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Baseline study on rural transport service indicators Kidabaga-Boma La Ng'ombe Road, Kilolo District, Tanzania

Final Report

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Cover Photo: Bus Service, Kilolo District Tanzania

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Abstract

Support for the development of rural transport services should go in tandem with investments in rural roads. There is a need to understand what constitutes good rural transport services in order to provide effective interventions.

This report describes a small scale study of rural transport services along the Kidabaga-Boma la Ng'ombe road in Kilolo District, Iringa Region, Tanzania. The aim was to collect data that can be used to describe the performance of rural transport services in the area. Data collected included: Existing modes of transport, costs for passenger and small freight by mode, reliability and frequency of transport services, and gender and age preferences for modes.

The study shows that conventional public transport vehicles such as buses and mini-buses are few in the survey area. Motorcycles have become important for short and medium distance transport. They are associated with higher service frequency, better responsiveness and ability to access remote places. They are however more expensive per passenger and tonne-km. Other notable findings are: The importance for users to have predictable services for time planning, the need to address seasonal fluctuations in services caused by impassability of roads in rainy season and the importance of transport services being able to provide mixed transport for freight and passengers is also highlighted. This is especially so because freight trucks complement buses as a means of medium and long distance passenger travel.

Recommendations are made for longer and more systematic studies on rural transport services. Such studies should be designed to encourage collaboration between rural road agencies and transport service stakeholders.

Key words

Rural Transport Services, Rural Transport Indicators, Rural Access Indicator, Rural Access.

Acronyms, Units and Currencies

$	United States Dollar (USD) In April 2015, USD 1 ≈ TZS 2000. USD 1 ≈ GBP 0.68
UK£	United Kingdom Pound (UK£≈3400)
AFCAP	Africa Community Access Partnership
ASCAP	Asia Community Access Partnership
DED	District Executive Director
DFID	Department for International Development (UKaid)
DSDO	District Social Development Officer
GIS	Geographical information systems
GoT	Government of Tanzania
IDA	International Development Association
IFRTD	International Forum for Rural Transport and Development
IMT	Intermediate means of transport
kg	kilogramme
km	kilometre
PMO-RALG	Prime Minister's Office – Regional Administration and Local Government
RAI	Rural Access Index
RTS	Rural Transport Services
ReCAP	Research for Community Access Partnership
RTSi	Rural Transport Services Indicator
SSA	Sub-Saharan Africa
SSATP	Sub-Saharan Africa Transport Policy Program
SUMATRA	Surface and Marine Transport Regulatory Authority
TANROADS	Tanzania National Roads Agency
TFG	Tanzania Forum Group
TOR	Terms of Reference
TZS	Tanzania Shillings (in April 2015, USD1 ≈ TZS 2000; GBP1 ≈ TZS 3000)
US$, USD	United States Dollar (in April 2015, USD 1 ≈ TZS 2000. USD 1 ≈ GBP 0.68)

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1 Executive Summary

This report describes a small scale survey of Rural Transport Service Indicators that was carried out along the Kidabaga-Boma la Ng'ombe road in Kilolo District, Iringa Region, Tanzania. The study is part of a process of building up knowledge on key characteristics of rural transport services. It is hoped that a series of such studies will lead to the development of data sets that can be used to develop Rural Transport Services Indicators (RTSi) that will support the existing World Bank's developed Rural Access Index (RAI). The importance of planning for transport services together with transport infrastructure is increasingly being recognised. Investments in better rural roads can be optimised through improvements in the transport services that operate along them. Rural transport services provide rural communities with access to markets, health services, education, livelihoods and numerous economic, social and civic opportunities. It is therefore important to understand the key attributes, characteristics and issues that are important in measuring the quality and adequacy of rural transport services.

The study builds on previous pilot work that was supported by AFCAP (Phase 1) in Tanzania, Kenya and Cameroon in the period 2012-2013. The earlier work used an experimental process in collecting a wide range of data from users, regulatory authorities, owners and operators of services, and agencies involved in rural development in sectors where transport plays an important role.

This current work focussed on collecting data on a narrower set of transport service attributes. The methodology used was built around a key question: "***what baseline data is the most important in describing and assigning key performance characteristics of the transport services operating along a road?"*** To answer this question, Key Informants from relevant government agencies and ministries were identified. A questionnaire was sent to them from which they were asked to select the key issues that should be the focus of the Kidabaga-Boma la Ng'ombe survey. From their feedback, priority issues identified (in order of importance) included:

- accessibility
- transport mode
- reliability
- affordability
- passenger fare
- number of competing services
- frequency of services
- small freight tariffs
- gender and age preferences.

The ranking formed the basis for narrowing down the data to be collected.

The study demonstrated a typical rural transport service situation. A traffic count showed that the majority of traffic on the road comprised pedestrians, followed by motorcycles, with only one bus service per day. Freight trucks also offer a passenger transport service though service reliability is erratic and also dependent on space availability. Despite there being a latent market for medium distance transport (to Kilolo and Iringa), operators are reluctant to bring in services on account of the extremely

hilly terrain coupled with the poor road surface condition in parts of the road. A significant number of short and medium distance trips are undertaken by foot.

Passenger fares vary between modes per passenger km. Motorcycles were found to be the most expensive. While motorcycle services are ubiquitous for local trips of short distance, discussions with people in the area showed dissatisfaction with their fares. Bus and trucks charge a more or less similar price for passengers. For comparable trips, motorcycle fares are at least three times higher than conventional bus fares. The passenger fare by bus mode from Mdeke to Boma la Ng'ombe is TZS 200/km (10 US cents) while by motorcycle the cost is TZS 825/km (40 US cents). Likewise the passenger fare from Boma la Ng'ombe to Kilolo bus is TZS 108/km (5 US cents) while by motorcycle the cost is TZS 690/km (34 US cents).

Freight costs vary between modes. For motorcycles, there is no significant difference in fare between unaccompanied and accompanied freight. For instance a journey from Mdeke to Kidabaga, (10 km) with accompanied freight costs TZS 8,528 (426 US cents) which is similar for unaccompanied freight. On the other hand for trucks, it costs TZS 6,963 (348 US cents) and TZS 2,920 (146 US cents for accompanied and unaccompanied freight respectively for the same distance.

The report concludes that collecting data on key aspects of rural transport services will help road research centres, local transport authorities and road agencies build knowledge of what constitutes good transport services, and how they can be evaluated and improved. The series of pilot RTSi research projects supported by ReCAP are providing a good basis for developing a standard set of indicators for transport services in Sub-Saharan Africa.

This report recommends the following in order to take the outcome of this study forward:

- Conduct a longer study on transport services based on statistically significant samples, in different locations and for different countries;
- Generate baseline data to show a numerical score of rural transport services in, for example a district;
- Creation of stronger collaboration and partnerships between the rural services research work and road agencies in order to jointly work together on key indicators that are mutually beneficial and can be adopted for planning purposes.

2 Research Objectives

This study is part of an ongoing ReCAP supported initiative aimed at contributing to the development of appropriate rural transport service indicators to enable better understanding of how rural transport services perform. With this study, no attempt was made to derive specific indicators, but rather it was aimed at providing illustrative data that can be reviewed and debated by stakeholders.

The objectives of this study were:

i) To collect primary data on rural transport services along the Kidabaga-Boma la Ng'ombe road with a narrower set of rural transport service attributes; and
ii) To initiate an engagement process with the relevant government agencies in Tanzania to agree on the key baseline data that would be useful to collect, and especially data that can be embedded alongside the RAI for use by the Government of Tanzania (GoT).

3 Review of Literature

3.1 Overview and Definitions

Indicators are a statistical benchmark that helps measure the progress of development in many fields. According to Segnestam (2002), several terms normally feature in the field of indicators. The most common ones are data (basic component of an indicator), indicators which are derived from data, index (combination of two or more indices of data) and information (the end result from the analysis of indicators, indices and data).

Development of indicators for rural transport services requires a broad definition that encompasses all facets involved in the provision of transport services. White (2011) defined the term rural transport as a link between small settlements traditionally based on agricultural activity and the nearest urban centers, usually market towns. However, rural areas can be easily distinguished from their basic characteristics, amongst others, lower frequencies of transport services, irregular service patterns including services operated only on certain days of the week such as market days (White, 2011; World Bank, 2007). Starkey et al (2002) pointed out that efficient rural transport system involve complementary large-and small-scale transport modes. Intermediate means of transport are important for on-farm, within-village and village-to market transport, and short trips within cities and peri-urban areas. Larger motorised vehicles are needed on routes with high demand, such as rural-urban links. Trucks and buses depend on local feeder transport for consolidation and dispersal of passengers and goods, notably transport hub such as markets, village terminals, and truck parks.

There are few references that propose methods and/or procedures for how to apply criteria in actual indicator development and selection process (e.g. Hardi and DeSouza-Huletey, 2000; Jackson et al, 2000; Innes, 1978). Accordingly, there are publications dealing specifically with indicator criteria for transport and/or sustainable transport (e.g. Dobranskyte-Niskota et al 2007; and Farchi et al 2006).

The available literature shows that indicators should have three main components, namely (a) name of the indicator, (b) definition and (c) unit of measurement. In this regard, the Rural Access Index (RAI) as developed by the World Bank (Roberts and Thum, 2005) is the closest proxy for Rural Transport Service Indicators that exists. The RAI measures the percentage of the population that lives within 2 km from an all-season road

3.2 Rural Transport Services

An analytical framework to define rural transport services can be used by looking at various components (Starkey, 2007). These include:

- Infrastructure (roads, bridges, tracks, footpaths, waterways, terminal hubs and spokes);
- Individual users (or potential users), differing by gender, age, wealth, occupation, ethnicity;
- Institutional users (health, education, government, NGOs, commercial companies);

- Means of transport (motor vehicles, intermediate means of transport, animals, boats) or lack of them (walking, failure to travel);
- Operators of transport (transport companies, agencies, taxi-operators, owner-drivers, users of IMTs);
- Transport regulators (governments and agencies, police, transport associations) and
- Physical, ecological, socio-cultural and economic operating environment.

Starkey et al (2002) identify the role of stakeholders and their demands as important to the development of rural transport services. Patterns of transport demand and supply are often linked to population densities and income levels in three broad categories. The first is low transport density in low-income areas, with few motorised vehicles or intermediate means of transport. A vicious circle of insufficient transport users and services impedes transport service development. Such patterns are found in many remote rural areas in Sub-Saharan Africa (SSA). The second category has higher transport density in low- to medium-income areas and is associated with medium to high population density, irrigated agriculture, cash crops, efficient marketing systems, and non-agricultural employment. In such areas transport services have achieved a critical mass, making it easy to buy and maintain various means of transport. Such patterns are found in higher-income rural and peri-urban areas of Sub-Saharan Africa. The third category is low to medium transport density in high-income rural areas. Transport infrastructure is mostly good, and people use motorised transport regularly to go to work, markets and social services.

There are a wide range of stakeholders that influence the provision, price, quantity, and quality of rural transport services. Key among them are users, operators, and regulators. Users set the demand for services based on income, occupation, age, gender, culture and special needs. Transport operators influence the transport sector mainly through their associations, which can affect the quality, quantity, and price of rural transport services. Where transport associations are politically and economically powerful and operate without real competition, rural transport becomes more expensive and less attractive to users. Transport service operators consist of public and private entities. Companies tend to operate medium-size and large vehicles, which require significant investment and organisational support. Individuals tend to invest in minibuses, pickups, and intermediate means of transport such as motorcycle taxis. Regulators can be from both local and national governments. They are often driven by the need to raise revenues from service providers and to enforce various rules and regulations. The approach of regulators may undermine the provision of effective rural transport services when high revenue charges may lead to an increase in fares and arbitrary enforcement of national standards – such as prohibition of mixed passenger and freight, which fails to take into account local travel circumstances.

3.3 Performance of Transport Services

3.3.1 Overview

Rural Transport services provide passenger and freight transport in rural areas. Inefficient transport services retard efforts towards meeting overarching national policy objectives such as Poverty Reduction and Millennium Development Goals (e.g. Ellis and Hine, 1998: Witkiss et al, 2001: Njenga and Davis, 2003). Transport is acknowledged as an enabler of development. By serving other sectors of a nation's economy, it puts development goals within reach (World Bank, 2008).

3.3.2 Safety Performance

Safety is a central element in assessing the performance of transport services. Accident statistics, if available and of good quality are still not enough to reflect safety performance. This is particularly so in rural areas where data on rural road accidents and their causes are under-reported. With the current increase in use of motorcycles in many rural areas of Africa, accidents are going to feature as an area of rural transport policy concern.

3.3.3 Gender

Studies show that gender equality is an important aspect in increasing development effectiveness and sustainability of rural transport infrastructure and services (e.g. Kunieda and Gauthier, 2007; Maramba and Bamberger, 2001; Rankin, 1999). Maramba and Bamberger (2001) developed gender–sensitive rural transport indicators with six (6) components namely; access, employment and entrepreneurship, income, time, affordability and voice in transport decision making.

3.3.4 Conclusions from the Literature

There is very little literature that specifically addresses the issue of rural transport services in Africa, especially regarding the issue of key performance characteristics. In 2005, the World Bank introduced the RAI which is now being applied in some countries as a standard for rural access planning. The Indicator measures the percentage of the population that lives within 2 km from an all-season road. Despite its usefulness, the indicator obscures a number of potential difficulties. Firstly, it fails to capture typical village level infrastructural bottlenecks such as broken footbridges, treacherous terrain etc - that may impede access to an all-season road. Secondly and more significantly, looking at rural access purely from proximity point of view obscures the fact that apart from roads, there needs to be reliable, affordable and safe transport services. Some rural transport services are inadequate in terms of affordability, safety, frequency and quality.

Literature on development of indicators shows that substantial investments are needed in development of indicators in any field. This is from the first stages of concept development through to identification of data needs, collection and verification of data sets and the derivation of indicators. The work done so far in collecting rural transport service data is a step that helps identify the key issues around which more robust data should be collected in the process of developing rural transport indicators. The process of collecting and identifying relevant indicators needs to be driven by key country level stakeholders who can then integrate them into the country's decision making processes.

4 Background to the Study Area

The road that forms the basis of this study is the Kidabaga-Boma la Ng'ombe road with an approximate length of 20 km. The area is in Kilolo District which is among four Districts in Iringa Region. The District has an area of 7,881 square km of which 6,803 square km are habitable whereas forests, mountains and water occupy the rest. The District borders Mpwapwa District (Dodoma Region) to the North, Kilosa District to the Northeast and Kilombero District to the East, Mufindi District to the South, and Iringa

District to the West. Administratively, Kilolo District is divided into 3 divisions, 23 wards, 93 villages, 484 hamlets and 51,455 households. The divisions are Kilolo Division with 12 wards, Mazombe Division with 8 wards and Mahenge Division with 3 wards. The District has a population of 218,130 people (United Republic of Tanzania, 2013) of who 112,274 are female and 105,856 are male.

The road starts at Kidabaga (about 54 km from Iringa town along Iringa – Idete regional road) and ends at Boma la Ng'ombe (See Figure 1). The road is under the jurisdiction of Prime Minister's Office Regional Administration and Local Government (PMO-RALG). The road passes through three wards, namely Dabaga, Ng'ang'ange and Boma la Ng'ombe. According to the 2012 Population Census the three wards had a combined total population of 23,223 and 5,187 households (Table 1).

Table 1: Population statistics for wards along the study road

Kilolo Wards	Population (Number)			Number of Households
	Both Sexes	Male	Female	
Dabaga	7,787	3,700	4,087	1,677
Ng'ang'ange	4,123	1,942	2,181	963
Boma la Ng'ombe	11,313	5,358	5,955	2,547
Total	**23,223**	**11,000**	**12,223**	**5,187**

Source: United Republic of Tanzania, 2013.

4.1 Economic activities

The major economic activities in the hilly hinterland are agriculture and livestock keeping. Crops grown include maize, sunflowers, beans, peas, vegetables and tomatoes. Farmers and traders use the village access spokes to bring produce from the farms and onto the Kilolo-Iringa road where some produce are sold and onto Iringa town and beyond. Kilolo is a growing district market town and a transport hub. Several district spokes feed into Kilolo town along which operate many motorcycles, bicycles and some freight trucks.

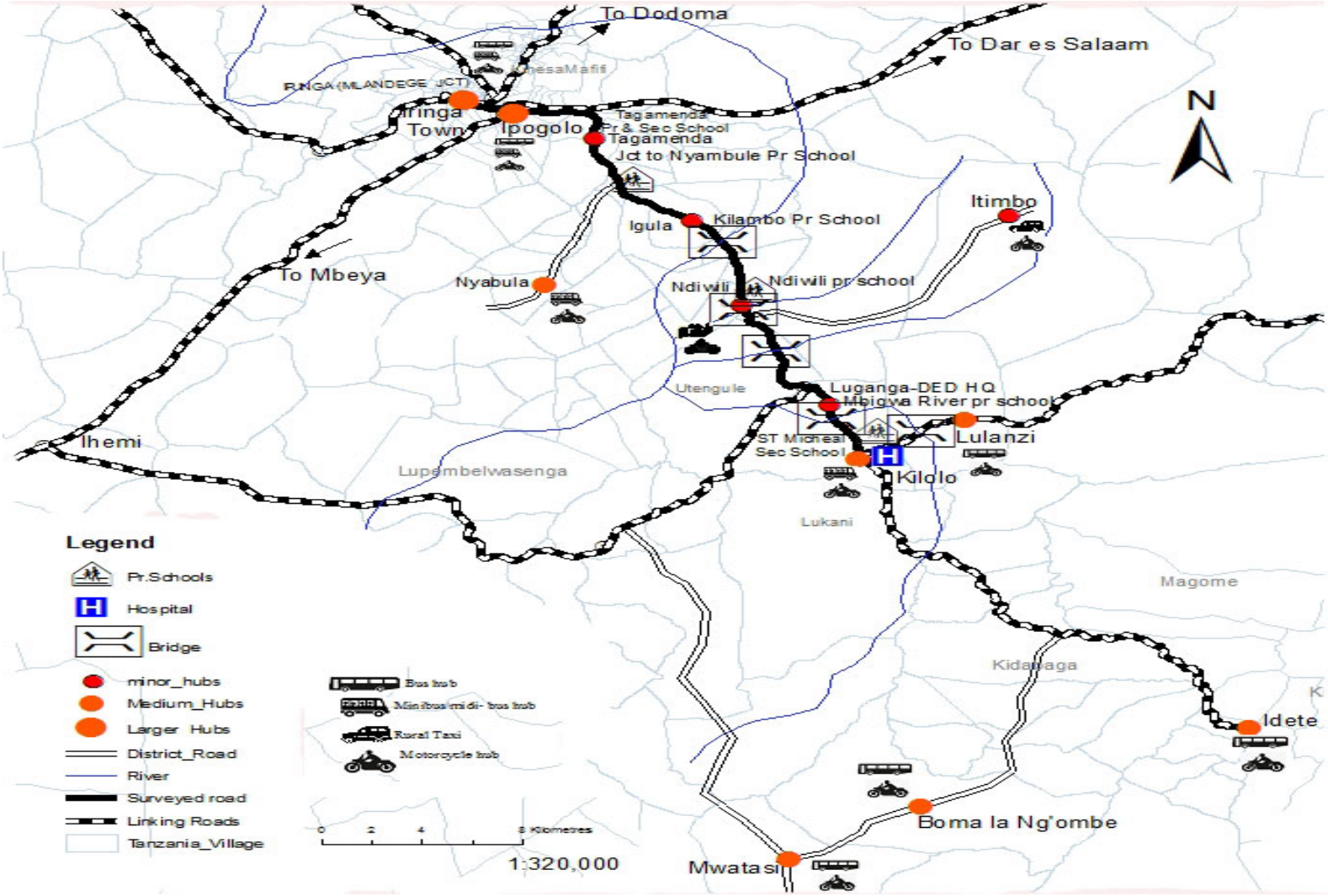


Figure 1: Study area context map

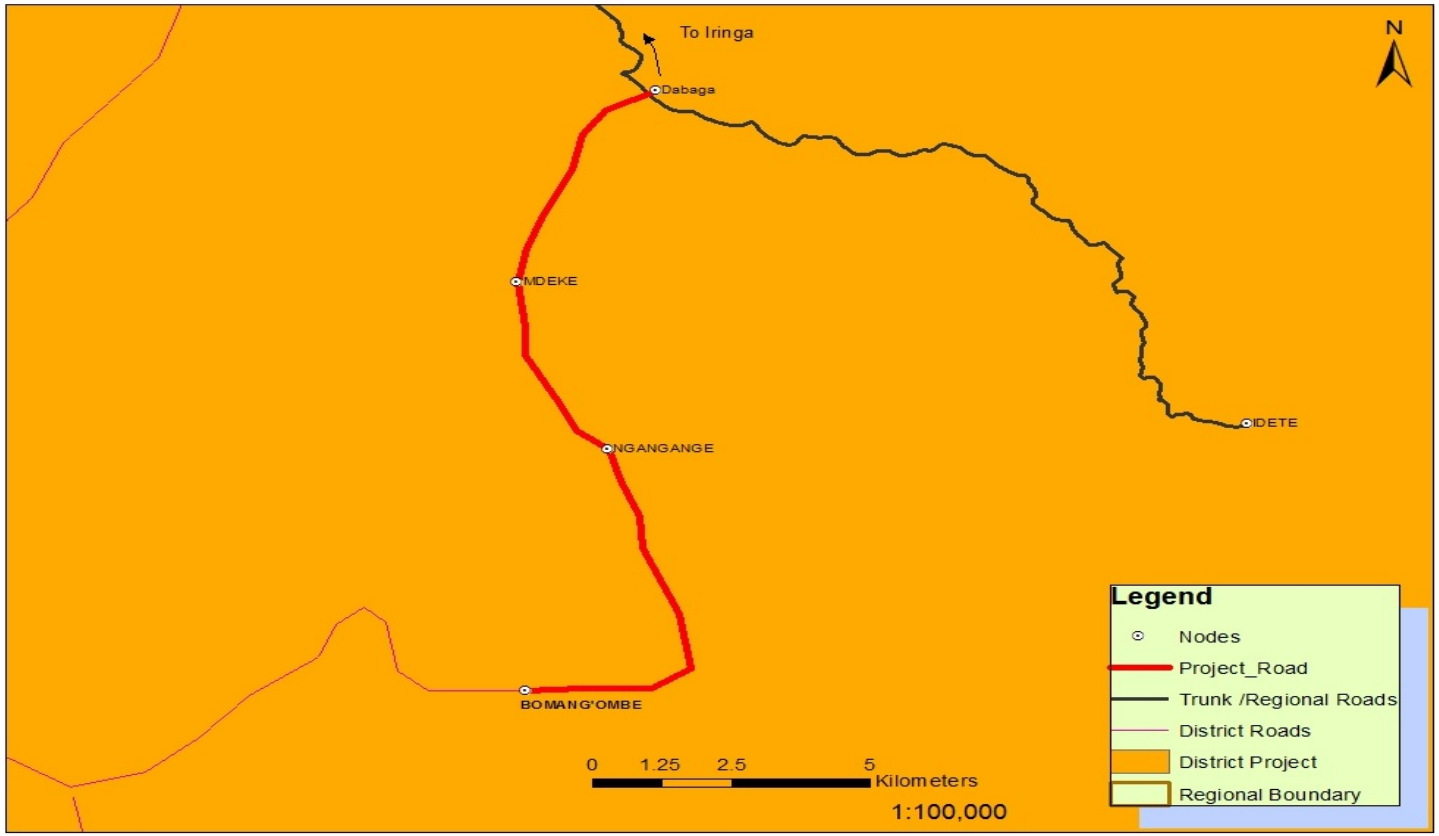


Figure 2: Map of the area showing the Kidabaga to Boma la Ng'ombe Road

The study road is shown in Figure 2. It starts from the junction of Kilolo-Idete Road at Daba in Kidabaga village and extends to Boma la Ng'ombe in the South.

5 Methodology

The study had two important dimensions. The first was an engagement process with the relevant government agencies in Tanzania to agree on the key baseline data that would be useful to collect, and especially data that would complement the RAI which the GoT has been trying to use with modifications.

The second was the collection of primary data on key attributes of the transport services operating along Kidabaga-Boma la Ng'ombe road.

5.1 Engagement Process with Key Stakeholders

A total of 13 Key Informants from the following 9 organisations in the transport sector were identified (See Annex 1 for a full list of informants):

- The Ministry of Transport (Tanzania);
- Ministry of Works (Tanzania);
- Surface and Marine Transport Authority (SUMATRA) – both nationally and in Iringa;
- Tanzania Roads Fund Board;
- Prime Minister's Office-Regional Administration and Local Government (PMO-RALG);
- Regional Planning officials in Iringa Region;
- The District Executive Director (DED), Kilolo;
- Kilolo District Social Development Officer (DSDO)
- Tanzania Forum Group (TFG).

A key informant questionnaire was sent asking them to rank key issues around which rural transport service data should be collected. Of the 13 Key Informants contacted, 6 responded from 6 of the target organisations. Only representatives from two organisations (Ministry of Works and SUMATRA) did not respond (See Annex 2).

5.2 Baseline data collection

Based on the responses from the Key Informants, the priority issues in order of importance included:

i) **Accessibility:** Distance, terrain and connectivity considerations for people to access RTS services on the study road.
ii) **Traffic survey**: to identify traffic volume, vehicle type, mode and composition of motorised and non-motorised vehicles and pedestrians along key road
iii) **Reliability:** Consistency and predictability of services.
iv) **Affordability:** A qualitative measure from the users' perspective. Can also be related to income levels
v) **Passenger fares** (cost per passenger-km) for each mode
vi) **Number of competing services:** Competitive environment has a bearing on fares and quality of services.
vii) **Frequency of services:** by mode and trip distance

viii) **Assessment of catchment population** along the road and the hinterland (catchment area of service)
ix) **Small freight tariffs** (20-50 kg) for each mode: Rural traders and farmers rely heavily on rural transport services. A typical consignment would normally be in the range of 20-50 kg
x) **Gender and age preferences:** Gender and age can be determinants of mode selection.

The ranking formed the basis for narrowing down the data to be collected (Table 2).

Table 2: Ranking of key relevant indicators for RTSi

Respondent's Organisation	Accessibility	Traffic Survey	Reliability	Affordability	Passenger fares	Number of competing services	Frequency of services	Assessment of catchment population	Small freight tariffs	Gender and age preferences
TFG	2	5	1	3	8	4	1	6	9	7
Local Government - PMO RALG	1	3	7	6	8	5	10	2	4	9
TANROADS	1	4	2	3	5	8	9	10	6	7
Ministry of Transport	1	2	4	5	3	6	7	10	8	9
Road Fund Board	1	2	5	9	8	4	3	6	7	10
Local Government - PMO RALG	1	3	5	6	2	7	8	4	9	10
Average Score	**1**	**3**	**4**	**5**	**6**	**6**	**6**	**6**	**7**	**9**
Ranking in Order of Importance	**1**	**2**	**3**	**4**	**5**	**5**	**6**	**6**	**7**	**8**

Source: Field data from study

5.3 Surveys and interviews

Primary data collection used simplified semi-structured questionnaires and checklists. During the previous phase of RTSi, data collection instruments for a wide range of attributes had been developed, tested and applied to a number of case studies. These instruments were modified and the range of issues to be covered condensed. Three types of interviews were conducted:

i) A survey of transport service users;
ii) A survey of transport operators;
iii) Key Informant interviews.

The surveys and interviews were conducted at 4 major village hubs namely Kidabaga, Mdeke, Ng'ang'ange and Boma la Ng'ombe. A 12-hour traffic count was also undertaken at Kidabaga and Boma la Ng'ombe villages on 26 March 2015.

5.3.1 Transport service users

A total of 45 transport service users were interviewed. Out of these, 15 were female and 30 male. Those interviewed comprised farmers (58%), traders (27%) and respondents who are both farmers and traders (15%). The transport service users' interview focus was:

i) To establish passenger and freight fares for various modes for a particular distance;
ii) To assess frequency of service/mode on normal, special and disrupted days (rainy);
iii) To investigate the perceived changes in modes available along the road in the last 2-3 years;
iv) To investigate the perceived changes in number of journeys made in the last 2-3 years; and
v) To rank the most important concerns with regard to rural transport services.

5.3.2 Transport service Operators

A total of 48 operators were interviewed. The operators were all male as no female operators could be found. Of these, 29 were operators only and the other 19 were transport service owner/operators. The transport service operators' survey aimed at assessing the following issues and their impact on service provision:

i) The road condition;
ii) Market demand;
iii) Availability of back-up financial and technical services for RTS;
iv) Competition and cooperation in service provision; and
v) Safety and security.

5.3.3 Key informant interviews

In addition to the key informant interviews that were conducted with national agencies to prioritise key data to be collected, local key informant interviews were also conducted with village leaders in the four village hubs along the road. The hubs are Kidabaga, Mdeke, Ng'ang'ange and Boma la Ng'ombe. In addition, one District Engineer was interviewed under this category. The intention of these interviews was:

i) To gain insights into the catchment area of the road;
ii) To check the population of villages along the road;
iii) To assess the social and economic activities that are serviced by various modes; and
iv) To find out the key transport services challenges and ways of resolving them.

5.4 Traffic Count

A 12-hour traffic count was undertaken at Kidabaga and Boma la Ng'ombe village on 26 March 2015. The counts took place in two places, one about 200 metres out of Kidabaga hub and the other about 200 metres before Boma la Ng'ombe hub. Based on this count, the average count of transport services observed along the road in both directions for the two count stations were as follows:

Table 3: Average Count of Transport Services in both directions for the Two Count Stations

Pedestrians	Bicycles	Motorbikes	Saloon cars	Buses	Pickups	Trucks	Tractors
118	10	66	3	2	2	2	5

Source: Field data from this study

It is worth noting that, this count was done on a rainy day which probably influenced traffic volume along the road.

Figure 3 shows the traffic volume at both traffic count locations along the Kidabaga-Boma la Ng'ombe road. The photographs in Figure 4 demonstrate the varied traffic mix along the road.

Figure 3: Traffic Volume Based on One Day Count at Kidabaga and Boma la Ng'ombe

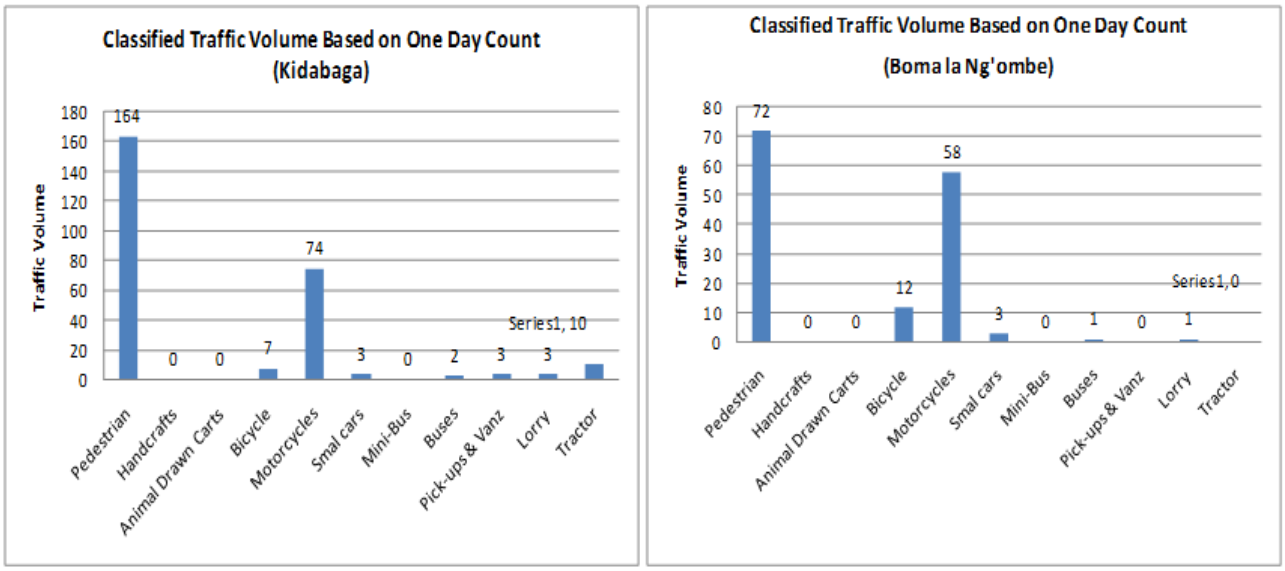


Figure 4: Traffic Mix along Kidabaga - Boma la Ng'ombe Road

5.5 Data Collection

The data collection was undertaken in March 2015. The assignment was preceded by recruitment of enumerators, training, and pre-testing. Data collection was conducted at 4 different village hubs along the road. The hubs are Kidabaga, Mdeke, Ng'ang'ange and Boma la Ng'ombe. Review of collected data was carried out daily. Data integrity review continued during and after data entry to produce reliable and consistent data files.

6 Results

6.1 Overview of Road Situation and Issues

The Kidabaga - Boma la Ng'ombe road is a 20 km district road under the jurisdiction of the Prime Ministers Office Regional Administration and Local Government (PMO-RALG). The road starts at Kidabaga village about 54 km from Iringa town and traverses through rolling and hilly terrain to Boma la Ng'ombe village, through Mdeke and Ng'ang'ange villages. The road comprises of gravel and earth sections resulting in limited access during the rainy season (see Figure 5).

48 operators were interviewed and asked about the condition of the road. Of these, 73% (35 operators) rate the road as poor but motorable for most parts of the year (Table 4).

Table 4: Road Condition Assessment - Operators Perspective

Road Condition Assessment	Transport Mode			Total Score
	Bus	Motorcycle	Truck	
Good for RTS		1		1
Fair for RTS		7	1	8
Poor but motorable for most parts of the year	1	29	5	35
Very poor and non-motorable for most of the year		3	1	4
Total Score	**1**	**40**	**7**	**48**

Source: Field data from this study

Transport services along this road are mainly motorcycles. One bus also operates once a day starting from Iringa Town to Boma la Ng'ombe via Kilolo and Dabaga. Trucks are also common especially for carrying agricultural produce, timber and building materials for the expansion of Boma la Ng'ombe town.

While motorcycle services are ubiquitous for local trips of short distances, discussions with people in the area show dissatisfaction with their fares. On the other hand, they consider the bus service as extremely inadequate compared to the number of people who need to travel within the area and beyond. However, despite there being an obvious market for medium distance transport (say Kilolo and Iringa), operators are reluctant to bring in services on account of the extremely hilly terrain coupled with poor surface condition. There are a lot of medium distance trips that are undertaken by foot.

Figure 5: Transport service challenges during rainy season

6.2 Cost of Rural Transport Service

6.2.1 Passenger fare

Passenger fare (per passenger km) varies between modes (see Table 5). Motorcycles are the most expensive. Bus and trucks charge more or less similar price for comparable distance. The passenger fare by bus from Mdeke to Boma la Ng'ombes is TZS 200/km (10 US cents) while by motorcycles the cost is TZS 825/km (41 US cents). Likewise the passenger fare from Boma la Ng'ombe to Kilolo by bus is TZS 108/km (5 US cents) while by motorcycles the cost is TZS 690/km (34 US cents). The fare for motorcycles appears to have some correlation with the road condition. Passenger fare per km from Mdeke towards Kidabaga by motorcycle is three times higher than what is charged by bus, but from Mdeke to Boma la Ng'ombe the cost is four times higher than what is charged by bus. It was reported that this difference is as a result of variations in road condition. Mdeke is a midpoint between Kidabaga and Boma la Ng'ombe, however the road is much better towards Kidabaga and relatively bad towards Boma la Ng'ombe. In addition, the cost for shorter trips within villages is much higher that between villages, for instance the passenger fare for motorcycles within Boma la Ng'ombe is TZS 1000/km (0.5 US$) while the fare by motorcycle from Kilolo to Boma la Ng'ombe is TZS 690/km (34 US cents) (Table 5 and Figure 6).

Table 5: Passenger Fare/km for Various RTS

RTS Mode	Origin/Destination	Average Passenger Fare							
		Boma la Ng'ombe		Kidabaga		Kilolo		Iringa	
		TZS/km	US$ cents/km	TZS/km	US$ cents/km	TZS/km	US$ cents/km	TZS/km	US$ cents/km
Bus	Boma la Ng'ombe			100	5	108	5	81	4
	Kidabaga							74	4
	Mdeke	200	10	200	10			85	4
	Ng'ang'ange			158	8			76	4
Motorcycle	Boma la Ng'ombe	1,000	50	739	37	690	34	355	18
	Kidabaga	750	38			735	37		
	Mdeke	825	41	742	37	741	37	703	35
	Ng'ang'ange	1,096	55	667	33	690	34		
Truck	Mdeke			217	11	222	11	94	5
	Ng'ang'ange	500	25			103	5		

Source: Field data from this study

Figure 6: Passenger fares per km from Mdeke for bus and motorcycle option (in TZS)

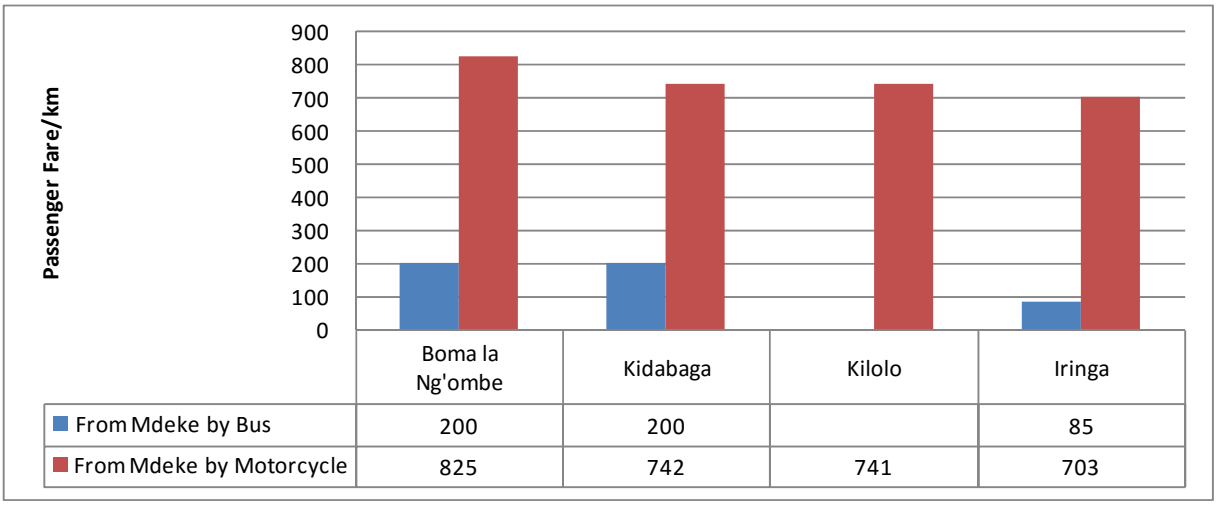


Table 6: Average Distance by Zone in km from Iringa to Boma la Ng'ombe

Origin/Destination	Average Distance by Zone - Fig. in km					
	Iringa	Kilolo	Kidabaga	Mdeke	Ng'ang'ange	Boma la Ng'ombe
Iringa		37	54	64	66	74
Kilolo	37		17	27	29	37
Kidabaga	54	17		10	12	20
Mdeke	64	27	10		2	10
Ng'ang'ange	66	29	12	2		8
Boma la Ng'ombe	74	37	20	10	8	

Source: Field data from this study

6.2.2 Freight Cost

In most cases, rural transport services operate with mixed passengers and freight because there are insufficient vehicles to carry passengers or freight separately, and mixed freight provides cost efficiencies. Passengers on motorcycles will typically be accompanied by small parcels for home consumption, provisions for retail shops or small quantities of farm inputs. This freight (around 20-50 kg) is normally chargeable, but mostly on the basis of negotiation. Trucks and buses carry both medium and large size freight. This is typically agricultural produce, and provisions for the shops in the area. As is the case for passenger fares, similarly, freight costs per tonne-km are higher for motorcycles compared with buses and trucks. However, for motorcycle the cost per tonne-km for accompanied and unaccompanied freight is more or less the same. On the other hand, for trucks it costs TZS 6,963 (3 US cents) and TZS 2,920 (1.3 US cents) per tonne-km for accompanied and unaccompanied freight respectively. This could be due to the fact that a motorcycle is meant to carry one passenger and the cost per trip is relatively fixed irrespective of the load carried and/or number of passengers carried. Thus in event where the motorcycle carries extra passenger(s) and/or passenger with some freight, the freight cost becomes part of the trip cost distributed between the passenger and the freight (See Table 7).

Table 7: Accompanied Freight Cost per tonne-km by Mode

RTS Mode	Origin/Destination	Average Accompanied Freight Cost per tonne-km							
		Boma la Ng'ombe		Kidabaga		Kilolo		Iringa	
		TZS	US$ cents	TZS	US$ cents	TZS	US$ cents	TZS	US$ cents
Bus	Boma la Ng'ombe			1,460	73	857	43	669	33
	Kidabaga							1,110	56
	Mdeke	5,000	250	1,250	63			539	27
	Ng'ang'ange			2,187	109			616	31
Motorcycle	Boma la Ng'ombe			1,944	97	7,660	383	2,365	118
	Kidabaga					980	49		
	Mdeke			8,528	426				
	Ng'ang'ange	5,557	278	926	46				
Truck	Mdeke			6,963	348			780	39
	Ng'ang'ange							665	33

Source: Field data from this study

Table 8: Unaccompanied Freight Cost per tonne-km by Mode

RTS Mode	Origin/Destination	Average Unaccompanied Freight Cost per tonne-km							
		Boma la Ng'ombe		Kidabaga		Kilolo		Iringa	
		TZS	US$ cents	TZS	US$ cents	TZS	US$ cents	TZS	US$ cents
Bus	Boma la Ng'ombe			750	38	720	36	674	34
	Kidabaga							1,110	56
	Mdeke			2,500	125			246	12
	Ng'ang'ange			2,487	124			213	11
Motorcycle	Boma la Ng'ombe			6,626	331			1,860	93
	Kidabaga	7,500	375			18,820	941		
	Mdeke	2,222	111	8,567	428	4,630	232		
	Ng'ang'ange	13,697	685	4,954	248	5,520	276		
Truck	Mdeke			2,920	146				
	Ng'ang'ange			10,000	500				

Source: Field data from this study

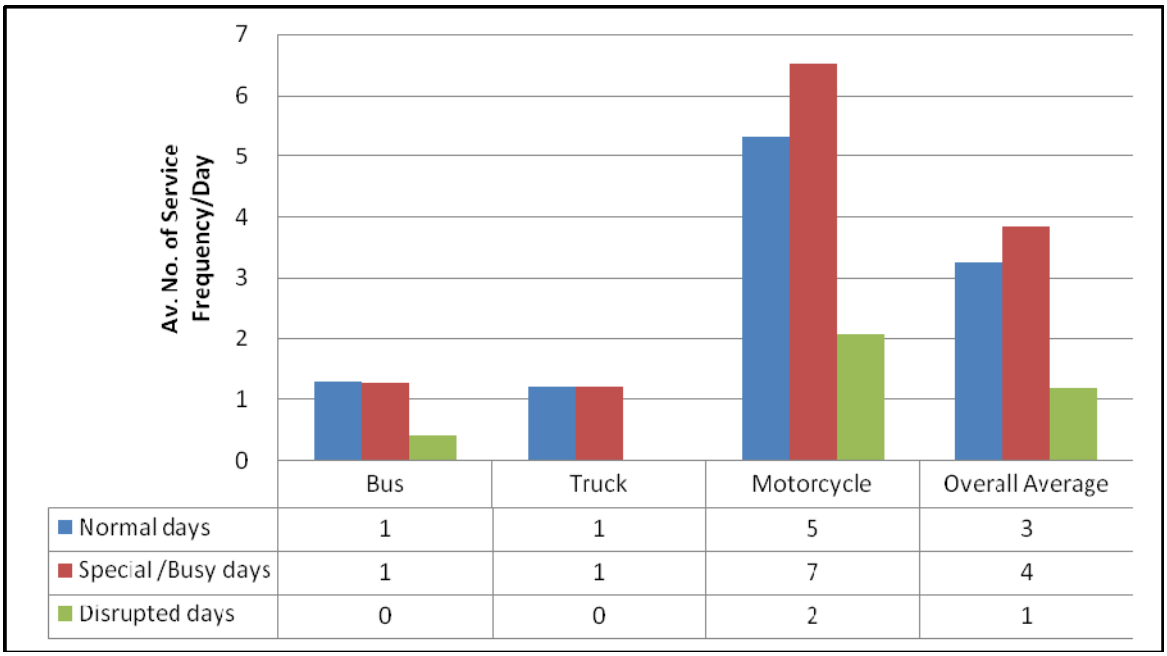
6.3 Predictability of Service

6.3.1 Frequency of service and roadside waiting time

Service frequency of rural transport services is just as important as it is for urban transport. With predictable and adequate frequency of service, users are able to better plan for their journey as well as be sure of travel at any desired time of day. Usually, frequency of service and predictability of service affects user waiting times. Normally, if people are uncertain of the frequency and predictability, they may travel to the roadside several hours to wait for the service. For the study road, there is one bus which makes one return trip a day. This implies there is only one travel opportunity a day. Although the arrival times of the bus at different stops is roughly known, the timing is not precise. The average roadside waiting time for the bus ranges between one to one and a half hours. Due to the condition of the road during the rainy season, the bus does not operate so users have to rely on motorcycles and the occasional truck, but largely they access their villages by walking.

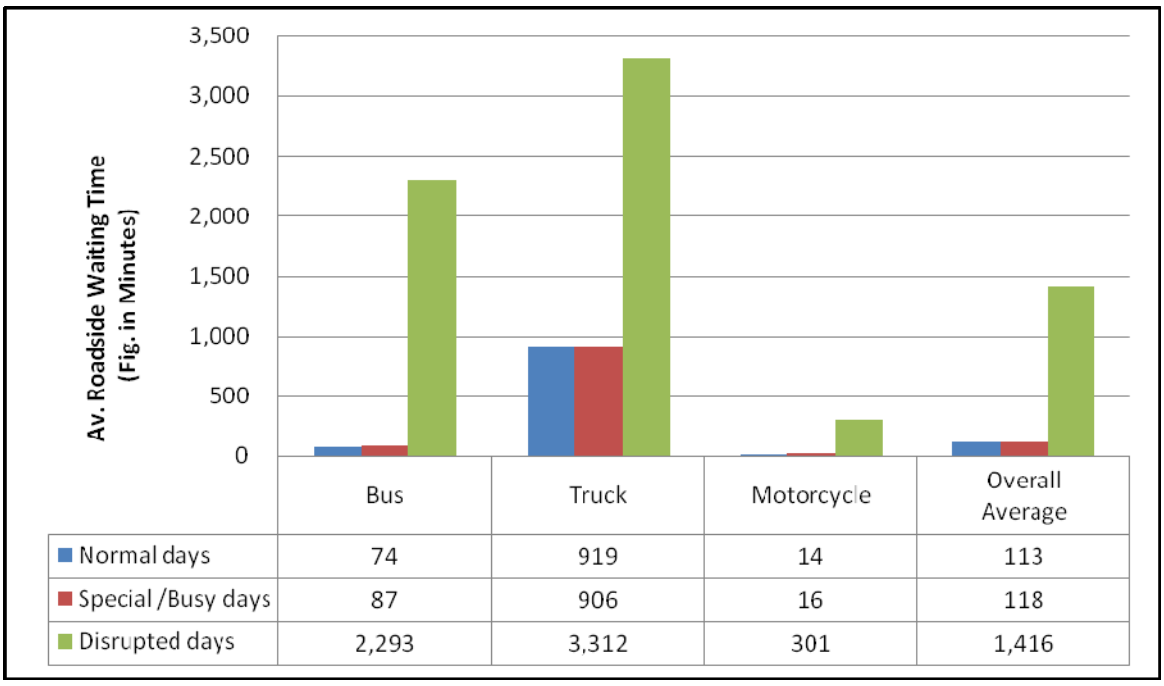
Motorcycles are widely available and are easily accessed by phone. During normal days, average waiting time for motorcycles is 15 minutes while on heavily disrupted days it is as long as 5 hours. Trucks are also operating on the road mainly for freight transportation but they are very few. The survey shows that during normal days an average of one truck per day operates on the road, while during disrupted days an average of one truck per week operate on the road (Figure 7 and 8).

Figure 7: Frequency of Service Disaggregated by Mode



	Bus	Truck	Motorcycle	Overall Average
Normal days	1	1	5	3
Special /Busy days	1	1	7	4
Disrupted days	0	0	2	1

Figure 8: Roadside Waiting Time Disaggregated by Mode



	Bus	Truck	Motorcycle	Overall Average
Normal days	74	919	14	113
Special /Busy days	87	906	16	118
Disrupted days	2,293	3,312	301	1,416

6.3.2 Seasonal fluctuations in the provision of services

Seasonal fluctuations have a huge impact on the provision and performance of rural transport services. Despite the fact that Kidabaga-Boma la Ng'ombe road is in fairly good condition, it is largely an earth road, and as a result the rainy season significantly affects the provision of rural transport services. Based on operator responses, on average for about five months a year the road is not suitable for RTS operation. This is between the months of December and April when the rains are at their peak. In addition, for at least one month of the year (typically March or April) transport services are severely disrupted. Motorcycles operate with great difficulty during this month while the bus service stops completely and trucks become very unreliable. Seasonal fluctuations also affect the number of various modes of RTS operating on the road. Operators reported a total of 12 trucks and 22 motorcycles ran services during normal days. This number goes down to 7 and 9 for trucks and motorcycles respectively during disrupted days. On the other hand, owner operators reported a total of 5 trucks and 51 motorcycles operate during normal days. Similarly, the number goes down to an average of 1 truck and 14 motorcycles during disrupted days. Freight carried during disrupted days is 30% and 80% less than what is carried during normal days for motorcycles and trucks respectively (Table 9 - 14).

Table 9: Seasonal Impacts on the Provision of RTS

RTS Ownership Status	RTS Mode	Av. No. of Months with Good Service per Year	Av. No. of Months with Disrupted Service per Year	Av. No. of Months with No Service per Year	Total No. of Months in a Year
Operator	Bus	6	4	2	12
	Motorcycle	7	4	1	12
	Truck	6	3	3	12
Owner Operator	Motorcycle	7	4	1	12
	Truck	7	2	3	12
Overal Average		**7**	**4**	**1**	**12**

Source: Field data from this study

Table 10: Seasonal Fluctuations in No. of RTS Operating on the Road

RTS Mode	Number of services operating on the road		
	Normal days	Disrupted days	Road cut off
Bus	2	2	0
Truck	12	7	0
Motorcycle	12	9	1

Source: Field data from this study

Table 11: Passenger transport - average number of passenger/mixed trips per day

RTS Mode	Average No. of Passenger/mixed trips per day		
	Normal day	Busy/Market day	Disrupted day
Bus	1	1	-
Motorcycle	6	9	4

Source: Field data from this study

Table 12: Passenger transport - average number of passengers per trip

RTS Mode	Average No. of Passengers per trip		
	Normal day	Busy/Market day	Disrupted day
Bus	93	133	-
Motorcycle	2	2	2

Table 13: Freight transport - average number of freight only trips per day

RTS Mode	Average No. of Freight only trips per day		
	Normal day	Busy/Market day	Disrupted day
Motorcycle	4	6	3
Truck	1	1	-

Source: Field data from this study

Table 14: Freight transport - average freight per freight trip (kg)

RTS Mode	Average Freight per Freight trip (Fig. in Kg)		
	Normal day	Busy/Market day	Disrupted day
Motorcycle	70	82	53
Truck	11,357	12,071	2,000

Source: Field data from this study

6.3.3 Journey Time

The survey road is a 20 km road. However, the average travel time on normal days along this stretch is 45 minutes for bus and motorcycle, and about an hour by truck. This implies that the average speed is approximately 25 km/hr for motorcycles and the bus, and approximately 20 km/hr for trucks. During disrupted days, a bus does not use the road at all. Few motorcycles and trucks operate on disrupted

days. The average travel time in this case is 1hr 10 minutes for motorcycles and 3hr 30 minutes for trucks. This implies that the average speed is 17 km/hr and 6 km/hr for motorcycles and trucks respectively. Generally, the final destination for the bus and trucks is Iringa town which is 74 km from Boma la Ng'ombe. Motorcycles are also occasionally used for trips to Iringa. The average travel time to Iringa on normal days is 2hr30 for motorcycles, 4hr00 for the bus and 4hr35 for trucks. This implies that the average travel speed is 30 km/hr, 19 km/hr and 16 km/hr for motorcycles, buses and trucks respectively.

On disrupted days the bus journey ends in Kidabaga. Passengers from Boma la Ng'ombe have to walk or use motorcycles once they reach Kidabaga. The average travel time from Kidabaga to Iringa town (54 km) is 4hr50 for the bus, implying an average travel speed of 11km/hr. Motorcycles take 5hr45 from Boma la Ng'ombe to Iringa town (9 km/hr) during disrupted days. Trucks are more seriously affected by disruptions and in the rainy month, they take an average of two days from Boma la Ng'ombe to Iringa town. This does not mean they are continuously travelling with very low speed, but they frequently get stuck for days in different places along the road (Table 15 and Figure 9).

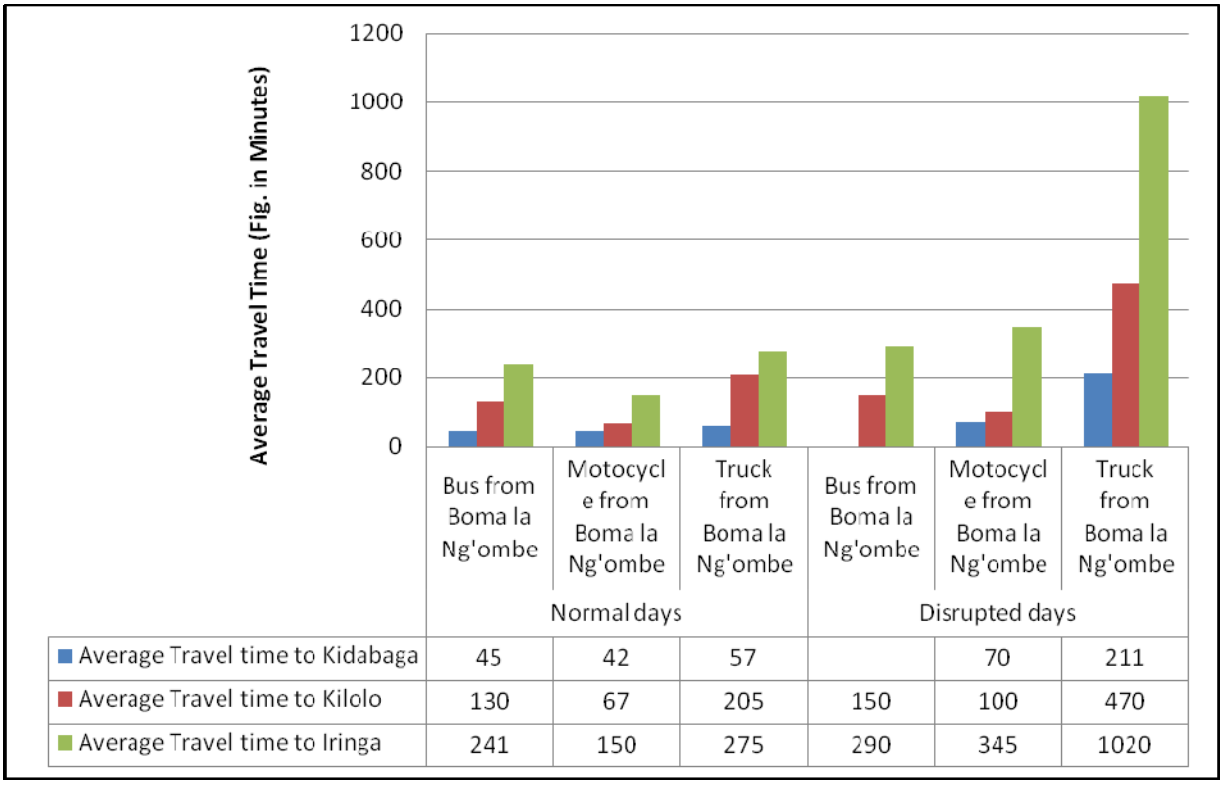
Table 15: Average Journey Time - Normal vs Disrupted days

Seasonality	Mode Vs Origin/Destination	Average Travel Time (Fig. in Minutes)		
		Kidabaga	Kilolo	Iringa
Normal days	Bus from Boma la Ng'ombe	45	130	241
	Motorcycle from Boma la Ng'ombe	42	67	150
	Truck from Boma la Ng'ombe	57	205	275
Disrupted days	Bus from Boma la Ng'ombe	*	150	290
	Motorcycle from Boma la Ng'ombe	70	100	345
	Truck from Boma la Ng'ombe	211	470	1020

Source: Field data from this study

* No bus operate from Boma la Ng'ombe to Kidabaga during disrupted days

Figure 9: Average journey time from Boma la Ng'ombe by various modes



6.3.4 Change in number of Rural Transport Services

Performance and availability of RTS was also assessed in terms of observed changes in the number of modes available over the past 2-3 years. The assessment was based on interviews with 45 users (Table 16) and triangulated with the operator perspective (Table 17). From the user perspective, the study revealed that there is a big increase in the number of motorcycles operating along the road. However, there is no change in the number of buses operating along the road section. In addition, there has been a small increase in the number of trucks over the past 2-3 years.

Table 16: Change in vehicles operating over the past 2-3 Years - User Perspective

Nature of Change	Transport Mode and Corresponding Score			Total Score
	Motorcycle	Bus	Truck	
Big increase	29	0	1	30
Small increase	22	2	5	29
No change	1	48	3	52
Small decrease	1	2	1	4
Big decrease	5	0	0	5
Total Score	**58**	**52**	**10**	**120**

Source: Field data from this study

Table 17: Change in vehicles operating over the Past 2-3 Years - Operator Perspective

Nature of Change	Transport Mode and Corresponding Score			Total Score
	Motorcycle	Bus	Truck	
Big increase	20	0	0	20
Small increase	12	0	4	16
No change	7	1	1	9
Small decrease	1	0	0	1
Big decrease	0	0	2	2
Total Score	**40**	**1**	**7**	**48**

Source: Field data from this study

6.3.5 Change in number of Trips of Service

The user surveys showed that there has been a big increase in the number of motorcycles over the past 2-3 years, with a corresponding increase in the demand for trips using this mode. This is due to the fact that they are versatile in accessing difficult places and they can be called on demand using mobile phones.

In the same respondents indicated that there has only been a small increase in the number of trips by trucks. The level of bus service has also not changed. This could be explained by the unreliability factor as a result of seasonal fluctuations, limited service frequency and motorcycle growth in the past 2 - 3 years (Table 18 and 19).

Table 18: Change in Number of Trips per Day on this Road over the Past 2-3 Years - User Perspective

Nature of Change	Transport Mode and Corresponding Score			Total Score
	Motorcycle	Bus	Truck	
Big increase	28	1	2	31
Small increase	15	1	4	20
No change	0	47	1	48
Small decrease	13	3	3	19
Big decrease	2	0	0	2
Total Score	**58**	**52**	**10**	**120**

Source: Field data from this study

Table 19: Change in trips per day over the Past 2-3 Years - Operator Perspective

Nature of Change	Transport Mode and Corresponding Score			Total Score
	Motorcycle	Bus	Truck	
Big increase	20	0	0	20
Small increase	12	0	4	16
No change	7	1	1	9
Small decrease	1	0	0	1
Big decrease	0	0	2	2
Total Score	**40**	**1**	**7**	**48**

Source: Field data from this study

6.4 Ranking of Key Indicators - User Perspective

The selection of key indicators and ranking started with the key Informant group from the key stakeholders which included government agencies responsible for transport and infrastructure. As discussed under the methodology section, the objective was to narrow down the indicators as developed in the previous phase of this work. Based on the response from the Key Informants, the priority issues in order of importance as presented previously in Table 2 include accessibility, transport modes, reliability, affordability, passenger fare, number of competing services, frequency of services, catchment population, small freight tariffs and gender and age preferences to affordability for different modes.

However, the survey shows that the key RTS issues from users' perspective are: reliability of service, frequency of service, passenger fare, journey time, freight cost for accompanied freight, and safety. The results indicate that, priority issues from user perspective might be different from development and/or regulator perspective. Thus for the transport/infrastructure intervention to be meaningful, users should be well consulted in the planning process (Table 20).

Table 20: Ranking Important RTS Issues - User Perspective

Selected Important RTS Issues	Weighted Score Disaggregated by Mode		Total Weighted Score	Ranking
	Motorcycle	Bus		
Reliability of Sevice	13	3	16	1
Frequency of Service	11	0	11	2
Passenger Fare	7	0	7	3
Journey Time	6	0	6	4
Freight Cost for Accompanied Freight	2	0	2	5
Safety	1	0	1	6
Freight Cost for Unaccompanied Freight	1	0	1	7
Comfort	0	0	0	8
Total Weighted Response	**42**	**3**	**45**	

Source: Field data from this study

6.5 Safety and Security Related to Rural Transport Services

Safety and security incidents are amongst the key issues of concern in the operation of RTS. Although precise data on safety and security are not available operators were asked to recall accidents and safety incidents over the last year. Despite there being only one bus service in a day, the bus was reported to have experienced 6 accidents in the last year. There were also reported to have been 3 truck accidents and 10 motorcycle accidents. Operators point out that most of these accidents happen during disrupted days (rainy days). Therefore it could be concluded that, the accidents along this road are associated with the poor road condition (Table 21). None of the accidents across the modes resulted in any serious injuries.

Security incidents are a moderate concern mainly for female users. For the past one year, there were only two security incidents, one involving a motorcycle and the other involving a truck.

Table 21: Accidents (safety) and incidents (security) for RTS passengers during the last year

RTS Mode	Recalled Number of accidents	Recalled number of insecurity incidents
Motorcycle	10	1
Bus	6	0
Truck	3	1

Source: Field data from this study

6.6 Challenges in Financing and Operating Rural Transport Services

6.6.1 Accessibility of capital and financial facilities

The survey results for operators indicate that poor access to capital and credit facilities were amongst the key challenges facing them. Most operators identified the issue as being a 'big' or 'very big' constraint. Truck operators appeared most concerned about the issue. Operators complain that there is none and/or very poor formal/informal financial facilities appropriate and accessible to facilitate the purchase and operation of RTS vehicles (See Tables 22 and 23).

Table 22: Accessibility of Capital/Credit for Buying/Operating RTS

Severity of Accessing Capital	Number of Operators responding by Mode		
	Motorcycle	Bus	Truck
Very Big Constraint	10	0	7
Big constraint	17	1	3
Medium Constraint	7	0	0
Minor Problem	6	0	0

Source: Field data from this study

Table 23: Accessibility to Formal Financial Facilities to Purchase and Operate RTS

Availability of Formal Financial Facilities to Support RTS	Average Score Disaggregated by Transport Mode			Total Score
	Motorcycle	Bus	Truck	
Very Good	0	0	0	0
Good	6	0	0	6
Medium	2	0	0	2
Poor	15	0	1	16
None/very poor	17	1	6	24
Total Score	**40**	**1**	**7**	**48**

Source: Field data from this study

6.6.2 Availability of technical services

The availability of technical services such as repair facilities and spare parts are important for the effective running of rural transport services. The bus operator pointed out that there is no garage service along the road, and as a result the bus often travels with a technician and sometimes some basic spare parts. The truck operators ranked the availability of technical service as poor to medium. For motorcycles, garage services and spare parts are available although the operators pointed out that the service is still poor and only improves close to the major village hub (Table 24).

Table 24: Presence of technical services (repair/spares) to support operation of RTS

Presence of Technical Services (Repair, Spare Parts)	Average Score Disaggregated by Transport Mode			Total Score
	Motorcycle	Bus	Truck	
Very good	3	0	0	3
Good	0	0	0	0
Medium	13	0	4	17
Poor	16	0	2	18
None/very poor	0	1	1	2
Total Score	32	1	7	40

Source: Field data from this study

6.6.3 Availability of operators associations

Operator associations are an important tool to facilitate easy provision of RTS equally as it is the case for urban transport. Operator associations can facilitate better negotiations with the regulators on various issues like passenger fare, trip frequency, route allocation and improvement of road infrastructure to support provision of RTS. Similarly, associations have a wide impact on operators for issues like safety and security management, establishment of informal and/or formal saving and credit organisations to support operators and organising enrollment in social security funds. For the road under review, operators across all modes indicated that generally there are no operators' associations. Nevertheless,

three motorcycle operators at Kidabaga indicated they do have an informal association concerned with welfare, fare control, queuing and terminus management (Table 25).

Table 25: Presence of operators associations and role

Availability of Operators Association	Motorcycle	Bus	Truck
Association concerned with welfare and terminal management	3	0	0
No Association	37	1	7

Source: Field data from this study

7 Conclusions

The study demonstrated a typical rural transport service situation that is observed in many rural areas of Africa. Pedestrians comprise the majority of rural road users, indicating prevalence of local trips, in-affordability or absence of rural transport service options. Motorcycles are increasingly becoming an important part of rural transport service provision. For example, there are more than 25 motorcycles operating along the study road, whereas there is only one bus service per day along the road.

Freight trucks are an important means of rural transport service. In the study area, trucks come in to fetch agricultural produce and timber. Together with this freight, they also carry passengers and other small freight depending on space availability. The trucks, though they do not operate a predictable schedule, do fill in the gap for medium and long distance travel in the absence of conventional passenger services.

Passenger fares are an important component of rural transport services. Other studies have shown that motorcycle fares are normally higher than other rural transport service modes. In the study area, motorcycle charges are at least three times higher than the bus and truck fares for comparable distances. This is because motorcycles offer short to medium distance travel and cannot enjoy the economies of scale due to their limited carrying capacity.

Predictability of service is also important for passengers. With predictable and adequate frequency of service, users are able to better plan for their journey as well as be sure of travel at any desired time of day. Motorcycles are most reliable because they are available at specific hubs or can be easily accessed by phone. During normal days, average waiting time for motorcycles is 15 minutes, while on heavily disrupted (rainy) days it is as long as 5 hours. As noted, there is one bus which makes one return trip a day. This implies there is only one travel opportunity a day. Although the arrival times of the bus at different stops is roughly known, the timing is not precise. The average roadside waiting time for buses ranges from between one to one and a half hours. Due to the condition of the road during the rainy season, the bus does not operate so users have to rely on motorcycles and the occasional truck for medium and long distance travel.

In many countries, carrying of freight and passengers together is prohibited. In reality however, rural transport services operate with mixed passengers and freight because there are insufficient vehicles to carry passengers or freight separately, and mixed freight provides cost efficiencies. Passengers on motorcycles will typically be accompanied by small parcels for home consumption, provisions for retail shops or small quantities of farm inputs. This freight (around 20-50 kg) is normally chargeable, but mostly on the basis of negotiation. Trucks and buses carry both medium and large size freight together with passengers. This freight is typically agricultural produce, and provisions for local shops.

Seasonal fluctuations have a huge impact on the provision and performance of rural transport services. This is something that planning authorities should monitor as disruptions can go on for weeks with negative consequences on access to basic services such as health and education as well as trade. In the study area, transport service operators indicated that on average, five months of each year are severely disrupted.

This study is part of a process of building up knowledge on key characteristics of rural transport services. It is hoped that a series of such studies will lead to the development of data sets that can be used to develop Rural Transport Services Indicators that can support the existing Rural Access Indicator, or be

part of a tool for monitoring rural transport services by national or local level planning agencies. While the RAI is based on proximity of users to an all weather motorable road, this study brings into focus the need to also build a better understanding of the transport services that operate on rural roads. It advances the argument that investments in better rural roads can be optimised through improvements in the transport services that operate along them. It is therefore important to understand the key characteristics and issues that are important in measuring the quality and adequacy of rural transport services. The study identifies key areas around which rural transport services data should be collected. These include:

- Identification of all transport modes used transport services along a rural road
- Assessment of reliability, frequency and predictability of transport services
- Passenger fares and cost of small freight
- Structure of the rural transport market (i.e. is it competitive, monopolistic or controlled?)
- Gender and age preferences.

The report concludes that collecting data on key aspects of rural transport services will help Road Research Centres, local transport authorities and road agencies build up a body of knowledge on what constitutes good transport services, and how they can be evaluated and improved. The series of pilot RTSi research projects supported by AFCAP are providing a good basis for developing a standard set of indicators for transport services in Sub-Saharan Africa.

8 Recommendations

The work done so far in collecting rural transport service data is a step that helps identify the key issues around which more robust data should be collected in the process of developing rural transport indicators. It is important to maintain the momentum of promoting rural transport services as a complementary part of rural infrastructure investments. The series of pilot RTSi studies supported by AFCAP are providing a good basis for understanding this under-researched area of rural transport and access. Collecting data on key aspects of rural transport services will help build knowledge of what consists of good transport services, how they can be evaluated and areas of intervention identified.

Substantial investments are needed in development of indicators in any field. To develop useful and credible rural transport service indicators requires a multi-stakeholder partnership approach involving data experts and local and national government agencies that are involved in data collection, rural development and transport planning.

Possible future work in this area should focus on:

- Validation of indicators based on statistically significant samples, in different locations and for different countries;
- Generation of baseline data to show a numerical score of rural transport services in, for example a district;
- Correlation between the level of rural transport services with economic productivity/growth of the community/village.
- Creation of stronger collaboration and partnerships between the rural services research work and the rural transport infrastructural agencies in order to jointly work together on key indicators that are mutually beneficial and can be adopted for planning purposes.

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Annex A: Key Stakeholders Contacted

The key stakeholders contacted during the field visit include:

i) Regional Administration for Iringa - the Regional Administrative Secretary

ii) Acting District Executive Director for Kilolo - Mr. AloyceMaira

iii) District Agriculture, Irrigation and cooperative Officer - Mr. Shehemba Bakari Kuziwa

iv) Community Development officer/public relations Officer for Kilolo - Mr. Filemon Elias Namwinga

v) Boma la Ng'ombe Ward Executive Officer – Mr. Sylvester Kitule

vi) Idete Village Executive Officer and Acting Ward Executive Officer - Mr. Niitos Mgola

vii) Regional Police Commander for Iringa - Mr. RamadaniMungi

viii) Acting Regional Police Commander for Iringa – Ms. Prudencia Protas

ix) Regional Traffic Officer - Mr. Leopard Fungu

x) Inspector at Kilolo Traffic Police – Mr. Munisi

xi) OCD Kilolo - Mr. Kaiza

xii) SUMATRA - Iringa Pateri Ngereza

xiii) Iringa Regional Manager –Tanroads - Eng. Lyakurwa

xiv) Tanzania Roads Fund - CEO - Mr Joseph Haule

Annex B: List of Informants contacted to advise on data collection

S/N	Contact Detail	Organisation
1	Elina Kayanda	PMO RALG
2	Stephen Lyimo	PMO RALG
3	Filemon Elias Namwinga	Kilolo Distric Council
4	Abdul Awadh	Tanzania Forum Group
5	Joseph Haule	Road Fund Board
6	Ronald Lwakatare	Road Fund Board
7	Eliud Nyauhenga	Road Fund Board
8	Paulo Stephano Laiser	Ministry of Transport
9	Joseph Nyamhanga	Ministry of Works
10	Charles Massawe	Road Fund Board
11	Gilliard Ngewe	SUMATRA
12	Bencolias Tinka	TANROADS
13	Jason Rwiza	TANROADS

Annex C: List of Informants who responded and provided data

S/N	Contact Detail	Organisation
1	Stephen Lyimo	PMO RALG
2	Filemon Elias Namwinga	Kilolo Distric Council
3	Abdul Awadh	TFG
4	Ronald Lwakatare	Road Fund Board
5	Paulo Stephano Laiser	Ministry of Transport
6	Bencolias Tinka	TANROADS

Annex D: Key Informant Questionnaire to Rank RTSi Data type to be collected

THE INTERNATIONAL FORUM FOR RURAL TRANSPORT AND DEVELOPMENT

CAN YOU HELP US IDENTIFY THE MOST IMPORTANT DATA REQUIRED TO UNDERSTAND RURAL TRANSPORT SERVICES?

1.0 INTRODUCTION

The International Forum for Rural Transport and Development (IFRTD) with the support of the Africa Community Access Partnership (AFCAP) carried out some exploratory work to identify key characteristics of *rural transport services* around which data can be collected, data that can then lead to the development of Rural Transport Services Indicators (RTSi). The earlier pilot work (2012-2013) used an experimental process in collecting a wide range of data on various attributes of rural transport services.

The importance of planning for transport services together with transport infrastructure is increasingly being recognised. Poor people in rural areas seldom own motorised transport. They generally rely on the transport services that operate on the rural roads. It is the rural transport services operating along the roads that provide rural communities access to markets, health services, education, livelihoods and numerous economic, social and civic opportunities. Rural transport services include both motorised (buses, trucks, pick-ups, saloon cars, motorcycles etc) and non-motorised transport (walking, bicycles, animal transport etc) all playing a complimentary role in providing rural people with access.

The earlier work by IFRTD attempted to build a broad perspective of transport services from the point of view of users, regulatory authorities, owners and operators of services, and agencies involved in rural development in sectors where transport plays an important role. This led to the development of a framework for the collection of detailed, and wide ranging set of data, together with software for data analysis. In addition to the broad perspectives of the different stakeholders, data collected included the quality and frequency of different types of transport services, together with passenger fares and (small load) freight tariffs, and estimates of their affordability, reliability, comfort and safety. Detailed data on operating cost components, for different vehicle types were also collected.

Building on the earlier work, it is now proposed to undertake a more focused study of transport services that can be more quickly carried out to help identify the most important key indicators for planners and policy makers.

2.0 ENGAGING KEY AGENCIES IN TANZANIA IN FURTHER DEVELOPING THE WORK

IFRTD is carrying out a short project to further the previous work done on development of rural transport service indicators. The project runs from January 2015-April 2015 and has two main components

- A short data collection exercise on Rural Transport Service Indicators to be implemented along the Dabaga - Boma la Ng'ombe road in Kilolo District, Iringa Region, Tanzania
- Strengthening linkages with relevant agencies in Tanzania in jointly identifying the specific data on rural transport services that is necessary and useful in the Tanzania context and how and by whom it can be integrated into routine data collection processes in the country. In particular, we are interested in exploring means through which the Rural Transport Services data can be used in conjunction with the Rural Access Index (RAI) as developed by the World Bank.

3.0 HOW YOU CAN HELP

Prior to the implementation of the field survey, we would like to request you, as a key stakeholder to help us in responding to a few questions that have been set out below. The focus of the questions is twofold:

1. Your advice on the key agencies for which rural transport services data would be useful.
2. From a list provided, your own ranking of the key data that is important in understanding rural transport services in the Tanzania planning context.

3.1 Question 1:

For which agencies would rural transport services indicators be an important planning tool?
Please name them in order of importance and give a short explanation why

NAME OF AGENCY	WHY IS IT IMPORTANT FOR THIS AGENCY
1.	
2	
3.	
4.	
5.	

3.2. Question 2

The table below gives a list of 10 various types of data that can be collected with regard to rural transport services operating along a particular road. Would you kindly rank them in order of importance (1=Most important; 10 = least important)

DATA TYPE	BRIEF DESCRIPTION	YOUR RANKING
Traffic Survey identifying transport modes, vehicle types and numbers along key road	Rural roads have varied transport modes in use, conventional and non-conventional, motorised and non motorised	
Passenger fares (Cost/Passenger-km) for each mode	Different modes have different fares (passenger-km).	

DATA TYPE	BRIEF DESCRIPTION	YOUR RANKING
Small freight tariffs (20-50kg) for each mode	Rural traders and farmers rely heavily on rural transport services. A typical consignment would normally be in the range of 20-50kgs	
Gender and age preferences and affordability of different modes	Gender and age can be determinants of mode selection.	
Frequency of services/mode /trip distances	Number of trips are available per day per mode together with typical trip distances	
Number of competing services	Competitive environment has a bearing on fares and quality of services	
Assessment of catchment population along the road and the hinterland (area of service)	Would try to relate the size of population that is served by a road	
Affordability	A qualitative measure from the users perspective. Can also be related to income levels	
Reliability	Are the services consistent or erratic?	
Accessibility	Distance, terrain and connectivity considerations for people to access a service on the road under consideration	

For the top 5 types of data, kindly give brief reasons why you have given them preference:

1.

2.

3.

4.

5.

Respondent's Name, Title & Agency ……

……..

We thank you very much for taking your time to complete this exercise. We shall keep you updated throughout the study process, including a feedback workshop in April 2015.

Annex E: User Perspective Questionnaire

USERS PERSPECTIVE QUESTIONNAIRE

Road Name/Location_____ **Date of Interview:**_____ **Geo Coordinates***: (if GPS)*_____ **Interviewer:**_____

Name of interviewee:_____ **Gender: Female Male**
Occupation: _____**Age:** _____
List the transport services you used during last year on the Kidabagala-Boma la Ngombe Road

Modes of transport	Purposes for
Motorcycle	
'Rural taxi'	
Minibus	
Bus	
Truck	
Tractor	
Other (specify)	

PLEASE PROVIDE THE REQUIRED INFORMATION BELOW FOR EACH MODE OF TRANSPORT

(Please record at least 2 different origins and destinations/mode if possible

	Origins	*Destinations*	*Dist. (km)* Note 1	Fare paid	*Journey time (min)*		*Accompanied freight (20-50kg)*		*Unaccompanied freight (approx 200kg)*	
					Normal period	*Difficult period*	*Weight kg* Note 2	*Cost*	*Weight kg*	*Cost*
Motor cycle										
Rural 'taxi'										
Minibus										
Bus										
Truck										
Tractor										
Other										

Note. *Rural 'taxi's include: cars, pick-ups and mixed trucks where passenger transport is regular and normal.*

1. Actual distances can be calculated from origin and destination, so leave blank if unsure of accuracy of information .

2. Where cost is per container (eg basket of produce) estimate a typical weight of this

SERVICE FREQUENCY

	Daily service frequency of travel opportunities per day in direction of hub [1]			**Average roadside waiting time (in minutes)**		
	Normal day	*Special day*	*Disrupted day*	*Normal day*	*Special day*	*Disrupted day*
Motorcycle						
Rural taxi						
Minibus						
Bus						
Truck						
Tractor						
Other *(Specify)*						

OVER THE PAST 2-3 YEARS, HAS THE NUMBER OF VEHICLES OPERATING EACH DAY ALONG THE ROAD CHANGED?

	Big decrease	Small decrease	No change	Small increase	Big increase
Motor cycle					
Rural 'Taxi'					
Mini- Bus					
Bus					
Truck					
Tractor					
Other (Specify)					

OVER THE PAST 2-3 YEARS, HAS THE NUMBER OF TRIPS PER DAY FOR EACH VEHICLE OPERATING EACH DAY ALONG THE ROAD CHANGED?

	Big decrease	Small decrease	No change	Small increase	Big increase
Motor cycle					
Rural 'Taxi'					
Mini- Bus					
Bus					
Truck					
Tractor					
Other (Specify)					

ON A SCALE OF 1-8, PLEASE RANK THE FOLLOWING 8 RURAL TRANSPORT SERVICES ISSUES IN ORDER OF IMPORTANCE (1 BEING OF HIGHEST CONCERN, 8 LOWEST CONCERN)

ISSUE OF CONCERN	**RANKING**
Passenger Fare	
Journey times	
Frequency of service	
Reliability of service	
Freight fares for accompanied freight (20-50kg)	
Freight fares for unaccompanied freight(50-200kg)	
Comfort	
Safety	

FOR THE FOUR MOST IMPORTANT CONCERNS, CAN YOU GIVE REASONS WHY

ISSUE	**REASON WHY IT IS OF CONCERN**
1	
2	
3	
4	

FOR YOUR DAILY LIVELIHOOD, WHICH OF THE 6 MODES OF TRANSPORT ARE MOST IMPORTANT FOR YOU (INCLUDING WALKING). (1 BEING MOST IMPORTANT, 6 THE LEAST)

MEANS OF TRANSPORT	RANKING
Motor cycle	
Rural 'Taxi'	
Mini- Bus	
Bus	
Tractor	
Truck	
Walking	

For what livelihood activities do you use the top four modes

MEANS OF TRANSPORT	MAIN LIVELIHOOD ACTIVITIES THE MODE IS USED FOR
1	
2	
3	
4	

Annex F: Operator Perspective Questionnaire

OPERATOR PERSPECTIVE QUESTIONNAIRE

Road Name:_____ Date of Interview:_____ Interviewer :_____

Name of interviewee:_____ Gender: Female Male

RTS owner / RTS operator *(circle one)*: **Age: _____**

TRANSPORT MODE: Bus/Midi-bus/Minibus/Rural 'taxi'/Truck /M-cycle/Other/Tractor (specify)……

N.B. Only one row per table should be completed that of the transport mode of the respondent

How many of your type of mode operate on this road on normal days, busy days and disrupted days?

Road cut off	Disrupted day	Normal day	Busy day (eg market day)	Number of busy days a year *(eg, weekly = 52)*

What are the periodic/seasonal fluctuations in availability of services for your mode

Number of months with no service per year [1]	Number of months with disrupted service per year [1]	Number of months with good RTS per year [1]	Total
			= 12

[1] *Note: Decimals are allowed for number of month per year*

How do disrupted days and market days (or other busy days) affect your business?

	Passenger/mixed trips per day	Passengers per trip	Freight per mixed trip (kg)	Freight only trips per day	Freight per freight trip (kg)
Normal day					
Busy day (eg, market day)					
Disrupted day					

During the past year, has your mode type operating each day along the road changed?

Big decrease	Small decrease	No change	Small increase	Big increase

During the past year, has the number of trips per day for your type of mode operating along the road changed?

Big decrease	Small decrease	No change	Small increase	Big increase

How many recalled numbers of accidents (safety) and incidents (security, related to RTS passengers) have occurred on this road during the last year for your mode of transport on this road?

	Safety [1]	Security [2]
Motorcycle		
Rural 'taxi'		
Minibus		
Bus		
Truck		
Tractor		

Other (Specify)		

[1] *Recalled number of accidents involving injury or damage to vehicle for that type of transport type on that road.*

[2] *Recalled number of security incidents including theft, harassment and assault per transport type along the surveyed road.*

What is the overall condition of the road infrastructure in relation to your mode of transport?

Very poor or non-motorable	Poor or motorable part of year	Medium	Good for RTS	Very good for RTS

To what extent is access to capital/credit a constraint to buying and operating a transport service on this road *(of your type of transport)***?**

Very big constraint	Big constraint	Medium	Minor problem	Not a problem

If an operator *(of your type of transport)* **needs a bank loan or formal credit to purchase/operate a vehicle, are there adequate formal financial facilities available, accessible and appropriate?**

None/Very poor	Poor	Medium	Good	Very good

If an operator *(of your type of transport)* **needs a loan or credit to buy/operate transport services are there informal financial facilities (including savings and loans groups) available, accessible and appropriate?**

None/Very poor	Poor	Medium	Good	Very good

How adequate are the present technical services (repairs and spare parts, formal/informal) to provide for the needs of your mode of transport on the route you normally operate?

None/Very poor	Poor	Medium	Good	Very good

Are there any active associations (formal/informal) of operators for your mode of transport on this road?

No association	Association with member welfare	Association concerned with welfare + fares control	Association concerned with welfare + fares control, queuing and terminal	Association with welfare + fare control, queuing, terminal + route allocation