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Research article

**SOCIOECONOMIC INEQUALITY AND PARTICIPATION IN URBAN
ECOTOURISM SPACES IN CALABAR METROPOLIS NIGERIA**

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ABSTRACT

This study evaluates how socioeconomic resources may structure participation in urban ecotourism and nature-based recreation in Calabar Metropolis. A reproducible quantitative simulation comprising 300 cases was analysed because no verified respondent-level field dataset accompanied the study. Participation was operationalised as a 1-5 composite of visit frequency, duration, activity diversity and regularity; income, education and occupational status were the principal predictors, with age and gender as covariates. Descriptive statistics, one-way analysis of variance and ordinary least-squares regression were applied. Mean participation increased from 2.53 in the low-status group to 2.93 in the middle-status group and 3.70 in the high-status group. The between-group effect was large, $F(2, 297)=106.14$, $p<.001$, $\eta^2=.417$. The multivariable model was significant, $F(5, 294)=93.93$, $p<.001$, explaining 61.5% of participation variance. Income ($\beta=.597$) and education ($\beta=.434$) were the dominant positive predictors; occupation was positive, age negative and gender negligible. The findings support a field-testable inequality mechanism but are not population estimates. A probability-based household survey linked to GIS accessibility and facility-quality measures is required before policy generalisation.

KEYWORDS

urban ecotourism;
socioeconomic inequality;
recreation participation;
simulation; environmental
justice; Calabar Metropolis

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INTRODUCTION

Urban ecotourism and nature-based recreational spaces contribute to physical activity, psychological restoration, social interaction and environmental awareness. Their benefits, however, are not distributed automatically or equally. Participation requires money, time, information, transport and confidence, while the location, safety, quality and affordability of facilities determine whether residents can convert interest into actual use. A city may therefore possess numerous parks, gardens and resorts yet reproduce unequal recreational opportunity.

International evidence shows a persistent socioeconomic gradient in leisure-time physical activity. Higher educational and income groups generally participate more

often, although the relationship varies by activity type and setting (Beenackers et al., 2012; Guthold et al., 2020). Spatial proximity alone is insufficient: lower-income neighbourhoods may have nominal access to facilities but lower use because effective access also depends on cost, safety, quality and transport (Giles-Corti & Donovan, 2002). This distinction is pertinent to Calabar, where recreational resorts are spatially clustered and open spaces differ in quality and accessibility (Bassey, 2018; Obiefuna et al., 2025).

Bourdieu's (1986) theory of capital explains how economic and cultural resources expand the range of feasible leisure choices. Leisure-constraints theory adds that participation depends on negotiating intrapersonal, interpersonal and structural barriers (Crawford et al., 1991), while social-ecological models locate behaviour within interacting individual, social and built-environment contexts (Sallis et al., 2006, 2015). Together, these perspectives predict that income, education and occupation influence participation directly and through residents' capacity to overcome admission charges, distance, time scarcity, weak information and poor facility conditions.

Existing Calabar studies have examined tourism facilities, recreational patronage and the spatial quality of green spaces, but multivariable evidence on who participates remains limited (Odok et al., 2013; Igah et al., 2026; Obiefuna et al., 2025). The present study therefore tests a transparent quantitative model of socioeconomic inequality in participation. It asks whether participation differs across socioeconomic-status groups and whether income, education and occupation retain explanatory power after age and gender are controlled. The null hypothesis is that socioeconomic indicators neither individually nor jointly predict participation. Because the available analytical data are simulated, the contribution is a reproducible empirical demonstration and field-validation protocol rather than an estimate of inequality among Calabar residents.

METHODOLOGY

Research design and analytical sample

A cross-sectional quantitative simulation design was used to evaluate the proposed measurement and modelling framework. The analytical file contained 300 synthetic cases divided equally among low-, middle- and high-socioeconomic-status groups. Simulation is appropriate for checking whether variables, contrasts and estimators answer the research questions before field deployment; it does not substitute for probability-sampled observations. Accordingly, all numerical results

below describe the synthetic sample and are reported with an explicit non-generalisation boundary.

Variables and operationalisation

The dependent variable was a continuous participation index ranging from 1 to 5, formed conceptually from visit frequency, duration, activity diversity and regularity. The core predictors were monthly household income, educational attainment and occupational status. Age and gender were included as demographic covariates. Higher scores represented greater socioeconomic resources or participation. A field version should use multi-item measures, report item coding and scale reliability, and add transport access, admission cost, perceived safety, facility quality, information access and network distance as theoretically specified constraints.

Statistical analysis

Analysis proceeded in four stages. First, selected sample characteristics and group distributions were summarised. Second, mean participation was compared across socioeconomic groups using one-way ANOVA. Eta-squared and omega-squared quantified the omnibus effect, while pairwise mean differences, 95% confidence intervals and Cohen's *d* described magnitude. Third, ordinary least-squares regression estimated the adjusted contributions of income, education, occupation, age and gender: $\text{Participation} = \beta_0 + \beta_1(\text{Income}) + \beta_2(\text{Education}) + \beta_3(\text{Occupation}) + \beta_4(\text{Age}) + \beta_5(\text{Gender}) + \text{error}$. Statistical decisions used $\alpha=.05$. Fourth, model adequacy was assessed from R-squared, adjusted R-squared, residual mean square and the overall *F* test. Respondent-level residual diagnostics could not be recomputed because the underlying case file was not supplied; future field analysis must report linearity, normality, homoscedasticity, influential observations and variance-inflation factors.

Research integrity and reproducibility

Reported statistics are either contained in the supplied analytical output or derived algebraically from the reported group sizes, means and standard deviations. No simulated result is represented as a field observation. The analytical logic, coding rules, questionnaire, de-identified field data and syntax should be archived when the study is validated with residents. Because the present analysis did not recruit human participants, institutional ethics approval and informed consent were not applicable to the simulation phase.

RESULTS

Sample profile and socioeconomic gradient

The synthetic sample was balanced across three socioeconomic groups (n=100 each). Selected reported characteristics included 144 men (48.0%), 54 respondents with secondary education or below (18.0%), and 66 unemployed or informal workers (22.0%). These indicators demonstrate variation in the analytical file but do not constitute a complete demographic profile.

Table 1. Participation by socioeconomic-status group

SES group	n	Mean	SD	95% CI for mean
Low	100	2.53	0.57	2.42-2.64
Middle	100	2.93	0.55	2.82-3.04
High	100	3.70	0.61	3.58-3.82

Source: Authors' analysis of the simulated dataset.

Participation rose monotonically across the three groups (Table 1). The omnibus difference was statistically significant and substantively large, $F(2, 297)=106.14$, $p<.001$, $\eta^2=.417$ and $\omega^2=.412$. Thus, approximately 42% of the synthetic participation variance was located between socioeconomic groups. The high-low contrast was 1.17 points (95% CI 1.01-1.33; $d=1.98$), the high-middle contrast was 0.77 (95% CI 0.61-0.93; $d=1.33$), and the middle-low contrast was 0.40 (95% CI 0.24-0.56; $d=0.71$). Each contrast was large enough to warrant targeted field testing.

Multivariable model

Table 2. Ordinary least-squares model of participation

Component	Estimate	Test or direction	Interpretation
Model fit	R=.784; R ² =.615; adjusted R ² =.608	F(5,294)=93.93; p<.001	Strong joint explanatory fit
Income	Standardised beta=.597	Positive; significant	Largest adjusted contribution
Education	Standardised beta=.434	Positive; significant	Second-largest contribution
Age	Standardised beta=- .190	Negative; significant	Participation declines with age
Occupation	Standardised beta=.166	Positive; significant	Smaller independent contribution
Gender	Standardised beta=.010	Near zero; not significant	No adjusted contribution

Source: Authors' analysis of the simulated dataset.

The five-predictor regression explained 61.5% of participation variance, with little shrinkage after adjustment (Table 2). The residual mean square was .223 and the standard error of estimate was .472. The omnibus test rejected the joint null hypothesis. Income had the strongest standardised association, followed by education. Occupation remained positive but smaller; age was inversely related to participation, and gender added virtually no explanatory value after adjustment. The reported output did not include unstandardised coefficients, standard errors, confidence intervals or collinearity statistics; consequently, causal interpretation and prediction for individual residents are not justified.

DISCUSSION

The results demonstrate a coherent inequality mechanism within the simulated system. The large socioeconomic-group effect and the dominance of income accord with leisure-constraints theory: residents with greater financial resources can more readily meet admission, transport, food, equipment and opportunity costs. The education effect is consistent with cultural capital, because knowledge, confidence and familiarity may expand awareness of formal recreational opportunities. Occupation plausibly combines income and time availability,

explaining its smaller independent contribution after the other predictors are controlled.

The inverse age coefficient indicates that an empirical survey should measure age-sensitive preferences, mobility limitations and facility design. The negligible gender coefficient shows why unadjusted group comparisons can be misleading: an apparent gender difference may disappear after correlated socioeconomic conditions are considered. This is a model-specific result, not evidence that gender is irrelevant in Calabar; safety, care responsibilities and culturally patterned leisure opportunities should be measured directly in field research.

Place remains central to interpretation. The distribution and quality of Calabar's recreational spaces are uneven (Bassey, 2018; Obiefuna et al., 2025). Resources may therefore moderate spatial constraints: private transport can overcome distance, while a nearby facility may remain functionally inaccessible because of fees, insecurity or poor maintenance. The proposed model advances the literature by treating participation as an environmental-justice outcome produced by the interaction of personal capital and urban opportunity structure.

The effect sizes are intentionally more informative than significance alone, but their magnitude may reflect how the simulation was constructed. Field estimates may be smaller, non-linear or context-dependent. The study also lacks respondent-level diagnostics, seasonal variation, neighbourhood clustering and verified scale reliability. These limitations prevent population inference and causal claims. Its defensible contribution is a pre-specified, auditable framework that can now be subjected to field validation rather than an assertion that inequality has already been measured among Calabar residents.

CONCLUSION AND RECOMMENDATIONS

The quantitative simulation supports the internal logic of a socioeconomic gradient in urban ecotourism participation. Participation increased across status groups; income, education and occupation were positive adjusted predictors; age was negative; and gender was negligible. The model explained 61.5% of synthetic variance, while the omnibus group effect was large. These results establish analytical feasibility, not the prevalence or causal magnitude of inequality in Calabar.

A field-ready validation should draw a probability sample of households across Calabar Municipality and Calabar South, include both users and non-users, and link questionnaire responses to GIS network distance, transport availability, facility

quality, admission cost and neighbourhood deprivation. The instrument should be piloted, translated where necessary, and evaluated for construct validity and internal consistency. Analysis should report complete coefficients and 95% confidence intervals, diagnostic plots, multicollinearity, sensitivity tests and neighbourhood-level clustering. Repeated wet- and dry-season measurement would reduce seasonal bias.

Pending validation, planners should treat affordability and effective accessibility as linked equity concerns. Public authorities should protect free or low-cost green spaces, improve public-transport connections, distribute facilities beyond advantaged neighbourhoods and publish participation indicators disaggregated by income, education, occupation, age, gender and neighbourhood. Operators should consider transparent concessionary pricing and accessible information channels. Policy adoption should follow verified field estimates rather than the simulation coefficients reported here.

DECLARATIONS

Ethics approval and consent to participate. Not applicable to the present simulation study because no human participants or identifiable records were used. Ethical approval and informed consent will be mandatory for the proposed field validation.

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Conflict of interest. The authors declare no conflict of interest.

Data and code availability. The summary statistics underlying this analysis are reported in the article. The authors should archive the synthetic case file, codebook and analysis syntax in a trusted repository before submission.

Author contributions. F. C. Adeyemi: conceptualisation, methodology and drafting. F. Okpiliya: supervision, interpretation and critical revision. L. B. Akeh: methodology, validation and critical revision. All authors approved the final manuscript; the authors should confirm these roles before submission.

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