requires women's mobilisation, institutional support and environmental education. The study clarifies women's agency as a grassroots pathway for health, gender and WASH outcomes.

KEYWORDS

Women's leadership; community advocacy; environmental education; SDG 3; SDG 5; SDG 6; WASH; Cross River State

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Introduction

Sustainable development has become a central framework for assessing whether community progress is inclusive, equitable and capable of improving the wellbeing of both present and future generations. The concept goes beyond economic growth because it requires the integration of environmental integrity, social justice, gender equality, health security, safe water, sanitation and participatory governance. In rural and semi-urban communities where basic social services are unevenly distributed, sustainable development is not an abstract international agenda; it is a daily question of whether households can access clean water, whether women can participate in decisions, whether girls can remain in school and whether communities can protect the environmental resources on which their livelihoods depend. This study therefore locates the global Sustainable Development Goals within the lived realities of communities in Ikom Education Zone of Cross River State, Nigeria. (Adejumo & Adejumo, 2014; Alamu, 2017). The seventeen Sustainable Development Goals provide a global benchmark for inclusive development. Among these goals, SDG 3 seeks to ensure healthy lives and promote wellbeing for all; SDG 5 seeks to achieve gender equality and empower women and girls; and SDG 6 focuses on the availability and sustainable management of water and sanitation. These three goals are closely linked. Poor water and sanitation systems expose households to preventable diseases and increase care responsibilities. Gender inequality restricts access to education, leadership, health information, income and

public voice. Poor health reduces the capacity of people to participate in farming, markets, education and community development. For these reasons, the local attainment of SDGs 3, 5 and 6 cannot be separated from women's participation in household, community and environmental decision-making.

Women are central to the practical implementation of health, gender and WASH-related goals because their everyday roles often place them at the point where environmental conditions affect human wellbeing most directly. In many communities, women organise household water use, prepare food, care for children, participate in sanitation routines, support community welfare activities, transmit cultural knowledge and respond quickly to health risks in the family. These responsibilities give women experiential knowledge of the relationship between water quality, sanitation behaviour, disease exposure, gendered labour burdens and community wellbeing. When this knowledge is supported through environmental education, leadership opportunities and advocacy platforms, it can become a powerful tool for localising the SDGs. (Hassan & Silong, 2008; Ozor & Nwankwo, 2008). The study rightly observes that no society can attain sustainable development when a substantial part of its population is socially, culturally, politically, economically or educationally marginalised. This argument is consistent with the inclusive philosophy of the 2030 Agenda, which emphasises participation and the commitment to leave no one behind (United Nations, 2015). Women's exclusion from community decision-making may weaken SDG implementation because the concerns most visible within households and neighbourhoods may fail to enter formal planning. Conversely, women's inclusion can strengthen accountability, improve awareness, support health-seeking behaviour and mobilise collective action on water, sanitation and hygiene. (Adejoh, 2015; Ugal, 2015).

In Cross River State, environmental and socio-economic development challenges are interconnected. Rural livelihoods are commonly linked to farming, forest resources, water systems, petty trading and community markets. Women contribute substantially to these livelihood systems, yet their labour and knowledge are often undervalued in formal governance. This is a critical issue for environmental education because sustainable development depends on the transformation of knowledge, values and behaviour. Women's leadership and advocacy can promote such transformation by challenging discriminatory norms, mobilising sanitation activities, encouraging health-seeking behaviour, supporting girls' education, strengthening water-source protection and enabling local participation in development projects. (Aasa et al., 2019; Nyong & Archibong, 2018). The study area, Ikom Education Zone of Cross River State, reflects communities where women are visible in farming, household management, community welfare and informal education but are less visible in formal political leadership and budgetary decision-making. The study that many women in the zone are local farmers with limited income, while some households experience difficulty accessing adequate food, clean water and affordable healthcare. It also observes that female students may be vulnerable to school dropout associated with early pregnancy, hawking and household economic pressure. These observations justify an empirical inquiry into whether women's leadership and advocacy roles relate to the attainment of SDGs 3, 5 and 6 in the zone. (National Bureau of Statistics, 2019).

The objective of the study was to examine the relationship between women's leadership and advocacy roles and the attainment of SDGs 3, 5 and 6 in Ikom Education Zone of Cross River State. Specifically, the study assessed whether women's leadership role relates to the attainment of wellbeing and healthy lives, gender equality, and access to clean water and sanitation; and whether women's advocacy role relates to these same development outcomes. The research questions asked the extent to which leadership and advocacy roles relate to SDG attainment. Two null hypotheses were tested at the 0.05 level of significance: women's leadership role does not significantly relate to SDG attainment, and women's advocacy role does not significantly relate to SDG attainment.

Literature review

Sustainable development is commonly understood as development that balances social, economic and environmental priorities while safeguarding the ability of future generations to meet their needs. Klarin (2018) explains that the concept has evolved through multiple historical phases but continues to rest on the relationship among development, needs and intergenerational responsibility. In community development terms, progress cannot be described as sustainable if it excludes women, leaves households without clean water, weakens environmental resources or fails to improve health and wellbeing. The SDG framework therefore requires both institutional policy and grassroots participation. Recent global evidence shows that SDG progress remains uneven. UN Women and the United Nations Department of Economic and Social Affairs (2024) report continuing gaps in gender equality, including under-representation in decision-making and the disproportionate burden of unpaid care work borne by women and girls. The WHO/UNICEF Joint Monitoring Programme also emphasises that WASH inequalities have a gendered dimension because women and girls are often affected by the burden of water collection, poor sanitation privacy and menstrual health challenges (World Health Organization & United Nations Children's Fund, 2023). These global patterns are relevant to Nigeria because rural women frequently bear the daily consequences of inadequate health, water and sanitation services.

Education for Sustainable Development provides an important bridge between the author's specialisation in environmental education and the variables examined in this study. UNESCO (2020) describes education for sustainable development as a means of empowering learners and communities to make informed decisions and take responsible action for environmental integrity, economic viability and a just society. In community settings, such education is not limited to classroom teaching. It includes household counselling, community meetings, school-community engagement, market sensitisation, women's associations, youth platforms, church and mosque groups, radio messages and peer learning. Women's advocacy can therefore function as a form of informal environmental education when it promotes hygiene, safe water use, sanitation, maternal health, gender inclusion and responsible environmental behaviour.

The attainment of SDG 3 is connected to women's roles because household health behaviour is often shaped by women's knowledge, care responsibilities and access to information. Women influence child nutrition, cleanliness of the household environment, immunisation uptake, maternal care decisions, first response to illness and sanitation practices. If women are marginalised or lack voice in household and community decisions, health-promoting behaviour may be constrained. Conversely, when women are informed and supported, they can mobilise families and neighbourhoods around preventive health, safe water, environmental sanitation and early use of health facilities. SDG 5 is directly concerned with the equality and empowerment of women and girls. Gender equality is not limited to formal legal rights; it also includes decision-making power, control over resources, freedom from harmful practices, access to education, participation in leadership and protection from discriminatory norms. Odera and Mulusa (2020) argue that gender equality and women's empowerment are central to SDG delivery because they influence how benefits, opportunities and responsibilities are distributed. In the present study, women's leadership and advocacy roles are treated as practical indicators of agency because they reveal whether women are merely beneficiaries of development or active contributors to local change.

SDG 6 also has a clear gender dimension. Water collection, domestic hygiene, care for sick household members and sanitation maintenance are often gendered responsibilities. Where water sources are distant, unsafe or unreliable, women and girls may lose time for education, livelihoods, rest and community participation. Where sanitation facilities are inadequate, privacy, dignity and health risks increase. Women's participation in community water committees, sanitation campaigns and environmental education can therefore help to ensure that WASH interventions respond to household realities rather than only to engineering outputs. This is why women's leadership and advocacy are relevant to both environmental education and community-level WASH governance. Women's leadership is widely regarded as an important route to inclusive decision-making. Women leaders can bring household-level knowledge, care concerns and community welfare priorities into governance

spaces that may otherwise be dominated by male voices. The study recognised the historical leadership roles of Nigerian women such as Funmilayo Ransome-Kuti and Margaret Ekpo in pre-independence political mobilisation. Okafor and Akokuwebe (2015) similarly discuss the persistent barriers to women's leadership in Nigeria and argue that greater participation of women requires social, political and economic empowerment. These arguments show that women's leadership is both historically grounded and developmentally necessary. (Bullough, 2008; Ette, 2017; Hoare & Gell, 2009; Ntiwunka, 2013; Ogbogu, 2012; Sahu & Yadav, 2018).

However, leadership does not automatically translate into measurable development outcomes. Where women occupy nominal positions without resources, budget influence, decision-making authority, training or community legitimacy, their leadership may remain symbolic. This distinction is central to the interpretation of the present results. The leadership variable produced a weak positive but non-significant relationship with SDG attainment, suggesting that leadership inclusion in the study area may not yet be strong enough to produce measurable change. For leadership to influence SDGs 3, 5 and 6, women must be able to shape decisions on health outreach, water governance, sanitation planning, girl-child education, environmental management and community development finance. Cultural perceptions are among the barriers that limit women's leadership. Nyamweya, Ogwora and Nyamwange (2018) found that cultural beliefs constrained women's active participation in leadership among the Abagusii in Kenya. Hora (2014) also identified socio-cultural attitudes, domestic responsibilities, limited role models and organisational barriers as factors affecting women's participation in leadership and decision-making positions. These findings observation that women in some communities in Ikom Education Zone rarely make household decisions, are subordinated in marital relations and are often restricted by cultural expectations that define leadership as a male domain.

Women's advocacy differs from formal leadership because it can operate through informal and semi-formal networks. Advocacy involves speaking for rights, mobilising people, seeking resources, sensitising households, challenging harmful practices and building public awareness. It can take place through market associations, age grades, religious societies, parent-teacher networks, women's meetings, cooperative societies, community health groups and school-based platforms. Orisadare (2019) shows that women's groups can be strong grassroots platforms for political participation and economic development, although their potential is often underused when groups lack organisation, legal awareness and access to decision-making channels. (Stephen, 2017; Vixathep, 2011). The study also drew on studies that connected women's advocacy and community roles with sustainable development. Chinwokwu and Arop (2018) argue that gender equality and women's empowerment are fundamental to sustainable national development in Nigeria. Bayeh (2016) similarly shows that empowering women and achieving gender equality are essential to sustainable development, even though women's contributions are often under-reflected in economic and political systems. These studies support the view that women's advocacy is not only a gender-rights issue but also a development strategy.

Women's environmental participation has become increasingly relevant in sustainability literature. Medupin (2020) describes women in environmental sciences as catalysts for achieving the SDGs, while Ezugwu, Maduka, Etta, Ekanem and Egaga (2024) argue that the role of women in environmental management and sustainability in Nigeria is often neglected. Sam and Zibima (2024) show that inclusive environmental decision-making in the Niger Delta requires deliberate attention to women's participation because institutional practices can reproduce local gender hierarchies. The theoretical foundation of the study can be linked to empowerment theory, gender and development theory and participatory development theory. Empowerment theory explains how marginalised individuals and groups gain capacity, confidence and resources to control decisions affecting their lives. Gender and development theory draws attention to the structural relations that shape men's and women's access to resources, voice and opportunities. Participatory development theory emphasises that people affected by development problems should be involved in identifying, planning and implementing solutions. Together, these perspectives explain why women's leadership and advocacy may be associated with local SDG attainment. The conceptual model guiding the study is presented in Figure 1. It assumes that women's leadership

and advocacy roles influence SDG localisation when they are supported by empowerment conditions, environmental education and community platforms. The model also recognises that the relationship is not automatic. Leadership requires authority, legitimacy and resources. Advocacy requires awareness, organisation and channels for action. Both variables may influence SDG 3 through health behaviour and community welfare, SDG 5 through gender inclusion and empowerment, and SDG 6 through clean water, sanitation and hygiene practices.

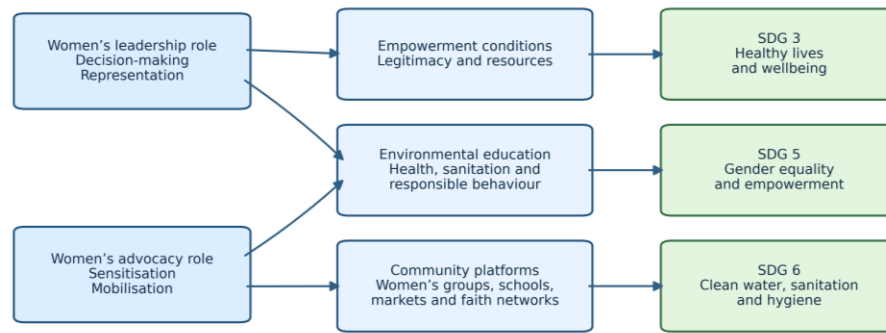


Figure 1. Conceptual framework linking women's roles to local SDG attainment.

Source: Author's conceptual design (2026).

Methodology

The study adopted a correlational survey design. This design was appropriate because the study examined the relationship between naturally existing variables rather than manipulating respondents or imposing experimental conditions. The independent variables were women's leadership role and women's advocacy role, while the dependent variable was attainment of SDGs 3, 5 and 6. The design enabled the study to determine the direction, strength and statistical significance of the association between women's roles and SDG attainment in the study area.

The study area was Ikom Education Zone in Cross River State, Nigeria. The education zone is located within a region characterised by rural settlements, farming communities, forest-linked livelihoods, market networks, school communities and diverse cultural practices. The study notes that the zone contains several communities where women contribute to family welfare, agriculture, petty trading and informal education but may have limited formal representation in development decision-making. Figure 2 presents a schematic locator map of the study area. The map is intended for contextual presentation rather than legal boundary determination.

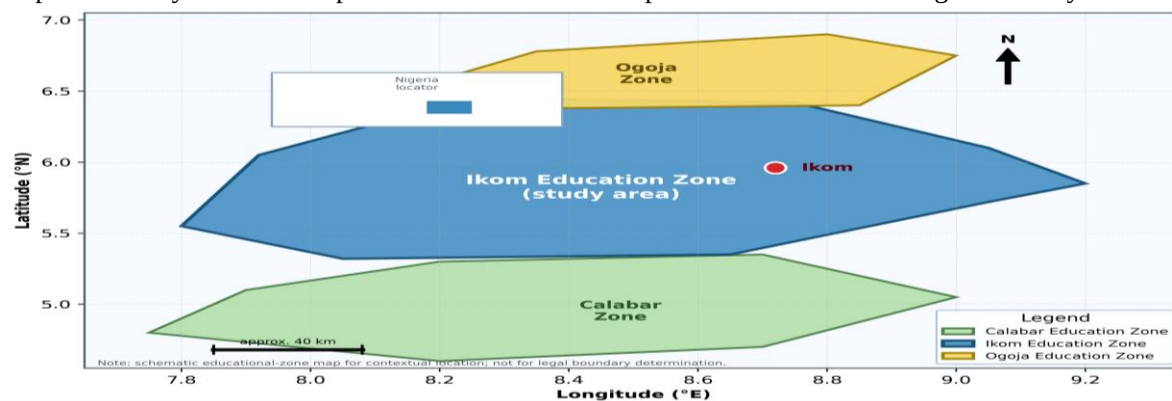


Figure 2. Schematic study-area locator map of Ikom Education Zone, Cross River State, Nigeria.

Source: Author's cartographic design (2026)

The population comprised 93,983 women aged 18-55 years in Ikom Education Zone. A sample of 400 women was selected using stratified random sampling. Stratification was adopted to ensure that the different local government strata within the education zone were represented in the study. Although 400 respondents were sampled, the regression tables indicate total degrees of freedom of 397, which implies that 398 valid cases were included in the final analysis. This study therefore reports the sample process as 400 selected respondents, with 398 usable questionnaires analysed after data cleaning. The instrument used for data collection was the Leadership and Advocacy Roles of Women and Attainment of Sustainable Development Goals Questionnaire (LARWASDGQ). The questionnaire contained sections measuring demographic information, women's leadership role, women's advocacy role and attainment of SDGs 3, 5 and 6. The SDG attainment dimension focused on wellbeing and healthy lives, gender equality, and access to clean water and sanitation. Responses were captured on a modified four-point Likert scale, and negatively worded items were reverse-scored before the sub-scale totals were computed.

Data were collected by the researcher with the assistance of trained research assistants. Community leaders were contacted before questionnaire administration to facilitate access and respect local protocols. Respondents were briefed on the purpose of the study and encouraged to provide honest responses. Participation was treated as voluntary, and the identity of individual respondents was not disclosed in the reporting of findings. Completed questionnaires were checked for completeness and coded for statistical analysis. Simple linear regression was used to test the two hypotheses at the 0.05 level of significance. The first model tested whether women's leadership role predicted attainment of SDGs 3, 5 and 6. The second model tested whether women's advocacy role predicted attainment of the same goals. The analysis reported the sum of squares, degrees of freedom, mean square, F-ratio, p-value, unstandardised coefficient, standard error, standardised beta, t-value, model R, R^2 , adjusted R^2 and standard error of estimate. All statistical values were rounded to two decimal places in the tables and discussion, while significance decisions were based on the p-values. The analytical approach was also guided by the need to correct inconsistencies in the study. The original narrative treated both hypotheses as significant, but the leadership model had $p = 0.15$, which is greater than 0.05. Therefore, the null hypothesis for leadership was retained. The advocacy model had $p = 0.01$ after rounding, which is less than 0.05. Therefore, the null hypothesis for advocacy was rejected.

Results and discussion

This section presents the regression results and discusses them in relation to the purpose of the study. The results are presented in blue-formatted tables to improve journal readability. All statistical variables are rounded to two decimal places. The discussion interprets the results cautiously because both models have small effect sizes. A small R^2 does not mean the predictor is unimportant; it means that other factors also contribute to SDG attainment and should be included in future models. Figure 3 summarises the comparative predictive strength of women's leadership and advocacy roles. The standardised beta for leadership was 0.07 with $p = 0.15$, while the standardised beta for advocacy was 0.13 with $p = 0.01$. This visual pattern reinforces the central finding: advocacy currently appears to be the stronger and statistically meaningful channel through which women's roles relate to SDG attainment in the study area, while leadership needs deeper institutional strengthening before it can produce measurable development outcomes.

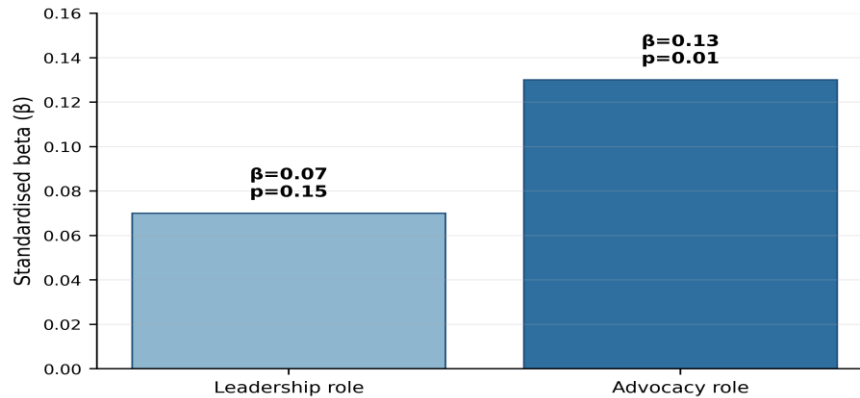


Figure 3. regression-effect summary for women's roles and SDG attainment.

Source: Author fieldwork, 2026.

Hypothesis one stated that there is no significant relationship between women's leadership role and the attainment of Sustainable Development Goals 3, 5 and 6 in Ikom Education Zone of Cross River State. The regression result showed a weak positive association ($R = 0.07$) and a very low explanatory value ($R^2 = 0.01$). The model was not statistically significant, $F(1, 396) = 2.06$, $p = 0.15$. Therefore, the null hypothesis was retained. Based on the valid data analysed, women's leadership role did not significantly predict SDG attainment in the study area.

Table 1. Regression model summary and ANOVA for women's leadership role and SDG attainment

Model component	SS	df	MS	F	p
Regression	10.09	1	10.09	2.06	0.15
Residual	1,942.85	396	4.91		
Total	1,952.94	397			

Model summary: $R = 0.07$; $R^2 = 0.01$; adjusted $R^2 = 0.00$; standard error of estimate = 2.21.

Source: Fieldwork, 2026.

Table 2. Coefficients for women's leadership role and SDG attainment

Predictor	B	SE	β	t	p
Constant	31.56	1.39		22.75	<0.001
Leadership role of women	0.10	0.07	0.07	1.43	0.15

Dependent variable: attainment of SDGs 3, 5 and 6.

Source: Fieldwork, 2026.

The coefficient table also showed that the leadership role of women had a positive but non-significant coefficient ($B = 0.10$, $SE = 0.07$, $\beta = 0.07$, $t = 1.43$, $p = 0.15$). This means that increases in leadership-role scores were associated with slight increases in SDG-attainment scores, but the evidence was not strong enough to conclude that the relationship exists in the wider population. In practical terms, women's leadership may be visible in some communities but may not yet be sufficiently empowered, resourced or institutionally recognised to improve health, gender equality and water-sanitation outcomes measurably. This finding should not be interpreted to mean that women's leadership is irrelevant. Rather, it suggests that leadership inclusion alone may be insufficient where leadership structures are weak or symbolic. In many rural settings, women may be nominated into committees or community associations but still lack authority over budgets, water projects, health campaigns or development priorities. The result therefore supports the need for leadership training, gender-sensitive governance structures, environmental education and institutional mechanisms that allow women leaders to influence practical decisions on health, water, sanitation, education and community welfare.

The finding is consistent with literature showing that cultural barriers, limited resources and low representation constrain women's leadership outcomes. Nyamweya et al. (2018) identified cultural perceptions as barriers to women's leadership participation, while Sam and Zibima (2024) showed that women's inclusion in environmental decision-making can remain low when institutions reproduce local gender hierarchies. In Ikom

Education Zone, leadership capacity may therefore require more than awareness. It may require structured mentoring, public legitimacy, access to funding, community by-laws that protect women's participation and deliberate inclusion of women in environmental and health planning committees. Hypothesis two stated that there is no significant relationship between women's advocacy role and attainment of Sustainable Development Goals 3, 5 and 6 in Ikom Education Zone of Cross River State. The regression result showed a weak positive association ($R = 0.13$) and a small explanatory value ($R^2 = 0.02$). The model was statistically significant, $F(1, 396) = 7.16$, $p = 0.01$. Therefore, the null hypothesis was rejected. This means that women's advocacy role significantly predicted SDG attainment, although the size of the effect was small.

Table 3. Regression model summary and ANOVA for women's advocacy role and SDG attainment

Model component	SS	df	MS	F	p
Regression	34.66	1	34.66	7.16	0.01
Residual	1,918.27	396	4.84		
Total	1,952.94	397			

Model summary: $R = 0.13$; $R^2 = 0.02$; adjusted $R^2 = 0.02$; standard error of estimate = 2.20.

Source: Fieldwork, 2026.

Table 4. Coefficients for women's advocacy role and SDG attainment

Predictor	B	SE	β	t	p
Constant	29.80	1.40		21.27	<0.001
Advocacy role of women	0.18	0.07	0.13	2.68	0.01

Dependent variable: attainment of SDGs 3, 5 and 6.

Source: Fieldwork, 2026.

The coefficient table showed that advocacy role had a positive and statistically significant coefficient ($B = 0.18$, $SE = 0.07$, $\beta = 0.13$, $t = 2.68$, $p = 0.01$). This implies that as women's advocacy roles improved, attainment of SDGs 3, 5 and 6 also tended to improve. The effect size was modest, but the result is meaningful because advocacy often operates through informal community channels that can influence health behaviour, gender awareness, water protection, sanitation practice and community mobilisation even where formal leadership access is limited. The advocacy finding supports Orisadare's (2019) observation that women's groups can be important grassroots platforms for political participation and economic development when properly oriented. It also supports Chinwokwu and Arop's (2018) argument that gender equality and women's empowerment are foundational to sustainable development. Advocacy may be more immediately effective than formal leadership in the study area because women can advocate through markets, churches, community meetings, age-grade associations, mothers' groups, school networks and informal social circles. These spaces can influence household and community behaviour even where women do not hold official political positions.

The advocacy finding is also relevant to environmental education. Women who advocate for clean water, sanitation, maternal health, girl-child education and community welfare contribute to behaviour change and public awareness. Such advocacy may reduce harmful practices, encourage household hygiene, support girls' school attendance, promote health-seeking behaviour and mobilise community pressure for water and sanitation facilities. In communities with ecotourism and natural-resource potential, women's advocacy can also promote responsible resource use, environmental cleanliness and community readiness for sustainable tourism development. (Eneyo, 2025a, 2025b; Eneyo & Eneyo, 2025; Eneyo & Ekong, 2019; Eneyo & Essien, 2023; Eneyo et al., 2017). The small R^2 values in both models should be interpreted carefully. The leadership and advocacy variables explain only a limited proportion of variation in SDG attainment, which is expected in a complex development context. SDG outcomes are also shaped by poverty, household income, education level, access to health facilities, water infrastructure, sanitation facilities, local government investment, road access, cultural norms, school retention, public health campaigns and environmental conditions. The statistical results therefore show that women's roles matter, especially advocacy, but they are part of a wider system of factors affecting community wellbeing.

The difference between leadership and advocacy may reflect the nature of community power. Leadership often depends on formal structures, titles and institutional recognition. If these structures remain male-dominated, women's leadership may be constrained even when women are capable. Advocacy, by contrast, can emerge through everyday communication, collective action and social networks. It may therefore be more flexible and more responsive to immediate community concerns. This interpretation suggests that development actors should strengthen both pathways: formal leadership should be made more effective, while advocacy platforms should be supported as legitimate channels for environmental education and SDG mobilisation. The results also demonstrate the importance of evidence-based interpretation. The study initially suggested that both leadership and advocacy had significant relationships with SDG attainment. The analysis shows a more nuanced pattern. Leadership has a positive but non-significant relationship, while advocacy has a positive and significant relationship. This refinement does not weaken the study; it strengthens it by making the claims more credible. Q1 and Scopus-indexed journals expect authors to interpret statistical outputs accurately, acknowledge small effects and explain what the results mean for practice rather than overstate significance.

Implications for environmental education, ecotourism and community development

The findings carry important implications for environmental education, gender-responsive community development and local SDG planning. First, women's advocacy should be recognised as a practical pathway for accelerating community awareness on health, gender equality and water-sanitation issues. Advocacy programmes should not be treated as ceremonial activities. They should be linked to measurable community objectives such as sanitation campaigns, maternal health referrals, gender-based violence reporting, safe water protection, school retention for girls and participation in environmental sanitation exercises.

Second, the non-significant leadership finding suggests that leadership inclusion needs to be strengthened. Women's leadership training should go beyond public speaking and meeting attendance. It should include budgeting, project monitoring, environmental education methods, community needs assessment, WASH governance, conflict mediation, advocacy strategy and data reporting. Local government authorities, school-based organisations, traditional institutions and civil society groups should create formal spaces where women leaders can influence the planning, implementation and monitoring of SDG-related interventions. Third, the study has implications for ecotourism and community sustainability in Cross River State. Communities that aspire to benefit from nature-based tourism require clean environments, safe water, inclusive governance, public health awareness and community readiness. Women's advocacy can support these prerequisites by encouraging environmental sanitation, waste control, water-source protection, visitor sensitisation and cultural hospitality. Women's groups can also serve as custodians of local knowledge, craft production, food services and community-based conservation messages when appropriately trained and included. (Eneyo, 2025c, 2025d, 2025e, 2025f; Eneyo & Ekpenyong, 2018a, 2018b; Eneyo & Itu, 2024; Eneyo et al., 2018; Eneyo, Ajake, et al., 2022; Eneyo, Attah, et al., 2022; Eneyo et al., 2021).

Fourth, the findings imply that SDG interventions should be gender-sensitive from design to evaluation. Development programmes should track not only infrastructure outputs, such as boreholes or health campaigns, but also women's participation in decision-making, household agency, sanitation behaviour, access to reproductive health information and leadership in environmental action. Without such indicators, programmes may claim success while leaving the social relations that shape use, maintenance and sustainability unchanged. Policy makers should treat women's roles as part of an enabling ecosystem. Advocacy will be more effective where women have access to information, legal protection, safe meeting spaces, responsive local institutions and links to health, water and education departments. Leadership will be more effective where women have authority, resources, legitimacy and accountability mechanisms. Environmental education can connect these conditions by equipping communities with the knowledge, values and skills needed for responsible local action.

Conclusion and recommendation

This study examined the relationship between women's leadership and advocacy roles and attainment of SDGs 3, 5 and 6 in Ikom Education Zone of Cross River State, Nigeria. The statistical results showed that women's leadership role had a weak positive but non-significant relationship with SDG attainment, while women's advocacy role had a weak but statistically significant relationship. The findings indicate that advocacy currently appears to be a more active pathway through which women influence community wellbeing, gender equality and water-sanitation outcomes, whereas leadership requires stronger institutional empowerment to generate measurable impact.

The study concludes that effective attainment of SDGs 3, 5 and 6 in the zone requires deliberate mobilisation of women not only as beneficiaries but as advocates, educators, organisers and decision-making partners. Women's voices should be integrated into local development planning, health promotion, sanitation campaigns, water governance, environmental education and community-based sustainability initiatives. Since the leadership effect was not statistically significant, special attention should be paid to converting women's representation into real influence through training, resources, legitimacy and accountability mechanisms. The study also concludes that small effect sizes should not be ignored. They indicate that SDG attainment is complex and cannot be explained by women's roles alone. Future interventions should therefore combine women's mobilisation with infrastructure, health services, safe water systems, sanitation facilities, poverty reduction, school retention, community security and gender-sensitive governance. Future research should include additional predictors, adopt mixed-method designs and examine the lived experiences through which women translate advocacy and leadership into measurable development outcomes.

Recommendations

1. Government and community institutions should organise structured leadership training programmes for women, with emphasis on environmental education, community health, water governance, sanitation planning, project monitoring, gender-responsive budgeting and accountable decision-making.
2. Women's advocacy groups should be strengthened through capacity-building, legal awareness, communication skills, access to community platforms and links with local government departments responsible for health, water, sanitation, education and environment.
3. Local government councils, traditional institutions and civil society organisations should formally include women in community development committees and ensure that their contributions influence decisions on SDG-related projects rather than serving only as token representation.
4. Environmental education campaigns should use women's associations, schools, faith-based organisations, market groups and youth platforms to promote safe water use, hygiene, sanitation, maternal health, girl-child education and responsible environmental behaviour.
5. Future studies should include additional predictors of SDG attainment, adopt larger multi-zone samples and consider mixed-method designs that capture both statistical relationships and the lived experiences of women in rural and semi-urban communities.

Declarations

Ethical approval: The study involved adult questionnaire respondents.

Informed consent: Participation was treated as voluntary, with confidentiality and anonymity maintained during data collection and reporting.

Funding: No external funding was reported in the study.

Conflict of interest: The author declares no conflict of interest.

Data availability: The data supporting the findings may be made available by the corresponding author upon reasonable request, subject to ethical and institutional requirements.

Author contribution: Usang Nkanu Onnoghen conceptualised the study, coordinated field data collection, supervised analysis and prepared the manuscript.

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References

- Aasa, O. P., Ajayi, O. M., Ogunjobi, V. O., & Akinbogun, O. T. (2019). Stakeholders' participation in environmental management in the Nigerian university system: Gender perspective. *Journal of Economics and Sustainable Development*, 10(24), 95–104. <https://doi.org/10.7176/JESD/10-24-11>
- Adejoh, P. E. (2015). Gender equality and women empowerment in Nigeria: Challenges and prospects. *Journal of Policy and Development Studies*, 9(2), 55–64.
- Adejumo, A. V., & Adejumo, O. O. (2014). Prospects for achieving sustainable development through the Millennium Development Goals in Nigeria. *European Journal of Sustainable Development*, 3(1), 33–46.
- Alamu, O. (2017). Sustainable development goals and Nigeria's development agenda. *Journal of Sustainable Development in Africa*, 19(3), 1–16.
- Bayeh, E. (2016). The role of empowering women and achieving gender equality to the sustainable development of Ethiopia. *Pacific Science Review B: Humanities and Social Sciences*, 2(1), 37–42. <https://doi.org/10.1016/j.psrb.2016.09.013>
- Bullough, A. M. (2008). Global factors affecting women's participation in leadership [Doctoral dissertation, Florida International University]. FIU Electronic Theses and Dissertations.
- Chinwokwu, E. C., & Arop, S. K. (2018). Gender equality and women empowerment towards sustainable national development in Nigeria. *Journal of Humanities and Social Policy*, 4(1), 42–54.
- Eneyo, V. B. (2025a). Essentials of tourism for beginners (pp. 1–91). University of Calabar Press.
- Eneyo, V. B. (2025b). Ethics and social responsibility in hospitality and tourism education. In *Tourism and the environment* (Vol. 1, pp. 358–374). University of Calabar Press.
- Eneyo, V. B. (2025c). Exploring sustainable livelihoods and socio-economic constraints in the Cross River National Park, Oban Division, Nigeria. *Journal of Environmental and Tourism Education*, 8(1), 569–587.
- Eneyo, V. B. (2025d). Leveraging Efik cultural festivals as strategic tools for tourism development and poverty reduction in Calabar, Nigeria. *Journal of Environmental and Tourism Education*, 8(1), 530–547.
- Eneyo, V. B. (2025e). The role of higher education in tourism and hospitality development. In *Tourism and the environment* (Vol. 1, pp. 340–357). University of Calabar Press.
- Eneyo, V. B. (2025f). Tourism for beginners II (pp. 1–117). University of Calabar Press.
- Eneyo, V. B., Ajake, A. O., & Ekpenyong, E. J. (2018). Assessing plastic wastes generation by eateries in Calabar, Nigeria. *World Environment Journal*, 2(1), 95–106.
- Eneyo, V. B., Ajake, A. O., Offiong, E. E., Ushie, M. A., & Akpan, N. A. (2022). Exploring spatial pattern of eateries in Calabar City, Cross River State, Nigeria. *Spatial Information Research*, 31(2), 167–179.
- Eneyo, V. B., Attah, F. M., Ekong, M. O., Offiong, E. E., Ekpo, E. E., Antai, A. S., Obi, F. B., & Essien, D. A. (2022). Marketing strategies of niche tourism products: A case study of Iboku Boat Regatta practised by the Efik people of South Eastern Nigeria. *African Journal of Hospitality, Tourism and Leisure*, 11, 541–554.
- Eneyo, V. B., Bassey, B., & Ekpenyong, E. J. (2017). Mapping hotel distribution in Calabar, Cross River State, Nigeria. *World Environment Journal*, 1(1), 66–83.
- Eneyo, V. B., & Eneyo, M. B. (2025). Philosophy of tourism: A philosophical approach to tourism studies. University of Calabar Press.
- Eneyo, V. B., & Ekong, M. O. (2019). Slave history 'theatre' as center for tourists' pull in Cross River State, Nigeria. *Journal of Tourism and Heritage Studies*, 8(1), 100–123.
- Eneyo, V. B., & Ekpenyong, E. J. (2018a). The contribution of tourism support services in the socio-economic development of Uyo Urban, Nigeria. *Multi-Disciplinary Journal of Research and Development Perspectives*, 7(2), 28–44.
- Eneyo, V. B., & Ekpenyong, E. J. (2018b). Spatial distribution of petrol filling stations in Calabar South Local Government Area, Cross River State. *Multi-Disciplinary Journal of Research and Development Perspectives*, 7(1), 66–83.
- Eneyo, V. B., & Essien, D. A. (2023). Economic and social impacts of cultural festivals: A comprehensive analysis of Calabar Carnival, Nigeria. *Nigerian Journal of Social and Development Issues*, 11(1), 116–133.
- Eneyo, V. B., & Itu, P. C. O. (2024). Variation in visitor numbers and contributing factors at tourism attractions in Akwa Ibom State, Nigeria. *World Tourism Journal*, 2(2), 83–98.
- Eneyo, V. B., Oba, D. O., Ochiche, C. A., Essien, D. A., & Antai, A. S. (2021). Economic impacts of curfew imposition on the nightclub industry in Calabar Metropolis, Nigeria. *African Journal of Hospitality, Tourism and Leisure*, 10(3), 955–971.
- Ette, M. (2017). Where are the women? Evaluating visibility of Nigerian female politicians in news media space. *Gender, Place & Culture*, 24(10), 1480–1497.
- Ezugwu, U. J., Maduka, E., Etta, E. E., Ekanem, S. A., & Egaga, U. T. (2024). The place of women in environmental management and sustainability in Nigeria. *Studia Ecologiae et Bioethicae*, 22(2). <https://doi.org/10.21697/seb.5808>
- Hassan, Z., & Silong, A. D. (2008). Women leadership and community development. *European Journal of Scientific Research*, 23(3), 361–372.
- Hoare, J., & Gell, F. (2009). Women's leadership and participation: Case studies on learning for action. Oxfam GB.
- Hora, E. A. (2014). Factors that affect women participation in leadership and decision-making position. *Asian Journal of Humanity, Art and Literature*, 1(2), 97–117. <https://doi.org/10.18034/ajhal.v1i2.287>
- Klarin, T. (2018). The concept of sustainable development: From its beginning to the contemporary issues. *Zagreb International Review of Economics and Business*, 21(1), 67–94. <https://doi.org/10.2478/zireb-2018-0005>
- Medupin, C. (2020). Women in environmental sciences (WiES) and the UN SDGs: A catalyst for achieving a sustainable future for all. *Sustainability*, 12(17), Article 7116. <https://doi.org/10.3390/su12177116>
- National Bureau of Statistics. (2019). Demographic statistics bulletin. National Bureau of Statistics.
- Ntiwunka, G. U. (2013). Women in decision-making and national development in Nigeria. *Journal of Gender and Development Studies*, 7(1), 44–56.

- Nyamweya, F., Ogwora, E., & Nyamwange, C. (2018). The impact of cultural perceptions on women's participation in leadership among the Abagusii: A case of Kitutu Masaba Constituency, Nyamira County, Kenya. *International Journal of Social Sciences and Information Technology*, 4, 52–71.
- Nyong, S. F., & Archibong, E. P. (2018). Women community managing roles and contribution to social development in Akpabuyo Local Government Area of Cross River State, Nigeria. *International Journal of Multidisciplinary Thought*, 7(2), 459–468.
- Odera, J. A., & Mulusa, J. (2020). SDGs, gender equality and women's empowerment: What prospects for delivery? *Interdisciplinary Studies in Human Rights*, 5, 95–118.
- Ogbogu, C. O. (2012). The role of women in politics and in the sustenance of democracy in Nigeria. *International Journal of Business and Social Science*, 3(18), 182–191.
- Okafor, E. E., & Akokuwebe, M. E. (2015). Women and leadership in Nigeria: Challenges and prospects. *Developing Country Studies*, 5(4), 1–10.
- Orisadare, M. A. (2019). An assessment of the role of women group in women political participation, and economic development in Nigeria. *Frontiers in Sociology*, 4, Article 52. <https://doi.org/10.3389/fsoc.2019.00052>
- Ozor, N., & Nwankwo, N. (2008). Gender and community development in Nigeria: Issues and prospects. *Journal of Agricultural Extension*, 12(2), 1–12.
- Sahu, T. K., & Yadav, K. (2018). Women's education and political participation. *International Journal of Advanced Education and Research*, 3(6), 65–71. <https://doi.org/10.22271/educatin.2018.v3.i6.15>
- Sam, K., & Zibima, T. (2024). Inclusive environmental decision-making in a developing nation: Insights from the Ogoni remediation project, Niger Delta, Nigeria. *Environmental Management*, 73, 323–337. <https://doi.org/10.1007/s00267-023-01885-y>
- Stephen, O. (2017). Women's advocacy and the struggle for gender equality in contemporary society. *Journal of Gender, Information and Development in Africa*, 6(2), 91–106.
- Ugal, D. B. (2015). Women empowerment and socio-economic development in Cross River State, Nigeria. *International Journal of Humanities and Social Science*, 5(6), 114–123.
- UNESCO. (2020). Education for sustainable development: A roadmap. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000374802>
- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. United Nations.
- UN Women & United Nations Department of Economic and Social Affairs. (2024). Progress on the Sustainable Development Goals: The gender snapshot 2024. United Nations. <https://unstats.un.org/sdgs/gender-snapshot/2024/>
- Vixathep, S. (2011). Khmu women's participation in community development projects in Luang Prabang Province, Lao PDR. *Gender, Technology and Development*, 15(1), 111–130.
- World Health Organization & United Nations Children's Fund. (2023). Progress on household drinking water, sanitation and hygiene 2000–2022: Special focus on gender. WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. <https://www.who.int/publications/i/item/9789240076921>