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Original Research Article

Niger Delta Development Commission (NDDC) and Water Scheme Development in Akwa Ibom State

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Abstract: Even with the NDDC scholarship program in place, many people in Akwa Ibom State are still struggling to access clean, safe water. It turns out that the water supply just isn't keeping up with the demand in rural areas, where boreholes are few and far between. In fact, many communities are facing serious water shortages, forcing the most vulnerable residents to rely on community streams for their water during the dry season. Unfortunately, drinking untreated water in this day and age has led to significant health issues, with many suffering from waterborne diseases and typhoid. This study aimed to explore how the Niger Delta Development Commission (NDDC) has contributed to providing solar-powered portable water in Akwa Ibom State. We used development theory as our theoretical framework and opted for a survey design. The study focused on a population of 7,019,115, which is the projected number of residents in Akwa Ibom State, and we sampled 384 individuals using a simple random sampling technique. The data we gathered from both primary and secondary sources were analyzed with simple regression analysis using the SPSS statistical tool. The findings showed that the NDDC has not made a significant impact on the availability of solar-powered portable water in the state. As a result, we recommend that the management of the Niger Delta Development Commission (NDDC) increase investments in potable water solutions like boreholes, water treatment, and distribution systems, especially in underserved local government areas. Additionally, they should focus on sustainability by establishing and training local water-user committees, providing funding for maintenance, and integrating water initiatives into WASH and primary healthcare objectives in Akwa Ibom State.

Keywords: Niger Delta Development Commission, Water Scheme Development, Solar-Powered Portable Water

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INTRODUCTION

The Niger Delta Development Commission (NDDC) has taken on the important task of ensuring that rural communities in Akwa Ibom State and the broader Niger Delta Region have access to clean and safe drinking water. This initiative is crucial for improving the quality of life for residents in these areas. Water is not just a basic necessity for survival; it's also a key element for sustainable community development. Having access to safe and dependable water sources is tightly linked to public health, sanitation, household well-being, and the overall productivity of rural communities. Unfortunately, many Nigerian communities, especially in rural areas, still struggle with inadequate public water infrastructure, making access to improved water sources a significant challenge. Research by Ansa et al. (2023) highlights that the lack of public water supply in rural Akwa Ibom has led communities to rely on small-scale water systems as alternatives. Similarly, Akankali et al. (2024) found that rural areas in Akwa Ibom continue to face difficulties in accessing domestic water sources. These ongoing issues underscore the urgent need for effective and sustainable solutions to enhance access to clean water in these communities.

One promising approach that's gaining traction in tackling rural water supply issues is the implementation of solar-powered water systems. These solar-powered pumps offer a viable alternative to diesel and traditional electric systems, particularly in areas where electricity is either unreliable or nonexistent. Omoraka et al. (2023) showcased the practicality of a solar-powered water pumping system tailored for rural residents in the Niger Delta, emphasizing its ability to deliver a consistent water supply with minimal maintenance. Similarly, Okakwu et al. (2023) explored the techno-economic aspects of using photovoltaic water pumping for domestic water supply, highlighting its potential benefits.

Statement of the Problem

Water scheme provision was one of the cardinal reasons for the establishment of the NDDC. It is presumed that water supplies are not adequate as regards its demand in rural communities of Akwa Ibom State, as there are inadequate boreholes in the rural communities of Akwa Ibom State. Many communities in Akwa Ibom State have been faced with water problems, with the most vulnerable opting for water from community streams for survival during dry seasons. Drinking such untreated water by the people of the 21st century has posed health problems to many, as lots of people are suffering from water-borne diseases and typhoid in the state.

Objective of the Study

The study has the following objectives:

The main objective of the study was to examine the contribution of NDDC to water scheme development in Akwa Ibom State.

The subsidiary objective was:

- To ascertain the contribution of the Niger Delta Development Commission to the provision of solar-powered portable water in Akwa Ibom State

Research Questions

Based on the objectives above, the research has the following question:

- What is the contribution of the Niger Delta Development Commission to the provision of solar-powered portable water in Akwa Ibom State?

Research Hypotheses

The following is the research hypothesis of the study, which is stated in null form:

- **H_{o1}:** There is no significant contribution of the Niger Delta Development Commission to the provision of solar-powered portable water in Akwa Ibom State

Niger Delta Development Commission

Niger Delta Development Commission is an interventionist agency established by the Federal Government of Nigeria to perform essential services to the people of the Niger Delta Region of Nigeria, and Akwa Ibom State is not left out. Bassey & Inyang (2023) asserted that the Niger Delta Development Commission (NDDC) is a federal agency established to facilitate the rapid, even, and sustainable development of Akwa Ibom State and the Niger Delta region at large, through the provision of infrastructural projects such as water infrastructure, environmental remediation, and other social protection programmes. Okorie & Eze (2022) also stated that NDDC is an interventionist agency aimed at addressing the developmental challenges and environmental degradation in the oil-rich Niger Delta by implementing people-oriented projects and fostering regional integration. Udoh & Essien (2021) opined that the Niger Delta Development Commission is a statutory body created to coordinate and drive sustainable development initiatives in the Niger Delta, especially in areas affected by oil exploration and underdevelopment in the Niger Delta, where, according to Eyo (2023), Government policies are always put forward for the development of the society as they enhance changes of individual well-being.

Water scheme development

World Health Organization (WHO) (2020) views a water scheme as the development, implementation, and management of a system that provides access to safe, clean, and reliable water for drinking, domestic use, and other purposes, which stands to benefit society. United Nations Children's Fund (UNICEF) (2020) opined that a water scheme involves the creation and maintenance of a water supply system that provides access to safe and clean water for households, schools, and communities. World Bank (2020) stated that a water scheme is a critical component of water resources management, involving the development, implementation, and management of a system that provides access to safe, clean, and reliable water for drinking, domestic use, and other purposes.

Asian Development Bank (ADB) (2020) opined that a water scheme is essential for promoting economic growth, improving health outcomes, and enhancing overall quality of life, involving the development, implementation, and management of a system that

provides access to safe, clean, and reliable water. African Development Bank (AFDB) (2019) sees a water scheme as the creation and maintenance of a water supply system that provides access to safe and clean water for households, schools, and communities, improving health, education, and economic outcomes in a particular society.

Solar-powered portable water

Effiong & Udom (2023) opined that solar-powered portable water is an organized system designed to source, treat, store, and distribute water to communities or populations to ensure access to a safe and reliable water supply for domestic, agricultural, or industrial use. Okafor & Eze (2022) established that solar-powered portable water refers to infrastructure and management systems established to provide potable water through boreholes, piped networks, treatment facilities, and reservoirs, particularly in underserved areas. The World Health Organization (WHO, 2021) also established that a water supply scheme is a planned system of water sourcing, purification, storage, and delivery infrastructure developed to meet the water needs of a defined population. According to Ibrahim & Musa (2021), solar-powered portable water is a public or private initiatives that involve coordinated efforts to construct water facilities to extract and supply clean water to households and communities through boreholes, treatment plants, and reticulation systems in the Niger Delta Region of Nigeria.

UNICEF (2020) stated that solar-powered portable water is a structured programme involving the development of water infrastructure and delivery mechanisms aimed at ensuring equitable access to safe water, especially in rural and peri-urban areas. According to Bassey & Etim (2023), a water scheme is a government or community-driven initiative involving the construction and operation of facilities for water abstraction, treatment, storage, and distribution to improve access to potable water in underserved communities.

Niger Delta Development Commission and Solar-powered portable water

The Niger Delta Development Commission (NDDC) was established with a wide-ranging mission to promote development in the region, which includes ensuring access to clean and safe water. As highlighted by Akpan and Udoh (2021), providing clean water is a key focus of NDDC’s initiatives, especially given the high rates of waterborne diseases and the impact of oil pollution in the area. Even though the Niger Delta is surrounded by water, many communities struggle to find drinkable water due to oil spills and inadequate sanitation. Etim and Bassey (2022) point out that NDDC's water projects play a vital role in improving access to safe drinking water, particularly in rural and underserved areas. The commission has rolled out numerous borehole projects throughout the states in the region.

George and Ekong (2020) note that these boreholes have significantly enhanced community hygiene, cut down on waterborne illnesses, and eased the burden on women and children who often have to travel long distances to fetch water. While urban centers benefit from municipal water systems, rural communities rely heavily on water initiatives funded by development organizations like NDDC. Inyang and Okon (2023) explain that

NDDC has made efforts to address this imbalance by focusing on water supply in remote and oil-affected communities. Recently, NDDC has also embraced solar-powered water projects to tackle the challenges posed by inconsistent electricity supply. Akintola and James (2021) found that solar water systems are not only more sustainable but also more effective in remote areas that lack access to the national grid. Unfortunately, oil spills and industrial waste continue to taint water sources in the region. Etim et al. (2026) assert that NDDC has the crucial task of developing water schemes in Akwa Ibom State specifically, as well as throughout the Niger Delta. However, as noted in the same study, while the commission has made strides in other development areas like education, it has fallen short in advancing water scheme development since its inception in 2000.

While observing the withdrawal of multinational corporations and the reluctance of the World Bank to provide support in the provision and improvement of water supply in developing countries, like Nigeria Udoh (2014) has lamented thus: “After a wave of privatisation of many water services in the 1990s, mostly in developing countries, experiences show that global water corporation have not brought the promised improvements in public water utilities. Instead of low prices, large volumes of investment and improvement in the connection of the poor to water and sanitation, water tariffs have increased out of the reach of poor homes.

Theoretical Framework:

Development theory by Daniel Lerner (1958)

Development theory was introduced by Daniel Lerner in 1958. He argued that development doesn't happen in isolation; it requires a driving force, which in this case is the NDDC, established to promote development in the Niger Delta Region, particularly in Akwa Ibom State. This theory serves as a valuable framework for evaluating the NDDC's impact in the area. While the NDDC emphasizes socio-economic growth, Lerner's theory highlights that genuine development also means changing mindsets, broadening opportunities, and allowing citizens to engage fully in contemporary society, such as through the provision of solar-powered portable water. This theory is pertinent to the study because it suggests that if the NDDC's water initiatives are implemented effectively, they could lead to the kind of modernization Lerner envisioned, ultimately resulting in sustainable socio-economic development in Akwa Ibom State.

Methodology

The study adopted a survey research design owing to the fact that it was considered suitable for obtaining information from a large number of respondents on the activities of the Niger Delta Development Commission (NDDC) and its water scheme development in Akwa Ibom State. The population of the study was the total population of Akwa Ibom State, projected to be 7,019,115 (National Bureau of Statistics (NBS), 2025). This population included residents (both employed and unemployed), business owners, public office holders, civil servants, and staff of the NDDC in Akwa Ibom State. Furthermore, the sample size of the study was determined through the use of cochran formula at a 95%

confidence level**,** 5% margin of error, and an estimated population proportion (p = 0.5), which is widely accepted for large population studies. Use standard values:

$$1 + \frac{no-1}{N} = \frac{384}{1 + \frac{384}{7,019,115}}$$

$$n = \frac{384}{1.000014} = 384.$$

Of the 384 samples distributed, 355 were duly filled and returned. The proportionate sampling distribution was adopted to extract samples from each of the selected Local Government Areas in Akwa Ibom State. While the simple random sampling technique was used to administer the questionnaire to the respondents in each of the selected Local Government Areas in Akwa Ibom State,

Sample size distribution

Table 1: Distribution of Sample Size across Selected Local Government Areas in Akwa Ibom State

L.G. As	Population	Sample calculation	Sample size
Nsit Atai	136,432	384 X 136,432/ 518,961	100.9
Ukanafun	137,261	384 X 137,261/ 518,961	101.6
Eket	245,268	384 X 245,268/ 518,961	181.5
Total	**518,961**		**384**

Source: (Projected population by NBS, 2025).

Table 2: Descriptive analysis on the provision of solar-powered portable water

NDDC and the provision of solar-powered portable water		**Extent of Agreement**				
	SA	**A**	**UN**	**D**	**SD**	**TOTAL**
NDDC has implemented boreholes and water supply projects in various communities, implying expanded access to water.	2(4%)	173(40.1 %)	10(15. 9%)	6(12.6%)	164(27.4 %)	355
NDDC water projects have improved access to safe drinking water in the communities of the Niger Delta Region.	30(10%)	131(30%)	26(15. 1%)	13(13.7 %)	155(31.2 %)	355
NDDC water projects have lowered waterborne diseases in the Niger Delta Region.	2(5%)	162 (35%)	26(16. 4%)	16(14.5 %)	142(29%)	355
NDDC water schemes have improved the region's living standards, underscoring their role in supporting hygiene and livelihoods in the Niger Delta Region.	5(8%)	155(30%)	12(10. 3%)	19(10.4 %)	164(41.2 %)	355
Total	**39**	**448**	**74**	**54**	**625**	**1420**

Proportion of N	**9**	**132**	**28**	**20**	**156**	**355**

Source: Field Work, 2026.

The results indicate that 44.1% of respondents (40.1% Agreed, 4% Strongly Agreed) stated that NDDC has implemented boreholes and water supply projects in various communities, implying limited access to water. However, 12.6% disagreed, while 27.4 % strongly disagreed and 15.9% remained undecided, suggesting uneven benefits across communities.

Regarding access to potable water, 10% strongly agreed, and 30% agreed that NDDC's efforts have enhanced the availability of safe drinking water, reflecting a positive effect on community welfare. Still, 31.2% disagreed, and 15.1% were undecided, indicating ongoing issues with water quality or distribution.

When it comes to health outcomes, 5% strongly agreed, and 35% agreed that NDDC water projects have lowered waterborne diseases in the Niger Delta, highlighting the significance of clean water for public health. Conversely, 14.5% disagree,d while 29% strongly agree,d and 16.4% were undecided, implying persistent waterborne illnesses in some areas.

Lastly, 5% strongly agreed, and 30% agreed that NDDC water schemes have improved the region's living standards, underscoring their limited role in supporting hygiene and livelihoods. Yet, 13.4% disagreed, while 41.2% strongly disagreed,d and 10.3% were undecided, suggesting that the full benefits of these schemes may still be unfolding.

Hypothesis

- **H_0:** There is no significant contribution of the Niger Delta Development Commission to the provision of solar-powered portable water in Akwa Ibom State.

Data Analysis

To ascertain the impact, the ordinary least squares simple regression technique was employed using SPSS version 20.0, yielding the following results.

Table 4.3.5

Model Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.468[a]	.219	.216	.495

a. Predictors: (Constant), NDDC

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	6.43	1	6.43	23.63	.000[b]
	Residual	96.12	353	.27		
	Total	102.55	354			

a. Dependent Variable: SPW
b. Predictors: (Constant), NDDC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.684	.337		5.00	.000
	NDDC	.355	.073	.284	4.86	.000

a. Dependent Variable: SPW

The regression results illustrate a moderate positive influence of the Niger Delta Development Commission (NDDC) on the development of solar-powered portable water, as evidenced by a correlation coefficient of R = 0.468. This indicates that there is no association between NDDC interventions and the effectiveness of water schemes in the region. The coefficient of determination ($R^2 = 0.219$) reveals that approximately 21.9% of the variability in water scheme outcomes can be attributed to the efforts made by NDDC, while the remaining 78.1% of the variance is explained by various other factors that were not included in the analysis.

Moreover, the adjusted R^2 value of 0.216 further confirms the stability and reliability of the regression model, indicating that the findings are consistent even when adjusting for potential predictors. The standard error of the estimate, calculated at 0.495, signifies that the model reliably predicts the outcomes of water schemes with a reasonable degree of accuracy.

The ANOVA results provide additional evidence of the model's significance, showing that the regression model is statistically not robust $F(1, 353) = 23.63$, $p < 0.001$). This suggests that the interventions introduced by the NDDC do not substantially contribute to the enhancement of water schemes in the study area.

Delving into the coefficients table, we find that the constant value is notably significant ($B = 1.684$, $t = 5.00$, $p < 0.001$), indicating a baseline level of water scheme development that exists independently of NDDC interventions. More critically, the unstandardized coefficient for NDDC intervention ($B = 0.355$, $t = 4.86$, $p < 0.001$) reveals that for every one-unit increase in NDDC involvement, there is a corresponding improvement of 0.355 units in the effectiveness of the water schemes. The standardized beta coefficient ($\beta = 0.284$) reinforces this finding, suggesting that NDDC has a positive and insignificant influence on the development of water schemes.

The findings of this analysis indicate that interventions by the NDDC, though they play a crucial role, are not capable of enhancing water schemes within the studied area. This leads to accepting the null hypothesis and rejecting the alternative hypothesis, confirming the non-influence of NDDC in improving the provision of water initiatives in the region.

Discussion of findings

NDDC and Water Scheme development

The primary data findings revealed that water schemes had the least explanatory power, with the Niger Delta Development Commission (NDDC) accounting for just 21.9% of the variance. This suggests that NDDC's initiatives in drilling boreholes and supplying clean water haven't effectively tackled the water scarcity issue in Akwa Ibom State.

In a similar vein, the baseline data findings shed light on the NDDC's role in implementing water schemes as part of its broader socio-economic development goals in the Niger Delta Region from 2015 to 2025. Access to water supply is a fundamental service that significantly impacts public health, productivity, household well-being, and overall quality of life. When we look at NDDC's other projects, like roads, electricity, education, and health, the data on water schemes highlights both the involvement of NDDC and the considerable gaps in coverage and effectiveness.

At the state level, the NDDC has completed a total of 37 water projects in Akwa Ibom State, but at the Local Government level, only 3 water development projects were recorded across the three selected Local Government Areas. This distribution points to an uneven allocation of water projects throughout Akwa Ibom State. The limited scope of water interventions becomes even clearer when we dive into the Local Government Area (LGA) data. Among the three sampled LGAs in Akwa Ibom State, only Eket has seen the initiation of a solar-powered portable water project, while Ukanafun and Nsit Atai have no water projects underway. In fact, there were no ongoing water projects reported in any of the LGAs.

This uneven LGA-level distribution highlights a significant development concern. While state-level totals suggest moderate coverage, the local-level evidence indicates that many communities may not have directly benefited from NDDC-supported water schemes. Given that socio-economic development is ultimately experienced at the community level, the absence of water projects in several LGAs implies persistent gaps in access to safe and reliable water. Such gaps can perpetuate health risks, increase household expenditures on water, and reduce productive time, especially for women and children who often bear the burden of water collection in rural and semi-urban Niger Delta communities.

The complete absence of ongoing water projects further suggested that water interventions may have been implemented as isolated or completed projects rather than as part of a continuous or expanding programme. While completed projects indicate delivery, the lack of ongoing initiatives raises questions about sustainability, maintenance and long-term functionality. Water infrastructure typically requires continuous investment in

repairs, management and expansion to meet population growth and environmental challenges. Without ongoing projects or follow-up mechanisms, completed water schemes risk deterioration, which can erode their socio-economic benefits over time.

The findings, therefore, suggest that NDDC's water interventions, though present, may not be commensurate with the importance of water as a driver of welfare and social equity in Akwa Ibom State and therefore do not create a significant impact. Information on the contribution of NDDC to water scheme development in Akwa Ibom State is shown in the table below:

Table 3: Presentation of data on the impact of NDDC on the provision of solar-powered portable water in Akwa Ibom State (2015-2025).

States	Local Government Areas	Water project (2015-2025).	Ongoing water projects
Akwa Ibom State	Nsit Atai	----	There are no ongoing water projects.
	Ukanafun	----	There are no ongoing water projects.
	Eket	1 water project	There are no ongoing water projects

Source: Department of Planning, Research & Statistics/Management Information System, NDDC Report, (2025).

Conclusion

The findings on the impact of the Niger Delta Development Commission (NDDC) on the provision of solar-powered portable water in Akwa Ibom State from 2015 to 2025 revealed that the Commission has made some inputs to water scheme development, despite the fact that the area of its coverage remains limited across the selected Local Government Areas. The data indicated that there are no ongoing solar-powered portable water projects in Nsit Atai and Ukanafun Local Government Areas**,** while Eket recorded one water project**,** with no ongoing project recorded. This submits that the interventions of the NDDC in solar-powered portable water provision have not been evenly distributed across the state and that the projects sustenance and continuity require greater attention. Notwithstanding the fact that the provision of water infrastructure represents a crucial step towards improving access to safe and portable water, the smaller number of projects identified clearly signifies that more interventions are needed to adequately address the water needs of rural and underserved communities in Akwa Ibom State. Therefore, the study concludes that NDDC has no positive impact or contribution to water scheme development in Akwa Ibom State, owing by the limited spread and continuity of projects in the Local Government Areas of the state, this underscores the need for increased investment, wider geographical coverage, completion of abandoned projects, and effective maintenance of existing water facilities to achieve sustainable access to portable water in the state.

Recommendations

Based on the findings and conclusions, the study recommended the following:

1. The management of the Niger Delta Development Commission (NDDC) should raise investment in potable water (boreholes, water treatment, and reticulation), especially in underserved LGAs, and ensure sustainability by setting up/ training local water-user committees, providing maintenance funding models, and integrating water schemes into WASH and primary healthcare goals in Akwa Ibom State.
2. The management of the Niger Delta Development Commission (NDDC) should intensify the number and geographical coverage of solar-powered portable water projects in Akwa Ibom State, particularly in underserved LGAs such as Nsit Atai and Ukanafun, while ensuring that existing facilities are completed, properly maintained, and sustained for long-term community usage.

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