

Sustainable Development Goals and Rural Household Welfare in Cross State, Nigeria.

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Abstract

This study examined the influence of selected Sustainable Development Goals (SDGs) on the welfare of rural households in Cross River State, Nigeria, with specific attention to three dimensions of welfare: household income, nutritional well-being, and healthcare outcomes. Guided by three objectives, the study investigated the influence of access to quality education on household income, the effect of employment opportunities on nutritional well-being, and the relationship between access to clean water and healthcare outcomes among rural households. The study adopted a descriptive survey research design, anchored on Social Capital Theory, and drew a sample of 317 respondents from a population of 1,524 registered rural households across the three senatorial districts of Cross River State, using a multistage sampling technique. A structured questionnaire was administered, out of which 304 copies were correctly completed and retrieved, representing a 95.9 per cent response rate. Data was analysed using descriptive statistics and Ordinary Least Squares (OLS) regression. Findings revealed that access to quality education, particularly teacher qualification and improvement in educational access over time, significantly influenced household income ($R^2 = 0.976$, $F = 2980.164$, $p < 0.001$). Employment opportunities, especially youth employment and the provision of regular income, significantly improved nutritional well-being ($p < 0.001$ for all indicators). Access to clean water was also very strongly and positively correlated with healthcare outcomes ($r = 0.949$ to 0.987 , $p < 0.001$). The study concludes that SDG-aligned interventions in education, employment, and water provision are critical levers for improving rural household welfare, and recommends that policymakers prioritise teacher quality, youth-focused employment programmes, and reliable clean water provision as integrated strategies for sustainable rural development.

Keywords: Sustainable Development Goals, Rural Household Welfare, Access to Education, Employment Opportunities, Clean Water, Healthcare Outcomes, Cross River State.

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1. Introduction

The pursuit of sustainable development has become a central concern in global development discourse, particularly given the persistence of poverty, inequality, and uneven access to basic services across many developing countries. In 2015, the United Nations adopted the Sustainable Development Goals (SDGs) under the 2030 Agenda, comprising 17 interrelated goals aimed at eradicating poverty and hunger, improving health and education outcomes, and fostering inclusive economic growth (UN, 2015; Adejumo, Asongu & Adejumo, 2021). A defining principle supporting the SDGs is the commitment to "leaving no one behind," which places rural households, who are disproportionately exposed to poverty and limited access to basic services, at the centre of global development efforts (Aku & Hassan, 2021).

In Nigeria, rural communities continue to experience significant development deficits, reflected in poor infrastructure, inadequate healthcare, low educational attainment, and limited livelihood opportunities (Jimoh, Abdullahi & Hadiza, 2020; Soyemi, Olowofela & Yunusa, 2020). Cross River State, a south-south state whose rural economy is predominantly agrarian, exemplifies this challenge. Despite the state's rich natural resource base, rural poverty and limited access to education, employment, and clean water persist, suggesting a gap between SDG aspirations and on-the-ground realities. Welfare, in this context, is understood as a multidimensional concept that extends beyond income to encompass health, education, nutrition, and access to basic services (Alkire & Foster, 2011; Erin, 2025).

Problem

Despite growing attention to the SDGs in development discourse, there remains limited empirical evidence on how specific SDG-related interventions, such as access to quality education, employment opportunities, and clean water, translate into measurable welfare outcomes for rural households at the sub-national level in Nigeria. Existing studies have often examined SDG implementation in broad or aggregate terms, with insufficient attention to how individual dimensions of welfare, such as income, nutrition, and health, are shaped by specific SDG-aligned interventions within a defined rural context (Kabari & Nwogo, 2021; Moromoke, Kunle & Taiwo, 2024). This gap limits the ability of policymakers to design targeted, evidence-based interventions capable of improving rural livelihoods in states such as Cross River.

This study therefore set out to examine the relationship between selected SDG-related variables and rural household welfare in Cross River State, Nigeria, guided by three specific objectives: (i) to examine the influence of access to quality education on the income levels of rural households; (ii) to evaluate the effect of employment opportunities on the nutritional well-being of rural households; and (iii) to investigate the relationship between access to clean water and the healthcare outcomes of rural households. By empirically testing these relationships, the study contributes to the literature on SDG implementation and rural development, while offering evidence-based insights to guide policy formulation in Cross River State and similar rural contexts in Nigeria.

2. Literature Review

Conceptual Review

2.1 Sustainable Development Goals and Rural Household Welfare

The Sustainable Development Goals represent a globally agreed framework of 17 goals designed to end poverty, protect the environment, and ensure that all people enjoy peace and prosperity by 2030 (UN, 2015). For rural households, the SDGs are particularly significant because rural populations bear a disproportionate share of global poverty and are often excluded from mainstream development planning (Aku & Hassan, 2021). Rural household welfare, in turn, is a multidimensional construct that reflects the overall well-being of a household, encompassing income adequacy, food and nutrition security, access to healthcare, education, and a safe living environment (Roefie, 2010; Monowaruz, 2018; Soursoy, 2022). Welfare therefore cannot be reduced to income alone; it must be understood as the combined outcome of a household's access to the resources and services that enable it to function and thrive (Alkire & Foster, 2011).

2.2 Access to Quality Education and Household Income

Access to quality education refers to the extent to which individuals, particularly children and youth in rural communities, can obtain relevant, adequate, and effective schooling, encompassing not just physical access to schools but also the quality of teaching, learning facilities, and continuous improvement in educational provision over time (Adeyemi & Ajinbola, 2019). Quality education is widely regarded as a primary pathway out of poverty, as it builds the human capital that enables individuals to access

better-paying employment, engage in more productive economic activities, and make informed decisions that improve household income (Adejumo, Asongu & Adejumo, 2021). In rural contexts, where formal employment opportunities are often limited, the quality of education, particularly the competence of teachers and the relevance of the curriculum, can determine whether educational investment translates into tangible income gains for households.

2.3 Employment Opportunities and Nutritional Well-Being

Employment opportunities refer to the availability of paid work, whether in the formal or informal sector, that enables members of rural households to earn an income. Nutritional well-being, on the other hand, describes the extent to which household members have consistent access to sufficient, safe, and nutritious food to meet their dietary needs (Adeniyi & Dinbabo, 2020). The link between employment and nutrition is well established in development literature: households with stable sources of income are better able to purchase diverse and nutritious food, reduce their vulnerability to food insecurity, and withstand economic shocks. In rural areas, youth employment is particularly important, as it not only provides income directly but also reduces dependency ratios within households, freeing up resources that can be channelled toward food and nutrition (Hanachor & Olumati, 2018).

2.4 Access to Clean Water and Healthcare Outcomes

Access to clean water refers to the availability of safe, reliable, and adequate water supply for drinking, cooking, and sanitation purposes. Healthcare outcomes describe the overall health status of household members, including the prevalence of illness, access to treatment, and general physical well-being (Akpan & Isihak, 2020). The relationship between clean water and health is one of the most firmly established in public health research: unsafe water is a leading cause of waterborne diseases such as cholera, typhoid, and diarrhoea, which disproportionately affect rural communities with limited access to treated water sources (Nnaeto & Umeh, 2020). Consequently, improvements in water access are expected to translate directly into measurable improvements in household health outcomes, making this relationship a critical indicator of SDG 6 (Clean Water and Sanitation) performance at the household level.

Theoretical Framework

This study is anchored on Social Capital Theory, propounded by Pierre Bourdieu (1986), which emphasises the value of social networks, norms of reciprocity, and trust within communities as resources that individuals and households can draw upon to improve their circumstances. Social Capital Theory is particularly relevant to this study because rural communities in Cross River State often rely on collective networks, cooperative labour, and shared community resources to access education, negotiate employment opportunities, and maintain communal water infrastructure. The theory holds that the success of development interventions, including SDG-aligned programmes, depends not only on the availability of resources but also on the strength of social ties and community cohesion that facilitate the equitable distribution and sustained use of those resources (Bourdieu, 1986).

The study also draws, in a complementary sense, on the Capabilities Approach associated with Amartya Sen, which argues that development should be assessed not merely by income but by the real freedoms and capabilities individuals have to live the lives they value, including access to education, healthcare, and economic opportunity. While the Capabilities Approach offers a useful lens for understanding individual welfare, its emphasis on individual agency can understate the role of community-level cooperation that is characteristic of rural Nigerian settings. Social Capital Theory was therefore considered the more suitable anchor for this study, as it better captures how collective action and community networks mediate the translation of SDG interventions into actual household-level welfare gains in Cross River State.

Empirical Review

Several empirical studies have examined the relationship between SDG implementation and rural household welfare across different contexts. Kabari and Nwogo (2021) explored the role of SDGs in reducing poverty and promoting rural development in Nigeria using a survey of 600 rural households in Rivers and Bayelsa States. Applying descriptive statistics and chi-square analysis ($\chi^2 = 23.41$, $p < 0.05$), the study found that interventions aligned with SDGs, particularly in health, education, and water access, significantly improved rural welfare, and recommended integrated community-based approaches to SDG implementation.

In a cross-national study, Apergis, Polemis and Soursou (2022) examined how SDG implementation influences rural household welfare using panel data from 29 countries. Employing fixed effects regression and GMM estimators, the study found that countries with higher SDG implementation scores experienced a 9.3 per cent increase in rural welfare indicators ($p < 0.01$), underscoring the empirical link between SDG performance and household-level outcomes. Similarly, Aku and Hassan (2021), in a study of sustainable development strategies in Nasarawa State, Nigeria, used ANOVA ($F(2,397) = 12.54, p < 0.001$) on a stratified sample of 400 participants to show that rural electrification, water supply, and educational schemes significantly enhanced household living conditions.

On the specific relationship between education and income, Adejumo, Asongu and Adejumo (2021) observed that increased enrolment and improved educational access positively influence rural employment and household welfare, demonstrating the central role of education in socioeconomic development. On employment and nutrition, Hanachor and Olumati (2018) used participatory rural appraisal and key informant interviews with 300 respondents to show that SDG-based interventions, particularly those promoting employment, improved nutrition, health access, and income stability in rural Nigerian communities.

Regarding water access and health, Akpan and Isihak (2020) analysed rural poverty and its connection with access to social services among 500 rural households, finding that poor access to services such as healthcare, education, and sanitation exacerbated rural poverty, with a correlation coefficient of 0.65. Nnaeto and Umeh (2020) similarly found, using chi-square tests on 400 rural households in Imo State, that inadequate social amenities, including water, significantly degrade the quality of life in rural communities, reinforcing the critical role of water access in household health.

Moromoke, Kunle and Taiwo (2024), using a mixed-methods design involving surveys and interviews with 550 rural dwellers, found a positive correlation between SDG-anchored interventions and household income, education, and health outcomes, recommending enhanced budget allocation for rural SDG programmes. Soyemi, Olowofela and Yunusa (2020), analysing data from 750 respondents across three states in Southwest Nigeria using logistic regression, found that households aware of and participating in SDG-aligned programmes recorded

significantly better welfare metrics, advising improved rural sensitisation and policy alignment with the SDGs.

Gap in Literature

While the reviewed studies provide valuable insights into the broad relationship between SDG implementation and rural welfare, most adopt an aggregate approach that treats welfare as a single composite outcome, with relatively few studies isolating specific SDG-aligned variables, such as teacher quality, youth employment, and water reliability, and testing their individual statistical influence on distinct welfare dimensions such as income, nutrition, and health, within a single rural state in Nigeria. This study addresses this gap by disaggregating rural household welfare into three distinct, measurable outcomes and empirically testing the specific influence of education, employment, and water access on each, using primary data from Cross River State.

3. Methodology

3.1 Research Design

The study adopted a descriptive survey research design, considered appropriate for systematically collecting and analysing data on the perceptions and experiences of rural households regarding the influence of selected SDGs on their welfare. This design is particularly suited to examining social phenomena that are not directly observable, such as the extent to which rural households benefit from education, employment, and clean water interventions (Adeyemi & Ajinbola, 2019).

3.2 Area of the Study, Population and Sample

The study was conducted in Cross River State, Nigeria, a south-south state with a predominantly agrarian rural economy, comprising 18 Local Government Areas grouped into three senatorial districts: Northern, Central, and Southern. The population of the study comprised all registered rural households benefiting from agricultural, educational, healthcare, and empowerment programmes linked to SDG interventions across the three senatorial districts, totalling 1,524 households according to records from the Cross River State Ministry of Rural Development (2025). Using Taro Yamane's (1967) formula at a 5 per cent margin of error, a sample size of 317 respondents was derived. A multistage sampling technique was employed: the state was first stratified into its three senatorial districts; three Local Government Areas were then randomly selected from each district; two rural communities were

randomly selected from each selected LGA; and households were finally selected through systematic random sampling from community registers. Of the 317 questionnaires administered, 304 were correctly completed and retrieved, representing a response rate of 95.9 per cent, which formed the basis for the analysis presented in this study.

3.3 Instrument, Validity and Reliability

Data were collected using a structured questionnaire developed on a 5-point Likert scale, comprising a demographic section and a second section organised into clusters corresponding to the study's three objectives, covering access to quality education, employment opportunities and nutritional well-being, and access to clean water and healthcare outcomes. The instrument's validity was established through review by the researcher's supervisor and experts in rural development and research methodology, who assessed the items for clarity, relevance, and alignment with the study's objectives. Reliability was established through a pilot study involving 20 rural households outside the study area, after which a Cronbach's Alpha coefficient of 0.82 was obtained, exceeding the 0.70 threshold recommended by Nworgu (2016) and confirming the instrument's internal consistency.

3.4 Method of Data Analysis and Model Specification

Data were analysed using both descriptive statistics, including frequencies, percentages, means, and standard deviations, and inferential statistics, specifically Ordinary Least Squares (OLS) regression and Pearson correlation analysis, to test the relationships formulated in the study's hypotheses. All hypotheses were tested at a 5 per cent level of significance ($p \leq 0.05$) using SPSS version 23. In line with the three objectives guiding this study, the general model is specified as:

$$Y = f(X_1, X_2, X_3) + \varepsilon$$

Where Y represents rural household welfare outcomes, X_1 represents access to quality education, X_2 represents employment opportunities, X_3 represents access to clean water, and ε is the error term. This general model is decomposed into three explicit regression/correlation models corresponding to the study's three objectives:

Model I (Objective One): $Y_1 = \beta_0 + \beta_1 X_1 + \varepsilon$, where Y_1 represents income levels of rural households.

Model II (Objective Two): $Y_2 = \beta_0 + \beta_2 X_2 + \varepsilon$, where Y_2 represents nutritional well-being of rural households.

Model III (Objective Three): $Y_3 = \beta_0 + \beta_3 X_3 + \varepsilon$, where Y_3 represents healthcare outcomes of rural households.

In each model, β_0 denotes the intercept, while β_1 to β_3 represent the regression coefficients measuring the magnitude and direction of the effect of each independent variable on its corresponding welfare outcome. For Objective Three, given the strength of the association observed between water access indicators and healthcare outcomes, Pearson correlation analysis was additionally applied to assess the strength and direction of the relationship.

4. Results and Discussion

4.1 Response Rate and Respondent Profile

Out of the 317 questionnaires distributed, 304 were correctly completed and retrieved, representing a response rate of 95.9 per cent, which indicates strong respondent cooperation and suggests that the data obtained are adequate and reliable for the analysis that follows. Of the 304 respondents, 57.9 per cent were female and 42.1 per cent were male, while the majority of respondents (48.0 per cent) fell within the 21 to 25 years age bracket, indicating that the study largely captured the perspectives of young, economically active rural household members. This relatively balanced demographic spread strengthens the credibility and generalisability of the findings presented below.

4.2 Objective One: Access to Quality Education and Household Income

The descriptive statistics show that the mean income level of respondents was 14.37 (SD = 5.16), indicating moderate variation in household income across the sample. Respondents generally held positive perceptions of access to quality education: teachers in rural schools were perceived as adequately qualified (Mean = 3.53, SD = 1.29), quality schools were considered accessible within communities (Mean = 3.49, SD = 1.29), educational facilities were seen to meet learning needs (Mean = 3.43, SD = 1.31), and access to education was perceived to have improved over time (Mean = 3.30, SD = 1.36).

The regression results show a very strong relationship between access to quality education and household income,

with a correlation coefficient of $R = 0.988$ and an R^2 value of 0.976, indicating that approximately 97.6 per cent of the variation in household income is explained by the education-related indicators jointly. The model was statistically significant overall ($F(4, 299) = 2980.164$, $p < 0.001$). At the level of individual predictors, teacher qualification emerged as the strongest and most significant determinant of household income ($B = 3.652$, $\beta = 0.915$, $t = 15.126$, $p < 0.001$), followed by improvement in access to education over time ($B = 0.326$, $\beta = 0.086$, $t = 2.288$, $p = 0.023$). In contrast, the accessibility of quality schools within the community ($B = -0.071$, $p = 0.811$) and the adequacy of educational facilities ($B = 0.033$, $p = 0.883$) did not have statistically significant effects on income. Based on the decision rule that the null hypothesis is rejected where $p \leq 0.05$, the null hypothesis that access to quality education has no significant influence on household income is rejected, confirming that access to quality education, driven primarily by teacher quality, significantly influences the income levels of rural households in Cross River State.

4.3 Objective Two: Employment Opportunities and Nutritional Well-Being

The mean score for nutritional well-being among respondents was 14.30 ($SD = 5.13$), reflecting moderate variation in nutritional status across households. Respondents generally agreed that employment opportunities are available locally (Mean = 3.59, $SD = 1.29$), provide regular income (Mean = 3.52, $SD = 1.31$), are improving for youth (Mean = 3.60, $SD = 1.30$), and help reduce household poverty (Mean = 3.47, $SD = 1.31$).

Regression results show that all employment-related indicators had a statistically significant positive effect on nutritional well-being. Improvement in youth employment recorded the strongest effect ($B = 1.565$, $\beta = 0.398$, $t = 8.041$, $p < 0.001$), followed by employment providing regular income ($B = 1.103$, $\beta = 0.282$, $t = 7.778$, $p < 0.001$) and employment reducing household poverty ($B = 0.828$, $\beta = 0.211$, $t = 7.439$, $p < 0.001$). The local availability of employment opportunities also had a positive, though comparatively smaller, significant effect ($B = 0.452$, $\beta = 0.114$, $t = 2.183$, $p = 0.030$). Based on the decision rule applied, the null hypothesis that employment opportunities have no significant effect on nutritional well-being is rejected, confirming that employment opportunities, particularly those involving youth engagement and regular income, significantly and positively influence the

nutritional well-being of rural households in Cross River State.

4.4 Objective Three: Access to Clean Water and Healthcare Outcomes

The mean healthcare outcome score among respondents was 15.26 ($SD = 4.70$), indicating moderate variation in health status across the sample. Respondents generally agreed that clean drinking water is easily accessible (Mean = 3.72, $SD = 1.23$), water sources are reliable year-round (Mean = 3.66, $SD = 1.23$), clean water reduces illness (Mean = 3.54, $SD = 1.28$), and water quality meets health standards (Mean = 3.74, $SD = 1.22$).

Pearson correlation analysis revealed very strong, statistically significant positive relationships between healthcare outcomes and all clean water indicators: clean drinking water accessibility ($r = 0.983$, $p < 0.001$), reliability of water sources year-round ($r = 0.968$, $p < 0.001$), clean water reducing illness ($r = 0.949$, $p < 0.001$), and water quality meeting health standards ($r = 0.987$, $p < 0.001$). All correlations were significant at the 1 per cent level, indicating that households with more reliable access to clean water consistently reported better healthcare outcomes. Based on the decision rule applied, the null hypothesis that there is no significant relationship between access to clean water and healthcare outcomes is rejected, confirming a statistically significant positive relationship between the two variables among rural households in the study area.

5. Discussion of Findings

The findings of this study reveal that access to quality education, particularly the quality of teaching rather than the mere physical presence of schools, is the most critical educational factor influencing rural household income in Cross River State. This finding aligns with Adejumo, Asongu and Adejumo (2021), who similarly observed that improved educational access and quality positively influence rural employment and household welfare, reinforcing the view that investment in human capital, specifically teacher competence, yields stronger welfare returns than infrastructural expansion alone.

With respect to employment and nutrition, the finding that youth employment and regular income exert the strongest influence on nutritional well-being corroborates Hanachor and Olumati (2018), who found that SDG interventions promoting employment in rural communities improved

nutrition and health access. This suggests that employment policies targeting young people and designed to generate consistent, rather than sporadic, income are particularly effective at translating into improved household food security and nutrition.

The very strong correlation observed between clean water access and healthcare outcomes is consistent with the findings of Akpan and Isihak (2020) and Nnaeto and Umeh (2020), both of whom reported that inadequate access to water and related social amenities significantly undermines rural health and quality of life. The strength of the correlations recorded in this study (all above 0.94) underscores water access as one of the most consequential SDG-related interventions for rural health outcomes, reaffirming the centrality of SDG 6 to the broader welfare agenda in rural Nigeria.

Taken together, these findings lend strong support to the study's theoretical anchor, Social Capital Theory, as the welfare gains observed across education, employment, and water access are most sustainable where rural communities are able to collectively organise, advocate for, and maintain the services and infrastructure that underpin these outcomes. This reinforces the view that SDG implementation in rural Nigeria is most effective when it works through, rather than around, existing community networks and structures of trust and cooperation.

Implications of the Findings

The findings carry important implications for SDG implementation strategy in rural Nigeria. First, they suggest that policy attention and funding should shift from a narrow focus on physical access, such as the number of schools built or boreholes drilled, toward the quality and reliability of the services delivered, since it was teacher qualification and water reliability, rather than mere availability, that drove the strongest welfare effects. Second, the strength of the youth employment effect on nutrition suggests that labour market interventions targeted at young people may yield broader household-level benefits than generic job-creation schemes, making age-targeted employment policy a particularly efficient use of limited development resources. Third, the consistency of these effects across three distinct welfare dimensions, income, nutrition, and health, suggests that an integrated, multi-sectoral approach to SDG delivery, rather than siloed, single-goal interventions, is more likely to produce measurable improvements in rural household welfare in Cross River State.

6. Limitations of the Study

While this study offers robust statistical evidence on the relationship between selected SDG indicators and rural household welfare, it is limited by its cross-sectional design, which captures relationships at a single point in time and cannot fully establish causality or account for how these relationships may evolve over time. Additionally, the study relied on self-reported perceptions of education, employment, and water access, which, while validated and reliable, may be subject to recall or social desirability bias. Future research may consider a longitudinal design, or the triangulation of self-reported data with objective administrative or health records, to further strengthen the evidence base on SDG-related welfare outcomes in rural Nigeria.

7. Conclusion and Recommendations

Conclusion

This study set out to examine the influence of access to quality education on household income, the effect of employment opportunities on nutritional well-being, and the relationship between access to clean water and healthcare outcomes among rural households in Cross River State, Nigeria. The findings demonstrate that all three dimensions of SDG-aligned intervention examined, education, employment, and water access, exert strong and statistically significant positive effects on their respective welfare outcomes. Specifically, teacher qualification stands out as the key driver of the education-income relationship; youth employment and regular income are the key drivers of the employment-nutrition relationship; and reliable, good-quality water access is strongly and consistently linked to improved healthcare outcomes. Collectively, these findings affirm that targeted, quality-focused SDG interventions, rather than interventions aimed merely at expanding access, are essential for meaningfully improving the welfare of rural households in Cross River State, and by extension, similar rural contexts across Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are made. First, policymakers and education authorities in Cross River State should prioritise the recruitment, training, and retention of qualified teachers in rural schools, as teacher quality, rather than school accessibility alone, was found to be the strongest determinant of household income. Second, government and

development agencies should design employment programmes that specifically target rural youth and are structured to provide consistent, regular income rather than one-off or seasonal earnings, given the strong link between youth employment, income regularity, and improved household nutrition. Third, rural development initiatives should prioritise the provision of safe, reliable, and consistently available clean water sources, alongside routine water quality monitoring, given the very strong relationship established between water access and healthcare outcomes. Finally, given the role of community cohesion in sustaining these welfare gains, SDG implementation agencies should actively engage existing community structures and social networks in the planning, delivery, and maintenance of education, employment, and water interventions, to ensure that the benefits of these programmes are equitably distributed and sustained over time.

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