

PROVISION OF RURAL TRANSPORT SERVICES: USER NEEDS, PRACTICAL CONSTRAINTS AND POLICY ISSUES

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ABSTRACT

Rural people need transport services to travel to markets and services at local towns. Different types of rural transport users want passenger services that are affordable, frequent, predictable, safe and carry freight. Many different vehicles can be used, each with advantages. Passenger trucks may be more realistic than buses. Motorcycles are the most common vehicles on many rural roads. In some countries, motorcycle taxis provide vital, off-road access to homesteads, despite high tariffs.

Compliance with public transport regulations is poor on rural roads. Local officials are less stringent with regulations to accommodate transport services. High vehicle standards and strict enforcement can reduce services and increase prices. Regulations inappropriate to local situations fuel petty corruption. Cartels entrench poor practices.

Rural roads and transport services authorities are not integrated. Transport regulators are under-resourced and concentrate on urban and inter-urban services. Research should identify 'best practices' for rural transport services.

RURAL TRANSPORT REQUIREMENTS, PREFERENCES AND PRIORITIES

Rural access, poverty and transport

Good access is vital for poverty reduction and rural economic and social development. Rural people require access to key services (notably health, education) and markets (agricultural sales, household purchases, employment and income generating opportunities). They also wish to be able to access government facilities, take part in democratic processes and access religious, sporting and family events. Such rural access depends on appropriate infrastructure and suitable means of transport. Land infrastructure includes footpaths and trails, tracks and roads. The means of transport includes walking and carrying, which can be appropriate for short distances and where the infrastructure does not permit wheeled vehicles. The transport can also involve work animals, bicycles, carts, motorcycles, three-wheelers, cars, pickups, trucks and various sizes of buses (minibuses, midi-buses and large buses). Each transport mode has its advantages and disadvantages and infrastructure requirements. In some countries waterways and boats are extremely important for rural transport, but this paper addresses issues relating to land transport.

Rural access index

A major element in ensuring access is the provision of roads to connect villages to local market towns and service centres and to the national road network. Evidence from many countries in Asia, and around the world, has shown how the provision of rural roads has been associated with poverty reduction and improved health and education (Starkey and Hine, 2014). One indicator for 'measuring' access is the 'Rural access index' (RAI) developed by the World Bank. It has been defined as the proportion of the rural population living within two kilometres of an all-season road (Roberts, Shyam and Rastogi, 2006). However, no standardised methodology for determining this index had been developed and few countries incorporated suitable questions into national household surveys, as had been suggested. More importantly, this was simply a national-level statistic which had relatively little value for prioritising rural investments at devolved levels. Some attempts were made to develop devolved-level RAI estimates (eg, Starkey and Cartier van Dissel, 2016), but recent research

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by a World Bank Team has proposed a 'new RAI' based on GIS data for roads and rural population (Iimi and Diehl, 2016). One great advantage of the new methodology is that it can be estimated at local level, and so used for district-level planning and prioritisation. The new working definition is the proportion of the rural population within 2 km of a 'good' road. There is still work to be undertaken to develop consistent methods of capturing road-condition data on what is a 'good' road in terms of rural transport.

However, while the RAI is a key method for estimating rural access, it only 'measures' infrastructure, and gives no consideration to the presence, absence or quality of rural transport services. Roads by themselves are not enough. People need means of transport. In most developing countries, only a minority of rural people own motorized transport, and so people depend on rural transport services to access markets and services. As will be discussed, rural transport services vary greatly, and tend to be relatively neglected by governments and development agencies. Most of the ideas presented in this paper draw on the author's observations and experiences conducting consultancy services relating to transport services in Africa, Asia and the Pacific.

Low volume rural roads

This paper focuses on transport services between villages and small towns, and between villages and junctions with national roads (where there are likely to be onward connections to towns). The roads between villages and small towns are generally small roads that may be unclassified or are at the lowest level of classification (generally the responsibility of the community or the local district authority). They are sometimes referred to as 'Low Volume Rural Roads' (LVRR) as traffic volumes are often well below 300 vehicle movements a day.

It is important to distinguish Low Volume Rural Roads from national, provincial or regional roads that pass through rural areas. The latter are basically inter-urban roads, linking towns, although naturally there will be some villages located along them. Inter-urban roads passing through rural areas generally have much higher traffic volumes and more transport services than the small roads that link villages to small towns. Unfortunately, there can be confusion. For example, road safety crash statistics may be divided into 'urban' and 'rural'. Most of the 'rural' data relates to national roads outside urban areas, not the Low Volume Rural Roads being discussed here. Some national decision makers find it difficult to accept the poor state of transport services on LVRR as they remember passing through rural areas (on national roads) and seeing bus stops and many transport services. In reality few national or provincial level transport personnel have time to visit the small LVRR to appreciate the reality on the ground. Small rural roads, and their problems of transport services, tend to be invisible to all except the local users of them.

Transport needs, preferences and priorities

Surveys of rural transport users (of different gender, age, occupation and abilities) in many countries have highlighted what rural people want from transport services (Starkey et al, 2002; Starkey, 2007a; Starkey, 2007b; Starkey et al, 2013b). Farmers and traders need access to markets to sell produce and buy inputs. Then want transport services that allow them to travel with baskets or sacks of produce to and from such markets. Rural households and artisans need access to markets and stores to buy necessities and inputs, and again they want transport services that allow them to carry their purchases, which may include some building materials. Everyone needs to be able to access healthcare, but the greatest need is for children and women of reproductive age. Children, older persons and people with disabilities may need to travel with a parent or helper. Children need to access schools. Primary schools are often (but not always) within reasonable walking distance, but middle and secondary schools are often too far for a daily walk, and so require some form of transport, or boarding arrangements, either of which can impose financial burdens that limit access to education for some children. People may need to travel for employment on a daily or regular basis.

For all these purposes, rural people need transport that is affordable, predictable and dependable, timely, safe and secure and that can carry people's goods and (when required) their supporting persons (parents/helpers). People also prefer transport that is uncrowded and clean and easily to enter and alight from. It is difficult for anyone to rank all these attributes, because it all depends on their particular priorities of the day, and their circumstances, which may change. Very often there are no choices, and so any ranking tends to be purely hypothetical. However, when

people do have choices, one can learn something about their priorities. For example, if there are two modes of transport to choose from, many rural people will opt for the cheaper option, but people with resources may pay more for a quicker journey and/or a bit more comfort.

Many rural people know they may have to wait at the roadside for perhaps an hour for a transport service. However, under conditions where transport is very undependable and very unpredictable, many people will simply not plan to travel. Farmers will not prepare crops for market and artisans will not make goods for the market if they are unlikely to obtain transport when they need it. Inadequate transport services may lead to a descending spiral of reduced mobility. When transport is readily available, people are more willing to adopt more mobile lifestyles for better economic opportunities.

Gender and transport services

Rural transport is a strong gender issue, with women's needs and priorities often differing from those of men (Turner and Grieco, 2000; Fernando and Porter, 2002; Starkey, 2007b; Duchene, 2011; Porter, 2013). While men may travel for one key purpose, such as employment or market participation, women are more likely to travel for several reasons, including family care and health and market participation. While an all-day return trip to the market town may suit men, women may prefer a later departure and earlier return. The dependability of the return transport is particularly crucial, as women are unlikely to travel if they cannot be sure of returning the same day. Women generally have less access to money than men, and so transport affordability can be a gender issue (Starkey, 2007b; Kemtsop and Starkey, 2013). Women have greater preference for safe transport and are less likely to travel on the top or on the sides of vehicles. However, crowded and cramped transport can be threatening to them. Most rural transport services are owned and operated by men. Opportunities for employment or entrepreneurial transport operations by women are rare for multiple gender-related reasons, including tradition, access to resources, power and security.

TRANSPORT TYPES AND OPTIONS

Buses, midibuses, minibuses and minivans

Buses of various types are commonly used for inter-urban transport, and sometimes on low-volume rural roads. The continuum of capacities can be thought of as comprising large buses (generally 35-60 passenger seats), midi-buses (typically 18-34 seats), minibuses (usually 10-17 seats) and minivans (6-9 seats). Individual countries and populations use many different terms to refer to their own passenger transport vehicles.

Different sizes of 'bus' public transport services offer advantages and disadvantages, in terms of economies of scale, speed of loading and operation, and profitability relative to transport demand. Their ability to cope with rough rural roads and poor environmental conditions is also a key factor. Due to low demand and poor road conditions, large buses are seldom seen on low-volume rural roads. In Sri Lanka, a project to develop a community bus service proved successful over many years, after switching to the use of a less expensive, older bus. The bus operated between a village and small town 13 km away, carrying 400-600 passengers a day (de Silva, 2014). Large buses, such as the Ashok Leyland (40-60 seats) are often able to negotiate rough roads but cannot generally cope with muddy or slippery roads (see Figure 1). Such buses can operate for very many years. In 2009, 21 per cent of Fiji's bus fleet was over 25 years old (Haworth and Starkey, 2009).

Figure 1: Large bus in Fiji (left); 19-seater buses in China (centre); Minibus in Timor Leste (right)



Midi and minibuses fulfil similar niches, but cater for different demand levels, with midi-buses being preferred where there is strong passenger demand, allowing greater economies of scale, and slightly lower fares. Neither type of vehicle can cope well with poor road conditions, often leaving poor rural roads to passenger trucks, pickups and jeeps. Minivans cater for even smaller demand levels, and their smaller wheels make them even more unsuitable for poor roads. In Fiji, minivans mainly operate in peri-urban areas, and in China they serve some villages where there is reasonable infrastructure but little economic transport demand.

Passenger trucks and pickups

In many countries, trucks and pickups are used to transport people on rural roads; particularly roads in poor conditions that would be difficult for conventional passenger vehicles (see Figure 2). Sometimes, these are primarily freight vehicles, carrying a few passengers associated with the operator, or transported as a favour (perhaps with some money paid). In some countries (including Indonesia, Fiji, Myanmar, Papua New Guinea and Timor Leste) there are light trucks and/or pickups fitted with sideways-facing bench seats, allowing passengers to be seated, but also enabling reasonable freight volumes to be carried (when carrying passengers and/or on separate assignments). These may be regulated as public transport vehicles. Security forces also often use similarly configured trucks with sideward-facing benches to carry police or troops.

Figure 2: Passenger trucks in Timor Leste (left), Myanmar (centre) and Fiji (right)



Photos: Paul Starkey

There are two main advantages of configuring trucks and pickups in this way for public transport. The clearance, wheelbase and power of such vehicles make it relatively easy for them to pass on poor roads. The flexibility of the configuration allows the vehicles to be used for passenger, transport, freight transport and mixed transport. On rural roads, the transport market is relatively small and often changes between days (market days and non-market days) and seasons (rains, harvest time, festivals). Passenger trucks and pickups are better placed to respond to such changes than more specialised passenger and freight vehicles.

The disadvantages of passenger trucks include low passenger comfort and difficult passenger access (although some have fitted steps at the rear). While some passenger trucks have weather-proof side sheets, passengers are more exposed to the elements and to mud, dust and dirt than they would in a passenger vehicle. Passenger trucks and pickups are strong, long-lasting and expensive vehicles. Even twenty-year-old vehicles are expensive compared with three-wheelers, and so operators tend to keep passenger numbers high to cover costs and make a profit. This may lead to uncomfortable overcrowding. In Myanmar, 'Dyna' passenger trucks (2-3 tonne trucks, not necessarily Toyotas) are licensed to carry 20 passengers (but it is not unusual for there to be 30 or more passengers). In Myanmar, even 'Hilux' passenger trucks (1 tonne pickups, not necessary Toyotas) can carry 25 passengers (including perhaps seven on the roof rack). Such loading levels are not permitted, but are not uncommon. Passengers tolerate this to benefit from timeliness and low fares (about 2 cents US\$ per kilometre on rough roads).

Rural taxis

In many countries, there is a niche for relative low-capacity; four-wheel rural transport services that operate on recognised routes that generally connect villages with small towns or road junctions. Depending on the state of the roads, the vehicles used may be cars (old Toyota Corollas are common), pickups or 'jeeps' (see Figure 3). Unlike urban taxis, they do not specialise in point-to-point services, but are shared transport systems that operate like low-capacity feeder bus services (albeit, seldom to timetables). Although the vehicles are technically low capacity, with perhaps 4-10

passenger seats, loading levels are often high, with 10-20 passengers not uncommon (depending on the vehicle). They generally carry people and goods, at prices that are often twice as high as bus fares, but which are much cheaper than motorcycle tariffs. Their comparative advantage over minibuses is that their restricted passenger capacity that allows them to travel with a full load (or overload) even on routes of low transport demand. It is common for rural taxis to be old vehicles and these greatly reduce the capital overheads of the operators. Rural taxi operators appear more willing than minibus operators to travel on poor roads. Generally, rural taxis operate on routes that do not have competing bus services, and so can maintain their premium fares. In some countries, including Myanmar and Fiji, route-based taxis do operate in competition with buses, with people paying premium fares for faster services, although this is mainly on inter-urban routes (Haworth and Starkey, 2009; Starkey and Cartier van Dissel, 2016).

Figure 3: Rural taxis in Nepal (left) and Myanmar (right)



Photos: Paul Starkey

Motorcycles and motorcycle taxis

In many developing countries, motorcycles are the most common vehicle on low-volume rural road (see Figure 4). Their rapid expansion has been associated with much greater availability of low-cost motorcycles made in China, India, Indonesia and some other rapidly developing Asian countries. Many motorcycles are bought for use by individuals for transporting themselves and perhaps their family members. This is the case with most motorcycles purchased in China, India, Nepal and Viet Nam, for example. They may sometimes carry other people as a favour, and perhaps receive some money for this, but this does not really constitute a public transport service. In contrast, motorcycle taxis are operated, on a full-time or part-time basis, by people intent on making income by providing point-to-point, on-demand transport services for passengers and/or freight. Motorcycle taxis are common in urban and rural areas in many Asian countries, including Cambodia, Indonesia, Myanmar, Thailand, Timor Leste and Viet Nam. In most countries they are tolerated but largely unregulated. Safety helmet rules may be enforced in some areas, but are often ignored, particularly by passengers. In China, motorcycle taxis and all small-scale entrepreneurial passenger transport services have been banned, but some motorcycle taxi services do operate.

Figure 4: Motorcycles in Myanmar (left); Motorcycle taxis in Timor Leste (centre and right).



Photos: Paul Starkey

It is not entirely clear why the use of motorcycle taxis gain significant traction in some Asian countries but not others. Certainly, the spread of intermediate means of transport has many interacting elements relating to supply systems, transport needs, regulations, history, culture and random circumstances (Starkey, 2001). In general, motorcycle taxis start in urban areas, where there

is great demand for point-to-point transport services. With the practice established, some operators start providing services in rural areas, where there is less density of demand, but also less competition and great need. In some countries, including India and Sri Lanka, by the time motorcycles became widespread, there were already well-established informal urban transport systems that made use of motorized or non-motorized three-wheelers. Such three-wheelers were much less common in countries such as Cambodia, Myanmar and Viet Nam, where motorcycle taxis developed.

Recent research on motorcycle taxis in Africa has documented many of the benefits of motorcycle taxis to rural women and men, including employment opportunities, particularly for young men (Starkey, 2011; Starkey et al, 2013a and 2013b; Starkey, 2016). In many countries, motorcycle taxis can be profitable to operate and profitable to lease out, due to low capital costs, low operating costs, unfulfilled rural transport demand and informal private-sector systems for the leasing motorcycles for a daily fee (Starkey, 2007b; Starkey, 2008; Starkey, 2016). On some rural roads motorcycle taxis now account for 80 per cent of passenger movements and a similar proportion of small-freight transport. Motorcycle taxis generally operate relatively short distances (often less than 10-20 km) and complement other transport services by transporting people between villages and the road network, where longer-distance transport services operate. Rural people greatly appreciate this and value motorcycle taxis extremely highly, because of their great availability, dependability and timeliness as they provide reliable, on-demand, point-to-point services. Surprisingly, perhaps, this is true even for pregnant women, older persons and vulnerable people. While they would prefer the greater comfort and the lower tariffs (for route operations) of larger forms of public transport, such services are generally infrequent or unavailable to villagers. (Starkey et al, 2013a and 2013b, Starkey, 2016).

As motorcycles often travel off the road, along paths and tracks, they are changing the whole rural transport situation, effectively 'widening' the impact of roads. For example, rural families living more than two kilometres from an all-season road (the basis of the Rural Access Index or RAI) may now be able to call motorized transport (motorcycle taxis) to their village to transport family members and/or their goods. In this way, in many countries motorcycles and motorcycle taxis have had a huge impact on reducing rural isolation (Starkey et al, 2013a and 2013b; Starkey, 2016).

While motorcycles and motorcycle taxis are having a huge positive impact on rural access and mobility, there are many safety and regulatory issues that need to be addressed. Motorcycles offer little protection for drivers and passengers. They can be dangerous if balance and control is adversely affected by potholes, poor road services, weather and environmental conditions, overloading, inconsiderate traffic or pedestrians, animals crossing or poor driver behaviour (including, on occasions, risky actions, alcohol and drugs). Safety helmet use is low (particularly for passengers who may resent wearing helmets used by other people). Many drivers have had no formal training, and possess neither driver licenses nor insurance. National road safety statistics generally show high numbers of crashes and fatalities for motorcycle riders. The causes of crashes are numerous, but in one classic study in United States of America, most accidents involved other vehicles (and were mainly the fault of those other drivers); in those crashes which did not involve other vehicles, the main cause was a misjudgement by the motorcycle driver (Hurt, Ouellet and Thom, 1981).

In terms of transport services, one pertinent issue relates to the numbers of passengers allowed on a motorcycle. In most countries, the law allows one driver and one passenger only. In some countries, one can see four or five people on one motorcycle, dangerously overloading recommended passenger limits on motorcycles. However, the advantages and disadvantages of allowing a second passenger on Low Volume Rural Roads (LVRR) do not appear to have been researched. During a field visit at a rural transport workshop, some rural women interviewed considered that allowing two passengers on a motorcycle was necessary on their LVRRs (TFG and IFRTD, 2015). Firstly, there were no alternative transport options, for them. Secondly, many essential journeys, including travel with a child, an elderly person, or a sick person required three people: the driver, the vulnerable person and someone behind that person to hold them securely. Thirdly, with two women passengers, they felt more secure, and were more able to control any tendency of the driver to go fast or drive dangerously. Fourthly, the price per passenger was significantly lower if two people are carried, as each paid just 60 per cent of the fare for carrying a single person (Starkey, 2016). There appears to be no objective data relating to the costs (including crash risks) and the benefits (including economic advantages and access to medical attention) of carrying one or two motorcycle passengers on LVRR. Any discussion of such issues at a national or international level is difficult due to people's

obvious reluctance to condone illegal and possibly unsafe practices. However, at a local level, enforcement officers in many countries in Asia, Africa and Latin America are often reluctant to enforce compliance with the 'one passenger' limit (Starkey, 2016).

Three wheelers

Public transport using motorized three wheelers is well-established in many countries, notably for urban and peri-urban transport. There are a wide range of designs and various local names, including 'tuktuk' that is prevalent in Thailand. The most common is the 'Bajaj' three-wheeler 'autorickshaw' that was developed in India (originally using Italian motor-scooter components). It is now used widely in South Asia and is exported to many other countries in Asia and worldwide. It is well-suited to urban roads, but with small-wheels and relatively low power, it is less appropriate for rough rural roads or hilly areas. The more powerful 'Tempo' (originally based on a German three-wheeler light delivery van) has larger wheels and a more powerful engine and is more suited to rural roads. In the Philippines, motorcycle sidecars have been used, and in Cambodia, there is some use of trailers-pulled by motorcycles (so technically four wheelers, but fulfilling a similar niche). More recently, relatively low-cost three-wheelers based largely on motorcycle components have been exported from China and are spreading in many countries. These are often used with a 'bucket' load platform, suited to carrying small freight loads. They are mainly used in urban areas (with high density of short distance transport demand), but some are used in rural areas. In Myanmar, special bodies are constructed reminiscent of small passenger trucks with sideways-facing bench seats (see Figure 5). Some of these are used for rural transport services, typically carrying about 20 passengers, at tariffs that are more expensive than passenger trucks but much cheaper than motorcycle taxis (Starkey and Cartier van Dissel, 2016). However, three wheelers are seldom able to carry such transport loads on rough roads or in hilly areas.

Figure 5: Three-wheelers in Timor Leste (left), Myanmar (centre) and China (right).



Photos: Paul Starkey

Other intermediate means of transport

There is a wide range of other intermediate means of transport used in Asian countries, many of which have been developed by local entrepreneurs. In South East Asia, there are various types of diesel powered transport, derived from two-wheel tractors with trailers or innovative 'iron oxen' machines using engines derived from irrigation pumps or grinding mills. These are mainly used for rural freight transport, but are sometimes used to carry passengers. They often have slow speeds, but considerable power, which allows them to navigate quite rough tracks and hilly areas. In Myanmar, some two-wheel tractors (power-tillers) pull 'passenger-truck' style trailers and provide transport services between villages and markets (Starkey and Cartier van Dissel, 2016). In China, all non-conventional transport services are banned, including transport using power tillers and agricultural trucks, but informal rural transport of 'family members' is not uncommon on Low Volume Rural Roads (see Figure 6).

Figure 6: Two-wheel tractors with trailers in Myanmar (left) and China (centre and right).



Photos: Paul Starkey

TRANSPORT SERVICES PRICES

Transport services on rural roads differ in many ways from the more visible inter-urban transport. Long-distance, inter-urban transport can be profitable for operators, and cheap (per passenger-kilometre or per tonne-kilometre) for users. This is due to high demand, relatively low operating costs on main roads and large passenger and freight volumes (allowing significant economies of scale). Prices are also kept low due to active competition and, in some countries, active price regulation (mainly for passenger fares). In many countries, inter-urban passenger bus fares tend to be in the region of 1.5-2.5 cents US\$ per passenger-kilometre (Starkey et al, 2013b; Starkey and Cartier van Dissel, 2016). On low volume rural roads, operating costs are higher due to poor roads. The relatively low passenger demand restricts the economies of scale possible by using high-capacity vehicles. With small vehicles and high operating costs, prices per passenger-kilometre tend to be in the range 5-10 cents US\$ (Starkey, 2007b; Starkey et al, 2013b; Starkey and Cartier van Dissel, 2016). Motorcycle taxis tend to be even more expensive, at 10-20 cents US\$ per passenger-kilometre, due to their low carrying capacity (Starkey et al, 2013b; Starkey and Cartier van Dissel, 2016).

Rural transport passenger fares in China are regulated and appear to be about 50 per cent more than those of other Asian countries (Starkey, 2013). The reason for this (and the defence of this) appears to be that the regulated standards are much higher: overcrowded and informal-sector operators are banned and only modern buses are allowed to operate on rural roads. Chinese bus operators are not incentivised to operate on Low Volume Rural Roads, even though, with the regulated fares, they could cover their operating costs provided half the seats of a 19-seater bus were filled. In one study in Pu'er, Yunnan, of 31 rural roads prioritised for upgrading, only four had operating bus services. Neither of the two rural roads studied what had already been upgraded had bus services (Starkey, 2013). Across the nearby international border with Myanmar, rural transport services were of a much lower standard, but were cheaper and more available (Starkey and Cartier van Dissel, 2016).

It is more difficult to provide comparable international figures for rural freight costs, as these are extremely variable, even within countries. Charges per tonne-kilometre for carrying small quantities of freight (50-200 kg) may vary by two orders of magnitude (a one-hundred-fold difference), due to different pricing systems, different distances and different vehicles (Starkey et al, 2013b).

TRANSPORT SERVICES HUBS AND ROUTES

A key destination for rural transport services are the nearby small towns that have produce markets, shops, government and private services, clinics or hospitals and secondary schools. These become transport hubs for the small-scale transport services that serve the villages. Such small towns are generally on the national road network and are served by inter-urban transport services, allowing connections to larger towns and other destinations for those who need to travel further. For many rural people, and in particular rural women, regular transport services between their village and small town is particularly useful. Depending on the distance, transport supply and passenger demand, people can travel to the town in the early morning and return later that morning, or travel to the town later in the morning and return early afternoon. Such regular transport is particularly good for multi-

tasking women who may need to access markets, health and education facilities in the same trip. In many Asian countries, including Myanmar, three-wheelers are able to provide such services as their small transport capacity can be well-matched to the demand. However, low levels of economic demand and more profitable transport opportunities mean that larger transport services rarely operate frequently between villages and towns, and sometimes only operate on market days on a day-return basis.

The operators of large capacity rural transport, such as buses and passenger trucks, generally make more money if they can travel longer distances and travel as much as possible on national roads. One way to achieve this is to have a transport service that starts in a village and leads to a large town, with much of the long journey on national roads. High capacity vehicles travelling long distances allow greater gross income per trip. Such vehicles are operating to and from larger urban transport hubs. Because the service starts in a village, it may be easier to obtain a route license than an inter-urban route. In China, a rural route is eligible for a rural transport fuel subsidy. Such a service can pick up passengers along the way, particularly on the inter-urban road sections that attract passengers. Such services provide important access to economic opportunities in the large towns, and mainly benefit men and people with the resources to travel. They tend to operate on a daily schedule, leaving in the early morning and returning near the end of the day. Such transport patterns are common in many countries, including China, Fiji, Nepal, Papua New Guinea and Timor Leste (Haworth and Starkey, 2009; MEH and Starkey, 2009; Starkey, 2013).

While long-distance bus services starting in villages are clearly valuable and beneficial to many passengers, they do not provide the same service as vehicles operating out of a small-town hub. A transport hierarchy with small vehicles serving small-town hubs may benefit more people and also provide 'feeder' services for inter-urban buses for those who need to travel further. Such systems operate quite well in Myanmar that has a very diverse transport fleet, numerous small-scale operators and minimal regulation (Starkey and Cartier van Dissel, 2016).

In contrast, in China small-scale passenger transport operators are not permitted and bus companies operate to and from large town hubs. These have little interest in developing smaller-scale transport services and these cannot arise spontaneously as entrepreneurial public transport services are prohibited. While some clandestine services meet the local demand, these cannot develop and flourish due to their illegal nature (Starkey, 2013).

In the flat Terai of Nepal, there is some complementarity with three-wheelers serving minor roads and tracks. In the hills of Nepal, where three-wheelers are under-powered, the evolution of such complementary systems is inhibited by the cartel system, as bus transporters may react against complementary jeep services, fearing they may be competitors (Starkey, Tumbahangfe and Sharma, 2013).

In Fiji, there are several bus companies operating long rural routes. There are also small-scale operators of minibuses, minivans and taxis. These do not generally provide complementary services on rural roads, due to the poor road condition, and they generally concentrate on the more profitable inter-urban routes. However, when they do operate on rural roads they tend to 'poach' passengers waiting at rural bus stops ahead of scheduled buses which can greatly affect the profitability of the bus services (Haworth and Starkey, 2009).

SAFETY ISSUES

Safety is a concern for rural people and for regulators and enforcers. No one wants to be in a crash or for there to be crashes. However, both rural people and rural-based enforcers tend to take a 'situation ethics' approach to safety: it all depends on the situation and the relative risks and the alternatives. If there are no safer alternatives, rural people and rural-based enforcers tend to accept 'poor' safety practices.

Road safety depends on numerous interacting factors including the design, quality and condition of the road, the condition and operational practices of the vehicles, the behaviour of drivers and other road users and the weather and environmental conditions. Rural road infrastructure tends to have relatively low safety standards that, for reasons of cost, may permit narrow roads, sharp bends, restricted vision, limited signage and relatively 'unforgiving' roadsides with few safety barriers. Road surfaces tend to be poor and eroded and road pavements, shoulders and drainage are seldom

well-maintained. The safety risks of the poor infrastructure are partly offset by the low traffic volumes and the necessity to maintain low travel speeds. As a result, travel on low volume rural roads may not be particularly dangerous. However, there is little clear evidence on this point as few, if any; national road safety statistics are disaggregated in a way that allows assessments relating specifically to low-volume rural roads.

Most, or all, safety legislation relating to rural transport services is made through national level regulations concerning vehicle loading levels (passenger numbers and freight loads), permitted vehicle uses, vehicle specifications and testing, operator competence, the rules of the road (highway code) and public transport operational requirements. In many countries, such national legislation is 'tightened up' following the publicity relating to a horrific crash. Long-standing local practices, such as carrying mixed loads of passengers and freight or transporting people using agricultural vehicles may be formally outlawed following a shocking crash that killed vulnerable people.

Throughout the world, fulfilment of safety obligations is strongly linked to the costs of compliance (or the benefits of non-compliance), to the level of enforcement, to the risk of detection and to the consequences of being found out. This is true for observing speed limits, ensuring technical and fiscal compliance and following public transport procedures and obligations. In rural areas, people may be hard-pressed to afford the financial and economic cost of compliance. In most countries, there is very little enforcement of transport regulations on remote rural roads themselves. The level of compliance for rural transport services is generally determined by the degree of enforcement in and around the service centres, small towns and markets to which transport services run. If the police and regulatory authorities are not strict, or if the consequences are minor (eg, a small bribe to overlook the infringement), compliance with many safety issues tends to be at the discretion of the operator. This is true of very many countries in Africa, Asia and the Pacific.

Overloading of rural public transport vehicles is one of the most visible signs of non-compliance with safety legislation (see Figure 7). In many countries, including Myanmar, Nepal and Timor Leste, it is not uncommon to see people travelling on the roof racks of buses, passenger-trucks, pickups and/or jeeps. In most developing countries in Asia and the Pacific, rural transport vehicles carry more people (and goods), than is officially permitted. It would be interesting to document the actual costs and benefits of such practices to provide evidence to policy makers and rural enforcers of the impacts of overloading.

Figure 7: Overloaded vehicles in Nepal (left), Timor Leste (centre) and Myanmar (right).



Photos: Paul Starkey

Reckless driving behaviour, including speeding (relative to the prevailing conditions) and substance abuse appear to be more crucial in causing safety issues than poor vehicle conditions or overloading. It is hard for authorities to regulate driving behaviour in rural areas.

REGULATION AND ENFORCEMENT

Rural transport passenger transport services have to conform to national safety regulations and certain technical and fiscal public service obligations. They may also be regulated for tariffs and routes. Freight operators are mainly regulated for safety, technical specifications and loading. There may be some enforcement by staff of the relevant road transport authority, notably at checkpoints and weighbridges. However, the numbers of transport regulatory staff in rural districts is generally tiny, and they tend to concentrate on administrative matters and the roads with high traffic volumes, such as urban areas and inter-urban roads. Enforcement of transport services regulations is generally left to

the police. A larger amount of police resources is allocated to areas with greater traffic volumes like towns and inter-urban roads. The police have the power to enforce transport services regulations, but seldom ensure complete compliance. Even in China, one of the most heavily regulated and policed countries, illegal practices can be observed (but are seldom discussed). In many parts of Asia and the Pacific, limited enforcement can be attributed to three main issues: lack of staff and resources; petty corruption; and sympathy with rural transport operators and passengers.

In many countries, the un-official but conventional penalty of non-compliance when caught is the need to pay a small 'gratuity' to the accusing officer. Provided the bribe is small, it may be more advantageous to the operator than the cost of compliance. This is generally the case with overloading, which allows greater income. The official also benefits from the extra income from bribes, some of which may have to be passed up the command chain. In such circumstances, neither the transport enforcers nor the transport operators would benefit from greater regulatory compliance.

Another key issue is that rural enforcers tend to understand the 'benefits' to people of non-compliance: when they are off-duty they may well travel in over-loaded vehicles, without seatbelts or crash helmets. They may be sympathetic to the benefits of rural transport operations, even those involving over-loaded, poor quality vehicles. To take a recent example from Africa, in a rural district in Ghana in 2016, police and local authorities received instructions from the capital city to prevent the operation of motorcycle taxis, which are very common but which are illegal throughout the country. The police reported that they could not do so, as the rural people now depended on the flexible 'feeder' services of motorcycle taxis (Starkey, 2016 and personal observation). In China, such apparent disregard for central authority would seem unthinkable. In China, it would be expressed differently: those people are not considered transport service operators, but simply individuals helping their 'family members' (albeit on a full-time basis, 7 days a week). Empathy with those involved in rural transport leads to one of the commonest features of rural transport regulation: ignoring the issue, benign neglect or, to use an English expression, 'turning a blind eye'.

ASSOCIATIONS AND CARTELS

In most countries, operators of transport form associations for mutual support. These range from associations of muleteers, to motorcycle taxi associations to bus operators associations and freight logistics associations. Generally, each association is for a particular form of transport in a specific geographical area, but in some countries there are broader associations, sometimes linking up to a national level. At this level they can be powerful voices, negotiating with national authorities on pricing and regulation, and influencing national policies on keys issues such as fuel prices, tariffs and competition.

Associations can play an important role in self-regulation. Transport services are often subject to the dilemma of 'the tragedy of the commons'. On communal grazing land, there is an inevitable tendency to increase stocking levels to a point where it is unsustainable: then it is in everyone's interest for someone to de-stock, but it is in no individual's interest to do so. So with transport operators, while there is a profitable demand, the number of transport operators will increase up to the point where there is too much supply, and there is a need to 'destock' and 'share' the demand in a way that is acceptable to all operators. The most common way is for associations to control rotas or queuing systems. In Ethiopia, the association responsible for rural transport routes organises route rotas, to allow members to share the more profitable routes, and also to service those routes with lower transport demand and profits.

A transport cartel is an association of operators that attempts to balance supply and demand in its transport sector and to reduce open competition between different operators, based on price or timeliness. Cartels can enforce queuing or rota systems on its members so they take turns to undertake particular transport supplies, so sharing the transport demand between its members. They can also restrict competition by making it difficult (or impossible) for new entrants into the transport market. The main disadvantage of cartels is that they restrict competition on prices and service quality. On the other hand, they can prevent 'destructive' competition that might lead to the lowering of incomes and insufficient investment in vehicles and vehicle maintenance.

In South Asia, syndicates or cartels are very significant in Nepal, and there have been incidents of violence, including bombs in the offices of the regulating authorities. There are examples of operators of 'jeeps' having their vehicles burned because they were perceived to be competing with

buses (Starkey, Tambahangfe and Sharma, 2013). In another example, one member of the Kapilvastu Jeep and Tempo Entrepreneurs Association had a relatively new jeep, causing customer dissatisfaction with the majority of jeeps that were old and dilapidated. The response of the association was not to start to upgrade the rest of fleet (an upward spiral resulting from competition) but to remove the newer vehicle and agree that newer vehicles would not be permitted on their routes (MEH and Starkey, 2009). In a more positive example in Nepal, a syndicate of bus operators in Rasuwa split and two operators started to run services in competition. When it was one association, tickets were sold from one kiosk and the operators departed on an agreed rota (a 'dial' system). This meant there was no real competition and passengers took the next bus, whatever its quality. When the bus operators separated, they departed at quite similar times, and passengers could choose the newer, more comfortable option. Prices were also discounted in response to the competition (MEH and Starkey, 2009).

TERMINALS AND BUS SHELTERS

Passengers that have to wait for transport appreciate being protected from the weather, with the opportunity to sit, and, if possible, have facilities such as drinking water, toilets and refreshment providers. They also greatly appreciate accurate information about waiting times. Transport terminals allow operators to concentrate their resources in one well-known area and for regulators (or associations) to control loading and departures. In competitive markets, some terminals (mainly inter-urban terminals) are private and restrictive as they are operated by a single bus company or association, to attract passengers to its particular facilities and transport services.

'Public' road transport terminals (used by several operators) can act as convenient interchanges between different transport services (eg, from rural 'feeder' services to inter-urban services). They also reduce traffic disruption caused by on-street public transport loading and waiting. Private, or public, investment in transport terminals and bus shelters seems desirable provided the costs are justifiable and there are no obvious disadvantages.

China has encouraged private sector investment in the building and operating of bus terminals for both rural and inter-urban bus services. A company (normally a bus-operating company) that builds and runs a bus terminal may claim subsidies for constructing or upgrading terminals. They are also entitled to put a surcharge on all tickets for journeys from that terminal, on a sliding scale (6-10 per cent) depending on the quality of the facilities being offered. One downside of this is that passenger fares have to be set higher to pay for the facility. If offered a choice, it is likely that many rural transport passengers would not pay a premium for there being a terminal. Nonetheless, once a terminal is established, all relevant public transport should use it. Because of the charges involved, it is not uncommon to see transport operators loading outside the terminals, to avoid the costs of using the terminals. Due to various incentives involved in terminal construction and operation, the development of transport terminals appears to be a popular policy within local authorities in China, with even proposals for village-level transport terminals (Starkey, 2013).

Another potential disadvantage of terminals (for passengers) is their location. If terminals are not adjacent to key destinations for passengers, they may cause further inconvenience, and may even require passengers to change to another form of transport for the final few kilometres. This may be reasonable for large cities, where some road transport terminals may be on the periphery of the city, allowing interchange with designated urban transport systems. However, similar planning would not be applicable to the small towns that connect rural areas.

Timor Leste has a policy (inherited from Indonesia) of locating transport terminals at the edge of a town, and this causes major inconvenience to rural transport passengers. For example, the small port town of OeCussi had a rural transport 'terminal' (without facilities) at Tono about five kilometres from the main market and ten kilometres from the port and town centre. Enforced regulations required minibuses arriving from the surrounding villages to end their journeys at this 'terminal', and passengers had to unload, with their produce and goods, and take 'urban' minibuses to the market. This increased the inconvenience and cost for rural passengers. Some paid \$1 (US\$) to travel with a sack of produce 20 km from OeSilo and then another \$1 (US\$) for the final five kilometres. Since it is a small town with little traffic, such regulations only benefited the (well-connected) urban minibus operators. The rural transport 'terminal' disadvantaged rural minibuses and their passengers (see Figure 8). A comparable issue was found in the small town of Lospalos in Timor Leste. Here an

elaborate transport terminal had been constructed about three kilometres outside the tiny town centre, and also three kilometres from a new administrative centre. Officially all inter-urban and rural services had to use this, and arriving and departing passengers had to either walk with their goods or take an urban taxi. In practice, most services stopped in the centre of the town and this caused no problems due to the very low volumes of traffic (Starkey, 2009).

Figure 8: Rural passengers changing minibuses at unnecessary ‘terminal’ in OeCussi, Timor Leste



Photo: Paul Starkey

While passengers who have to wait for transport can benefit from the weather protection and facilities of bus shelters and transport terminals, it must be stressed that for rural people, the key priorities are predictability, reliability, timeliness and affordability. Initiatives to improve rural transport services should also concentrate on these key issues. Investments in terminals and bus shelters are unlikely have much beneficial impact on these priorities, and, as has been illustrated here, may even increase the overall cost of travelling.

NEED TO UNDERSTAND ‘BEST PRACTICES’

Governments and aid agencies working in Asia and the Pacific, and other parts of the world, allocate very limited resources to the topic of rural transport services. Land transport budgets are generally high, dominated by infrastructure investment and maintenance, with rural roads relative to national and regional roads and highways. The regulation and planning of road transport services has a much lower allocation of funds and personnel than road infrastructure. With few resources, transport services authorities concentrate on areas of high transport volume, which are urban and inter-urban transport services. Few, if any, resources are allocated to planning and regulating better rural transport services. The tendency is to leave the private sector to develop ways of meeting the transport demand. Few, if any, large-scale transport companies invest in rural transport services. Small-scale entrepreneurs do try to meet the demand and earn a living, but with little guidance and few incentives from the public sector.

Investment in roads is often justified by assumed improvements in transport services. However, there are very few attempts, if any, by road projects to ensure these transport services improvements happen do happen. Road engineering departments and organizations often have very weak linkages with transport services planners and regulators. Developing an integrated approach to rural transport is fraught with institutional problems. The Asia Development Bank (ADB) has been pioneering approaches that view rural access and investments from an integrated perspective, and have developed the Sustainable Transport Appraisal Rating (STAR) system of project appraisal. This tool can be used for all types of transport project to ensure that positive human outcomes are considered at all stages of project planning, implementation and evaluation (Véron-Okamoto and Sakamoto, 2014). Several ADB major road investment projects in Asia have included work relating to transport services, including studies in China, Timor Leste and Myanmar (Cardno Acil, 2009; ADB, 2014; Starkey and Cartier van Dissel, 2016). However, stimulating long-term, collaborative approaches to rural transport within the various national authorities may prove difficult.

As should be clear from the information presented here, what constitute 'best practices' in rural transport is not well understood. How is it best to meet the needs of rural men, women and children and their goods, for transport services that are dependable, timely, affordable, safe and convenient? There is no simple answer to this, but three methodological 'best practices' seem clear. There is need to:

- **Understand rural transport needs and options from the point of view of rural people (differing by gender, age, occupation, income, etc)**

This is not automatic, as increasingly, people involved in rural transport planning and regulation may live urban-lifestyles, with little contact with the reality of rural transport issues. The responsible authorities need to make an effort to understand the issues through visits and people-orientated, diagnostic studies. The rural people and/or supporting organizations may need to explain the various priorities of the different rural stakeholders. It is important that transport-related survey data, including road safety statistics, are disaggregated for different types of rural people and for road type (separating low-volume feeder roads from inter-urban roads).

- **Seek solutions that positively improve rural access and mobility**

It is important to avoid the tendency to over-regulate in the interests of quality and apparent safety as this can remove some readily-available, affordable and locally-acceptable transport options. The consequences of regulation should be better transport, in terms of the priorities of the different rural people (who generally rank availability and affordability above comfort and safety).

- **Develop sustainable integrated transport systems that maximize the use of local transport operators and available transport modes**

The aim should be to have integrated rural transport services, that are likely to involve several different, complementary transport modes bringing passengers and freight to roadside pickup points and to markets and service centres. For the initial journeys from villages, low-capacity, multi-purpose vehicle are likely to be appropriate, and these may be privately-owned for a variety of reasons. They may not be conventional vehicles purchased specifically for transport services provision, but they may well be appropriate to allow some affordable access. Complementary higher-capacity services may require innovations such as consolidation of passenger and freight loads and/or route sharing.

Encouraging evidence-based research can generate appropriate "best practices" on rural road services. The Research for Community Access Partnership (ReCAP), provides such an example, which aims to stimulate research on rural transport. Rural transport projects and programmes should aim to provide better rural transport services suitable for different needs of all rural people, to reduce poverty, increase mobility and contribute towards economic growth.

CONCLUSIONS

People living in rural areas need roads and transport services to access markets, health facilities, education and economic and social opportunities. As most rural people in developing countries do not own motorized transport, they depend on transport services to transport themselves, their family members and their goods to local small towns to access markets, shops and services. Rural men, women, children, older person and people with disabilities have different transport needs and preferences but all require services that are available, predictable, dependable, timely, affordable, safe and secure. Surveys of passengers and studies of their transport choices suggest dependable availability is a priority, and regulatory attempts to improve safety and comfort should not have the unforeseen consequence of reducing availability. On national road networks, buses of various sizes are the main means of transport. However, the transport demand on low volume rural roads is low and variable and requires vehicles that can take people and freight. A wide range of transport types of various capacities meet this market, including motorcycle taxis, three-wheelers and passenger trucks. Their entrepreneurial operators often overload their vehicles, a reality often accepted as inevitable by the passengers and local enforcement officials. In the short term, blanket enforcement of national regulations will not be constructive if it reduces the mobility of rural people (of different incomes, gender, ages and abilities). Little attention has been paid to realistic best practices in rural transport

services. The transport sector is not integrated. Well-funded road engineering organizations and projects are not involved with transport services and transport services regulatory bodies are underfunded and concentrate on the high demand areas of urban and inter-urban transport. There is need to stimulate research on rural transport services to gain a better understanding of 'best practices' for planning and operating good rural transport services. There should be good evidence-based policies that are appropriate and lead to better, available, timely, affordable and safe rural transport services.

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