

WASTE REDUCTION AND WATER MANAGEMENT PRACTICES AS CORRELATES OF JOB CREATION IN CROSS RIVER AND AKWA IBOM STATES, NIGERIA

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ABSTRACT

This study examined Waste Reduction and Water Management Practices as Correlates of Job Creation in Cross River and Akwa Ibom States, Nigeria. with particular emphasis on waste reduction practices and water management activities. The study was anchored on Sustainable Development Theory. The paper adopts quantitative survey design. The study covered selected tourism development zones in Cross River and Akwa Ibom States, with a sample of 800 tourism stakeholders selected through a multistage sampling procedure. Data were collected using a structured questionnaire, which demonstrated satisfactory internal consistency (Cronbach's alpha = 0.87), and analyzed using Pearson Product Moment Correlation. The findings revealed a moderately strong, statistically significant positive relationship between waste reduction practices and job creation ($r = .642$, $p < .001$, matching Table 1). Similarly, water management activities exhibited a strong, statistically significant positive relationship with job creation ($r = .612$, $p < .001$, matching Table 2). The study concludes that environmentally sustainable tourism practices can serve as important mechanisms for expanding employment opportunities and improving local livelihoods. It recommends institutionalized waste management systems, recycling initiatives, public-private partnerships, skills development, and inclusive water management policies that prioritize residents in tourism-related employment opportunities.

Keywords: Sustainable tourism, job creation, waste reduction, water management and sustainable development

Introduction

Globally, tourism remains one of the largest employment-generating sectors due to its extensive value chain, which encompasses transportation, accommodation, food services, entertainment, handicrafts, agriculture, and other supporting industries. The sector creates both direct employment through tourism enterprises and indirect employment through backward and forward linkages with other sectors of the economy. Sustainable tourism further expands these opportunities by encouraging local participation, community entrepreneurship, environmental stewardship, and inclusive business models that benefit host communities, United Nation World Tourism Organization (UNWTO, 2023). In Nigeria, the tourism sector possesses enormous but largely underutilized potential. The country is endowed with diverse ecological landscapes, wildlife reserves, waterfalls, beaches, cultural festivals, historical monuments, and indigenous traditions that collectively provide opportunities for sustainable tourism development (Okijie & Effiong, 2022). Nevertheless, despite these abundant resources, tourism has not contributed significantly to national economic diversification relative to its potential because of inadequate infrastructure, poor destination management, insecurity, weak policy implementation, limited investment, environmental degradation, and insufficient community participation. These constraints have reduced the sector's capacity to generate sustainable employment and stimulate local economic development.

The emphasis has shifted from maximizing tourist arrivals to ensuring that tourism development creates long-term socio-economic benefits while minimizing environmental degradation and promoting equitable distribution of tourism income among host communities (Egbo, Anih, Jonas, Peter, & Obiokoye, 2025). Among Nigeria's tourism destinations, Cross River State occupies a prominent position because of its unique combination of ecological, cultural, and recreational attractions. The state hosts internationally recognized destinations such as Cross River National Park, Obudu Mountain Resort, the Calabar Carnival, waterfalls, rainforest ecosystems, and numerous cultural heritage sites. Over the years, Cross River State has consistently pursued tourism-oriented development policies aimed at positioning itself as Nigeria's foremost tourism destination. Sustainable tourism initiatives in the state have contributed to environmental conservation, community participation, hospitality expansion, cultural promotion, and employment creation across accommodation, transportation, entertainment, and informal business sectors. However, sustaining these gains requires continuous investment in infrastructure, destination management, environmental protection, and policy consistency (Okonkwo & Odey, 2018). Similarly, Akwa Ibom State possesses considerable tourism resources, including extensive Atlantic coastlines, beaches, mangrove ecosystems, cultural festivals, historical landmarks, and hospitality facilities that provide opportunities for sustainable tourism development. Recent studies indicate that the state's coastal communities possess significant tourism potential capable of stimulating local economic development, increasing household income, and creating employment opportunities if properly developed through sustainable planning and effective destination management.

Tourism development within Akwa Ibom State also presents opportunities for expanding SMEs, promoting local crafts, improving hospitality services, and encouraging community-based tourism initiatives that directly involve local residents in tourism value creation (Abasi-Eyo et al., 2025). Empirical evidence from Akwa Ibom State further suggests that tourism contributes positively to employment creation through increased demand for hotel services, restaurants, transportation, entertainment businesses, tour operations, and local supply chains. Beyond direct employment, tourism stimulates indirect jobs in agriculture, fisheries, handicrafts, construction, retail trade, and other supporting sectors. Such multiplier effects enhance household income while strengthening local entrepreneurship and regional

economic resilience. Nonetheless, these employment opportunities remain constrained by inadequate tourism infrastructure, limited private investment, insufficient marketing, environmental challenges, and weak institutional coordination (Iyoho, Daniel & Udoh, 2025). Moreover, increasing concerns regarding environmental degradation, climate change, biodiversity conservation, community inclusion, and socio-economic inequalities have reinforced the need to evaluate tourism development from a sustainability perspective rather than merely measuring visitor arrivals or tourism revenues (KC et al., 2025). The growing global emphasis on responsible tourism further underscores the importance of ensuring that tourism development creates decent, stable, and inclusive employment while conserving environmental resources and preserving indigenous cultural heritage. Against this background, this study seeks to examine the relationship between sustainable tourism and job creation in Cross River and Akwa Ibom States, Nigeria.

Objectives of the study

This study is guided by the following objectives

1. To see if waste reduction practices lead to job creation
2. To examine the relationship between water management activities and job creation

Literature review

Waste reduction practices and job creation

The tourism and hospitality industry generates substantial quantities of solid waste through accommodation facilities, restaurants, transportation services, recreational activities, and tourist consumption patterns. Filimonau, and Tochukwu (2020) provide an important starting point by showing that waste prevention and managerial action are essential to reducing waste in Lagos hotels. Their work is particularly relevant because it is situated within the Lagos hospitality environment. Nevertheless, employment effects are largely outside their focus. The present study builds on this foundation by considering whether activities such as waste sorting, recycling, recovery, composting, and reuse can generate additional employment. Dhir, Talwar, Kaur & Malibari (2020) broaden the discussion by demonstrating that hospitality food-waste prevention cannot be achieved by hotels alone. It requires the involvement of multiple stakeholders, including managers, employees, suppliers, consumers, waste handlers, and policymakers. This perspective is valuable for the Nigerian context because waste reduction and job creation are likely to depend on relationships between hotels and external actors. In other words, employment opportunities may emerge not only inside hotels but also through recycling businesses, waste-collection services, informal workers, and other parts of the tourism value chain. Waste reduction not merely as an environmental management practice but as a strategic mechanism for promoting sustainable tourism development, stimulating green entrepreneurship, and creating employment opportunities across tourism value chains (Capucho & Leitão, 2025). Circular economy principles encourage waste prevention, reuse, recycling, composting, resource recovery, and sustainable procurement, thereby minimizing environmental footprints while improving operational efficiency. Rodríguez-Antón and Alonso-Almeida (2020) argue that circular economy adoption enables tourism businesses to transform waste into economic resources, creating new business opportunities in recycling industries, eco-innovation, local supply chains, and sustainable product development. This transition strengthens destination resilience while supporting environmental sustainability.

Hotels, resorts, restaurants, and tourism operators increasingly implement initiatives such as food waste reduction, plastic-free operations, waste segregation, recycling systems, composting programmes, digital documentation, refillable amenities, and green procurement policies. These initiatives reduce landfill disposal, conserve natural resources, lower operational costs, and enhance destination attractiveness to environmentally conscious tourists. As global travellers increasingly prefer environmentally responsible destinations,

waste reduction practices have become important competitive advantages within sustainable tourism markets (Madanaguli, Srivastava, Ferraris & Dhir, 2022). Green tourism creates direct, indirect, and induced employment opportunities throughout the waste management value chain. Direct employment emerges through waste collection, recycling facilities, composting operations, environmental auditing, sustainability consulting, eco-certification services, and waste treatment technologies. Indirect employment develops through local sourcing, recycling enterprises, packaging innovation, sustainable product manufacturing, environmental education, and circular supply chains. Induced employment results from increased economic activities generated by sustainable tourism investments and enhanced destination competitiveness (Yuliawan, Ekowati, Sudarnice, & Sangadji, 2025).

The emergence of green jobs represents one of the most significant outcomes associated with sustainable waste reduction practices. Green employment includes environmental managers, sustainability coordinators, recycling technicians, waste auditors, eco-tour guides, environmental educators, renewable energy specialists, and circular economy consultants working within tourism enterprises. Green human resource management has therefore become an important organisational strategy that integrates environmental sustainability into recruitment, training, employee engagement, and performance management. Such practices simultaneously improve environmental outcomes and create skilled employment opportunities within the hospitality and tourism sector (Suleman, Nejati, Shafaei, & Redmond, 2025). Local artisans increasingly transform discarded materials into handicrafts, souvenirs, furniture, decorative items, and tourism merchandise, thereby creating additional income opportunities for local communities. Similarly, food waste is increasingly converted into compost for community agriculture, while organic waste supports bioenergy production and sustainable farming activities. These circular business models diversify local economies while reducing environmental pressures associated with tourism activities (Rodríguez-Antón & Alonso-Almeida, 2020). Community-based tourism models encourage residents to participate in waste segregation, recycling programmes, environmental conservation, awareness campaigns, and local environmental governance. Such participation generates income while strengthening social inclusion and environmental stewardship (Capucho & Leitão, 2025). Innovation and digital technologies have further expanded opportunities for waste reduction within sustainable tourism. Smart waste monitoring systems, Internet of Things (IoT)-enabled waste bins, artificial intelligence-assisted waste sorting, blockchain-enabled supply chain transparency, and digital inventory management systems enable tourism organisations to minimise waste generation while improving operational efficiency. These technological innovations require skilled personnel for system design, implementation, maintenance, and data analysis, thereby generating additional knowledge-intensive employment opportunities within the green economy (Sk, 2025). Nevertheless, the literature also identifies several barriers limiting effective implementation of waste reduction practices in tourism destinations.

These include inadequate waste management infrastructure, insufficient financial investment, weak environmental regulations, poor stakeholder collaboration, limited environmental awareness among tourists, inadequate staff training, and inconsistent government policy implementation. Small tourism enterprises particularly experience financial and technical constraints that hinder investment in advanced waste management technologies. Consequently, researchers advocate stronger policy support, financial incentives, environmental education, public-private partnerships, and institutional capacity building to facilitate wider adoption of sustainable waste reduction practices (Madanaguli et al., 2022; Capucho & Leitão, 2025). Another recurring theme concerns the integration of corporate social responsibility (CSR) with waste reduction strategies. Tourism enterprises increasingly adopt CSR initiatives that include plastic reduction, zero-waste programmes,

responsible consumption, community recycling projects, and environmental awareness campaigns. These initiatives strengthen corporate reputation, improve customer loyalty, increase employee commitment, and contribute to sustainable local economic development. Furthermore, CSR-driven environmental initiatives encourage collaboration among governments, private organisations, local communities, and tourists, thereby enhancing collective responsibility for destination sustainability (Madanaguli et al., 2022). However, despite substantial progress, empirical evidence examining the direct relationship between specific waste reduction interventions and measurable employment outcomes remains relatively limited, particularly in developing countries.

Water management practices and job creation for residents

Water is a strategic resource for sustainable tourism because it underpins ecosystem health, visitor satisfaction, and community livelihoods. Tourism destinations depend heavily on reliable water supplies for accommodation facilities, recreational activities, sanitation, landscaping, and food production (McLennan, Becken & Stinson, 2017). Early studies conceptualized water management as an operational issue aimed at reducing water consumption and minimizing business costs within hotels and resorts. Technological interventions such as low-flow fixtures, wastewater treatment systems, water metering, and efficient irrigation systems have largely improved eco-efficiency and ensuring that tourism businesses complied with environmental regulations rather than addressing broader socio-economic outcomes (Kelly & Williams, 2007). Similarly, Gossling, Peeters, Hall, Ceron, Dubois, Lehmann & Scott, (2015) argued that traditional water management indicators focused almost exclusively on direct water use in accommodation facilities while neglecting indirect water consumption embedded in food production, landscaping, and supply chains. During this period, employment creation was generally discussed separately from environmental sustainability. Tourism was recognized as a labour-intensive industry capable of creating jobs, but researchers rarely examined how sustainable water management itself could stimulate employment opportunities for local residents. Cole, Cañada, Ma, & Sandang, (2020) observed that tourism and water are deeply interconnected with social equity, governance, gender, and community welfare. The review also emphasizes that tourism destinations experiencing water scarcity require participatory management involving governments, tourism operators, and local communities. Likewise, Moyle, Weaver, Gössling, McLennan, & Hadinejad, (2022) demonstrated that water related tourism research has become closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action). Water management is now viewed as an essential component of destination competitiveness and long-term sustainability rather than merely an environmental obligation. Sustainable tourism practices including efficient water management can create employment opportunities in infrastructure maintenance, ecological restoration, water conservation projects, environmental monitoring, hospitality operations, community-based tourism, and environmental education.

Theoretical framework

Circular Economy Theory

Circular Economy Theory is strongly associated with the work of David, Pearce and Kerry Turner, in 1990. The theory assumed that resources are finite and economically valuable. Natural resources such as water, land, energy and raw materials cannot be treated as inexhaustible inputs into production. Their inefficient use creates environmental costs and may constrain future economic activity. The theory further assumes that waste is not necessarily the endpoint of an economic process. Materials that are regarded as waste within a linear economy can potentially become inputs into another production or consumption

process through reuse, recycling, repair, recovery and remanufacturing. Circular Economy Theory is particularly relevant to the study of waste reduction and water management practices as correlates of job creation in Cross River and Akwa Ibom States, Nigeria because it provides a logical explanation of how environmental-management practices can generate economic opportunities. This relationship is important in Cross River and Akwa Ibom States, where increasing urbanization, commercial activity, tourism, household consumption and industrial development generate different forms of solid waste. Despite its usefulness, Circular Economy Theory has some limitations when applied to the present study. First, the theory can overstate the capacity of circular practices to automatically generate employment. The introduction of recycling, automation, efficient water-treatment technologies or resource-saving systems may sometimes reduce labour requirements rather than increase them. Consequently, the relationship between circular practices and employment is not necessarily positive in every circumstance. This limitation is important when job creation is used as an outcome variable.

Sustainable Development Theory

The theory was popularized through the work of the World Commission on Environment and Development (WCED), chaired by Gro Harlem Brundtland, in its landmark report, *Our Common Future* (1987). Sustainable Development Theory emphasizes the integration of economic growth, environmental conservation, and social equity in all development initiatives. The theory further assumed that economic activities, including tourism, should utilize natural resources responsibly to prevent environmental degradation and ensure their continued availability for future generations. Also, that development should improve the quality of life of local communities by creating employment opportunities, reducing poverty, promoting equity, and encouraging community participation in decision-making. Biodiversity, historical sites, cultural festivals, and traditional practices should be protected because they provide the foundation for sustainable tourism and long-term economic benefits.

The Sustainable Development Theory provides a suitable framework for examining the relationship between sustainable tourism and job creation in Cross River and Akwa Ibom States because tourism depends directly on environmental quality, cultural preservation, and community participation. The theory explains how sustainable tourism contributes to employment generation by encouraging long-term investment in tourism infrastructure, hospitality services, transportation, cultural industries, recreation, and environmental conservation. Such investments create both direct and indirect employment opportunities for local residents. The theory emphasizes the conservation of tourism resources. Cross River State possesses attractions such as the Cross River National Park, Obudu Mountain Resort, and the Calabar Carnival, while Akwa Ibom State is endowed with beaches, heritage sites, cultural festivals, and recreational facilities. Sustainable management of these resources ensures their continued attractiveness to visitors, thereby sustaining employment opportunities over time. Despite its wide acceptance, Sustainable Development Theory has several limitations for instance, the theory is often criticized for its broad and ambiguous nature. The concept of sustainability is interpreted differently across countries and institutions, making it difficult to establish universally accepted indicators for measuring sustainable tourism and employment outcomes. The theory assumes that economic growth, environmental conservation, and social development can always be balanced. In practice, conflicts frequently arise between tourism expansion and environmental protection, especially where governments prioritize short-term economic gains over ecological sustainability. However, the theory provides a robust theoretical foundation for understanding the relationship between sustainable tourism and job creation in Cross River and Akwa Ibom States.

Methodology

This study adopted quantitative survey design. The study was conducted in Cross River State and Akwa Ibom State, located in the South-South geopolitical zone of Nigeria. The two states possess abundant tourism resources, including cultural festivals, historical monuments, wildlife reserves, beaches, waterfalls, museums, eco-tourism destinations, and hospitality establishments. Cross River State is widely recognized as Nigeria's tourism capital because of attractions such as the Obudu Mountain Resort, Cross River National Park, Tinapa Business Resort, Agbokim Waterfalls, Marina Resort, and the internationally acclaimed Calabar Carnival. Tourism contributes significantly to the state's economy through employment generation in hotels, transportation, recreation, catering, and handicraft industries. Akwa Ibom State also possesses considerable tourism potential with attractions such as Ibeno Beach, Amalgamation House, Ibom Tropicana Entertainment Centre, scenic waterfronts, cultural heritage sites, and numerous hospitality establishments. The target population comprised key stakeholders directly involved in tourism activities in Cross River and Akwa Ibom States. A total sample size of 800 respondents was adopted for the study using Taro Yamane sampling frame. A multi-stage sampling technique was adopted to ensure that respondents were selected systematically and fairly from different categories of tourism stakeholders. The first stage involved the purposive selection of Cross River State and Akwa Ibom State because they are among Nigeria's leading tourism destinations with substantial tourism investments, diversified attractions, and significant tourism-related employment opportunities. Each state was stratified into major tourism development zones based on the concentration of tourism activities. For Cross River State, the selected tourism zones included: Calabar Municipality, Calabar South, Obanliku, Ikom and Yakurr. For Akwa Ibom State, the selected tourism zones included: Uyo, Eket, Ibeno, Ikot Ekpene and Oron. These zones were purposively selected because they host major tourism attractions and hospitality businesses. Within each selected tourism zone, respondents were stratified into homogeneous groups to ensure adequate representation. Stratification minimized sampling bias and ensured that all relevant stakeholder groups were represented. A sampling frame of registered tourism establishments was obtained from the State Tourism Boards and relevant hospitality associations. Tourism establishments were selected using simple random sampling through a computer-generated random selection procedure. Every registered establishment had an equal probability of inclusion. Within each selected establishment, respondents were selected using systematic random sampling. After randomly selecting the first respondent, every Kth respondent was subsequently selected until the allocated sample was obtained. The study utilized both primary and secondary sources of data. The combination of both sources improved the credibility and comprehensiveness of the study. Structured Questionnaire was used for data collection. A pilot study involving 80 respondents (10% of the study sample) was conducted outside the study area to avoid contamination of the main survey. The internal consistency of the questionnaire was assessed using Cronbach's Alpha. A reliability coefficient of 0.87 was obtained indicating that the instrument was reliable for data collection. Data obtained was analyzed using Pearson product moment correlation analysis.

Results

Table 1: Pearson Product–Moment Correlation between Waste Reduction Practices and Job Creation for Residents (N = 800)

Variables	N	Mean (X)	Mean (Y)	SD	r	Sig. (P)
Waste reduction practices	800	3.72	2.25	0.68	0.642	<0.001
Job creation for residents	800	2.41	3.65	0.71	0.642	<0.001

$r = 0.642$; $p < 0.001$; $N = 800$; two-tailed test.

The result indicates a positive and moderately strong relationship between waste reduction practices and job creation for residents. This implies that higher levels of waste reduction practices tend to be associated with higher levels of job creation for residents.

Table 2: Pearson Product-Moment Correlation Analysis of the relationship between Water management practices and Job creation for residents

Variables	N	Mean (X)	Mean (Y)	SD	r	Sig. (p)
Water management practices	800	3.74	2.87	0.68	0.612	<0.001
Job creation for residents	800	3.69	3.66	0.71	0.612	<0.001

The results in the table indicate a positive and statistically significant relationship between water management activities, represented by waste reduction, and job creation for residents. This suggests that higher levels of water-management-related waste reduction tend to be associated with greater opportunities for job creation among residents.

Discussion of findings

Waste reduction practices and job creation for residents

From the finding, it was upheld that; there is significant relationship between waste reduction practices and job creation. Findings of this study are in line with the study carried out by Oloruntoba, Adebayo, A. A. & Oladokun, (2020) which adopted structured questionnaires and regression analysis in Lagos State and revealed that waste recycling as a form of tourism practiced in the area significantly create jobs and employment opportunities for residents in the area through waste collection. The study also agreed that within the waste processing sectors, a 15% increase in recycling activities leading to a 10% rise in employment opportunities. Findings of this study also corroborates Eze, Okeke & Nwankwo, (2021) who adopted a mixed-method approach combining surveys and in-depth interviews to examine waste management practices in Enugu State. Their findings indicated that waste sorting and recycling created employment opportunities in logistics, transportation, and waste processing, particularly for low-skilled workers. This study findings also agreed with Adewumi et al. (2022) who investigated the impact of waste reduction policies on employment in Nigeria's tourism sector using the random sampling and regression analysis. Their results of their study shows that waste reduction initiatives contributed to a 12% increase in employment opportunities, especially the waste recycling enterprises and supply chain services. Findings of this study also agreed with Ibrahim, Mohammed, & Abdullahi, (2023) who a study on the influence of community-based waste reduction programmes and employment generation among youths and women in Kano State, Nigeria, a study which adopted the quasi-experimental approach with pre- and post-intervention data. The findings of their study observed that community-based waste reduction programmes led to the establishment of small-scale recycling businesses, which significantly increased employment among youth and women residing in the area.

This study's findings also agreed with Ogunlade, Akinyemi & Sadiq (2020) who carried out a study on household participation in waste reduction initiatives and informal employment generation in Abuja, Nigeria, using a cross-sectional survey involving 420 respondents and applying logistic regression analysis. They discovered that households participating in waste reduction initiatives was more likely to engage in employment such as waste sorting and resale, thereby increasing income-generating opportunities for residents in the area. The finding also agreed with Babayemi and Dauda (2017) who in a study utilized

descriptive statistics and field observations to examine waste management practices in Nigerian cities. Their study found that recycling activities created numerous jobs for waste pickers, transporters, and small-scale entrepreneurs, contributing significantly to urban livelihoods.

The study further corroborated Okoye, Ezeokoli & Ugwu, (2022) who applied a structural equation modeling (SEM) technique to analyze the relationship between waste reduction and employment in Southeast Nigeria. Their findings indicated a strong positive relationship between recycling practices and indirect employment, mediated by entrepreneurial activities and market demand for recycled products. Findings of this study also agreed with Yakubu, Musa & Abubakar, (2023) who conducted a time-series analysis using secondary data from 2005–2022 to examine the long-term effects of waste reduction on job creation for youths. Their study found that increased investment in waste recycling infrastructure led to a steady rise in indirect employment for youths, particularly in urban centers.

Water management practices and job creation for residents

The finding revealed that there is significant relationship between water management practices and job creation for residents in Cross River and Akwalbom states. Findings of this study are in lines with Adewumi, Akinola, & Ajayi, (2022) who in a study used panel regression analysis to examine the impact of water infrastructure investment on employment outcomes of residents. The finding of their study showed that improved water access increased women's employment by approximately 14%, the authors noted that particularly in agriculture and micro-enterprise sectors the benefits were high. Findings of this study also agreed with Ogunlade et al. (2020), who in their study maintained that household water access and women's participation in small-scale economic enterprises in Abuja, conducted a cross-sectional survey involving 420 respondents using logistic regression analysis. The study proved that households with improved water access were more likely to engage in small-scale enterprises such as food processing, retail trading, and agricultural production, which create jobs and offer employment opportunities for residents. Findings of this study also agreed with Eze et al. (2021), who in a study on water management systems and rural employment creation in Southeast Nigeria, adopted a mixed-method approach combining interviews and structured questionnaires. Their findings showed that improved water management systems created job opportunities in irrigation farming, water vending, and sanitation services, particularly for rural community residents. This study finding also agreed with Ibrahim, et al. (2023), in a study on community water intervention projects and women's economic empowerment in Northern Nigeria, applied a quasi-experimental design to evaluate community water intervention projects.

Their results indicated that women who participated in water governance committees experienced increased access to microcredit and employment in irrigation-based agriculture and water service enterprises. These findings equally suggest that tourism communities with effective water governance are better positioned to support women's economic inclusion. Findings of this study further agreed with Yakubu et al. (2023) who employed time-series data analysis from 2005–2022 to examine the long-term relationship between water infrastructure development and employment among residents. Their findings revealed that increased investment in water systems consistently improved participation in agro-processing and rural enterprise development. Findings of this study also agreed with Okoye, et al (2022) who used structural equation modelling (SEM) to assess water management and employment relationships in Southeast Nigeria. Their study found a statistically significant positive relationship between efficient water systems and women's engagement in entrepreneurial and wage employment activities. These outcomes reinforce the importance of water infrastructure in sustaining women-led tourism businesses.

Recommendations

Waste reduction should be approached not only as an environmental responsibility but also as a practical avenue for improving local livelihoods. Local authorities, community organizations, households and private waste-management operators should therefore adopt an integrated system in which waste prevention, segregation, recovery and recycling are deliberately linked to employment opportunities for residents. Local government authorities should establish and enforce a community-based waste segregation programme within the first three to six months of implementation. Households, markets, schools and other institutions should be provided with clearly labelled containers for organic waste, recyclable materials and residual waste. Local authorities should organise awareness campaigns through community meetings, schools, religious institutions and local media to explain what residents should separate, when collection will occur and how materials should be prepared for collection. Water management should similarly combine resource conservation with locally generated employment. The emphasis should be placed on reducing water losses, improving rainwater utilization, protecting drainage and water infrastructure, and creating opportunities for residents to participate in routine maintenance and monitoring.

Conclusion

Practices such as waste sorting, recycling, reuse, composting, responsible disposal, water conservation, wastewater management, and the maintenance of water infrastructure create opportunities for both direct and indirect employment. These activities require labour across collection, processing, transportation, treatment, maintenance, monitoring, and related service activities, thereby creating avenues for income generation, particularly within local communities. The relationship is particularly relevant to Cross River and Akwa Ibom States, where population growth, urbanization, commercial activities, and increasing demand for water and other environmental resources continue to place pressure on existing infrastructure. Strengthening waste reduction and water management systems can therefore generate a dual benefit: improving environmental quality while expanding opportunities for productive employment. The study consequently underscores the need for government agencies, private enterprises, community-based organizations, and development partners to integrate employment considerations into environmental policies and programmes. Investments in recycling enterprises, waste-to-resource initiatives, water treatment facilities, sanitation services, skills development, and environmentally oriented small and medium-sized enterprises could provide practical pathways for translating environmental challenges into employment opportunities. However, the study was geographically restricted to Cross River and Akwa Ibom States; therefore, the findings may not be directly generalizable to other parts of Nigeria with different environmental, socioeconomic, and institutional conditions. Second, the analysis of waste reduction, water management, and job creation may be influenced by the quality and availability of respondents' reported information, particularly where data were obtained through self-reported measures. Future studies could address these limitations through longitudinal designs, broader geographical coverage, objective employment and environmental indicators, and comparative analyses across different Nigerian states.

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