A PROFILE OF RURAL TRANSPORT SERVICES IN KENYA.

A BACKROUND RESOURCE PAPER

For

RURAL TRANSPORT SERVICES PROJECT FOR KENYA

By

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Improved Agricultural Rural Transport for Kenya

A Natural Resources International Limited
Crop Post-Harvest Programme (CPHP)

Supported Project

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Research Programme: **CPHP**
Project Leader/Institution: **Pascal Kaumbutho / KENDAT**
NRIL Contract Number: **ZB0293**
DFID Contract Number: **R8113**
Production System: **Cross-cutting**

Project Start Date: **April 2002** End Date: **March 2005**

Coalition Partners:

- **Community Cabinets in Mwea, Lari and Busia Divisions**
- **Donkey Placement Response Unit in Kalama**
- **ILO – Advisory Support Information and Training (ASIST)**
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December, 2003

EXECUTIVE SUMMARY

i) The purpose of this paper is to provide baseline information about rural transport services in Kenya, relative to other countries in Eastern and Southern Africa and South Asia. It is also meant to provide a basis for making choices between different types of IMT interventions within the framework of KENDAT's Rural Transport Services Project.[1i]

ii) The paper is divided into three broad sections. The first section introduces the scope of the discussion in the paper. The second section presents the policy context of rural transport discussion, focussing on the 2 dimensions of infrastructure and services. In respect of infrastructure, the paper examines the role of rural roads in agricultural development and provides comparative impact data from Kenya and other countries. Within the infrastructural dimension, ongoing trends in rural roads' policy and financing are discussed. The discussion covers issues of labour-based methods to rural infrastructural development, the Roads 2000 programme, and rural roads financing under the Kenya Roads Board Act. The second dimension discussed looks at the more difficult issue of transport services. Within this, current policy trends are discussed, especially the opportunities within the draft Road Subsector strategy and the Integrated National Transport Strategy. In addition, critical factors determining different types of rural services are discussed. The final section zeroes in the role of IMTs from a regional and international perspective. A matrix showing the characteristics, costs and performance attributes of different IMTs is presented in the Annex.

iii) The term rural transport services, has particular attributes that has made it a subject of special interest in research, policy and development planning. For the purpose of this report, we refer to rural transport services as that continuum of transport activities and operations that connect rural households and farms to primary market centres with secondary rural markets and services centres, such as are found at the divisional administrative centres. Distinguishing features of rural transport systems as compared to urban transport systems is not only their infrequency, unreliability and high/km costs, but also their invisibility to policy makers

iv) The issue of improving rural transport services is intertwined with other development challenges facing rural areas. These include:

- Low densities and volumes of economic activities which leads to a weak resource base for financing improvements,
- Lack of innovation to bring forth new, affordable and appropriate transport technologies that are suited to rural operating conditions,
- Absence of decentralised planning frameworks and therefore, weak institutional structures and partnerships for managing development -including transport services-in rural areas

v) The total length of the road network in Kenya is estimated at 150,000 kilometres. About 60% of the road network is in rural areas, most of it is unpaved and is severely degraded owing to lack of maintenance. The length of roads in poor condition increased from 28% to 42% between 1994 and 1997. According to available data, Kenya has a lower road density per population [2.3 Km/1000 people] than the average for all Africa [3.0 Km/1000 people] and the average for Sub-Saharan Africa [2.9/1000 people].

[1] See Terms of Reference Annex 3

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

vii) An inadequate public infrastructure could result in massive losses to producers. In 1988, three regions in Tanzania lost 50% of their cotton, one region 80% of its rice, and another region 50% of all its seeds and fertilizers when rural roads became impassable following heavy rains [Gavira, 1990].[v] In Siaya District, Omamo [1998][vi] established that cropping patterns were influenced by access to market centres from the farms. The physical distance to market centres is a function of the state of existing road infrastructure and existence of means of transport. A study by Obare [2000][vii] corroborates findings from previous research - In Nakuru District a reduction of access costs by 10% translated into average production cost savings of Kshs 14,000 per hectare.

viii) Currently, it is estimated that US$1.2 billion is required to restore the road network to an acceptable condition and keep to keep it there. the Kenya Roads Board [KRB] was established by an act of parliament in July 2000. The roles of KRB include co-ordination of all implementation of all policies relating to maintenance, rehabilitation and development of the network and to administer the funds derived from the fuel levy and any other funds that may accrue to it. Within the act establishing the KRB, the following agencies are recognised:

- The Roads Department in the Ministry of Roads and Public Works. This is responsible for the trunk and primary roads [classes A, B and C of the classified network]
- Kenya Wildlife services [KWS] that is responsible for roads in national parks and game reserves.
- District Roads Committees [RDCs], which are responsible for secondary roads [classes D, E and special purpose roads] and unclassified roads [urban and rural].

ix) The KRB currently manages the disbursement and accounting of money coming from the Road Maintenance Fuel Levy [R.M.F.L]. This fund came into effect in 1993. It consists of an automotive fuel levy and transit toll collection. KRB provides an institutional framework within which the entire road network is managed. The KRB is composed of major stakeholders in the roads sector who constitute the majority of its membership, and representatives of relevant government ministries of departments. Stakeholders include the Kenya National Chamber of Commerce and Industry, The Kenya National Farmers' Union, the Automobile Association of Kenya, road contractors, transporters and the Kenya Association of Tour Operators. The Ministries of public Works, Transport, Finance and Local Government represent the Government.

x) Currently, the levy is collecting over Kshs 8 billion per year [USD$100 million]. The impact of the fund has however has been negated by the fact that most of the roads in Kenya are not maintainable, but need to be reconstructed first, which is far more expensive, and beyond the amount available from R.M.F.L.

xi) Maintenance and rehabilitation of rural roads using Labour Based Technologies is one of the viable options of ensuring rural accessibility within financial constraints, with the additional benefit of providing rural employment. Currently the Roads 2000 Programme is trying to institutionalise this approach in different parts of the country. It is designed to raise the operating conditions on the 55,000-km of unpaved classified roads.

xii) n regard to rural transport services, challenges stem from four main directions. Firstly, the low levels of motor vehicle ownership. According to statistics, there were about 474,000 motor vehicles [all categories] in Kenya in 2000. About 75% of which are concentrated in the three big urban centres in the country. The second problem stems from poor transport infrastructure, which cannot attract vibrant and competitive transport operations. Thirdly, is the discouragement and therefore lack of growth in low cost transport technologies. Fourthly, and connected to the other problems, is absence of vibrant rural economies that would stimulate the growth of competitive [transport] services. In particular, one area whose full potential has not been fully exploited is optimising the combination of motorised and non-motorised options and matching this with appropriate infrastructural support.

xiii) Despite their importance in local transport, support to IMTs in many countries is always lacking. IMTs are disregarded by motorists and ignored by planners. Overall, 98% of resources in the provision of roads are allocated to satisfying just 2% of transport demand. The role of IMTs has largely been underestimated in the planning of rural roads and rural transport services. Many of the road appraisal and planning methods do not include components for operating costs, time and generated traffic benefits associated with IMTs and particularly animal carts [Ellis SD 1997][viii]. The appropriateness of different IMTs to a variety of local transport situations is dependent on such characteristics as:

- Initial investment costs.
- Payload capacity
- Speed and distance range
- Cultural environment etc.

Annex 1 gives a general overview of the characteristics of different IMTs. The IMTs are divided into 3 categories, namely:

- Human powered vehicles [bicycles, hand-carts etc]
- Animal powered vehicles
- Low-cost *motorised* vehicles.

1.0 Introduction

For the purpose of this report, we refer to rural transport services as that continuum of transport activities and operations that connect rural households and farms to primary market centres with secondary rural markets and services centres, such as are found at the divisional administrative centres. Included in the term "continuum of transport activities" are the various means and methods by which people in rural hinterlands transport themselves and their goods. The methods include, for personal travel, walking, cycling and use of motor vehicles, while for goods transport, the methods of transport similarly involve headloading/backloading, use of animal based transport, bicycles as well as motor vehicles.

The term rural transport services, has particular attributes that has made it a subject of special interest in research, policy and development planning. Distinguishing features of rural transport systems as compared to urban transport systems is not only their infrequency, unreliability and high/km costs, but also their invisibility to policy makers. Underdeveloped transport services are of particular concern to rural development and poverty reduction. Lack of transport services for the movement of goods and people is frequently identified as an important constraint to agricultural and rural development. The cost of agricultural production and marketing are directly related to the costs and reliability of transport. Expensive transport increases the costs of inputs and reduces the competitiveness of produce. Similarly, unreliable transport reduces opportunities and timeliness of marketing, which is particularly important for agricultural products.

The issue of improving rural transport services is intertwined with other development challenges facing rural areas. These include:

- Low densities and volumes of economic activities which leads to a weak resource base for financing improvements,
- Lack of innovation to bring forth new, affordable and appropriate transport technologies that are suited to rural operating conditions,
- Absence of decentralised planning and investment frameworks and therefore, weak institutional structures and partnerships for managing development in rural areas

This paper describes in broad terms the main characteristics of rural transport system in Kenya. However, it is impossible to capture the complex variety of issues and concerns that relate to rural transport in different parts of the country. Conditions in different rural areas are not homogeneous. For example, areas characterised as Arid and Semi-Arid Lands [ASAL] in Kenya may have different sets of problems as compared to areas designated high potential areas.

The paper will try to focus on key rural transport issues based available knowledge, but more particularly, based on the fieldwork being carried out by KENDAT and its partners. Key issues covered include availability, affordability and use of low-cost transport technologies, management and financing of rural transport infrastructure and the capacity for planning and managing rural transport at decentralised levels.

In order to give a full account of these issues, it will be important to put the discussion within the overall context of the relevant policies. Thus the paper outline key issues relating to national transport policies as well as rural and agricultural development. In providing this background, it should be pointed out that Kenya is currently in the process of developing, for the first time, an Integrated National Transport Plan, which includes a Road Sector Policy.

Notwithstanding the fact that rural transport in Kenya has in the past primarily focused on improving infrastructure, the coverage and quality of the road network remains extremely poor.

2.0 Rural Transport Services in a policy context.

In Kenya, as is typical in most developing countries, much of the investments into rural transport problems continue to be dominated by construction of infrastructure. In conventional economics, provision of rural infrastructure is thought of as a public good and therefore the responsibility of the state. On the other hand, the day to day provision of transport services is left to the private sector with little official support in terms of planning to redress existing inadequacies in rural areas. The limited view of equating rural transport to infrastructure is based on the notion that better quality infrastructure will induce higher traffic flows, improve overall mobility and therefore stimulate agricultural production through improved access and lower transport costs.

There is a particular weakness to this argument especially in the context of rural areas in Kenya. As the work by KENDAT has consistently shown, even though the national policies on land transport have consistently focussed on roads, due to poor implementation, feeder and rural roads still remain in a pathetic condition in many parts of the country. This is compounded by the fact that the bulk of the village network - where the bulk of the agricultural production takes place - is unclassified and therefore effectively does not exist.

However, the state of the rural infrastructure is not the only problem. A deeper problem lies in our limited understanding of the relationship between infrastructure and improved transport services. A continued over-emphasis on infrastructure and an under-emphasis on mobility improvements [both motorised and non-motorised] can lead to sub-optimal returns on road investments.

It is however recognised that the draft Road Sub-Sector Policy and the Integrated National Transport Plan have made significant strides in recognising mobility and access dimension of transport and especially the need for focussing on needs of different segments of the population.

2.1 Infrastructure Dimensions of Transport Policy.

As pointed out above, notwithstanding the fact that rural transport in Kenya has in the past primarily focused on improving infrastructure, the coverage and quality of the road network remains extremely poor.

The total length of the road network is estimated at 150,000 kilometres. Out of this, 63,000 kilometres are classified, which leaves 86,000 as unclassified. However, there is considerable underestimation of the length of the roads that are unclassified. Figures provided to the Kenya Roads Board by County Councils give an estimate of 116,000 kms of rural unclassified roads. Out of the classified segment, 14,000 kms are considered main roads, i.e., classes A, B and C. The rest are secondary and feeder roads. Out of the 14,000 kms of main roads, only about 7,000 kms is paved, while only 2,000 km of the 49,000 km of secondary and feeder roads are paved. In general only about 5% of the entire road network in Kenya is paved.

Accurate information on size and condition of the network is not readily available. In broad terms however the sector can be categorised as:

Network segment	Daily traffic	kms	Network need
Main urban network	very high	3,000	High capacity and service
Main trunk network	>400	6,000	High service quality
Secondary road network	>75	9,000	All weather
Rural road network	<75	100,000	Passability

According to available data, Kenya has a lower road density per population [2.3 Km/1000 people] than the average for all Africa [3.0 Km/1000 people] and the average for Sub-Saharan Africa [2.9/1000 people].

Table 1 below gives a summary overview of Road-Population ratio for selected African countries. Even more worrying is the declining road density over the 15-year period as can be seen from table 1 below. This is compared to a road density of 43km/1000 in high-income countries

Table 1: Road-to-population ratio for selected African countries.

	Road 1 km/1000 persons		
	1980	1990	1995
Sub-Saharan Africa [SSA]	3.3	2.5	2.9
SSA excluding South Africa	3.1	2.2	2.5
South Africa	6.7	5.3	8.5
Cameroon	7.2	6.1	2.6
Nigeria	1.5	1.2	1.7
Uganda	2.1	1.8	-
Tanzania	2.5	-	3.0
Kenya	**3.1**	**2.6**	**2.3**
Ethiopia	1.0	0.5	0.5
Ghana	3.0	2.6	2.2
Malawi	1.7	3.2	1.5
Namibia	-	28.7	41.0
Botswana	9.1	7.0	12.5
Algeria	3.9	-	3.7
All Africa [combined]	3.1	2.3	3.0

Source: World Bank[ix] [2000: 256]

Generally about 60% of the road network is in rural areas, most of it is unpaved and is severely degraded owing to lack of maintenance. The bulk of the rural network is to be found in high potential agricultural areas, though the condition of the network [paved and unpaved] has deteriorated significantly through a lack of maintenance, and on the main paved networks, the overloading of vehicles. The length of roads in poor condition increased from 28% to 42% between 1994 and 1997. In general, roads in Kenya have not been planned, developed and maintained to adequately meet the needs of communities they serve [GoK, 2003][x].

Currently, it is estimated that US$1.2 billion is required to restore the road network to an acceptable condition and keep to keep it there. Table 2 provides some estimates of the financial resources needed for backlog and annual maintenance of various classes of the network.

Table 2: Estimated costs of restoring roads to maintainable levels.

Network type	length	Annul maintenance need Amount $	Backlog
Main urban network	3000km	60m	+-850
Main inter-urban network	6000km	27m	
Secondary road network	9000km	14m	
Rural road network	100,000+km	24	125m

2.1.1 Rural access and Agricultural development

Ex-post evaluations on rural road projects in Sub-Saharan Africa indicate a strong positive correlation between feeder roads and agricultural productivity. In Kenya the Rural Access Road Programme [RARP] and the Minor Roads Programme showed very positive impacts by improving access to markets. An evaluation of RARP showed a 29% increase in crop production from the baseline condition one year after project completion. Over the same period, sales of farm produce went up by 51%, farm income by 275, non-farm cash earnings by 11% and total household earnings by 20% [MoITC 1984][xi]. Similar rural road projects in Uganda led to 200-700% ex post increase in cotton production, with a corresponding rise in income of 373-525% [MoITC, 1981][xii]

A study in Nyandarua District [Central Kenya] shows that an inadequate road and transport infrastructure discourages adoption of high-value horticultural crops through which farmers could easily improve their incomes [Dijkistra and Magori, 1992][xiii]

An inadequate public infrastructure could result in massive losses to producers. In 1988, three regions in Tanzania lost 50% of their cotton, one region 80% of its rice, and another region 50% of all its seeds and fertilizers when rural roads became impassable following heavy rains [Gavira, 1990].[xiv] In Siaya District, Omamo [1998][xv] established that cropping patterns were influenced by access to market centres from the farms. The physical distance to market centres is a function of the state of existing road infrastructure and existence of means of transport. A study by Obare [2000][xvi] corroborates findings from previous research - In Nakuru District a reduction of access costs by 10% translated into average production cost savings of Kshs 14,000 per hectare.

2.1.2 Labour based approaches

Use of labour-intensive techniques for road development is one of the ways of delivering rural transport infrastructure. This strategy has been pursued since independence, [beginning with Rural Access Roads Programme - RARP, Minor Roads Programme -MRP and currently, the Roads 2000 programme. Labour based road programme provides a number of advantages, quite apart from delivering transport infrastructure. When implemented within the appropriate circumstances they can create local employment, inject cash into the local economy, produce roads at less cost per km, and at the macro level, require less foreign exchange content. Table 1 below compares the costs of labour-intensive RARP/MRP roads with those of other minor sub-district link roads. A RARP job costs less than 10% of a job in the mechanised construction system, and its capital labour ratio is a mere third. A similar picture is revealed by comparing a typical MRP road with one in the machine-intensive section of the Ministry of Public Works. The end products are of the same standard, but MRP uses labour-based technology using simple equipment such as forks, spades and wheelbarrows. A 1990 evaluation found that the cost of road improvement is 10%

higher in financial terms and 35% in economic terms when capital intensive rather than labour-intensive methods are used[xvii].

Table 3: Comparison between RARP and Conventional Road Construction

Criteria	RARP	Conventional Programme
Cost per km of road [K£]	2,050	7,500
Cost per job created [k£]	152	1,760
Share of wages in total [%]	49	3.00
% of foreign exchange in total cost	20	60-65

Source: World Bank [1993: 96][xviii]:

2.1.2.1 Roads 2000 Strategy Following the success of the RARP and the MRP in the 70s and 80s, the Government of Kenya designed the Roads 2000 Strategy whose principal objective is the maintenance of the classified road network to an economic level of serviceability using local resources and labour-based methods wherever these are cost effective.
The Strategy adopts a network approach and spot improvements thereby improving accessibility Although the roads 2000 strategy was endorsed by all stakeholders in the early 90s, it did not take off, with the exception of 2 projects funded by SIDA and DANIDA in Central and Coast Provinces respectively. The roads 2000 approach is an eminently rational response to the needs of the rural sector given Kenya's resource constraints. Kenya has a very large unpaved network, which would be too costly to maintain using conventional engineering maintenance practices. Kenya has a large and growing pool of unemployed/underemployed people who desperately need income earning opportunities.

The Roads 2000 approach to the rehabilitation and maintenance of the unpaved network offers an opportunity to increase the level of accessibility of the network within these constraints

- Low cost: Partial rehabilitation and spot improvements
- Employment generating: labour based works for both rehabilitation and maintenance can generate substantial unskilled and semi-skilled employment in local areas.
- Material tolerant: spot rather full regravelling, use of quarry waste and other over-sized materials.

Donors have assisted with the introduction of the strategy in a few districts with very encouraging results:

- SIDA: Nyeri and Kirinyaga
- DANIDA: Coast Province

Expected support also includes:

- SIDA: Preparing to undertake studies in Nyanza Province
- EU: Preparing a second phase of assistance in Eastern Province
- KfW: Nakuru, Nandi, Kericho, Bomet, Bureti and Nyamira

Roads 2000 approach is also an important component in poverty alleviation as it provides jobs and incomes to unskilled and semi-skilled people in rural areas. Some components of labour-

based methods can also be used on the paved road network, especially off-carriageway maintenance.

2.1.3 Institutional Arrangement for financing and Managing Transport infrastructure:

As a response to deteriorating condition of roads in Sub-Saharan Africa, the Economic Commission for Africa and the World Bank managed Sub-Saharan Africa [SSATP] came up with the Road Maintenance Initiative [RMI] aimed institutionalising sustainable methods of financing road maintenance and management. The main thrust of RMI was to introduce methods of securing adequate and stable flow of funding based on dedicated user charges, and to delineate clear specification for various responsibilities and their appropriate assignment with matching authority.

As an outcome of this programme, the Kenya Roads Board [KRB] was established by an act of parliament in July 2000. The roles of KRB include co-ordination of all implementation of all policies relating to maintenance, rehabilitation and development of the network and to administer the funds derived from the fuel levy and any other funds that may accrue to it.

Within the act establishing the KRB, the following agencies are recognised:

- The Roads Department in the Ministry of Roads and Public Works. This is responsible for the trunk and primary roads [classes A, B and C of the classified network]
- Kenya Wildlife services [KWS] that is responsible for roads in national parks and game reserves.
- District Roads Committees [RDCs], which are responsible for secondary roads [classes D, E and special purpose roads] and unclassified roads [urban and rural].

The KRB currently manages the disbursement and accounting of money coming from the Road Maintenance Fuel Levy [R.M.F.L]. This fund came into effect in 1993. It consists of an automotive fuel levy and transit toll collection. KRB provides an institutional framework within which the entire road network is managed. The KRB is composed of major stakeholders in the roads sector who constitute the majority of its membership, and representatives of relevant government ministries of departments. Stakeholders include the Kenya National Chamber of Commerce and Industry, The Kenya National Farmers' Union, the Automobile Association of Kenya, road contractors, transporters and the Kenya Association of Tour Operators. The Ministries of public Works, Transport, Finance and Local Government represent the Government.

In the first year, the fund collected just below Kshs 1 billion. Currently, the levy is collecting over Kshs 8 billion per year [USD$100 million]. The impact of the fund has however has been negated by the fact that most of the roads in Kenya are not maintainable, but need to be reconstructed first, which is far more expensive, and beyond the amount available from R.M.F.L.

The KRB act provides a broad framework for the allocation of maintenance of funds, with 60% going to international and national trunk roads and primary roads, 24% to secondary roads [within districts] and 16% to rural roads [through constituency road fund]. The secondary and rural roads are within the mandate of the District Road Committees.

Need to entrench the role of stakeholders.

The role of stakeholders in the delivery and management of road infrastructure needs to be improved. Users pay directly and indirectly for the costs of roads, but they hardly have say in the decision-making processes involving their roads. Users are not made aware of their rights and obligations.

The Roads 2000 approach provides a major window of opportunity to involve both the local leadership and the roads users. District Roads Committees and members of parliaments do not necessarily provide an adequate platform for the people to influence priorities and monitor allocation of resources.

There is need to develop a framework for public participation in planning, management and monitoring. There is need to sensitise the leadership more so because the Roads approach - accessibility improvement as opposed to condition upgrade is not politically attractive.

2.1.3 Discordant Institutional arrangement.

In Kenya, roads are managed by different government departments. The Ministry of Transport and Communication [MoTC] has nominal overall responsibility for Kenya's policies involving planning, designing and management of rail. Road, air and maritime transport. The Roads Department of the Ministry of Roads and Public Works is responsible for planning, designing, constructing and maintaining the classified network. The Kenya Wildlife Service [KWS] is responsible for roads in the national parks. The rest of the network is administered by either municipalities and County Councils, which are under the Ministry of Local Government, or the Forest Department under the ministry of Environment. In general, each agency involved in roads subsector [i.e., three government ministries, local authorities and KRB] has its own objectives and funding sources. The spread institutional responsibilities maybe a factor in the sector's poor performance in maintaining the network. Under such an arrangement, it is difficult to co-ordinate the activities of the various road agencies, to determine their financial requirements and to address problems in a co-ordinated way. Table 4 below gives a summary view of the disjointed institutional responsibilities.

Table 4: Institutional stress in management of road infrastructure.

Road type	Responsible Institution	Network size [km]
Classified roads	Ministry of public works	63,300
Unclassified network ▪ National parks ▪ Game reserves	 Kenya Wildlife Service [KWS] Local authorities, but contracted to KWS	 5,900 2,800
Urban roads councils	Local authorities [city and municipal]	6,000
Rural roads	County councils	63,600
Forest Roads	Forest Department	8,000

Its important however to point out that the development of an integrated transport policy [currently being finalised with EU funding support], is expected to lead to a more rational structure for the management, co-ordination and financing of the transport sector. Within the road sub-sector, it is expected that the new policy would address itself to at least some of the following critical concerns:

- Rationalise the institutional framework for managing the rural infrastructure at different levels.
- Strengthen the capacity for decentralised planning and management of transport infrastructure and services
- Specify clear roles for decentralised institutions such as the District Road Committees [DRCs].
- Provide a coherent strategy for dealing with rural roads. In fact, the very concept of rural roads is not well defined. They are generally defined as those roads criss-crossing rural areas, be they classified [mainly class D and E] or the unclassified 'Community Roads'. However, as of now, the concept of 'community roads' does not exist in Kenya's classification system of the road network.

2.2 Rural Transport Services: Policy Gaps

Rural transport services cover the variety of transport operations that on the one hand connect rural households, rural hinterlands with the main markets, service centres or main roads within the relevant regions. The problem of poor rural transport services in many Sub-Saharan Africa countries stem from 3 principal directions. First, the low levels of motor vehicle ownership, 75% of which are concentrated in the three big urban centres in the country. Table 5 below shows the vehicle fleet in Kenya

Table 5: Vehicle fleet in Kenya.

Vehicle fleet: Includes about 492,000 motor vehicles of which 85% are light vehicles and 15% are buses and trucks. Heavy traffic is only found inside major urban areas and on the main roads. Urban roads are estimated to carry more than half the traffic in vehicle km.

Kenya Vehicle fleet ['000] vehicles]

	1970	1980	1990	1995	1997	1998	1999	2000
Cars	58.5	113.6	157.7	172.8	211.9	225.1	229.0	229.6
Pick ups	37.4	55.5	88.3	100.9	121.7	148.8	147.9	146.8
Trucks	13.7	23.6	13.2	32.6	39.5	54.2	53.8	52.9
Buses/minibuses	2.5	5.1	13.2	29.8	34.9	46.4	45.6	44.8
Total	**112.1**	**197.8**	**272.4**	**336.1**	**408**	**474.5**	**476.3**	**474.1**

The second problem stems from poor transport infrastructure, which cannot attract vibrant and competitive transport operations. Thirdly, there is a fundamental problem in the assumption that improved transport infrastructure would lead to sufficient and satisfactory levels of transport services that are appropriate and accessible to the bulk of the rural population. The first issue is of a more practical nature. With ongoing re-organisation in the institutional framework for financing rural transport infrastructure, [highlighted in the preceding section] it is possible that reasonable improvements in rural infrastructure can be achieved in the medium to long term. This still begs the question - would this guarantee sufficient and affordable transport services to the rural population? This requires re-examining the assumption that improved transport infrastructure would automatically attract transport services and locally competitive [and therefore affordable] transport services.

The policy of leaving the provision of RTS, including IMTs to the private sector is no always successful because the market for these services does not operate effectively. There are a number of reasons for this, which include a low density of demand [poor market development for all services including transport services,] un-competitive practices, and absence of new and

innovative methods of delivering transport services that match market needs. In particular, one area whose full potential has not been fully exploited is optimising the combination of motorised and non-motorised options and matching this with appropriate infrastructural support.

In general, the previously dominant focus on infrastructural issues has completely overshadowed issues related to the quality, frequency, appropriateness and cost of transport services. On the positive side however, the draft Roads Sub-Sector Policy [2003] in Kenya now proposes to take a more integrated way of delivering roads that are responsive to the needs of different groups in the population.

Draft Road subsector policy statement.

"In particular [Road Transport Development] development will be focussed on improving accessibility and mobility especially of the poor, women and vulnerable groups, increasing the variety and quality of affordable urban and rural transport and improving accessibility for the development of key economic sectors…." [GoK, 2003][xix]

2.3 Critical factors determining types and levels of Rural Transport Services

The frequency of rural transport service operations are heavily influenced by the following interlocking factors:

- Intensity [or density] of demand;
- Ability to pay [related to above]
- Cost of operating service [services with high initial investment and operating costs]
- Quality of infrastructure.

A distinguishing feature of rural transport systems in most Sub-Saharan Africa is the low density of demand, which in turn is the consequence of two mutually reinforcing factors, namely low population densities and low volume of economic activities. This means that often a critical threshold of effective transport demand cannot be achieved, and therefore transport activities remain in the realm of subsistence economy.

Generally, the greater the size and density of demand, the greater range of loads, distances, route patterns and types of vehicle service. In this variable environment, there is a greater possibility to sustain a competitive transport system that will encourage a wide range of vehicle types. In many of the remote parts of the village, motorised transport plays no part in transport operations. In surveys in Zambia, villages with access to 6 motorable roads may only see commercial vehicles three times in a year. A study in Makete District of Tanzania in 1987 found only one in four wheeled vehicle and three motor cycles for 13,700 people [Dawson and Barwell, 1993]. Cross country comparisons between Africa and Asia show that representative villages in Asia have far greater access to vehicles than in Africa. For example, surveys found that villages in Zimbabwe would on average have one motorised vehicle per 300 people, which is a fifth of the level in Sri Lanka.

The problem of low demand densities in Africa is compounded by the nature of farming systems in Africa which tend to be small scale, low input and low output. High input and high output agriculture gives a wider scope for specialisation and market agriculture and hence the greater is the demand for transport.

2.4 Role of IMTs: International and Regional perspectives

Despite their importance in local transport, support to IMTs in many countries is always lacking. IMTs are disregarded by motorists and ignored by planners. Overall, 98% of resources in the provision of roads are allocated to satisfying just 2% of transport demand. The role of IMTs has largely been underestimated in the planning of rural roads and rural transport services. Many of the road appraisal and planning methods do not include components for operating costs, time and generated traffic benefits associated with IMTs and particularly animal carts [Ellis SD 1997][xx].

The role of IMT's is particularly important in some Asian countries. In Bangladesh for example, a survey found that non-motorised vehicles accounted for 94% of all commercially operated vehicles and two-thirds of total carrying capacity [the majority of these are probably accounted for by rickshaws] [Dawson J., Barwell I., 1993][xxi].

In India, it is estimated that there are 15 million animal drawn carts carrying 1200 million tonnes of goods per year [Saxena and Verkeyachan 1989][xxii]

IMTs have a potentially significant role in many rural communities that suffer from poor access to key subsistence, economic and social services. They can increase both load capacity and speed and expand the range over which people can seek economic opportunities. IMTs can reduce the drudgery of subsistence tasks, and are appropriate for operation on the existing network of paths and tracks without the need for expensive road building schemes.

However, in most of Sub-Saharan Africa, there is little alternative to head loading or transport by trucks. It is often not viable to operate a frequent transport service in small rural communities and hence many villages are only served by motorised transport on market days. There is enormous gap between the productivity of trucks and headloading and, where there are no alternatives, the introduction of IMTs may allow the productivity gap to be plugged. They provide a vital step between the high load and high speed and high technology trucks and the drudgery involved in headloading

2.5 Characteristics and Performance of different IMTs.

The appropriateness of different IMTs to a variety of local transport situations is dependent on such characteristics as:

- Initial investment costs.
- Payload capacity
- Speed and distance range
- Cultural environment etc.

Annex 1 gives a general overview of the characteristics of different IMTs. The IMTs are divided into 3 categories, namely:

- Human powered vehicles [bicycles, hand-carts etc]
- Animal powered vehicles
- Low-cost *motorised* vehicles.

Here is brief overview on the characteristics of different IMTs.

Bicycles:

The use of bicycles is growing steadily in Kenya. In particular, bicycle transport services [boda boda] have gained prominence in the last 2-5 years [Ochieng F. and Egessa, 2002][xxiii]. The growth of bicycle based transport services is attributed to deterioration in off-road infrastructure, falling costs of bicycles and unemployment of youth in rural areas. A study by Ochieng and

Egessa, [ibid] indicates that in Busia, every household has two bicycles, while in Mwea, 50% of the household have bicycles. The bicycles are used for passenger, personal and goods transport. In Busia, only 8% of the total population of bicycles are used as boda bodas, while in Busia, only 14% are used as boda bodas. The rest are used for personal and goods transport within households.

There are some incremental changes that can be made to integrate boda bodas into the local transport system. These include working with the operators to strengthen their capacity for policy influence and self-regulation. It would also be important to help develop a platform that brings together the operators, local planners and administrators in order to create an enabling environment for the development of the sector.

Technically, the load capacity of bicycles can be increased by attaching a trailer or by being used as rickshaw. For similar loads motorcycle technology can also be considered either when a trailer or sidecar is attached or when the vehicle is designed to have a payload areas on the front or back. These types are very rare in rural Kenya.

Animal carts

Animal carts are the lowest cost option over a 10-km distance until the demand reaches about 250 tonnes per year. These are the typical requirements for small - medium scale intensive farmers, such as to be found in Mwea and Lari.

The ox-cart is one of the more common modes of animal transport there are many other animals which can be considered. These include donkeys, mules, and horses. The animals can be used in conjunction with a cart or as pack animals. Horses maybe considered where speed is important, pack donkeys for poor quality mountain paths and a camel and cart for high-load capacity road transport. This is roughly five to six times the quantity of goods being carried on India's railways

Animal transport have the advantage that it can also be used for agricultural preparation and can therefore maintain relatively high utilisation levels. Although the ox-cart is slow, it can use very basic infrastructure, maintenance costs are low and the cart is simple to repair. Disadvantages include a limited range and speed.

Low-cost farm vehicles.

Low-cost farm vehicles powered by single cylinder engines can provide higher speeds and payloads for farm operations. They are very simple to repair and maintain and are suitable for local manufacture. As such the vehicles operating costs are lower than other conventional vehicles over a wide range of distances and loads. They can also be used for other farm operations such as ploughing, pumping water etc.

3.0 Tentative conclusions.

In the context of KENDAT's work, the three study zones of Mwea, Lari and Busia are not the typical low-density areas to be found in many rural areas. In fact the areas are within high potential and densely populated regions of the country. They also have either an international or a national road traversing them. Both transit and local motor traffic is common.

In addition, all the study areas have a high population of IMTs - Predominantly bicycles in Busia and animal carts in Lari and Mwea, with a good bicycle population. IMTs in these areas have evolved of their own accord in response to the demands of the production and trading systems in the different areas.

So what are the rural transport and marketing issues in these areas?

- The first is mainstreaming IMTs into local level planning. At the national level, there is now general acceptance that IMT are an essential part of the growing transport sector. This recognition needs to percolate to lower planning jurisdictions, especially among local authorities and provincial administration. There is need to build local platforms that can advance the cause for IMTs.
- Secondly, development and maintenance of local transport infrastructure remains a serious challenge in the operation of motorised and non-motorised transport services in rural areas. Rainwashed roads, broken bridges and culverts make transportation expensive and risky. This state of affairs often has to do not only with lack of institutional structures for development and maintenance of rural infrastructure, but also with financial constraints of public investment. The financial and technical processes are also not clear to local stakeholders. An interesting question is to what extent popular policies can influence and leverage local investment in infrastructure. After all, stakeholders are already paying a relatively high price for poor accessibility and mobility.

- The third issue is the strengthening the IMT sector through new innovations that can meet the needs of different income groups and increase the range of technical possibilities, such as improved speeds, lower costs of maintenance

Annex 1:

CHARACTERISTICS OF HUMAN POWERED VEHICLES					
Vehicle type	**Average cost [Kshs]**	**Max load [kg]**	**Aver. Speed[Km/h]**	**Range [km]**	**Vehicle Characteristics**
Wheelbarrow	3500	100	4	1	Used mainly for running household chores, to collect water, firewood, and to transport manure and farm produce within the farm
Handcart	12,000	100-150	7	10	Used in urban and rural areas, particularly in market environments. They are mostly used for commercial hire, and are rarely kept as household transport equipment.
Bicycle	5000	100	10	50	Used for personal, passenger transport and goods transport. It is one of the most valued household possessions in many rural areas. Men mostly use it. There has been an "explosion" in bicycle use in the last 5 years as a low-cost means of rural transport. Its potential in farming not fully exploited.
Bicycle Trailer	10,000	100	8	30	Not well developed in Kenya. Promoted by ITDG and KENDAT among others. Soft drink company Coca Cola is promoting use of a trailer among distributors in urban areas. To operate well, they require a reasonably flat terrain and a fairly wide and smooth road surface.
CHARACTERISTICS OF ANIMAL POWERED TRANSPORT					
Donkey cart	7000-16,000	300	5	15	Normally powered by 1-3 donkeys, donkey carts are common in central parts of Kenya [Nyandarua, Limuru, Kirinyaga], some parts in western Kenya and Nyanza, as well as Eastern Province. They are used for marketing of produce, fetching water and delivery of farm inputs. They also transport goods for small retail shops in the rural areas. High payloads and faster speeds are some of the benefits associated with donkey carts. A major constraint to introduction of donkey carts in areas where they are traditionally not in use is due to the costs of acquisition
Pack donkey	5000	100	5	20	Generally used in drier parts of the country. In high-density areas, pack donkeys are not common. There are also cultural inhibitions among many communities on use of donkeys as pack animals.
CHARACTERISTICS OF MOTORISED VEHICLES					
Motorcycle [50cc]	70-8500	100	50	100	Not common in rural transport service sector in Kenya, though used in urban areas for deliveries.
Single cylinder engine tractors	120,000[in Asia]	1000	15	50	Have not been tested in Kenya.

Annex 2:

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[i] See Attached Terms of reference.

[iiii] Ministry of Information Transport and Communications [MoITC], 1984, Assessment of the Socio-Economic Impacts of Information of the Kenya Rural access Roads Programme, MoITC, Nairobi.

[iii] Ministry of Information Transport and Communications [MoITC], 1983. *A Baseline study of Rural Access Roads in Kenya*, Nairobi MoITC.

[iv] Dijkstra T., and T.D. Magori, 1992 *Horticultural production and Marketing in Kenya*. Part 2B. Horticultural production in Nyandarua District. Food and Nutrition Studies Programme Report No. 48. Leiden: Africa Studies Center.

[v] Gavira J., 1990 'A regional analysis of institutional and financial constraints to rural transport: The case of Tanzania' SSATP/MADIA Discussion Paper, Washington, DC: World Bank.

[vi] Omamo, S.W., 1998: 'Transport costs and small holder cropping choices: An Application to Siaya District, Kenya' *American Journal of agricultural Economics*: 80: 116-123.

[vii] Obare, G.A. 2000: 'The impact of road infrastructure on input use and farm level productivity in Nakuru District, Kenya' PhD thesis, Egerton University, Njoro, Kenya.

[viii] Ellis, S.D. [1997]: Key Issues in Rural Transport in Developing Countries. TRL Report 260

[ix] World Bank: 2000 African Development Indicators 2000, World Bank, Washington DC

[x] Government of Kenya [2003]: "Roads for Economic Development: Roads Sub-Sector Policy" A consultative document. Kenya Roads Board.

[xi] Ministry of Information Transport and Communications [MoITC], 1984, Assessment of the Socio-Economic Impacts of Information of the Kenya Rural access Roads Programme, MoITC, Nairobi.

[xii] Ministry of Information Transport and Communications [MoITC], 1983. *A Baseline study of Rural Access Roads in Kenya*, Nairobi MoITC.

[xiii] Dijkstra T., and T.D. Magori, 1992 *Horticultural production and Marketing in Kenya*. Part 2B. Horticultural production in Nyandarua District. Food and Nutrition Studies Programme Report No. 48. Leiden: Africa Studies Center.

[xiv] Gavira J., 1990 'A regional analysis of institutional and financial constraints to rural transport: The case of Tanzania' SSATP/MADIA Discussion Paper, Washington, DC: World Bank.

[xv] Omamo, S.W., 1998: 'Transport costs and small holder cropping choices: An Application to Siaya District, Kenya' *American Journal of agricultural Economics*: 80: 116-123.

[xvi] Obare, G.A. 2000: 'The impact of road infrastructure on input use and farm level productivity in Nakuru District, Kenya' PhD thesis, Egerton University, Njoro, Kenya.

[xvii] Republic of Kenya [1990b]: Minor Roads Programme Evaluation Mission. MRP Evaluation Report. February, Nairobi, Government Printer.

[xviii] Kenya Employment Growth for Poverty Alleviation,11659-KE, Washington DC

[xix] Government of Kenya [2003]: "Roads for Economic Development: Roads Sub-Sector Policy " A consultative document. Kenya Roads Board

[xx] Ellis, S.D. [1997]: Key Issues in Rural Transport in Developing Countries. TRL Report 260

[xxi] Dawson, J., and Barwell I. [1993]. Roads are not Enough. IT Publication, London.

[xxii] Saxena, R K and Varkeyachan [1989]. Modernization of Animal Drawn Transport Vehicles in India. International Seminar on Rural Transportation, Indian Roads Congress and ILO.

[xxiii] Ochieng, F., and Egessa J.O [2002]:Options for provision of rural transport services in Kenya: Boda Boda Case Studies in Busia and Mwea. Kendat.

Annex 3

Terms of Reference for the study

Re: Intention to hire your services: RTS Project, Kenya

Our earlier discussions and deliberations of the recent Year II kick-off workshop for the above project refer.

Kindly refer to the attached Year II and III Proposal paying special attention to the revisions of the original log-frame and Milestones set for the current year.

KENDAT needs you assistance to:

1) Generate base-line and status information about rural transport services in Kenya relative to other countries in Eastern and Southern Africa where IFRTD has ongoing projects.
2) Authenticate the cost-benefit analysis of means and services to help set a surface level status if not a basis for choosing ongoing IMT interventions.

You will exchange notes with Engineering Team (re: Dr. J. Mutua) and the Ministry of Agriculture, Horticulture department (re: Mr. Mugambi , Deputy Director of Agriculture, Horticulture – Kilimo House), whose office should have finger-tip data and horticulture marketing information or reports.

You may want to pay a visit to Limuru, Busia or Mwea, if that will help you in gathering basic analytical business information KENDAT has adequate field-level contacts, at your disposal in these areas.

You have access to reports by Engineering Team, Agric Economist (draft only) and Boda boda survey as well as your own policy and other reports compiled last year by the KENDAT consortium. Specific relevant information and data should be available from ILO-ASIST and ITDG, KRB and Chief-Engineer Roads office, as may be needed.

KENDAT will assist with research assistant and logistical support as and when necessary. The assignment is however seen to be very much a desk-top one.

The following Terms of Reference may provide more insight to your assignment:

1) Using RTS project and other secondary information or data, assemble baseline (comparative) information on RTS services in Kenya with regard to:
    - Infrastructure services status and operations (facilities, capacities, finance, management etc.) and necessary interventions.
    - Means and services in general and with reference to post-harvest agricultural transport and marketing (operational efficiency cost and access implications by the less able in society)
    - Policy guidelines and relevant shortcomings or necessary interventions relative to other countries in the region
2) Using available information and data assembled by the KENDAT consortium, and based on preliminary cost-benefit and access to means and services information available, build a basis for quality determinants of RTS (means and services).
    - The extent (or potential) to which the boda boda and other IMTs are accessible to service agricultural transport and marketing

- Interventions needed to make (which) IMTs relevant to (which) personal or agricultural (goods) transport and marketing (-Engineering group and ergonomics input may be sought).
- International experience to borrow from and interesting (novel) findings regarding RTS in Kenya, worth disseminating or sharing with others in similar development studies (think of a KENDAT or IFRTD website summary for RTS Kenya, so far).

If you need discussion or any other clarification or details, do not hesitate to contact the undersigned or KENDAT Technical Manager, Dr. J. Mutua.

We look forward to working with you.

Dr. Pascal G. Kaumbutho
Executive Coordinator
KENDAT