RURAL TRANSPORT SERVICE INDICATORS:
Kenya Country Report

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in collaboration with
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RURAL TRANSPORT SERVICES iNDICATORS

African Community Access Programme (AFCAP)
Project AFCAP/GEN/060
Developing Indicators for Rural Transport Services

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Cover photo
Rural taxis, motorcycle taxis and pedestrians on the .

This project was funded by the Africa Community Access Programme (AFCAP) which promotes safe and sustainable access to markets, healthcare, education, employment and social and political networks for rural communities in Africa.

Launched in June 2008 and managed by Crown Agents, the five year-long, UK government (DFID) funded project, supports research and knowledge sharing between participating countries to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

The programme is currently active in Ethiopia, Kenya, Ghana, Malawi, Mozambique, Tanzania, Zambia, South Africa, Democratic Republic of Congo and South Sudan and is developing relationships with a number of other countries and regional organisations across Africa.

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For further information visit https://www.afcap.org

The International Forum for Rural Transport and Development (IFRTD) in conjunction with Paul Starkey was awarded a research contract by the African Community Access Programme (AFCAP) to develop and test indicators that can be used to assess how good rural transport services are at providing access for rural people. The envisaged outcome of the research will be appropriate rural transport services indicators that are tested and disseminated to the transport sector in various African countries.

The research aims to identify, develop, test and share rural transport services indicators relevant to the key stakeholders, including rural people, transport operators, regulators, planners, roads authorities and development agencies. This will be achieved using participative methodologies involving local stakeholders and sector experts.

The research team comprises:
Paul Starkey *(Team Leader)*
Peter Njenga *(Project Manager)*
Kenneth Odero *(Kenya Research Leader)*
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Juliet Ritta *(Kenya Research Assistant).*
Shedrack Willilo *(Tanzania Research Leader)*
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Krishan Jayatunge *(Website and design)*

The project website is http://www.ruraltransport.info/RTSi.

This document is one of three outputs prepared at the end of the first phase of research (April to September 2012):

- Work-in-progress paper
- Tanzania country report
- Kenya country report.

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Table of Contents

Acronyms and abbreviations

AFCAP	African Community Access Programme
Aids	Acquired immune deficiency syndrome
eg	for example
GIS	Geographical information systems
GPS	Global positioning system
HIV	Human immunodeficiency virus
ICT	Information and communication technologies
ie	that is to say
IFRTD	International Forum for Rural Transport and Development
IMT	Intermediate means of transport
KeRRA	Kenya Rural Roads Authority
kg	kilogram
km	kilometre
m	metre
NGO	Non-governmental organisation
RAI	Rural Accessibility Index
RTS	Rural transport services
RTSi	Rural transport services indicator
UK	United Kingdom (of Great Britain and Northern Ireland)
USA	United States of America
USD	United States Dollar
USDc	United States Dollar cents

1 Executive summary

This is the initial Kenyan country report of the AFCAP-funded project to develop indicators to 'measure' the adequacy of rural transport services (RTS) for meeting the access needs of rural people. Based on the research framework and methodology developed, information was collected from a range of users (balanced for gender) on three roads. The surveyed roads were: Tala- Kilimambogo (29 km, D521-01, Matungulu District; 'Tala road'), Longisa-Kimuchul (21 km, E268 in Bomet District; 'Longisa road') and Nyabangi-Kapsuser (8 km E222J1 – R8 in Kericho District; 'Nyabangi road').

Interviews were held with people who have used transport services in relation to agriculture, health, education and economic activities. Elderly and disabled people and those responsible for children were interviewed to learn of their particular transport issues. For each type of transport used, people were asked about prices, frequencies, predictability, reliability, convenience, capacity, seasonality, safety, security, accessibility, comfort and connectivity. The cost and convenience of transporting small (20-50 kg) and medium (200 kg) freight was ascertained from users.

Operators (and/or owners) of each mode of transport service were interviewed. Information was also collected concerning fares, frequencies, reliability, predictability, seasonality, safety, security and freight transport. The information was compared with that provided by users and discrepancies were investigated immediately. Detailed information was also obtained relating to operating costs and income, associations, regulation, incentives and disincentives.

Local regulating authorities and/or competent individuals (eg, village leaders, teachers and traffic police) were interviewed about compliance with technical, financial, operational, safety and environmental regulations. People with knowledge of the road and the appropriate sector were interviewed to assess how the road contributed to key development issues. These included agriculture, trade facilitation, health, maternal health, HIV/Aids, education, gender, disability, information technologies (including mobile phones), cultural heritage and the environment. Traffic counts were undertaken.

The key survey information for each road will be summarised in a RTSi Road Report, one of which is included at the end of this document. At the start of each report, four tables summarise most of the statistics considered relevant for subsequent indictor development. These include key statistics about the road (including maps), traffic and transport services patterns (disaggregated for mode and showing service fluctuations), key operational statistics (costs, frequencies, safety, security, regulation compliance and development impact) and user satisfaction (disaggregated for gender). Four further tables include further information from the survey and these are complemented by numerous charts.

The surveys in Kenya yielded a great deal of information on rural transport services. The analysis of this data is continuing. Statistics generated show the annual travel volumes and the market share. These show that although motorcycle taxi services are relatively new, they have captured a significant part of the rural transport market. In terms of overall annual passengers, the market share of motorcycles was 37% for the Tala road, 43% for Nyambangi road and 52% for Longisa road. As motorcycle trips are shorter these percentages would fall if presented as passenger-kilometres.

Information obtained on user satisfaction, disaggregated by gender and transport type is still being analysed. Overall levels of satisfaction with motorcycles, minibuses and rural taxis were quite similar at around 3.2 out of 5 (just better than 'medium satisfaction'). Motorcycles were more popular on the roads that did not have minibus services. People did not express particular dissatisfaction with motorcycle fares even though these are higher than those of minibuses.

The operators were generally stoical, and did not rate many things as being particularly good or bad. Operators did not feel particularly constrained by regulatory disincentives (including police checks). Operators near a town (such as Tala) were more satisfied with the availability of technical and financial services. In general, motorcycle operators expressed lower levels of satisfaction than the operators of minibuses and rural taxis.

People providing a regulator perspective felt that compliance with regulations was less than satisfactory for all means of transport on all three roads. Motorcycles consistently had poorer scores than other means of transport (1.6 out of 5 for Tala road, 2.4 for Longisa road and 1.6 for Nyabangi road).

The survey showed that motorcycles were considered the vehicles most useful for meeting development objectives. Motorcycles had high scores for their contribution to agriculture. Their un-weighted average development score was 4.1 out of 5 for Tala road, 4.0 for Longisa road and 4.2 for Nyabangi road. Minibuses and rural taxis had lower scores.

The surveys have produced a great deal of information on rural transport services in Kenya. This should contribute to greater understanding, the development of rural transport services indicators and appropriate policies to improve rural transport services in Kenya.

2 Introduction and background

This Kenya country report derives from the first six months of work to develop indicators to 'measure' the adequacy of rural transport services for meeting the access needs of rural people. The AFCAP-funded project is being implemented by an IFRTD team led by Paul Starkey and Peter Njenga. The first project phase from April to September 2012, aimed to develop and test a methodology to acquire the information required to develop indicators. The team met in April 2012 to plan the research framework and participative survey methodology. It was decided that information for indicator development would be linked to specific roads. Data should be easy to obtain, relevant to key stakeholders, reliable, replicable and comparable. Researchers should obtain specific information from users, operators, regulators and development personnel. They should verify the accuracy of information during the survey by interviewing several people per stakeholder category and by observations and triangulation between the sources.

The agreed survey methodology involved surveying users, operators, regulators and development personnel. Various users were interviewed using small samples (balanced for gender) that were intended to be representative of the key stakeholders. As a result, interviews were held with people who had recently used transport services in relation to agriculture, health, education and economic activities. Elderly and disabled people and those responsible for children were interviewed to learn of their particular transport issues. For each type of transport used, people were asked about prices, frequencies, predictability, reliability, convenience, capacity, seasonality, safety, security, accessibility, comfort and connectivity. The cost and convenience of transporting small (20-50 kg) and medium (200 kg) freight was ascertained from users.

Operators (and/or owners) of each mode of public transport services were interviewed. Information was collected concerning fares, frequencies, reliability, predictability, seasonality, safety, security and freight transport. The information was compared with that provided by users and discrepancies were investigated immediately. Detailed information was also obtained relating to operating costs and income, associations, regulation, incentives and disincentives.

Local regulating authorities and competent individuals were interviewed about compliance with technical, financial, operational, safety and environmental regulations. People with knowledge of the road and the appropriate sector were interviewed to assess how the road contributed to key development issues. These included agriculture, trade facilitation, health, maternal health, HIV/Aids, education, gender, disability, information technologies (including mobile phones), cultural heritage and the environment. Traffic counts were undertaken on the roads to obtain estimates of traffic types and the passengers being carried (disaggregated for gender).

Further information on the research project and the methodologies used for surveying and analysis are provided in two work-in-progress papers that are available to download from the project website (Starkey et al, 2012a and 2012b).

This document provides the initial results obtained from three road-based surveys in Kenya. The document highlights emerging issues that are presented from four different perspectives:

- User's perspectives
- Regulator's perspectives
- Operator's perspectives
- Overall development perspective.

The research on developing indicators is at an early stage. Nevertheless, the survey work on these Kenyan roads has highlighted many issues concerning rural transport services that are very relevant to the local stakeholders. These are summarised and discussed in the following sections of this report. Statistics and observations relating to the particular roads are then presented in three RTSi

Road Reports. Although these are placed at the end of this document, they are integral components of this country report.

3 Overview of the three roads surveyed

3.1 Tala- Kilimambogo (D521-01), Matungulu District, Kenya

The road linking Tala with Kilimambogo (also known as Ol Donyo Sabuk) is located in the newly created Matungulu District. Under the Kenya Road Classification system, it is a 'Class D' road. It is a secondary road linking locally important centres (Tala and Kilimambogo) to each other, and onto regionally and nationally important centres (eg, Thika and Nairobi), and to a higher class road (Thika-Garissa-Liboi Road, A3). It is a graded, unpaved all-weather road that is about 30 km long. The development, maintenance and management of this rural road is under the Kenya Rural Roads Authority (KeRRA) and the Matungulu District Roads Committee.

Left: Minibus that is the next scheduled departure from Tala to Ol Donyo Sabuk and Thika
Right: Passengers descending from a side-facing rural taxi at Tala terminal

The road traverses gently undulating landscape characterised by several ridges and hills. Highest hill to the east is the Kilimambogo or Ol Donyo Sabuk peak which is 2144 m above sea level. The geology of the area comprises volcanic rocks that are visible in some of the more prominent hills. The soils in the area are mainly sandy and well-drained. The area is characterised by mixed cropping on small-scale farm holdings. Maize, with legumes (green beans and pigeon peas) are the most common food crops, along with fruit crops including mangoes, papaya, avocado and some coffee plantations. There is a large, agro-industrial pineapple plantation near the midpoint of the road. There is also livestock rearing in the area.

Left: Motorcycle taxis near the Tala end of the road
Right: Ox cart regularly hired for freight transport over distances of 10 km

The area around the road has experienced significant land-use changes over the last five years as a result of population increases and subsequent land subdivision. Some of the outcomes of these changes are observed in population settlement patterns and in public transport. Firstly, the creation of Nairobi Metropolitan Area comprising four regions brought the area under the ambit of Nairobi's Eastern Metro. The Eastern Metro has a population of over 3 million and includes the Town Council

of Kangundo/Tala, as well as the adjacent local authorities comprising Machakos County. Secondly, the opening of the Eastern bypass linking the Mombassa Road to the Nairobi-Thika Road considerably reduced the journey time to and from Nairobi making it possible to commute from Tala and the surrounding areas. The construction of the Thika Highway has likewise had a similar impact in terms of journey time and cost. Thirdly, the grading of the Tala-Kilimambogo road in 2010 has also had a significant impact in the area. It has opened up the area for settlements resulting in a vibrant land market as noted by District Commissioner during an interview as part of the survey. Concomitant with the population influx has been the rapid growth in transport services, especially motorcycles.

Left: Kwa Mwaura market and transport hub between Tala and Ol Donyo Sabuk
Right: Two minibuses on the road to Tala with Ol Donyo Sabuk (Kilimambogo) peak behind

Transport services along this road consist of motorcycle taxis and minibuses. There are also two midi-buses that link Thika and Kangundo, using this road. Some ox carts are used for medium-distance freight transport, although their significance has declined substantially in the past 10 years. Currently, there are approximately 50 motorcycle taxis plying this road. Almost all have started operating within the past two years. There are 6-8 minibuses operating as 'rural taxis' on this route. Their associations organise a 20 minute departure timetable from either end of the road.
The minibus and motorcycle (*boda boda)* operators view the Tala-Kilimambogo road as “motorable with difficulty”. The road is however open throughout the year, and does not experience significant disruptions.

According to the district authorities, the road was last graded in 2010 and this resulted in many changes. Most RTS users reported a 'big increase' in the number of vehicles operating each day along the road as well as the number of trips per day especially in the case of motorcycles. In general, development actors in the district consider the maintenance regime of the road adequate, while the regulatory authorities view the road as 'fairly safe'. The number of recalled accidents in the past year involving injury and/or damage to vehicle is very low, but slightly higher for motorcycles than minibuses.

3.2 Longisa-Kembu-Kimuchul Road (E268), Bomet District, Kenya

The Longisa-Kembu-Kimuchul Road is classified as 'Class E' (ie, it is a link to minor or local centres in the rural area). It is a graded, unpaved all-weather road of about 21 km. The development, maintenance and management of this rural road is under KeRRA and the Bomet District Roads Committee. The road is in good condition and is easily accessible from the main B3 Narok-Buret road.


Left: Start of surveyed road at Longisa, with taxis, motorcycles, donkeys and a truck
Right: Taxis, motorycles and pedestrians on the road near to Longisa

The road runs in a north easterly direction across five Locations (Chemaner, Kapkimolwa, Kembu, Kimuchul and Tegat) of Longisa Division, Bomet Constituency in Bomet County. The population of these Locations is about 60,000 (KNBS, 2010). It traverses undulating topography that characterise the area. With the exception of November and December, the area receives rainfall throughout the year. The long rains occur from March to May and the short rains from August to October. A mean rainfall of 1100-1500 mm, hilly terrain and heavy black cotton soils combine to make road construction and maintenance in the area relatively expensive.


Left: Motorcycle milk transporter at the Kimuchul hub
Right: Motorycle taxi with three passengers passing a tea farm

The area, which is located in the Rift Valley highlands, is characterised as high agricultural potential which explains why farming is the economic mainstay of the residents who practice tea growing, horticulture and the tending of livestock including dairy cattle. Transportation of milk from farm gate to collection points and to the milk cooling/processing plant is an important component of freight transport in the area. The good economic potential of the area is reflected in the large number of banks and financial institutions present in the nearby hub town of Bomet. Despite this, half the motorcycle operators surveyed considered the financial facilities available to them as poor, suggesting these institutions are not assisting with the working capital requirements of motorcycle taxis. Similarly, only a quarter of the rural taxi operators considered the financial services available to them as good.


Left: Motorcycles near Kimuchul hub
Right: Long distance donkey freight passing along the road at the Kimuchul hub

Bomet District is the fourth most densely populated district in Rift Valley Province. The high population manifests in terms of high demand for rural transport services. There is a predominance of rural taxis and motorcycles, both of which generally carry more people than they were designed to. Motorcycles carry an average of two passengers per trip. The popular rural taxis (*jambulit*), which are Toyota Probox estate cars, carry an average of 12 passengers per trip (instead of the five persons they are designed to carry). Regulators and development practitioners both acknowledge low compliance with regulations by operators. Most transport users that were surveyed thought that neither taxis nor motorcycles followed timetables, although a few considered that they had some informal timetable patterns.

There are approximately eight rural taxis and 20 motorcycles operating along the Longisa-Kimuchul route. The number of passengers using rural taxis in a day were 406, comprising men (174), women (152) and children (80). This figure was based on a 12 hr count on a 'normal' day in the direction of the local Longisa hub. Passenger traffic would be higher on busy days and less on disrupted days. Rural taxis have about a month when there is reported no service and another month of 'disrupted service'. The rest of the 10 months are said to have 'good service'. For motor cycles there are 8.4 months of good service, 2.6 months of disrupted service and 1 month when there is no service in a year.


Left and right: Taxis often load four passengers in the front, six on the back seat and four in the rear

3.3 Nyabangi-Kipsolu-Kapsuser Road (E222J1 – R8), Kericho District, Kenya

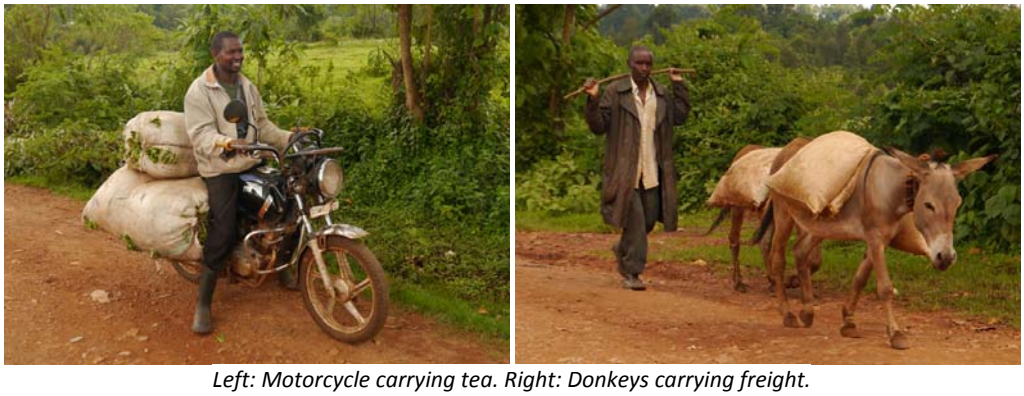
The Nyabangi-Kipsolu-Kapsuser Road is classified as 'Class E' (ie, it is a link to minor or local centres in the rural area). It is a graded, unpaved all-weather road of about 8 km. The development, maintenance and management of this rural road is under KeRRA and the Kericho District Roads Committee. The road is in good condition with motorcycles and rural taxis providing most transport services. Many heavy trucks use the road to access a nearby gravel quarry. There are also lighter tea transportation trucks that regularly use the road. While these trucks do not offer rural transport services, they do affect the road. Their economic importance helps to ensure the road is kept in a reasonable state.

Left: Large gravel truck passing along road. Right: Tea collecting truck at a smallholder tea buying shed

Located in Belgut, one of the seven Divisions of Kericho District, the road links Kapsuser, a small trading centre on the busy B1 Kericho-Kisumu Road with Chebirbei, and further west to Kebenet. Kericho is the regional hub. This is a tea growing region with hills and valleys on the high plateau. The central part of the district where the survey road is situated rises eastwards to 3000 m above sea level. The geology of the area is characterised by igneous and metamorphic complexes. In Belgut and surrounding areas the soils are suitable for tea, coffee, and horticulture (including tomatoes and different kinds of vegetables and fruits). Sunflower, maize as well as livestock activities also do well in this area.

Left and right: Motorcycle taxis and rural taxi at the Kipsolu junction near the middle of the road

The population of Belgut Division where the road is located is about 65,000. The 'catchment population' of the road is much lower as the rural road network in the area is quite dense and the people of the division are served by several roads. The pattern of rivers and ridges means that the nearest road is not always the most accessible one most and one Location may be served by more than one road.



Left: Motorcycle carrying tea. Right: Donkeys carrying freight.

Motorcycles and rural taxis (Probox estate cars) are the most common form of public transport. There are five rural taxis and 18 motorcycles operating on this route. The number of passengers using rural taxis is on a 'normal' day is about 211, comprising men (79), women (90) and children (42). This was based on a 12 hr count in the direction of the Kericho regional hub town. The corresponding passenger figures for motorcycles were 129 (70 women, 50 men and 9 children). The

rural taxis provide 9.4 months of good service, 2.3 months of disrupted service and 0.3 months of no service each year. In the case of motorcycles, it is 8.9 months of good service, 2.3 months of disrupted service and 0.8 months when there is no service in a year. Most users surveyed felt there were no timetables for either the rural taxis or the motorcycles. However, most users were satisfied with the availability of motorcycle and rural taxi services, with motorcycles considered more available.

Left: Disabled man with crutches and iron leg brace demonstrating access problems in a rural taxi
Right: Taxi dropping and picking passengers at Kipsolu junction

The grading of the Nyabangi-Kipsolu-Kipsuser Road in the last year (with spot improvements on-going under the road maintenance programme of KeRRA) has greatly improved accessibility of RTS, partly explaining the levels of user satisfaction with services reported. However, operators of motorcycles and rural taxis reported the overall condition of the road infrastructure as 'motorable with difficulty' which perhaps reflects the combined effects of the climate and topography.

4 References

Starkey P, Njenga P, Odero K, Kemtsop G, Willilo S and Mbathi M, 2012a. Rural transport service indicators: work in progress paper, July 2012. International Forum for Rural Transport and Development (IFRTD), London, UK for Crown Agents, Sutton, UK. 56p. Available at: http://www.ruraltransport.info/RTSi/resources/resource_documents.php

Starkey P, Njenga P, Odero K, Kemtsop G, Willilo S and Mbathi M, 2012b. Rural transport service indicators: work in progress paper, July 2012. International Forum for Rural Transport and Development (IFRTD), London, UK for Crown Agents, Sutton, UK. 67p. Available at: http://www.ruraltransport.info/RTSi/resources/resource_documents.php

5 RTSi Report of Tala- Kilimambogo Road, Matungulu District, Kenya

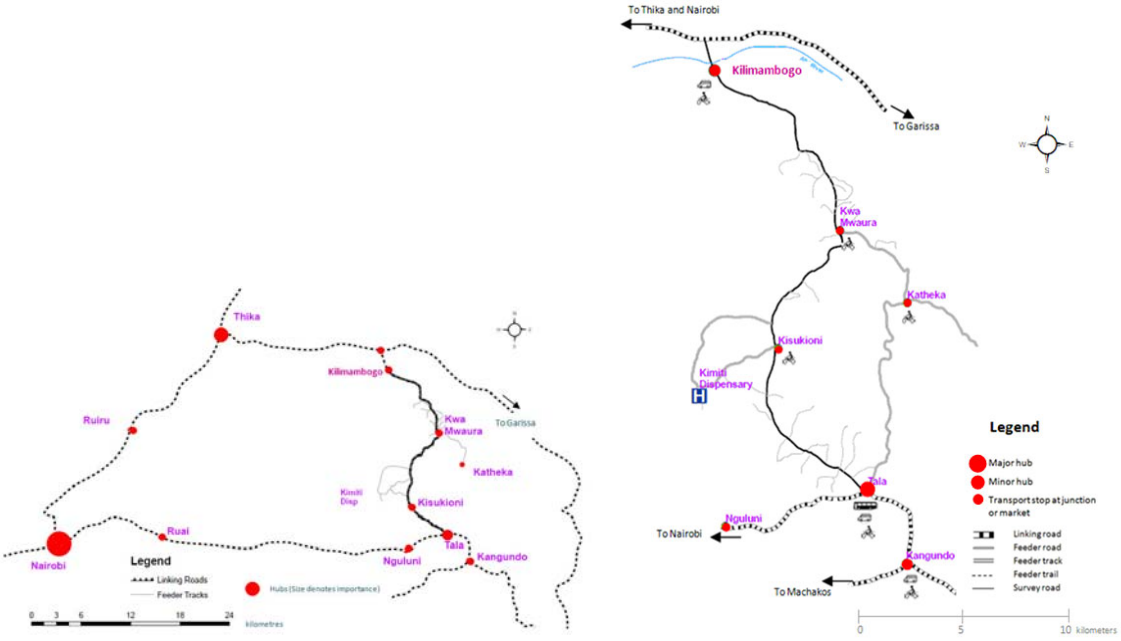
Rural Transport Service Indicators Report

Report of Tala–Kilimambogo Road, Machakos County, Kenya

Prepared by: Kenneth Odero, Musyimi Mbathi, Peter Njenga and Paul Starkey

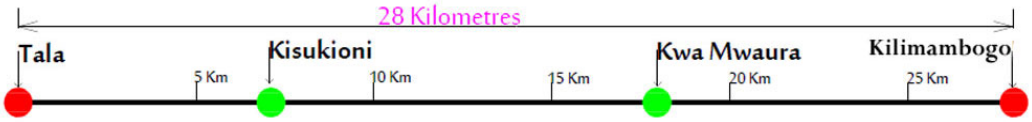
Date: 18 September 2012

Part 1: Summary Tables

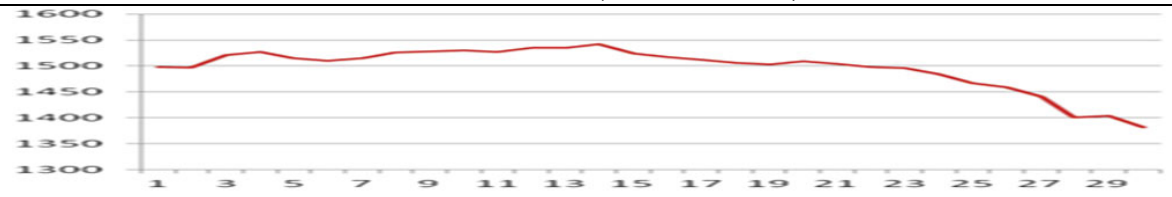
Table 1. Road information			
*Road name:*Tala-Kilimambogo (Ol Donyo Sabuk) D521-01			
*District, Region and Country:*Matungulu District, Machakos County, Kenya			
Road type: Class D (secondary road linking locally important centres)	*Responsible authority:*Kenya Rural Roads Authority		
*Road start location:*Tala	*GIS:* 37 0312964 - 9860036		
Road finish location: Kilimambogo	*GIS:*37 0311425 - 9872841		
Road length: 29 km	*Catchment population*[1] *wip*		
Road quality and condition from different perspectives			
Road authority[2]	*Operators* [3]	*Development*[4]	*Safety* [5]
★★★☆☆	★★★☆☆	★☆☆☆☆	★★★☆☆
Summary of road geography and socio-economic situation			
The Tala-Kilimambogo Road traverses gently undulating landscape characterised by several ridges and hills, rising towards the north and the highest peak (also known as Kilimambogo or Ol Donyo Sabuk) is 2144 m above sea level. The geology is primarily volcanic and the soils are mainly sandy and well-drained. The area is characterised by mixed cropping on small-scale farm holdings. Maize, with legumes are the most common food crops, along with fruit crops including mangoes, papaya and avocado. There are some coffee plantations and an agro-industrial pineapple estate. There is also livestock rearing in the area. The whole area is being affected by rapid peri-urban growth around Nairobi and land acquisition, property development and travel opportunities into Nairobi and Thika are beginning to influence the local economy.			
Maps of road, with context and hub and spoke connections			
			
Description of hub and spoke patterns			
Tala is a small and growing town with a transport terminal hub with bus routes to the city of Nairobi and several minibus and rural taxi routes including to Kilimambogo, Kangundo and Machakos. Kilimambogo is a much smaller community with a market and small transport terminal, with transport services routes to Tala and the industrial town of Thika. Kisukioni and Kwa Mwaura are smaller communities along the route that are transport stops for the minibuses and small hubs for motorcycle taxis.			

Intermodal connectivity *(one to five stars, the more stars the better)*				
'Feeding'[7]	*User satisfaction*[8]	★★★☆☆	*Development impact*[9]	★★★☆☆
'Linking'[10]	*User satisfaction*[11]	★★★★☆	*Development impact*[12]	★★★★☆

Schematic map of 'straightened' road with features



GPS elevation track *(same horizontal scale)*



GPS speed track[6] *(same horizontal scale)*

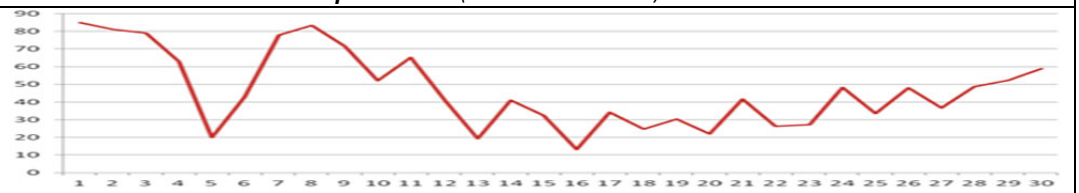


Table 2. Traffic and transport along road

Daily traffic flows[1]					**Fleet**[2]	**Passengers and small freight**[3]						
	Normal[4]	*Busy*[5]	*Disrupted*[6]	*Impass-able*[7]	*No of RTS vehicles operating on road*[8]	***Trip transport*** *normal day per vehicle*[9]		***Daily transport*** *normal day all vehicles*[10]		***Annual transport*** *adjusted for traffic fluctuations*[11]		***Change*** *in past year*[12]
						Pax (no) [14]	*Frt (kg)* [15]	*Pax (no)* [16]	*Frt (kg)* [17]	*Pax (000)* [18]	*Frt (t)* [19]	*- - 0 ++*
Bus (large)	0	0	0	0	0							
Midi-bus	1	2	1	0	1	wip	wip	wip	wip	wip	wip	wip
Minibus	40	60	18	0	18	18	400	995	16000	37	5600	0
Rural taxi	30	40	15	0	8	wip	wip	wip	wip	wip	wip	wip
Passenger truck	0	0	0	0	0							
Large truck	1	2	0	00								
Small truck	7	15	4	0								
Govt/ private/NGO	10	20	5	0								
Motor tricycle	0	0	0	0	0							
Motorcycle	170	250	80	80	82	2	50	552	12,000	21	4200	+
Bicycle	20	40	15	15								
Riding/pack animal	0	0	0	0								
Animal cart	wip	wip	wip	wip	wip							
Pedestrians >5km	wip	wip	wip	wip								
Totals												

wip: work in progress (data is being checked or is not yet available)

Table 3. Key operational statistics for major transport modes		
		
	Minibus	*Motorcycle*
Contribution to annual passenger transport (% of market)	wip	wip
Contribution to annual small freight transport (% of market)	wip	wip
Fare per km in USDc[4]	6	15
Journey time (average speed on normal days) in km/hr [5]	21	21
Transport frequency (normal days) [6]	35	14
Disruption factor (%)[7]	76	64
Men as % of passengers/day [8]	43	47
Women as % of passengers/day [8]	48	47
Children as % of passengers/day [8]	9	6
Cost of 50 kg accompanied freight in USD per tonne-km [9]	wip	wip
Cost of 200 kg consigned freight in USD per tonne-km [10]	wip	wip
Safety: Recalled no. of accidentsper 100,000 journeys [11]	173	550
Security: Recalled no. of incidents per 100,000 journeys [12]	25	80
Operating distance per year in km[13]	wip	wip
Vehicle operating costs (VOC)/year (USD) [14]	wip	wip
VOC per passenger-km (USDc)[15]	wip	wip
Operating income per passenger-km (USDc)[16]	wip	wip
Percentage operating income due to freight[17]	wip	wip
Regulation compliance (overall assessment) [18]	★★☆☆☆	★★☆☆☆
Development impact (overall assessment)[19]	★★★☆☆	★★★★☆
wip: work in progress (data is being checked or is not yet available)		

Table 4. User satisfaction with main RTS modes (disaggregated for gender)						
	Minibus		**Motorcycle**		**Rural Taxi**	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
Sample size (N)	*17*	*13*	*15*	*8*	*2*	*0*
Fares	★★★☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★☆☆☆	
Journey time	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	
Operational features [2]	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆	
Freight [3]	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	
Safety and security [4]	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★★	
Comfort [5]	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	
Universal access [6]	★★☆☆☆	★★★☆☆	★★☆☆☆	★★☆☆☆	★★★☆☆	
Overall satisfaction [7]	**3.1**	**3.1**	**3.2**	**2.8**	**3.1**	
The more stars the better. ★☆☆☆☆ *= Very dissatisfied.* ★★☆☆☆ *= Dissatisfied.* ★★★☆☆ *= Medium.* ★★★★☆ *= Satisfied.* ★★★★★ *= Very satisfied.*						

Part 2: Report

Overview of road situation and issues

The Tala–Kilimambogo (also known as Ol Donyo Sabuk) Road is classified under the Kenyan system of road classification as Class D (ie, it is a secondary Road linking locally important centres). It links Tala (Geo-Code 37 0312964–9860036), a vibrant rural hub where many commercial and social services are available, to Kilimambogo to the north (Geo-Code 37 0311425 - 9872841), a small but busy market hub for a wide range of agricultural commodities. The road traverses gently undulating landscape characterised by several ridges and hills, rising towards the east to the highest hill (Kilimambogo or Ol Donyo Sabuk peak) which is 2144 m above sea level. From Tala, after four kilometres, the road passes through Kisukioni, an administrative centre and headquarters of Matungulu District. Further north it passes through Kwa Mwaura, a trading and former mission post situated about 21 km from Tala and 8 km from Kilimambogo. The road is therefore an important connector between the busy Kangundo–Nairobi Road and the Thika–Garissa highway (Figure 1).

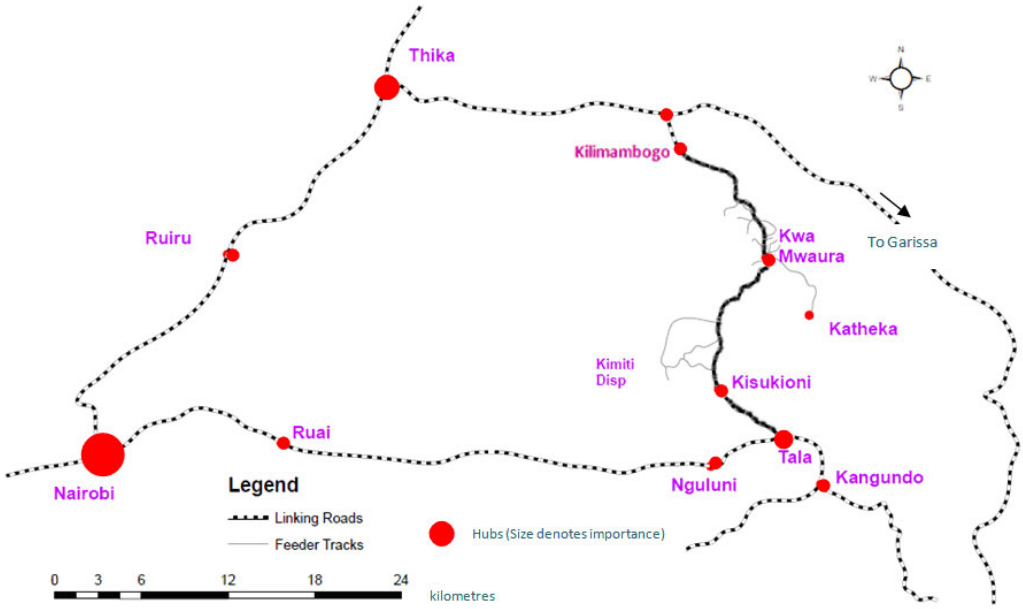


Figure 1: The context of the surveyed road

The grading of the road in 2010, a year after Matungulu was upgraded to a District (it had been a Division of Kangundo District), has generally improved its condition and attracted increased transport services. In general, RTS operators said the road is motorable with difficulties, which would suggest that more regular and better maintenance of the road could improve its condition. However, the overall assessment of the rural transport services (RTS) from the perspective of development personnel was positive. Currently, the road and the rural transport services (primarily motorcycles and minibuses) are having positive development impacts in the area. This has resulted, for example, in many people buying land for property development as new immigrants start to settle in this previously neglected region on the peri-urban fringe of Nairobi. Performance of schools in the area has also improved (based on exam performance charts) which was probably a result of improved access and mobility conditions for both teachers and pupils. There is also evidence that agriculture in the area is undergoing a transformation from food deficit zone to self-sustenance. Maize, with legumes (green beans and pigeon peas) are the most common food crops, along with fruit crops including mangoes, papaya, avocado and some coffee plantations. There is also livestock rearing in the area and a large agro-industrial pineapple plantation.

The area in which the road is located is rapidly being absorbed into the peri-urban fringe of Nairobi. Increased human settlements and socio-economic activities are exerting a growing demand for

transport services. With this in mind, the Tala–Kilimambogo road requires regular and better maintenance in order to service the growing demand for mobility. Although the road is considered 'fairly safe' from the regulators' perspective, there is certainly need to improve the general road infrastructure condition and signage. The average speed for vehicles is 40 km/h. However, the first 5 km from Tala towards Kilimambogo is in good condition and vehicles achieve speeds above 40 km/h (80 km/h while recording the speed track). The local authority has maintained this section because it links with the District Headquarters at Kisukioni. The area between Kisukioni and Kwa Mwaura centres is characterised by rocky outcrops and gullies on the road. These features make it difficult for vehicles to attain speeds above 40 km/hr (see GPS speed track).

Overview transport services situation and issues

The main means of transport on the Tala–Kilimambogo road are minibuses and motorcycles, with about 82 motorcycles and 18 minibuses operating on normal days (more on busy days and fewer on disrupted days). There are also rural taxis that generally operate on particular sections of the road as they link Tala and Kilimambogo with settlements off the road. There is also a daily medium distance midi-bus that passes along the road. Minibuses transport 358,000 people annually compared with the 213,000 passengers transported by motorcycles annually (see Figure 2). While fewer in number, minibuses generally carry 18 passengers per trip compared to two for motorcycles. Despite the big difference in capacity, motorcycles make many shorter distance trips per day compared to other modes. This, together with their fleet size, explains their current share (37%) of the market (excluding rural taxis and the midi-bus). This is likely to change with time as the number of motorcycles as well as the number of passengers transported by this mode is fast growing.

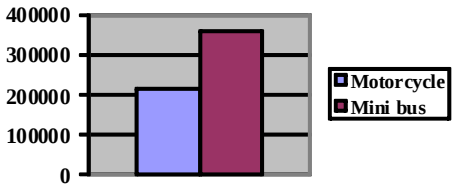


Figure 2: Annual passenger volumes for motorcycles and minibuses

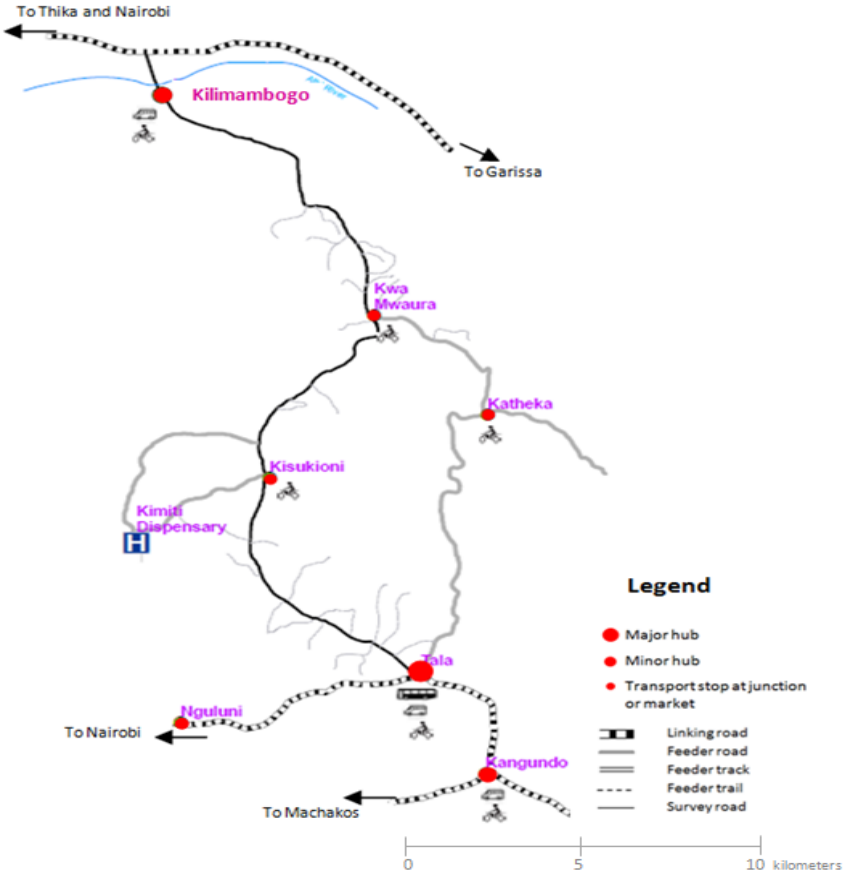


Figure 3: Road showing hubs, linking and feeding roads

User perspectives

A total of 31 users of RTS along the Tala–Kilimambogo Road were interviewed. Of these 18 (58%) were male and 13 (42%) were female. Different types of users were interviewed as shown below in Figure 4. The largest group was in the employment category while people travelling for reasons relating to finance was the least. The youngest respondent was 7 years and the oldest was 70 years.

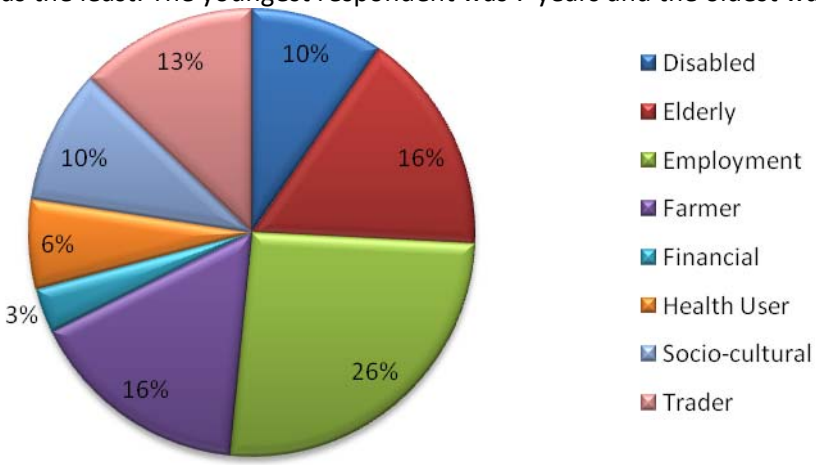


Figure 4: The type of users interviewed

Summary of user satisfaction with motorcycle transport services

The survey interviewed both women and men on their satisfaction with the different means of transport. For the motorcycle transport service, 15 (66%) men and 8 (34%) women were interviewed. Figure 5 shows gender disaggregated levels of satisfaction with passenger fares, journey times, service frequency, and service predictability. Higher scores (away from the centre) represent greater satisfaction. Both genders were satisfied with service frequency and medium satisfied with journey times. Men tended to be more satisfied with service predictability of motorcycles compared to women. Women also tended to be less satisfied with passenger fares compared to men.

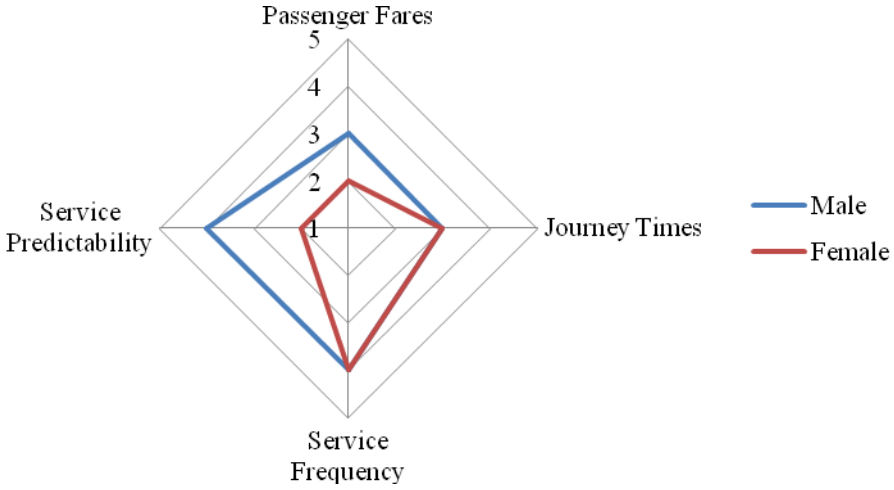


Figure 5: User satisfaction with motorcycle fares, journey times, frequency and predictability

In terms of motorcycle freight characteristics, both men and women were satisfied with small freight availability, small freight charges, medium freight availability and medium freight handling (Figure 6). Men were more satisfied with courier services and the charges for consigned freight.

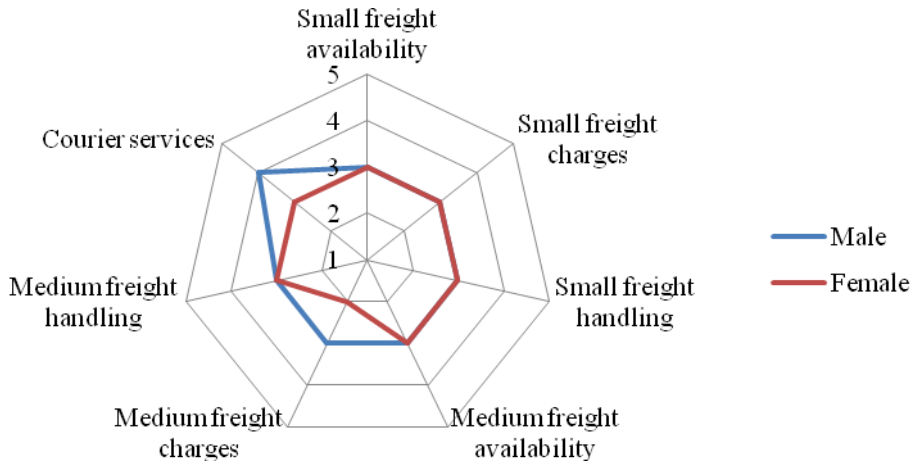


Figure 6: User satisfaction with motorcycle freight services

Both women and men were equally satisfied with the level of comfort in terms of motorcycle seats but only medium satisfied with the level of comfort in terms of baggage around the passengers. Both men and women thought access was poor for vulnerable people (elderly or physically challenged people, for example those using mobility aids). Similarly the level of comfort in terms of the environment (noise levels/dust/heat) was considered poor for both male and female passengers on motorcycles on the road (Figure 7).

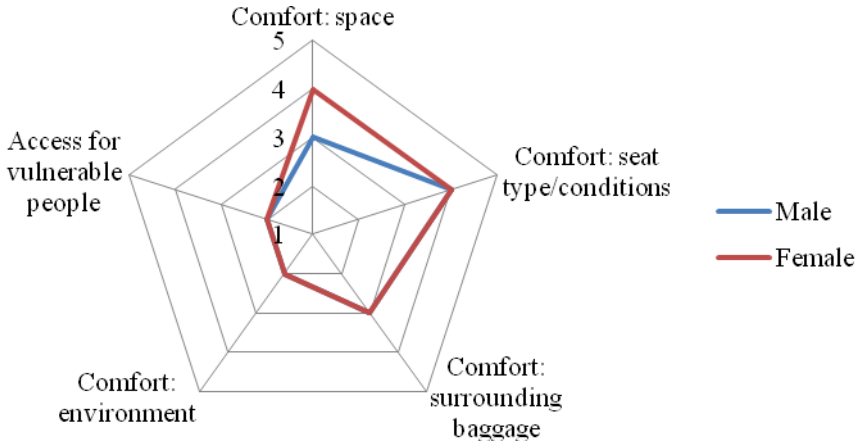


Figure 7: Level of user satisfaction with motorcycle comfort and access for vulnerable people

Both women and men expressed satisfaction with passenger capacity. Motorcycles often carry two passengers per trip although there are many situations when only one passenger is available. On road safety and security, both men and women have medium satisfaction with the level of safety of motorcycles on this road. At the same time they were both medium satisfied with the level of security of this mode of transport on the Tala–Kilimambogo Road.

Summary of user satisfaction with minibuses

A total of 30 interviewees responded to questions on minibuses, 17 (57%) men and 13 (43%) women. Both genders expressed similar level of satisfaction (medium satisfaction) with passenger fares, journey times, service frequency and predictability of minibus transport services along the Tala–Kilimambogo Road.

With regard to small and medium freight services offered by mini buses, there was a gender difference in the level of satisfaction with respect to the availability of small freight services (20-50 kg of accompanied goods). In general women said they were satisfied with the available small freight service while their male counterparts said they were only medium satisfied with the same services. The same responses were obtained with respect to the levels of satisfaction with handling

of small freight services. Another difference related to the availability of medium freight services (200kg) where men said they were medium satisfied while women said they were unsatisfied. These results are shown in Figure 8.

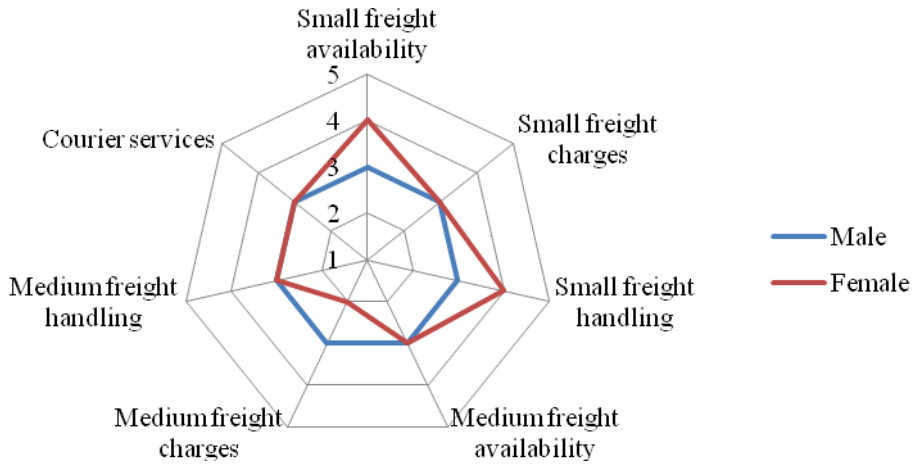


Figure 8: User satisfaction with minibus freight services

Gender disaggregated levels of satisfaction with respect to comfort of services offered by minibuses as well as access for vulnerable people are depicted in Figure 9. In general, both women and men have similar levels of satisfaction on all aspects of comfort discussed, including seat space, seat type/conditions, baggage around passenger and noise levels/dust/heat in the minibus. However, as seen in Figure 9, men were less satisfied with the present convenience of access for the elderly and physically challenged people. One possible explanation for this apparent difference is that the three people with disabilities interviewed were all males.

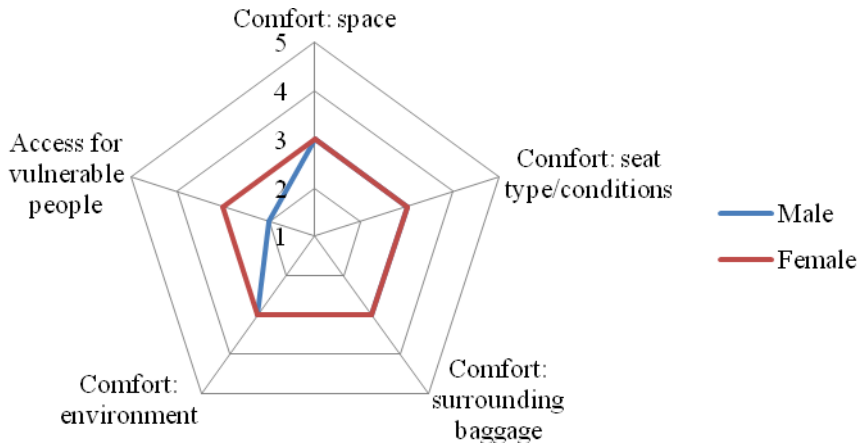


Figure 9: User satisfaction with minibus comfort and access for vulnerable people

Men and women expressed the same levels of satisfaction with regard safety and security issues and passenger capacity for minibuses. However, the level of satisfaction was lower in relation to passenger capacity, which may be associated with overloading issues.

Overall assessment of all transport modes

Both women and men said they were very unsatisfied with roadside waiting facilities, which in most cases do not exist. However, both men and women are moderately satisfied with inter-modal integration of services along the road and satisfied with the inter-modal integration with services beyond the road. This suggests that rural transport services in the area facilitate the movement of people and goods to and from the road as well as facilitating timely links to other types of transport on the Thika-Garissa road and the southern roads to Nairobi. All the satisfaction levels relating to the transport services are summarised in Table. 5

Table 5. Summary of user satisfaction disaggregated for gender						
Means of transport	**Minibus**		**Motorcycle**		**Rural taxi**	
Gender of respondent	**M**	**F**	**M**	**F**	**M**	**F**
Sample size (N)	*17*	*13*	*15*	*8*	*2*	*0*
Passenger fares	3	3	3	2	2	
Journey times	3	3	3	3	2	
Service frequency	3	3	4	4	4	
Service predictability	3	3	4	2	4	
Passenger capacity	3	3	4	4	4	
Small freight availability	3	4	3	3	3	
Small freight charges	3	3	3	3	4	
Small freight handling	3	4	3	3	4	
Medium freight availability	3	3	3	3	2	
Medium freight charges	3	3	3	2	2	
Medium freight handling	3	3	3	3	2	
Courier services	3	3	4	3	3	
Road safety	4	4	3	3	4	
Security	4	4	3	3	4	
Comfort: space	3	3	3	4	4	
Comfort: seat type/conditions	3	3	4	4	4	
Comfort: surrounding baggage	3	3	3	3	3	
Comfort: environment	3	3	2	2	4	
Access for vulnerable people	2	3	2	2	3	
Overall un-weighted	**3.1**	**3.2**	**3.2**	**2.8**	**3.1**	
Overall weighted						

Satisfaction for all transport types		
Gender of respondent	**M**	**F**
Facilities at roadside stops	1	1
Feeding intermodal connectivity	3	3
Linking intermodal connectivity	4	4
Overall un-weighted	**2.9**	**2.8**
Overall weighted		
The higher the score the better. 1 = Very dissatisfied. 2 = Dissatisfied. 3 = Medium. 4 = Satisfied. 5 = Very satisfied		

Operator perspectives

A total of six operators were interviewed, three of each for the two main transport modes (minibuses and motorcycles). All three of the minibus operators interviewed were hired drivers. The three motorcycle operators all hired their motorcycles from fleet owners who charged KSH 300/day (approximately USD 3.60/day). Fares per passenger-km are higher for motorcycles at around 15 USDc (KSH 13) compared to USDc 6 for minibuses (KSH 5). Accompanied freight on motorcycles is twice as expensive as in minibuses.

Both motorcycles and mini-bus operators expressed a medium level of satisfaction on the road condition, they both felt the road condition restricted their speed (to around 21 km/h). Both types of operator had similar medium scores on the adequacy of working capital and financial services. Both types of operator expressed satisfaction with the availability of back-up services (spare parts and repair services) as well as availability of facilities offering formal credit. The responses are summarised in Table 6.

Table 6. Summary of operator perspectives		
Means of transport	**Minibus**	**Motorcycle**
Sample size (N)		
Road condition for operations	★★★☆☆	★★★☆☆
Adequacy of working capital	★★★☆☆	★★★☆☆
Facilities for formal credit	★★★★☆	★★★★☆
Facilities for informal credit	★★★☆☆	★★★☆☆
Adequacy of technical facilities	★★★★☆	★★★★☆
Regulatory disincentives	★★★☆☆	★★★☆☆
Regulatory incentives	★★★☆☆	★★☆☆☆
Active associations	★★★☆☆	★★☆☆☆
Security risks	★★★★☆	★★★☆☆
Un-weighted average [2]	**3.3**	**3.0**
Weighted average[3]		
The more stars the better. ★☆☆☆☆ *= Very dissatisfied.* ★★☆☆☆ *= Dissatisfied.* ★★★☆☆ *= Medium.* ★★★★☆ *= Satisfied.* ★★★★★ *= Very satisfied.*		

Regulator perspectives

Two people were interviewed to provide the regulator's perspective. One was an enforcement officer with the local council, responsible for management and revenue collection at the Tala terminus. Another was a police officer who did not want to be quoted on record because he was not authorised to comment officially. The enforcement officer at the local council restricted his perspectives to issues of revenue collection and order in the terminus. He confirmed compliance of minibuses to daily terminal charges, parking zones and time-tables. They were well self-regulated through their association that assisted in enforcing time-tabling and order in the terminus. The police confirmed that generally, there was a medium level of compliance by minibuses on technical and insurance issues, while safety and environment issues scored poorly.

There were however difficulties with motorcycles because they used informal termini and, although they were ubiquitous, there was no clear regulatory policy on the management of their operations. The overall compliance of motorcycles was low. The police conceded that there is a poor regulatory and enforcement framework for motorcycles as the laws have lagged behind the growth of the industry. Also, for this particular road, there are no well-established motorcycle associations. Emerging associations are more focussed on social welfare rather than self regulation and operational issues. The policeman noted that in general, full compliance along rural roads is hardly practicable given the fact that standards established for urban and inter-urban transport are not suited for rural services. Furthermore, the capacity for enforcement is very low as the presence of police officers is very thin in rural areas. The perspectives are summarised in Table 7.

Table 7. Summary of regulator perspectives		
Means of transport	**Minibus**	**Motorcycle**
Vehicle technical compliance	★★★☆☆	★☆☆☆☆
Vehicle fiscal compliance	★★★☆☆	★☆☆☆☆
Insurance compliance	★★★☆☆	★☆☆☆☆
Operational compliance	★★★★☆	★★★★☆
Safety compliance	★☆☆☆☆	★☆☆☆☆
Environmental compliance	★☆☆☆☆	★☆☆☆☆
Regulatory planning framework	★☆☆☆☆	★☆☆☆☆
Safety of the road	★★★☆☆	★★★☆☆
Un-weighted average	**2.4**	**1.6**

The more stars the better. ★☆☆☆☆ = Very poor. ★★☆☆☆ = Poor. ★★★☆☆ = Medium. ★★★★☆ = Good. ★★★★★ = Very good.

Table 8. Summary of development perspectives				
Means of transport	**Minibus**	**Motorcycle**	**Rural taxi**	**Truck**
Agricultural facilitation	★★★★☆	★★★★☆	★★☆☆☆	★★☆☆☆
Enterprise/trade facilitation	★★★☆☆	★★★★☆	★★☆☆☆	★★☆☆☆
Women's empowerment	★★★★☆	★★★★☆	★★☆☆☆	★☆☆☆☆
Disabled people's empowerment	★★★☆☆	★★★☆☆	★★★☆☆	★☆☆☆☆
Young people's empowerment	★★★★☆	★★★★★	★★★☆☆	★★★★☆
Maternal health needs	★★★★☆	★★★★☆	★★★★☆	★☆☆☆☆
Medical service transport	★★★☆☆	★★★★☆	★★★★☆	★☆☆☆☆
Education-related transport	★★★★☆	★★★★☆	★★★☆☆	★☆☆☆☆
Mobile phone and ICT integration	★★☆☆☆	★★★★★	★★★★★	★★☆☆☆
Un-weighted average [2]	**3.4**	**4.1**	**3.0**	**1.8**
Cultural impact	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆
Environment impact	★★★☆☆	★★★☆☆	★★★☆☆	★☆☆☆☆
HIV/Aids impact	★★☆☆☆	★★☆☆☆	★☆☆☆☆	★★☆☆☆
Un-weighted average [3]	**2.6**	**2.4**	**2.5**	**1.8**
Overall weighted average[5]				
Number of interviews (people answer questions relevant to their experience)				*6*

The more stars the better. ★☆☆☆☆ = Very poor. ★★☆☆☆ = Poor. ★★★☆☆ = Medium. ★★★★☆ = Good. ★★★★★ = Very good.

Development perspectives

Six people were interviewed to gain development perspectives in the education, health, agricultural sectors and trading sectors. These sectors are crucial in rural development. Since agricultural extension services do not exist anymore, transport services in the sector are mostly seen from the point of view of buying and selling of agricultural inputs and produce. Two decades ago, extension services demanded some level of rural mobility, but this was provided by government owned motorcycles and bicycles. There is a good level of satisfaction with the role of minibuses and motorcycles in facilitating agricultural inputs and marketing. They are an important part of the distribution of food from key hubs in Tala and Kilimambogo to the smaller hubs along the road.

Although they are uncomfortable, motorcycles are particularly useful for those seeking medical attention. The hospital in this area is located about 4 km from the road and is not served by minibuses. Apart from walking, motorcycles are the main transport mode to reach the hospital. The development perspectives are summarised in Table 8.

Conclusions

The Tala–Kilimambogo road survey has helped profile some of the emerging characteristics of rural transport services in Kenya. Transport services along this road consist mainly of minibuses and motorcycles. Motorcycles offer flexible short distance services of around 7 km per journey. Minibuses offer medium distance services between Tala–Kilimambogo Road and the places along the roadside. The area is fast becoming part of the expanding Nairobi-Thika peri-urban area. The population is increasing and small-scale business is beginning to thrive. Demand for housing, schools and health facilities is likely to increase. A vibrant construction sector is likely to develop soon. Demand for improved transport with better maintained roads, roadside waiting facilities and an efficient transport services should be an important development priority. The government tends to view transport service policies from the point of view of regulations. It is important to take a broader planning approach that supports and incentivises better transport services. Key elements of this would include such issues as inter-modal integration, use of ICTs to monitor and manage transport services and paying attention to the needs of different transport users, the disabled, children and women.

The 18 minibuses operating on this road provide a regular and predictable service, leaving the termini at 20 minute intervals. The minibus service seems to operate at good capacity. The minibuses operating on this road are in relatively good condition, and would benefit from better road infrastructure.

The recently started and highly responsive motorcycle transport services are of huge importance for both men and women in rural areas. An important aspect of this is their ability to provide linking transport services from the homesteads to the roadside and also from one hub to another. Mobile telephones have become an important tool for enabling users to get motorcycle transport service when needed. Both men and women report a good level of satisfaction with motorcycle services, though men express higher levels of satisfaction then women. The higher fares per passenger-km charged by motorcycles are noted as a concern by the users, though they acknowledge that convenience of use and responsiveness compensates for the higher fares. Operation of motorcycle taxis has also become an important source of employment for rural youth. There are about 80 motorcycles operating on the survey road. Apart from direct employment to the operators, they are also an important part of rural enterprises through leasing services and repair and maintenance services.