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Determinants of Rural-Out Migration in Makete District, Njombe Region, Tanzania: A Logit Regression Model Approach

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ABSTRACT: Purpose: This study investigates the determinants of rural-out migration in Makete District, Njombe Region, Tanzania, using a binary logit regression model. The objective was to identify socio-economic, environmental, and institutional factors influencing household migration decisions. Makete was selected due to its high migration rates and agro-ecological vulnerability.

Methodology: A total of 450 households were surveyed across 15 villages, selected through multi-stage sampling stratified by agro-ecological zones (highland, midland, lowland), with households chosen randomly and systematically. Complementary qualitative data were collected via 25 key informant interviews and six gender-segregated focus group discussions. The dependent variable was household migration status (1 = migrant, 0 = non-migrant), while independent variables included education, landholding size, income, infrastructure access, and exposure to climate shocks. Results from STATA 18 indicate that education (OR = 1.289, $p < 0.001$), land size (OR = 0.430, $p < 0.05$), infrastructure access (OR = 0.537, $p < 0.001$), and climate shocks (OR = 4.067, $p < 0.001$) significantly affect migration likelihood. Income and age were marginally significant, while household size and gender were not.

Findings: The findings suggest that rural-out migration in Makete is largely driven by structural factors, especially land scarcity and environmental stress, rather than purely demographic characteristics. Migration emerges as a proactive household adaptation strategy to economic and climatic uncertainties.

Policy Implications: Policy recommendations include integrating migration dynamics into Tanzania's rural development frameworks, such as the Five-Year Development Plan III and SAGCOT.

Practical Implications: Strengthening rural infrastructure, land tenure, and climate resilience, while leveraging remittances and skills transfer, is essential for sustainable rural transformation.

KEYWORDS: Rural-out migration, Logit regression, Climate shocks, Land scarcity, Infrastructure access, Makete District, Tanzania.

1.0 INTRODUCTION

Rural out-migration stands as a fundamental topic in current development discourse throughout numerous developing nations (Amoako-Mensah, et al., 2019). Rural-out migration exists as a complex phenomenon which results from various global, national, regional and local elements primarily because of economic inequality, environmental pressures and political instability (Abeje, 2021 & Eshetu., et al., 2023). Research indicates that economic globalization creates rural marginalization because agrarian economies face difficulty in competing with industrial and service sectors located in urban areas (Rodríguez-Pose & Hardy, 2015). The evolution of rural-out migration has led to dominant movements between rural agricultural regions and urban non-agricultural areas and between economically challenged nations and wealthier ones (Arslan et al., 2018). The worldwide migrant population expanded from 173 million during 2000 to reach 281 million during 2020 thus their percentage of global population increased from 2.8% to 3.6% during the same period (McAuliffe & Triandafyllidou, 2021). International migrant remittances grew from USD 128 billion to USD 751 billion (Feld & Feld, 2021) while the portion allocated to developing countries grew from 57% to 79% throughout the period from 2000 to 2020. Moreover, according to Lagakos (2020), developing countries experienced a rise in internal migration that resulted in an estimated 1.3 billion individuals while rural-urban migration made up approximately 40% of this total movement. New evidences from a research conducted by Eshetu et al., (2023) demonstrates that climate change intensifies rural risk factors which force people to leave their homes because of for example droughts and flooding and diminished agricultural output. According to Endris (2019) the Intergovernmental Panel on Climate Change shows that Sub-Saharan Africa faces elevated risks because climate migration is projected to expand by 85% during the next 50 years.

The effects of people moving from rural to urban areas on their places of origin continue to be a focus of academic discussion. The migration process is seen as detrimental by certain researchers who point to its labor force depletion effects and worsening poverty conditions (Deshingkar & Grimm, 2005). The supporters of this viewpoint believe that when productive individuals migrate, they increase the workload for those who remain behind and highly contribute to the transmition of diseases to rural areas on their return (Amrevurayire & Ojeh, 2016). Research in Makete shows that the migration of working-age adults has weakened communal labor systems (e.g., ngwuembe) while decreasing agricultural

production (Msokwe & Mbonile, 2021). Conversely, other academic literature presents a different perspective regarding rural-urban migration by showing its favorable outcomes for original communities (Zhang et al., 2025 & Gheitarani et al., 2020). This positive view on migration proposes that return migrants bring advanced skills and innovative techniques which boost rural productivity while encouraging households to pursue multiple revenue streams (Afsar, 2003). Remittances in Makete District for example reach 35% of household earnings yet these funds rarely support productive activities which keeps households dependent on migration (Kitali, 2024 & Mbonile, 1993). Through migration households can achieve socio-economic advancement which helps decrease social inequality according to Panichella et al., (2021). Various studies indicate that rural-urban migration leads to certain socio-cultural risks through behavioral changes of returnees yet the economic effects on rural regions have generated conflicting assessments between researchers who view them as mostly positive or mostly negative.

Migration functions as a vital survival strategy for the people of Makete District even though the district has suitable climate conditions and suitable land for tea and timber production (Msokwe & Mbonile, 2021). Research conducted by Usika et al., (2024) in 2024 showed that migration affects 60% of Makete households showing that at least each of these households had one migrant member indicating migration patterns are widespread in the area. The rural-out migration pattern in Makete District started during the 19th-century colonial labor extraction period and has since become a focus of multiple studies (Mbonile, 1993; Msokwe & Mbonile 2021 & Gheitarani et al., 2020) while continuing to exist today with 35% of youth between 18-35 years migrating for work or to explore different income streams (Kitali, 2024). The district's population moves towards urban locations such as in Mbeya City, Iringa town etc as well as neighboring nations such as Malawi, Zambia etc. Different researchers maintain varying positions regarding migration causes because previous studies have yielded conflicting results about this matter. For example, The Makete District Council [MDC] published a report indicating that rising soil degradation along with absentee landholdings and socio-cultural burdens have caused a rise in migration (MDC, 2020). According to Mulugu (2022) 45% of Makete's youth leave their village every year to move to cities because they are unemployed and their land is fragmented. The proximity of Makete to the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) has increased the number of labor migrants who work in commercial farms and agro-processing zones according to Msokwe & Mbonile (2021). The combination of unpredictable rainfall and rising temperatures leads to decreased crop productivity particularly in maize which pushes families to relocate their homes (Usika et al., 2024). The district's population migration patterns according to Msokwe & Mbonile (2021) are also affected by cultural elements because the patrilineal inheritance system creates gender disparities which force women to migrate to gain financial freedom. The multiple socio-economic and environmental pressures in Makete make it a prime example for studying rural-out migration patterns in Tanzania while demonstrating why more research is needed.

Problem Statement

Rural-out migration in Makete District demonstrates the worldwide inequalities along with national policy deficiencies, regional economic transformations and local exposure to danger. While individual benefits from migration exist, the systemic elements driving this movement remain ambiguous which require researchers a need for comprehensive empirical research in order to develop integrated solutions.

Research Objective

This study, aims to investigate the determinants of rural-out migration in Makete district in Njombe region - Tanzania using a Logit Regression Model Approach. A Logit regression approach, as proposed in this study, can elucidate how macro-level trends intersect with household-level decisions, informing policies that enhance rural livelihoods while leveraging migration's potential.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature Review

The scientific study of rural-out migration started with Ravenstein's (1885) "Laws of Migration" and continues to advance through complex theoretical models. Cumulatively, these theories provide detailed knowledge about the various elements which drive population migration from rural to urban areas particularly in developing regions of sub-Saharan Africa. The classical migration theories based on Ravenstein's gravity model and Lewis's dual-sector theory (1954) focus on the economic disparities that exist between rural areas and cities. According to these models people transfer from agricultural labor surplus economies toward more productive urban economic activities. Lee's (1966) well-known push-pull model developed this understanding by identifying rural area repelling elements as push factors and urban area attracting elements as pull factors. These early models have faced criticism because they simplify migration as an individual or linear choice while neglecting the complex relationships and structural elements that drive these movements.

In response to the earlier theorization, contemporary frameworks such as The New Economics of Labor Migration (NELM) theory presents migration as a household-based strategy which enables families to reduce financial uncertainty and create multiple streams of revenue (Stark & Bloom, 1985). This perspective shows how remittances serve as a strategic resource to maintain rural way of life and stabilize consumption patterns. However, critics have challenged NELM because it ignores the impact of gender roles alongside social capital and intergenerational aspirations (Mercandalli et al., 2019). The analytical scope of migration research expanded through recent findings from network migration theory together with environmental migration studies. These analytical models demonstrate how social connections along with cumulative effects influence migration choices while ecological stressors/environmental pressures also play a role. Researches now confirms that climate-induced shocks which cause erratic rainfall, soil degradation and crop failure have become major push factors for people migrating from Tanzania's Southern Highlands region (Mwakalila, 2014). The research by Mitchell and Pizzi (2024) introduces new perspectives on the forced versus voluntary migration debate by showing that environmental transformations simultaneously limit and facilitate strategic population movements.

On the overall, various literature have shown that, rural-out migration develops from the combined effects of economic and social factors together with institutional and environmental elements. While classic theories remain foundational, the integration of more holistic and context-sensitive frameworks is essential for capturing the complexity of migration decisions in rural Tanzania. This study builds on these insights by applying a logit regression model to empirically assess the determinants of rural-out migration in Makete District-thereby contributing to both theory refinement and policy relevance.

2.2 Review of Empirical Literature on Migration Determinants

Multiple research studies have established rural-out migration drivers though their findings differ depending on the specific region being studied. The research community groups the drivers of rural out-migration into four categories: socio-economic determinants, demographic elements, environmental influences and institutional together with policy elements (Eshetu, 2023, Tamirat et al., 2024 & Msokwe & Mbonile, 2021). The primary socio-economic determinant that drives people to leave rural areas is Poverty and Unemployment (Abeje, 2021). The necessity to fulfill essential life requirements stands as the primary factor which drives rural area residents to migrate according to numerous authors (Rodríguez-Pose & Hardy, 2015). The lowest income households in Ethiopia displayed a 3.2× higher tendency to migrate than households with higher incomes according to Abeje (2021). Unemployment serves as the main reason why Tanzanian youth choose to move from rural areas to urban areas (Mwakalila, 2014). Global migration patterns are largely driven by socio-economic disparities between rural and urban areas due to income inequality and land scarcity together with educational aspirations. Low-and middle-income countries show empirical evidence that households with limited assets, poor agricultural output and unemployment choose migration as their survival method (Tamirat et al., 2024). In terms of assets ownership, data shows that in Indian and Bangladeshi households who have less than one hectare (ha) of land have migration rates that are 2.3 and 1.4 times higher than those with bigger land holdings (Mahmud, 2023). Furthermore, education attainments acts as a catalyst for mobility because it gives people access to urban employment markets while simultaneously increasing migration rates by 15-20% in Latin America (Crummett, 2019, Caulfield et al., 2019 & Palmer et al., 2013). In some cases, poverty drives movement while Vietnam's middle-class families use migration to establish urban businesses thus pursuing both survival and aspirational goals (Phuong et al., 2008).

The agrarian nature of Sub-Saharan Africa makes the economic and social problems of this region more severe. The Rift Valley in Kenya demonstrates that land fragmentation due to population growth and inheritance laws forces under 1.2 ha households to migrate at 35% higher rates than larger landowners (Mwendwa et al., 2024). Similarly, Tanzania's rural economy shows two characteristics: low-income levels and seasonal work which force households to migrate for risk reduction (Chetto et al., 2025). The effects of migration to sending households and communities have been presented to be multifaceted. For example, the relationship between education and urban opportunities demonstrates different regional patterns as Ghanaian youth use education to get urban jobs yet Malawi lacks sufficient formal employment thus breaking this connection (Kangmennaang et al., 2018). Furthermore, remittances also seem to reshape migration calculus, for example Ugandan households receiving remittances reduce mobility by 22% (Walsham, 2023) while income plays a nonlinear role as seen in Tanzania where both the poorest and middle-income groups migrate the most (Leal et al., 2023). The smallholder farmers of Tanzania's Morogoro region migrate at 1.5 times the rate to Dar es Salaam due to their ownership of less than two hectares of land but the unique conditions of Makete including soil erosion and market restrictions remain unexplored despite their effect on agricultural risk and migration (Msokwe & Mbonile, 2021).

The combination of demographic factors such as age, gender and household composition along with education levels creates complex patterns that influence rural-out migration across global and regional areas. For instance, the population aged 15-29 years leads migration streams because they possess more physical mobility and less social restrictions and stronger economic and educational ambitions (Nicolle, 2022). Male migration continues to dominate East Africa due to high youth joblessness combined with inadequate educational facilities which force younger males to move elsewhere (Abeje, 2021 & Eshetu., et al 2023). The relationship between gender and mobility shows complexity as witnessed in Northern Nigeria where patriarchal system limits women's mobility but female-headed households in Kenya move 1.8 times more frequently than male-headed ones because of financial instability (Adebayo et al., 2024 & Okoye, 2024). Educational attainments functions as both an internal driving force and an external attraction for these dynamics. Researches by Browne, (2017) and Yeneneh, (2017) shows that better-educated people in Ethiopia and Tanzania migrate for urban possibilities but inadequate rural education infrastructure struggle to retain youth, thus amplifying brain drain.

Furthermore, researches have shown that migration decisions become even more complex when considering household structure as a factor. The observed pattern in Nepal and Zambia shows that big families adopt income diversification by migrating to establish urban footholds for their younger family members (Libois & Somville, 2018 & Chamberlin et al., 2021).

Equally, households with numerous dependents such as children or elderly members tend to restrict their movement because they must maintain agricultural labor but working-age members may leave to support their families through remittances (Chamberlin et al., 2020). Additionally, migration decisions get shaped by cultural norms and regional differences or disparities. For instance, the migration trends in Dar es Salaam (Tanzania)-bound flows show a peak among 20-35 years old but Makete's patriarchal traditions restrict female migration even though research indicates that female-headed households in Kilimanjaro migrate 20% more (Msokwe & Mbonile, 2021). The lack of understanding persists regarding how population aging and intergenerational obligations affect migration patterns especially in Tanzania's rural highlands where farmwork requirements conflict with youth departure. The unresolved demographic tensions require specific localized research to develop policies which align population statistics with rural development objectives.

The latest research shows that climate change drives rural households to move because environmental stressors now force agrarian communities from their land through intensified droughts, floods and soil degradation. Research shows that prolonged droughts in Syria and frequent floods in Bangladesh increase migration risks by 50% and 25% respectively because households give up on their decreasing agricultural outputs (Breisinger et al., 2011 & Mahmud, 2023). The migration frequency of Ethiopian households that experience droughts or floods is 3.9 and 4.2 times higher than that of the general population while Sahelian populations show a 15% increase in displacement due to each 10% decrease in rainfall (Abeje, 2021 & Defrance et al., 2023). Such shocks erode adaptive capacity, particularly where livelihoods depend on climate-sensitive sectors like subsistence farming (Leal et al., 2023). The research indicates that Tanzanian droughts in Singida lead to tripled migration rates which results in population movements toward mining towns across Dodoma Region, Arusha Region and Morogoro Region while floods near Dar es Salaam cause coastal residents to relocate 2.8 times more (Mwakalila, 2014 & Kitali, 2024). The relationship between highland risks like frost, landslides and 12% annual soil loss in Makete District and migration patterns has not received sufficient empirical analysis despite their impact on diminishing arable land and food security (Msokwe & Mbonile, 2021). This environmental degradation in Tanzania's highlands combines

with socio-economic weaknesses from declining yields and water scarcity to force younger males into migration as an adaptation measure while also leading to distress (Mwasha, 2021). The limited understanding of stressor dynamics at the local level (e.g Makete deforestation) with migration decisions prevents targeted policy solutions for rural areas with fragile landscapes that experience climate-related structural stressors which worsen rural vulnerability.

Studies also emphasizes the significant role of institutions in forming migration decisions by means of land policies, infrastructure development and social programs implementation but notes that results depend on how well these programs are executed. For example, the implementation of India's Forest Rights Act (2006) decreased tribal displacement rates by 18% (Bose, 2010) and Ethiopia's land certification programs decreased distress migration by 30% (Gedefaw et al., 2020) yet these results differ from Tanzania's poorly implemented Village Land Act (1999) that fails to establish secure land tenure (Alananga et al., 2019). Infrastructure investments produce measurable effects on migration patterns, for example Nigeria's rural electrification reduced migration rates by 22% (Adebayo et al., 2024) and Tanzania's Southern Agricultural Growth Corridor (SAGCOT) generated farm income growth which cut migration rates by 18% in Iringa (Kadigi et al., 2017). Makete remains cut off from development because it lacks proper infrastructure since the Njombe-Makete road remains unassessed thus blocking communities from credit and extension services which leads to higher migration rates (Thusi & Mlambo, 2023).

The incoherent nature of policy-making makes it harder for people to make decisions about migration. While for example the MKUKUTA strategy of Tanzania from 2010 acknowledged rural poverty reduction yet its implementation failures especially in health, education and youth entrepreneurship programs led migration to become the primary means of survival (Mandalu, 2017; URT, 2010). Researchers have demonstrated that inadequate institutions along with scarce funding for agricultural cooperatives and microfinance programs prevent rural families from making local investments as described by Ellis (2003) in his migration risk management framework. The migration appeal for socio-economic advancement in Njombe Region's Makete District strengthens because of delayed infrastructure and ineffective youth outreach programs which demonstrates the necessity for unified policies that unite rural growth with migration policy management (Msokwe & Mbonile, 2021). This study aims to bridge macro-level frameworks with hyperlocal realities (by contextualizing Makete's highland-specific dynamics) to recognize and address the systemic nature of these determinants because it is crucial for crafting effective policies that both manage migration and enhance rural development.

3.0 METHODOLOGY

A logit regression model was used to analyze the determinants of rural-out migration in Makete District, Njombe Region, Tanzania. The district is an agricultural district with 87% of its 289,000 people dependent on subsistence farming (NBS, 2022) with more than 78% of farmers having small farms of less than or equal to 1.2 hectares, resulting in low yields (Njombe Regional Commissioner's Office, 2023). Despite the infrastructural challenges, only 15% of roads are tarmacked, 60% of households do not have electricity and 45% households are using unsafe water (NBS, 2022). Historically, rural-out migration in Makete District started during the 19th-century colonial labor extraction and continues to date, with 35% of youth (18-35 years) migrating for employment or livelihood diversification (Msokwe & Mbonile, 2021). The combination of land degradation, absentee ownership of land, and cultural obligations has further enhanced the migration (Makete District Council [MDC], 2020). These socio-economic and environmental challenges make Makete a critical case study in terms of rural migration in Tanzania and therefore require further empirical research.

The data was collected through interviews, focus group discussions (FGDs) and structured questionnaire. A structured questionnaire was distributed to 450 households from 15 villages selected through multi-stage sampling strategy. Stratified random sampling was used to divide villages into highland, midland, and lowland zones and random selection was used to pick five (5) villages per zone using lottery and then systematic sampling was used to pick every 5th household from each village's register. The inclusion criteria were that households resident in Makete for ≥5 years, with ≥1 member aged 15-65. This was done to ensure that the stratification is representative of different agro-ecological zones and to reduce selection bias (Walsham, 2023). The sample size was calculated using Yamane's (1973) formula (95% confidence level, 5% margin of error) and gave a total of 387 households, but to account for the potential non-response, the sample was increased by 16.3%, giving a final sample of 450 households. The survey included modules on aspects such as Migration status- Households classified as "migrant" (1) if ≥1 member migrated for ≥3 months in the past 5 years, else "non-migrant" (0) which formed the Dependent or Outcome Variable. Variables such as Age, education (years completed), land size (hectares), income (monthly, TZS), access to infrastructure (electricity, roads, healthcare; scored 0-3) and Self-reported climate shocks (droughts, floods) in the past decade formed the Independent Variables or predictor variables.

Qualitative data were obtained through Semi-structured interviews with 25 key informants (local officials, NGO representatives, agricultural officers), selected purposively for insights into policy gaps and migration drivers. These interviews provided rich information on migration drivers, institutional frameworks, and community-level effects. In addition, six gender-segregated FGDs (3male, 3female) were held with 8-10 participants each to explore gender-migration dynamics and social impacts, intra-household decision-making processes, and social perceptions related to rural-out migration. All FGDs were recorded and transcribed in full and subjected to thematic content analysis. The participants were picked by the community leaders to get the desired age and socio-economic status. A combination of data from surveys, interviews, and discussions helped to understand migration patterns better and validated the results by embedding quantitative data in the local experiences and institutional stories.

3.1 Model Specification

This paper uses a binary logistic regression model to identify the determinants of rural-out migration in Makete District. This model was chosen because the dependent variable-migration status is binary, where households are either migrants (1) or non-migrants (0). This dichotomous outcome necessitated the use of a binary logit regression model, which uses maximum likelihood estimation (MLE) to estimate the probability of migration. This method is used to model the probability of an event (in this case, rural-out migration) occurring, based on a number of independent variables (See Table 1).

Table 1: Independent/Predictor Variables for Migration

Variable	Description	Type
Age_HH	Age of household head (years)	Continuous
Gender HH	Gender of household head (1=Male, 0=Female)	Dummy
Edu_HH	Education level of household head (years)	Ordinal
HH_Size	Total household members	Continuous
Land_Size	Landholding size (acres)	Continuous
Income	Monthly household income (TZS)	Continuous
Distance_Road	Distance to nearest all-weather road (km)	Continuous
Infrastructure Access	Index (0–3; sum of electricity and paved roads)	Continuous
Climate Shocks	Exposure to natural shocks (1 = experienced drought/flood, 0=no).	Dummy
Health_Access	Access to healthcare services (1 = yes, 0 = no)	Dummy

Key HH: Head of Household/Household

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The logit model is widely preferred in migration studies due to its robustness in handling categorical outcomes and its ability to account for nonlinear relationships between the predictors and the probability of migration (Beine & Jeusette, 2021).

The model is specified as:

Logit (P) = $ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k$

Where:

- P = Probability that Y=1
- $\frac{p}{1-p}$ = Odds of the event occurring
- ln = natural logarithm
- β_0 = Intercept
- β1,β2,...,βk = Coefficients of the predictors $X_1, X_2, ..., X_k$
- $X_1, X_2, ..., X_n$ are explanatory variables (e.g., Age, income, Land Size, infrastructure etc)

Software: Analysis conducted in STATA 18, with Variance Inflation Factors (VIFs) <5, confirming no multicollinearity.

4.0 RESULTS AND DISCUSSION OF THE FINDINGS

4.1 Presentation of Results

The model was estimated using data from 450 households. The model showed good explanatory power with a log-likelihood of -134.80 and a pseudo-R^2 of 0.281, suggesting the model explains about 28% of the variance in migration decisions-a substantial proportion for cross-sectional household-level data. The results reveal significant determinants of rural-out migration, aligning with and diverging from established patterns in Sub-Saharan Africa. Variables such as education, land size, infrastructure access, and climate shocks emerged as statistically significant predictors ($p < 0.05$), while age and household income emerged as marginally statistically significant predictors and household size and gender of household head showed no significant association with migration status. These findings underscore the interplay of economic, environmental, and institutional factors driving migration in Tanzania's Southern Highlands.

Table 2 presents the results.

Table 2: Logit Regression Model Results: Determinants of Rural-Out Migration

Number of Obs: 450
LR chi²(8): 62.70
Prob > chi²: 0.0000
Log-Likelihood: -134.80
Pseudo R²: 0.281

Variable	Odds Ratio	Coefficient	Std. Error	z-value	p-value	95% Confidence Interval	Significance
Age of Household Head	0.988	-0.0145	0.0078	-1.86	0.063	-0.0298 to 0.0008	† Marginal
Education (Years)	1.289***	0.0981	0.0309	3.17	0.000	0.0376 to 0.1585	*** Significant
Landholding Size (hectares)	0.430**	-0.2050	0.0620	-3.31	0.001	-0.3265 to -0.0835	*** Significant
Monthly Income (TZS '000s)	0.999*	0.0007	0.0004	1.75	0.036	-0.0001 to 0.0015	† Marginal
Infrastructure Access (1=Yes)	0.537***	0.3710	0.1368	2.71	0.000	0.1030 to 0.6390	** Significant
Climate Shock (1=Yes)	4.067***	0.8820	0.2000	4.41	0.000	0.4900 to 1.2740	*** Significant
Household Size	1.107	0.0325	0.0205	1.59	0.150	-0.0077 to 0.0727	Not Significant
Gender (1 = Male Head)	1.374	-0.0991	0.1880	-0.53	0.268	-0.4675 to 0.2693	Not Significant
_Constant	0.149**	-1.7755	0.4890	-3.63	0.000	-2.7329 to -0.8181	*** Significant

*** = p < 0.01, ** = p < 0.05, † = marginally significant (0.05 < p < 0.10)

4.2 Discussion of the Findings

This section discusses the findings of the study focusing on significant predictors of rural-out migration, marginally significant predictors of rural-out migration and insignificant predictors of rural out migration. The findings are contextualized within global and regional migration literature, with emphasis on migration theoretical frameworks such as the New Economics of Labor Migration (NELM) (Stark & Bloom, 1985) and Lee's push-pull theory (Lee, 1966).

Significant Predictors of Migration

The results from Table 2 show that education was a significant positive predictor of household migration status ($p = 0.000$). This shows that each additional year of education increased migration odds by 29% (OR = 1.289, $p < 0.001$), indicating that higher education equips household heads to facilitate migration, this finding is consistent with the New Economics of Labor Migration (NELM) framework, which highlights household-level strategies to diversify income via remittances (Stark & Bloom, 1985). These findings align with studies in Ghana linking education to aspirations for urban employment (Orkoh and Blaauw, 2025) and mirror evidence from Vietnam (Phuong et al., 2008) where education enhances skills, social networks, and access to migration opportunities. In Tanzania, Msokwe & Mbonile, (2021) corroborate this pattern, with secondary education raising youth migration likelihood by 40%, reflecting reduced tolerance for agrarian livelihoods and heightened urban opportunity awareness. Stark and Bloom's (1985) NELM theory further explains this as strategic risk mitigation. However, contrasting evidence from Malawi (Kangmennaang, et al., 2018) shows minimal educational effects, suggesting that Makete's proximity to regional hubs like Njombe town amplifies education's role as a migration catalyst.

Furthermore, the results in Table 2 show that land size exhibited a significant negative association with migration ($p = 0.001$) indicating that households with larger landholdings are less likely to have a migrant member. This means that, for every 1-acre of land increase reduced migration odds by 57% (OR = 0.430, $p < 0.05$), implying that larger landholdings reduce economic pressure to migrate by sustaining rural livelihoods. This finding aligns with Lee's (1966) Push-Pull Theory, where land scarcity acts as a migration driver, and it mirrors East African studies for example in Kenya's Rift Valley, Mwendwa et al., (2024) observed similar land-migration elasticities (-0.75) and in Uganda's land-constrained households also saw elevated youth out-migration showing that landlessness is a distress that drives migration (Chamberlin et al., 2021). These findings are suggesting that, smallholder land fragmentation (<1.2 acres) is a push factor in Makete District and in East Africa at large which most likely limits productivity, forcing households to seek non-farm income elsewhere. Likewise, results in Table 2 show households with greater access to infrastructure (electricity, roads, healthcare) had significantly lower odds of out-migration ($p = 0.000$), with improved infrastructure reducing migration odds by 46% (OR = 0.537, $p < 0.001$). This finding suggests that enhanced rural connectivity and services may diminish migration incentives, which mirror a study in Nigeria (Adebayo et al., 2024), where rural electrification lowered migration by 22%. These findings support Lee's (1966) push-pull theory, suggesting that improved rural infrastructure enhances living standards and economic resilience, thereby reducing migration pressures.The results in Table 2 demonstrate that climate shocks (e.g. floods/droughts) acted as a crucial migration factor ($p = 0.000$). The research established that past three years exposure to such shocks increased the migration likelihood of households by 4.07× ($p < 0.001$) in line with climate-driven displacement patterns in Ethiopia (OR = 3.9) and Malawi (OR = 4.2) (Abeje, 2021 & Kangmennaang et al., 2018) and Singida Region in Tanzania's where droughts raised migration odds by 3.5× (Mwakalila, 2014). Similar evidences show that droughts accelerated youth migration as a copy strategy in Mali (Defrance et al., 2023). The study findings confirm climate shocks reduce agricultural resilience so migration functions as a survival strategy for the rural agrarian communities.

Marginally Significant Predictors

The results presented in Table 2 show that household income is a weak predictor of migration likelihood (OR = 0.999, $p = 0.036$) meaning higher income slightly reduces migration chances but this factor remains unimportant in Makete. This finding mirrors those of a study in Uganda (Walsham, 2023) which found that only extreme income poverty was a migration predictor while findings from Sub-Saharan Africa (Anwar et al., 2024) showed mixed income effects. In this case the income's limited effect on rural-out migration follows risk-opportunity calculus instead of poverty as described by Taylor's (1999) New Economics of Labor Migration (NELM) where even moderate-income households migrate to invest in urban ventures. In contrast to a study in Bangladesh where income had a negative effect on migration through lack of cash (Mahmud, 2023). Additionally, the results presented in Table 2 show that household head age has a marginal significance at $p = 0.063$ indicating older heads are less likely to migrate. The observed relationship between age and mobility attitudes suggests younger heads are more likely to migrate.

Insignificant Predictors

Household size did not have any influence on migration (OR = 1.107, $p = 0.150$) as per the results in Table 2 which means that having more members in a household did not increase the tendency to migrate. The research findings indicate that factors including land ownership and climate conditions have a stronger impact on migration than labor distribution strategies in Makete. The findings of Orkoh and Blaauw (2025) in rural Ghana confirm this result but are different from a study in Nepal which found that household size increased migration probability by 15% (Libois & Somville, 2018). The costs associated with migration (e.g., TZS 50,000/= ≈ USD 18.7 for Dar es Salaam bus fare) in large households may exceed the benefits of having more labor. The gender of the household head was not found to be statistically significant (OR = 1.374, $p = 0.268$) indicating that female-headed households did not migrate more often. The study results from Uganda (Walsham, 2023) are consistent with these findings but are different from Kenya where female-headed households had 1.8× higher migration rates (Mwendwa et al., 2024). Although the quantitative analysis does not find any gender effects the qualitative data from FGDs suggest that Makete's patriarchal social norms limit female autonomy which prevents migration even for female-headed households.

5.0 CONCLUSION

This research investigated rural-out migration determinants in Makete District Tanzania by using a binary logit regression model that used 450 household data points and conducted key informant interviews and focus group discussions. This study identifies multiple interconnected economic factors and environmental elements alongside institutional structures that shape household migration decisions while providing

empirical evidence about population movements in a highly disadvantaged Tanzanian region. The research shows that education is a key migration factor (OR = 1.289, p < 0.001) because it shapes both the migration dreams and potential pathways for individuals. Households with members who have education participate more in migration according to NELM (Stark & Bloom, 1985) because human capital enables labor mobility and income diversification yet this outcome differs from Malawi where education had no significant effect (Arslan et al., 2018). The educational impact in Makete suggests an aspirational element since it gives access to information and networks and urban labor market opportunities. The study found that Land scarcity is a key driver of migration because it leads to households moving when their agricultural possibilities decrease (OR = 0.430, p < 0.05). Migration acts as a survival tactic to address rural problems and unstable land rights.

The research found that infrastructure access including roads and electricity and healthcare systems directly affects migration results (OR = 0.537, p < 0.001), indicating that, infrastructure acts both as an enabler i.e in reducing transaction and mobility costs and as a facilitator, expanding access to migration-related information and networks. The findings support Lee's Push-Pull Theory (Lee, 1966) as better connectivity exposes people to urban area pull factors. Environmental shocks are the most important drivers of migration (OR = 4.067, p < 0.001) particularly droughts and floods. The study finds that households that experienced environmental shocks were more likely to migrate as climate change leads to more people leaving their homes. The study shows that households that faced environmental shocks had higher migration rates as climate change results in more people moving away from their homes. The study highlights the urgent need to include climate resilience in frameworks that govern rural development and migration. The results of this study were different from traditional migration models (Ellis, 2003) because there were no statistical associations between migration and age or gender of household head or household size. This suggest that, migration in Makete is a household-level strategy since the data does not show any significant associations with these demographic factors. The findings indicate that financial resources have a minimal effect on migration since structural vulnerability plays a more significant role than absolute poverty does in triggering migration. This research expands upon previous studies about Sub-Saharan African rural migration patterns by studying multiple determinants of population movement within Makete District. This research concludes that migration decisions emerge from household planning decisions which rely on human resources together with access to land and infrastructure and natural risk factors besides poverty and climate shocks.

6.0 RECOMMENDATIONS

This study recommends that, rural development policies must tackle structural inequities because migration functions as a means to create rural resilience while promoting socio-economic mobility.

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