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Rural Roads Maintenance and Households' Wellbeing

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Infrastructure development is a key ingredient not only in economic growth of a country but the general well-being of the local communities in Kenya. However, with the numerous benefits associated with infrastructural development, many rural roads in the country in general and Kericho County in particular are still impassible, especially during the rainy season and dusty during dry periods. Therefore, the purpose of the study was to examine the rural road maintenance and well-being in Kericho County. The study was guided by the pragmatism philosophical paradigm and mixed research design. The study was undertaken in Kericho County whose target population is 206,036 households from which a sample of 382 were selected. Descriptive statistics was employed to analyze quantitative data. This included the measure of central tendency and the measure of dispersion. Statistical inferences were drawn using correlation analysis. Qualitative data was analyzed using content analysis based on analysis of meanings and integrated with quantitative data. The findings revealed that rural road maintenance had a positive effect on household well-being ($R=0.829$, $P<0.05$). The County Government's performance was above average in repaving, pothole maintenance, and road reconstruction initiatives. The study concluded that rural road maintenance positively and significantly influences household well-being. The study recommended that the County Government adds resources for the maintenance of roads to improve accessibility.

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INTRODUCTION

Rural communities in developing countries are often completely disconnected from the major roads, rail lines, and public transport services that enable access to the economic and social activities and opportunities in cities (HLAGST, 2016). Rural access is thus a main driver in solving the first/last mile problem and enabling the rural poor to emerge from poverty and overcome social exclusion by connecting their goods to markets and linking rural areas to market towns, large cities, and the global marketplace. Rural communities have a potential for development if only the County Government improved development and maintains rural roads.

Akinyosoye (2013) noted that majority of poor people in the world especially in Africa live in rural areas where the level of public infrastructure development especially roads seems to be low. "Kenya is characterized by devolution which involves devolving of functions, like decision making, health, urban and rural roads, finance and management, from the national government to the County governments (Simiyu & Mweru 2014). The sustainable development of communities depends on various supportive rural infrastructural facilities (Usman et al., 2013). Rural roads across Africa especially in Kenya are inadequate in coverage and quality; they are also usually poorly maintained, and therefore poorly served by low-cost, high-volume transportation providers (Riverson, & Carapetis, 2011). There are many roads, especially in rural areas which are in pathetic condition. This study investigated whether current rural road development has impacted the local community welfare.

According to GoK (2013) generally before devolution, approximately 60% of the road network is in rural areas, most of it is unpaved and severely damaged due to lack of maintenance. The greater part of the rural network is in high agricultural areas though the roads' conditions are in a pathetic state and have deteriorated

significantly through lack of maintenance and also overloading of vehicles which compromises the rural roads. In general, rural roads in Kenya have not received the attention they deserve, they have not been planned, developed, extended, opened up and maintained to adequately meet the needs of the local communities (MoRPW, 2006). The roads sub-sector is mandated to open up county road networks countywide, build drainage structures, and maintain urban and rural county roads. The sub-sector is set to achieve the opening up of specific lengths of priority road networks identified in the Annual Development Plan. The department has opened up over 2,500 km of rural road networks across the County with more attention in marginalized areas like Kipkelion West, Sigowet/Soin and Kipkelion East constituencies (Kericho Second County Integrated Development Plan, 2018-2022).

Inadequate rural roads make it hard for farmers to produce more and to transport any surpluses to the market. The roads are inadequate in coverage and quality; poorly rehabilitated and maintained, and therefore poorly served by low-cost, high-volume transportation providers (Pederson, 2001). The road transport infrastructure has over recent years deteriorated to the extent that 47% of the classified road network is currently in a failed condition and requires reconstruction. According to the Republic of Kenya (2019), in Kenya, the national rural population stands at 32,732,596 people which is 68.9 % of the total population while those living in urban areas are 14,362,838 people which is 27.3% of the total population in the Country.

LITERATURE REVIEW

Research carried out by Lucas, Rutachokozibwa and Tagora (2015) on "impact evaluation of the Njombe-Makete Road Project in Tanzania. The project undertook improvements of feeder roads, bridge construction, and rural road routine and spot maintenance. The impact study found an increased participation of vendors at local markets

and an increased variety of available consumer goods and agricultural products. The geographic size of markets for agricultural products increased significantly. There were significant increases in the sale of all types of agricultural products as well as increased availability of agricultural inputs. A household and village-level survey conducted by IFPRI in Bangladesh provides some evidence of the impact of transport infrastructure on various facets of the rural economy (Raisuddin, & Hossain, 2016). The sampling method controlled for differences in observed natural endowments to focus on the effects of infrastructure development (of roads in particular) on several components of the rural economy.

The majority of rural communities depend on agriculture (including crops, livestock, fisheries and forestry) for subsistence and income generation. Improving agricultural production can provide economic justification for new investments in the construction and maintenance of rural roads, and should lead to increasing rural incomes. Knox, Daccache and Hess (2013) reviewed in detail 27 published documents linking road access to agriculture and their study summarised briefly many analyses of how the construction of rural roads had led to increased food security. Examples included new roads correlated with lower input prices and freight costs in India (Lebo and Schelling, 2014), increasing crop outputs in Ethiopia (Dercon et al., 2009) and increasing cultivated farm areas in Nicaragua (Orbicon, & Goss, 2015). Escobal and Ponce (2012) also reviewed 25 documents relating to various countries in Latin America and elsewhere that reinforced the benefits of small rural roads in terms of enhanced food security, employment, living standards and poverty reduction.

The agricultural benefits of rural roads have been clearly identified in many countries. The lack of rural roads and the poor quality of road infrastructure has been cited as a major constraint to food security in East Africa (Salami, Kamara, & Brixiova, 2014). However, the link between greater agricultural production and poverty elimination can be complicated by issues of land

ownership and costs, employment and migration. In an influential study, Binswanger, Khandker and Rosenzweig (2013) analysed large survey databases in India with many variables and concluded that, excluding weather, irrigation and other issues, roads contributed directly to food security and increased fertiliser use. However, there were complex interactions, with the location of credit facilities and markets being very significant (and influenced by road provision and other factors).

In a spatial analysis that correlated travel times (road connectivity), crop yields and agroecological potential in sub-Saharan Africa, Dorosh, et. al. (2005) concluded that investment in rural roads directly affected agricultural production and food security. They suggested that agricultural production in areas more than eight hours of travel time from a town of 100,000 people was only at 5% of its potential, compared with 45% of its potential in areas less than four hours of travel time from a large town. Using data from Mozambique, they argued that investing in small rural roads would be the most cost-effective way to improve overall road connectivity. Like many authors, they concluded that while the benefits to agricultural production and food security from better rural road connectivity should be clear, the implications for rural people would be complex, with changes in agricultural prices and practices and migration to cities (Dorosh et al, 2015). An analysis of options for transport investments for increasing food security in South Sudan also concluded that emphasis should be on low-cost roads linking villages to markets (World Bank, 2013). While it is clear that rural roads can promote enhanced agriculture production and food security, the impact on communities is not always straightforward.

According to the World Bank (2018), “roads improvement in Nigeria has been associated with increased productivity, food security and improvement in quality of life. This is by encouraging the movement of agricultural and non-agricultural consumption commodities and ensuring the personal mobility of rural households. Similarly, in a northern Nigeria

study, Yunusa et al. (2012) established that road improvement in part of rural Kaduna State, led to a significant increase in agricultural production, food security, farm and non-farm employment and revitalization of economic activities in the area. While many studies like that of Ogunsanya and Ojetola (2013) and Aderamo and Magaji (2017) focused on rural areas most road transport studies in Kwara State focused on the urban environment. All of these previous studies also depended on aggregate level data assuming that all individuals within a particular administrative unit have equal access to available transport facilities.

RESEARCH METHODOLOGY

The study utilized the concurrent triangulation design which uses two research methods one of them is basically used to confirm or check on the findings of the other, (Barnes, 2019; Creswell, 2014). This study utilized explanatory and exploratory research design. The study was conducted in Kericho County which is one of the 47 counties in the Republic of Kenya. The total study population for the study was 206,036 households. Also forming part of the target population are a sub-county administrator and Chief achieve per sub-county. They were interviewed to give their insights on rural roads development and its effect on local welfare making 12 interviews. Furthermore, one Focus Group Discussion consisting of eight members was conducted to give more insight per sub-county into the study making 6 discussion groups in total. From a target population of 206,036 households, a sample size of 382 households, 12 interviews and 6 focus groups comprised of 8 people was adopted. The sample size for the study comprised of households in addition to the staff of rural roads department in the County. The data collected was obtained from households and staff

of rural roads department using structured questionnaires, interview guides and Focus Group Discussions. The study used structured questionnaire to collect data from household respondents in Kericho County. This study also utilized key informants interview instrument. Key informant interviews are qualitative in-depth interviews with people who have knowledge of the ongoings in the community. Among those interviewed were Rural roads staff in the County, opinion leaders and chiefs. The study conducted six focussed group discussions that is one in each Sub-Counties, to shed more light on rural roads development. The researcher also informed the authorities in the area like chiefs and village managers. Quantitative data was done first then qualitative so that qualitative data either supported or contradicted quantitative data. Descriptive statistics was employed to analyze quantitative data this included the measure of central tendency and measure of dispersion. The descriptive statistics include frequency counts and percentages. Statistical inferences were drawn using correlation analysis, and simple regression analysis.

RESULTS AND DISCUSSIONS

Rural roads are the backbone of rural development. When the rural roads are accessible and passable throughout the year then it will improve the local household welfare. For this to happen, the rural roads must be maintained. This in a way leads to diversification of farming, improved methods of farming through access to rural and improved food situation. The responses from questionnaires and interviews were both discussed in tandem. Rural roads maintenance descriptive statistics was examined using a five-scale Likert scale which was used to obtain the mean as presented in Table 1 below;

Table 1: Rural road maintenance

Rural Road Maintenance	Strongly Disagree (1)	Disagree (2)	Undecided (3)	Agree (4)	Strongly Agree (5)	Mean
Existing rural roads are repaved (asphalt overlays) to improve their condition.	44 (11.6%)	55 (14.5%)	29 (7.6%)	211 (55.5%)	41 (10.8%)	3.39
County governments have maintained potholes and reworked on bad areas in the roads.	27 (7.1%)	89 (23.4%)	1 (0.3%)	199 (52.4%)	64 (16.8%)	3.48
Road networks that are poor are generally maintained	28 (7.4%)	95 (25.0%)	32 (8.4%)	175 (46.1%)	50 (13.2%)	3.33
The road slabs are reconstructed to improve their condition in our areas.	29 (7.6%)	79 (20.8%)	41 (10.8%)	128 (33.7%)	103 (27.1%)	3.52

According to Table 1, a total of 66.3% of the respondents agreed that rural roads were repaved (asphalt overlays) to improve their condition, however, 26.1% did not agree. Its mean of 3.39 shows that slightly more agreed to have their area repaved. This indicates that the County Government has taken a small initiative of repaving roads in rural towns. Rural roads repaving makes roads passable and accessible reducing the cost of transport to the locals. The findings of this study corroborate with what Lucas, Rutachokozibwa and Tagora (2015) who further supported the fact that maintenance of potholes increased the participation of vendors at local markets and an increased variety of available consumer goods and agricultural products. The geographic size of markets for agricultural products increased significantly. These results concurred with a current study where the County Government was responsive to filling potholes developed in rural areas as agreed by 66.3% of the respondents. Similarly, Dorosh et al., (2005) added that better roads that are well maintained and potholes and bad sections reworked on assisted rural people in reducing agricultural costs of production. From the interview, evidence showed that the county government ensured that potholes were repaired to ensure that roads were well-networked in the rural areas. In relation to the discussion on how the road has been maintained in the residence in relation to asphalt overlays,

patching potholes and slab replacement noted that the main theme indicated that road maintenance has been done in the region through repairing potholes and filling them with murrum, however, the maintenance is below average based on the expectation of the public.

According to this study response of 69.2% agreed that the County government maintained potholes and reworked on bad areas in the roads and 32.4% disagreed. This indicates that the County Governments were somewhat responsible for maintaining potholes and improving bad areas of the road in the rural areas (with a mean of 3.48). The results of this study are in support of the sentiments of (Dorosh et al., (2005) that like many authors, they concluded that while the benefits to agricultural production and food security from better rural road connectivity should be clear, the implications for rural people would be complex, with changes in agricultural prices and practices and migration to cities. Further, the results are supported by (World Bank, 2014) in an analysis of options for transport investments for increasing food security in South Sudan which concluded that emphasis should be on low-cost roads linking villages to markets. In response to, "Has the County Government filled potholes in existing roads? If yes explain?" indicated that 9 (75.5%) had filled the potholes while 3 (15.5%) revealed that the potholes have not been filled. Those who

agreed that a few feeder roads had been graded to fill the potholes, however, there were numerous other roads that were not being filled.

The response from Interviewee 5,

“Yes, the county government has filled in potholes which has drastically reduced stagnating water and potholes that can lead to accidents.”

The poor road networks were slightly maintained as indicated by a total of 59.3% of respondents agreed and 32.4% disagreed. This resulted in a mean of 3.33 which means that poor road network maintenance was done to a small extent by the county government. From the results, it was evident that poor roads were maintained by the County Government of Kericho. The findings further revealed that 60.8% of the respondents agreed while 28.4% disagreed that the roads were reconstructed to improve their condition in rural areas. The mean of 3.52 further reveals that road slabs were reconstructed in rural areas to improve the condition of the roads. According to the results, the majority of rural areas have improved on the roads through the reconstruction of road slabs. The results are in line with the idea put across by a study by Yunusa et al. (2012) on Northern Nigeria Roads as being significantly improved in rural Kaduna State which concurs with the current state of Kericho County which led

to a significant increase in agricultural production, food security, farm and non-farm employment and revitalization of economic activities in the area.

This implied that the improvements of roads are down among the developing nations to open up the rural areas for more production. However, based on the interview responses the replacement of slab is slow leading to low replacement which implies that the county government should consider building durable roads or reallocating resources to cover the low repair rate. In general, rural road maintenance was above average in performance. However, there is a need for more resources to be utilized since it had a high impact on the agricultural and business sector development. The results of the third interview question “Are there replacement of slab and reconstruction of road around your home area?” revealed that those who disagreed were 7 (58.3%) and 5 (41.7%) agreed that their roads were being reconstructed. Interviewee 8 commended,

“No, those who disagreed indicated that the county government has done little on replacement of slab, there are areas which still need reconstruction.”

Pearson correlation analysis was used to examine the interrelationship among variables. The results are presented in Table 2;

Table 2: Correlation Analysis

		HHW
RRM	Pearson Correlation	.827**
	Sig. (2-tailed)	.000
	N	380

According to the results in 2, rural road maintenance had the highest positive correlation with household welfare (R=0.827).

The results also addressed the following research hypotheses;

H₀₁: Rural roads maintenance does not significantly influence local households’ welfare in Kericho County, Kenya.

The first null hypothesis was rejected and the alternative was accepted since the rural roads maintenance coefficient of 0.398 was significant on household welfare ($\beta_1=0.398$, $P<0.05$). This implied that rural road maintenance had a positive significant effect on household welfare.

Similar results showed that the impact evaluation of the Njombe-Makete Road Project in Tanzania by Lucas, Rutachokozibwa, and Tagora (2015) revealed tangible benefits. The project's

improvements in feeder roads, bridge construction, and routine maintenance resulted in increased participation of vendors at local markets, a broader array of consumer goods, and a significant expansion in the geographic size of markets for agricultural products. This, in turn, led to considerable increases in the sale of agricultural products and enhanced availability of agricultural inputs, contributing to improved household income and food security.

IFPRI's survey in Bangladesh (Raisuddin, & Hossain, 2016) reinforced these findings, providing evidence of the positive impact of transport infrastructure, particularly roads, on various facets of the rural economy. Agriculture, being the primary livelihood for many rural communities, plays a pivotal role. Knox, Daccache, and Hess (2013) conducted a comprehensive review linking road access to agriculture, summarizing multiple analyses that demonstrated how rural road construction correlated with increased food security globally. Examples included lower input prices and freight costs in India, amplified crop outputs in Ethiopia, and expanded cultivated farm areas in Nicaragua.

While the agricultural benefits of rural roads are evident, complexities arise in the relationship between greater agricultural production and poverty elimination. Issues such as land ownership, costs, employment, and migration can complicate the positive impacts. Binswanger, Khandker, and Rosenzweig (2013) analyzed large survey databases in India, concluding that roads directly contributed to food security and increased fertilizer use. However, they highlighted the complex interactions, emphasizing the significant role of credit facilities and market accessibility influenced by road provision and other factors.

Spatial analysis in sub-Saharan Africa (Dorosh et al., 2005) further emphasized the importance of road connectivity. Their study concluded that investment in rural roads directly affected agricultural production and food security. Areas with better road connectivity demonstrated higher agricultural potential. Yet, they acknowledged the complexity of the implications for rural

communities, foreseeing changes in agricultural practices, prices, and potential migration to urban areas.

The case of road improvements in Nigeria, as stated by the World Bank (2018) showcased increased productivity, food security, and improved quality of life. Similarly, the study by Yunusa et al. (2012) in northern Nigeria indicated significant positive outcomes, including increased agricultural production, food security, and economic revitalization, following road improvement in rural Kaduna State.

Extent studies have emphasized the positive impact of rural roads on agriculture and food security, but challenges remain in interpreting the implications for communities. An analysis of transport investments in South Sudan (World Bank, 2014) suggested a focus on low-cost roads linking villages to markets for increased food security. However, it is crucial to recognize the complexity of the impact on communities, considering changes in agricultural practices, prices, and potential migration patterns. Moreover, existing studies often depend on aggregate-level data, assuming equal access within administrative units, which might oversimplify the nuanced realities of individual access to available transport facilities. In conclusion, while rural roads undeniably promote enhanced agricultural production and food security, a nuanced understanding is necessary to navigate the complex web of factors influencing their impact on communities.

CONCLUSIONS AND RECOMMENDATIONS

The first objective was to examine the effect of rural road maintenance on household welfare. The results revealed that rural road infrastructure, revealing that 66.3% of respondents agreed that their roads were repaved with asphalt overlays, indicating a modest initiative by the County Government to improve road conditions in rural towns. Additionally, 69.2% of participants agreed that the county government played a role in maintaining potholes and addressing bad road

areas, with a mean of 3.48 suggesting a moderate level of responsibility. However, poor road networks saw slightly lower maintenance, with 54.5% agreeing and a mean of 3.33 indicating a relatively small extent of county government efforts. Furthermore, 60.8% of respondents agreed that roads were reconstructed to enhance conditions in rural areas, with a mean of 3.52 suggesting significant efforts in reconstructing road slabs. In overall, the rural road maintenance had a positive significant effect on household welfare in Kericho County.

CONCLUSIONS

The first objective highlighted the positive effects of rural road maintenance on household welfare in Kericho County. With a significant majority of respondents acknowledging road repaving, pothole maintenance, and road reconstruction initiatives by the County Government, the mean values suggest a moderate to high level of responsibility. This indicates that rural road maintenance has a positive and significant effect on the overall welfare of households in the county.

RECOMMENDATIONS

The study recommends that the County Government should allocate additional resources and attention to improve the maintenance of these roads. Regular maintenance activities such as grading, filling potholes, and addressing bad road areas should be prioritized to ensure the overall quality and usability of rural roads.

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