

PROMOTING THE USE OF IMT'S CASE STUDY – SRI LANKA

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Objectives of the case study

Following a brief summary of Sri Lanka's current socio-economic and political status, this case study seeks to identify the use of Intermediate Modes of Transport in four study areas, and the way in which particular IMTs such as bicycles, power tillers, hand and ox carts, tractors, trailers and motorcycles are used to alleviate the transport burden of the communities living in the study areas. It also examines the vehicle operating costs of each mode, relative to the loads they can carry. Finally, the study concludes with a review of the impacts of these transport provisions on the local populace.

1. 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, 1995b). 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.

2. 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.

3. 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.

4. 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 two kms 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.

5. 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.

6. 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).

7. VEHICLE OPERATING COSTS

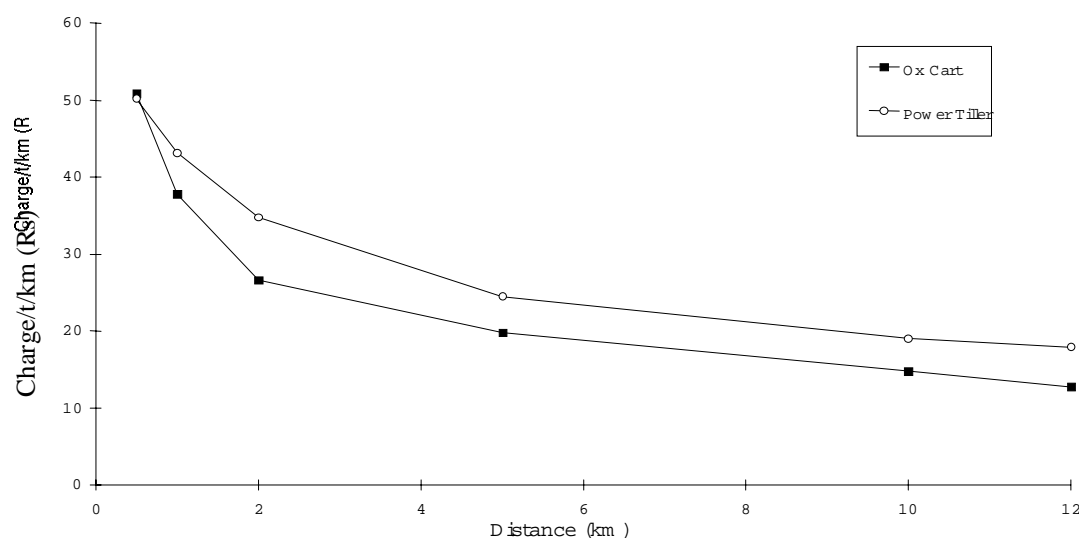
The ox cart is the cheapest vehicle to operate up to about 8km with an available load of 500 tonnes. When the available load is varied over a 10km, the ox cart still remains substantially cheaper until about 410 tonnes per year. At very small levels of demand, up to about 10 tonnes, the bicycle is the 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.

8. TRANSPORT CHARGES

The only reliable data collected on rural transport charges was for the power tiller and ox cart as shown in Figure 1. Smaller vehicles such as bicycles and motorcycles were not hired out for transport services, but would be lent to neighbours in an emergency. The diagram shows that the power tiller has a charge curve that is between 15-30% above the ox carts curve. This would suggest that operators are very aware of their operating costs and therefore power tiller operators charge a premium for their services.

Figure 1: Sri Lanka transport charges

9. FACTORS AFFECTING THE PROVISION OF RURAL TRANSPORT SERVICES

9.1. 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.

9.2. 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.

9.3. Vehicle backup services

The larger villages such as Malagala had vehicle repair facilities for both motorised 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.

10. VEHICLE OPERATING COST INFORMATION

Data from Sri Lanka

Table 1: Vehicle operating costs for a density of demand of 500 tonnes and various distances

Distance (km)	5	10	20	30	40	50
Power Tiller	21.1	13.0	9.4	8.2	7.6	7.3
Tractor	42.1	22.1	12.2	8.9	7.2	6.2
Ox Cart	16.1	15.0	14.5	14.3	14.2	14.1
Motorcycle	103.9	71.7	55.6	50.2	47.5	45.9
Bicycle	58.6	54.5	53.2	52.5	51.8	51.3

Table 2: Vehicle operating costs for a trip distance of 10 km and various levels of demand

Demand (tonnes)	50	100	200	500	750	1000
Power Tiller	60.8	37.9	20.5	13.0	13.0	13.0
Tractor	190.1	96.8	50.1	22.1	15.9	12.8
Ox Cart	22.0	17.2	15.0	15.0	15.0	15.0
Motorcycle	74.8	71.7	71.7	71.7	71.7	71.7
Bicycle	54.5	54.5	54.5	54.5	54.5	54.5

KEY REFERENCES

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