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The Trickle-Down Effects of Rural-Urban Linkages on Household Living Conditions in the Hinterlands of Kibaigwa Township, Kongwa District, Tanzania

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ABSTRACT

Rural-urban linkages are increasingly recognized as crucial for development, but the mechanisms through which economic benefits diffuse from emerging urban centres to their hinterlands require deeper empirical analysis. This study evaluates these trickle-down effects by examining how linkages with Kibaigwa Township, a rapidly growing trade hub in Tanzania, enhance household living conditions in adjacent rural villages. Utilizing a cross-sectional design, data were collected from 114 households in Mtanana and Pandambili villages and analysed using an Ordinary Least Squares (OLS) regression model. The findings reveal that rural-urban linkages account for approximately 56% of the variation in household income ($R^2 = 0.566$). Migration and closer proximity to the township were found to be the most significant drivers of higher income ($p < 0.05$). These results underscore that while linkages are vital, their benefits are not automatic and are strongly mediated by mobility and spatial factors. Policies should therefore focus on targeted infrastructure investment and market integration to ensure a more equitable distribution of economic growth.

1. Introduction

The persistence of spatial inequality between urban centres and their rural peripheries remains a critical challenge for regional development (Ejaz & Mallawaarachchi, 2023). A fundamental hypothesis in development economics posits that the dynamism of urban growth poles can generate spillover or trickle-down effects, enhancing the living conditions in surrounding rural areas (Böventer, 1975). This study employs the concept as a specific analytical lens—distinct from its use in political-economic theory—to empirically test this hypothesis in a Tanzanian context. The research investigates the extent to which Kibaigwa Township's economic growth translates into measurable improvements in household welfare in its adjacent rural hinterlands, thereby seeking to quantify the tangible outcomes of rural-urban interactions (Sang-Arun, 2013).

The transmission channels for these potential trickle-down effects are the multifaceted rural-urban linkages that facilitate the flow of goods, capital, people, and information between urban and rural spaces (Wenban-Smith, 2014). In Tanzania, such linkages are considered fundamental to rural economic transformation (Lazaro et al., 2017). Functional linkages enable rural households to access more lucrative urban markets for their agricultural products, resulting in higher and more stable incomes (Wegerif, 2017). Simultaneously, labour migration to urban centres often results in remittances flowing back to rural families, providing a crucial source of capital that enhances household resilience and investment capacity (Owamah et al., 2025; Mgendi et al., 2019). Moreover, these connections can facilitate technology transfer and enhance access to essential services, such as healthcare and education, which are fundamental to improved living standards (Mushi & Makindara, 2021; Onyebueke & Akinyoade, 2022).

Despite the well theorized nature of these mechanisms, there remains a significant gap in the literature regarding their empirical quantification. Kibaigwa Township, strategically situated along a key transport corridor, presents a compelling case for analysis due to its recent and substantial urbanization into a key node for agricultural trade (Mushi & Makindara, 2021). Although previous studies have aptly described the nature of rural-urban linkages in Tanzania (Lazaro et al., 2017; Tacoli, 2006), there has been a lack of focus on quantitatively measuring the relative contribution of specific linkage channels—such as migration, employment opportunities, or physical proximity—to household income. This lack of granular,

quantitative evidence makes it challenging for policymakers to identify and prioritize the most effective interventions for fostering inclusive growth (World Bank, 2020).

This study directly addresses this gap by providing a quantitative assessment of the trickle-down effects originating from Kibaigwa. By employing regression analysis to disaggregate and examine the impact of specific linkage pathways on household income, this research provides robust evidence on which mechanisms are most significant. The findings provide policymakers and development planners with evidence-based recommendations to inform the design of targeted strategies to enhance rural-urban connectivity and promote more inclusive and equitable growth across rural landscapes.

2. Literature Review

2.1. Theoretical Framework

2.1.1. Growth Pole Theory

The Growth Pole Theory, developed by François Perroux (1950), posits that economic development is inherently unbalanced. It argues that growth does not appear everywhere simultaneously but originates in specific nodes or 'poles' that possess propulsive, leading industries. These poles attract investment, technology, and skilled labour, generating multiplier effects intended to diffuse outward into the surrounding region, or hinterland (Böventer, 1975). For this study, this theory provides the foundational logic for the 'trickle-down' hypothesis, framing Kibaigwa Township as a potential growth pole from which economic benefits, or 'spread effects', are expected to radiate into the adjacent rural areas (Sang-Arun, 2013).

2.1.2. The Core-Periphery Model

Offering a more critical perspective, the Core-Periphery Model conceptualizes regions as comprising a dominant economic 'core' (the urban centre) and a dependent 'periphery' (the rural hinterland) (Friedmann, 1966). The model contends that the extractions of resources such as labour and raw materials from the periphery often sustain the core's growth. This dynamic can lead to polarising 'backwash effects', where capital and human resources are drained from the periphery to the core, thereby exacerbating regional inequalities rather than reducing them (Myrdal, 1957; Tacoli, 2006). This model provides a crucial counterpoint, suggesting that the linkages between Kibaigwa and its hinterlands may not be mutually beneficial and could reinforce existing spatial disparities.

2.1.3. The Location Quotient Model

The Location Quotient (LQ) is an analytical tool rather than a comprehensive theory, used to measure the concentration of an industry or economic activity in a specific region relative to a larger reference area (Isserman, 1977). This study uses the Location Quotient (LQ) as a conceptual guide to identify the most concentrated economic sectors in Kibaigwa. A high LQ in sectors such as trade or agro-processing would suggest that Kibaigwa has a specialized economic base that could drive demand for rural products and labour (Stimson et al., 2006). Thus, the LQ concept helps operationalize the growth pole theory by identifying the specific 'propulsive' industries within Kibaigwa that may be generating trickle-down effects.

2.2. Empirical Review

2.2.1. Role of Market Towns

Empirical literature confirms the central role of market towns as critical nodes in mediating rural-urban linkages. Studies across Africa indicate that these towns serve as vital hubs for market integration, providing rural producers with access to outlets for agricultural goods while also acting as distribution points for consumer products and services originating from larger urban areas (Agergaard et al., 2019). As Satterthwaite and Tacoli (2003) argue, these towns are not merely passive conduits but actively shape the economic opportunities available to rural populations. Their development is therefore seen as a key factor in stimulating local and regional economies.

2.2.2. Contributions of Small Towns to Rural Development

Building on the role of market towns, a substantial body of research underscores the broader contributions of small towns to rural development. Studies in Ethiopia (Adugna & Hailemariam, 2011; Gashu, 2014) and elsewhere demonstrate that small towns are indispensable for delivering essential services, generating nonfarm employment, and diversifying rural livelihoods, thereby enhancing household economic resilience. By offering alternative income sources, these towns can reduce rural households' vulnerability to agricultural shocks (Wiggins & Proctor, 2001), thereby providing a tangible trickle-down benefit.

2.2.3. Emerging Urban Centres and Their Impact

Emerging urban centres like Kibaigwa, often driven by specific economic forces, such as trade or resource extraction, can have a profound transformative impact on their surrounding regions. Research shows these centres attract significant investment, which stimulates local economies and generates employment (Turok & McGranahan, 2013). However, the impact is often uneven. As noted by Potts (2009), while such centres create opportunities, they can also lead to increased land pressure and competition for resources, which may disadvantage poorer rural households.

2.2.4. The Rural-Urban Divide and Disparities

A critical theme in the literature is that rural-urban linkages do not automatically erase the rural-urban divide or dichotomy. In fact, without proper management, these linkages can exacerbate the rural-urban divide. Research consistently indicates persistent inequalities in income, infrastructure access, and the quality of social services between urban and rural areas (Zimbalist, 2017). Tacoli (2006) argues that the terms of trade are often skewed in favour of urban centres, leaving rural producers with limited bargaining power. The quality of infrastructure, particularly transport networks, is a key determinant of whether linkages reduce or reinforce this divide (Porter, 2014).

2.2.5. Linkages and Livelihood Improvement

Ultimately, the value of rural-urban linkages is measured by their impact on household livelihoods. Stronger linkages are consistently associated with greater livelihood diversification, as households move beyond subsistence farming into nonfarm enterprises and wage labour (Barrett et al., 2022, 1997; Ellis, 2000). Migration and remittances represent one of the most direct and consequential linkage mechanisms, providing a vital source of capital for rural households that can be invested in health, education, and productive activities (Adams & Page, 2005; Taylor, 1999). Recent studies continue to affirm that these financial flows are transformative, significantly improving consumption and reducing poverty in rural areas (Owamah et al., 2025, 2020; Botchey et al., 2025).

3. Materials and Methods

3.1. The Study Area

This study was conducted in Kibaigwa Township and its adjacent hinterland villages, particularly Mtanana and Pandambili, in Kongwa District, Tanzania (Figure 1). The area is purposefully selected as a case study due to Kibaigwa's status as a rapidly growing hub, as indicated by the National Bureau of Statistics (NBS), which shows its population expanded from 12,321 in 2002 to 50,054 in 2022. This growth rate represents a compound annual growth rate of approximately 7.2%, more than double the national average of around 3.1% over the same period. This intense growth, driven by its role as a major agricultural trade centre, makes it an ideal setting to investigate the mechanisms and impacts of rural-urban linkages.

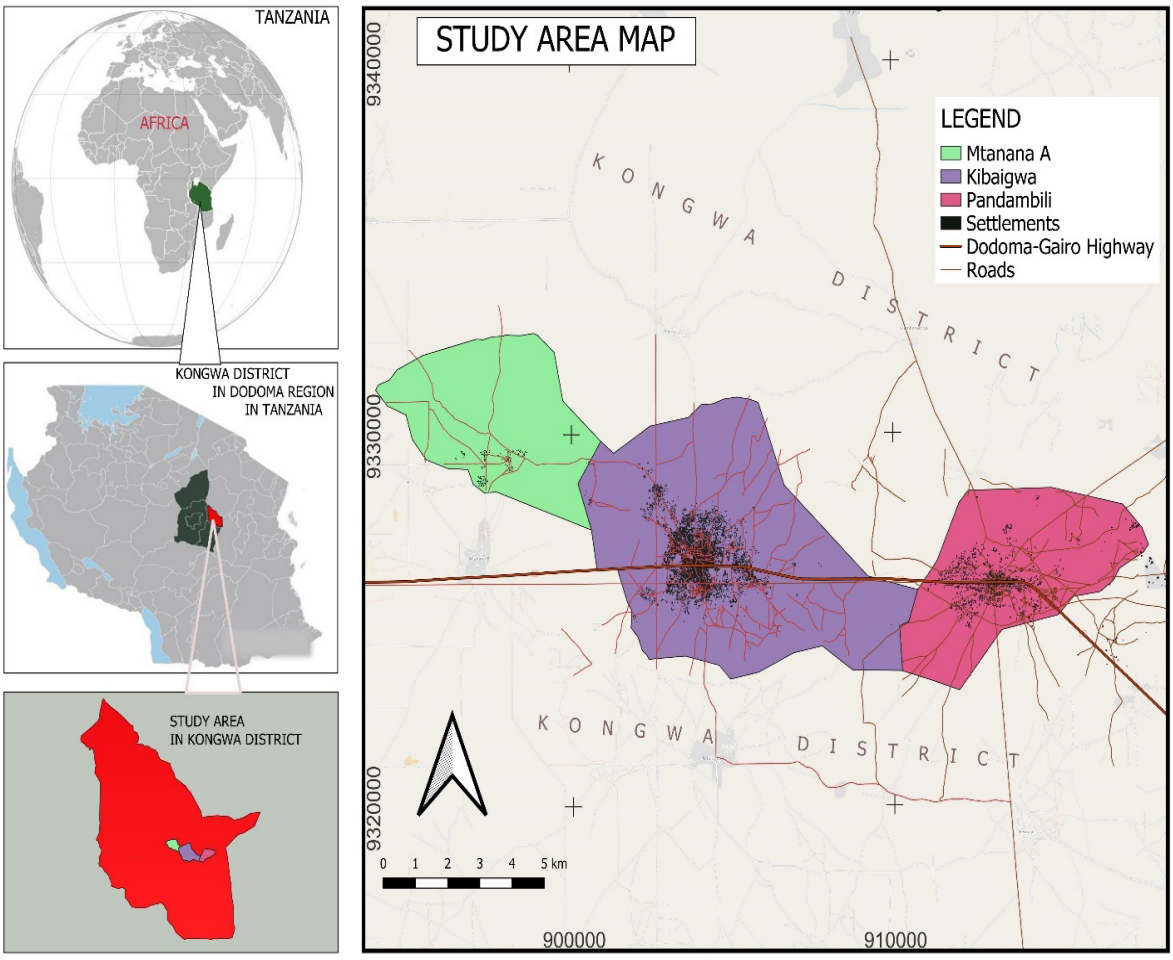

Figure 1: Location map of Kibaigwa Township in Kongwa District, Tanzania [i]

3.2. Research Design

The study employed a cross-sectional research design, which is appropriate for capturing a snapshot of conditions and relationships among variables at a single point in time (Bryman, 2016). This approach enabled an efficient, timely assessment of the prevailing socio-economic dynamics and the perceived impacts of rural-urban linkages, aligning well with the study's exploratory objectives. Both quantitative and qualitative data were collected to provide a comprehensive understanding of the research problem.

3.3. Sampling Procedures and Sample Size

The target population comprised all households within Mtanana and Pandambili villages. The ideal sample size, calculated using Cochran's (1977) formula, was 385 households for a 95% confidence level, using both probability and non-probability sampling techniques. Purposive sampling was employed to collect information from key informants, while stratified random sampling was used as the population was divided into strata based on households in the selected villages. Random samples were then drawn from each stratum.

Cochran's Formula:

The formula used is:

$$n = \frac{(Z^2\, p(1-p)}{e^2} \text{.....(i)}$$

Where,

n = sample size

Z = Z-score corresponding to the desired confidence level (e.g., for a 95% confidence level, Z ≈ 1.96)

p = estimated proportion of the population with a particular characteristic (if unknown, use 0.5 for a conservative estimate, which results in the maximum required sample size)

e = margin of error

n = (1.96^2 * 0.5 * (1 - 0.5)) / (0.05^2)

n = (3.8416 * 0.25) / 0.0025

n = 384.16, a sample size of 385 households is to be studied

However, the final sample obtained consisted of 114 households. The justification for this smaller sample is based on severe logistical constraints encountered during fieldwork. The data collection period coincided with the heavy rainy season, when most residents were engaged in farming. Furthermore, the collapse of the main bridge into Kibaigwa due to flooding severely impeded access and elongated the research process. Given these unavoidable challenges, the sample of 114 was the maximum achievable within the timeframe, and this limitation is acknowledged.

3.4. Data Collection Methods

A structured household questionnaire was administered via face-to-face interviews to the 114 households to obtain quantitative data on demographics, livelihoods, income, and perceptions of linkage impacts. Qualitative data were gathered through two methods: (10) in-depth interviews with key informant interviews were conducted with: the Ward Executive Officer (WEO) for Kibaigwa; the Village Executive Officers (VEOs) for both Mtanana and Pandambili (2); one Agricultural Extension Officer (AEO) serving the area; two established agro-traders in Kibaigwa market; two local business owners (one from each village); and two village elders (one from each village) to provide historical context. Two FGDs were conducted, one in each village. The Mtanana group comprised 11 participants (6 male, 5 female) of varying ages, and the Pandambili group had 9 participants (7 male, two female) to capture a diverse range of community perspectives.

3.5. Data Analysis

The study employed descriptive and inferential statistical models to analyze the collected data effectively. Descriptive statistics were used to determine the frequencies and percentages of respondents' characteristics, and multiple-response analyses were conducted to identify the impacts of rural-urban linkages at the household level. Furthermore, inferential statistics were applied using a regression model to evaluate the impact of rural-urban linkages on rural economic growth. Regression analysis was chosen for its ability to estimate relationships between the independent variables (market access, migration, technology transfer, and infrastructure) and the dependent variable (household income). The study utilized Ordinary Least Squares (OLS) regression, as it is widely used in studies involving household-level data and has been applied in similar research examining rural-urban linkages in sub-Saharan Africa (Knauder, S. 2018). The regression model for this study is specified as follows:

$$Y_i = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\ldots+\beta_nX_n+\varepsilon_i \text{..(ii)}$$

Where:

Y_i = Average household income (Dependent Variable).

X_1 = Age of household head.

X_2 = Gender of household head. (1 Male, 0 = Female).

X_3 = Education level of household head (Years of Schooling).

X_4 = Household having migrant (1 = Yes, 0 = No).

X_5 = Distance from the village to Kibaigwa TC (km).
X_6 = job opportunities created as a result of rural-urban linkages.
X_7 = Household expenditure.
X_8 = Market accessibility. (1 = Yes, 0 = No).
X_9 = Household receipt of remittance. (1 = Yes, 0 = No).
X_{10} = Household access to credit. (1 = Yes, 0 = No).
X_{11} = Rural urban linkage impact in agriculture. (1 = Yes, 0 = No).
$\beta 0$: The Intercept.
β_1 to β_7: Coefficients indicating the impact of each independent variable.
The coefficients β_1-β_7 were tested for statistical significance to determine whether rural-urban linkages have a significant influence on household living conditions. Positive coefficients would indicate that enhancements in rural-urban linkages are associated with improved outcomes in household income, agricultural productivity, and access to services. Conversely, negative coefficients would suggest that such linkages may have adverse effects on rural households.

4. Results and Discussions

4.1. Respondent Characteristics

The survey of 114 respondents from Mtanana and Pandambili villages provides crucial demographic context for understanding rural-urban linkages, as detailed in Table 1. These statistics inform the representativeness of the sample and highlight demographic factors that may influence household living conditions and engagement with rural-urban linkages (Tacoli, 2017). These characteristics enable a deeper understanding of subsequent findings in establishing the demographic landscape within which the trickle-down effects are observed (Bezu & Holden, 2014).

Table 1: Demographic Characteristics of respondents

Demographic Category		Frequency n=114	Per cent (%)
Gender	Male	76	67
	Female	38	33
Age (Years)	18-25	5	4
	26-35	39	34
	36-45	10	9
	46-55	42	37
	56-Above	18	16
Marital status	Single	19	17
	Married	72	63
	Separated	19	17
	Widowed	4	4
Education Level	Informal education	29	25
	Primary school	55	48
	Secondary School	20	18
	Vocational training	7	6
	University degree or higher	3	3
Household size	1-3	18	16
	4-6	72	63
	7-9	23	20
	10+	1	1

As presented in Table 1, the majority of respondents were male (67%) and married (63%), highlighting the significant role of male household heads and family units in rural-urban interactions, consistent with studies by Lundh (2022) and Gashi Nulleshi & Kalonaityte (2023). on gender roles and family dynamics in rural economies. The average age was 44, with the largest group (37%) aged 46-55, reflecting the active engagement of middle-aged individuals in income-generating activities linked to urban markets (Mushi & Makindara, 2021). Educational attainment was 48%, with 48% having primary education, indicating potential challenges in leveraging diverse urban economic opportunities that require specialized skills (UN-Habitat, 2017). Household sizes predominantly ranged from 4 to 6 members (63%), suggesting that larger households may utilize a greater labour pool to diversify economic activities and benefit from rural-urban connections (Andersson, 2025). These demographic

patterns collectively provide vital contextual information for understanding the socio-economic composition and its influence on rural-urban engagement within the study area.

4.2. Prevailing Linkages

4.2.1. Physical Connectivity

The physical connectivity between the rural villages (Mtanana and Pandambili) and Kibaigwa Township was quantitatively assessed using two key metrics: geographical distance (km) and travel time. The findings indicate that the average distance from both villages to Kibaigwa Township for respondents is 5.3 km, with a range of 2-18 km. Further analysis, detailed in Table 2, reveals a notable disparity between the study villages. Mtanana village exhibits significantly closer proximity, with 66% of its respondents residing within a five-kilometre radius of Kibaigwa, compared to only 48% in Pandambili village. Correspondingly, Mtanana village benefits from shorter average travel times, with 60% of its residents reaching the township within 30 minutes, whereas only 37% of Pandambili residents reported similar travel times.

Table 2: Travelling Distance and Time in the Study Area

Proximity to the Township		Mtanana n=62	Pandambili n=52	Total n=114
Travelling Distance	Below 5 KM	41(66%)	25(48%)	66(58%)
	5-10 KM	20(32%)	23(44%)	43(38%)
	11-20 KM	1(2%)	4(8%)	5(4%)
Travelling Time	Less than 30 minutes	37(60%)	19(37%)	56(49%)
	30 minutes to 1 hour	18(29%)	22(42%)	40(35%)
	1 to 2 hours	7(11%)	11(21%)	18(16%)
Total		**62**	**52**	**114**

4.2.2. Trade Network Patterns and Linkages

The exchange of goods and services for monetary value constitutes a primary form of transactional linkage between Kibaigwa Township and its surrounding rural hinterlands. This section details the nature, types, and volumes of trade activities, reflecting the robust economic interdependencies within the study area.

As detailed in Table 3, the predominant trade patterns are characterized by a substantial flow of consumers' goods from Kibaigwa Township to the villages of Mtanana and Pandambili. Specifically, the most exchanged items are clothing and apparel (86.0%), electronic products (86.0%), household goods and appliances (79.8%), and food products (53.5%). This robust transfer of manufactured and processed goods from the urban centre to the rural periphery is crucial for fulfilling daily needs and enhancing the living standards of rural residents (Ejaz & Mallawaarachchi, 2023). It signifies Kibaigwa's role as a significant retail and distribution hub for the surrounding rural communities

Table 3: Prevailing Trade Networks in the Study Area

Trade Patterns	Responses (N)	Per cent of Cases (%)
Groceries and food products	61	53.5
Clothing and apparel	98	86.0
Household goods and appliances	91	79.8
Electronics and technology	98	86.0
Medicine and medical equipment	69	60.5
Education services	14	12.3
Financial services	42	36.8
Transportation services	48	42.1
Entertainment and recreation	27	23.7
Agricultural inputs and equipment	62	54.4
Construction material	90	78.9
Utilities (water and electricity)	25	21.9
Fuel and energy products	19	16.7
Total	**744**	**652.6**

Note: The results are based on multiple responses.

Qualitative data from Focus Group Discussions (FGDs) revealed that while the exchange is primarily monetary, a sense of reciprocal economic dependency underpins these trade networks. Participants articulated how Kibaigwa Township has transformed from a mere market to a vital source of goods previously unavailable or expensive in the villages. As a youth, aged 29 from the Mtanana village noted, *"Before Kibaigwa grew, we had to go to Dodoma for good clothes or electronics. Now, it is just a short daladala ride, and we find everything there."* The Kibaigwa Ward Executive Officer emphasized Kibaigwa's strategic advantage as a central collection point for agricultural produce, allowing farmers from Mtanana and Pandambili to bypass distant, larger markets. This transition has largely replaced any previous informal barter-like exchanges with a more formalized, cash-based economy.

Beyond tangible goods, the trade linkages extend to essential services, including healthcare (60.5%), financial services (36.8%), and education services (12.3%). The necessity for rural residents to travel to Kibaigwa Township to access these critical services underscores a prevalent pattern of service centralization in urban centres. This highlights the inherent spatial disparities in service provision, where rural areas often depend on adjacent urban hubs for comprehensive social infrastructure (Tacoli et al., 2025). The Mtanana Village Executive Officer confirmed that while basic clinics exist in the villages, specialized healthcare and higher education facilities are almost exclusively found in Kibaigwa.

Furthermore, the data reveal substantial trade volumes in agricultural inputs (54.4%) and construction materials (78.9%) flowing from Kibaigwa to the villages. This bidirectional flow is critical, as it signifies Kibaigwa's role not only as a market for rural produce but also as a source of essential resources for agricultural enhancement and infrastructural development within the hinterlands. These findings align with the broader literature, which emphasizes the potential of rural-urban linkages to facilitate the transfer of inputs and resources vital for sustained rural development (Spielman et al., 2017; World Bank, 2020). FGD participants frequently mentioned purchasing fertilizers, improved seeds, and modern farming tools in Kibaigwa, indicating a shift towards more commercial and intensive agricultural practices. Similarly, the availability of construction materials has spurred improvements in housing and local infrastructure.

4.3. Impacts of Rural-Urban Linkages on Rural Hinterlands

An examination of respondents' perceptions of rural-urban linkages in Kibaigwa Township reveals largely positive sentiment, with a substantial majority (65% agreeing and 7% strongly agreeing) acknowledging the beneficial impacts of these connections on their respective villages. This widespread recognition indicates that the linkages are perceived as a net positive force for development within the study area.

As presented in Table 4, variations in perception exist between the study villages. Mtanana has a slightly higher proportion of respondents who strongly agree (10%) than Pandambili (5%). While both villages exhibit strong consensus on the benefits (Mtanana: 73% agreement; Pandambili: 56% agreement), subtle differences may be attributed to varying degrees of proximity to the township, access to transportation infrastructure, and the individual socio-economic characteristics of households in each village. The Kibaigwa ward executive officer suggested that Mtanana's closer physical and historical ties to Kibaigwa might explain its slightly more positive perception, as residents have experienced the trickle-down effects for a more extended period.

Table 4: Perception on the Impact of Rural-Urban Linkage on the Community

Responses	Mtanana		Pandambili		Total	
	n	%	n	%	n	%
Strongly Disagree	3	5%	2	4%	5	4%
Disagree	10	16%	13	25%	23	20%
Neutral	1	2%	3	6%	4	4%
Agree	45	73%	29	56%	74	65%
Strongly Agree	3	5%	5	10%	8	7%
Total	62	100%	52	100%	114	100%

Further disaggregation of perceived impacts, as shown in Table 5, highlights several key areas where rural populations have been significantly influenced by their connections to Kibaigwa Township. Improved access to goods and services (74.2%) and enhanced market access (70.1%) were identified as

the most frequently reported positive outcomes related to accessibility. These findings corroborate the existing literature, which underscores the role of rural-urban linkages in improving market integration for rural producers, enabling them to sell their products at better prices and access a wider variety of consumer goods (Smale et. al., 2012; Djurfeldt, 2015). A woman aged 46 years from Pandambili village, during FGD praised the convenience: *"We no longer struggle to find cooking oil or sugar; everything is available in Kibaigwa."*

In terms of economic impacts, a significant majority of respondents reported positive changes in household income (74.2%) and increased employment opportunities (60.8%). Respondents indicated that the linkage with Kibaigwa Township has had a tangible impact on household livelihoods through wages from employment, profits from microenterprises, and gains from agricultural trade. One hardware business owner confirmed this, stating,

> *"Many young people from the villages now come to Kibaigwa daily for casual labour in the market or construction. It is not always formal, but it is income they did not have before."*

Additionally, 34% of respondents noted that the linkages fostered the development of microenterprises in rural areas, driven by robust trading networks. This aligns with scholarship that posits rural-urban linkages stimulate entrepreneurship and contribute to the diversification of rural economies beyond traditional agriculture (Valle, 2021; Manyerere, 2022).

Other observed impacts included improvements in agricultural activities (32.0%), infrastructure development (32.0%), financial flows and remittances (28.9%), and a heightened perception of community investment (33.0%). These diverse positive effects indicate that rural-urban linkages extend beyond mere economic transactions, contributing to multidimensional improvements in rural life, including increases in productive capacity, physical connectivity, and financial resilience. The township transportation officer noted specific infrastructure developments, such as improved access roads and the expansion of mobile money services, that directly affect the ease of interaction between Kibaigwa and its hinterlands.

Table 5: Impacts of Rural-Urban Linkages in the Study Area

Impacts	Responses (n)	Per cent (%)	Per cent of Cases (%)
Income change	72	14.50	74.20
Employment opportunities	59	11.90	60.80
Microenterprise development	33	6.70	34.00
Community investment perception	32	6.50	33.00
Infrastructure development	31	6.30	32.00
Access to goods and services	72	14.50	74.20
Access to market	68	13.70	70.10
Access to social services	37	7.50	38.10
Technological innovation	33	6.70	34.00
Financial movement and remittances	28	5.60	28.90
Improved agricultural activities	31	6.30	32.00
Total	**496**	**100.00**	**511.30**

Note: The results are based on multiple responses.

4.3.1. Household Income in Relation to Rural-Urban Linkages

A multiple linear regression analysis was conducted to investigate the relationship between various factors associated with rural-urban linkages and household income in the study villages adjacent to Kibaigwa Township. The model demonstrated a strong, significant positive correlation (R = 0.752) between the independent variables related to rural-urban linkages and improvements in household income. This robust R-value indicates that the model effectively captures a substantial proportion of the factors influencing income variation. Furthermore, the R-squared value of 0.5661 implies that approximately 56.6% of the variance in household income levels can be statistically explained by the included variables, underscoring a meaningful association between rural-urban linkages and household economic well-being.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.7523	0.5661	0.4761	1,862,409.031

Table 7: Regression Coefficients for Household Income

Model	Unstandardized Coefficients			
	β	Std. Error	t	Sig.
(Constant)	2530726.67	1802391.67	1.404	0.163
Gender of respondent	29426.894	427038.145	0.069	0.945
Age of respondent	-6857.454	20107.045	-0.34	0.734
Education level (Years of schooling)	30850.039	50686.621	0.609	0.044
Household size	-41205.305	116450.828	-0.35	0.724
10 years, family member migrated permanently or temporarily to Kibaigwa	771387.27	355984.498	2.167	0.033
Distance from Kibaigwa township to village	-22106.002	68883.058	-5.32	0.049
Received financial assistance or loan from institution in Kibaigwa	409835.795	481724.737	0.851	0.397
Number oof employment opportunities created by Kibaigwa township linkage with the village	6092.567	181038.961	2.034	0.073
linkage with Kibaigwa Township has contributed to the improved village agricultural productivity in the rural villages	921126.65	652313.935	1.412	0.061
Household access to market for their agricultural produces	513083.543	608681.18	0.843	0.401
Household receipt of remittance due to household migrant from village to Kibaigwa	1085625.99	628718.533	1.727	0.087
Household access to credit from micro financial institutions linked with the village	723280.664	718672.968	1.006	0.317

The regression results (Table 7) compellingly demonstrate that rural-urban linkages significantly contribute to household income in the study area. Key positive factors identified include household migration, proximity to Kibaigwa Township, diverse job opportunities, and improved agricultural productivity. Specifically, the positive and significant coefficient for household migration (p = 0.033) indicates that households with members who have migrated to Kibaigwa Township experience a substantial increase in income, primarily through remittances and diversified livelihood strategies. This finding is further supported by qualitative insights from FGDs, where participants frequently cited financial support from urban-based relatives as critical for household expenses, education, and even agricultural investments, corroborating the findings of Owamah et al. (2025) and Wouterse (2010) on the role of remittances in sub-Saharan Africa. Similarly, the negative and significant coefficient for distance (p=0.049) confirms that closer proximity to Kibaigwa Township positively influences household income, as it facilitates easier access to markets for selling produce, sourcing inputs, and engaging in urban employment, aligning with the agglomeration benefits discussed by Carleto et al. (2017) and the World Bank (2020).

Furthermore, the positive impacts of increased employment opportunities (p = 0.073) and improved agricultural productivity (p = 0.061) underscore the multifaceted ways in which Kibaigwa Township stimulates rural economic activity. The township acts as an employment magnet, absorbing surplus rural labour into both the formal and informal sectors, thereby providing crucial alternative income streams. Simultaneously, its role as a hub for agricultural inputs and markets helps rural households improve their farming practices, leading to greater output and higher incomes. This is a synergy that has been consistently noted in the literature (World Bank, 2020; Vanlauwe et al.,

2021). While other demographic variables, such as Gender, age, household size, and access to financial assistance or credit, were included in the model, their coefficients were not statistically significant in explaining variations in household income, suggesting that the direct rural-urban linkage variables exert a more dominant influence on income within this specific study context.

4.3.2. Employment Creation and Diversification

Further analysis of employment creation resulting from rural-urban interactions revealed a strong positive correlation (R = 0.752) between sectoral employment and household income, accounting for 56.6% of the variation in household income (R-squared = 0.5661). As shown in Table 8, employment in the agricultural sector was the most influential, with a coefficient of β = $512,000 and a highly significant p-value (p = 0.001). This finding highlights agriculture's enduring dominance in rural income generation in Tanzania and similar developing contexts (Amankwah, 2024).

Table 8: Regression Results of Household Income in Relation to Sectoral Employment

Variable	Unstandardized Coefficients (β)	Std. Error	t-Statistic	Sig. (p-value)
(Constant)	2,530,726.67	1,802,391.67	1.404	0.000
Agriculture Employment	512,000	125,000	4.096	0.001
Trade Employment	438,500	118,300	3.707	0.002
Transport Employment	94,200	95,700	0.984	0.329
Service Sector Employment	478,900	132,5009	3.615	0.003
Model Summary				
Model	**R**	**R square**	**Adjusted R square**	**Std. Error of the Estimate**
1	0.75661	0.5661	0.4761	1,862,409.03

However, it is crucial to note that non-agricultural sectors, specifically trade (B = 438,500, p = 0.002) and services (B = 478,900, p = 0.003), also significantly contributed to household income. This robust contribution from nonfarm activities supports the argument that diversification into such employment opportunities helps stabilize and enhance rural incomes, providing a buffer against agricultural seasonality and price fluctuations (Barrett et al., 2021; Steven et. al., 2010). One participant from FGDs highlighted the appeal of these non-agricultural opportunities:

"Farming alone is risky with the rains. My children go to Kibaigwa to work in the small shops or as motorcycle taxi drivers; such employment gives us a steady income," explained an elderly farmer from Pandambili. The combined positive influence of both agricultural and non-agricultural sectors highlights how rural-urban linkages, by fostering integration across these sectors, can lead to substantial improvements in household income in rural regions.

This evidence contrasts with earlier assumptions that rural household income is solely driven by agricultural production. The significant impact of employment in trade and services underscores the need to enhance infrastructure and market access to enable rural households to participate effectively in broader economic activities. This study complements existing scholarship arguing that strengthening rural-urban linkages promotes local entrepreneurship and market integration, thereby expanding income opportunities beyond traditional farming (Ellis & Bigsten, 2022; Sietchiping et al., 2014). Consequently, fostering a diversified approach that encompasses both agricultural and non-agricultural sectors is vital to achieving comprehensive rural economic resilience.

4.3.3. Migration Patterns and Remittance Effects

The study's investigation of migration patterns and their associated remittance effects revealed distinct contributions to household income, as summarised in Table 9. Households with permanent migrants receive higher average monthly remittances (TZS 315,000) compared to those with temporary migrants (TZS 212,000). This disparity suggests that long-term migration provides a more stable and substantial financial support system for rural families, thereby reinforcing their household financial resilience. This finding is consistent with Tacoli & Agergaard (2017) who emphasize the crucial role of remittances in mitigating income volatility and promoting economic stability in rural areas of developing countries.

Table 9: Migration Patterns and Remittance Effects on Household Income

Migration type	Number of Households (%)	Average Monthly Remittance (TZS)	Contribution to Household Income (%)	Primary Employment Sector in Urban Areas	Primary Employment Sector in Local Township
Permanent Migration	48 (42.1%)	315,000	28.5%	Trade, Services	Agriculture, trade
Temporary Migration	66 (57.9%)	212,000	19.3%	Trade, Construction	Agriculture, Informal Services
Total	114 (100%)	-			

Furthermore, the data show a divergence in the primary employment sectors of migrants: permanent migrants tend to be more engaged in urban trade and services. In contrast, temporary migrants often focus on urban construction and local agriculture. This pattern aligns with research indicating that migration serves as a key strategy for knowledge transfer and economic diversification, with different migration modalities contributing uniquely to rural livelihoods (Regmi & Tisdell, 2002; Wiggins et al., 2018). Kibaigwa Township Planning officer confirmed that permanent migrants often establish small businesses in Kibaigwa, providing more stable income for their families, while temporary migrants fill seasonal labour gaps. The significant contribution of remittances, accounting for 28.5% of income from permanent migrants, profoundly enhances household financial resilience. These financial inflows from migrants are integral to broader rural-urban linkages, offering vital pathways for poverty reduction and economic stability in the hinterlands.

5. Conclusion and Recommendations

The primary objective of this study was to assess the effects of rural–urban linkages on enhancing household living conditions in the hinterlands of Kibaigwa Township. It was hypothesized that stronger rural–urban interactions—evidenced by improved market access, migration flows, and technology transfer—would significantly enhance household income and overall welfare in rural villages. The findings revealed that rural–urban linkages play a pivotal role in rural development, with approximately 56% of the variation in household income attributable to factors such as migration, proximity to the township, and improved market accessibility. These results indicate that rural–urban linkages serve as a potent catalyst for sustainable development, extending beyond economic improvements to facilitate better access to essential services and the adoption of modern agricultural practices. Nevertheless, the study is not without limitations; its cross-sectional design and relatively small sample size mean that long-term dynamics and broader contextual influences warrant further investigation.

Generally, this research highlights the potential of policies that strengthen rural–urban linkages through targeted infrastructure investments and supportive market integration initiatives, thereby significantly enhancing rural living conditions. Future studies employing larger, longitudinal datasets will be essential to comprehend and harness these linkages for sustainable rural development fully.

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