

**ASSESSING THE IMPACT OF TRANSPORT INFRASTRUCTURE ON POVERTY
REDUCTION**

RETA 5947 : INTERIM (STAGE 1) REPORT

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INTRODUCTION

In general the presentation is admirable for the brevity and clarity it brings to a complex subject. The reviewer's comments are grouped into two categories: a few *major* considerations that might improve the clarity of discussion and research design; and *minor* observations that are made in the interests of accuracy or completeness, which are listed in page order. A few concluding suggestions are made about research design.

MAJOR CONSIDERATIONS

Transport and roads

Although there are various references in the report to the need to give separate consideration to service provision, the impression is still that investment in roads is taken as synonymous with investment in transport. An example is Figure 1 the propositional inventory. The heading is *transport*, but everything in the rural transport sub-category starts with the word *roads*. This has been the predominant mind-set among sector professionals for the past four decades. Reality is very different. Research has shown that investment in roads is no guarantee efficient transport services will follow, or that they will be of a type appropriate to the needs of the poor [Carapetis, et.al. 1984, Ellis and Hine 1998].

It may help both discussion and research formulation, therefore, to clarify how investment in roads can lead to benefits for the poor i.e. the essential *mechanism* of benefit transfer. Defining this mechanism will make clear the role of roads *per se*, and distinguish the complementary role of transport services. It will also signify other lines of inquiry that could be useful in understanding sectoral interaction with poverty reduction.

Providing a new or improving an existing rural road usually results in a number of immediate *effects*, for example: employment in the work of construction or improvement, lower transport costs, more traffic, or faster journey times. In due course - usually over a period of some years - the effects, *if they endure*, may produce more long-lasting and structural changes, or *impacts*. Thus, impacts are essentially mid- to long-term changes i.e. over a 3-10 year period.

Road investment can have both *direct* and *indirect* influences on poverty alleviation. Indirect influences are not manifest from investment in roads *per se*, but through the extent to which accompanying changes do or do not occur. Broadly these can be defined as changes in:

- employment;
- transport;
- agricultural production;
- non-road related employment;
- non-agricultural production;
- social patterns; and
- institutions.

It is important to note that the above series is listed in approximately *temporal* order of appearance and certainty. Employment in the process of improvement provides an immediate and direct source of income, and, together with the changes in transport, can be characterised as 'effects'. The remaining aspects are more in the nature of 'impacts', which require that the improved road and transport conditions are sufficiently sustainable to induce positive

changes. Only employment can be regarded as certain. *The other changes require complementary investments and actions, which may or may not occur.*

Employment, and thus the potential for poverty alleviation effects, is obviously enhanced by the use of labour-intensive methods, but there is, of course, no certainty that they will be used, or sustained in use. Where used there is clear evidence of the benefits that are likely to result, especially for rural roads (Box 1).

Box 1 Labour intensive works benefit the poor

- Employ five times more labour
- Can be wage targeted on poorest groups
- With new construction or major rural road rehabilitation US\$ 3,000 – 5,000 per km injected into local economy
- Forward linkages – spending of earnings during construction – generate income multipliers in range 1.5 – 2.8
- 25 – 30% cheaper than comparable capital-intensive methods

Source: Keddeman 1998

Because of these conclusions, which are supported by numerous other studies I regard the conclusion quoted on pg.36 from the Gannon and Liu study, and the observations attributed to Pouliquen on pg. 52, to be over-stated. There are clearly identifiable benefits that result from the execution of road works by labour-intensive methods. They can easily be wage targeted to ensure participation by the poorest, and means for ensuring participation by women are also well understood [Bryceson and Howe 1993]. However, for a number of reasons the current scale or duration of these benefits should not be exaggerated. The problem lies not with the process itself, but with institutional commitment to its use.

First, the scale of investments in labour-based works is comparatively modest in relation to the sub-sector total. Precise figures are not available, but, as with other aid sectors, it is doubtful if poverty-focused lending of this nature amounts to 5% of the total [Cox and Healey 1998].¹ Second, most of the associated income benefits are short-term, and tend to be used by the poorest on immediate consumption needs rather than for productive investment.² Longer-term economic benefits associated with the improved access itself tend to accrue mainly to wealthy residents – traders, vehicle owners, business people, and some farmers [Richards and Howe 1984, Howe, et. al. 1998]. Third, whilst there are frequently immediate social benefits associated with such projects – such as the improved access to and viability of education and health facilities – they depend on the flow of such services being planned to complement road improvement. Longer-term social and economic benefits are often threatened by the unsustainability of road maintenance. Fourth, there have been few sustained labour-based maintenance programmes. Ironically these provide a drip-feed of investment which creates time to effect changes in the lives of the poor. For example, in

¹ While there are dangers in reading too much into figures from a single year, data presented at the World Bank Transport Forum 7-9, 1998 are instructive. In 1997, lending for highways was 83% of the sector total. Second place was urban transport (7%), followed by rural roads (4%). Lending for railways, ports and others accounted for about 6%.

² Between 1985-1990 labour-based works focused on the poor resulted in the construction of 131,000 kms of rural road and 8,000 bridges. About a quarter of earnings were used for productive investments and just 4% for fixed assets. The remaining three-quarters of income were used on consumption goods [Ling and Zhongyi 1996].

Bangladesh special and typically 15-member crews of 'destitute women' have been formed for the preventative maintenance of flood control embankments and rural roads. They normally work for 4 years during which time they are entered into a compulsory savings scheme that accumulates a sixth of their earnings in a special bank account. They are given training in income diversification activities so that when they 'graduate' from the programme, so as to make way for others, they have both the savings and training to become self-sufficient. In excess of 60,000 women are currently engaged in such works.

With the exception of employment all the rest of the effects and impacts are *indirect*. Whether they occur, or not, depends on two things: (i) that traffic materialises as a result of the road improvement; and (ii) that this traffic is operating more efficiently than that which existed prior to improvement.

Changes in the *efficiency of transport* are the essential *mechanism* by which benefits from road building are transferred or released [Howe 2000]. The various economic and social benefits (or dis-benefits) are manifest only if transport operations become cheaper (or dearer), quicker (or slower), more (or less) frequent, or more (or less) reliable. Available evidence is that *cost* is not always as dominant a consideration as is commonly supposed and assumed in the knowledge gap analysis. Journey time, service frequency, and reliability may be just as or even more important.

Changes in transport efficiency can come from: (i) improvements to transport services; and (ii) improving the personal means of transport of the poor. While the first of these is self-evident, it is a mechanism that is often frustrated [Carapetis, et.al. 1984, Ellis and Hine 1998]. The second is characteristically neglected. Where considered at all it is conventional to assume that the 'market' will cater for personal means of transport even though there are situations where this is clearly not the case e.g. lack of credit facilities, foreign exchange rationing, and/or import quotas, etc.

A full assessment of both of these aspects ought to be part of the contextual and situational analyses of the case studies. Such an assessment should also give consideration as to the *nature* of the transport system used by the poor. Again reality is rather different to assumptions commonly found in investment appraisal reports.

Most low-income countries have two transport systems operating largely in parallel. I term these the *modern* and *traditional* systems. The modern system is *mechanised*, primarily for the *long-distance movement* of people and goods in bulk, and is used by a *minority* of the population. In contrast traditional transport is *non-mechanised*, mostly for the *short-distance, small parcel traffic*, and is the *dominant* system for most poor people.

This is a rarely acknowledged duality, being mainly invisible in official studies and educational curricula. The traditional system, in particular, tends to be ignored thereby strengthening the conclusion that it is in some way unimportant. This is not true, but is widely believed to be the case to judge by investment policies and actions. India provides rare quantitative evidence to refute the belief that the traditional sector is unimportant. Studies in 1977-78 showed that the traditional sub-sector accounted for 90% of the rural goods tonnage and 78% of the tonne-km [National Council of Applied Economic Research 1981]. Comparable figures for the traditional system in 1995 were 75% of the tonnes and 55% of the tonne-km showing that it was still dominant [Asian Institute of Transport Development 1997].

In the current context traditional transport systems have an added importance because of the changing livelihoods to which many of the rural poor are being subject under the influence of globalization [Bryceson et.al. 2000,]. The increasing importance of off-farm employment in rural, and the informal service sector in urban, areas is changing the nature of transport for the poor from an emphasis on the need for access to one for a need for *personal mobility* so as to enhance the potential for work-search [HABITAT 2001].

Transport and communications

The report makes no mention of the need to take into account possible trade-offs between transport and communications. This is important precisely because there has been such a rapid change in the potential for communications, even in the least developed of countries and among its poorest of people, due to the introduction of cell phone technology. For example, Grameen Telecom (GT) provides cellular pay phone services at an affordable price in villages in Bangladesh. In the three years since the program began in March 1997, GT has provided access to nearly 2.8 million poor villagers (in 1,100 villages) out of reach of the main phone network [Lawson and Meyenn 2000]. Prior to this much passenger travel in low-income countries is known to have resulted from deficiencies in telephone and postal services necessitating personal information-seeking behaviour. Whilst the need to consider possible trade-offs between transport and communications complicates research design, it would in my view be unwise simply to ignore it as a factor.

Network approach

The desirability of this is mentioned in the Introduction, but is not really elaborated. Calls for the use of this concept are more commonly heard in discussions on road maintenance, especially of poor countries that have inherited nominal networks they do not have the resources to conserve, and consequently have a need to identify rational *core networks*. In a poverty context it is perhaps more useful to appreciate a little known fundamental property of road networks that helps to distinguish those roads serving an economic function from those that essentially only serve social needs. This distinction not only clarifies the likely outcomes of investment, it also makes explicit where subsidies may be necessary.

It has been shown that the distribution of travel on the UK road system is highly asymmetrical [Tanner et. al. 1962]. Subsequent work indicates this to be a general property of road networks and is likely to apply to any reasonably large area e.g. a province, state, or even large district [Howe 1971]. Typically 30%, by length, of a road system will carry about 80-85% of the vehicle kms. Conversely 70% of the road length can be expected to carry only some 15-20% of the vehicle kms. Such roads carry little, if any, daily traffic and perform primarily a social function. That is investment in their creation, rehabilitation or even maintenance cannot be justified from user benefits. Logically, they ought to be regarded as part of the social overhead capital, in the same way as schools and health facilities. It certainly does not make analytical sense to mix the two functional categories, as is commonly the case, although there will be boundary cases where this is unavoidable.

The foregoing property can be linked to the comment on Pg.12 - resulting from ADB's stakeholder consultations - of the need 'to balance the social gains from infrastructure investment in remote areas against diminishing economic returns'. There is in fact a significant network in most countries that can never be expected to produce an economic return on investment. Identifying this fact makes clear why investment is being undertaken, especially where the prime motive is poverty reduction for reasons of social inequity.

Urban studies

While agreeing that urban studies of transport and poverty are conspicuous by their absence a recent report, prepared as part of the World Bank's efforts to develop a new urban transport sector policy, has provided some additional evidence [Howe and Bryceson 2000]. It derives from studies over a six-year period in four cities in East Africa; however, certain conclusions seem likely to have a wider relevance. Just three of these will be mentioned here.

Perhaps the most startling aspect is the dominance of *walking*, which is the only mode of transport used by half the total population. Among the poor it can account for 80-90% of all trips, yet the infrastructure system available to them is deplorable. Indirect, congested with pavement businesses, dangerous, unlit and uncared for.

While some of the poor can be found in settlements on the urban periphery, it is a false though popular stereotype to assume that this characterises the urban poor's settlement patterns, particularly in Sub-Saharan Africa. In most cities the poor are widely dispersed, even where informal settlements are spatially concentrated. In fact the proliferation of informal settlements throughout urbanised areas, as well as the existence of poor households even in nominally wealthy areas, is the norm. In transport planning and policy, it is better then to think in terms of poor cities characterised by significant personal mobility constraints, rather than treating the city's poor as isolated cases with special travel and transport needs.

Urban areas in East Africa show a strong imbalance in operational costs. Non-motorised transport accounts for 50-80% of the trips, but only 1-7% of the costs.³ The private car accounts for just 4-6% of the trips, but 60-68% of the costs.

Targeting

In conducting the intended research I think it is important to be aware of recent developments in poverty targeting, since this might influence the design of the studies. To target poverty efficiently we first need to know where the poor are, and in what way – transient, structural, chronic – they are poor. This knowledge then needs to be complemented by corresponding information about the state of the transport or energy systems.

Poverty targeting is a very old and controversial topic. Recognising that poverty, transport and energy systems are essential spatial phenomenon, and that our ability to handle large amounts of such data has been boosted by the availability of simple GIS technology has revived interest in it. By 'overlying' knowledge of transport or energy systems with that on poverty characteristics appropriate interventions can be formulated.

This approach has already been applied across a range of countries and poverty-related topics [Bigman and Fofack 2000]. It is also germane that even countries with modest resource endowments, such as Bangladesh and Cambodia, currently have functioning GIS systems at local government level.

³ These are only the direct financial costs of travel. Time, road infrastructure, accident and environmental costs have been excluded. Were these taken into account it would obviously increase the relative cost of motorised to non-motorised modes of transport.

MINOR OBSERVATIONS

Monitoring indicators

These are discussed on pg.19 and elsewhere. A recent ILO publication provides an extensive analysis of requirements for the rapid assessment of poverty impacts with special reference to employment-intensive infrastructure projects [Murphy 2000]. The proposals reflect current thinking on the poverty concept and the livelihoods approach to analysis of potential interventions.

IMT in Ghana

This is discussed in Box 6 on pg. 22. In fact it was not a success. The World Bank has produced a comprehensive review of this and similar experience with introducing IMT's and a draft report⁴ is available from: dschelling@worldbank.org.

Water transport and poverty reduction

Bangladesh has provided an important contribution to the admittedly sparse literature on water transport and the poor with a particular focus on its extensive fleet of 'country boats'. It's experience is described in a number of books and papers, however, the focus has been on technological developments and policy and few have discriminated poverty in the way of current discussions [Jansen, et.al. 1989, Kvam et.al. 1991]. The International Forum for Rural Transport and Development (IFRTD) has produced a useful guide to recent literature, which includes the Mekong delta, upper Mekong, Ayeywarwady delta in Myanmar, and Thailand [Palmer 1998]. It is currently planning further case studies with a stronger poverty focus funded by DFID. The ILO has also initiated studies in Cambodia in which wealth differentiation is a component of the analysis [Damien 2001].

Origins of Integrated Rural Accessibility Planning (IRAP)

This is wrongly attributed to Indian authors, pg. 35. IRAP was in fact developed by the ILO in the Philippines in 1990 and has since been used in Cambodia, Indonesia, and Laos. Proposals to further initiate/strengthen IRAP in Bangladesh, India, Indonesia, Nepal and Vietnam are currently being considered [ILO 2000]. It is a bottom-up and participatory approach that implicitly targets the poorest communities.

Bangladesh as a model

In a number of places the experience of Bangladesh with transport investment and poverty alleviation is quoted. In my view extreme caution should be exercised in drawing general conclusions from this. The country exhibits a number of characteristics that are probably unique. Among these are an extremely high population density (+800 persons per sq. km.); high proportion of double (59%) and triple (12%) cropped land; high proportion of landless (+50%); continuously rising demand for transport due to population (1.8% annually) and rice production (4% annually) increases; and abundant non-motorised transport able to meet local movement demands. It is a combination of factors found in few parts of the world. In consequence investment outcomes there are unlikely to be replicable in the same way elsewhere.

⁴Starkey et.al. 2001.

RESEARCH DESIGN

As a result of the previous observations and discussion a few changes might be considered to the proposed research design.

1. In contradiction to the proposal on pg.78, I would undertake contextual *before* situational analysis. Local situations, especially those affecting transport service provision, or the constraints on enhancing personal vehicle ownership, are often dictated by the macro-level policy context. Having a clear understanding of this is a pre-requisite to designing efficient local studies.
2. A similar argument can be applied to changes in the communications sector, which ought to be monitored at both the contextual and situational levels to try to determine trade-offs with transport and their use by the poor.
3. A broad range of changes in transport service provision should be monitored including journey time, reliability and frequency.
4. The investigations should also place emphasis on measuring changes in personal mobility not just access.
5. For urban studies special attention should be given to the provisions for and obstacles to walking and other non-motorised transport modes.

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forms of transport infrastructure: to close infrastructural gaps, to accelerate economic transformation for the country, and to attain the Vision 20:20. Recently, the Chinese government also made the pledge of US\$6 billion for the funding of infrastructure in Nigeria [7]. Moreover, not long ago, Nigeria's government released the sum of 1 trillion-naira capital funds for road construction and rehabilitation among others. [10] stated that the effect of economic growth on poverty reduction would be smaller or insignificant if the economic growth and the worsening distribution of income are associated. Today, Nigeria is one of the fastest growing developing countries in the world with a high poverty level, and worsening distribution of the income or wealth.