

Session 3.1: Notes

Transport Operations

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Learning Objective

The focus of this session is on the nature Transport Operations in different countries. The session starts with briefly considering the Logistics Performance Index before looking in detail at five different case studies. The first three case studies (Ghana, Cameroon and Mali) consider the organisation of conventional transport services and how they are affected by operator associations. The last two case studies consider the role of IMT operations, cycles and motorcycles in East Africa and the use of a broad range of IMTs in Sri Lanka.

1. Logistics Performance Index

(Source: Arvis et al, 2012)

The third edition of *Connecting to Compete: Trade Logistics in the Global Economy* reports on the Logistics Performance Index (LPI) and its six component indicators. The LPI measures logistics efficiency, now widely recognized as vital for trade and growth. A country's ability to trade globally depends on its traders' access to global freight and logistics networks. And the efficiency of a country's supply chain (in cost, time, and reliability) depends on specific features of its domestic economy (logistics performance). Better overall logistics performance and trade facilitation are strongly associated with trade expansion, export diversification, attractiveness to foreign direct investment, and economic growth.

A multidimensional assessment of logistics performance, the LPI compares the trade logistics profiles of 155 countries and rates them on a scale of 1 (worst) to 5 (best). The ratings are based on 6,000 individual country assessments by nearly 1,000 international freight forwarders, who rated the eight foreign countries their company serves most frequently.

The LPI's six components comprise:

1. The efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs.
2. The quality of trade- and transport-related infrastructure (ports, railroads, roads, information technology).
3. The ease of arranging competitively priced shipments.
4. The competence and quality of logistics services (transport operators, customs brokers).
5. The ability to track and trace consignments.
6. The frequency with which shipments reach the consignee within the scheduled or expected delivery time.

Connecting to Compete 2012 also includes a set of domestic performance indicators for 143 countries. For these data, survey respondents assess the logistics environments in the countries where they work, providing information on the quality of infrastructure, the performance of core services, the friendliness of trade clearance procedures, and the time, cost, and reliability of import and export supply chains. These domestic indicators help define logistics constraints within countries, not just at the gateways, such as ports or borders. They analyze the major determinants of overall logistics performance, focusing on country performance in four major determinants of overall logistics performance: infrastructure, services, border procedures and time, and supply chain reliability.

The gap between the highest and lowest scores in the 2012 LPI, and the score distribution across countries, are about the same as in 2010. Singapore ranked highest at 4.13, Burundi the lowest at 1.61 (19 percent of Singapore's top score). The 2012 LPI does not suggest that the converging trend from the 2007 LPI to the 2010 LPI is continuing. From 2007 to 2010, lower performing countries improved

their overall LPI scores more than did higher performing countries. But from 2010 to 2012, they were not able to further narrow the gap.

This stalled improvement likely reflects conditions that shifted governments' priorities away from logistics reform— such as the global recession and the European sovereign debt crisis. In some regions, declining trade further disrupted supply chains. In the context of the recession, a slowing progression in customs indicators could reflect an unusual focus on revenue collection at the expense of trade facilitation.

The “logistics gap” between high- and low income countries remains wide. The countries with the worst performance in 2012 were least developed countries that were also landlocked countries, small-island states, or post conflict countries. Making up three-fourths of the bottom LPI quintile, these countries typically have small trade volumes, are far from trade hubs, and are hampered by severe capacity constraints. Adding to their difficulties- on top of their reform challenges and their lack of scale economies for infrastructure and services-is their dependence on the logistics of similarly constrained neighboring countries.

Despite the broad association between low performance and difficult circumstances, the policies a country adopts are important. True, most high-income countries from the Organisation for Economic Co-operation and Development (OECD) are high logistics performers, but in other income groups some countries have had more efficient logistics than others over the three LPI surveys, including China, India, South Africa, and Vietnam. Among least developed countries, it is harder to find countries outperforming their income group. Benin jumped from 89 in 2007 to 67 in 2012, however, perhaps reflecting traders' satisfaction with the country's new national single window system in the Port of Cotonou.

Morocco's LPI rank jumped from 113 in 2007 to 50 in 2012, having implemented a comprehensive strategy to improve logistics and connectivity and take advantage of the country's proximity to Europe. Combining border management reform with large physical investments in the Tangier-Med Port, the strategy fostered the emergence of Morocco's just-in-time exports to Europe (especially textiles, electronics, and automotive components). Morocco's fast rise in the LPI highlights the payoffs of such a comprehensive approach.

Reformers are seeing more and more that many modern logistics problems are entrenched-that there are no quick fixes. Reaping low hanging fruit will not sustainably improve logistics in the ways that count most for traders. The stagnancy of some performance indicators suggests that the source of problems is deeper than an errant regulation or a lack of equipment. In the 2012 LPI, infrastructure stands out as the chief driver of progress, with the modest convergence since 2007 explained by a perceived improvement in the infrastructure of low- and middle-income countries-and to a lesser extent in their logistics services and their customs and border management. This perceived improvement attests to the success of donor efforts to close the infrastructure gap between high- and low-income countries.

The quality and availability of trade-related infrastructure, especially roads, still constrains logistics performance in developing countries, especially for countries with the lowest incomes. Yet countries nearer the middle of the LPI rankings are also hindered by the quality and availability of roads and ports. And railroads have low ratings almost everywhere. In developing countries, rail services dissatisfy more than 90 percent of survey respondents.

Efficient border management and the coordination of the agencies involved in border clearance are more critical now than ever. Across income groups, customs agencies have higher LPI ratings than all other agencies involved in border management. But in many countries, the agencies responsible for enforcing sanitary and phytosanitary regulations (and to a less extent other product standards) lag well behind customs in their perceived performance. A comprehensive approach is needed to reform border management, with attention to all the relevant sectors and agencies.

The quality of logistics services-trucking, forwarding, and customs brokerage-is also central to trade efficiency. Logistics services generally have higher LPI ratings in 2012 than in 2010. Yet the gap between high-income countries and developing countries remains wide.

Low-income countries score poorly on trucking, despite trucking systems having recently attracted more policy attention. Environmental sustainability concerns are emerging as a market driver. The 2012 LPI includes a new survey question on the demand for green logistics. A third of respondents shipping to OECD countries recognized a strong demand for green solutions (meaning modes or routes), compared with just a tenth of those shipping to low-income economies. Developing countries will need to consider the environmental footprint of logistics, especially in trading with developed countries.

Logistics performance is strongly associated with the reliability of supply chains and the predictability of service delivery available to producers and exporters. Supply chains are becoming more and more complex, often spanning many countries while remaining critical to national competitiveness. Comprehensive reforms and long-term commitments from policymakers and private stakeholders will be essential.

Events such as the recession and economic troubles in Europe in 2011 may have derailed planned logistics reforms, so it is now all the more urgent that countries and donors renew their efforts to improve logistics.

Countries, and groups of countries, have adopted forward-looking logistics policies. In 2011, Morocco adopted a public-private charter on logistics development. South Africa publishes a yearly state-of-logistics report. Indonesia and Malaysia have national logistics strategies. China is among the few countries with a bureau for logistics development. And the United States launched a Supply Chain Competitiveness Council, in cooperation with its Chamber of Commerce, in 2011.

Such public support affirms the importance of logistics services providers. The global network of logistics operators for international trade includes ocean shipping, air freight, land transport, warehousing, and third-party logistics. To keep global supply chains working uninterrupted, logistics services providers have had to both integrate and diversify. Key segments of the industry- air freight, container shipping, port operations, and contract logistics (or third/ fourth-party service providers) have become highly concentrated, especially since the economic downturn of 2008. Yet the industry is far less concentrated in local, traditional subsectors with low entry costs: trucking, traditional freight forwarding, and customs brokerage.

Global logistics requires that this ideally seamless chain of service providers support the physical movement of goods. But the ease with which a country's exporters can access the global logistics network depends on domestic factors subject to government intervention. Governments can improve the regulation of logistics services, finance trade-related infrastructure (either directly or in public-private partnerships), and smooth trade procedures. Although efficient logistics and trade facilitation are central to national competitiveness, the simultaneous involvement of many sectors can create difficulties for sound policymaking. Supply chain performance is measured in time, cost, reliability, and flexibility. But these outcomes depend on local inputs that affect the supply chain within a country. There are trade-related procedures. There is the supply for trade-related support services. And there is infrastructure, which includes ports, roads, railroads, airports, and information and communications technology (ICT). A trade supply chain is only as strong as its weakest link. Progress in one area cannot always offset a lack of progress elsewhere. So policymakers must strengthen the weakest links with targeted development interventions. Interventions that target areas not among those in most need of reform waste scarce resources. Reforms need not have the sole objective of boosting supply chain performance. In border management reform, governments try to reconcile security and fiscal objectives with trade facilitation.

2. Ghana Case Study

(Source: Ellis and Rutter, 2001)

In October/ November 1997 and March/ April 1998 TRL conducted two survey exercises in Ghana, funded by the Department for International Development (DFID), each of five to six weeks duration to address the latter two components. This work was conducted in collaboration with the Building and Road Research Institute of Ghana and the Department of Planning of the University of Science and Technology, Kumasi. The instruments for data collection were:

- A checklist to obtain information on village parameters such as population, essential facilities within the village and availability and access to transport services. This information was gathered during group participatory discussions within the villages visited.

- A questionnaire aimed at individual household representatives to determine household size, livelihood, income and other indicators of prosperity, transport requirements and trip frequencies with respect to trip purpose, cost and mode.
- A questionnaire aimed at vehicle operators to obtain information on the extent of trip making, goods charges and passenger fares, and factors affecting their businesses such as seasonal deterioration of roads, competition, access to vehicle repair and maintenance facilities, regulation and access to credit facilities for vehicle purchase.

Seven Districts were chosen for study throughout Ghana and in addition two villages were investigated in a peri-urban district close to Ghana's second largest city, Kumasi. Villages were selected over a wide range of degrees of accessibility from those located on main roads to those accessed only by unmotorable tracks. In total, 57 villages were visited and 412 householders were interviewed. A total of 197 vehicle operators were interviewed in market towns and villages. The main findings were as follows:

- Population density has a large impact on the cost and provision of rural transport services, i.e. better services are associated with higher population densities as evidenced by fares, goods charges, waiting times for vehicles and frequency of vehicles serving the villages.
- Wide variation exists between the districts surveyed with respect to household prosperity as indicated by income and total known expenditure per capita. The northern sector of Ghana is poorer than the south and in the north far less use is made of motorised transport services. The average northern household spends only 8.8% of its expenditure on transport, compared with 6.6% in the south. In the north, much more use is made of bicycles instead and ownership of bicycles is greater than in southern Ghana.
- Large differences in public transport fares exist between districts which may suggest that operators and unions have less influence where competition is greater, for example, the peri-urban district Kwabre.
- Goods charges for short distances are high. This suggests that there may be pressure to keep passenger fares down but vehicle operators' income is made up by goods movement.
- In the Southern sector of Ghana, where use of motorised transport services is commonplace, expenditure on transport increases dramatically as income rises. This is reflected in the number of motorised trips to market per household, which increases with household income.
- Market-related trips are the main trip purpose outside the village and accounts for the majority of use of motorised transport.
- Elasticities of demand for motorised transport services indicate that to stimulate a 1% increase in trip making a 6.1% decrease in fare is required. Household trip making shows little sensitivity to change in income: a 32.6% increase in income is required to produce a 1% increase in trip making.

Role of GPRTU

In Ghana a more informal control of transport services has been provided by the Ghana Private Road Transport Union (GPRTU). Vehicles are registered by the

GPRTU for a particular route, the fee is dependent on the perceived route profitability. The GPRTU controls 80 % of the lorry parks, passenger and goods fares are fixed and the vehicle must wait its turn in the line. Reports of vehicles waiting for one to two weeks are not uncommon. The GPRTU collects 5 to 10% of the fare and a park entrance fee; it also collects 3% income tax on behalf of the Internal Revenue Service. It is reported that loads acquired outside of the lorry parks are also obliged to pay the GPRTU commission and income tax (Delaquis, 1993).

Ownership of vehicles

Farmers constituted the single largest group (27%) of vehicle owners in the districts surveyed. Businessmen accounted for 21% of vehicle ownership whilst owner/ drivers formed 14 per cent. Significantly, all vehicle owners were natives of the district in which the vehicles operated with most of them actually resident in these areas. It is also interesting to note that few vehicles (10%) were owned by people who are exclusively transport owners.

The majority of vehicle owners were in the transport business only part-time to supplement income generation from their more established occupations. Being in a predominantly agrarian setting, perhaps it was not surprising that the latter group was mostly farmers. An insignificant number of vehicles were owned by government or para-statal transport providers.

Type and condition of vehicles

Vehicle types covered included mini-buses, buses, taxis articulated trucks and smaller lorries. Whereas the mini-buses and taxis were more prevalent in the coastal and forest regions, open-top trucks and pick-ups converted for maximum passenger use were the most common in the Northern, Upper-East and Upper-West regions. The Afram Plains District fell in the latter category. These differences were apparently occasioned by the type of demand for transport services, and to some extent, the operating conditions.

In the coastal and forest regions, the demand is mostly for passenger transport since the more common goods here tend to be cash crops, whose transportation is rather formalised and handled by more organised transport companies.

In contrast, in the three northern regions and the Afram Plains which constitute a major food growing area, the transport of food crops is less formalised and it becomes just as important as that of passenger transport. In this context, the open-top trucks and converted pick-ups are seen as more utilitarian vehicles in which passengers are usually crammed in together with all sorts of goods. It is not uncommon to find passengers and cattle or other animals combined in one vehicle in these parts of the country.

The harsh operating conditions of high ambient temperatures, corrugated road surfaces and relatively longer travel distances in the north also call for the use of more robust vehicles which the pick-ups and trucks have proved to be. Most vehicles were in deplorable condition with obvious signs of overdue maintenance and refurbishment. The predominant vehicle makes were Toyota, MAN Diesel and Bedford, and most probably, all were originally bought secondhand. In the hands of the current owners the vehicles have been ran for 10-15 years on the average, and most have undergone so much alteration that the original manufacturers would have a hard time identifying them.

Trip frequency

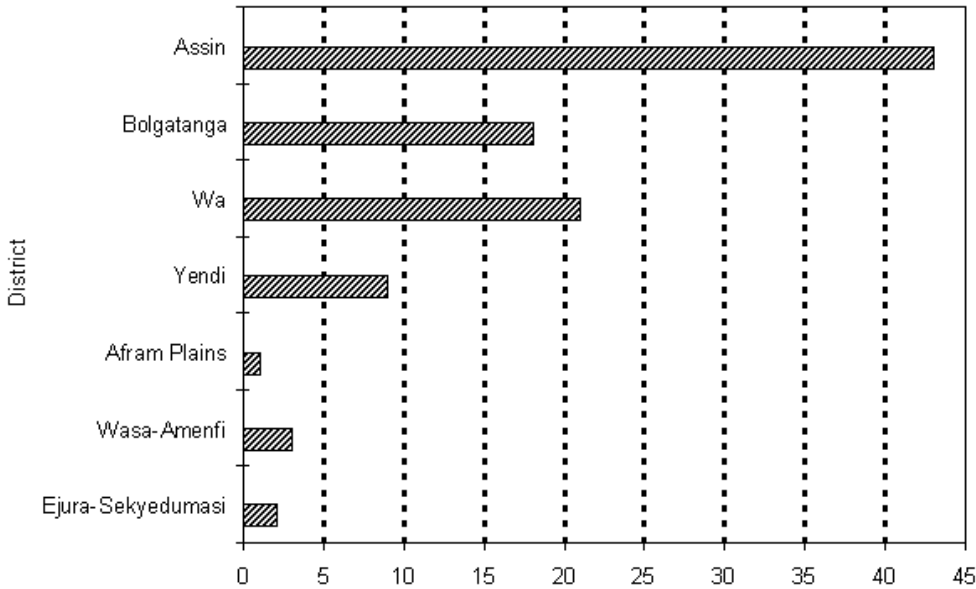
Figure 1 shows the maximum number of trips recorded by any vehicle in each of the districts. Assin District recorded the highest (43 trips/week), followed by Wa and Bolgatanga Districts with 21 trips/week and 18 trips/week respectively.

The common factor among these districts is perhaps the relatively short travel distances. However, Assin uniquely stands out because it is the most accessible, with a feeder road density of 1.68 km/km², which are also comparatively well- maintained. In addition, most travel in the district is by taxi and mini-bus which are much quicker than other vehicles such as trucks.

At the other extreme are the Afram Plains and Ejura-Sekyedumasi Districts. One and 2 trips per week respectively were recorded here. Incidentally, these are the districts with the worst operating conditions; low feeder road density or poor accessibility, longer travel distances over very bad roads and fewer numbers of motor vehicles, a significant proportion of which are trucks or even agricultural tractors. In a way, the low population densities (as a reflection of reduced demand for transport services in these districts) also may have contributed to the low trip frequency.

In the Afram Plains in particular, vehicles also have to synchronise their movement with that of a ferry which links the more populated areas across the Lake Volta. This would serve as a further constraint to the number of trips a vehicle could make.

Figure 1: Highest number of trips per week per vehicle operator by district



How Often are Vehicles Off the Road?

Except for the Ejura-Sekyedumasi district where it was only once a week, in all the other districts, vehicles were off the road at least twice a week.

The reasons given included the vehicle undergoing routine maintenance or repairs, or lack of demand for transport services. Occasionally, it was reported that a vehicle could also be taken off the road simply to give it a break or to enable the driver to take a rest.

Availability of spares or repair garages in the vicinity of the district were identified as key determinants of the duration of maintenance or repairs carried out on a vehicle. Incidentally, 85% of all drivers interviewed in the seven districts admitted to knowing about the existence of and regularly making use of the services of the Kumasi Magazine for such operations. Naturally, therefore the close proximity of Ejura-Sekyedumasi to Kumasi means that the district had better and easier access to the services, hence the shorter durations for vehicle unavailability.

Seasonal Variation of Vehicle Operations

Generally all vehicles covered by the survey in the seven districts, operate on several routes at the same time switching from one to another, depending mainly on the availability of demand for transport services and the condition of the roads. Such an operational strategy ensures maximum utilisation of the vehicle and increased income to the operator.

Thus, during the dry season, when even the worst roads are in some motorable condition, drivers could be operating on as many as six routes at the same time. Out of these, 1 or 2 routes would be the most preferred and relatively all-weather roads to

which the drivers would confine their operations when the others become unattractive either due to lack of demand or impassability following the rains.

The highest incidence of vehicles getting bogged down on the roads (8 times a month) was recorded in the Wasa-Amenfi and Ejura-Sekyedumasi districts. This is explained by the generally poor infrastructure in these districts coupled with prolonged rainy seasons and high annual average rainfall.

In the other districts, the majority of drivers interviewed also said their vehicles often get stuck on the roads, rendered impassable by the rains and they also had problems moving up slippery slopes. The overall result was that average journey times increased by at least 40 per cent and few trips were made during the rainy season.

3. Comparison of Operations in Cameroon

(Source: Lisinge, 2001)

Surveys were undertaken in Southern and Northern Cameroon looking at all aspects of rural transport. An interesting finding emerged that the cost of transport services, both for inter-urban and rural trips, were considerably cheaper in the North. For example in Muyuka district in the South passenger fares were between 53% (10kms) to 370% (200kms) higher than in Ngoundere district in the North.

Characteristics of rural transport services in the North – Most operators form themselves into transport agencies. The transport agency operates from its own bus park and has strict rules on the quality of vehicles. A technical committee will inspect new vehicles before allowing them to operate. Customer service is also good and drivers with complaints made against them are fired. Competition is stiff because the local major also gives other agencies permission to operate from the towns. Transport charges in Ngoundere have reduced by 40% in the last two years as new agencies have entered the market. The agencies use rugged Renault buses (32 seat capacity). These agencies serve the rural areas on sometimes very poor quality roads.

Characteristics of rural transport services in the South – Operators form themselves into transport syndicates which operate in a similar way to the transport agencies. The difference being that there is no competition, the vehicles are not in such good condition and they all operate from the same bus park. The vehicles tend to be cars, some of which are modified to cope with rough rural roads, which tend to be overloaded because of their low capacity. Some transport agencies do operate in the South but they tend to be restricted to the longer routes.

Policy implications – The key to the difference between the North and South is the actions of the local major. In the North the major allows different agencies to operate from the town and hence has brought competition into the market. The policy of local majors allowing competition between operators in the same town has clearly led to a better, safer and lower cost rural transport services in the North.

Implementation of policy – It is very unusual to see two systems of rural transport service provision develop in the same country. It provides a unique opportunity to assess the actions which need to be taken to encourage the South to adopt the same operating practises as the North:

- Arrange study tours for Southern operators, syndicate representatives, Ministry of Transport officials, political leaders and users to see first hand how transport is organised in the North.
- Provide transport planning support to the Southern Major and Ministry of transport to understand the necessary actions to move towards competition.
- Provide training in all aspects of transport operations to give the members of the existing syndicates the skills needed to compete in a free market.
- Sensitise all stakeholders to the potential benefits from the new system of operation.

4. Mali Case Study

(Source: Ellis, 2001a)

Background

The length of classified roads in Mali is 89,000km, of which 40,000km are 'council' roads including unmaintained bush tracks. The classified network is poorly maintained with 57% being classified as in poor condition. Mali's road density is one of the lowest in West Africa, with 1.18km of road per 100km², compared to 3.1 for the West African Economic Community (CEAO) as a whole.

The country has just introduced a new vehicle registration system and while determining exact vehicle numbers is difficult, the best estimate is that there is a total fleet of 46,600 with 80% of new vehicle registrations, either from new or used vehicles, coming from the Bamako District. One estimate puts the number of vehicles used for rural operations at 840. The vehicle fleet is extremely concentrated in Bamako and as a result it is generally regarded that there is excess supply.

Nearly 70% of communities are within 5km of the first stage primary school but the distance increases with access to secondary schools with 88% of communities being further than 15km. Nearly 50% of communities are within 5km of weekly transport but only for emergency access to health services with 37% of communities being further than 15km away. As already discussed the marketing system in Mali is very developed, as a result nearly 50% of communities are within 5km of a local market and 84% within 15km.

Cost and Affordability of Rural Transport in Mali

It should be noted that poverty is largely a rural phenomenon in Mali, 92% of very poor people are rural, 86% of poor people are rural. If annual expenditure is compared with typical transport costs that were encountered on the field visits it

becomes obvious that the ability of rural people to pay for transport services is very limited. For a person who is very poor and living in a remote area with seasonal access problems, such as Kolokani (rural), they may only be able to make two or three trips per year. Even if it is assumed that this number can be multiplied by the number of people in a household, it is clear that the possibilities for household travel are still very limited.

Transport costs are dependent on the quality of the infrastructure and (where roads are in poor condition), on the season i.e. transport costs increase as the quality of the road deteriorates or where access is threatened by the results of heavy rain. A study in 1978 found that transport costs increased by 1.5 times with a move from a paved surface to a good quality gravel surface, and that there was a doubling in cost with a move from a paved road to a poor quality track. Roughly, these differentials have been maintained to this day.

The combination of the majority of the poor living in rural areas and a poor standard of infrastructure resulting in high transport costs, makes the transport burden particularly acute in rural areas.

The Transport Unions

Since 1992 there has been a liberal transport market in Mali and therefore no government regulation over routes and fares. However, after liberalisation there was a significant reduction in transport costs in the country. It was felt that there was a "dumping" of transport services, i.e. freight rates were below long run operating costs, and this led to the demise of a number of vehicle operators in the country. An example from the petroleum industry was that the price per tonne kilometre dropped from FCFA 32-35 before liberalisation to FCFA 16 after liberalisation.

To stop the perceived demise of the transport industry in Mali, the transport unions stepped in to publish voluntary minimum and maximum prices for all road sector transport. These prices were based on the previously used government figures. This practice is still in place today.

There are four main unions (or Syndicates) in existence at the moment. Although it has not been possible to determine the exact numbers of operators who belong to a union, the experience from this field trip would suggest that it is virtually 100% at the rural level and the majority on inter-urban routes.

The union system requires that operators use truck parks where they must wait for loads on a first come, first served basis. This can mean that operators will wait for many days to secure a load. This problem is particularly acute in Bamako but can also be seen in many rural markets around the country. To become a member of a union you must pay a joining fee (FCFA 10,000 every 3 years), an annual membership fee (FCFA 2,000 every year) a small daily fee to use the lorry park (~FCFA 500 per day) and a fee for each trip made (~FCFA 500-1000 depending on trip and size of vehicle).

The practice of queuing for loads and fixed prices for particular routes makes the vehicle fleet very inefficient. There are no incentives for operators to be aware of their operating costs, or to renew their vehicles in order to maximise utilisation. The result is a very old fleet which only survives because it can afford to because of the system.

The Policy Environment

At the present time there is considerable confusion over transport policy in Mali. There are many different organisations who have a stake in the transport system, but none are aware what the others are doing. For example, the transport unions talk to the Ministry of Transport but the Ministry of Finance collects all import duties, fuel taxes and travel taxes. Neither the Ministry of Transport or the transport unions are sure what the taxes are being used for. There is no co-ordination between the different organisations. At the rural level, the situation is yet more complicated because the Ministry for Rural Development and Agriculture has a stake in the efficiency of the transport system together with the Cotton Marketing Board. The result is that individual relationships are being developed between the transport unions and each of the interested organisations and an inefficient equilibrium is maintained. There is now a push in Mali to develop a Roads Board where all of the interested parties can get together and develop a co-ordinated policy to transport in the country. More transparency is required as to what revenues are being raised, from where and for what purpose. The confusion makes process of transportation long winded and uncertain. As such there is no incentive for more efficient operators to join the market.

5. Boda Boda Operations in East Africa

(Source: Howe and Davis, 2002)

Introduction

One of the puzzles of the African transport sector is that, with a few isolated exceptions, it suffers from what has been called the 'missing middle' (Pankaj 1991). Movement of people and goods goes from walking and headloading to the truck and bus in one technological leap. There is nothing much in between. In comparison with Asia there has been little use of animal, bicycle, or motorcycle-based technologies i.e. the sector lacks flexibility in service provision.¹ This has been equally true in urban and rural areas, although the situation is starting to change with the development of passenger-carrying motorcycle services in West Africa (Howe & Iyiola Oni, 1996; Anon, 1997).

¹ This situation does not exist in isolation. Africa also has a weaker industrial base and lower population (market) density about a sixth that prevailing in much of Asia.

Boda boda transport services are a Ugandan innovation that has grown from small beginnings in the 1960s in the border region with Kenya (Malmberg-Calvo, 1994). The term itself is a corruption of the English 'border border'. They mainly provide a passenger taxi service, although they can sometimes be hired to move goods. The original services were provided on a man's bicycle, equipped with a padded cushion fitted over the rear carrier. In the early 1990's bicycle-based carriers were complemented by, and compete with, light motorcycles that have greatly extended the range and load carriage of services.

This paper describes the nature of the boda boda phenomena with a special emphasis on the benefits they have brought to Uganda's poor. It is based on household surveys, and interviews with key stakeholders, operators and users. The studies covered both urban and rural areas, and are part of a Department for International Development (DFID) financed research project into 'Sustainable Livelihoods, Mobility and Access Needs (SLAM)', being undertaken in Uganda and Zimbabwe, and which is reported on in another paper at this conference.

History

Confusingly both bicycle and motorcycle services are often known by the same name boda boda, although machala (Western Uganda) or zabala (Mukono District) are preferred in some areas for the motorcycle services (Leyland, 1999). We use the term boda boda for both bicycle-based and motorcycle services since it is the most commonly used term. Both vehicles are unusual in providing a short-distance, low-capacity service that is able to serve low-density demands, or those where access is restricted by the width or quality of the route. Taxis do not find it profitable to go to many villages due to insufficient demand. Equally they physically cannot use the footpaths and tracks that provide access to many low-income urban settlements. Boda boda operate from 'stands' in towns, in trading centres, and at the passenger service stops along main roads providing access to feeder routes. On these routes they are the dominant service in many areas of the country, both rural and urban.

The introduction of motorcycle-based services is reported to have resulted from the initiative of a local firm, BMK (Uganda) Ltd. A trade visit to Cyprus in 1992 exposed the owner to the use by local farmers of motorcycles. This example, and the knowledge that Japan disposed of large numbers of second-hand and reconditioned motorcycles, led to their introduction into Uganda in the same year. BMK was alone in the market until 1994 when several other firms followed. It was at this time that the phenomenon appears to have taken off as indicated by the figures for newly registered vehicles in Table 1.

Table 1: Newly registered motorcycles 1988 – 2000

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Motorcycles	755	685	1770	1729	1248	1744	4866	1103	16106	18798	13730	14047	9093
Change %		5.5	-6.8	-3.2	-4.7	29.4	101.3	64.9	29.1	16.2	-29.6	4.6	-26.6

Source: National Transport Date Base

The size and growth of the motor vehicle fleet in Uganda are subjects of considerable uncertainty due to inconsistencies in official statistics. However, it is clear that there was rapid expansion in the first two thirds of the 1990's, with a substantial slowdown after the end of 1996. Motorcycles appear to have increased in number by a factor of 14, more than double that of the nearest motorized vehicle (pickups and 4-WD). However, the number of newly registered motorcycles has declined by almost 50% since 1997 (Table 1). Undoubtedly a contributory factor to the previous growth of the industry was ease of entry into the market. In 1991 government restrictions on the import of vehicles more than five years old were relaxed. A recent sample analysis of the Ministry of Finance vehicle database shows that the import of used vehicles is now the principal means of supplying the Ugandan market, and in 1999 some 90% of those newly registered were second hand.

Regulation and Organisation

It has proved difficult for the government to regulate the *boda boda* industry. However, some operational discipline is provided by the 'associations', to which the majority of *boda boda* operators belong, although most have only a local jurisdiction.² Attempts to form a national organization have been defeated by the chronic instability that plagues most associations.

Members of an association pay an annual entry fee in the range 6000-10,000 Ushs³. The association represents them in cases of harassment by security personnel, traces members in cases of theft, or their relatives if there is an accident, and through their 'stage committees' enforce discipline and hygiene through fines, suspension of membership and the right to operate, and other sanctions. In some cases the association also has a semi-banking (savings) and credit role for members.

Operations

Bicycle *boda boda* have spread to most areas of Uganda and parts of Kenya where the terrain permits operations. They operate in only a few flat parts of the capital Kampala, in competition with motorcycles, but traffic and terrain bar them from most of the area. In cities where the terrain is flat they predominate and far outnumber motorcycles, mainly due to the cheaper fares they are able to offer and the generally short trip distances that appear to dominate.⁴

There are clear differences in the ownership patterns of bicycle and motorcycle *boda boda*. Most bicycle *boda boda* (71%) are operated by the owner, compared to 44% of motorcycles. A further 13% of bicycles belong to the family or close

² Many use the term association in their title, but in other cases it is a club. All function in effect as unions or co-operatives.

³ Current exchange rate is US\$1.00 = 1,700 Uganda Shillings

⁴ Household surveys show that mean trip length varies with income from 1.3 – 5.4 kms, although most operators claim that they seldom exceed 3 kms.

relative, and a similar proportion of motorcycles. Correspondingly, hiring of bicycles for operation comprises about 16% of the total, but 56% of motorcycles.

The motorcycles range in size from 50 to 250 cc engine capacity. Operators show a preference for the smaller sizes. The main considerations seem to be purchase cost - a 50cc motorcycle costs 1.4 million Ushs (US\$820) and one of 80cc 1.7 Million Ushs (US\$1000) - and fuel economy. The annual licence fee is also charged at 145 Ushs (US\$0.085) per cc per 12 months (i.e. US\$4.27 for a 50cc motorcycle), so operating costs are higher for the larger motorcycles, yet the small engine clearly limits the payload and range of operations. Larger off-road motorcycles, up to 250cc, are used in the western border regions because they make long distance trips into the Congo with goods.

Boda boda primarily provide three types of - (predominantly) - short-distance services: (i) within the main urban areas, where they compete with conventional sole hire taxis and *matatus*; (ii) as feeders to urban areas on routes that - due either to the low density of demand or the roughness of the route - are unattractive to *matatus*; and (iii) as feeders to the main roads in which role they tend to complement *matatu* and large capacity bus services.

It is very difficult to estimate the scale of *boda boda* operations, more so in the case of bicycles than motorcycles. The total fleet of bicycles can be estimated from the Ugandan national household survey, which records the percentage of households owning a bicycle in different regions of the country (Uganda Bureau of Statistics, 2001). This source yields a figure of 1.7 million. These are used to provide personal mobility, for dedicated rural goods transport, and *boda boda* services, however, the split between these three functions is not known. Three independent, albeit crude, estimates all converge on a *boda boda* fleet of about 200,000.

The motorcycle fleet can be estimated from new vehicle registration statistics (Table 1). Between 1994, thought to be the point of service take-off, and 2000 some 90,000 motorcycles were imported. The overwhelming majority of these are operated commercially and - allowing for scrapping due to old age and accidents, and pre-1994 baseline import levels to reflect non-commercial operations - then the current national fleet of motorcycle *boda boda* is about 70,000. Currently a typical short stage (0-1 km) fare differential would be 500 Ushs (US\$0.28) by motorcycle and 300 Ushs (US\$0.17) by bicycle. Motorcycle fares per km vary in the range 125 Ushs (US\$0.07) to 210 Ushs (US\$ 0.12) with the lower rates applying to the longer trips up to 16 kms. Comparable inter-urban bus fares per passenger are around 31 Ushs on paved routes and 68 Ushs on unpaved routes (Benmaamar *et.al.* 2001). Thus, motorcycle *boda bodas* are 2-7 times more expensive than bus fares. However, they are cheaper than sole hire taxi services, which realistically are their most likely competitors in cities.

The number of passengers is very dependent on the location of the stage and competition, with the relatively wealthy city centres generating proportionately more, but shorter, trips than small towns or rural feeder routes that have fewer but

longer journeys. Also, not all operators work continuously – many take time off for other activities and occupations. Surveys of bicycle *boda boda* operators in a secondary city (Jinja) found them carrying 35-160 passengers per week, with a mean of 86, or 12 per day.

In Kampala bicycle operators claimed substantially higher numbers of passengers than in Jinja, in the range 75-330 per week, with a mean of 153. In both cities the claimed passengers correlate closely ($r^2 = 0.86$) with stated earnings, which gives credence to the figures. These average 42,300 shs (US\$24) per week within a range of 12,000 – 107,000 shs (US\$7-59).

Motorcycle *boda boda* exhibit a similar phenomenon to bicycles with the average number of city centre passengers (64) being double those in the peri-urban area of Seeta (32). In Kampala motorcycle operators have a similar range to bicycle operators in Jinja, 18-160 passengers per week.

Stated earnings for motorcycle operators differ for owners and hirers, and by location. Owner earnings in Kampala (100,400 shs per week or US\$56) are almost double those of hirers (54,200 shs or US\$30), but they do have additional costs, especially vehicle depreciation and major repairs. Peri-urban areas yield substantially lower earnings for owners (54,200 shs per week or US\$30).

Operators

Operation of both service types is an exclusively male preserve. There is no obvious reason why women should not operate motorcycles other than custom and culture. 83% of bicycle and 80% of motorcycle operators view the provision of *boda boda* services as their main occupation. The remainder combine vehicle operation with a variety of other income earning activities.

Among bicycle operators 67% are married, compared to 81% of motorcyclists, probably reflecting the relative 'youth' of the former. The HIV/AIDS pandemic means that many operators support significantly more dependants than might be expected from their comparatively youthful age distribution. As expected dependency is much higher among married than unmarried operators, and slightly higher in both categories for bicycle than motorcycle operators, although it is not clear why (Table 2).

Table 2: Number of dependents of married and unmarried *boda boda* operators

Operators	Number of dependants	
	Married	Unmarried
Bicycle	7.3	1.7
Motorcycle	6.2	0.5

Allowing for the proportion married and the operators themselves, an average *boda boda* provides livelihood support to a little over 6 people. Given the previous estimates of the size of the industry these figures imply that about 1.6 million

people depend on it for part of their livelihood, which represents about 7% of Uganda’s population.

Users

Measurements at the household level (Table 3) show that bicycles account for 8 – 11% of household trips and motorcycles 1 – 3%. Bicycle use, however, tends to decline with income and motorcycle to increase. The surveys indicate that men are more numerous users (61%) of *boda boda* services than women (39%).

Table 3: Trip mode share by income group

Income Group	Mode share (%)							
	Walk	Bicycle	Motorcycle	Car	Shared taxis	Bus	Staff bus	Other
Low	75.1	9.5	1.2	1.6	12.2	0.1	0.0	0.1
Medium	68.8	10.7	1.7	4.1	14.4	0.0	0.0	0.3
High	52.9	7.9	3.2	22.4	11.3	0.0	1.6	0.5
Average	64.5	9.4	2.2	10.4	12.6	0.0	0.6	0.3

Source: SLAM Household surveys 2001.

Interviews showed that users of either type of *boda boda* are drawn mainly from labourers, the business community, students, and health facility patients. People in wage and salaried employment accounted for a little over 43% of users, the self-employed about 38%, and students (18%).

For both men and women it is the speed and convenience of motorcycles that seems to be most prized especially when: there are no taxis available, a door-to-door service is required, or the user is in a hurry. Some operators are equipped with mobile phones and hence can be summoned. Tiredness, wet weather, terrain and security for women (relative to walking) are also usage factors.

The main reasons for using bicycle-based services rather than motorcycle are to save money, due to the short distance travelled, and no other choice, especially in rural areas. Load carriage, availability, and acceptability of a slower journey were also given as usage factors.

The SLAM household survey results in Table 4 show that within each of the categories there is considerable variation in mean income, due to location. In each category village incomes are substantially the lowest. Household expenditure on transport is more uniform between locations than income, with Jinja households consistently the lowest, perhaps because it is dominated by (cheap) bicycle *boda boda* services. The percentage of household expenditure on transport increases broadly with income from a mean of 6.5% to 10.3%. Constraints of income and high fares ensure that the poorest group make only limited use of *boda boda* services.

For over 90% of men and women users *boda boda* services have resulted in significant changes in lifestyle by increasing the range and number of the activities in which they engage. They have also enabled them to save time and be more

punctual; to make activities easier; and increase their personal performance and output. About 60% of male and 38% of female users say that use of *boda boda* services has resulted in increased income. Prominent among these are traders in bricks, chickens, fish, food, and *waragi*.⁵

Table 4: Household monthly income and expenditure on transport

Location	Poor		Medium		High	
	Monthly Income Ushs	Expenditure On Transport %	Monthly Income Ushs	Expenditure on Transport %	Monthly Income Ushs	Expenditure on Transport %
Kampala	134,640 (77)	6.5	611,400 (349)	10.6	1,631, 230 (932)	13.5
Peri-Urban	99,750 (57)	8.4	308,000 (176)	10.3	967,750 (553)	10.8
Jinja	91,000 (52)	5.4	327,250 (187)	5.9	1,697, 500 (970)	7.5
Village	17,500 (10)	5.7	98,000 (56)	8.0	619,500 (354)	9.4
MEAN	87,500 (50)	6.5	334,250 (191)	8.7	1,230, 250 (703)	10.3

Source: SLAM Household surveys 2001. (Figures in brackets are US \$)

Main Problems

There is an unfortunate history of instability attached to the associations that most operators belong to, with recurrent take-overs, financial mis-management and organisational collapse. They have been formed from within the industry and by local authority officials, but still instability persists.

Existing and would-be owners and operators face a number of problems. The main ones are the high cost of entry to the industry, lack of credit facilities, difficulty in obtaining spares, and poor maintenance facilities and skills outside of the main cities.

Despite the best efforts of their associations both types of *boda boda* operators have a poor profile among users. Men complain of reckless, inexperienced driving and disdain for traffic rules; dishonesty in overcharging, not having change and actively thieving; poor appearance and personal hygiene; and abusive and arrogant treatment of clients, and coarse behaviour towards women.

Accidents are certainly common with reckless driving and drunkenness alleged to be the main contributory factors (Amimo, 2001). There is some evidence that casualties resulting from accidents involving *boda boda* occur disproportionately to

⁵ Local alcoholic spirit in high demand in major urban areas.

women (Amimo, 2001). It is not obvious why this should be the case other than their propensity to sit sidesaddle, which implies they are more easily ejected from the vehicles (Iga, 2002).

Benefits to the Poor

There are two mechanisms by which the poor can benefit from the operation of bicycle and motorcycle *boda boda*: from the employment created, and using the services provided.

The surveys showed that the majority of the operators are drawn from the least educated classes. Among motorcycle operators the low proportion owning their own vehicles, and the high proportion who are married with dependents, also indicate that they are likely to be from the lowest income category. Thus, the majority of the estimated at 1.6 million who are directly dependent on the industry can be assumed to be drawn from Uganda's poorest population segment.

Household expenditure data suggests that the poorest stratum of the population only occasionally use *boda boda* services, low incomes and the high unit cost of fares being the binding constraints to increased usage. However, those engaged in formal or informal sector wage employment seem likely to have received benefits from the enhancement of their income earning activities through the greater mobility afforded by *boda boda* usage.

Conclusions

It is clear that the *boda boda* industry has made a significant and unique contribution to the conduct of economic and social activities in Uganda by providing services in circumstances where the main alternative is to walk, which is slow, expensive as a means of load carriage, and of limited capacity. The low-capacity of *boda boda* enables them to service demands that other forms of transport find uneconomic, albeit at a relatively high unit travel cost. They provide service coverage in previously inaccessible rural and urban areas, and also enhance the profitability and effectiveness of more conventional transport services by feeding and distributing passengers to and from major stops.

Greater use of *boda boda* by the poor requires an increase in their income, or a reduction in fares through greater competition and lower vehicle operating costs. The first measure is not really a transport sector issue. Elimination of unnecessary government taxes on entry to the industry, and the establishment of credit finance schemes to widen ownership and increase competition, seem the best way to achieve a short-term lowering of operating costs and fares.

The main dis-benefits associated with *boda boda* services are their poor safety record and the pollution created in urban areas by concentrations of motorcycles. Operator education and training, to be provided by the associations, offer the main ways of addressing these issues, backed by an appropriate programme of enforcement. Specific measures may need to be identified to address the issue of

motorcycle exhaust pollution, as this is likely to become critical in Kampala in the near future.

6. IMTs in Sri Lanka

(Source: Ellis, 2001b)

Introduction

Sri Lanka boasts an impressive roads infrastructure, with 94,800 kilometres of road of which a third are paved, and the network per inhabitant is larger than in any other South Asian country and double the average in East Asia (World Bank, 1995). However, there are problems with maintenance and congestion particularly on the major routes, and the freight and passenger services are deregulated and competitive. Transport at the rural level is dominated by the bicycle for personal travel and marketing functions, but ox carts and two and four wheel tractors transport the bulk of agricultural produce.

Study Area No. 1

Malagala village is accessible along a single track paved road, 5kms from Parduka the main service centre. As such the bulk of production is purely for subsistence with any excess being bought by traders to sell in Parduka. The small amounts of cash crops available would make individual trips to market unprofitable.

Goods transport in the village is used mainly for building materials, firewood and a relatively small amount of agricultural produce. Vehicles are primarily used for personal transport and in particular to get to alternative sources of income. The bicycle is the predominant form of transport vehicle for most people and it satisfies nearly all of their needs. These include travel to markets, friends and relations, employment, grinding mills, fields and for the harvest from the rubber plantations. Richer members of the community use motorcycles for these tasks. There is a regular bus service which provides travel for most activities outside of the immediate vicinity of the village.

The power tiller is used for agricultural preparation and village level transport including the transport of fertiliser, harvest, firewood, building materials and to local markets. Oxen are also used for agricultural preparation but in this village their use for transport has all but finished due to competition from the power tiller. Tractors are used almost entirely for transport because the paddy fields are so wet that they cannot hold the weight of a tractor.

Study Area No. 2

The nearest service centre to Madiyawa is Maho which is 10kms from the village along an earth road which becomes all but impassable during the rainy season. The most common form of transport is either by bicycle or foot. The lack of a bus service causes the villagers to feel very isolated, unable to visit anyone outside the

village and restricted in the work they can accept because of their limited travelling range. As a result, the more dynamic members of the community leave altogether.

Vehicle usage follows much the same pattern as in Malagala village with the bicycle providing the predominant transport role. The role of the bicycle is perhaps more important in this village because of the lack of a bus service. The services provided by the power tiller are becoming increasingly important and the owners of ox carts are seeing the demand for their services fall. Motorcycles are used by traders (dried fish is a popular product), shop keepers and the richer members of the community for personal travel. Motorcycle owners are often asked to transport the sick to hospital.

Study Area No. 3

The Aluwathugirigama GSN area consists of four small villages (Melagal Gammadda, Deniya Gammadda, Mada Gammadda and Peterkanda Colony). Here, there is a lack of easily cultivable land and the physical infrastructure in terms of roads, tracks and paths is inadequate. Travel within the villages is almost entirely by footpaths which are in the main unsuitable for anything other than humans. In the rainy season it becomes difficult even for them. Any roads or permanent paths suffer from being washed away by heavy rains which can turn roads into rivers in a matter of minutes.

As a result of the poor village level infrastructure the level of vehicle ownership is very low. Consequently, goods have to be transported to the roadside by headloading (the paved road is on average 2km from the village) from where the villagers are reliant on the bus services. Traders rarely operate in this area because of the difficulties of getting into the village. There was a village level scheme to build appropriate roads into the village using local contractors. Although the local contractors had experience in maintaining the existing network, it was not clear that the design of the road was going to prevent it from being washed away with heavy rainfall.

Study Area No.4

Venivallara is a government sponsored resettlement scheme where landless people have been allotted two acre plots to develop as agricultural land. It is supposed to be connected to a maintained road network and irrigation system, but as Venivallara is on the outskirts of the scheme these facilities have not yet become available. As a result the road to the village is an earth road which becomes difficult to pass during the rainy season. Consequently, Venivallara experiences a number of seasonal problems that stem from the road. Small traders have to cease trading during about three months of the rainy season, whilst the bus service which stops 3km away during the dry season suspends services altogether during the rains.

The seasonal access problems have intensified the role of the power tiller in this area as it is now used for passenger transport to Suriyawewa, the nearest service centre. The relatively large agricultural plots that have been assigned to the farmers under this resettlement programme have also increased the viability of power tillers. Bicycles and motorcycles are used as in the other villages for personal

transport and trading. The demand for ox carts is falling but some people prefer this mode for the transport of bananas because they feel there is less damage.

Vehicles in Operation

In Sri Lanka, all motorised modes are imported vehicles while non-motorised modes are constructed locally.

The bicycle - the bicycle is undoubtedly the most widely used vehicle in rural Sri Lanka. According to the Ministry of Policy Planning and Implementation (MPPI, 1989) there are approximately 446,000 in use around the country. They are primarily used by men, but the slow process of the acceptance of women riding bicycles has started, though many of the household tasks are still conducted by women headloading water and firewood.

The main uses for the bicycle include travel to external sources of income for example to schools, factories, offices etc.; travel to markets to buy or sell produce; travel for personal reasons for example to see friends and relatives, and to health or educational facilities; travel to and from fields during the crop production season; and travel in a marketing role, for example selling fish or coconuts around the village or between villages.

The hand cart - the hand cart is predominantly used in the hilly areas for transport of firewood and agricultural produce etc. They are locally manufactured and consist of a wooden box mounted on two axles with four small wooden wheels. These vehicles can only be found on paved roads and would be inappropriate for use on rough roads because of the primitive nature of the wheels. The carts vary in size and require between one and four people to push them.

The motorcycle - the motorcycle performs many of the same functions as the bicycle and is the next step up the ladder as a vehicle for personal mobility. There are approximately 325,000 motorcycles in operation in Sri Lanka. As such motorcycle owners who just use the motorcycle for their own mobility tend to be the richer members of the community. However, the motorcycle can also be used as a commercial vehicle, mainly for marketing, milk, dried fish, village shop supplies and other high value perishable commodities. The motorcycle is ideal for use on rough rural roads but some riders complained of having to cease trading during the wet months (up to three months per year) due to muddy roads.

The power tiller and trailer - the power tiller was first introduced into Sri Lanka in 1956, nearly 11,000 units being imported up until 1975 (Plumbe and Byrne, 1981). Currently, over 2,000 units are being imported per year. The power tiller is rapidly becoming the most important multi-purpose agricultural and transport vehicle. It is ideal for the small field sizes and the relatively short distances needed to be travelled in rural Sri Lanka. It is used for ploughing, threshing, pumping water, and the transport of harvest, firewood, produce to market, for marketing and passenger movement. The multi-purpose nature of the vehicle means that they

can be utilised all the year round and therefore provide a good alternative income source to farming.

Ox carts - oxen are the longest standing form of animal draught power in Sri Lanka. They can be attached to a plough, and are used for the transport of firewood and paddy at the village level as well as for transport of agricultural produce to the market. However, oxen are used less intensively, being phased out by the use of power tillers and are only really required at times of peak activity. Though, Buffalo numbers are estimated to be around 1,500,000 and bullock numbers around 1,000,000 which still makes them an important source of draught power (FMRC, 1991).

Yet, in some wet zone areas, oxen are used for ploughing because the soil is too wet and deep to be able to support a power tiller. The oxen are basically taken into the fields to trample the soil. The ox cart is also preferred for the transport of very delicate perishable goods such as eggs and bananas.

Tractor and trailer - tractors were initially imported into Sri Lanka as part of a series of measures to increase agricultural production. In 1952 a large consignment of over 400 tractors were imported from Great Britain and Australia, which effectively tripled the countries fleet of tractors. These vehicles were entered into co-operative tractor pools but due to poor management and lack of spares they were under utilised and became inoperative (Biggs, Kelly and Balasuriya, 1993).

Tractors became a competitive alternative to lorries for road haulage and dominated the market, particularly for relatively short haul movements. Even after the relaxation of controls on the import of tractors in 1968 the high foreign exchange premiums to be paid on both vehicles gave a considerable price advantage to tractors (Plumbe and Byrne, 1981). The total number of tractors in operation is estimated at between 16,000 and 38,000 (Biggs et al, 1993 and FMRC, 1991).

Vehicle Operating Costs

The ox cart is the cheapest vehicle to operate up to about 8km with an available load of 500 tonnes. When the available load is varied over a 10km, the ox cart still remains substantially cheaper until about 410 tonnes per year. At very small levels of demand, up to about 10 tonnes, the bicycle is the cheapest form of transport. These types of loads would only be found at the household level and for very small business'. As loads become greater so the bicycle becomes less attractive.

What is most interesting in the rural transport systems of Sri Lanka is the competition between the power tiller and draught animal power. The two modes perform exactly the same tasks but draught animal power is more labour intensive. Since the introduction of power tillers there has been a decline in the use of draught animal power. Agriculture has become more intensive which has reduced the area on which it is possible to keep animals, feed costs have gone up as have labour costs. The result has been a move to a vehicle with better productivity as

the variable costs of draught animal power have risen and the demand for agricultural and transport services increases.

The power tiller remains the cheapest option until the tractor and trailer takes over at 1,000 tonnes at 10km or at 40km with a load of 500 tonnes. The tractor is again a vehicle that has been affected by competition from the power tiller. Although the tractor is used for ploughing, the fields are generally too small to make it practical. The power tiller is more suited to small and often water logged fields. As a result the tractor is used to a greater extent for transport purposes including the movement of produce after harvest and the movement of building materials and firewood for the rest of the year. Tractors are also used on road works for the haulage of road building materials.

Transport Charges

The only reliable data collected on rural transport charges was for the power tiller and ox cart. Smaller vehicles such as bicycles and motorcycles were not hired out for transport services, but would be lent to neighbours in an emergency. Power tillers were found to have charges that are between 15-30% above that of ox carts. This would suggest that operators are very aware of their operating costs and therefore power tiller operators charge a premium for their services.

Factors Affecting the Provision of Rural Transport Services

Infrastructure

The rural feeder road network in Sri Lanka is generally good and most rural communities have good access to these roads. On some of the resettlement programmes the villages situated furthest from the service centres do have problems because of lack of maintenance and poor design of roads in the construction stage. In these places seasonal inaccessibility can be a problem particularly with regard to the curtailment of bus services and traders unable to conduct their business.

Credit

There are many sources of credit available in rural Sri Lanka but for the poorest they are either very expensive or unavailable. There are many commercial banks that lend money at reasonable rates of interest and a large percentage of the richer farmers use this source to buy agricultural machinery. Indeed, only 4.5% of farmers have access to formal short term credit. Hence, small-scale farmers are unable to get loans because they require collateral. In addition to commercial banks there are a number of informal sources such as traders and village money lenders. Their rates are very high, around 12% per month, but they provide an invaluable source of credit to rural people.

Vehicle backup services

The larger villages such as Malagala had vehicle repair facilities for both motorized and non-motorised vehicles. The other villages had repair facilities in their nearest service centres which were never more than 10-15kms away. Spare parts were easily available and often manufactured within the country. The only complaint

from the farmers was that the spare part suppliers were increasing the price of spares very rapidly.

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