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## **TRANSPORT SERVICES AND THEIR IMPACT ON POVERTY AND GROWTH IN RURAL SUB-SAHARAN AFRICA**

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This project was funded by the Africa Community Access Programme (AFCAP) which promotes safe and sustainable access to markets, healthcare, education, employment and social and political networks for rural communities in Africa.

Launched in June 2008 and managed by Crown Agents, the five year-long, UK government (DFID) funded project, supports research and knowledge sharing between participating countries to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

The programme is currently active in Ethiopia, Kenya, Ghana, Malawi, Mozambique, Tanzania, Zambia, South Africa, Democratic Republic of Congo and South Sudan and is developing relationships with a number of other countries and regional organisations across Africa.

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This overview paper considers transport services and their impact on poverty and growth in rural sub-Saharan Africa. It builds on a substantial preliminary literature review [Annex1], associated communication with Africa-, UK- and US-based researchers active in transport services-related research, discussions during three AFCAP-sponsored sessions held during the biennial conference of the African Studies Association at the University of Leeds in early September 2012, a further meeting of transport researchers in London on 10<sup>th</sup> September 2012, and subsequent review of the draft papers by transport specialists including members of AFCAP's Steering Group.

It covers:

1. Observed transport services impacts on poverty and growth to date in rural sub-Saharan Africa
2. Constraints on poverty alleviation and growth associated with deficiencies in rural transport services
3. The potential for improved transport services to impact on poverty and growth in rural areas (including possible extended connectivity from integration with mobile phone networks)
4. Identification of key research gaps, assessing (i) where and how current commissioned AFCAP projects will contribute to filling these gaps and (ii) areas where new transport services research needs commissioning.

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## **GLOSSARY**

**AAPG** Africa All Party Parliamentary Group  
**AFCAP** Africa Community Access Programme  
**AfDB** African Development Bank  
**ASI** Accessibility Shortfall Index  
**AU** African Union  
**BRIC** Brazil, Russia, India and China [grouping acronym]  
**DFID** Department for International Development  
**DHS** Demographic and Health Surveys  
**ECA** [UN] Economic Commission for Africa  
**EU** European Union  
**GATNET** Gender and Transport Network  
**GIS** Geographic Information System  
**HDM-4** Highway Development and Management Model  
**ICT** Information and Communications Technology  
**IFRTD** International Forum for Rural Transport and Development  
**ILO** International Labour Organisation  
**IMT** Intermediate Means of Transport  
**IRAP** Integrated Rural Accessibility Planning  
**M&E** Monitoring and Evaluation  
**MDG** Millenium Development Goal  
**NMT** Non-motorised Means of Transport  
**ODI** Overseas Development Institute  
**OED** Operations Evaluation Department  
**SAP** Structural Adjustment Programme  
**SSATP** Sub-Saharan Africa Transport Policy Programme  
**VOC** Vehicle Operating Cost  
**VPD** Vehicles Per Day  
**WB** World Bank  
**WHO** World Health Organisation

## 1. INTRODUCTION

This Overview Paper considers transport services and their impact on poverty and growth in rural sub-Saharan Africa. It builds on a preliminary literature review focused on material published from 2000 onwards [Annex 1], associated communication with Africa-, UK- and US-based researchers active in transport services-related research, discussions during three AFCAP-sponsored sessions held during the biennial conference of the African Studies Association at the University of Leeds in early September 2012 and a meeting of transport specialists convened by Elizabeth Jones, DFID's Senior Infrastructure Adviser in the Growth Research Team, on 10<sup>th</sup> September in London. A draft version of the final report was subsequently circulated to AFCAP Steering Group members for comment. The paper covers the following topics:

1. Observed transport services impacts on poverty and growth to date in rural sub-Saharan Africa
2. Constraints on poverty alleviation and growth associated with deficiencies in rural transport services
3. The potential for improved rural transport services to impact on poverty and growth (including possible extended connectivity from integration with mobile phone networks)
4. Identification of key research gaps, assessing (i) where and how current commissioned AFCAP projects will contribute to filling these gaps and (ii) areas where new transport services research needs commissioning.

Substantial reference is made to detailed material presented in the literature review [Appendix 1]. This is indicated by a bracketed LR and relevant page numbers, to avoid repetition.

## 2. OBSERVED TRANSPORT SERVICES IMPACTS ON POVERTY AND GROWTH TO DATE IN RURAL SUB-SAHARAN AFRICA

### *2.1 Introduction: changing patterns of transport services*

A brief historical overview provides essential context for this section. Transport services have played a vital role in shaping the livelihood repertoires of rural people in sub-Saharan Africa over the last century but precise implications for poverty alleviation and growth have varied considerably over time and place and between different sectors of the population.

The development of motorised transport services followed rapidly after road construction in many parts of the continent (but with a focus on major export producing areas) from the early decades of the twentieth century. Trucks commonly provided feeder services to the railways, a key transport mode for the evacuation of agricultural produce and minerals for export in the colonial period. However, political economy analyses remain cautious regarding positive impacts of these developments for in-country poverty reduction and growth in this period. Large areas remained un-served by all-season roads and thus often inaccessible to motorized transport services. Consequently, the vast majority of produce for home consumption (and probably the vast majority of produce at the first stage in transport of goods destined for export) was headloaded. In most cultural contexts, portage was seen principally as work for women and their children.

Since Independence, this pattern of transport services has changed in detail, but many of its broader features persist. One of the main changes has been the decline of rail transport services in many regions, especially West Africa, as road construction and associated, more flexible, motorized road transport services expanded. The vehicle stock has also changed over time, but since rural transport services commonly need to cater extensively for passengers accompanying their freight, there has been continued widespread dependence on vehicles with substantial carrying capacity, whether [in earlier days] traditional mammy-wagons, or [more recently] imported second-hand minibuses. Bicycle ownership has offered a complementary transport mode for personal travel and smaller loads, but mostly for men – in many regions women and girls are discouraged from cycling [LR: 66-67, 75]. Women and their children, however, have continued to play a dominant role not only in intra-village goods transport but also in much intra-settlement [especially non-commercial] pedestrian portage [LR: 66,74-75].

The most recent - and arguably the most dramatic - change in rural transport services in many countries has been the expansion of motorcycle-taxi services, which gathered pace in the 1990s. These are still penetrating remoter rural areas today, fuelled particularly by the availability of cheap imported Chinese

motorcycles [LR: 84]. This development has special significance because it has occurred at roughly the same time as the expansion of mobile phone networks and the acquisition of handsets even in poor rural households [LR:85]. For the first time in African rural transport history many –even very poor - rural dwellers may have the potential summon transport when they need it. For people living in remote areas the consequent new levels of connectivity amount to a transport revolution, because even if they cannot afford transport on a regular basis, many can now obtain it in emergency contexts and perceive this to be of crucial importance to their well-being.

### *2.2 Transport service impacts on poverty and growth: direct employment*

Transport services have certainly impacted on poverty alleviation and growth among rural populations in diverse ways [though there is a shortage of sound economic analyses that demonstrate effectively the precise scale of benefits conferred either by roads or by transport services on direct employment or on other elements of rural life]. In the first place, there are the many very poor rural people who obtain a direct income from providing transport services. Cart pushing, commercial pedestrian portage and similar activities [bicycle repair, tyre vulcanisers, minibus call boys etc.], have long been an important employment niche for some of the very poorest young men and boys. Now, they also drive motorcycle taxis for [often urban-based] employers, usually on some form of hire basis. There is evidence [LR 84] to suggest that in some rural areas [such as Kibaha district, Tanzania], this employment may be helping to keep young men in the village where otherwise they would drift into town in search of work. Direct *paid* employment from transport service activities in rural areas is less commonly obtained by women and girls, though it occurs in some locations [e.g. girl porters in the charcoal trade in rural southern Malawi]. In many contexts, as noted above, women and girls undertake substantial unremunerated portage work for domestic purposes and sometimes also to support husbands' or family commercial activities.

### *2.3 Transport service impacts on poverty and growth: agricultural employment*

In productive agricultural regions, transport services are essential for the evacuation of produce. This may include movement of produce by pedestrian load-carriers, or by Intermediate Means of Transport [IMT] such as push carts or animal drawn carts or bicycles, especially between sites of production and bulking or marketing centres. Despite widespread preference for motorized transport, IMTs offer a relatively low-cost alternative and still play a vital role in many regions, especially for richer male farmers [LR: 82,83]. Although the majority of studies of market access focus on road connectivity to markets, rather than on the role of transport services, observations across Africa suggests that an all-season road is more likely to be associated with regular transport services than a poor road and, if agricultural conditions are favourable, production and associated prosperity in the farming population will be higher than in remoter

areas with poor access [LR: 92]. In the case of perishable products, such as tomatoes, cassava or plantain, motorized transport often plays a crucial role re travel time for ensuring adequate market access while produce is still in good condition.

#### *2.4 Transport service impacts on poverty and growth: off-farm employment*

Given the significance of multiplex livelihoods and off-farm employment to rural livelihoods and poverty alleviation, we can hypothesise that regular, reliable, affordable transport services are likely to be of prime importance in enabling travel to alternative work and income sources, though there is insufficient research to support this contention [LR:94-5]. However, in the case of trading activities, reliable, regular, affordable transport is certainly of great importance. In many areas women, in particular, rely on petty trading for a basic regular income, even though returns are low. They often walk long distances to access local markets, but when appropriate transport is available may be able to travel to more distant markets with better prices [and possibly less competition for their local products]. Access to mobile phones is now assisting many traders, including petty traders - but especially traders with larger businesses - to make more efficient use of transport services [LR: 68, 102-3].

#### *2.5 Transport services for health, education and well-being: crucial requisites for growth*

Good physical access to health and education services helps secure the educated and healthy workforce and wider community well-being that is essential for poverty alleviation and economic growth. Recently, evidence regarding the specific role that transport services play in shaping access to health facilities has been growing. In emergency maternal health contexts the role of transport is particularly evident [LR: 65-6], but even for basic primary care, travel time significantly affects levels of clinic attendance [LR: 86-7, South African data]. Low-cost, timely transport also improves access to ARV therapy [LR:87], to pre-natal care [LR: 65-6] and to immunization services [LR: 73].

In the formal education context, transport service provision is particularly important for access to secondary schools, which are often only sparsely located in rural areas. Girls' school attendance, whether at basic or secondary level, has particularly benefitted from improved transport [LR: 73].

The development and maintenance of social networks, so often key to accessing funds [e.g. for school fees], employment opportunities and broader well-being, are similarly facilitated where good transport networks exist. The massive expansion of mobile phone use across Africa also supports many family and wider social networks [in addition to the commercial activities noted above]. While phones now enable improved distance management, occasional face-to-face meetings facilitated by travel still appear to be key to maintaining strong social bonds [LR: 101].

Regular, reliable transport services also provide a key de-isolating function, helping to change perceptions of rural life and thus improving service quality. They not only enable access to services for the rural residents per se who need them, but also encourage and enable key service personnel [teachers, health workers and extension agents, among others] who are so often determinedly urban-based, to at least travel to work in rural areas on a daily basis, and thus provide regular services in rurally-located service sites.

### 3. CONSTRAINTS ON POVERTY ALLEVIATION AND GROWTH IN RURAL SUB-SAHARAN AFRICA ASSOCIATED WITH DEFICIENCIES IN TRANSPORT SERVICES

Clearly, efficient, regular, reliable and affordable transport services play an essential role in promoting growth and reducing poverty. In many parts of Africa, however, transport services remain entirely inadequate for user needs.

The importance of competition in motorized transport services development cannot be over-emphasised – it is a critical pre-condition [unless subsidies are available]– otherwise there is little incentive for existing transport providers to improve their service or pass on savings on vehicle operating costs to customers. Competition requires demand, which is usually closely linked to population density and wealth [agricultural/mining potential of the area, plus possibly also government encouragement of local marketing etc.], confidence about regular road maintenance, the removal of formal barriers [such as restrictive government regulation like unnecessary army/agricultural ministry road checks] and informal barriers [cartels and rent seeking]. In some remote places, demand will be so low that it may be necessary to consider the role of credit and subsidy. However, there is limited experience of formal transport subsidy in Africa, except in South Africa where the cost and complexity of managing transport subsidy interventions, especially in the informal sector remain significant issues [LR: 107]

Constraints from a *user perspective* are usefully reviewed in terms of those currently often most disadvantaged: remote populations, women, children and young people, older people and the disabled. There is now substantial evidence regarding the impacts of deficiencies in transport services on women's lives, but rather less for other transport-disadvantaged groups. [Moreover, even though we now have considerable knowledge of constraints on women's access to transport services, this is not adequately reflected in improved policy or practice.]

In *remote areas* chronic poverty tends to be particularly widespread and, even if transport services are available, fares are often too costly for the majority of people [LR:61-2]. The shortage of cheap, reliable transport impacts strongly on people's access to services, since remote areas also tend to be characterized by low service density. With long distances to service centres and high transport costs, access to health services [especially maternal and child health, discussed further below, but also ARV treatment [LR:87], vaccinations etc.], secondary schools and markets is inevitably low. Poor access to education and health services impacts massively on human capital stocks, while costly access to markets impacts on growth potential: farm-gate prices for agricultural produce (often the mainstay of livelihoods in remote areas) will be characteristically low compared to those prevailing in more accessible locations. There will also be

limitations on the nature of produce which can be sold, since perishability will limit market potential. If markets have to be accessed on foot, or delays are experienced because of sparse, unreliable transport services, sellers may arrive at market too late to obtain a good price or even in time to meet any potential purchasers; if their produce is perishable and there are delays it may be spoiled in transit. Key inputs, notably fertilizer, are also likely to be restricted [LR: 91-2]. Off-farm activities are now recognized as an important factor in building multi-plex livelihoods as a route out of rural poverty, but again, poor transport services are likely to inhibit this strategy in remoter areas, since they often require travel to the nearest market or service location [LR: 79].

Women and children tend to experience deficiencies in transport services particularly strongly, especially (but not only) in remoter areas away from all-season roads. Where transport services are poor and charges high, in many cultural contexts across Africa, women and their children are required to fill the household transport gap as pedestrian transporters: this applies particularly to goods required for domestic purposes such as water and firewood, but often also to farm produce and other commercial goods which may have to be head-loaded long distances to market, with implications for children's education and possibly also for women and children's health [LR:64-5, 66, 74-5]. It has long been recognized that load-carrying impacts substantially on women's time budgets, and consequent time-poverty, thus contributing to reduced time for both productive tasks such as farming, and reproductive tasks including childcare and community participation [LR: 64]. If Intermediate Means of Transport are available, they are often seen as men's equipment: women's use may even be culturally prohibited, especially where draught animals are concerned, but more often women simply do not have the financial means to purchase IMTs [LR: 66-7, 82-3].

There is also substantial direct evidence to show that poor transport services and distance impact considerably on women's health, especially maternal health and emergency obstetric care [in this case including even women of high socio-economic status]. They are also likely to affect pre- and post-natal care [LR 65-6, 86-7] and levels of contraceptive use [LR: 74]. Knock-on impacts of poor access to maternal health services among women not only include some of the highest rates of maternal mortality in the world, but also long-term damage, notably obstetric fistula, which affects all aspects of women's lives by keeping them virtually isolated from their communities.

For children, the impacts of poor transport services and distance can be seen particularly with respect to access to secondary education [though this is barely recognized in the education sector literature]. The majority of children in most contexts walk to primary school [albeit sometimes over long distances], which may contribute to late enrollment, truancy and early drop-out, especially when coupled with

household labour demands, including pedestrian transport requirements [LR: 72-3]. At secondary school level, where distances to school tend to be even greater, the constraints imposed by deficient transport services are often such that adolescent girls and young women, in particular, are simply unable to attend, unless affordable local boarding facilities of some sort are available, because of parental fears that they may be attacked on journeys between school and home [LR:72]. In terms of children's health care, transport service impacts on low vaccination rates and access to emergency care are of particular concern [LR: 73-4].

The impact of deficient transport services on older people might seem to be of greater significance in terms of poverty than growth, but it is important to bear in mind that many older people play a vital role as carers of young people across Africa, in the absence or death of parents, especially in rural areas, and that many must also continue to find a livelihood for themselves and those in their care [LR: 78]. Poor transport services affect older people's ability to support themselves and the children in their care, since they may be unable to walk to distant markets and thus must accept very low farmgate prices, while poor access to health services for themselves and their charges will inevitably also impact on children's access to education and future livelihood potential. Disability can affect all ages, but tends to be particularly prevalent among older people: for this group as a whole, transport services are of vital significance and deficiencies in transport services contribute to the chronic poverty in which many currently live.

#### **4. THE POTENTIAL FOR IMPROVED TRANSPORT SERVICES TO IMPACT ON POVERTY AND GROWTH (INCLUDING POSSIBLE EXTENDED CONNECTIVITY FROM INTEGRATION WITH MOBILE PHONE NETWORKS)**

Improved transport services could impact very substantially on poverty and growth in rural areas, particularly once the potential for extended connectivity based on integration with mobile phone networks is considered. For the most part, different interventions are likely to be appropriate for intra-village and inter-settlement transport so these are considered separately below.

##### *4.1 Intra-village transport: the potential of IMTs and other interventions*

So far as intra-village transport is concerned, much travel tends to be associated with domestic loads – notably water, fuelwood and farm produce for home consumption. Time poverty among women, children and older people, in particular, is strongly associated with domestic load carrying and could be much reduced were it possible to reduce domestic transport commitments. The reduction in load-carrying work would increase many children’s time availability, with likely knock-on impacts on school attendance, homework etc. It would allow women’s time freed up in this way to be used both in productive pursuits such as farming, enabling higher incomes, but also for wider aspects of personal, family and community well-being [leisure, child-care, community activities etc.]

Reduced dependence on pedestrian load-carrying could be achieved through IMT interventions [in conjunction with any necessary path/track improvements] and non-transport interventions [such as additional water points, firewood reserves etc.]. However, this will require a stronger commitment to IMT than has hitherto been achieved, especially in terms of scale. Many IMT schemes have been small, piece-meal interventions, in some cases promoted by hobbyists with inadequate appreciation of social and other contextual factors. Some larger-scale projects have also failed because of inadequate pilot ground work, such that inappropriate equipment has been promoted, communities inadequately prepared etc. In the context of a low-carbon future, attention to promoting contextually-suitable IMTs may once again become a prominent feature of donor rural transport agendas, though local elite perceptions of IMT as a synonym for primitive transport may also need to be overcome.

A key factor for IMT intervention success is affordability - appropriate national fiscal policies and local microfinance schemes for potential adopters are both likely to be essential. Cost of IMTs remains a major issue among the very poor [who may often value the equipment most, including many women]. Credit provision *per se* may not present an adequate incentive for women to buy IMTs, unless the IMTs are appropriate and affordable. IMT introductions require careful pre-intervention study and monitoring to

ensure that the equipment is appropriate to the context, plus preparatory work with communities to ensure adequate recognition is given to the need to budget for repairs, maintenance training etc. Reduced novelty of IMT equipment would allow more use by women, but IMT can even aid women in contexts where they are unable to gain control of the equipment, if the presence of such equipment encourages men and boys to take over female tasks [LR: 83]. Very basic IMTs, including wheelbarrows, could be of considerable value in many locations. For emergency health travel from remote locations with poor roads, IMT equipment such as motorbike ambulances or simple stretchers based on mountain rescue designs [P.Starkey et al. discussion at ASAUUK] could play a much larger role. Attention to building a critical mass of key equipment and research into novel ways of promoting equipment sharing, beginning in the most favourable locations, will be needed to reduce costs and increase acceptability.

The importance of non-transport interventions which can complement transport service improvements also requires emphasis. The value of non-transport interventions (such as boreholes, fuelwood plantations, portable grinding mills, girls boarding facilities at schools, maternity waiting homes) has continued to be noted regularly by transport researchers, but in the absence of strong inter-sectoral connections (e.g. to agriculture, natural resources, energy, health, education) they have failed to attract adequate attention in those other sectors.

#### *4.2 New connectivities in inter-settlement travel: motor-cycle taxis and other interventions*

For inter-settlement travel, the motorcycle-taxi is now changing the face of rural transport services in many parts of Africa, thanks primarily to the introduction of cheap motorcycles [especially from China, also some Indian models], but also to the improved connectivity provided by the spread of mobile phone networks and handset ownership. The efficiency advantages gained when motorcycle taxis can be contacted by mobile phone are particularly impressive, such that even very old poor people may patronize motorcycle-taxi services in areas where these services have only been recently introduced [LR: 103].

Although fares tend to be higher than for other transport services, motorcycle-taxis are not only reaching remote villages where there is no alternative service, but services are being stationed within those villages [rather than being limited to base-stations at the paved road, as has commonly been the case with conventional motor taxis]. Conventional taxis usually do not find it profitable to operate from or into remote locations due to insufficient demand and the fact that 4-wheel vehicles cannot easily negotiate unsurfaced tracks, especially in wet conditions.

Additionally, it is important to note the employment opportunities that work operating motorcycle-taxis has brought to hitherto unemployed young men. This is of particular significance in poor families [even

though ownership commonly rests elsewhere, often among urbanites and salaried professionals who find good profits in the business]. A growing pattern in rural areas is for motorcycle taxis to act as feeder services, linking off-road villages to other [cheaper] motor transport at the paved road. However, motorcycle taxi fares are typically above those charged on buses or minibuses, and are thus least used by the very poor, except in emergencies.

Despite the evident value of motorcycle-taxi services, there are a number of areas where improvements are urgently needed, especially given the prevalence of accidents associated with their operation. High accident rates seem to be ubiquitous in locations where motorcycle-taxi services are well established, impacting not only on the young men who mostly operate them but also on their [usually female] carers and on already stretched medical services.

- Insufficient attention is currently paid in road engineering to the question of road access conditions where motorcycles are now the dominant transport. Motorcycles need a firm, cambered running surface but at a much reduced width than that required by conventional 4-wheel vehicles. Experience in Vietnam cited by Petts may have some relevance for Africa [though lower population densities than in Asia could be an inhibiting factor]: here, communities have constructed their own [1.4 metre] motorcycle roads of concrete which can allow two motorcycles to pass at normal speed, and 0.5 metre concrete or fired clay brick tracks in remote areas where cycles are unlikely to have to pass each other regularly [LR: 84]. However, it is important to bear in mind that better road surfaces are likely to encourage drivers to increase their speeds, and thus it will be necessary to also consider appropriate traffic calming measures in areas around schools, settlements etc. [and driver training, as discussed below].
- Driver training needs urgent attention. Drivers are supposed to be licensed, but corruption in the licensing authorities, police etc. is so prevalent, in many countries, that a majority of drivers probably operate without adequate training. Moreover, many are extremely young men [driving at age 14 years is not uncommon] who enjoy the speed and thrills of this work and take undue risks. Driver training which is specifically geared to motorcycle-taxi drivers is very urgently required. This need to cover issues such as passenger numbers [since it is not unusual to see three passengers on one motorcycle taxi] and helmet wearing, as well as driving techniques, road safety, carrying procedure for older/sick/disabled passengers etc.
- For very old, sick or disabled people in remote areas, motorcycle-taxis are often the only source of transport. Currently, such passengers tend to be carried with the support of a second passenger sitting behind them. There is a need to develop appropriated seating facilities [such as a harness] which can support them safely without an additional passenger.

- Helmet usage is often required by law, for drivers and their passengers, but rarely implemented or adequately enforced. The importance of helmet-wearing can be stressed to drivers in training, but also needs further consideration:
  - Helmet quality needs attention – many helmets are of substandard quality and offer little protection.
  - Operators need to have a second helmet available for their passengers.
  - Passengers are often concerned about ‘fungus’ [skin diseases etc.] in borrowed helmets. This needs attention [e.g. cotton helmet liners could be made cheaply, locally, so that passengers carry their own washable liners].

Improvements in service quality associated with developments of this type can be expected to lead particularly to improvements in journey time, reliability and safety; reductions in fares are likely to take longer to achieve, and will depend greatly on the degree to which competition develops between service providers.

It is likely that the new connectivities associated with the expansion of motorcycle taxis and mobile phone networks will dominate intra-settlement travel developments in many remoter rural locations away from the paved road for some years to come. They may well also have knock-on impacts on the nature and organization of other rural transport services, though it is difficult as yet to predict likely areas of change, which will depend in part on local context and the wider political economy.

#### *4.3 Impacts on poverty alleviation and growth from improved intra- and inter-settlement transport services*

Impacts on poverty alleviation and growth can be anticipated in diverse areas. In terms of women’s and children’s *intra-village domestic load-carrying work*, a reduction associated with improved transport can be expected to have substantial knock-on impacts:

- Improvements in productivity in agriculture and other rural activities associated with reductions in time poverty, leading to higher incomes, but also for wider aspects of personal, family and community well-being (leisure, child-care, community activities etc.)
- Improvement in education achievement due to children’s timely, less exhausted, and regular attendance at school
- Improvements in health and well-being associated with reduced load-carrying and reductions in time poverty

Improvements in *inter-settlement transport services* could also have substantial consequences for poverty alleviation and growth, in this case in terms of productivity, employment, migration, staffing of rural services, and wider well-being:

- Increased agricultural production associated with better profits i.e. improved evacuation of farm produce, consequent better condition and timely arrival at destination markets, thus better prices [even if transport *costs* do not reduce or are little reduced].
- Improvement in evacuation of other rural products to local and export markets with similar impact on profits.
- *Direct* employment benefits in the transport sector, associated with an expansion in transport services – this is already evident in the motorcycle-taxi sector.
- Much larger *indirect* employment benefits from improved transport services associated with:
  - Increased agricultural employment, due to improved evacuation of farm produce, consequent better condition and timely arrival at destination markets, thus better prices.
  - Increased off-farm employment, due to better access to work in rural service centres and any proximate urban areas.
  - Increased opportunities for rural youth employment in transport and in other sectors. This is of vital importance given current high levels of youth unemployment in rural areas and migration of youth to urban areas (where job prospects are also limited).
- Improved transport services will reduce perceptions of remoteness which have encouraged youth and entrepreneurs' out-migration from rural areas and discouraged professionals in key services such as education and health from taking jobs and residing in rural areas [LR:13,81].
- Improved transport safety would reduce injury and deaths associated with traffic accidents, not only with substantial potential benefits for the health, well-being and productivity of rural populations but also a reduction in related health service expenditure.

## **5. IDENTIFICATION OF KEY RESEARCH GAPS, ASSESSING (A) WHERE AND HOW CURRENT COMMISSIONED AFCAP PROJECTS WILL CONTRIBUTE TO FILLING THESE GAPS AND (B) AREAS WHERE NEW TRANSPORT SERVICES RESEARCH NEEDS COMMISSIONING**

The literature review identified a number of key research gaps which need to be filled; additional discussions at the ASAUUK Leeds meeting and the discussions held at DFID on 10<sup>th</sup> September encouraged further refinement of this list. For each identified gap, observations are made regarding where and how current commissioned AFCAP projects may contribute to filling it and what additional new transport services research will be needed. The research gaps identified are categorised into five broad types: those associated with wider global issues, those linked to Africa's changing political economy, the socio-economic impacts of transport from a user perspective, rural transport service operations from the operator perspective and road safety.

### ***5.1 RESEARCH GAPS CLOSELY ASSOCIATED WITH WIDER GLOBAL ISSUES***

The likely impacts of two major global developments - climate change concerns and the rise of the BRICs and other newly emerging economies - on Africa's transport needs and potential are, as yet, largely unknown. These are significant gaps where research is urgently needed.

- ***The linkages between transport, environment and climate change in Africa:***

A review of the literature indicates that there is a major knowledge gap, a) regarding the potential impact of linkages between transport, environment and climate change on rural populations in sub-Saharan Africa in terms of risk, vulnerability and resilience, and b) regarding the specific interventions needed for pro-poor climate change mitigation, adaptation to progressive climate change and managing climate risk in rural transport contexts [LR: 104-5].

- *Contribution from current AFCAP projects to filling this research gap:*

No clear specific contribution from any current AFCAP transport services project, though this is to be one of the key themes in the AFCAP sponsored session at the T2 meeting in Gabarone in March 2013.

- *Further commissioned research required:*

Inter-disciplinary research focused on the complexity of transport impacts likely to be associated with climate change and other environmental changes – this will require a very broad partnership, drawing on expertise in areas as diverse as road engineering, socio-economics, climate science and agricultural/food security, since there will be many complex feed-back mechanisms at work. Perhaps the most appropriate strategy would be

to look to nest such transport-focused research in this area within an identified broader climate-change Africa-focused research programme [such as a follow-on programme to the recently completed DFID Climate Change Adaptation in Africa programme].

- ***The impact of Chinese and other emerging powers on African transport contexts***

This relates directly to knowledge gaps [discussed further below] regarding motorcycles and mobile phones in the African transport nexus. Future transport services are likely to be substantially shaped not only by the availability and nature of goods and ideas imported into Africa from the emerging powers [perhaps low-carbon vehicles etc.], but also by the interaction between African and emerging powers in the transport sector.

- *Contribution from current AFCAP projects to filling this research gap:*

No current AFCAP projects are specifically focused on this field.

- *Further commissioned research required:*

Mapping and analysis of current and likely future relations between Africa and the emerging powers which impact on the transport services scene would be valuable.

## ***5.2 RESEARCH GAPS ASSOCIATED WITH AFRICA'S CHANGING POLITICAL ECONOMY***

Transport services provision has important political economy dimensions which have, as yet, been insufficiently recognised and tackled in sub-Saharan African contexts.

- ***The role of transport services in fragile and conflict-affected societies and states***

The need for work in this field has been noted in various strategy documents - notably the World Bank Group's transport business strategy for 2008-2012 (2008) [Safe, clean and affordable... transport for development]. This recognizes the potential role of improved transport in helping to rebuild economies in post-conflict countries and lessen vulnerability to future conflict, such as overcoming potential disputes over access to resources, and defusing the seeds of conflict sometimes arising out of feelings of isolation. However, there is a lack of in-depth research regarding potential means whereby this can be achieved.

There has been a small amount of work on transport as a *source* of conflict [notably South Africa's taxi wars] but this is urban-based. One potential area for research may be into the role of social networking tools and approaches for addressing potential and actual transport conflicts, along the lines currently used through Ushahidi to address conflict issues.

- *Contribution from current AFCAP projects to filling this research gap:*

Only the Mozambique 10-year follow-up assessment of the DFID Feeder Roads project in Zambezia contributes to work in post-conflict contexts. Terms of Reference were produced for a baseline study in South Sudan, and Expressions of Interest received, but the ongoing political situation has required AFCAP to put commissioning of this work on hold.

- *Further commissioned research required:*

This will be an important area for future commissioned research. The Zambezia study may offer valuable pointers to potential themes. Small –scale studies exploring local transport-related conflicts in rural areas may be valuable [e.g. around unionization], in addition to study of transport issues in broader conflict contexts.

- ***Increased attention to other aspects of political economy and associated socio-cultural dimensions of transport provision [including topics such as grand and petty corruption, and the role of transport in social network construction and access to the political process].***

There has been a tendency in much transport services research even in stable political contexts to focus more on technical issues and downplay social and institutional factors which significantly shape transport management, use and impacts. This may be attributed at least partially to the difficulties of pursuing investigations which are potentially highly sensitive [and have, in the past, occasionally put individual researchers in physical danger]. Nonetheless, a stronger focus on political economy is needed to explore the nature of transport decision-making and decisions which impact on transport, at national, regional, district and community levels. The significance of political influence on road programmes is well recognized, but there are many other aspects associated with the socio-political context of transport decision-making which merit investigation, such as the importance of transport in building social networks, government/union relations etc. [LR: 16, 66, 69, 76]. The role of transport services in improving poor people’s access to the political process [i.e. physical access to local government offices, especially important in the context of state decentralization] is a related major research gap [LR: 44, 61].

- *Contribution from current AFCAP projects to filling this research gap:*

There is little work specifically taking a political-economy approach among current AFCAP projects, though political and associated socio-cultural issues may well be raised as an issue among findings.

- *Further commissioned research required:*

Topics where a significant research gap exists and commissioned research would be valuable include: the influence of community power dynamics on local transport-related

decision-making; the impact of transport union/government relations on transport service decisions; the enforcement of transport safety legislation; transport equipment importation; transport-related taxation; rent-seeking impacts on national trucking industries; impacts of petty corruption in the rural transport services sector in terms of both monetary and time costs; rural transport services as a factor in social network construction and access to the political process.

### ***5.3 RESEARCH GAPS CONCERNING THE SOCIO-ECONOMIC IMPACTS OF TRANSPORT***

Although the quantity of empirical data on socio-economic aspects of transport service provision in Africa has expanded over the last few decades, important research gaps remain. These include the need for a better understanding of the role of transport services in shaping youth employment patterns, of pedestrian goods transport and its impacts on poverty and growth, and of transport in commercial agriculture and mining operations. More broadly, the poor fit of standard transport economics approaches to African contexts presents a major hurdle in economic analyses, while the failure of transport planning to improve user access to facilities and services in situations where relevant user information exists suggests the need for in-depth [qualitative] studies of the transport policy and practitioner environment in order to identify where and why information does not translate adequately into action and find means to rectify this.

- ***New work to resolve methodological issues in applying transport economics in African contexts***

As Stefan Dercon emphasized in the DFID 12<sup>th</sup> September meeting, there are major unresolved issues for instance in assessing rates of return from transport developments in health, education and agriculture and the complementarities associated with social benefits: standard techniques used in Western contexts are not easily applicable. Discussion in the accompanying literature review gives an indication of the complexities and diversity of African socio-cultural and economic contexts which prevent the direct application of standard techniques utilised elsewhere. The development of an appropriate set of Africa-adapted measurement techniques is essential for the construction of a sound economic argument to support transport services interventions.

- *Contribution from current AFCAP projects to filling this research gap:*

No contribution as yet in this field

- *Further commissioned research required:*

This will require a major inter-disciplinary research programme involving both economists and other social scientists, perhaps drawing on the expertise of groups such as Oxford University's Centre for the study of African Economies.

- ***Youth mobility and transport for improved employment prospects***

High youth unemployment rates in Africa are of widespread concern: they have important implications for economic growth and for inter-generational poverty transfer [LR: 95]. Transport services are implicated in young people's access to education and training, access to work places [including off-farm work] and as a direct employment option. Means of improving girls' access to and use of bicycles towards improved school attendance or employment, for instance, are little understood [LR: 75-6], while the role of transport as a niche employer for the poor [notably young men's employment in motorcycle-taxi businesses] raises questions regarding its potential to enable young people to move out of poverty and into other entrepreneurial roles.

- *Contribution from current AFCAP projects to filling this research gap:*

No current AFCAP projects are specifically focused on children or youth, though the University of Pretoria's project on the supply and pricing strategies of informal rural transport providers in South Africa and the IFRTD Indicators project may provide some relevant material. [An earlier AFCAP project supported dissemination of young people's own research findings about their transport and mobility problems. ]

- *Further commissioned research required:*

Research is needed in all key areas of youth mobility and transport i.e. to distinguish interventions required for improved access to education, training and work and to understand its role and potential as a niche employer for the poor.

- ***Continuing sustained research on social impacts of transport exclusion among other vulnerable populations (women, children, older people, disabled); research into means of getting findings into policy and practice.***

Specific attention was paid to youth in the previous point, but there are other groups which also tend to be poorly accounted for within transport policy appraisal and are often difficult to measure and quantify. The elderly, for instance, may be discounted in growth-focused work, but certainly play a key caring role for children and youth in many rural areas. A deep understanding of transport-related social exclusion is essential for addressing wider issues of poverty and growth, particularly in areas such as inter-generational poverty transfer. It is also important to note that, by contrast with other vulnerable groups, there has been substantial research on women's transport exclusion, but this knowledge has rarely translated adequately into policy and practice: there are token efforts at gender mainstreaming in transport projects, often as a response to donor requirements, but this still mostly amounts to little more than 'ticking the gender box'.

- *Contribution from current AFCAP projects to filling this research gap:*

Two AFCAP projects are focused on improving women's access to maternal health services: Transaid's 'Linking rural communities with health services: assessing the effectiveness of the Ghana Ambulance Service in meeting the needs of rural communities' and DevTech's 'Improving access to emergency health facilities in rural areas; Zambia'. The HelpAge Tanzania project is specifically focused on older people's mobility and transport issues and provides clear evidence of the importance of transport research among this age group: the findings should have widespread relevance for many other African contexts. [An earlier AFCAP project supported dissemination of young people's own research findings about their transport and mobility problems.]

- *Further commissioned research required:*

The failure of transport planning to improve women's access to facilities and services remains a major concern in 2012. Similar neglect of research findings could well also apply to research conducted with other user groups. To ensure uptake of findings, it will be necessary to undertake in-depth [qualitative] studies of the transport policy and practitioner environment in order to identify where and why information does not translate adequately into action and find means to rectify this.

- ***The impact of widespread pedestrian transport of heavy loads on poverty and growth***

Load-carrying for domestic/subsistence purposes is widespread across Africa and likely to have substantial impacts on both education and health, especially for girls and women [LR: 64-5, 66, 74-5]. Recent research has drawn attention to impacts on children's education, but the impacts on health are essentially unknown: the majority of current information is little more than anecdotal. Medical research on load carrying is needed, but the issue falls awkwardly in the gap between medical, transport and social science expertise and this is reflected in difficulties of obtaining research funding. Moreover, potential interventions to reduce load-carrying raise difficult issues: if it is highly damaging to affected populations, we would need to find practical interventions at sufficiently low-cost to enable a reduction in carrying. However, this could present a new impetus to innovation in and interventions with Intermediate Means of Transport. Or it may be more a matter of establishing parameters for ergonomic guidelines regarding avoidance or reduction of head-loading practices detrimental to health (e.g. guide weights re magnitude and frequency of load in different terrains, at different ages and by gender, optimum speed of movement, carrying distances, loading and unloading techniques, footwear, combination with other physically demanding activities, recovery time after childbirth etc.) together with appropriate health interventions and associated policy recommendations.

There are other issues regarding take up of findings in policy and practice. Before we can move to such questions, however, we need to have a firmer understanding of the nature and extent of load-carrying impacts on health.

- *Contribution from current AFCAP projects to filling this research gap:*

Some data on perceived load-carrying impacts on older people have been gathered in the HelpAge Tanzania study. This reinforces the point that medical research is needed in this field.

- *Further commissioned research required:*

A fully-integrated programme of inter-disciplinary research is required that brings transport and health specialists together with bio-mechanical engineers. [A multi-disciplinary team from the universities of Leeds, Durham, Newcastle, Napier in UK and from Ghana's medical schools has been working together for some time to develop research in this area but access to funding is hampered by the level of interdisciplinarity required; as noted above, the issue falls awkwardly in the gap between medical, transport, engineering and social science research funding schemes, including UK research councils].

- ***Extended work on time/money integrated livelihood assessments which include fuller recognition of rural transport elements***

Livelihood-focused studies still rarely contain adequate consideration of rural transport issues and their implications for rural incomes and time budgets [LR 45, 91-4]. Issues such as the role of transport services in improving access to financial services [banks, cheaper credit sources, MPESA], are of considerable importance, given the crucial role of credit availability for entrepreneurship and economic growth. Transport services may also have a major impact on patterns and processes of urbanization with important implications for livelihoods, rural and urban. These impacts have not been adequately charted as yet [as noted by the World Bank participants in the DFID 10<sup>th</sup> September meeting].

- *Contribution from current AFCAP projects to filling this research gap:*

Linkages between rural transport and livelihoods are specifically examined in the Kendat study on smallholder farmer access to markets in Kenya and the HelpAge study in Tanzania.

- *Further commissioned research required:*

Action research on developing cross-sectoral linkages between transport and sectors such as agriculture, energy, health, education etc. could aid better integration of sectors and thus improve the likelihood of fuller recognition of rural transport issues in livelihoods work within agriculture and other relevant sectors, and related impacts on urbanisation.

- ***Detailed [longitudinal] economic and social assessments of the impact of roads and other transport interventions on locations beyond a narrow road corridor***

Transport-related impact studies tend to focus on road impact per se, and assessments are commonly focused spatially on very narrow corridors along the study roads. Moreover, impact assessments are commonly made soon after road construction/improvement is completed, and rarely repeated some years later, to see what has happened in terms of transport services and related developments [e.g. crop production levels, marketed output etc.] in the interim period. Impact studies need to be broader, to encompass a) transport services impacts as well as road impacts, b) impacts across a wider spatial area [i.e. into off-road areas beyond the 5 km zone], c) temporal studies which consider impact over a substantial time-frame i.e. pre-intervention; immediately post intervention [after c. 2years]; subsequently periods [5, 10, 15 years post-intervention], d) qualitative and quantitative assessments of potential impacts which cover a wide range of factors through a gender and age lens e.g. changes in crop production, marketed output, trading, transport organisation.

- *Contribution from current AFCAP projects to filling this research gap:*

The AFCAP follow up assessment of the DFID Feeder Roads project in Zambezia province, Mozambique, 10 years after an initial assessment, has evaluated the outcomes of three principal impacts of that project on rural livelihoods in Zambézia across 5 study areas where the original impact study took place: a) The involvement of local people, especially women in labour on the roads; b) The positive trends created by the impact of project wages and employment; and c) The wider impact that the rehabilitated roads have had upon livelihood strategies along the roads.

- *Further commissioned research required:*

The findings from the AFCAP Mozambique study will inform our understanding of longer-term impacts of road investment on livelihoods in similar contexts, but work of this type is needed in many locations, preferably with a broad remit regarding spatial coverage and themes, as noted above.

- ***Transport operations in the large-scale commercial [agriculture and mining] sector.***

Transport service issues are rarely considered in large commercial agriculture contexts in Africa, or in mining contexts, despite the fact that large firms in agriculture and other industries are more likely to complain about transport than smaller firms, with substantial losses reported from theft and transport delays for their company-owned transport [LR: 94]. There is clearly need for much more empirical research in this arena: in addition to their role in national economic growth, in many cases these large commercial enterprises play an important labour role as employers of the very poor. There is a lack of comparable, cross-country and time series data on transport and logistics costs in Africa and relatively high transport costs are an important factor in the continent's slow growth in exports compared to other developing regions.

- *Contribution from current AFCAP projects to filling this research gap:*

Some findings relevant to medium-scale agricultural enterprises may emerge from the AFCAP Kendat study in Kenya, despite its small-holder focus.

- *Further commissioned research required:*

The lack of comparable, cross-country and time series data on transport and logistics costs in Africa is clearly a significant research gap where transport studies could make an important contribution in support of growth in agriculture and other rural-based enterprises (i.e. country-level assessments of the local trucking industry including the impact of state taxation policies on fuel pricing, levels of vehicle imports, implications for transport costs and prices etc.)

#### **5.4 RESEARCH GAPS REGARDING RURAL TRANSPORT SERVICE OPERATIONS**

Detailed knowledge of rural transport service operations is remarkably sparse. Research to explore owner/operator perspectives is urgently needed, especially where recent changes in transport operations have occurred, associated with the expansion of motorcycle-taxi operations and/or mobile phone networks.

- ***Rural-based owner/operator perspectives***

Still very little is known about rural and village level transport operations in which private operation and control by small enterprises tends to be the norm. There has been remarkably little research conducted on rural transport business operations, such as the role of transport operator associations in route designation, fare setting, timetabling, training, road safety and driver/passenger interactions with police and other relevant actors etc.[LR: 96] This is an important gap which needs to be filled to complement work from user and policy perspectives.

- *Contribution from current AFCAP projects to filling this research gap:*

Two current projects involve relevant research in this field, the University of Pretoria's project on the supply and pricing strategies of informal rural transport providers in South Africa and the IFRTD Indicators project [through its work with operators]. Some information is also likely to emerge from the Kendat study [Rural logistics for smallholder farmers to meet new agricultural market demands; Kenya], while interviews with motorcycle-taxi drivers have provided some preliminary material from the HelpAge Tanzania study.

- *Further commissioned research required:*

Studies so far have been limited and piecemeal. Further extension of work on rural taxi services and the Indicators study to new countries and contexts would help in building basic information, but in –depth socio-economic-focused qualitative research into owner/operator perspectives will be needed to gain a strong understanding of current owner/operator strategies in different contexts and the potential for promoting the development of services which are better geared to user needs.

- ***Motorcycle-taxi operations***

This is an important area for research since motorcycle-taxi operations are likely to dominate transport developments in many parts of rural Africa over the next decade or more. Research is needed in diverse areas, from economic returns in the sector, to improved road access for motorcycles, safety and organizational features [as discussed above]. Work in this field is particularly important because there has been inadequate research on successes and failures in transport developments and motorcycle-taxis provide, in many locations, evident examples of private-sector-led success.

- *Contribution from current AFCAP projects to filling this research gap:*

Two current AFCAP projects make a preliminary contribution to the study of motorcycle-taxis: the HelpAge project on older people in Tanzania [Learning with older people about their transport and mobility problems in rural Tanzania: focus on improving access to health services] and the IFRTD Indicators project [Developing indicators for rural transport service; Tanzania and Kenya]

- *Further commissioned research required:*

Research is needed into a) patterns of penetration of motorcycle-taxis across sub-Saharan Africa, and their [gendered] impacts on poverty alleviation and growth, linking this to institutional, economic and socio-cultural factors; b) cost-effective road/track design to

support their safe use; c) other road safety aspects; d) organizational factors such as unionization.

- ***The current and likely future impact of mobile phone network expansion on operator organization of transport services, user travel behaviour etc.***

As noted above, and in the literature review [LR: 101-3], virtual mobility through use of mobile phones has substantial potential to synchronise and beneficially reduce the transport needs of all sectors of the rural population. ICTs – principally mobile phones – now seem to be starting to fundamentally change the organization of travel in many African households. In the context of an increasingly carbon-constrained world and the search for more sustainable transportation, potential interactions between the virtual mobility facilitated by mobile phones and the physical travel afforded by transport services are of great importance.

- *Contribution from current AFCAP projects to filling this research gap:*

Information on the impact of increasing use of phones in transport contexts is likely to emerge from all current AFCAP transport services projects, since this has been specifically requested. However, this does not constitute a focused research programme.

- *Further commissioned research required:*

Mixed-method [qualitative and survey] research which is specifically focused on current and potential connectivity between travel and mobile phone use [including data sets disaggregated by gender-, age-, occupation etc.] would make an important contribution to transport services planning. Assessments of current and potential phone impact on travel patterns [i.e. virtual versus physical mobility] are particularly important in the context of climate change.

## **5.5 GAPS IN ROAD SAFETY RESEARCH**

The need for an expansion of research into road safety issues and interventions is widely recognised in Africa though, as yet, there seems to have been little specific attention to consideration of key issues such as road safety training for motorcycle taxi operators, out-of-school children etc. or the collection of gender-, age- and locationally- disaggregated data on road accidents. Detailed studies of transport-related injury are still remarkably sparse, despite high levels of incidence and mortality, not least among children [LR: 77-8, 88-90]. The 2007 Pan-African road safety conference identified issues such as the need to mainstream safety design issues in road investment programmes; collect reliable road accident

statistics and enact national legislation to deal with speeding, driving unroadworthy vehicles, failing to use safety helmets, using mobile phones while driving and driving under the influence of alcohol. However, implementation of road safety legislation is a major hurdle across Africa: this requires better understanding of the factors shaping current non-compliance and associated investigation of means to eliminate corruption in licensing, enforcing on-road behavior and inspecting and controlling vehicle condition. Action research focused on making interventions and monitoring their effectiveness is probably a key route to improvement.

- *Contribution from current AFCAP projects to filling this research gap:*

The current AFCAP project in Tanzania, [Road traffic injury on rural roads in Tanzania: a population based control study assessing road traffic injury .... and the effectiveness of road safety measures at reducing injury rates; Tanzania], run by the road-safety NGO, Amend, will provide rare gender- and age-disaggregated data on rural road traffic injuries and insights into the value of various road safety measures for rural areas through its action research approach.

- *Further commissioned research required:*

It is likely that during this UN Decade for Action for Road Safety [2011-2020] a number of donors will put more resources into new road safety research. AFCAP will need to develop research projects which complement other initiatives, but building on on-going research in AFCAP would appear a logical approach. This could involve extending the approach being currently taken in Tanzania to other countries, but also putting in place some longitudinal studies to monitor the impact of road safety interventions into the future [e.g. 5-year review of road safety interventions being made under the current Amend project]. So far as children's road safety is concerned, it is important to note that school-focused road safety work does not take account of the very many children who never attend school and may be at most risk of road accidents through their work as road-side traders: this is certainly one area where action research would be valuable.

## 6 CONCLUDING COMMENTS: THOUGHTS ON STRATEGY AND METHODOLOGIES FOR CHANGE

The material presented in this review provides a strong indication of the critical role that regular, reliable and affordable transport services, available across the rural population, can play in promoting positive development in sub-Saharan Africa, and – where absent- in retarding it. Clearly, however, much research still remains to be done in the rural transport services field to support poverty alleviation measures and promote economic growth. Recent AFCAP commissioned work in transport services will contribute further new insights, but is mostly small in scale [the Indicators study is the largest commissioned project in cost terms]. Moreover, it is based on research conducted over a very short-time frame [typically only c. 18-24 months from inception to final project completion]. There is an urgent need now for a rigorous research programme which can systematically address the major research gaps identified above. This will require work set within a substantially longer time-frame than that available to previous AFCAP transport services research projects so that strong longitudinal perspectives to be developed.

However, an even bigger challenge is to develop the strong uptake pathways that will ensure that such research in rural transport services is transformed into action. The following actions are needed not only to support an innovative new programme of research but also to ensure that the research findings obtained can contribute to significant policy change:

- As attention turns towards development post-MDGs, the importance of **obtaining a higher profile for transport, particularly transport services**, in development discourse needs urgent attention.
- Stronger **advocacy** is needed to promote the concept of transport services' centrality to development. This in turn requires much stronger attention to **building cross-sectoral linkages** and associated alliances – in health, education, environment and energy, as well as agriculture [where SSATP is already forging significant linkages]. The development of methodology to enable production of a **stronger economic argument regarding rates of return from transport** developments in these sectors and the complementarities associated with social benefits would greatly facilitate advocacy of this type. As Stefan Dercon emphasized in the DFID 12<sup>th</sup> September meeting, there are major unresolved methodological issues in applying transport economics in African contexts.
- Related to this, greater attention needs to be given to **the conversion of limited circulation reports by transport specialists into peer-reviewed publications** to ensure greater cross-sectoral impact.

- A much stronger emphasis on support to **capacity-building in transport-services** issues in ministries and universities is essential. Moreover, demand-led work in Africa is greatly hampered in the transport services field because of current capacity shortages, especially in central (but also local) government; this greatly hinders uptake of findings that have emerged to date from transport services research. In particular, it is important to note:
  - There is need for much stronger social science input. Rapid survey research is a valuable tool, but is unlikely to provide the depth of understanding essential, for instance, either for economic benefit analyses, or for a political economy approach. If transport research is to move substantially beyond descriptive reviews, in-depth qualitative research will be a key component in the development of strong mixed-methods methodologies.
  - University-trained transport services specialists with training in African transport issues are rare.
  - There is a lack of post-graduate courses in transport services focused on low income countries [not just in African national universities, also in UK]
  - South-South learning could help support research in transport services in Africa [though it is important to bear in mind that much Asian experience in this field will not relate directly to many African contexts, not least because of different demographics (population densities)].
  - Presence of transport services specialists based in African ministries [roads/transport + cross-sectorally] would substantially improve the transport sector profile and the potential for impact.
- Greater attention is needed to supporting multi- and, in particular, **inter-disciplinary** research which brings social scientists together with transport engineering specialists in strong partnerships and promotes a holistic approach i.e. research which will contribute to integrated mobility and accessibility planning. While there are some excellent examples of strong working relationships between engineers and social scientists in project *implementation*, this is rare in research contexts, especially in terms of *inter-disciplinary* as opposed to multi-disciplinary research.
- In conjunction with more substantial longitudinal studies, more systematic, rigorous **participatory M&E** will be required [as discussed in Banjo et al. 2012].
- **Regarding methodology**, in addition to the research gap in economics noted above, there is need for:
  - A stronger focus on **action research approaches**, where transport interventions are followed by very close community-based monitoring over a period of at least one year,

but preferably more. This is time consuming but would greatly improve understanding of what works, or doesn't work, for whom and in what circumstances, and why. This would be beneficial with reference to IMT interventions, but also in other interventions such as trials of transport subsidies etc.

- More use of **participatory mapping techniques** to engage communities in transport planning to elicit and evaluate differential mobility (see Vajhala and Walker 2010).
- Inclusion of **community co-investigation** as a base for participatory research with users [i.e. as in the case of peer researchers trained in the current AFCAP HelpAge and University of Pretoria studies; also explained in the booklet on child mobility supported by AFCAP available at [www.dur.ac.uk/childmobility/](http://www.dur.ac.uk/childmobility/) ]. A similar approach could also aid investigations and engagement with transport operators: recent cooperation between transport researchers and Nigeria's National Union of Road Transport Workers encourages this view.
- Increased attention to ensuring that **gender- and age-disaggregated** data collection occurs, and that this is not only adequately disseminated but also translates into policy and practice.
- Combination of **mixed method approaches** – recognition of qualitative studies [using checklists etc.] as an essential base for and complement to wider surveys [as noted above].

Such initiatives, if they are to be considered for taking forward within a future DFID transport services programme, will need to be carefully set within a broader transport research Theory of Change.

## **ACKNOWLEDGMENTS**

I am most grateful for the information and advice I received from numerous transport specialists in compiling this review paper, including all those who participated in the ASUK Leeds meeting, the London meeting organised by Elizabeth Jones at DFID, Camilla Lema, George Banjo and John Riverson at SSATP, and members of AFCAP's Steering Group.

# **ANNEX 1: LITERATURE REVIEW**

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## INTRODUCTION

This review identifies key texts on transport services, poverty and growth, with a particular focus on post-2000 literature. It includes a range of material mostly produced outside AFCAP, though reference is also made to on-going AFCAP projects. The year 2000 is an appropriate start date for this review not only because it marks the inception of the Millennium Development Goals – which omit transport as a specific goal though it is an implicit essential component to achieving them - but also because in June 2000, a commissioned report, ‘Poverty and Transport’ was produced by Booth et al. for the World Bank in collaboration with DFID (Booth, Hanmer and Lovell, Poverty and Transport, Final Report, ODI). This is the first paper discussed below as it provides an appropriate base from which to consider more recent contributions.

Web searches for relevant peer-reviewed publications for this review were made firstly using Web of Knowledge and then additional search engines such as Google Scholar, in each case employing a wide range of key words.<sup>1</sup> A review of associated abstracts helped in the selection of texts for review. This has brought together much material written by non-transport specialists, notably health professionals, among whom recognition of the role of transport in service access is increasing. Searches were also made in relevant journals, notably the Journal of Transport Geography and Transport Reviews. I have also drawn on my own library files and publications in the field. Communication with other researchers active in transport services-related research in Africa requesting recent relevant grey literature and associated documentation [including SSATP, TRL archive, IFRTD reports etc.] has brought in much of the most relevant specific transport services material [including material from TRL’s archive<sup>2</sup>]; significantly, however, most of this material is never turned into peer-reviewed publications and thus reaches only a very limited audience. Perhaps it is hardly surprising, in these circumstances, that transport is rarely a

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<sup>1</sup> Key words utilised for web of science searches: Transport services AND poverty AND growth; Rural access AND poverty AND growth; Transport services AND poverty; Rural access AND poverty, refined to Africa + transport; Distance AND Africa, refined to transport + roads; Roads AND Africa, refined to transport; Transport AND health, refined to Africa/rural; Transport AND education, refined to Africa/rural; Transport AND livelihoods, refined to Africa/rural; Transport AND environment, refined to Africa/rural; Transport AND climate change, refined to Africa/rural; Transport costs AND Africa, refined to rural; Mobility AND Africa, refined to transport/rural; Motorcycle taxis AND Africa; Transport Unions AND Africa.

<sup>2</sup> Thanks are due to Annabel Bradbury for a substantial set of materials from TRL and to Camilla Lema for access to SSATP’s document, Banjo, G., Gordon, H. and Riverson, J. 2012 (draft) Rural transport: improving its contribution to rural growth and poverty reduction in sub-Saharan Africa. Washington World Bank, SSATP draft paper, May 2012.

key consideration in the wider development research arena: an issue which needs urgent attention.

Efforts have been made, as far as possible, to distinguish and focus on transport services and their impacts on the poor and on potential for growth in Africa, rather than examining road impacts *per se*. The review covers diverse economic, social and health impacts of transport services - and the absence of transport services - but pays particular attention to social impacts on potentially disadvantaged users, given the strong focus on poverty. A recent broad spectrum review of *social* impacts and equity issues in transport (Lucas and Jones 2012) observed that although social impacts can be significant, especially for already vulnerable populations (children, youth elderly, disabled etc.), these effects are ‘currently poorly accounted for within transport policy appraisal’ and are often difficult to measure and quantify (i.e. even in Western contexts). *Economic* assessments of transport services developments in Africa are also difficult because still very little is known about rural and village level transport operations in which private operation and control by small enterprises tends to be the norm: the quality of data provided between 1986 and 1995 by the pioneering ILO Makete Integrated Rural Transport Project in Tanzania is rare. While there are many reports relating to transport services, they frequently cite the same few cases for which strong empirical data exists.

***Poverty and growth:*** Poverty is taken in this review to be a multi-dimensional phenomenon, underlain by complex interconnected factors, and one in which assets are often perceived (by the poor themselves) to be of greater significance than income. It thus includes human deprivations in areas of health, education, participation (voice) and security (Jahan and McCleery 2005): community and individual perceptions of well-being, deprivation and vulnerability are key. It is especially important to bear in mind, in the context of this review, that – particularly for the chronic rural poor - pedestrian transport continues to be the main transport mode; motorized mobility is extremely limited.

Consideration of the linkages between poverty and growth is extremely important in a transport services context. While IMF growth forecasts for Africa in 2012 continue well above 5 percent (as they have in the last eight years, underpinned by strong prices for its natural resources, better governance and growing disposable incomes), poverty is not falling quickly, despite some positive changes such as the fall in child mortality in many countries. The percentage of poor

Africans is estimated to have fallen only from 58 percent in 1999 to 47.5 percent in 2008, a decline of about one percentage point a year [Reuters, June 1, 2012]. A stronger focus on the needs of current and potential transport users could make an important contribution towards improved understanding and removal of constraints on employment and growth.

**Organisation of the review:** The first two sections of the review [sections A and B] are limited principally to short précis of papers and reports which have extended the broad argument regarding transport, poverty and growth in sub-Saharan Africa from 2000 onwards, or document important way-marks. However, the conclusion, which presents observations about progress in transport services research since 2000, draws not only on the broader key texts identified there, but also on a much more diverse range of literature which is reviewed under specific topic headings in Section C. The reader with limited time may wish to move directly from Section B to the conclusion.

## **SECTION A: A BASELINE PERSPECTIVE FROM 2000**

***Booth, D., Hanmer, L., and Lovell, E. (2000) Poverty and transport: a report prepared for the World Bank in collaboration with DFID: Final Report, June 2000. London: ODI***

This is a key baseline paper, based on an extensive [14-week] review of published and grey literature up to 2000<sup>3</sup>. It focuses on transport infrastructure and transport services (without necessarily always distinguishing their specific contributions) through the lens of poverty. Its significance lies in its poverty and sustainable livelihoods focus and its production by a team of poverty researchers rather than transport specialists (though transport specialists were consulted). Unlike the current review it was not restricted to either rural locations or to Africa but it provides useful material in both areas. It makes the following pertinent points for further consideration in this current review:

- Existing assessments of the impact of transport spending on poverty are limited to roads.

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<sup>3</sup> This current review, by contrast, has been allocated just 16 days time in total, including preparation of the overview paper to follow.

- Studies of rural transport needs tend to focus on rural communities per se; they seldom differentiate between poor and non-poor within communities.
- Population density influences transport services supply; it is a structural condition which shapes the potential for transport interventions.
- All-weather rural roads improve access to schools and markets but roads are not enough.
- Lack of *affordable* transport services or *means of transport* can mean that *provision* of transport alone may not alleviate this constraint.
- In rural areas, lack of transport infrastructure and services may constrain the poor's access to services which can build human and social capital – notably schools and health services. However, it is important to note that the poor in urban areas often live in peripheral, marginalized locations and may thus also face severe service access problems.
- Lack of information on the relationship between health and education outcomes and improvements/deterioration in transport service conditions.
- There is a strong correlation between poverty and remoteness or residence in a disadvantaged region, i.e. associated with geographical or political bias.
- Agricultural transport demands in poor communities are often higher re production and harvesting than crop marketing. Poor people rarely own means of transport, so walking, cycling and animal traction predominates. Local transport services often involve NMTs and animal traction and can be an important income source for operators [but no further comment on transport services as employment – the employment section of the report focuses only on labour-based road construction and employment generated by roadside trade].
- Research on gender relations and transport is rich and abundant.
- Women have distinctively heavy, time- and energy-consuming transport burdens. A majority of goods transport to meet subsistence needs is by headloading/ pedestrian load carrying and the majority of this is undertaken by women [but see below re role of children as load carriers].
- Women are less likely to benefit from transport interventions than men and are much more likely to travel within the village than beyond it. As the novelty and scarcity of technology declines, women are more likely to obtain direct access. Substitution of IMTs

– where men allow it and the technology suits women’s use - could help women with their domestic loads but may not necessarily show a direct economic rate of return.

- Some of the solutions to women’s transport problems may be found in non-transport measures, particularly those based on increased proximity of essential services. Labour resources released by reducing women’s transport burden would probably be reallocated to beneficial reproductive or productive activities.
- The need for consultation with key stakeholders from national to community level, including from poor people, in policy- and planning- formulation processes.
- Not all social and economic effects of investments in rural transport infrastructure are wholly benign: they may exacerbate exposure to risk [e.g. disease diffusion], or take income away from poor women or other groups.
- The importance of a multi-sectoral approach to poverty alleviation, with transport services considered in relation to other needs. The impact of an intervention in infrastructure on poverty will depend on the net effect of outcomes in related product and factor markets on poor people’s livelihoods. Moreover, improved access to transport services, increased ownership of means of transport and improvements in the transport infrastructure most used by the poor are all required to have an impact on poverty.
- Policy usually favours mobility over accessibility [following Western approaches]- i.e. favours those already mobile, especially vehicle owners and users. Need for government policies [eg reduced bicycle tariffs and import duties on spare parts; road design to include NMTs; regulatory frameworks that minimize opportunities for corruption] to support the poor.
- The poor are particularly vulnerable to road accidents since they are restricted to walking or public transport – i.e. the modes most vulnerable to traffic accidents. However, improved safety incurs costs which unless covered by government leads to higher user charges.
- Lack of research on if/how waterways and railways meet the demands of the poor.
- Lack of research on improving rural transport at household level
- Need for:
  - more consultation with poor women and men,
  - implementation of credit schemes to allow women to buy IMTs,

- provision of affordable and appropriate IMTs,
- search for relevant non-transport solutions
- information to women about their rights to mobility and options available to achieve greater mobility,
- development and enforcement of regulations re women's safety when walking and using public transport services
- attention to corruption affecting transport services operation

I will return to these points in the conclusion of the report, in order to examine progress in the transport services sector since 2000.

## **SECTION B: OTHER BROAD TRANSPORT TEXTS WITH A POVERTY AND/OR GROWTH FOCUS**

The papers included in Section B are those which, like Booth et al. (2000), take a broad view of transport services issues. By presenting the papers in chronological order, it is possible to chart the principal foci and debates in transport services research over the last 12 years and thus reach a concluding assessment of progress since 2000. More detail on specific topics is available to the reader in Section C.

**Leinbach, T.R. 2000: Mobility in development context: changing perspective, new interpretations and the real issues. J of Transport Geography 8, 1: 1-9.**

Based principally on Asian examples, this paper (like that by Booth et al.), emphasizes the way that transport is critically interwoven with social change. It stresses that the extent to which development follows roads is critically dependent on the capacity of the local and regional economy to respond and reallocate resources. New conceptual frameworks and methodologies are needed to analyse the complex ways in which accessibility and mobility are embedded in development issues, but with a focus on micro-scale approaches, household travel needs and the mobility of all its members, especially women.

**Starkey, P., Ellis, S., Hine, J., Ternell, A. 2001: Improving rural mobility: options for developing motorized and nonmotorised transport in rural areas. Washington: World Bank technical paper 525.**

This complements the earlier work by Booth et al. because it has been produced by transport specialists [as opposed to researchers who focus on poverty issues]. Unusually, it has a specific focus on transport services as opposed to more general reviews incorporating [and commonly emphasizing, to the detriment of transport services issues] transport infrastructure. Its focus is rural but its remit extends across low income countries. It provides a useful overview of key stakeholders, and suggests means whereby rural transport might be improved, notably through:

- Government and NGOs promoting new means of transport in many low density, low-income areas and efforts to consider the needs of disadvantaged groups,

- Looking at infrastructure and mobility in an integrated way
- Drawing on inclusive, participatory methods to involve stakeholders to determine infrastructure priorities, appropriate locations for facilities and suitable means of transport
- Focusing on priorities reflecting local needs and economic development and social equity goals
- Noting that promotion and subsidy have little long term impact unless services being promoted are appropriate to the environment and people's *real and perceived* needs [my italics] and observing that stakeholders linked through networks can be particularly important in developing decentralized initiatives.

**Lebo, J. and Schelling 2001: Design and appraisal of rural transport infrastructure: ensuring basic access for rural communities. DFID/World Bank**

The importance of a basic access approach for poverty alleviation in rural areas, using a participatory planning process, is emphasized here. The authors argue that in order to complement poverty reduction strategies, rural transport interventions must be an integral part of rural development interventions and focus on the mobility and access needs of rural communities. They advocate a holistic approach which is demand led and people centred. A comprehensive rural transport framework requires consideration of location and quality of facilities such as wells, grinding mills, schools etc. The subsequent discussion focuses principally on road and track improvements rather than on modes of transport [emphasizing the need for rural transport infrastructure interventions designed in a least-cost, network-based manner focusing on eliminating trouble spots and using a participatory physical planning process undertaken jointly with concerned local governments and communities, supported and coordinated by regional or central government agencies. Simple screening methods facilitate the selection process, reducing the number of alternatives to a manageable level. Ranking is then applied to the remaining options, and in most cases (below 50 VPD) the use of cost-effectiveness methods is recommended, supported by sample cost-benefit analysis on selected links, where appropriate.]

**Porter, G., 2002a: Living in a walking world: rural mobility and social equity issues in sub-Saharan Africa. *World Development* 30, 2, 285-300.**

This paper is focused on transport-related social exclusion. It emphasizes the frustrations and costs of living away from the paved road and associated regular transport services, such that off-road residents are frequently marginalized and invisible, even to local administrations. Drawing on field research in southern Ghana, it argues that poverty and ill health among rural populations are compounded by poor access and that poor access can be experienced even in villages only 3-4 kms from a good road and close to urban areas. Inhabitants of off-road villages tend to be markedly poorer than those resident in comparable roadside locations in the same region, and off-road settlements are almost inevitably disadvantaged in the allocation of public services. State decentralization has brought little benefit since district staff commonly focus their efforts on accessible locations: they rarely venture beyond the main roads, despite the provision of 4 wheel drive vehicles. The decline in off-road markets brings particularly arduous load-carrying treks for women and girls who are usually the principal porters. Off-road transport is sparse and costly and delays in getting to roadside market result in failure to find a buyer and major losses of crops through spoilage [e.g. cassava and plantain]. Those few off-road residents with sufficient funds to purchase a vehicle to use as a taxi tend to keep it with a driver resident at the paved road because of local road conditions. It is argued that greater appreciation of access quality is needed, including a specific recognition of the significance of the tarmac road in symbolic as well as practical terms.

**Njenga, P. and Davis, A. 2003 Drawing the road map to rural poverty reduction. *Transport Reviews* 24, 2: 1-23.**

This provides a useful short review of diverse transport issues (infrastructure and transport services) with a clear poverty focus, a rural remit and some illustration of key points with empirical data from the authors' own research. It incorporates both economic and social perspectives (including farm and market access, health and education), stresses the heterogeneity of the rural poor both within and between countries (with particular reference to gender) and their consequently diverse transport needs. The shift to an increasing focus on user perceptions in transport planning is noted and a call made for a paradigmatic shift in transport planning

method to incorporate the needs of the poor. It is argued that changes in transport efficiency that benefit the poor could be achieved in three ways:

- Improvements in transport services available to the poor;
- Improved personal means of movement of the poor, generally by replacing human by animal or vehicular transport;
- Increasing local employment through provision of local transport services.

**Bryceson, D., Mbari, T. and Maunder D. 2003 Livelihoods, daily mobility and poverty in sub-Saharan Africa. *Transport reviews* 23,2: 177-196.**

This paper, which draws on the authors' field research in urban and (easily accessible) rural sites in Zimbabwe and Uganda (based on Bryceson, Maunder et al. 2003), makes the important point that livelihood work is the most frequent short-distance travel for all income groups, in all study locations. Pedestrian travel dominates among low-income groups in particular. It emphasises the important distinction between mobility and accessibility: accessibility depends on physical proximity and mobility and may be improved by either greater mobility and/or improved proximity. The authors argue that the mobility lens offers a particularly valuable approach when examining livelihoods issues because it has to take account of all the motivational factors of individual agents – the age, sex and income elements which will influence choice of destinations as well as their facility for individual movement. Their study emphasises the relative immobility of the poor and their restricted transport assets as a defining feature across locations. They suggest that giving precedence to poverty eradication 'requires trying to chip away at the income division of modal transport', with efforts to lower the cost of public transport, encourage non-motorised transport and provide pedestrians with safer smooth paths away from traffic hazards on main roads. At the district and regional planning level they argue the need for policies which enable improved access to work, education, health services, shops and basic utilities like water and energy.

**SSATP [coordinated by M. Braithwaite] 2003 Report on the pilot country case studies of transport policy and poverty reduction. Washington: World Bank, May 2003.**

This report provides information from three country case studies – Rwanda, Guinea-Conakry and Tanzania – based on participatory assessments by local stakeholders, organized principally through a series of workshops. It refers to a serious data gap on transport services:

*‘the case studies show that it is still much easier to explain and discuss the ‘contribution’ of the transport sector in terms of deliverables such as numbers of kilometers of roads rehabilitated, .....or the provision of IMTs, than in terms of improved access and mobility, especially related to the needs of particular groups and sectors.... the difficulty of demonstrating social and economic impacts also arises from the perceptions and language of transport policy-makers’ (p. 11).*

In Rwanda there is a call to promote IMTs in rural areas for shuttling between field and markets, water supplies, schools etc., and to reduce the work of women and girls who are marginalized by this work as it prevents them from engaging in other activities and to develop railways re external linkages, to reduce environmental damage [but without any detail in any of these areas]. In Tanzania some elements of transport services were found to be recognized under the PRSP [such as raising awareness of NMT among rural women, promoting cheap NMT technology, need of affordable transport for youth, provision of affordable transport for special groups (students, elders, disabled), mobilizing resources to enable transport equipment acquisition, enhanced environmental protection], but weaknesses were also noted: no special financial support to assist women to acquire transport facilities, lack of integration of policy/strategies linking physical infrastructure provision and quality of services using the infrastructure, gender-blind transport infrastructure and services planning process; lack of reference to subsidies to compensate commercial operators serving students and vulnerable groups. Recommendations include the need for complementary transport infrastructure to roads (i.e. railways, tram and water transport). The Guinea study identifies vulnerable groups (women, children, elderly, unemployed graduates, social outcasts) and areas but, as in the other country studies, detailed analysis of their mobility problems and how to address these is lacking.

**African Union/UN Economic Commission for Africa/African Development Bank/World Bank/European Union 2005 Transport and the millennium development goals in Africa. February 2005.**

A set of papers prepared by transport sector specialists for a meeting of African transport ministers, drawing attention to the importance of transport to each of the MDGs, and associated key transport targets. For MDG1 [Eradication of extreme poverty and hunger] the key targets are a) access to input and markets and generation of employment opportunities, improved by halving the proportion of rural population living beyond 2km of an all-season road, and b) the difference in average transport cost between Africa and Asia narrowed by 50%. Incorporation of both road access and transport services targets arguably helps draw attention to the interrelatedness of these elements for poverty eradication. While the document provides an important position paper regarding the importance of transport to the MDGs, it subsequently appears to have been only rarely referenced outside the transport sector.

**De Grassi, A. 2005 Transport, poverty and agrarian change in Africa: models, mechanisms and new ways forward. IDS Bull 36, 2, June 2005: 52-57.**

Another general review paper – not based on empirical research. It emphasises the lack of rigorous empirical research on multiple links between rural transport, poverty and agrarian change in Africa. De Grassi notes the general shift from roads to ‘integrated rural accessibility’, including not only decentralized road construction and maintenance but also IMT, gender and mobility, but observes that funding remains a fraction of highway finance. Transport research – as well as planning, policy and projects - has rarely involved popular participation. Those studies that exist suffer from assumptions of relatively homogenous communities and harmonious deliberation [thus reiterating points made in Njenga and Davis etc.]. There has been a lack of attention to social, economic, political and cultural dimensions that are critical for understanding and improving projects and policies. He also suggests diverse possible negative impacts of transport development. Other key points made include: disrupting traffic is a visible and financially threatening protest tactic; the importance of networking on short and long journeys; because transport networks move value quickly, security is key; transport holding companies and networks play key roles in corruption and conflict involving high-value resources such as minerals. De Grassi argues for a broader social science input and more local knowledge

in transport studies; the need to incorporate insights from geography, anthropology, history and political economy, because of downplaying of social and institutional factors which significantly shape transport management, use and impacts. He also refers to the reliance of transport projects on foreign consultants, such that there is a lack of local expertise and relatively poor understandings of local context. Conventional wisdom is reproduced in specialized transport periodicals but debates are rarely open to wider scrutiny.

**Kodero, K. 2005 Pro-poor transport policy: meeting the challenge in Zimbabwe. Feb. 2005 Harare: Zimbabwe forum for rural transport and development [ZFRTD]**

A useful review of one country's transport service deficiencies; it suggests many of the recently preferred approaches to transport planning – but only a wish list? Prepared at the time of the National Economic Revival Programme, this emphasises the importance of mobility and accessibility, not just roads, and notes that most rural travel and transport is off-road: 'policies focusing narrowly on roads tend to have a limited impact on rural access and mobility' [p. 16]. He presents the Zimbabwean context of poverty focused in rural areas, especially in low rainfall areas, with limited access to good land and poor access to health care and education and argues that some of the most obvious benefits of transport [e.g stimulating agricultural production] are often missed because in general transport policies have not been deliberately made pro-poor. Diverse cross-sectoral and institutional linkages are observed and a call is made for wide stakeholder participation and a holistic approach as key to understanding and improving the transport sector (e.g. re The Zimbabwean draft National Transport Policy). The need for capacity –building as a continuing process is emphasized – 'capacity remains a critical issue' [p. 15]. Kodero recommends improvements in footpaths/tracks, footbridge construction, facilitating availability of IMT and transport services and non-transport interventions to reduce travel, with greater community and NGO contributions to such initiatives. District pilots support this approach. He calls for IRAP, participatory methods, and new levels of intergovernmental and public competency, requiring institutions to 'evolve beyond the rule-based, definitively structured and hierarchical operating parameters of the centralized system' [p. 17]. Transport interventions need planning 'within the wider context of livelihoods, resources, knowledge and rights', including attention to men, women and children, elderly and disabled [p.19-20]. It is further observed that deregulation of public transport in the 90s led to short-term expansion of

services in rural areas but in the long run high inflation and interest rates brought unprecedented increases in transport fares and a decline in the fleet. The call for more systematic, rigorous participatory M&E is one which is also taken up in Banjo et al. 2012 [below].

**Starkey, P. [et al.] 2007 Rural Transport Services in Africa: lessons from rapid appraisal surveys in Burkina Faso, Cameroon, Tanzania and Zambia. SSATP Working Paper 87-B, August 2007.**

This paper focuses on the process of developing and testing a rapid appraisal methodology but also provides valuable transport observations for the selected survey areas in the four study countries. It was preceded by a draft in 2006 which is also referenced in this review.

**World Bank (2008) Safe, clean and affordable... transport for development. The World Bank Group's transport business strategy for 2008-2012.**

This is a very broad strategy document with a focus on growth. It stresses the need to combine ongoing work on poverty alleviation/MDG goals with more work to help Africa's growth agenda: this will require greater investment and managerial capacity than is now available to the public sector. The document notes that two thirds of rural people [c. 300 million of the world's poorest people] in sub-Saharan Africa lack reliable access to an all-weather road, and are thus reliant on subsistence living and cut off from health care and education. Since the 1960s many countries have lost around half their road network (especially rural roads) and the region currently contributes only 2% of world trade. Unit transport costs are typically 3-5 times higher than those of developed countries (ibid pp. 64-5). Africa also contains half of the world's landlocked developing countries. It stresses the many factors that push up Africa's transport costs, some of them mutually reinforcing. Thin markets, for instance, make it difficult to justify investments to overcome infrastructure deficiencies or to introduce new transport handling technology. Poor road asset management is a particular problem. Part of the answer is to help build the capacity for transport administration and management. A report by the Bank's Independent Evaluation Group (OED 2005) had indicated deficiencies in previous fragmented

approaches to capacity building in Africa and had called for fostering and improving country-led capacity building within sector programs such as transport.

Road safety and transport improvements in conflict-affected areas are flagged as key areas for further work: road crash deaths are predicted to increase by 80 percent between 2000 and 2020 unless new approaches are adopted. For each death, there are many more incidences of injury and disability, which have consequences beyond the affected individuals. Improved transport can help to rebuild economies in post-conflict countries and lessen vulnerability to future conflict. Transport can play a key role in keeping a country together, in overcoming potential disputes over access to resources, and in defusing the seeds of conflict sometimes arising out of the feeling of isolation.

**Bryceson, D. (2009) Roadmapping development and poverty alleviation: transport and the millennium development goals in Africa. In Grieco, M., M. Ndulo, D. Bryceson, G. Porter and T. McCray (eds): Africa, transport and the Millennium Development Goals: achieving an internationally set agenda. Newcastle: Cambridge Scholars Publishing.**

This introductory chapter to an edited volume on transport and the MDGs stresses how mainstream concepts of 'transport' resulted in a failure to recognize its significance for poverty reduction. Bryceson argues that 3 basic assumptions thwart an appreciation of transport/mobility's role in poverty alleviation: 1. Transport for the poor is equated with road transport (such that transport becomes synonymous with road infrastructure for conveying people by motorized vehicles and thus takes on a top-down provider rather than a bottom-up agency perspective); 2. Rural roads are assumed to provide better access to health and education services (but she notes that parents actually tend to prioritise other elements of rural household transport constraints rather than transport to school, and that trips to health facilities tend to be relatively few ); 3. It is assumed that the experience of these improved services by the poor will alleviate their poverty (yet, whenever roads are built, the poor are the least likely to use and benefit from the road, because road utility is contingent on modal availability i.e. the poor do not have funds to pay for vehicles or transport fares, drawing on data from Uganda and Zimbabwe to

support this argument). Transport improvements focused on poverty alleviation need to be based on the reality of actual mobility patterns. She argues thus that the starting point where poverty reduction is the ultimate objective should be the decision-making parameters of the person who needs to travel rather than the road network *per se*. Their immediate considerations will be a) time versus money expenditure, b) road utility contingent on modal availability and c) accessibility versus mobility. Given the poor's restricted access to motorized transport, their preference is likely to be nearby service accessibility rather than road availability i.e. it is important to bear in mind that long trip distances are not necessarily a positive sign of high mobility but may rather reflect forced circumstances. An efficient balance is needed between transport and social service infrastructural investment; at the same time, transport infrastructural investment [including local path improvement] needs to be accompanied by efforts to enable the poor to upgrade their transport modality [including bicycles and other non-motorised wheeled transport] to take advantage of improved infrastructure. She suggests this integrated mobility and accessibility approach is required as an antidote to a road bias which has been reinforced by the convergence of engineering and road lobbies with African politicians' interests. [GP: one reservation regarding this argument is that service presence *per se* is insufficient to improve access to services – adequate staffing by teachers, nurses etc. is also essential as are adequate medical supplies].

*Note:* the issue of time versus money is further highlighted by Hobbes et al. (2011) who develop a methodology of time/money integrated livelihood assessment which identifies the freedom that people –within the range of their agency and the local context- have to engage in activities that generate above-basic consumables, in physical or social investments for the future, in above-basic care-giving or leisure i.e. time left after satisfying a household's basic needs. This freedom is seen as key condition for any out-of-poverty strategy: it is a potentially important complement to conventional transport studies, especially in rural Africa. [Although it is not set within a transport context it may have utility, building on the preliminary Value of Time studies made in an African context - rural Ghana and Tanzania - by Ahmed 2005]

**Gwilliam, K. et al. (2010) Chapters 9 and 10 in Foster, V. and Briceno-Garmendia, C. (ed.) Africa's Infrastructure: a time for transformation. Washington: World Bank.**

Although this work is not strongly focused on poverty alleviation (with the exception of chapter 3 in this edited volume which deals with poverty and equality issues within the broader infrastructural environment), it provides some important insights into the broader context within which transport services currently operate, from integrating multi-modal transport and developing transit corridors to road safety. It includes a general review of transport services which are significantly identified as 'the forgotten problem'.

**Porter, G. 2012 Reflections on a century of road transport developments in West Africa and their [gendered] impacts on the rural poor *EchoGeo* 20, april/juin 2012**

This paper is included because it provides an uncommon longitudinal view of transport services issues. It develops earlier arguments (Porter 2002a) about the impact of road construction and associated transport services in two West African countries (Ghana and Nigeria) on the rural poor, with particular reference to women. In some periods and some areas, all-weather road access has improved and for those with assets, substantial benefits could accrue once a good road was available, if local and national (policy) conditions allowed the development of transport services. But for those with little access to resources - of whom women tend to form a major portion in West Africa - even access to the road may bring little benefit, because opportunities to gain from land speculation or increased farming/commercial activities are few. The impact of regional all-weather road construction programmes on off-road areas may be even more negative. Not infrequently, a reduction of transport movements (and sometimes of economic activity) has occurred in areas away from the paved road (e.g. in Ghana just after independence, north-eastern Nigeria in the oil boom and from Nigeria's Jos Plateau following the imposition of SAP). When transport stocks are small or declining, as in the early years of SAPs, the impact of all-weather road construction is to concentrate transport activity even more strongly along the best routes to conserve vehicle life. This results in a reorganisation of economic life, very evident in the decline of off-road markets. More time is spent trekking with the produce of all family members to roadside markets. In looking to resolve these access issues in Ghana and Nigeria, the immediate focus of attention - of governments and communities - still tends to be on roads. This raises a number of issues, however, not least the limited budgets available for road

construction and how to spend those funds most effectively. Donor initiatives for a time refocused attention towards intermediate technology solutions in both transport and road construction, on the basis that they were more likely to benefit the rural poor whose transport needs are often diverse and dominated by subsistence-related journeys. But these initiatives also need careful monitoring to ensure they assist the populations at which they are targeted: the failure of individual projects – and, in particular, the failure to bring benefits to poor women – has discouraged donors. Given the potential offered by large road construction projects for corruption, there is also continuing in-country resistance among some key players to smaller-scale low technology approaches, which give less opportunity for misappropriation of funds. Despite the various tentative initiatives towards intermediate technology, the development of locally appropriate, viable rural transport strategies which can benefit the rural poor, especially rural women, has seemed frustratingly elusive. However, the remarkable expansion of mobile phone networks and their increasing integration with the more flexible transport afforded by motorcycle taxi services (in Nigeria, though not yet in Ghana) suggests that a new era may be commencing which offers improved opportunities at least for some of the rural poor. But the extent to which such developments will advantage poor rural women – whose activities are often constrained not merely by transport costs and availability but also by prevailing socio-cultural practices and mores – is unclear.

**United Nations Economic Commission for Africa (ECA), United Nations Environment Programme (UNEP), United Nations Industrial Development Programme (UNIDO) and the Secretariat of the Africa Roundtable on Sustainable Consumption and Production (ARSCP) 2012 3rd Sustainable Development Report on Africa (SDSRA:) Sustainable Consumption and Production for Sustainable Growth and Poverty Reduction.**

This report, which has a direct focus on the links between poverty and growth, includes a chapter on transport. Importantly, it specifically recognises (section 6.1) that *‘the transport sector is very much linked and influences developments in other sectors of the economy. Indeed, it affects attainment of all eight MDGs’*. It stresses the role that walking and back/head loading play in much of rural Africa, with most transport activities involving travelling between villages on footpaths and tracks and with the transport burden falling mainly on women. Attention is also drawn to recent initiatives such as integration of transport sector strategies into poverty reduction

goals through a) the Poverty Reduction and Transport Strategy Review (PRTSR) involving SSATP, b) efforts to ensure an integrated approach to Africa's infrastructure through the Programme for Infrastructure Development in Africa (PIDA) and c) the large scale rural access improvement programmes linked to rural development introduced in some countries (notably Ethiopia, Malawi and Nigeria's major Rural Access and Mobility Project. RAMP). However, there is more emphasis on urban than rural transport developments.

**Banjo, G. et al. (2012 draft) Rural transport: improving its contribution to rural growth and poverty reduction in sub-Saharan Africa. Washington: World Bank, SSATP draft paper, May 2012.**

This paper is strongly focused on agricultural development and the constraints which rural transport presents to improved productivity in Africa [n.b. it was produced in conjunction with the World Bank's agriculture and rural development unit]. It is centred on the access and mobility needs of rural farm households and smallholder farmers and marks an important development towards aligning transport more closely with other sectors, an essential move if we are to generate stronger external support for a transport focus post-MDGs. It also has the potential to support the stronger advocacy which is needed to promote the transport sector's centrality to development. It argues that, in Africa, a) many of the approaches needed to improve the impact of rural transport on poverty reduction are known [particularly through the SSATP's rural travel and transport programme] but that many remain untested beyond the pilot stage in Africa; b) rural households are rarely the focal point of rural transport interventions, despite available methodologies – their needs tend to be assessed indirectly and consequently inadequately; c) the emerging convergence between agriculture, rural development and transport communities in approaches to rural growth such as labour saving technologies, the need for rural diversification and strategies for non-farm development in areas of low agricultural potential, and the need for efforts to improve agricultural marketing and reduce produce price volatility. It points out that poverty reduction strategies need to give prominence to the basic mobility associated with domestic and subsistence tasks and argues that country transport policies need to be better aligned with existing poverty reduction strategies and the MDGs. Consequently, a rural

transport framework must incorporate aspects of policy, institutional arrangements, planning, financing, implementation and monitoring.

## **SECTION C: OTHER RELEVANT KEY PAPERS, LISTED BY TOPIC**

In this section, many other key papers on transport services issues are reviewed by topic focus. These generally add detail to the broader papers presented in sections A and B. The emphasis is on providing an overview of individual topics, drawing on relevant papers, rather than providing a detailed description of key content for each paper.

### **1. THE RELATIONSHIP BETWEEN RURAL TRANSPORT SERVICE PROVISION AND ROADS FOR POVERTY ALLEVIATION AND GROWTH**

Gwilliam et al. (2010: 219) refer to transport services as ‘the forgotten problem’. There is a persistent widespread traditional assumption governing the development of rural roads that investment in roads will spontaneously lead to the provision of transport services by the private sector as passenger and freight operators benefit from lowered vehicle operating costs and travel time savings. There is a logical further perception that this will bring cheaper and better transport for all, through competition (as Hettige 2006 notes in a review of Asian road impacts based on in-depth case studies) and even if the poor do not benefit directly, it is assumed they can benefit indirectly through the trickle-down of economic growth (Njenga and Davis 2003). However, the relationship between rural road investment, transport service development and competition (and consequent impacts on the poor) is not straightforward and no automatic link can be assumed. In the first place, rural road investments may have limited impact on transport service provision where rural populations’ principal transport and travel needs relate to domestic tasks such as produce, water and firewood collection along footpaths in the village area and demand is low: this is likely to be the case where the majority of the rural population is poor.

A key paper by Bryceson et al. (2008) drawing on surveys in Ethiopia and Zambia reinforces earlier conclusions (Dawson and Barwell 1993; Ellis and Hine 1998) that roads are not enough so far as the rural poor are concerned. In Ethiopia, in an on-road well-connected village, income was found to correlate with travel speed, whereas in off-road areas with poor connectivity all income groups faced similarly constrained transport choice. However, such on-road villages in Ethiopia attract better service infrastructure and staffing so that requirements to travel may actually also reduce for all inhabitants (ibid; also Porter 2002a for Ghana): accessibility improvement may be of more significance in such cases than mobility enhancement (a point

made many times in the literature, see e.g Airey 1985 on the ‘de-isolating’ impacts of rural roads in Sierra Leone re health and school siting there) , i.e. in the early stages of road improvement prior to the development of a dense road network.

It is also important to emphasise that road provision does not necessarily lead to lower transport fares: in the absence of competition there is no incentive for road transport providers to improve services or pass on cost savings (mostly from reduced maintenance costs) to users: transport prices may thus fail to fall sufficiently to allow the poor and very poor to access transport services even where these are available (Hettige2006). Competition among transporters tends to rise when roads are improved to all-weather standard, especially on bitumen roads: on many earth and gravel roads across Africa competition is mostly absent.

Nonetheless, there is substantial evidence in the post-2000 literature to suggest that all-weather roads often do have a mostly positive impact on poverty alleviation and growth in many regions across rural Africa (Anyanwu and Erhijakpor 2009; Dercon et al. for Ethiopia 2009); benefits may accrue through four channels – reduced costs of acquiring inputs, increased output prices, reduced impact of shocks and permitting entry into new, more profitable activities (Dercon et al. 2009). Clearly, such road-related benefits implicitly require - and are likely to generate - some associated expansion of transport services, but detailed empirical evidence concerning the specific interrelations between road construction, road improvements and transport services and their impact on poverty alleviation and growth remains sparse. Economic decision models such as RED [a simpler version of HDM-4] still do not adequately capture the impact of rural road improvements on travel time or wider social benefits (Teravaninthorn and Raballand 2008: 99, 101). Teravaninthorn and Raballand cite a survey by Pederson (2001) showing that 4% of total transport distance comprising rural and local transport trucking contributed almost 50% of total transport costs from Ghana to Europe. This indicates the massive scale of benefits potentially achievable from rural road investments: they call for revisions of road economic analysis to focus more on secondary networks and rural access.

Where all-season roads are complemented by regular, reliable and *affordable* public transport, it is logical that greater benefits will accrue for all, including the poor. Thus, Bird et al. (2007, citing Ifad 2001) report that in Tanzania, households within 100 meters of a gravel road passable 12 months a year, *with a bus service*, earn about one-third more p.c. than the rural average.

However, as Bryceson et al. (2008) note, population density and purchasing power of the area will need to reach a certain level before bus and lorry hire services appear (unless public subsidy occurs) and high transport costs even then may remain a major impediment to mobility, especially among the rural poor.

Starkey et al. (2001) calculated that achieving good overall rural accessibility would require at least doubling the length of the classified network in most countries. In most countries Gwilliam et al. (2010: 212) observe that at least 90% of reported traffic on the classified network is carried on the main networks and, with the exceptions of Nigeria and South Africa, traffic on the main road network averages only c. 500 vehicles per day: absolute volumes of traffic on the rural network average only about 30 vehicles per day, except in Nigeria. They argue that the priority for rural transport services is to maintain basic year-round vehicle access 'for the types of vehicle likely to be operating. The quantity of access is even more important than the quality' (p. 223). They also observe the potential for better rural telecommunications to more effectively match vehicles to loads and the importance of community organization for a collective lobby as a route to addressing the monopoly power of service providers. It is noted that 'operating subsidies are usually infeasible, but providing credit for vehicle purchases, possibly through piggy-backing on agricultural credit programmes is an option' (ibid p 223).

Detailed studies of road quality and road improvement impacts on transport services in terms of vehicle operating costs, transport prices paid by end users, traffic volume, modal split etc., in Africa remain remarkably sparse, at least so far as published material is concerned. Among the rare instances of published data, information for southern Ghana suggest that minibus charges to users are approximately double those for paved roads per km (Porter 2002a), while Ellis and Hine (1998) presented figures for paved and earth roads in Zambia with differences of even greater magnitude. This can be to some degree be justified if tyre life is reduced 25-50% of normal life under poor road conditions (Beenhacker 1987); there is also likely to be reduced fuel efficiency, reduced vehicle utilization due to lower speeds, higher vehicle maintenance costs and reduced overall vehicle life (Teravaninthorn and Raballand 2008). Nonetheless, transport prices may be substantially inflated above transport costs, because essentially there is so often a strong seller's market, especially where cartels operate. Certainly, for truckers using international corridors, Teravaninthorn and Raballand (2008: 103) argue that road conditions [mostly relating

to paved roads, though not necessarily in good condition] do not have a large negative impact on operating costs and that relatively large profit margins are obtained by trucking companies along some corridors. Cartels [especially prevalent in West and Central Africa] may capture the benefits of road improvement without any benefit to consumers in terms of lower transport prices.

Road impact assessments tend to focus on a narrow corridor close to the roads concerned, but impacts on transport services beyond the immediate road corridor also need consideration. In densely populated Asian regions where national road densities are substantially higher, so-called transport-induced local-market development can be expected to occur and spread over time, as corridors of road influence are likely to overlap and individual NMT and motorized vehicle ownership is relatively high compared to Africa. Mu and van de Walle (2011) thus not surprisingly find impacts on primary school completion rates, on markets and the availability of various services, especially in poorer communes in Vietnam. But this will be less common in African rural areas where population densities are characteristically much lower and rural communities have by far the lowest accessibility to an all-season road in the developing world (Gwilliam 2010: 212). Certainly, research examining road construction impacts on off-road areas in Nigeria and Ghana indicates quite common decline and disappearance of small off-road markets following road construction/rehabilitation, because transport services refocus on these routes and transporters become increasingly reluctant to travel off-road, especially in periods of economic downturn, with very substantial negative impacts on the poorest (Porter 2002, 2007 etc.). Meanwhile, land value changes along improved roads may also negatively impact on the potential of poor populations to remain in those locations: as agricultural land along the road becomes more profitable, this land may be appropriated by the wealthy (e.g. Fairhead 1992 re rural Zaire). Where improved rural roads attract high density motorized traffic, another negative impact on poorer rural people may be displacement of NMTs. Feldacker et al. (2011) draw on their studies of HIV status in rural Malawi to point to another negative impact of roads: community proximity to a major road is found to be associated with increased odds of HIV for both women and men.

The principal advantages of improved rural transport, allied to all-season roads, are set out by the World Bank (2008) report 'Safe, clean and affordable....Transport for Development' [see section

B.]. The Bank which had previously drawn attention to the importance of road access through its application of the Rural Access Indicator now gives emphasis in this document to the need for greater attention to the performance, affordability and inclusiveness of road transport services, making the key point that the ‘effectiveness of road transport services markets is instrumental in reaping the benefits of transport infrastructure’ (ibid 80). Despite the conduct of numerous economic appraisals and more recent (mostly post-2000) efforts to assess the social benefits of roads (including many detailed ILO studies of the economic and social impacts of labour based road work), it is clear that in-depth micro-studies are needed which focus more strongly on the links between road impact and transport services provision. Broad assessments of regional economic change are inadequate. Following rural road construction and rehabilitation, careful inventories are needed to provide a more secure evidence base than what has been achieved to date. These should include: detailed surveys of transport modes [including pedestrian transport], operator characteristics and organization, frequency and reliability of services, service quality, prices for passengers and for freight in different quantities, user needs and levels of satisfaction with transport services [for diverse groups disaggregated by age, sex, occupation, socio-economic status, ethnicity etc.], service provision and demographic patterns in both on and off-road locations [up to perhaps 20 km from the roadside, prior to and at intervals of 2 and 5 years, bearing in mind findings for Vietnam from Mu and van de Walle 2011 that suggest a lag of at least 2 years can be expected before impacts start to kick in]. This is particularly important now because the transport services context has changed so significantly in some locations, associated with the massive expansions of motorcycle taxis and mobile phone networks (see below), both of which may have particular significance for transport among the poor.

Starkey et al. (2012, AFCAP project in progress) note the potential value of a relatively simple indicator that could help the monitoring and evaluation of transport investments. They cite a recent road programme in Ethiopia where the importance of improving rural transport services was mentioned repeatedly in the planning documents required to justify the infrastructure investment. Yet when it came to the evaluation, there was no assessment as to whether or not transport services had actually improved: the evaluation was of the physical development. Thus we cannot know whether this particular investment had the intended consequences for transport services on those roads in Ethiopia. Starkey et al. argue that as the World Bank’s Rural Access Indicator (RAI) equates rural access to proximity (2 km) to a motorable road, ignoring transport

services and is thus relatively 'unresponsive' to anything except motorable roads, there is need for another indicator that will complement the RAI and provide some means of assessing how rural transport services are meeting the access needs of rural populations. If there were reliable and relevant data available on transport services, these could be used to develop indicators for rural transport services. However, very little information is available about rural transport services. Regulatory authorities generally concentrate on urban and inter-city services, and they seldom keep up-to-date records about rural routes, particularly when it comes to informal sector, mixed services. Socio-economic survey data may contain transport-related questions, but seldom are these linked to particular roads and routes. Traffic count data may be available on some roads, but these seldom record gender-disaggregated passenger data. Therefore, there is a need for new survey data to be collected from which transport services indicators can be derived.

One of the key road sector changes with potential to influence the delivery of transport services has been the move to **decentralized road administration**. However, Robinson and Stiedl (2001) observed at an early stage that it was proving difficult to realize fully the expected benefits. Problems included: lack of local government powers to exercise political influence; insufficient financial resources; lack of management capability; and a lack of accountability mechanisms. Similar problems are reported in Gwilliam et al. 2010: 223 with particular reference to Tanzania and Zambia in the late 90s. Moreover, there was little evidence of existing decentralized systems being particularly responsive to addressing the needs of the rural poor. There is a need for the poor to be involved more actively in the planning, financing and implementation process. Different models for administrative decentralization are described and recommendations made for approaches likely to be the most appropriate for rural transport infrastructure administration and management.

**Remote areas:** In very remote areas, where chronic poverty is characteristically particularly widespread (Chronic Poverty Report 2004-5), road improvements are likely to catalyse the expansion of social-service provision and the NGO activity which so often plays a role in such provision. (See Brass 2012 for a study of NGO location in Kenya which shows paved road provision as highly significant in where NGOs go to work: as the road density in a district increases, the number of NGOs in that district increases). However, given the poor's relative lack of motor vehicles and ability to pay for public transport, roads are by no means a sufficient

condition for enhancing their mobility (Bryceson et al. 2008, also Porter 2002a, 2007,2008). While empirical evidence strongly emphasizes remoteness and consequent poor access to markets as a key factor in chronic poverty (e.g. Davis 2000 for Zambia; Christaensen et al. 2003), much literature focused on remoteness still tends to limit discussion principally to infrastructure provision and roads *per se* (if it discusses transport issues at all - there is a tendency to focus simply on distance and national policy neglect of regional inequality), without adequately taking into account the crucial significance of associated transport services.

The scale of the remoteness and accessibility problem in Africa [associated with much lower population densities than those in other developing regions] is strongly emphasized in new work by Linard et al. (2012) which develops a new high resolution population distribution dataset for Africa and analyses rural accessibility to population centres. Contemporary population count data are combined with detailed satellite-derived settlement extents to map population distributions across Africa at a finer spatial resolution than ever before. Substantial heterogeneity in settlement patterns, population concentration and spatial accessibility to major population centres is exhibited across the continent. The average per-person travel time to settlements of more than 50,000 inhabitants is around 3.5 hours, with Central and East Africa displaying the longest average travel times. The analyses highlight large inequities in access, the isolation of many rural populations and the challenges that exist in providing access to services.

## 2. USER PERSPECTIVES ON RURAL TRANSPORT SERVICES

Transport solutions need to reflect the conditions, needs, and preferences of transport *users* (Starkey et al. 2001:2). *Quantitative* assessment of user needs in transport planning was improved with the development of IRAP's accessibility indicator and various modifications such as the Accessibility Shortfall Index (ASI) (Sarkar and Ghosh 2000). However, in-depth knowledge of the linkages between transport, mobility and poor people's livelihoods and well-being in Africa remains remarkably sparse (Leinbach 2000, Njenga and Davis 2003, Porter 2007, 2008, 2010). Concern to gather qualitative perspectives of disadvantaged users on problems of transport disadvantage has been gathering pace in research in Africa since the 1980s and 90s (e.g. Porter 1988), arguably rather earlier than in Western-focused transport literature, where participatory studies of transport disadvantage and associated focus on the social exclusion of low income groups and communities have only been a strong theme since the late 90s (Lucas and Jones 2012). Mobilities research has recently started to gather stronger momentum in the social sciences, aimed at exploring how different forms of mobility help to shape wider societal values and norms and reinforce existing social stratification. Consequently, social scientists such as geographers (who largely abandoned transport geography as an outmoded area of research from the early 1990s) are beginning to return to transport-related – mostly user-focused- research and may bring new insights to transport services studies. In the following sections I consider gendered and age-related user perspectives.

### **A. USER PERSPECTIVES: GENDER ISSUES [this section includes travel for maternal health, IMT use and the policy environment; it draws substantially on Porter 2008]**

The interactions between gender constructs, women's mobility and transport development are strongly evident in rural Africa. Prevailing gender constructs are intimately related to places and to the interaction between places: just as social processes help shape gendered mobility patterns and access to transport, mobility and transport are strongly implicated in the shaping of social processes. In terms of livelihood, women's mobility affects their immediate access to facilities like markets, banks and credit and their potential for occupational flexibility and diversification as a way of moving out of poverty, while mobility which gives access to education, social networks (for example attendance at funerals in Ghana) and the political process may have

crucial implications for the future division of labour and the overall bargaining power and position of women in society (Evers and Walters 2000; Porter 1997, 2002a; Davis 2005).

Although women's and men's access to mobility and transport may vary with age, socio-economic status, local culture and other factors, there are fairly widespread gender distinctions across Africa (particularly among lower income groups) regarding use and operation of transport and in broader patterns of mobility. Currently, men are still the principal operators (and owners) of commercial motorised and non-motorised transport equipment in most rural and urban areas, while women are commonly the principal pedestrian transporters (though Duchene 2011 provides a few urban examples of women in the commercial transport sector in Africa). Both men and women may be important consumers of transport, but women tend to face more substantial constraints on their mobility and travel mode than men due to their relatively poorer economic position (generally lower incomes than men and less access to land, labour resources and other productive assets), and the time-poverty induced by heavy work burdens and child care responsibilities (Blackden and Wodon eds. 2006).

Most of the early gender and transport research (notably Curtis 1986, Doran 1990, Urasa 1990, Bryceson and Howe 1993, Malmberg Calvo 1994a) was conducted in rural contexts and emphasised how African women's time poverty (associated with their multiple roles in production, reproduction and broader community support) is exacerbated by transport-related labour demands and by their widespread inability to access transport services (where these are available) due to lack of funds. Water and fuel wood transport is commonly a woman's duty (assisted by her children) but in remoter and less accessible areas she is often also required to carry agricultural produce and other loads over considerable distances for her husband and male family members, because of inadequate or costly transport facilities. It is a cultural norm in many African societies that men over the age of about 15 years head-load wood, water and grain (particularly where these are for the family's own use) only in exceptional circumstances.

Even where good roads and frequent transport services exist, women are often seen trudging along the roadside with heavy loads because they cannot afford transport fares. Early studies of transport activities in Ghana found men spent only 35% of the time and exerted only 25% of the load-carrying effort of women (Howe and Barwell 1987) while comparative work in Tanzania suggested that trips by women accounted for 70% of all transport time and ton-km carried

(Barwell and Malmberg Calvo 1989). More recent research has elaborated on this work: examples include Mudzamba on rural Zimbabwe (1998), Potgeieter et al. (2006) on South Africa's rural Eastern Cape, and a series of small rural-based case studies (researched mainly by NGO and government staff who work in the transport sector, rather than academic researchers) conducted under the auspices of the International Forum for Rural Transport and Development (Fernando and Porter eds. 2002).

Cultural context is highly significant in the shaping of women's mobility and use of transport services. Moslem societies which practice female seclusion offer an extreme case. However, it is important not to draw blanket conclusions about the impact of Islam on women's access to and use of transport. In many Islamic areas in West Africa, for example, most women are not secluded and are widely in evidence both walking and (if they have sufficient funds) travelling on public and private transport. It is also important to bear in mind that strong restrictions on women's mobility are by no means restricted to Moslem societies. Young married Goun women in Benin, for example, are expected to stay at home with their families until they have several children of at least school age (Mandel 2004).

Access to health services provides a particularly good example of the crucial significance of mobility to women's lives (including women from high socio-economic groups), especially with reference to maternal health and emergency obstetric care, including associated issues such as obstetric fistula (Muleta 2006; Babinard and Roberts 2006). The important research gap in linkages between gender, mobility and health has been highlighted by growing concerns over reaching the MDG on reducing maternal mortality (by 75% by 2015) and the fact that Africa has the world's highest maternal mortality rates. An early study showing access to transport as an implicating factor in 28% of maternal deaths in Masvingo, rural Zimbabwe (as opposed to 3% in Harare, Fawcus et al. 1996), is indicative of the scale of the problem in rural areas, given the fact that women have a 1 in 13 chance of dying from pregnancy in childbirth in sub-Saharan Africa. Distance to health facilities per se is emphasized in many studies and is a key constraint where transport services are limited and high cost, such that women's lack of resources may require them to walk (e.g. see Babinard and Roberts 2006, Gabrysch et al. 2011). Medical literature has begun to draw attention to other transport and associated mobility permission issues in the context of women's health care (e.g. Moodley 2004 on hypertensive disorders in

South Africa; Abrahams et al. 2001 and McCray 2004 on prenatal care in South Africa; Cham et al. 2005 on maternal mortality in rural Gambia; Murray and Pearson 2006 on maternity referral; Onah et al. 2006 on maternity services in Nigeria).

A factor which may have important health implications for many African women and girl children, in particular, is their role as pedestrian porters (Porter et al. 2012). Many women walk substantial distances each day carrying heavy loads, often while pregnant and/or with a baby on their back. The impact in direct health terms is difficult to assess: the majority of evidence is anecdotal. There is also potential inter-generational impact on children (miscarriage, poor growth of foetus, quality and quantity of breast milk). This is an issue on which detailed research is needed.

**Women's usage of Intermediate Means of Transport (IMTs):** IMTs such as cycles, motorcycles and animal-drawn carts can greatly facilitate intra- and inter- village trip making in Africa, but women generally have much more limited access to IMTs than men. This is commonly attributed to a mix of economic and socio-cultural factors: women's more limited resources to purchase transport equipment; restricted access to equipment belonging to male household members when the latter view IMTs as symbols of social status and prestige; cultural constraints on women's use of particular modes associated, for example, with respect and honour (women being placed in a position of shame by traffic hooting at them) or women's perceived lack of physical strength to handle draught animals or push heavy carts (despite their evident strength in headloading) and perceived gynaecological dangers in riding astride transport equipment (Grieco et al. 1996: 92-3; Flanary 2004) . However, the association of IMTs with improved personal mobility and women's perceived increased potential for promiscuity or for empowerment may be an underlying factor affecting individual male attitudes in many cases (Porter 2011).

Cycling provides clear illustration of the issue. Women cyclists are a rare phenomenon across much of Africa (Malmberg Calvo 1994b, ITTransport 1996:26, Grieco et al. 1996; Doran 1996:25). A study in one northern Ghana village found women's bicycle riding condemned by many men as evidence of laziness and disobedience, though it is becoming more common to see women on cycles (Flanary 2004). Sometimes women may be allowed to ride side-saddle as passengers, but are discouraged or barred from riding astride: Malmberg-Calvo (1994b) refers to

areas of eastern Uganda where women who ride cycles are perceived to be 'acting like men.' The availability of women's cycles (sometimes recommended as a potential solution to women's perceived reluctance to cycle) does not necessarily resolve this issue: when women in an action research project in southern Ghana were offered women's cycles on credit they still selected men's cycles (Porter, Blaufuss and Acheampong 2012). The reason they gave was that cycles with a cross-bar are stronger, but it transpired that women generally handed over the cycle to male family members (and argued that they still gained benefits from the availability of cycles to the family). Most village women in this study had never had time or opportunity to learn to cycle in childhood, and it was this which seemingly governed their choice rather than concerns about the gynaecological impacts of cycle riding. Because women had not had any opportunity to learn in their youth, most were extremely reluctant to learn in adulthood (despite offers to teach them). A similar point about the difficulties for women to find time to learn to ride bicycles or handle other IMTs such as donkey carts emerges from a study in Tanzania (Mwankusye 2002).

It would be unwise to assume attitudes to women's use of IMTs are immutable. Draught animals, for example, are often the preserve of men and boy children in a sub-Saharan context, but in Zimbabwe male migration has reportedly led to women performing 'male' tasks including handling oxen (IT Transport 1996). The rapid expansion of cycle and motor-bike taxi services in Africa (associated with availability of cheap imported Chinese motor cycles) over the last two decades has also improved women's transport and mobility. On the Jos Plateau in Nigeria achaba (motorbike taxi) services are operated mostly by young men and patronised more by men than women, but younger women also now use them. Women admit to concern about the speed and dangerous driving of the young male drivers, but they still see achaba as a lifeline when medical emergencies arise, particularly in the wet season when motor vehicles have difficulty negotiating rural roads (Porter 2002b). Similarly, in East Africa, cycle and motorcycle boda-boda taxi services, mostly operated by young men, are less used by women than men (rural women's use mostly revolves around using them for personal journeys to social events or church while rarely for relieving domestic tasks) but still bring undoubted benefits for women in terms of both speed and convenience (Iga 2002, Howe 2003). In the last decade the impact of motorcycle taxi services has expanded dramatically in some countries, including Tanzania and Nigeria, but detailed research on their impact on rural communities is only now gathering pace.

**Transport and mobility-related interventions: what benefit for women?** Despite the positive impact of motor-cycle taxis, the potential for transport interventions to improve women's lives is by no means a certainty. Indeed such interventions can have unanticipated negative consequences for women. Improved and new roads bring increased traffic speeds and traffic volumes commonly lead to higher accident rates (which may particularly increase women's burden as carers (Kwamusi 2002), while increased mobility and the establishment of truck stops along major transit routes can encourage the transmission of communicable diseases, including HIV/AIDs and other STDs (Mashiri 2004; Ferguson and Morris 2006). Meanwhile, those living in the same region but at some distance from the new road may suffer because of the rapid reorganisation of the local marketing system, which commonly follows (Porter 2002, 2011).

Moreover, physical mobility *per se* is not necessarily desirable, especially if it is simply required because of poor access to work and facilities (Bryceson et al. 2003: 43). Indeed, planning for mobility, as opposed to accessibility, may enhance gender biases in that the benefits tend to accrue to those already mobile i.e. male vehicle owners (Masika 1997: 9). Non-transport interventions to improve access to resources and thus substitute for mobility - installation of improved water supplies, community woodlots, more efficient wood-burning stoves and crop-grinding mills – might all bring more significant reductions in women's transport time than efforts to improve mobility and have the potential to bring particular benefits to poorer women who would not be able to afford improved transport services. ICTs (mobile phones, VHF radio, internet etc.) offer other opportunities for elements of mobility substitution in health, education, trade etc. and for more efficient use of transport (IFRTD 2002). Overa's (2006) study of the impact of mobile phones on women traders in Ghana (saving time and transport costs) is particularly encouraging. However, there remains much concern that the structural barriers of time- and income-poverty which constrain women's access to transport will similarly affect access to ICTs (Rathgeber and Adera eds. 2000; Fuchs and Horak 2006; Nite Tanzarn, GATNET contribution, 31/05/2005).

**Gender, transport and the policy environment:** Studies emphasising the enormous transport demands placed on women in many African societies and problems associated with their limited access to motorised and non-motorised transport have now been available to the development community for some years, yet transport remains a surprisingly neglected area among gender

specialists, while some transport specialists are still reluctant to take on gender issues. Perhaps reluctance in both areas can be linked to the fact that Africa's transport ministries, the donor transport sector and academic transport institutions tend to remain dominated by male civil engineers, many of whom appear more focused on delivery and outputs than on perspectives and needs of users. Moreover, the participatory and qualitative research approaches favoured by most gender researchers are often still discounted by transport engineers and planners. A Ugandan researcher reported one such response to qualitative data: "Do you expect us to work with corridor rumours to plan for the country"! (Nite Tanzarn, GATNET, 17/06/05).

Consequently, although there are token efforts at gender mainstreaming in transport projects, often as a response to donor requirements, this mostly amounts to little more than 'ticking the gender box'. In 1997 just 4% of World Bank transport projects included a gender component or gender actions, compared with 35% for agriculture and 44% for education (World Bank 1999): the situation has improved little, despite Bank efforts such as the preparation of a handbook for gender responsive transport projects (Maramba and Bamberger 2001). Gender tends to be included as a specific component within larger projects, rather than a gendered approach being taken to the design of the whole project or programme (Turner 2004). When budget cuts are required in such projects, the gender component is a vulnerable target. Thus, a review of gender integration in Uganda, Senegal and South Africa found little meaningful action on gender in the transport sector, despite strong commitments to gender issues in national gender and other policy frameworks (Transport Research Laboratory 2003 [www.id21.org/urban/u3jt1g1.html](http://www.id21.org/urban/u3jt1g1.html) ) and pointed to the crucial need for gender auditing in the transport sector. Women still tend to be seen as welfare objects rather than decision makers whose views count in consultations about the location of new roads or the provision of transport services.

An external consultation by the World Bank on its Transport Strategy in 2004-5 sparked a lively debate in the GATNET (an email discussion group dedicated to gender and transport issues) around the limitations of the document, the failure of the Bank to draw on its own commissioned studies of integrating gender into the transport sector and the need for commitment to collection of gender disaggregated data on transport and gender responsive budgeting in transport. A subsequent paper (Roberts and Kunieda 2006) gave some hope that GATNET's views would be

heeded, but local commitment to more effective gender transport planning seems difficult to achieve, not least because of limited local capacity.

The failure of transport planning to improve women's access to facilities and services still remains a major concern in 2012. There is a range of interventions which could improve women's access, including non-transport options like improved water supply and ICTs. A recent study in 7 communities in Western Kenya (Crow et al. 2012) shows that women and girls in households with water connections save about 1.5 hours per day which they put to beneficial use – girls to education, women to garden production, both to resting. Moreover, the ability for women to be physically mobile and access transport *from choice* can be seen as not only a valuable livelihood asset, but arguably a human right.

**B. USER PERSPECTIVES: CHILDREN AND YOUTH [this section includes travel to school and health services, children as transporters and road safety; it draws substantially on Porter 2010]**

Transport specialists are only just beginning to recognise the significance of children and young people's mobility. The publication of the 2007 World Development Report, "Development and the next generation" (World Bank 2006) set an important way-mark in the development community, though it disappointingly incorporated only limited, peripheral discussion of transport and mobility issues. Over half the population of many African countries consists of people under the age of 18. Improving mobility and physical access to health and education facilities for both girl and boy children has massive implications for their subsequent lives and livelihood potential and is crucial to many of the Millennium Goals, notably universal primary education, promoting gender equality and women's empowerment, and reduced child mortality (Fay et al. 2005; see AU-AfDB-ECA-WB-EU 2005 in Section B.). It thus may play a critical role in helping to break inter-generational cycles of poverty.

There are likely to be important differences in rural young people's spatial mobility related to age, gender, family socio-economic status and parental status, disability, and to the broader socio-cultural and economic context and physical environment. Perceptual and cultural factors (for instance, attitudes to girls' mobility in Moslem societies, child rearing practices), in

particular, may play a significant role. It is important to consider the mobility and transport needs of children and young people in the context of their lives within the family and household and in terms of potential life and livelihood trajectories. For instance, access to facilities and services may depend not only directly on transport (vehicles and roads) availability and cost allowing children to travel, but may also be strongly affected by family and household demands for children's work. Economic conditions, sometimes associated with or exacerbated by HIV/Aids, put enormous pressures on families and consequently on their children. Children of six years and above often make a major contribution to household production and survival strategies.

Studies of young people's daily mobility and transport in rural areas is sparse, though Malmberg Calvo (1994a) made an important early contribution in her work on women's role in rural transport, which included data on children's transport tasks. Katz's research in rural Sudan (1991, 1993, 2004) records young children delivering messages and carrying food around the village, and subsequently how they may travel more frequently [but mostly walking], depending on birth-order position. Katz finds a great deal of spatial autonomy, with few sex or status related differences evident until late in childhood. Only when girls reach puberty do their spatial horizons contract. Robson (2004) similarly presented detailed time studies to show how children in rural Hausaland are highly mobile [again mostly as pedestrians], in part due to the need to act as trading intermediaries for secluded women.

One of the more depressing images of rural youth mobility in the literature is of young men in Western Kenya 'tarmac-ing': moving endlessly to and forth between their village homes and town in search of work (Prince 2006). Negative components of mobility from rural areas are also strongly evident in Bryceson's (2006) report of growing incorporation of transactional sex in *ganyu* labour contracts made by Malawian girls and women for basic foodstuffs since the 2001-2 famine (because these now often entail travel outside the village). Across southern Africa, the high risk to youth of teasing, bullying and rape as they travel, mostly - though not wholly - directed at young girls, has been reported (for instance in Lesotho among girls travelling home from school, to the mills or to fetch water: GATNET, Mamoeketsi Ntho 11/10/2004; and in Zimbabwe and Eastern Cape, South Africa on the journey to school; Leach et al. 2000:15, Potgeiter et al. 2006). In rural areas of southern Ghana, by contrast, limits on children's spatial

autonomy beyond the village area boundary (especially where this involved travel by motorised transport) appear to be more due to perceptions of their risk of getting lost rather than potential harassment (Porter and Blaufuss 2003; Porter et al. 2010). The ways in which harassment influences girls' travel patterns and practices, and means of reducing harassment, is an area where further detailed research is needed, not least for the help this could bring to improving female school attendance figures. It is also important to note that the impact of youth mobility and immobility on the construction of *social networks* is likely to be an important factor in access to work.

***Access to formal education: making the journey to school:*** In recent years, primary education has been given a substantial boost by the emphasis on 'free' universal primary education in the MDGs. Nonetheless, the opportunity costs of children's time spent at school and the parental contributions which commonly still have to be made, plus other factors such as poor school quality, or lack of access to credit, are observed to be continuing constraints. The significance of the time, effort and/or costs of transport incurred in getting to school, however, is rarely considered in any detail. Schools, like health centres, are usually built in central places: secondary schools, in particular, are likely to be located at a distance from most rural communities. In remoter rural areas even primary school enrolment and attendance may be affected by travel distance, since schools cannot usually be provided in every settlement. There have been surprisingly few studies directly concerned with travel to school in Africa, especially in the last decade. Some of the most detailed travel to school data comes from South Africa. The 2003 South Africa National Household Travel Survey found 76% of 'learners' walking to their educational destination and almost 3 million out of the 16 million total (especially those located in more rural provinces) spend more than an hour a day walking to and from educational institutions (Department of Transport 2003; also Mahapa 2003). When parental contributions and household labour demands are coupled with a long journey to school, these are likely, acting together, to present a particularly strong deterrent to attendance (Porter et al. 2010). A programme incorporating a range of interventions may often be essential to improved participation. The importance of a multi-sectoral approach to development intervention is emphasised in a number of recent studies: see Gibson and Mace (2006) for a particularly instructive study linking boreholes and reduced water carrying with rising birth rates and child malnutrition.

Children who are able to attend school may still be disadvantaged in their school performance by transport constraints in the home environment: at the household level transport failures may require children to carry water, firewood etc as well as to perform other household tasks, both before and after classes. These duties, which tend to fall particularly heavily on girls, in accordance with local cultural norms, delay the time when children leave for school, may cause them to arrive late at school (resulting in punishment from their teachers) and leave them exhausted during lesson time. Transport issues along the route to school (poor roads; unreliable, costly or non-existent transport services etc.) may add further to their problems (Porter 2011). The school transport situation is further complicated by the substantial expansion of private education in some countries, much of it supplied by the for-profit sector. Even poor rural families may choose not to send their children to the nearest state school, often because of perceived deficiencies in the quality of education provided.

The transport impacts on girls' education are of particular interest since girls' school enrolment rates are often considerably lower than boys' (with the exception of a few regions such as Lesotho and South Africa's Eastern Cape, where herding duties have traditionally been defined as boys' work). This can be related to a number of factors, including girls' heavy household duties, cultural perceptions regarding the (limited) value of girls' education, and perceived dangers for girls who have to travel a long distance to school or board away from home. Improved road access and transport availability can probably make a significant impact on girls' attendance at school in some contexts. The studies which are still usually cited on this point were made some years ago: in Morocco, notably, these show that opening of a paved road increased the probability of girls attending primary school by 40% (Khandker et al. 1994, Levy and Voyadzis 1996, cited by AU-AfDB-ECA-WB-EU 2005). A review of children out of school (DFID 2001:7) using DHS surveys suggests that in Niger, where there are only 41 girls per 100 boys at school in rural areas (compared to 80:100 in town), distance of home from school is a key factor.

***Transport and access to health services.*** Difficulties of physical access to health services may impact on young people in a number of ways. Transport and time costs from settlements without health services and limited mobility of mothers and health staff can contribute, for instance, to low immunisation rates (Booth et al. 2001, Bosu et al. 1997; Porter 1997, 2002a). This raises the

likelihood of a wide range of diseases among children, including those associated with poor sanitation and water supplies. Since carrying water and garbage are often children's work, they are also potentially more exposed to specific health problems due to the heavy weights and noxious materials carried. The fatality rate for young children who fall ill with cerebral malaria or meningitis is likely to be very high: a study in Malawi found that the majority of children presumed to be suffering from these two illnesses died whilst awaiting transport or within a few hours of delayed arrival at hospital (Cullinan and Pieterick 1998). Distance and lack of emergency transport are likely to be critical factors in low and delayed hospital referrals of children from many remote rural areas as Bossyns et al. (2006) show for Niger. Children in remoter areas are probably also more vulnerable to severe parasitic infections due to failure to access early treatment (Raso et al. 2005, drawing on their studies in western Cote d'Ivoire). Analysis of data relating weight-to-height of children to quality and accessibility of health services in Ghana led Lavy et al. (1996) to suggest that reducing distance to clinics could substantially improve child health in rural areas. However, other factors, notably cost, quality of service available (AU-AfDB-ECA-WB-EU 2005 citing various studies) and socio-cultural factors influencing patterns of treatment-seeking (Kamat 2006), may be of even greater significance than distance to the health facility (see also Hampshire et al. 2011).

The implications of poor physical access may be particularly serious for teenage girls, who typically have less funds to pay transport fares and more time constraints than young men, and may also face restrictions on their mobility imposed by the local cultural context. The problems of physical access to reproductive health services may contribute to the high levels of teenage pregnancy observed in many rural areas and dangerous home abortions among young women. Costs of travel (where transport is available) and/or the travel time to a distant health centre for pre-natal and post-natal checks may reduce the likelihood of timely attention and treatment even in urban areas. Since the risks of childbirth complications are higher than average among first time and very young mothers, problems of travel to health centres can have particularly adverse implications for the health of young women and their babies (World Bank 2006:150).

***Young people as pedestrian transporters and transport operators:*** In rural areas, in particular, the transport gap caused by inadequate or costly transport facilities can contribute substantially to children's time poverty because of the common requirement to help carry goods for family

members and others: this is a crucial but overlooked issue. Children's role in filling the domestic transport gap may have important implications for their ability to attend and perform well at school: it may also have health implications when the loads carried are very heavy, possibly resulting in deformation of the vertebral column and other permanent injuries. Women's domestic transport effort is now relatively well recognised, but children's domestic transport work is commonly subsumed under women's work rather than receiving specific acknowledgment: this is an area where carefully disaggregated studies of women's and children's effort in different cultural and environmental contexts are needed. Recent field work on this theme is reported in Porter et al. 2011 re Ghana and Porter et al. 2012 for 12 rural sites in Ghana, Malawi and South Africa. Headloading, especially for domestic (as opposed to commercial) purposes, is generally considered a task for girls, women and young boys in sub-Saharan Africa: young men beyond their mid-teens are usually not expected to do such low-status work except in an emergency (e.g. Potgieter et al. 2006:15 for Eastern Cape, South Africa). By contrast, any work associated with mechanised transport – driving, minibus call boy, mechanic etc. - tends to be seen as a male preserve. Mahapa (2000), for instance, reports that the children who commonly help their parents by operating donkey carts in the Northern Province of South Africa (where they remain an important form of transport in remoter rural areas) are usually boys (aged 10 and over). In countries such as Nigeria, Kenya and Uganda, operation of cycle and motorbike taxis seems to be principally in the hands of young men. The latter appears to offer a relatively lucrative livelihood for young men, though negative impacts (association with reckless driving, increased accident rates and violent crime) are now reported in some regions (see Waage 2006 on Ngaoundere, Cameroon).

***The potential for Intermediate Means of Transport and other interventions to improve young people's mobility and access to services:*** Research on IMTs such as bicycles in Africa has focused principally on adult use. Current use of IMTs by children and their potential to improve children's mobility and access to services has received less attention. A case study of cycling among girls and boys in Accra (Grieco et al. 1995, 1996) illustrated the impact of diverse ethnic backgrounds on child access to transport, since unlike children from northern Ghana living in Accra, children from southern ethnic groups are not encouraged to cycle by their families. Among boys it is perceived as dangerous: the behaviour of 'rebellious, deviant school age males'. If girls dare to ride they are considered of 'questionable sexuality' (Grieco, Turner and Kwakye

1995). South Africa's Shova Kalula (Ride Easy) National Bicycle Programme, which commenced in 2001, is a particularly interesting government initiative not least because of its scale: it aims to provide one million low-cost bicycles (used and new) in rural and peri-urban areas to disadvantaged groups. The programme, which also provides training in riding and maintenance, is aimed at school children and farm workers. Although it has encountered a range of problems, including lack of spare parts, a shortage of locally available appropriate cycles (i.e. robust with load carrying capacity) and perceived abuse by parents purchasing cycles in their children's names, it offers an exciting opportunity to improve physical access to school and other facilities. An early assessment of the first phase concluded that the project was helping school children to arrive at school in better time, but lacked adequate consideration of gender issues (Mahapa 2003).

The potential for Intermediate Means of Transport to improve children's access to services needs further investigation, particularly attitudes to cycling for girls across Africa and the extent to which this affects their school attendance and access to other facilities. If daughters are out of school because they are needed to help fill the domestic transport gap, broader IMT interventions aimed at the family might play a significant role, but we do not have sufficient evidence to support this suggestion. Other potential transport interventions, depending on local context, might include offering stipends to girls who have to travel a long distance to school (an approach piloted by the World Bank in Pakistan to encourage girls in to the classroom), and introducing a locally adapted version of the 'walking bus' as a safety initiative to counteract dangers of rape/harassment (rather than primarily as a means of reducing pollution and traffic congestion, improving health etc. as in Western contexts). Virtual mobility through use of mobile phones, internet and other ICTs, also has substantial potential to beneficially reduce the transport needs of all sectors of the population: mobile phone uptake has been remarkably rapid among young people, even in rural Africa, with reported impact in terms of reduced need to travel (Porter et al. 2012).

Transport interventions, whether to reduce traffic-related accidents among young people or to improve their mobility and access to services, need to involve them directly. In the UK the incorporation of young people's perceptions and views in road safety initiatives and transport

planning is only just beginning and in sub-Saharan Africa is at an even more preliminary stage (Porter and Abane 2008).

***Traffic accidents and road safety:*** As young people's mobility increases, inevitably traffic accident rates are also likely to rise. Coverage of children's road safety issues has been surprisingly sparse in the literature on African transport, given that accident rates in some African countries (albeit still under-reported) are among the highest in the world. Epidemiological trends in developing countries show that mortality rates of childhood infectious diseases are declining while rates of traffic injury-related death and disability are increasing (e.g. Mock et al. 1999). In 2002, deaths due to road traffic accidents were 20.0 and above per 100,000 children aged 0-14 years across most of sub-Saharan Africa: the highest level worldwide (WHO 2004:31).

A small study of child accident victims in Ilesa, a town in south-west Nigeria (Adesunkanmi et al. 2000), found that the majority (89%) were pedestrians and mostly over 5 years: 60% of these child pedestrians were injured either while hawking at the roadside or on an errand. Motorcycles were involved in 20% of the cases. In Nigeria the continued expansion of motorcycle-taxi businesses, usually operated by young men, and commonly associated with risky driving styles, is likely to lead to a significant rise in injuries to drivers, passengers and pedestrians. Drawing on substantial household surveys (which provide a better assessment of rates than official statistics due to under-reporting to police) in rural Brong Ahafo and urban Kumasi, Mock et al. (1999) emphasise that, in both rural and urban Ghana, children have a particularly high exposure to accidents. In rural areas, 46% of injured pedestrians and 30% of injured cyclists were children (up to 15 years), while in Kumasi 52% of injured pedestrians and 33% of injured cyclists were children.

Road safety problems of poorly maintained public transport, driven by poorly trained drivers over poorly maintained roads, are also likely to be a major problem (Potgeiter et al. 2006 re Eastern Cape, South Africa). Adequate disaggregation of data by gender is often missing in work on African road safety, but a review of published and grey literature on road traffic injury among children and adolescents ( $\leq 19$  years) for urban areas sub-Saharan Africa suggests males are twice as likely to be involved as females (Hyder et al. 2006; see also Hobday and Knight 2010 re male dominance in South African accidents). A study among 8,000 primary school

children in Kampala Uganda, however (Nakitto et al. 2008) found no gender differences in risk of traffic injury. Injured children here had a mean age of 9 years, regardless of gender. Motorcycles and bicycles were the lead cause of traffic injury. More and better gender-, age- and locationally-disaggregated data is required.

Despite the level of traffic injuries sustained by children in Africa, most receive little road safety training, though efforts have been in progress in a number of countries since 2000 to promote road safety within the curriculum (in Uganda and Ghana, for instance, with support from DFID-funded TRL projects and in Ghana from DANIDA). However, school-focused road safety work does not take account of the very many children who never attend school and may be at most risk of road accidents through their work as road-side traders [a small study in Tanzania by the road safety NGO Amend is currently examining the issue but only in an urban context].

### **C. USER PERSPECTIVES: OLDER PEOPLE**

Older people's mobility and transport needs are only just starting to gain attention in both Western and African contexts. Older people form a substantial key component of African populations, not least in the era of HIV/AIDs, which in many countries has left grandparents supporting and caring for grandchildren, in the context of a missing or incapacitated middle generation resulting from parental deaths and ill health. In a recent child mobility study, approximately 20% of 3000 child respondents surveyed lived with people other than their parents - in South Africa, Malawi and Ghana respectively, 14%, 9% and 9% live with grandparents (usually grandmother alone); the remainder lived with other relatives/foster parents, many of whom are older people (Porter et al. 2010 etc.). The mobility and mobility constraints older people face, which will impact strongly on their ability to act effectively in this role, constitutes a major knowledge gap. Ipingbemi 2010 presents a rare study in Africa for Ibadan city – the current AFCAP HelpAge Tanzania study is probably the first in Africa specifically focused on older people's mobility and transport issues.

Mobility, or lack of it, is likely to be implicated in many facets of older people's lives (Schwanen and Paez 2010). Continuing access to livelihoods is frequently vital, not just for the elderly to support themselves, but now also to support young orphans and others in their care. Access to a

secure livelihood is often particularly difficult for older people: in rural areas income from farming is frequently insecure, and is likely to become more insecure with climate change. Multiplex livelihoods and income are widely recognised to provide a route out of rural poverty (e.g. Bryceson 1999, 2002; Gladwin et al. 2001) but livelihood diversification very often requires travel to the nearest market or service location, causing particular difficulties for elderly women traders (Grieco et al. 1996; Ipingbemi 2010; Afcap HelpAge study in progress). Ill-health and infirmity may introduce further problems for older people, in a walking world where pedestrian transport dominates among all ages. Reduced pedestrian mobility due to infirmity and the unaffordable cost of motorised transport may help to limit older people's access to work and vital health care, thus reinforcing their poverty: a vicious circle in which mobility restrictions form a key component. At the same time, care-giving responsibilities of older people (especially women), who have adult children affected by HIV/AIDS may require prolonged travels to care for the sick (Ssengonzi 2009).

In the context of limited work potential, ill health and lack of social security, social bonds are likely to be essential to securing care and financial support in old age. In many African societies, giving money is a way younger kin traditionally pay respect and show affection and care for the elderly, but when the younger generation has migrated elsewhere, it may be difficult for older people to achieve the sustained interaction necessary to maintaining such links. Mobility and access to affordable transport are likely to be key factors in sustaining social networks, though mobile phones also now play a growing role. Data on transport and mobility among older people is remarkably sparse. The following hypotheses requiring detailed examination are being addressed in the AFCAP HelpAge Tanzania study:

- Lack of reliable low cost transport and restricted mobility may severely affect older people's access to clinics, pension points (where pensions are provided), paid work, livelihood opportunities, churches, participation in social networks, and other facilities and services important to their lives, with negative impacts on their health and well-being. Long walks to access a transport route or to services are likely to present a serious hurdle, particularly to less fit/disabled older people, and especially where the route crosses difficult terrain, and in the rains.

- Where regular transport is available, low incomes and poverty may limit access: older people, especially women carers, often appear to be among the poorest, thus probably those least able to afford transport fares.
- Older people may face numerous difficulties when they are able to access public transport. Some of these difficulties are probably similar to those reported by children (harassment, being cheated on fares by operators, having to stand up and keep balance in an unstable vehicle when all the seats are taken etc.) Older travellers may also face other difficulties around specific problems sometimes associated with old age such as urinary incontinence among women due to earlier obstetric problems (e.g. obstetric fistula and related conditions).
- The mobility and access constraints experienced by older people may impact negatively on the educational, health and livelihood opportunities of children and young people in their care and thus reduce overall long-term potential for poverty eradication. For instance, mobility and access constraints are likely to impact strongly on older people's ability to earn income, with consequent impact on their ability to feed, clothe and educate children in their care. Access to livelihoods has been inadequately considered in an older people's context (they are often treated by government, academics and others as if they are outside the working population).
- Older people may gain access to services not only directly but also indirectly through both adults and children in the community. The relationality between children and older people's lives has been considered in general terms (e.g. Whyte et al., 2004), but needs analysis in a mobility context (see Turner and Kwakye 1996 for a rare study re Accra). Thus, impacts on older people of other household and community members' mobility need to be considered, especially regarding migration, which may affect indirect access to services via family helpers.
- In some regions the demands of load carrying on women from childhood and onwards *appear* to impact severely on health and quality of life as they enter and experience old age (though we are unaware of any evidence base to support this hypothesis). The implications of Africa's transport gap and consequent dependence on pedestrian headloading (often designated a female activity), has received remarkably little attention.

The particular plight of older women in accessing fuelwood, water and markets needs further investigation.

- Road traffic accidents are a major cause of injury and death across Africa. Older people are likely to be at disproportionate risk because of age-related physical and cognitive changes.
- Very old and infirm people, in particular, may face a lack of power and access to wider decision-making processes (similar to that experienced by children). Where this is the case, their views are less likely to be heard and their transport and mobility needs even less likely to be met than those of other groups.
- We can expect considerable diversity of experience amongst older people, according to age, gender, ethnicity, socio-economic status, family composition (dependants etc.), occupational history, infirmity/health, personal mobility status, density of service provision, etc. It is important to assess how this diversity impacts on transport usage, suppressed journeys, mobility and access to services and other elements important to older people's well-being.
- Potential routes to improving mobility among older men and women are likely to vary from those open to younger people in their communities. Bicycles usage, for instance, may be impossible for older women who have never had time/opportunity to learn to cycle. Older people with disabilities are particularly disadvantaged, such that even mobile service provision to settlement centres may not serve them adequately: adapted wheelbarrows with invalid seats might assist in some contexts.

The potential for mobile phone use (expanding dramatically across Africa) to substitute virtual for physical mobility to the advantage of older people is considerable: current and potential uses among older people need investigation – research on this theme is taking place in the AFCAP HelpAge study in Tanzania.

### **3. THE POTENTIAL OF IMT TO IMPROVE ACCESS AMONG POOR POPULATIONS**

A key baseline text on Intermediate Means of Transport [IMT] adoption in Africa is provided by Starkey (2001). This assesses their position in transport systems close to the beginning of the focus period for this review. It draws attention to the vital issue of critical mass: the fact that a vicious circle hinders early adoption when there are insufficient support services and insufficient users to sustain sales and maintain services. Women (and children) face very limited access to IMTs (see section 2B above). Other issues include road safety, maintenance (including budgeting for maintenance) and access to credit. Starkey emphasizes the potential for credit to aid adoption (placing particular emphasis on credit access for women), but recognizes that neither credit nor subsidy works in all cases. Similar themes are discussed in Starkey et al. (2001) - in particular, the importance of a critical mass of users, operators and suppliers for NMTs. Insofar as women's usage is concerned, the wide acceptance of a transport mode [such as bicycles in Burkina Faso] certainly makes it easier for women to adopt. A later report (Starkey et al. 2006) emphasizes IMTs as a means of reducing poverty and isolation but also stresses their great growth potential and suggests the need for fiscal policies to encourage their use, arguing that 'small initiatives and incentives' can have a profound effect on poverty reduction.

A paper by ITTransport (2003), which documents a project aimed at developing a rapid appraisal method for IMT demand (and inputs needed to promote the demand), emphasizes the complexity of factors surrounding IMT uptake (and which are not only transport related). Studies in five African countries concluded that transport of goods to market is the prime need for IMT, but that efficient transport per se may not be enough to facilitate agricultural development, which also requires improved agricultural methods, access to affordable inputs, an effective marketing network and good storage facilities. Landholders with 2 ha or under rarely owned an IMT. Only when total load to be transported to market exceeds 1.2 tonne.km/ season per active household member will there be a demand for IMT. Only when the load exceeds c. 10 tonne.km will there be demand for load carrying capacity greater than that which can be provided by a bicycle. Cost was a primary factor affecting IMT demand, but people expressed a preference for higher speed transport rather than IMT. Another study by Phiri (2006) describes the PIRTP [Pilot integrated

rural transport project] in Malawi which included 650 IMTs [animal carts, bicycles, etc.] given out on credit. However, reportedly insufficient attention was given to women or female-headed households in the credit scheme so that IMTs mostly went to men. It is further observed that the cost of IMTs was a major constraint on uptake among the very poorest in communities. Efforts to introduce donkey carts in Malawi's RAMPA [Rural Accessibility and Mobility] project meanwhile failed due in part to a shortage of donkeys in Malawi and difficulties of procuring and importing from surrounding countries [there were also many broader institutional issues]. It was concluded that both IMT equipment availability and micro-finance have to be very carefully planned, to ensure sustainability and equitable access.

Because the reasons for women's low access to IMT had attracted little detailed investigation, an action research project was designed in which IMTs were introduced in 5 villages in southern Ghana [with women given preferential access] (Porter et al. 2012). The impact of the IMTs was then monitored over an 18-month period among IMT adopters, with comparison to a carefully matched control group. This monitoring highlighted a number of important issues. In the first place, women's stated preferences for IMTs at baseline stage varied substantially from those they purchased on credit. Availability of children to operate the equipment was a key factor in women's adoption of push trucks. Although men took over many of the IMTs purchased ostensibly by women, women still gained advantage overall, in terms of reduced load carrying and overall work-loads [because men were prepared to carry domestic wood and water if an IMT was available for the purpose, whereas it was culturally unacceptable for men to carry wood and water by headloading]. IMTs which aid goods movement rather than women's personal mobility [i.e. push truck rather than bicycles] were preferred – this seemed to be partially due to men's reluctance to allow their wives to travel far since unaccompanied female travel is associated with promiscuity. Reasons behind the lack of interest in IMT purchases on a group basis were examined in an earlier paper (Porter and Lyon 2006). Group ventures in transport have been promoted in the past by donors but aversion to joint ownership is often soundly-based on concerns around joint sharing of initial costs, maintenance, usage etc.

N.B. One of the most negative recent developments regarding IMT policy in Africa is the South African National Department of Transport's discussion [2012] about prohibiting bicycle trailers on public roads, due to concerns about road safety.

**The rapid expansion of motorcycle taxis** has been a particularly important element in recent IMT development in Africa. In areas with insufficient demand to support motor vehicles, the potential for motorcycle taxi services seems to be enormous, as recent observations in Kibaha district, Tanzania in the AFCAP HelpAge project emphasise. The introduction of motorcycle taxis was probably first observed in Nigeria [e.g. Howe and Oni 1996] and in Uganda [Howe and Davis 2002], where boda-boda services evolved from bicycles in the 1960s to motorcycles in the early 90s. In both countries, as elsewhere, motorcycle taxis offer many people their only transport service in remoter rural areas, since conventional taxis do not find it profitable to travel to many locations due to insufficient demand; nor can they easily negotiate unsurfaced tracks. The common pattern in rural areas is for motorcycle taxis to act as feeder services, linking village to other [cheaper] motor transport at the paved road. However, motorcycle taxi fares are typically above those charged on buses or minibuses, and are thus least used by the very poor, except in emergencies. Moslem women in regions like the Jos Plateau, Nigeria use motorcycle taxis, despite being concerned about dangerous driving – they are seen as a lifeline when medical emergencies arise, especially in the wet season (Porter 2003). More recently, the introduction of sharia law in northern Nigerian states has sometimes prevented women from riding on motorcycle taxis, but resistance is generally substantial, given their utility.

The introduction of cheap Chinese motorcycles has been a key factor in the expansion of motorcycle taxis across much of the continent, though intriguingly they are still rare in some countries, such as Ghana. Young men [many of whom would otherwise be unemployed] are usually the principal operators; ownership commonly rests elsewhere, often among urbanites and salaried professionals who find good profits in the business.

Insufficient attention has been paid as yet to road access for motorcycles, given their massively expanded role in many rural transport systems, though Petts (Rural-transport-development network 18/9/2009) notes that cycles need a firm, cambered running surface and that loaded cycles have a high ground pressure which can cause problems in the rains, especially on black cotton soils. He refers to personal observations from Vietnam where communities have constructed their own [1.4 metre] motorcycle roads of concrete which can allow two motorcycles to pass at normal speed, and 0.5 metre concrete or fired clay brick tracks in remote areas where cycles are unlikely to have to pass each other regularly.

**Mobile phones and taxi services:** The efficiency advantages gained when motorcycle taxis can be contacted by mobile phone are particularly impressive. Even in 2002, Howe and Davis observed how some operators were also equipped with mobile phones and thus could be summoned by customers. Among older poor people in rural Tanzania's Kibaha district, where boda-boda services were only introduced a few years ago, this is already a very common strategy [HelpAge AFCAP project].

#### **4. RURAL TRANSPORT SERVICES AND ACCESS TO HEALTH SERVICE FACILITIES [see also the sections on gender issues and on children above]**

Transport and health are interlinked on many levels, with transport directly and indirectly influencing health, and health status influencing transport options. It is obviously possible to show links between health access, physical distance and road provision *per se*, even without explicit consideration of transport services provision in many contexts. A study in Western Kenya by Ombok et al. (2010), for instance, described local geospatial variation and geospatial risk factors for child mortality in rural western Kenya, calculating under-5 mortality rates (U5MR) in 217 villages in a Health and Demographic Surveillance System (HDSS) area in western Kenya 2002-2005. U5MRs by village were mapped and geographical positioning system coordinates of residences at the time of death and distances to nearby locations were calculated. In multivariable analysis, controlling for maternal age and education as well as household crowding, higher infant mortality was associated both with living closer to streams and further from public transport roads.

However, the specific role that transport services play in shaping access to health facilities is becoming evident in many recent studies (including by health specialists, among whom transport issues are now gaining recognition). The role of transport in health was emphasized in Airey's (1992) key early research in Kenya on linkages between hospital utilization and transport (although this found that treatment costs were an even more significant barrier for men and women than transport costs). Its role in emergency maternal health contexts is particularly evident (discussed above in the section on gender), but recognition of the relevance of transport and travel time in patient access to other services (e.g. vaccination, child health and ARV treatment) is growing, though detailed consideration of the specific role and nature of transport service issues remains sparse.

Among health studies, Tanser et al. (2006), make a broad argument around physical access to primary health care through a field study in KwaZulu-Natal South Africa where they demonstrate the value of using GIS in conjunction with home-based interviews, presenting a framework for modelling physical access to clinics which may have widespread relevance in other settings. They find 65% of rural homesteads travel 1 hour or more to attend the nearest clinic. There was a significant logistic decline in usage with increasing travel time. The adjusted

odds of a homestead within 30 minute of a clinic making use of the clinics were 10 times those of a homestead in the 90-120 minute zone. Cultural context will have some impact in shaping physical access and usage of transport services, as work by Okolo et al. (2011) indicates in a multivariate analysis of WHO data in Burkina Faso where respondents who lived in urban areas were found to access health care more than those in rural areas, but this difference was significant only among females – a factor likely to be associated with constraints on women’s travel in this Muslim context.

Low patient uptake of antiretroviral (ARV) therapy is of growing concern, especially in southern Africa. The potentially significant potential role of transport costs for HIV-positive TB patients is raised in a number of papers (e.g. Chileshe and Bond 2010, drawing on interviews in rural Zambia) but was hypothesized as a major reason for low hospital attendance in a study by Zachariah et al. (2006) in rural southern Malawi and made a focus of that study. They found transport cost to be significantly associated with ART acceptance. Individuals who had to pay 50 Malawi Kwacha (1 United States Dollar = 100 Malawi Kwacha, MW) or less for a one-way trip to the Thyolo hospital were four times more likely to accept ART than those who had to pay over 100 MW. Decentralizing the ART offer from the hospital to health centers that are closer to home communities would be an essential step towards reducing the overall cost and burden of travel. A smaller ART study in South Africa (Fried, et al. 2012) focused on urban and rural patients in resource-limited settings (rural and urban) suggested the main challenges included transport costs (as well as food costs and health system constraints).

## **5. RURAL TRANSPORT SERVICES, ROAD SAFETY AND TRANSPORT-RELATED INJURIES [see also the section on children above]**

Road safety is a major problem in most African countries, such that traffic accidents are the third leading cause of death (after malaria and HIV/AIDS) and a major cause of disability. Factors such as poor road conditions, inadequate safe spaces for pedestrians and IMTs, inadequate road safety training, inadequate enforcement of safety measures, old and badly maintained vehicles and transport equipment and excessive passenger and freight overloading, all contribute to this. Africa has the highest fatality rates per capita of any continent and, as SSATP's annual report for 2011 emphasises, this is a poverty issue. Over 65% of victims are 'vulnerable road users' – pedestrians, cyclists and users of IMTs and public transport (ibid p. 19). Rates for Kenya at the turn of the 21<sup>st</sup> century were c. 68 deaths per 1000 registered vehicles, i.e. 30-40 times the accident rate in highly motorized countries (Gwilliam et al. 2010: 221). A 5-country study (Jacobs et al. 2009) suggested that 20-56% of pedestrian casualties came from the poorest socio-economic group. It seems likely that high pedestrian fatalities impact most on the poor, and probably particularly on men, but with women also facing disadvantage because of the additional burden they face as carers (Kwamusi 2002). Transport injuries may also occur outside the motorized traffic context. Carrying heavy loads along narrow, muddy and uneven paths is a common source of falls and injury. The need to cross rapidly rising streams and rivers in the absence of adequate bridge crossings is another cause of injury and death.

Detailed studies of transport-related injury are still remarkably sparse, despite high levels of incidence and mortality (Labinjo et al. 2009; Lamont 2011). One early study, by Mock et al. (1999), compares incidence, characteristics, and consequences of transport-related injuries in an urban and a rural area of Ghana. Transport-related mechanisms accounted for 16% of all injuries in the urban and 10% of all injuries in the rural area in the preceding year. The annual incidence of transport-related injuries was almost identical in the two settings, 997/100 000 persons in the urban area and 941/100 000 in the rural area. In both settings, transport-related injuries were more severe than other types of injuries in terms of mortality, length of disability, and economic consequences. In the rural area, the most common transport-related mechanisms were bicycle crashes. The second most common rural mechanisms were motor vehicle crashes, which were the most severe and which involved commercial (83%) rather than private

vehicles. They conclude that prevention strategies need to target commercial drivers more than private road users.

Labinjo et al. (2009) found no multi-site population-based surveys of road traffic injuries had as yet been reported from Nigeria. They collected road traffic injury status and demographic information from 553 households in seven of Nigeria's 37 states. The overall road traffic injury rate was 41 per 1000 population (95% CI 34 to 49), and mortality from road traffic injuries was 1.6 per 1000 population (95% CI 0.5 to 3.8). Motorcycle crashes accounted for 54% of all road traffic injuries. Interestingly, the road traffic injury rates found for rural and urban respondents were not significantly different. Increased risk of injury was associated with male gender among those aged 18-44 years, with a relative risk of 2.96 when compared with women in the same age range (95% CI 1.72 to 5.09,  $p < 0.001$ ).

A study by Olukoga and Harris (2006) is instructive in its attempts to estimate the costs of road-traffic fatalities in South Africa, using Department of Transport road-traffic accident data for 2003 (with valuation was based on the gross output or human capital approach). The number of road-traffic fatalities in rural areas was 2.7 times that in the urban areas (a very different ratio from that found in Nigeria by Labinjo et al. above). The total costs of the road-traffic fatalities was estimated at R 8 billion (>US\$ 1 billion) i.e. about 0.6% of the country's nominal GDP for 2003. 60% of the cases and costs of road-traffic fatalities involved persons aged 20-39 years, although this age group is only 27% of the country's population. The rural areas accounted for 73% and the urban areas 27% of the total costs of fatal road-traffic crashes. The study does not focus on poverty impacts, but the significance of these statistics for poor families must be very considerable.

Clearly, road safety has to be a growing focus of attention across Africa. The 2007 Pan-African road safety conference (Accra, February 2007) identified the following priorities: strengthening pre-hospital emergency services; mainstreaming safety design issues in road investment programmes; collecting reliable road accident statistics and enacting national legislation to deal with speeding, driving unroadworthy vehicles, failing to use safety helmets, using mobile phones while driving and driving under the influence of alcohol (ibid: 226). Regarding institutional arrangements, Gwilliam et al. (2010) note the need to choose between a special agency and broadly injecting safety skills and procedures in all relevant agencies (notably transport, health,

education); in terms of programme composition, the evidence from elsewhere [e.g. Japan; Richards Bay KwaZulu-Natal] supports a concentrated multi-dimensional ‘big bang’ approach. However, they point out that enforcement will be crucial: elimination of corruption in licensing, enforcing on-road behavior, inspecting and controlling vehicle conditions (ibid 226).

## **6. TRANSPORT SERVICES AND RURAL LIVELIHOODS [see also the sections on gender and children above]**

Linkages between rural transport systems and agricultural development are well recognized among transport services specialists. Banjo et al. [2012: 25] point out that poor rural transport systems increase the costs of marketing from farms, inhibit use of fertilizer and other inputs, limit the spread of information and increase risk. Given the fact that the vast majority of farmers in Africa are small holders, and c. 85% of these are farming under 2 ha, they argue that a stronger focus on small-holder farming transport constraints is crucial and suggest the need to pay particular attention to the roads and paths at the lower end of the road network. In similar vein, recent analysis in central Africa suggests that road investments in very isolated rural areas are less attractive than in areas some distance from urban markets but still within ‘reasonable reach’, because they will not make enough difference in overall travel times to provide adequate market access (Gwilliam et al. 2010: 222). In areas where volumes of production are below the threshold needed to justify use of a truck to collect produce, ‘simpler roads targeted more at ensuring accessibility for 2-wheeled vehicles or animal-drawn carts may be more suitable’ (ibid). As Sieber (1999) observed, however, an emphasis on paths, tracks and intermediate means of transport such as donkeys, bicycles and animal carts is still very often rejected by decision-makers as primitive and backward.

The importance of transport services for African farmers is also recognized by agriculture specialists. However, while many authors have observed broadly that both improved road conditions and transport services in rural areas will be required to improve farmers’ accessibility to local output markets and external markets (e.g. Senyolo et al. 2009 re South Africa), most provide little further detail. The role of transport in improving access to inputs also rarely gains specific recognition. With reference to fertilizer farmgate prices and associated access, however, Jayne et al. (2003), notes that the sum of importer, wholesaler and retailer profit margins generally account for less than 10% in Kenya, Zambia, and Ethiopia and suggest there are opportunities to reduce domestic marketing costs through a variety of measures including coordinating the timing of fertilizer clearance from the port with up-country transport, reducing transport costs through port, rail and road improvements, and reducing high fuel taxes. Estimated reductions in the farm-gate price of fertilizer from implementing the full range of

options identified in each country [not only transport] ranged from 11 to 18%. Farrow et al. (2011) specifically consider the differential access of households to resources and transport in the case of Malawi fertilizer inputs, noting that these differences are not considered when reviewing problems though they can have a large effect on the physical access to inputs. They argue that improvements in road infrastructure might not directly benefit the poorest farmers (if they are walking) but could serve to reduce the wholesale prices and therefore the retail price. In addition, improvement in roads might increase the number of potential customers of any particular stockist, with economies of scale allowing the reduction of prices while ensuring a satisfactory profit margin for the stockist.

A short report by Torero and Chowdhury (2005) for IFPRI is important in that it emphasizes that infrastructure is key to poverty reduction in Africa: that broad review includes some reference to the significance of high transport costs and the importance of an inter-sectoral approach. However, the majority of agricultural studies have concentrated on road connectivity to markets rather than the specific role of transport services in market access [though sometimes road quality is also taken into consideration, e.g. Minten and Kyle 1999 re former Zaire]. This can probably be explained at least in part by the relative ease with which broad measures of road connectivity can be obtained and analysed remotely for large regions, compared to the complexities of gathering field data on road transport pricing and other (often hidden) non-economic aspects of transport services operations. Minot et al. (2006), for instance, conduct research on the relationship between poverty and market access in Tanzania based on analysis of GIS and National Bureau of Statistics data though they also draw on DHS surveys: the study did not involve direct information collection on travel conditions.<sup>4</sup> They find that households farther from regional centers tend to be poorer, but that there is no relationship between poverty and distance to road or distance to Dar es Salaam.

Dorosh et al. (2012) provide a broader overview of road connectivity, population, and crop production in Sub-Saharan Africa, also using a GIS approach to examine the relationship

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<sup>4</sup> The four travel-time measures were generated with a raster analysis that measured the distance along the road network, with weights for each type of road to convert distance into travel time. This analysis, using ArcInfo, created a country-wide “surface” for each of the four travel-time market access variables, from which the values corresponding to each DHS cluster were selected.

between transport infrastructure, population location, and agricultural production. This shows that both population and agricultural production are spatially concentrated near large cities, with 41.4% of population and 23.6% of agricultural production [in value terms] within 2.5 hours travel time to large cities and [taking into account agroecological and other factors] a statistically significant association between travel time and agricultural production. However they focus principally on road investments per se, using coefficients estimated for Mozambique, to simulate the effects of hypothetical increases in road investments on travel times and agricultural production, and suggesting that improvements in road infrastructure could facilitate a substantial increase in agricultural production. There is no specific direct analysis of transport services effects.

Also taking a similarly broad continental approach, Buys et al. (2010) focus on road network upgrading in the context of promoting overland trade expansion, arguing that poor economic integration and isolation from regional and international markets have contributed significantly to poverty in Sub-Saharan Africa. Poor transport infrastructure and border restrictions are major deterrents to trade expansion which would stimulate economic growth and poverty reduction. Using spatial network analysis techniques and gravity trade model estimations, this paper quantifies the economics of upgrading a primary road network that connects the major urban areas in the region. They argue that the results indicate that continental network upgrading is worth serious consideration from an economic perspective: overland trade among Sub-Saharan African countries might expand by about \$250 billion over 15 years, with major direct and indirect benefits for the rural poor (but financing the programme would require about \$20 billion for initial upgrading and \$1 billion annually for maintenance).

Independent, rigorous research on the precise links between poverty, transport and agrarian change in Africa remains rare. Information presented in the recent SSATP review of rural transport by Banjo et al. [draft 2012] suggests that the limitations observed by de Grassi in 2005 still prevail. They point out that it is essential to understand the nature of poverty in specific rural settings and have knowledge of both the types of agriculture and rural transport interventions likely to have the greatest and most direct impact on rural poverty. They thus call for better integration of agricultural activity and transport need to ensure both faster growth and

poverty reduction, based on mutually reinforcing sector strategies, a rural household focus which is at the centre of designs for rural transport interventions, and a long-term perspective in planning and implementation: scaling up of pilot activities and making them sustainable is seen as the major challenge. This report itself may mark an important development in cross-unit collaboration at the World Bank [it involved both SSATP and the Africa Agricultural and Rural Development Unit].

***Transport in the commercial agriculture sector:*** Transport services are also rarely considered in large commercial agriculture contexts in Africa, despite the fact that, according to Ramachandran (2008), large firms in agriculture and other industries in Africa are more likely to complain about transport than smaller firms, with substantial losses reported from theft and transport delays for their company-owned transport (based on World Bank Enterprise Surveys database). In this respect, work in the South African sugar industry presents a rare exception (Bezuidenhout et al. 2004, Nordengen et al. 2009). There is clearly need for much more empirical research in this arena: while not poverty-focused, in many cases these large commercial enterprises play an important labour role as employers of the very poor. They may also play a significant negative role in local land markets, especially in new agricultural areas, with important implications for poor households.

Naude (2009) argues that there is a lack of comparable, cross-country and time series data on transport and logistics costs in African but points out that Africa's relatively high transport costs are an important factor in the continent's slow growth in exports compared to other developing regions. Distance remains one of the most important variables determining transport costs and distances to international and even local urban markets are commonly high in the region. The dominance and expensiveness of road freight in many countries is a major disadvantage. Being a land-locked country has a particularly cost inducing effect, through costs of transiting borders and time lost at border delays. The seasonality of crops also raises transport costs.

***Supporting activity for greater livelihood security in agricultural communities:*** Expansion of employment opportunities in the non-farm sector can increase the sustainability of livelihoods in agriculturally-focused communities. Multiplex livelihoods and off-farm income are widely recognised to provide a route out of rural poverty (as emphasised in early studies by Bryceson

1999, 2002; Gladwin et al. 2001). However, such livelihood diversification very often requires travel to the nearest market or service location: a point which has received very little attention. Research in the transport services field has barely started in this area; a paper by Venter and Cross (2011) provides a rare examination of transport-related employment access issues in a South African context. Given recent concerns about high levels of youth unemployment in Africa, further work in this field is urgently needed.

## **7. TRANSPORT SERVICE OPERATORS [INCLUDING COMMERCIAL GOODS TRANSPORTERS] AND THEIR ASSOCIATIONS**

There has been surprisingly little detailed research into transport operator perspectives in rural areas since 2000: virtually all of the very limited body of work available on transport operators [notably recent small studies of motorcycle taxis] and their unions is urban focused<sup>5</sup>. When looking at transport service operators from a poverty perspective, the most important point to make at the outset is the niche that certain transport operations provide for the very poor to earn a livelihood. Pedestrian portage, cart-pushing, other IMT operations and minibus call-boy work are all jobs commonly undertaken by poor men and [mostly in the case of portage activities] poor women. In the case of bicycle and motorcycle boda-boda operators in Uganda, Howe (2003) finds many low-income men earning a livelihood from their operation [commonly for richer owners]. In the boda-boda industry it is very common for young men to either work for a wage or to hire a cycle or motorcycle from its owner on a daily or weekly basis, paying the hire charges out of their takings [AFCAP HelpAge project, in progress]. Unionisation in the motorcycle taxi business is now proceeding apace in some rural areas and is worthy of examination. The role of transport operator associations in shaping other transport services in rural areas also needs detailed investigation: their role in route designation, fare setting, timetabling, training, road safety and driver/passenger interactions with police and other relevant actors is still very largely unknown but is likely to vary considerably according to locational and institutional context. A current AFCAP-funded project on taxi operations in rural South Africa should contribute significantly.

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<sup>5</sup> though see relevant earlier sections on women and child pedestrian portage.

## **8. TRANSPORT REGULATION: IMPROVING THE EFFICIENCY OF TRANSPORT MARKETS [STATE, POLICE, ROAD SAFETY, LOCAL GOVERNMENT]**

Starkey et al. (2001:3) observed the weakness of transport regulators in Africa: that many traffic laws were inadequate for current traffic conditions and resource capacity was usually limited in ministries of transport, so that regulators were not in any position to monitor user requirements or provide a conducive environment for transport services. Local government control of vehicle routes and transport terminals was usually limited, in some cases further constrained where transporters are politically influential. The situation seems to have changed little across the subsequent decade.

Particularly since liberalisation in the 1990s, provision of transport services in Africa has been largely left to the private sector. Mwase (2003) was hopeful that this was bringing positive impacts, arguing that *'ensuing favourable pricing and marketing policies have led to improved transport services. ....Past policies and practices emphasising excessive reliance on public transport monopolies, direct or indirect (cross-)subsidisation of transport services, administratively determined tariffs and regulatory protection of, or preference for, national as against (sub-)regional operators are giving way to transport policy reform and restructuring to increase financial accountability and viability, enterprise autonomy and cost-effectiveness in resource use and enhanced transport service delivery'*. However, although the change in the policy environment with almost complete deregulation increased vehicle numbers substantially [with many second hand vehicles imported from Europe], the transport industry remained inefficient and operating costs high, due to technical and institutional factors. A TRL study in Ghana and Uganda, albeit focused on urban contexts (Benmaamar 2002), emphasizes the way established transport associations continued to dominate, and acquired political patronage, preventing new non-members entering the market. The importation of second hand vehicles supported the pattern of unreliable vehicle operations and associated accidents, breakdown, pollution. Freight transport was characterized by highly inefficient, unreliable services, widespread overloading and high empty shipment rates particularly regarding return loads (ibid). Suggestions for improvement included: increased access to finance by providing

leasing schemes for potential vehicle owners (with reduced interest rates and extended repayment periods), improved technical control including age limits on vehicle imports, improved standards of driver/operator training, an independent transport regulatory body to maintain competitive market conditions and enforce transport regulations effectively, a public-private partnership arrangement for development and management of lorry and bus parks to enhance competition and transparency, technical assistance to ministries for institutional and capacity building.

The situation has improved little since then. Teravaninthorn and Raballand (2008: 105) conclude in their study of the impact of road conditions on transport costs that rent-seeking behavior and governance of the trucking industry are at the core of the issues in many sub-Saharan countries (and call for deregulation in West and Central Africa). Similarly, Gwilliam et al. (2010) observe that regulation of transport markets (formal and informal) remains obstructive rather than constructive in Africa despite the fact that bus transport and trucking are now predominantly private and many railways are concessioned; protection of national carriers still prevails in road freight, for instance and inland waterway transport is now in decline. They (ibid: 211) stress that since Africa's very high road freight tariffs are driven by high profit margins rather than high costs or defective roads, the most urgent reform is to liberalise trucking while mitigating associated social effects. Regulatory regimes are needed, both nationally and regionally, that will reconcile public and private interests (ibid: 204). Multi-modal transport is poorly integrated, with physical (e.g. lack of infrastructure for transshipment), institutional (unclear allocation of responsibilities) and operational weaknesses (taxes, duties and rent seeking) especially evident at interchanges though there has been some effort to develop coordinated corridor systems (e.g. the Ghana Gateway, Maputo corridors). Logistics competence is low, with the exception of South Africa, and there are high levels of corruption which severely inhibit international movements, especially in the case of transit from landlocked countries.

Promotion of more freight competition between road and rail would be advantageous, but it is recognized that, given the cartels and high profit rates in road haulage (especially in West and Central Africa), greater benefits could be obtained by promoting competition in road haulage (Gwilliam et al. 2010: 208; also Teravaninthorn and Raballand 2008: 90). In the international

corridors it is not road quality but the regulation and market structures of the road freight industry that most constrains performance (Gwilliam et al. 2010: 219-220). Primary research by Teravaninthorn and Raballand 2008 on freight illustrates key regulation issues particularly effectively. Profit margins on freight transport in the main international corridors reportedly reach 70-160% in Central Africa (compared to 20-60% in southern Africa and 80% in West Africa). Industry cartels are part of the problem in Central and West Africa, such that Teravaninthorn and Raballand 2008: 87 estimate, for instance, that 67% of trucking companies and truckers belong to an association, and 76% in Chad, compared to only 11% in Zambia and 30% in Kenya. Government use of public sector monopolies to generate excess revenues is also highly damaging: the average age of locomotives in Africa is 25 years and freight wagons 25-30 years i.e. nearly twice international best practice (Gwilliam et al. 2010: 224). Gwilliam et al. (ibid) conclude that the most damaging aspect of trucking organization is the combination of self-regulation with national protection, noting the coalition of interest groups in West and Central Africa opposing change and their strong leverage on high level authorities because of their power to block trade: the challenges are more political and social than technical (see also Teravaninthorn and Raballand p.91). They thus recommend a move to the southern African international transport model whereby regulatory systems would combine strict quality control including rigorous enforcement of national safety and operational behaviour with liberal approaches to pricing and market entry. Teravaninthorn and Raballand (2008: 90-96) make specific recommendations for each of Africa's major regions, based on these points above: interventions are clearly urgently needed given the inevitable scale of impacts on poor populations, urban and rural, in terms of prices both paid and received for food and non-food goods. However, it remains difficult to give precise estimates of the potential benefits of specific interventions in particular countries, in the continuing inadequacy of data on trucking fleets, transport prices and costs in most of Africa: even vehicle registration data are generally poor (Teravaninthorn and Raballand 2008: 97). They call for specific studies at country level to assess the local situation of the trucking industry, how state taxation policies are affecting fuel pricing, and levels of vehicle imports, their implications for transport costs and prices and how necessary interventions can be best operationalised (ibid 106). They also urge (ibid 106) coordinated support from the donor community for changes in regulation (such as trucking deregulation) which require policy dialogue for institutional change.

These points are reiterated by Raballand and Macchi [2009 <http://ipl.econ.duke.edu/bread/papers/0809conf/Raballand.pdf>], based on their study of trucking services in Africa. They state that ‘in most cases, investments in roads will probably not lead to a decrease of transport costs for end-users of transport services’ [p.1] and ‘contrary to what most literature has presented, transport costs are not excessively high in Africa’ [because variable costs such as high fuel cost, old age of truck fleets and road conditions are offset by lower fixed costs than in Europe due to much lower wages and lower capital costs from using aged truck fleets] ‘but transport prices are, especially in Central Africa mainly due to official and unofficial market regulation and structure in trucking services’ [ibid p.3].

Corruption in the African transport sector is widely reported but rarely documented in any detail. It is probably most obviously associated with the road construction sector: Kenny (2009: 326) emphasises how impacts of such ‘grand’ corruption affects associated transport services. In many contexts, however, it is petty corruption in the form of harassment of transport services by law enforcement agencies that is perceived to be the principal problem, as Ubogu et al. (2011) show for Nigeria. A questionnaire to truck drivers working along the two major port-hinterland corridors found that this was the highest ranking problem (associated with numerous checkpoints and ‘toll gates’ – here truckers and cargo owners make ‘non receipted payments to public agents for no obvious reasons’ [p.110]. Traffic delays are the second most important difficulty, and armed robbery the third. Police in many countries supplement their wages by harassing taxi and other transport drivers – in Cameroun, taxi drivers reportedly went on strike in 2004, because many police were imposing more than the usual [accepted] level of bribes (AAPG 2006).

## 9. NEW INTERVENTIONS: THE POTENTIAL OF MOBILE PHONES AND OTHER ICT DEVELOPMENTS TO IMPACT ON TRAVEL

ICTs – principally mobile phones – now seem to be starting to fundamentally change the organization of travel in many African households. In the context of an increasingly carbon-constrained world and the search for more sustainable transportation, potential interactions between the expanded virtual mobility facilitated by mobile phones and physical transport services are of great importance. In Western contexts, where there has been considerable interest in examining the interactions between expanded phone (and other ICT) use and trip-making behaviour, Kwan 2006 suggests that, while travel patterns may to some extent be reconfigured in time and space, there is likely to be no reduction in travel, and indeed there may even be an increase, because people need to spend less time at home performing activities or making arrangements that can now be conducted on the move. The potential for substituting travel to work with tele-working from home (using a variety of ICTs) has been seen as a means of reducing urban traffic congestion in Western contexts but appears unlikely to live up to early predictions of travel reduction, not least because face-to-face interaction remains so important in a business context (Line et al. 2010). Social networks are vital not only for developing the trust needed for economic interactions, but for a wide range of livelihood-related activities including influencing the political process and building safety nets: they are crucial for poverty alleviation and growth. Urry (2012) argues that much travel involves making new connections and extending or sustaining one's networks. 'Network capital' is presented as a key concept – the capacity to engender and sustain social relations with those people who are not necessarily proximate and which generates emotional, financial and practical benefit. Even in the global world in which Urry's study is set, trust and tacit knowledge still seem to presuppose intermittent co-presence from those often distant.

Face-to-face interaction is of even greater significance in Africa, where personalised relationships are crucial in business. However, when the value attached to personalized relationships is balanced against factors of widespread poverty and irregular, sometimes very dangerous transport, the potential for some mobile substitution for travel may be greater than in Western contexts. Firm evidence is sparse, but when respondents were asked about any perceived linkages between phone use and personal travel in a child mobility study (Porter et al.,

2012), many of those questioned, particularly in rural locations, suggested that mobile phones were already – or would in the future- reduce their need to undertake journeys. The cost differential between a phone call and travel was observed by many respondents, though there were also references to other benefits: saved time, effort and avoidance of potential travel dangers. Better distance management through phone use can be expected to be particularly closely associated with populations with very low disposable incomes, and/or whose physical mobility is limited (for instance by disability or infirmity).

Earlier research by Samuel et al. (2005) in South Africa and Tanzania also suggests that phones are substituting for travel. They found particularly substantial impact in Tanzania (related to its many poor roads and limited public transport), such that 91% of those surveyed (N=223) said that the phone had impacted on them because they could call rather than travelling to family and friends (compared to 77% in South Africa, where N=252). But even in South Africa, only 4 out of the 10 communities surveyed had a regular bus service to the nearest town: the round-trip journey cost about R15, compared to a typical pre-paid voice call of R5. In Tanzania, 67% reckoned that phone use had made a large saving in travel time and 65 % a large saving in travel cost, while in South Africa 52% reporting large time savings and 58% large cost savings.

Similar transport savings have been observed among *aso oke* weavers using mobile phones in Nigeria. Journeys and face-to-face interactions have not disappeared entirely, but perceived savings are expressed in terms of comparing call costs with transport costs (i.e. not including the capital cost of the phone), such that a call rate of N50 (\$0.40) per minute is cheaper than a taxi cost for an average journey of, say, N1,000 (\$8), since calls are normally completed in less than five minutes (Jagun et al., 2008). In Niger, an average trip to a market 65 kilometers distant will involve a grain trader in a 2-4 hour round-trip, as compared to a two-minute call. Based on a local daily wage of 500 CFA francs (\$1 U.S.) per agricultural labourer, a mobile phone will reduce search costs by 50 percent as compared with personal travel (Aker and Mbiti 2010). In rural Kenya, M-PESA's wide agent network and presence in rural areas is also reportedly helping to reduce travel (Morawczynski 2009). In some cases, respondents in this study observed that, prior to the advent of M-PESA, the travel cost to obtain their cash had amounted to nearly one third of the total sum remitted.

The literature cited above concerning the use of mobile phones in trading and money transfer contexts suggests that travel is made more *efficient* – phones were observed to cut travel costs and time, reducing the number of long, potentially hazardous road journeys on poor roads in badly maintained vehicles, in regions with among the world’s highest accident rates and where highway robbery and other types of harassment associated with travel are widespread. Moreover, from observation and anecdotal evidence, mobile phones are also starting to help improve transport service operations in some locations. Samuel et al. (2005) cite the example of taxi drivers in Tanzania, who used their mobiles to request additional taxis when there were many people waiting for transport, thus reducing customers’ waiting time and increasing their own income. The potential for developing more efficient transport systems through integration of transport with mobile phone communication in Africa is substantial and already taking place [e.g. evidence from AFCAP HelpAge project, Tanzania].

## 10. TRANSPORT SERVICES, ENVIRONMENT AND CLIMATE CHANGE

Although Africa's automobility is far below that of other regions, stronger recognition of potential environmental changes associated with growing motorized transport usage is beginning to emerge. In the first place, motorised vehicles mostly consume non-renewable fuel resources which in Africa commonly have to be imported. The future of road transport worldwide, being currently reliant on carbon-based liquid fuels is, in any case, largely unclear (Charles et al. 2011). Secondly, growing numbers of motorized vehicles, even in rural areas, raise concerns about air pollution and associated environmental damage, likely to have strongest impact on the real income and welfare of the poorest.

Environmental impacts in rural Africa associated with roads *per se* have attracted more attention than the specific impact of transport services as yet. An early key text (Tsunokawa and Hoban eds 1997) focuses largely on road construction rather than road use, though it includes a chapter on air quality, and refers to issues such as vehicle noise pollution. Teravaninthorn and Raballand (2008: 92) strongly advocate a review of secondhand truck import policy in Africa as it has important implications for climate change (in addition to road safety and transport costs) since old vehicles are fuel inefficient and polluting. They also call for a reassessment of fuel taxes, especially in landlocked countries. Fuel taxes are widely used as an easy means of recovering road maintenance costs from road users, but with significant impact on transport costs and prices. In Africa, fuel costs comprise at minimum 40% of total VOCs, and fuel comprises at least 50% of that.

The high energy intensity of road transport in Africa, associated with aging and inefficient vehicles is recognized in the UNECA et al. report (2012). This report emphasises that Africa's demand for energy will keep on rising with the ever-increasing need for mobility in the efforts to eradicate poverty and achieve sustainable development and that this growth will call for increased consumption of energy, mainly petroleum products, or emerging alternatives. With the rapidly increasing motorized means of transport in Africa, the sector has become the fastest growing source of greenhouse emissions on the continent.

Climate change, wherever instigated, is likely to present particularly significant challenges in sub-Saharan Africa, with food security a key issue for many regions and improved transport services a vital component in responding to food security challenges, though recent work has also examined potential impacts of sea-level rise (Friedrich and Timol 2011). There is now a substantial and growing literature on climate change and Africa but specific consideration of transport services issues is rare. Banister and Hickman (2012 in press) examine the role that different types of scenario [forecasting, exploratory and backcasting] can play in helping to derive different transport futures in the context of climate change and, although they apply this to an urban Asian example, the broader discussion is relevant to African rural contexts. They stress the importance of a longer-term perspective in approaching need for decarbonising and the importance of engaging decision makers at all levels in a fully participatory process to confront the need for action on both mitigation and adaptation. They also note the potential of 2- and 3-wheel vehicles if cleanly fuelled, and the need for major investment in walking and cycling facilities [segregated routes so that they are safe from motorized transport incursions] and promotion of increased freight transport by rail. However, their strongest message - about the need for scientific researchers to engage with policy makers to bridge the current implementation gap and develop a new dialogue - is most relevant of all. Certainly, planning for Africa's rural transport services in the context of climate change is an area where work has barely commenced and is urgently needed.

## CONCLUSION: RURAL TRANSPORT SERVICES, POVERTY AND GROWTH

At this point it is appropriate to return to the 2000 review by Booth, Hanmer, and Lovell, *Poverty and transport*, which I used as a key baseline study for the report. Lack of attention to social science research outside transport has continued to prevail widely within the transport field, despite its important contribution to understanding poverty issues. Against each of Booth et al.'s points reported in the introduction, I note progress to date and other relevant comments [in italics]:

- Existing assessments of the impact of transport spending on poverty are limited to roads. *Despite efforts to redirect this focus since 2000, this remains the case, hence the importance of IFRTD's Transport Services Indicator study under the current AFCAP programme.*
- Studies of rural transport needs tend to focus on rural communities per se; they seldom differentiate between poor and non-poor within communities. *This is now less the case – there has been much research focused on women as transport users, some more recently on children and on older people [the latter principally involving a current AFCAP-funded study in Tanzania]. Nonetheless, the need for a stronger focus at the household level remains an important argument in Banjo et al. 2012.*
- Population density influences transport services supply; it is a structural condition which shapes the potential for transport interventions. *Population density continues to shape transport availability – a point strongly made in Linard (2012) which highlights continuing large inequities in access, the isolation of many rural populations and the challenges that exist between countries and regions in providing access to services.*
- All-weather rural roads improve access to schools and markets but roads are not enough. *This has been a persistent message in transport services studies over the last decade. The focus on transport services has increased, including within AFCAP, but transport services research continues to attract only a very small proportion of funds in all donor agencies.*

- Lack of affordable transport services or means of transport can mean that provision of transport alone may not alleviate this constraint.

*Affordability issues have attracted greater attention [not least through the 2008 World Bank title which refers to this point]. Motorcycle taxi transport is one of the modes which has expanded dramatically in many parts of Africa since 2000 – it is usually expensive by comparison with the minibus taxi but often still brings emergency transport services to the relatively poor, which are highly valued. Perhaps most significantly, motorcycle taxis can usually operate even where road access is poor. However, the importance of competition in motorized transport services development cannot be over-emphasised – it is a critical pre-condition [unless subsidies are available]– otherwise there is no incentive for existing transport providers to improve their service or pass on savings on vehicle operating costs to customers. Competition requires demand, which is usually closely linked to population density and wealth [agricultural/mining potential of the area, plus possibly also government encouragement of local marketing etc. ], confidence about regular road maintenance, the removal of formal barriers [such as restrictive government regulation like unnecessary army/agricultural ministry road checks] and informal barriers [cartels and rent seeking]. In some remote places, demand will be so low that it will be necessary to consider the role of credit and subsidy [see Starkey et al 2001 p.5 -]. There is limited experience of formal transport subsidy in Africa, except in South Africa where provincial governments contract and pay subsidized bus operators. Walters (2012) in a broad paper on public transport in South Africa [without specific reference to rural contexts] highlights the cost and complexity of managing transport subsidy interventions, especially in the informal sector.*

- Lack of information on the relationship between health and education outcomes and improvements/deterioration in transport service conditions.

*Health researchers, in particular, have started to take a keen interest in rural access issues, now recognizing that physical access constraints are a very common component of overall failure to access health services, not least in the case of maternal and neonatal health. More monitoring of the impact of improvements/deterioration in transport services is still urgently needed; this is currently being explored in two AFCAP research*

*projects on the impact of ambulance services. Research quality in this field can be improved substantially by stronger multi-disciplinary team-working involving health and transport specialists. By contrast with the health sector, education specialists continue to pay little attention to the significance of transport and physical access to schools: recent studies of child mobility emphasizing the impact of distance and poor/absent transport services on child school attendance, lateness and drop-out will hopefully attract some attention. [A booklet produced by child researchers themselves has been distributed in schools and education ministries in two countries with support from AFCAP: available at [www.dur.ac.uk/child.mobility/](http://www.dur.ac.uk/child.mobility/)].*

- There is a strong correlation between poverty and remoteness or residence in a disadvantaged region, i.e. associated with geographical or political bias.  
*Remoteness was subsequently one focus of a major UK research project focused on chronic poverty, but much literature focused on remoteness still tends to limit discussion principally to infrastructure provision and roads per se (if it discusses transport issues at all; there is a tendency to focus simply on distance and national policy neglect of regional inequality), without adequately taking into account the crucial significance of associated transport services.*
- Agricultural transport demands in poor communities are often higher regarding production and harvesting than crop marketing. Poor people rarely own means of transport, so walking, cycling and animal traction predominates. Local transport services often involve NMTs and animal traction and can be an important income source for operators. *Research on transport issues in the agricultural sector has remained sluggish. Hopefully the latest SSATP report [Banjo et al. 2012] will re-energize work in this sector. The role of transport services in rural employment – including as an employment niche for the poorest i.e. in portage, cart pushing, and as a growing area of youth employment as motorcycle taxi operators – requires attention.*
- Research on gender relations and transport is rich and abundant.  
*Yes, and gender-focused transport research continued in the early 2000s. However, the pace of gender-focused research has subsequently slowed in the transport sector, not least because findings have not generally translated into improved transport options for women. Cynicism around policy makers ‘ticking the gender box’ has grown. The*

*situation is unlikely to change without a substantial increase in transport and other ministries' capacity to address the gender transport challenge. This is one of the reasons why an AFCAP transport services course focused on improving capacity in African ministries and universities is to be piloted.*

- Women have distinctively heavy, time- and energy-consuming transport burdens. A majority of goods transport to meet subsistence needs is by headloading/ pedestrian load carrying and the majority of this is undertaken by women.

*Pedestrian portage remains a massive burden across rural Africa, in the absence of cheap transport, not only for moving agricultural produce but also for water and fuel in the domestic context [in the near absence of piped water and electricity]. Recent research on load carrying in rural communities has emphasized the substantial role that is played by children but commonly subsumed under women's work. The long-term health impacts of headloading on women, children and men are only known anecdotally, and remain un-researched: an important research issue which falls between the stools of medical and transport funding.*

- Women are less likely to benefit from transport interventions than men and are much more likely to travel within the village than beyond it. As the novelty and scarcity of technology declines, women are more likely to obtain direct access. Substitution of IMTs – where men allow it and the technology suits women's use - could help women with their domestic loads but may not necessarily show a direct economic rate of return.

*Reduced novelty of transport equipment may allow more use by women, but the tendency to ignore women in transport interventions has continued. Nonetheless, further research has confirmed the suggestion that IMTs can still help women by reducing their portage workload, even in cases where they do not gain control of the equipment. In the context of a low-carbon future, greater attention to promoting contextually-suitable IMTs is required. Cost of IMTs remains a major issue among the very poor, including many women [especially older women]: attention to building critical mass of key equipment and research into novel ways of promoting equipment sharing, beginning in the most favourable locations, is urgently needed to reduce costs and increase acceptability.*

- Some of the solutions to women's transport problems may be found in non-transport measures, particularly those based on increased proximity of essential services. Labour

resources released by reducing women's transport burden would probably be reallocated to beneficial reproductive or productive activities.

*The importance of non-transport interventions which can complement transport service improvements still requires emphasis. The value of non-transport interventions (such as boreholes, fuelwood plantations, portable grinding mills, girls boarding facilities at schools, maternity waiting homes) has continued to be noted regularly by transport researchers, but in the absence of strong inter-sectoral connections (e.g. to agriculture, energy, health) such priorities seem to have been ignored.*

- The need for consultation with key stakeholders from national to community level, including from poor people, in policy- and planning- formulation processes.

*Consultations with key stakeholders and participatory studies at community level have been pursued to a much greater extent since 2000 in policy- and planning- formulation processes. However, at national level, input is restricted by limited capacity but growing demands for participatory input in all sectors. At community level, there are indications that many communities [especially those in accessible roadside locations] may be becoming weary of time-consuming participatory consultations without perceived subsequent benefit.*

- Not all social and economic effects of investments in rural transport infrastructure are wholly benign: they may exacerbate exposure to risk [e.g. disease diffusion], or take income away from poor women or other groups.

*This point has been further emphasized since 2000, notably through work in the HIV/AIDS field, but also by reference to women's loss of market income in off-road areas where markets have declined following road improvement/construction. There are also growing concerns about road accident levels, which disproportionately affect more vulnerable pedestrians, cyclists and other IMT users.*

- The importance of a multi-sectoral approach to poverty alleviation, with transport services considered in relation to other needs. The impact of an intervention in infrastructure on poverty will depend on the net effect of outcomes in related product and factor markets on poor people's livelihoods. Moreover, improved access to transport services, increased ownership of means of transport and improvements in the transport infrastructure most used by the poor are all required to have an impact on poverty.

*Transport services continue to be a Cinderella in the development world, despite efforts from transport specialists to emphasise the significance of transport to all the MDGs since 2000. Building linkages to other sectors must be a key priority for transport professionals if transport is to achieve a stronger profile in post-MDG development strategies.*

- Policy usually favours mobility over accessibility [following Western approaches]- i.e. it favours those already mobile, especially vehicle owners and users. Need for government policies [eg reduced bicycle tariffs and import duties on spare parts; road design to include NMTs; regulatory frameworks that minimize opportunities for corruption] to support the poor.

*Policy continues to favour mobility of those already mobile, though the massive expansion of motorcycle taxis [in association with mobile phone networks and ownership] is changing accessibility perceptions among the poor in many remoter rural locations in an increasing number of countries - not necessarily because it always improves general accessibility but because it enables emergency access. The need for road design in rural areas to take account of motorcycle taxis and other IMTs/NMTs is very urgently required. More remains to be done to encourage governments to reduce import duties and other tariffs on spare parts and IMTs. The adoption and implementation of regulatory frameworks which minimize corruption – grand and petty-remains a major challenge for the transport sector across Africa.*

- The poor are particularly vulnerable to road accidents since they are restricted to walking or public transport – i.e. the modes most vulnerable to traffic accidents. However, improved safety incurs costs which unless covered by government leads to higher user charges. *Road safety issues in Africa have grown rather than declined since 2000. However, the UN Decade of Action on road safety, initiated in 2011, may offer a significant opportunity to expand governments' attention and resource allocation to this issue. Attention to road safety in the third [NGO] sector is also likely to grow in the next decade, especially if donor funding encourages work in this area. AFCAP is supporting one innovative research project focused on road safety [Tanzania] including among motorcycle taxi drivers.*
- Lack of research on if/how waterways and railways meet the demands of the poor.

*Some research has been conducted on waterways since 2000 [a series of IFRTD-supported studies] but both waterways and railways remain relatively neglected research areas, particularly in terms of their potential to aid poor populations: roads continue as the principal focus of transport specialists.*

- Lack of research on improving rural transport at household level.

*This has received a stronger emphasis among transport services specialists since 2000. Nonetheless, the needs of individual user groups [notably young people and older people] require much greater attention; for instance, in the context of concerns about high youth unemployment in Africa, research into improving their physical access to work still presents a major research gap. However, experience in gender focused research is pertinent: research is an important first stage but getting findings transformed into action is likely to be a bigger challenge. As noted with reference to gender issues in transport, this will require significant capacity building in the ministries. AFCAP is supporting one research study on older people's mobility [Tanzania]; its planned pilot short course on transport services focused on users is aimed at building improved capacity in ministries and universities.*

- The need for:

- More consultation with poor women and men,

*As noted above, the need is not simply for more consultation with poor women and men but for carefully prepared plans - made prior to and in conjunction with consultation - to ensure that action follows. This in turn depends on increased capacity among policy makers and practitioners to enable them to respond to consultation findings.*

- implementation of credit schemes to allow women to buy IMTs,
- provision of affordable and appropriate IMTs,

*A series of studies since 2000 have highlighted the complexities of IMT intervention. Credit provision per se may not present an adequate incentive for women to buy IMTs, unless the IMTs are appropriate and affordable. This in turn requires a stronger commitment to IMT in terms of scale- many schemes have been piece-meal small interventions promoted by hobbyists, or when larger in scale have failed to undertake the careful pilot ground work necessary for success [the World Bank-supported VIP project in Ghana is a good example].*

- Search for relevant non-transport solutions

*This literature review has illustrated the many ways in which improved transport services are vital for rural poverty alleviation and economic growth; they are needed for intra-village, intra-rural (within and outside the region), and rural-urban movements. However, it is important to keep in mind the fact that the primary objective of transportation is to connect people (and their goods) with the places they need to reach – of bringing destinations closer to the user - a means to an end, not an end in itself [Cevero, in press, writing on urban contexts] and all-weather road construction is expensive. This suggests the value also of a stronger emphasis on non-transport interventions, notably more extensive service provision, which could often be among the most effective means to improve access. Nonetheless, suppliers and operators of services such as health centres and schools tend to require physical road access ‘even if the service users do not!’ [Davis 2001:16]. Not only are teachers and health workers certainly very resistant to postings in remote locations away from the paved road but, in areas of low population density – often very remote areas - it tends to be difficult to justify the heavy investment in services which would be required to reduce trip distances. Under state decentralisation programmes, sectoral approaches have unfortunately tended to work against holistic service and road planning. Again, this reinforces the argument for stronger cross-sectoral alliances.*

- Information to women about their rights to mobility and options available to achieve greater mobility,
- development and enforcement of regulations re women’s safety when walking and using public transport services

*As noted above, getting women-friendly transport actions into policy and practice has to date proved enormously difficult. Concerted efforts at capacity –building are essential if the situation [not just for women but for other mobility/transport disadvantaged groups] is to be improved.*

- Attention to corruption affecting transport services operation

*Corruption may adversely affect all aspects of transport services operations in sub-Saharan Africa. State interventions have, to date, mostly proved ineffective in its eradication, especially where petty corruption (such as unofficial tolls along roads) is concerned. Social networking approaches, utilizing devices such as face-book and mobile phone messaging and radio phone-in programmes - may offer one of the most effective routes to exposing and reducing corruption as mobile phone and associated internet access and usage expands in rural areas [i.e. exposure of corrupt individuals, organizations, vulnerable sites, etc.], possibly along the lines currently used through Ushahidi to address conflict.*

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