INFLUENCE OF SUSTAINABLE MAINTENANCE OF RURAL ROADS ON SOCIO–ECONOMIC ACTIVITIES: A CASE OF HOUSEHOLDS OF RONGO CONSTITUENCY IN MIGORI COUNTY, KENYA

BY
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A Research Project Submitted in Fulfillment of the Requirements for the Award of the Degree of Bachelor of Arts in Project Planning and Management of the University of Nairobi

2015
DECLARATION

This is my original work and has not been presented for a degree or any award in any university.

Signature ……………………… Date……………………

ONGLOMA GEORGE OMOLLO
L46/58692/2012

This research project has been presented for examination with my approval as university supervisor.

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DEDICATION

I would like to dedicate this research proposal to my late father Mr. Vincent Ongoma and my mother Mrs. Angeline Ongoma for instilling in me hard work and determination and for having played a key role in financing my education.

To my wife Beatrice Omollo for her undying support despite various challenges in life. To my daughters Nancy, Winnie and Christine and Sons Edwin and Sunday for their daily encouragement and prayers.
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I wish to convey my sincere appreciation to the following people without whom this research project report would not have been successfully completed. First, I am greatly indebted to my supervisor, Prof. Charles Rambo for his valuable council, commitment and encouragement throughout the study. My heartfelt appreciation also goes to my employer Ministry of Transport and infrastructure for granting me permission and support towards the success of this work.

My acknowledgement also goes to the project planning and management classmates who contributed tremendously and critiqued my document which helped in fine tuning of the research project to make it a better document for presentation and approval by the university of Nairobi.
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ABBREVIATIONS / ACRONYMS

ADB – Africa Development Bank
FAO – Food and Agriculture Organization
GOK – Government of Kenya
KIPPRA – Kenya Institute of Public Research
MOITC - Ministry Of Infrastructure Transport and Communications
NEPAD – New partnership for Africa’s development
RARP – Rural Access Road Programme
US – United State
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ABSTRACT

The socio-economic impacts of rural roads are well established. Communities and local county governments often attach a high priority to rural roads improvements. Rural roads improve rural access, which facilitates marketing, schooling and health services. Better access provides the opportunity for increased income and employment opportunities and can also contribute to the alleviation of poverty. However, maintenance of rural roads is seriously neglected in many counties in Kenya. Therefore, this study sought to examine the influence of sustainable maintenance of rural roads on socio-economic activities of households in Migori County, Kenya. The dependent variable here which is socio-economic activities was thought to be affected by sustainable maintenance of rural roads. The indicators of socio-economic activities include agricultural activities, transportation services, marketing and trade activities and education and health services; which were thought to have come up or improved as a result of sustainable maintenance of rural roads. The research study made the assumption that the respondents were truthful and answered the questions honestly and that the team was honest and maintained data integrity and that the data collected was a true representation of the actual situation. The literature reviewed covered the relation between the four dependent variables and sustainable maintenance of rural roads, theoretical and conceptual framework. This research study adopted descriptive research design. The research study mainly targeted households of Rongo constituency in Migori County and the Migori County government staff. Systematic random sampling was adopted to sample the households while Migori County staffs were purposively sampled. However, no data was forthcoming from the county government officials. Only one household was picked for every 300 household giving a sample size of 149 households. Pilot study was undertaken in 15 households from Uriri constituency which is a neighboring constituency. The study used ‘split-halves’ and ‘internal consistency’ methods to measure reliability. The data was analyzed and presented in frequency tables and graphs to present the findings of the study. The study adopted Pearson’s correlation to show the relationship between the key variables. The result of the study reveals that sustainable maintenance of rural roads can be held responsible for the slow development of agricultural production, marketing and trading, education and health and transportation services in Rongo constituency, Kenya. The regression analysis indicates that the model has closeness of fit which means that the model is statistically significant. Since the value of R square is less than 50%, the researcher deduced that the proportion of variation associated to the independent variables had a moderate effect. This means that Marketing and trading, Agricultural Production, transportation services and education and health are moderately affected by sustainable maintenance of rural roads. This study recommends that: the government of Kenya strengthen Kenya Rural Roads Authority and county government to come up with mitigation measures to control the degrading of rural roads to cushion rural road users from slackened agricultural production and poor transportation services the researcher recommends a further research on the impact of County government policies on socio-economic activities in Migori County, Kenya.
CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Inadequate provision of sustainable maintenance of rural roads infrastructure and services usually provide a basis for explaining the incidence of poverty across various communities in both urban and rural areas. It is clear that inadequate rural road transport facilities and services as well as the constraints imposed on the mobility and accessibility of people to facilities such as markets hospitals and water sources have grave implication on deepening poverty levels. Thus, there is need for having sustainable well maintained rural road networks in a country to address the prevailing travel and transport problems. The importance of well-maintained rural road infrastructure to a nation cannot be overemphasized as efficient road infrastructure facilities act as catalysts for economic development. In Nigeria today, there is cause for concern while considering the road infrastructure sustainability base since it compares unfavorably with those of several African nations both in terms of sustainable maintenance and network coverage. In particular, the rural areas, where the bulk of the population resides are largely deprived of basic pieces of well-maintained road infrastructure (Olomola, 2003)

Socio-economic benefits of having sustainable road network include all weather reliability, reduced transportation costs, increased access to markets for the local produce and products, access to new employment centres, better access to health care and other social services and strengthening of local economies. However, the road network in Africa is characterized by several constraints that limit economic growth development within African countries. Work related to NEPAD (Food and Agriculture organization FAO) of the United Nations 2002 indicates that a part from North Africa, Africa’s rural infrastructure is generally inadequate and underdeveloped, with the lowest density of paved roads of any of the regions in the rest of the world. For example, there are an estimated 1.8 million km of roads in sub-Saharan Africa, of which only 284,000km (approximately 16%) are paved.
One of the major constraints is the availability of sufficient funds. This results in lack of capital funds to develop and expand the road network and also lack of funds for routine and periodic maintenance of existing roads. External investment in economic infrastructure from 1990 – 1996 for sub-Saharan Africa was in the region of US$26.7 billion, compared to US$ 41.4 billion for Latin America and the Caribbean and US$ 101.9 for Asia (Food & agriculture organization (FAO, 2002).

Based on the above it is evident that the financing needs with respect to road network development and sustainability in Africa is quite substantial. The challenge therefore first of all lies in the determination of road maintenance financing needs, through the execution of an accurate assessment of the nature and extent of a country’s road network i.e. the road asset value and road network condition, and secondly in the identification of financing sources and accordingly to attract sound and sustainable road maintenance investment areas (Amadi, Saka & Jatau, 2013).

Inadequate road maintenance investment results in road networks not being able to be developed and expanded and existing roads bot being maintained. The consequence is deterioration of the road network that not only limits accessibility, mobility and regional connectivity of a country, but also results in increased production and transport costs. Deterioration of a road network therefore causes significant ripple effects, ultimately creating a negative impact on the overall macro-economy and subsequently impeding on poverty alleviation, socio-economic development and overall macro-economic growth and development. To avoid this continuous sustainable road maintenance investment should form the basis of any country’s actions in place to address road infrastructure deterioration, development and maintenance so as to address the socio-economic development of African countries wellareas (Amadi, Saka & Jatau, 2013).

Road transport plays important role in the development of the Kenyan economy. It accounts for over 80% of land freight and passenger traffic in Kenya (Kenya institute of public policy research) and analysis (KIPPRRA),2001; world bank, 2011; government of Kenya (GOK), 2012. An efficient road infrastructure is a prerequisite for socio-economic development, particularly in agricultural economies.
In this regard, a well-developed road network is necessary to facilitate the transportation and marketing of farm produce (Heggie, 1995; Nyangaga, 2007)

1.2 Statement of the Problem

The socio-economic impacts of rural roads are well established. Communities and local county governments often attach a high priority to rural roads improvements. Rural roads improve rural access, which facilitates marketing, schooling and health services. Better access provides the opportunity for increased income and employment opportunities and can also contribute to the alleviation of poverty. Still, maintenance of rural roads is seriously neglected in many counties in Kenya, with Migori being one of them (World Bank, 2001).

Although the link between rural roads and poverty alleviation is mostly indirect, experience clearly shows that areas with poor road access are generally more disadvantaged than areas which are better served. Investments in rural roads maintenance can therefore often be justified from both a socio-economic and poverty reduction point of view. Nevertheless whatever benefits they provide are short lived if they are not maintained (Africon, 2006).

The principle objectives of sustainable maintenance of roads is to keep roads open, reduce rates of deterioration and extend the life of the road network, reduce vehicle operating costs and improve the speed, frequency, safety and convenience of private and public transport. When maintenance is provided, it also provides employment opportunities and additional market prospects for the local construction industry in Migori County. These are the benefits of sustainable maintenance of rural roads, which will be benefits foregone if no maintenance takes place (Africon, 2006).

The decline of rural access roads in the yester years has been of great concern to the previous regimes in Kenya. In Migori County, rural roads are important and they provide the opportunity to realize the productive potentials of agricultural land facilitate schooling, health services and marketing and satisfy other social and economic needs. If rural roads are not maintained properly, access will deteriorate and
these activities will be negatively affected. Most benefits emerge when a region receives first time access. The first roads open up the area to markets, health facilities, schools, government services etc. This can bring about substantial economic and social benefits. Goods, services and facilities become increasingly accessible frustrated if access deteriorate and improvements in their living standards are compromised areas (Amadi, Saka & Jatau, 2013).

In Migori County, maintenance of rural roads usually offers an excellent and sustainable opportunity for local job creation which is popularly referred to as “Kazikwavijana”. Routine maintenance is by its nature labour intensive. There are also several periodic maintenance activities that can be efficiently carried out by manual labour. Using labour based methods provides long-term employment and income as maintenance is a continuing activity. The Philippians, for example, has a rural road network of about 172,000 Kilometers, not including the national roads. A lack of maintenance is a critical problem in the country severely constraining growth of the local economy. If the country would adopt a length – man system, with an average one person responsible for the routine maintenance of 3 kilometer of rural road, it could create 57,000 permanent jobs. In addition, another 35,000 short term jobs could be created through periodic maintenance. Greater investment in maintenance therefore would not only preserve the road network but also contribute to employment creation and income generation in the rural areas thus having a positive impact on local development and poverty reduction (Ahmed, 2011).

A lack of maintenance also affects people’s life in social terms. Once roads become impassable, people can no longer access schools health centres or other service centres and also agricultural farm produce would not reach market buying centres in good time. It also becomes more difficult for service providers to reach communities schools and health centres. As a result, the level and quality of certain services deteriorate. Teachers may well be absent more often as schools become more difficult to reach; mobile health teams visit areas less often and the distribution of medicines declines. These negative social impacts have significant long term economic consequences. It is in this regard that we have set out to establish the effect of sustainable maintenance of rural roads on socio-economic activities in Migori county western region.
1.3 Purpose of Study

The purpose of the study was to examine the influence of sustainable maintenance of rural roads on socio-economic activities of households in Migori County, Kenya.

1.4 Objectives of the Study

The study was guided by the following research objectives.

1. To determine how sustainable maintenance of rural roads influence agricultural production activity in Migori County.
2. To establish how sustainable maintenance of rural roads influence transportation services in Migori County.
3. To establish how sustainable maintenance of rural roads influence marketing and trading activity in Migori county.
4. To assess how sustainable maintenance of rural roads influence education and health services in Migori County.

1.5 Research Questions

The study sought to answer the following questions:-

1. How does sustainable maintenance of rural roads influence agricultural production activities in Migori County?
2. How does sustainable maintenance of rural roads influence transportation services in Migori County?
3. How does sustainable maintenance of rural roads influence marketing and trading activities in Migori County?
4. How does sustainable maintenance of rural roads influence education and health services in Migori County?
1.6 Significance of the Study

It is hoped that the findings of this study can inform the Migori County government on the influence that sustainable maintenance of rural roads can have on agricultural production activities, transportation services, marketing and trading activities and ultimately on the education and health services. Investments in sustainable rural roads have significant potential for the use of local resources, create decent jobs, support the local economy and strengthen local commerce and have therefore important implications for poverty reduction and local economic and social development. The direct consequence of investing in sustainable rural roads is the generation of jobs, incomes and business opportunities, particularly if the development and maintenance of these rural roads is targeted in favor of local resource based methods. Longer lasting impacts such as improved access to goods and services and production and productivity enhancing impacts further contribute to sustainable poverty reduction and local economic and social development. Impacts however can only be sustainable if the roads are maintained.

This study might also lead to more intensified research in this sector which in return can result to availability of latest information to the county governments.

1.7 Basic Assumptions of the Study

The research study made the assumption that the respondents were truthful and answered the questions honestly and that the team was honest and maintained data integrity. The researcher also assumed that the data collected was a true representation of the actual situation.

1.8 Limitations of the Study

The data was collected when some parts of Migori County might experience heavy rainfall while other parts might experience a serious dry spell. Some roads coupled with networks were in poor shape due to heavy rainfall during the period of data collection which resulted into a serious challenge to the research team. To overcome this, the researcher sought the services of experienced local BodaBoda operators usually referred to as “Peng” in the local language who are
familiar with the research areas topology to be able to reach the study participants and collect the required data safely.

Rongo constituency covers a vast area and therefore to be able to collect data within the stipulated period services of research assistants were employed to assist the researcher.

1.9 Delimitation of the Study

Various classes of roads do exist, however this research study delimited itself to sustainable maintenance of rural roads as this is the most common class of roads found in Migori County. In terms of location, the study will be delimited to households in Migori County at large in the western region of Kenya. Migori County has been chosen for this study due to its uniqueness in terms of race, tribe, religion, economic activities and its proximity to the Kenya / Tanzania border. It is generally assumed that if a county has a good rural road network then the socio-economic activities like agricultural production would increase in volume, enrollment in primary education would increase throughout all areas covered by the road network and even commercial trading would thrive in abundance due to the fact that roads are considered to be crucial to economic and social development. It is surprising therefore that the data on roads in Migori County are not only difficult to find but also questionable regarding their veracity. Data on the national highways is relatively abundant, however the further one progresses down the network the more difficult it is to find reliable statistics.

Rural roads form part of an overall network and they are dependent on the higher order roads to serve their purpose and vice versa. In the first place it is useful therefore to see rural roads in the overall context of the road networks of the county. “Rural roads” is generally an ill-defined phrase. Road classification varies across the region depending on weather roads are described by type or by function. However there is rarely a full definition of rural roads. Indeed they are generally put together as those that are not primary or secondary roads. In this research study, we have defined rural roads as the part of the public road network.

However, to realize the objectives of the study, a data collection tool that could collect data in a vast area with a limited time period will be required. The
researcher while appreciating other data collection tool will delimit the study to the use of questionnaire as the data collection tool allowed the researcher to achieve the study objectives within the short timelines with minimal cost, tools and specialized skills.

1.10 Definition of Significant Terms Used In the Study

**Agricultural activities** – any agrarian act or occupation such as cultivating land, raising livestock, keeping fish and many others

**Education and health services** – provision of learning and medical facilities to the public

**Funding levels** – different categories of resource allocations

**Marketing and trade activities** – the action or business of promoting and selling products or devices including market research and advertising.

**Politics of the day** – state of partisan views, bickering and commentary along party lines

**Rural Roads** – Is the part of the public road network that directly serves the rural areas

**Transportation services** – any means of movement of people and goods from one place to another

**Weather conditions** – climatic situations of a place

1.11 Organization of the Study

The study was organized into five chapters starting with chapter one which comprised of an introduction giving the background of the study, statement of the problem, purpose of the study, research objectives and research questions,
significance of the study, limitation and delimitation, basic assumption and the organization of the study as well as definition of significant terms used in the study.

Chapter two comprised of the literature review, theoretical framework as well as conceptual framework, chapter three which is the research methodology comprised of the subtopics on introduction, research design, population, sampling procedure and sample size instruments, validity and reliability procedure for data collection and data analysis.

Chapter four of this research presented the introduction, themes on which data will be presented, interpretation and discussion of data. Chapter five of the research study presented a summary of findings, conclusions, recommendation of the study’s contribution to knowledge and suggestions for further research.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is expected to review literature which is related to the research study based on the following areas. Sustainable maintenance of rural roads and socio-economic activities, sustainable maintenance of rural roads and agricultural production activity, sustainable maintenance of rural roads and agricultural production activity, sustainable maintenance of rural roads and marketing and trading activities, sustainable maintenance of rural roads and education and health services. The chapter also presents the theoretical and conceptual frameworks on which the study was based as well as a summary of the literature review.

2.2 Sustainable Maintenance of Rural Roads and Socio – Economic Activities

The purpose of sustainable maintenance of rural roads is to ensure that the road remain serviceable throughout its design life areas (Amadi, Saka & Jatau, 2013). This sustainable maintenance is important because it prolongs the life of the road by reducing the rate of deterioration, thereby safeguarding previous investments in construction and rehabilitation, lowers the cost of operating vehicles on the road by providing a smooth running surfaces keeps the road open for traffic and contributes to more reliable transport services and sustains social and economic benefits of improved road access (World Bank, 2000). The first purpose is primarily in the interest of the responsible government authorities. The last three are of more general interest to the inhabitants of the area traversed by the road and to the vehicle operators (Ahmed, 2011).

To estimate the impact of road investment is a complex task, as all rural road investment benefits to rural communities cannot be measured in monetary terms areas
The impact of sustainable maintenance of rural roads investments on socio-economic development and economic growth is therefore an important indicator for the justification of the considerable costs involved in sustainable maintenance of rural roads infrastructure investment. Socio-economic aspects are a significant part of overall economic and human development. Sustainable maintenance of rural roads plays a major role in facilitating and enabling access to socio-economic centers in rural areas and ultimately contributes to achieving equity in a country (World Bank, 2000).

Several studies have been carried out over time to estimate the impact of sustainable maintenance of rural roads investments on socio-economic development. Although many studies in the past focused on the direct impact through the application of relevant software tools, the estimation of the indirect impact on socio-economic development is becoming more and more prevalent (World Bank, 2000).

A socio-economic impact assessment was recently carried out regarding the sustainable maintenance of rural roads in the copper belt of Zambia (African 2004). The assessment focused on the current situation in the copper belt province and the project areas, and investigated the impact that improvements to the rural roads network could have on the socio-economics. The socio-economic assessment also focused on labour based construction and sustainable maintenance of the rural roads, with the view on especially employing people living in the catchment areas (Amadi, Saka & Jatau, 2013).

The study indicated that economic activities involve self-employment among both men and women, and constitute a wide range of economic activities such as trading, logging, saw milling, carpentry, wood fuel selling, vending, beer brewing, baking, sewing, knitting and vending in makeshift markets. Agriculture is seen as an alternative economic activity to mining for economic growth (Africon, 2004).

Parallel work (World Bank, 2001) indicated that a significant improvement in socio-economic living conditions was estimated with sustainable rural roads investment. The estimated benefits included the following, improved accessibility to social infrastructure (schools and health centers), increased opportunities to access
education and health facilities and improved social interaction and mobility, which are important for social and economic development, improved access to markets by reducing transport costs, improvement of the marketability of perishable goods through timely and cheaper transport that will provide a direct incentive for more market oriented agriculture with more profitable cash crops, an increase in rural income and also additional employment opportunities (Brushett, 2005).

A recent study (Bryceson, 2006) investigated how effective sustainable maintenance of rural road investment is in addressing mobility and social service accessibility is in addressing mobility and social service accessibility in rural areas by using comparative data from Ethiopia, Zambia and Vietnam. It also investigated the question of whether sustainable maintenance of rural roads can end geographical isolation and economic and social marginalization for poorer communities. The findings of the paper indicated that sustainable maintenance of rural roads investments have the potential to facilitate development and poverty alleviation, subjective to other key factors and basic preconditions that are linked to the realization of benefits. These include the existing density of the sustainable maintenance of rural road network, the level of social and economic infrastructure provisioning, the level of ownership and access of motorized transport in the rural population and the level of purchasing power of rural households to access public transport. The study indicated that when sustainable maintenance of rural roads enhances mobility it occurs in association with motorized transport, thereby providing easier movement for communities. This could result in poverty alleviation when the savings in travel time and the travel distance covered provide more economic opportunities or improved access to social services.

Socio-economic household surveys carried out in early 2006 in the rural mountain areas of Lesotho, as part of a study (Africon, 2006) to determine the feasibility of sustainable maintenance of rural roads investment in this area, aimed to obtain the views of communities with respect to the expected impact of the sustainable maintenance of rural road investment on their day – to – day living standard and overall socio-economic conditions (Africon, 2006).
The results of the surveys indicated that, in terms of the views of the communities, the proposed sustainable maintenance of rural road investment would pose significant socio-economic or indirect benefits. The surveys indicated that the proposed sustainable maintenance of rural roads investment could potentially create several short-term employment opportunities through road construction and also long-term employment opportunities through continuous rural road maintenance through the lifespan of the road. The surveys furthermore indicated that daily activities and living conditions of communities in the project road area will be impacted upon positively, in the sense that there will be improved accessibility and mobility due to an improved road, with a subsequent improvement in day-to-day access to public family and social activities and also improved accessibility to work opportunities. The study results further indicated that factors that are highly correlated with poverty (unemployment, limited to no income low or no education level etc.) are also related with low access in the sense that men and women can afford little to no transport services, thereby constraining their mobility and accessibility. Furthermore, households without access to an all-weather road network definitely have lower access to other facilities, as the specific project road in question in this regard appears to be inaccessible during rainy season (Burningham & Stankveich, 2005).

In addition, the survey indicated that accessibility is impacted upon by the income and location of households. As most households in the Lesotho rural mountain areas earn less than 135 per month, very few households are in a position of owning a private vehicle or make use of public transport on a daily basis. This can tend to limit accessibility to business, social and cultural centers that are not within walking distance of households. Households that are also located deep into the valleys and mountains and not directly adjacent or at least close to the road also have limited accessibility as it is difficult for public transport vehicles to access the valleys and mountains (Der, 2011).

2.3 Sustainable Maintenance of Rural Roads and Agricultural Activities

Alleviating poverty through sustainable maintenance of rural roads infrastructure development has been one of the goals in many developing nations’ agendas. Roads are thought to be the catalyzer in the process of economic
development (Rostow, 1962) and are a particular important factor to the growth of rural areas (Dawson, 2009). Sustainable improvement of roads in developing nations, especially rural – roads, has received growing funding and evaluation interest (Estache, 2010). The World Bank (The World Bank, 2007) and leading donor communities have labeled sustainable maintenance of roads as an instrument of poverty alleviation in developing nations. As Sub-Saharan Africa nations depend on agriculture as the backbone of their economy (Gollin and Rogerson, 2014,) sustainable maintenance of rural roads will have far reaching effects on agricultural productivity. The African Development Bank (ADB) estimates that 34% of rural Africa (where 80% of the citizens dwell) can access roads compared to 90% in the rest of the world (Africa Development Bank, 2010)

Studies on the impacts of sustainable maintenance of rural roads infrastructure in Asia, Africa and Latin America have shown positive impacts on agricultural activities as follows; in Tangali District of Bangladesh, 130km of rural feeder roads were rehabilitated and 16 local markets and 16 bridges built. As a consequence, turnover on local markets increased by 115%, farmers were able to stabilize income by year round marketing and diversifying their production (Kandler & Bar, 2004). In Colombia, sustainable improvement of rural roads in areas previously inaccessible to vehicles reduced travel times and transport costs by 80%. Farmers responded by increasing production of goods for market (particularly perishables) by between 50% in one area and 200% for some products in others (Evans 1990). In Ethiopia, access to all – weather roads in 15 villages reduced the incidence of poverty by 6.7% (World Bank Development Report, 2008)

In Guinea, within areas where sustainable maintenance of rural roads had been provided the areas have shown indications of crops doubling as compared with other areas. Output sold to market for cash almost quadrupled. In areas where no such improvements were made there was no change, citizens remained locked into traditional subsistence living (Republique de Guinee, ministere des Transports, 2005). In Madagascar, simulations suggest that a 50% reduction in travel time per kilometer on roads would increase rice production by 1% (World Bank Development Report, 2008).
2.4 Sustainable Maintenance of Rural Roads and Transportation Services

Lack of transport services for the movement of goods and people is frequently identified as an important constraint to agricultural and rural development. Past evaluations on sustainable maintenance of rural roads projects in Sub-Saharan Africa indicate a strong positive correlation between feeder roads and agricultural productivity. In Kenya, the sustainable maintenance of the Rural Access road programme (RARP) and the minor roads programme showed very positive impacts by improving access to markets. An evaluation of RARP showed a 29% increase in crop production from the baseline condition one year after project completion. Over the same period, sales of farm produce went up by 51%, farm income by 275, non-farm cash earnings by 11% and total household earnings by 20% (MOITC, 1984) similar rural road projects in Uganda led to 200 – 700% expose increase in cotton production with a corresponding rise in income of 373 – 525% (MOITC, 1981). A study in Nyandarua District (Central Kenya) shows that an inadequate road and transport infrastructure discourages adoption of high-value horticultural crops through which farmers could easily improve their incomes (Dijkistra & Magori, 1992)

An inadequate transport infrastructure could result in massive losses to producers. In 1988, three regions in Tanzania lost 50% of their cotton, one region 80% of its rice, and another region 50% of all its seeds and fertilizers when rural roads became impassable following heavy rains (Gavira, 1990). In Siaya District, Omamo (1998) established that cropping patterns were influenced by access to market centers from the farms. The physical distance to market centers is a function of the state of existing rural road infrastructure and existence of means of transport. A study by Obare (2,000) corroborates findings from previous research – in Nakuru District, a reduction of access costs by 10% translated into average production cost saving of Kshs. 14,000 per hectare.
2.5 Sustainable Maintenance of Rural Roads, Marketing and Trading Activities

Over the last two decades, governments and donors in Sub-Saharan African have devoted considerable resources to rural road construction and rehabilitation of which a large share was used to upgrade feeder roads that link up small localities with each other or to larger roads. The rationale behind these investments is that good maintained rural roads, while expensive, are central to the integration of markets, primarily because they reduce transport costs and hence improve the access of farmers to markets for their crops. The existing body of research on the impact of sustainable maintenance of rural roads is plagued by identification problems, and does not always provide compelling causal evidence on the impact of infrastructure improvement (Dawson, 2009). Sustainable maintenance of rural roads usually improves the quality of rural roads which in-turn lowers transport costs, both for traders who come to rural markets to purchase agricultural produce and also for farmers who bring their crops to these same markets. This implies that the improvement in rural road quality will have both demand effects (via changing transport costs for traders) as well as supply effects (via changing transport costs for farmers)

A part from increasing access to facilities, sustainable maintenance of rural roads can improve livelihood prospects. Sustainable maintenance of rural roads can also directly benefit many poor people through employment in the transport sector. Connectivity also provides indirect benefits. It can improve agricultural profitability and facilitate income diversification through marketing and trading. Proximity to urban and trading centers is crucial for agricultural trade, which comprises 75% of rural employment (Anriquez & Stloukal, 2008). Underdeveloped rural roads networks lead to high transport costs for moving agricultural products to market as well as bringing in farm inputs, reducing farmer’s competitiveness (Brixiova, Kamara & Salami, 2010). Research studies have found that agricultural reduction is highly correlated with proximity (as measured by travel time to urban markets) (Der, 2011) and that isolation strongly negatively correlates with agricultural productivity (Minten & Stifile, 2008) sustainable maintenance of rural roads access can therefore increase agricultural output and farm incomes by improved marketing opportunities and reduced transaction costs (Wiguna & Scott, 2005).
Evidence shows that sustainable maintenance of rural road access increases non-agricultural diversification. Those with better maintained rural road access are more likely to source income from other sectors, most notably service-based enterprises (Lanjouw, Quinzon & Sparrow, 2001). Improved rural road connectivity can encourage diversification to more profitable livelihoods, broadening the range of economic activities in a region. A study in Madagascar found that reducing the cost of transport through the sustainable maintenance of rural roads in remote areas boosted household income by nearly half, mostly by raising non-farm earnings (Jacoby & Minten, 2008)

2.6 Sustainable Maintenance of Rural Roads, Education and Health Services

Research studies suggest that increased maintenance of rural roads can improve the uptake and quality of health and education services, particularly in rural or isolated areas (Ahmed, 2011). Sustainable maintenance of rural roads is particularly important in access to emergency and life-saving healthcare. Access to transport can increase the uptake of health services. A research study in South Africa found that the adjusted odds of a homestead within 30 minutes of a clinic making use of the service were 10 times those of a homestead in the 90 – 120 minute zone (Tanser, Herbst & Gijsbertsen, 2006). Evidence from transport interventions show that improved rural road conditions can have measurable impacts on health indicators such as immunization (Ahmed, 2011). Low cost transport as a result of good rural roads as well as timely transport also improves access to ARV therapy (Zachariah, Harries, & Manzi, 2006)

Transport is also a key component of the “three delays” model for maternal mortality (Van Dissel, 2010). The World Health Organization estimates that 75 percent of maternal deaths can be prevented if emergency obstetric care can be reached within 12 hours of obstetric complication (IDS 2013). Sustainable maintenance of rural roads and transport services can increase the likelihood of reaching obstetric care. In Pakistan, it was found that 58 percent of births in villages with well-maintained rural road access were assisted by a skilled attendant, compared with 39 percent for women without rural road access (Babinard & Roberts, 2006).
Sustainable maintenance of rural road infrastructure can improve education outcomes by increasing primary school enrolment, especially where rural roads improvements are associated with improved access to transport services. In Morocco, the most significant impact of a rural roads maintenance programme was a sharp increase in school enrolment, especially for girls (Levy, H. 2004). Evidence from Vietnam shows improvement in primary school completion rates as a result of rural roads rehabilitation (Mu & Van de walle, 2007).

Connectivity is particularly important for secondary school attendance, since secondary schools tend to be more sparsely located than primary. A study of rural road transport infrastructure in Asia found that, while all villagers surveyed had primary schools, many students had to travel outside of the village for post-primary education. Children in particular adolescent girls may be prevented from attending school because of parental fears for their safety on the journeys between school and home (Ranjit, 2010). Thus, amongst other factors such as the spread of secondary schools, enrolment in secondary and further education is contingent on pupils’ proximity to school and mobility potential (Di Domenico, Haugh & Tracey, 2010). Connectivity due to good maintained rural roads may also affect service delivery long-term. The more accessible areas can attract better quality staff, improve staff retention in schools and health centres (World Health Organization, 2009) and increase the feasibility of monitoring rural schools (Di Domenico, Haugh & Tracey, 2010). Thus investing in sustainable maintenance of rural roads infrastructure and transport more broadly may facilitate the improvement and equity of health and education services.

2.7 Theoretical Framework

Provision or improvement of transportation services results in reduction of transport costs and travel time which in turn leads to increased production. Improved transport infrastructure, therefore, promotes social and economic development by increasing mobility and improving physical access to resources and markets. Rural roads connect production areas to markets and to major roads making transport to be one of the main factors of production (Sactra, 2000). As transport cost decreases, the factor prices fall resulting in increased demand for input use or more output supply according to microeconomic theory. Local farmers can benefit from a well maintained rural road when the road reduces the cost of transporting agricultural products to
markets and extends the distance to breakeven locations. This might lead to more intensive cultivation and increased production of cash crops. Sustainable maintenance of rural road infrastructure can further reduce production costs by lowering prices of delivered inputs, including equipment and information (for example through better agricultural extension services).

The ultimate effect is increased net farm gate prices and increased farm incomes although the extent to which this happens depends on the competitiveness of the transport service market. Sustainable maintenance of rural roads not only increases income from farming activities, but also makes prices more stable and thus enables the poor to improve risk management and reduction of risks. Good access rural roads will also improve labour force mobility and thereby increase households’ job opportunities.

According to World Bank (1996) as the cost of transport declines, the production cost falls which may result in increased production. Similarly, when travel time is saved, more labour is available for production which is equivalent to an increase in labour supply, resulting in increased production. So the overall activities expand with the provision of transport infrastructure services. Investment in the transport sector infrastructure can improve access to economic opportunities by reducing transport costs and travel time. If markets are reasonably competitive, this can result in lower prices for freight and passenger services. This in turn can lead to lower prices for product and consumer goods, a spatial extension of the market for production and consumption goods, higher personal mobility, and a general higher level of socio-economic activities. The provision or improvement of transportation infrastructure services reduces the cost of goods, which results in increase in farm gate prices of agricultural products with a decrease in the farm gate prices of agricultural inputs and other consumer goods. The width of price band reduces due to the improved rural road infrastructure services so that the rural households can get double benefits.

2.8. Conceptual Framework

The conceptual framework for this study shows the link between the predictor variable (sustainable maintenance of rural roads) on the dependent variable (Socio-economic activities) as illustrated in figure 2.1.
Moderating variable

Dependent variables
- Funding levels
- Politics of the day

Independent Variable
- Sustainable maintenance of rural roads

Extraneous variable
- Weather conditions
- Topography

Agricultural activities:
- Increased production
- Stabilized income

Transportation services:
- Access to markets.
- Non-farm cash earning
- Farm sale increment

Marketing and trade activities:
- Low transport costs.
- Employment
- Income diversification

Education and health services:
- Emergency health care
- Access to ARV therapy
- School enrolment
- Staff retention

The dependent variable here which is socio-economic activities is thought to be affected by sustainable maintenance of rural roads. The indicators of socio-economic activities include agricultural activities, transportation services, marketing and trade activities and education and health services; which are thought to have come up or improved as a result of sustainable maintenance of rural roads. Therefore, the independent variable for the study is sustainable maintenance of rural roads.
2.9 Summary of Literature

The literature has revealed that many studies have been done as regards the impacts of sustainable maintenance of rural roads on socio-economic activities. The results of some of the studies indicated that, in terms of the views of the communities, sustainable maintenance of rural roads investment would pose significant socio-economic or indirect benefits some of which are, improved accessibility to social infrastructure (schools and health centres), increased opportunities to access education and health facilities and improved social interaction and mobility, which are important for social and economic development, improved access to markets by reducing transport costs, improvement of the marketability of perishable goods through timely and cheaper transport that will provide a direct incentive for more market oriented agricultural with more profitable cash crops an increase in rural income and also additional employment opportunities. However, these studies lack detailed information on effectiveness of having sustainable maintenance of rural roads. This research works is a modest attempt to fill this knowledge gap.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology and procedures that will be adopted while carrying out the research study. This chapter presents; research design, target population, sample size and sampling procedure, research instruments, data collection methods, data analysis techniques and ethical consideration.

3.2 Research Design

This research study adopted descriptive research design. Descriptive research is conducted for studies that aim at documenting existing conditions about a specific topic or area (Khan, 2008). According to this author, the research conducted would give a vivid description of exactly what would happen in a chosen area and eliminates any strings of subjectivity from the researcher with this kind of research method, research tools such as observations and data studies were used to achieve this goal (Trochim, 2005). Using this kind of strategy involved identifying relations between two or more variable and how they will impact on each other (Trochim, 2005). The current research study is out to relate the sustainable maintenance of rural roads and socio-economic activities performed by households.

3.3 Target Population

Target population is a complete set of individuals, households with some common observable characteristics (Mugenda and Mugenda, 2003). The research study mainly targeted households of Rongo constituency in Migori County and the Migori County government staff. Among the 44769 households in Rongo constituency (KNBS, 2009), the study targeted households who had lived in the ward for at least 2 years and had also been involved in some socio-economic activity.
3.4 Sample Size and Sampling Procedure

This section describes the study sample size and how it was arrived at.

3.4.1 Sample Size

For this study sampling was done to overcome the constraints in time and money to conduct a census. For this study, systematic random sampling was adopted to sample the households. According to CBS (2009), Rongo constituency had 44769 households; only one household was picked for every 300 household giving a sample size of 149. A total of 20 staff members from Migori County were purposively chosen for the interview.

3.4.2 Sampling Procedures

One household was selected randomly from every group of 300 households. The sampling procedure that was used to select the County Government of Migori staff was purposive sampling. Purposive sampling strategy is ideal because respondents will be selected based on their knowledge of the area of study.

3.5 Research Instruments

The questionnaire is organized into three sections. The first section is the introduction which details the opening remarks. The second section covers the demographic information. The third section covers the influence of sustainable maintenance of rural roads on the four dependent variables which are health and education services, marketing and trading, agricultural production and transport services.

3.5.1 Pilot Testing

Pilot testing was undertaken to test the data collection tool for validity and acceptability by the would be participants. It required that the pilot testing be based on subjects which are from a similar population to that which was examined in the survey, but not from the same target population. For this research study, the pilot study was undertaken in 15 households from Uriri constituency which is a neighboring constituency. The results of the pilot study enabled the researcher to determine the suitability of the responses made by respondents and adjustments of items done accordingly by revising the questionnaire and the interview guide.
3.5.2 Validity of Instruments

According to Creswell (2011), validity is the degree by which the sample of test items represents the content the test is designed to measure. Content validity was employed by this study as a measure of the degree to which data collected using a particular instrument represents a specific domain or content of a particular concept. Mugenda and Mugenda (2003) contend that the usual procedure in assessing the content validity of a measure is to use a professional or expert in a particular field. To establish the validity of the research instrument, the researcher sought opinions of scholars and experts including the supervisor and other lecturer.

3.5.3 Reliability of Instruments

Reliability, according to Eriksson and Kovalainen (2008), is the extent to which a measure, procedure or the research instrument yields the same result on repeated trials. Mugenda and Mugenda (2003) define reliability as a measure of the degree to which the research instrument yields consistent results or data after repeated trials. In order to test reliability in research, three methods are widely used which are the ‘test re-test’ method, the ‘split-halves’ method and the ‘internal-consistency’ method.

The study used ‘split-halves’ and ‘internal consistency’ methods to measure reliability. ‘Split-halves’ method was used by comparing the two halves of the responses to each other and similarities identified. The more similarities between the two halves and each question can be found the greater the reliability. According to Zikmund (2003), the ‘split-halves’ method is the most suitable and basic method for checking reliability when the study have a large amount of raw data.

Internal consistency method was tested using Cronbach’s Alpha. Cronbach’s alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A "high" value of alpha is often used as evidence that the items measure an underlying (or latent) construct (Warmbrod, 2007). Reliability with a predetermined threshold of 0.7 is considered acceptable. That is, values above 0.7 indicate presence of reliability while values below signify lack of reliability of the research instrument.
3.6. Data Collection Methods

A research permit was obtained from NACOSTI (National Commission for Science, Technology and Innovation) in order to conduct the study. The study used both the primary and the secondary data. Secondary data was obtained from the records directly while primary data was obtained directly from the respondents. The researcher obtained an introductory letter from the University to collect data from the households, then personally delivered the questionnaires to them and had them filled in his presence. The researcher employed both self-administration and assistance approach of data collection and monitored the process to ensure that unintended people did not fill the questionnaire. The questionnaires was filled and assistance sought where possible thus raising the reliability.

3.7. Data Analysis Procedure

Data was analyzed both quantitatively and qualitatively. The data from the tools was coded and entered in to statistical package for social science (IBM SPSS Version 17.0). This computer aided software for research assists the researcher to present data. The data was analyzed and presented in frequency tables and graphs to present the findings of the study. The study adopted Pearson’s correlation to show the relationship between the key variables. The themes emerging from secondary data were identified to augment the primary data.

3.8. Ethical Considerations

Some of the ethical issues that were given special attention during the process of data collection by the researcher as pointed out by Mugenda (2008) included privacy, confidentiality, voluntary and informed consent, anonymity and honesty. In addition, the researcher exercised extra caution to ensure that the parties which were involved were treated with respect and care. This involved employing professionalism, legal and ethical considerations. In this study, the researcher concealed the identity of the respondent, maintained data confidentiality and respect for the respondents.
CHAPTER FOUR

STUDY RESULTS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the results based on the study objectives and discusses its interpretation. The chapter begins by presenting the findings highlighting the purpose of the study which is to examine the influence of sustainable maintenance of rural roads on socio-economic activities of households in Migori County, Kenya. This is presented and discussed in line with the objectives of this study which were to determine how sustainable maintenance of rural roads influences agricultural production, transportation services, marketing and trading activities; and education and health services.

4.2 Response Rate

Out of the one forty nine (149) questionnaires distributed, only one hundred (100) were fully filled with relevant information that could be entered and analyzed. This represents a response rate of 67.11%.
4.3 Demographic Results

4.3.1 Gender of the Respondents

Table 4.1: Gender of respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>55</td>
<td>55.00</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>45.00</td>
<td>45</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Research data (2015)

Among the respondents, the male respondents were 55% while the female respondents were 45%. This basically implies that the number of male respondents was more than that of their female counterparts. This was not purposive or preplanned but occurred randomly. This result implies that the study was male dominated. The ratio of male to female respondents in this study is better compared to that of Nyaboga, Basweti, Miyienda and Onsongo (2012) who found out that 260(70.27) of the respondents were male while 110(29.5) were female in their study of socio-economic factors and road development in Kisii town.

4.3.2 Level of Education of the Respondents

50% of the respondents had attained secondary education; 1% had university qualifications while another 49% of the respondents had college education. Approximately all of the respondents were literate and with a grasp on sustainable road maintenance.
Table 4.2: Education attained

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid University</td>
<td>1</td>
<td>1.00</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Secondary</td>
<td>50</td>
<td>50.00</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>College</td>
<td>49</td>
<td>49.00</td>
<td>49</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Research data (2015)

4.3.3 Age

In summary, more than 50% of the study respondents were over 50 years of age; further adding value to the data collected and its relevance. The other 31% were aged 31-50 while only 18% were aged 20-30.

Table 4.3: Age

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 20-30</td>
<td>18</td>
<td>18.00</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>31-50</td>
<td>31</td>
<td>31.00</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Above 50</td>
<td>51</td>
<td>51.00</td>
<td>51</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
### 4.4 Socio-Economic Activity

61% of the respondents were farmers, 11% were employed while only 28% had their own business to run. This implies that majority of the respondents were involved in socio-economic activities.

*Table 4.4: Socio-economic Activity*

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming</td>
<td>61</td>
<td>81.00</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>Business</td>
<td>28</td>
<td>8.00</td>
<td>8</td>
<td>89.0</td>
</tr>
<tr>
<td>Employment</td>
<td>11</td>
<td>11.0</td>
<td>11</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Research data (2015)

### 4.5 Sustainable Maintenance of Rural Roads and Socio-economic Factors

#### 4.5.1 Agricultural Production

The following table displays the feedback from the respondents regarding influence of sustainable maintenance of rural roads on agricultural production.
### Table 4.5: Agricultural Production

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response</th>
<th>Percentage</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of sustainable Maintenance of rural roads has led to increased</td>
<td>Strongly agree</td>
<td>27.27%</td>
<td>1.9</td>
<td>0.70</td>
</tr>
<tr>
<td>sustainable maintenance of rural roads in agricultural production in</td>
<td>Agree</td>
<td>54.45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migori County</td>
<td>Neutral</td>
<td>18.27%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged sustainable maintenance of rural roads has led to growth</td>
<td>Strongly agree</td>
<td>54.54%</td>
<td>1.5</td>
<td>0.52</td>
</tr>
<tr>
<td>of agricultural production</td>
<td>Agree</td>
<td>45.45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads in Migori led to higher</td>
<td>Strongly agree</td>
<td>64.54%</td>
<td>1.4</td>
<td>0.51</td>
</tr>
<tr>
<td>profits in agricultural production</td>
<td>Agree</td>
<td>26.36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td>9.09%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has led to increased income</td>
<td>Strongly agree</td>
<td>27.27%</td>
<td>1.6</td>
<td>0.59</td>
</tr>
<tr>
<td>for both farmers and business owners</td>
<td>Agree</td>
<td>63.63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td>9.09%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the respondents were asked whether lack of sustainable maintenance of rural roads has led to increased sustainable maintenance of rural roads in agricultural production in Migori County, over half (54.45%) of the respondents agreed, 27.27% strongly agreed while 18.27% were neutral. The mean response was 1.9; denoting agreement. It can thus be concluded that majority of the respondents believe that lack of sustainable maintenance of rural roads has led to increased sustainable maintenance of rural roads in agricultural production in Migori County.
When the respondents were asked whether prolonged sustainable maintenance of rural roads has led to growth of agricultural production; more than half (54.54%) strongly agreed while the rest (45.45%) agreed. The mean response was 1.5; denoting agreement. It can thus be concluded that majority of the respondents believe that prolonged sustainable maintenance of rural roads has led to growth of agricultural production.

When the respondents were asked if sustainable maintenance of rural roads in Migori led to higher profits in agricultural production, a majority (64.54%) strongly agreed, 26.36% agreed while 9.09% were neutral. The mean of 1.5 was obtained when the respondents were asked. It can thus be concluded that majority of the respondents strongly believed that sustainable maintenance of rural roads in Migori led to higher profits in agricultural production.

4.5.2 Sustainable Maintenance of Rural Roads and Transportation Services

The following table displays the feedback from the respondents regarding how Sustainable maintenance of rural roads affects transportation services.
When the respondents were asked whether Sustainable maintenance of rural roads has reduced the time taken to transport produce to the market within Migori County, majority (63.63%) of the respondents agreed, 18.18% strongly agreed while the rest were either neutral or disagreed. The mean response was 2.1; denoting agreement on a slight note. It can thus be
concluded that majority of the respondents believe that Sustainable maintenance of rural roads has reduced the time taken to transport produce to the market within Migori County.

When the respondents were asked whether rural road transportation services are usually affected most by lack of sustainable maintenance of rural roads; majority (63.63%) agreed while the rest were either neutral (9.09%) or strongly agreed (27.27%). The mean response was 1.8; denoting agreement. It can thus be concluded that majority of the respondents believe that rural road transportation services are usually affected most by lack of sustainable maintenance of rural roads.

When the respondents were asked if sustained maintenance of rural roads has enhanced transportation accessibility to individual households and business, a majority (72.72%) strongly agreed, while the rest (27.27%) agreed. The mean was 1.2 denoting strong agreement. It can thus be concluded that majority of the respondents strongly believed that sustained maintenance of rural roads has enhanced transportation accessibility to individual households and business.

When the respondents were asked whether most transport delays are caused by poor sustainable maintenance of rural roads in the area; only 9.09% strongly agreed, 36.36 % were neutral while 27.27% disagreed. The mean response was 3.1; denoting neutrality. It can thus be concluded that majority of the respondents were not sure whether most transport delays are caused by poor sustainable maintenance of rural roads in the area.

4.5.3 Sustainable Maintenance of Rural Roads and Marketing and Trading

The following table displays the feedback from the respondents regarding how sustainable maintenance of rural roads influences marketing and trading.
**Table 4.7: Marketing and Trading**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response</th>
<th>Percentage</th>
<th>Mean</th>
<th>Standard Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable maintenance of rural roads has helped the business community in marketing their products</td>
<td>Disagree</td>
<td>18.18%</td>
<td>4.8</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>81.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads affect the growth of business in terms of marketing and trading</td>
<td>Strongly agree</td>
<td>72.72%</td>
<td>1.3</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>27.27%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing and trading activities contribute positively to the sustainable maintenance of rural roads</td>
<td>Neutral</td>
<td>18.18%</td>
<td>4.2</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>45.45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>36.36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads in the area has increased the marketing and trading activities</td>
<td>Agree</td>
<td>27.27%</td>
<td>3.3</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>27.27%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>36.36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>9.09%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor sustainable maintenance of rural roads has led to marketing and trading loses</td>
<td>Strongly agree</td>
<td>27.27%</td>
<td>1.9</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>54.45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>27.27%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When the respondents were asked whether sustainable maintenance of rural roads has helped the business community in marketing their products, majority (81.81%) of the respondents strongly disagreed while 18.18% disagreed. The mean response was 4.8; denoting strong disagreement. It can thus be concluded sustainable maintenance of rural roads has helped the business community in marketing their products.

When the respondents were asked whether Sustainable maintenance of rural roads affect the growth of business in terms of marketing and trading; majority (72.72%) strongly agreed while the rest agreed (27.27%). The mean response was 1.3; denoting strong agreement. It can thus be concluded that majority of the respondents strongly believe that sustainable maintenance of rural roads affect the growth of business in terms of marketing and trading. When the respondents were asked if marketing and trading activities contribute positively to the sustainable maintenance of rural roads, only 18.18% were neutral while the rest either strongly disagreed (36.36%) or just disagreed (45.45%). The mean was 4.2 denoting strong disagreement. It can thus be concluded that majority of the respondents do not believe that marketing and trading activities contribute positively to the sustainable maintenance of rural roads.

When the respondents were asked whether sustainable maintenance of rural roads in the area has increased the marketing and trading activities; more than half (54.45%) agreed, the rest were either strongly agreeing or neutral. The mean response was 1.9; denoting agreement. It can thus be concluded that majority of the respondents were not sure whether sustainable maintenance of rural roads in the area has increased the marketing and trading activities.

**4.5.4 Sustainable Maintenance of Rural Roads and Education and Health**

The following table displays the feedback from the respondents regarding how sustainable maintenance of rural roads affects education and health.
### Table 4.8: Education and Health

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response</th>
<th>Percentage</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable maintenance of rural roads has helped improve education and</td>
<td>Strongly agree</td>
<td>54.54%</td>
<td>1.5</td>
<td>0.52</td>
</tr>
<tr>
<td>health services</td>
<td>agree</td>
<td>45.45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has increased children</td>
<td>Strongly agree</td>
<td>54.54%</td>
<td>1.5</td>
<td>0.69</td>
</tr>
<tr>
<td>enrollment in schools</td>
<td>agree</td>
<td>36.36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>9.09%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has increased administration of</td>
<td>Strongly agree</td>
<td>18.18%</td>
<td>2.1</td>
<td>0.83</td>
</tr>
<tr>
<td>ARV drugs therapy in the area</td>
<td>agree</td>
<td>63.63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>9.09%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>9.09%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads in the area has discouraged</td>
<td>Strongly agree</td>
<td>27.27%</td>
<td>1.8</td>
<td>0.60</td>
</tr>
<tr>
<td>deployment of health and education staff in the area</td>
<td>agree</td>
<td>63.63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>9.09%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the respondents were asked whether sustainable maintenance of rural roads has helped improve education and health services, over half (54.54%) of the respondents strongly agreed while 45.45% just agreed. The mean response was 1.5; denoting agreement. It can thus be
concluded that majority of the respondents strongly agree that sustainable maintenance of rural roads has helped improve education and health services.

When the respondents were asked whether sustainable maintenance of rural roads has increased children enrollment in schools; majority (54.54%) strongly agreed, 36.36% agreed while the rest were neutral (9.09%). The mean response was 1.5; denoting agreement. It can thus be concluded that majority of the respondents believe that sustainable maintenance of rural roads has increased children enrollment in schools.

When the respondents were asked if sustainable maintenance of rural roads has increased administration of ARV drugs therapy in the area, only 18.18% strongly agreed, 63.63 % agreed while the rest were either neutral or disagreed. The mean was 2.1 denoting agreement. It can thus be concluded that majority of the respondents agree that sustainable maintenance of rural roads has increased administration of ARV drugs therapy in the area.

When the respondents were asked if sustainable maintenance of rural roads in the area has discouraged deployment of health and education staff in the area; more than half (63.63%) agreed, the rest were either strongly agreeing or neutral. The mean response was 1.8; denoting agreement. It can thus be concluded that sustainable maintenance of rural roads in the area has discouraged deployment of health and education staff in the area.

4.6 Regression Analysis

The following table displays the results from the regression analysis.
Table 4.9: Partial regression coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-4.722</td>
<td>0.209</td>
<td>78</td>
</tr>
<tr>
<td>Does sustainable maintenance of rural roads influence agricultural production</td>
<td>3.944</td>
<td>0.587</td>
<td>5.984</td>
</tr>
<tr>
<td>Does sustainable maintenance of rural roads influence marketing and trading</td>
<td>7.667</td>
<td>0.251</td>
<td>6.587</td>
</tr>
<tr>
<td>Does sustainable maintenance of rural roads influence transportation services</td>
<td>4.667</td>
<td>0.293</td>
<td>4.421</td>
</tr>
<tr>
<td>Does sustainable maintenance of rural roads influence education and health services</td>
<td>2.833</td>
<td>0.196</td>
<td>7.337</td>
</tr>
</tbody>
</table>

Source: Research data (2015)

The beta coefficients give the rate of change on the dependent variable that was produced by a change on the independent variables. Here, agricultural production takes a lead with 0.587 followed by transportation services at 0.293, then trading and marketing at 0.251 and health and education at 0.196. The researcher thus concluded that sustainable maintenance of rural roads had a major influence on agricultural production and transportation services. The results are as shown in table 4.9 above. The results relate to those of Nyaboga, Basweti, Miyienda and Onsongo (2012) who found out that all variables demonstrated average variance extracted
between 0.420 and 0.775, transportation services was higher than the benchmark of 0.5. In their study, all the variables displayed a higher composite reliability than 0.60. Another study done by Greuning and Iqbal (2007) displayed slightly similar deviations when the independent variables were compared to the dependent variable; education and health taking a lead with 0.55 deviation followed by trading activities at 0.33, then transport services at 0.21 and agriculture at 0.13. Unlike this study, the latter study by Greuning and Iqbal (2007) concluded that sustainable maintenance of rural roads mostly influenced education and health services.

### 4.7 The Coefficient of Determination

The following table displays the results for the coefficient of determination.

**Table 4.10: The coefficient of determination**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.587(a)</td>
<td>.395</td>
<td>.179</td>
<td>11.858</td>
</tr>
</tbody>
</table>

Source: Research data (2015)

The value of R was 0.587 and R square was 0.179 (17.9%) as shown in the table above. Since the value of R square is less than 50%, the researcher deduced that the proportion of variation associated to the independent variables had a moderate effect. This means that agricultural production, marketing and trading; education and health and transportation services are moderately affected by sustainable maintenance of rural roads. This finding is similar to that of Nyaboga, Basweti, Miyienda and Onsongo (2012) who found out that sustainable maintenance of rural roads moderately influenced agricultural activities in Kisii town, Kenya.

However, Nyaboga *et al.* (2012) found a high and significant relation between transport services and sustainable maintenance of rural roads. The findings of this study do not relate to those of Podpiera (2008), who studied sustainable maintenance of rural roads in Colombia, and concluded that agricultural activities are not affected by sustainable maintenance of rural roads.
but by government regulations. The variations in the later findings could be explained by the difference in the economies.
CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the findings and an analysis of the results and findings focusing on the objectives, research questions, recommendations and the various areas to focus on for further research.

5.2 Summary of Findings

The result of the study reveals that sustainable maintenance of rural roads can be held responsible for the slow development of agricultural production, marketing and trading, education and health and transportation services in Rongo constituency, Kenya. The regression analysis indicates that the model has closeness of fit which means that the model is statistically significant. Since the value of R square is less than 50%, the researcher deduced that the proportion of variation associated to the independent variables had a moderate effect. This means that Marketing and trading, Agricultural Production, transportation services and education and health are moderately affected by sustainable maintenance of rural roads. This means that the hypothesis that sustainable maintenance of rural roads influences agricultural production, Marketing and trading and transportation services and health and education is accepted. The implication is that a variation sustainable maintenance of rural roads resulted in a variation in any of the above factors in line with the priori expectation.

From the estimated multiple regression equation, the research revealed that the variables agricultural production and transportation services were affected most by sustainable maintenance of rural roads. This is logical given the fact that most rural roads are in rather remote areas far from main towns; such areas experience
transportation services challenges, poor telecommunication networks and even lack of electricity.

The adjusted R squared coefficient which is the coefficient of determination indicates that the sustainable maintenance of rural roads accounted for the variation in the explanatory variables. This could be described as a moderate effect but the outcome of such a magnitude could be felt throughout the County. This basically means that all the four dependent variables are actually influenced by sustainable maintenance of rural roads. These variables include agricultural production, education and health services, transportation services and marketing and trading.

5.3 Conclusions

This paper attempts to determine the influence of sustainable maintenance of rural roads on socio-economic activities in Rongo constituency, Kenya. An important finding is that sustainable maintenance of rural roads result in the direct influence of the variables in the model. The paper also provides preliminary evidence regarding the relative influence sustainable maintenance of rural roads has on the variables. Specifically, the findings suggest that agricultural production and transportation services were the most important variables influenced most by sustainable maintenance of rural roads.

Conclusively, central government and county government should implement policies that will check on sustainable maintenance of rural roads to ease out transportation services and improve agricultural production. Also, sustainable maintenance of rural roads to agricultural production areas should be automated in order to enhance faster corrective measures. The tight work schedule and sensitivity of information regarding sustainable maintenance of rural roads posed a slight challenge to the study. This is because the respondents that were approached were reluctant in giving information demanding incentives to participate or written permission to be interviewed.
The management of Migori county government should embark on a strategic and customer-focused training to their staff on the sustainable maintenance of rural roads with a bias to agricultural production areas, road safety skills and general transport policies. Moreover, risk policies associated with sustainable maintenance of rural roads should consider the people perspective rather than the county government perspective. This will in turn improve service delivery specifically the efficiency in sustainable maintenance of rural roads.

5.4 Recommendations

This study recommends that: the government of Kenya strengthen KERRA (Kenya Rural Roads Authority) and county government to come up with mitigation measures to control the degrading of rural roads to cushion rural road users from slackened agricultural production and poor transportation services; control and monitoring of system failures and technical hitches to fast track sustainable maintenance of rural roads so as to enable faster and reliable transport networks; creation and strengthening of an independent oversight institution at the county level to monitor sustainable maintenance of rural roads and even provide technical training to the county staff.

5.5 Suggested Areas for further Research

From the study and subsequent conclusions, the researcher recommends a further research on the impact of County government policies on socio-economic activities in Migori County, Kenya.
REFERENCES


Faísca, J. S., Baena, J., Baltzer, S., Gajewska, B., Nousiainen, A., Hermansson, Å.,


APPENDICES

Appendix I: Letter of Transmittal

George Omollo Ongoma
University of Nairobi
School of Continuing and Distance Education
Department Of Extra – Mural Studies
Kisumu Campus

Dear respondent,

You are requested to participate in the study on “Influence of sustainable maintenance of rural roads on socio – Economic activities in Western Region: A case of households in Migori county”. Please key in the right information on the questions asked in this booklet. Do not indicate your name or any other personal information in this questionnaire. The answers you give will be treated with utmost confidentiality. You input will be great importance in ensuring the success of this work.

God bless you.

Thanks in advance.

Regards

George .O. Ongoma
University Of Nairobi Student
Appendix II: Questionnaire to Households

Introduction:

My name is George Omollo Ongoma. I am a Bachelor student of University of Nairobi, Kisumu, carrying out a study on “Influence Of Sustainable Maintenance of Rural Roads On Socio-Economic Activities In Western Region “A Case of Households In Migori County “. This research is purely for academic purposes and any information provided shall be treated with confidentiality. Your contributions are highly appreciated .Thanking you in advance.

Yours Sincerely

G.O. Ongoma.

SECTION A: Demographic Data

Tick Appropriately

1. What is your gender? : Male [ ] Female [ ]

2. What is your age bracket? ; Below20 [ ]
   20 – 30 [ ] 31 – 50 [ ] above 50 [ ]

3. Your highest level of education: Basic [ ]
   Secondary [ ] College [ ] University [ ]

4. Tick on your main Socio-economic activity
   Farming [ ] Business [ ] Employment [ ]
## SECTION B: SUSTAINABLE MAINTENANCE OF RURAL ROADS AND AGRICULTURAL PRODUCTION WITHIN THE HOUSEHOLDS

<table>
<thead>
<tr>
<th>Factor</th>
<th>Always</th>
<th>Occasionally</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of sustainable Maintenance of rural roads has led to increased cost in agricultural production in Migori County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged sustainable maintenance of rural roads has led to growth of agricultural production.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads in Migori led to higher profits in agricultural production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most agricultural farmers are satisfied with sustainable maintenance of rural roads in the area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has led to increased income for both farmers and business owners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## SECTION C: SUSTAINABLE MAINTENANCE OF RURAL ROADS AND TRANSPORTATION SERVICES WITHIN MIGORI COUNTY

<table>
<thead>
<tr>
<th>Factor</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable maintenance of rural roads has reduced the time taken to transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
produce to the market within Migori County

Rural road transportation services are usually affected most by lack of sustainable maintenance of rural roads

Sustained maintenance of rural roads has enhanced transportation accessibility to individual households and business

Most transport delays are caused by poor sustainable maintenance of rural roads in the area

Sustainable maintenance of rural roads has led to faster and affordable transport in the area

SECTION D: SUSTAINABLE MAINTENANCE OF RURAL ROADS AND MARKETING AND TRADING IN MIGORI COUNTY

<table>
<thead>
<tr>
<th>Factor</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable maintenance of rural roads has helped the business community in marketing their products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads affect the growth of business in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
terms of marketing and trading

Marketing and trading activities contribute positively to the sustainable maintenance of rural roads

Sustainable maintenance of rural roads in the area has increased the marketing and trading activities

**SECTION E: SUSTAINABLE MAINTENANCE OF RURAL ROADS AND EDUCATION AND HEALTH SERVICES IN MIGORI COUNTY**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable maintenance of rural roads has helped improve education and health services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has increased children enrollment in schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads has increased administration of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARV drugs therapy in the area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable maintenance of rural roads in the area has discouraged deployment of health staff in the area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU