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Disparities in the Socio-Economic Impacts of Road Improvements Across Rural Communities in Kilosa, Tanzania (2019-2025)

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ABSTRACT

This study investigated the disparities in the socio-economic impacts of road infrastructure development on rural livelihoods across three distinct communities (Mkwatani, Magomeni, and Dumila wards) in Kilosa District, Tanzania, covering the period 2019-2025. Improved road infrastructure is widely acknowledged as a catalyst for socio-economic development, yet its benefits are not always uniformly distributed. This research employed a mixed-methods approach, utilising an explanatory sequential design. Quantitative data were collected via questionnaires administered to 384 residents, while qualitative data were gathered through in-depth interviews with key informants. The findings revealed significant variations in perceived impacts across the studied wards. For instance, a substantial majority (89.1%) of respondents in Mkwatani reported noticeable improvements in road infrastructure and subsequent positive impacts on market access, whereas in Dumila, nearly half (49.2%) perceived no improvements. Similarly, while road improvements positively affected children's school attendance in Mkwatani (51.6%), the benefits were less pronounced in other wards. Dumila ward reported a comparatively larger impact on increased tourism activities (43.0%) due to road improvements, though this was not a universally strong outcome. Overall, the study highlights that while road infrastructure development can enhance access to markets, essential services, and mobility, these impacts are heterogeneous, contingent on localised factors and the extent of the improvements. The study underscores the need for targeted and equitable road development strategies to ensure inclusive benefits for all rural communities.

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INTRODUCTION

The development of road infrastructure is a cornerstone of economic growth and social advancement, particularly in rural regions of developing countries (Jedwab & Moradi, 2016). Roads are instrumental in connecting rural peripheries to urban centres, thereby facilitating the movement of goods, services, and people, which in turn enhances access to markets, healthcare, education, and other vital services (Kaiser & Barstow, 2022). In Sub-Saharan Africa, road transport accounts for approximately 75% of freight and passenger movement (Beuran et al., 2015). Despite this, a significant proportion of roads, especially in rural zones, remain underdeveloped or in poor condition, posing a substantial barrier to socio-economic progress (Cobbinah et al., 2015).

Tanzania has consistently prioritised road infrastructure development as a key component of its national economic strategy since gaining independence (Mhando & Msuya, 2018). However, the benefits accruing from these investments have often been unevenly distributed, with rural areas frequently lagging behind their urban counterparts in terms of road quality and accessibility (Kihwele & Mbwambo, 2020). This disparity has critical implications for rural livelihoods, which are predominantly agriculture-based. Inadequate road networks can severely curtail farmers' ability to transport produce to markets, access essential inputs, and obtain fair prices, thereby entrenching poverty (Mhando & Msuya, 2018). Furthermore, poor road conditions limit access to healthcare and educational facilities, compounding the challenges faced by rural populations.

Previous research indicates that while improvements in road infrastructure can lead to enhanced agricultural productivity and economic growth, these benefits are not uniformly experienced across different rural communities (Kessy et al., 2021). Farmers in areas with better road connectivity are more likely to achieve higher incomes and have greater access to inputs and services compared to those in more remote or poorly connected areas. Kilosa District, with its economy heavily reliant on agriculture, exemplifies these challenges. Despite the presence of some major Tanzania National Roads Agency (TANROADS) and Tanzania Rural and Urban Roads Agency (TARURA)-managed roads, such as the Mikumi-Kilosa road and Kilosa-Kibaoni road, many communities within the district, particularly in wards like Mkwatani, Magomeni, and Dumila, experience varying degrees of road infrastructure quality and accessibility (Tanzania National Road Agency, 2023; Tanzania Railways Corporation, 2023). This study, therefore, aimed to assess the socio-economic impacts of road infrastructure development on rural livelihoods in Kilosa District, with a specific focus on understanding the disparities in these impacts across different communities. The general objective was to understand the overall effect of road infrastructure development on the socio-economic aspects of rural livelihoods in the Kilosa district. Specifically, the study intended to: (1) analyse the influence of road infrastructure improvement on access to markets for

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rural communities; (2) assess the effect of road infrastructure development on access to essential services (healthcare, education); and (3) investigate how road infrastructure improvements have affected mobility patterns and economic opportunities, including tourism. This research is significant as it seeks to provide nuanced insights that can inform more equitable and sustainable infrastructure development policies, contributing to poverty reduction and socio-economic transformation in rural Tanzania.

LITERATURE REVIEW

This study is theoretically underpinned by the Sustainable Livelihoods Framework (SLF), developed by the UK Department for International Development (DFID, 2000). The SLF provides a holistic approach to understanding poverty and livelihoods by examining five core asset categories: human, natural, financial, physical, and social capital (Scoones, 2009; Morse & McNamara, 2013). Road infrastructure falls under physical capital, which is crucial for supporting livelihood strategies and achieving positive livelihood outcomes. The framework posits that improvements in physical capital, such as roads, can enhance access to other assets and opportunities, thereby improving overall well-being (Kedir, 2015). However, the extent to which these benefits are realised can be influenced by the vulnerability context (e.g., economic shocks, environmental changes) and existing structures and processes (e.g., policies, local governance).

Empirical studies globally and within Africa have consistently highlighted the positive correlation between road infrastructure and rural development. Improved roads have been shown to enhance agricultural productivity by reducing transportation costs and improving market access for farmers (Baker et al., 2019). In Ethiopia, for instance, road transport is dominant, and infrastructural limitations severely constrain the marketing of agricultural produce (Ibrahim, 2011; Bisht, 2013). Conversely, poor road accessibility imposes high transportation costs, limits access to quality inputs, and restricts market participation (Adugna, 2009; Kishor & Basanta, 2021).

However, the benefits of road development are not always evenly distributed, and potential negative consequences exist. Road construction can pose environmental risks, including habitat fragmentation and impacts on biodiversity (Clevenger et al., 2003; Laurance & Gomez, 2005). Socio-economically, while roads can open up new economic opportunities (Lokesha & Mahesha, 2016), they can also lead to social and spatial inequalities, particularly in peri-urban areas, through processes like displacement and land speculation (Yankson & Gough, 1999; UN-Habitat, 2016). Studies in Ghana and Kenya have shown such mixed outcomes (Gina, 2013; Ravetz et al., 2013).

In Tanzania, research by Kessy et al. (2021) indicated that road infrastructure benefits are often uneven. While the government has invested significantly in road networks (Mhando & Msuya, 2018), disparities persist, particularly affecting rural agricultural communities (Kihwele & Mbwambo, 2020). This study addresses a gap by specifically examining the disparities in socio-economic impacts across different rural communities within a single district (Kilosa), using the SLF to understand the nuanced effects on various aspects of rural livelihoods. It moves beyond general assessments to explore the heterogeneity of impacts, considering how local contexts mediate the outcomes of road infrastructure development.

METHODOLOGY

This study employed a mixed-methods research approach, utilising an explanatory sequential design to gain a comprehensive understanding of the socio-economic impacts of road infrastructure development in Kilosa District. The pragmatic philosophical worldview guided the research, allowing for the integration of quantitative and

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qualitative data to address the research questions effectively (Creswell & Poth, 2018).

The study was conducted in three purposively selected wards within Kilosa District, Morogoro Region, Tanzania: Mkwatani, Magomeni, and Dumila. These wards were chosen due to their varying levels of road infrastructure development and their representation of rural communities reliant on agriculture. Kilosa District itself is significant due to its agricultural base and ongoing infrastructure projects.

The target population comprised residents and students within the selected wards who are directly impacted by road infrastructure. A sample size of 384 respondents was determined for the quantitative component. This sample was equally distributed across the three wards, with 128 respondents from each. Simple random sampling was used to select participants for the questionnaire survey from lists of residents in the identified wards. For the qualitative component, key informants, including local leaders, experienced residents, and students (form four leavers in 2024), were selected purposively based on their knowledge and experience with road infrastructure development.

Data were collected between October and December 2024, focusing on changes observed from 2019 to 2025. Quantitative data were gathered using structured questionnaires with closed-ended questions covering demographics, access to markets, access to essential services, mobility patterns, and economic opportunities. Qualitative data were collected through semi-structured interviews with key informants to explore experiences and perceptions in greater depth.

Quantitative data were analysed using descriptive statistics (frequencies, percentages), and chi-square tests were used to identify patterns, trends, and significant associations between variables, particularly by comparing responses across the three wards. Qualitative data from interviews were transcribed and translated from Kiswahili to English. Then, the data were subjected to thematic analysis to identify recurring themes and insights related to the research objectives.

Validity of the instruments was ensured through expert review of the questionnaire and pilot testing of interview questions. Reliability was addressed by administering questionnaires consistently and ensuring interviewer training. Ethical considerations were paramount throughout the study. Permission was obtained from the relevant authorities. Informed consent was secured from all participants, who were assured of confidentiality and their right to withdraw. The data collected were used solely for academic purposes.

RESULTS AND DISCUSSION

The study investigated the socio-economic impacts of road infrastructure development across Mkwatani, Magomeni, and Dumila wards in Kilosa District. The findings reveal notable disparities in these impacts, reflecting the uneven nature of infrastructure improvements and their perceived benefits by local communities.

Demographic Characteristics of Respondents

A total of 384 respondents participated, with 157 (40.9%) males and 227 (59.1%) females. The sample was evenly distributed across the three wards: Mkwatani (128 respondents, 33.3%), Magomeni (128 respondents, 33.3%), and Dumila (128 respondents, 33.3%).

Disparities in Access to Markets

To start with, researchers investigated perceived road improvements, whereby they found significant variations were observed in perceived road infrastructure improvements over the past five years ($p=0.000$). In Mkwatani, 89.1% of respondents noted improvements, compared to 52.3% in Magomeni and only 35.9% in Dumila. Conversely, 49.2% in Dumila saw no improvements. This suggests that road development efforts have not been uniform across the district.

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Then researchers looked at the current road condition. Respondents' perceptions of current road conditions also varied significantly (*p=0.000*). Mkwatani respondents generally rated their roads more favourably (50.0% "fair", 33.6% "good") compared to Magomeni (34.4% "fair", 32.8% "poor", 27.3% "very poor") and Dumila (43.8% "fair", 25.8% "poor", 18.0% "very poor").

Regarding travel time to market, changes in travel time to markets over the last five years differed across wards (*p=0.000*). In Dumila, 45.3% reported no change in travel time, and a combined 20.3% reported increased travel time. In Mkwatani, responses were more mixed, with 32.8% reporting a slight decrease and 29.7% no change. Magomeni saw 42.2% reporting a slight increase in travel time. These findings suggest that road improvements, where they occurred, did not uniformly translate into reduced travel times for market access.

Ability to Transport Goods: Road improvements' effect on transporting goods to market showed significant ward-level differences (*p=0.000*). Mkwatani had the most positive perception, with 60.2% reporting a slightly improved ability and 8.6% significantly improved. In contrast, Dumila had 41.4% reporting no change, and a combined 31.2% reporting worsened ability. Magomeni also showed mixed results, with 32.8% reporting slight improvement but 26.6% slight worsening.

With regard to transportation costs, changes in transportation costs to markets also varied (p=0.000). A notable portion in all wards reported no change (Mkwatani 39.1%, Magomeni 33.6%, Dumila 35.2%). However, in Dumila, 23.4% reported significantly increased costs and another 23.4% slightly increased costs. Mkwatani saw 31.2% reporting slightly decreased costs. This indicates that road improvements did not consistently lead to lower transport costs, and in some areas, costs may have risen.

Concerning income from market-related activities, changes in income from market activities over the past five years differed significantly (*p=0.000*). Mkwatani reported the most positive trend, with 56.2% experiencing a slight increase and 6.2% a significant increase. In Dumila, 46.1% reported no change, and a combined 29.6% reported decreased income. Magomeni also had a substantial portion (28.1%) reporting no change, with 31.2% reporting a slight increase.

With respect to overall market access enhancement, when asked if improved roads enhanced market access, Mkwatani respondents largely agreed (56.2% agree, 8.6% strongly agree). In stark contrast, Dumila respondents largely disagreed (33.6% disagree, 32.8% strongly disagree). Magomeni was more divided (28.1% agree, 28.1% disagree). This highlights a clear disparity in the perceived market benefits of road infrastructure (*p=0.000*).

The findings on market access align with literature suggesting that improved road infrastructure generally enhances agricultural productivity and market integration (Baker et al., 2019). However, the significant disparities observed across the three wards in Kilosa underscore the arguments by Kessy et al. (2021) and Kihwele & Mbwambo (2020) that such benefits are often unevenly distributed. Mkwatani ward, which reported more substantial road improvements, also reported more positive outcomes in terms of market access, the ability to transport goods, and income. Conversely, Dumila, with fewer perceived improvements, reported limited or even negative impacts on market access. This unevenness can be attributed to the actual extent and quality of road works in each ward, as well as other mediating factors not captured, such as local economic conditions or market dynamics. The SLF helps explain this: while physical capital (roads) is improved, its translation into positive livelihood outcomes (like increased income via market access) depends on the initial asset base and the vulnerability context of different communities.

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Disparities in Access to Essential Services

Researchers started investigating disparities in access to essential services by looking at access to healthcare. Perceptions of changes in healthcare accessibility due to road improvements varied significantly (*p=0.000*). Mkwatani showed the most positive impact, with 64.8% reporting slightly improved access and 18.8% significantly improved. In Dumila, while 32.8% reported slight improvement, a notable 20.3% reported significantly worsened access, and 28.1% reported no change. Magomeni also had a considerable portion (32.8%) reporting no change.

Regarding children's school attendance, the effect of road improvements on children's ability to attend school regularly also showed disparities (*p=0.000*). In Mkwatani, 51.6% reported slight improvement and 8.6% significant improvement. However, in Magomeni, 46.9% reported no change, and in Dumila, 43.8% reported no change, with 23.4% in Dumila reporting significantly worsened school attendance.

In relation to overall access to essential services enhancement, respondents' agreement that improved roads enhanced their access to essential services differed significantly by ward (*p=0.000*). Mkwatani had a strong agreement (55.5% agree, 10.2% strongly agree). In Dumila, there was strong disagreement (37.5% disagree, 30.5% strongly disagree). Magomeni was again divided, with 37.5% disagreeing and 26.6% agreeing.

Access to essential services like healthcare and education is a critical dimension of rural development. The findings indicate that where road improvements were perceived to be substantial (as in Mkwatani), access to these services generally improved. This aligns with the broader literature (e.g., Kaiser & Barstow, 2022). However, the negative or stagnant perceptions in Dumila and parts of Magomeni are concerning. It suggests that either road improvements in these areas were insufficient to make a difference, or other barriers (e.g., availability of services, cost of transport despite road quality) persist. The reported worsening of school attendance or healthcare access in some segments of Dumila, despite some road works, points to complex interactions where road development alone is not a panacea and might even correlate with other disruptive changes if not managed inclusively.

Disparities in Mobility Patterns and Economic Opportunities

Researchers started investigating disparities in mobility patterns and economic opportunities by asking respondents questions related to the frequency of travel. Changes in the frequency of travel outside the village/town compared to five years ago varied significantly (*p=0.000*). In Mkwatani, 39.8% reported travelling more frequently and 4.7% much more frequently. In contrast, Magomeni had 34.4% travelling less frequently and 17.2% much less frequently. Dumila also saw a tendency towards less frequent travel (35.9% less frequently, 25.8% much less frequently).

In terms of the increase in economic opportunities, respondents showed that their perceptions of increased economic opportunities due to improved roads differed markedly (*p=0.000*). Mkwatani respondents were most optimistic, with 57.8% noticing a slight increase and 25.0% a significant increase. In Dumila, 28.9% saw no change, while 25.8% reported a significant decrease and 11.7% a slight decrease. Magomeni also had a substantial portion (30.5%) reporting no change, and a combined 32% reporting decreased opportunities.

As regards to new businesses or investments, the findings of this study shows awareness of new businesses or investments due to improved roads varied significantly (*p=0.000*). In Mkwatani, 51.6% were aware of such developments. However, in Magomeni, 53.1% were not aware, and in Dumila, 48.4% were not aware.

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Regarding household members starting new economic activities, the findings of this study indicated that whether household members started new economic activities due to improved road access also showed significant differences (*p=0.000*). In Mkwatani, 56.2% reported yes. In Magomeni, 71.9% reported no, and in Dumila, 67.2% reported no.

In connection with the impact on tourism activities, the study found that the extent to which improved roads increased tourism activities varied significantly (*p=0.000*). In Dumila, there was strong disagreement that tourism had increased (43.0% strongly disagree, 27.3% disagree). Mkwatani respondents were more positive, with 37.5% agreeing and 10.2% strongly agreeing. Magomeni respondents largely disagreed (36.7% disagree, 28.1% strongly disagree).

The disparities in mobility and economic opportunities are particularly stark. Mkwatani consistently reports more positive outcomes, suggesting that the road improvements there have indeed catalysed economic activity and enhanced mobility. The findings from Magomeni and especially Dumila paint a different picture, where road infrastructure changes have not translated into perceived economic benefits for a large segment of the population, and in some cases, opportunities are seen as declining. This aligns with concerns raised by Yankson & Gough (1999) and UN-Habitat (2016) about infrastructure development sometimes leading to increased inequalities if not planned inclusively. The limited impact on tourism, especially in Dumila and Magomeni, suggests that road infrastructure is only one factor; other attractions, marketing, and supportive infrastructure are also necessary for tourism development. The SLF highlights that physical capital (roads) needs to interact favourably with other capitals (natural attractions, human skills for tourism, financial capital for investment) to generate desired livelihood outcomes like increased tourism revenue.

Overall, the discussion reveals that the socio-economic impacts of road infrastructure development in Kilosa District are highly heterogeneous. The disparities across Mkwatani, Magomeni, and Dumila wards underscore that a one-size-fits-all approach to rural road development is unlikely to yield equitable outcomes. The perceived level of improvement in the roads themselves appears to be a primary driver of these differential impacts. Where improvements were seen as substantial (Mkwatani), a cascade of positive effects on market access, service accessibility, and economic opportunities was more likely. Where improvements were limited or contested (Dumila, Magomeni), the benefits were muted or even perceived negatively. This emphasises the importance of not just constructing roads but also ensuring they are of adequate quality, strategically located, and complemented by other development initiatives to unlock their full socio-economic potential for all segments of the rural population.

CONCLUSION

This study assessed the disparities in the socio-economic impacts of road infrastructure development on rural livelihoods across Mkwatani, Magomeni, and Dumila wards in Kilosa District, Tanzania. The findings confirm that while road infrastructure development holds significant potential for improving rural livelihoods, its benefits are not uniformly distributed. Clear disparities were evident across the studied communities concerning access to markets, essential services (healthcare and education), mobility patterns, and economic opportunities.

Mkwatani ward, which reported more significant road improvements, generally experienced more positive socio-economic outcomes. This included better market access, enhanced ability to transport goods, increased income from market activities, improved access to healthcare and education, and a greater perception of new economic opportunities. In contrast, Dumila ward, where perceived road

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improvements were minimal, reported limited benefits and, in some instances, negative impacts, such as worsened school attendance or increased transportation costs without corresponding income gains. Magomeni ward often presented a mixed picture, with some positive impacts but also significant segments of the population not experiencing tangible benefits.

The study highlights that the mere presence of road projects does not guarantee equitable socio-economic upliftment. The quality and extent of road improvements, coupled with local contextual factors, play a crucial role in determining the nature and distribution of impacts. The Sustainable Livelihoods Framework helps to understand these dynamics, illustrating that enhancements in physical capital (roads) must effectively interact with other livelihood assets and be supported by conducive policies and processes to translate into widespread and equitable livelihood improvements.

The observed disparities underscore the need for more nuanced and targeted approaches to rural road infrastructure development. Policymakers and development practitioners must move beyond simply increasing the mileage of roads to ensuring that these investments are strategically planned, of high quality, and accompanied by complementary measures that address the specific needs and vulnerabilities of different rural communities. Failure to do so risks exacerbating existing inequalities and leaving marginalised communities further behind.

Recommendations

Based on our findings, we recommend that the government and relevant agencies, such as TANROADS and TARURA, conduct thorough needs assessments in different rural communities to prioritise and implement road development projects equitably. Areas such as Dumila and Magomeni, which have demonstrated limited benefits, may require more targeted investments or alternative interventions to address specific connectivity challenges. Moreover, it is essential not only to construct new roads but also to ensure the quality and regular maintenance of existing rural networks, since poor-quality or inadequately maintained roads, even when classified as ‘improved’, may fail to deliver the expected socio-economic benefits.

Additionally, road infrastructure projects should form part of broader integrated rural development strategies, encompassing investments in agricultural support services, market development, healthcare and education facilities, and initiatives to promote local economic diversification, including sustainable tourism where viable. To foster sustainability and align projects with local priorities, communities must participate actively in planning, implementation and monitoring, thereby cultivating a sense of ownership.

Finally, further research is needed to explore the specific contextual factors mediating the impacts of road infrastructure in diverse rural settings; longitudinal studies could shed light on long-term effects and sustainability, while comparative analyses across other districts may yield valuable lessons for national policy.

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