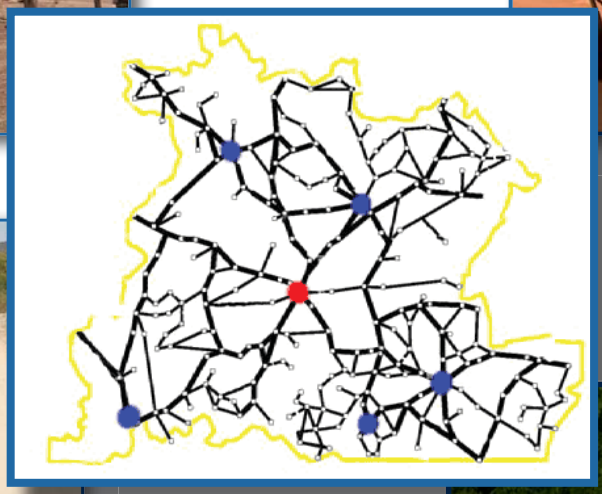
Sub-Saharan Africa Transport Policy Program
SSATP Working Paper No.87-A

# A Methodology for Rapid Assessment of Rural Transport Services

Paul Starkey



*SSATP Working Paper No. 86-A*

# The rapid assessment of rural transport services

***A methodology for the rapid acquisition of the key understanding required for informed transport planning***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*in collaboration with*

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## FOREWORD

As part of the 2004-2007 SSATP long term development plan (LTDP) work program the appropriate transport services (ATS) thematic group decided to embark on the preparation of a methodology to rapidly and efficiently assess the provision of rural transport services in SSATP member countries.

While in Sub-Saharan African countries there is often little knowledge available on the extent and condition of the rural transport infrastructure, even less knowledge exists on the quantity and quality of the provision of rural transport services. In order to design poverty focused transport policies and strategies - the main objective of the SSATP LTDP - knowledge on rural transport services provision is required.

While there are known methodologies for the assessment of urban transport services, to our knowledge no such methodology existed for the assessment of rural transport services, particularly not for the medium to long distance services. Prior to the LTDP, SSATP has done, in the framework of the Rural Transport and Travel Program (RTTP), substantive work on near-village transport services which are mainly provided by (female) porterage and is sometimes assisted by intermediate means of transport (IMT). However, for the medium to long distance rural transport (5-200 kilometers) no appropriate assessment methodology existed.

This study proposes an affordable assessment methodology (costing an estimated $40,000 per country) based on a hub-and-spoke model and being carried out in a representative rural region of a particular country. Open-ended interviews are held with a representative sample of the various stakeholders. All data is geo-referenced by means of the Global Positioning System in order to establish appropriate physical maps of the region. Sample survey forms and questionnaires are annexed to this report.

The SSATP management believes that this methodology provides for a very appropriate and affordable tool for the rapid assessment of the provision of rural transport services, which will substantially assist to improve the formulation of appropriate policies and strategies to enhance such services to help the rural dwellers to better their lives and reduce rural poverty.

Dieter Schelling

Former SSATP, Appropriate Transport Services Team Leader

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## ACKNOWLEDGEMENTS

The work presented here was implemented by Intermediate Technology Consultants (ITC) and WSP International Management Consulting (WSPimc). ITC subsequently changed its name to Practical Action Consulting (PAC).

The implementing team comprised active members of the International Forum for Rural Transport and Development (IFRTD). They made a point of involving other IFRTD members in the planning, implementation and follow up of this work. They attribute much of the success and impact of this project to this IFRTD networking approach.

The author, Paul Starkey, was the team leader and had the responsibility of writing this document. However the methodology was developed by a nine-person team and implemented by team consultants in four countries. This report contains important inputs from all members of the team. Therefore the first acknowledgement goes to the whole team, comprising Paul Starkey (Team Leader, UK), Peter Njenga (IFRTD, Kenya), Stephen Newport (WSPimc, UK), Abdul Awadh (Tanzania), Gnanderman Sirpé (Burkina Faso), Guy Kemtsop (Cameroon), Henry Musonda (Zambia), Liz Tapper (PAC, UK) and Paul Murray (ORH, UK). Priyanthi Fernando (WSP Sri Lanka) was actively involved in preparing the research proposal and participating in the initial email discussion group. She also provided valuable comments on the methodology and report.

The team undertook its planning workshop in Ethiopia, and were able to benefit from exchanging ideas with the Ethiopia National Forum for Rural Transport and Development and staff of the Ethiopian Roads Authority, the World Bank and WSPimc. Particular thanks for assistance with the field visits and logistical support go to Ato Yacob Gebre Medhin, Dr Taye Berhanu, Yeshash Work Kidane and Sam van der Ende.

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The implementing team members are grateful for the opportunity and privilege of visiting many rural areas and learning from many people. During the surveys, many people in capital cities and rural areas provided advice, assistance and logistical support. Thanks go to the various offices that supported the work (including World Bank and Ministry of Transport staff) and to the very many people who were interviewed and provided the information that is central to this report.

Special mention must be made to the consultancy firm ORH Ltd, based in Reading UK. Its Director Mike Vicary collaborated closely and allowed its staff members, notably Paul Murray and Chris Polden to work with the team to develop the mapping system. Time did not allow this to be fully

developed within this study, and it is hoped that there will be future collaboration to take the various valuable ideas generated further.

Finally, and very importantly, the whole exercise was initiated, contracted and supported by staff of the SSATP and PAC. Particular acknowledgement goes to Dieter Schelling, Siélé Silué and Fanny Barrett of the World Bank and to Greg Beeton, Sharon Mackenzie and Kate Devereux of PAC. To these and all who assisted this work, a very big 'thank you'.

Paul Starkey

## ACRONYMS, ABBREVIATIONS, EXCHANGE RATES, WEBSITES

| | |
|---|---|
| °C | degrees Celsius |
| $ | Dollar (United States) |
| 4x4 | four wheel drive vehicle |
| cc | cubic centimeter |
| e.g. | 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 UK) |
| i.e. | that is to say |
| IMT | Intermediate means of transport |
| ITC | Intermediate Technology Consultants (subsequently Practical Action Consulting) |
| ITDG | Intermediate Technology Development Group (now known as Practical Action) |
| kg | kilogram |
| km | kilometer |
| m | meter |
| mm | millimeter |
| NGO | non-governmental organization |
| ORH | Operational Research in Health Ltd (UK consultancy firm) |
| PAC | Practical Action Consulting, UK |
| Pax | passengers |
| PRSP | Poverty Reduction Strategy Paper |
| RAMP | Rural Access and Mobility Program |
| RTTP | Rural Travel and Transport Program |
| sq km | square kilometer |
| SSATP | Sub-Saharan Africa Transport Policy Program |
| t | ton |
| 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<br>USD 1 = 4800 ZK (approx) at time of survey |

**Websites** The following websites concern the organizations mentioned in this report. Some or all of the documents and reports cited here can be seen and downloaded from the first three sites listed

**www.worldbank.org/afr/ssatp**
www.ifrtd.org
www.animaltraction.org
www.practicalactionconsulting.org
www.wspgroup.com/imc

# 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 Africa Transport Policy Program (SSATP) 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. 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/regional towns, market/district towns and villages. Spokes have catchment populations using them to access markets or services. The various spokes and hubs have characteristic combinations of transport, including trucks, buses, minibuses, pickups and intermediate means of transport (IMTs). The smallest spokes are footpaths while national spokes form transport corridors. The methodology surveys transport types, operators, users and regulators at sampled hubs and spokes, stratified by hub hierarchy and remoteness. This provides a rapid overview of rural transport systems, highlighting key constraints, stakeholder views and proposals for improvements.

A region, representing about 5 percent of the country, is chosen where the transport catchment area corresponds approximately to administrative boundaries. Within this area, open-ended interviews are held with the regulatory authorities (local government, police) at provincial, district and village levels. Operators, suppliers and repairers of transport devices (motorized and non motorized) 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 marginalized 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. All data acquired is geo-referenced by taking global positioning system (GPS) coordinates.

During the survey, observations, data and stakeholder opinions are reviewed on a daily basis. Information is specifically triangulated by comparing information from different sources and anomalies are investigated immediately. 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.

## Implementation, reporting and follow-up

The participative methodology requires two months to implement (including planning and reporting). One transport professional, or a small team of experts, undertakes all the semi-structured ('rapid rural appraisal') interviews. Enumerators are not employed for interviews. Undertaking the study will provide excellent experience for transport professionals.

This document contains practical advice relating to local observations, interview techniques, survey opportunities and traffic counts. Illustrative data forms and check lists of possible topics are provided, for modification according to local needs.

The information collected should lead to estimates of the regional fleet of motorized and non-motorized vehicles, and the traffic characteristics of the sampled spokes. Tables of passenger and freight costs for different transport means and road types can be compiled. Many results can be presented in graphical form, including public transport routes and areas without access to motorized transport. Computer-generated maps can be used as models in subsequent planning. The survey processes will generate valuable information and also stimulate debate on improving rural transport services. This momentum should be followed up with stakeholder workshops in the surveyed area and a national workshop on improving rural transport services.

The survey methodology was tested in four countries and five detailed reports are available to consult. The findings of these surveys have been summarized in the companion SSATP working paper: Rural transport services in Africa: lessons from surveys in Burkina Faso, Cameroon, Tanzania and Zambia. This also contains a discussion of the key issues that emerged, and the implications for improving rural transport services.

# 1. BACKGROUND AND INTRODUCTION

## AIM OF 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 to improve rural access and mobility in order to unlock the potential of poor people in rural areas.

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. The challenging task would involve obtaining estimates of the existing motorized and non-motorized 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 provide some suggestions of ways by which the various services could be improved.

## PLANNING THE METHODOLOGY IN ETHIOPIA

Members of the team met in Ethiopia from 4-8 April 2005 to agree on 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, the Ethiopian Roads Authority and the World Bank. Before and after the workshop, field visits 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 described in detail in Chapters 3-6, 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 authorities (government, regulators, national and decentralized), transport operators (passenger, freight, mixed, intermediate means of transport), supporting services (suppliers, repairers and financial services) and a very wide range of users and potential users.

## IMPLEMENTING THE PILOT SURVEYS AND LESSONS LEARNED

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 traveled about 3000 kilometers 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, initial survey findings and their implications for improving rural transport services in their respective countries.

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

### Financial costs and time needed for remote surveys and replication

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 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.

One of the issues discussed during the methodology review related to replication. The team strongly supported the idea of carrying out surveys in two or three regions, provided resources were available. The experience of the Tanzanian consultant was discussed. He had surveyed two separate ar-

eas, using the same time and resource allocation as the other consultants. 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.

Unlike questionnaire surveys that involve separate processes of data collection and subsequent analysis, this methodology requires almost daily analysis, as part of the triangulation and team discussions. With such 'rolling' analysis, and daily identification of information gaps, it should theoretically be possible to complete all the survey work in one visit of three weeks. However, all experts undertook two separate visits and felt that this was necessary as they were able to use the second visit to gain specific information that was lacking and explore key issues in greater depth. Therefore funds should be budgeted for two separate visits of two weeks (depending on local conditions).

## Adapting to survey design to local conditions

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. The surveys indicated for example that there were no animal-drawn carts in Southern Cameroon, and therefore 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 numerous animal-drawn carts, and one single category was insufficient. There were two-wheel and four-wheel carts, pulled by oxen, donkeys and horses, 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.

## Importance of survey skills and etiquette

The importance of protocols and survey etiquette were highlighted during the pilot surveys. In some countries, the relevant authorities had not been adequately informed. This caused unnecessary friction when visiting some government offices. The importance of appropriate advance letters has therefore been specifically mentioned in the methodology. Some transport professionals were unfamiliar with participatory techniques, opportunistic interviews and open-ended (semi-structured) questioning. They felt uneasy interviewing people encountered along the roads or at transport hubs. They did not have the confidence to ask spontaneous questions and tended to read out questions from the check lists. These skills were quickly acquired and the benefits of them were greatly appreciated. However, this could be an initial problem for someone starting to apply this

methodology without training. For this reason, many practical details relating to interview techniques, lines of questioning and the importance of personal observations have been included in this document.

## Separate realities and need for validation


**Transport on national road in southern Cameroon. Although passing through a rural area, the heavy traffic is primarily inter-urban and is not representative of the rural transport systems**

The transport experts undertaking the surveys found that some national and regional transport authorities seemed unaware of the realities of rural transport. The authorities in certain countries did not accept the validity of some of the survey observations relating to low levels of motorized transport, the importance of intermediate means of transport or the effect of corruption on transport prices. This has several implications. It is clearly vital for the survey experts to triangulate information from different informants (e.g. authorities, operators, users) and from personal observations to ensure that they are fully aware of the true reality of the existing transport services. It is essential that the survey experts visiting the remote rural areas are the same experts who interview the national and regional authorities, so they can describe what they have seen with their own eyes. It is also important that key observations that may appear controversial are validated by stakeholder groups, which should include devolved government where practicable. The true situation can then be presented in the final report, not only as survey observations, but also as validated findings accepted by a range of stakeholders.

## Defining provincial/regional and market/district towns and hubs

The hub and spoke system is central to the methodology. In Chapter 2, the four levels of hub are defined and described, in terms of their administrative, economic and transport importance. In all the countries visited, this hierarchy of hubs was clearly apparent. However, the names of the administrative areas surrounding the hubs do differ. In Zambia, there are provinces and districts, while in Tanzania there are regions and districts. In Cameroon there are regions and divisions, while in Burkina Faso there are 'régions' and (somewhat confusingly) 'provinces' (equivalent to districts/divisions). In this report, the terms regional and provincial are used interchangeably to describe the larger area. The smaller administrative areas are referred to here as districts. In many cases, a market town is also a district town. However the term market hub and district hub are not totally interchangeable, as one district can have several markets. Thus in one district there could be several market hubs, but only one district hub.

## SURVEY REPORTS AND SYNTHESIS OF FINDINGS

The consultants responsible for undertaking the surveys have each prepared a report of their survey work. These 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 summarized the regulatory environment and made various suggestions for improving the rural transport services in the surveyed area. These detailed survey reports contain much valuable information and many insights. Copies are available on several websites (see website addresses in the acronym table).

In a separate SSATP working paper[1], the author of this report summarizes some of the key lessons from the five surveys. This contains selected observations from the four countries as examples of what this methodology can achieve. It goes on to analyze the implications of the pilot survey findings and to discuss the policy implications of the results.

## 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 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.

In the associated SSATP report, some suggestions arising from the pilot testing of this methodology have been given, with some options and mechanisms for improving the quantity and quality of rural transport. No single report could provide universal answers to rural transport problems, since rural transport services are very situation-specific. It will be for various people in different countries to use (and modify) the ideas presented here to acquire new understanding in their own countries. They can then start informed debates on how their 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 adapt this methodology, engage in the debate, move it forward, and help fulfill the vision of a virtuous circle of improving rural transport and a better quality of life for rural families.

[1] Paul Starkey and Al (2007), 'Rural transport services in Africa: lessons from surveys in Burkina Faso, Cameroon, Tanzania and Zambia', SSATP Working Paper 87-B.

# 2. 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 depend on understanding and identifying the various hub and spoke systems operating in the selected areas. This chapter introduces 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 and is distributed from one or more directions. This is illustrated in Figure 2.1. In Figure 2.1a, there are eight unconnected points, while Figure 2.1b the points are linked to a central hub by spokes that both converge inwards and radiate outwards.

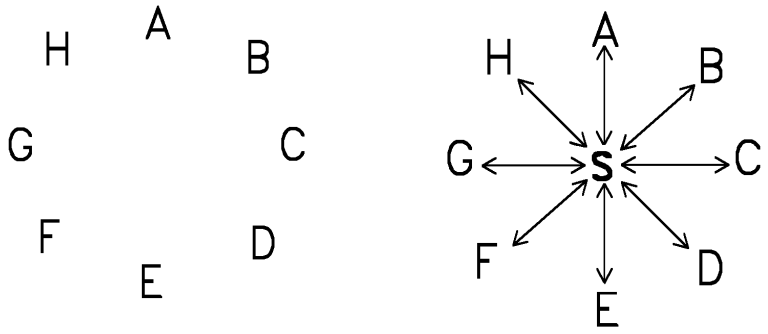


*Figure 2.1 a and b. Eight points, connected by a hub and spokes*

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

- 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 organizations and transport systems have hierarchies of hubs. The central point in the simplified diagram (Figure 2.1), would actually be part of another wider network. Similarly, the peripheral points (or nodes) may also be hubs for smaller networks, as illustrated in Figure 2.2. Telephone exchanges show hierarchies of hubs and spokes and so do delivery services and commercial manufacturing and distribution systems (factory, wholesalers, retailers).

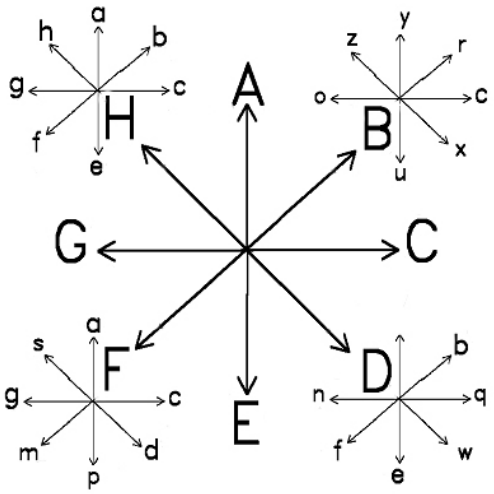


*Figure 2.2. Eight points, forming a hub and spoke network, with sub-networks*

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 2.3. This is true for most road systems and information exchange networks.

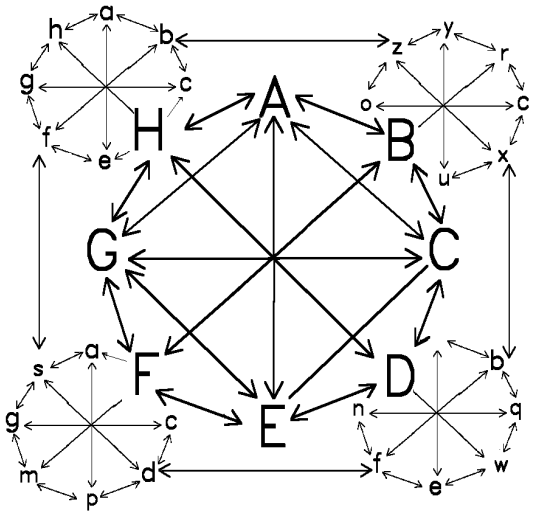


*Figure 2.3: Eight points, forming a hub and spoke network, with additional peripheral links and sub-networks*

Even though Figure 2.3 represents a complex situation showing a hub and spoke system. 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 AND SPOKES

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, trading centre and probably regional/provincial authorities) with spokes leading to . . .
- Market towns or district 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 2.4.

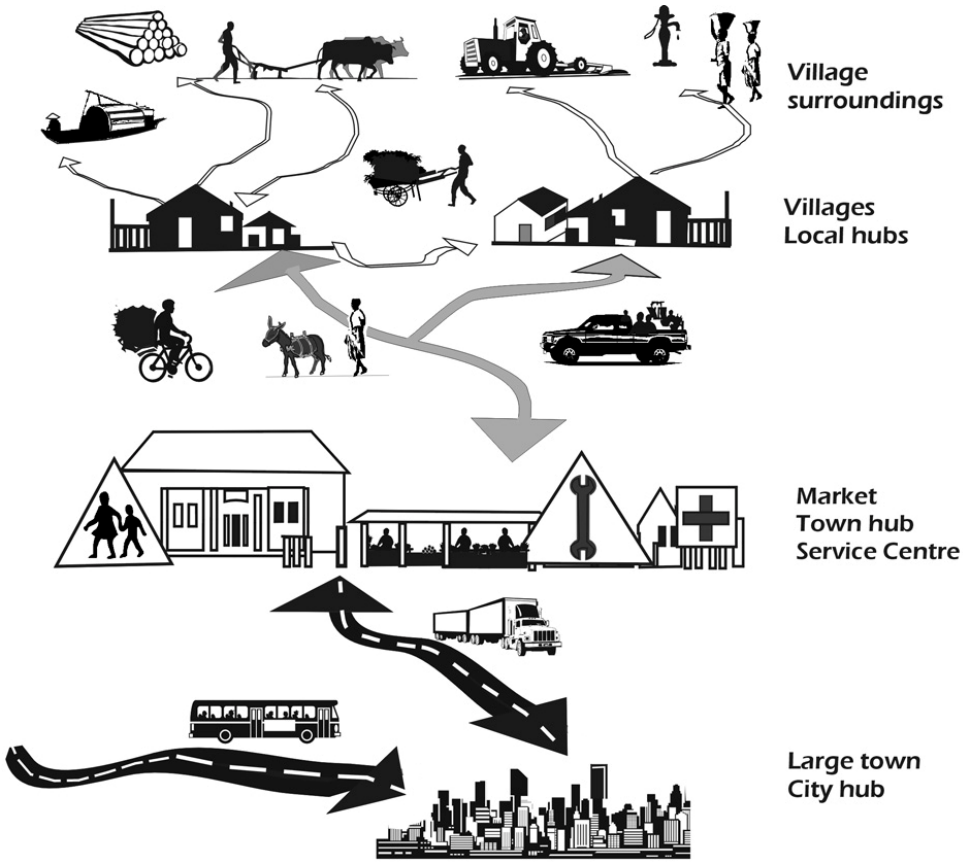


*Figure 2.4: National transport system, with a hierarchy of hubs*

The main cities within a country are joined by intercity transport links (main roads, perhaps rail and air links). The cities may be linked to ports and neighboring countries. These national and international intercity transport connections may be described as transport corridors. They have relatively high levels of 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 towns as transport hubs. Market towns (an economic description) are very often the centers of local government, and may be called district towns (an administrative description). The local government activities and employment in a district town lead to greater transport (official and private) and this reinforces the importance of the town as a transport hub.

## TRANSPORT CATCHMENT AREAS

The area around any hub is known as a '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 (public and private). The regional catchments include several smaller-scale 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 and regional services to the various market towns.

An example of a regional hub system is shown in Figure 2.5. Figure 2.5a shows a map of the Boucle du Mouhoun region in the north west of Burkina Faso, and Figure 2.5b 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.

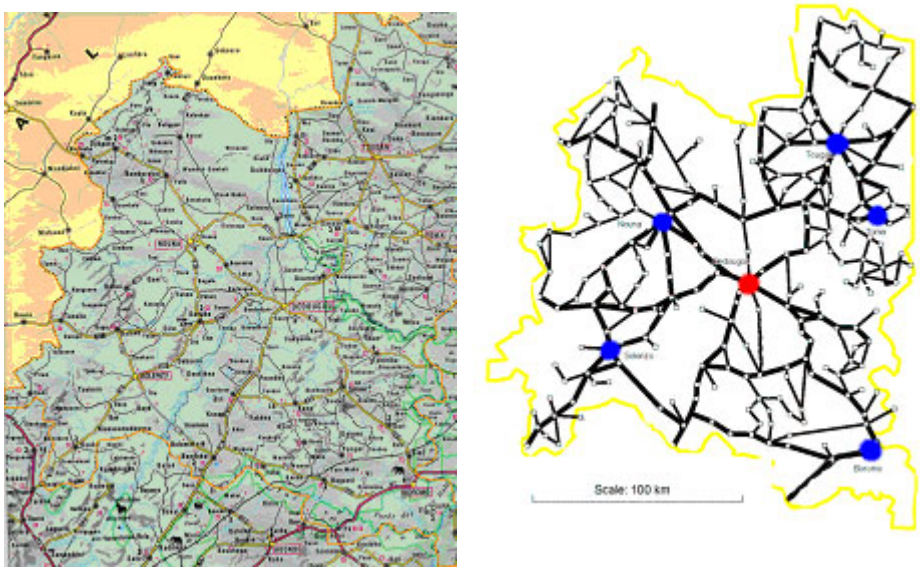


*Figure 2.5: Example of a regional hub system in Burkina Faso*
*Fig 2.5 a (left) is a map of the Boucle du Mouhoun region and Fig 2.5b (right) is a schematic map of the road system, showing the regional hub (red, or light grey) and five market town hubs (blue, or dark grey).*

This concept of a hierarchy of rural transport hubs and spokes serving rural catchment areas is central to this methodology. In this conceptual model, a regional or provincial town is surrounded by several market towns, themselves surrounded by many villages. This is illustrated in the following diagram (Figure 2.6).

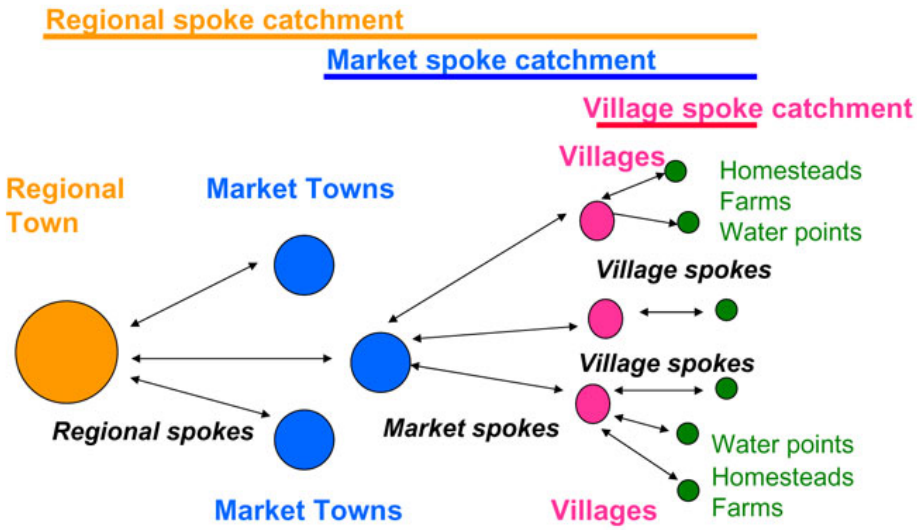


*Figure 2.6: Conceptual model of a segment from a regional transport hub system*

The hierarchy of rural hubs and catchment areas is broadly valid for marketing and distribution systems, 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 systems 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 level only connecting to secondary level and the latter only connecting to tertiary level. 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.

A market town hub in Burkina Faso, with long-distance trucks, buses and shorter distance intermediate means of transport

Transport hub and spoke systems are seldom totally discrete, for they join up with other hub and spoke systems, including those of neighboring 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 only be part of one administrative system). On the border of a political catchment area, it is not unusual for people to use one hub for administrative matters (licensing, taxation, salaries), while using the neighboring transport system for their inputs and marketing.

To illustrate the fact that administrative and transport catchments may not coincide, an example can be taken from the Hintalo Wajirat district (woreda) in Ethiopia. This district lies to the south of Mekelle, the regional town of Tigray. The district lies on a national road running north-south (Mekelle to Addis Ababa) and most district spokes feed into this combined national and regional spoke. Most of the district is therefore part of the transport catchment area of this regional spoke to

and from the regional town of Mekelle. However, the northwest of the district lies on another regional spoke to and from Mekelle. This is illustrated in Figure 2.7. The two catchments are connected by a good district road that runs from Dengolat via Hintalo to the district town of Adi Gudom. However, this road, one of the best in the district, has hardly any traffic on it, the traffic mainly flowing along the various spokes of the Mekelle regional hub and spoke system. To go between the two transport catchment areas of the district by public transport, requires going into the regional town on one spoke, and out on another. In this case, the economic and transport catchment areas do not coincide with the district boundaries. In this district, appreciating how the different hub and spoke systems are operating would be crucial to understanding the existing patterns of rural transport and ways of it might be improved.

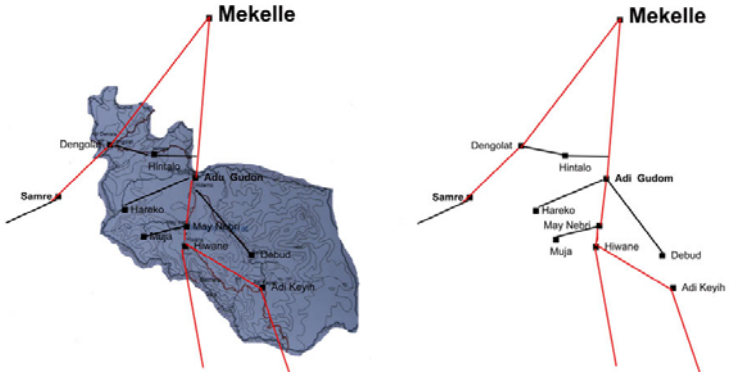


*Figure 2.7 Example of a district catchment that does not coincide with the transport catchments. Map of Hintalo Wajirat district (woreda) in Tigray, Ethiopia, showing national/regional spokes (in red, or grey) and some district roads (in black). The villages in the northwest are on a different regional spoke to those in most of the district. The district is part of two separate transport catchments of the Mekelle regional hub.*

## TRANSPORT CORRIDORS

A village bus stop on a major corridor route in Tanzania has become a small transport hub, with rural taxis and intermediate means of transport providing transport links to outlying villages.

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 centers 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 the national hub pattern.

An example of regional transport strongly influenced by a transport corridor is shown in Figure 2.8. The main road from the port of Dar es Salaam to the town of Mbeya and on to 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 influence 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.

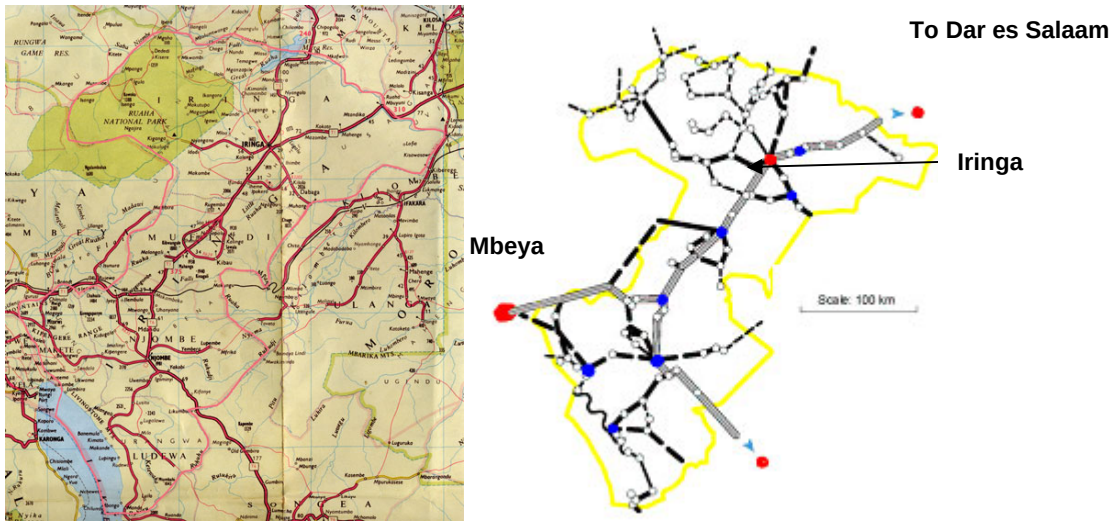


*Figure 2.8 Example of a transport corridor in Tanzania and hub and spoke systems*
*2.8a (left) Map showing Iringa Region in Tanzania. 2.8b (right) schematic representation of resulting hub and spoke systems. The grey roads joining the red (or grey) dots represent corridor transport (part of the national 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. Waterways for instance, 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 on infrequently used regional roads.

There is very often significant movement of people and goods across national frontiers, even if this is clandestine and without roads or border posts.

An important cycle route between villages and markets in Burkina Faso is an 'invisible' spoke that is not on the regional road maps

Weekly or monthly markets can act as important transport hubs on market days. Villages barely mentioned on road maps can, once 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 recognize. 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, it should be possible in all areas to see clear signs of a hierarchy of hubs and spokes embedded within the rural transport network. To appreciate these can be 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.


A market town transport hub in Tanzania: most routes of buses and minibus start or finish at such hubs, making it possible to record all the public transport routes in the area.

Rural taxis (including minibuses) are likely to operate from the regional town or 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 between 2 or 10 kilometers 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 are 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, 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 motorized and non-motorized 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 following chapters.

# 3. OBJECTIVES AND ANALYTICAL FRAMEWORK

## OBJECTIVES

In order to alleviate poverty and stimulate economic growth, rural people need adequate transport to access goods, services, facilities and economic opportunities. To improve rural accessibility, governments have invested heavily in roads, with the support of development banks and aid agencies. There has been little investment in rural transport services, which have been largely left to the formal and informal private sectors to provide. Inadequate rural transport appears to be a constraint to poverty alleviation and development, particularly for the more isolated, impoverished and marginalized communities. In rural areas, particularly the more remote rural areas, there appears to be a vicious circle of poor transport, inadequate access to services and limited economic opportunities. Governments, aid agencies and rural communities wish to change this into a virtuous circle of improved transport, better access to services and greater economic development.

There do appear to be examples of such virtuous circles of better transport, better access and greater economic opportunities, but they tend to be in peri-urban areas or associated with special economic situations (irrigation schemes, rural employment opportunities). Many rural communities remain isolated and impoverished with inadequate access to transport services.

The realities of rural transport are often poorly understood by urban decision makers. The extent to which the private sector is meeting the rural demand for transport is not known. There is little data on the existing transport services, the numbers of intermediate means of transport in use, the portion of rural people with no access to motorized or non-motorized transport. What is constraining the provision of safe, clean and reliable rural transport services? How can rural women, men and children have better access to affordable transport? In many countries, these are unanswered questions, and there is insufficient understanding of the situation to allow informed strategy formulation and policy action to address rural transport services.

The methodology aims to acquire, in a relatively short time, the information and understanding needed for informed planning and decision making that can improve sustainable passenger and freight transport in rural areas.

### Activities

The methodology requires

- review of the regulatory environment
- geo-referenced observations of different hub and spoke systems
- participatory assessment with the key stakeholders of the existing rural transport services, and how they might be improved

- complementary quantitative data collection including traffic counts
- triangulation of findings with different stakeholders

### Outcomes

The study will provide:

- descriptions of the rural transport systems and its hub and spoke patterns
- estimates of existing transport fleet (including IMTs) and traffic movements
- transport needs and wants of a range of users
- examples of good practices and constraints
- options for improvements arising from and/or validated by local stakeholders

## ANALYTICAL FRAMEWORK

Rural transport systems comprise:

- Infrastructure (roads, bridges, tracks, footpaths, waterways, terminal hubs and spokes)
- Individual users (or potential users), differing by gender, age, wealth, occupation, ethnicity
- Institutional users (health, education, government, NGOs, commercial companies)
- Means of transport (motor vehicles, intermediate means of transport, animals, boats) or lack of them (walking, failure to travel)
- Operators of transport (transport companies, agencies, taxi-operators, owner-drivers, users of IMTs)
- Transport regulators (governments and agencies, police, transport associations)
- Physical, ecological, socio-cultural and economic operating environment.

All these have numerous variables and characteristics and a comprehensive survey of all possible parameters affecting rural transport would be impracticable. There is a need to focus on key issues. This methodology proposed focuses on obtaining information on:

- **Pattern of transport**: hubs, spokes and transport routes
- **Means of transport** (motorized and non-motorized): vehicle types, frequency, loads (passengers/goods)
- **Transport supply**: service operators, operating costs, fares, suppliers, repairers, operating environment
- **Transport demand**: users and potential users, purposes, affordability
- **Transport regulation**, policy, enforcement, incentives and disincentives

Inevitably, there are numerous cross-cutting issues that affect or are affected by each of these areas of focus, including economic and development concerns, or the needs of rural people for sustainable livelihoods and appropriate health and education services. The methodology flags poverty, safety, gender, environment, HIV/AIDS and marginalized people to ensure they do receive atten-

tion. Other important cross-cutting issues should be highlighted by those implementing this methodology and included as interview topics throughout the survey.

## Methodological approach

The methodology developed is intended to be:

- Inclusive (involving national and local authorities, the formal and informal private sectors, NGOs and all sections of rural communities)
- Participative, based mainly on open-ended discussions
- Gender sensitive, culturally aware and recognizing the needs of various groups with specific transport needs (mothers, children, elderly, handicapped, HIV/AIDS affected)
- Qualitative, based on in-depth discussions with a wide range of rural stakeholders, ascertaining their views on the existing situation, key constraints and their ideas for improvements
- Quantitative, in order to gain reliable estimates of key statistics and indicators
- Rigorous, with tested systems of stratification, data collection and analysis
- Accurate and verifiable, through systems of information triangulation
- Geo-referenced, allowing all data to be included in maps and models
- Transparent, with broad acceptance by the various stakeholders of the validity of the data and its implications for national and local authorities, transport operators and rural communities
- Flexible and adaptable, designed to be modified in accordance to local conditions and the specific interests of those commissioning the work

## Qualitative and quantitative data collection

This methodology concentrates on qualitative data collection. Semi-structured, interactive interviews are used to collect data relating to people's ideas, attitudes, priorities, preferences and perceptions about the roles of transport in their lives and that of the community. Samples of people will be selected for interview, based on their occupation, their gender, their travel needs and their location (surveys are stratified by hub type and remoteness). During these interviews, some quantitative data will be obtained, such as travel frequency, prices, distances and times. However the small sample sizes and the lack of random selection, mean that these figures will

A rural market in Guinea by a river crossing that has developed as a transport hub, served by trucks, rural taxis, motorcycles, bicycles, animal carts, boats and pedestrians

not be statistically significant. They will however provide useful order-of-magnitude estimates relating to the 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.

For most of this survey, quantitative survey techniques would be inappropriate as they tend to constrain learning opportunities by predetermining both the topics to be addressed and the response options. Comprehensive quantitative surveys, with larger random samples would be slow and labor-intensive, requiring detailed knowledge of the key issues and the data required from the outset. The rapid survey methodology, with its emphasis on qualitative data, may well identify a few key areas where there is insufficient reliable data available. This could lead to some highly focused and targeted quantitative surveys to gain specific information, although these would probably be recommended as follow-up activities.

Traffic counts will be undertaken on a variety of spokes (stratified by hub type and remoteness) on 'normal' and busy days (market day or similar). This will lead to quantitative estimates of the overall numbers and types of people, and means of transport, the extent they are loaded and the relative importance of the different forms of transport on that spoke.

### Adapting the methodology to the needs of the client

In the following chapters, the methodology will be presented in the form of guidelines concerning:

- planning the survey (team, area, topics)
- data collection tools (reviews, geo-referenced observations, interviews, traffic counts)
- reporting and follow ups

The methodology has been designed primarily for organizations concerned with rural transport services. These could include planning ministries, national or regional transport authorities, regional development authorities and associated aid agencies. The methodology is intended to be flexible and adaptable to various situations and needs. For example, the emphasis can be placed on particular environments (e.g. mountains, coastal communities), transport users (e.g. women, children), economic sectors (e.g. agricultural marketing), health concerns (e.g. HIV/AIDS) or social issues (impact on displaced peoples). While the following chapters contain many specific recommendations for planning, implementing and following up the rapid surveys, it is stressed that the methodology (and data forms) should be modified in the light of local conditions and the needs of the organization commissioning the work.

# 4. PLANNING TO IMPLEMENT THE METHODOLOGY

## INTRODUCING THE METHODOLOGY, PROCESSES AND TIMESCALE

### 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 decentralized), 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.

### 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 organizations 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. The aim is to verify the information and ensure that the various stakeholders take ownership of the conclusions. This should not only initiate debate, but lead to collaborative action 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 are likely to be more effective. The methodology requires analysis and triangulation on a daily basis in the field, and so technically it should be possible to obtain all the information needed in a single visit. However, experience suggests that it would be better to start to prepare some of the key maps, tables, area descriptions and discussion of the main issues arising after two weeks of survey work. The second visit could then be more targeted on information gaps and greater exploration of the key topics 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.

## SELECTION OF THE IMPLEMENTING ORGANIZATION OR RESEARCHERS

A small team of researchers working very closely together could implement this methodology 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, or 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 analyze 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 the same researcher(s) who visits the remote villages and talks to marginalized rural stakeholders is/are the one(s) who interviews the national and regional decision makers. Given the importance of gender issues and the need to interview many rural women it could be beneficial if the researcher, or one member of the team, were a woman.

The survey will involve geo-referencing data. The use of Global Positioning System (GPS) technology is straightforward. If members of the team do not have the necessary skills, these can be easily acquired at the outset of the survey. However, the subsequent handling of the GPS data will probably require the skills of someone experienced in Geographical Information Systems (GIS) and mapping software. If an appropriate expert can be found to analyze and present the GIS data in the form of maps and models, this would be extremely beneficial. However, if such expertise is not available, the methodology can still be used effectively (the five pilot studies were successfully completed without geo-referencing). Nevertheless, it is strongly recommended that a GIS expert be consulted

at the outset of the survey (before any data collection) to advise on the practicalities of geo-referencing all the survey data, and ways in which such data can be presented in the form of maps.

Appropriate and proficient staff of a transport ministry, a NGO, a university or a 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 with 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 local, 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 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 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 tons and heavy)
- Buses (more than 20 seats)
- Rural 'taxis' (mini-bus, pickup, car, 4x4)
- 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.

A water way in Madagascar, is an important (but 'invisible') transport spoke with numerous small and medium size boats providing personal transport and transport services

## Additional transport services and intermodal links

The methodology is designed to be open ended, and can be adapted to local circumstances. In many countries, air services are primarily intercity connections that cannot really be considered as important components of the rural transport systems. However, in some countries small planes provide invaluable links for isolated rural communities and should certainly be studied. Whether or not air services should be included within surveys might depend on whether local stakeholders (including rural medical services) mention their importance. If there are other transport types that play important roles in medium-distance rural transport, additional survey categories may be added. Examples could include tractors, tricycles and specialized 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 (e.g. when an organization 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 needs careful thought in order to be representative or typical. Various areas 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 recognized 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 organization 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 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 or 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 organization 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 (e.g. presence of water transport, high diversity of transport types, poverty and remoteness) and prioritize 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 preselected 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 the methodology be carried out in each of the representative areas (e.g. ecological zones, different degrees of poverty and remoteness).

| Some reasons for inclusion | Possible reasons for exclusion |
|---|---|
| ▪ Good match of transport catchment areas with administrative divisions<br>▪ Spectrum of different settlements (regional town, market town, villages and homesteads)<br>▪ Spectrum of different types of transport<br>▪ Availability of secondary data | ▪ Strong influence from an international transport corridor<br>▪ Strong cross-border influences and transport<br>▪ Politically atypical<br>▪ Near major city<br>▪ Large and 'atypical' commercial presence in the region e.g. mines, atypical large-scale agriculture<br>▪ Logistical constraints and practicalities (access) |

## 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 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 categorized 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 3.1 provides a reminder of the theoretical hub and spoke model, on which the stratification is based.

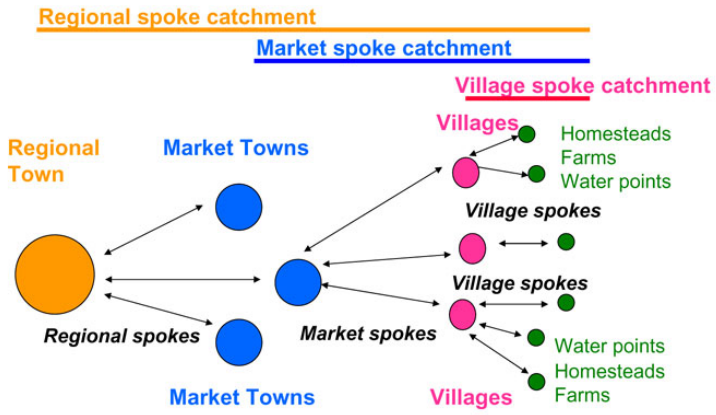


*Figure 4.1: Conceptual model of a segment from a regional transport hub system*

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 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, as well as with some poverty-focused development organizations. 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

An access path to a village in Tanzania. The methodology requires researchers to visit villages representative of the 10% most remote villages that may not have easy access for vehicles.

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 center. It is assumed that there will be homesteads and smaller settlements (without schools) in the surrounding areas.

The towns will have already 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 percent most remote villages. It is therefore quite likely that this village will not have access to motorized 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 3.4.

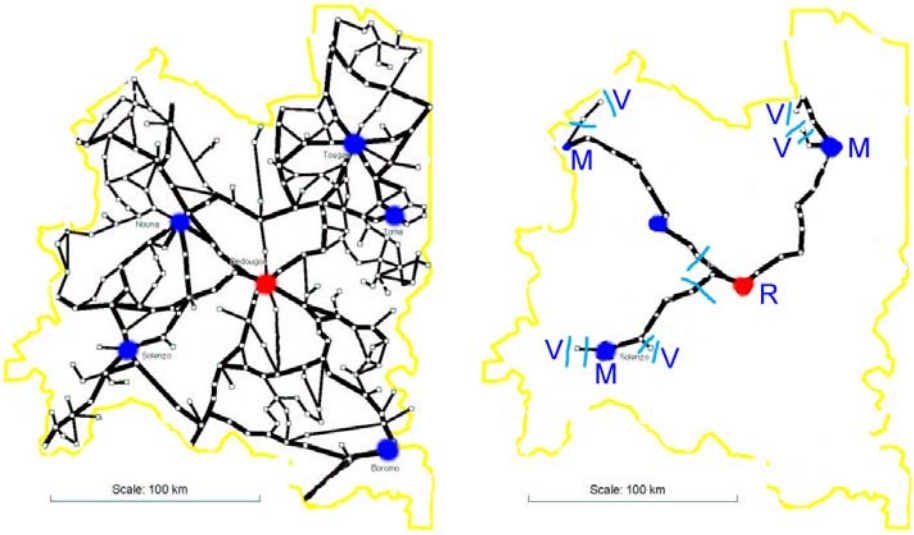


*Figure 4.2. Example of market and village hub selection in Burkina Faso*
*Fig 3.4a (left) is a schematic map of the Boucle du Mouhoun region and*
*Fig 3.4b (right) shows the market towns (M) and village (V) hubs selected for surveying.*
*The lines show where traffic counts were made. The many criteria, including road condition, which influenced the selection of these towns and villages are described in the survey 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, the extent to which 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 used 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 carried out on certain of the spokes associated with the selected hubs. The counts will be carried out on 'normal' and 'busy' days (e.g. market days) at 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 are 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 (which is available for downloading).

### 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 would be an appropriate sample size that will capture a fair range of opinions and experiences and provide reasonably consistent estimates of costs and prices. Experience from the pilot surveys suggested that a minimum of five people should be interviewed from all broad and wide-ranging categories of users (farmers, patients, students). If the interview results show large variations in the information being collected, the sample size should be increased. In this case, the extra interviews can focus on the particular variable of interest. In some categories with a narrower professional interest in transport, three people may be sufficient (e.g. head teachers, local administrators, cycle repairers). 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. Prior to the pilot surveys, it had been assumed that motor vehicle operating costs would be easy to assess through just three in-depth interviews. However, in some countries, the variation was so great the sample size had to be increased to five.

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

For all categories of informants, the actual numbers of people interviewed will depend on local conditions and any particular concerns of the organizations arranging the survey. With increasing diversity (ecological, economic, cultural, transport type) there will be a need for more interviews to capture this. A survey focusing on agriculture would have more interviews with farmers, livestock keepers, extension workers and produce traders. A survey with a particular interest in maternal and child health care would interview more women and more health workers. The following list is therefore only illustrative of the type of informants and minimum numbers of interviews. A check list is also given 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 motorized 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 organization (might be at other levels too) (1)
- NGO / programs (might be at other levels too) (1)
- Regional repairer of motorized 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 organization (might be at other levels too) (1)
- NGO / programs (might be at other levels too) (1)
- Passengers in a rural taxi (market spoke) (5)
- Operator of main mode of transport, e.g. rural taxi (3)

- Operator of main mode of transport, e.g. truck / bus (3)
- Market town repairer of motorized transport (1)
- Seller of bicycles (market town) (1)

### Village level interviews

- Village authority (3)
- Farmers (5)
- Traders (5)
- Employees traveling 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 marginalized (5)
- Operator of main mode of transport, e.g. bicycle / cart (3)
- Repairer of bicycles (village level, if possible) (1)
- Manufacturer/repairer of carts (if available) (1)

Hand-driven tricycle in Burkina Faso. Interviews should be held with at least five 'excluded' people, who may be old handicapped and/or socially marginalized

The list of village-based users contains several overlapping categories. For example, a woman can be a housewife, a 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 traveling 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 (i.e., 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 (e.g. 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.

Woman trader operating motorcycle in Burkina Faso. At least 40% of interviews should be with women and should include female operators of transport, where this is applicable.

# 5. DATA COLLECTION TOOLS AND TECHNIQUES

In this methodology geo-referenced evidence will be gathered from:

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

The use of several data collection tools is important as it assists the process of 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. Triangulation is a technique that can lead to rapid understanding of complex situations, particularly if it is undertaken on a daily basis by the team implementing the survey. This is discussed in more detail later in this chapter.

## GEO-REFERENCING ALL SURVEY DATA

It is recommended that all the data collected is geo-referenced. This means that Global Positioning System (GPS) coordinates should be recorded in all relevant situations. In many situations, basic GIS (geographical information systems) data may already exist for villages and the road network. There may also be GIS information on health services. Some countries have started to geo-reference socio-economic data. Where existing GIS information is readily available, this should be verified and built upon. Where there is no existing information, GPS coordinates should be taken during the survey, and recorded together with the survey data.

All towns, villages and localities should be geo-referenced. In the areas visited, all transport infrastructure (the hubs and spokes) should also be geo-referenced by recording the coordinates of the roads, tracks, footpaths, bridges and terminals. A full GIS survey is not required, but if observations are made concerning the infrastructure and its condition (road impassable in the rains, broken footbridge), the GPS coordinates should be recorded. GPS readings should be taken wherever interviews are held and observations make. This is not particularly onerous and should become a matter of course for the survey team.

Geo-referencing survey data is a relatively new concept, and the value and importance of geo-referencing data was not appreciated when this survey methodology was first developed. The collection of GIS data was not an integral part of the pilot surveys, and so the use of GPS technology was not tested by the project team. However, as the value of GIS mapping and modeling became clear, it became apparent that all data should be geo-referenced, and this is now an integral part of the methodology presented here.

Some ways in which the GIS data could be presented and used are provided in the section relating to report preparation. It is appreciated that GIS is a relatively new area of expertise and incorporating it into rapid appraisal surveys is quite innovative. It may not be practicable for some survey teams to make full use of the geo-referencing of data when preparing their reports. If this is the case, they will still be able to use all other aspects of this methodology and gain excellent qualitative and quantitative information. Even if teams do not have access to GIS expertise, it is suggested that they should still try to geo-reference all data as it is collected. In the future, geo-referencing is likely to become a standard practice throughout the transport sector, and geo-referenced data-sets will be much more useful to future planners and researchers.

## 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 sub-regions) 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 organizations working in the area that should be contacted.

Organizations to approach at the outset for relevant reports, maps, GIS data 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 researchers 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 GPS recorder, a simple digital camera and a USB memory stick. The camera can be invaluable for copying maps and the information displayed on office wall charts. It can even be used to copy documents when the electricity is off or when the photocopier has failed. 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. The GPS recorder allows all observations to be reliably and quickly geo-referenced.

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 researchers will probably have a unique opportunity to see in a short time a large range of road conditions, transport technologies and rural transport situations. They 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. In addition to recording the location of observations with GPS readings, it is suggested that annotations are made on one or more of the outline maps mentioned above. Such maps will help to build up a picture of existing transport infrastructure, services and issues on the various transport spokes being studied.

## Traveling traffic counts

View while traveling along a road in Burkina Faso. Throughout the study, researchers should note the road condition, the numbers and types of traffic, and the types of users and loads

Traveling 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 color, decoration or design? What are the degrees of loading? What is the age and condition of the vehicles? Who is operating them? Who is traveling in them? 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 and male/female? Why are there these ratios?

Such personal observations should be analyzed in terms of the hub and spoke model. What type of spoke is this road? How does the volume and type traffic on this spoke differ from other spokes, and why? On this spoke, are there smaller transport hubs (fed by smaller spokes) along the way (eg, at villages, junctions, markets)? What is the means of transport along these minor spokes? Is there complementary 'feeder' transport? What is done at the hubs to organize and consolidate passenger loads and goods? What are the waiting times at these interchanges?

Personal observations should also be made with reference to crosscutting issues such as poverty, gender, environment, safety and HIV/AIDS. What are the differences in terms of gender, age and ethnicity of people walking, people carrying, people on intermediate means of transport or people

waiting for rural taxis? What proportion of the catchment population seems to be traveling? Is this a poverty-related issue? How safe are the different vehicles, and how do different types of passengers travel in or on them? How does through traffic affect the safety of villages? How does the environment affect transport and vice versa (sand, mud, long grass)? What efforts are made at transport terminals, markets and roadside villages to inform about HIV/AIDS?

The first of these 'mental traffic counts' (informal assessment of traffic types and volume) that researchers will make is likely to be at the start of the survey, while on the road to the regional town. This is likely to be on a *national* spoke, with a disproportionately high amount of motorized traffic compared with regional spokes and market spokes. Before the researchers start to speak with regional authorities, it might be advisable for them to also undertake some 'mental traffic counts' on a *regional* spoke, and perhaps *market* and *village* spokes. This will ensure that when discussing the regional situation, including transport services and the road network, the researchers already have 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.

Women head loading and men cycling on a rural road in Tanzania. Researchers should always observe the details of rural transport uses (numbers, loads, technologies, gender, distances)

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 (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, or 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 and transport routes and geo-referencing these

Observations can be used to verify the hubs-and-spokes 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 motorized 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. For example in most of the regions surveyed for the pilot surveys, there were fewer than 200 public transport vehicles operating, serving about 30 routes. 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 recommendations can be given here. However, subsequent users of the methodology might consider the merits of seeing what secondary GIS data are available and 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 researchers, 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. They 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 operating costs, regulations and the organization of transport. Users will be asked about reasons for traveling, journey times and costs. Non-users of transport services (identified during village visits and opportunistic discussions with farmers and household managers) will be asked about their transport needs and what prevents them from using transport services.

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, organizations) 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.

### 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 legitimize subsequent contacts. Simple letters of introduction should be sent to all main government services to be contacted at national and regional levels (transport ministries, decentralized 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 have 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 cross-checking 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 (e.g. women) or modes of transport (e.g. 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

An 'opportunistic' interview with a bicycle user in Madagascar.

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 maximizing 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. The researcher must be sensitive to this and should be appreciative of the valuable time that the informant may sacrifice to assist with an interview. 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 become 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 fulfill 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, reactively 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.

## 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 cross-check 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 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 realize 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 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.

## 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 motorized and non-motorized transport services and sources of information on these topics. Questions should relate to 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 organizations. The policy makers and regulators should also be asked about key cross-cutting issues (poverty reduction, gender, safety, environmental issues and HIV/AIDS). For example, gender awareness and training among their staff, any pro-poor strategies for improving rural transport, or the positive and negative environmental impacts of transport. The linkages between safety and poverty may be explored (rural areas often have poor roads, old vehicles and unsafe loading, but enforcing safely regulation might reduce the already inadequate transport services). Similarly, the links between transport, HIV/AIDS and rural markets could be discussed and local strategies to address these and raise awareness.

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 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, e.g. 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 national and local poverty reduction programs and the achievement of the Millennium Development Goals. More specific issues could include: import regulations affecting prices, incentives (e.g. 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 motorized 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 summarized in Table A6: Operator costs summary sheet and Table A7: Operator costs calculation sheet.

Rural buses in Tanzania: researchers should interview operators and users to determine costs, income, profitability, service frequency, satisfaction and the effects of regulation

- Normal loading (passengers and/or freight)
- Average trip distance
- Average number of trips per week
- Average kilometers traveled per week
- Distance traveled 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 kilometer and per week
- Total costs per year

- Cost per kilometer
- Tariff per kilometer (passengers and/or freight)
- Estimated profit per kilometer
- Estimated annual profit

There will also be questions relating to regulation, safety, competition, transport associations, maintenance, load consolidation and HIV/AIDS issues (concerning operating staff and passengers). 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 summarized 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

Repairer at a market in Burkina Faso. Researchers should interview artisanal and formal sector suppliers and repairers to determine services, costs, constraints and key issues

Some suppliers of transport vehicles should be interviewed including some importers of motorized 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 suggest that many of the larger motorized 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 influen-

tial, 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 summarized in Table A8: Checklist of some key questions for support services.

### Interviews with users (origin and destination, demand and 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 interview while waiting at the terminal, or even on the bus itself.

Users should provide examples of fares paid 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.

Interviews with people of various occupations (farmers, students, household managers, old people or handicapped persons) are likely to identify some people who do not use transport services for various reasons. Their reasons for not traveling must be explored, and what changes in transport services would attract them to become users (e.g. lower prices, greater frequency, better security, less intimidation). 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) traveling over 5 km to access secondary school or college and five people (at least two female) traveling over 5 km to access

health care. In addition, interviews should be held with the managers of district (market town) health centers and with the principals of three secondary schools or colleges.

The health care centers 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

Nurse who travels by bicycle to village-based mother and baby clinics in Zambia Researchers should investigate transport issues for both patient access and service provision.

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 organizations 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

To give an idea of the types of cross-cutting issues that may emerge from interviews with a range of stakeholders, some examples can be given from the pilot studies.

- Lack of affordable transport meant that women and men in remote villages could not access markets and so could not raise themselves out of the rural poverty trap
- Poorer rural women had no access to any means of transport and had to carry produce to market; richer rural women with donkeys or bicycles could transport more
- Gender-related responsibilities mean that transport predictability and reliability is particularly important for women: agreeing timetables can be an important gender issue
- Many rural bicycles lack brakes due to lack of affordable brake blocks in rural areas
- On roads with motor transport, long grass reduced visibility and increased the risk for pedestrians and cyclists
- Commercial trucks (logs, cotton, grains) after heavy rain were major risks to rural roads
- Itinerant markets represented an HIV/AIDS risk that was not being addressed

Further information on these topics as well as many more concrete examples of specific topics and cross-cutting issues are available in the pilot survey reports and the overview report (Rural Transport Services in Africa), available from the websites listed in the Table of Acronyms.

Additional topics and key issues based on the actual situation in the survey area should emerge and be explored during interviews with relevant stakeholders. 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 (e.g. 'bribe barrier' road controls)
- Access to rural credit for the acquisition of intermediate means of transport
- Increasing role of mobile phones in transport operations
- Impact of infrastructure provision and quality on transport services and costs
- Effects 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 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.

Congestion on a market spoke in Burkina Faso: on market days 750 animal-drawn carts pass along this road, compared with just 30 on a 'normal' day

Counting sites will be located along one of the spokes at least five kilometers 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 traveling less than five kilometers) 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 (boats, tractors, tricycles). Some vehicles may be grouped (rural taxis can include minibuses) but others may need to be separated (particular types of animal-drawn carts). Table A10 shows a traffic count form designed for a part of Burkina Faso where 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, already mentioned.

Where possible, a note should be made of the loading of vehicles (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 motorized transport, estimates should be made of the gender balance of passengers and crews.

### Enumerators and traffic count logistics

A traffic count on a rural road in Tanzania. The research assistants are gaining information on users, origins, destinations and travel purposes at the same time

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).

# 6. 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, most of it referenced with GPS coordinates, 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 so this is not a specific 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 prices paid by users for passengers and for freight transport should be tabulated by vehicle type and also by road type. The costs per kilometer should be 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, for recording passenger fares and freight costs is given in Table A12: Example of table summarizing fares and transport prices.

## ESTIMATING THE REGIONAL TRANSPORT FLEET

One output of the research will be an estimate of the entire fleet of motorized and non-motorized 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 motorized and non-motorized 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 (e.g. cotton export or forestry industries) and vehicles that only enter for seasonal markets (these should recorded separately).

Vehicle licensing data may be one starting point, but these may well over- or under-estimate the true picture. For motorized 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 motorized vehicle, etc). An example of a summary table is provided in Table A13: Example of table summarizing the rural transport fleet.

## MAPPING AND MODELING

How the GIS information is used and presented will depend on the availability of GIS expertise and other GIS data. It was recommended that this be clarified with transport authorities (and other organizations like planning ministries, universities and health authorities) at the outset of the survey.

In its simplest form, the collected GIS data will be useful in the creation of simple maps of the hub and spoke systems, and the locations of traffic counts, agricultural markets and key interviews.

Onto such simple maps, additional geo-referenced data can be added concerning traffic flows, road condition, travel times, transport costs, the ownership of intermediate means of transport, freight movement, transport seasonality or other transport indicators. Given the survey methodology, most of these will be order-of-magnitude estimates, rather than precise figures.

From the basic GIS information, simple maps can be generated to demonstrate relative accessibility within the area surveyed. For example, different map colors or shades could be allocated to areas according to certain transport indicators (e.g. 2, 5, 10, 20, 50 km from a road with public transport). A simple example of such an accessibility map is shown in Figure 6.1.

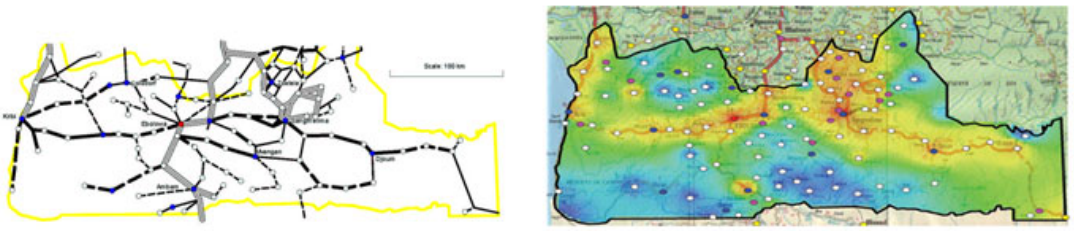

*Figure 6.1: Example of an accessibility map from southern Cameroon*
*Fig 6.1a (left) is a schematic map of the southern Cameroon, with main spokes*
*Fig 6.1b (right) is an example of a simple accessibility map, with the cooler colors (greens and blues) showing areas of greatest isolation, based on road links and distances*
*(this particular accessibility map had some imperfections but illustrates the concept)*

If GIS information exists on the populations of villages, maps can be created to show the relative importance of the different spokes in terms of their catchment populations. This can be refined with information on health, education and agricultural markets. Such maps could powerfully illustrate existing relationships between transport services, accessibility, poverty, economic opportunities, health and education.

It must be remembered that most of the data obtained in this survey will be 'order-of-magnitude' estimates or 'guestimates'. While they may well be the most accurate and realistic figures available, they should not be given undue authority simply because they have become part of a GIS database.

That being said, such GIS maps can be developed as models to illustrate alternative transport scenarios. Depending on the data used, they can be quite powerful planning tools. Using the hub and spoke systems as the basic model, information can be entered on transport routes and terminals, markets, schools and health facilities. Layers of data can be added relating to population, health, road conditions, transport times, and the costs of transport, road maintenance and infrastructure provision. Optimizing models can then be run, to compare transport routes (for public transport, agricultural marketing and/or health care). The effects of different investments in infrastructure and/or maintenance can be compared and contrasted. The relative economic, social and health benefits of pro-poor investment in different transport spokes on their respective catchment populations can be ascertained. Another possible use would be to calculate optimal locations for developing new hubs for motorized transport services with feeder spokes that would optimize the use of intermediate means of transport. If the data entered is gender-disaggregated (such as gender-disaggregated information from the traffic counts), the implications of the different scenarios for women and men can be investigated.

Such optimizing models are beyond the scope of this present document. However, in line with the participative methodology being proposed, the parameters used in any modeling should be discussed with local stakeholders. It is important to obtain local ideas on different transport options, and to learn whether the results of computer optimization are perceived as appropriate to the local needs of women, men and children.

## REPORT PREPARATION

The surveys should result in a great deal of valuable and fascinating information that needs to be clearly and 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.

It is suggested that key findings be presented visually, where this is practical. In particular, maps should be used to hub and spoke systems. Such maps can also be used to illustrate the main transport routes and the flows of people and freight. While GIS mapping technology can be very useful for this, it is not essential. Since the methodology is intentionally 'pro-poor', the maps should not simply show the routes with transport services, they should also highlight those spokes, catchment areas and populations that are not served by adequate transport. It may be argued that this information is provided by the blank areas of the transport maps, but this is not sufficiently powerful. Route maps tend to imply widespread access (partly due to the width of the lines). If a significant percentage of the rural population is more 2 km from public transport (for example), this should be clearly highlighted.

The report should draw attention to important issues raised by stakeholders. This has to be done thoughtfully. The fact that 10% of women now own bicycles may indicate recent progress. The same information presented as 90% of women do not yet own bicycles, may suggest there is much still to be done.

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. As noted, these are available on one or more websites listed beneath the Table of Acronyms at the front of this document, and highlights are also available in the SSATP publication: 'Rural transport services in Africa: lessons from surveys in Burkina Faso, Cameroon, Tanzania and Zambia'.

**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, marginalized people), general implications (poverty,
Millennium development goals and rural transport services), priorities
according to the different stakeholders, specific recommendations (ways to improve
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

## FOLLOW UP: INCLUDING ALL STAKEHOLDERS AND BUILDING ON THE PROCESS

This methodology does not end with the survey report. The methodology proposed requires that the report preparation is followed up in several ways with the various stakeholders. Funding for the surveys should include provision for some activities to be undertaken immediately after the report preparation, so that the participative processes can be built upon.

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 re-

gional 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. International networks, such as the International Forum for Rural Transport and Development (IFRTD) and their regional contacts, could be involved in the process of sharing the many lessons with a wider audience.

## ANNEXES

The following tables are provided to assist the planning, implementation and reporting of a rapid appraisal of rural transport. They are not themselves an integral part of the proposed methodology. The questions are primarily check lists of topics that might be covered. They are not intended to be the basis of any formal questionnaire surveys. All forms should be adapted to local conditions and modified as appropriate.

**Table A1: Summary of key interviews**

| Key informant interviews | Minimum no. of Interviews |
|---|---|
| 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 organization | 1 |
| NGO / programs | 1 |
| Aid agency / World Bank | 1 |
| **Total** | **19** |

| User groups informal interview | Minimum no. of Interviews |
|---|---|
| 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 |
| **Total** | **55** |

| Operator Surveys informal interviews | |
|---|---|
| Operator of main mode of transport 1 e.g. rural taxi | 3 |
| Operator of main mode of transport 2 e.g. bicycle | 3 |
| Operator of main mode of transport 3 e.g. truck / bus / animal cart | 3 |
| **Total** | **9** |

| Support Service Surveys informal interviews | |
|---|---|
| Importer of motorized transport | 2 |
| Regional/Market town repairer of motorized 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 |
| **Total** | **8** |

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

| | |
|---|---|
| **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)* | |
| 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 programs relating to rural transport? If so what are they? (eg, awareness raising at transport hubs) |
| 9 | Are there gender issues or programs relating to rural transport? If so what are they? (eg, gender balances of transport professionals, transport operators and users, load carrying for markets, access to IMTs, security in vehicles) |
| 10 | Are there environmental issues or programs relating to rural transport? If so what are they? |
| **National authorities responsible for Poverty Reduction Strategy (e.g. Ministry of Finance) (1 or more interview, as appropriate)** | |
| 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 programs relating to rural transport? If so what are they? |
| 6 | Are there gender issues or programs relating to rural transport? If so what are they? |
| 7 | Are there environmental issues or programs relating to rural transport? If so what are they? |
| **Regional Authorities (1 or more interview, as appropriate)** | |
| 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? |
| **District Authorities, including District Transport Officer (3 or more interviews, as appropriate)** | |
| 1 | What is your role, if any in connection to rural transport services? |
| 2 | What is the frequency of motorized 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? |

| Village Authorities, including most remote village surveyed *(3 or more interviews, as appropriate)* | |
|---|---|
| 1 | What is the frequency of motorized 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? |

| Police (1 or more interviews, as appropriate) | |
|---|---|
| 1 | What are the major rural transport safety issues in your area, motorized and non-motorized? Obtain statistics if available. |
| 2 | What are the major rural transport security issues in your area, motorized and non-motorized? 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? |

| Health Managers, District and village level (3 or more interviews, as appropriate) | |
|---|---|
| 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? |

| Education - secondary schools (3 or more interviews, as appropriate) | |
|---|---|
| 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? |

| Transport association leaders (5-7 as appropriate) | |
|---|---|
| 1 | Whom do you represent? (e.g. 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? (e.g. 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? |

| | |
|---|---|
| | **Financial Organization** *(1 or more interviews, as appropriate)* |
| 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? |
| | **NGO and programs operating at the local level** *(1 or more interviews, as appropriate)* |
| 1 | What is your role, if any, in rural transport provision or support? |
| 2 | Please provide details of your program / 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? |
| | **World Bank and donor agencies** *(1 or more interviews, as appropriate)* |
| 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? |
| | **Other potential sources of information** *(as appropriate)* |
| | Institutions involved in rural transport issues (e.g. universities)<br>National Bureau of Statistics |

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

| | | | | |
|---|---|---|---|---|
| **Study location:** | | | | |
| **Date:** | | | | |
| | **Exists** | **Implemented** | | **Remarks** |
| | | **National** | **Survey area** | |
| **Policy** | | | | |
| 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 decentralized 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) | | | | |
| **Regulatory frameworks** | | | | |
| **Freight regulation** | | | | |
| Freight fare regulation | | | | |
| Route regulation | | | | |
| Tax incentives | | | | |
| **Freight Safety** | | | | |
| Speed limits | | | | |
| Prohibition of passengers | | | | |
| Loading | | | | |
| Axle load control | | | | |
| Vehicle licensing | | | | |
| Driver regulation | | | | |
| **Public transport regulation** | | | | |
| Price fare regulation | | | | |
| Route regulation | | | | |
| Tax incentives | | | | |
| Licensing | | | | |
| **Public Transport Safety** | | | | |
| Passenger numbers | | | | |
| Speed limits | | | | |
| Safety belts | | | | |
| Loading | | | | |
| Driver regulation | | | | |
| Other relevant issues (specify as appropriate) | | | | |

| | | | | |
|---|---|---|---|---|
| **IMT regulation** | | | | |
| Safety | | | | |
| Prices | | | | |
| Vehicle licensing | | | | |
| Incentives | | | | |
| Animal welfare | | | | |
| Other relevant issues (specify as appropriate) | | | | |
| **Vehicle regulation** | | | | |
| Import regulation | | | | |
| Specifications | | | | |
| Vehicle testing | | | | |
| **Other operator costs (road tolls and other levies)** | | | | |
| **Road safety (infrastructure)** | | | | |
| **Driver licensing regulation** | | | | |
| **Local government byelaws** | | | | |
| Local fines | | | | |
| Terminal fees | | | | |
| Others | | | | |
| **Local road groups** | | | | |
| **Formal transport association** | | | | |
| **Informal frameworks** | | | | |
| 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 | |
|---|---|
| **Aim:** | To collect qualitative data relating to customer satisfaction |
| **Tool:** | Semi-structured interview |
| **Methodology:** | To be conducted by professional personnel in the survey area - villages, markets, people in transit including on bus (ideally prior to departure) etc. |
| **Date:** | **Location:** |
| **Interviewer:** | **Interviewee:** |

| Interview sample | |
|---|---|
| **Category of user (or potential user)** | **Minimum Number of Interviews** |
| Small scale farmers | 5 |
| Traders | 5 |
| Employees (e.g. 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 (e.g. elderly, disabled, socially marginalized) | 5 |
| **Total** | **55** |
| **Survey Questions** | **Some response options** |
| 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 e.g. 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. | |
| If you, or a member of your household, do not travel why is this? What changes to transport services would encourage you (or household member) to travel more? | |
| 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 traveling on distances greater than 5 km each day? | less than 1 hr, 1-3 hrs, 3-5 hrs more than 5 hrs |
| How far from your home do you have to access a motorized 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 | |
|---|---|
| **Date:** | **Location:** |
| **Interviewer:** | **Interviewee:** |
| **Type of operator:** | |
| **Sample size:** | 3 operators of each of the important modes of transport in the survey area (eg. 3 bus operators, 3 donkey cart operators etc) |
| **To be conducted where?** | 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. |
| **Instructions:** | Survey questions relating to prices, distance and costs to apply to an individual vehicle<br>Pricing and costs to be given in local currency (where appropriate these can be converted to international currency in subsequent reports) |
| **Questions** | |
| What service do you provide? e.g. 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 kilometers 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:<br>Licensing, insurance registration / tax fixed taxes other | |
| How much do you pay per year per vehicle /animal for the following:<br>servicing tyres salaries other | |
| On average, how much fuel do you consume per kilometer? | |
| 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? e.g. 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 prioritize? | |
| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Transport mode (adapt to local conditions)** | **Insurance (currency)** | **License (currency)** | **Operating taxes (currency)** | **Other fixed costs (currency)** | **Total fixed annual costs (currency)** | **Fixed annual costs (USD)** | **Fuel & oil (currency)s** | **Tyres (currency)** | **Salaries (currency)** | **Spare parts (currency)** | **Other costs (currency)** | **Total variable costs (currency)** | **Total annual variable costs (USD)** |
| Trucks - less than 3 tons | | | | | | | | | | | | | |
| Trucks - more than 3 tons | | | | | | | | | | | | | |
| 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) | | | | | | | | | | | | | |
| *Equations* | *Data* | *Data* | *Data* | *Data* | *B+C+ D+E* | *F/exchange* | *Data* | *Data* | *Data* | *Data* | *Data* | *H+I+J +K+L* | *M/exchange* |

## 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)** | **Depreciation 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** | | | | | | | | | | | | | | |
| Trucks - more than 3 tons | | | | | | | | | | | | | | |
| 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) | | | | | | | | | | | | | | |
| *Equations* | *Data* | *Data* | *Data* | *Data* | *D/E* | *Data* | *Data* | *F+G+H* | *I/B* | *Data* | *Data* | *K*L* | *M-J* | *B*N* |

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 kilometers and annual kilometers 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 | |
|---|---|
| **Date:** | |
| **Location:** | |
| **Interviewer:** | |
| **Interviewee:** | |
| **Type of support services** | |
| **Sample size:** | At least one supplier and one repairer of transport for each of the important modes of transport in the survey area (e.g. one supplier of minibuses, one supplier of motorcycles, one garage/repairer, one bicycle wholesaler, one bicycle repairer, one cart builder, etc) |
| **To be conducted where?** | The suppliers of motorized transport may well be based in the capital, port or provincial town. The importers of bicycles may also be located here. The repairers of motorized 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. |
| **Instructions:** | 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.<br>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. |
| **Questions for suppliers** | |
| What service do you provide? (e.g. 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? (e.g. 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? (e.g. cost of imports or materials) | |
| What price do you sell at (e.g. 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? | |
| **Questions for repairers** | |
| How many vehicles do you repair each month? (of each type) | |
| What prevents your from repairing more? (e.g. 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? (e.g. 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 night-time 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 tons | | | | | | | |
| Trucks - more than 3 tons | | | | | | | |
| Buses ( more than 20 seats) | | | | | | | |
| Rural taxis - Mini bus (less than 20 seats) | | | | | | | |
| Rural taxi - pick ups | | | | | | | |
| Rural taxi - cars, 4x4s | | | | | | | |
| Government / NGO - cars or 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 passengers** | **3 passengers** |
| Animal drawn carts (separate lines for each type) | | | | | | | |
| Pack animals (separate lines for each type) | | | | | | | |
| Ridden animals (separate lines for each type) | | | | | | | |
| **General observations: e.g. Time of heaviest traffic, gender issues, types of load** | | | | | | | |

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

| Example of specialized 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 tons | | |
| Trucks - more than 3 tons | | |
| 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) | | |

**Instructions:**
The form needs to be adapted to local circumstances, particularly in relation to loads carried.
A total of six summary forms should be produced
Regional spoke on market day (average of two counts)
Regional spoke on non-market day (average of two counts)
Market spoke on market day (average of three counts)
Market spoke on non-market day (average of three counts)
Village spoke on market day (average of five counts)
Village spoke on non-market day (average of five counts)
The load (kg) and/or passengers should be the estimated typical load, based on counts and observations

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.

**Table A12: Example of table summarizing fares and transport prices**

| **Summary of fares and transport prices per kilometer**<br>(This can be used for both passengers and freight;<br>adapt to local conditions; repeat for different transport modes) | | | | | | |
|---|---|---|---|---|---|---|
| *Road type* | *Start of journey* | *Finish of journey* | *Distance (km)* | *Price (currency)* | *Price/km (currency)* | *Price / km (USD cents)* |
| 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 summarizing the rural transport fleet**

| Estimates of the transport fleet operating in the survey area | | | | | |
|---|---|---|---|---|---|
| *Transport type (adapt to local fleet types including water transport if appropriate)* | *Estimated numbers* | *Unit value (USD)* | *Overall value (USD)* | *Unit capacity pax and/or kg* | *Overall capacity pax and/or kg* |
| Trucks | | | | | |
| Buses (20+ seats) | | | | | |
| Minibuses | | | | | |
| Rural taxis | | | | | |
| Govt, NGO and private | | | | | |
| Motorcycles | | | | | |
| Animal drawn carts | | | | | |
| Pack animals | | | | | |
| Bicycles | | | | | |

*Notes: estimated based on field observations [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 (e.g. 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 maps, 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 organization
- 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 summarizing 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 marginalized
- 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 organization
- NGO / development programs

## 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
- Marginalized 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