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## VILLAGE LEVEL TRANSPORT

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### Objectives of the paper

#### Abstract

Over the past fifteen years it has been increasingly recognised that improving rural roads and assisting with the passage of motorised vehicles would do little to help short distance village level movements. Although initially it was known that the rural population spent considerable time on within village movements the exact scale was not known. Once the magnitude of the problem was identified various approaches were suggested to help reduce the village level transport burden. These included the use of transport aids and Intermediate Means of Transport (IMTs), construction of village level infrastructure (e.g. paths, pedestrian bridges) and the planning location of facilities to reduce the scale of movement.

#### Key issues

- Studies indicated that village pedestrian based transport activities could take up a huge proportion of the active working day. Women particularly had to shoulder the main burden of village life; it was common to find many women spending over two hours per day collecting water firewood and travelling to and from the grinding mill. Besides these tasks many other short distance movements also took place by foot, for example for farming, taking goods to local markets and visiting local clinics. Women had far less access to bicycles carts and other forms of IMTs. Often simple measures like the construction of a village well could substantially reduce the transport time burden on women.

#### Key topic areas

- Village transport studies
- Time and effort spend on transport tasks
- Trip purpose, opportunity cost of time
- Access to IMTs
- Differential burden on women
- Integrated Rural Transport Planning (IRTP)
- Integrated Rural Accessibility Planning (IRAP).

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## 1. BACKGROUND TO VILLAGE-BASED TRAVEL AND TRANSPORT STUDIES

The purpose of this paper is to explain the process which led to the development of a new (village and household-based) rural transport planning paradigm for low income areas and to indicate useful publications and information. The focus is on two main elements of the development process: (i) the key institutions involved, since their identity provides an insight into the motivations for change; and (ii) the underlying conceptual and methodological changes that have evolved.

### 1.1 Institutions

Among the first organisations to challenge the wisdom of the dominant approach to transport planning in developing countries was the UK Intermediate Technology Development Group founded in 1966 to implement the *intermediate technology* development philosophy of E.M. Schumacher (Schumacher, 1963). In 1971 ITDG set up a voluntary panel to explore new ideas and approaches to the development of transport. The initial focus of its activities was rural, reflecting the concentration of poverty in developing countries. It is significant that soon after, in 1973, radically new field studies of road construction technology were initiated under the World Bank's labour substitution study and the ILO's World Employment Programme which were driven by similar concerns: the growing employment and related poverty problems in developing countries.

From the late 1970s ITDG worked increasingly with the ILO in an informal partnership that still endures. This development was important in providing international support and finance to expand work on research, publications and workshops. More important, the resulting synergy of experiences and staff of these two organisations, with intermittent but vital stimulus from the World Bank, led to the formulation of a new planning paradigm. Parallel, but essentially independent, contributions were also made by a number of other organisations and individuals, although few sustained a commitment to change the way in which rural transport problems were viewed and approached.

Two decades later the influence of the ILO was also crucial to the setting up in 1991 of the International Forum for Rural Transport and Development, with financial support from CIDA, NORAD, SDC and SIDA. The establishment of the Forum has undoubtedly provided a new impetus to the process of change.

## 2. CONCEPTUAL AND METHODOLOGICAL ADVANCES

The search for a new rural transport planning paradigm began in a somewhat unfocused manner. The initial point of departure was simply dissatisfaction with the existing implied policy - reliance on infrastructure investment for conventional motorised vehicles as both the catalyst for economic and social change, and the prime means of enhancing accessibility and personal mobility, with vehicle supply being left to the private sector.

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Early criticism focused on the unnecessarily high design standards applied to local - feeder, penetration or development- roads, and the resulting slow and uncertain rate of network development (Thriscutt, 1972); the unaffordability and indeed non-availability of motor vehicles to the mass of the population; and the neglect of effective policies for the development of the local transport and vehicle system (Howe 1975).

## 2.1 Low-Cost Vehicles

Emphasis on the vehicle system was a departure from established thinking. Among most professionals the rural transport problem in developing countries was essentially seen as one of providing, or improving on the quality of, access. The term access meant, almost exclusively, road access. The extent to which developing countries might have special transport requirements was reduced to the search for low-cost roads (UNESCO, 1967). There were no parallel discussions of low-cost vehicles or indeed any other type of vehicle particular to developing country needs. Moreover, the implicit assumption was that, as in the developed countries, vehicle supply could be left to the private sector.

The case for developing low-cost vehicles to meet the special transport needs of developing countries was first brought into general debate at two conferences in 1976, in the immediate aftermath of the first oil-induced energy crisis<sup>1</sup>. Prominence to the notion of low-cost vehicles has been given at intermittent intervals since (Bryceson and Howe 1989; Riverson and Carapetis 1991), but to date there has been no significant follow-up in the form of international or national investment policies designed to facilitate their production and distribution. Reliance has continued to be placed on market forces which has sometimes actually resulted in the suppression of low-cost vehicle use, most notably the bicycle in Africa (Howe and Dennis, 1993; Howe, 1995). The change in focus from the road to the vehicle nonetheless served to broaden the discussion about rural transport policies, since it shifted attention away from the provision of infrastructure and towards the travel demand characteristics of users and how these best ought to be met. The logic of this shift was predicated on the notion that existing planning processes were too focused on the transport system rather than the needs of the people who wished to use it, which led to a fundamental misunderstanding of the real nature of the movement demands for the majority of the rural population.

## 2.2 User Travel Demand Studies

A broader view of user travel demand characteristics started to emerge simultaneously in the 1970s from a number of sources. Among the first was the work of Tripathi (1972) and Ramaswamy (1977) on bullock cart users in India; the Overseas Development Group, University of East Anglia's studies of the small farm sector in Bangladesh (Government of Bangladesh, 1977) and Nepal (Blaikie, et. al. 1977); and a specially commissioned study of small farm transport needs and constraints in Kenya, financed by the World Bank (World Bank, 1977b).

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<sup>1</sup> The very first effort to actually introduce new types of NMT in Africa with community involvement, under a transport project with international funding, was under a World Bank funded roads project in Ghana (1988).

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By giving prominence to the petty nature of most small farmer transport needs in Bangladesh and Nepal, the work of the Overseas Development Group cast serious doubt about the benefits impoverished peasant societies were likely to receive from conventional road and motor vehicle based investments, and thus the whole basis of the rural transport development policies being implemented in those countries. Again it is a lesson which has been largely ignored. Although the issue of benefit distribution has been extensively discussed in the literature on economic appraisal techniques, operational applications have been restricted by ideological considerations (Howe and Richards, 1984).

Similarly the study in Kenya served to highlight that the rural travel demands of most small farmers are much different to what is commonly supposed. It showed that most transport needs could be characterised as the movement of small loads (10-150 kg units) over relatively short distances (1-25 km). For transport related directly with the farming activity, the range of loads was likely to be the same, but the typical distances were shorter (1-13 km). Rarely were motorised transport services available, affordable or even necessary for such demands.

The findings from this early unstructured research stimulated the ILO to commission a further series of studies in Asia and Africa. These combined with other informal studies formed the core of the book *Rural Transport in Developing Countries* (Barwell, et. al. 1985). The ten case studies presented covered three broad aspects:

- (i) micro-level surveys of the transport patterns of rural farming communities in Malaysia, India, Nigeria, and Kenya;
- (ii) brief investigations of seven local-level transport modes in the Philippines, the Republic of Korea, and Western Samoa; and
- (iii) broader evaluations of transport policy and planning, and their implications for the rural communities in Bangladesh, Kenya and Tanzania.

These studies did not have a common research framework or methodology. The feature which linked them was their examination of transport conditions and problems from the perspective of rural people rather than the modern transport system. The studies thus paid explicit attention to transport activities, which took place remote from the motorable road system and borrowing from the generic study in Kenya, characterised movements as on- or off-farm (Howe 1976b, World Bank 1977b). They attempted to define the nature of small farmer and household transport needs and the physical and other constraints within which these had to be satisfied. The style of questioning was relatively loose and did not try to quantify the totality of household movement demands in a precise way, nor did it give prominence to questions of transport access by income group and gender. The research focus was more on physical mobility than the factors governing people's use of resources and the reach of services.

The studies reported in *Rural Transport in Developing Countries* led to a number of

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robust conclusions, especially when combined with the findings of a six-country case study India, Indonesia, the Philippines, Sierra Leone, Sri Lanka, Tunisia on rural transport services published the previous year by the World Bank (Carapetis, et. al. 1984). These conclusions can be summarised as follows:

- Correlation between the type and quality of infrastructure and the type and quality of transport services. Where all-weather roads exist motor vehicles frequently provide services. These are not normally available on dry season roads except at premiums of 200 to 400% above those on all-weather routes. Non-motorised vehicles sometimes fill the gap in services on dry season roads but at high unit costs.
- Limited extent of the effective road system and the poor prospects for its extension. A significant proportion in some cases the large majority of the population is not accessible under all-weather conditions. At the time of the surveys it was concluded that this situation could only be expected to improve very slowly, but in many of the poorer countries economic prospects have worsened since then.
- Significant numbers of people are effectively disenfranchised of any form of transport facility. Among those of the population who do have physical access to all-weather roads there is a significant proportion unable to afford those services that are provided.
- Real nature of local level travel. Household travel is dominated by subsistence tasks, which gives a local community orientation to most trips. The prime transport requirement is for the movement of frequent, small loads over short distances (Table 1). Social and welfare needs are the main motivation for longer-distance travel for which road transport might be appropriate. Few households possess any form of vehicular transport and walking, cycling and movement by animal dominate.
- Existence of simple but effective means of transport. Both on and off the road system a wide variety of unconventional and simple vehicles are used, although this is more so in Asia than Africa. Important aspects of these vehicles are their relatively low cost and modest infrastructure needs.
- Negative effects of the lack of credit. Whilst small farmer credit is a generally recognised aspect of development policy, in practice simple means of transport and their complementary repair and production facilities are frequently omitted. Where loan schemes are available the poor are precluded because of the level of collateral demanded by local credit institutions, high interest rates and down payments, or combinations of these reasons.
- Lack of perception of local level transport problems by policy makers. Many of the real transport problems faced by the rural population remain unperceived and neglected by policy makers and planners. Existing policy analysis and planning procedures have evolved to deal with the more visible parts of the economy such as exports, imports, industry, and their major investment and infrastructure

requirements. The procedures and criteria by which investment programmes are determined tend to ignore the non-users of transport services and the local level movement needs of rural people. These are only likely to be addressed if the starting point of the analysis is a local-level perspective.

**Table 1: Length and loads of rural goods movement by small farmers.**

	Kenya	Malaysia	India	Bangladesh	Western Samoa	Republic of Korea
<b>Typical Distance of transport</b>	90% of trips < 7km	75% of trips < 7km	90% of trips < 5km	Most trips < 12km	Most trips < 5km	Most trips < 10km
<b>Average On-farm* distance</b>	0.8km	1km	1.5km			
<b>Average off-farm* distance</b>		10km	8.3km			
<b>Loads transported</b>	70% of trips < 25kg			Most trips < 50kg	Most trips < 80kg	30-80kg

\* On farm transport comprises movements related to domestic needs, such as water and firewood collection, smallholder cultivation, grazing of animals and transport of farm inputs and outputs between house and fields. On-farm transport comprises trips to the market, to visits friends or to reach certain social amenities, for example, schools and health clinics. Off-farm transport relates more to the conventional perception of transport in that at least some of it takes place on a recognisable road, and sometimes, with a motorised vehicle (Source: Carapetis et. al. 1984, Barwell et. al. 1985). Another conclusion that emerged during studies in this period was the high cost of headloading (about US\$2 to US\$3 equivalent per ton-km, which is needed in the absence of road access and NMT vehicles (Pankaj, 1991).

The results from these studies effectively destroyed the validity of the predict and provide infrastructure-led approach to the provision of rural transport for the majority of the population of low-income areas. However, they did not produce a well-founded alternative method of quantifying rural travel demands that might lead to more effective policy formulation. A better understanding of rural transport demands and constraints required a more thorough analysis of the needs of individual households. In this respect the focus on farming and the categorisation of travel as on-farm or off-farm, were not particularly useful since some small farms actually comprised several scattered fragments of land, and they also ignored non-farming households and differences between individual household members. Also, for really poor households more prominence needed to be given to the transport demands associated with subsistence tasks. These requirements could only be met by a qualitative and quantitative assessment of the nature of rural household travel characteristics - specifically their magnitude, frequency,

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duration, purpose, gender differentiation and the modes used.

### 2.3 Household Travel Analysis

The substitution of the household for the transport system as the fundamental unit of travel analysis enabled a conceptual leap in rural transport studies to take place. It was one the developed countries had gone through some thirty years earlier. Spearheaded by the 1952 and 1956 Detroit and Chicago urban traffic and transportation studies, planning practice in most developed countries changed rapidly from system-based methods to those founded on the mathematical modelling of the behaviour of users derived from household-based studies (Detroit Metropolitan Area Traffic Study 1955, Chicago Area Transportation Study, 1960). The travel characteristics of the household became the fundamental unit of study and analysis. This concept spread rapidly from an urban to regional focus in all major developed countries. In the 1970's the techniques were transferred to the urban areas of developing countries, with varying degrees of success, but there are few recorded uses in rural areas. One attempt was made by the UK Road Research Laboratory in the late 1960s in Kenya (Howe and Tennant, 1977). It failed largely because it was based on the then accepted notion of transport as being limited to modern motorised vehicles. However, in the rural areas motor vehicle ownership levels were so low as to make household-based surveys impractical.

The first systematic use of the rural household as the basic unit of travel analysis in developing countries took place during the mid-1980s in the course of three studies, two in Tanzania and one in Ghana (Barwell and Leggett 1986, Barwell and Malmberg 1986, Barwell and Howe 1987). The core of the method was a structured interview, which recorded basic data about a household and the local and external travel activities of its members (Box 1). It required a broadening of the notion of transport which was defined as: travel from the home for any purpose, and by any means of movement, including walking or carrying loads on the head and back. The result was a quantification of household movements in terms of trips; time spent travelling and distance travelled to various facilities such as supplies of water, firewood, health clinics, grain grinding mills, markets, etc; tonne and tonne-km of effort; modes used; and the gender and adult/child involvement split.

#### Box 1: Structure of Household Interview Survey

##### A. HOUSEHOLD DATA BASE

1. Location of Household
2. Household Composition
3. Household Possessions
4. Sources of Cash Income
5. Household Expenditure
6. Land
7. Farm Inputs

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**B. TRANSPORT ACTIVITIES IN THE VILLAGE**

8. Collection of Water
9. Collection Firewood
10. Villages Activities
11. Crop Production
12. Crop Harvesting

**C. TRAVEL OUTSIDE VILLAGE**

13. Grinding of Grain
14. Health
15. Building Materials
16. Marketing of Products
17. Purchase of Food and Consumer Items
18. Main Markets
19. Travel to Other Places

The details of these results are available elsewhere (Barwell, et. al. 1987). However, the findings highlight the: (i) substantial amounts of time and effort devoted by households just to transport; (ii) disproportionate burden undertaken by women; and (iii) dominance of subsistence tasks over those for production for the market.

The general reaction to these results was one of considerable surprise because subsistence transport clearly comprised a very much bigger constraint on household-level productive capacity than had hitherto been thought the case. Moreover it is in the nature of a pre-emptive constraint in that the household does not have the option of not doing these tasks i.e. productive activities can only be entertained by the household once subsistence needs have been met.

Methodologically the technique was a significant advance since a degree of precision in quantifying household travel demands was achieved (Barwell, Howe and Zille, 1987). Thus, it was possible to isolate differences in travel demands, among villages or households, potentially enabling assistance to be targeted on, and tailored to, specific requirements, and to quantify gender and adult/child contributions. It was also apparent that while much of the time and effort devoted to meeting household travel demands could only be reduced by more efficient transport, a significant proportion could be reduced by non-transport interventions in the form of more convenient services such as water supplies or health facilities.

The diagnostic character of the approach was unexpected, and led to the realisation that it could be a powerful tool for both transport and more general development planning. Accordingly the methodology was refined by further studies in Tanzania and then used as the foundation of intervention projects initiated by the ILO in the Philippines and Malawi with a view to defining a new planning approach to meeting rural transport requirements.

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