



A Comparative Analysis of Social Service Trajectories in Tanzania's Mtwara Gas Region

Salha Salumu Mohamed

ORCID: <https://orcid.org/0009-0002-4570-6245>

Department of Rural Development and Regional Planning, Institute of Rural Development Planning, Tanzania

Email : salhasalumu22@gmail.com

***Jeremiah Vedastus Mkomagi**

ORCID: <https://orcid.org/0000-0001-7861-8837>

Department of Rural Development and Regional Planning,

Institute of Rural Development Planning, Tanzania

Email: jmkomagi@irdp.ac.tz

Fredrick Allen Mfinanga

ORCID: <https://orcid.org/0000-0002-0242-0899>

Department of Development Finance and Management Studies

Institute of Rural Development Planning, Tanzania

Email: fmfinanga@irdp.ac.tz

***Corresponding Author:** jmkomagi@irdp.ac.tz

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Abstract: Natural gas discoveries in Tanzania's Mtwara Region raised expectations for improved socio-economic development, particularly through improvements in essential social services. This study examined how gas extraction has influenced the provision of key social services in Madimba and Msimbati Wards. Using a mixed-methods approach, the study combined household survey data from 196 respondents with key informant interviews and focus group discussions to assess changes in the availability, accessibility, distance burden manageability and affordability of water, electricity, education and healthcare services. The findings show that the onset of gas extraction coincided with expanded availability of social services, with universal coverage reported for the selected services during the extraction period. Access to services improved significantly and perceptions of distance burden declined notably for water and health facilities. Affordability improved, particularly in Msimbati, where several services fall within the high affordability category. However, moderate affordability and persistent school access challenges in Madimba reveal uneven benefit distribution.

Keywords: Resource curse; livelihoods; social services; gas extraction impacts; Mtwara.

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Introduction

Natural gas extraction has increasingly been promoted as a catalyst for economic transformation in developing countries, particularly in resource-rich but historically marginalized regions (Peng et al., 2022; Bay & Hong, 2017). In their study, Bay and Hong (2017) found that the natural gas industry in

Mozambique is positively cointegrated with economic growth in the long run. Similarly, Peng et al. (2022) provided evidence from China showing that natural gas exploitation contributed to local economic growth, highlighting how gas sector development can have transformative regional effects.

Globally, hydrocarbon discoveries have generated optimism about their potential to stimulate economic growth through fiscal revenues, employment creation, infrastructure development and technology transfer, a theme well documented in the resource-development literature (e.g., Hilson, 2012; Scurfield & Mihalyi, 2017). For example, significant offshore oil and gas in Namibia's Orange Basin have attracted major foreign investment and are expected to expand jobs, government revenues and energy infrastructure, potentially catalyzing broader economic transformation.

In Tanzania, empirical research shows that natural gas revenues stimulate economic growth in both the long and short run, validating the argument that gas development can be growth-enhancing under appropriate policy frameworks (Kondowe & Osoro, 2022).

However, a substantial body of literature also cautions that natural resource extraction can produce adverse socio-economic and environmental outcomes, particularly where governance capacity is weak and local participation is limited (Lacárcel, et al., 2024). Documented challenges include environmental degradation, disruption of traditional livelihoods, rising inequalities and local marginalization (Shiquan, 2022; *Auty, 1998*). In the African context, experiences from oil- and gas-producing countries, such as Nigeria, Angola and Mozambique, highlight persistent governance deficits, volatility of resource rents and inequitable benefit distribution (*Chijioko et al., 2025; Gaventa, 2021; Ross, 2015*). These contrasting outcomes underpin the enduring resource curse versus resource blessing debate and point to the need for micro-level analyses that examine how extractive activities reshape household livelihoods and access to essential social services.

In Tanzania, the discovery of substantial offshore and onshore natural gas reserves has positioned the country as an emerging actor in the global energy landscape, raising expectations of accelerated economic growth and national development (Kondowe & Osoro, 2022; United Republic of Tanzania, 2013). The Mtwara Region, home to the Mnazi Bay gas field and key gas infrastructure, such as the Mtwara-Dar es Salaam pipeline, has become a focal point of these ambitions. Historically characterized by limited public investment and a predominantly agrarian economy (United Republic of Tanzania, 2024), Mtwara Rural District's

livelihood base, including farming, fishing and small-scale trade, has been reshaped by natural gas investment activities.

These developments generated high expectations among both national and local populations regarding rapid regional development and poverty reduction (Kweka, 2022; Mwakyambiki, 2018; Nkolo, 2018; Ntiyakunze et al., 2025). Yet, the expectations have frequently clashed with lived realities. The 2013 protests in Mtwara, sparked by plans to transport gas to Dar es Salaam for processing, illustrated deep local fears of marginalization and exclusion from the benefits of locally extracted resources (Kweka, 2022; Nuhu, 2023; Nuhu et al., 2020; Pedersen & Bofin, 2015). A critical barrier to equitable benefit sharing has been the limited capacity of local households to meaningfully participate in the gas economy, with involvement often confined to low-skilled and peripheral activities, such as vending, catering, cleaning and security while skills deficits exclude many residents from stable, higher-paying employment opportunities (Kinyondo & Villanger, 2017; Ntiyakunze et al., 2025).

Emerging research also demonstrates that the initial wave of project-related employment has not translated into sustained livelihood improvements for most households in Mtwara and that gas extraction has coincided with disruptions to traditional economic activities, such as agriculture and fishing (Musoma et al., 2024; Musoma et al., 2023; Musoma, 2022). This restructuring has been accompanied by income insecurity, food access challenges and increased vulnerability, suggesting that the anticipated economic benefits of extraction have not been fully realized by host communities. These shifts, in turn, have important implications for households' ability to access and afford essential social services, including water, electricity, education and healthcare.

Globally, extractive projects influence local livelihoods through multiple mechanisms, including direct employment, supply chain linkages, land use reconfiguration and fiscal transfers, that can either enhance or undermine welfare outcomes (Hilson, 2012; Bebbington et al., 2008). The revenue from natural gas production is broadly expected to enable governments to invest in infrastructure and social services (Humphreys et al., 2007) but the translation of resource wealth into development outcomes is contingent on effective institutional and financial

transmission mechanisms, as shown in studies applying methodologies, such as Autoregressive Distributed Lag models to illustrate how targeted financial development can mitigate resource curse dynamics by channeling revenues into productive investments (Al Balushi & Yusoff, 2025).

Despite these insights, a systematic gap remains in the literature regarding longitudinal, household-level evidence on how natural gas extraction in Mtwara has affected access to and affordability of key social services over time. While macroeconomic research documents aggregate revenue growth (Kondowe & Osoro, 2022) and qualitative studies reveal community perceptions of benefit exclusion and tension, few studies assess the trajectory of social services at the household level in direct relation to gas extraction activities.

This study addresses this gap by empirically examining changes in the availability, accessibility, distance manageability and affordability of essential social services in Mtwara Rural District before and after the onset of gas extraction. By centring on household-level experiences, the study provides micro-level evidence to the resource curse–resource blessing debate and generates policy-relevant insights on how gas-led development can be made more inclusive, equitable, and sustainable in rural Tanzania.

Theories Underpinning the Study

This study employed the Resource Curse Hypothesis (Auty, 1998; Ross, 2015), which posits that resource abundance can hinder development through governance and economic distortions and the Sustainable Livelihoods Framework (Chambers & Conway, 1992), which examines how households utilize capital assets to navigate vulnerabilities and achieve well-being. This study argues that social service trajectories in Mtwara are shaped by the interplay between macro-level resource curse risks and micro-level livelihood adaptations, mediated by local formal and informal institutions. Predominant curse dynamics are hypothesized to disempower local actors, yielding inequitable and unsustainable services (Ross, 2015; Bebbington et al., 2008). Alternatively, effective governance and active local participation in the gas industry processes, which mitigate these risks, could channel revenues to enhance local assets, producing services marked by greater access, quality and sustainability, thereby fostering resilient livelihood (Humphreys et al., 2007; Mehlum et al., 2006; Scoones, 1998).

Methodology

This section outlines the research methodology. It covers the study area and design; the methods and tools used for data collection and a description of the population and sampling process. The procedures for data processing and analysis are also explained.

Study Area

This research was conducted in Mtwara Rural District, specifically in Msimbati and Madimba wards, which host extraction activities and a gas processing plant. The study villages were Msimbati, Mtandi, Madimba and Mngoji.

Design

A cross-sectional design using retrospective recall was adopted to compare the period before 2012 with the period during active extraction, up to the time of data collection in 2025.

Data Collection Methods and Tools

Both primary and secondary data were collected between February and March 2025. Primary data were collected primarily through a household survey. Using the questionnaire, the study collected data on respondents' socio-economic characteristics, availability, access and affordability of water, health, education and electricity services. The survey purposively targeted household heads aged 30 years and above who resided in the area before gas operations began, ensuring respondents had the experiential knowledge to assess temporal changes. Secondary data, including household listings from the selected villages, were sourced from local government offices. Complementary qualitative insights were gathered through key informant interviews with ward and village leaders as well as a representative from the gas extraction company. Moreover, four focus group discussions (FGDs), one for each study village, were conducted with both male and female participants, each group comprising six to eight members, which, according to Hennink (2007), is an adequate number for an FGD.

Population and Sampling

The survey purposely targeted household heads who had lived in the area before the onset of gas extraction activities. Therefore, respondents aged 30 years and above were included to capture the perspectives of individuals with sufficient experience to assess livelihood and changes in social services since gas extraction and processing began

in 2012. The sample size was determined using Yamane's (1967) formula from 2749 respondents eligible for the study. Since the study was conducted in four villages, stratified proportionate

random sampling was used, as indicated in Table 1, to get a fair distribution of respondents across the study villages.

Table 1: Distribution of study respondents across the study villages

Ward	Village*	Total households	Sampled households
Msimbati	Msimbati	939	67
	Mtandi	488	35
Madimba	Madimba	620	44
	Mngoji	702	50
Total	4	2749	196

*Data on the number of households per village were obtained from the study area's village government registers.

Data Analysis

A mixed-methods approach was used. Quantitative data was analyzed using descriptive statistics and paired-sample t-tests to compare access before and during the period. Qualitative data (FGDs, KIIs) was thematically analyzed to support trends. A Service Affordability Index (SAI) was computed using weighted means (1–3) to assess perceived affordability.

Findings and Discussion

This section presents the findings of the study, beginning with an overview of the demographic

characteristics of the respondents and followed by the findings.

Respondents' Socio-economic Characteristics

Based on the study results (Table 2), the survey captured a near-balanced gender representation, with a slight male majority (54.1%), which is common in rural household surveys. The age distribution was concentrated in the working-age, with the largest cohort (34.7%) being 40-49 years old, indicating a sample of economically active individuals.

Table 2: Socio-economic Characteristics of Respondents [n = 196]

Household characteristics	Total	Percent (%)
Sex of respondents		
Male	106	54.1
Female	90	45.9
Age of respondents		
30 - 39	54	27.6
40 - 49	68	34.7
50 - 59	47	24.0
60 +	27	13.7
Marital status		
Married	166	84.7
Widow/Widower	17	8.7
Single	8	4.1
Divorced	5	2.5
Education level		
No formal education	58	29.6
Primary education	109	55.6
Secondary education	29	14.8
Household size		
1 - 3	43	21.9
4 - 6	108	55.1
7 +	45	23.0

This age structure implies that the sampled households are headed by individuals with substantial experience in the area, thus capable of providing reliable assessments of livelihood and service changes over time. Most respondents were

married (84.7%), suggesting that household livelihoods are largely organized around stable family units. Education levels were generally low; over half (55.6%) had only primary education and 29.6% had no formal schooling. This low educational

attainment can constrain households' capacity to access skilled employment within the gas sector, reinforcing dependence on low-skilled jobs or traditional livelihood strategies such as fishing, farming, or petty trade. Finally, household sizes were substantial, with over half (55.1%) having 4-6 members and 23% having seven or more. While large households increase consumption needs, they can also be a source of labor for farm and other household-based enterprises.

Research Question 1: What changes have occurred in the availability of key social services following the onset of gas extraction?

This study examined changes that have occurred in the availability of key social services following the onset of gas extraction in the study area.

As shown in Table 3, services that were previously limited and uneven became universally accessible after the commencement of gas extraction, with water, electricity, schools, and health services reaching 100% coverage. The most notable

improvement was electricity access, which increased from 10.2% to full coverage.

To establish the drivers of this change, the study analysed data from Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). Participants attributed the observed improvements to the combined efforts of government agencies and corporate actors involved in the project. As one key informant explained:

After the commencement of gas extraction and processing operations, Tanzania Electric Supply Company (TANESCO) supplied the electricity in the entire ward through the Rural Electrification Project. However, the road lights at Madimba Centre were set up by the gas company. Schools, both primary and secondary, were built jointly by community members and the government. Nonetheless, the gas company supplied tap water in all study villages. It also provided an ambulance service for emergency cases" (Key informant, Madimba Ward, 15 March 2025).

Table 3: Availability of selected social services in the study area by ward

Type of services	Before			During		
	Madimba	Msimbati	Total	Madimba	Msimbati	Total
Water supply	70(35.7)	100(51.0)	170(86.7)	94(48.0)	102(52.0)	196(100)
Electricity supply	6(3.1)	14(7.1)	20(10.2)	94(48.0)	102(52.0)	196(100)
School access	64(32.7)	67(34.2)	131(66.8)	94(48.0)	102(52.0)	196(100)
Health services	44(22.4)	66(33.7)	110(56.1)	94(48.0)	102(52.0)	196(100)

From a Sustainable Livelihoods Framework (SLF) perspective (Chambers & Conway, 1992; DFID), these developments represent a substantial augmentation of households' physical and social capital assets. The enhanced asset base directly strengthens livelihood capabilities and socio-economic resilience by reducing daily burdens, improving health services and fostering human capital.

Viewed through the lens of the Resource Curse hypothesis (Auty, 1998; Ross, 2015), the study results initially appear to reflect a *resource blessing*, manifested in infrastructure expansion and improvements in household well-being. However, the broader resource-curse literature (Humphreys et al., 2007; van der Ploeg, 2011; Ross, 2015) cautions that such early gains do not necessarily translate into sustainable long-term development, as resource-driven growth may later be undermined by economic volatility, governance challenges, or uneven distribution of benefits.

Resource-rich contexts often experience divergent development trajectories because the conversion of resource windfalls into sustainable socio-economic benefits depends largely on institutional conditions (Mehlum et al., 2006; van der Ploeg, 2011; Ross, 2015). These include comprehensive planning frameworks, binding long-term development policies and enforceable regulatory systems that safeguard local interests while guiding revenue allocation and environmental management (Humphreys et al., 2007; Bebbington et al., 2008). In the absence of such conditions, discretionary distribution of resource rents may encourage rent-seeking, clientelism and weak accountability, ultimately undermining development outcomes despite initial economic gains (Narh, 2023). Furthermore, the observed collaboration between government authorities and the gas company reflects governance and corporate social responsibility (CSR) mechanisms that can enhance developmental outcomes when effectively implemented (Kinyondo & Villanger, 2017).

Research Question 2: How has access to social services changed following the commencement of gas extraction?

In response to the second research question, Table 4 indicate substantial improvements in access to social services following the commencement of gas extraction. Prior to gas extraction, most households reported significant difficulties in accessing key services. For example, 62.8% of the respondents in Madimba and 19.6% in Msimbati reported difficulty accessing water while electricity access was considered difficult by 89.4% and 92.2% of the households, respectively. Similar constraints were observed for school and health centre access. For instance, 53.2% in Madimba and 33.3% in Msimbati considered school access as difficulty whereas 64.9% in Madimba and 33.3% in Msimbati considered health care services as difficulty.

During the gas extraction period, access conditions improved markedly. In both villages, the majority of

households reported water and electricity access as somewhat or very easy. Health centre access also improved significantly, with most respondents reporting very easy access. This positive transformation is further illustrated by a community member who noted:

Access to social services is significantly easier than before the extraction, which is a blessing. We now have running water as well as primary and secondary schools. There are a village dispensary and a health center in the ward. Electricity is now available and it is very easy to access (FGD, Msimbati Village, 18 March 2025).

However, access to education in Madimba remained largely unchanged, with the proportion reporting difficulty staying high (54.3%). This suggests that infrastructure improvements associated with gas development did not equally translate into better educational access in that village

Table 4: Ease of Accessing Social Services by Wards

Categories	Before		During	
	Madimba	Msimbati	Madimba	Msimbati
Water supply				
Difficult	59 (62.8)	20 (19.6)	0 (0.0)	0 (0.0)
Somewhat easy	35 (37.2)	69 (67.6)	22 (23.4)	27 (26.5)
Very easy	0 (0.0)	13 (12.8)	72 (76.6)	75 (73.5)
Electricity supply				
Difficult	84 (89.4)	94 (92.2)	10 (10.6)	11 (10.8)
Somewhat easy	10 (10.6)	8 (7.8)	63 (67.0)	73 (71.6)
Very easy	0 (0.0)	0 (0.0)	21 (22.4)	18 (17.6)
School access				
Difficult	50 (53.2)	34 (33.3)	51 (54.3)	0 (0.0)
Somewhat easy	40 (42.6)	63 (61.8)	11 (11.7)	34 (33.3)
Very easy	4 (4.2)	5 (4.9)	32 (34.0)	68 (66.7)
Health centre				
Difficult	61 (64.9)	34 (33.3)	10 (10.6)	1 (0.9)
Somewhat easy	33 (35.1)	68 (66.7)	32 (34.0)	28 (27.5)
Very easy	0 (0.0)	0 (0.0)	52 (55.4)	73 (71.6)

Table 5: Change in Ease of Access to Social Services in the Study area

Variables	Mean before extraction	Mean during extraction	Difference	P-Value
Water Supply	1.984694	2.964286	0.9795918	p< 0.001
Electricity Supply	1.091837	2.19898	1.107143	p< 0.001
School Access	1.566327	2.443878	0.877551	p< 0.001
Health Centres	1.566327	2.887755	1.321429	p< 0.001

Additionally, the study employed a paired *t*-test to determine whether the observed changes were statistically significant. The results in Table 5 reveal a significant difference between the pre- and post-gas extraction periods ($p < 0.05$). These findings indicate that the changes in access to social services

were not due to chance. Rather, the introduction of gas extraction activities was associated with improved provision of essential services in the local area, thereby enhancing residents' ease of access to water, electricity, education and health facilities during the study period.

The significant improvement in physical access is central to the resource curse–resource blessing debate. It provides empirical, micro-level evidence that resource extraction can directly stimulate the development of foundational infrastructure, a key component of the “resource blessing” narrative. The observed investments in roads, electricity lines, and water systems represent a tangible expansion of community physical capital. These developments support arguments in the literature that resource revenues, when effectively managed, can finance essential public goods and infrastructure that enhance local welfare and broaden economic opportunities (Humphreys et al., 2007).

Yet, evidence further exposes the limitations of a purely infrastructural “blessing.” Although Kondowe and Osoro (2022) report no macro-level resource curse in Tanzania’s gas sector, the persistent inequity in school access in Madimba (Table 5) shows that positive macro-level outcomes from gas operations may not necessarily translate into equitable community well-being (Narh, 2023; Kweka, 2022). This gap supports Narh’s (2023) argument that macroeconomic growth or infrastructure expansion has limited value for marginalized groups. Thus, while the infrastructure gains associated with gas extraction are evident, they can remain shallow by failing to ensure equitable human capital development.

The core driver of this trend appears to be governance and coordination gaps, reflected in the disconnection between corporate CSR initiatives, national infrastructure project guidelines and localized government planning that fails to account for specific demographic pressures and intra-

community disparities (Bebbington et al., 2008). This aligns with critiques of the resource curse literature, which emphasize that centralized planning and a lack of binding, long-term development plans for host communities can perpetuate marginalization (Narh, 2023). The study’s results have important implications for household livelihoods. Easier water access saves time, especially for women and girls, which can be redirected to education or productive activities. The study’s results have important implications for household livelihoods. Easier water access saves time, especially for women and girls, which can be redirected to education or productive activities. Improved electricity supports small enterprises while better health services strengthen human capital. These changes indicate progress toward SDGs 3, 6, and 7. However, persistent inequalities in service access suggest that the key challenge is ensuring equitable and sustainable distribution of these benefits so that the gains translate into inclusive development rather than a superficial resource blessing.

Research Question 3: Has the onset of gas extraction improved community perceptions of the distance burden to social services?

In Table 6, this study examined whether the onset of gas extraction improved community perceptions of the distance burden associated with accessing social services. The distance burden reflects both the physical distance to services and the opportunity costs involved in travelling to them, thereby providing a more comprehensive measure of accessibility.

Table 6: Manageability of distance burden to services by ward

Categories	Before		During	
	Madimba	Msimbati	Madimba	Msimbati
Water supply				
Not manageable	53 (56.4)	18 (17.6)	0 (0.0)	0 (0.0)
Somewhat manageable	39 (41.5)	77 (75.5)	25 (26.6)	17 (16.7)
Easily manageable	2 (2.1)	7 (6.9)	69 (73.4)	85 (83.3)
School access				
Not manageable	62 (66.0)	47 (46.1)	49 (52.1)	0 (0.0)
Somewhat manageable	25 (26.6)	46 (45.1)	18 (19.1)	49 (48.0)
Easily manageable	7 (7.4)	9 (8.8)	27 (28.7)	53 (52.0)
Health centre				
Not manageable	62 (66.0)	61 (59.8)	12 (12.8)	2 (2.0)
Somewhat manageable	32 (34.0)	41 (40.2)	45 (47.9)	43 (42.2)
Easily manageable	0 (0.0)	0 (0.0)	37 (39.4)	57 (55.9)

The results indicate that the effects of gas extraction on perceived distance to social services were mixed

across the study communities, suggesting a heterogeneous impact following the commencement of extraction activities.

A dramatic improvement is evident for water and health services (Table 6). A proportion of respondents reporting distances as "not manageable" fell to 0% for water and to 12.8% and 2.0% for health in Madimba and Msimbati, respectively. Concurrently, the "easily manageable" category, previously nonexistent for health, rose substantially to 39.4 (Madimba) and 55.9 (Msimbati). In stark contrast, the manageability of school distances remained a critical challenge in Madimba, with 52.1% still reporting "not manageable" distances, underscoring a significant intra-community disparity. This stagnation is qualitatively corroborated by reports of students at Madimba Secondary School- which is a day school - travelling up to 20 kilometers daily to attend study. "Our kids have to go a considerable distance to get to school, roughly 20 kilometres from Mngoji to Madimba, where the secondary school is situated" (FGD, Mngoji Village, 20 March 2025).

The pronounced reduction in distance burdens for water and health services aligns with common Corporate Social Responsibility (CSR) priorities in extractive regions, particularly the provision of tangible infrastructure, such as water and health facilities (Gillo et al., 2025). However, the persistent challenge of school distance management in Madimba reveals a key limitation of this

development model. This finding is consistent with literature indicating that the benefits of resource extraction are often unevenly distributed, with "softer" yet essential social infrastructure, such as education, frequently neglected because it is commonly perceived as the primary responsibility of government, rather than extractive companies (Hilson, 2012).

This implies that the improved manageability of distances to water and health services directly enhances household welfare by reducing the time and labor previously required for long journeys. The continued difficulty in accessing education in Madimba highlights a governance coordination gap, suggesting that CSR and state initiatives have not sufficiently addressed the demographic pressures associated with the gas project. Thus, although gas extraction has reduced spatial barriers to some essential services, the resulting benefits remain unevenly distributed.

Research Question 4: Has the onset of gas extraction improved community perception of affordability of key social services in the study area?

In Table 7, the study assessed whether the onset of gas extraction improved community perception of affordability. Index values were classified into three categories: low affordability (1.0–1.9), moderate affordability (2.0–2.5) and high affordability (2.6–3.0).

Table 7: Affordability of Social Services during the Gas Extraction Period by Ward

Social service categories	Response by Ward		Total score	Service affordability index	
	Madimba	Msimbati		Madimba	Msimbati
Water supply					
Less affordability (1)	0 (0.0)	0 (0.0)	0 (0.0)	2.82	2.85
Same affordability (2)	18 (19.15)	15 (14.71)	33 (16.93)	High	High
More affordability (3)	76 (80.85)	87 (85.29)	163(83.07)	affordability	affordability
Electricity supply					
Less affordability (1)	24 (25.53)	3 (2.94)	27 (13.8)	2.44	2.66
Same affordability (2)	5 (5.32)	27 (26.47)	32 (16.3)	Moderate	High
More affordability (3)	65 (69.15)	72 (70.59)	137 (69.9)	affordability	affordability
School access					
Less affordability (1)	7 (7.45)	11 (10.78)	18 (9.2)	2.29	2.69
Same affordability (2)	53 (56.38)	10 (9.8)	63 (32.1)	Moderate	High
More affordability (3)	34 (36.17)	81 (79.41)	115 (58.7)	affordability	affordability
Health centre					
Less affordability (1)	17 (18.09)	2 (1.96)	19 (6.7)	2.31	2.73
Same affordability (2)	31 (32.98)	24 (23.53)	55 (28.0)	Moderate	High
More affordability (3)	46 (48.94)	76 (74.51)	122 (62.2)	affordability	affordability

Results indicate that the onset of gas extraction coincided with improvements in community

perceptions of affordability of key social services, although the magnitude of these improvements

varies across services and between wards. For water supply, the vast majority of respondents reported increased affordability. Specifically, 80.85% of respondents in Madimba and 85.29% in Msimbati indicated that water services had become more affordable. This is reflected in the service affordability index scores of 2.82 for Madimba and 2.85 for Msimbati, both of which fall within the high affordability category. These findings suggest that water supply services became widely affordable to households in both communities during the gas extraction period.

Electricity services show a slightly different pattern. While a substantial proportion of respondents in both wards reported improved affordability, the index score for Madimba (2.44) indicates moderate affordability whereas Msimbati records a higher index score of 2.66, reflecting high affordability. This suggests that although electricity services became more affordable overall, households in Msimbati appear to have benefited more substantially than those in Madimba.

A similar trend is observed for school access and health center services. In Madimba, the affordability index scores for school access (2.29) and health centers (2.31) fall within the moderate affordability category, indicating that although improvements occurred, some households may still face financial constraints in accessing these services. In contrast, Msimbati records higher index values of 2.69 for school access and 2.73 for health services, both reflecting high affordability.

These findings suggest that gas extraction activities may have enhanced household economic capacity and contributed to improvements in service affordability, potentially through employment opportunities, local economic stimulation and infrastructure investments associated with the extractive development (Humphreys et al., 2007; Hilson, 2012). However, the observed disparities between Madimba and Msimbati highlight uneven distribution of these benefits across the communities. This reinforces arguments in the resource governance literature that while extractive industries can support local development, effective institutional arrangements and equitable benefit-sharing mechanisms are necessary to ensure that economic gains translate into inclusive improvements in community welfare (Ross, 2015; Narh, 2023)

Conclusion and Recommendations

The study findings highlight a complex relationship between resource extraction and social service provision in peripheral regions. While extractive-led development can stimulate service infrastructure expansion, the distribution of associated benefits remains uneven across communities and sectors. These patterns suggest that improvements in service infrastructure alone are insufficient to ensure equitable and inclusive access to essential social services. The findings therefore underscore the importance of stronger alignment between extractive-sector investments, state development programs and local planning processes. Without deliberate coordination and equity-oriented policies, resource-led development risks reinforcing existing spatial inequalities rather than addressing them. More broadly, the study points to the need for governance frameworks that better integrate extractive industry development with inclusive rural service provision.

The findings point to several policy implications. First, stronger integration between extractive-sector investments and long-term regional development planning is needed. Aligning gas-sector infrastructure development with district planning frameworks could help ensure a more balanced distribution of essential services across communities. In the case of Mtwara Rural District, this may include prioritizing additional secondary education infrastructure in underserved areas, such as Madimba Ward and ensuring that newly constructed health facilities, including a dispensary in Mngoji village, are promptly operationalized.

Second, improvements in service infrastructure should be complemented by investments in human capital and local economic participation. Vocational training programs linked to gas-sector supply chains, alongside financial support for small and medium enterprises, could help translate infrastructure expansion into sustainable livelihood opportunities for host communities.

Finally, corporate social responsibility initiatives by gas companies could move beyond infrastructure provision toward stronger institutional partnerships with local governments and community organizations. Such collaboration may support initiatives that reduce service cost burdens for vulnerable households and co-finance critical education and health infrastructure in gas-affected areas.

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