

**Intermediate Technology Consultants  
WSP International Management Consulting**

# **The Rapid Assessment of Rural Transport Services**



**Paul Starkey**

*Draft final report, March 2006*

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All photos taken during the survey work in:  
Tanzania, Tanzania, Zambia  
Burkina Faso, Burkina Faso, Cameroon  
Cameroon, Tanzania, Zambia*

**Intermediate Technology Consultants (ITC)**  
**WSP International Management Consulting**  
*networking with members of the*  
**International Forum for Rural Transport and Development**

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**Paul Starkey**  
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## Acronyms, abbreviations and exchange rates

°C	degrees Celsius
\$	Dollar (United States)
4x4	four wheel drive vehicle
ADRTom	L'association pour le développement de la région de Toma, Burkina Faso
cc	cubic centimetre
CIDR	Centre International de Développement et de Recherche, France
CVECA	Caisses Villageoises d'Epargne et de Crédit Autogérées, Burkina Faso
DRC	Democratic Republic of Congo
eg	for example
ESA	Eastern and Southern Africa
FCFA	CFA Franc (originally Franc de la Communauté Française d'Afrique). USD 1 = 525 FCFA (approx) at time of survey
GIS	Geographical Information Systems
GPS	Global Positioning System
HIV/Aids	human immunodeficiency virus / acquired immunodeficiency syndrome
hr	hour
IFRTD	International Forum for Rural Transport and Development (Secretariat in London, UK)
ie	that is to say
IMT	Intermediate means of transport
ITC	Intermediate Technology Consultants (UK-based consultancy firm)
ITDG	Intermediate Technology Development Group (known in UK as Practical Action)
kg	kilogram
km	kilometre
m	metre
mm	millimetre
NGO	non-governmental organisation
ORH	Operational Research in Health Ltd (UK consultancy firm)
Pax	passengers
PRSP	Poverty Reduction Strategy Paper
RAMP	Rural Access and Mobility Programme
RTTP	Rural Travel and Transport Program
sq km	square kilometre
SSATP	Sub-Saharan Africa Transport Policy Program, World Bank, Washington DC, USA
t	tonne
TB	tuberculosis
Tsh	Tanzania shilling USD 1 = Tsh 1100 (approx) at time of survey
UK	United Kingdom (of Great Britain and Northern Ireland)
US	United States of America
USB	universal serial bus (for computer peripherals)
USD	United States Dollar
VAT	value added tax
WSPimc	WSP International Management Consulting (WSP is the name of a group of companies)
ZK	Zambian Kwacha USD 1 = 4800 ZK (approx) at time of survey

# Chapter 1: Summary

## Background to study

Rural transport services are often inadequate. Passenger and goods transport needs improving to stimulate rural economies and reduce poverty. Understanding existing rural transport systems and constraining factors is a precondition for appropriate policy action.

The Sub-Saharan African Transport Policy Program (SSATP, managed by the World Bank) commissioned a study to develop and test a methodology for the rapid assessment of rural transport systems. The guidelines specified passenger and freight transport for distances of 5-200 km, encompassing much rural transport, but excluding within-village transport, long-distance national transport and international corridors. Under a contract implemented by Intermediate Technology Consultants (ITC) in 2005, a multidisciplinary team met in Ethiopia to devise the survey methodology. Four national experts and the team leader implemented the methodology in parts of Burkina Faso, Cameroon, Tanzania and Zambia. The team reconvened in Kenya to review the methodological lessons and survey findings.

## The methodology developed

Rural transport systems operate on hub and spoke systems at several levels. Key rural hubs are provincial towns, market towns and villages. The various spokes and hubs have characteristic combinations of transport, including trucks, buses, minibuses, pickups and intermediate means of transport (IMTs). The methodology surveys transport types, operators, users and regulators at sampled hubs and spokes, stratified by hub hierarchy and remoteness. The methodology requires two months to implement (including planning and reporting) and provides a rapid overview of rural transport systems, highlighting key constraints, stakeholder views and proposals for improvements.

A region, representing about 5% of the country, is chosen where the transport catchment area corresponds approximately to administrative boundaries. Within this area, interviews are held with the regulatory authorities (local government, police) at provincial, district and village levels. Operators, suppliers and repairers of transport devices (motorised and motorised) are interviewed and operating costs and fares recorded. Interviews are conducted with users (and potential users) of transport including farmers, traders, employees, household managers, school authorities, pupils, health service providers, patients and marginalised people. Five interviews (at least two with women) are needed per stakeholder category and are stratified for isolation. Traffic counts (including pedestrians and IMTs) are carried out on selected provincial, market and village spokes on market and non-market days.

The survey expert (not enumerators) undertakes all the semi-structured ('rapid rural appraisal') interviews. As the survey progresses, information from different sources is triangulated and anomalies investigated. Survey guidelines stress the importance of poverty focus and crosscutting gender, safety and HIV/Aids issues. Complementary national level document reviews and interviews ascertain the positions of key institutional stakeholders, the policy and regulatory frameworks and the availability of relevant data. Many results can be presented in graphical form and computer-generated maps can be used as models in subsequent planning.

Using this methodology, many fascinating survey results were obtained and detailed reports have been prepared. Selected observations are highlighted in this document and summarised here (all figures being estimations and/or approximations).



### **Survey results from Boucle du Mouhoun, Burkina Faso**

The Boucle du Mouhoun region has 1.4 million people and represents 12% of Burkina Faso by area and population. It is semi-arid and most people engage in small-scale farming. There are 1200 km of recognised roads, many in poor condition. None are paved. The motorised transport fleet is small and old, with total investment cost of 1.5 million dollars. It comprises 50 rural taxis (midi-buses and pickups, always overcrowded) and 30 large trucks carrying mixed loads with people on top. Most vehicles operate to and/or from Dédougou, the regional transport hub. There are five smaller hubs. Bicycles, animal drawn carts and small motorcycles are extremely important. There are 220,000 IMTs with a total investment cost of 35 million dollars. Many people travel 10-80 km to reach periodic markets, often along 'invisible' tracks that are not part of the road network. Most medium distance journeys (10-40 km) are made by IMTs. Women use about 20% of bicycles and donkey carts. Local production of bicycles and motorcycles is unsustainable due to cheap Chinese imports. National policies and local regulation have little impact on rural transport services. Motor transport services seem locked in a viscous circle of low investment, low profitability, low transport frequency and low economic demand. IMTs could increase further through de-taxation of imports.

### **Survey results from Southern Province, Cameroon**

The Southern Province represents 10% of Cameroon by area and contains 500,000 people, 3% of the national population. Lying in the humid forest zone, its economy is dominated by agriculture and forestry. It has 4300 km of roads of which 12% are good quality paved national spokes linking regional towns with Yaoundé and Douala. These roads are busy with inter-urban traffic. Other roads have infrequent traffic and half are in poor condition. There are 650 rural taxis (minibuses and cars) that are the main means of medium distance (20-60 km) transport. Most operate to/from the regional town Ebolowa or four other significant transport hubs. New transport franchises operating from private terminals have proved successful on inter-urban routes and are starting to develop on rural routes. There are also 110 trucks and 80 buses in operation. The fleet is old and represents three million dollars of investment. There are no work animals in the humid zone. There are few bicycles due to their high cost. Recent years have seen a rapid growth in cheap motorcycles imported from China. Almost 20,000 motorcycles are used, representing an investment of thirteen million dollars. Motorcycles provide important, profitable transport services for short-to-medium distances (1-30 km) in urban and rural areas. The many control barriers frustrate transport operators. These do not strictly enforce regulations but daily barrier payments (bribes) increase vehicle operating costs. There is little evidence that national transport policies affect transport service provision directly. However, national transport policies on prioritising road rehabilitation are being implemented. The region provides examples of high fares and low transport frequency on poor roads changing in response to road improvements and road deterioration.

### **Survey results from Iringa Region, Tanzania**

The Iringa Region has a population of 1.5 million, and represents 6% of Tanzania by area and 5% by population. It is topographically varied, with mountains in the south. The economy is based on smallholder agriculture. The road network is dominated by a bifurcating spine of paved national road, which carries most of the traffic in the region. Other roads are unpaved, and about half the 7000 km are in poor condition. The regional transport service fleet comprises buses (25), minibuses (45), rural taxis (30) and trucks (75). Most operate to/from one of four major hubs along the trunk road. There are four minor hubs. Buses and minibuses operate to regulated timetables. The trucks provide mixed transport notably for periodic markets. The total fleet represents an investment of 1.5 million dollars. Bicycles are increasing, with 65,000 in use, primarily by men. Some bicycle taxi services exist. Pack donkeys and animal drawn carts are locally important. Private motorcycle use is low. Six million dollars have been invested in IMTs. Inadequate motorised transport services away

from trunk roads are associated with low profitability, poor roads and low rural incomes. Therefore people often walk or cycle long distances to markets and services. A legal, regulatory and institutional framework exists for rural transport services but is weakly enforced. Little is done to stimulate improved transport services or greater use of IMTs.

### **Survey results from Singida Region, Tanzania**

The Singida Region has a population of 1.1 million and represents 4% of Tanzania by population and 5% by area. The main activity is small-scale mixed farming in semi-arid conditions. The road system is dominated by a transport corridor (Dar es Salaam to Burundi) running from southeast to northwest. This is being paved. National roads also link Singida town with regions to the northeast and southwest. There are 3000 km of unpaved roads with half in poor condition. Singida, Manyoni and Kiomboi are the dominant transport hubs. Most rural transport services begin or end in one of these towns. There are two smaller hubs. The regional transport fleet is small and old and worth less than one million dollars. It comprises 30 trucks, 20 buses, 25 rural taxis and 10 minibuses (a small number due to poor roads). There are few private motorcycles. Away from national roads little motorised traffic circulates. There are 60,000 bicycles, one per four households. With little affordable motorised transport, walking and cycling are the main means for medium distance (10-40 km) rural transport. Bicycle journeys of 10 km are common and journeys up to 50 km are not unusual. Only 7% of bicycle journeys recorded involved women. Bicycle taxi services have started. Ox-drawn carts (13,000) are widely used and donkeys are important in some locations. Six million dollars have been invested in IMTs. Many people attend periodic markets, arriving by foot, bicycle, cart or rural taxi. Traders travel in heavily laden buses and trucks. These sometimes travel in circuits of markets, causing an HIV/Aids risk yet to be addressed. There is a regulatory framework controlling roads and transport services. Bus timetables are a popular result of regulation, but traffic safety enforcement is weak. The government aims to stimulate rural transport by improving roads and all stakeholders agree with this. Increasing the numbers of IMTs by de-taxation should also improve rural transport.

### **Survey results from Luapula Province, Zambia**

Luapula Province has 800,000 people and represents 7% of Zambia by area and population. A quarter of Luapula is water, with two large lakes, rivers and swamps. Fishing, small-scale farming and marketing provide most work. Much transport relates to fish trading (which stops for three months each year). Government transport policies primarily concern roads but there is some regulation of motorised transport services. The policy of increasing IMTs has not yet been implemented in the province. Parastatal organisations provide limited large-scale ferry services on the big lakes. The road network comprises a bifurcating spine of 600 km of tar road that connects the province to Lusaka and the Copperbelt. The rest of the network comprises 2300 km of unpaved roads, most in poor condition. Most traffic circulates on the paved spine. Some roads (including one regional spoke) have no regular motorised transport. The regional fleet comprises minibuses (65), rural taxis (65), trucks (50) and buses (15), representing an investment of two million dollars. Most operate to or from the provincial capital (Mansa) or the fishing ports (Samfya, Nchelenge). There are two minor transport hubs. Small boats provide essential rural transport around the lakes, islands, rivers and swamps. On land, bicycles are the main means of transport. The 80,000 bicycles represent an investment of seven million dollars. Bicycles and spares are expensive and most bicycles lack brakes. People ride bicycles long distances with tens of thousands of journeys each year in excess of 50 km. Bicycle taxis regularly carry people distances over 70 km, due to the lack of motorised transport. Women ride bicycles, but bicycle price and scarcity (one bicycle per three households) limit who can benefit. There are few work animals. There are few motorcycles, but long-distance bicycle taxis suggest a potential niche for motorcycles. People said they need better roads, predictable motorised transport services and cheaper bicycles.

## **Key issues emerging from the surveys**

Many findings were common to all areas surveyed (the poverty of rural transport systems, small and old motorised transport fleets, poor safety standards, importance of IMTs). Some findings were specific to certain areas (eg, new transport franchises, water transport, motorcycle services, regulatory corruption). The low level of transport services and the importance of IMTs surprised the survey team. Many people think the roads they use to visit a rural area represent ‘rural transport’. However, such approach roads are not typical of rural areas, as they are busy transport corridors that are part of the national hub and spoke system.

Based on the various survey findings, twenty issues are highlighted, each with a general recommendation relevant to policy formulation. These recommendations can be made specific when adapted to the unique transport situation of a country. These relate to:

- Understanding of rural transport systems (poverty implications, infrastructure needs, hubs, fluctuations, low investment in motorised services, importance of IMTs)
- Regulating rural transport (transport associations, control barriers, routes, timetables, safety and enforcement)
- Promoting rural transport services (transport firms, mixed transport, consolidating demand and participatory planning, reducing prices of IMTs)
- Crosscutting issues in rural transport (education, health services, gender, HIV/Aids and mobile phones).

## **Conclusions and follow-ups**

There is need for informed decision making. The methodology presented here will allow policy makers to quickly and easily obtain a reliable picture of the status of rural transport and ways of overcoming key constraints that can be used for evidence-based decision-making.

Intermediate means of transport, particularly bicycles and motorcycles, are extremely important, and offer great growth potential. They are sometimes ‘invisible’ to policy-makers, but rural women and men need them to reduce their isolation and poverty. Fiscal policies should encourage their use so rural people can increase their productivity and quality of life.

Improved infrastructure for motorised and non-motorised transport is vital. Year-round access is particularly important for poor people. Road maintenance work needs to be cost-effective and sustainable, with local stakeholders involved in prioritising for spot improvements.

Improving roads is not sufficient to ensure reliable and predictable services in most rural areas that have low densities of transport demand. Local collaboration and participative planning is required involving all types of transport users, operators and regulators to ensure consolidated transport demand that will allow profitable transport operations. Such collaboration and consolidation should start a virtuous spiral of increasing transport services stimulating increasing demand, greater competition and lower prices.

National and local governments should provide enabling environments, regulating for appropriate standards while encouraging the private sector to provide good services. Policies should stimulate greater, better, safer and more dependable rural transport services. Small initiatives and incentives can have a profound affect on rural transport and the lives of rural women, men and children, reducing poverty, stimulating economic growth and meeting the millennium development goals.

Follow-up suggestions include surveys in other countries (adapted to local circumstances), preparing supporting resources, developing hub-mapping and modelling as a planning tool, testing ways of consolidating transport demand, adapting the methodology for healthcare, and stimulating international debate on policy options for improving rural transport services.

## **Chapter 2: Background and introduction**

### **Aim of study and terms of reference**

Rural transport services are often inadequate. Passenger and goods transport needs improving to stimulate rural economies and reduce poverty. Understanding existing rural transport systems and constraining factors is a precondition for appropriate policy action.

This report presents the results and conclusions of a study undertaken for the Sub Saharan Africa Transport Policy Program (SSATP) administered by the World Bank. It was contracted to Intermediate Technology Consultants (ITC, [www.itcltd.com](http://www.itcltd.com)), working with WSPimc ([www.wspgroup.com/imc](http://www.wspgroup.com/imc)) and members of the International Forum for Rural Transport and Development (IFRTD, [www.ifrtd.org](http://www.ifrtd.org)).

The report author led an international team including consultants from Burkina Faso, Cameroon, Tanzania and Zambia where the fieldwork for the study was carried out. The team comprised Paul Starkey (Team Leader, UK), Peter Njenga (IFRTD, Kenya), Stephen Newport (WSPimc, UK), Abdul Awadh (Tanzania), Gnanderman Sirpé (Burkina Faso), Kemtsop Tchinda (Cameroon), Henry Musonda (Zambia), Priyanthi Fernando (WSPimc, Sri Lanka), Liz Tapper (ITC, UK) and Paul Murray (ORH, UK). Most members of team had collaborated previously through the networking activities of the IFRTD and its associated national networks.

The purpose of the study was to develop and test a methodology for the rapid assessment of the provision of rural transport services in developing countries. In this context, rural transport services were defined to include both passenger and freight transport services operating in the range 5-200 km. This allowed the study to concentrate on transport supply and demand for medium-distance journeys within rural areas. The study did not include short-distance transport within villages or long-distance transport along national and international transport corridors.

The aim was to develop a methodology that would allow researchers and transport planners to obtain, in a relatively short time, an understanding of the existing rural transport situation and provide information that could assist with policy formulation in these countries. It was envisaged that the challenging task would involve obtaining estimates of the existing motorised and non-motorised services and their costs, the demand for transport services for economic requirement as well as for social, health, educational and community reasons. It would also involve assessing rapidly the regulatory situation and it would provide some suggestions of ways by which the various services could be improved. The full terms of reference are provided in an appendix.

### **Planning the methodology in Ethiopia**

Members of the team met in Ethiopia from 4-8 April 2005 to agree a working methodology and prepare associated data sheets. Prior to this, there had been some debate about the issues through an email discussion group. During the planning workshop, the team exchanged ideas with members of the Ethiopia National Forum for Rural Transport and Development and staff of the Ethiopian Roads Authority and the World Bank. Before and after the workshop, there were field visits that provided valuable insights into the practicalities of meeting stakeholders and obtaining information on key rural transport issues. Some of the observations from the Ethiopian field visits have been carried forward into the lessons learned from the study.

It was agreed from the outset that the methodology would be primarily qualitative. It would facilitate an in-depth understanding of the issues rather than collecting statistically significant data. The latter would require much more time and resources. However, the methodology

would produce some valuable ‘order of magnitude’ estimates relating to movement of people and goods in the area, the costs of transport, the transport trends and the problems and solutions from the point of view of various key stakeholders.

The methodology, which is described in detail in Chapter 4, aims at identifying key features of the rural transport system that allow it to be described and ‘mapped’ schematically. The information has to be collected using participatory, inclusive and gender sensitive techniques that lead to an understanding of the transport system from the perspective of all the key stakeholders. Key stakeholders include the authorities (government, regulators, national and decentralised), the transport operators (passenger, freight, mixed, intermediate means of transport), the supporting services (suppliers, repairers and financial services) and a very wide range of users and potential users.

## **Selecting regions to survey**

The choice of the four countries in which to test the methodology had been predetermined in the Terms of Reference. However the team members had to decide the survey locations within the countries. They therefore established various selection criteria, and these have been included as part of the methodology and are described in Chapter 4. Using the agreed criteria (representative or typical, large enough for a clearly identifiable transport system and comprising one or more administrative divisions), it should be possible to identify several suitable survey locations in any country. The final choice of study area will depend on the particular interests of the researchers or their sponsors. In this case, the team wanted to survey a range of transport types in a variety of ecological conditions, and this affected the choices.

In Burkina Faso, the Boucle du Mouhoun region in the northwest of the country had a clear association between the transport catchment area and administrative boundaries. There were no major transport ‘distortions’ other than some frontier effect and small influences from a transport corridor. It has a semi-arid climate and savannah ecosystem. Cameroon is a very diverse country, and a survey in the semi-arid north would yield very different results from one in the forest zone. It would have been good to carry out three separate surveys in Cameroon, but this was not possible given the agreed terms of reference and budget. For reasons of balance with the other surveys, it was agreed to survey a humid forest zone in the francophone part of the country, and the Southern Province was selected. In Zambia, Luapula Province was selected as this area included some water transport. In Tanzania, the main choice was between Singida and Iringa Regions. Following much discussion, it was agreed to try to rapidly survey both regions, without additional time or resources, to see how this affected the breadth and depth of the survey.

## **Implementing the surveys**

During the period April to August 2005, the national experts carried out the surveys in Burkina Faso, Cameroon, Tanzania and Zambia in collaboration with the team leader. All researchers needed to visit the study areas twice, for visits of seven to ten days. Each travelled about 3000 kilometres in total. Time was also required to contact officials in the capital city.

The team leader spent about two weeks in each country with the national experts. Together they visited the regions, conducted interviews, met officials and observed transport services in operation. They jointly reviewed the methodology and initial survey findings and the implications of these for improving rural transport services in their respective countries.

The methodology requires surveying at least one remote village. This is essential but expensive in terms of transport costs and time. To visit a remote village generally requires traveling for a whole day on a bad road in a 4x4 vehicle, remote accommodation and several hours walking. The team were all happy to do this, but were aware that some of their

colleagues might be tempted to save, time, money and effort by only surveying ‘privileged’ villages that are easily accessible. The danger of this has been flagged in the methodology.

## **Reviewing the methodology and survey results**

During the survey months, the team kept in contact through email discussions and circulated draft reports. The team reconvened in Kenya to review the methodological lessons and findings of the different surveys. Paul Murray of ORH joined this workshop and gave advice on mapping the survey results. ORH is a British-based consultancy firm that specialises in mapping software and the modelling of transport systems (particularly for medical and emergency services). The team also benefited from field visits and exchanges with the Kenya National Forum Group (affiliated to IFRTD) and Kendat, an NGO focussing on animal traction issues.

One of the issues discussed during the methodology review related to replication. The team strongly supported the idea carrying out surveys in two or three regions, provided resources were available. The experience of the Tanzanian consultant who had surveyed two separate areas was discussed. He had found the exercise difficult in terms of available time, travel logistics and trying to gain an understanding of two distinct transport regions in a short period of time. For reasons of time and transport resources, he had to focus on relatively accessible areas in the two regions. The team’s conclusion was strong and unanimous. It is not desirable, beneficial or realistic to try to implement two ‘half’ surveys. For each additional region to be surveyed, there is need to budget for about 15-20 days of researcher time, plus reasonable travel costs.

Another issue raised was the need to adapt the methodology to the local conditions, not just at the beginning of each survey, but throughout the study period. It is unrealistic to expect the researchers to be aware of all the transport types and systems of use in the initial planning phase. To give examples from the surveys, in Southern Cameroon, there were no animal-drawn carts, and so there was no need to include these. Government transport experts suggested there were no bicycles either. These might have been excluded from the survey, but villagers spoke of the importance of bicycles. In northwest Burkina Faso, there are very many animal-drawn carts, and one single category was insufficient. There were two-wheel and four-wheel carts, pulled by oxen, donkeys and horses, and operated by men or women. Traffic count forms had to be modified to take into account these locally important categories of vehicles. In Zambia and Tanzania, there were commercial bicycle taxis operating in some rural areas, while in Cameroon there were motorcycle taxis. In Burkina Faso there was no evidence of paid transport services using bicycles or motorcycles. In all areas studied, it was necessary to adapt the survey to local circumstances, interviewing additional categories of service providers, users and regulators where these were identified.

## **Survey reports**

The consultants responsible for undertaking the surveys have each prepared a report of their survey work. These reports have followed the reporting guidelines built into the methodology, and contain the survey results, including the points of view of the various stakeholders (users, operators, regulators, service providers). They contain summaries of the traffic counts as well as estimates of regional transport fleets and vehicle operating costs. Each consultant has summarised the regulatory environment and made various suggestions for improving the rural transport services in the area they surveyed.

The detailed survey reports contain much valuable information and many insights. It is intended that these reports will be circulated nationally and be available internationally (in printed form and/or from appropriate websites). While these reports form an integral part of

the final project output, for reasons of size, they may not be automatically circulated with this particular document.

## **Report on the methodology and lessons learned**

This present document is a report on the methodology that also highlights some of the lessons learned from the process of developing and testing the methodology. It contains selected observations from the four countries as examples of what the methodology can achieve. This report therefore complements the individual survey reports and does not replace them.

This report first discusses the concept of hubs and spokes (Chapter 3), and then presents in detail the methodology developed (Chapter 4). It then provides some of the findings of each survey, highlighting key issues (Chapters 5-9). It is stressed that these do not summarise all the issues and information gained in the surveys and they are not designed as substitutes for the main survey reports. The overviews contain selected observations thought to be of particular relevance to the debate on the methodology and the types of issues that it can raise. The report then discusses twenty topics considered to be particularly interesting and relevant to the debate on how rural transport services can be improved (Chapter 10). In the conclusions (Chapter 11), five key implications of the work are presented, together with several proposals for follow-up actions. Annexed to the report are various tables and data sheets developed as part of the survey methodology.

One great strength of the methodology is that it allows the collection in a short time of very many observations and opinions. These can be usefully reported to illustrate genuine issues that can be investigated in more depth at a later date. The author is aware that to present such information in this report may create problems if people quote them out of context. While it is perfectly correct to report here examples where informants have provided thought-provoking information, these should not be interpreted to represent 'typical' African conditions. Various informants have described travelling 200 km by bicycle, spending one third of operating costs as bribes and having 100 passengers hanging onto the top of a truck. These are legitimate and valuable examples that illustrate genuine transport problems. While they may be 'typical' of certain situations in specific locations, they certainly do not represent what is 'typical' for an average rural person in any of the countries.

## **Specific follow-up initiatives**

The main aim of the study and this report has been to provide a mechanism by which decision making relating to rural transport can be informed relatively quickly and at an affordable cost. It is hoped that the methodology will be locally adapted and used in very many countries in Africa, Asia and Latin America. It is also hoped that it can be adapted for particular transport situations, such as transport for health care.

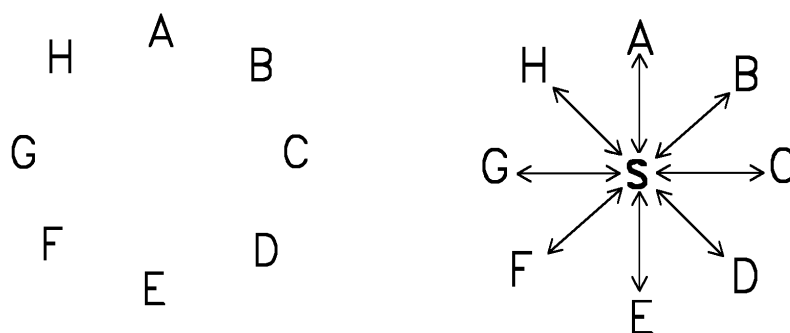
A further aim of the study and this report has been to highlight some options and mechanisms for improving the quantity and quality of rural transport. This report does not claim to provide the answers to rural transport problems (universal solutions would be inappropriate since rural transport services are very situation-specific). Rather this report wishes to start a new debate on how rural transport services can be improved and made sustainable, in order to reduce poverty, improve livelihoods, increase economic growth and provide better access to health, education and other services. It will be up to you, the reader, to engage in the debate, move it forward, and help fulfil the vision of a virtuous circle of improving rural transport and a better quality of life for rural families.

## Chapter 3: Rural transport hubs and spokes

### The concept of hubs and spokes

The concept of rural transport hubs and spokes is central to the methodology of rapidly appraising rural transport services. The planning, implementation and interpretation of the survey and its findings depends on understanding and identifying the various hub and spoke systems operating in the selected areas. This chapter will introduce the hub-and-spoke concept with the help of some simple diagrams.

Cartwheels and bicycle wheels have central hubs and radiating spokes. A hub is a central place where spokes both converge and radiate out. A transport hub is a key location where several routes and means of transport converge and diverge. In informatics, a hub is similarly defined as a place of convergence and divergence, where information arrives from one or more directions and is distributed to one or more different directions. This is illustrated in Figure 3.1. In Figure 3.1a, there are eight unconnected points, while Figure 3.1b the points are linked to a central hub by spokes that both converge inwards and radiate outwards.



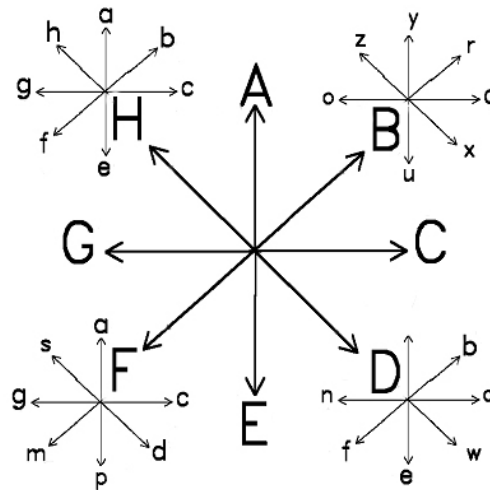
*Figure 3.1 a and b. Eight points, connected by a hub and spokes.*

Such simple hub and spoke models can be used for in a wide variety of contexts, including distribution systems and information gathering and sharing. The hub could be a whole range of things including:

- a telephone exchange
- a manufacturer, with retail outlets
- a bus station, with routes to different villages
- a school, with pupils from the surrounding area
- a clinic, with patients from the surrounding area.

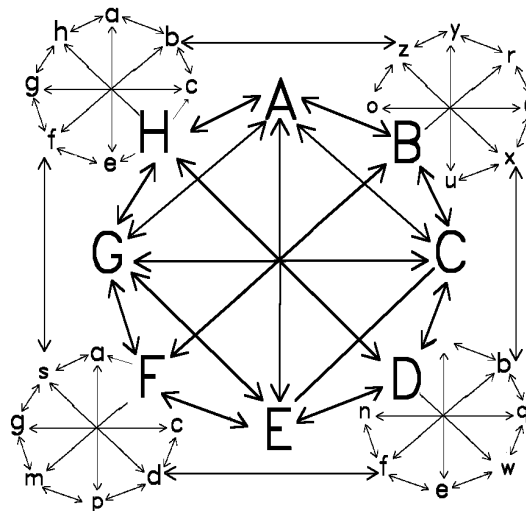
Hub systems are rarely as simple as these models, and usually comprise additional relationships between points (or nodes). Most organisations and transport systems have hierarchies of hubs. The central point in the simplified diagram (Figure 3.1b), would actually be part of another wider network. Similarly, the peripheral points (or nodes) may also be hubs for smaller networks. This is illustrated in Figure 3.2. Telephone exchanges illustrate hierarchies of hubs and spokes and so do delivery services and commercial manufacturing and distribution systems (eg, factory, wholesalers, retailers).





*Figure 3.2. Eight points, forming a hub and spoke network, with sub-networks*

To complicate matters further, the hub(s) may be important but not exclusive. It may be possible for there to be some direct relations between the points without going through the hub(s). This is shown schematically in Figure 3.3. This is true for most road systems and information exchange networks.



*Figure 3.3. Eight points, forming a hub and spoke network, with additional peripheral links and sub-networks*

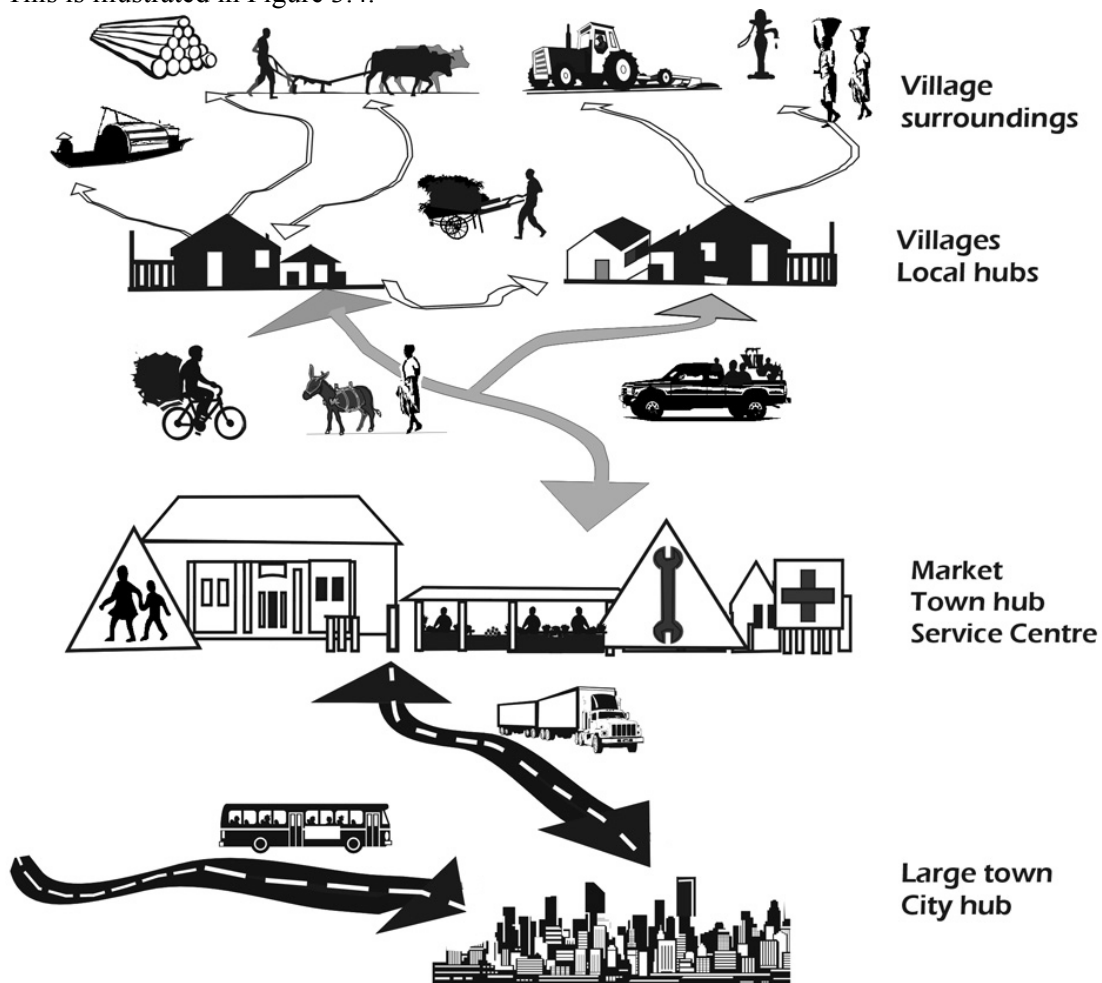
Even though Figure 3.3 represents a complex situation, it is still possible to see the hub and spoke systems. Appreciating the underlying patterns is what is important. Very similar patterns exist in rural transport systems, and these can help us to describe and explain existing transport services.

## **Rural transport hubs, spokes and catchment areas**

**National transport systems** tend to operate from hubs of different size and scale. These include:

- City hub (with university, large hospital, industrial area and possibly central government), with spokes leading to . . .
- Regional or provincial towns (with college, hospital, commercial area trading centre and probably regional/provincial authorities) with spokes leading to . . .
- Market towns (with secondary school, large health centre, large market and possibly district level government), with spokes leading to . . .
- Large villages (with primary school, small health centre, small market) – with ‘spokes’ to outlying small villages, homesteads and fields.

This is illustrated in Figure 3.4.



*Figure 3.4. National transport system, with a hierarchy of hubs*

The main cities within a country are joined by intercity transport links (main roads and perhaps rail and air links). The cities may be linked to ports and to neighbouring countries. These national and international intercity transport connections may be described as transport corridors. They have relatively high levels transport services, for passengers and freight. It is primarily intercity transport, rather than rural transport, although places along the route can be significantly affected by the passing traffic.

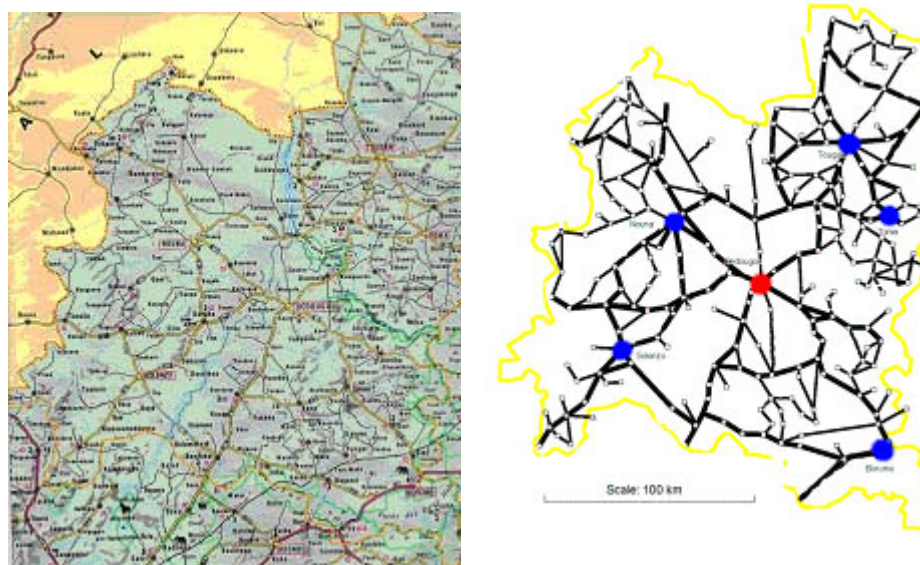
Rural transport systems differ significantly from intercity and corridor transport systems. Agriculture, fisheries, forestry and livestock production remain central to most rural economies. Produce markets are very important for rural people. Towns that have grown around such markets act as foci for much of the rural trade, and naturally become local transport hubs. As rural towns expand, they become increasingly important for providing rural

communities with employment and access to public and commercial services. This reinforces the importance of the market town transport hubs.

The area around any hub is known as its 'catchment area'. Just as a water catchment is the total area from which water flows toward a given point, so agricultural produce from local villages appears to 'flow' into a market town. The people in these villages may also depend on the services available in the market town, including healthcare, secondary education, and various public and private services. Thus market towns have their catchment areas for agricultural produce, patients, pupils and services.

Larger regional or provincial towns have much larger catchment areas for produce and for services (governmental and private). The regional catchments include several smaller-scale catchments of market town hubs which themselves comprise many village hubs each with their own small catchment area. Regional towns tend to be important transport hubs for medium and long-distance services, with both national inter-city services and regional services to the various market towns.

An example of a regional hub system is shown in Figure 3.5. Figure 5a shows a map of the Boucle du Mouhoun region in the north west of Burkina Faso, and Figure 5b provides a schematic representation of the road systems, with the central regional hub and five of the market towns (this example is discussed in more detail in the survey report of Boucle du Mouhoun, Burkina Faso).



*Figure 3.5. Example of a regional hub system in Burkina Faso*  
*Fig 3.5 a (left) is a map of the Boucle du Mouhoun region and Fig 3.5b (right) is a schematic map of the road system, showing the regional hub (red, or light grey) and five market town hubs (blue, or dark grey).*

This concept of a hierarchy of rural transport hubs and spokes serving rural catchment areas is central to the methodology being presented here. In this conceptual model, there is a regional or provincial town, surrounded by several market towns, themselves surrounded by many villages. This is illustrated in the following diagram (Figure 3.6).

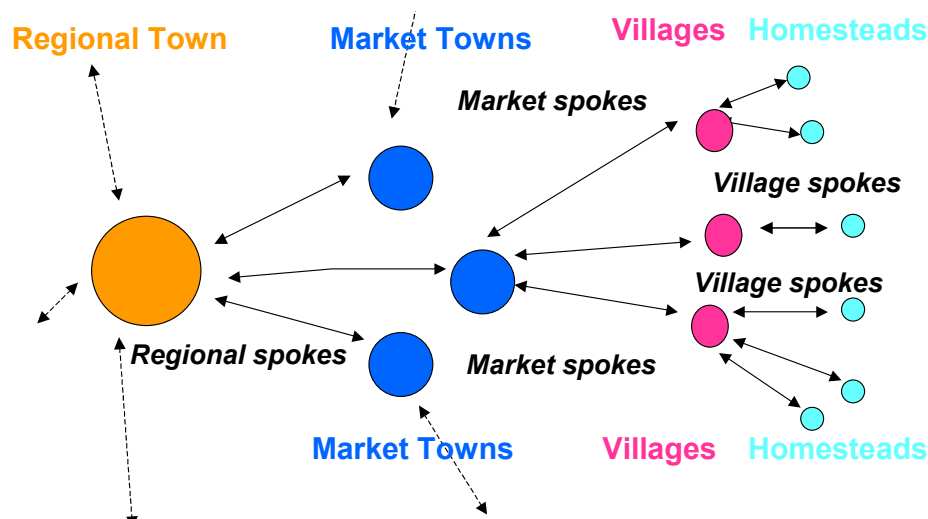


Figure 3.6: Conceptual model of a segment from a regional transport hub system

The hierarchy of rural hubs and catchment areas is broadly valid for marketing and distribution systems (agricultural produce, bottled drinks), devolved government, education, healthcare and transport. Villages have primary schools and clinics, with people coming in from outlying homesteads and hamlets. The market towns may also have secondary schools and small hospitals. The regional towns may also have colleges and larger hospitals. For both historic and practical reasons, the transport hubs and the administrative hubs often coincide at several levels.

While the concept of ‘catchment areas’ is helpful, rural transport systems do not operate like watersheds that have a one-way flow. Rural transport moves people and goods in several directions. Passengers, produce and traded goods move to, from and between the various villages and towns.

### Simple models in the face of complex realities

The hub and spoke models are only models, and the situation on the ground is more complex than the hierarchical model suggests. While there are systems of hubs and spokes, these are not ‘perfect’ hierarchies with primary only connecting to secondary and secondary only connecting to tertiary. Villages connect to villages; market towns may connect directly to other market towns; some villages connect directly to regional towns. Towns have primary schools as well as secondary schools and colleges.

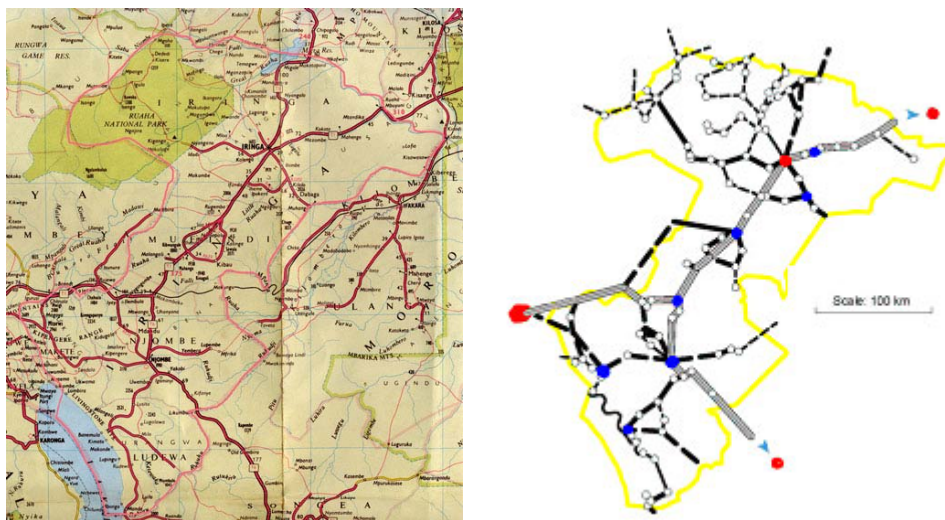
Transport hub and spoke systems are seldom totally discrete, for they join up with other hub and spoke systems, including those of neighbouring districts, regions and countries. At the periphery of one system, there may be an interface with another system, and a town or village may be an integral part of two separate systems. From the transport perspective, some towns and villages can face two ways, being part of two different catchment areas. This is seldom the case with administrative hierarchies (villages will be part of one just administrative system). On the border of a political catchment area it is not unusual for people to use one hub system for administrative matters (licensing, taxation, salaries), while using the neighbouring transport system for their inputs and marketing.

### Transport corridors

The development of rural transport hubs and spokes can be significantly influenced by the existence of a transport corridor in the region. Essentially, a corridor is part of a national hub

and spoke system, but along the corridor there may be regional towns, district market towns and villages that are also part of rural transport systems. Access to national transport (and markets) stimulates the economies of towns and villages close to the corridor. Along the corridor, a line of transport hubs develops, with hubs of different sizes (village, market and regional town). These serve to connect the rural areas to the national transport system. In some cases, regional administrative centres lie on national and international transport corridors, and in other cases they are far away. In either situation, there will be a distinct regional hub pattern in addition to national hub pattern.

An example of regional transport strongly influenced by a transport corridor is shown in Figure 3.7. Figure 3.7a shows a map of the Iringa Region of Tanzania and Figure 3.7b shows the main road systems. The main road from the port of Dar es Salaam to the town of Mbeya and Zambia, passes through the region, with a branch to the south of the country. This, together with topography, land use systems and the shape of the region influences the hub and spoke patterns. There is one clear hub and spoke system around Iringa town itself (in the centre north on the map), and a series of smaller market hubs, several of which are on the main transport corridor (this example is discussed in more detail in the Iringa study report).



*Figure 3.7: Example of a transport corridor in Tanzania and hub and spoke systems*  
 3.7a (left) Map showing Iringa Region in Tanzania. 3.7b (right) schematic representation of resulting hub and spoke systems. The grey roads joining the red (or grey) dots represent corridor transport (part of the national system). The top centre red (or grey) dot represents Iringa town, a major regional transport hub, and the blue (or dark grey) dots are smaller, market town hubs.

### **‘Invisible’ spokes and hubs**

Road maps can give a good indication of rural hub and spoke systems, but they may not provide the whole picture. There may be important hubs and spokes that are not apparent from the road map. For examples, waterways may be important transport routes. Along these may be hubs and spokes entirely devoted to water transport, in addition to the more obvious ‘ports’ where land and water transport share a joint hub. In many countries, significant movement of people and goods occurs on footpaths, cycle ways, cart tracks and over small bridges. The overall movement of people and goods on such ‘invisible’ spokes can sometimes be more than that on infrequently used regional roads. There is almost always significant movement of people and goods across national frontiers, even if this is clandestine and there are no roads or border posts.

Weekly or monthly markets can act as important transport hubs on market days. Villages barely mentioned on road maps can, for one day a week, attract thousands of people arriving by foot and on a range of transport types. Hospitals, clinics, animal dip tanks, mobile financial services and places of pilgrimage can also act as temporary hubs that may not be obvious from road maps, but which are very important for local people and rural transport services.

### **Interpreting rural hub and spoke systems**

The patterns observed on a road map may seem complicated and the hub and spoke structure may not immediately be obvious. Roads and tracks do not always form symmetrical branching patterns: there are rural networks linking villages to other villages and market towns to other market towns. There are also natural and artificial barriers that constrain the theoretical pattern. Coasts, deserts, national frontiers, mountain chains, mining areas and international transport corridors can all 'distort' the theoretical pattern, or make it difficult to recognise. Variations in the number and density of roads may reflect different population densities and settlement patterns as well as local history and governance systems.

### **Rural transport services operating from hubs**

Despite some local deviation from the theoretical model, in all areas it should be possible to see clear signs of the existence of a hierarchy of hubs and spokes embedded within the rural transport network. To appreciate these can be a key to understanding the rural transport services operating in the area.

Buses and large freight transport are likely to operate mainly from regional bus stations and transport terminals in key market towns. Services may include national transport (often over 200 km) and regional transport to the market towns (along 'regional spokes' that may be 50-200 km long). The numbers of buses and lorries operating within any region are likely to be quite small. Their routes and areas of operation can be listed.

Rural taxis (including minibuses) are likely to operate from the regional town and also from several market towns and perhaps a few major villages. These 'market spokes' are often gravel roads 20-50 km long. Although rural taxis may serve many villages, the number of locations (hubs) from which rural taxis operate will be finite and can be listed.

From the village transport stop, people may walk to the homesteads on tracks that may be 2-10 kilometres long, or they may use animal-drawn carts, bicycles or motorcycles. Some of these intermediate means of transport may operate as paying services, and some will be used for personal mobility. The total numbers in use may be very large, but if ownership patterns can be understood, they can be estimated with reasonable accuracy.

Where water transport is used, there will probably be clear hubs, comparable to road transport systems. Other means of transport, including government, NGO and commercial vehicles and private cars will tend to operate from the various towns or larger villages.

On the basis of this analysis, we can effectively assess rural transport services by looking at motorised and non-motorised transport services operating at the three levels (regional town hub, market town hubs and village hubs). By contacting the operators, users (and potential users) and regulators at each level, it is possible to build up an understanding of the quantity and quality of transport services available and the demand for such services. This is the basis for the methodology that is outlined in the next chapter.

## **Chapter 4: The survey methodology**

### **Introduction to the methodology**

This chapter will present the final methodology developed. For clarity, it is presented in the form of guidelines. The methodology is based on the provisional methodology developed by the study team at a workshop in Ethiopia, and modified in the light of field experience in testing out the methodology in four countries in sub-Saharan Africa: Burkina Faso, Cameroon, Tanzania and Zambia and subsequent discussions at a team meeting in Kenya.

### **Emphasis on rapid acquisition of quality information**

The aim of the methodology is to achieve in a relatively short time (four to eight weeks) an overview of the rural transport system in the selected area. Its purpose is to identify key indicators and features that will allow the system to be described, and if possible ‘mapped’ (graphical representation, not cartography). The survey work must be participatory, inclusive and gender-sensitive in order to gain information and viewpoints from the wide variety of stakeholders. The methodology will allow the transport system to be understood from the perspectives of all the key stakeholders, including the authorities (government and regulators, national and decentralised), the transport operators (passenger, freight, mixed, intermediate means of transport), the supporting services (suppliers, repairers and financial services) and a very wide range of users. The ‘users’ will include potential users, such as poor women and men living in the more isolated parts of the selected region, who do not have access to transport services at the moment.

The methodology is specifically designed to obtain a rapid assessment of the key issues. The combination of user ideas, field observations and traffic counts, all obtained using a stratified sampling methodology, will result in information of high quality that will facilitate the in-depth understanding of the issues. This will be achieved by using a flexible and open-ended approach to data collection, allowing the inclusion at all stages of new ideas and additional categories of information and informants.

Quantitative data collection techniques tend to constrain learning opportunities by predetermining both survey topics and response options. Furthermore, comprehensive quantitative surveys are generally slow and expensive. This rapid survey methodology, with its emphasis on qualitative rather than quantitative methods, will not itself result in statistically significant data. However, it will provide some valuable ‘order of magnitude’ estimates relating to movement of people and goods in the area, the costs of transport, the transport trends, and the problems and solutions from the point of view of various key stakeholders. In addition, this qualitative survey may identify a few key areas where there is insufficient reliable data available and this could facilitate some highly focussed and targeted follow-up quantitative surveys.

### **Processes and timing in the planning and implementation**

The methodology consists of four main processes. The first involves selecting one or more suitable study area(s) and an appropriate researcher or research team. The second involves learning about the legal and policy environment, through literature review and interviews with relevant national-level organisations and authorities. The third, which overlaps with the second, involves the main survey work, gaining information through stratified, semi-structured interviews involving all key groups of stakeholders. From the outset, survey information from different sources is triangulated and linked to field observations and some strategic traffic counts undertaken around different hubs. The final process involves sharing the results with key stakeholders, and, it would be hoped, initiating debate and collaborative action in order to address some of the key challenges raised.



The whole process could be completed in eight weeks, although three months from beginning to end is more realistic. A week is required for planning, literature review and some of the national-level interviews. One visit of three weeks is the minimum required for the rural survey, but two separate visits each of two weeks is likely to be more effective. After some preliminary analysis of the initial survey data, the second visit could be more targeted on information gaps and the key issues emerging. Two weeks will be required for final data analysis and report preparation, and time should also be made available for sharing the results within the region(s) studied and at a national level.

## **Planning and selection**

### **Selection of the implementing organisation or researchers**

A small team of researchers working very closely together could implement this methodology very effectively and provide opportunities for stimulating debate and synergy. A single researcher, with the right combination of attributes and skills could achieve the desired results. The assistance of others will be required for traffic counts, but not for undertaking the main survey. For a team to implement this effectively, it would have to be a small, close-knit team that would travel and work together, sharing and discussing experiences on a day-to-day basis. If the different survey tasks were divided up without such close and rapid exchanges, it would be difficult to 'triangulate' information from the different sources. For example, operators and passengers may quote different fares, and local regulators and operators may provide contradictory descriptions of what really happens at control barriers. Such discrepancies need to be identified and investigated immediately (rather than being picked up at the time of report writing).

While knowledge of rural transport is desirable, the most important qualifications would be an enquiring mind, powers of observation, a willingness to learn and the ability to analyse situations and identify key issues. The team (or researcher) must have experience in participatory research, gender analysis skills and the ability to get strangers to talk openly. The researcher or team must be of sufficient seniority to be able to interview national and regional decision makers involved in transport, while also be willing to travel extensively along uncomfortable roads and to stay overnight in some remote areas. It is considered crucial that same researcher(s) who visits the remote villages and talks to marginalised rural stakeholders is/are the researcher(s) who interviews the national and regional decision makers. Given the importance of gender issues and need to interview many rural women it could be beneficial if the researcher, or one member of the team, were a woman.

Appropriate and proficient staff of a transport ministry, NGO, university or consultancy firm could perform the work. Conducting this survey will provide an extremely valuable learning experience. It will allow the researcher(s) to gain a great deal of understanding about rural transport issues, key challenges and possible solutions. The implementation of this work could be an important training investment. Therefore, as far as possible, the responsibility for this work should be entrusted to some person, or persons, who will continue to be involved in rural transport issues.

### **Transport services to be surveyed**

The survey is designed to describe the rural transport services carrying passengers and goods within a region. These will mainly be transport services operating in the range of 5 km to 200 km. This range is only for guidance and is not absolute. The figure of 5 km was set from the outset to exclude the study of very localised, village-based transport, such as the collection of domestic water and the field-to-village transport of harvest. Such village-based transport is obviously very important, but not part of this particular methodology. Therefore, to allow



focus on the regional movements, village-based transport activities are not included, even where distances exceed 5 km.

At the other end of the scale, transport over 200 km is generally ‘corridor’ transport, linking towns to cities, ports and other countries. Again, such transport is very important, but it is not part of this methodology. Thus intercity transport that is part of a national or international hub and spoke system is not included, even though it may be passing through the area surveyed. However the limit of 200 km is only indicative, and if in a large region, some links between villages, towns and the local regional capital exceed 200 km, they should definitely not be excluded from this survey.

The exact profile of the transport types to be studied will depend on the country and the area. The main forms of land transport are likely to be:

- Trucks (light, less than 3 tonnes and heavy)
- Buses (more than 20 seats)
- Rural ‘taxis’ (mini buses, pickups, cars, 4x4s)
- Private, government and NGO cars, pickups and trucks
- Motorcycles
- Bicycles
- Animal-drawn carts
- Animals carrying loads or being ridden
- Pedestrians (out of village journeys exceeding 5 km).

In some areas, water transport will be important. The different forms of water transport tend to mirror road transport, but with great passenger or freight capacity than their land equivalents.

- Large-scale commercial boats with capacity of more than 30 passengers
- Medium scale vessels, equivalent to rural taxis, often carrying 4-30 passengers
- Small craft such as canoes and small pirogues, carrying 1-4 passengers, with a comparable niche to land-based intermediate means of transport.

### **Additional transport services and intermodal links.**

The methodology is designed to be open ended, and can be adapted to local circumstances. While air services are primarily intercity connections, they may be considered in this survey if local stakeholders (such as rural medical services) mentioned their importance. If there are other transport types that play an important role in medium-distance rural transport, additional survey categories may be added. Examples could include tractors, tricycles and specialised vehicles (such as logging trucks), if local stakeholders use these as transport services. In regions where livestock marketing is important, people taking livestock to markets (by foot or by truck) would represent an extra category, both for survey questions and for traffic counts.

Most railways are intercity links and while they pass through rural areas, they are part of a national hub and spoke system of transport. However, for some rural people, railways provide important access to regional markets, healthcare and education. The decision whether or not to include railway passengers in this survey will depend on local circumstances. If a railway line that runs through a selected area is used for medium-distance trips (to and from markets and services), then clearly passengers should be surveyed and the importance of this mode of transport be assessed. The survey instruments presented here can be easily modified to include rail transport where it is important. For example, a sample of five rail passengers can be interviewed in the same way that five bus passengers will be interviewed.

The various modes of transport tend to work with different but comparable hierarchies of hubs. Some interchanges between the transport modes develop as significant transport hubs (eg, railways stations, river ports, airports and freight and bus terminals along transport corridors). Where such inter-modal links exist in the survey areas, they should be visited and their importance assessed.

### **Selection of the study region(s)**

In some cases, the choice of the study area(s) will be obvious (eg, when an organisation wishes to commission work in a particular area). In other cases, choices may have to be made. Where possible, the area(s) chosen should:

- be representative or typical of the country (or of particular interests)
- be large enough to have clearly identifiable transport systems
- comprise one or more administrative divisions (or sub divisions) used for government planning and service provision.

### **Selecting a typical rural area**

Since this methodology aims to quickly gain information about ‘typical’ rural transport constraints in a country, the requirement of the study region to be representative or typical needs careful thought. Various areas of the country may have important differences in terms of topography, ecological zones, farming systems, population density, economic development, remoteness, ethnicity and transport systems. It may be difficult to find any single region that is really representative and typical of the country, in which case it may be necessary to replicate the study in two or more locations.

In testing the methodology it was recognised that many countries have diverse climatic and ecological zones and selecting one survey area that accurately represents the entire country is not always feasible. The case of Cameroon was particularly pertinent as this country has ecosystems ranging from the semi-arid Sahel in the north to rain forest in the south, with highland areas further affecting the situation. In such diverse countries, no one area could be considered ‘typical’ from the ecological perspective. That being said, rural areas in all the ecological zones would probably exhibit certain ‘typical’ rural transport problems, such as the low density of economic demand and relatively expensive and irregular transport services.

Specific transport types are often linked to particular ecosystems and/or geographical characteristics. Thus donkey carts are found in semi-arid regions and water transport requires coasts, lakes, rivers or canals. In a country such as Tanzania, water transport by lake and coast is important in the north, west and east, but not in the main central areas, which are otherwise quite ‘typical’. Within countries, transport patterns can be strongly influenced by major ports and cities, by international transport corridors and cross-border trade. An example of strong cross-border influence can be seen in The Gambia, while the influence of international transport corridors can be seen in Ethiopia, Kenya, Tanzania and Zambia.

In some countries, the selection of the study area(s) will be strongly influenced by the agenda of the organisation that is carrying out or commissioning the study. Some areas may be considered atypical and ‘difficult’ because they are very remote, with low population densities and few roads or market towns. Such areas are likely to contain some of the poorest and most disadvantaged rural communities in the country. Thus, it may be important to study such ‘atypical’ areas if the aim of the study is to understand the links between rural poverty and transport services. Similarly, there may be benefits from studying ‘atypical’ areas if they are ‘representative’ in terms of ecology (mountain ranges), economic proximity (peri-urban or transport corridor), technology (navigable waterways) or ethnicity (marginalized groups).

### **Clearly identifiable transport system**

The concept of transport hubs provides a framework with which a study area with an identifiable transport system can be defined. Using the concept, the study area can be selected for the existence of one clear transport ‘catchment area’ (comprising one regional hub, several market town hubs and many village hubs) that can be studied and understood in detail. Areas with more complex patterns (cross-border trade, transport corridors) may be very interesting, but will be more difficult to encapsulate in an overview summary.

### **Administrative divisions.**

To make it easy to relate secondary data (transport and household statistics) with the rural transport area being studied, it is good for the transport catchment area to correspond approximately to one or more political area (region, province or district). This will also make it easier to see how administrative hubs (government, health, education) relate to transport hubs.

The most suitable study areas are therefore clear transport ‘catchment areas’ that correspond (approximately) to local political boundaries and that are not unduly influenced by long-distance transport corridors or large cities. The areas should also be reasonably ‘typical’ with a selection of transport types.

### **Poverty focus and cost implications**

Because this methodology has a poverty focus, and because remoteness and lack of access is often associated with poverty, there will probably be a need to study rural transport in one or more remote and disadvantaged areas. This has important cost and time implications. If the organisation commissioning the survey wants to understand rural transport systems in terms of impoverished communities in remote areas, it should insist on the selection of a remote area, and it should be prepared to pay the extra costs that this will involve. A remote area will almost certainly require a four-wheel drive vehicle and at least four extra travel days (at least two extra days for each of two visits). Studying a well-connected area with good infrastructure will require less travel time and a cheaper vehicle, but the knowledge gained will not be the same.

### **Replicating the survey**

Although the methodology described focuses on studying one particular area, there may well be a case for carrying out parallel or consecutive studies in two or three regions representing different ecosystems or different degrees of economic development and remoteness. In such cases, full surveys should be carried out in each of the selected regions. The ‘marginal cost’ of these extra surveys should be proportionately less.

If more than one location is to be surveyed, experience has shown, that trying to split the time and resources needed for one survey will not prove satisfactory. While it is possible to visit two regions in three weeks, it is not practical to try to fully implement this methodology in just ten days. In trying to do so, it is inevitable that the researcher would have to concentrate on accessible areas, so neglecting remoter areas and the principle of stratification imbedded in the methodology.

### **Summary of selection methodology**

- Consider political boundaries (regions, provinces and districts) and look for transport catchment areas that tend to coincide with these.
- State any criteria that would make an area particularly interesting (eg, presence of water transport, high diversity of transport types, poverty and remoteness) and prioritise remaining areas using these criteria.

- Exclude (in the first instance) potential survey regions if there are obvious transport distortions relative to the other areas (frontiers, cities, international transport corridors, extreme remoteness, politically or ethnically atypical) unless these characteristics have been pre-selected as desirable.
- From the remaining parts of the country, select a suitable study area considering factors such as clear hierarchy of hubs, diversity of transport, availability of secondary data and reasonable access for the researcher(s).
- If the country is very diverse, recommend that the methodology be carried out in each of the representative areas (eg, ecological zones, different degrees of poverty and remoteness).

Some reasons for inclusion	Possible reasons for exclusion
<ul style="list-style-type: none"> <li>• Good match of transport catchment areas with administrative divisions</li> <li>• Spectrum of different settlements (regional town, market town, villages and homesteads)</li> <li>• Spectrum of different types of transport</li> <li>• Availability of secondary data</li> </ul>	<ul style="list-style-type: none"> <li>• Strong influence from an international transport corridor</li> <li>• Strong cross-border influences and transport</li> <li>• Politically atypical</li> <li>• Near major city</li> <li>• Large and 'atypical' commercial presence in the region eg, mines, atypical large-scale agriculture</li> <li>• Logistical constraints and practicalities (access)</li> </ul>

## Stratifying the survey and determining sample size

The aim of the survey is to gain a valid impression of the existing rural transport services for a wide range of stakeholders in the whole selected area, within a short time and with limited resources. It will not be possible to visit all villages or talk to all stakeholders. It will be necessary to talk with a reasonable number of different stakeholders who can provide a representative picture. From the outset it is necessary to have a clear idea of what would be a reasonable 'sample' size. A large sample size should result in greater 'accuracy' of the survey, but it will have implications in terms of time and cost. There are diminishing returns from interviewing large samples and so a considered compromise between sample size and accuracy should result in an optimum number of people to be interview.

Since the stakeholders interviewed should be broadly representative of the people in the whole region, mechanisms are necessary to 'stratify' the sampling, to ensure the people interviewed are a reasonably representative cross section who will reflect the views of people in a range of roles and locations. The areas to be surveyed will be stratified by hub type, remoteness and criteria of local importance. The people to be interviewed will be categorised mainly by work function and transport requirements. Guidelines for the sampling and stratification are provided below, but this survey methodology is designed to be responsive to local situations. The sampling and stratification employed should be based on local conditions, and initial decisions may need to be adjusted in the light of early survey findings.

### Geographical or location stratification

The first level of selecting the sample is based on both administrative and transport hierarchies of hubs and spokes, with criteria to ensure different ecological conditions and degrees of remoteness are considered. Figure 4.1 provides a reminder of the theoretical hub and spoke model, on which the stratification is based.

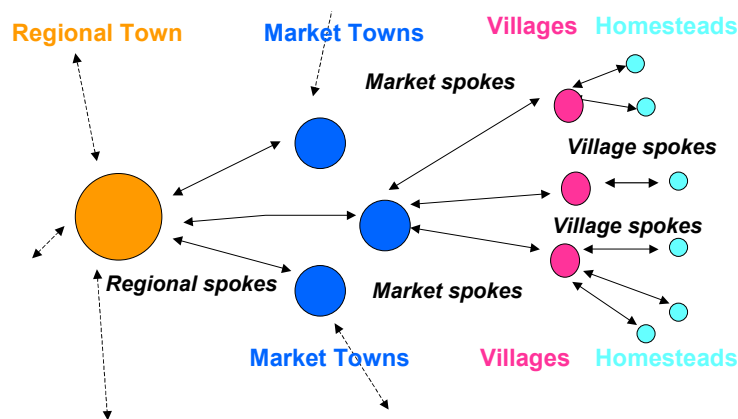


Figure 4.1: Conceptual model of a segment from a regional transport hub system

The methodology requires that a minimum of one regional hub, three market hubs and five village hubs are selected for surveying. In most cases the regional hub will be pre-determined by the criteria used for selecting the study area.

### Selection of market town hubs to be surveyed

Early in the survey, three ‘market towns’ should be identified within the region, province or survey area. These should be widely separated, in different parts of the region and, where possible, in areas with different characteristics (varying terrain, farming systems, transport modes, etc). These hubs will be used for interviews relating to market town services (transport hubs, education, health). Where possible, the three towns should represent three levels of separation or isolation from the regional town (in terms of distance and/or road quality) with one of the market towns considered relatively ‘remote’.

It is best not to select towns that lie along main ‘through routes’. On such roads it is difficult to distinguish between regional transport and national or international ‘corridor transport’. Thus market towns along the main approach road to the regional town should not be selected.

The selection of these three towns is one of the crucial decision points of the survey, and will normally be made after initial discussions with the regional transport authorities and also with some poverty-focused development organisations. The selection will be based on multiple criteria of geographical separation, ecological variation, population characteristics and physical and economic remoteness.

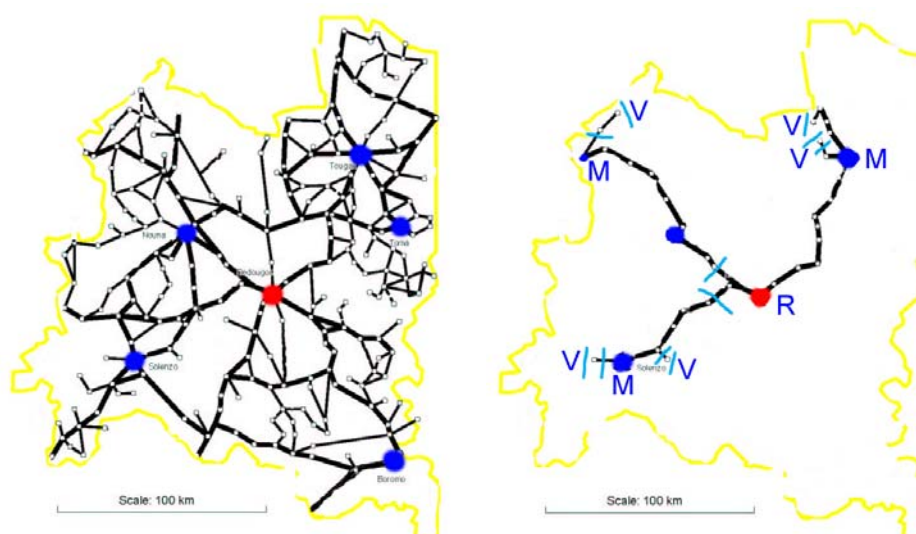
### Selection of village hubs to be surveyed

Five villages will be selected for the surveys, each within the hub-and-spoke system of one of the selected market towns. Thus two market towns will have two outlying villages, and one will have a single village surveyed. These selected villages should be large enough to have a primary school and a small health centre. It is assumed that there will be homesteads and smaller settlements (without schools) in the surrounding areas.

The towns will have already have been selected for differences relating to remoteness, ecology, geography and population. The villages to be surveyed will be selected mainly on their degree of ‘remoteness’ from the market towns, using five degrees of remoteness. Depending on the type of area, these might be 10 km, 20 km, 30 km, 40 km and 50 km from the nearest market town (or in lower density areas 20 km, 40 km, 60 km, 80 km and 100 km away). The villages selected should not lie on main roads, as it will be difficult to distinguish between local traffic and through traffic.

The most remote village should be representative of villages with poor access. It need not be the most remote village in the region, but it should be among the 10% most remote villages. It is therefore quite likely that this village will not have access to motorised transport, and the researcher may have to walk for several hours to reach it (or possibly travel by boat for several hours).

The selection of these villages is also crucial. It is not a random selection, but will be made considering various local factors, particularly those of access and remoteness. While some options for stratifying villages for remoteness can be made with the help of maps, the final decisions will normally be made following discussions with some local stakeholders in the market towns. An example of a selection of surveyed towns and villages is shown in Figure 4.2.



*Figure 4.2. Example market and village hub selection in Burkina Faso*

*Fig 4.2a (left) is a schematic map of the Boucle du Mouhoun region and Fig 4.2b (right) shows the market towns (M) and village (V) hubs selected for surveying. The lines show where traffic counts were made. There were many criteria that influenced the selection of these towns and villages, and these are described in the Boucle du Mouhoun report.*

### **Selection of regional, market and village spokes for traffic counts**

Traffic will be counted in several areas in order to assess the quantity of traffic moving, how much vehicles (and people) are loaded and the relative importance of the different transport types, in terms of overall numbers, frequency and loading. New counts will be necessary as it is extremely unlikely that any existing systems by transport authorities for counting traffic will include all the types of road and types of transport being studied in this survey.

Traffic counts will be carried out on certain of the spokes associated with the selected hubs. The counts will be carried out on ten sites.

- Two regional spokes (2 sites)  
(two different roads, each radiating from the regional centre and going to one of the selected market towns)
- Three market spokes (3 sites)  
(for each selected market town hubs, one radiating spoke leading to a village).

- Five village spokes (5 sites)  
(for each main village, one path or track linking the main village with an outlying village or homesteads)

With the choice of hubs already established, there is relatively little selection required for the traffic count spokes. Selection should be based on acquiring data that is interesting and representative, and a diversity of traffic count situations is likely to be most valuable. As far as practicable, the selected spokes should reflect just one element of the hub hierarchy. Through routes should be avoided at all levels as these will have traffic from more than one destination and this will complicate analysis. Logistical considerations will also be important, as the traffic counts require enumerators to be on site for one or two long days. To provide an example, the traffic count locations selected for Burkina Faso are illustrated in Figure 4.2 and explained in the report of the Boucle du Mouhoun survey.

### **Sample size and categories of people**

The actual numbers and descriptions of the people contacted will depend on the country and the circumstances. A good picture of rural transport services should be gained by interviewing about one hundred people. These would be located in various areas (determined by the geographical stratification) and have various functions or involvement in rural transport. The selected sample might contain (about):

- 20 people in the public sector and development aid at national and local levels
- 60 users of transport in the rural areas (several categories of users)
- 10 operators of different types of transport
- 10 supporting services (supply, repairs, finance).

For each type or category of informant, it is necessary to consider what is the minimum sample size that will capture a fair range of opinions and experiences and provide reasonably consistent estimates of costs and prices. In this survey, it is suggested that a minimum of five people should be interviewed for broad and wide-ranging categories of users (farmers, patients, students), but three people may suffice if the category is more specific (head teachers, bus operators, local administrators). The minimum sample size has been intentionally linked to the stratification model, so that there are five villages to visit, and also five farmers to interview. There are three selected market spokes and three selected health care officials and head teachers. These are minimum figures that can (and should) be exceeded wherever it is clear that important differences of opinions and experiences are not being adequately captured by the minimum sample size.

In some interviews with national and regional authorities there is no need of replication (there is only one Minister of Transport and only one regional police authority). For other categories of national or regional stakeholders, such as aid agencies, NGOs, development projects and importing organisations, it will be appropriate to contact up to three organisations, depending on local circumstances.

For all categories of informants, the actual numbers of people interviewed will depend on local conditions, with greater diversity (ecological, economic, cultural, transport type) necessitating more interviews to capture this. However, illustrative lists of the type of informants, and minimum numbers of envisaged interviews, are provided below and are also listed in Table A1: Summary of interviews.

### **National level interviews**

- National transport authorities (4)
- National authority responsible for Poverty Reduction Strategy (1)
- Aid agencies / World Bank (1)

- Importer of motorised transport (2)
- Importer of bicycles (1)
- Other (university, statistics office, etc) (as required)

### **Regional administration level interviews**

- Regional Authority (1)
- Police (might be at other levels too) (1)
- Transport Associations (might be at other levels too) (1)
- Financial organisation (might be at other levels too) (1)
- NGO / programmes (might be at other levels too) (1)
- Regional repairer of motorised transport (1)
- Passengers on a bus (regional spoke) (5)

### **Market town/District level interviews**

- District Authority (3)
- Health Managers (3)
- Education - Head teachers (3)
- Transport Associations (might be at other levels too) (1)
- Financial organisation (might be at other levels too) (1)
- NGO / programmes (might be at other levels too) (1)
- Passengers in a rural taxi (market spoke) (5)
- Operator of main mode of transport, eg, rural taxi (3)
- Operator of main mode of transport, eg, truck / bus (3)
- Market town repairer of motorised transport (1)
- Seller of bicycles (market town) (1)

### **Village level interviews**

- Village authority (3)
- Farmers (5)
- Traders (5)
- Employees (travelling to work over 5 km) (5)
- Financial services users (5)
- Students (5)
- Health users (5)
- Household managers (housewives) (5)
- Transport for socio-cultural reasons (5)
- Excluded people - old, handicapped, socially marginalised (5)
- Operator of main mode of transport, eg, bicycle / cart (3)
- Repairer of bicycles (village level, if possible) (1)
- Manufacturer/repairer of carts (if available) (1)

The list of village-based users contains several overlapping categories. For example, a woman can be a housewife, farmer and a trader, who travels to market, uses health services, financial services and travels for socio-cultural reasons. The reason why these are given as separate categories is that some of the questions relate to specific types of usage for which discrete information is required. The survey requires that information is obtained from five informants about how they access health services, from five informants about how they access financial services (credit, pensions, salaries) and from five informants travelling to school. This will ensure that sufficient discrete information is available on each of these (and other) reasons to travel.



## **Addressing gender and other biases**

Many transport surveys tend to be biased towards active, male respondents in accessible areas. This methodology has tried to address this in the following ways:

- At least 40% (two out of five) of people in each main transport user categories should be female (ie, at least two farmers, traders, employees, financial services users, students, health users, users of transport for socio-cultural reasons and excluded people).
- If it is normal for women to operate particular transport types (eg, bicycle) then at least one of the interviewed operators should be a woman.
- At least one market town should be relatively remote
- At least one village will have very poor access (perhaps with no passable road), which will mean that about 20% of transport users interviewed will have this level of poor access.
- At least five 'excluded' people (old, handicapped, socially marginalized) will be interviewed and their transport concerns noted.

## **Data collection tools and techniques**

The methodology proposes the use of several data collection methodologies that assist in triangulating the information collected. Triangulation refers to an approach to data collection in which evidence is deliberately sought from a range of independent sources in order to identify differences and understand discrepancies.

In this methodology evidence will be gathered from:

- Review of existing documentation and secondary information
- Observations of actual transport situations
- Interviews with key stakeholders (users, operators, regulators)
- Traffic counts.

## **Literature review and initial contacts**

The researcher or small team conducting the survey will be expected to track down, and make use of, important sources of secondary information. These may include documents relating to transport policy, transport regulations, poverty reduction, transport services, transport costs, population data and household spending on transport.

In the preparatory phase of the survey, the researcher(s) should undertake some internet searches, using key words relating to the survey region (and subregions) and to transport, population, agriculture, education, health and development. While this may not yield much direct information on rural transport services, it may well provide useful socio-economic data and information on some key organisations working in the area that should be contacted.

Organisations to approach at the outset for relevant reports, maps and background information will include the national ministry of transport (and associated agencies), national statistics office, a relevant cartography department, university departments and NGOs with an interest in rural transport, or with a particular interest in the survey region.

As the survey progresses, the researcher will be able to track sources of secondary data as they make their visits to key informants (national government, local government, statistics offices, donors, NGOs, universities, etc). While there may be little information on rural transport services themselves, useful information may be found in a range of planning documents and consultancy reports.

On a practical note, to aid in the collection of secondary data, it is recommended that the researcher undertakes visits equipped with a simple digital camera and a USB memory stick. The camera can be invaluable for copying maps and information on office wall charts. The USB memory stick provides an easy and inexpensive way of obtaining copies of recent planning documents or reports produced in national or regional offices.

It is also recommended that early on in the survey, the researcher obtains or draws a simple map of the region, showing the road network and main settlements. Multiple copies of this should be made and kept available throughout the survey. The researcher and informants can use these outline maps to record things such as bus routes, road conditions, transport hubs and important markets.

## **Observations**

Personal observation is one of the main tools of this survey, and must be applied in all contexts. The researcher(s) will probably have a unique opportunity to see in a short time a large range of road conditions, transport technologies and rural transport situations. The researchers should benefit from this opportunity, recording observations and triangulating them with other sources of information. A camera may be used to capture some of the observations, and a digital camera may allow some to be rapidly shared with other people. The outline maps mentioned above could be used for recording where observations are made, and for gradually building up a picture of existing transport infrastructure and services.

## **Travelling traffic counts**

Travelling to the areas and between towns and villages provides much opportunity for informal traffic counts. These will not be statistically significant, but they may be hugely educational. How many trucks, rural taxis, bicycles, carts and pedestrians with loads are being passed? Where would they have come from? What is unusual about them? What is the significance of their colour, decoration or design? What are the degrees of loading? What is the age and condition of the vehicles? How safe are they? Who is operating them? Who is travelling in them? Look for differences in terms of gender, age and ethnicity, for example. What are the ratios of the different transport technologies being seen: truck/bus, car/rural taxi, car/motorcycle, motorcycle/bicycle, pedestrian/bicycle, cart/bicycle, loaded/empty, new/old, male/female, etc. Why are there these ratios?

Personal observations should be linked to the theoretical framework and also to the crosscutting issues (poverty, gender, environment, safety, HIV/Aids). The first ‘mental traffic count’ (informal assessment of traffic volumes) that researchers make is likely to be on the road to the regional town. This will be a *national* spoke, with a disproportionately high amount of motorised traffic compared with regional spokes and market spokes. Before speaking with regional authorities it might be advisable to travel on a *regional* spoke (and perhaps *market* and *village* spokes) and to undertake some ‘mental traffic counts’ on these. This will ensure that when discussing the regional situation, including transport services and the road network, the researcher already has some concrete knowledge of the situation, based on personal observations. These personal observations can then be ‘triangulated’ with information provided by regional authorities or other stakeholders.

## **Observations of people and patterns**

Information from recent personal observations should influence the key topics and actual questions asked in any particular interview. These can include observations concerning traffic characteristics (technologies, gender, numbers, ratios, safety) and observed situations (people carrying, people waiting, produce waiting, unused technologies). In all situations (offices, schools, clinics, terminals, markets, villages) the researchers should look around and ask

themselves, who is doing what, and why? This is likely to come up with something that seems surprising, and putting this to one of the stakeholders may result in some fascinating new information.

Observations from different locations should be linked to help understand patterns. The use of different transport systems will not be homogenous in the region. There will be concentrations of particular technologies (eg, trucks, pickups, motorcycles, animals) and particular loading systems (seats, saddles, roof-racks, containers). There may be patterns in road type, condition and maintenance. Differences may be due to random factors, but could be due to ecological conditions, market location, different regulatory arrangements or political interference. Observing the differences and appreciating any patterns and triangulating this with information from interviews, may lead to new insights and understanding.

### **Observations of hubs, transport routes and global position**

Observations can be used to verify the hubs-and-spoke model of transport services. Wherever the researchers travel, they should carefully record the observed pattern of hubs and spokes, combining visual recognition of hubs with some pertinent questions to waiting transporters and passengers. For regular motorised transport services (buses, minibuses, rural taxis) it should be possible to map every hub and note how many vehicles normally operate from them. Route maps may also be feasible for these vehicles, as the total number of vehicles and routes is likely to be quite small (fewer than 200 vehicles and 30 routes in many regions). It may also be possible to identify the hubs of all trucks operating regularly in the region. For services provided by intermediate means of transport (motorcycles, bicycles, animal-drawn carts) the task may be more difficult, but not totally impossible. As a result of these observations, it should be possible to provide an illustrative map of the transport hub and spoke systems in the region.

While the information on hubs and routes can be presented as a simple sketch map, it can also be presented using modern mapping software. This is discussed later. While the methodology developed here did not involve seeking secondary Geographical Information Systems (GIS) data or taking Global Positioning System (GPS) coordinates, these could be very valuable refinements. As these ideas came too late in the methodology development to allow them to be tested, no clear recommendation can be given here. However, subsequent users of the methodology might consider the merits of seeing what secondary GIS data is available, taking GPS readings at all transport hubs, towns and villages visited and key road junctions. This could lead to the development of maps that not only present the survey findings, could also act as computer models for exploring the rural transport systems further.

## **Interviews**

### **General nature of the interviews**

The core team of researcher(s), with experience in participatory interview techniques, must undertake all the interviews. Research assistants or enumerators should not be used for interviews. The interviews will be wide-ranging and open-ended discussions rather than 'question and answer' sessions. Many interviews last for about half an hour, and most will be in the range of 15 to 45 minutes. Interviews will commonly cover the same types of issues, but from different perspectives. For example, at some stage in all the interviews, the informant should be asked open-ended questions asking what they consider to be the key transport issues, the recent trends in transport, particular transport problems (from their perspective) and their suggestions for improving the situation.

Certain interviews will involve more specific questions. For example some informants will be asked about transport operating costs, transport regulations and the organisation of transport. Users will be asked about reasons for travelling, journey times and costs.

For the guidance of people who are using this methodology for the first time, some specific questions have been listed in the various data sheets provided. These have not been designed for a formal question-response survey and should not be read out. They are for guidance only and should serve as 'check lists' of some of the important topics to raise. The order of the questions is not really significant and can be changed according to how the interview progresses.

It is anticipated that all interviews with operators, users and key informants will be wide-ranging. Many will exceed the scope of these questions. In some other cases, the interviews may be quite brief. For example, once a clear understanding is gained relating to certain features of the rural transport situation, subsequent interviews can quickly pass the main themes in order to focus on new examples and ideas.

### **Networking questions**

All interviews should aim to discover new ideas, new information and also new sources of further information. Each interview should include at least one 'networking' question along the lines of 'Who are the key stakeholders (people, organisations) involved in [this particular aspect of] rural transport?'. This should help identify other key informants, whether at the national, regional, district or village level. For institutional stakeholders, questions may also be asked about the existence of any reports or publications on the subject.

### **Triangulation**

One of the skills of the interviewers will be to 'triangulate' the information obtained from the various sources (different informants, personal observations and secondary data). Sometimes it will be appropriate to crosscheck information by asking the same question twice, but in different ways, within an individual interview. This is particularly important when the person interviewed provides information that seems surprising or controversial. Approaching the topic from a different direction may help clarify the situation.

Information gained from one source should be 'triangulated' by obtaining comparable information from other sources. This is where the 'interview' differs from a survey questionnaire and the skills of researcher differ from those of an enumerator. For example, in a survey questionnaire, an enumerator would be expected to simply to record the stated transport costs from three independent sources. This information could be used to provide an average figure, even if the stated costs were very different. In the methodology used here, the interviewer is expected to realise when the costs quoted by one person are widely different from another, and straight away ask further questions to find out the reasons for the apparent discrepancies. In most cases, the differences can be explained immediately, and new insights gained. Similarly, the interviewer might learn from a district official that regulations were being enforced fairly, but would go on to validate this information by asking comparable questions to local transport operators and to transport users, to see if everyone shared that point of view.

Information gained from interviews has to be 'triangulated' with field observations and vice versa. Unusual observations and apparent discrepancies should be examined as soon as possible. This is one reason why it is important for a very close team or one researcher to undertake all the interviews and field observations. For example, if people claim that there are no gender differences in transport use, but most passengers are men, this requires explanation.

If regulators claim to enforce safety legislation, but dangerous and over-crowded vehicles are seen on the roads, the issues should be explored with the different stakeholders.

### **Survey etiquette, protocols and potential bias**

It is extremely important that the research team follows correct protocols when dealing with authorities and uses polite etiquette when commencing interviews with the various stakeholders. Experience from the surveys undertaken here reinforced the importance of this. Simple thoughtfulness and empathy in planning and implementation can open doors, hearts and minds, and make the survey easier and more valuable.

Once the survey has been agreed, key institutional stakeholders should be informed through letters or emails, and the broad objectives outlined. Such communications may not be acted on, but their existence can always be referred to and this will facilitate and legitimise subsequent contacts. Simple letters of introduction should be sent to all main government services to be contacted at national and regional levels (eg, transport ministries, decentralised government, police, health, education, agriculture). In very formal countries, this is essential; in more informal countries, it is merely polite.

Despite such letters, not all relevant individuals will be informed of the survey and the interviews. It is therefore important to start all meetings with personal introductions and the aims and objectives of the survey. This is also true when talking to transport operators and users. Most people will be delighted to talk openly and assist once they understand that the survey is about helping to identify and understand the real problems of rural transport. Until they appreciate this, they are likely to be very suspicious of strangers asking questions.

Once the researchers has explained the objectives, there is the slight danger that the people being interviewed give information that they think is wanted, rather than what they really believe. This situation can generally be corrected by crosschecking questions and triangulation (approaching topics from a different direction, referring to personal observations, citing the opinions of others). While the respondent should always be shown respect, they can also be challenged to defend their view point. While the researcher(s) should not try to impose their own points of view on all informants, people may well be encountered who are prejudiced against particular groups (eg, women) or modes of transport (eg, bicycles). Engaging such people in debate is not excluded, provided it is in the context of mutual understanding and learning.

At the end of each interview, the respondents will naturally be thanked, and names and addresses noted (unless there is a request of anonymity). When feasible, it is good practice for informants supplying important information to receive subsequent feedback from the survey, in the form of a thank you letter, a copy of the report and/or copies of relevant photos that have been taken.

### **Spontaneous and opportunistic interviews**

The majority of interviews will not involve appointments, but will occur spontaneously. The researcher must therefore be opportunistic, in the sense of seeing opportunities and maximising their potential benefits. For example, the researcher may stop by a rural taxi that is loading, talk to a passing donkey cart operator, see a woman delivering a load on a bicycle, or see a handicapped person in a special transport situation. The researcher must be alert to such opportunities and be able to learn and use the situation created to ask some questions.

Naturally, the first words must be of greeting, introduction and explanation. Once mutual confidence has been established, some informal questions can begin, that demonstrate the researcher's sympathetic interest in the subject and the point of view of the informant. In

some cases, the encounter will end quickly because the person is too busy or un-relaxed, and the researcher must appreciate this. Not all spontaneous encounters can lead to full interviews. However, the majority of the knowledge gained by this methodology is likely to come from spontaneous meetings with operators, users and support services. These will generally start very informally with some opening questions (without notebook or clip board) and then, as the conversation becomes more focused, the discussion may develop into an important interview.

### **Village-based interviews and meetings**

The researcher must take into consideration local traditions and protocols when working within villages. In many cases, it will be appropriate to start by meeting with the village authorities. Such a meeting is likely to be productive, and 'count' as an interview with a village authority. It is important early in such a meeting to stress that the methodology requires some detailed interviews with individuals within the village. Unless this is made clear, it is very likely that meeting with the village authority will develop into a formal meeting involving several people. This may yield valuable insights but it will not fulfil all the requirements of the methodology.

A joint meeting with five similar stakeholders present must not be counted as five interviews. It should be considered as just one interview (albeit with a focus group rather than an individual). As explained before, interviews with different types of stakeholders must be stratified. There should be five interviews with each category of stakeholders (farmers, traders, handicapped people, etc), and, where practical, each of these five interviews should be in a different part of the region, stratified by remoteness.

Village based meetings can be interesting and valuable, but they may also be time-consuming. The advantage of one-to-one interviews is that they are very reactive: it is easy to ask for immediate explanation or clarification of an interesting point. This can also be the case if two or three people extra people are involved, whether actively or passively. However, once a meeting becomes large, reactivity diminishes and people start to give speeches that cannot easily be stopped. A small number of people can dominate such meetings (often important men with particular agendas). It is generally best to avoid allowing such meetings to develop, and to concentrate on individual interviews or small groups of stakeholders. If the powerful men are heard in one interview, the disadvantaged can be heard separately and independently during another interview.

## **Interview topics**

### **Interviews with policymakers and regulators**

Semi-structured but open-ended interviews should be held with those responsible for transport policy and transport regulation at national, regional and local levels. Those responsible should be asked what they consider to be the key transport issues, the recent trends, particular problems and their suggestions for improving the situation. They should be asked about motorised and non-motorised transport services and sources of information on these topics. Questions should be put concerning regulation and enforcement. Examples of some of the general types of question that may be used to stimulate discussions are given in Table A2: Checklists of some key questions for authorities and organisations. The policy makers and regulators should also be asked about key crosscutting issues (including poverty reduction, gender, safety, environmental issues and HIV/Aids).

Another simple checklist has been prepared giving the opportunity to indicate whether or not relevant policy or regulation is in place and whether or not it is implemented (or having any impact) at national level or in the surveyed area (see Table A3: Policy and regulatory

framework checklist). On a summary sheet based on this checklist it will be possible to record the existence of legislation (giving a reference to the relevant regulation, eg, the control of axle loads) and to note whether or not it is being implemented. Since the existence and implementation of policies is not always a clear case of yes/no, a five point star system has been used to provide more information. A line of five stars clearly illustrates fully implemented policies, while regulations that do exist but are not actually enforced may receive only a single star.

For the purposes of this survey, there is no need to record full details of all the relevant legislation relating to transport. Only legislation that should be flagged for its important impact (positive or negative) at national, regional or local levels needs to be detailed.

The various suggested topics, as well as others that emerge in the course of the survey, should be discussed with the different stakeholders concerned with regulation, and reported. These might include the role of transport in the poverty reduction programme, import regulations affecting prices, incentives (eg, de-taxing public transport vehicles or bicycles) and possible legal backing for transport cartels. The actual and potential roles of transport associations should be explored with the regulators (as well as with the operators and users). The existence and enforcement (or lack of enforcement) of safety regulations should also be raised at all levels. The role of formal or informal traffic control barriers and their actual impact on safety and transport costs should also be explored at all levels. This may be a delicate topic and a sensitive issue in countries where bribes are regularly given at barriers.

### **Interviews with operators**

Detailed information should be obtained from the operators of at least two types of motorised transport and at least one type of intermediate means of transport. Illustrative data sheets are provided listing some of the key information required. From interviews with operators, the following type of information will be gathered and calculated, as summarised in Table A6: Operator costs summary sheet and Table A7: Operator costs calculation sheet.

- Normal loading (passengers and/or freight)
- Average trip distance
- Average number of trips per week
- Average kilometres travelled per week
- Distance travelled per year
- Passengers or freight carried per year
- Typical load carried (passengers and/or freight)
- Fixed annual costs
  - Vehicle source, initial cost and depreciation cost
  - Vehicle life expectancy
  - Costs of licensing, insurance, registration and tax
- Variable costs per year
  - Costs of servicing, tyres, salaries, etc
  - Fuel consumption per kilometre and per week
- Total costs per year
- Cost per kilometre
- Tariff per kilometre (passengers and/or freight)
- Estimated profit per kilometre
- Estimated annual profit

There will also be questions relating to regulation, safety, competition, transport associations, maintenance and load consolidation. The actual and potential roles of transport associations should be explored with the operators (as well as with the regulators and users). Examples of

topics to raise are summarised in Table A5: Checklist of some key questions for transport operators.

Experience from the pilot survey interviews suggested that it is actually difficult to obtain reliable estimates that fit in well with ‘conventional’ models of vehicle operating costs. There are three main possible reasons:

- The operators do not keep reliable conventional records, and so this information is not actually available to them.
- The operators do not wish to share their information, perhaps because they fear additional tax liabilities or further competition.
- Many of their operating costs occur through informal sector transactions that do not have traceable financial transactions. For example.
  - relatives are employed, with in-kind benefits
  - fuel may be bought from informal roadside traders
  - second-hand parts are obtained from informal sources.

### **Interviews with suppliers and repairers**

Some suppliers of transport vehicles should be interviewed including some importers of motorised vehicles, importers and assemblers of bicycles and the builders of carts. They will be asked questions relating to costs, demand (and seasonality), competition, regulation and how the market could be expanded. Experiences from the pilot studies suggests that many of the larger motorised vehicles (cars, minibuses, trucks and buses) used in rural areas are not obtained from formal sector importing franchises. They are generally purchased second hand within the country or directly imported (second hand). However, importers of new Asian motorcycles are increasingly influential, with imports of Chinese motorcycles expanding rapidly in several countries.

Some people responsible for servicing and maintaining transport should be interviewed, including garages (in the towns) and bicycle repairers (possibly in the villages). They will be asked questions relating costs, finance, availability of spares, competition, regulation, customers and developing the market. Indicative questions are summarised in Table A8: Checklist of some key questions for support services.

### **Interviews with users (origin and destination, demand, satisfaction)**

Some interviews should aim to collect data on the purpose, origin, destination and duration of journeys being made at the time of the survey. People using intermediate means of transport or rural taxis in remote areas will probably be willing to be interviewed at the roadside on market and village spokes. On the regional spokes, where some traffic may be fast-moving, interviews may be made where there are natural breaks in the journey, such as at fuel stations, refreshment stops or roadblocks. People on buses on the regional spokes could be interviewed while waiting at the terminal, or even on the bus itself.

Users should be asked for examples of fares they pay to travel by different modes. These should be triangulated with similar information given by the operators and regulators, and anomalies investigated.

Other questions should relate to the main requirements for transport for particular purposes, including marketing produce, employment, trading, education, health, accessing financial services and social, cultural and political activities. People should be asked about the types of transport used, their ownership, the frequency of trips, and the affordability and reliability of the transport, from the users perspective. The seasonality of their transport requirements should also be assessed. Additional questions may relate to multi-modal travel (using more than one type of transport to reach a destination), the potential for consolidating loads and



whether telephones are playing a role in accessing transport. A list of some subjects to raise is provided in Table A4: Checklist of some key questions for transport users.

### **Interviews with health, education and other services**

Access to education and health services are key development indicators. For these two sectors, specific attention should be given to the service providers as well as the users. As part of the user surveys, questions should be asked to five students (at least two female) travelling over 5 km to access secondary school or college and five people (at least two female) travelling over 5 km to access health care. In addition, interviews should be held with the managers of district (market town) health centres and with the principals of three secondary schools or colleges.

The health care centres will be asked about:

- Transport for health care inputs (drugs, vaccines, etc)
- Transport for patients accessing the village/district health system
- Transport for patients within the health system
- Transport for health workers to reach the outlying communities

The head teachers will be asked about.

- Transport for educational inputs
- Transport for pupils and affects of transport on school attendance
- Transport for staff and affects of transport on staff recruitment and attendance.

As with all surveys, the information from the service providers will be ‘triangulated’ with the views of service users (patients and students).

In addition to health and education, there are other rural services that depend on transport, including agricultural extension, communications systems, credit provision, religious, sporting and political activities. These issues may well emerge during interviews with national and local authorities, transport users and key informants in financial organisations and NGOs. Interesting leads should be followed up, and additional interviews undertaken where appropriate.

### **Crosscutting issues and specific topics**

Certain crosscutting issues should be considered at all levels and with all types of stakeholder. These include transport issues that specifically relate to:

- Poverty and poverty reduction
- Gender
- Safety
- Environmental issues
- HIV/Aids.

Additional topics and key issues should emerge, based on the actual situation in the survey area. Among the topics that might well prove of particular interest in some countries might be:

- Free competition, monopolies and the role of transport associations (cartels)
- The affects of corruption on transport costs (eg, ‘bribe barrier’ road controls).
- Access to rural credit for the acquisition of intermediate means of transport.
- Increasing role of mobile phones in transport operations
- Importance of infrastructure on transport services and costs
- Affects on transport services of increasing low cost importations (second hand vehicles and cheap Chinese bicycles and motorcycles).

## **Traffic counts**

Traffic counts should be undertaken on selected and representative rural spokes in order to provide estimates of the volume and nature of traffic of various types. There will be two selected traffic count locations on regional roads, three on market spokes and five on village spokes (see discussion of stratification, above). The variation is likely to be least on the main roads, and greatest in the villages, which explains the greater number of traffic counts on the smaller routes.

Rural transport is often greatly influenced by markets, and there may be huge differences between traffic on market and non-market days. For example in Burkina Faso, on one market spoke there were 750 animal-drawn carts on market days and only 30 on non-market days. In Cameroon, there were significant differences between weekdays and weekends, and so counts were performed at both times. In Zambia, there were major differences between spokes that were part of the fish marketing system and those that were not, and so counts were performed on 'fish spokes' and 'non-fish spokes'.

Wherever there are important weekly variations (or monthly in the case of some markets), there should be separate counts for busy and non-busy days. If the regional town has permanent markets, with little daily variation, it may be reasonable to perform a single traffic count on each of the selected spokes.

## **Seasonality**

Due to the nature of this rapid survey, there will be little flexibility in relation to the time of year the traffic counts take place. However, there is generally important seasonality in rural traffic, and this must be captured and understood. Questions should be asked of operators and users to establish how the traffic varies within the week and between the months and the seasons. It should be noted whether the counted figures represent a busy or a quiet part of the year, and roughly what proportion of the peak traffic is represented, and when the quiet periods occur.

Counting sites will be located along one of the spokes at least five kilometres from the hub (to avoid local traffic being counted). On each road sampled, counts will be conducted at the same point on what is a clear market day (with heavier traffic) and a non market day. Counts will be nominally for 24 hours. The actual time required will depend on local conditions, and 12-16 hours may be typical. Night-time movements and early mornings are likely to be very important in some areas. Such early and late traffic should either be counted or reasonable estimates made (the objective is to obtain a realistic overall picture, and reliable estimates based on sensible extrapolations could be part of the data collection process). Counting should be in both directions, so that one vehicle with two return trips will be counted four times. As far as possible, local traffic (people and vehicles travelling less than five kilometres) should not be included.

Sample traffic count forms have been prepared (see Tables A9-11), but they should be modified for local conditions. Some forms of traffic need not be included, but others may need to be added (eg, boats, tractors, tricycles). Some vehicles may be grouped (eg, rural taxis can include minibuses) but others may need to be separated (eg, particular types of animal-drawn carts). Table A10 shows a traffic count form designed for a part of Burkina Faso where several different types of animal-drawn cart operate (carts with two-wheels or four-wheels pulled by donkeys, horses and oxen). This is discussed in the report of the survey in the Boucle du Mouhoun region of Burkina Faso.

Where possible, a note should be made of the loading of vehicles (eg, empty, half-full, full capacity, over-full). As far as possible, the collected data will be disaggregated for gender. This should be accurate for pedestrians and intermediate means of transport. For motorised transport, estimates should be made of the gender balance of passengers and crews.

### **Enumerators and traffic count logistics**

The traffic counts will inevitably provide the researcher(s) with logistical problems that have to be resolved. There will need to be some assistants (enumerators) to help count the traffic. There are several practical ways to obtain suitable enumerators. For the village spokes, the easiest way may be to recruit and train local people, perhaps with the assistance and support of the village authorities, local teacher or local religious leader. The village traffic counts are not complicated, and local people can be available early in the morning and late in the evening. For the regional and market spokes, it may be possible to come to an arrangement with a local government department that is interested (transport ministry, local authority, regional project, NGO or college). In some countries, the local police have collaborated with traffic counts on the regional spokes, briefly stopping the traffic.

The need for enumerator supervision should ensure that a researcher has to be present at least once at most count locations. This should not be considered arduous as the traffic counts will be interesting and provide excellent opportunities for completing several of the required interviews. Even if the traffic count enumerators are highly responsible, it is a methodological requirement that a researcher should be present on at least six occasions (one count on each type of spoke on a market day, and one count on each type of spoke on a non-market day).

## **Survey results, analysis, outputs and follow-ups**

### **Record keeping**

The survey will result in notes from about 100 interviews, data from 20 traffic counts, tables of transport costs and prices, and various documents obtained during the course of the survey. There will be a wealth of information, but in a variety of forms, particularly if more than one person has done the research.

If a small team undertakes the work, then it is vital that the results of the interviews are shared on a regular (preferably daily) basis. This will allow team discussion, triangulation of the different sources, listing of points requiring clarification and identification of issues to be pursued further with other stakeholders.

There would be great merits in transposing all field notes into a database. However this would take a great deal of time, and this is not a requirement. A list should be prepared of the names and contacts of all people interviewed. This should be included as an appendix to the report, serving as an acknowledgement of sources of information, and a potential verification of the findings, should there be disputes. Similarly, the original notebooks and data sheets should be retained, for possible consultation and verification.

### **Calculating actual transport prices**

During the survey, price information will be obtained from transport operators, transport users and transport regulators, with the information triangulated to see if there are discrepancies. The actual fares paid by users should be tabulated by vehicle type and also by road type, and the cost per kilometre calculated for a range of transport services and distances. This may illustrate how transport costs vary with transport type, transport infrastructure (road condition and type), journey distance and transport demand. An example of such a summary table is given in Table A12: Example of table summarising fares and transport prices.

## **Estimating the regional transport fleet**

One output of the research will be an estimate of the entire fleet of motorised and non-motorised transport operating within the region. It is unlikely that there will be any single source of information on this, and the estimates will probably be built up from a variety of sources. The figures should relate to motorised and non-motorised vehicles mainly used for the transport of people and goods within the area on a year-round basis. They should exclude national and international level long-distance services, transport restricted to within-village or on-farm use, fleets of vehicles of large companies that do not provide transport services (eg, cotton export or forestry industries) and vehicles that only enter for seasonal markets.

Vehicle licensing data may be one starting point, but these may well over- or under-estimate the true picture. For motorised vehicles, it should be possible to record all transport hubs in the region, with estimates of numbers and types of vehicles operating from each hub. For intermediate means of transport, data will be required on the number of villages and the number of households. Based on field observations and the views of different stakeholders, estimates can be made of ownership of bicycles and carts per household or per village (taking into account local differences in wealth, topography and farming systems). Early ‘guesstimates’ can be triangulated with information from traffic counts, market parking, stakeholder reactions and by comparing the ratio of different means of transport (how many bicycles per cart, carts per motorised vehicle, etc). An example of a summary table is provided in Table A13: Example of table summarising the rural transport fleet.

## **Report preparation**

The surveys should result in a great deal of valuable and fascinating information that needs to be concisely reported and shared. They should provide a composite picture of the existing rural transport situation from the points of view of a large range of stakeholders. The surveys should provide some clear examples of the opportunities and constraints facing transport operators and the different categories of users, potential users and non-users.

The surveys will certainly not provide a statistically significant set of data. Any quantitative results provided are likely to be in the form of ‘order of magnitude’ figures. These will allow some informed ‘guesstimates’ of transport costs and actual traffic volumes, which represents important planning information that is unlikely to be available from other sources.

An indicative example of the contents of such a report is provided below, with more details in Table A14: Survey report: outline contents. Naturally, the final reporting should be adapted according to local conditions and priorities, as with all other aspects of the whole survey methodology. Examples of actual reports generated using this methodology are available from the studies carried out in selected regions of Burkina Faso, Cameroon, Tanzania and Zambia. Highlights of these are provided in Chapters 5 to 9.

One of the challenges will be to present the data obtained in a way that is clear and concise. Some possible ways of mapping the information are presented in the following chapters, but this could not be fully developed under this assignment. One of the report’s recommendations is that ways of mapping and modelling the results should be developed.

### **Example of report contents**

#### **Summary**

#### **Survey background and methodology**

Introduction to the surveyed area

Administration and population, Natural resources, Economy and services

#### **Survey results**

Policy and regulatory environment, Views of key informants on policy,

Road network and road conditions in survey area, Other transport types

(water transport, railways), Existing transport services in the area

(Overview regional transport, market town hub transport, village hub

transport, transport fleet, transport types on the different spokes), Demand for

rural transport services and user perspectives, Rural transport services

technologies and costs, Support services for rural transport services,

Perspectives of local stakeholders on specific issues

#### **Analysis and conclusion**

Key issues (Transport situation and trends, Profitability and supply issues,

Affordability and demand, Regulation and associations, Other key factors

influencing transport), Cross cutting issues (Poverty, Safety, Gender,

Environment, HIV/Aids, Marginalised people), General implications (Poverty,

millennium development goals and rural transport services), Priorities

according to the different stakeholders, Specific recommendations (Ways to

improve rural transport services, Specific follow up activities proposed)

#### **Annexes**

List of references and resource materials, List of people contacted/interviewed

Summary of data forms, Lessons from the survey methodology

### **Following up: including all stakeholders and building on the process**

The survey should have done a great deal to stimulate interest in the topic of rural transport services, and the opportunity should be taken to build on this interest. It would be polite and fitting for the report to be distributed to the key stakeholders who were interviewed. It would also be appropriate to arrange one or more stakeholder workshop(s) in the survey areas(s) to discuss the issues raised. There may well be some recommendations that can be implemented speedily at regional level, and some others that can be forwarded to central government. In many cases, starting a constructive dialogue between the transport operators, the regulators and the users could result in some new suggestions for improving rural transport services on poorly served routes. Through discussion, regulation and/or the formation of user groups, it may be possible to consolidate demand to allow new timetabled services that are appropriate to the users and profitable for the operators.

Similarly, at national level, the issues raised may well stimulate new interest in how to improve rural transport services. A national-level workshop to present the results and discuss their implications for rural transport in all regions would seem appropriate. This could involve national and regional transport personnel and decision makers, representatives of operators, users, support services and special interest groups, as well as supporting aid agencies and NGOs.

## Chapter 5: Rapid assessment of transport services in Boucle du Mouhoun, Burkina Faso

*summarised by Paul Starkey and Gnanderman Sirpé*

### Introduction to Boucle du Mouhoun

Burkina Faso has an area of 274,200 sq km and a population of about 13 million. It is divided into 13 regions, 45 provinces and 350 departments. The Boucle du Mouhoun, in the northwest of the country (see Figure 5.1), has an area of 35,000 sq km (about 13% of the country). The population is about 1.4 million (2002) or about 11% of the population of Burkina. The average population density is about 40 persons per square kilometre.



*Figure 5.1. Sketch of Burkina Faso showing Boucle du Mouhoun*

The region has six towns, 47 rural areas (communes) and 1042 villages. The regional capital is Dédougou, the sixth largest town in Burkina Faso, with a population of about 50,000. There are six provinces, each with a small market town as an administrative centre, and these towns have populations of about 20-30,000 people.

<b>Table 5.1 The six provinces of the Boucle du Mouhoun region of Burkina Faso</b>		
<i>Province</i>	<i>Population (1998)</i>	<i>Administrative town</i>
Balé,	170,000	Boromo
Banwa	220,000	Solenzo
Kossi	220,000	Nouna
Mouhoun	250,000	Dédougou
Nayala	140,000	Toma
Sourou	200,000	Tougan
<b>Total (Boucle du Mouhoun)</b>	<b>1,200,000</b>	<b>Dédougou</b>

Agriculture is the main economic activity in the area. The rainfall varies from 500 mm in the north to 1000 mm in the south of the region. Cotton is the main economic crop, but cereal production is also very important, with sorghum a major crop as well as millet, finger millet and maize. Cereal production is estimated at half a million tonnes a year, or 17% of the national production. Livestock are important, with significant populations of cattle (settled and transhumant), sheep and goats.

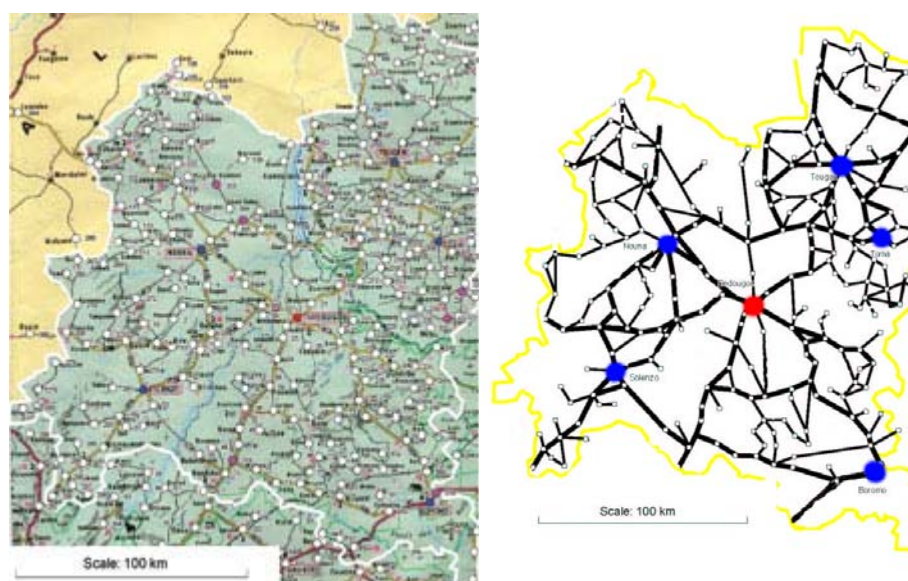
### Road infrastructure

There are effectively no tar roads in the region (although 44 km of tarred national road transits through the region at Boromo in the southeast). A national tar road linking Dédougou with Bobodioulasso (177 km) is under construction. The regional road network comprises 1218 km

of graded roads, ranging from good to very poor. Many roads are badly corrugated, due to heavy lorries such as those of the cotton company. Many of the smaller roads are impassable to large motorised transport in the rainy season from July to September. There are rain barriers to stop heavy vehicles travelling on the roads immediately after heavy rain, but these are not always effective. There are very many tracks, paths and cycle-ways that link villages to other villages and to the road network. All transport operators and rural people complained about the state of the roads, but the Director of Transport argued the situation was not bad, considering the maintenance budget and traffic volumes.

## Transport patterns: hubs, spokes and corridors

The regional capital, Dédougou is a transport hub, situated in the centre of the province (see Figure 5.2), with radiating roads going to the five main market towns and the two main national cities (Ouagadougou and Bobodioulasso).



*Figure 5.2. Boucle du Mouhoun region showing settlements (left) and the hub and spoke systems of the roads (right)*

One of the market towns is situated on the main Ouagadougou and Bobodioulasso tar road. National transport to Ouagadougou and Bobodioulasso (buses, lorries and bush taxis) operate from Dédougou and most regional towns. A local businessman has invested in a private bus terminal (Liza Voyages) offering daily services (passengers, mail, money) to national cities with onward international connections.

There is some cross-border transport with Mali, including dry season corridor transport of fuel tankers from Togo to Mali. The cotton company, Sofitex, has a large transport operation, with imported fertilizer from Togo and cotton exports. Its large articulated lorries do not generally transport passengers or other goods, and their main local impact is road wear and corrugation.

Each sub region ('province') has an administrative centre in a market town that acts as a small transport hub. There are also other important rural markets. The biggest is at Djibasso (northwest), a small town that has a large market every Thursday, attracting thousands of people, the majority of whom travel by intermediate means of transport. On market days, an estimated 3000 bicycles, 1500 carts and 300 motorcycles bring people and goods to the market for distances of up to 80 kilometres. About thirty rural taxis and trucks also serve this market. There are many smaller but important rural markets that have not developed into towns, and so are not obvious from road maps. Some are held in small villages but attract

hundreds of people from tens of kilometres away, often travelling on unmapped tracks by bicycle, cart or foot.

## Transport services and regional fleet

Between the various towns in the region, there are three main types of public transport. Most are over twenty years old.

- Small bush taxis, such as Peugeot pickups
- Larger bush taxis or midi-buses such as 20-30-seater Renault Super Goellette buses without glass windows
- Large trucks, known generally as ten-tonne trucks, including old Mercedes lorries.

The rural taxis, large and small operate on standard routes throughout the year, subject to road conditions. The larger trucks (to which bush taxi drivers aspire) are more opportunistic. In the dry season they enter villages, purchase grains and transport these to the north of the country. Trucks from the north also come into the region in the dry season to transport grains. Poor roads mean that trucks cannot enter villages in the rainy season, and they seek out other routes and markets. Wherever they go, they carry large numbers of people, sitting on of the sacks (or hanging off the sides when full). It is common for these trucks to transport fifty passengers, and one hundred passengers are not unusual. Bicycles are sometimes carried free of charge and hang off the sides.

Intermediate means of transport are very important. Bicycles are the most common, with one regional estimate of 100-130 bicycles per 100 households. At markets, it is usual to see several hundred bicycles parked. Small motorcycles are also important, but less common, and most markets would have 20-50 motorcycles parked. Donkey carts are widely used, mainly for intra-village and farm-village transport, but also for travelling to and from markets. Most markets would have 20-50 carts. There are also ox carts and horse carts. In the north, public transport services using horses pulling four-wheel wagons are increasing. On one small track leading to Djibasso market, the survey counted 370 donkey carts, 300 horse carts, 36 ox carts and 25 horse wagons (four wheels). The traffic count forms used on the surveys were modified to capture this diversity.

<b>Table: 5.2 Estimates of the transport fleet operating in Boucle du Mouhoun<sup>1</sup></b>			
<i>Transport type</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD million)</i>
Trucks	30	32000	1.0
Buses (20+ seats)	30	12000	0.4
Rural taxis and minibuses	20	12000	0.3
<b><i>Subtotal: Large motorised</i></b>	<b>80</b>		<b>1.6</b>
Motorcycles	10,000	800	8.0
Animal-drawn carts	10,000	250	2.5
Bicycles	200,000	120	24.0
<b><i>Subtotal: IMTs</i></b>	<b>220,000</b>		<b>34.5</b>
<sup>1</sup> Notes: estimates based on field observations. These figures are for vehicles mainly used for transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars, the fleet of vehicles operated by the cotton export and vehicles that only enter for seasonal markets. Bicycle numbers based on socio-economic surveys that suggest 100-130 bicycles per 100 households. Carts estimated at average of ten carts per village.			

A summary of the regional fleet is given in Table 5.2, together with estimates of values (cost of acquisition). Investment in intermediate means of transport is very much greater than the investment in vehicles used for motorised transport services. According to estimates, the regional fleet of motor transport cost about USD 1.6 million (the purchase price of the second



hand trucks and taxis). Investment in intermediate means of transport has been much greater, at about USD 35 million (the overall purchase price of the very many bicycles, carts and motorcycles).

## **Key observations and lessons learned**

### **Urban-rural differences**

While the region is reasonably ‘typical’ of the rural areas of Burkina Faso, rural Burkina Faso is very different from the country’s two large urban centres. One estimate suggests that 70% of the country’s motorised vehicles operate in and around Ouagadougou (population 1.5 million), and 20% operate in and around Bobodioulasso (population 400,000). The remaining ten percent of the national fleet operates in the rural areas (population 11 million).

The towns in Boucle du Mouhoun are all small (generally 30,000 or fewer people). Most of the traffic in the towns comprises two-wheeled transport: bicycles, motorcycles and donkey carts. Women use a relatively high proportion of these (perhaps one third). In rural areas, women also use these transport types, but the proportion of women users is much lower.

### **Importance of markets and the ‘invisibility’ of some hubs and spokes**

The Boucle du Mouhoun region has a complex and effective system of markets, some operating daily (Dédougou town), some weekly (Djibasso) and some on three or five day cycles. Most villages are within ‘reasonable’ cycling distance (up to 50 km) of two or three markets. The region has low levels of motorised transport, high ownership of intermediate means of transport and flat, savannah conditions that allow simple paths and tracks to be developed and kept open by regular use. Local paths and cycle-ways that are not on regional road maps are very important for the movement of people and goods. A relatively high proportion of medium distance (5 to 80 km) regional transport takes place on such tracks that may be ‘invisible’ from the main road network.

Rural people consider themselves in relation to several hubs, of which some are permanent administrative hubs and others are temporary market hubs, which may be reached by cart and cycle tracks of up to 80 km passing through the ‘bush’. Since some of these markets and tracks are not obvious from the regional road maps, it appears that the mental ‘maps’ of the area according to rural people may differ from the formal maps used by the regional authorities. Effectively some important hub and spoke market systems appear ‘invisible’ in regional road maps. Traffic counts on the main roads are likely to seriously underestimate the actual levels of mobility and trade in the rural areas.

### **Local production of bicycles and motorcycles**

Burkina Faso is famous for having large numbers of bicycles and light motorcycles. In the capital, Ougadougou, there are some cycle lanes with special traffic lights that allow two-wheeled transport to cross some junctions separately from larger vehicles. One reason for the great ‘success’ of bicycles and motorcycles has been the local supply system (the relatively flat terrain and suitable climate are also considered positive factors).

Local factories produced bicycles and motorcycles of French designs (notably Peugeot). The bicycles and motorcycles were sold at relatively expensive prices (80,000 FCFA or USD160 for a bicycle), protected by customs tariffs. Imported bicycles had to pay 46% duty on a minimum customs value of fifty dollars, plus 18% VAT – so there was at least 30 dollars of tax on an imported bicycle. As European prices increased, the components for bicycles were increasingly imported from India. Local production facilities have been unable to compete on price with Chinese bicycles and motorcycles and all local production has now stopped or is in the process of stopping. Most bicycles and motorcycles now arrive in boxes with all main parts assembled, for local final assembly.

The low cost of the imported products means that it is hardly worth the cost and effort of even nominal local manufacture that would allow a more favourable customs tariffs (26% rather than 46%). Some importers seem to be able to ‘negotiate’ favourable customs terms with ‘sympathetic’ customs officers. This means the actual tax paid is often below the official ‘protective’ tariff. Importers see little or no advantage in incurring the various expenses associated with local production.

The bicycle and motorcycle markets in Burkina Faso appear set to become dominated by Chinese imports with prices falling. In addition to the small motorcycles already widely in use, larger and more powerful 175 cc Chinese motorcycles (as used in Nigeria and Cameroon) are likely to increase also.

### **Importance of bicycles and potential for price reduction through de-taxing**

In Burkina Faso, bicycles are means of transport and production for rural people. Women and men use bicycles to access farms, markets and services, improving the productivity and revenue of rural households. Although bicycles are common in Burkina Faso, they are still not widely owned by the poorest rural families due to their cost.

In recent years, prices have fallen (from 80,000 FCFA for locally produced Sifa bicycles to 25,000 FCFA for imported Chinese bicycles, ie, from 160 dollars to 50 dollars). Nevertheless, bicycles are still expensive for rural women and men.

Burkina Faso could follow the ‘pro-poor’ policies of some other African states by removing import duties from bicycles altogether. Existing taxation on bicycles is high (it is estimated at thirty dollars, although given the present selling price of bicycles is now fifty dollars, it seems that this rate of tax is not always paid). The high price of bicycles is restricting the access of poor people to the productive advantages of bicycles. It is also encouraging importers to ‘negotiate’ lower tax bills, so that the government does not necessarily receive its high rate of tax. It is arguable that the government would benefit more, in the medium term, from the greater ability of poor people to produce more and access markets, using the benefits of bicycle transport.

### **Importance of animal power**

Animal power is very important for rural transport throughout the Boucle du Mouhoun region, with the numbers of carts and work animals greater in the northern areas. Donkey carts are used in and around most villages. Ox carts are used in smaller numbers throughout the region. Horse carts tend to be used only in the north which is drier. Horses are fast, but relatively expensive. Horses are not as robust as the cheaper donkeys. Oxen may be slower, but they are strong and appreciate in value as they grow larger. Some donkeys and horses (and a few camels) are used for riding, and some donkeys are used for pack transport.

In the northern markets most transport between villages and markets (distances of between 10 and 80 km) is based on animal-drawn carts. The carts transport grains, fuel wood, people, building materials and manufactured goods. Animal drawn carts are quite expensive, and more people would use and own carts if they were cheaper, or if rural credit were available to purchase them.

### **Transport services provided by intermediate means of transport**

Burkina Faso has large numbers of two-wheeled intermediate means of transport including bicycles, motorcycles and animal-drawn carts. These are mainly owned and operated by individuals for their own use. There are few, if any, public transport services based on two-wheeled transport (bicycles, motorcycles or carts).

Two-wheel animal drawn carts are mainly operated for family use, and the transport of other people and their goods is generally based more on favours than financial considerations. In the north of the country, some transporters use four-wheeled wagons ('buses') that are pulled by horses. These often operate on a commercial fare-paying basis, with distinct prices for passengers and for goods over various distances. The use of such four-wheel horse 'buses' appears profitable and numbers are increasing.

In nearby Nigeria and Cameroon, motorcycle taxis are common in both urban and rural areas. In East Africa, bicycle taxis are common in some rural areas. In several African countries, people operate animal drawn carts (particularly horse carts) as income-generating transport services. There appears to be little, if any evidence of such services in Burkina Faso. Motorcycle taxis have not become established even in the city of Ouagadougou. One reason given is that it is demeaning to transport someone for money. Another possibility is that the common motorcycles and mobylettes are relatively underpowered for such services. With cheap 175 cc Chinese motorcycles now coming into Burkina Faso, there may be more scope for commercial rural transport services based on motorcycles.

### **Motorised transport operators**

Private individuals, as opposed to transport firms, own most of the motor vehicles that provide transport services in the region. Some vehicles are owner operated and some have hired drivers. Very few transporters own more than one vehicle.

There is a syndicate of transport operators, but its officials admitted it was not very strong, and not all transporters paid their dues. It organised queuing for loads in Dédougou, and some other transport terminals, although this is not always very strict. Due to low demand at the urban terminals, transport operators often leave without a full load, hoping to pick up custom along the route. In general, there seemed to be little concern about competition, despite the fact that an itinerant ten-tonne lorry could pick up a large number of passengers along a roadside.

Most transport operators are running very old vehicles. It was difficult to obtain accurate figures on transport costs. Operators claim that their incomes from transport are low, and that it would be difficult to replace their vehicles were they to fail completely. It appears that the investment cost of the vehicles has often come from non-transport income (eg, relatives abroad, trading income).

### **Gender and transport**

In much of the world, including most African countries, men are the main operators of transport devices, including intermediate means of transport. In some countries it is unusual to see women riding bicycles, motorcycles and animal drawn vehicles. This is not the case in Burkina Faso.

In urban areas (including Ouagadougou) and small towns like Dédougou, women ride a relatively high proportion (perhaps one third) of all bicycles and motorcycles. In rural areas the proportion is lower, but it is still common to see women on bicycles. Men own most rural bicycles so that rural women riding bicycles are generally riding the bicycle of their husband (or a male relative). Most rural women would like to own bicycles, but they are relatively expensive, and women have less access to money than men. Some women cycle thirty kilometres or more to sell goods, to access shops and medical services, and to visit friends and family.

Not many rural women ride motorcycles. The number of rural motorcycles is very small – some villages visited only had between two and five motorcycles, compared with thirty to sixty bicycles. Some of these urban-based women have bought their own motorcycles, using income from their small commercial enterprises (trading, making clothes or selling food).

Women operate carts pulled by donkeys in many parts of the country. In the northwest of the Boucle du Mouhoun region, women also operate carts pulled by oxen and by horses. Most carts are purchased and owned by men.

### **Safety**

Large buses operate on national routes, but pickups, lorries and 'mixed transport' midi-buses provide most transport on the regional and local routes. Thus most large-scale rural transport is 'mixed' transport, with goods and people in the same vehicle. All parties accept that this is not ideal, but is inevitable in present circumstances. When trying to gauge the maximum payload of the motorised transport, the operators gave the classic response 'a bush taxi is never full, there is always room for one more person!'

Women travelling on top of the 10-tonne lorries generally sit in the middle and this is clearly safer for them and the baby that is often with them. Men are more likely to travel unaccompanied and are willing to sit on the edge of the trucks and the roofs of the bush taxis.

Very few bicycles have front brakes. The cost of brake blocks (50 FCFA or ten cents) seems cheap, but rural people do not seem to regard this as an important purchase, and use their sandals for braking.

### **Barriers and 'tips'**

The regional roads have various control barriers, including police, customs and forestry. These seldom delay private vehicles but transport operators must stop, and it is customary to pay something, generally 500 or 1000 FCFA (one or two dollars). The bigger transporters pay more. On the Dédougou /Djibasso road there is normally little traffic and only one barrier for most of the time, but five appear for the busy market day. Transporters considered the charges paid at barriers to be a normal part of daily life: a routine cost rather than an unfair tax on their livelihoods. While transporters accept the principle of rain barriers, that temporarily close roads after heavy rain, trucks in a hurry are probably able to 'encourage' lax enforcement.

### **Microcredit**

Most rural people do not have access to credit to buy means of transport. There are two NGO initiatives that could help to improve the situation. Les Caisses Villageoises d'Épargne et de Crédit Autogérées (CVECA) is a network of autonomous village savings and loans banks established with the help of the French NGO Centre International de Développement et de Recherche (CIDR) with funding from the European Union. Such banks mobilise local savings, and allow them to be used for rural loans, including loans to buy means of transport. L'association pour le développement de la région de Toma (ADRTom) in Nayala province, launched a scheme to assist women (and men) to buy second-hand bicycles donated from Europe. It has imported three containers of 600 bicycles, but its cash-flow problems mean that men (who can pay cash) are increasingly the beneficiaries rather than women (who generally need credit). Both NGOs recognise the importance of means of transport for improving rural livelihoods and incomes.

### **Transport for health services and for education**

In the rural areas, people use whatever transport is available to access health services, for routine visits or for emergencies. On the main roads, people may travel by lorry or bush taxi to medical centres and hospitals. However, most people do not have reliable access to any form of four-wheeled transport, and so they may travel on bicycles, motorcycles or animal drawn carts, with hand-carried stretchers for the very sick.

Most children walk to primary school. Many would like to use bicycles, but they are generally unaffordable for use by children. Secondary schools are generally on the outskirts of towns,

and people from far away villages find accommodation with the town. It is quite common for children to cycle to secondary school, but distances are seldom more than five kilometres.

### **Transport for handicapped people**

Tricycles for handicapped people are relatively common in Burkina Faso, and they can be seen in rural and urban areas. They are generally donated by local charities and religious organisations. It appears that men mainly operate them, which suggests that women with similar handicaps may have greater transport problems.

One handicapped person living in a village was interviewed. He would sometimes travel by bush taxi to town. The bush taxi charged to carry the tricycle (two dollars for the passenger, one dollar for the tricycle). Due to the high cost of transport, and his low income (he repaired watches and torches), he sometimes travelled long distances by his hand-operated tricycle to save the fare. Most years he had travelled to Bobodioulassou (about 180 km), taking four days each way and staying in villages.

## **Conclusions**

The Boucle du Mouhoun region has a small and quite old fleet of motorised public transport vehicles, comprising about 50 rural taxis (pickups, small buses) and 30 large lorries. These operate from Dédougou and five market hubs. Poor infrastructure particularly in the rainy season is a major constraint to motorised transport services.

There is little evidence that national or local policies or regulatory systems have significant impact on rural transport services. There seems to be a viscous circle of low investment, low profitability, low transport frequency and low economic demand. Evidence from intercity transport, in Burkina Faso and elsewhere, suggests that transport demand can be consolidated and can grow with investment in new and predictable services.

Intermediate means of transport, notably bicycles, animal drawn carts and motorcycles, are extremely important, for both rural women and rural men, for distances up to 80 km. Although rural people have invested heavily in intermediate means of transport, their relatively high cost and the lack of access to credit is restricting their ownership in the villages, particularly for women. Increasing access to intermediate means of transport through lower prices and/or greater availability of rural credit, should significantly improve rural livelihoods and access to important services (notably health and education).

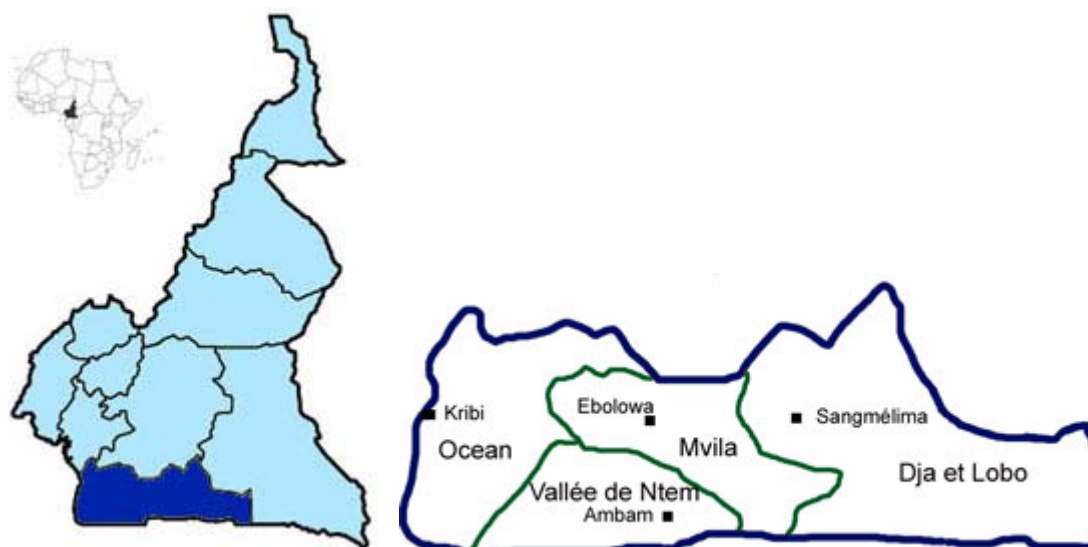
In the Boucle du Mouhoun region, a significant proportion of regional transport (inter-village and village-to-market journeys) is conducted on small tracks rather than the main roads. The pattern of these tracks, and the complex system of markets is not clear from conventional road maps. Future transport planning should consider the importance of these tracks and intermediate means of transport and involve local communities in participatory discussions relating to infrastructure and the different means of transport.

## Chapter 6: Rapid assessment of transport services in the Southern Province of Cameroon

*summarised by Paul Starkey and Guy Kemtsop*

### Introduction to the Southern Province

The Southern Province of Cameroon covers an area of 47,190 km sq and has a population of about 500,000, of which 350,000 (63,000 families) live in rural areas. It is one of the ten provinces of the country, and although it represents 10% in area, it contains only 3% of the national population. The Province is divided into four divisions (Dja et Lobo, Mvila, Ocean and Vallée du Ntem), 22 subdivisions (each with one town) and 1185 villages. The capital of the province is the town of Ebolowa, which has a population of about 90,000 people. The province is bounded by the Atlantic in the west, the Littoral and Centre Provinces to the north and the Eastern Province to the East. Its southern boundary borders Equatorial Guinea, Gabon and Congo. Figure 6.1 shows the location of the Southern Province, its divisions and main towns.



*Figure 6.1. Sketch map of Cameroon showing the Southern Province (left) and sketch map of the Southern Province showing its four divisions and main towns (right)*

The province has about 900 primary schools and 125 secondary schools, including private schools. Almost all children attend primary school, but only one third go on to secondary school. There are nine health districts, each with a hospital or large health centre and a total of 226 health centres, of which about 30% are private (mainly run by churches).

The climate is warm (average about 24°C) and humid, and the natural vegetation is tropical forest. Annual rainfall is 1200-2000 mm, with two rainy seasons (March to May and September to November). Most of the land is undulating hills, covered with forests with small-scale farm plantations within five kilometres of villages. There are some larger scale agro-industrial plantations (rubber, oil palm).

Forestry remains an important industry, even though many of the valuable trees have already been extracted. The forests provide the hunting and gathering livelihoods of the small populations of Baka and Beyeele (Pygmy) ethnic groups. Agriculture is extremely important

for rural people, and women are mainly responsible for growing and marketing the major food crops (yams, cassava, other root crops and plantains). Men tend to be responsible for the main cash crops that include cocoa, coffee, oil palm and rubber. Cocoa is particularly important, and much farm income comes in from September to December, at the time when itinerant cocoa buyers visit the villages. Most household capital expenditure, such as the purchase of bicycles and motorcycles, occurs immediately after receipt of cocoa revenue.

There are almost no large livestock (cattle, donkeys) and livestock production is mainly household poultry and a few pigs, sheep and goats. Hunting is important, and 'bushmeat' is commonly eaten, with some informal supplies to urban areas. Fishing is important on the Atlantic coast and along some rivers. Although there are many rivers that have fishing canoes and there is no long distance water transport in the province.

While all towns have electricity and telephone services, most villages do not. There is a very rapid increase in the ownership and use of mobile telephones, although coverage is still mainly in and around the towns.

## **Some key observations and lessons learned**

### **Transport policy and regulatory environment**

Cameroon has a rural transport policy that emphasises the development and maintenance of rural infrastructure. A road fund has been set up and all road construction and maintenance work is now contracted out to the private sector. A system has been established for prioritising roads at both national and decentralised levels, in order that scarce resources can be assigned to the roads seen to be important by local authorities and communities. The national poverty reduction strategy addresses transport issues, with emphasis on improving rural access through better roads. In the Southern Province, while there is widespread dissatisfaction with the state of the unpaved roads, there is evidence that the transport strategy is being implemented, and contracted maintenance work is being prioritised. While there is a system of rain barriers, the people who operate them have few resources and little real power. On the main roads there is a system of road tolls that appears to operate efficiently.

The national transport policy does refer to transport services and intermediate means of transport. In the Southern Province there is little evidence of any strategies relating to transport services or intermediate means of transport being implemented. The development of the use of motorcycles has occurred spontaneously. Transport officials at national and provincial level appeared very negative about bicycles and their potential role in the Southern Province.

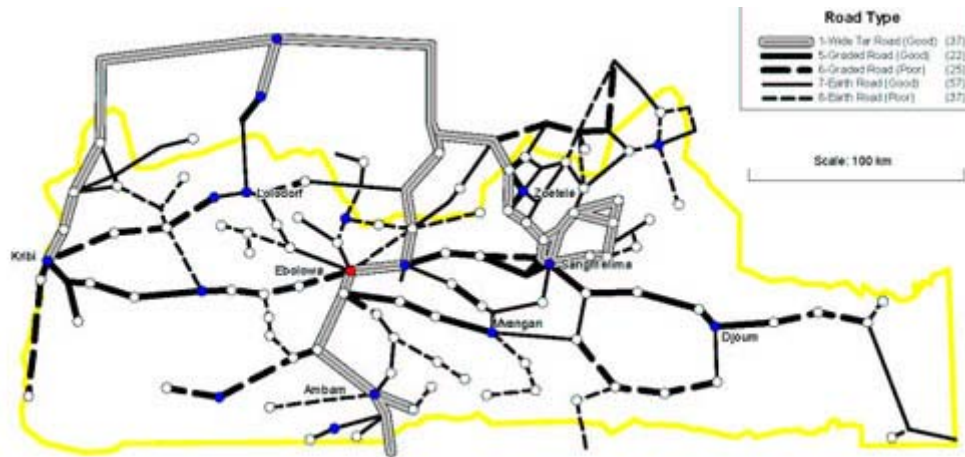
The Ministry of Transport has established control barriers on major roads to promote road safety and to control dangerous vehicle loads. However, genuine enforcement is minimal, and overloaded vehicles make payments in order to pass the barriers. Transport operators in Southern Cameroon have to deal with a range of other officials as well (police, paramilitary, customs, forestry) some of whom have control barriers on the main roads. These tend to intimidate transport operators, who often make small payments to allow them to pass through quickly. Because there are many barriers, the cost of these tips or bribes mounts up, as discussed below.

Transport associations exist in the main towns and control queuing in the council terminals. The development of transport agencies working from different terminals has reduced the importance of transport associations.

## Road network and condition

The road network in the Southern Province comprises 4300 kilometres of road, of which 12% are tarred. The roads are categorised as national (1106 km, 26%), provincial (368 km, 8%), district (960 km, 22%) and rural (1855 km, 44%). The ministry of public works considers that 45% of the network is in bad condition.

The paved roads are primarily part of the national network, linking four main towns to the national capital. One good quality tar road runs from the capital (Yaoundé) to Ebolowa and onto Amban and the Gabon border. A branch from this road passes to Sangmélina. The other main tar road passes from the Yaoundé-Douala highway and goes to the port and oil terminal of Kribi. This is shown in Figure 6.2.



*Figure 6.2. Diagram of the road network in the Southern Province showing also the Yaoundé-Douala highway to the north.*

This pattern of tarred roads means that the provincial capital of Ebolowa is connected to two important towns (Kribi and Sangmélina) both tar roads (good but longer) and gravel roads (poor but shorter). Ebolowa and Kribi are connected via Yaoundé-Douala highway (about 460 km) as well as by the unpaved direct route (170 km). Ebolowa and Sangmélina are connected via the converging tar roads that go in the direction of Yaoundé (distance via tar 242 km) as well as by the direct route (117 km). In both cases, the tar road allows faster speeds, greater comfort and a dependable arrival time. They do however take longer (if conditions are good on the gravel road) and use more fuel. No commercial operators travel to Kribi by the long tar road, but some private cars and civil servants opt for this route. Commercial mini-bus services tried to operate to Sangmélina via the longer tar route, but fuel costs were higher and most passengers were not prepared to pay extra to travel in comfort.

While the main tar roads are based on a national hub and spoke system, many of the other roads form a genuine network, giving more than one option for travelling between two locations. This is important when roads become blocked or temporarily impassable. Another characteristic of the province is that almost all villages are located on the road network and only a few people (foresters, hunters, fisherfolk and Pygmy communities) live away from the roads. This means that there are very few genuine 'village spokes' (routes between large villages and small outlying villages). Most routes linking villages are part of the provincial road network, and the traffic on them is a mix of short-distance inter-village transport and longer distance transport (village to market town, and market town to provincial town). The fact that villages all lie on the road network and that rural taxis operate on most roads (going from/to one of the towns) means that most people in the province live very close to a 'bus stop'. Mean distance from a bus stop is one of the international indicators of transport. Judged by this indicator, Southern Cameroon would therefore have an exceptionally high quality of



transport, although taking into account low transport frequency, overcrowding and high prices, the reality is quite different.

The existence of alternative routes provides examples of the effect of road condition on rural transport services. In one example there are two routes covering the 40 km between Zoébefam and the town of Sangmélina. There is the main national road (in poor condition) and a newly graded feeder road (in much better condition). Rural taxis and one transport agency have started to use the new route for some of their trips and this has dramatically increased traffic on the new road. For the villages on the 'new' route, transport fares have gone down by 50% and people's mobility has increased (with more trips to market each month). On the poor quality national road, rural taxis have decreased and some transport prices have increased. Surprisingly, motorcycles have decreased on the better road and increased on the poorer road, suggesting they cannot compete directly with four-wheel taxis over such distances, unless taxi frequency is very low.

In a second example, there are two ways of travel from Oveng to Sangmélina. The direct route (100 km) has some very difficult patches but passes many communities with transport needs. An alternative route is in better condition but has few villages with significant transport requirements and is twice the distance. The rural taxis all opt for the shorter distances and greater transport market, despite the bad state of the road.

One strange phenomenon (reported and observed) is the deliberate sabotage of roads in certain villages. This causes accidents and vehicles may become stuck. It appears that the benefits to some villagers from their work in 'rescuing' vehicles are greater than the benefits from freely-passing traffic.

### **Transport service hubs and provincial fleet**

Much of the transport along the main roads is national-level transport, notably to and from the capital of Yaoundé and the port city of Douala. Transport agencies operate express bus and minibus services to Yaoundé from Ebolowa and all the main towns.

Although there are international boundaries with three countries, there is only a small amount of long-distance international traffic. Some trucks carry produce from Cameroon to Gabon, including tomatoes from the northwestern highlands. Most other international traffic is relatively local cross-border trade, including trucks that bring produce to and from various periodic markets held in villages in Equatorial Guinea, Gabon, Congo and Cameroon that are close to the frontiers.

All the passenger and freight transport services that operate within the southern province operate to and from a small number of transport hubs, notably Ebolowa, Kribi, Sangmélina, Ambam and Djoum. Most motorised vehicles will go to and from one of these towns each day. Some vehicles will start their journeys from one of the 17 other divisional towns. These towns may act as secondary hubs particularly for motorcycle transport. Examples include Mintom, Oveng, Olamze, Ma'an and Mvangan.

Estimates of the numbers of vehicles operating in the Province are given in Table 6.1. The two most common vehicles are 650 rural taxis (including minibuses and old hatchback cars) and about 20,000 motorcycles. Some of the rural taxis operate on intercity routes and some of these motorcycles are based in the towns. The total capital investment in motorcycles is higher than that of all other vehicles because of their large numbers and the fact that most of these first enter the province as new vehicles. Most trucks, buses and rural taxis are bought into the province when they are already quite old.

<b>Table: 6.1 Estimates of the transport fleet operating in Southern Province<sup>1</sup></b>			
<i>Transport type</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD million)</i>
Trucks (below three tons)	110	10000	1.1
Buses (20+ seats)	80	6000	0.5
Rural taxis including minibuses	650	2000	1.3
<b><i>Subtotal: Large motorised</i></b>	<b>840</b>		<b>2.8</b>
Motorcycles	19,000	700	13.0
Bicycles	2,000	160	0.3
<b><i>Subtotal: IMTs</i></b>	<b>21,000</b>		<b>13.3</b>
<sup>1</sup> Notes: rough order-of-magnitude estimates based on field observations. These figures are for vehicles mainly used for transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars. Values are based on the approximate investment made by the purchaser: most large motor vehicles used in the region were purchased when over ten years old, while most intermediate means of transport used in the region were purchased new.			

Apart from the high number of motorcycles, there are very few intermediate means of transport. There are no work animals and very few bicycles. Some locally made wooden 'bicycles' exist. These are pushed up hill and can be ridden downhill. They are used for short distance transport and for children's recreation. Metal bicycles are rare and expensive, costing about 90,000 FCFA (about 180 dollars) and this is half the price of a second hand motorcycle.

### **Importance and profitability of motorcycles**

Motorcycle taxis are increasing rapidly in Cameroon generally and in the Southern province in particular. There are estimated to be about 20,000 in the province. A large number of these are used as taxis, some of which are urban, some peri-urban and some rural-based. In Ebolowa town, members of the motorcycle taxi association increased from 200 to 1000 in the past four years. Most motorcycles operate within a twenty-kilometre radius of the various towns. Some are based at road junctions (small transport hubs) where they complement rural taxis by taking passengers between villages and the main taxi routes. These services are increasingly important because conventional taxis have reduced their services on minor routes. Motorcycle taxis seldom transport people more than 30 km. Very few drivers or passengers wear crash helmets. Motorcycles frequently carry two passengers (in addition to the driver) and carrying three passengers is not unusual.

The rapid growth of motorcycles has been associated with a great drop in prices. A few years ago, motorcycles were mainly Japanese models that cost 2000 dollars. Now new motorcycles (125-175 cc) imported with China are widely available and come with numerous gadgets and accessories (including remote locking). The ones used by motorcycle taxis are mainly 175 cc machines costing about 400, 000 FCFA (USD 800). Business people and civil servants living in towns purchase these for leasing to motorcycle operators. Operators have to pay the owners about 4000 FCFA (USD 8) if working in the towns and 8000 FCFA (USD 16) a day if operating on muddy rural roads. This means owners can recover their capital in 50 to 100 paid days, and they may well buy an additional motorcycle to lease out. Motorcycles generally last only a few months without major repairs, but in that time they have earned their owner and operator significant income. Motorcycles are sold for about half price after just six months. This puts second hand motorcycles in the reach of many more people. The buyers of older machines will face repair bills, and small repair facilities are increasing in the province. With competition in the urban areas high (waiting motorcycles at most corners) and fares low (100 FCFA or USD 0.20), rural motor taxis are increasingly attractive. Fares in rural areas are often 2000 FCFA (USD 4) for a journey of up to 20 km.

The rapid increase in the use of motorcycles is partly due to their low cost, their profitability and the way they are funded. Urban businesspeople or civil servants who have access to some capital or credit are the main people buying them. They make a profit, as do the operators, and so they continue to invest, and encourage others to do the same. This means that urban capital is being used to develop new rural transport services. The rapid spread of motorcycles may also be assisted by the relative freedom from regulation. For the moment, motorcycle operators do not pay road tolls or the high taxes paid by the operators of long-distance transport, although they may have to make payments (bribes) at control barriers and when stopped by urban police.

### **Transport periodicity and seasons**

Transport is affected by seasonality with several different influences. Although the main food crops (yams, plantains) grow throughout the year, there are annual variations associated with cash crops, particularly cocoa marketing. There are also annual religious festivals and national holidays that affect traffic. During the two rainy seasons, rural traffic is affected as small roads become difficult or impossible to pass. There are period markets (weekly or monthly) that cause local surges in traffic flows. There is also a significant 'weekend' effect throughout the province. People living in towns maintain strong ties with their traditional villages. Major ceremonies, including funerals and weddings are held in villages at weekends so that people living in towns can attend. It is not unusual for urban people to drive several hundred kilometres to their remote villages for important weekend events. Rich people often build an expensive house in their traditional village.

The main food crops (tubers and plantains) grow throughout the province and are relatively heavy (high water content) and low value. This means that transporting them long distances is not profitable and they tend to be marketed quite locally. Women close to markets transport these products by back-pannier, handcart (close to market only), rural taxi or motorcycle taxi. Some rural taxis are crammed to overflowing with plantains. Women in the more remote villages seldom walk long distances with such products (they are too heavy for the distances and the value). For these people, the main marketing opportunities come at weekends, when urban people visit their villages, providing opportunities for roadside sales (plantains, tubers, bush meat). There are similar 'opportunistic' possibilities of selling such produce when vehicles enter the villages to purchase cocoa, coffee, latex rubber and palm oil.

### **Expensive bicycles**

Although government officials tend to be very negative about bicycles (saying that they are from 'prehistory'), bicycles are actually owned in most villages and villagers stressed the potential value to them of bicycles. The existing bicycles are mainly used for journeys of 5-30 km between villages and towns, between villages and for access to local schools and medical facilities. Men mainly use them, but women said they could use them, and school children would like to use them. Some itinerant traders use bicycles. Bicycles are not available to purchase in the rural areas and even in towns there are very few suppliers and very high prices (90,000 FCFA, about USD 180). At this price (half the price of a used motorcycle) it is not surprising that there are few sales. The rapid reduction in prices associated with Chinese imports has not yet affected the bicycle market in Southern Cameroon. Prices are three times more than they need be. Villagers stated that if bicycles costing 30,000 FCFA (USD 60) were available to purchase at the time of the cocoa harvest, the number of bicycles in use would increase. While bicycles are never likely to be as widespread as in the savannah zone (where they can be used along small paths) there is still great potential for greater use of bicycles along existing roads for inter-village transport and village-to-market transport of people and goods.

## Transport associations and agencies

In the Southern Province of Cameroon there are both transport associations and transport agencies ('Agence de voyage' in French). The associations, or syndicates, comprise operators of transport (mainly rural taxis, both cars and minibuses) that load at public transport terminals owned by town authorities. The associations are recognised by the local authorities and have the power to control queuing for loads at the main urban public terminals. They have little, if any, influence at the smaller hubs or at village stops. By organising loading and queuing, the associations prevent anarchic scrambling for customers, but the queuing system means that customers and operators cannot really select each other. This lack of competition for customers (it is determined by the queue) means that operators have little incentive to provide a better vehicle or better service. This is particularly obvious in Southern Cameroon, where vehicles operated by association members are generally older and more battered, than the vehicles operated by the transport agencies.

There are two main types of transport agency operating in the Southern Province.

- **Private transport firms.** These are businesses that own fleets of buses and minibuses, and operate these from private terminals (bus stations). These mainly operate on long-distance inter-city routes with good infrastructure. These are similar to private bus companies in other countries.
- **Transport franchises.** These are private transport firms that offer franchises to other private transport operators to join them, to share their name and their transport terminals. These also operate from their own terminals where they arrange their own system of queuing. The existing franchises were each started by a transport operator who encouraged other transporters to join the franchise. Those joining kept ownership of their own vehicles but repainted them (taking on the 'brand name') and start to operate from the franchise's own terminals (for a fixed cost and/or a percentage of takings). These transporters (the initiator and the subsequent partners) generally started as rural taxi operators, loading from the public terminals (with which they now compete). These franchises operate on the main inter-city transport routes (in competition with the bus companies) and also on some rural routes that have significant demand (in competition with rural taxis).

On the intercity routes, there is intense competition for the transport services and this is reflected in both prices and quality of service. Because they the different transport agencies load at different terminals, the customer has to choose which terminal to go to. So people go to the terminal that provides them with the best price, quality, frequency and 'brand image'. As a result, the travel firms provide newer and more comfortable vehicles, and better terminal facilities, and compete on price, frequency, security and 'image'.

Only a few transport agencies operate on truly rural routes (as opposed to intercity routes). On some rural routes with plenty of transport demand, transport agencies, such as Kouma Voyages now encourage the passengers with better vehicles (generally minibuses), lower prices, better services and more secure terminals. All stakeholders agree that the transport agencies are having an effect on price, quality and reliability of rural transport services, and they are generating 'brand loyalty'. At the urban terminal, one might expect that by dividing the passengers waiting for transport into three different queues (the council terminal and two different franchises) would increase average waiting times for everyone (and long waiting time is a major problem of rural transport). However, what appears to be happening is that when transport franchises start operating, the services improve and prices come down and the market increases, with more people travelling. In villages alongside transport routes, one might expect that people would invariably take the first vehicle to pass. However, people have been encouraged by lower prices, better vehicles and more regular and dependable services and have started to express strong brand loyalty.

There are not yet any transport franchises operating on rural routes with low transport demand. Only rural taxis that load in the council terminal operate on such routes, using old and battered vehicles. Motorcycle taxis may also operate on parts of such routes, but unlike rural taxis, motorcycles seldom travel long distances. The operators of rural taxis resent the fact that motorcycles (and some private cars) take away some of 'their' transport market.

### **Tolls, control barriers and safety**

On the tarred national roads there are toll charges. For small vehicles these are 500 FCFA (about one dollar). These appear to be efficiently collected, with no sign of avoidance or 'negotiations'. The costs seem modest for drivers on the intercity routes. Operators of rural transport services do complain, as they often pass through the toll barriers on their way to the unpaved routes leading to villages. They have to pay each time they pass. Motorcycles do not pay charges.

Outside each town in the Southern Province of Cameroon is a series of control barriers (police, paramilitary, Ministry of Transport road safety, customs, forestry). All vehicles providing public transport are stopped. Even if all papers are correct and the vehicle is immaculate, there is likely to be some fault found, which will be very time consuming to deal with. Some transport owners reported they never gave 'tips' to pass, but the great majority of transporters simply pay a fixed price (usually 1000 FCFA, about two dollars) to pass quickly. For example, an overloaded rural taxi with people sitting on the roof pays a fee at each barrier (including the 'Road Safety' barrier) and can pass. One payment a day is generally sufficient at each barrier, but with four different barriers outside each town on the main roads, the total payment mounts up. The overall importance of the bribes, in terms of vehicle running costs, varies with the route, the number of trips a day and the degree of overloading. In some cases in the Southern Province, the cost of bribes was comparable to the cost of fuel, and this is shown in Figure 6.3.

The Ministry of Transport has a team of people to promote road safety. They mount barriers on main roads, and are meant to advise on a range of issues including seat belts, vehicle condition and safe loading. Advice is given, but there is little enforcement. It is generally agreed (by operators, regulators and passengers) that unsafe practices such as overloading are inevitable given the lack of transport and its high cost, relative to rural incomes.

### **Operator perspectives and cost of rural transport services**

Some operators and regulators expressed the view that rural passenger transport is more of a social service than a business. Returns are low and high capital investment is not justified. Operators have to cover all costs, but their expectations of gaining income for re-investing is low.

All transport services are motorised, and operating costs include fixed costs (licensing, capital or depreciation and flat-rate taxation), and variable operating costs (fuel, barrier costs and repairs). Fuel is the biggest operating cost, but the cost of control barriers (tips, bribes and road tolls) is the second largest item of expenditure (see Figure 6.3). Operators of rural taxis consider the taxation system penalises them, as they have to pay flat rate taxes. Those operating short distances (including motorcycles) pay modest local taxes (25,000 FCFA, about USD 50). Those operating more than 40 km, also pay trading taxes (ten times the local tax). This tax appears disproportionately high to the poorer rural taxis. There are also anomalies, with final payments based on 'negotiation'. All operators consider their maintenance costs would go down if the roads were improved (and this was confirmed by the experiences of repairers). However, the reported cost of maintenance is significantly less than the reported cost of barrier payments. Reducing these could have a major effect on transport operating costs, prices and profitability.

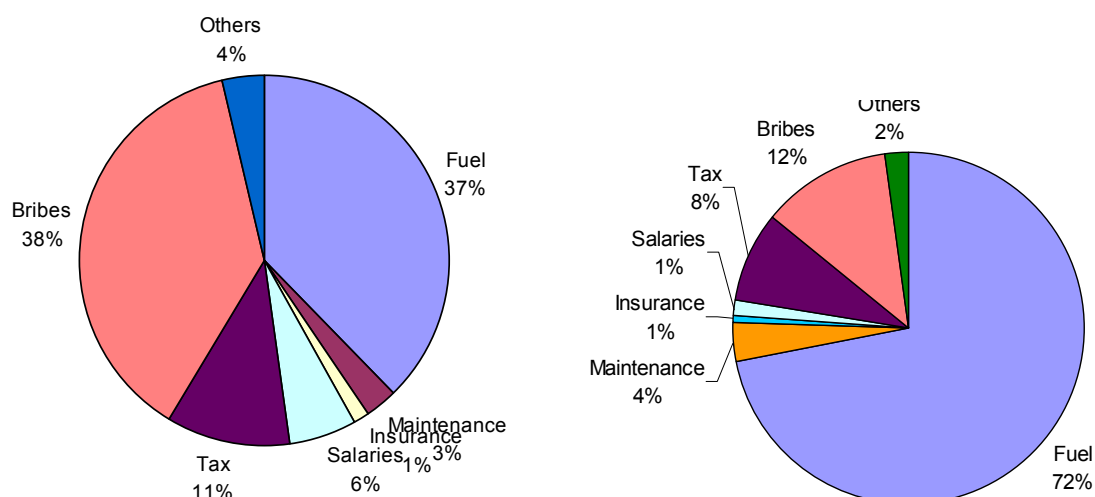


Figure 6.3. Pie charts showing component proportions of operating costs for minibus (left) and motorcycle (right). Each based on figures provided by three informants. Total annual operating costs were about USD 7000 for the minibus and USD 4500 for the motorcycle.

Some transport prices are regulated and are equivalent to about 3 cents (USD) per kilometre. The actual prices charged depend vary from 2 to 9 cents (USD) per kilometre based on road type, traffic volume and distance. The higher prices are associated with poor roads, low traffic volume and short distances. Prices tend to be stepped in units of 500 FCFA (one dollar). Examples of prices, and some of the contributory factors are illustrated in Table 6.2

**Table 6.2. Examples of passenger fares by rural taxi in Southern Cameroon**

Road type	Start	Finish	Distance (km)	Price FCFA	Price / km (USD cents)
Main tar road, high traffic volume	Ambam	Meyo Centre	42	500	2
	Ebolowa	Meyo Centre	49	1000	4
	Ambam	Ebolowa	90	1000	2
Good road, low traffic volume	Ambam	Aban–Minkoo	27	1000	7
Good graded road, high traffic volume	Ebolowa	Akom II	171	2000	2
	Ebolowa	Kribi	257	3500	3
Poor road, low traffic volume	Ebolowa	Biwong Bane	30	1000	7
	Ebolowa	Mekomo	38	1500	8
	Ambam	Olamze	45	2000	9
	Ambam	Ma'an	57	2000	7
	Ebolowa	Nkouékouk	60	2000	7
	Ebolowa	Lolodorf	73	2000	5
	Ebolowa	Ma'an	121	2500	4
	Ebolowa	Nyabessan	157	3500	4

Note: the practice of fixing fares in increments of 500 FCFA (one dollar) creates some pricing anomalies

### Transport for health and education and some gender issues

Health services and schools have very limited access to transport, and often have to make use of public transport and hired vehicles for obtaining supplies and transporting staff. In most

cases, patients and pupils have to organise their own transport to access health and education services. This may involve walking or use of rural taxis or motorcycles. Women are particularly affected due to pregnancies and responsibilities for children's health and education. Bicycles could save students much travel time, but the use of bicycles by students is very low, due to their high cost and lack of availability.

In public transport, women passengers are given some preference in seat allocation, and women are not expected to travel on the roofs of vehicles. The traffic counts showed that similar numbers of men and woman walk along the roads, but that very few women ride bicycles or motorcycles (except as passengers). Women did express interest in owning and using bicycles or motorcycles.

## Conclusions

It is generally agreed by all that rural transport services are unsatisfactory in the Southern Province of Cameroon, and one major reason for this is the poor state of the roads. When roads have been improved, transport services have increased and prices have been reduced. While transport services are poor, most people live on roads where rural taxis operate every day. People have problems in accessing health and education facilities and marketing food crops, and this particularly affects women.

All indications suggest that motorcycles will continue to expand in numbers and become increasingly important for rural transport in the coming years. One of the biggest problems with rural transport is the lack of rural credit or capital for investment in means of transport. This is still the case with bicycles, which are expensive relative to rural incomes. Removing duties and taxes should increase bicycle ownership. In the case of motorcycles, urban capital is being invested in motorcycles, with people leasing them to operators (urban and rural). As a critical mass of rural motorcycles and repairers develops, it will become increasingly feasible for some rural people to buy second hand motorcycles themselves (eg, after the cocoa harvest). While there is some urban investment rural in taxis (in particular the travel firms), the economic model is different, with more capital required and more regulation (taxes, barriers). It is possible that the profitability of rural transport could change if low-cost Chinese vehicles (comparable to the motorcycles) were to become widely. However existing rural taxis are actually quite cheap to buy, as they are very old vehicles.

Informal payments made at control barriers contribute significantly to rural transport costs, and, in principle, improved governance (at all levels, and in all services) could eliminate these. The apparent efficiency of toll barriers suggest that this is possible.

The development of transport agencies, and their proven ability to raise standards and reduce prices along major transport routes provides a valuable model for rural transport. Ways of extending the process to routes with lower transport demand should be explored. Load consolidation appears practicable, if rural communities and transport agencies can agree appropriate prices and timetables. Regulatory mechanisms could involve making route licensing of popular inter-urban routes conditional on some service provision on less popular routes (perhaps with operator rotas). The tax system, considered a constraint for rural transport operators, could be used to provide incentives for those operating on difficult rural routes.

## Chapter 7: Rapid assessment of transport services in the Iringa Region of Tanzania

*summarised by Paul Starkey and Abdul Awadh*

### Introduction to the Iringa Region

The Iringa Region of Tanzania covers an area of about 59,000 sq km and has a population of 1,500,000. This represents about 6% of the country by area and 5% by population. It is divided into six districts comprising 33 divisions, 138 wards and 703 villages (see Table 7.1). It is a large and topographically diverse region stretching from central Tanzania to Lake Nyasa in the southwest (see Figure 7.1).

Table 7.1. The districts of Iringa with approximate population data (2002).					
District	Town	Area (sq km)	Villages	Households	Population
Iringa Rural	Iringa	20,576	109	56,680	246,000
Mufindi	Mafinga	7,123	133	66,060	283,000
Njombe	Njombe	10,668	210	98,830	420,000
Ludewa	Ludewa	8,397	73	27,730	129,000
Makete	Makete	4,128	98	27,670	106,000
Kilolo	Kilolo	7,881	77	45,340	206,000
Iringa Urban	Iringa	4,287	3	24,510	107,000
<b>Total</b>		<b>58,936</b>	<b>703</b>	<b>346,820</b>	<b>1,497,000</b>



*Figure 7.1. Sketch of Tanzania showing Iringa*

Iringa Region includes a dry plain to the north (altitude 600 m), a high plateau in the central part (1200-1600 m) and mountains in the south and southwest (altitude 1600-2700 m). Much of the land is agricultural (cropped and/or fallow) and there are large agro-industrial plantations in the central plateau, forestry plantations in the southwest and a large national park in the north. The climate is varied, with 500 mm of rain in the north, and up to 2000 mm of rain in the mountains. The main rainy season is November to May. Temperatures vary greatly with altitude, with relatively constant temperatures (18-28 °C) in the north but a more temperate climate, with frosts, in the southwestern mountains.

The economy of the region is based primarily on agriculture, with more than 80% of its population depending directly or indirectly on farming. The main food crops grown in the region are maize, sorghum, beans, rice, potatoes and vegetables, while cash crops include coffee, tobacco, sunflower and vegetables. Livestock kept include poultry, cattle, goats, sheep, pigs and a small number of donkeys. Other economic activities include service provision, trading, fishing, forestry, mining and tourism.



The region has 812 primary schools, 72 secondary schools and one university college. It has 13 hospitals, 28 health centres and 256 dispensaries, with the government providing about two thirds of these service. While census figures suggest the mean distances to secondary schools and hospitals are 13 km and 19 km respectively, people in rural areas are often far from such facilities, and find them difficult to access. While the main population centres have access to electricity, piped water and mobile phones, most rural households lack these facilities.

## **Some key observations and lessons learned**

### **Transport policy and regulatory environment**

Tanzania's policy on Rural Transport includes improvement of rural transport infrastructure, promoting the use of non-motorised transport, organising (through participatory approaches) the rural households to contribute to the improvement of the infrastructure and encouraging the private sector to participate in the provision of competitive and affordable rural transport services to rural communities. Tanzania's National Development Vision, National Strategy for Growth and Reduction of Poverty and Rural Development Policy all envisage improving rural infrastructure and transport to allow rural people greater access to markets and services.

While the national government retains responsibility for administering the road network, it has delegated the management of national and regional roads to a national roads authority (Tanroads) and district, feeder and community roads to local government authorities. A new category of 'community roads' may replace what have been called 'unclassified roads'.

A legal and regulatory framework exists for rural bus and minibuses services, which are licensed to operate to timetables on specific routes. They should not exceed 80 kph in rural areas. Rural taxis (such as old Land Rovers) are licensed to carry passengers on specific routes (where bus services do not operate) without timetables. Large trucks are not recognised as passenger service vehicles and are not regulated for routes or timetables. All vehicles have to have licenses, insurance and annual inspections. Non-motorised means of transport (bicycles and carts) are not generally controlled (although local regulations may be applied).

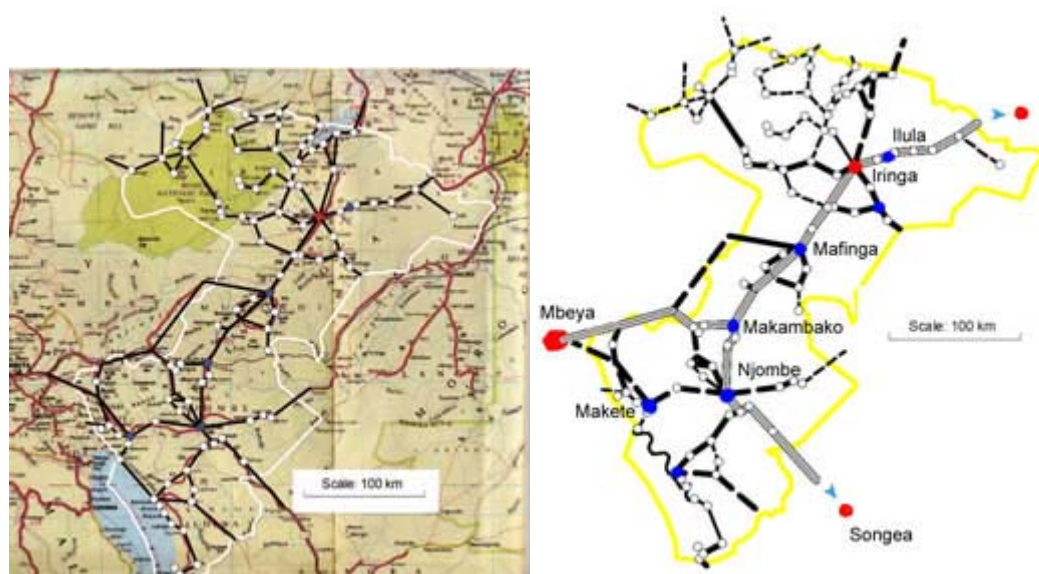
The enforcement of regulations is not strict, particularly in the more remote rural areas. Barriers are found on certain places for checking compliance with the regulations but operators and the enforcing officers often settle infringements with a small payment. While these are technically bribes, the amounts are generally quite small (Tsh 500 or USD 0.4), and the term used (*chai* or tea) indicates the informality of the system. There are relatively few barriers and transport operators seemed to accept the system without much complaint.

### **Road network and condition**

Running through Iringa are 875 kilometres of national trunk roads, including the paved TanZam Highway, the paved route to the south (Songea) and the unpaved road linking Iringa with the capital, Dodoma. The other roads are unpaved, and include regional (1030 km), district (2190 km), feeder (2340 km) and unclassified/community roads (1900 km). About 45% of the rural roads are considered to be in poor condition. While regional roads are 'all weather', some smaller roads are temporarily impassable in the rainy season.

In addition to the road network, there is the Tazara railway that passes through the region, providing important long-distance transport services. A relatively small number of people situated near the line use the railway to access regional markets and services. Iringa Region borders the large Lake Nyasa in the southwest and water transport is important for communities living on the lakeshore.

The trunk roads are important national and international transport corridors, and form a clear framework for the entire regional transport network. This is illustrated in Figure 7.2.



*Figure 7.2. Road and settlement patterns in Iringa, Tanzania*

*7a (left) Map showing Iringa Region in Tanzania with main roads and settlements.*

*7b (right) schematic representation of resulting hub and spoke systems. The grey roads joining the red (or grey) dots represent corridor transport (part of the national system). The top centre red (or grey) dot represents Iringa town, the major regional transport hub, and the blue (or dark grey) dots are the smaller, market town hubs.*

### **Transport hubs, services and regional fleet**

The main transport hubs in the region are the towns of Iringa, Mafinga, Makambako and Njombe. These towns are located in a line along the national trunk roads. They all have regulated bus terminals (managed by the local authorities) that are used by national transport services (express intercity buses) and regional transport. Makete is smaller hub connected by poor quality roads to the Njombe hub. Ilula is a small hub closely linked to Iringa along the national road. Almost all regular motorised transport services in the region travel to and from one of these hubs. Most vehicles operate from these hubs each day, but some travel to the hubs from outlying towns and villages. There are also some transport links to nearby hubs outside the Iringa Region (including Mbeya and Songea).

Buses (about 25, mainly old vehicles) and minibuses (about 45, more modern but well used) provide most of the public transport services. There are also about 30 rural taxis (very old Land Rovers and a few pickups and estate cars) and 75 trucks operating within the region. The trucks are particularly important for carrying goods (and some people) to and from the various periodic (daily, weekly and monthly) markets held in the region.

The main intermediate means of transport are bicycles. There are about 65,000 in use, and their numbers are increasing quite rapidly, partly as a result of cheaper Chinese bicycles now being available. They are found in all parts of the region, but numbers are low in the mountainous areas. They are used for personal mobility, marketing and transport services. Bicycle taxis and bicycle freight services are particularly common in the central plateau area around Makambako. Information from traffic counts suggested that more people use bicycles than any other form of rural transport. Bicycle journeys over 20 km are common and journeys of up to 50 km are not unusual.

Motorcycle numbers are very low, but may well increase in response to the availability of cheaper Chinese motorcycles. In much of the region, animal drawn carts are rare (due to topography, lack of tradition and lack of supply). Pack donkeys and donkey carts are locally important in some areas, notably in the flatter areas to the northeast of the region.

Rough estimates of the overall numbers of transport vehicles in use are given in Table 7.2. Due to the high numbers of intermediate means of transport, their total carrying capacity is much greater than motorised transport. In many rural locations, the total passenger-kilometres and tonne-kilometres carried by intermediate means of transport exceed that carried by motorised transport. Overall investment in intermediate means of transport is estimated at about six million dollars. In contrast, current investment in motorised transport services is only about one and a half million dollars.

<b>Table: 7.2 Estimates of the transport fleet operating in Iringa Region<sup>1</sup></b>			
<i>Transport type</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD million)</i>
Trucks	75	12000	0.9
Buses (20+ seats)	26	8000	0.2
Minibuses	45	4500	0.2
Rural taxis	32	2000	0.1
<b><i>Subtotal: Large motorised</i></b>	<b>180</b>		<b>1.4</b>
Motorcycles	250	900	0.2
Animal-drawn carts	8,000	200	1.6
Bicycles	65,000	60	3.9
<b><i>Subtotal: IMTs</i></b>	<b>73,000</b>		<b>5.7</b>
<sup>1</sup> Notes: rough order-of-magnitude estimates based on field observations. These figures are for vehicles mainly used for transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars. Values are based on the approximate investment made by the purchaser: most large motor vehicles used in the region were purchased when over ten years old, while most intermediate means of transport used in the region were purchased new.			

### **The supply of rural transport services and operator perspectives**

In Iringa region, clear supply-side links can be seen between infrastructure, transport quality, service frequency and cost. The fares charged vary with road quality as well as distance: for example, it may cost USD 2.0 to travel for 65 km on good road, but USD 1.5 to travel 35 km on a rough road. Communities along the paved trunk roads benefit from relatively frequent minibus services. On poorer roads, only rural taxis (Land Rovers, pickups), trucks and buses operate. For example, between Njombe and Makete, minibuses travel only on the well-graded road as far as Igunda. Land Rovers, large buses and trucks serve the more difficult section between Igunda and Makete. On the most difficult roads, there are often no regular public transport services at all.

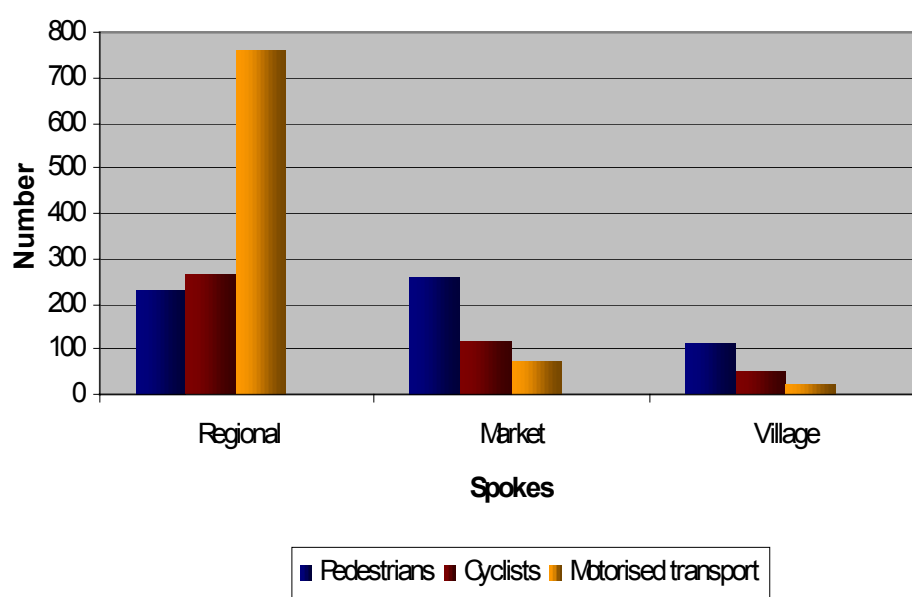
Operators of motorised transport consider poor road infrastructure to be the major constraint to their services. Poor roads increase journey times and wear and tear on vehicles. Most public service vehicles operating on poor roads are old, and operators say it is difficult to replace them, due to the low profitability of rural transport services. The low investment in rural transport vehicles contrasts with higher investment in the intercity services operating on paved roads (although there are major differences in the transport markets as well as road conditions).

Transport associations exist but are not very strong. Members are primarily bus operators who help to supervise services and loading at the main transport hubs. They complain that some

transport services (notably Land Rovers, pickups and trucks) are not so highly regulated, and therefore provide ‘unfair’ competition.

### Demand for rural transport services and user perspectives

Almost all rural people contacted considered lack of affordable motorised transport to be a serious constraint. It is common for women and men walk distances between 5 km to 20 km. Some people have to walk up to 40 km for the purposes of market access, work, education or even health care. Some walk because there is no alternative, but some walk because they can afford neither motorised transport, nor bicycles. In interviews, a wide range of people estimated that they spend about a quarter of their income on transport. The relative importance of walking, bicycles and motorised transport in Kilolo District is illustrated in Figure 7.3.



*Figure 7.3. Numbers of people using various transport modes on roads in Iringa*  
The histograms, derived from traffic counts, show the numbers of people travelling distances of more than five kilometres by motorised transport, bicycles or walking on regional spoke roads (between Kilolo and Iringa), market town roads (between Kilolo and the villages Lulanzi and Lukani) and village roads (to/from Lulanzi and Lukani). The counts were undertaken in the Kilolo District, a hilly area relatively unfavourable to bicycles and with little use of animal power.

Relative to much of the region, Kilolo is well-connected, being only 35 km from Iringa, with a daily bus service along the gravel road costing TSh 1200 (US\$ 1.1). Nevertheless, many users surveyed (men and women who were farmers, traders, students, employees, etc) were unable to make regular use of the transport services due to their high price relative to incomes. They expressed ‘demand’ for transport in terms of advantages to them (marketing, trading, health, social visits) but not at the existing prices. Even salaried employees (teachers) talked of walking long distances due to the relatively high cost of transport. The use of bicycles was cited as one solution, but the cost of bicycle purchase was considered beyond the incomes of most people, particularly as credit was not available to allow the bicycle to be paid over time.

One feature of motorised transport favoured by rural people was the relative reliability and predictability of rural buses on some of the routes. Because they operate to timetables, people know when buses are expected and can plan accordingly.

## **Gender issues**

Women are particularly affected by the poor rural transport situation. This is associated with their gender-related roles (greater responsibility for children's healthcare), their gender related financial and economic situation (less access to money) and their gender-related poor access to transport technologies. Women interviewed reported that they could not afford frequent journeys by motorised transport. Men own most intermediate means of transport and few women use bicycles. Some men and women considered this to be related to culture and tradition, but others said it was due to lack of access to bicycles (and to funds). In areas where bicycles are more common (such as around Ilula, Makambako and Njombe), the percentage of women riding bicycles seems to be increasing from a low level, suggesting greater overall adoption of bicycles may lead to increasing use of bicycles by women.

## **Transport for health**

Most rural people have to access health centres and hospitals by walking or using bicycles. Bicycles are used to transport some patients and government publicity posters illustrate a pregnant woman being pushed to hospital on a bicycle. Very sick people are carried on stretchers or local beds. For people living along routes with motorised transport, people may travel to hospital by bus or rural taxi (in very exceptional cases by ambulance). Public transport may also be used for transferring patients between health facilities. The high cost of using public transport to access healthcare is considered a constraint. Transport for old and handicapped people is particularly difficult, as these people cannot travel without the assistance of others. Few, if any, tricycles are available to allow such people to have mobility, and this may be associated with lack of supply, unaffordability and lack of appropriate infrastructure to allow tricycles to operate effectively.

## **Animal power**

In the plains to the northeast of Iringa, there has been a long tradition of using donkeys as pack animals (although total numbers in use has not been high). The Village Travel and Transport Project has recently introduced donkey carts into this area. The Makete Integrated Rural Transport Project introduced pack donkeys in the 1980s, and these have become well established. Ox carts are used in small numbers in several areas. While some farmers already own cattle, it is difficult for them to obtain and afford carts. The recent project initiatives suggest that animal power can contribute towards rural transport in Iringa, and that project activities (assistance with credit and the supply of animals and carts) can lead to new adoption and sustained use.

## **HIV/AIDS**

Levels of HIV/AIDS infection are high in some parts of Iringa Region, including Makete District. The reasons are complex and not fully understood, but may be linked to transport issues and temporary migration for work.

The system of monthly markets operating in the region may represent a risk. Some traders are young men who move from one market to another, spending nights in the various villages. It does not appear that there are specific campaigns to address this potential risk.

## **Conclusions**

Transport services in the Iringa Region are strongly influenced by the national trunk roads that pass through the region and provide a framework for the regional network. Motorised transport services in the region all operate to and from a series of transport hubs located at towns along the main transport corridors. The regional fleet of transport vehicles is both old and small (fewer than 200 public transport vehicles and trucks). The low investment in

regional transport is associated with low operational profitability, partly attributable to the poor state of secondary roads and partly associated with the low incomes of the rural population.

While efficient rural transport is considered a priority (in terms of national and regional policy), the only visible evidence for this is investment and gradual improvement in the rural infrastructure. It was widely agreed that the infrastructure is slowly improving and some transport problems decreasing. There exists a legal, regulatory and institutional framework for controlling rural transport services, but this is weakly enforced and little is done to stimulate or assist the development of improved motorised transport services.

While there have been some successful efforts to promote animal power for transport, there have been no attempts to promote bicycles or motorcycles. Bicycles are arguably the most important means of rural transport in the whole region, in terms of total private investment and day-to-day use for income generation and access to services. Bicycles and motorcycles are still expensive, relative to rural incomes and credit is generally unavailable. Removing import duties (currently 10% on bicycles and 25% on motorcycles) and VAT (20% on bicycles and motorcycles) would reduce the prices of these intermediate means of transport and allow more rapid adoption. Since intermediate means of transport are widely used as tools for income generation, increased economic activity in the region could offset the loss of tax revenue.

# Chapter 8: Rapid assessment of rural transport services in the Singida Region of Tanzania

*summarised by Paul Starkey and Abdul Awadh*

## Introduction to the Singida Region

The Singida Region in Tanzania covers an area of about 50,000 sq km and has a population of 1,100,000. This represents about 5% of the country by area and 4% by population. It is located in the centre of the country and is bordered by six other regions (see Figure 8.1a). Much of the region is undulating plateau (around 1000 metres high), with the higher (1500 m) Iramba plateau to the north. These both drop in the west to the Wambere valley.



*Figure 8.1a (left). Sketch of Tanzania showing Singida Region  
Figure 8.1b (right). Sketch of Singida Region showing rural districts*

The region is divided into three rural districts (Figure 8.1b). Iramba District includes the northern plateau, while Singida Rural includes much of the central area. The southern half of the region comprises the large but sparsely populated Manyoni District. The districts and their populations are shown in Table 8.1

<b>Table 8.1. The districts of Singida Region with approximate population data (2002).</b>					
<i>District</i>	<i>Town</i>	<i>Area (sq km)</i>	<i>Villages</i>	<i>Households</i>	<i>Population</i>
Iramba	Kiomboi	7,900	118	71,680	368,000
Manyoni	Manyoni	28,620	76	42,890	206,000
Singida Rural	Singida	12,164	133	78,490	402,000
Singida Urban	Singida	657	19	24,510	115,000
<b>Total</b>		<b>49,341</b>	<b>346</b>	<b>217,570</b>	<b>1,091,000</b>

The region comprises semi-arid savannah, smallholder farmland (planted and fallow) and woodland. Annual rainfall is 500-800 mm, with the higher rains in the more fertile northern plateau and quite dry and sandy conditions in the south, much of which is a nature reserve. The rains are concentrated in the period December to April. Temperatures are fairly constant, ranging from 15°C to 30°C depending on the altitude and season. The period from May to October tends to be dry, dusty and windy.

The region is quite poor with an economy based largely on small-scale mixed agriculture. Both men and women work the land using mainly hand hoes and animal traction. The main crops are maize, sorghum, millet, groundnuts, beans, rice, cassava and sweet potatoes. Cash

crops include sunflower, cotton, tobacco and onions. Cattle, donkeys, sheep, goats, pigs and poultry are raised. Oxen are used for plowing and pulling carts, while donkeys are mainly used for pack transport. Fishing is important in some localities, including the shore of Lake Kitangiri. There are few industries, and most non-agricultural employment is associated with markets, retailing and service provision.

The region has 411 primary schools and 32 secondary schools. It has nine hospitals, 14 health centres and 138 dispensaries, with the government providing about two thirds of these services. While census figures suggest the mean distances to secondary schools and hospitals are 10 km and 13 km respectively, people in rural areas may find such facilities far away and difficult to access. There are few towns in Singida Region, but they all have reliable electricity, piped water and mobile phone access. Most rural households lack these facilities and only 5% of families have mains electricity.

## **Some key observations and lessons learned**

### **Transport policy and regulatory environment**

Tanzania's policy on Rural Transport includes improvement of rural transport infrastructure, promoting the use of non-motorised transport, organising (through participatory approaches) the rural households to contribute to the improvement of the infrastructure and encouraging the private sector to participate in the provision of competitive and affordable rural transport services to rural communities. Tanzania's National Development Vision, National Strategy for Growth and Reduction of Poverty and Rural Development Policy all envisage improving rural infrastructure and transport to allow rural people greater access to markets and services.

While the national government retains responsibility for administering the road network, it has delegated the management of national and regional roads to a national roads authority (Tanroads) and district, feeder and community roads to local government authorities. A new category of 'community roads' may replace what have been called 'unclassified roads'.

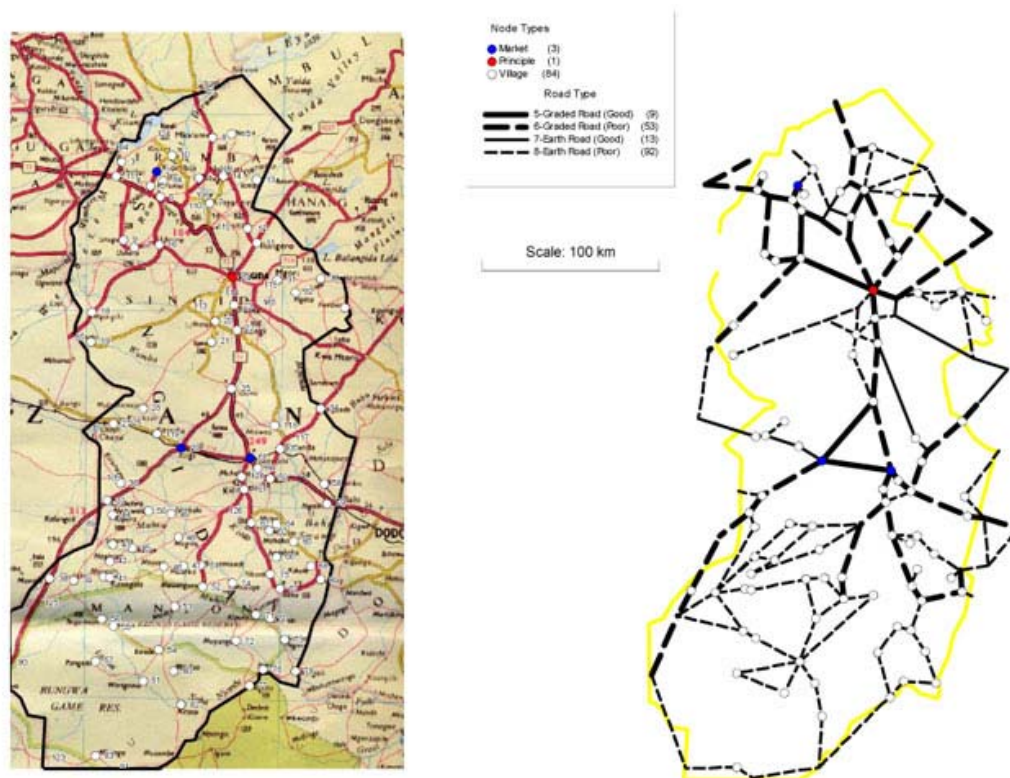
A legal and regulatory framework exists for rural bus and minibus services, which are licensed to operate to timetables on specific routes. They should not exceed 80 kph in rural areas. Rural taxis (such as old Land Rovers) are licensed to carry passengers on specific routes (where bus services do not operate) without timetables. Large trucks are not recognised as passenger service vehicles and are not regulated for routes or timetables. All vehicles have to have licenses, insurance and annual inspections. The enforcement of regulations is not strict, particularly in the more remote rural areas. Non-motorised means of transport (bicycles and carts) are not generally controlled (although local regulations may be applied).

### **Road network and condition**

Running through Singida are 602 kilometres of national trunk roads, including the major international transport corridor to that runs from Dar es Salaam to Burundi and Rwanda. This is in the process of being realigned and paved, but at the time of the survey it was rough and extremely dusty. Numerous large trucks and fuel tankers pass along this road, and there are also long distance buses.

The other national routes are unpaved and connect Singida with Arusha (to the northeast) and Mbeya (to the southwest). All other roads are unpaved and the network comprises regional (797 km) and district and feeder roads (2152 km). The national and regional roads are passable throughout the year. About 50% of the district and feeder roads are considered to be in poor condition, and some become impassable in the rainy season. Figure 8.2 illustrates the road network.





*Figure 8.2. Singida Region showing settlements (left) and the hub and spoke systems of the roads (right)*

### **Rail and water transport links**

In addition to the road network, a railway line passes through the region in the south (Mayoni, Itigi) with a branch to Singida town. This provides important long-distance transport services linking the region with Dodoma, Dar es Salaam, Tabora and many onward connections. The Singida line has three trains a week, and these trains link Mayoni (district town) to Singida (regional town) as well as providing longer distance travel opportunities. Some people in the villages served by railway stations are able to benefit from rail transport to access markets and healthcare, although most travel by road.

Around Lake Kitangiri, in the north of the region, small boats are important for fishing and for linking with the communities situated across the lake (in Shinyanga Region).

### **Transport hubs, services and regional fleet**

The main transport hubs in the region are district towns of Singida, Manyoni and Kiomboi (in that order) all of which have transport terminals regulated by the local authorities. Almost all motorised transport services within the region start or finish at one of these towns. Shelui (northwest on the trunk road to Shinyanga and Burundi) and Itigi (central west on Mbeya road) are smaller hubs without formal transport terminals. Singida is the main transport hub, and at its bus station, controlled by the local authorities, are both inter-regional long-distance bus services and local services within Singida Region. Mayoni is a major stop on inter-regional routes as well as a hub for local transport. Some inter-regional services, notably to Dodoma, originate from Mayoni. Kiomboi is not on a main road and is a much smaller transport hub. Its official transport terminal is under construction. Transport links between Iramba District and Arusha are quite strong, and routes do not pass through Singida town. This provides a good example of communities that 'face two ways' in transport terms (with strong trading linking with Arusha as well as Singida).

Trucks (about 30), buses (about 17, mainly old vehicles) and rural taxis (about 25, mainly old Land Rovers and a few pickups) and minibuses (about ten) provide most of the rural transport services that operate within the region. The number of minibuses is low, and this probably reflects the poor condition of the roads. The trucks are particularly important for carrying goods (and some people) to and from the various periodic (daily, weekly and monthly) markets held in the region.

The main intermediate means of transport are bicycles. There are about 60,000 in use, which is about one bicycle per four households. Their numbers are increasing quite rapidly, partly as a result of cheaper Chinese bicycles now being available. They are found in all parts of the region and are used for personal mobility, marketing and transport services. Some bicycle taxis services have recently started, linking villages on feeder roads with transport services on major roads. Information from traffic counts suggested that more people use bicycles than any other form of rural transport. Bicycle journeys over 10 km are common and journeys of up to 50 km are not unusual. Only a few motorcycles are used, due to their high cost. Numbers may well increase in response to the recent availability of cheaper Chinese motorcycles.

There are estimated to be about 13,000 animal-drawn carts (one per fifteen rural households). Two, four or even six oxen pull these carts. Some people use pack donkeys and there are a small number of carts operated by donkeys using technologies similar to those with oxen (central cart shaft and yokes).

Rough estimates of the overall numbers of transport vehicles in use are given in Table 8.2. Due to the high numbers of intermediate means of transport, their total carrying capacity is much greater than motorised transport. In many rural locations, the total passenger-kilometres and tonne-kilometres carried by intermediate means of transport exceed that carried by motorised transport. Overall investment in intermediate means of transport is estimated at about six million dollars. In contrast, current investment in motorised transport services is less than one million dollars.

<b>Table: 8.2 Estimates of the transport fleet operating in Singida Region<sup>1</sup></b>			
<i>Transport type</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD million)</i>
Trucks	30	12000	0.4
Buses (20+ seats)	20	8000	0.2
Minibuses	10	4500	0.1
Rural taxis	25	2000	0.1
<b><i>Subtotal: Large motorised</i></b>	<b>85</b>		<b>0.8</b>
Motorcycles	160	900	0.1
Animal-drawn carts	13,000	200	2.6
Bicycles	60,000	60	3.6
<b><i>Subtotal: IMTs</i></b>	<b>73,000</b>		<b>6.3</b>
<sup>1</sup> Notes: rough order-of-magnitude estimates based on field observations. These figures are for vehicles mainly used for transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars. Values are based on the approximate investment made by the purchaser: most large motor vehicles used in the region were purchased when over ten years old, while most intermediate means of transport used in the region were purchased new.			

### **Demand for rural transport services and user perspectives**

Most rural people are farmers and a major transport need is for selling produce. Many sales take place in periodic markets, and produce is generally carried to market by headload, bicycle or ox cart. Traders in trucks visit the markets, and at harvest times they may also visit

villages. Most people live close to small clinics and primary schools, but have to travel further to hospital and to secondary schools. People living on main transport routes may travel by bus or rural taxis, but most people in the villages will have to reach a main road by walking or travelling on bicycle (as rider or passenger). Major reasons given for travelling by motorised transport include trading, family visits, obtaining goods and spare parts and for health treatment.

The main reasons given for not taking motorised transport were lack of affordability (it was cheaper to walk or to cycle) or lack of motor transport (there were few transport services on the small roads). Many pedestrians (women and men) said they would have preferred to travel by bicycle, but they did not have access to one.

The traffic counts carried out in Iramba District illustrated the pattern of transport supply and demand in the region. On all roads, very many people travel by foot and by bicycle. On all spokes, bicycles are numerically most important, but the large capacity of buses means that the majority of people on regional spokes travel in motorised vehicles. There are very few motorised vehicles on the market and village spokes. This is shown in Figures 8.3 and 8.4 and Table 8.3. Of 1000 pedestrians counted on all spokes, about 60% were women, but of 900 cyclists counted, only 7% were women. No women motorcyclists were counted.

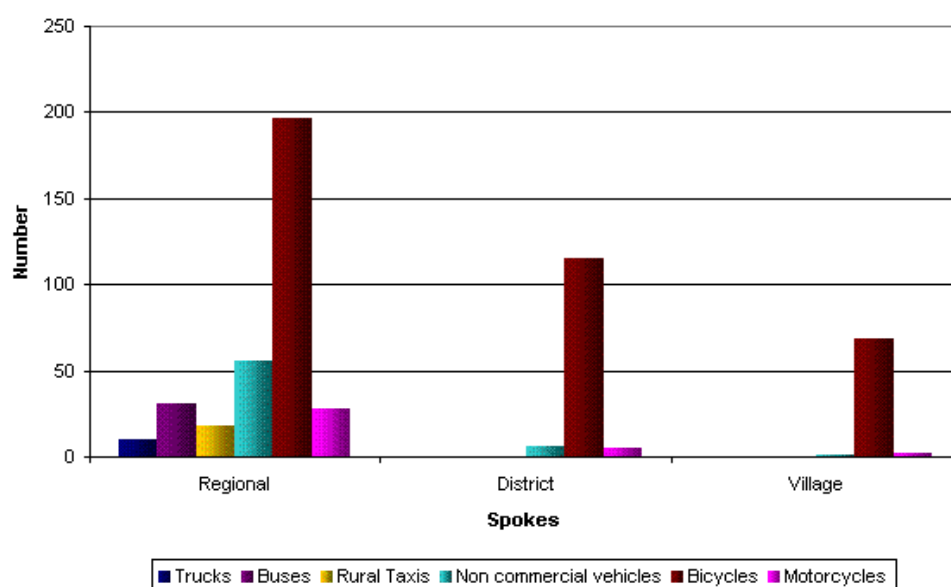


Figure 8.3. Summary of traffic counts on regional, district and village spokes in Iramba District

<i>Traffic type</i>	<i>Regional spoke</i>	<i>Market spoke</i>	<i>Village spoke</i>
Trucks	10	0	0
Buses (more than 20 seats)	17	0	0
Rural taxis (including mini bus)	25	2	4
Government, NGO and private vehicles	31	4	1
Pack donkeys	11	4	8
Animal drawn carts	10	1	2
Bicycles	336	115	68
Motorcycles	28	6	2
Pedestrians	220	84	94

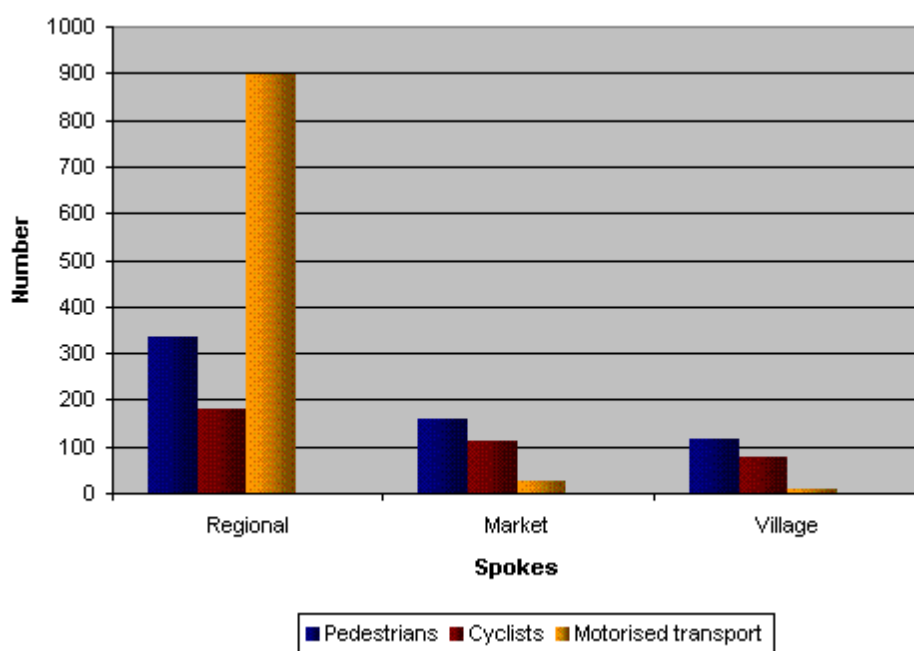


Figure 8.4. Summary of passenger journeys by motor transport, bicycle and walking on regional, district and village spokes in Iramba District

### The supply of rural transport services and operator perspectives

The total number of transport service vehicles operating in the region is small (fewer than 100) and all are old. Many are more than 20 or 30 years old. Most operators claim that the profitability of transport is low, and so old vehicles cannot be replaced. Buses operate to timetables and are expected to depart on schedule, whether or not they are full. Old Land Rovers act as rural taxis on fixed routes but no timetables. They are generally overloaded, often with people on the sides and roofs. Some trucks travel regularly to various markets, carrying vendors and their wares. Some also carry agricultural produce and livestock. Loads are piled high and many people ride on top.

A transport association exists in Singida town and helps regulate loading, but it is not officially recognised. The main concern of transporters is the poor state of the roads and the price of fuel. Official regulations and occasional control barriers are not seen as a serious constraint. Barriers are found on certain places for checking compliance with the regulations but operators and the enforcing officers often settle infringements with a small payment. While these are technically bribes, the amounts are generally quite small (Tsh 500 or USD 0.4), and the term used (*chai* or tea) indicates the informality of the system.

### Markets transport and HIV/Aids

Throughout the region, there are periodic markets, some weekly and some monthly. While agricultural produce and livestock are sold in parts of the markets, the markets are now dominated (in terms of sales area) by the sale of inexpensive clothing and household items. Traders also sell spare parts for bicycles. As an example, about 2000 people attend the monthly market in Gumanga village. Three quarters of these arrive on foot and about 350 travel by bicycle. The traders (about 150 in total) are mainly young men who travel to the market in several trucks and one old Land Rover.

Vehicles leaving from Singida serve some markets through day trips. Other markets are supplied by small convoys of several trucks that travel around a circuit of markets. The itinerant system means that traders sleep in a different villages after each market. This presents an HIV/Aids risk that does not appear to have been addressed yet, as there are no

obvious signs of awareness campaigns linked to the markets. A schematic diagram of a market circuit is shown in Figure 8.5.



*Figure 8.5. Schematic example of travel routes (blue lines) used to supply markets (M). The markets to the east and west of Singida are served by day trips, but the markets to the north in Iramba District are supplied in a circuit, with the trucks and their traders staying in the villages.*

## **Bicycles**

Bicycles are the most common and most versatile intermediate means of transport, and their numbers are increasing. On some rural roads, one can see smooth cycle routes worn by numerous passing bicycles. Bicycles carry a wide range of goods, and some carry passengers. Some people earn their livelihoods by transporting goods (fish, fuel wood, grains) or through itinerant services (mobile tailors, traders, repairers). Bicycle taxi services are a relatively recent development and they currently appear to be spreading.

Imported bicycle prices have been dropping in recent years, although at USD 80 for a Phoenix from China they are still expensive for rural people. Rural people have invested more than three million dollars in the purchase of bicycles (around five times the value of the motorised transport fleet). Many more people (including women) would buy and use bicycles if they were cheaper.

## **Transport for health and for marginalised people**

With so little motorised transport circulating in Singida, most people access health care by bicycle or on foot. A ministry of health poster shows a man pushing his pregnant wife on a bicycle to a health clinic. A blind woman interviewed was being taken 40 km by bicycle for eye treatment. A man with a bad leg was able to visit the local town on the back of a bicycle. There do not seem to be any tricycles for handicapped people: this seems to be due to their high cost, lack of local supply and rough infrastructure that is not well adapted to such technologies.

## Conclusions

Travelling around Singida Region, one is made aware of the number of women and men without any means of transport, who are walking long distances, often with significant loads. These people need greater access to bicycles and to motorised transport services, in order that they can better reach markets and health services. Removing import duties (currently 10% on bicycles and 25% on motorcycles) and VAT (20% on bicycles and motorcycles) would reduce the prices of these intermediate means of transport and allow more rapid adoption.

People agree that the biggest problem is the poor infrastructure. There are long-term strategies in place to decentralise, prioritise and improve road maintenance practices. In the short term, existing bad road conditions discourage the private sector to provide rural transport services. High operating costs are passed onto passengers, and fares on bad roads are higher than those on good roads. A 30 km journey on a bad road in Singida costs about one dollar while a comparable journey on a good road might cost only forty cents. The high cost reduces demand, and perpetuates a vicious circle of high cost and low demand and little investment in the aging transport fleet.

There is a legal, regulatory and institutional framework controlling rural transport services. However, the enforcement of the regulations is weak so that unsafe practices are tolerated in rural areas.

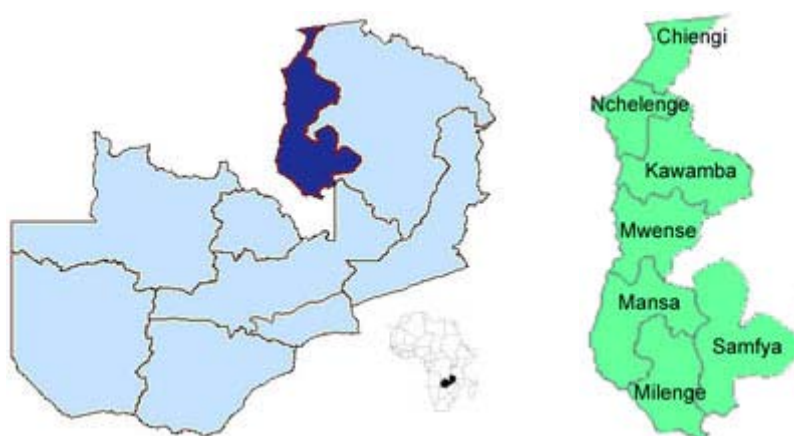


## Chapter 9: Rapid assessment of transport services in Luapula Province, Zambia

*summarised by Paul Starkey and Henry Musonda*

### Introduction to Luapula Province

Zambia has an area of about 753,000 sq km and a population of about 11 million. Luapula Province in the north represents about 7% of the country, both in terms of area (50,600 sq km) and population (800,000). Luapula is located between Zambia's Northern Province (to the east) and the Democratic Republic of Congo (to the west). The Provincial town of Mansa (population about 42,000) lies approximately 700 km from Lusaka, the national capital. The location of Luapula is shown in Figure 9.1 and the seven districts are listed in Table 9.1.



*Figure 8.1. Sketch of Zambia showing Luapula Province (left) and sketch of Luapula showing Districts (right)*

<b>Table 9.1 The seven districts of Luapula Province, Zambia</b>	
<i>District</i>	<i>Population</i>
Mansa	180,000
Samfya	164,000
Nchelenge	111,000
Milenge	29,000
Kawambwa	103,000
Mwense	106,000
Chiengi	84,000
<b>Total (Luapula)</b>	<b>775,000</b>

The province is quite flat, being on a plateau about 1500 metres above sea level. Rainfall is 1100 to 1500 mm, with the rainy season lasting from November to March. Annual mean temperatures are around 24 °C.

Population densities are low. Communities are small and tend to be concentrated along roads, lakeshores and rivers. About one quarter of the province is covered with water, including Lake Mweru, Lake Bangweulu, the Luapula and Chambeshi rivers and several large swampy areas. The rest of the province comprises grassland and open woodland. Fishing is the main economic activity in the province and is central to many livelihoods (fishing, fish processing, trading and support services). While it is men who fish, both women and men are involved in

fish marketing. To protect fish stocks, from December to March there is an annual prohibition of fishing. During this period, the whole economy of the province contracts noticeably. The other main activity is small scale, rain-fed farming, growing mainly cassava, maize and beans. Apart from household poultry, there are few livestock, and without readily available cattle or donkeys, there is very little animal traction.

The whole of the western boundary of Luapula is an international frontier with the Democratic Republic of Congo, separated by Lake Mweru in the north and the Luapula River in the south. While small boats are used all along the boundary for informal cross-border trade, little traffic passes through the small number of formal frontier crossing points.

The province has 325 government primary schools, 35 secondary schools, 102 health centres and six hospitals. The province as a whole has ample electricity (with local hydro-electrical stations). All seven of the district towns are connected to the grid, as well as some villages close to pylon lines. Most villages do not have electricity. Six of the seven district towns are connected to the land line telephone system, but Milenge does not have telephone connections. Mobile telephone systems are gradually being installed in the main towns (at the time of the survey only Mansa and Nchelenge were connected).

## **Some key observations and lessons learned**

### **Transport policy and regulatory environment**

Zambia's Transport Policy, launched in 2003, has established three agencies under the Ministry of Transport. The Road Development Agency is responsible for the infrastructure and the Road Maintenance Initiative. The National Road Fund Agency supervises the raising and disbursement of funds for road construction and maintenance. The Road Transport and Safety Agency is responsible for regulating traffic and promoting safety. To date, emphasis in Luapula has been on improving infrastructure with no specific programme for stimulating rural transport services. While there are regulations concerning public transport vehicles, there is little enforcement in rural areas. The national Poverty Reduction Strategy envisages improved rural mobility, primarily through improved infrastructure. The Rural Access and Mobility Programme (RAMP) will soon start a ten-year programme that will include investments in small-scale infrastructure and waterways. This programme will also promote intermediate means of transport, building on five small pilot district-level projects (none of which was in Luapula Province).

National policies concerning HIV/Aids include publicity and awareness posters, and these are clearly evident on roadside signboards and notice boards in public buildings throughout Luapula province.

There used to be national associations of transporters and users (United Transport and Taxis Association, Bus Driver and Motor Taxis Association and Passengers Transport Association). These were all 'deregistered' in 2003 as destabilising influences on the country following protests over fuel price increases. Since then there has been no legal framework for transport associations, and no associations exist in Luapula. New guidelines for transport boards to represent transport interest groups were drawn up in 2005.

The two large lakes each have a water transport board. These are responsible to the Department of Maritime and Inland Water Transport of the Ministry of Communications and Transport for regulating water transport. While safety regulations exist relating to service provision, life preserving devices, fire extinguishers, etc, these are not actually enforced. Enforcement would prohibit almost all existing transport services.



## Road network and condition

The road network is based on a central spine of good quality paved road. This includes the national road that links Lusaka with Mansa and continues north to Nchelenge (on Lake Mweru). There is another paved road linking Mansa with the border with the Democratic Republic of Congo (DRC) and the ‘shortcut’ route to the Zambian copperbelt (Mufulira, Kitwe and Ndola) via the unpaved ‘pedicle’ road. The rest of the network comprises about 2250 km of unpaved provincial and local roads, two thirds of which are considered by all concerned to be in poor condition. This is summarised in Table 9.2 and illustrated in Figure 9.2.

<b>Table: 9.2 Estimates of road type, condition and distance in Luapula Province <sup>1</sup></b>				
<i>Road type and general condition</i>	<i>National km</i>	<i>Provincial km</i>	<i>Local km</i>	<i>TOTAL km</i>
Wide tar (good)	250	330	35	615
Wide tar (poor)	0	0	32	32
Engineered (good)	0	0	158	158
Engineered (poor)	0	0	2093	2093
<b>Total</b>	<b>250</b>	<b>330</b>	<b>2318</b>	<b>2898</b>

<sup>1</sup> Estimates based on Road Development Agency information and field observations.

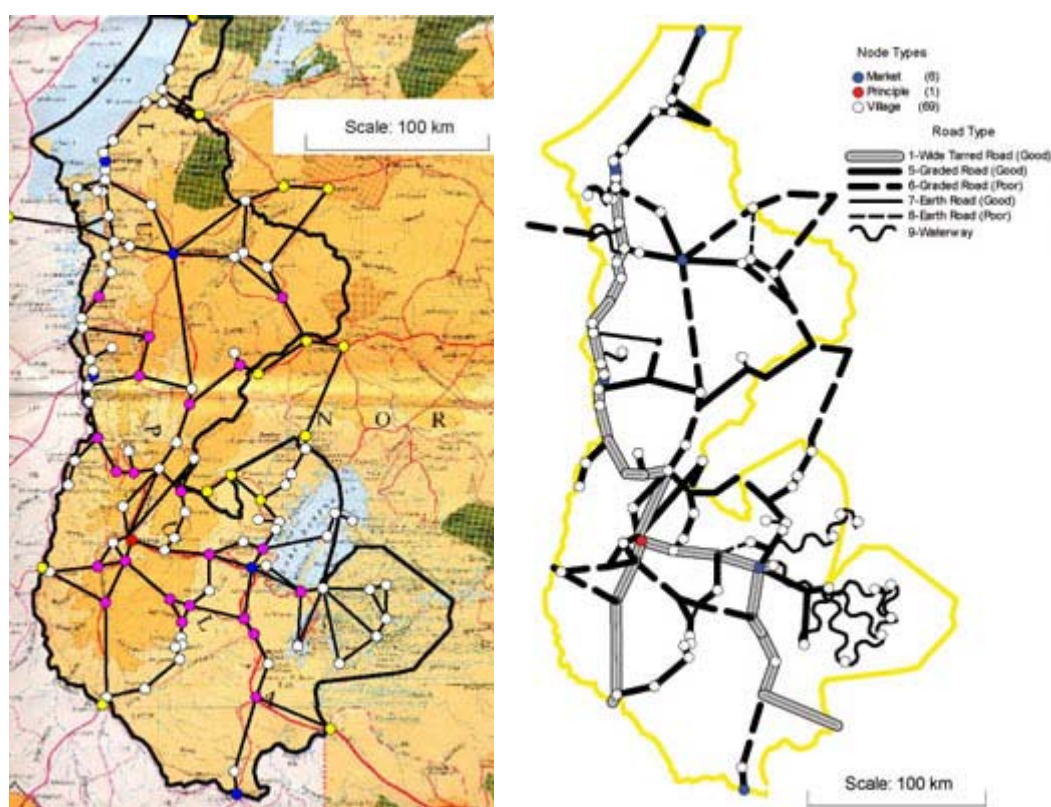


Figure 9.2. Luapula Province showing settlements (left) and the hub and spoke systems of the roads (right)

There is a huge contrast between the good quality paved roads and the rest of the network. Most people contacted (government, transport operators, transport users) considered that road conditions were deteriorating, with rough uneven surfaces that were slippery when wet and sometimes impassable. As a result, it was generally agreed that transport services were

declining, and were only reliable on the main tar spine road. There were some specific problems of failed bridges and culverts. In one extreme example, the lack of a bridge at one location with the Milenge district makes the direct 60 km road from Milenge to one health centre impassable, and the only motorable route involves travelling over 500 km via Mansa.

### Transport patterns: hubs, spokes and corridors and regional fleet

Although Luapula has a long international border, this does not greatly affect traffic movements. Most cross-border trade between Zambia and the Congo takes place through the Copperbelt Province. A small number of copper-bearing trucks from Congo transit through Luapula. Most other trading with the Congo involves individuals using small boats, bicycles or rural taxis to carry fish, agricultural produce or goods.

In terms of national transport, express buses operate to timetables along the main paved road from Mansa, Samfya, Mwense and Nchelenge to Lusaka and the Copper Belt. Commercial trucks carrying fish also operate along these routes. Relatively little traffic uses the pedicle road to the Copperbelt, as it is not paved and there are many control barriers that can cause delays and aggravation.

Transport services that operate within the Luapula Province do so from a small number of transport hubs of which the provincial capital Mansa and the fish ports of Samfya and Nchelenge are the most important. A small number of vehicles (rural taxis and light trucks) operate from Kawambwa, Mwense and Chiengi. Although Milenge is the headquarters of a new district, it is not yet a transport hub, and there are no motorised vehicles that operate regular transport services from there.

Almost all the regular motorised transport movements in the province take place along the main paved road, and on the short side roads that link the paved road to fish markets or small towns (Chiengi and Kawambwa). The other roads are largely devoid of motorised rural transport services and any vehicles that do pass generally belong to government services or NGOs. Only about 200 transport service vehicles regularly operate in Luapula, and most of these are quite old. This is summarised in Table 9.3.

<b>Table: 9.3 Estimates of the land transport fleet operating in Luapula<sup>1</sup></b>			
<i>Transport type</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD million)</i>
<b>Trucks</b>	50	13000	0.6
Buses (20+ seats)	15	13000	0.2
Minibuses	65	7500	0.5
Rural taxis	65	7500	0.5
<b>Subtotal: Large motorised</b>	<b>200</b>		<b>1.8</b>
Motorcycles	12	2000	0.0
Animal-drawn carts	0	250	0.0
Bicycles	80,000	90	7.0
<b>Subtotal: IMTs</b>	<b>80,000</b>		<b>7.0</b>

<sup>1</sup> Notes. Rough order-of-magnitude estimates and rounded values based on field observations. These figures are for vehicles mainly used for transport of people and goods within the province on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars. Values are based on the approximate investment made by the purchaser: most large motor vehicles used in the region were purchased when over ten years old, while most intermediate means of transport used in the region were purchased new.

Traffic counts on the different types of road illustrated the low levels of transport, and the importance of the fish trade. On the provincial spokes, there were 70 motorised vehicles and

several hundred bicycles a day on a 'fish' spoke but only four motorised vehicles and 25 bicycles on a long-distance 'agricultural' spoke (a road not associated with fish marketing).

### **Water transport infrastructure and services**

Water transport in Luapula Province is extremely important and can be separated into two distinct systems of transport: large scale and small scale. The small-scale transport comprises large numbers of small boats (often called banana boats) made of wooden planks or fibreglass, and some simple dug out canoes. These are used for fishing and for transporting people and goods across rivers and the large lakes. They provide transport services for the communities living on the islands, the lakeshores and those swampy areas served by small waterways. A few boats have outboard motors, but most have paddles and/or long poles. These can take one or two days to reach their destinations, and as a consequence many of the communities served by rural waterways are extremely isolated from national and provincial services. A traffic count on a waterway approaching a village-based fish market recorded about 100 boat passes a day, about half of which were small boats (carrying up to three people) and half were larger boats (carrying an average of about 16 people). None of these were motorised. There is almost no infrastructure provision for small craft, and the banana boats operate from beaches near the towns and settlements they serve. The banana boats are very vulnerable in open water during rough conditions and storms. Operators complained of the lack of supply of fibreglass boats and the difficulty of obtaining fibreglass, resin and repair services in Luapula. At present, fibreglass boats costing ZK 7 million (US\$ 1500) are bought from Kafue (700 km).

The large-scale water transport comprises a small number of large steel motorised boats, providing passenger and freight ferry services. They are operated by the two governmental (parastatal) organisations, the Bangweulu and Mweru Water Transport Boards. The Bangweulu boat (almost 50 years old) is based at the small port constructed at Samfya and provides a passenger and freight service to the islands of Mbabala, Chishi and Chilubi. The service makes an operating loss and its budget is not sufficient to allow full compliance with all safety regulations. The boats of the Mweru Water Transport Board should operate from the small port at Nchelenge and serve the communities living on the Mweru islands. The old boats are no longer in active service, but two new ferries are due to be obtained soon. As there are no large-scale motorised boats on Lake Mweru, informal sector 'banana' boats provide the only transport services to the various island communities. Although such services are unofficial, government officers (health, education, security, revenue, legal) have to use them whenever their duties take them to the islands.

### **Intermediate means of transport: importance of bicycles**

Bicycles are the main land-based intermediate means of transport, and they are extremely important for rural transport, carrying people and goods. Although the price of bicycles has been high (ZK 450, 000 or USD 95) there are estimated to be about 80,000 in use (representing a capital investment of seven million dollars). However many rural households that require bicycles do not own them due to their price and the lack of credit to acquire them.

Bicycles are used for personal mobility, for trading and for providing services to other people. Some young men make their living by providing full-time rural taxis services using bicycles. Other bicycle-owning people will assist their neighbours by providing occasional lifts (sometimes paid, sometimes as a favour). Sometimes women or men with loads (fish, produce, goods) will hire two or three bicycle taxis to carry them and their loads.

The distances regularly travelled by bicycles can be great. For example:

- Mulunda-Kawamba (76 km each way). Teachers cycle this distance each month to collect salaries. Other people needing access to the town (selling produce, trading,

administration, bank, medical, legal and social reasons) commonly hire cycle taxis (ZK 25,000 or USD 6 each way) as there are no regular motorised taxis on this route.

- Mpanta-Samfya (48 km), Mpanta-Mansa (128 km). Several bicycle taxis operate on these routes, carrying people and loads of fish. The charge is ZK 10,000 (about USD 2) for Mpanta-Samfya on an earth road with little traffic. To take people and fish all the way to Mansa costs ZK 25,000 (about USD 5). The journey from Samfya to Mansa is along the main tar road, where rural taxis operate but are infrequent.
- Milenge-main-road (74 km). Milenge-Mansa (160 km). In the absence of motorised transport, bicycle taxis are the main way of travelling from Milenge to the road junction (cost ZK 15,000, about USD 3). It is not unusual for people to cycle to Mansa for salaries or other business.
- Milenge-Ndola (130 km). Traders regular cycle to the Copperbelt, passing through the Congo. It is estimated that over 10,000 such trading trips are made each year.
- Nsemiwe-main-road (12 km) and Nsemiwe-Nchelenge (28 km). In the absence of motorised transport, almost all movement of people and goods is by foot, bicycle or bicycle taxi. Bicycle taxis to the main road cost ZK 10,000 (about USD 2.5) but most people take the cycle taxis to the provincial town (cost ZK 25,000 about USD 5) as motorised services along the road are infrequent and expensive.

Bicycles are used for a variety of purposes and are perceived by rural people as important means of livelihood. For example, women in an isolated village argued that if they could obtain bicycles, they could sell agricultural produce, make goods for sale and trade and so earn a reasonable income. In this village, only some men (including a teacher, cycle taxi operators and long-distance traders) owned bicycles. The nurse who visited for the under-fives clinic arrived by bicycle each month. A handicapped person was only able to travel outside the village on the back of someone's bicycle. Transport to hospitals is normally on bicycle, except in extreme cases when someone has to cycle to fetch a motorised ambulance. Bicycles have become vital to the economy of the village, but everyone agrees that more are needed.

Most bicycles are of the roadster type without gears. People find these cheaper to operate, with lower repair costs. A repairer confirmed this by pointing out a high proportion of his income came from repairing gears, even though most bicycles did not have gears.

There are very few motorcycles in use. A small number of government agents use motorcycles in their duties, but there are not yet any private sector transport services based on motorcycles. In some other countries (notably Nigeria and Cameroon), the use of low cost Chinese motorcycles has increased rapidly, providing valuable rural transport services. Given the long distances currently being undertaken by bicycle taxis, and the amounts people appear able to pay, there may well be a niche for motorcycle taxi services in Luapula Province.

As there are very few cattle and even fewer donkeys, there is no significant use of animal drawn carts at present. While animal power could have a role in some of the villages, there seem no immediate prospects of promoting the widespread use of animal-drawn carts.

### **Transport for health and education**

All persons contacted (teachers, medical staff, patients and pupils) agreed that the scarcity of rural transport in Luapula Province was a major constraint. Schools and health centres had problems obtaining supplies, and pupils, patients and staff had problems travelling to and from schools and health centres. Staff often had to be absent for at least two days a month to travel to collect salaries. There were some good emergency ambulance services, but most people travelled to health care by foot or on someone's bicycle. Transport problems lead to deaths not only due to failure to access medical treatment in emergencies, but also failure to return for routine treatment (especially TB). People suggested that better roads, more

motorised transport services (including motorcycles and motorised boats) and more bicycles could improve the situation. Better rural banking services and better telephone services would also help the schools and rural health centres.

### **Population movements towards roadsides**

For the past forty years, there has been a steady migration of people from villages to live alongside the main paved road that runs through the province. People want to be on the roadside, and not simply close to the road. This has led to the creation of linear villages, with a single row of houses on each side of the road. Along the main road, there are areas with almost continuous strip settlement for over 30 km. While these are administered as independent villages (with their own primary schools, village stores and churches) there is often no open land separating them. One reason cited for the movement was that electricity is now available along much of the road, but this does not explain the linear nature of the settlements. Roadside trading and access to motorised transport is easy from roadside houses, but neither of these are particularly common. People do make use the main road for walking, cycling and socialising, creating 'village high streets' stretching for tens of kilometres along a national trunk road. Although traffic volumes are not great, the local use of the paved road raises very many safety issues, with clear conflicts of interest between the residents and fast-moving traffic.

From the point of view of transport services, the linear settlements along the main roads mean that this significant proportion of the rural population has easy access to the small number of rural taxis that stop on demand and also to bicycle taxis that operate along the paved roads.

### **Infrastructure for bicycles**

Bicycle operators (private individuals and bicycle taxis) travelling to towns complained that it was difficult to find secure parking for bicycles. On one major cycle route (Milenge to the main road, 76 km) a local house at the main road junction now provides secure parking for bicycles (for a small fee). This allows people to cycle to the main road, and then take motorised transport to Samfya, Mansa or Lusaka. Further secure parking facilities for bicycles close to markets and transport terminals would encourage greater use of bicycles and the integration of motorised and non-motorised transport systems.

### **Safety**

There are significant safety issues relating to rural transport in Luapula. As noted above, the main paved road is now used as a series of village high streets lasting for tens of kilometres, with numerous pedestrians as well as cyclists. There are few traffic calming measures and as traffic levels are low, pedestrians and cyclists may be lulled into a false sense of security.

Along both the paved roads and small district roads, tall grass grows and overhangs the road. Eventually, all grass is cut manually, but before it is cleared the effective width of the road is greatly narrowed. Pedestrians and cyclists are unable to stay close to the road edge, and this risk is compounded by greatly reduced visibility for motorised vehicles.

As in most remote rural areas, trucks are commonly used to transport passengers. Most trips are concluded safely, but the occasional horrific accident illustrates the potential danger of such transport. In 2005, an open truck carrying 110 secondary pupils turned over on a hilly bend 17 km from Kawamba, and 45 students were killed.

Most bicycles in use lack effective brakes. Some cyclists use their feet to brake, and some try to turn the bicycle towards an upward slope. Emergency braking often involves falling off the bicycle. Brake blocks are expensive (ZK 14,000 or USD 2 in Mansa) and this is given as one

reason for lack of effective brakes. While many cyclists operate with due respect for motorised transport, some cause accidents by paying inadequate attention to fast moving traffic.

The banana boats are the main means of water transport on the lakes and rivers. In calm conditions and with small to medium loads they are very safe and stable. The lakes can get quite choppy on normal afternoons, and during storms and squalls conditions can be very dangerous, particularly if boats are heavily laden. Officially, for reasons of safety, banana boats are not permitted to operate commercial transport services. In practice, most water based rural transport services do use banana boats, as there are no real alternatives at present.

### **Non transport solution: ice plants to allow load consolidation**

Time is of the essence for marketing fresh fish and this leads to transport problems. The problem is particularly serious for those with small loads of fish who cannot afford to arrange immediate transport by motorised vehicles. Such people sometimes hire three or four bicycles to transport the fish to a market (perhaps 35 to 120 km away). If there were simple ice plants in the main locations where fishermen land, the fish could be preserved in good condition until the combined load was sufficient to justify motorised transport.

### **Operator perspectives and cost of rural transport services**

All operators of motor transport complained of poor profitability and low economic demand. The more profitable services seemed to be the light trucks operating on fish routes. One private truck had tried to operate three times a week on the Milenge-Mansa route, charging ZK 25,000 (about USD 5) to the main road (74 km) and ZK 45,000 (about USD 10) to Mansa (240 km). The businessman had not found this profitable and so moved his vehicle to operate on a tar road serving a fish market.

Minibus do not operate to timetables, but generally wait for a full load. They claim they need the income from all passengers to cover their costs (and this is the case when owners insist the drivers always submit funds based on a full load). Minibus operators object to the passenger services offered by light trucks. Fish traders hire the trucks which depart as soon as the fish is loaded. However passengers are also taken (from terminals and along the road). This improves transport availability (but not comfort) for those passengers in the trucks, but takes away passenger from the rural taxis, which have to wait even longer for their full load. Passengers like the trucks because they reduce their waiting time.

Transport operators did not report any problems concerning delays or enforced unofficial payments at the various control barriers in the province. However, when describing the horrific accident outside Kawamba in 2005, the Zambia media reported that prior to the accident, the truck driver transporting 110 pupils had passed through a police barrier and paid ZK 60,000 (USD 12) to be allowed to continue.

## **Conclusions**

### **Motorised transport, fish markets and seasonality**

The main types of motorised transport in Luapula are rural taxis (minibuses and pickups) and light trucks. Nearly all the motorised transport services in the province are associated with the profitable trade in fish, and operate on main roads between fish markets and the national and provincial transport hubs. During the months that the fish markets are closed, motorised transport decreases and the whole economy of the province shrinks.

Most communities in Luapula that have agricultural rather than fish-based economies do not have access to regular motorised transport services (unless they are situated on a road serving

a fish market. Without access to transport, rural people feel excluded from economic opportunities. With assured transport services (motorised by preference, bicycles when necessary), rural people say they could undertake many more productive and economic activities. For motorised transport, rural people need low prices, but just as important is a reliable and predictable service that allows people to plan journeys. Rural women argued that a predictable twice-a-week service might be better than an uncertain daily one.

### **Importance of intermediate means of transport**

For most residents of Luapula, bicycles and/or banana boats are extremely important in allowing them to gain their livelihoods. For most people, these means of transport link them to the motorised transport hubs that are central to the fish trade and commercial economy. Very large distances (well over 100 km) are regularly being undertaken by bicycles and bicycle taxis (tens of thousands of such trips a year in the whole province). Medium distance (10-30 km) journeys are even more common. The importance of bicycles, in general, and long-distance bicycle journeys, in particular, does not seem to be fully acknowledged by transport authorities at the national or provincial levels.

Bicycles are expensive, costing about ZK 400,000 or USD 90, for a basic 'roadster' bicycle without gears. The cost of brake blocks seems disproportionately expensive. Given the value of bicycles for mobility and livelihoods, ownership of bicycles is still relatively low (less than one in three rural households). Their high cost and the lack of credit are cited as the main constraints. Women use bicycles, but not as much as men do, due to insufficient access to available bicycles.

### **Possibilities for improving rural transport**

From the survey and related discussions, several suggestions were made for improving rural transport services in Luapula. These are not presented as definite recommendations, but as possibilities whose feasibility could be considered, with appropriate implementation by private, government, NGO or community based sectors.

- Improve the quality of rural roads
- Establish regular motorised transport services on all routes by linking communities and operators and agreeing essential service requirements with community-guaranteed minimum ticket sales
- Establish small ice plants to allow consolidation of fish loads
- Assist long-distance cycle taxis services to acquire motorcycles.
- Increase ownership of bicycles
- Decrease cost of bicycles and spares by removing import duty (25%) and VAT (17.5%)
- Increase rural banking facilities and credit availability for the purchase of intermediate means of transport (banana boats, bicycles, motorcycles)
- Increase existence of working brakes on bicycles
- Provide secure parking facilities for bicycles.
- Remove long grass from roadsides earlier in the season
- Establish local production of fibreglass boats in Luapula
- Understand the safety and other implications of population settlement along roadsides
- Expand mobile phone network rapidly as this will facilitate better matching of transport supply and demand.

## **Chapter 10: Lessons and implications for rural transport**

### **Context and caveat**

The pilot studies were carried out in five different regions in Burkina Faso, Cameroon, Tanzania and Zambia. There were widespread variations within and between the areas surveyed. The national researchers each implemented the methodology in slightly different ways. All surveys yielded much valuable information, some unique and some common to all the areas. Certain findings can be used immediately to help improve rural transport services. Other information and ideas can be followed-up with more detailed studies focussing on some pertinent issues that have been raised.

In all cases, the survey findings need to be assessed in their contexts by the various stakeholders. It may not be appropriate to try to generalise from context-specific observations or extrapolate from small samples that were not statistically significant. Bearing in mind these words of caution, it is possible to review some clear lessons that have emerged. For each topic, a recommendation will be made that relating to transport policy. These will be phrased in quite general terms. It will be for the key stakeholders at local, regional or national level to determine the relevance of these to their own unique situations and, if they are appropriate, to adapt them accordingly.

### **Understanding rural transport systems**

#### **Poverty, economic growth and private sector transport services**

Improved rural transport is a prerequisite for poverty alleviation. The achievement of several millennium development goals, including those relating to health, maternal and child mortality and education, depend on better access to services, and this requires better transport infrastructure and better transport services.

Motorised rural transport services and intermediate means of transport are generally run and maintained by private sector operators, often operating in the informal sector. In most countries, government have restricted their role in transport to maintaining road infrastructure (with problems), regulating against unsafe transport practices (with minimal enforcement) and taxing means of transport. Governments are not generally engaged in any proactive initiatives for increasing people's access to rural transport or providing incentives to improve rural transport services. This laissez-faire approach is clearly not working and is preventing millions of people of from being more productive, contributing to local economies and having better qualities of life through improved access to income, health and education. Lack of transport services and intermediate means of transport is perpetuating rural poverty and limiting economic growth.

In all the areas surveyed, rural women and men complained that inadequate transport prevented them from increasing their productivity and improving their livelihoods. They said it was pointless to grow or make things for sale if there was no access to a suitable market. Because of poor transport, many rural people remain primarily subsistence farmers, with little impact on the regional economy.

The surveys provided examples of rural people becoming more productive when transport became more available. Productive rural people buy goods and services and pay taxes. It is in everyone's interest that rural people should be helped to be productive, by ensuring that there are dependable and affordable transport services in rural areas. Both motorised and non-motorised transport systems are needed. The surveys showed how intermediate means of transport (IMTs) are particularly important for rural women, men and children. Increasing



access to IMTs, particularly bicycles, could contribute significantly to achieving the millennium development goals.

### **Recommendation**

**Consider improvements in rural transport infrastructure, transport services and intermediate means of transport as prerequisites for achieving rural growth and meeting the millennium development goals. Develop proactive transport policies and investments accordingly.**

### **Transport hubs**

The concept of transport hubs and spokes assists understanding rural transport and planning for optimised transport services. In most cases, there is a hierarchy of hubs, and it is possible to recognise four levels, each with particular characteristics.

- National hub, with high levels of traffic on the national (and international) inter-urban spokes.
- Regional hub, with daily motorised transport on main spokes to market towns
- Market hub with irregular motor transport on the village to market spokes and much use of intermediate means of transport
- Village hub with most transport on the homestead to village spokes involving walking and carrying and intermediate means of transport.

The national spokes act as ‘transport corridors’ and towns, villages and junctions along the transport corridor tend to develop as transport hubs. While national transport spokes greatly affect the rural areas they pass through, most long-distance traffic on them is inter-urban rather than rural transport. The main road connecting a regional hub to the capital city is primarily a spoke on the national hub system, and has significantly more traffic than the regional spokes. Many people (including decision makers) overestimate rural transport services by thinking that this national spoke is typical of the region.

Rural transport services almost invariably operate to and from national, regional, market or village hubs. Motorised rural transport services generally operate from a very small number of hubs (the regional town and a few market towns). By surveying each of these hubs, it is possible to obtain a very accurate picture of the transport services operating in an area including their routes, frequencies and charges and the concerns of their operators and passengers.

While the main transport hubs and spokes are likely to correspond to the road system, there may be other important processes in operation. ‘Invisible’ hubs and spokes can include periodic markets, footpaths, cycleways, small bridges, water transport and cross-border exchanges. Not all rural people will consider the regional town as their main transport destination. They may travel in the opposite direction for their markets, health facilities and services. This is frequently the case near regional or national boundaries. Transport planners should talk with rural people to understand their transport patterns and priorities.

Using mapping software and geographical information systems (GIS) technology, vector maps can be created of transport systems (infrastructure and traffic). Properties can be ascribed to the nodes (villages, towns, populations characteristics) and vectors (roads, tracks, traffic) to create computer models. These can be used for understanding existing transport systems, and comparing options for interventions relating to roads, transport services and optimal location of various services.

### **Recommendation**

**Transport planners, operators, regulators and user groups should use the hub and**

**spoke concept to help understand and model rural transport systems and options for improving rural transport services.**

### **Importance of infrastructure**

All stakeholders, including transport operators, passengers and the regulatory authorities, consider that road quality is a crucial limiting factor to rural transport. Poor roads lead to

- long journey times
- unreliable services
- high operating costs
- high fares
- poor access to health (and consequently higher mortality)
- poor access to education (and consequently lower school attendance)
- low participation by rural people in the regional and national economy

The surveys provided examples where road improvements have led to improved services and lower fares, with greater access of villagers to markets and social services. Similarly, road deterioration has led to reduced services, higher fares and increased isolation from markets and services. In all regions surveyed, the authorities were having problems in funding the work required to maintain and improve the roads. The management of rain barriers was generally weak. In some countries, there were systems in place for local level prioritisation of road maintenance and rehabilitation, but transport operators seldom felt involved in the processes.

Some communities are completely inaccessible for part of the year. Much investment in road maintenance serves to decrease journey times on major roads that are accessible but in poor condition. If greater weight were given to poverty reduction criteria, more funds might be allocated to strategic spot improvements that open blocked roads.

Infrastructure does not only concern roads. Most transport services operate from terminals (public or private) that require basic facilities for passengers (sanitation, security for luggage). Passengers in small boats may benefit from quays and loading ramps. Cyclists often need secure parking for bicycles around markets or transport terminals. Small bridges for pedestrians and cyclists reduce journey times and greatly increase safety.

### **Recommendation**

**Consider poverty reduction criteria in determining priorities for road funding, maintenance and rehabilitation and the provision of small scale infrastructure and involve rural stakeholders and transporters in the processes road prioritisation and management.**

### **Transport services fluctuate greatly**

Rural transport services are not constant, but vary greatly, with daily, weekly, monthly and annual fluctuations. Periodic markets (eg, weekly, monthly) cause major surges in traffic, as can holidays and festivals. Harvest times stimulate itinerant traders to visit rural areas (eg, cocoa harvest in Cameroon) whereas closed seasons can significantly reduce transport (eg, fish ban months in Zambia). Some roads are completely impassable during the rain seasons, bringing motorised traffic to a halt.

The fluctuations in traffic affect rural people, who may adjust their travelling, produce sales and family visits accordingly. Service providers (health, financial, training, extension advice) would do well to consider transport services and opportunities when devising their programmes and their operational locations. For example, if specialised clinics are held on market days, more people may be able to access transport to attend. Transport authorities

should build the various transport fluctuations into their planning models, as they could affect the prioritisation of infrastructure improvements and transport service regulation.

## Recommendation

**Understand fluctuations in transport supply and demand and build these into transport planning models, road prioritisation and the planning of service provision.**

## Low investment in motorised rural transport services

In all the countries visited, the great majority of all motor vehicles operate in and around the major cities. The fleets of transport service vehicles (buses, trucks, minibuses and rural taxis) that operate within rural areas are extremely small. Most vehicles are very old (often more than twenty years) and have been bought when they were already well used. The amount of capital invested in rural transport vehicles is therefore low, ranging from one to ten dollars per head of population. This is illustrated in Table 10.1.

<b>Table: 10.1 Some estimates of rural transport fleets</b>			
<i>Region</i>	<i>Population</i>	<i>Regional fleet of motor transport vehicles<sup>1</sup></i>	
		<i>Numbers</i>	<i>Investment value (USD millions)</i>
Mouhoun, Burkina Faso	1,400,000	80	1.5
Southern, Cameroon	500,000	830	5.0
Iringa, Tanzania	1,500,000	180	1.4
Luapula Zambia	800,000	180	1.7
<sup>1</sup> Notes: Order-of-magnitude estimates based on field observations. These figures are for buses, mini-buses, trucks and rural taxis vehicles mainly used for the transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, government and NGO vehicles and private cars. Values are based on the approximate investment made by the purchaser: most motor vehicles were purchased when over ten years old.			

Rural transport services appear to have low profitability. Individuals operating within the informal sector generally provide them. There are few, or no, private transport firms operating in the formal sector (although such firms do operate on inter-urban, national and international routes).

The surveys did not identify any transport entrepreneurs who were investing significant income from profitable transport to build up large fleets of transport vehicles operating in rural areas. Such entrepreneurs may exist in urban and inter-urban transport markets, and in the special markets provided by motorcycles and transport agencies in Cameroon. Vehicles operating on inter-urban routes and along good national roads are generally in better condition. If a rural resident obtains a good vehicle, it will probably be operated on an inter-urban route or for trading, and not as a rural transport service. Most operators of rural taxis interviewed aspired to owning large trucks, rather than large buses.

Most rural transport vehicles appear to have been bought from non-transport income (trading, salaries, remittances from relatives). Operators say it is difficult to afford replacements, and this is borne out by the deterioration of vehicles. Rural transport operators generally consider themselves to be over taxed. Most have to pay a flat-rate amount that is not based on their operating profit.

It is difficult to obtain accurate estimates of running costs and income, partly because many costs are informal and unrecorded. It is rare for transport operators to be paid formal salaries. All inputs are kept to a minimum, including fuel, repairs and replacements. Most operators feel they have to cover their costs on each and every journey (whereas transport firms can

afford to have unprofitable trips as long as average income is acceptable). This need to cover all costs prevents operators from keeping to fixed timetables and exacerbates the vicious circle of low transport demand and unreliable transport market.

### **Recommendation**

**Consider financial incentives (including tax incentives) to encourage investment to improve the quantity and quality of rural transport services.**

## **Intermediate means of transport**

### **Importance of intermediate means of transport**

The surveys all highlighted the immense importance of intermediate means of transport (IMTs) for rural transport. In all the countries visited, intermediate means of transport (bicycles, motorcycles and/or animal-drawn carts, depending on the local conditions) play an extremely important role in regional transport. For many rural people, the only way they can access markets, healthcare, education and financial services is by intermediate means of transport. These are commonly used for journeys of over twenty kilometres, and some people travel over 100 kilometres using IMTs. Although intermediate means of transport are costly in rural areas, and expensive relative to local incomes, people have been investing in them. The amount of capital invested in intermediate means of transport ranged from three to twenty-five dollars per head of population, and was in all cases greater than the total invested in large-scale transport service vehicles. This is illustrated in Table 10.2.

<b>Table: 10.2 Some estimates of intermediate means of transport (IMTs)</b>			
<i>Region</i>	<i>Population</i>	<i>Regional fleet of IMTs <sup>1</sup></i>	
		<i>Numbers</i>	<i>Investment value (USD millions)</i>
Mouhoun, Burkina Faso	1,400,000	220,000	35
Southern, Cameroon	500,000	21,000	14
Iringa, Tanzania	1,500,000	73,000	5
Luapula Zambia	800,000	80,000	8
<sup>1</sup> Notes: Order-of-magnitude estimates based on field observations. Values are based on the approximate investment made by the purchaser: most IMTs were new when brought into the regions.			

In all countries, there were major difference in the perceptions of the transport authorities and the rural populations concerning intermediate means of transport. The authorities tended to ignore IMTs and even despise them. The rural people considered them extremely important for their livelihoods and for accessing services.

### **Recommendation**

**Understand and acknowledge the importance of intermediate means of transport for rural people, and develop policies to facilitate their adoption and use.**

### **Bicycles are tools for production and livelihoods**

Bicycles are the most common and the most versatile intermediate means of transport. In most countries, the ownership and use of bicycles is increasing quite rapidly. As bicycles become more common, women make greater use of them. Rural people often consider bicycles as an important means of livelihood and as work tools that increase their productivity and their access to markets. They increase the weight and volume of goods that one person can carry to and from markets. They provide faster access to health, education and other services.

In most countries, medium-distance (20 km) journeys by bicycle are common and long-distance (80+ km) journeys by bicycle not unusual. Bicycle taxi services are increasing in some countries. In Zambia, very long distance journeys (over 100 km) by bicycle taxi were reported.

In all countries visited, bicycles were expensive, costing about USD 100-200. In some areas, there has been a vicious circle of high price, causing little apparent demand, little supply and few support services. Elsewhere, prices are falling, and this is stimulating greater adoption. The low cost of assembled or semi-assembled bicycles imported from Asia, means that local bicycle production is unrealistic. Local factories have been closing and the system of importing bicycles in cartons of three or five is favouring decentralised assembly. The cost of Chinese or Indian bicycles on the international market is about USD 25. Import duties and VAT may add USD 10-20 to the cost of bicycle. With lower taxes, it is realistic to envisage bicycles costing USD 50-60 in rural areas. This would lead to much greater adoption, with resulting benefits to agricultural production, education and health. If men, women and students are to have greater access to bicycle transport, ownership may rise to several bicycles per household.

Most authorities contacted were unaware of the importance of bicycles, and some were quite scornful of them, considering them to be old-fashioned. Decision makers generally underestimate the productive value of bicycles. In all the countries visited, the authorities should aim for greater bicycle use **and** improved motorised transport services. As bicycles become common in rural areas, people find new and creative uses for bicycles, increasing local production and trade. De-taxing bicycles will reduce prices, increase adoption, stimulate the local economies and improve people's access to services.

### **Recommendation**

**Remove taxes and duties from bicycles and other intermediate means of transport: in the medium term the economic, health and educational benefits of the bicycles should more than compensate for the small revenue loss to governments.**

### **Increase in motorcycles**

Large-scale motorcycle production in China has led to a dramatic fall in the cost of imported motorcycles. These have typically fallen from about USD 2000 for a Japanese model, to USD 600 for a Chinese motorcycle. At this price more people can afford them, particularly if they can obtain income from marketing or providing transport services. There has been a huge increase in motorcycles in Cameroon (and neighbouring Nigeria), and a significant increase in Burkina Faso. To date, their use in rural Tanzania and Zambia is minimal, but as a result of the surveys, we predict that rapid increases will follow in these and other countries. One reason for this prediction is the system of funding purchases that has proved effective in Cameroon. Subject to appropriate motorcycle prices and fares, it should also be viable elsewhere.

- An urban-based trader or civil servant buys a new motorcycle for USD 600
- This is hired to a young operator for USD 4-6 per day
- The young operator profits and gains employment by making eight journeys at one dollar (for example)
- The owner recovers all capital in just three-to-six months
- The owner replaces the motorcycle every six months, selling for half price (USD 300)
- This creates a second-hand market for less wealthy people (who will also be faced with repair bills)
- Rural people gain a convenient and available transport service at prices they can afford (one dollar)

- As a critical mass of motorcycle users, suppliers and repairers develop, it becomes increasingly easy to adopt and run motorcycles, for private use as well as service provision.

Naturally, the owner does not need to be urban based, but there is often easier access to capital or credit in urban areas. In the first instance, the motorcycle transport services are most likely to develop in urban and peri-urban areas, but competition will encourage people to look for new transport markets in remoter, rural areas.

There are advantages and disadvantages of motorcycle transport services, but they do work, they do generate employment and they do provide transport services that benefit rural communities. Their load carrying ability is small, but is greater than a bicycle and they are much quicker than bicycle taxis. Over long distances, they cannot compete on price with trucks, buses and rural taxis. However they can complement such services, linking villages to junctions on the main roads. Greater motorcycle use raises some environmental, safety and regulation issues (emissions, crash helmets, safe loads, safe driving techniques).

### **Recommendation**

**The development of motorcycle transport services will benefit rural areas and should be encouraged and regulated appropriately.**

## **Regulating rural transport**

### **Control barriers and enforcement**

In all countries surveyed, there are control points for mandatory or random questioning. Traffic police, para-militaries forces, customs officers, market regulators (forestry, fish, livestock) or 'road safety' officials may operate various controls. In some regions, for example in Southern Cameroon, the roads close to towns have a series of control barriers, with several services acting separately.

In some countries, the barriers are used for legitimate control purposes, and unsafe or illegal loads are not allowed to pass. However, in most regions visited, the controlling officers accept tips or bribes to allow rapid transit, whatever the load or condition of the vehicle. In such circumstances, semi-formalised systems develop, with rural transport operators offering a standard payment each day at each barrier. The barriers are most active on lucrative routes, at peak times and when the officials feel most in need of 'tips' (towards the end of the month, and before public holidays). Transport operators are generally fairly tolerant of occasional barriers (they have become a normal part of life), but they do resent multiple barriers. In exceptional cases, operators considered that 'bribe' barriers accounted for one third of their operating costs, a figure comparable to their fuel costs. Naturally, these costs are passed on in the form of higher fares and tariffs, but unlike road tolls, they provide no benefits to the rural transport system.

### **Recommendation**

**Bribery at control barriers should be eliminated as it increases transport costs and reduces legitimate safety enforcement.**

### **Transport associations and transport user groups**

In many countries there are associations of transport operators. There may be separate associations for rural taxis, trucks, buses, bicycle taxis and motorcycle taxis. Their main role is to control loading and queuing at terminals, preventing anarchic squabbling for passengers or freight. They may agree prices and route allocation between members and/or with authorities. They may also discuss and help enforce safety regulations. Their role is partly anti-competitive, since the system of queuing means that passengers cannot easily choose

‘better’ operators or vehicles, and operators have few incentives to improve (they get a full load simply by waiting long enough in the queue). Some associations have member support functions, such as bulk purchases, credit provision or sickness assistance.

While transport associations may have the capacity to be exclusive, anti-competitive cartels, this was not found to be the case in regions surveyed. Most associations contacted were quite weak and only operated at major hubs. Controlling queuing and prices does not mean that all competition is eliminated. Most transport operators try to gain customer loyalty in various ways, including price incentives. There is also competition between the different modes of transport (buses, rural taxis, trucks, motorcycles, bicycle taxis). In one country, Zambia, associations had been banned, primarily because of their participation in protests over fuel price increases.

While the survey team was well aware of the potential dangers of anti-competitive practices on rural transport, it saw little evidence any negative impact of the existing transport associations. In contrast, the team did see one positive example of how transport associations can collaborate with the authorities in regulating transport routes on a rotational basis. This system (observed during the planning workshop in Ethiopia) meant that all rural taxi operators had to have some days working on low demand routes in order to operate on other days on the more lucrative high-demand routes.

The survey team did not hear of any associations of transport users. User groups could have an important role in trying to consolidate local transport demand. User groups could discuss with transport operators and regulators issues relating to routes, timetables and fares and ways of improving transport safety, comfort and reliability.

### **Recommendation**

**Transport authorities should work with different transport associations and user representatives to stimulate and regulate appropriate, fair, competitive and improving transport services.**

### **Routes and timetables**

All stakeholders prefer dependable and predictable transport. Rural people, particularly women, said they would travel more if they could be certain of the arrival and departure times. Waiting for full loads at terminals makes travelling unpredictable and this reduces demand. The practice of waiting for full loads can be exacerbated by

- Mistrust (the owner knows the driver’s income if there is a full load)
- Low liquidity (operators must profit on each and every journey and not ‘on average’)
- Low transport demand along the routes (which is a vicious circle as unpredictable services reduce demand)

In Tanzania, route regulation for buses includes the condition that they operate to timetables. This is beneficial for all and should be encouraged. The success of transport agencies in some countries, such as Cameroon, has been linked to timetabled and reliable services (initially on inter-urban routes, and now on some rural routes. In Ethiopia, transport associations have worked with regulators to assign route rotas, so operators have to alternate profitable, high-demand routes with lower demand routes. This increases the predictability of transport services, to the benefit of all.

### **Recommendation**

**Transport authorities, in discussion with key stakeholders, should provide incentives (regulatory, financial or fiscal) for more predictable transport, encouraging operating to timetables and/or licenses that combine high-demand and low demand routes.**

## Safety

While all countries have regulations that prohibit unsafe transport practices, these are little enforced in rural areas. Important safety issues concern the transport infrastructure, the various vehicles, the systems of operation and the behaviour of the various stakeholders.

Common problems include:

- Inadequate infrastructure: potholes, dusty roads, long grass obscuring vision, lack of safety barriers, lack of livestock fencing, inadequate signs, lack of traffic calming measures, lack of special lanes for intermediate means of transport
- Unsafe vehicles: poor tyres, inadequate lights and reflectors (including carts), inadequate brakes (including bicycles)
- Unsafe loads: high and unstable freight, passengers on top of vehicles, mixed passengers and freight, passengers crowding driver (rural taxis and motorcycles), overloaded boats
- Unsafe behaviour: high speed, alcohol/drugs, wrong side of road (IMTs), inadequate attention (drivers, pedestrians), lack of safety measures (seat belts, crash helmets, life vests).

While vehicle overloading (with passengers and/or freight) looks dramatic, driver errors (high speed, drugs/alcohol, inadequate attention) are arguably more dangerous for rural people. While no one likes to be involved in an accident, rural people seldom raise safety as a key issue. Transport availability and price are cited as major concerns. Security is an issue, and a gender-related one (women and young children seldom travel on top of rural taxis). It is also a poverty-related issue: many rural people cannot afford to invest in transport themselves, and accept the discomfort and indignity of unsafe transport because it is all that is available and affordable.

Since unsafe transport practices are generally illegal, there seldom need for new legislation. What is required is the promotion of greater safety awareness and behaviour and the gradual increasing enforcement of realistic safety regulations. A context-sensitive approach is required as rapid enforcement of all existing safety regulations could significantly decrease rural transport services and/or increase prices. Recent experience in Kenya demonstrated that safety regulations in minibuses could be enforced, but that such measures had transport cost implications that affected poor people most. Where there is little rural transport, freight vehicles can have important roles in carrying passengers. Realistic safety regulations allowing some passenger/freight combinations may be appropriate in such circumstances. In general, prohibitions should be accompanied by education on appropriate and affordable alternatives that are realistically available.

## Recommendation

**Promote safety awareness and education, and gradually enforce safety regulations that are affordable and appropriate considering the transport needs of poor rural people.**

## Promoting rural transport services

### Transport firms and franchises

In Cameroon, Burkina Faso and Tanzania new transport businesses have been established that operate from private transport terminals. The transport operators and the new terminals try to attract customers with improved waiting facilities, enhanced security, regular travel timetables and lower prices. Competition between transport firms improves standards, and has led to the adoption of more modern and comfortable vehicles, as well as the introduction of a range of courier services. Initial success came from the provision of long-distance, national and international travel, but the model is being copied for some rural transport services. In Cameroon, the firms may operate as franchises, with independent vehicle operators sharing the terminal, brand name and livery, in return for a fixed fee and/or percentage of the takings.



Intuitively, it would seem that dividing demand into two or more separate terminals would increase average waiting time (two or more vehicles are simultaneously waiting for a load). Surprisingly, this was not reported as a problem, and this may be due to an overall growth in the transport market caused by the better and cheaper services, and also due to the active role of agents and consolidators who promote the services.

### **Recommendation**

**Competing transport firms and franchises should be encouraged as they can stimulate lower prices while having a positive impact on transport quality and predictability.**

### **Importance of rural freight transport**

Rural freight transport is very important but regional fleets are generally quite small and seldom organised. Few rural transporters own many trucks, which suggests it is not a very profitable business. Some commodity buyers and retail outlets buy trucks to support their trading businesses. Some transport entrepreneurs buy trucks to operate as small transport businesses, responding opportunistically to various hire options. Much work comes from transport services to traders attending periodic markets and from produce buyers at harvest times.

Some truck operators ply regular routes, carrying freight and people. This is particularly common in areas with poor roads, where vehicles with low clearance may get stuck. Large trucks may carry as many as 100 people on top of a freight load. Despite the discomfort of standing in a truck, or sitting on sacks, some passengers prefer trucks to rural taxis as:

- Trucks travel when the freight is ready (rural taxis wait for a full load of passengers)
- Trucks allow passengers to carry larger loads (including bicycles)
- Trucks often get through in poor conditions
- Truck fares may be cheaper.

It is rare for trucks to be licensed to carry people, and in most countries it is illegal to travel with 'mixed' loads of freight and passengers. In remote rural areas, authorities seldom try to stop passenger transport in trucks, as it is well known that there is a shortage of alternative transport modes. For remote communities, with low transport demand, mixed transport using pickups or light trucks to carry goods, produce and people may be the only viable transport system.

### **Recommendation**

**While separate passenger and freight services are preferable, for comfort and safety, the benefits that trucks and pickups can provide for poor rural people through mixed transport should not be dismissed.**

### **Participatory planning of transport services and load consolidation**

All the stakeholders in rural transport (authorities, operators, users and support services) agree there is a need to improve the quantity and quality of rural transport services. They agree that good infrastructure is a crucial long-term issue but that the immediate concern is to find a way of providing predictable, dependable and affordable transport services now. It has been demonstrated in numerous ways that the transport market can grow in response to better services (frequency, reliability and quality) and/or lower prices. In rural areas there is need to start the processes (prime the pump) to start the virtuous circle of more transport supply leading to more transport demand and to greater economic (and social) activity. Where there is a low density of transport demand, there is a need to consolidate that demand. In the rural areas, this is seldom (if ever) done on a systematic and participatory basis. However, it should be possible, if someone takes the initiative and brings the key stakeholders together. It is

suggested that the following process be tested in a location where there is no regular motorised transport service, but a clear need for one, for economic and social reasons. An example from the Zambia survey area would be the small town of Milenge, a district ‘capital’ 75 km from a main road, but with no regular service provided by buses or rural transport.

The key stakeholders (authorities, potential transport operators, potential users) need to meet together to plan for ways developing a predictable, timetabled service at an affordable cost for users while giving a satisfactory income for the operator. This may involve

- Agree the different types of transport needs that could be met by a new service (including transport for farmers, traders, health services, schools, store keepers, NGOs, women’s groups, religious groups, etc).
- Agree minimum initial service requirements (eg, daily, twice weekly)
- Agree potential load, if assured service (including transport of people, goods, packages, documents, etc)
- Agree reasonable transport prices for this load (ticket costs, freight costs)
- Agree mechanisms for assuring an acceptable guaranteed income for transporters (eg, the community agrees to purchase a minimum number of seats each trip, so assuring a ‘profitable’ load).
- Agree appropriate vehicle type(s) to meet the diverse needs
- Agree routing arrangement, perhaps requiring transport operators to alternate between high demand and low demand routes.
- Agree operators (existing operator on another route, the transport association of a nearby town, a local entrepreneur, store keeper, NGO, community group, etc).

The process may seem complicated to arrange but it could result in the beginnings of reliable transport services that allow rural communities to develop and thrive. The team members that conducted the surveys are convinced that in most rural communities visited there is the potential for economically viable transport services, provided that demand is consolidated and the service is predictable. Someone (local government, NGO, entrepreneur) needs to take the initiative to ‘prime the pump’.

### **Recommendation**

**Test community collaboration and participatory planning to consolidate transport demand and ensure basic dependable transport services in rural areas and regulate as necessary**

## **Crosscutting issues in rural transport**

### **Transport for education**

Lack of affordable transport is a huge problem for rural schools. Most schools do not have their own vehicles for transporting teachers, pupils or supplies, and rural school bus services are rare or inexistent.

Primary schools are generally situated in villages so that access for pupils is mainly a constraint for families living in outlying villages and homesteads. However, transport problems seriously affect the running of rural primary schools. Education authorities experience problems in recruiting teachers. Teachers have great problems reaching the schools, receiving their salaries and obtaining educational inputs. Some teachers reported they had to be absent for two days each month to travel by rural taxi or bicycle to obtain their salaries.

Secondary schools are often located in towns, and sometimes have boarding facilities for people living outside the town. Inadequate transport causes reduced attendance at secondary

schools, particularly for poorer children who cannot afford boarding arrangements and cannot afford to buy bicycles.

Bicycles can greatly benefit both primary and secondary school pupils. Increasing access to bicycles is likely to increase school attendance by boys and girls and help meet the millennium development goal of universal primary education. Schools should take an integrated approach, combining promotion of bicycle use with safety training and secure parking facilities. Schools should work with parents, local bicycle suppliers and other stakeholders to explore options for funding bicycles acquisition such as hire-purchase arrangements.

#### **Recommendation**

**Promote bicycle use by pupils in combination with safety training and appropriate parking facilities at schools.**

### **Transport for health services**

Transport is fundamental to the provision of health care. Women, children and men need to transport to access health services for both routine advice and emergency treatment. The health services themselves need transport to provide outreach services, to obtain supplies and to move patients within the healthcare system.

In rural areas, emergency ambulance services are rare or nonexistent. People travel for health care in whatever transport is available including buses, rural taxis, private cars, bicycles, animal-drawn carts and local stretchers. Clinics seldom have suitable transport for hospital referrals and referred patients may have to travel by public transport. Lack of suitable transport increases medical problems and mortality, particularly for children and pregnant women. Most affected are the poorest people who cannot afford to travel.

While medical services would benefit from more specialised vehicles, the sheer scale of health care needs mean that relatively few people can benefit from any one ambulance. Most people travel to clinics and hospitals in other forms of transport. Increasing access to rural taxis, bus services, bicycles and motorcycles will improve access to health care for the majority of the population.

While health authorities, hospitals and clinics all complain of lack of transport, they seldom look at the existing transport resources in an area. Clinics and hospitals without adequate transport may be able to make better use of the existing private sector transport services in the area, including trucks, buses, rural taxis, motorcycles and bicycles. By combining medical transport needs with other transport requirements in the area, it may be possible to develop multipurpose transport services, benefiting large numbers of people. Existing local transporters could also form a rota for providing transport for medical services.

#### **Recommendation**

**Medical services, local communities and transporters (all types) should work together to plan and meet health transport needs, using a wide range of transport types**

### **Gender and transport**

When travelling in rural transport, women may have some privileges, such as being provided with relatively safe seats (they are not expected to travel on the roof of taxis). However, women generally have greater transport problems than men. Rural transport services are generally unreliable and unpredictable. As a result, given their responsibilities and status, women may decide not to travel, rather than risk being stranded. This affects the ability of women to sell produce at distant markets and to benefit from such trade.

Women have special healthcare needs relating to pregnancy and childbirth. Women also tend to be the major carers, with particular responsibilities for ensuring the health and education of their families, and these responsibilities require travel to schools and health facilities. However, women have less access means of transport and funds to afford transport. Most transport owners and operators of transport services and intermediate means of transport are men. Women may find themselves in a vicious circle, since by having less access to transport, women have less access to potential solutions to their transport problems (information, credit, income-generating options).

As ownership of transport devices (cars, motorcycles, bicycles, donkey carts) grows, women increasingly become users and beneficiaries of such transport. As the transport becomes more common, a critical mass of supporting services develops and the transport becomes easier to access (perhaps borrowed from male relatives). It then becomes increasingly acceptable and normal for women to use the technologies. In rural areas, it is quite unusual for women to ride bicycles when overall numbers of bicycles are low. As ownership increases, women's access to bicycles increases and quite quickly women start to make more and more use of bicycles. Bicycles can really empower poor rural women through increased mobility. They can act as 'levers of access' to economic, social and political opportunities. In some circumstances donkeys and motorcycles may also offer great benefits for women.

#### **Recommendation**

**Treat the needs to increase access to intermediate means of transport and predictable motorised rural transport services as important gender-related issues that can empower rural women.**

#### **HIV/Aids and transport**

Increasing rural transport services and mobility could favour the spread of HIV/Aids. On the other hand, regular and more predictable transport should reduce the likelihood of people being stranded overnight at transport terminals (high risk areas for HIV/Aids transmission). All situations of high risk, including transport terminals and truck stops, should be specifically targeted for awareness campaigns.

Period markets are not always targeted for HIV/Aids awareness campaigns, even though they may be important hubs for the spread of the disease. The system of traders going from market to market with overnight stops in the villages represents a clear HIV/Aids risk that needs to be addressed.

#### **Recommendation**

**Consider the implications transport services and different market systems in spread of HIV/Aids and modify awareness campaigns appropriately.**

#### **Increasing importance of mobile phones for transport services**

Mobile telephones are increasingly important as coverage increases. Due to decreasing prices, increased ownership and the growth of informal phone services (taxi phones), mobile phones have become extremely important to those communities in range. The operators of many different forms of transport (including trucks, buses, minibuses, rural taxis, motorcycles, bicycle taxis and small boats) use mobile phones to obtain information on road conditions, weather and traffic and to report problems and delays. Transport consolidators at terminals and in villages use mobile phones link transporters and loads. Similarly, transport operators can inform clients of arrival times and ensure loads and people are ready. The combination of mobile phones and bus-based courier services is improving the speed of obtaining spare parts in rural areas, so reducing down times of transport operators. In medical emergencies, people with telephone access can contact an ambulance service or other transport operator.

**Recommendation**

**The spread of mobile telephones is having a profound and beneficial effect on transport services, and a rapid increase in rural coverage should be encouraged.**

# Chapter 11: Conclusions and implications

## Methodology

The methodology developed by the international team has been tested in four African countries and has already resulted in some valuable insights. The hub and spoke model is used to help understand the rural transport system and to survey it in a relatively quick time. The survey involves contacting a wide range key stakeholders (transport users, operators and regulators) and triangulating their different opinions. This allows the research team to build up an overall picture of the transport situation and the key constraints and opportunities. Further details obtained through personal observations and traffic counts on representative spokes help to develop and map a model of the rural transport system. This can then be used to inform decision making and help set priorities for appropriate interventions for improving rural mobility.

## Findings

The surveys produced a great deal of information that has been reported in detail and summarised here. Some findings were specific to certain countries (eg, new transport franchises, water transport, regulatory corruption). Much was common to all countries (the poverty of rural transport systems, small and old motorised transport fleets, poor safety standards, importance of intermediate means of transport).

In all countries, rural people clearly stated that they wanted to improve their quality of life through access markets, health care, education and other services but they were frustrated by the lack of affordable transport. In all countries, there exists the rhetoric of poverty reduction policies at the level of central government and serious attempts to develop sustainable means of maintaining deteriorating road infrastructure at all levels of government. What is lacking are national policies and local practical actions to address the existing problems of inadequate transport services and insufficient means of transport. National and regional transport authorities have concentrated on infrastructure issues, and have insufficient understanding of the actual situation with rural transport services (hence a clear need for these surveys).

## Implications

The surveys have resulted in many ideas for improving rural transport services that can be further explored and developed by governments and key stakeholders at national, regional and local levels. Twenty recommendations have been provided, some quite general and some specific. Transport policy makers and supporting agencies in all countries should consider the following five lessons drawn from this work.

### Need for informed decision making

Rural transport policy making need not take place in an uninformed context. Using the hub-spoke concept and participatory discussions with a wide range of stakeholders, policy makers can quickly and easily obtain a reliable picture of the status of rural transport and ways of overcoming key constraints. This can be used for evidence-based decision-making and integrated into map-based planning tools.

### Importance of intermediate means of transport

Intermediate means of transport, particularly bicycles and motorcycles, are extremely important, and offer great potential for growth. While these may be ‘invisible’ to policy-makers living in cities, the importance of bicycles, motorcycles and work animals to rural women and men for reducing their isolation and poverty cannot be overemphasised. The

country studies show that rural people have had to make considerable investments in intermediate means of transport, despite their poverty. It is important that fiscal policies and import regulations should encourage, rather than discourage, the growth of these means of transport that increase both the productivity and the quality of life of rural people.

### **Need to maintain rural infrastructure**

Year-round road access is important and needs to be provided in a cost-effective and sustainable manner. Local people and transport operators should be involved in the prioritisation of maintenance work. Poverty reduction criteria may favour spot improvements that keep small roads open. Transport infrastructure is not simply roads and bridges: it also includes transport terminals, quays, footbridges, cycle-ways and safety provisions.

### **Consolidating transport demand**

While rural infrastructure is important, the provision and maintenance of roads is clearly not enough to ensure that there are reliable and predictable transport services operating along the roads. Local collaboration and participative planning is required involving all types of transport users, operators and regulators to ensure consolidated transport demand that will allow profitable transport operations. Such collaboration should start a virtuous spiral of increasing transport services stimulating increasing demand, greater competition and lower prices.

### **Need for positive policies and practical actions**

Means of transport and transport services are provided by the private sector. The role of national and local government is to provide an encouraging and enabling environment, while regulating for appropriate standards. Policies on transport, poverty reduction and economic growth should all aim to stimulate greater, better and more dependable rural transport services. There is much scope for relatively small initiatives and incentives to have a profound affect on the lives of rural women, men and children, reducing poverty, stimulating economic growth and meeting the millennium development goals.

### **Specific follow-up initiatives**

#### *Implement similar surveys in many African countries*

The methodology has been proved in five locations and is now ready to be implemented elsewhere and locally adapted. It is proposed that the methodology presented here is used as the basis for surveys in many countries. It is believed that all African countries could benefit from the valuable understanding of rural transport that such surveys could bring. In large and diverse countries, surveys should be conducted in more than one area.

#### *Develop resource materials and hold training workshops*

To assist in the planning and implementation of such surveys, it is recommended that resource materials including practical guides be produced. National and international training workshops should be held to share the methodology.

#### *Adapt and test methodology in Asia and Latin America*

While the methodology was developed in Africa, it is based on participatory principles and techniques that should be universally valid. It is therefore recommended that it be tested in appropriate locations in Asia and Latin America, on the understanding that the local research team should always adapt the practical details of the survey to the prevailing conditions.

*Develop the hub mapping system as a planning tool*

The hub mapping system could be developed further. A very valuable planning tool could be created using mapping software and adding key properties to the nodes (villages, services, population characteristics) and vectors (roads, spokes). This could be used for planning transport systems, optimising key services (including health care) and prioritising areas for poverty alleviation initiatives and hubs to stimulate economic growth.

*Test the proposals for participatory transport planning*

It has been suggested that in remote areas with no regular motorised transport services, it may be possible to bring the various stakeholders together to discuss ways of consolidating the genuine but dispersed transport demand to create predictable and viable transport services. This proposal should be tested in appropriate circumstances (perhaps using the facilitation and support of a local NGO) and lessons should be drawn that could help improve and increase transport services in other areas.

*Develop the methodology for use in other sectors*

The tools used in the survey (observations, stakeholder interviews, joint analysis, mapping) could be developed for use to improve services in several sectors. For example, it could be used effectively to plan for improved access to health services, based on several different means of transport owned by medical services and also private operators.

*Share and build upon the implications of the findings for policy and practical action*

The surveys have already yielded ideas and information on some of the key issues and possible ways by which governments and other stakeholders could improve rural transport services. More ideas will come from further survey work. There is already much information to inform an international debate, and start the national-level processes of turning ideas into policy and practical action. Key international players, such as the World Bank, the International Forum for Rural Transport and Development (IFRTD), bilateral donors and/or supporting organisations, could initiate the international debate. An electronic discussion leading up to an international workshop on the subject could be a suitable mechanism.



## **Annexes**

**Table A1: Summary of key interviews**

<b>Key informant interviews</b>	<b>Minimum no. of Interviews</b>
National Authorities	4
National Authority Responsible for Poverty Reduction Strategy	1
Regional Authority	1
District Authority	3
Village Authority	3
Police	1
Health managers	3
Education - Head teachers	3
Transport associations	1
Financial organisation	1
NGO / programmes	1
World Bank	1
<b>Total</b>	<b>19</b>

<b>User groups informal interview</b>	<b>Minimum no. of Interviews</b>
Farmers	5
Traders	5
Employees	5
Financial services users	5
Students	5
Health users	5
Household managers (housewives)	5
Transport for socio -cultural reasons	5
Excluded people (eg, old, handicapped, socially marginalized)	5
Passengers on a bus	5
Passengers in a rural taxi	5
<b>Total</b>	<b>55</b>

<b>Operator Surveys informal interviews</b>	
Operator of main mode of transport 1 eg, rural taxi	3
Operator of main mode of transport 2 eg, bicycle	3
Operator of main mode of transport 3 eg, truck / bus / animal cart	3
<b>Total</b>	<b>9</b>

<b>Support Service Surveys informal interviews</b>	
Importer of motorised transport	2
Regional/Market town repairer of motorised transport	2
Importer of bicycles	1
Seller of bicycles (market town)	1
Repairer of bicycles (village level, if possible)	1
Manufacturer/repairer of carts (if available)	1
<b>Total</b>	<b>8</b>

**Table A2: Checklists of some key questions**

<b>National Transport Authorities including Ministry of Transport, Roads Agencies, Public Works and other relevant Ministries with transport concerns such as Agriculture, Rural Development and Local Government (3 to 5 interviews, as appropriate)</b>	
1	Is there a transport policy that addresses rural transport issues and services? If yes what is this?
2	What, if any are the current rural transport initiatives?
3	What are the regulations relating to rural transport (freight, passenger, IMTs and safety)?
4	Are there any incentives to stimulate rural transport?
5	Who are the key stakeholders in rural transport to contact?
6	What are the key trends in rural transport services and access to rural services?
7	What are the key problems and solutions for rural transport?
8	Are there HIV/Aids issues or programmes relating to rural transport? If so what are they?
9	Are there gender issues or programmes relating to rural transport? If so what are they?
10	Are there environmental issues or programmes relating to rural transport? If so what are they?
<b>National authorities responsible for Poverty Reduction Strategy (eg, Ministry of Finance) (1 or more interview, as appropriate)</b>	
1	What role is your PRSP playing in developing rural transport and access to rural services?
2	Who are the key stakeholders in rural transport to contact?
3	What are the key trends in rural transport services and access to rural services?
4	What are the key problems and solutions for rural transport?
5	Are there HIV/Aids issues or programmes relating to rural transport? If so what are they?
6	Are there gender issues or programmes relating to rural transport? If so what are they?
7	Are there environmental issues or programmes relating to rural transport? If so what are they?
<b>Regional Authorities (1 or more interview, as appropriate)</b>	
1	What is your role, if any in connection to rural transport services?
2	Who are the key stakeholders in rural transport to contact?
3	What are the key trends in rural transport services and access to rural service?
4	What are the key problems and solutions for rural transport?
<b>District Authorities, including District Transport Officer (3 or more interviews, as appropriate)</b>	
1	What is your role, if any in connection to rural transport services?
2	What is the frequency of motorised transport in the District?
3	Are there byelaws affecting rural transport? Please expand.
4	Are there transport associations and if so what role do they play?
5	What are the key trends in rural transport services and access to rural service?
6	What are the key problems and solutions for rural transport?
<b>Village Authorities, including most remote village surveyed (3 or more interviews, as appropriate)</b>	
1	What is the frequency of motorised transport in the village?
2	Are there transport associations or local transport groups and if so what role do they play?
3	What are the key trends in rural transport services and access to rural service?
4	What are the key problems and solutions for rural transport?

<b>Police</b> ( <i>1 or more interviews, as appropriate</i> )	
1	What are the major rural transport safety issues in your area, motorised and non-motorised? Obtain statistics if available.
2	What are the major rural transport security issues in your area, motorised and non-motorised? Obtain statistics if available.
3	What are the major regulation issues in rural transport regulation?
4	Who are the key stakeholders in rural transport to contact?
5	What are the key trends in rural transport services and access to rural services?
6	What are the key problems and solutions for rural transport?
<b>Health Managers, District and village level</b> ( <i>3 or more interviews, as appropriate</i> )	
1	What, if any are the problems relating to accessing the required inputs?
2	How do patients access the health centre?
3	How are patients transported within the health system?
4	How do health workers reach the outlying communities?
5	What are the key trends in transport for access to rural health services?
6	What are the key problems and solutions for rural transport?
<b>Education - secondary schools</b> ( <i>3 or more interviews, as appropriate</i> )	
1	What, if any are the problems relating to accessing the required inputs?
2	How does rural transport affect school attendance?
3	How does rural transport affect teachers and schools?
4	What are the key problems and solutions for rural transport for education?
<b>Transport association leaders</b> ( <i>5-7 as appropriate</i> )	
1	Whom do you represent? (eg, users, operators of different transport modes)
2	What is the role of the association?
3	How do new operators enter the transport market?
4	What is the procedure, if any, for route allocation?
5	How are terminals managed and what conditions apply? (eg, queuing, payments)
6	How are fares set?
7	Are there byelaws affecting rural transport? Please expand.
8	What are the key trends in rural transport services and access to rural service?
9	What are the key problems and solutions for rural transport?
10	Are there local transport / road groups and if so what role do they play?
<b>Financial Organisation</b> ( <i>1 or more interviews, as appropriate</i> )	
1	Is credit available in the region for transport provision including IMTs?
2	What are the key trends relating to credit for rural transport issues?
3	What are the key problems and solutions for rural transport financing?

<b>NGO and programmes operating at the local level</b> ( <i>1 or more interviews, as appropriate</i> )	
1	What is your role, if any, in rural transport provision or support?
2	Please provide details of your programme / intervention.
3	Who are the key stakeholders in rural transport to contact?
4	What are the key trends in rural transport services and access to rural services?
5	What are the key problems and solutions for rural transport?
<b>World Bank and donor agencies</b> ( <i>1 or more interviews, as appropriate</i> )	
1	Who are the key stakeholders in rural transport to contact?
2	What are the key trends in rural transport services and access to rural services?
3	What are the key problems and solutions for rural transport?
<b>Other potential sources of information</b> ( <i>as appropriate</i> )	
Institutions involved in rural transport issues (eg, universities)	
National Bureau of Statistics	

**Table A3: Policy and Regulatory Framework checklist**

<b>Study location:</b>				
<b>Date:</b>				
	Exists	Implemented		Remarks
		National	Survey area	
<b>Policy</b>				
Is there a National Transport Policy? If so does it address rural transport issues?				
Is there a Poverty Reduction Strategy Paper (PRSP)? If so, does it address rural transport issues?				
Does a Rural Travel and Transport Policy (RTTP) exist?				
Does a road fund exist?				
Does decentralised road funding exist?				
Agriculture policies relevant to rural transport				
Gender policies relevant to rural transport				
HIV/Aids policies relevant to rural transport:				
Environment policies relevant to rural transport				
Other relevant issues (specify as appropriate)				
<b>Regulatory frameworks</b>				
<b>Freight regulation</b>				
Freight fare regulation				
Route regulation				
Tax incentives				
<b>Freight Safety</b>				
Speed limits				
Prohibition of passengers				
Loading				
Axle load control				
Vehicle licensing				
Driver regulation				
<b>Public transport regulation</b>				
Price fare regulation				
Route regulation				
Tax incentives				
Licensing				
<b>Public Transport Safety</b>				
Passenger numbers				
Speed limits				
Safety belts				
Loading				
Driver regulation				
Other relevant issues (specify as appropriate)				

<b>IMT regulation</b>				
Safety				
Prices				
Vehicle licensing				
Incentives				
Animal welfare				
Other relevant issues (specify as appropriate)				
<b>Vehicle regulation</b>				
Import regulation				
Specifications				
Vehicle testing				
<b>Other operator costs (road tolls and other levies)</b>				
<b>Road safety (infrastructure)</b>				
<b>Driver licensing regulation</b>				
<b>Local government byelaws</b>				
Local fines				
Terminal fees				
Others				
<b>Local road groups</b>				
<b>Formal transport association</b>				
<b>Informal frameworks</b>				
Informal transport associations or cartels				
Public sector /private competition - does this exist?				
Informal road checks ('bribe barriers')				
Local road groups				
Other relevant issues (specify as appropriate)				

**Table A4: Checklist of some key questions for transport users**

User demand and satisfaction survey	
<b>Aim:</b>	To collect qualitative data relating to customer satisfaction
<b>Tool:</b>	Semi-structured interview
<b>Methodology:</b>	To be conducted by professional personnel in the survey area - villages, markets, people in transit including on bus (ideally prior to departure) etc.
<b>Date:</b>	<b>Location:</b>
<b>Interviewer:</b>	<b>Interviewee:</b>
Interview sample	
Category of user (must be travelling over 5 km)	Minimum Number of Interviews
Small scale farmers	5
Traders	5
Employees eg. teachers	5
Financial services users	5
Students	5
Health users	5
Household managers (housewives)	5
Transport for socio -cultural reasons	5
Passengers on a bus	5
Passengers in a rural taxi	5
Excluded people (eg, elderly, disabled, socially marginalized)	5
<b>Total</b>	<b>55</b>
<b>Survey Questions</b>	
How many people are in your household (dependants)?	
What is your primary transport need for travel outside of the village (over 5 km)?	
Which means of transport do you currently used?	
Do you own your own means of transport? If so provide full details.	
How far do you typically travel in one journey?	
How frequently do you typically make this journey?	
How much do you pay for the transport on this journey? Please specify for freight and person.	
How do you rate the affordability of the service(s) offered?	☺ A - B - C - D - E ☹
How reliable are the transport services(s)?	☺ A - B - C - D - E ☹
Is there any system for consolidating loads? (Mainly applicable to traders and farmers but also for schools eg, any school bus services?)	
Did this journey start or will this journey end with a different means of transport, including on foot? If so provide details of mode and distance.	
What role does telephone play in transport services?	
Approximately how much of your monthly household spending is on transport? How does this vary seasonally?	0-25%, 25%-50%, 50 -75%, 75-100%
Approximately how much time does your household spend travelling on distances greater than 5 km each day?	less than 1 hour, 1-3 hours, 3-5 hrs more than 5 hours
How far from your home do you have to access a motorised public transport service?	
Have you noticed any trends (changes) in rural transport?	
How do the service(s) vary seasonally?	
What are your transport problems?	
How could the transport service be improved for you?	



**Table A5: Checklist of some key questions for transport operators**

Operator Survey Questions	
<b>Date:</b>	<b>Location:</b>
<b>Interviewer:</b>	<b>Interviewee:</b>
<b>Type of operator:</b>	
<b>Sample size:</b>	3 operators of each of the important modes of transport in the survey area (eg. 3 bus operators, 3 donkey cart operators etc)
<b>To be conducted where?</b>	With transport operators on the regional spokes, market spokes and village spokes. Please note that the operators of such services may be based in the larger settlements, also the operator may not necessarily be the owner.
<b>Instructions:</b>	Survey questions relating to prices, distance and costs to apply to an individual vehicle Pricing and costs to be given in local currency (where appropriate these can be converted to international currency in subsequent reports)
<b>Questions</b>	
What service do you provide? eg. Type of freight / passenger route	
What is your normal level loading? (Passengers and freight)	
How far do you travel per trip?	
On average how many trips do you make per week?	
On average how many kilometres do you travel per week?	
Please give details of your tariffs.	
How many vehicles do you operate?	
What is the initial cost of the vehicle / animal?	
What is the age of the present vehicle / animal?	
What is the expected life of the vehicle from the time of purchase?	
How much do you pay per year per vehicle /animal for the following: Licensing, insurance registration / tax fixed taxes other	
How much do you pay per year per vehicle /animal for the following: servicing tyres salaries other	
On average, how much fuel do you consume per kilometre?	
On average, how much do you spend per week on fuel?	
How much do you earn from your transport business per week?	
Are there any incentives available for transport related purchases?	
Have you had access to credit for transport purchases? If so, give details.	
What recent trends have you noticed in transport service provision?	
Who are your direct competitors for business?	
How does the competition affect you?	
What are the regulations for your services and how do these affect you? eg. Government involvement, cartels, checkpoints	
What is the availability of spare parts and repair services?	
What are the safety issues affecting your transport operation?	
Are you a member of any transport association and if so, what if any are the benefits of membership?	
Is there any system for load consolidation?	
If limited funds were available for rural transport improvements what would you prioritise?	
What role do telephones play in transport service provision?	
How does your service(s) vary seasonally?	
What are your transport problems?	
How could your transport service be improved?	

**Table A6: Operator costs summary sheet**

A	B	C	D	E	F	G	H	I	J	K	L	M	N
<i>Transport mode (adapt to local conditions)</i>	<i>Insurance (currency)</i>	<i>License (currency)</i>	<i>Operating taxes (currency)</i>	<i>Other fixed costs (currency)</i>	<i>Total fixed annual costs (currency)</i>	<i>Fixed annual costs (USD)</i>	<i>Fuel &amp; oil (currency)s</i>	<i>Tyres (currency)</i>	<i>Salaries (currency)</i>	<i>Spare parts (currency)</i>	<i>Other costs (currency)</i>	<i>Total variable costs (currency)</i>	<i>Total annual variable costs (USD)</i>
Trucks - less than 3 tonnes													
Trucks - more than 3 tonnes													
Buses (20+ seats)													
Rural taxis (pick up trucks, minibuses, cars)													
Motorcycles													
Bicycles													
Animal drawn cart													
Pack/riding animals (donkeys, etc)													
Water transport – large (more than 30 passengers)													
Water transport – medium (4-30 passengers)													
Water transport – small (1-3 passengers)													
<i>Equations</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>B+C+ D+E</i>	<i>F/exchange</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>H+I+J +K+L</i>	<i>M/exchange</i>

**Table A7: Operator costs calculation sheet**

Operator costs calculation sheet														
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Transport mode (adapt to local conditions)	Distance per year (km)	Passengers or freight carried per year	Initial costs (USD)	Vehicle life (years)	Depreciat ion cost (USD)	Fixed annual costs (USD)	Variable costs per year (USD)	Total costs per year (USD)	Costs per km (USD)	Tariff per km (USD)	Typical load (pax or tonnes)	Typical income per km (USD)	Typical profit per km (USD)	Annual profit (USD)
Trucks - less than 3 tonnes														
Trucks - more than 3 tonnes														
Buses (20+ seats)														
Rural taxis (pick up trucks, minibuses, cars)														
Motorcycles														
Bicycles														
Animal drawn cart														
Pack/riding animals (donkeys, etc)														
Water transport – large (more than 30 passengers)														
Water transport – medium (4-30 passengers)														
Water transport – small (1-3 passengers)														
<i>Equations</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>Data</i>	<i>D/E</i>	<i>Data</i>	<i>Data</i>	<i>F+G+H</i>	<i>I/B</i>	<i>Data</i>	<i>Data</i>	<i>K*L</i>	<i>M-J</i>	<i>B*N</i>
Notes. This table is for guidance and should be adapted to local circumstances. With good data from informants, it should provide 'order of magnitude' estimates of operating costs and profitability. Calculations may need to be adjusted to take account of mixed freight and passenger transport, and differences between total annual kilometres and annual kilometres carrying a typical load. Apparently anomalous results (large profits or losses) should be investigated to identify the problematic data or assumptions														

**Table A8: Checklist of some key questions for support services**

Support services survey questions	
<b>Date:</b>	
<b>Location:</b>	
<b>Interviewer:</b>	
<b>Interviewee:</b>	
<b>Type of support services</b>	
<b>Sample size:</b>	At least one supplier and one repairer of transport for each of the important modes of transport in the survey area (eg, one supplier of minibuses, one supplier of motorcycles, one garage/repairer, one bicycle wholesaler, one bicycle repairer, one cart builder, etc)
<b>To be conducted where?</b>	The suppliers of motorised transport may well be based in the capital, port or provincial town. The importers of bicycles may also be located here. The repairers of motorised transport will probably be found in the provincial town or market town: interviews may be needed in both locations. For the local suppliers and repairers of intermediate means of transport, concentrate on the village level (if support services exist there) and the market town level.
<b>Instructions:</b>	Survey questions relating to supply and repair costs to apply to specified types of vehicles Pricing and costs to be given in local currency. They can subsequently be converted to USD for comparative analysis, if required. Some people interviewed will be suppliers, some will be repairers, and some will combine both functions. While two sets of questions have been prepared, individual interviews should be geared to the particular circumstances of the informants.
<b>Questions for suppliers</b>	
What service do you provide? (eg, type vehicles that are supplied and/or repaired)	
How many vehicles do you supply each month? (of each type)	
What prevents your from supplying more? (eg, lack of demand, capital/credit, workforce, available supplies, etc)	
Why do you supply the types of transport you do? Would you prefer to supply other types (makes/designs)? If so, what are your reasons?	
What price do you buy in at? (eg, cost of imports or materials)	
What price do you sell at (eg, sale price of imported or manufactured transport means)?	
How do you rate the demand for your product? (numbers, increasing or decreasing trends)	
How could you supply for a lower cost?	
Have you had access to credit for your supply business? If so, give details.	
Are you affected by government regulations? (imports, byelaws, etc)	
Who are your main competitors?	
How does competition affect you?	
Do your supplies vary seasonally - if so why?	
Are your supplies readily available? If no, what is the constraint?	
Who are your main customers?	

How could you attract more customers?
How could you attract customers of different types (including women and disadvantaged groups)?
What problems does your supply business have?
How could your supply business be improved?
What recent trends have you noticed in the supply of different types of transport?
<b>Questions for repairers</b>
How many vehicles do you repair each month? (of each type)
What prevents your from repairing more? (eg, lack of demand, capital/credit, workforce, available supplies, etc)
Why do you repair the types of transport you do? Would you prefer to repair other types (makes/designs)? If so, what are your reasons?
What are the major spare parts that you supply / fit?
What price do you buy these parts in? (eg, wholesale/retail cost of parts or materials)
What price do you sell these parts at?
How do you rate the demand for your repair services? (numbers, increasing or decreasing trends)
How could you repair for a lower cost?
Have you had access to credit for your repair business? If so, give details.
Are you affected by government regulations? (imports, byelaws, etc)
Who are your main competitors?
How does competition affect you?
Do your repairs vary seasonally - if so why?
Are supplies of spares and materials readily available? If no, what is the constraint?
Who are your main customers?
How could you attract more customers?
How could you attract customers of different types (including women and disadvantaged groups)?
What problems does your repair business have?
How could your repair business be improved?
What recent trends have you noticed in the repairs of different types of transport?
What role, if any, do telephones play in your repair service?

**Table A9: Traffic count form**

Traffic count form (first part)							
Date:				Location:			
Start time:				Finish time:			
Market day? (Yes or No)				Surveyor:			
Condition of road at count site?				Spoke:			
Counts to include two-way traffic as one total. Counts to be carried out over a 12-16 hour period. If there is significant nighttime traffic, figures may be adjusted to represent the 24 hour traffic (and this should be explained). Surveys to begin early on market days in accordance with local conditions							
Mode	Numbers	Over full	Full	Half full	Empty	Primarily freight	Primarily passengers
Trucks - less than 3 tonnes							
Trucks - more than 3 tonnes							
Buses ( more than 20 seats)							
Rural taxis - Mini bus (less than 20 seats)							
Rural taxi - pick ups							
Rural taxi - cars, 4x4s							
Government / NGO -car / pick ups/							
Government / NGO - trucks							
Private - car, pick ups, 4x4s							
Water transport - large (more than 30 passengers)							
Water transport - medium (4-30 passengers)							
Water transport - small (1-3 passengers)							

Traffic count form (continued)							
Pedestrians	Number	Load over 5 kg	Load below 5 kg	No load	Livestock to market		
Female pedestrian							
Male pedestrian							
Cyclists	Number	1 passenger	Load over 5 kg	neither			
Male bicycles							
Female bicycles							
Motorcycles	Number	1 passenger	2 passengers	3 passengers	Driver and load	Load in addition to passengers	
Male motorcyclist							
Female motorcyclist							
Animal drawn carts	Number	Full	Half full	Empty	1 passenger	2 passenger	3 passenger
Animal drawn carts (separate lines for each type)							
Pack animals (separate lines for each type)							
Ridden animals (separate lines for each type)							
General observations: eg, Time of heaviest traffic, gender issues, types of load							

**Table A10: Example of specialised traffic count form**

Example of specialised traffic count form for particular types of transport (animal-drawn carts)														
Date:								Location:						
Start time:								Finish time:						
Market day? (Yes or No)								Surveyor:						
Condition of road at count site?								Spoke:						
Direction		Type of cart				Driver		Passengers (numbers)			Goods			
To market	From market	Donkey	Ox	Horse (2 wheels)	Horse (4 wheels)	Male	Female	Men	Women	Children	Little or empty	Some	Much	
														1
														2
														3
														4
														5
														6
														7
														8
														9
														10
														11
														12



**Table A11 Traffic count summary – Numbers and Loads**

Traffic count summaries: numbers and loads		
Level (Regional, District or Village):		
Mode	Average number per day	Load (kg) or passengers
Trucks - less than 3 tonnes		
Trucks - more than 3 tonnes		
Buses (more than 20 seats)		
Rural taxis - Mini bus (less than 20 seats)		
Rural taxi - pick ups		
Rural taxi - cars, 4x4s		
Government or NGO cars or pick ups		
Government or NGO trucks		
Private - car, pick ups, 4x4s		
Water transport - large (more than 30 passengers)		
Water transport - medium (4-30 passengers)		
Water transport - small (1-3 passengers)		
Female pedestrian		
Male pedestrian		
Male bicycles		
Female bicycles		
Male motorcyclist		
Female motorcyclist		
Animal drawn carts		
Pack / riders animals (donkeys, camels etc)		
<p><b>Instructions:</b></p> <p>The form needs to be adapted to local circumstances, particularly in relation to loads carried.</p> <p>A total of six summary forms should be produced</p> <p>Regional spoke on market day (average of two counts)</p> <p>Regional spoke on non-market day (average of two counts)</p> <p>Market spoke on market day (average of three counts)</p> <p>Market spoke on non-market day (average of three counts)</p> <p>Village spoke on market day (average of five counts)</p> <p>Village spoke on non-market day (average of five counts)</p> <p>The load (kg) and/or passengers should be the estimated typical load, based on counts and observations</p> <p>Note: in some cases it will be more appropriate aggregate or disaggregate particular counts to show location or market day similarities or difference and to explain findings.</p>		

**Table A12. Example of table summarising fares and transport prices**

<b>Summary of fares and transport prices per kilometre</b> <i>(Adapt to local conditions, repeat for different transport modes)</i>						
<i>Road type</i>	<i>Start of journey</i>	<i>Finish of journey</i>	<i>Distance (km)</i>	<i>Price (currency)</i>	<i>Price/km (currency)</i>	<i>Price / km (USD cents)</i>
Main tar road, high traffic volume						
	Start	Finish				
	Start	Finish				
	Start	Finish				
Good road, low traffic volume						
	Start	Finish				
	Start	Finish				
	Start	Finish				
Good graded road, high traffic volume						
	Start	Finish				
	Start	Finish				
	Start	Finish				
Poor road, low traffic volume						
	Start	Finish				
	Start	Finish				
	Start	Finish				

**Table A13. Example of table summarising the rural transport fleet**

<b>Estimates of the transport fleet operating in the survey area <sup>1</sup></b>					
<i>Transport type (adapt to local fleet types including water transport if appropriate)</i>	<i>Estimated numbers</i>	<i>Unit value (USD)</i>	<i>Overall value (USD)</i>	<i>Unit capacity pax and/or kg</i>	<i>Overall capacity pax and/or kg</i>
Trucks					
Buses (20+ seats)					
Minibuses					
Rural taxis					
Govt, NGO and private					
Motorcycles					
Animal drawn carts					
Pack animals					
Bicycles					
<sup>1</sup> . Notes: estimated based on field observations and . [sources]. These figures are for vehicles mainly used for transport of people and goods within the area on a year-round basis. They exclude national and international level long-distance services, within-village transport, fleets of vehicles of any large companies that do not provide transport services (eg, cotton export or forestry industries) and vehicles that only enter for seasonal markets . Pax = Passengers Unit value should be the normal replacement price, which may be the second hand price if vehicles are generally bought second hand The table should be adapted to local conditions, with additional transport types as required. The passenger and freight columns should be modified according to the types of vehicles and local circumstances					

## **Table A14. Survey report: outline contents**

It is proposed that the survey data be presented in a relatively succinct report of about 20-30 pages, making use, as far as practicable, of tables and diagrams to present data and to illustrate the points. The reports could be based on the framework of the headings listed below.

### **1. Summary**

### **2. Survey background and methodology**

### **3. Introduction to the surveyed area**

#### **3.1 Administration and population**

Including:

- Map of country showing survey area (essential)
- Local authorities / administrative arrangements
- Map of area showing administrative divisions (desirable)
- Population size, density and settlement patterns
- Table giving main administrative divisions and population (desirable)
- Ethnic diversity and religious makeup (very brief summary only)

#### **3.2 Natural resources**

- Land area, terrain, topography and significant water resources
- Climate and natural seasonality
- Land use systems and farming systems

#### **3.3 Economy and services**

- Agriculture and other economic activities
- Average incomes and any easily available socio-economic data
- Public service provision, particularly availability and accessibility of schools and health care
- Electricity and telephone coverage, including mobile phone coverage/use
- Patterns of socio-economic seasonality, if applicable (e.g., closed season for fish, regular weekend visits, important seasonal markets or festivals relevant to transport)

### **4. Survey results**

#### **4.1 Policy and regulatory environment (2-3 pages)**

- Overview of transport policy and framework

**Table: Summary of policy and regulatory framework relevant to rural transport**

#### **4.2 Views of key informants on policy**

- National Authorities
- National Authority Responsible for Poverty Reduction Strategy
- Regional Authority
- District Authority
- Police
- Transport Associations
- Financial organisation
- Donors /World Bank

#### **4.3 Road network and road conditions in survey area**

- Basic map of survey area and/or diagrammatic ‘mapping’ of the transport systems
- Table: Estimates of the road distance and type in the survey area

#### **4.4 Other transport types, if applicable (water transport, railways)**

- Details of important water transport or other transport types relevant to rural transport. With map(s) and tables as appropriate.

#### **4.5 Existing transport services in the area (2-3 pages)**

##### ***4.5.1 Overview regional transport, with types and volumes of traffic***

- Pen portrait of the surveyed area, describing the regional spokes (type of infrastructure) and the transport technologies operating on the spokes. Diagrammatic ‘mapping’ of the regional and market hub systems, if possible

##### ***4.5.2 Overview market town hub and transport***

- Pen portrait of the market town describing the market spokes (type of infrastructure) and the transport technologies operating on the spokes and mentioning the regional spokes and transport operating

##### ***4.5.3 Overview village hub and transport***

- Pen portrait of the typical villages in the area, describing the village spokes (type of infrastructure) and the transport technologies operating on the spokes

##### ***4.5.4 Overview of the transport fleet***

- Table of estimates (guesstimates) of transport fleet operating (select appropriate types of vehicles)

##### ***4.5.5 Transport types on the different spokes***

- Tables and pie charts summarising traffic count information

#### **4.6 Demand for rural transport services and user perspectives (2-4 pages)**

Overview of demand and satisfaction information with specific cases of

- Farmers
- Traders
- Employees
- Financial services users
- Students
- Health users
- Household managers (housewives)
- Transport for socio -cultural reasons
- Excluded people - old, handicapped, socially marginalised
- Passengers on a bus
- Passengers in a rural taxi
- Pedestrians

#### **4.7 Rural transport services technologies and costs (2-4 pages)**

- Table of typical transport fares, sorted by transport type and road type, giving distances calculated costs per km
- Summary table of operator costs
- Pie charts of operator costs (for different vehicle types)

#### **4.8 Support services for rural transport services (1-2 pages)**

- Overview of the supply system(s) and key issues
- Overview of the maintenance/parts system(s) and key issues

#### **4.9 Perspectives of local stakeholders on specific issues (2-3 pages)**

- District Authorities

- Village Authorities
- Police
- Health Managers
- Education - Head teachers
- Transport Associations
- Financial organisation
- NGO / development programmes

## **5. Analysis and conclusion**

### **5.1 Key issues**

- The transport situation and trends
- Profitability and supply issues
- Affordability and demand
- Regulation and associations
- Other key factors influencing transport

### **5.2 Cross cutting issues (1-2 pages)**

- Safety
- Gender
- Environment
- HIV/Aids
- Marginalised people

### **5.3 General implications (1-2 pages)**

- Poverty, millennium development goals and rural transport services
- Priorities according to the different stakeholders

### **5.4 Specific recommendations (1-2 pages)**

- Ways to improve rural transport services
- Specific follow up activities proposed

## **Annexes**

- List of references and resource materials
- List of people contacted/interviewed
- Summary of data forms
- Lessons from the survey methodology