

APPENDIX A

TRANSPORT AND SUSTAINABLE LIVELIHOODS

Source: Fouracre, P. (1999). Transport and sustainable livelihoods. TRL Annual Research Review 1999. Crowthorne: TRL Limited

INTRODUCTION

The British Government's policy on international development underlines a commitment to the elimination of poverty, in line with internationally agreed development targets (DFID, 1997). The strategy adopted by the Department for International Development (DFID) to achieve this aim has three main components:

- Policies and actions which promote sustainable livelihoods
- Better education, health and opportunities for poor people
- Protection and better management of the natural and physical environment

In developing strategies to achieve these goals, DFID and like-minded donors are currently promoting a sustainable livelihoods approach. A policy of sustainable livelihoods focuses not on the needs of the rural poor, but rather, builds on the existing assets of the poor, both at the community level, and as individuals. A Sustainable Rural Livelihoods (SRL) framework can be used in helping the rural poor to improve their lives and strengthen the sustainability of their livelihoods. The holistic framework which has been developed by DFID is intended to:

- Define the scope of and provide the analytic basis for livelihood analysis
- Help those concerned with supporting SRL to understand and manage the complexity of rural livelihoods
- Become a shared point of reference for all concerned with supporting livelihoods, enabling the complementarity of contributions and the trade-offs between outcomes to be assessed
- Provide the basis for the development of a set of concrete intermediate objectives which DFID should pursue with its partners as a means to supporting the development of SRL.

The purpose of this paper is to examine how transport development contributes to the sustainable livelihoods approach, and also how future transport research might adopt and integrate the ideas embedded in SRL.

THE TRANSPORT ENVIRONMENT

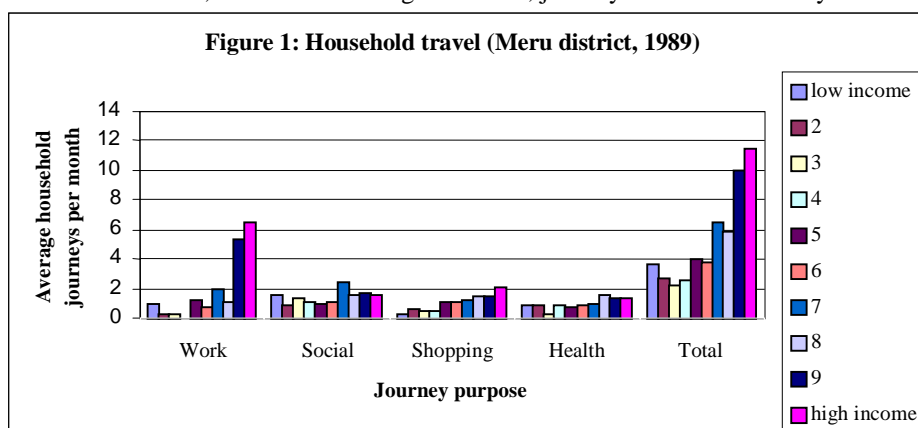
It is convenient to differentiate between urban and rural contexts to contrast the extremes of transport characteristics and operating environments. Perhaps the key point of contrast between urban and rural transport is that the former exhibits chronic congestion, usually on a grand scale, while the latter is poorly provided and perhaps as a consequence, used sparingly. Inevitably, however, these two characterisations present a very limited picture of the possible variations and other scenarios which exist. In particular, the peri-urban environment, which bridges the urban-rural divide, has a different set of norms and conditions not covered by the outline of rural and urban conditions described below.

The Rural Context

The main factors which characterise a typical rural transport environment are the low population densities, low levels of economic activity (and hence low incomes), low vehicle ownership levels (of any description, including non-motorised vehicles), inferior provision of roads (both quality and quantity), and near absence of regular transport services.

Given these difficult conditions, travel still takes place though at very low levels of participation by comparison with, say urban communities. The case-study of household travel in the Meru District of Kenya (Airey and Cundill, 1998) illustrates this point. A panel survey of 300 households in twelve villages was undertaken during the development of a new all-weather road giving these communities better access. During the survey periods, household travel rates in this relatively remote region varied between an average of 5.0 and 11.2 journeys per month. The majority of these journeys (between one fifth and one third) were in connection with work (both for paid and self-employment, as well as for working on the household farm). Some 20 to 26% of travel was generated by shopping and marketing needs, while 13-14% of trips were for health-care needs and 17-20% connected with social purposes. The amount of school travel was extremely small (between 2 and 6% of household journeys), reflecting limited up-take in secondary school attendance. More than 95% of journeys took place within the District, and most were urban oriented.

Figure 1 illustrates the relationship between journey making and income for the four main journey purposes. There is a close and significant correlation between the frequency of journeys, and income, for most journey purposes. However, the amount of 'social', and to a lesser degree 'health', journeys are less obviously income related.



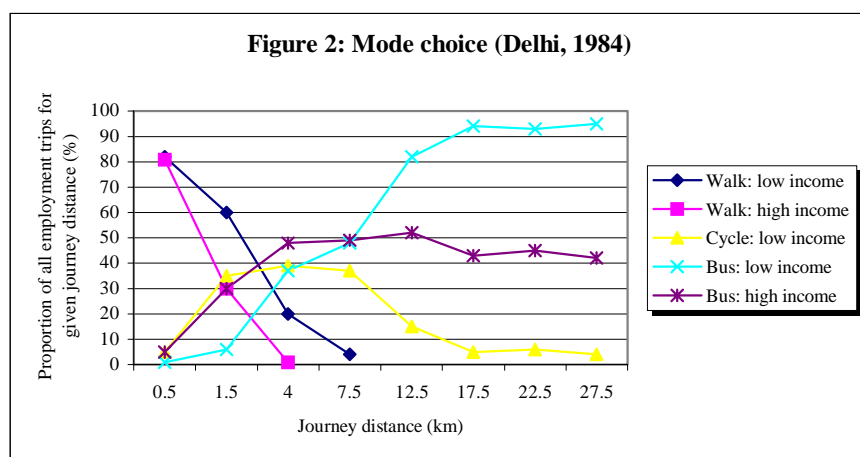
The study found that the relative and absolute importance of agricultural incomes were influenced by widely different commodity production and sales experience quite unrelated to the effect of the new road (agricultural production being dominated by the major export crops, tea and coffee). However the amount of travel increased substantially (particularly in the short term) after completion of the road, due to a reduction in transport prices. Undoubtedly, much of this increased travel was from amongst higher income groups (a strong positive relationship between household income and the frequency of work and shopping trips, for example), but social trips seemed to be inelastic to income, the poor having as much need as the rich to attend to family affairs.

The Urban Context

In the urban context, transport is an integral part of the city fabric. It is the way in which the great urban service and manufacturing industries are supplied with their manpower inputs; not surprisingly, a high proportion of household trips are work related.

Cities present a range of development characteristics, dynamic growth patterns, transport infrastructure and operations, and social customs that defy all but the broadest generalisations. Daily trip rates per capita are in the range 1.5-2.5, and it is usual to find that 5-10 per cent (15-25 per cent in poorer households) of household income is spent on transport.

Because incomes are low, the majority of trips will be undertaken on either some form of non-motorised transport (principally walk or bicycle) or one of the many forms of public transport. The latter will be particularly important in providing for longer trip lengths, which make up a larger proportion of travel as cities expand in area. Thus as cities become larger, travel demand grows at a disproportionately higher rate and there is a greater dependence on public transport for travel needs, particularly (but not exclusively) from the urban poor. Figure 2 shows how mode choice for employment trips in Delhi is influenced by both income and intended travel distance. As trip length increases, the dependence on bus increases. This relationship is most marked for low income travellers.



Public transport, potentially the most efficient carrier and that which serves the majority of travellers, has a poor record of service delivery in the often chaotic traffic conditions; journey times and waiting times are long, irregular and unreliable. And because of the poor productivity of buses, together with a low revenue earning potential, the

financial position of operators is often weak. In these circumstances the prospect for improved public transport services is grim; operators cannot afford new investment when they cannot even afford the depreciation on existing stock.

IMPACT OF TRANSPORT ON LIVELIHOODS

Natural Capital

Transport development may bring in its wake the problem of environmental degradation. This is not just an urban problem, associated with the high volumes of traffic (air pollution, noise and severance). Rural road construction can have profound ill-effects on, for example, slope stability, erosion and natural drainage patterns. Of these, erosion is thought to have the major environmental impact. Mitigation measures to control erosion can be included in the designs (e.g. appropriate drainage channels and culverts) as well as in the implementation (e.g. quickly establishing vegetation on exposed slopes). The method of implementation may also contribute to reduced environmental damage; thus labour-based (as opposed to heavy machinery) operations may be better deployed due to the greater precision and sensitivity of application that is possible (McCormick, 1990).

The indirect environmental impacts of rural transport development are much less easy to predict, because they are likely to be of a long-term nature. Changes in land-use may result from the greater accessibility due to improved roads and services. Roads which have been used to 'open up' the tropical rain forests of Brazil, have encouraged the development of settled farming communities, but at the expense of the indigenous peoples' livelihoods, and at the expense of the natural ecology.

Social Capital

'At the heart of the social development approach is an understanding that the behaviour of each of us is determined not just by economic rationalism. Each person's response to the development challenge is also shaped by the society, culture and historical moment in which he or she lives. In analysing society and culture we recognise that the behaviour of individuals is determined by structures and networks of social relationships and obligation - and by shared knowledge and values. It is only by a process of shared respect between 'indigenous' knowledge and values and technical skills can sustainability be achieved', (ODA, 1993).

Travel is evidently an essential component of the livelihoods of most individuals; it is the main means by which local communities and individuals access the outside world, and as such, the means for selling their output (produce and labour) and provisioning their needs. It is also the means of access to other facilities and services (which may be uneconomic to provide locally), and a means to social bonding and development (the social capital of livelihoods analysis). These are the benefits of transport which contribute to livelihood, and which cost benefit analysis has difficulty capturing.

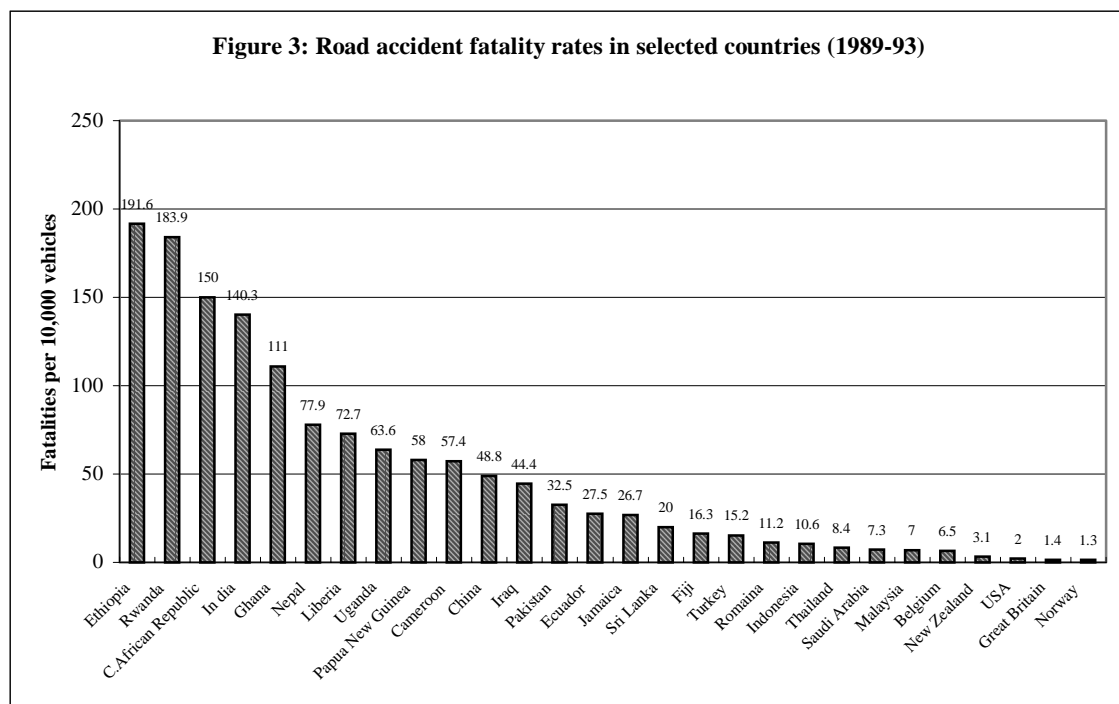
Many surveys have indicated that while transport development has improved the condition of the poor, the very poor are unlikely to be affected. They often do not have a sufficient standard of living to take advantage of transport improvements. In Zambia these were the families who owned little livestock and little land, who could not grow more cotton, and therefore could not take advantage of reduced marginal transport costs (Hine et al, 1998).

A study of rural travel in Tanzania (Dawson and Barwell, 1993) showed that women undertake 75% of all transport tasks. However, women are less likely to be able to take advantage of rural transport improvements (such as better public transport services) as they are less likely to possess their own independent source of income. Women comprise one of the major categories of the socially excluded, their subjugation being a common feature of rural societies in the developing world. Transport improvements need to take into account the needs and social responsibilities of women so as to avoid the benefits of any programme being enjoyed disproportionately by men.

Human Capital

Transport development provides employment, but also raises exposure to traffic and traffic accidents. Road safety issues are particularly important, if for no other reason than that they are a major cost to society (consuming perhaps 1-2% of gross national product in lost output and the commitment of medical and police resources). Furthermore, fatality rates are very much higher in the poorer countries, as compared to the industrialised world (Figure 3).

Traffic accidents directly impinge on livelihoods of individuals, families and communities; in the absence of insurance, free health-care or other government support, households are vulnerable to the loss of earnings (temporary or permanent) when productive family members are incapacitated as a result of a traffic accident. The poor probably suffer disproportionately, since they are less able to meet medical expenses, and have less resources to fall back on in the event of prolonged incapacity. They may also be more at risk on the roads, because they are perhaps more likely to be walking in unprotected conditions vulnerable to traffic.



The employment generation of transport construction and service industries is an important component of any economy. In the urban context, transport services which have a large component of intermediate public transport (particularly non-motorised forms like cycle-rickshaws) are highly labour intensive. For example, in Dhaka, Chittagong and Khulna there are thought to be almost 300,000 cycle-rickshaws which employ over half a million people (Gallagher, 1992), and which are the main source of livelihood for perhaps as many households. Furthermore, the livelihoods issue spills over into the rural context, since many of the rickshaw-pullers are rural based, working in the city during the 'low' part of the farming season.

Labour based techniques for construction and maintenance of roads are a source of employment for rural economies. It is now common practice to contract out routine road maintenance (e.g. clearing verges and drains) to local communities. This can provide a useful cash supplement to the income of local employees (many of whose regular activities may be outside the cash economy).

Physical Capital

Roads and transport are a key element of a country's infrastructure, and a substantial part of the development budget (typically of the order of 20% of total investment) is spent on their up-keep. With such high expenditures, an important consideration in their provision is the standards to which the transport is constructed. Thus there is evidence of over-design of roads, particularly in the rural context where the measurable benefits (vehicle operating cost savings and time benefits) are small by comparison to the construction costs. Hine (1993), for example, suggests that 'the benefits of adding new vehicle access using simple methods is over one hundred times greater, from the viewpoint of farmers, than upgrading a similar length of earth track to gravel standard' (Hine 1993). The particular study in Ghana looked at the effect of access standards on farm gate prices, and produced the results summarised in Table 1 below and graphically represented in Figure 4. The cost savings derived in the change from headloading along a rough path to vehicle movement along a track (i.e. from cost C1 to cost C2) are significantly greater than those derived from the upgrading the track to a properly engineered gravel pavement (i.e. from cost C2 to cost C3). More recently, Hine has undertaken participatory surveys in rural Ghana which confirm that communities place far higher priority on simple access and transport services rather than highly engineered roads.

	Length of access to be upgraded	
	5 km	20 km
Upgrade from earth to gravel road	0.08	0.29
Upgrade from path to earth road	11.4	70.6

Table 1: Percentage increase in farm-gate price of maize with improved access

In urban areas, while the standard of roads is also an issue, the more critical question often concerns how mass transit should be developed, with options ranging from bus-based to fixed rail. The most cost-effective solution is likely to be running buses on reserved rights-of-way in congested areas; but this is a solution which is most often over-looked because it lacks political appeal. This despite the fact that fixed-rail systems are capital intensive (between ten to one hundred times more expensive than a busway) and ill-affordable by the community, in particular the poor who should be the beneficiaries of urban transport investment (Gardner, 1995).

Financial Capital

In the past, the main goal of transport investment has been to reduce transport costs, and hence contribute to delivery of a more efficient economy. In the urban context, where congestion is a key problem, the main savings resulting from transport investment (like traffic management, public transport services and road widening) are in the form of reduced travel times, which feed through to improved labour productivity. In the rural context, the main savings are in vehicle operating costs, which feed through to lower farm input and produce prices.

Clearly, improving the efficiency, and hence reducing the costs, of the transport sector is an important contribution to delivering sustainable development; yet this may not be a sufficient condition for yielding tangible benefits for the rural poor. For example, the construction of an improved all-weather road may be of little value to a rural community if transport operators fail to provide services along the new facility. And, as an example of extending this argument to other sectors and the interaction with transport, health facilities require effective means of access (including both roads and transport services), in order that they can effectively administer health care to the community.

TRANSFORMING STRUCTURES AND PROCESSES

In many respects, the transport sector is relatively well organised and ordered, being subject to a long established body of law, regulations, standards and organisational frameworks. Even so, many of these instruments are out of step with current practices and thinking; as a result, evasion is common, and enforcement is weak and often corrupt. Furthermore, the level of resources for implementing and monitoring the laws have not always been sufficient or readily available.

Driving examinations and vehicle inspections are just two examples of where good intentions (with respect to traffic safety) have foundered on such limitations. Ghana is currently addressing this problem in a number of ways, but principally by making the organisation which effects the testing of drivers and vehicles a self-sustaining agency which covers its costs through inspection fees (which it can retain). It is also going to pilot out-sourcing of the vehicle inspections, as a mechanism for evolving a new structure of monitoring and enforcement of the laws.

Institutional developments like this take an enormous amount of time, and continual supervision. They require detailed planning, training and management to effect the changes in attitudes, working habits, and resource use. These elements are often missing or ill-conceived, and as a result many schemes are badly served in implementation. Thus decentralisation of roads and transport planning services (part of the move towards devolution to local responsibility) can only be accomplished where attention has been given to training sufficient cadres, putting in place the local organisational structures and the sustaining resource mechanisms. Clearly, much of this is outside the remit of the transport sector whose contribution to local and regional empowerment is critically dependent on strong local government. (Roads engineers and transport operators have a long tradition of regional based working, though

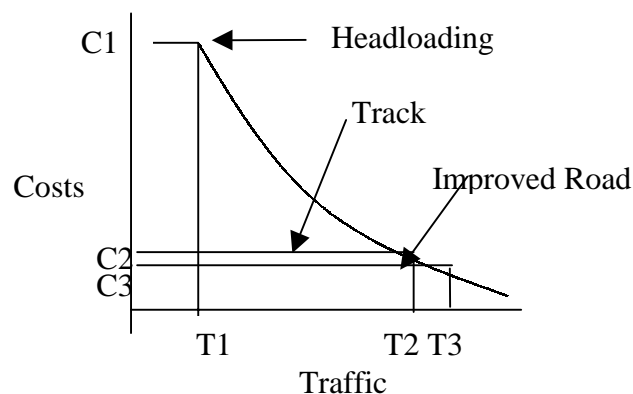


Figure 4: Graph of cost effectiveness of upgrading to a motorable track

usually with a national headquarters making the important decisions and offering the best choice for career development.)

Education and training are key transforming processes in any sector, not least transport. They offer a real opportunity for beneficiaries to participate in the development process and positively affect their own well-being. Unfortunately, the resources required are not readily available; for example, teaching driver skills and road safety education seems to have a very low priority in most developing countries. There are embryo organisations which are trying to promote these activities, but they are poorly resourced, and lack the appropriate materials. While the TRL road safety teaching resource 'Safe Ways' (Sayer et al, 1997) has been well received by children, teachers and educational authorities alike, its distribution and implementation could only be effected on a limited scale, and hence with limited impact.

There is good evidence from many developing countries of strong development in domestic construction capacity, with some local contractors capable of undertaking large road construction projects. Ministries are fostering these and other developments; for example, Ghana's Ministry of Roads and Transport runs regular support courses for both local labour-based and other local contractors. Similarly, the consulting industry is developing rapidly, and there are now a number of highly successful local firms which are capable of undertaking road feasibility and detailed design work, as well as providing supervision services.

The common theme of much of the above, concerns limitations on resources, and inadequate and unsustainable funding. New mechanisms for funding transport development are being conceived, tested and implemented. Many involve private participation with associated risk and profit sharing. Others involve new ways of funding public bodies: car insurance levies to fund road safety programmes; road taxes and tolls to fund road investment programmes; driver examination fees to cover the cost of the driving test provision. These are largely sustainable mechanisms which closely align the users with the costs which they incur.

Application of the Livelihoods Approach

Clearly, transport as a service to the community impacts on the development options of many of their livelihood interests; a proper analysis of transport development requires a holistic understanding of all the development opportunities and priorities at the community level. Thus as noted earlier, poor farmers might not appreciate the benefits of better access without additional extension facilities to help, for example, in taking up cash crop production.

A livelihoods analysis does not provide a definitive answer to the development problem. What the analysis attempts to do is try to account for all the possible outcomes of the project in terms of impacts on stakeholders. Furthermore, the analysis can also suggest what strategies they (the stakeholders) might adopt, and what support (through the transforming structures and processes) might need to be put in place to help them adapt. In this sense, the livelihoods analysis provides a comprehensive check-list which is non-quantitative, but captures in some qualitative and descriptive manner the impacts of transport development which are usually outside the remit of conventional cost-benefit analysis, as traditionally applied to the assessment of transport schemes.

In the Zambia case-study cited earlier (Hine et al, 1998), the 'entry point' to the development process had already been identified, i.e. the feeder roads upgrading was the project to be analysed. In other scenarios, the livelihoods analysis might equally well be used to help identify appropriate entry points for development. While there would be no guarantee that such an analysis would identify transport projects, the chances are that transport development, because of its key supporting role to many other sectors, would feature in many livelihoods programmes.

Research Needs

At present the application of the livelihoods approach in the transport sector has been very limited. In order to promote its application additional knowledge is required to help in understanding the impacts and interactions of transport and livelihoods. This knowledge falls in two categories, namely:

- A basic understanding of activity patterns of individuals, households and communities;
- Impact studies of transport interventions, which provide the set of experiences that can be used to help appraise new schemes.

Activity patterns

- There is a need to describe the activity patterns of the poor, relating these to different household attributes, as well as to different patterns of social organisation and land-use structures. The aim would be to identify how access and mobility needs are related to differences in these attributes, and hence the extent to which policy initiatives (e.g. different approaches to health care provision) can influence travel generation.

- Urban-rural linkages are clearly an important component of both urban and rural livelihoods. There is a need to understand these linkages (e.g. what are they, and how do they contribute to both urban and rural livelihood) and to examine what role transport plays in supporting and maintaining these linkages.

Impact Studies

- Impact studies of urban restructuring (for example the development of new towns and satellite cities, or internal restructuring directly aimed at the urban poor). There are many examples of such developments, but little awareness of how transport has been used to support these activities and what the impact has been. What is even less clear are the dynamics of urban poor settlement, and how transport reacts to these changes over time.
- Impact on travel of major infrastructure development (e.g. up-graded feeder roads, a metro or a major urban road or perhaps a bicycle network).
- Impact of public transport restructuring (such as the privatisation of an urban bus operator).
- Impact of policy and operational interventions (such as subsidies or new services) directly targeted at the poor.

Summary

The livelihoods approach reminds us that transport is a service industry and thus a means to an end; not an end in itself. As such, the development of transport has to be seen in the wider context of individual, household and community development. Hence the impacts of transport need to be addressed beyond the basic level of economics, taking account of social and environmental concerns and aspirations.