

**INFLUENCE OF ROAD MAINTENANCE ON ECONOMIC
DEVELOPMENT OF RURAL AREAS: A CASE OF MOIBEN
CONSTITUENCY, UASIN GISHU
COUNTY, KENYA**

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for the Award of Master of Arts Degree in Project Planning and Management of
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DECLARATION

I, declare that this research project is my original work and it has not been presented in any other university.

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DEDICATION

This research project is dedicated to my wife Gladys, my sons Bethwel and Brian for their unwavering support during the preparation of this work.

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LIST OF ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highways and Transportation Officials
ADB	Asian Development Bank
CDF	Constituency Development Fund
EPFRP	Eastern Province Feeder Road Project
IFRT	International Forum for Rural Transport
ILO	International Labour organization
ITF	International Transport Forum
KeRRA	Kenya Rural Roads Authority
KHDS	Kenya Household Development Survey
MDG	Millennium Development Goal
NHS	National Highway System
RTI	Rural Transport Infrastructure
SSATP	Sub-Saharan Africa Transport Partnership

ABSTRACT

The rapid deterioration of rural roads is one of the more challenging issues facing many countries in the developing world today. Generally, rural areas serve as the base for the production of food and raw materials, the major sources of capital formation for a country and a principal market for domestic manufactures. In Kenya, rural roads maintenance is a real challenge in most constituencies and Moiben Constituency is not an exception. There has been an increase in rural poverty with majority of farmers not being able to access markets for their agricultural produce and neither can potential investors able to be attracted to invest in these areas. The purpose of this research was to establish the influence of road maintenance activities on development of rural population. The study was conducted in Moiben Constituency, Uasin Gishu County, Kenya. The study objectives included to; establish the influence of road maintenance timing on economic development of rural areas; asses how road drainage structure maintenance influence economic development of rural areas, asses on how funding of roads maintenance influence economic development in rural areas and assess how community involvement level influence economic development of rural areas. The target population for the study comprise of KeRRA staff, and residents of Moiben. This target population was deemed relevant since they are directly involved in either road maintenance or utility of the roads. A sample size for the study was selected through use of Krejcie and Morgan Table which gave a sample size of 380 respondents. The respondents were selected through stratified, simple random sampling and purposive sampling techniques. The data for the study was collected through the use of questionnaires and interview schedules. The questionnaire was validated and tested for reliability prior to administration to the field. The data collected was analysed using descriptive and inferential methods to which presentations were made using frequency distribution tables. The results indicated that timing of road maintenance is poor and more reactive; drainage structures maintenance was significant in economic development; there were multiple sources of funds for road maintenance which resulted in lack of accountability and responsibility for road maintenance and finally it found out that the level of community involvement was low resulting in wrong prioritization of roads maintenance. The study recommends that; KeRRA and contractors must ensure their time plans are adhered to so as to facilitate passable roads; KeRRA should ensure they factor in the budgets the cost of maintaining drainage structures and enforce the maintenance; The national government should allocate adequate funds to road maintenance so that farmers not to incur cost on roads repairs and also road maintenance agencies in the rural areas must fully involve all the stakeholders including the residents in order to ensure achievement of good rural roads that will spur development.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Roads are clearly a critical enabling condition for improving living conditions in rural areas (Asian Development Bank [ADB], 2006). Rural roads have only recently received attention in development research. The International Bank for Reconstruction and Development, or World Bank, moved away from the World War II reconstruction mandate during the early 1960s to start, and address, the “Third World” development agenda. At that time, the development process was not understood beyond the need to build infrastructure. Development was pursued on a sector-by-sector basis, giving priority to the larger “structural” infrastructure. Rural roads were attended mostly as part of agricultural sector investment. During the 1990s, rural roads became the centre of intensive and specific attention, in particular under the leadership of the International Forum for Rural Transport (IFRT), and through the studies of the Sub-Saharan Africa Transport Partnership (SSATP) (ADB, 2006).

The American Association of State Highway and Transportation Officials (AASHTO) define roads maintenance as “all the activities and services required in maintaining infrastructure assets and providing services to the travelling public” (AASHTO 2005). This gives a vivid illustration of what the study intended to do. Rural roads maintenance was the core focus in the study especially the role it plays in development of the rural areas.

The condition of highway pavements on the National Highway System (NHS) in the United States is such that the cost to maintain the system at existing condition levels is nearly \$50 billion annually (World Bank, 2010). However, the United States

currently spends only about \$25 billion per year, and the estimated cost to bring the entire system up from its current level to a good level is \$200 billion. Judging from this, it is clear that the system could not continue to operate with traditional approaches to pavement management at the maintenance level and that the pavement preservation strategies employed at the various levels of Department of Transportation (DOT) (i.e., state, county, and city) needed to be restructured (FWHA, 2002).

A study conducted on 85 developing countries found that 25 % of the paved roads outside urban areas have been lost owing to inadequate maintenance. This loss could have been saved with preventive maintenance costing \$12 billion. In addition, 40 % of the paved roads were in need of routine maintenance in five years costing \$40 billion. However, if no action is taken, the cost will reach \$100 billion. The crisis has reached such dimensions, because the rate of deterioration of roads is not immediately evident. New paved roads deteriorate very slowly and almost imperceptibly in the first ten to fifteen years of their life, and then deteriorate much more rapidly unless timely maintenance is undertaken (World Bank, 1988).

The study pointed out that the costs of routine and periodic maintenance needed to preserve the pavement from further deterioration during the 1986-1999 period was estimated to be around \$4.6 billion/year or \$46 billion over 13 years. However, if the needs are met on a timely basis, \$3 billion would have been saved and the requirements would be about \$43 billion. Further to that, as an estimate for the cost of the rehabilitation of the roads, if the maintenance needs for 20% of the roads in fair condition are not met at the proper time, the cost would have been increased by about \$20 billion at the point where they require major rehabilitation (World Bank, 1988).

In Asia rural Roads maintenance has not received such intense attention (ADB, 2006). This is not to say that the problem is any less apparent or real. In many of the countries of the region, rural road maintenance is conspicuous by its absence. Insufficient funds are allocated and even where funds are available they are generally not applied within a planned maintenance framework. Rather, the funds are used to correct major defects which have been caused by the absence of preventive maintenance. This is evident not only in the statistics on the condition of rural roads but also for anyone who has travelled on rural roads in the region.

In Saudi Arabia, rural road maintenance has been developed in response to three major needs, notably, social needs, economic and industrial needs, and defence needs. The contribution of the transportation sector to the GDP of the Saudi Arabia represented 3.2% in 2006 while the expenditure was only 1.43% (CDSI, 2008). This figure shows that there is a need to allocate more investment to the transportation sector by the Saudi government.

Case studies of different developing countries have shown that regular maintenance of rural roads is a critical pre-condition for sustaining the positive impact which these assets generate for the rural community. Road deterioration due to lack of maintenance has become a growing issue in a number of developing countries. The problem has been discussed at length and the results of a lack of maintenance have been well defined and quantified. Nevertheless, the extent of the problem is not fully appreciated and the solutions are still not commonly understood (World Bank, 2010).

Equally, the measures required to rectify the shortcomings are underestimated. The implication is that the poor state of roads slows down the development of supply system, farmers travel and food distribution. It is against this background

that the study looked at the road maintenance aspects and their effect on economic development of rural areas.

In Zambia, the Roads Department of the Ministry of Works and Supply (MWS) is responsible for constructing, operating and maintaining trunk and main roads and about 60 percent of district roads. The Roads Department operates through the various Provincial Road Engineers in all the country's nine provinces. Rural roads are the responsibility of the Ministry of Local Government and Housing (MLGH) through over 70 district councils. The district councils develop and maintain rural roads in their jurisdiction. Communities are expected to carry out maintenance of community road infrastructure with technical support from the district and provincial road engineers but road maintenance is a perennial problem (Bryceson, Bradbury and Bradbury, 2006).

Ethiopia's road network consists of a classified road network of approx 33,300 km of which only 12 percent is paved. The condition of existing roads has been generally neglected. It is estimated that 50 percent of the paved and gravel roads are presently in poor condition. As a result of investment made under Road Sector Development Program, the share of roads (federal and regional) in good condition has improved from 14 percent in 1995 to 32 percent in 2003. The road density was 30 km per 1000 km² in 2003, representing an improvement since 1994 when it was 21 km per 1000 km². It is still well below the average of 50 km per 1000 km² for Africa. About 65 percent of rural households are more than half day's walk from an all weather road (Bryceson, Bradbury & Bradbury, 2006).

The implications of this lack of maintenance are severe in several studies conducted across the globe (International Transport Forum, 2012; Kabugu, 2013; Heggie, 1994). In the first place it means that the enormous investments in capital

assets that a country has placed in its rural road network are sometimes deteriorating faster than roads are being rehabilitated. In the Philippines for example it is estimated that the annual loss in national capital assets is twice the budget that is required to maintain these assets. Second, rural roads play an important role in supporting the livelihood of the population in the rural areas. If they are not maintained then the number of people who benefit reduces rapidly over time and the economic and social benefits of proper access are lost.

In India, Aggarwal and Singh (2010) indicates that the huge rural road network in the country not only increases the agricultural production and the size of markets, but also provides better prices for agriculture produce, reduction in transport costs and the creation of off-farm employment opportunities to the rural population in India. It also provides access to medical and educational facilities in rural areas (Sahoo, *et. al.*, 2010). However, these benefits would reduce substantially due to poor maintenance of these rural roads. Thus, in order to reap the benefits of created assets it is essential to maintain this rural road network. In Bangladesh, maintenance of the rural roads is a prerequisite, *inter alia*, to protect investment made and to maximize return on investment. The main problem of rural road maintenance is not technical but financial and management (Ahmed, 1997).

Sub-Saharan Africa has approximately 700,000 kilometres of rural roads, with half of them in poor condition. Road densities per 1000 km² are generally much lower than those of Asia or Latin America. Low population densities, low levels of income and weak road planning and maintenance capabilities combine to make Sub-Saharan Africa altogether under-equipped and overburdened in terms of rural road infrastructure. Total needs for rehabilitation of existing roads and for expansion of rural road networks are enormous and have generally not been recognized by planners

and policy-makers (World Bank, 2010). However, many of the poor communities are isolated by distance, bad road conditions, lack of or broken bridges and inadequate transport. These conditions make it difficult for people to get their goods to market and themselves to place of work, to handle health emergencies, to send children to school, and to obtain public services (Narayan *et al.*, 2000).

In Nigeria, the issue of rural transportation development has continued to be of national importance. For instance, most of the rural roads are in poor condition, and this has imposed significant cost on the national economy especially to the agricultural activities due to increased vehicle operating costs and travel times (Akintola, 2007). The Federal Government of Nigeria (FGN) has embarked on various programmes at one time or the other to ensure the provision of adequate transport facilities to meet the needs of the rural population but these programmes have not been able to achieve hundred percent successes.

The importance of transport facilities in rural areas can be justified from both social and economic perspectives. Socially, a significant proportion of Nigeria population lives in the rural areas and demands various forms of transport to facilitate socio-political interactions. Secondly, the rural areas are indispensable in the supply of food, raw materials to urban centres and the country's economic growth as a whole. In light of the above, it becomes expedient to examine rural transportation problems, so that the extent of the problems can be known, and possible solution can be proffered to achieve sustainable rural economic development.

The transport sector in Kenya contributes about 6% of the gross domestic product (Kabugu, 2013). It also provides the necessary linkages for promoting national and international trade, economic growth, poverty reduction and wealth creation. 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. The road networks had therefore become obstacles to economic recovery which most of these countries had embarked on (Kabugu, 2013).

1.2 Problem Statement

Majority of the population in Moiben constituency live in rural areas. However, Kenya Household Development Survey (KHDS, 2013) shows that poverty rate in the constituency stands at 66% of more than 20,000 households. Statistics from on the road network shows that only 25 kms of road network is paved and tarmacked while the rest are seasonal roads. With the introduction of county governments, donors support and constituency development fund, road infrastructure network needs to be a priority. Escalating poverty levels have however been recorded in the recent times. Despite studies proving that adequate, reliable and economic means of transport is a prerequisite for overall rural development and for access to different facilities to rural residents in order to carry out different activities.

In spite of an increased awareness of the impact of neglecting road maintenance, there is still a reluctance to prioritise maintenance. Pavement undergoes a process of deterioration directly after opening to traffic. This process under the effects of traffic and environmental conditions begins very slowly so that it may not be noticeable. Over time, the pavement deterioration has different mechanisms and faster rate of deterioration. The Kenya Rural Roads Authority (KeRRA) and other roads authorities have not been able to document the consequences of what will happen to the roads when there is lack of funds. Also the problem under the study is further compounded by the fact that major policy reforms in the road sector are unlikely to succeed without the active support of road users (respondents). The rural

populations are the ones who use the road network and also pay for it. Given that current allocations for road maintenance are erratic and well below the levels needed to keep the road network in a stable long-term condition, the first building block thus involves winning public support for more road funding. However, this seems not to be working in Moiben constituency despite calls by area residents

1.3 Purpose of the Study

The aim of this study was to examine the influence of road maintenance on economic development of rural areas, a case of Moiben Constituency.

1.4 Objectives of the study

The following were the objectives of the study

1. To establish how roads maintenance timing influences economic development of rural areas in Moiben Constituency.
2. To assess how road drainage structures maintenance influence economic development of rural areas in Moiben Constituency.
3. To assess how funding of roads maintenance influence economic development of rural areas in Moiben Constituency.
4. To establish how level of community involvement in road maintenance influences economic development of rural areas in Moiben Constituency.

1.5 Research Questions

The following were the research questions:

1. Does roads maintenance timing influence economic development in Moiben constituency?

2. How does road drainage structure maintenance influence economic development of rural areas in Moiben Constituency?
3. To what extent does funding of rural roads maintenance influence economic development of rural areas in Moiben Constituency?
4. To what extent does community involvement level in road maintenance influence economic development of rural areas in Moiben Constituency?

1.6 Significance of the Study

It was expected that the findings of the study were of significance to residents of Moiben Division, the Kenya Rural Roads Authority (KeRRA), Constituency Development Fund (CDF) and future researchers. The roads authorities were deemed to benefit from the study finding in the sense that if timely road maintenance is ensured, the huge investments made in construction of new roads or upgrading of roads to give them the desired level of service throughout its design life and beyond would decline. For the rural people of Moiben Constituency, maintenance of rural access roads may result in increased economic benefits all around. Since the maintenance is done to ensure that the road that has been constructed, or improved, is maintained in its original condition. For future researchers, it was expected that the study findings would form platform for future researchers in the field of roads maintenance and development.

1.7 Limitations to the study

The study used questionnaires, which though appropriate, had their own limitations. Some respondents were unable to complete answering the questions,

while others could have failed to give genuine responses. The researcher appealed to the respondents individually for their utmost cooperation.

The questionnaire was also deemed to have a likelihood of drawing different meaning to different respondents hence the study carried out a pilot study as well as ensuring validity and reliability of the instrument. Another constraint was poor roads and the limited time to carry out research. The researcher stuck to the time plan and deployed the services of research assistants.

1.8 Delimitations of the Study

The study was conducted in Moiben constituency area by involving officials from KeRRA and sampled residents from the area. The study relied on questionnaire and interviews as sources of data. The study was conducted in Moiben, Uasin Gishu County and therefore the results of the study reflect the actual situation in that area.

1.9 Assumptions of the Study

The study methodology was carefully designed to maximize the use of both qualitative and quantitative information available for a retrospective impact evaluation of this nature. The study assumed that there road maintenance influences economic development. It further assumed that respondents would be cooperative and able to give honest responses to the questions in the research tools. The study assumed that all the sampled respondents had a common understanding on the issues in the tools of data collection. It was also assumed that the respondents were acquainted to road maintenance.

1.10 Definitions of Significant Terms

Funding: Refers to the provision of financial resources for development and maintenance of road infrastructure.

Gravelling: The loading, hauling, unloading, stockpiling, spreading and compaction of the gravel on roads.

Maintenance: refers to all the technical and associated administrative functions intended to retain road network in, or restore it to, a state in which it can perform its required function. In practice, it is common to carry out small upgrades of roads such as widening or shoulder sealing together with rehabilitations. Without maintenance, roads can quickly fall into disrepair leading to increased costs for road users in terms of; vehicle maintenance, travel time, reliability and safety. If deterioration goes too far, users will be reluctant to use the road with attendant losses of the economic and social benefits the road confers.

Pavement: Refers to hard smooth surface, especially of a public area or thoroughfare that will bear travel

Re-construction : The restoration of impassable road into good road. The activities involved include site preparation, earthworks, reshaping, installation of culverts and gravelling.

Rehabilitation: refers to both road re-construction and routine maintenance.

Reshaping: Blading with or without scarification to restore the camber as well as re-excavation of side ditches.

Road management: Is to provide for an overall coordinated framework that promotes safe and efficient public road networks and the responsible use of

road reserves for other legitimate purposes, such as the provision of utility and public transport services.

Routine maintenance (gravel road): Consists of the activities that are required continually to keep the road in good condition. The activities include grass cutting, grading and compaction.

Rural roads: they are rural roads that forms part of the public road network that directly serves the rural areas in Moiben Constituency.

Site preparation: The clearing of vegetation and removal of boulders and top soil.

1.11 Organization of the study

This project report is organised into five chapters. Chapter one consists of the background of the study, statement of the problem , purpose of the study, research objectives, research questions, significance of the study, delimitations of the study, limitations of the study, and basic assumptions of the study. Chapter two covers literature review which is divided into various topics in accordance with the objectives. The theoretical and conceptual framework is provided at the end of the chapter linking the independent and the dependent variables of the study. Chapter three constitutes the research methodology which is divided into eleven subthemes: research design, study area, target population, sample size and sampling technique, research instruments, data collection procedure, validity of instruments, reliability of instruments, data analysis procedure and ethical considerations. Chapter four constitutes of data analysis, presentation, interpretation and discussions. The sections are organized as per the objectives of the study. Finally chapter five constitutes the discussion, conclusions drawn, recommendations and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents and discusses a review of some of the literature related to the study. The information presented in this chapter follows the research objectives which are the main themes of this study, together with theoretical framework, conceptual framework and summary of the literature review.

2.2 Roads Maintenance Timing and Economic Development of Rural Areas

Routine maintenance is a recurrent activity. Careful timing of work inputs forms an important part of an efficient maintenance programme. The prime objective when scheduling maintenance works is to ensure that the works are carried out as preventive measures, at an early stage when the road deterioration and damage are still limited. The works are therefore scheduled at strategic intervals when it is expected that the need for action is essential. For this reason, the timing of regular, or routine maintenance works are often related to the time of the year when rainfalls occur (ILO, 2007).

Maintenance is an essential follow-up action after road infrastructure improvement investment (World Bank, 2010). A well-planned road infrastructure maintenance programme is necessary to: (i) provide comfort, convenience and safety to public; (ii) protect investment in roads. For example, in Africa nearly third of the \$150 billion invested in roads has been eroded due to lack of maintenance (4ie, 1995) (iii) minimize further investment in the roads deteriorated due to lack of maintenance. For example, in Africa at least US\$ 1.5 billion per year will be required for next ten

years to restore those roads which are economically justified for rehabilitation and to protect further deterioration due to lack of maintenance (Heggie, 1994).

Timing of maintenance action is important since it must be carried out at the time of maximum return. Otherwise, the maintenance needs will be higher if the pavement is allowed to experience further deterioration. The pavement starts to deteriorate after opening to traffic. The deterioration starts at a low rate and with time this rate increases. Some studies showed that the highway network deteriorates to an extent that 60% of roads will reach the stage of functional failure in 20 year unless maintenance management systems are implemented. This situation will result in enormous increase in maintenance and reconstruction budget (World Bank, 1987). Many studies showed that the maintenance cost of a road which is in a very poor condition is four to five times the cost of the road if pavement is maintained while it is in a good condition (Haas *et al.* 1994). Therefore, the implementation of an effective maintenance system will reduce maintenance costs. Preventive maintenance actions taken earlier have a very important role in keeping the pavement in a good condition for longer time, and in reducing the overall costs significantly.

Due to lack of “planned maintenance” initiative, rate of deterioration of road network in developing countries is faster than the rate of construction (Edmonds, 1989). Edmonds (1989) also confirmed that the funds allocated for maintenance are actually spent on improvement and emergency works rather than on routine maintenance. Hence, the Public Works Departments are caught in a vicious cycle.

Rural roads are very vital to the socioeconomic and political development of rural communities in Nigeria (Ipingbemi, 2008). These roads provide access to schools, clinics, farms, markets, neighbouring rural communities among others (ORN, 2003). They also link rural areas to the higher order road network. Thus it is important

that they remain open to traffic throughout the year. However, in practical terms these roads are seasonal, particularly during the wet season. The seasonality of roads is due mainly to deterioration occasioned by inadequate maintenance (Ipingbemi, 2008). Continuous rural road deterioration due to poor maintenance has tremendous negative impact on the utility of these roads for enhanced rural development. Poor roads usually have undesirable effects not only on agricultural production but also on the entire socio-economic development of the rural areas since the rural economy depends largely on the former (Ipingbemi, 2008).

In Iran, rural roads need to be maintained at a minimum level of acceptable serviceability. Lack of adequate and timely maintenance is bound to accelerate the process of deterioration of the roads, which in turn results in loss of time, agriculture output, access, and eventually the asset itself. Further rehabilitation cost is high with increase in the vehicle operating costs. In case of loss of asset there may be isolation. Regular maintenance of rural roads is a critical pre-condition for sustaining the positive impacts that roads bring to rural communities. Routine minor maintenance is often neglected not only because of lack of funds, but also because there is little political capital, or mileage in maintaining roads regularly as the outcome is not highly visible. Instead, politicians prefer to authorize major rehabilitation or reconstruction after the road has deteriorated considerably. Though this is a universal phenomenon, it is time this issue of sustainable rural roads maintenance is taken seriously (Rafipoor, 2000 & 2002).

Road maintenance means preserving and keeping road structures as near as possible in its original state. It consists of correcting deficiencies that have developed as a result of age or use, and taking steps to prevent the development of other deficiencies (World Bank, 1988). It comprises of the activities to keep pavement,

shoulders, slopes, drainage facilities and all the structure and property within the road margins in good condition (PIARC, 2013). Road maintenance is vital in order to prolong the life span of roads. A well-maintained road reduces cost of operating vehicles by providing good running surface. Proper maintenance keeps the roads open and ensures greater regularity, punctuality and safety of transport services (Ipingbemi, 2008).

Effective road maintenance is the most important prerequisite for safeguarding the investment and ensuring that the road serves its purpose over the anticipated lifetime. It must be noted that a road should not be constructed if maintenance cannot be afforded and managed, especially in Nigeria where rural roads require continuous maintenance throughout the year especially during the raining season (Ipingbemi, 2008).

Road maintenance could be classified into routine, recurrent, periodic as well as emergency (World Bank, 1988; Lebo and Schelling, 2001; CBN, 2002). Routine maintenance comprises of small scale works conducted regularly aimed at ensuring the passability and safety of existing roads in the short-run and to prevent premature deterioration of the roads (PIARC, 1994). Frequency of activities varies but it is generally once or more a week or month. Typical activities include drainage clearing, carriageway repair, clearing of silted ditches, bridges and culverts maintenance, grass cutting and potholes repair among others (Ipingbemi, 2008). Recurrent maintenance on the other hand is required at intervals during the year depending on the topographic and climatic characteristics of the area as well as the volume of traffic. It involves the maintenance of pavements, filling of potholes and grading for unpaved roads (Ipingbemi, 2008).

The periodic maintenance covers activities on the section of the road at regular and relatively long intervals, with the aim of preserving the structural integrity of the road (Burningham and Stankevich, 2005). These operations tend to be large scale, requiring specialized equipment and skilled personnel. They cost more than routine maintenance works and require specific identification and planning for implementation and even design. Lastly, emergency repair takes place when road is abruptly cut or bridge washout which could be due to seismic activities (Ipingbemi, 2008).

2.3 Roads Drainage structures Maintenance and Economic Development of Rural Areas

Among the three types of maintenance, obviously the emergency maintenance is the most important as it relates directly to keeping the roads open to traffic. In terms of non-emergency related works, experience clearly show that it is the regular or routine maintenance activities related to preserving the drainage system which have the most significant effect in terms of extending the lifetime of a road. These works do not involve any sophisticated technology or skills. They can be carried out using manual labour and simple hand tools and are inexpensive. Despite this, they still require a sound management organisation to ensure that works are carried out at the right place and time (Vägverket, 2008).

Two types of drainage systems, surface and sub-surface, are commonly used to conduct water away from the area surrounding the road and to evacuate extra water from the road structure. The design of road drainage systems varies with factors such as road importance and age, traffic load and rural/urban area (Faísca et al., 2009). A surface drainage system (ditch) collects and diverts storm-water from the road surface

and surrounding areas to avoid flooding. It also prevents damage to sub-surface drains, water supplies (wells) and other sensitive areas adjacent to roads. It decreases the possibility of water infiltration into the road and retains the road bearing capability (Fáisca et al., 2009). Open ditches are the most common form of drainage ditches in Sweden. Subsurface drainage systems drain water that has infiltrated through the pavement and the inner slope, but also groundwater. Subsurface drainage systems usually comprise culverts and have a direct linkage to surface drainage systems (Dawson, 2009). The usual design is a tube form. According to Vägverket (2008) culverts are road constructions with a theoretical span of ≤ 2.0 m. When exceeding the theoretical span of 2.0 m, the structures are referred to as pipe bridges.

One of the key elements of rural gravel and earth road construction and maintenance is the provision of sufficient drainage surface and side drainage (by camber or cross-slopes, and side ditches), and stream and river crossings (i.e., culverts, causeways or also known as drifts or fords, and bridges) (Riverson, et al., 2001) Many rural roads and tracks whose surfaces consist of local materials, either naturally occurring on the road or imported from nearby sources, are quite adequate structurally when traffic is light weight and low volume, and the wearing course surface is well drained and has sun exposure. However, poor drainage is responsible for most of the structural deficiencies of these roads because the wearing courses become waterlogged and soften, or because unrestrained or uncontrolled water flows cause erosion or scouring (ORN, 2003).

Unpaved road surfaces must be sloped (with camber of up to 5%) to remove standing water and to prevent softening and surface slipperiness after rains (Dawson, 2009). Unfortunately, this is often compromised with during construction, or neglected in maintenance. Side drains over 2-3% gradient usually need frequent scour

checks and turn outs (miter drains), and must sometimes be provided with cross-drainage pipes to ensure good lateral drainage (Riverson *et al.*, 2001). Both machine and hand labor methods have been successfully used to construct good drains for rural roads. Their continued good performance depends on the consistency in maintaining the original camber specifications, and to keep the drains clear of debris. Drainage structures have usually been an integral part of rural roads design and construction, and much has already been written on this topic. Therefore, detailed design and construction aspects are not covered in the present paper. Given the importance of good drainage for adequate performance of rural gravel and earth roads it is essential that drainage specifications are clearly defined and disseminated.

Concrete and corrugated metal pipes are most commonly used for cross-drainage structures in many countries. Pre-cast concrete pipes are usually made locally, but supply of cement sometimes poses problems; corrugated metal pipes require foreign exchange. The extensive needs and cost become a major constraint in many countries resulting in a continued search for low-cost solutions. Drifts are the simplest cross-drainage often used providing inexpensive protection for the pavement, while allowing water in normally dry stream crossings to flow over the road surface during heavy rains. In addition, low-cost stream crossings have been provided by constructing timber logs, with or without wooden decks, to bridge streams and provide basic access. Simple bridge designs use masonry abutments with wooden decks as in the case of DRIMP in Malawi. It is reported that experiments with wooden bridge designs are ongoing in Nigeria by DFRRRI and in Ghana by the Building and Road Research Institute (PIARC, 2013).

Under resource constraints, as well as to secure essential access in many areas, some projects have assisted local communities by constructing simple bridges and

culverts. The communities then provide labor for the construction or rehabilitation of the access road to the bridges. A good example of this is the Village Access Roads and Bridge Improvement Assistance Unit (VARBAU) in Malawi which provided assistance for the improvement of access roads to villages otherwise not covered under DRIMP. To effectively provide improved rural road access, each country needs to prepare and implement specifications for low-cost river crossings and drainage structures. Necessary engineering expertise and technical supervision as well as funding will in many instances have to be provided centrally (Riverson et al, 2001).

2.4 Funding of Roads Maintenance and Economic Development in Rural Areas

Maintenance funding is a major problem in the road sector. There are several reasons for this. The result is that major parts of the road networks of the countries in the region receive little or no maintenance from one year to the next. The further down the network one goes, the lower the amount of funds that are available (ILO, 2007). One IPFRI study by Fan and Chan-Kang (2004), finds that low quality (mostly rural) roads have benefit/cost ratios for national GDP in China that are about four times larger than the benefit/cost ratios for high quality roads.

Mobilizing the resources necessary to finance road maintenance is of paramount interest in most developing countries. As with finance questions in general, this topic can be considered from both a conceptual or theoretical view and from the standpoint of what has worked or might work in a developing country (World Bank, 2010). In Bangladesh, donors' role in rural infrastructure maintenance financing is not substantial as it has been visualized by the donors that after the completion of project maintenance are government's responsibility. Donors' role is

limited to the maintenance of project rural feeder roads within the project period (Ahmed, 1997).

Overseas Development Institute (2011) laments that despite the large amounts spent on rural roads; there is remarkably little formal evidence on their benefits to households or to enterprises. What has been lacking is a general methodology, using micro-data, to estimate these gains. It has been argued that RTI (Rural Transport Infrastructure) and provision of RTI services – including rural feeder roads – could be considered pre-requisites for growth and the achievement of the Millennium Development Goals (MDGs). Improving access to markets, for example, can lower agricultural input prices and increase production (MDG1). Improving RTI and services can help children get to school (MDG2).

In India, Aggarwal and Singh (2010) comments that there is a continuous decline in the resource provisions for maintenance of rural roads in India. Sufficient funds are not available for regular maintenance of roads. Hence, timely maintenance is not being carried out. Absence of timely maintenance results in severe damages. Restoration works are very expensive and time consuming.

An ILO (2006) study in Madhya Pradesh also illustrated the ambiguity caused by a lack of foresight in devolving road maintenance responsibilities (ILO, 2006). The study pointed out that the spread of responsibilities for rural road maintenance within the various levels of government has lead to a situation where no one agency feels responsible for sustaining the rural road network. The study showed that very little road maintenance has been possible due to lack of funds and a lack of proper policy and institutional framework. However, weaknesses in the implementation capacity coupled with the lack of clarity of the institutional responsibilities are hidden as the emphasis has been placed on the inadequacy of funds. While the need for adequate

funds is evident it is the more critical institutional issues which require attention (ADB, 2006).

There have been considerable improvements in the financing of rural feeder roads maintenance in Bangladesh since early 90s. An analysis shows that current resource requirement for maintenance is closely matched with the resources available Bangladesh in the past has not paid attention to planned rural road maintenance, achievements in the context of rural feeder road maintenance financing in recent times are laudable. More efforts is still needed to achieve sustainable solution to rural road maintenance financing of present stocks and planned improved stocks of rural road infrastructure (Ahmed, 1997).

Roads funds have been set up in several African countries in order to ensure stable flow of fund for operation and maintenance of road infrastructure (de Richecour & Heggie, 1995). Some of them were set up also to finance transport studies, road safety programmes, road rehabilitation and new investment. The first Road Fund in Africa was set up in South Africa in 1935 and the remainder were established in the 80s and 90s (de Richecour & Heggie, 1995). Road Fund derives its revenues from road users' charges - mainly fuel levy, bridge and ferry tolls and an earmarked portion of other taxes and charges. The Road Funds are special account held either at a Central Bank or a commercial bank.

Figures for overall fund allocation and expenditure on road maintenance are notoriously difficult to come by. Maintenance is often not classified as a separate item in the budget or it is listed under the capital investment budget rather than the recurrent budget; budgets for maintenance are often used for improvement; funds may be earmarked for projects which in fact are periodic maintenance activities; different agencies are responsible for different classes of roads; often recurrent budgets do not

differentiate between road maintenance and other recurrent activities. Allocations, particularly at the local level, are more difficult to identify (ILO, 2007).

Road maintenance allocations, being part of the recurrent budget, are easily commandeered for other more pressing activities. Even where there is a budget for rural road maintenance often little is spent on maintenance activities as such. The roads are in such a parlous state that the money is spent to keep some key links open. Thus the budget that exists for maintenance is often spent on what can be described as repairs, reconstruction and emergency works (ILO, 2007).

2.5 Level of Community Involvement and Development of Rural Areas

The communities may be defined differently according to the project demands. In this context rural roads and transport planning, the community can be identified as legal or administrative community, social community and geographical community (DFID, 2003). Rural accessibility has direct impact on reduction of poverty; therefore the sustainability of rural road network would obviously have direct impact on sustainability of enhanced socio-economic conditions of the community. And therefore, the relation of poverty with the sustainability of the rural road network should trigger immense interests of the communities leading to active participation and involvement, provided the communities are adequately sensitised to the above facts (PIARC, 2013).

Participation of community refers to its active involvement in an activity through taking part or sharing it. A rural road network is such a basic community asset which has tremendous bearing on socio-economic development of rural communities, therefore; involvement of communities is critical in projects or works aimed at providing rural accessibility. In a highly technical sector, the scope for a

local community to be involved in the design process may be much less than in a social sector project that uses a simple technology. Participation does not imply communities will make the final decisions on projects. In some cases, they may offer consultative inputs. On other occasions, they may share in decision making (PIARC, 2013).

Local communities can contribute in the assessment of transportation needs, they may provide inputs for design, they may contribute through labour inputs or cost sharing for road building, the community can play a vital role in monitoring the quality and the project implementation. The community may immensely contribute in maintenance on a continuing basis (PIARC, 2013). The roles identified above represent a mix of partnership and watchdog functions. Though the mix of roles that local communities can play in the road sector might vary from one context to another, there are some generalisations that can be useful. First, in all road projects, an early assessment should be undertaken of appropriateness and feasibility of community participation. Second, participation will be easier to organise when potential users are easily identified and brought on board. The roles of community may seem simple enough, but getting the work organised with efficiency and integrity will call for competent organisation and leaders.

The mechanistic or standardised approaches to community participation are unlikely to work. The areas including their various combinations, pertaining to (a) planning the rural accessibility, in rural accessibility planning and selection alignment for individual roads or tracks; (b) community contribution in terms of funding of construction or maintenance or providing labour support or material support and in terms of community contracting; (c) community in watchdog role in construction supervision or quality control as a stakeholder and (d) community involvement in

maintenance management planning and implementation, may be considered for community participation in rural road projects.

Group homogeneity, importance and type of access, administrative strength, infrastructure history and capacity to conduct the activity are the significant factors that determine the likely success of community participation in roads. These factors are important in predisposing or sensitising communities to participate in the field of rural roads or local transport infrastructure. These factors form an important backdrop to project planning which seeks to actively engage communities in road maintenance with a view to establishing long-term sustainable systems.

Bangladesh in the past has not paid attention to planned road maintenance (Local Government Engineering Department, 1995a). Lack of maintenance initiative was mainly due to poor maintenance culture coupled with unsound macro economic situation. Kingombe (2011) focuses on Zambia's experience to fill the gap in the literature on how labour-based-RTI investments in the medium to long term affect rural growth, poverty reduction, equity and trade. The analysis is based on a series of five micro-level studies of the ILO-executed Eastern Province Feeder Road Project (EPFRP) implemented in Zambia from 1996 to 2001. The success of the EPFRP has been substantial and it has had much influence on the design of other labour-based projects being implemented within and beyond Zambia. It relies on the analysis of data from, respectively, the post-harvest survey, rural household survey, community survey and transport survey. Each of the four core chapters in Kingombe (2011) present a different framework used to estimate the impact of rural road development, because reliance on any one technique is unlikely to be appropriate.

Kingombe (2011) suggests a non-robust linkage between household consumption growth and feeder road improvements in rural areas in Zambia's Eastern

Province. He also finds that the squared poverty gap for most districts in the Province was not reduced, which suggests that the changes experienced have not been relatively pro-poor. While inequality was higher in the pre-treatment region in 1998 compared to the control region, this is no longer the case in 2004 after the EPFRP treatment had occurred.

On the other hand, through a more qualitative analysis using focus group interviews within communities, Kingombe (2011) finds that only 42% of the communities covered by his own primary survey had seen their quality of life go up because of the impacts associated with the EPFRP. However, in 63% of the reporting communities the life quality situation was considered better than before the start of the EPFRP. Amongst these communities, 45% considered that the major determinant was directly associated with feeder road rehabilitation. His regression results lend support to the qualitative findings, which leads him to conclude that the EPFRP treatment has an impact on poverty, which seems to have been sustained in the medium term after the completion of the project due to maintenance of the feeder roads.

In Laos UNDP (1999) found out that communities can successfully participate in the development of their rural infrastructure if the opportunity is given to them. In Latin America, van Dissel (2010) experience of micro enterprises originating from the local community and its involvement in the maintenance or rural roads has proven to be an economically and technically viable option for the conservation of road by national and sub national governments in the Latin American region, resulting in improved road conditions, a longer life span for both the paved and unpaved networks, and lower overall maintenance cost. Additionally, the approach has demonstrated to have an important positive influence on local economies and local

capacity building, resulting in the generation of incomes and employment for communities along the roads concerned.

Ranjit (2010) did an evaluation of the project after two years of its completion and found out that many social and economic changes in the villages. One of the major aspects was the senses of ownership of the road by the communities. They have gained many economic benefits such as better prices for their products as a result of reducing the transport costs and influx of transport services and traders in to their villages. The land value has increased significantly and many opportunities have been made open. However, as a result of the impacts, the trained educated youth had left the village for either higher studies or high income employment outside the village. Anyhow, they have not forgotten to continue their support as and when required in the road maintenance work.

2.6 Theoretical framework

The theoretical framework for the study will be underpinned by conventional theory of Pavement Deterioration as postulated by Van Rijn (2006). Van Rijn assumes that the need for periodic maintenance depends on the conventional theory of Pavement Deterioration, manifested by fatigue at the underside of the pavement or structural deformation, and assumes that deflection increases with time and traffic as the pavement deteriorates from traffic induced stresses.

Ifeoma (2010) explains that no road is constructed to last forever, just like every other thing created by man. Roads get damaged with usage over time. In rural areas where majority of roads are seasonal, changes in weather conditions over time, floods, usage and other factors have some damaging effect on roads right from the moment they are built. However, effect of these factors to a large extent depends on

the quality of the material used for building specific roads, how well they were constructed and the frequency of usage.

Earth roads generally get damaged faster than their paved or tarred counterparts. The types and loading of vehicles that would use a road and the volume of traffic have to be put into consideration when constructing it in addition to the nature of the soil on which it is to be built. Otherwise, the road would get damaged quickly and fail to give the desired service. Every road needs to be maintained in order to repair the damages occurring to it with time and usage.

2.7 Conceptual Framework

The conceptual framework for this study shows the link between the predictor variables (roads maintenance) on the dependent variable (rural development) as illustrated in Figure 1.1.

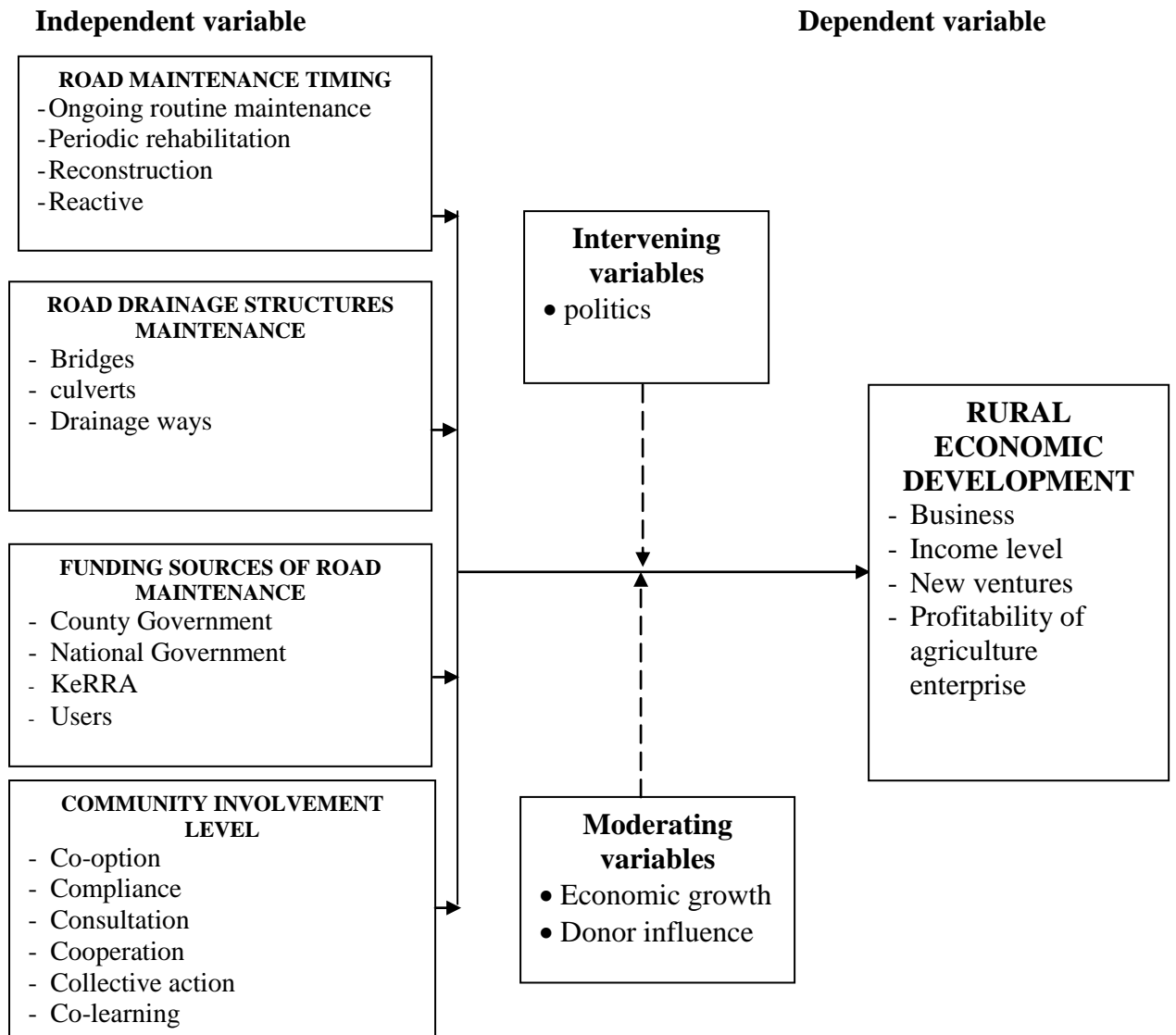


Figure 2.1 Conceptual framework

The independent variables for the study are the road maintenance practices which are denoted through determination of road maintenance timing, road drainage structures maintenance, funding sources of road maintenance and community involvement level in road maintenance. The dependent variable involves determining the rural economic development activities that have come up or improved as a result of development and maintenance of road infrastructure network.

2.8 Summary of Literature

There is little doubt that rural roads are vital to agro-based industry and rural development, to create jobs, and to make the country's growth more broad based according to the studies reviewed. However, studies shows that road maintenance has been given low priorities in developing countries despite the use of IFRT and SSATP by various organisations and funding agencies across the world. However, studies reviewed seem to focus more on the construction and development of new road network rather than the maintenance and repair of the existing ones. Therefore, this study determined the influence of roads maintenance on development of rural areas in Moiben Constituency, Uasin Gishu County, Kenya.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents the methodology and procedures that were adopted while carrying out the study. This chapter presents; research design, study area, target population, sample size and sampling techniques, data collection instruments, data collection procedures and data analysis and presentation. Each of the sub-headings mentioned above is separately explained below.

3.2 Research Design

This study adopted descriptive research design. Descriptive research is conducted for studies that aim at documenting existing conditions about a specific topic or area (Trochim, 2005). According to this author, the research conducted gives a vivid description of exactly what is happening in a chosen area and eliminates any strings of subjectivity from the researcher. With this research method, research tools such as observations and data studies are used to achieve this goal (Trochim, 2005). Using the exploratory research strategy involves identifying relations between two or more variables and how they impact each other (Trochim, 2005). The current study was out to relate the road maintenance and rural areas development.

3.3 Target Population

Target population is a complete set of individuals, cases or objects with some common observable characteristics (Mugenda and Mugenda, 2003). The study mainly targeted residents of Moiben Constituency in their respective wards. The residents were mainly adults drawn from this constituency. The study targeted 48,409

respondents from the five wards in Moiben Constituency. It also included four KeRRA staff who were interviewed.

Table 3.1 Target Population

Wards	Target Population
Tembelio	19,742
Sergoit	8,344
Karuna/Meibeki	8,266
Moiben	7,129
Kimumu	4,928
Total	48,409

Source: Kenya National Bureau of Statistics.

3.4 Sample size and Sampling Technique

3.4.1 Sample Size

The study used Krejcie and Morgan sample size calculator to get the ideal sample size. The sample size was found to be 380 respondents. The distribution of the respondents was as shown in the table 3.2.

Table 3.2 Sample size

Ward	Sample size
Tembelio	155
Sergoit	66
Karuna/Meibeki	64
Moiben	56
Kimumu	39
Total	380

Source: Study 2014

3.4.2 Sampling Technique

The household were selected by simple random sampling method. The sampling technique that was used to select the KeRRA staff was purposive sampling strategy (Trochim, 2005). Purposive sampling strategy was deemed as ideal because respondents were selected based on their knowledge in the area of study.

3.5 Data collection Instruments

3.5.1 Pilot Study

To get validity of the research instruments, the researcher piloted the instruments by distributing twenty (20) questionnaires to respondents in Turbo, which is not part of the areas sampled. The results of the piloted questionnaires enabled the researcher to determine the consistency of responses which were made by respondents and adjust the items accordingly by revising the document.

3.5.2 Validity

The research purposed to ensure validity of research instruments by using simple language free from jargon which made it easily understood by the respondents. Validity is the extent to which research instruments measure what they are intended to measure (Creswell, 2011). Orodho (2004) alludes that validity is the degree to which result obtained from a study actually represents the phenomena under study. It ensures that research instruments are relevant to the objective of the study. Validity of research instrument was determined through piloting as well consulting and discussing with the supervisor. Piloting helped to test the feasibility of research instrument and to perfect the questionnaire concepts and wording. The results from piloting were used to improve on the instruments.

3.5.3 Reliability

The researcher ensured that the instruments designed are of high quality. In order to achieve this, the instrument was tested and re-tested in Turbo consistency. The reliability of data collection instruments was determined from the pilot study where the researcher administered the research instruments in Turbo constituency. The study administered questionnaires to the same respondents twice. The Cronbach's Alpha indicates the extent to which a given group of test items can be treated as a measure of a single latent variable (Cronbach, 2001). In the event that Cronbach's alpha for the tool is found to be greater than 0.7; it is considered acceptable. Cronbach's coefficient Alpha of 0.72 was found hence taken to be above the cut off value for being acceptable which enhanced the identification of the dispensable variables and deleted variables.

3.6. Data Collection Procedure

The study used both secondary and primary data. The secondary data was obtained from the records while the primary data was obtained from the respondents. After seeking the consent of the University of Nairobi and the supervisors, the researcher sought the consent of respective ministries as well as obtained a permit from the National Commission for Science, Technology and Innovation. In collecting data, the researcher visited the respondents within a span of two weeks to allow time for the respondents to fill in the questionnaires. Also, the researcher explained the purpose of the visit to the respondents. This assured the respondents of their confidentiality of any information they gave.

3.7 Data Analysis Procedure

Data was analyzed both quantitatively and qualitatively. The data from the tools was coded and entered into Statistical Package for Social Sciences (IBM SPSS Version 17.0). This computer aided software for research assisted the researcher to present the data. Open-ended questions were analyzed through reporting emerging themes. The data was analyzed and presented in frequency tables and graphs to present the findings of the study. The themes emerging from secondary data were identified to augment the primary data.

3.8 Ethical Considerations

The ethical issues that were given special attention in the process of data collection by the researcher as pointed out by Mugenda (2008) included privacy and confidentiality, voluntary and informed consent, anonymity and honesty. As result, the researcher exercised extra caution to ensure that parties involved were treated with respect and care. This involved employing professionalism, legal and ethical consideration. In this study, the researcher concealed the identity of the respondent, kept confidential data private, and respected respondents' views and beliefs.

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND
DISCUSSION

4.1 Introduction

This chapter presents an analysis, interpretation and discussion of the results from the study using tables comprising of cross tabulations and tables. In coding of the data, different responses on every variable were assigned numbers and data entered by the numbers directly into SPSS. Data cleaning was thereafter done to avoid responses that are outside the allowable range. The results indicated the level of agreement and significance of each structured question. The findings were also discussed to give better reflections on the proposed study.

4.1.1 Response Rate

There was a very good response rate; out of the 380 respondents to whom the questionnaires were administered 372 were returned well filled.

4.2 General Characteristics of Respondent from Moiben Constituency

The study sought to find out the general characteristics of respondents based on their gender profile, age category and main economic activity they engaged in. the results are presented in Table 4.1.

Table 4.1 Characteristics of respondents

Characteristics		Frequency	Percent (%)
Gender	Male	204	54.8
	Female	168	45.2
Total		372	100.0
Age	Below 20 years	28	7.5
	20-30	166	44.6
	31-50	147	39.5
	Above 50 years	31	8.3
Total		372	100.0
Economic activity	Farming	166	44.6
	Business	150	40.3
	Employed	53	14.2
	Any other	3	.8
Total		372	100.0

Source: Study 2014

From Table 4.1 it is evident that about 54.8% of the respondents were male while the female respondents represented 45.2%. The majority of the respondents, who accounted for about 45%, were in the age bracket of 20 to 30 years. Only 8% were below 20 years. Those between the age of 31 and 50 years accounted for 40% while those above 50 years were 8%. The results also showed that 45% of the respondents engage in farming. Those in business were 40% while those employed were only 14% of the respondents. Only 0.8% of the respondents had engaged in other economic activities. The background information of the respondents was sufficient in carrying out the study.

4.3 Roads Maintenance Timing and Economic Development of Rural Areas

Objective one sought to establish the influence of road maintenance timing on rural areas economic development and the results were as follows. First, the

respondents were asked whether irregular rehabilitation of roads had led to increased cost of transport in Moiben. The findings of the analysis are illustrated in Table 4.2.

Table 4.2 Nature of repairs and cost of transport

	Response	Frequency	Percent
Lack of periodic rehabilitation of roads has led to increased cost of transport in Moiben	Yes	248	66.7
	No	124	33.3
Total		372	100.0

Source: Study 2014

From Table 4.2, it was evident that majority of the respondents 248 (66.7%), agreed that lack of periodic rehabilitation of roads has led to increased cost of transport. Only 33% of the respondents held a contrary opinion.

Furthermore, the study wanted to find out the frequency at which road repairs were made by several authorities in Moiben constituency. Their responses are given in Table 4.3.

Table 4.3 Frequency of road repairs

	Frequency of Road Repairs	Frequency	Percent
How often are roads maintained and repaired in your area?	Always	23	6.2
	Occasionally	89	23.9
	Sometimes	137	36.8
	Rarely	97	26.1
	Never	26	7.0
Total		372	100.0

Source: Study 2014

Table 4.3 above indicates that the roads are sometimes repaired as supported by 37% of the respondents. About 6% were for the idea that the roads were always

maintained. This implies that roads are rarely maintained in this region as also evidenced in Table 4.2 responses.

The study also wanted to find out the length of time taken by different contractors in repair and maintenance of roads in Moiben constituency. The results of the analysis are presented in Table 4.4.

Table 4.4 Length of time taken

		Frequency	Percent
Length of time	Less than 1 month	117	31.5
taken to complete	1-3 month	99	26.6
Road Repairs and	4 months	29	7.8
maintenance	More than 4 months	127	34.1
Total		372	100.0

Source: Study 2014

From Table 4.5 above on completion of road repair and maintenance indicates that, contractors spend much time on repair as supported by 34.1% of the respondents. On the other hand, 32% argue that the exercise lasts for only a month. This implies that there was no keenness to repair roads promptly. Other factors that could lead to delays and unpredictable time are the government delays in release of funds, cases of shortage of appropriate raw material, lack of capacity among road contractors or poor management of maintenance road processes.

The research also was interested in finding out whether prolonged repairs affected the growth of businesses through a Likert scale of five. The results of the analysis are presented in Table 4.5.

Table 4.5 Prolonged repairs and growth of businesses

		Frequency	Percent
Prolonged rehabilitation of roads has led to slow growth of the businesses	Strongly Agree	170	45.7
	Agree	146	39.3
	Undecided	9	2.4
	Strongly disagree	47	12.6
	Total	372	100.0

Source: Study 2014

It was evident that majority of the respondents (85%) agree that prolonged rehabilitation of roads has led to slow growth of the businesses and increased transport costs while only 12% were of a contrary opinion and 2% undecided. This implies that the poor timing of road maintenance is a costly affair to the residents of rural areas. The few that disagreed with this view could probably have been moved by other factors that lead to increased transportation cost that could range from taxation and security issues. In a different context regarding roads maintenance and poverty reduction, Kingombe (2011) suggested a non-robust linkage between household consumption growth and feeder road improvements in rural areas in Zambia's Eastern Province. Kingombe also found out that the squared poverty gap for most districts in the Province was not reduced, which suggests that the changes experienced in rural roads maintenance had not been relatively pro-poor. This shows that roads repairs have negative effect on economic development if road repairs are prolonged.

The study also sought to know respondents opinion regarding the time to which roads maintenance was mostly done. The results are given in Table 4.6.

Table 4.6 Seasons when maintenance is mostly done

	Frequency	Percent
Dry season	122	32.8
Rainy season	171	46.0
Periodically	76	20.4
Any other	3	0.8
Total	372	100.0

Source: Study 2014

The study indicates that most roads undergo maintenance during rainy season. About 33% of the respondents concurred that some road repairs were done during the dry season. There were more respondents who thought that the repairs were mostly done in the rainy season than those of dry season. This implies that the repairs are more inclined to the season when farmers experience much challenges in transporting their goods due to muddy roads. The activities being done were mostly grading and graveling without compaction indicating poor timing, since these activities are better done during dry season.

The study also wanted to identify if there existed a relationship between roads maintenance and farmers profits in agricultural production in Moiben Constituency. The results are presented in Table 4.7.

Table 4.7 Road maintenance timing and farming profits

		Frequency	Percent
Timing of road	Strongly agree	137	36.8
maintenance in	Agree	99	26.6
	Undecided	3	0.8
Moiben is more	Disagree	97	26.0
reactive to road	Strongly	36	9.8
distress thus lowering	Disagree		
profits in farming			
Total		372	100.0

Source: Study 2014

In Table 4.7 it was evident that road maintenance timing in Moiben was more reactive to road distress thus affecting the profitability in farming. This view was supported by 63% of the respondents. About 35% of the respondents however felt that the reactive manner of timing does not really affect the profitability in farming. Kwame (2011) in Ghana found out that poor timing resulted to cash flow problems which made it difficult for contractors to procure material and services; creation of enormous stress on contractors, leading to interruption of programme of works and likely suspension and resulting in disputes e.g. litigation/ arbitration. When such a case arises there is huge loss of expected benefits of the road.

The respondents were asked whether road maintenance timing influenced their income levels as given in Table 4.8.

Table 4.8 Road maintenance timing and income levels

		Frequency	Percent
Do you think road maintenance timing influences income levels?	Yes	251	67.5
	No	121	32.5
Total		372	100

Source: Study 2014

When asked whether they think road maintenance timing had influence on income levels, it was evident from table 4.8 that majority of the respondents accounting for 67% agreed. Only 32% were opposed to the opinion. This can be inferred to mean that timing is sensitive to the needs and want of the residents. In conclusion to this objective, the study sought to understand whether constituents were satisfied or dissatisfied with the timeliness of roads maintenance in Moiben constituency. The results are given in Table 4.9.

Table 4.9 Satisfaction on timing of maintenance of roads

		Frequency	Percent
Satisfaction	Highly satisfied	10	2.7
Level on	Satisfied	30	8.1
timeliness of	Moderately satisfied	229	61.6
Road	Dissatisfied	56	15.1
Maintenance	Extremely Dissatisfied	47	12.6
	Total	372	100.0

Source: Study 2014

The table indicates that respondents were moderately satisfied as shown by 62% with timeliness of road maintenance. However, there are a good number of respondents that were dissatisfied represented by 15% with road repair timeliness. The trend line shows that the respondents were neither highly satisfied nor extremely dissatisfied but were in the middle. The results of the study are consistent with Kingombe (2011) results in Zambia eastern province that showed that the mean distance to services and community assets diminished significantly thanks to the rehabilitation of feeder roads.

Also Dercon and Hoddinott (2005) found out that in Ethiopia, an increase of 10 km in the distance from the rural village to the closest market town has a dramatic effect on the likelihood that the household purchases inputs. However, they got mixed results in terms of the likelihood of people engaging in various productive activities when roads of poor quality (accessible only to carts, animals or people) are replaced by good quality roads (reasonable access to any motorised vehicle).

4.4 Roads Drainage Structures Maintenance and Economic Development of Rural Areas

Objective two sought to establish the influence of road drainage structures maintenance on rural areas economic development and the results were as follows.

The study wanted respondents' opinion on the drainage structures; bridges, culverts and drainage ways that influenced easy transportation time in Moiben constituency. The results are presented in Table 4.10.

Table 4.10 Drainage structures maintenance

		Frequency	Percent
Which of the following road drainage structures if well maintained can improve transportation time in Moiben Constituency?	Bridges	203	54.6
	Culverts	61	16.4
	Drainage ways	108	29.0
Total		372	100

Source: Study 2014

Majority of the respondents accounting for 54% allude that if bridges are well maintained can lead to reduced transport time. However 29% and 16% felt that drainage ways and culverts respectively lead to shorter transportation time and distance hence lowering the cost of transport. In addition, not all areas are connected with proper road network; some areas have foot bridges that assist in ensuring that cross passage is assured for both residents and their produce. Therefore, the study wanted to establish constituents' perception as to whether footbridges shortened transportation of produce from the farm to the market. The findings are illustrated in Table 4.11.

Table 4.11 Foot bridges and transportation of produce

		Frequency	Percent
Foot bridges in	Strongly agree	132	35.5
Moiben Constituency	Agree	186	50.0
have shortened the	Undecided	1	0.3
distance taken to	Disagree	12	3.2
transport produce to	Strongly	41	11.0
the market	Disagree		
Total		372	100.0

Source: Study 2014

Foot bridges in Moiben Constituency can shorten the distance taken to transport produce to the market. This is evidenced by about 85% of the respondents. About 14% were of a contrary opinion. Footbridges are mostly used by those transporting goods on foot hence are easily used by farmers. The footbridges are comparatively shorter than using vehicles which sometimes delays. The study findings concur with Kingombe (2001) research that showed that improved accessibility led to changes in land allocation and in yields to the cash crop—cotton. Although, the mean cotton sales share of household income more than doubled, the estimation results only show small gains to mean consumption.

The study also sought constituents' opinion as to whether poor clearing of blocked culverts destroyed farms. Their responses are summarised in Table 4.12.

Table 4.12 Culvert blockages and storm water farm destructions

		Frequency	Percent
Clearing of blocked culverts is poorly done hence storm water sometimes destroys our farms?	Strongly agree	43	11.6
	Agree	52	14.0
	Undecided	7	1.9
	Disagree	97	26.0
	Strongly Disagree	173	46.5
Total		372	100.0

Source: Study 2014

In Table 4.12, it was evident that most of the respondents (72%) believed that clearing of culverts was well done and hence not in many occasions does the storm water destroy their farms. Nevertheless there were those who were of contrary opinion. This perception was contrary to field observation that showed most culverts blocked. It is possible that the respondents resisted the clearing of culverts since they would drain water into their farms. This is a big challenge in road maintenance that local leadership must address through civic education and community development.

Moreover, the constituents were also asked whether culvert structures affected the accessibility to business. The results are illustrated in Table 4.13.

Table 4.13 Culvert structures and accessibility to businesses

Response		Frequency	Percent
Culvert structures have enhanced accessibility to individual business besides the roads	Yes	287	77.2
	No	85	22.8
Total		372	100

Source: Study 2014

It is observed that 287 (77.2%) of the respondents posited that culvert structures have enhanced accessibility to their businesses while there were 85 (22.8%) who were of a different opinion. The culverts seem to have made it possible for most

businesses or farms to be accessed with ease especially by vehicles. This makes their farms and businesses to be more accessible and open for transportation of the produce or goods with less transport related costs.

The researcher sought to know the effect of roads drainage structures on economic development. The results of the analysis are presented in Table 4.14.

Table 4.14 Road drainage structure and economic development

		Frequency	Percent
To what extent does road drainage structure in your area influence economic development of your area?	Very high	137	36.8
	High	125	33.6
	Average	9	2.4
	Low	58	15.6
	Very low	43	11.6
Total		372	100.0

Source: Study 2014

About 69% of the respondents say that the influence is high while about 26% believe the contrary. This implies that the drainage structure of any rural roads needs to keenly be maintained to ensure efficiency in the residents' day-to-day businesses.

4.5 Funding Sources of Roads Maintenance and Economic Development in Rural Areas

Objective three sought to establish the influence of road maintenance funding sources on rural areas economic development and the results were as follows. The respondents were asked the people who funded repair and maintenance of rural roads in Moiben constituency towards improving the economic development. The results are illustrated in Table 4.15.

Table 4.15 Funders of the road repairs

	Sources of funds for maintenance of roads	Frequency	Percent
Among the following, who mostly fund the improvement, maintenance and occasional repair of rural access roads in your area?	KeRRA	78	21.0
	County government	199	53.5
	CDF	29	7.8
	NGOs	55	14.8
	Farmers groups and cooperative	10	2.7
	Companies	1	.3
Total		372	100.0

Source: Study 2014

The study above indicates that the county government is the major stakeholder in funding roads repair and maintenance as supported by about 53% of the respondents. On the other hand, KeRRA assist the county governments in maintenance as supported by 21%. About 14% of the respondents said that NGOs assist in funding, 2% agree that farmers contribute to funding while 7% say that CDF is utilized. It is therefore apparent that the County government plays a fundamental role in funding of road repair and maintenance. In reference to (ILO, 2007) maintenance funding is a major problem in the road sector. There are several reasons for this. The result is that major parts of the road networks of the countries in the region receive little or no maintenance from one year to the next. In Kenya, Kabugu (2013) found out that majority of the respondents expressed the view that South Rift Region did not receive adequate funding for road maintenance where a significant number of respondents thought that the funding for road maintenance was not adequate.

Mobilizing the resources necessary to finance road maintenance is of paramount interest in most developing countries. As with finance questions in

general, this topic can be considered from both a conceptual or theoretical view and from the standpoint of what has worked or might work in a developing country (World Bank, 2010). In Bangladesh, donors' role in rural infrastructure maintenance financing is not substantial as it has been visualized by the donors that after the completion of project, maintenance are government's responsibility. Donors' role is limited to the maintenance of project rural feeder roads within the project period.

The respondents were asked to indicate how roads maintenance monetary and non-monetary resources affected their business growth. The results are given in Table 4.1.6

Table 4.16 Resources mobilization and business growth

		Frequency	Percent
How does local road maintenance monetary and non-monetary resources mobilization affect your business growth?	Positively	103	27.7
	Somehow positive	62	16.7
	Undecided	2	0.5
	Negatively	141	37.9
	Very negative	64	17.2
Total		372	100.0

Source: Study 2014

From the study above, about 43% of the respondents agree that monetary and non-monetary resources are always mobilized during road maintenance and affect their business growth positively. On the other hand, 54% of the respondents were for the idea that mobilization negatively affected their business growth. It was therefore apparent that sometimes monetary and non-monetary resources mobilized during road maintenance affected the business growth. This could be attributed to the allusion that most of the time the periodic repairs timing is very poor.

The residents of Moiben were further asked to indicate the extent to which they made contributions towards roads repairs in their areas. Their responses are given in Table 4.17.

Table 4.17 Contribution of resources towards repairs

	Response	Frequency	Percent
How often does	Always	50	13.4
residents/community contribute their	occasionally	61	16.4
resources and finances towards	Sometimes	107	28.8
repair and maintenance of rural	Rarely	87	23.4
access roads?	Never	67	18.0
	Total	372	100.0

Source: Study 2014

Majority 107 (28.8%) of the respondents above agree that sometimes community contribute their resources towards repairs and maintenance of rural roads. On the other hand, 87 (23.4%) were for the idea that they rarely contributed, 61 (16.4%) said they occasionally contributed, 50 (13.4%) agreed that they always contributed while 67 (18.0%) were for the idea that never did the community contribute their resources and finances towards repairs. This implies that roads are sometimes in an impassable state during economic peak periods such as crop planting and harvesting forcing the community to fix the roads with their own resources.

With the incoming of county government in April 2013, the study wanted to know respondents' opinion on how much county government's funds allocation for road repairs and maintenance had influenced their business development. The findings are given in Table 4.18.

Table 4.18 County government allocation and local business contributions

		Frequency	Percent
Does the county government allocate very little funds	Yes	182	48.9
for road maintenance thus forcing you to use your	No	190	51.1
resources?			
	Total	372	100.0

Source: Study 2014

The results in Table 4.18 above indicate that 51% of the respondents disagree that county government allocate very little funds for road maintenance thus forcing them to use their resources for the repairs. The study pointed out that the spread of responsibilities for rural road maintenance within the various levels of government has lead to a situation where no one agency feels responsible for sustaining the rural road network.

The study also wanted to find out respondents perception on the relationship between funding of roads and accessibility of agricultural produce to markets. The results of the analysis are given in Table 4.19.

Table 4.19 Funding and roads accessibility

		Frequency	Percent
Inadequate funding	Strongly agree	73	19.6
of road maintenance	Agree	159	42.7
affects accessibility	Undecided	9	2.4
of agricultural	Disagree	84	22.6
produce to market	Strongly	47	12.6
	Disagree		
	Total	372	100.0

Source: Study 2014

In Table 4.19 it was evident that about 60% of the respondents agreed that inadequate funding makes some of the roads impassable. However, this is disputed by

about 34% of the respondents. Those who agree could be attributing their allusions to the way KeRRA, as the main national government agency in rural roads management, operate. Due to government bureaucracies, there is likelihood that the respondents could view that inadequate funding is responsible for impassable roads.

The regular delays in disbursement of funds also make farmers to take individual initiative to repair roads. The findings are consistent with Dercon and Hoddinott (2005) research in Ethiopia that showed that adequate funding to roads reduced poverty by 6.9 percentage points and increased consumption growth by 16.3%. These results are robust to changes in model specification and estimation methods

4.6 Community Involvement Level on Roads Maintenance and Economic Development of Rural Areas

Objective four sought to establish the influence of community involvement in road maintenance on rural areas economic development and the results were as follows. A rural road network is a basic community asset which has tremendous bearing on socio-economic development of rural communities, therefore; involvement of communities is critical in projects or works aimed at providing rural accessibility. At first, the respondents were asked if they were involved in maintenance of rural roads. The findings are given in Table 4.20.

Table 4.20 Community involvement level in rural roads maintenance

	Involvement	Frequency	Percent
Is the community involved to your expected level?	Yes	155	41.7
	No	217	58.3
	Total	372	100.0

Source: Study 2014

The results in Table 4.20 indicate that majority 217 (58.3%) of the respondents felt that they were not involved in the decision making on road maintenance while about that 155 (41.7%) agreed that they were involved. The difference in view could be due to the perception of what involvement means. Some of the respondents view it as a way of employing the locals while other view it as a consultation forum from which priorities are set at the initiation stage till the last level where a social audit is done. The findings correspond to Kabugu (2013) research on Kenya National Highways Authority in South Rift region that showed that majority of the respondents (50%) agreed with this statement, 33.3% of the respondents claimed to strongly agree, 8.3% of the respondents were neutral while another 8.3% disagreed with the statement. It was clear that despite public participation being a policy in road agencies' operations its implementation is still weak.

The respondents were further asked to indicate the areas to which they were involved by KeRRA in maintenance and repairs of rural roads. The findings are presented in Table 4.21.

Table 4.21 Involvement areas

Involvement areas	Frequency	Percent
Which of the Planning	14	3.8
following areas Procurement	26	7.0
are locals mostly Recruitment of workers	134	36.0
involved Implementation	168	45.2
Social audit	30	8.0
Total	372	100.0

Source: Study 2014

In Table 4.21, it was evident that respondents accounting for 81% felt that involvement mostly takes place at the implementation stage of maintenance while 8% agreed being involved at the last stage where they evaluate or do a social audit of what has been done. Few of the respondents believe that involvement occurs at the planning and procurement stages as represented by 3% and 7% respectively. This scenario is likely to be interpreted to mean that locals are only involved at the implementation stages in form of job absorption, local material acquisition or as a public relations exercise, so as to blind fold them on the underlying issues. It is unlikely that by the time the farmers and business people are involved, they are able to initiate any substantial level of change, in the prioritization of roads to be maintained and prudent utilization of resources.

Consultation and involvement of all stakeholders are important in ensuring that projects succeed. The study asked the constituents of Moiben as to whether local representatives to the road committee have no real input in roads repairs and maintenance. The results are given in Table 4.22.

Table 4.22 Locals input and prioritization of road repairs

		Frequency	Percent
Local representatives	Strongly agree	125	33.6
chosen have no real	Agree	77	20.7
input which leads to	Undecided	4	1.1
wrong prioritization	Disagree	123	33.1
of roads to be	Strongly	43	11.6
repaired	Disagree		
Total		372	100.0

Source: Study 2014

From Table 4.22, it was evident that 53% of the respondents agree that local representatives chosen to present have no real input which leads to wrong prioritization of most productive roads. This could be attributed to the stage at which this group of people are mostly involved. When they do not become proactive at the planning stage and probably procurement, there is a tendency that their agenda might not be adequately be considered hence the base for the argument in the results. Nevertheless, some of the respondents accounting for about 44% felt that the representatives were doing a good job.

The study asked respondents as to whether local community participation and quality of roads. The results are given in Table 4.23.

Table 4.23 Local community participation and quality of roads

Approaches		Frequency	Percent
Local community	Strongly agree	103	29.5
participation ensures	Agree	138	36.8
there is valuable road	Undecided	0	0.
to the community in	Disagree	36	9.8
quality and hence	Strongly	87	23.9
reliable transport?	Disagree		
	Total	372	100.0

Source: Study 2014

Majority of the respondents (65%) felt that it was true to allude that local community participation ensures there is valuable road to the community in terms of quality and hence reliable roads. Nonetheless, there was about 32% of the respondents who believed that the contrary was true.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on the summary of the study findings, discussions, conclusions and recommendations. Suggestions for further research are also enumerated. The study set out to investigate influence of road maintenance on development of rural areas; a case of Moiben constituency, Uasin Gishu County, Kenya.

5.2 Summary of Findings

This section presents a discussion of the findings of this study. This study was carried out at Moiben Constituency. The respondents' personal data was sought and it was found out that majority of the respondents were in the age bracket of 20 to 30 years followed with those with ages between 31 and 50 years. This implied the youthful lot as well as experienced group that qualified them for the study. The results also showed most residents engage in farming and business. The farmers and business persons are mostly affected by the state of the road in the course of carrying out their activities; these gave them a better chance to respond to the questions under study.

5.2.1 Roads Maintenance Timing and Economic Development of Rural Areas

The study in line with the first objective sought to establish the influence of road maintenance timing on rural areas economic development. The results indicated that majority of the respondents, agreed that lack of periodic rehabilitation of roads has led to increased cost of transport. They further indicated that the roads are

sometimes repaired. It was also evident that majority of the respondents agree that prolonged rehabilitation of roads has led to slow growth of the businesses and increased transport costs while only a few were of a contrary opinion. This implies that the poor timing of road maintenance is a costly affair to the residents of rural areas. The few that disagreed with this view could probably to have been moved by other factors that lead to increased transportation cost that could range from taxation and security issues.

The study indicates that most roads undergo maintenance during rainy season. A few of the respondents concurred that dry season too is an ideal time for repair. There were more respondents who thought that the repairs were mostly done in the rainy season than those of dry season. This implies that the repairs are more inclined to the season when farmers experience much challenges in transporting their goods due to muddy roads. It was also evident that road maintenance timing in Moiben was more reactive to road distress thus affecting the profitability in farming.

5.2.2 Roads Drainage Structures Maintenance and Economic Development of Rural Areas

Objective two sought to establish the influence of road drainage structures maintenance on rural areas economic development and the results were as follows.

Majority of the respondents allude that if bridges are well maintained can lead to reduced transport time. Foot bridges in rural areas can shorten the distance taken to transport produce to the market. It was also evident that most of the respondents believed that clearing of culverts was well done and hence not in many occasions does the storm water destroy their farms. Further, respondents posit that culvert structures have enhanced accessibility to their businesses while there were a few who were of a

different opinion. The culverts seem to have made it possible for most businesses or farms to be accessed with ease especially by vehicles. This makes their farms and businesses to be more accessible and open for transportation of the produce or goods.

5.2.3 Funding Sources of Roads Maintenance and Economic Development in Rural Areas

The study in line with the third objective sought to establish how value of the roads maintained influences the development of rural areas. To accomplish this, the respondents were asked to indicate their opinion on particular statements. Mobilizing the resources necessary to finance road maintenance is of paramount interest in most developing countries. Most of the respondents agree that monetary and non-monetary resources are always mobilized during road maintenance and affect their business growth positively. It was therefore apparent that sometimes monetary and non-monetary resources mobilized during road maintenance affected the business growth. This could be attributed to the allusion that most of the time the periodic repairs timing is very poor.

Majority of the respondents above agree that sometimes community contribute their resources and finances towards repairs. Most of the respondents disagree that county government allocate very little funds for road maintenance thus forcing them to use your profits for the repairs. The study pointed out that the spread of responsibilities for rural road maintenance within the various levels of government has lead to a situation where no one agency feels responsible for sustaining the rural road network. It was further noted that majority of the respondents felt that introducing toll centres on well maintained roads could affect the cost of transport hence eroding farmers' profits. However, a few held a contrary opinion. Introduction

of some fees on the well maintained roads is likely to bring about regular repairs from the agencies charged with the responsibility of collecting the duty. This could also be interpreted to mean that farmers might have more say in the sense that they are likely to demand value for their money directly from the authorities.

Most of the respondents agreed that inadequate funding by KeRRA makes some of the roads impassable. However, this was disputed by few of the respondents. Those who agree could be attributing their allusions to the way KeRRA, as the main national government agency in rural roads management, operate. Due to government bureaucracies, there is likelihood that the respondents could view that inadequate funding is responsible for impassable roads. The regular delays in disbursement of funds also make farmers to take individual initiative to repair roads.

5.2.4 Community Involvement Level on Roads Maintenance and Economic Development of Rural Areas

Objective four sought to establish the influence of community involvement in road maintenance on rural areas economic development and the results were as follows. The results indicated that majority of the respondents felt that they were not adequately involved in the decision making on road maintenance while other were of a contrary opinion. The difference in view could be due to the perception of what involvement means. Some of the respondents view it as a way of employing the locals while other view it as a consultation forum from which priorities are set at the initiation stage till the last level where a social audit is done.

Most of the respondents agree that local representatives chosen to present have no real input which leads to wrong prioritization of most productive roads. This could be attributed to the stage at which this group of people are mostly involved. When

they do not become proactive at the planning stage and probably procurement, there is a tendency that their agenda might not be adequately be considered hence the base for the argument in the results.

Accessibility is core to any business location or even efficacy in farming. It is apparent that KeRRA get the opinions of the locals. Majority of the respondents felt that it was true to allude that KeRRA seeks local opinions but later ignore them hence creating uncertainties which discourage potential investors. This could be attributed to the fact that although investors are risk takers who can even take their own initiative to repair the roads, the costs of repairing roads cannot be sustained by the investments.

5.3 Conclusion

In conclusion, this study contends that for economic rural development to be sustainable there is a need for efficient road networks that are deemed to augment the development agenda. The study notes that the timing of road maintenance is poor and more reactive. Maintenance seems to be done only during the rainy season which is not a good practice. The frequency of the very maintenance seems to be done in an ad hoc manner.

The study further concludes that the road drainage structures play an important role in ensuring that, transport distance is shortened and there is effective storm water control. The study concludes that even though the residents contribute their resources to the maintenance and this adversely affects their profitability and growth. Lastly, the study concludes that there is a chronic tendency of the road agencies and contractors not to concentrate on the needs of the residents but rather be influenced by other forces including politics while choosing which roads to repair and how to repair.

5.4 Recommendations

The study makes the following recommendations based on the study finding;

1. KeRRA and contractors must ensure their time plans are adhered to so as to facilitate passable roads.
2. KeRRA should ensure they factor in the budgets the cost of maintaining drainage structures and enforce the maintenance
3. The national government should allocate adequate funds to road maintenance so that farmers not to incur cost on roads repairs.
4. The study recommends that the road maintenance agencies in the rural areas must fully involve all the stakeholders including the residents in order to ensure achievement of good rural roads that will spur development.
5. The county government should encourage residents to form social audit teams that cannot be easily compromised to monitor the performance of the assigned contractors.

5.5 Suggestion for Further Research

This study recommends that further research should be done to establish the challenges experienced by contractors while carrying out rural roads maintenance so as to unravel the underlying reasons for poor road maintenance.

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APPENDICES
APPENDIX I LETTER OF TRANSMITTAL

Matthew Bore
University of Nairobi
School of Continuing and Distance
Education
Department of Extra- Mural Studies
Eldoret Extra Mural Centre

Dear Respondent,

You are requested to participate in the study on “**Influence of Road maintenance on rural areas development: A Case of Moiben Constituency**”. 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 will give will be treated with utmost confidentiality. Your input will be of great importance in ensuring the success of this work.

God bless you.

Thanks in advance

Regards,

Mathew Bore
University of Nairobi Student

APPENDIX II QUESTIONNAIRE

QUESTIONNAIRE

My name is **Mathew Bore**. I am a postgraduate student of University of Nairobi, Eldoret, carrying out a study on “**Influence of Road maintenance on economic development of rural areas: A Case of Moiben Constituency**”. This research is purely academic and any information provided shall be treated with confidentiality. Your contributions are highly appreciated. Thank you very much in advance.

Yours sincerely,

Mathew Bore.

SECTION A: Demographic Data

Tick appropriately

1. Tick your Ward

Tembelio [] Sergoit [] Karuna/Meibeki [] Moiben []
Kimumu []

2. What is your **gender**? : Male [] Female []

3. What is your **age bracket**: Below 20 [] 20– 30 [] 31 – 50 [] above 50 []

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

5. Tick on your main economic activity

Farming [] Business [] Employed []

Any other (specify) _____

SECTION B: ROADS MAINTENANCE TIMING AND ECONOMIC DEVELOPMENT OF RURAL AREAS

6. Lack periodic rehabilitation of roads has led to increased cost of transport in Moiben constituency.

Yes [] No []

7. How often are roads maintained and repaired in your area?

Always [] Occasionally [] Sometimes [] Rarely []

Never []

8. How long does road repair and maintenance take to complete in this area?
 Less than 1 month [] 1-3 months [] 4 months []
 More than 5 months []
9. Prolonged rehabilitation of roads has led to slow growth of businesses
 Strongly agree [] Agree [] Undecided [] Disagree []
 Strongly Disagree []
10. Which season does roads maintenance takes place?
 During dry season [] During rainy season [] Periodical []
 Any other time (explain) _____
11. Timing of road maintenance in Moiben is more reactive to road distress and hence has led to lower profits in farming
 Yes [] No []
12. Do you think road maintenance timing has led to increased income levels for both farmers and business owners?
 Yes [] No []
-
13. What is your level of satisfaction on roads maintenance timing on development of your area?
 Highly satisfied [] Satisfied [] Moderately satisfied []
 Dissatisfied [] Extremely Dissatisfied []
-

SECTION C: ROADS DRAINAGE STRUCTURES MAINTENANCE AND ECONOMIC DEVELOPMENT OF RURAL AREAS

14. Which of the following road drainage structures is well maintained and improve transportation time in Moiben Constituency?
 Bridges [] Culverts [] Drainage ways []
15. Foot bridges in Moiben Constituency have shortened the distance taken to transport produce to the market
 Strongly agree [] Agree [] Undecided [] Disagree []
 Strongly Disagree []
16. Clearing of blocked culverts takes is poorly done hence storm water destroys our farms?
 Strongly agree [] Agree [] Undecided [] Disagree []

Strongly Disagree []

17. Culvert structures have enhanced accessibility to individual business besides the roads.

Yes [] No []

18. To what extent does road drainage structure in your area influence socio-economic development of your area?

Very high [] High [] Average [] Low [] Very low []

SECTION D: FUNDING SOURCES OF ROADS MAINTENANCE AND ECONOMIC DEVELOPMENT IN RURAL AREAS

19. Among the following who mostly fund the improvement, maintenance and occasional repair of rural access roads in your area?

KeRRA []

County Government []

NGOs []

Farmers groups and cooperatives []

CDF []

Companies []

20. How does local road maintenance monetary and non-monetary resources mobilization affect your business growth?

Positively [] Somehow positive [] Undecided [] Negatively []

Very negative []

21. How often does residents/community contribute their resources and finances towards repair and maintenance of rural access roads?

Always [] Occasionally [] Sometimes [] Rarely []

Never []

22. Does the county government allocate very little funds for road maintenance thus forcing you to use your resources to use your profits for the same?

Yes [] No []

23. Inadequate funding of road maintenance affects accessibility of agricultural produce to market

Strongly agree [] Agree [] Undecided [] Disagree []

Strongly Disagree []

SECTION E: COMMUNITY INVOLVEMENT LEVEL ON ROADS MAINTENANCE AND ECONOMIC DEVELOPMENT OF RURAL AREAS

24. Is the community involved to your expected level?

Yes [] No []

25. Which of the following areas are you mostly involved

Planning []

Procurement []

Recruitment of workers []

Implementation []

Social audit []

26. Local representatives chosen have no real input which leads to wrong prioritization of roads to be repaired.

Strongly agree [] Agree [] Undecided [] Disagree []

Strongly Disagree []

27. Local community participation ensures there is valuable road to the community in quality and hence reliable transport.

Strongly agree [] Agree [] Undecided [] Disagree []

Strongly Disagree []

THE END
THANK YOU

APPENDIX III: INTERVIEW SCHEDULE FOR KeRRA OFFICIALS

1. How long have you worked in this area/region?
2. How frequent do you inspect rural access roads in Moiben constituency
3. Do you conduct occasional repairs and maintenance of rural roads in Moiben constituency (specify whether repairs are made for culverts, drainage among other)
4. As an organisation, are you able to repair all rural access roads in Moiben constituency?
5. Are there other organisations that you work with in conducting routine maintenance of rural roads in Moiben constituency?
6. How does the cost of operations influence roads maintenance activities in Moiben division? Is the organisation capable of meeting the costs of the exercise?
7. Does the organisation get value for money disbursed for regular repair and maintenance for rural roads?
8. Does the structure and value of repair and maintenance works influence Moiben constituency development? (Explain in detail)
9. Do you have adequate funds to conduct regular repair and maintenance works in Moiben constituency rural roads
10. Does the funding source influence regular repair and maintenance of roads in Moiben constituency towards rural development?
11. What challenges does your organisation face in rural roads maintenance in Moiben constituency
12. What are the solutions to the above mentioned challenges?

The end

Thank you for accepting to be interviewed.

APPENDIX IV: RESEARCH PERMIT



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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NAIROBI-KENYA

Ref. No.

Date:

NACOSTI/P/14/6519/2236

3rd July, 2014

Mathew Bore B.
University of Nairobi
P.O.Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Influence of road maintenance on development of rural areas: A case of Moiben Constituency, Uasin-Gishu County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Uasin-Gishu County** for a period ending **20th November, 2014**.

You are advised to report to **the County Commissioner and the County Director of Education, Uasin-Gishu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


SAID HUSSEIN
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Uasin-Gishu County.



National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified

