TRANSPORT & POVERTY ALLEVIATION WORKSHOP

WORLD BANK 13th JUNE 2000

ROADS, PERSONAL MOBILITY & POVERTY: THE CHALLENGE

By

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Abstract.

Drawing on research into rural mobility carried out in Ghana and Malawi and other field experience from Zambia, Kenya and Ghana, data is presented that demonstrates that there is very wide range of use of motor vehicle transport for personal movement. For example, the motorised mobility rate in Kwabre in Ghana was found to be 35 trips per person per year while it was found to be less about one tenth of a trip per person per year in five Districts in Malawi (i.e. a 350 fold range). The evidence suggests that at current service and fare levels the poorest people can only make use of motor vehicle transport for the long distance transport of crops. In contrast better off rural populations will make extensive use of transport services for a wide variety of social and economic purposes. A tentative income based model of mobility is presented. It is recognised that road investments can be an expensive intervention relative to the incomes of those affected and there may be no guarantee that the poorest members of the community will benefit other than through the direct effects of transport cost savings on the economics of crop marketing. Complementary measures are required in order to increase the personal mobility of the very poor. In order to take a more holistic approach to the alleviation of poverty through transport measures, it is suggested that direct interventions should be made to encourage the provision of transport services at low fare levels for the most disadvantaged rural communities. A possible Private-Public Partnership solution is suggested.

1. Introduction

Within rural areas of developing countries there is a wide range of access to, and use of, motorised transport services. The intensity of use is dependent on income, the availability of transport services (which is in turn dependent upon quality of road infrastructure and the density of demand) and on the level of tariffs and fares. Moderately well off and richer communities will tend to make relatively greater use of motor vehicle transport for visits to market, for employment and for social and medical purposes. In contrast poorer, more isolated, communities will tend to restrict their use of motor transport to the long distance movement of harvested produce.

The key characteristics of poor households in rural areas include isolation, vulnerability to shocks, lack of access to education and health facilities and social and economic exclusion. Improved access to transport services and greater mobility can clearly help alleviate many aspects of poverty. Within the context of rural development, improved transport has, in the past, been primarily seen as a mechanism for improving the returns gained from agricultural production and marketing. The 'Producers Surplus Approach' road planning method (Carnemark et. al 1976) is an example of this.

In recent years the Sustainable Livelihoods Approach (see Carney, 1998) has brought a wider perspective to the understanding of poverty alleviation. The emphasis is now more multidimensional; there is less emphasis on immediate income generation and

more emphasis on the value and maintenance of the five types of capital assets (Natural, Social, Human, Physical and Financial) that people can draw upon to build their livelihoods. Improved transport can help increase the value of the asset base of all forms of capital. The role of transport in agricultural production and marketing is well understood (i.e. principally involving natural and financial capital). However transport also has a role in the development of human and social capital. Improved access to clinics, hospitals and schools is an obvious example. There is also increasing recognition that social trip making can also be valuable in helping to maintain a person's social capital and thus help in reducing their vulnerability to adverse changes in circumstances.

In the quest to tackle rural poverty, feeder road investment is a favoured solution of many donors. It can be targeted to poor rural areas where beneficiaries can be identified. It also tends to be very popular with both road agencies and rural communities. However, relative to incomes in the local area, it can be an extremely expensive intervention and without complementary measures there is little guarantee that it will meet its expectations.

This paper presents some new data derived from a research project funded by the UK Department for International Development (DFID) on the availability of rural transport services undertaken by the Transport Research Laboratory and carried out in Ghana and Malawi. It discusses how transport interventions may be targeted to help the rural poor.

2. The pattern of rural mobility in Africa

The Transport Research Laboratory has recently undertaken household surveys of rural mobility in Ghana and Malawi, data from these surveys is reported in Figures 1 to 5. In total around six hundred household interviews were carried out in 95 villages across fourteen districts of the two countries. Information on trip frequency, journey purpose and mean distances to the nearest pickup point for transport services is shown.

Figure 1 shows the wide difference in motorised trip rates. Northern Ghana (three districts surveyed) is recorded as having a trip rate of about five trips per person per year in contrast to Kwabre, a District close to Kumasi in Southern Ghana has a rate that is seven times this. Kwabre benefits from a high density of demand and fare levels here are much lower than elsewhere in Ghana - a 10 km fare is on average about a third of that in the other districts. The rest of Southern Ghana (four districts) has a trip rate that is very close to that found in a study of the Meru District of Kenya ie. about 13 trips per person per year (Airey and Cundill 1998). Average income levels in Southern Ghana are recognised to be much higher than in Northern Ghana.

Motorised trip rates are much lower in Malawi. In total, six districts were surveyed in Malawi, only Nkhata Bay had any appreciable motorised trip making. The average for the other Districts (Chikwawa, Mchinji, Chitipa, Salima and Zomba) was in the order of one tenth of a trip per person per year. The extremely low motorised trip rates recorded in Malawi also appear to be common in both rural Zambia and Mozambique.

Recent field visits to Northern and Luapula Provinces in Zambia has shown that there are many roads and tracks (some as much as 100 km long) that only have vehicle services during peak harvest time for two months or so during the whole year. The function of these services appears to be almost exclusively for transporting harvest produce.

Road quality does, of course, have an influence on service frequency and thus on the frequency of motorised trip making. However the quality and state of the roads and tracks was not thought to be a major explanation of the large differences in *dry season* trip making. Although many roads were in a poor state, all districts, in both Ghana and Malawi, had a substantial proportion of roads in fair-to-reasonable condition and so the overall *inter-district* variation cannot be easily explained by road quality.

Trip purpose is identified in Figures 2 and 3. Figure 2 shows that for Ghana visits to market health centres and friends and relatives are the prime journey purpose for motorised trips. However Southern Ghana has a much more diversified pattern of motorised trip purpose compared with Northern Ghana; in the latter case market movements dominate. The composition of out-of-village trip purposes for Malawi is very similar to that of Ghana, except of course, market trip frequency is less and far fewer motorised trips are made. In Malawi trips are made by walking or on bicycle.

The effort and time put into regular longer distance walking and headloading, often in sweltering temperatures should not be underestimated. This effort must represent a very considerable investment of human physical resources which could effectively be used in other ways to better sustain their livelihoods.

Figure 4 shows that average trip distance is much less in Malawi. For longer distance trip purposes the distance is about half that found in Ghana. As expected this tends to demonstrate that access to motor transport dramatically increases the range of services available and the potential for social and economic interaction.

Figure 5 gives the distance to the nearest pickup point for motorised services for the two countries. Vehicle accessibility alone does not guarantee direct transport service access. In Ghana only one village (out of 55) had a footpath as its principal connection to the road network. For Malawi footpaths connected 8 villages (out of 40) to the road network. As can be seen 30% of villages in Ghana and 43% of villages in Malawi had walking distances of more than 4 km to the transport services pickup point while 10% of the Ghanaian villages and 19% of the Malawi villages had walking distances of over 10 km to the pickup point. Although road quality is clearly an explanatory factor the density of demand may well be more important in explaining the distance to transport services. This also appears to be particularly the case in Zambia where it has been found that there are many inhabited roads through farming areas of a reasonable quality, yet there are no transport services available to the local population. In one case in Southern Zambia the only vehicles to regularly use a 40 km road belonged to the cotton buying organisation and two missions.

Fig 1. Average number of motorised (round) trips per person per year in Northern and Southern Ghana, Malawi and Meru District, Kenya

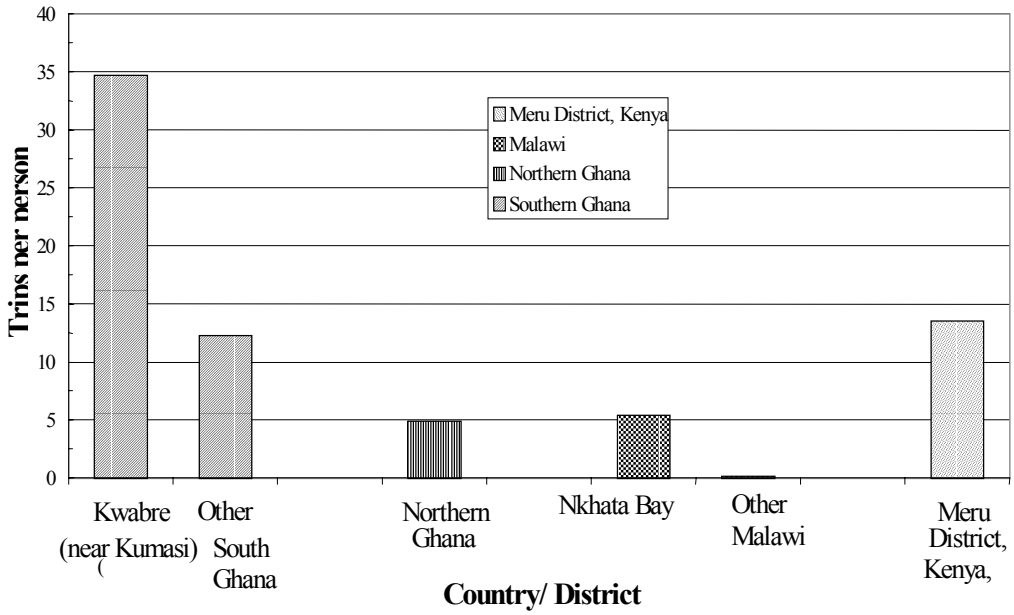


Figure 2: Out-of-village travel patterns by trip purpose and mode in Ghana

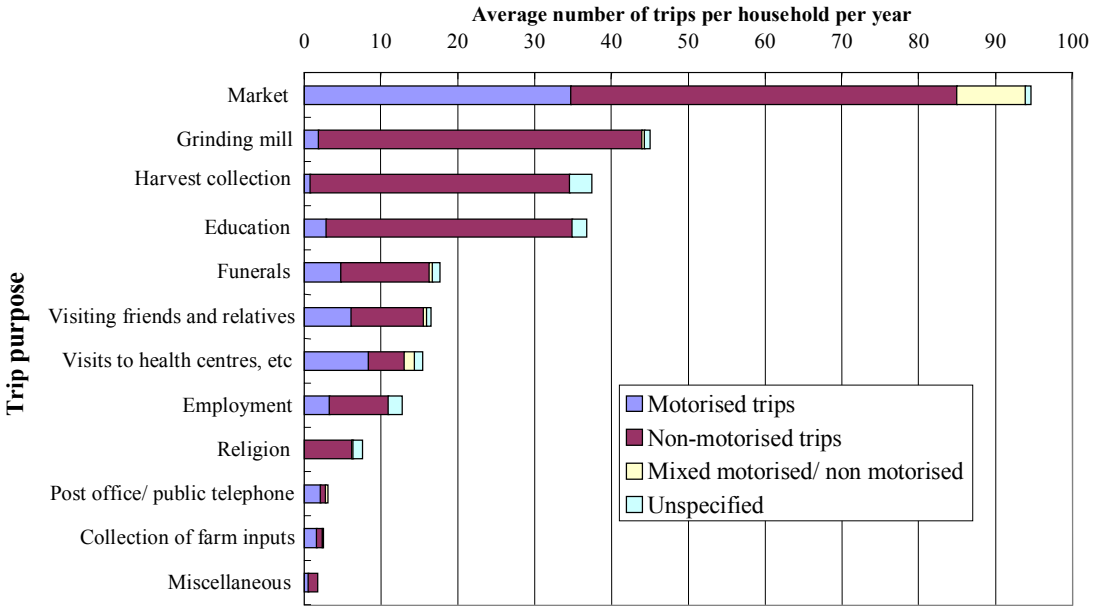


Figure 3: Out-of-village travel patterns by trip purpose and mode in Malawi

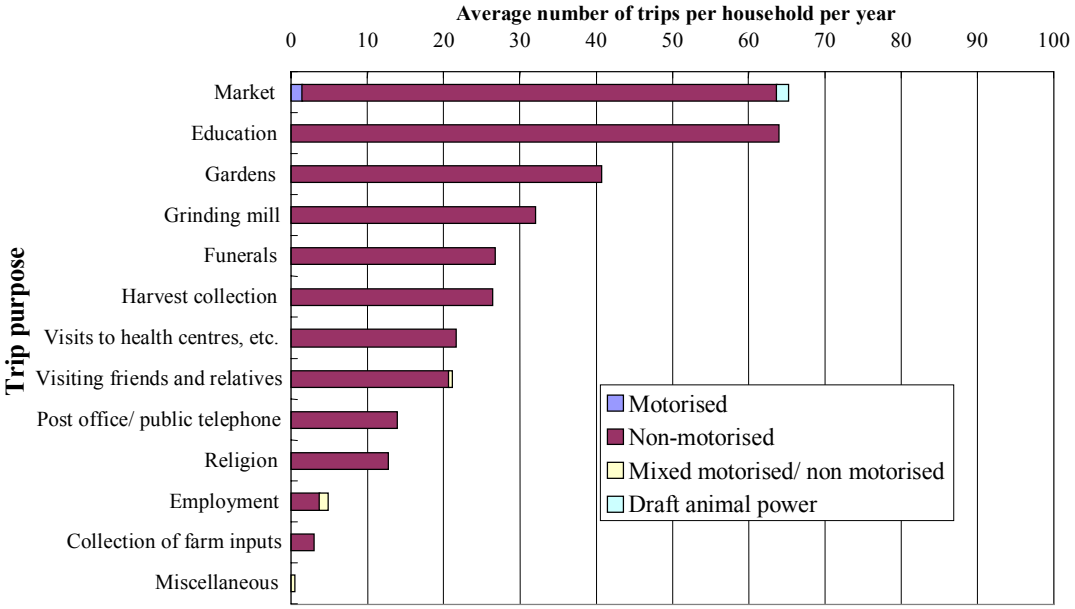


Figure 4: Average one-way trip distance (km) by trip purpose in Ghana and Malawi

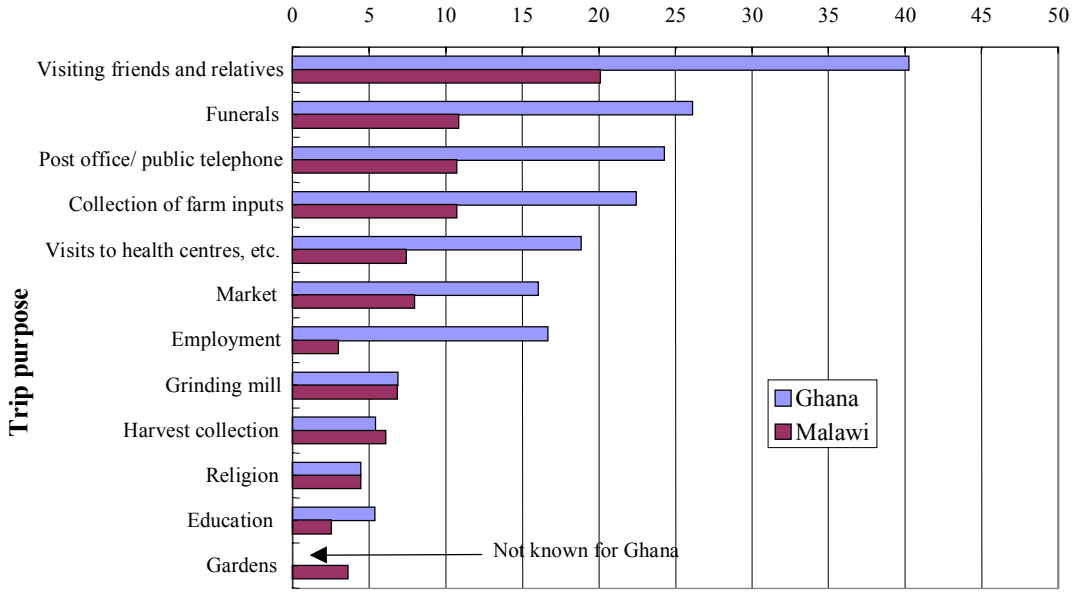
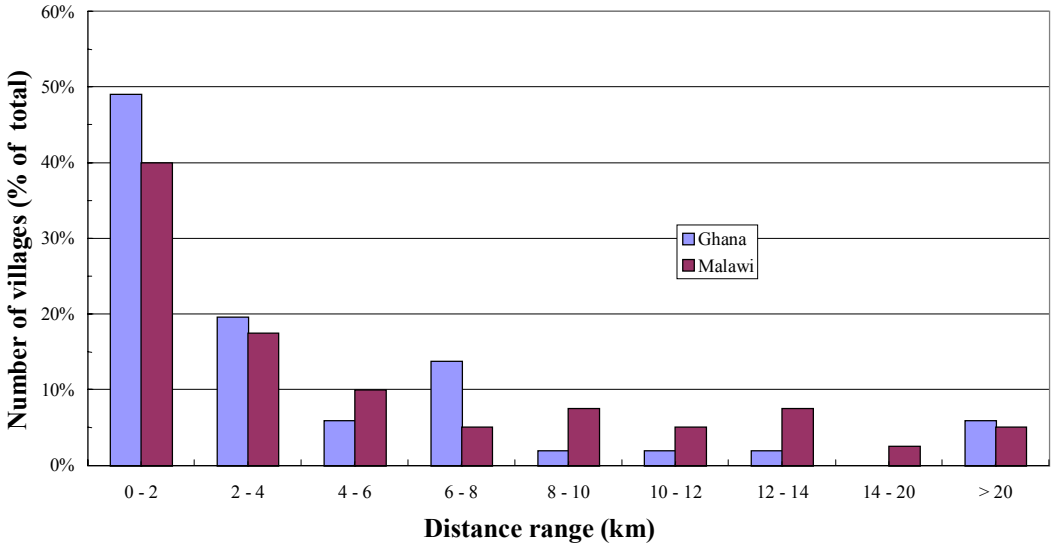


Figure 5: Distance (km) of pickup point for motorised transport from village centre in Ghana and Malawi



3. A tentative model of poverty, modal choice and rural trip behaviour

In order to predict how different interventions will impact upon rural communities it is useful to have an understanding of how different groups currently make their transport choices. Unfortunately there are still large gaps in our understanding of this process. There are wide differences within areas and between countries in access to animal transport and other intermediate means of transport (IMTs), and, inevitably any simplified model will have exceptions. Not all members of the same household can be fitted into the same income/access/mobility category. There are marked differences in access to cash between men and women to pay for motorised transport. Likewise although many households may own a bicycle often women will be denied access to its use. Despite these difficulties it is felt useful to suggest the following broad set of typologies.

Group 1: The Extremely Poor. (Including the most vulnerable, such as elderly and infirm and often includes female headed households). These people tend not to travel far, and if they do only infrequently. Walking is by far the most important means of transport. Because of the very limited access to cash they make virtually no use of motorised transport. Regular motorised transport services may well be 10 to 20 km away from their homes. Sometimes long distance trips (over 40 km) will be made on foot and goods may be carried. Due to their extreme poverty, they will have less access to animals and IMTs compared with others in their local community. Their main contact with motorised vehicles is when a truck is employed in long distance movement to take away harvested crops from their village area.

Group 2: The Very poor. These people will travel more frequently than those in Group 1. A limited use may be made of IMTs and animals but walking is still by far the most important means of transport. They will often walk regularly to market up to

10-15 km away and sometimes they will cycle many times this distance. The use of motor vehicles will be principally restricted to carrying harvested produce from the village area. Typically there will be no social use of motorised transport. Regular motorised transport services may still be located 5 km away while a functional road or track will usually be located within a kilometre. Sometimes, (possibly dangerous) long distance trips will be made on the top of, or in the back, of a truck.

Group 3. The Poor. Travel by foot and by bicycle will be the most common methods of transport. There is likely to be increased ownership of and access to IMTs than in Groups 1 and 2. As with Group 2 they will often visit the local market on a regular basis. Occasional and regular use of motorised transport will be made for longer distance (over 20 km) passenger movements. They are more likely to have access to surplus cash with which to pay for motorised transport if they have something to trade at market. They will also use motor transport to go to hospital or to visit relatives. Transport services may be 1 to 5 km away. Buses, minibuses, trucks and trains are used for long distance transport.

Group 4. The Better Off. Will make frequent use of motor transport on regular basis. They will receive regular/ semi- regular income from paid employment or small informal business. To go to work, visit markets, visit friends, social events and visits to clinic and hospital. Access distance to transport services will usually be within a half a kilometre. Will have access to bicycles and sometimes motorbikes and occasionally an agricultural tractor. Long distance trips will be made by bus, minibus or train, not by truck. As with all the previous groups primary school children will walk to school.

Group 5. The Rich. There are very few rich who live in rural areas. They will often have houses in the main towns as well as the country. They will make motorised trips on daily or weekly basis. They will either own cars or make intensive use of taxis. Long distance transport will be made by car, bus, train or by aeroplane. Many of the children of this group are taken daily to school by motorised vehicle. They will usually live close to good vehicle access and to transport services.

4. Access to services and the costs of roads and transport

Rural access roads or feeder roads are, by far, the most common developmental intervention to improve rural transport. However they may also be very expensive in relation to the income of the beneficiaries. Expenditures in the range of US $ 10,000 to 25,000 per km are common. As an example data will be drawn from a new Feeder road improvement project in Ghana. Sixteen roads in Bimbilla District of Northern Region were recently surveyed for improvement, the average length was 14 km and the estimated costs were around $ 10,000 for access improvements and $ 14,000 for full rehabilitation. The average population to benefit was 2400 people per road. So for access improvements the cost was $58 per head. Overall the cost of each road is probably of a similar order to the costs of housing the population affected by the road or to the total cash income generated by this population each year. The main engineering purpose of the proposed access improvements was to provide improved passability during the three to four months of the wet season. Although the natural soils are strong there are many small rivers and streams that prevent all year round

accessibility. Average daily dry season traffic levels per road were found to be 10 motor vehicles (range 0 to 34 vpd), 187 headloading, 181 walking, and 337 cyclists.

It is sometimes argued that an important part of building access roads is to assist with access to clinics, hospital and schools. As we have argued above, with current fare levels and transport service availability hardly any "Very Poor" or "Extremely Poor" make much use of motor vehicles for personal movement. In a serious situation or an emergency they will of course pay for motor transport to hospital but, as we have seen, they may be far from any kind of service, even if located on a good road. Currently total health expenditure in Ghana is about $8 per head, per annum. Although there are clearly situations in which new access roads may well be an important part of a programme to improve access to health facilities it seems unlikely that Ghanaian health care professionals would see widespread rural road expenditure of more than a few dollars per head for health purposes as a key priority, particularly if there are no other measures to promote increased mobility.

Virtually all rural primary school children go to school daily on foot or by bicycle. Only the rich can afford daily motorised transport. Children going to secondary school may have to use motorised transport. Many secondary children will, of course, cycle. Often secondary schools are located so far away from their rural catchment areas that boarding is provided and the journeys will be made each week or each term. There have been many cases where children are prevented from going to school because impassable rivers and streams in the wet season. Clearly road building can have an important input here; however it is likely that there are cases where relatively cheap foot bridges could achieve the same result.

The case is sometimes made that school teachers cannot be kept in post without a good quality road. Again, is it the case that the teacher wants the road or does he or she really want a reliable transport service? Currently in Ghana primary school teachers earn about US $ 77 per month. For our typical road there might be say eight primary school teachers to cover the whole road and their combined annual income is US $7,400 this in comparison with say US $140,000 for access improvement for the whole road. Educational administrators might argue for some increased road expenditure in particularly difficult areas to help improve their own access to schools and improve rural environment of their teachers. However if the budget was under their own control alternative, more focussed, incentives for teachers would also be considered very carefully. There are, of course, many forms of incentive that can be offered to keep a teacher in place, such as free accommodation, free food, enhanced pay or as is sometimes supplied a free bicycle. (A free bicycle for the eight teachers might cost say US $ 800).

A number of research studies have been carried out to indicate a very wide range of transport costs between different countries. Ellis (1996) estimated that a pickup truck in Ghana had operating costs 4.5 times the level in Thailand. Other studies have found African freight transport costs are between 2.5 to 4.5 times the level of tariffs in Asia. (Hine et al, 1997, Rizet and Hine, 1993). Currently it appears that passenger transport costs in India are in the order of US 0.6 cents per km compared with about US 2 cents for passenger fares in rural Tanzania and Ghana.

Not only are there large differences between Africa and Asia in transport charges there are also substantial differences within and between African countries. It has already been observed that Kwabre (the District with by far the highest motorised transport use) had fare levels one third of the rest of Ghana. Typical fares in Zambia for a 25 km trip have been found to be 70 % higher than the average for Ghana and 60% higher than in Mali (Ellis and Hine 1998).

There are number of explanations of high tariff and fare levels in some African countries. A critically important explanation relates to the low density of demand leading to cartels and the operation of monopolistic lorry and bus parks. There is often a gross oversupply of very poorly used old inefficient vehicles that are kept in business through the practice of transport unions that control lorry and bus parks and insist that customers go to the first vehicle in the queue. High input prices, exclusive dealerships and poor driver training and behaviour are also factors. High vehicle maintenance costs in Africa appear to be a function of unnecessary fast driving often in combination with poorly maintained pot-holed roads coupled with a lack of adequate routine vehicle maintenance.

Overall the data indicates that there may well be very significant efficiency gains possible from a more competitive transport industry in Africa.

5. A possible Public Private Partnership to supply rural transport services ?

There are no simple solutions to the problem of lack of access to motor vehicle services. Much of the above suggests that, apart from their impact on wholesale marketing of produce and the provision of pedestrian access over water crossings in the wet season, road interventions alone may be of only limited help to the poorest sections of the rural community. Other, possibly complementary, interventions are required to assist the rural poor with personal mobility. (Labour intensive road construction activity can, of course, provide a welcome, if temporary, source of cash income for the rural poor.)

The challenge to transport professionals is to develop a solution which would guarantee a minimum service provision at fare levels affordable to the very poor. If possible this should be arranged so that the opportunities to increase operational efficiency are achieved. A possible Public Private Partnership might be a solution whereby operators bid (in terms of the minimum incentive payment/ subsidy they would require) for route licenses. Minimum fare levels and trip frequency would have to be agreed. In return excess capacity (particularly of the old, unsafe and polluting vehicles) may be "bought out" and the incentive payments agreed. There would of course need to be policing of the arrangement. Initially the intervention might be focussed on those roads where remote poor communities have no direct access to any motorised transport services.

The costs of incentive payments might be relatively small to guarantee a minimum level of service. In view of the current fares that are charged a subsidy of, say, US 40 cents per km might be expected to ensure a service at a low fare level (say US 0.5 cents per km or less). A 40 km return service of, say, three times per week would cost

$5000 per year. In relation to the costs of building a feeder road this seems a very small cost that could be targeted directly to benefit the rural poor.

There is clearly a problem of how to sustain transport services in the longer term. (This problem is not confined to transport services, there is a huge difficulty with sustaining and maintaining road investment.) If the substantial potential transport efficiency gains can be achieved this might not be a problem. If the efficiency gains cannot be achieved then there might be a need for incentive payments to continue. Most major developed countries including the United States and Britain recognise the problem of access for the rural poor to public transport and as a result public transport subsidies are widely employed.

A range of solutions are possible to provide the long term financing of incentive payments. Payments could come from the recurrent government budgets or from the revenues generated from the new Road Funds that have been set up, primarily to finance road maintenance. Donors could set up a separate fund that could be invested to service payments in the longer term. The fund administrators could negotiate and come to an agreement with the appropriate local authorities controlling local rural transport that the payments would only continue provided certain performance criteria are met.

The object of the exercise is to enhance the livelihoods of the rural population concerned. A reduced effort spent in headloading and walking for many hours could be usefully deployed in other ways to improve livelihoods and generate a sustainable income. With increasing mobility it is anticipated that access to health care would be improved, vulnerability and isolation would be reduced, and social and economic interaction increased thus improving the income earning opportunities for poor.

6. Acknowledgements

The work described forms part of a programme of research carried out by the International Division of the Transport Research Laboratory. The work was funded under the Knowledge & Research Programme of the UK Department for International Development (DFID).

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