POVERTY AND URBAN TRANSPORT IN EAST AFRICA:
REVIEW OF RESEARCH AND DUTCH DONOR EXPERIENCE

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with
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A report prepared for the World Bank

December 2000

International Institute for
Infrastructural, Hydraulic and
Environmental Engineering
# ACKNOWLEDGEMENTS

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This report results from the efforts of a number of people who assistance is gratefully acknowledged. In Tanzania Mrs Rustica Tembele (social scientist; pilot team leader Temeke) and Mrs Asteria Mlambo (planner) both of the Tanzaniana national team on urban mobility and non-motorised transport (NMT) were responsible for case studies, data collation, updating of information, and commenting on the accuracy of drafts of the report. Mr. Tom Opiyo, national team leader Kenya performed an identical function. Mr. Jan Fransen - formerly of the International Labour Office (ILO), Advisory Support, Information Services, and Training (ASIST) Nairobi, and now urban poverty adviser at the Institute for Housing and Urban Development Studies (IHS), Rotterdam, The Netherlands - provided specialist inputs on the Hanna Nassif settlement upgrading project in Dar es Salaam; international experience with the provision of transport infrastructure for low income settlements; and the urban poverty and development assistance literature of East Africa. He also commented on the accuracy of the draft report. Mr. Richard Sliuzas and Drs. Sherif Amer supplied information about the research activities of the International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, The Netherlands in Dar es Salaam, and the specific Annex on planning public health care facilities. Dr. Deborah Bryceson (socio-economist) of the Afrika Studiecentrum, Leiden, The Netherlands provided specialist knowledge of livelihoods development in SSA, the socio-economic content of the report, and edited the final manuscript. Mr Marius de Langen (IHE) read critical sections of the report and made a number of helpful suggestions. Useful comments were also received from Ms Lucia Hanmer Overseas Development Institute, and Mr. Gwilliam and Mr. Ejbergen of the World Bank. However, responsibility for the main drafting, opinions expressed, and accuracy of the final report rests with Professor John Howe of IHE.

J.D.G.F. HOWE
November 2000
## ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ASIST</td>
<td>Advisory Support, Information Services, and Training</td>
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<td>CBD</td>
<td>Central Business District</td>
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<tr>
<td>CBO</td>
<td>Community Based Organization</td>
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<td>dala dala</td>
<td>Tanzanian share taxis</td>
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<td>DSM</td>
<td>Dar es Salaam</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GoK</td>
<td>Government of Kenya</td>
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<tr>
<td>GPT</td>
<td>Graduated Personal Tax</td>
</tr>
<tr>
<td>gurudumu tatu</td>
<td>Pedal-operated load carrying tricycles</td>
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<tr>
<td>IHE</td>
<td>International Institute for Infrastructural, Hydraulic and Environmental Engineering</td>
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<tr>
<td>IHS</td>
<td>Institute for Housing and Urban Development Studies</td>
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<td>ILO</td>
<td>International Labor Office</td>
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<td>IRAP</td>
<td>Integrated Rural Accessibility Planning</td>
</tr>
<tr>
<td>ITC</td>
<td>International Institute for Aerospace Survey and Earth Sciences</td>
</tr>
<tr>
<td>Jua kali</td>
<td>Literally working in the hot sun</td>
</tr>
<tr>
<td>KBS</td>
<td>Kenya Bus Services</td>
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<td>KUTIP</td>
<td>Kenya Urban Transport Infrastructure Program</td>
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<tr>
<td>matatu</td>
<td>Kenyan share taxis</td>
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<tr>
<td>NCC</td>
<td>Nairobi City Council</td>
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<td>NISCC</td>
<td>Nairobi Informal Settlements Coordinating Committee</td>
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<td>NMT</td>
<td>Non-Motorized Transport</td>
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<td>SCP</td>
<td>Sustainable Cities Program</td>
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<td>SIDA</td>
<td>Swedish International Development Cooperation Agency</td>
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<td>SSA</td>
<td>Sub-Saharan Program</td>
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<tr>
<td>SSATP</td>
<td>Sub-Saharan Africa Transport Program</td>
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<tr>
<td>UDA</td>
<td>Usafiri Dar es Salaam (bus company)</td>
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<tr>
<td>UMU</td>
<td>Urban Mobility Unit</td>
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<tr>
<td>UNECA</td>
<td>United Nations Economic Commission for Africa</td>
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<td>UNEP</td>
<td>United Nations Environment Program</td>
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EXECUTIVE SUMMARY

1. This report reviews Dutch-funded development assistance to the urban transport sector in East Africa. It aims to enhance understanding of the direct and indirect ways by which the well-being of poor households is shaped by the availability and nature of transport infrastructure and services. Two metropolitan cities (Dar es Salaam and Nairobi), and two secondary cities (Eldoret and Morogoro), one each in Kenya and Tanzania, provided the focus for the study.

2. The review pivots on the studies of urban mobility and non-motorized transport among low-income households conducted between 1993 and 1999 as part of the World Bank and UNECA Sub-Saharan Africa Transport Program in the above mentioned cities. These were complemented by studies of transport infrastructure improvement and infrastructure-upgrading projects using employment-intensive, community-based methods. The latter took place in a low-income informal settlement (Hanna Nassif) in Dar es Salaam. Another study cited in this report used innovative accessibility concepts to reveal the mobility patterns connected with the health-seeking behavior of Dar es Salaam's poor.


THE CITIES AND THEIR POOR

4. The study cities appear to be reasonably representative of conditions in much of SSA. While some of the poor can be found in settlements on the urban periphery, it is a false though popular stereotype to assume that this characterizes the urban poor's settlement patterns. In most cities the poor are widely dispersed, even where informal settlements are spatially concentrated. In fact the proliferation of informal settlements throughout urbanized areas, as well as the existence of poor households even in nominally wealthy areas, is the norm. In transport planning and policy, it is better then to think in terms of poor cities characterized by significant personal mobility constraints, rather than treating the city's poor as isolated cases with special travel and transport needs. Thus, targeting projects to informal settlements will actually miss a lot of the poor and should be seen as short-term remedial measure, until local governments are able to implement more general pro-poor policies.

5. The current transport situation in the study cities reflects two to three decades of economic and social stagnation and decline. The most important casualty of this process is not the conspicuous physical deterioration of infrastructure and services, which is especially severe in the areas inhabited by the poor, but the collapse of civic authority as represented by the informal privatization of land and public transport markets. Not only has this brought disbenefits to the poor, more worryingly it has undermined the whole notion of centrally coordinated and regulated transport development.

6. The regulation of land and public transport markets are obvious targets for reform. More generally there is a need to strengthen - and in some cases create - municipal capacity to regulate the private sector so as to reduce corruption, especially in the capital cities, and to plan in a pro-poor way.

BASIC NEEDS

7. In the past few decades, public investment in the urban transport sector has mainly been concerned with crisis management. There has been little attention given to the issue of
its contribution to meeting basic needs, or even clarity in identifying what these needs might be. However, consideration of their special nature in urban areas indicates that the notion of core basic needs is a useful concept for poverty-focused transport planning. These can be defined as the need for employment (as a proxy for income), and access to health, education, water and energy supplies. In an urban context, employment is so crucial that there is an argument for regarding it as a direct rather than indirect approach to poverty alleviation, and this consideration could be beneficially incorporated into assessments of transport investments.

8. The deterioration in route infrastructure, which all cities have experienced, has had identifiable negative influences on the livelihoods of the poor through fare increases and, under extreme conditions, the withdrawal of transport services. Similarly the change in passenger service providers from stage buses to share taxis has resulted in the loss of cross-subsidies on low-demand routes, and the effective withdrawal of fare reductions to school children and (probably) to other concessionaires.

9. Positive influences on the livelihoods of the poor have resulted from employment-intensive, settlement infrastructure upgrading schemes; the privatization of bus passenger services which has generated unskilled employment opportunities; and the new services provided by non-motorized goods vehicles.

TRAVEL BEHAVIOR
10. The increasing importance of informal sector activities as a source of income for the poor is changing the nature of travel behavior. Commuting peaks remain, but they are overlaid, in both space and time, by more complex irregular movements associated with trading, hawking or employment-seeking. These spatially and temporally diversified activities are little understood and need further research, but they appear to require more flexible transport systems for people and goods than the heavily radial movements provided by existing public transport systems.

11. There is evidence from Dar es Salaam that in the last five years the informal privatization of transport services has reduced the former radial orientation, by the creation of feeder operations, and in so doing is producing a more dense pattern of urban settlement. Densification has also been facilitated by government provision of car and housing allowances as a way of raising incomes in the public sector.

12. Motorcycle-based passenger services have become established in both West (Benin, Nigeria) and East (Uganda) Africa. Although they give rise to significant environmental problems – air pollution, accidents – their ability to operate under low demand densities, penetrate congested areas, and flexibility gives them inherent advantages over conventional services. It is thus likely to be difficult to resist their more widespread introduction.

13. From a household perspective these are pre-eminently cities in which walking dominates. Public transport is next in importance, with cycling as the potentially third most important mode – a potential that presently, for safety reasons, can only be fulfilled in the secondary cities. The evidence is emphatic - unsafe conditions are the most important single cause of reduction in cycling as a mode of transport. Anecdotal evidence also supports the contention that it is a significant restraint on walking, especially for schoolchildren and women.

14. All of the modes used by the poor - walking, cycling and public transport - are inadequately provided for. This raises their cost of transport, estimated to be as high as 30 per cent of household income for those in the most remote suburbs. High transport costs
reduces the poor's access to basic needs and erodes the monetary returns and efficiency of their economic activities. It also raises the total cost of urban transport thereby reducing municipal and national economic efficiency.

15. The total cost of transport is high partly due to modal inefficiency, but also because there is a severe distortion in the overall transport cost distribution. Travel by private car meets less than 10% of demand, but incurs over 50% of total system costs. By contrast, walking meets almost half of trip demand but accounts for only 1% of total costs. These distorted cost distribution patterns represent a serious misallocation of economic resources and transport policies should aim at their reduction.

**TRAVEL PROBLEMS**

16. Users are vocal and explicit about the travel and transport problems they experience. All the modes of transport used by the poor - be they for the movement of people or goods - have lost out in the competition for policy attention and funding. Walking, cycling, and the operation of handcarts have at best suffered from neglect, and at worst active harassment. They operate in a hostile environment with high levels of danger and insecurity, especially to women and children. Accident statistics confirm the accuracy of users' views.

17. In the metropolitan areas users have little expectation things will get better. Civic authority has simply lost its credibility. Decades of empty promises, non-delivery of services, and seeming helplessness in the face of free market forces, has left a legacy of mistrust among the poor which could take decades to eradicate. No clearer evidence for this can be found than in the *raison d'etre* for the establishment of the Nairobi Informal Settlement Coordination Committee. Municipal government has lost its capacity to provide necessary infrastructure and coordinate urban development in the informal settlements, and in the city as a whole. It is symptomatic of this situation that in Africa the most successful example found of program-scale transport infrastructure investment with a clear poverty-focus, is directed by an international NGO - CARE-Ethiopia - not civic government. In the study cities, UN agencies and NGOs rather than municipal governments have pioneered projects for infrastructural provisioning in informal settlements.

18. The secondary cities generally present more benign travel and transport conditions than their metropolitan counterparts - mainly because of the economies of scale associated with their small size - but they are heading rapidly in the same direction of congestion and inefficiency. Their informal settlements are growing in number and density. This implies that inadequate internal transport systems and other service distribution mechanisms will worsen with time. While the secondary city civic administrations seem more cohesive, and consequently have retained a degree of trust among the governed, there is a similar backlog of infrastructure works and service negligences. The restoration of services and financial and regulatory problems, especially related to land and public transport, remain unresolved.

**POVERTY FOCUSED POLICY INTERVENTIONS**

19. As a result of the hiatus in investment and civic administration there have been few officially inspired urban transport policies and interventions focused on the poor. Most have been at the initiative of aid agencies, NGOs, and local stakeholders. Project-scale activities have dominated with correspondingly limited accounting of the effects and impacts of transport on the poor.

20. The most promising interventions have been directed at improving the transport infrastructure in informal settlements, and the SSATP pilot interventions to increase the mobility of low-income inhabitants, both of which have clearly identifiable benefits for the poor. Road and footpath improvement can be successfully embedded in a diverse program...
of employment-intensive works. Improved mobility and facilitation of solid waste collection were immediate effects in the case of Dar es Salaam’s Hanna Nassif program. Short-term employment creation was a significant poverty-alleviating benefit while longer-term skill creation and materials provisioning provided forward and backward linkages, respectively. Improved productivity, health and reduction in house repair benefits, were due to the concomitant flood relief.

21. Specific measures to reduce household travel costs are also identified in the report. It is estimated that overall household travel costs could be reduced by 50% within a decade.

22. The informal settlements’ overcrowding creates special internal access problems, which cannot be dealt with through conventional transport planning approaches or implementation mechanisms. However, participatory planning of infrastructure improvements and community contracting have shown promising results.

23. From the perspective of the poor, measures to suppress the non-motorized providers of goods services are misguided. They have a strong symbiotic relationship to the petty hawking and trading activities that sustain their livelihoods. They are likely soon to be joined by two-wheeled providers - motorized and non-motorized - of passenger services that are abundant in Uganda and some West African cities, since these provide the flexibility of service the poor need.

QUESTIONS AND ISSUES

24. It is important that the orientation of investment identification and planning, be changed from a focus on vehicles to one on people. As this analysis has shown, travel problems, modes of use and many other characteristics look very different depending on whether they are viewed from the (poor) household upwards, or the transport system downwards.

25. In common with most previous studies mobility and income criteria were used to characterize travel and transport, and poverty, respectively. They revealed useful insights, but both criteria have limitations as a means of establishing a deeper understanding of the relationships between poverty and transport.

26. Poverty is a complex phenomenon that requires both quantitative and qualitative descriptors, especially in relation to basic needs. Moreover these descriptors exhibit significant spatial variation that cannot easily be compared with mobility criteria that are not spatially defined. It is the accessibility that a transport system provides which is of fundamental importance to the extremely poor and this exhibits strong spatial variations. GIS-based techniques and accessibility criteria offer a powerful but flexible way of exploring the complex spatial variations and inter-relationships between urban poverty and transport.

BEST PRACTICE AND LESSONS

27. The documented approaches to the upgrading of low-income settlement transport infrastructure, and improving the mobility of the low-income population, are two means of providing immediate benefits to the poor. In both cases the focus is on improving the transport system available to poor people rather than to vehicles. They can easily be targeted on specific locations.

28. For the largest cities, with weak civic and professional institutions, that will have to be painstakingly rebuilt, we conclude that the most effective immediate pro-poor policies would combine: (i) restoration of an efficient network of walking routes by rebuilding sidewalks and construction of missing links, especially footbridges; (ii) direct targeting of the severe access
problems experienced in the informal settlements; and (iii) measures to reduce accidents on the arterial roads where they are concentrated.

29. The poor road accident situation in all urban areas suggests the need for a complete re-think of existing approaches to safety education. The studies indicate that at present there is widespread ignorance among all user classes concerning basic safety behaviour protocols.

30. In the metropolitan cities transport and poverty-related problems are much worse than in their secondary counterparts. There are very real diseconomies of scale with increasing size. A key aim must therefore be to prevent these problems becoming entrenched in the secondary cities. Transport policy principles and strategies are given in the report to achieve this objective.

31. The focus of these studies has been East Africa. Although conditions in Asia and South America differ in some respects - with a higher proportion of motorized and non-motorized two wheelers in the former, and higher levels of personal car motorization in the latter - the transport problems of the extreme poor are similar everywhere. Thus, the direct targeting of access problems and safety oriented measures should be applicable.
1 – INTRODUCTION

BACKGROUND TO THE STUDY

1.01 The International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE) was appointed by the World Bank to carry out a review of Dutch experience in the field of urban transport with a focus on developing countries. The purpose of the review is to enhance understanding of the major direct and indirect ways in which the well-being of poor households located within or on the periphery of urban areas is shaped by the availability and nature of transport infrastructure and services. The review paper is expected to collate experience and best practice on different topics in urban transport, identify critical problems and issues, and describe the outcomes of interventions, and different organizational models.

1.02 These aspects are to be investigated on the basis of an in-depth review of three or four urban areas in countries in which Dutch development assistance has been given. This criteria is most comprehensively met by the studies that IHE has been directing in East Africa from 1993-2000 on behalf of the World Bank and United Nations Economic Commission for Africa (UNECA), with Dutch funding. They are part of the mobility studies of the Sub-Saharan Africa Transport Program (SSATP) and were specifically focused on investigating the role of non-motorized transport (NMT). Studies have been conducted in four cities, two each in Kenya and Tanzania. They comprise the two capitals, Nairobi and Dar es Salaam, and two secondary cities Eldoret and Morogoro, respectively. The general objective in reviewing these studies was to identify the lessons learned, and determine how, and under what conditions, Dutch donor experience in urban transport planning and administration in large and medium size towns might be adapted to other countries.

1.03 Additionally, two of the cities have been the location of innovative pilot studies of transport infrastructure improvements using employment-intensive, community-based methods that were deliberately focused on low-income informal settlements. Information from these studies and the NMT investigations were complemented by the extensive literature that exists for each city on poverty and urban studies.

1.04 One city, Dar es Salaam, has been the subject of extensive studies by the Division of Urban Planning and Management of ITC2 in the Netherlands. A summary of a study on planning public health care facilities is incorporated in the report because of its focus on one of the core basic needs of the poor and innovative use of accessibility concepts (Annex II).

1.05 Urban conditions and processes of change in the study countries are judged to be reasonably compatible with those in most of Sub-Saharan Africa (SSA) [Stren and White 1989]. Scrutiny of the data for the study cities suggests that there are significant variations in the availability and depth of the information on the different aspects that were to be investigated under the terms of reference. This is primarily a reflection of the meager resources that have been invested in the urban transport sector in the last three decades, with some cities more favored than others, but none being well endowed.

1.06 The crisis conditions existing in most SSA cities' transport infrastructure has resulted in such investment being primarily focused on immediate physical constraints and problem locations, what might best be termed a ‘fire fighting approach’. This has tended to give emphasis to the most evident motor traffic-related problems, such as congested highways and junctions. The approach has been vehicle rather than people-based.

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1 Detailed terms of reference are provided in Annex I.
2 Normally referred to ITC, its official name is the International Institute for Aerospace Survey and Earth Sciences.
1.07 Moreover, despite the steady growth of low-income groups in the urban areas of Africa, the mechanisms for coping with urban poverty were not studied extensively until the end of the 1980s [Harts-Broekhuis 1997]. The discrimination in poverty concepts and definitions, as they have evolved in the literature over the past decade [Baulch 1996, Maxwell 1999], is usually absent from that on transport. The transport literature - in general and specific to the study areas - delineates poverty mainly in terms of monetary income or consumption. This is not wholly inappropriate in an urban setting, since the need for money is a distinguishing characteristic of urban, as distinct to the rural, poor. However, it is difficult to assess the effects of transport provision on the more qualitative aspects of poverty, such as basic needs and livelihoods (see discussion in Section 2).

1.08 Until recently, poverty has been perceived as being a predominantly rural phenomenon and many aid agencies did not have general urban sector support programs or any specific to transport [Kolstee et al. 1994, SIDA 1999]. In contrast to rural areas, impact studies of the urban transport sector are virtually non-existent, precisely because significant scale public investment - in either infrastructure or services - has been equally uncommon [Fouracre et al. 1999]. It follows that there have been few large-scale, poverty-focused transport policies or interventions. Nonetheless there is experience to be teased out of a diversified range of urban development activities. Although it will be subsequently argued that urban poverty is more widespread than its most visible symbols – the unplanned settlements – these have attracted the attention of a plethora of agency and project activities in which transport has inevitably been, albeit small, a part. Fortunately the case study cities have been at the forefront of such activities in SSA.

STUDY FOCUS

1.09 There is an emphasis in this review on the two capital cities, since they have generated a more comprehensive range of appropriate studies than the secondary cities. Moreover, it is sometimes contended that such metropolitan areas pose more acute movement problems for the low-income urban population because of diseconomies of scale [De Langen 1997, Pendakur 1997, Mosi et al. 1998, Roberts et al. 2000]. So where possible, comparisons with the secondary cities will be made precisely to establish if there is any evidence of these scale problems. However, the secondary cities (50,000 to 500,000 inhabitants) are also significant in their own right as: (i) they are among the fastest growing cities in the world [Linden 1996]; and, as such, (ii) there are likely to be 1200 such centers in SSA by the year 2020 [Elong M'Bassi 1995]. Furthermore, there is a body of opinion that asserts that these cities are attractive as the locations for demonstration interventions because their transport problems are still manageable [De Langen and Koster 1997]. This in contrast to the near intractable conditions exhibited by many of the largest cities [The Urban Age 1993, Gakenheimer 1999]. Where possible the comparisons are extended to cities in the rest of Africa and other developing regions, as appropriate, so as to contextualize the findings within the existing portfolio of knowledge on the poverty and urban transport nexus.

1.10 The focus of the main East African studies4 reviewed here is on the urban mobility of the low and middle income populations, with special emphasis on that provided by non-

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3 Not only has Africa experienced extraordinary urban growth in the past few decades, more people have been moving away from small population centers into the major towns and cities. Whilst, in 1960, 44% of the urban population lived in small towns (with less than 50,000 inhabitants), this proportion has fallen to 29% in 1990 and, in 2020, will be around 20%. Some of this growth is contrived in the case of secondary cities due to the extension of boundaries; also natural population growth increasingly dominates immigration [Elong M’bassi 1995].

motorized modes – walking and cycling. They were not specifically focused on the poor as such, although low-income inhabitants, including the poorest, are the dominant users of NMT. In this context one of the earliest conclusions from the stakeholder workshops that initiated the Dutch research programs, was not to emphasize the connection between NMT and the poor because of its negative association [World Bank 1994a]. Given the heterogeneity of NMT - with a wide range of use and performance characteristics - it does not aid clarity of discussion to collapse poverty and NMT use into one concept [World Bank and UNECA 1994a]. Instead the studies focus on highlighting the inefficiency of the transport systems in use by the majority of inhabitants, as exhibited by different travel modes, and the consequent need for improvements.

**STRUCTURE OF REPORT**

1.11 Section 2 of this report briefly reviews the theoretical and empirical literature on the relationships that appear to exist between investments in the transport sector and their likely influence on the poor. The purpose is to clarify concepts and provide a framework to guide the case study findings. Section 3 reviews the general regional economic characteristics before turning to the study cities in Section 4. Sections 5 and 6 comprise the main examination of travel and transport characteristics of the low-income population, including an analysis of user perspectives on travel needs and problems for the metropolitan and secondary cities respectively. Section 7 collates experience with an emphasis on poverty-focused transport policies and interventions. Section 8 considers the main questions and issues that remain to be addressed, followed by Section 9's discussion of the principle lessons, best practice and some suggested guidelines resulting from the Dutch transport project experience in East Africa.
2 – TRANSPORT’S IMPACT ON THE URBAN POOR

2.01 This section of the report briefly reviews the theoretical and empirical literature on the relationships that appear to exist between investments in the transport sector and their likely influence on the poor. The purpose is to clarify certain key concepts and provide a framework for summarizing and critiquing the case study findings.

2.02 As noted, a significant difficulty confronting this inquiry is that literature on investments in the urban transport sector, and their likely influence on the poor, has little devoted to the evaluation of effects and impacts [Fouracre et al. 1999, Roberts et al. 2000]. Reflecting the weight of investment, such evaluations have been more concerned with rural than urban situations, and with short- and medium-term effects rather than longer-term impacts. The long-term association between investment in transport infrastructure and socio-economic development is well known. As a country’s income grows, the amount of infrastructure increases [Owen 1964, World Bank 1994]. But establishing causative relationships between infrastructure investment and income growth or distribution has proved elusive. While this is partly due to the complexity of the relationship, an additional reason is simply the observed inconsistency of human reactions to the creation of economic opportunity [Wilson 1973].

2.03 As a consequence of our inability to predict likely outcomes, long-term, large-scale investment in transport infrastructure has in and of itself come to be regarded as a fairly blunt instrument for influencing either income growth or re-distribution in developing countries. This is because the (debt) costs of mistakes are high [Howe 1997]. Instead current investment strategies are to target evident supply bottlenecks created by the huge backlog of maintenance and rehabilitation with which most countries have to contend or, in exceptional favorable situations, areas where there are clearly identifiable resources to be exploited that can be expected to give rise to more predictable and positive short-term returns. More broadly, however, from the perspective of the growing numbers in poverty, transport has a role in providing access to basic needs [Gannon and Liu 1997].

TRANSPORT AND ACCESS TO BASIC NEEDS

2.04 There is no single universally accepted definition of basic needs, or of what a development effort aimed at meeting basic needs would comprise [Ghai et al. 1977, Sandbrook 1982]. Nor is there a uniform vocabulary to describe the various elements [Overseas Development Institute 1978]. There is, instead, a wide spectrum of meanings ranging from, at one extreme, a minimal list of those things which are required by human beings for bare survival (e.g. food, shelter and clothing) to, at the other extreme, an emphasis that human needs are not only physical but also psychological, not absolute but relative to what is enjoyed by other people in society, not finite but expanding as the satisfaction of one need gives rise to another. At this inclusive extreme basic needs include not only commodities but also public services such as clean water and transportation, employment, education, participation in decision-making, leisure, human rights, democracy, an egalitarian society, self-reliance, and more besides.

2.05 What is clear is that the adoption of a basic needs approach - and with it the definition of a specific set of basic needs for a country or region constituting a minimum acceptable standard of living - will enable the identification of a group or groups of people falling below the minimum and will provide a concrete set of targets against which to measure progress. Thus, in planning local level urban transport the use of the basic needs approach appears attractive precisely because it seems likely to lead to an unambiguous and comprehensive appreciation of the most fundamental of movement requirements. There is also the option of targeting investment directly to the poorest members of a community simply through the mechanism of clearly identifying them and their needs.
2.06 Used in the above way the concept would be two-pronged. Nationally or regionally agreed basic needs targets could first be used to identify groups within a community experiencing different levels of deprivation. Second, the various day-to-day activities of these different groups could be studied so as to identify movement requirements associated with their attempts to fulfill basic needs. It would thus be a more comprehensive process than those in most common use, which tend to focus on transport system inputs and outputs and give little attention to the movement of people per se.

2.07 For the purpose of poverty-focused transport planning one of the more useful concepts to emerge from the various definitions of basic needs is that of 'core' requirements, most of which are essential for survival. The specification of a core list of basic goods and services has the merit of highlighting deprivation in the most critical areas and hence of the need to concentrate efforts on attaining targets in these fields. It has also the advantage of simplicity and is likely to command wider agreement than a more extensive list. It has been proposed that the following should constitute the core bundle [Ghai et al. 1977].

- food
- clothing
- shelter (including sanitation)
- health
- education
- services provided by and for the community at large
- water supply

2.08 In an urban context it would be necessary to add energy to these requirements. It is also apparent that some of these needs are more directly transport-oriented than others: where health and education services or water supplies are not directly available then people either have to be transported to the nearest source or more services/supplies created. In contrast an increase in the quality or quantity of food, clothing or shelter enjoyed by a community is unlikely to result from improved transport per se, but from income resulting from activities of which transport is an important component. Given that government transfers to the poor (e.g. unemployment, social security and other benefits) are unlikely to take place on a significant scale in many developing countries in the immediate future, the need for income becomes expressed as a need for employment. Thus for many urban communities the needs which are categorized as being privately consumed could, for transport purposes, be replaced by a proxy need for employment, since it is through income that other goods and services become affordable.\(^5\)

2.09 The previous arguments suggest that for the purpose of analyzing local level urban transport requirements the core needs could be reduced and re-defined to comprise only those for which movement either to a source of employment, or a service, is a direct means of meeting the particular need. Thus, 'core' local level movement requirements might more practically be defined as those involved in meeting community or household needs for:

\(^5\) There is growing appreciation of the crucial role of employment in addressing basic needs and urban poverty, and it has led to proposals for it to be integrated into all infrastructure investment planning, together with a series of indicators that might be used to estimate employment potential [World Bank 1999, Dixon-Fyle 2000]. For example, work years created per unit of investment; percentage of total investment in different local-resource based interventions spent on unskilled wages; or direct calculations of the employment potential of satisfying certain basic needs. Examples of this are the labor productivity needed to produce a certain standard of housing (work-years per m\(^2\)), or collector-hours per day for solid waste collection expressed per thousand inhabitants served.
• employment (as a proxy for income earning opportunities),
• health,
• education, and
• water and energy supplies.

2.10 The common characteristic of the last three of these transport demands is that in most cases they are of a local, short-distance nature. Quintessentially they are concerned with access as conditioned by competing supply, cost and locational attributes. They are also mostly the preserve of women and children. Whilst they have been subject to extensive investigation within their own sub-sectors, it is unusual to find them within main stream transport planning and policy studies. This report contains a specific example of health-seeking behavior among the poor in Dar es Salaam (Annex II). It is included because the observational and analytical techniques used could equally be applied to the investigation of other core basic needs, e.g. employment-seeking or enhancing behavior.

TRANSPORT AND EMPLOYMENT

Employment-generated Demand for Transport

2.11 The transport consequences of formal sector employment have dominated both research and investment. In contrast the transport characteristics and consequences of informal sector activities have been virtually ignored [Roberts et al. 2000]. These are important precisely because they reflect those from which the great and increasing majority of the urban poor in many developing countries derive their livelihoods.

2.12 In relative terms, and in some cases absolutely, formal sector employment is declining relative to informal sector activities. The rising importance of informal sector activities in the livelihoods of the majority of the (poor) population imposes more complex patterns of movement in time and space. The tidal flows of commuting remain, but they are increasingly submerged in less directional or time bound patterns of movement associated with hawking, trading, work search or employment in-filling, i.e. multiple part-time activities, with often very different characteristics exhibited by men and women.

Employment supplying the Transport Sector

2.13 There is the additional dimension of employment in the transport sector itself, of which employment in public passenger and goods services are the most visible. The employment generated through investment in transport is of two types - direct and indirect. Direct employment is created in both the construction and operation phases of the transport system. Operation includes both maintenance and actual production of transport services. Indirect employment is induced by and hence related to direct employment through a chain of backward or forward linkages. The backward chain of linkages starts with material and service inputs used in the construction or operation of the system. Each of these inputs has to be produced, which causes additional manpower to be employed. Forward linkages in the transport system arise when additional employment is generated in consuming the transport service, such as employment created in loading and unloading, service stations and wayside amenities.

2.14 Direct employment is created in such activities as provision of infrastructure, production of vehicles, and running of services. For road transport, for example, direct employment is generated in: (i) construction and maintenance of routes and associated buildings, (ii) manufacture and maintenance of vehicles, (iii) commercial and other staff for operation, and (iv) general administration.

2.15 While it is relatively straightforward to identify and enumerate direct employment, it is extremely difficult to follow all the chain reactions, stage-by-stage, for indirect employment. In
fact, the effect of backward and forward linkages becomes weaker and weaker as one moves away from the industry, where direct employment is generated. Apart from these measurement problems, comparison between modes becomes extremely tricky as indirect employment is traced after a few stages of backward and forward linkages for each mode.

2.16 There has been considerable research effort by the World Bank and ILO into the employment implications of rural infrastructure investments [Howe and Bantje 1995]. There is also a useful synthesis of their socio-economic effects and impacts that have undoubtedly brought benefits to the poor [Keddeman 1998]. However, there has been no comparable effort to date in urban areas. The results of some limited studies of these aspects in the urban areas are given later in this report.

2.17 The employment consequences of different transport modes or types of ownership—public or private—have rarely been studied. India seems to have been one of the few countries to have examined the employment consequences, direct and indirect, of different modes of transport, although it is not clear how this information was used to inform policy [National Council of Applied Economic Research 1974, Dalvi 1997]. Conceptually giving greater prominence to the employment consequences of sectoral investments favoring different modes or types of ownership, would require employment to be regarded as a direct rather than an indirect approach to poverty alleviation [Gannon and Liu 1997].

SUMMARY

2.18 Investigations in East Africa confirm that - reflecting the paucity of urban investment - there has been little accounting of the effects and impacts of transport on the poor. For poverty-focused transport planning the notion of core basic needs is a useful concept. These can be reduced to the need for employment (as a proxy for income), and access to health, education, water and energy supplies. A major difference between the urban and rural poor is the prime need in the case of the former for cash to buy those things - food, energy, water - normally available either free or for the expenditure of effort in rural areas. Thus, in an urban context employment is so crucial that there is an argument for regarding it as a direct rather than indirect approach to poverty alleviation, which should be incorporated into assessments of transport investments.

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6 The lack of importance attributed to this issue is illustrated by a number of well-publicized instances where, in the desire for modernization, employment-intensive modes of transport have been banned, without any apparent consideration for who was gaining or losing by the decision.
3 – EAST AFRICAN NATIONAL AND URBAN CONTEXTS

3.01 This section examines the general economic and administrative context that prevailed in the study countries, since they gained political independence in the early 1960s, and how this has influenced the incidence of poverty in their cities. It provides a general overview of poverty in East African urban areas and then examines some relevant temporal aspects of their transport systems.

NATIONAL ECONOMIC AND ADMINISTRATIVE CONTEXT

3.02 The economic context of any city reflects the economy at large. For this reason we first consider national economic trends in each country before examining the situation in the study cities.

Kenya

3.03 Following independence in 1963, Kenya experienced a quarter century of reasonably steady growth with GDP averaging 6.8% per annum during 1965-80 and 4.2% during 1980-90 [World Bank 1992]. The 1990s, in contrast, have been a decade of recession with GDP averaging barely 2.5% per annum below the rate of population increase [Kenya Human Development Report 1999, Republic of Kenya 2000]. Currently the GDP growth rate in Kenya is around 1.4%.

3.04 Prospects for growth in the short-term are uncertain because of several adverse factors: a large debt burden; dilapidated infrastructure, largely the result of inadequate maintenance and severe weather conditions (El Nino storms); a tourism sector in decline, undermined by insecurity; and falling donor confidence as a result of the lack of progress on economic reforms and rising corruption [Care International of Kenya 2000].

3.05 Despite the reasonable economic growth in the 1970s and 1980s, the financial position of most local authorities declined steadily. They were financially sound in the 1960s and early 1970s when they collected a Graduated Personal Tax (GPT) and there was little demand for basic urban services. Population in urban areas was low and councils needed little manpower resources to implement basic infrastructure programs. During the mid-1970s, the government decided that some services could be provided more efficiently by the central government and consequently these (e.g. water supply) were transferred from local authorities to the central agencies. Between 1969 and 1973 the government also gradually abolished the GPT. In the 1980s, there was rapid urbanization exerting pressure on the existing urban services. The local authorities were unable to expand or maintain existing urban services due to lack of adequate financial, manpower and administrative capacity. This resulted in declining local revenue generation causing a draw down of the reserves which were accumulated in the 1960s, increasing deficits in the General Rate Fund Revenue Accounts, and mounting arrears in payments by the local authorities to the other parts of the public sector. In recognition of the dire financial situation, in 1987 the government introduced a produce cess for Rural County Councils and in 1989 a Services Charge was put in place. Despite these new taxes, the increased revenues have not improved the financial position of the Authorities sufficiently to allow them to effectively deliver and maintain basic services. The situation is further compounded by a large and growing backlog of provisioning basic services to meet the increasing demands of a growing population [World Bank 1996].

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8 For example, the capital expenditure of the Nairobi City Commission (in real US $ per capita) for water and sewage fell from US $27.8 in 1981 to US $ 2.5 in 1987 and maintenance expenditure fell from US $ 7.3 to US $2.3 over the same period [Matrix Development Consultants/USAID 1993].
Nairobi

3.06 In Nairobi’s case the previous problems have been compounded by continuing political difficulties between councilors and central government. The corrupt allocation of public land to private individuals, particularly councilors, was one of the factors behind the suspension and dissolution of the City Council in March 1983 and its replacement by a City Commission [Lee-Smith 1989]. Similarly an initiative was taken in 1993 to improve the management of the city. The Nairobi City Convention, held in July, had particular importance in that, for the first time all citizens were invited to give their views on how the city should be developed and managed. The result was a plan: ‘Actions Towards a Better Nairobi’ which proposed actions under four main headings: Space and Physical Environment, Public Utilities, the Social Sector, and Administrative, Legal and Political Issues [Charge 1993]. The plan was never implemented partly because of divisions within the City Council and between it and the government. All but one of Nairobi’s eight national members of Parliament were from opposition parties [Alder 1995].

3.07 The weak state of city finances is clearly a binding constraint on any immediate improvement in services by the city council. Moreover its freedom to initiate innovative attempts to involve the private sector are strongly inhibited by central government controls and the sort of national structural problems found in many Sub-Saharan African countries. These include: (i) macroeconomic performance – excessive public borrowing, high and volatile interest rates, currency volatility; (ii) financial regulations – capital controls, reserve requirements, ease of collecting bad debts, barriers to entry for new financial institutions; (iii) undeveloped financial markets – lack of long term finance, lack of markets and financial instruments [Cockburn et al. 2000].

Eldoret

3.08 The investment context in Eldoret broadly parallels that described for Nairobi, but with one salient difference. Its council has always prided itself on fiscal conservatism and maintaining a balanced budget. However, this stance can simply mean little or no investment. Like most local authorities it tried to maintain staffing levels, which has resulted in emoluments consuming the bulk of council expenditures leaving little for actual services.9

Tanzania

3.09 Following independence in 1961, Tanzania experienced only modest economic growth in the next three decades with GDP averaging 3.9% per annum during 1965-80 and 2.8% during 1980-90 [World Bank 1992]. From 1990-99 GDP growth has averaged 3.2% slightly more than population, which is currently estimated to be growing at 2.8% per annum.

3.10 Significantly the economic growth rate is below that estimated as necessary to achieve officially adopted poverty reduction targets. Between 1992 and 2015 the economy of Tanzania needs to grow by about 4.9% per year to halve poverty using the food poverty line definition, and by 7.3% per year using the Basic Needs Line definition [National Bureau of Statistics 2000].

3.11 The country remains heavily dependent on the agricultural sector, which in 1999 still contributed almost half (46.3%) of GDP.10 The real value of exports more than doubled from 1990-96, but has since fallen by 30%. The balance of merchandise trade has been increasingly in deficit throughout the 1990s [The Planning Commission 2000].

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9 In the year to June 2000 salaries were 56% of local revenue receipts, but the Municipality did show a budget surplus of K£ 1.2 million (US$ 16,500).
3.12 As in Kenya, Tanzania’s poor record of economic growth, over some three decades, has resulted in failure by the public authorities to provide new, or to expand existing, infrastructure to cope with demand. The stress on existing services, coupled with lack of maintenance, has led to the breakdown of most infrastructure in urban areas [United Republic of Tanzania 1996].

3.13 Local authorities were abolished between 1972 and 1974 in a process known as decentralization that actually saw the central government extend its control to the local level. A significant deterioration of urban services and infrastructure resulted and Dar es Salaam City Council was restored in 1978 and other councils in 1982. They were empowered to raise revenue from a variety of local sources, but were not very efficient in doing so. Consequently most depend for 60% and above of their (restricted) revenue, on central government subsidies. While revenue collection has been weak, the pattern of expenditure has left a lot to be desired being concentrated on personal emoluments and the running of vehicles [United Republic of Tanzania 1996].

Dar es Salaam
3.14 In 1996 the government abolished the Council, as being largely ineffective, and established the Dar es Salaam City Commission with a mandate to reform operations, improve service delivery, and re-structure the local government system of the city. The difficulties facing the Commission were formidable. The local authority had almost completely depended on central government, and had very low levels of own income. While it had a staff of 14,000, it delivered few effective services, and inefficiency was widespread. To function, the first imperative was to establish a revenue base and gradually develop sources of own revenue. Concurrently the Commission had to reduce costs, discover and eliminate corruption and waste, and reduce its staff complement [The Dar es Salaam City Commission 1999].

3.15 The refuse collection was privatized, in areas which could sustain the cost of private sector collectors, and charges were introduced for on-street parking. A retrenchment program reduced staff numbers to 10,700. Recurrent own costs were reduced by an overall 8%. The traffic system was improved with the introduction of one-way systems, and pedestrian congestion caused by street traders was resolved by relocating trading. As a result own resources revenue has risen from $4.5 million in 1996 to a projected level of almost $12 million in 1999. However even at this level it is just $4 per city inhabitant.

3.16 Before the city is handed back to elected council control it is intended to implement a further reform. The future governance of Dar es Salaam will be conducted on a three-tier basis: a City Council; three Municipalities of Ilala, Kinondoni and Tembeke; and ward administrations.

Morogoro
3.17 The Municipality is also in the process of going through a centrally directed reform program. Own revenue generation has risen from $290,000 in 1995 to an estimated $543,000 in 1999. These comprised 20 and 24% of the total respectively, the remainder coming from central government.

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11 In the mid-1990s municipalities were spending only US$1.5 per capita on infrastructure, while in Dar es Salaam it was US$0.02 [United Republic of Tanzania 1996].
POVERTY AND LIVELIHOODS IN EAST AFRICAN URBAN AREAS

3.18 The recent Kenya Human Development Report provides a characterization of urban poverty (Box 3.1). The poor are clustered in certain social categories which in urban areas comprise unskilled and semi-skilled workers, casual laborers, female-headed households, the physically handicapped, HIV/AIDS orphans and street children. Allowing that this description is a stereotype it accords well with observation in much of East Africa.

Box 3.1 Characteristics of the urban poor in Kenya

The poor represent an increasing proportion of the urban population. According to recent participatory surveys, almost 50% of urban households consider themselves to be poor. The majority of these households are tenants in informal settlements facing daunting problems. They have to cope with the high costs of food, water, housing and transport. They live in very crowded tenements, usually whole families occupying one room and sometimes sharing it with another family. Their access to primary education and basic health services is limited because of the inability of the local authorities to provide these services. They cannot afford the fees and charges demanded by private providers of these services. The traditional kinship and neighborhood support for these families is not as strong as in smaller communities and rural areas. The urban poor are often the main victims of crime, substance abuse, drug trafficking and child delinquency.

Source: Kenya Human Development Report 1999

3.19 It is difficult to be sure about variations in the extent and degree of poverty between the two countries, because of differences in the dates, definitions, and relative prices used in making national assessments. The assessment themselves are a complex and controversial topic [Ravallion 1992, Hanmer et al. 1997]. It is not proposed to enter into the discussion of the accuracy of the assessments of the relative incidence of poverty in the two countries, but simply to report at face value the results of the most recent official surveys.

3.20 An urban food poverty line was calculated for both countries in 1994 [National Bureau of Statistics 2000, Republic of Kenya 2000]. The general urban figure for Kenya was equivalent to US$ 19.5 per month per adult, whereas in Tanzania it was around half the Kenyan figure at US$10.8 per month per adult. Since food staples are similar in both countries the large difference in these figures might suggest a higher incidence of urban poverty in Kenya. On the other hand, however, Kenya’s per capita income is roughly double that of Tanzania so price differences might account for some of the variation in the figures.

3.21 Notwithstanding the difficulty in interpreting these figures certain broad aspects about the incidence of urban poverty in East Africa are reasonably uncontroversial:

(i) It has increased sharply in the 1980s and 1990s in both countries;
(ii) It appears to be worse in the secondary cities, clearly so in Tanzania, but less obviously in Kenya; and
(iii) The incidence in Nairobi appears substantially higher than in Dar es Salaam, which is consistent with the much greater degree of income inequality that exists in Kenya.

3.22 Recent research suggests that inequality does matter [Ravallion 1997, Hanmer et al. 2000]. At any rate of growth in average incomes, the higher the initial level of inequality, the lower the rate at which income falls. Indeed it is possible for inequality to be high enough so that poverty can actually increase even if the economy is growing overall.
3.23 Countries with a Gini coefficient above 0.4 are usually considered to be high inequality countries. In Tanzania’s case there are two recent estimates of the Gini coefficient - a 1991/92 value of 0.46 and a 1993/94 value of 0.39. In Kenya’s case there is a single estimate of 0.55. Only South Africa (0.62) and Zambia (0.57) had higher values.

3.24 As the real value of urban salaries and wages eroded during the crises decades of the 1980s and 1990s, urban households of all income levels increasingly diversified their livelihood sources. There are three main tendencies embedded in this trend: (i) formal sector employment shrank relative to the informal sector as government cutbacks and job retrenchments in the civil service and parastatal sector were implemented under SAP; (ii) the ‘family wage’ earnings of male heads of households became insufficient and other members joined the labor force, notably women as well as youth, especially male youth. Informal sector earnings, intended to be supplementary, often began to supercede formal household earnings; and in the process (iii) the work portfolio of the household became occupationally diversified. Market trading became a major absorber of labor. In addition urban farming, for subsistence as well as commercial sale became common [Bryceson 1990, Lugalla 1997, Macharia 1997].

3.25 In the scramble to find additional income sources, those without education or without members of the family in formal sector employment and most of all without starting capital, were less well-placed to find work. The poor’s petty trading and service activities, based on low capital entry requirements, tended to be oversubscribed and highly competitive, affording very meager earnings. Overall, the 1980s and 1990s were a period of growing inequality and rising urban poverty [de Maio, Stewart and van der Hoeven 1999, Sarris and van den Brink 1997].

3.26 The mobility implications of these trends are uncertain. Many informal sector trading activities were itinerant, requiring a high level of urban mobility. Young men, in particular, were involved in hawking. On the other hand, women working in the informal sector often produced and distributed products and services from their homes. Primary school enrolment fell with the introduction of school fees, probably causing a reduction in neighborhood service-oriented mobility, but a significant segment of these young school-age drop-outs were absorbed into the informal sector, often in street trading. For example, in Nairobi, primary school net enrolment rates were 84% for the non-poor and only 69% for the poor [Kenya, Central Statistical Bureau, 1998].

**Temporal Aspects of East African Urban Transport Systems**

3.27 In considering the existing urban transport systems and the service provided to the urban population, it is necessary to examine not just the present state, but the processes by which this was achieved, and thus the prognosis for the immediate future. In the metropolitan areas studied there has been considerable transport planning, but little implementation. Past plans are thus of interest primarily from the perspectives adopted and the extent to which these were intended to address the needs of the urban majority.

3.28 In both countries there was little investment in the urban road systems in the 1980s and for much of the 1990s. Infrastructure investment took the brunt of government expenditure reductions due to the recession induced by rising interest costs, high prices for petroleum imports, depressed primary exports, and the post-1983 debt crisis [Hicks 1991, Stren et al. 1994, World Bank 1996].

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12 Source: Demery and Squire “Data set for comparing inequality” World Bank, [http://www.wbln.worldbank.org](http://www.wbln.worldbank.org) UNDP’s 1997 Human Development Report gives a slightly higher value for Kenya (0.57) and notes that it is the highest among the 22 poorest countries in the world.
3.29 Due to lack of substantive investment, growth in population, economic activity and traffic have been superimposed on an infrastructure receiving little maintenance. Consequently much has deteriorated and continues to deteriorate (see para 4.13 Nairobi; 4.38 Eldoret; 4.63 Dar es Salaam; and 4.83 Morogoro).

3.30 In most metropolitan cities the dominance of walking and public transport, comparative insignificance of trips by private car, and demise of cycling, have been apparent since major sector studies started in the early 1970’s. These aspects will be re-visited in Sections 4 and 5, but for the purposes of this discussion attention is limited to the means of movement used by the majority of the population.

3.31 Rapid and continuing population growth has been accompanied by an equally rapid increase in the demand for public transport. This is not only because of the increase in the number of (potential) users, but also the increasing commuting distances resulting from physical expansion of the cities. This make other modes (walking, cycling) less attractive; also transport by private car remains the prerogative of the wealthy minority - less than 10% of household trips.13

3.32 While the deregulation and privatization of public transport is a phenomenon in most of the Western world, in East Africa, these processes have taken place in rather a different way. It has been privatization by default rather than deliberate action, and in urban areas has resulted in public transport provision with little or no government involvement or control. This is significant in a situation where, contrary to many cities in the West, public transport is not just a social good or alternative to car travel, but the only motorized mode available (albeit not always affordable) to the majority of the urban population, providing 70-85% of all motorized trips [Armstrong-Wright 1993]. With the continuing rapid growth of these cities and somewhat extensive urban land-use patterns resulting in dispersed low-income populations being increasingly housed on the urban fringes, long commuting distances become more evident, heightening the importance of public transport.

3.33 A trend accompanying privatization has been the demise of western-style stage bus services running on fixed routes, schedules and fares, and with prescribed stopping places. Their operations have been largely replaced, or more accurately undermined, by share taxi services – called matatus in Kenya and dala dala in Tanzania. These were originally based on saloon cars or mini-vans, since being illegal they wanted to be as unobtrusive as possible. However, with their (grudging) acceptance by the authorities – in 1973 in Nairobi and 1983 in Dar es Salaam – larger vehicles have been obtained with 12, then 35 passengers, and finally up to full bus size of 90 seat capacity, although the smaller sizes predominate.14

13 It has not been possible to analyze motorization trends because vehicle registration data in East Africa has been suspect for at least three decades. Motorization levels in Africa remain very low and, with present economic stagnation, show few signs of increasing. Nonetheless the latent threat of increased motorization that is beyond the carrying capacity of the economies concerned, and would undermine sound economic development, is there. For conventional motor vehicles the high pricing policies successfully pursued by e.g. China, India, Korea and Japan, seem the most realistic way of containing growth of private car use to remain in tune with economic conditions. However, since this is a hypothetical situation it is not clear if there is any political support for such a policy. Perhaps the biggest threat is for a rapid rise in the use of two-wheeled motor vehicles as experienced in many Asian countries to the detriment of urban traffic safety and environments. There are signs of this happening in Nigeria and Uganda, where they are used for commercial passenger and light goods transport.

14 The progressive rise of these informal transport services has followed the classic, complex and highly politicized process described by Peruvian economist Hernando de Soto [1989]. He argues that the process involves a tremendous waste of resources. Moreover, since transport does not only involve the people using it, society in general ultimately suffers from the resulting corruption of public officials and the disorder, danger, and lack of safety on the streets. These problems are fundamentally due to failures in their legal systems in which the transport sector is embedded.
SUMMARY
3.34 Both study countries, Kenya and Tanzania, have experienced two decades of declining or extremely modest growth. Urban areas have had to contend with rapid urbanization and declining revenues, problems that have been compounded by the instability of civic government institutions. Infrastructure has taken the brunt of expenditure reductions and much has deteriorated and continues to do so. The outcome is a huge and growing backlog in provisioning basic needs. Since both countries exhibit a high level of income inequality, which is particularly severe in Kenya, the result is that the incidence of poverty has increased sharply. Government support for transport services has either dwindled (Tanzania), or actively undermined established operators (Kenya). In both cases there has been an informal privatization of public transport with increasing dominance by largely unregulated share taxi services. This development fundamentally undermines the rule of law since it is essentially a failure in their legal systems.
4 – THE CASE STUDY CITIES

4.01 This section describes key aspects of the case study cities. Brief mention is made of the historical background and physical geography, commercial function, land use distribution, population and poverty characteristics, employment, and transport systems of each urban area.

NAIROBI

Background

History and physical geography

4.02 Nairobi has its origins in the colonial decision to build a railway from Mombasa to Uganda. It was founded as a camp in 1896 at the point where the railway line entered the Highlands. Until independence in 1963 it was a colonial city and that shaped its economic function and land use distribution. The location of Nairobi on the plains at the start of the highlands was largely fortuitous. It is divided roughly east-west by the Nairobi and Mathari rivers and their tributaries. Most of the time these are little more than streams, but give rise to swampy ground that has been bridged only in a few places and obstructs the movement of traffic, especially pedestrians. The terrain is reasonably flat except to the north where it is incised by a number of valleys. Expansion of the city to the south is inhibited by the Nairobi Game Park, so development has tended to be in a lateral east to west direction.

Commercial function

4.03 Its initial commercial function was service oriented as a collection and distribution center for exports. But in the last half-century Nairobi has become the center for regional tourism, new light capital-intensive industry, and as the Eastern Africa center for the international community, the United Nations, diplomatic missions and foreign agencies. While its productive base has altered, with growing tourism and manufacturing, these have been insufficient to alter its fundamental economic reliance on agriculture. Until 1998 agriculture remained the dominant contributor to GDP but was overtaken in 1999 by the tourism and hotel sector. Manufacturing contributes roughly half of either agriculture or tourism to GDP. Agriculture’s dominance is significant because declining returns to farming and growing landlessness are thought to be the main causes of rapid urbanization.

Land use distribution

4.04 Initially Nairobi’s population was segregated racially into European, Asian and African zones occupying grossly unequal areas. Following independence the city developed a much more complex character, although with the same broad spatial characteristics. Although the racial divisions have largely gone there are tribal, class and income distinctions that have a direct bearing on the development and governance of Nairobi. There has been a blurring of the zone boundaries and high and low income areas may now be separated only by a fence. Pockets of low-income settlements, of varying size, are widely distributed with many of the newly arrived immigrants in lower-density areas surrounding the city. Different terms – ‘unplanned’, ‘low-income’, ‘slum’ and ‘non-slum’, ‘informal’, etc. – are used to describe the land generally occupied by the poorest. All have varying degrees and types of imprecision. Not all occupants of informal settlements are poor – the majority are in terms of income, assets, access to resources and environmental conditions - and not all the poor live in formally acknowledged settlements. Others are scattered throughout the more wealthy areas as house servants, watchmen, messengers, etc. Notwithstanding this the most visible symbols of poor communities remain the informal settlements, where the vast majority of the poor reside and which are the focus of much of the efforts to address urban poverty. In 1993 there were about 110 informal settlements with a population of approximately 0.75 million. They occupied 5.84% of the land area used for residential purposes, but housed 55% of the...
city’s population [Alder 1995]. The intense overcrowding of Nairobi informal settlements is a feature that distinguishes poverty in the two metropolitan cities.  

4.05 Figure 4.1 shows the main informal settlements, which are distributed at varying distances from the center. In 1993 they, and their associated populations, were: Kibera (251,040), Dagoretti (186,250), Kasarani (158,120), Makadara (102,480), Embakasi (31,890), Pumwani (11,890) and Parklands (7,330). Some of the largest - Dagoretti, Kasarani and Embakasi - are the most remote, being in the range 12 to 18 kms from the main employment and service centers in the CBD and Industrial Area. Conversely the smaller and older settlements - Parklands, Pumwani - are closer to the center being in the range 4-6 kms. Kibera is exceptional in that it is large and close, at about 5 kms from the CBD. For all settlements the weighted average distance from the center was around 11 kms. As Box 4.1 makes clear life in such settlements is at best grim and at worst touches the extremes of what it means to be poor.

Figure 4.1: The main informal settlements in Nairobi

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15 Residential land in Nairobi comprises 31% of the total area, but of this high income occupiers consume almost 51%, middle income 19%, low income 21%, and unplanned just 10% [World Bank and UNECA 1993].

16 Because formal institutional, legislative, and physical planning structures were not designed for and could not cope with this form of economic activity, it was labeled the informal sector. To a large extent, the urban crisis in Africa can be measured by the failure to cope with this sector, while useful urban reforms have been those which are designed to accommodate or aid this sector [Lee-Smith 1989]. The term informal settlements is convenient because of its use for some of the most recent and best documented surveys. Also the majority of the residents of such settlements embody the main attributes of those living in urban poverty [Box 3.1].
Box 4.1: ‘Informal Settlements’

The term informal is an attempt to encapsulate the characteristics of such settlements found in many urban areas worldwide. However there are some attributes of Kenyan informal settlements, which are distinctive. In Kenya the term informal settlement refers to an urban area which has the following characteristics:

• Most settlements, particularly those on public land, have extremely high densities, typically 250 units per hectare (compared to 25 per hectare in middle-income areas and to 15 per hectare in high-income areas) and residents are exposed to severe environmental risks which critically affect their ability to play a full economic role in the life of the city.

• Morbidity and mortality rates caused by diseases stemming from environmental conditions are significantly higher than in other areas of the city (owing to poor sanitation, lack of potable water, poor drainage, uncollected refuse and overcrowding).

• Physical layouts are relatively haphazard making it difficult to introduce roads, pathways, drainage, water and sanitation.

• Urban services such as water and sanitation are non-existent or minimal. Water is only provided to a few standpipes if it is provided at all. Most residents do not have access to adequate sanitation. Educational and health services are also inadequate although NGOs and CBOs make an important contribution in this area.

• Owners of structures have either a quasi-legal right of occupation or no rights at all. Structures (houses) are constructed largely of temporary materials and do not conform to minimum standards. The majority of structures are let on a room-by-room basis and the majority of households occupy a single room or part of a room.

• The majority of the inhabitants have low or very low Incomes, normally less than Ksh 2000 (US$27) per month.

• Not all settlements exhibit all of these characteristics or to the same degree but the above broadly characterizes informal settlements in Nairobi.

Source: Alder 1995, Matrix Development Consultants Inc. 2000

4.06 Settlements in Nairobi are mostly constructed from temporary materials. Surveys at about the same time in Dar es Salaam suggest that housing is more substantial with 62% using concrete, cement or stone walls; another 5% using baked or burnt bricks; and 12% using mud bricks [National Bureau of Statistics 2000].

Population

4.07 This has grown rapidly from 350,000 at the time of independence in 1963 to its 1999 estimate of 2.14 million [Republic of Kenya 2000]. This is increasing annually at 4.8%, a rate that is expected to decline only slowly over the next decade. Population expansion in the past was largely due to rural-urban migration, but natural increase is now the most important factor. With a nominal area of 680 square km. the city has an average population density of 3200 persons per square km.

4.08 Notwithstanding the existence of master plans to guide physical planning, it is highly significant that much of this growth has been unplanned, especially in the last two decades [Charge 1993, Matrix Development Consultants Inc. 2000]. There is a rapid growth outside
the boundary in peri-urban areas, which have a direct impact on the city, and it is expected to incorporate the peripheral towns of Thika, Athi River, Limuru and Ngong in the near future.

Employment and livelihood activities

4.09 Over the previous decade the job creation rate in the informal sector, including the low-income ‘jua kali’ informal work, has been almost treble that of the formal sector. Significantly, combined formal and informal sector employment growth in the Nairobi region from 1989-1997 was at 2.3% per annum, less than half that of the rate of population growth [Post Buckley International Inc. 1998].

4.10 The main formal employment zones in Nairobi are the CBD and the Industrial Area along Jogoo/Mombasa road, Ruarka/Thika road and Dandora. Although there have been efforts to de-centralize employment concentration from the central areas to satellite centers, the CBD and the central industrial area (Jogoo/Mombasa road) still remain the core employment zones. It is for this reason that the city is often described as being a mono-polar center. It is estimated that 45-50% of Nairobi’s labor force work in the informal sector whose activities are spread throughout the city [Macharia 1997].

4.11 In addition to informal sector involvement, roughly 20-30% of the adult population was engaged in some form of crop or animal husbandry within Nairobi itself [Freeman 1991, Mboganie-Mwangie and Foeken 1996]. Plots tend to be extremely small averaging 13 square meters, significantly smaller than agricultural plots in other Kenyan cities. Many cultivate in backyard gardens, but large numbers simply farm on vacant land, especially road-side verges and land along the railway line and drainage ditches. Such cultivation is in fact illegal, but nonetheless has become a prominent feature during the last two decades. Women are most prevalent in the cultivation work. The desire to farm is both culturally and economically inspired; seen as a productive form of physical exercise that many middle class people enjoy, and as a vital supplement to household income in poor households.

Poverty

4.12 All definitions and indices indicate that poverty in Nairobi has sharply increased between 1994 and 1997, and is at a high level.¹⁷ The overall absolute urban poverty level in Kenya has increased from 29.0% in 1994 to 49.2% of the population in 1997, an increase of 20.3 percentage points.¹⁸ Nairobi had 51% of its population living in absolute poverty in 1997 [Republic of Kenya 2000]. Furthermore the figures in Table 4.1 show that in 1992 the bottom 40% of the population in Kenya had only 11.1%, and the bottom 60% only 20.8% of the income or consumption. In contrast the top 10% consumed almost 48% of the income or consumption [World Bank 1999]. Thus, because of its very unequal income distribution a significant proportion of the population is not very much better off than those living in absolute poverty. It seems clear that in Nairobi poverty is not the condition of a minority or even sizable pockets of the population. It is quite simply a city dominated by the number, but not the influence, of the poor.

¹⁷ There is some evidence that certain forms of poverty are worsening. The number of street children is reported to have increased from 4,500 in 1990 to 30,000 by June 1994 [Matrix Development Consultants/USAID 1995].
¹⁸ The expectation was that the combined rural and urban proportion living in absolute poverty would reach 56.5% by 1999 [Republic of Kenya 2000].
Table 4.1: Distribution of income

<table>
<thead>
<tr>
<th>Country</th>
<th>Survey year</th>
<th>Gini index</th>
<th>Percent share of income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lowest 10%</td>
</tr>
<tr>
<td>Kenya</td>
<td>1992</td>
<td>57.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1993</td>
<td>38.1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: World Bank 1999

Transport system

Road system

4.13 A full inventory was made in 1992 with a partial survey of the most heavily trafficked routes in 1998 [Ministry of Local Government 1992, Post Buckley International Inc. 1998]. There are around 300 kms of main and 850 kms of access roads, including unpaved earth tracks, much in a deteriorated condition. The 1992 survey found only 39% of the network surfaces to be in a good or adequate condition, the remainder being poor or very poor requiring resurfacing or reconstruction. However, drainage conditions were worse with 56% poor (under-designed) or very poor (non-functional) and 17% having no roadside drains or culverts. The 1998 surveys focused on 300 kms of main roads that were in reasonable condition, but suffered from a high level of side friction reducing their operational efficiency. The side friction was in the form of encroachment onto the carriageway, or excessive provisions for local access.

4.14 The most common forms of encroachment were by NMT, either parallel with traffic or crossing the road in large numbers; public transport vehicles stopping in the carriageway to take on or discharge passengers, or waiting to fill up with passengers; and on-street parking, which combine to block the smooth flow of traffic. The lack of access control was cited as one of the major causes of traffic congestion in Nairobi [Post Buckley International Inc. 1998].

4.15 The initial layout of Nairobi’s main road system was reasonably well planned and spacious with the city center laid out in a grid pattern, but its development has not been able to keep up with the explosive growth of population and road traffic. The orientation remains largely radial focusing on the CBD, with the arterial system dominated by the main Mombasa to Uganda road traversing the city from south-east to north-west, and a north-east fork that serves the important population centers and agricultural areas around Mount Kenya. There are few by-passes or circular routes by which long distance traffic can avoid the center of the city. The result is road congestion in the peak hours even at comparatively low levels of car ownership.

4.16 The 1998 study claimed that for most employed people: “the journey to work in Nairobi occupies 2 to 4 hours per day, which places (it) in the same category of inconvenience as cities such as Mexico City, Sao Paulo, and Shanghai, with the difference that these are cities with populations of tens of millions of persons and millions of motor vehicles, whereas Nairobi has a population of 2.1 million and 300,000 motor vehicles” [Post Buckley International Inc. 1998]. This description might seem exaggerated, but there is little doubt that Nairobi has traffic problems that are out of proportion to its apparent size. The evident parking problems in the CBD - with motorists compelled to park on the pavement - is

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19 850 kms was the measured total, but the 1998 study yielded a more speculative estimate of double this.
one clear indication of its difficulties. This particular problem is easily explained by the loss of control over land use. In the 1970’s and 1980’s there was a rash of speculative high-rise office building with no addition to on-street parking capacity. As a result on-street spaces per m² of office floor space decreased. Additionally central area off-street parking space declined by 60% between 1972 and 1987 as a result of 7 out of the 19 parking areas available in 1972 being allocated to developers by the Commissioner of Lands [World Bank 1990]. Some on-street space was removed for security reasons or allocated to matatus to provide terminals, since the spectacular increase in their operations had not been anticipated [Lee-Smith 1989]. The result has been traffic clogged central streets for much of the working day, and the obstruction of pedestrian spaces and paths.²⁰ Both serve to raise the cost of transport unnecessarily.

4.17 There were just as serious problems with its access road system due to severe deterioration and because it did not reach into many of the informal settlements. The high housing densities and haphazard layouts in the informal settlements has precluded an effective road system even if resources were available [Alder 1995, Mukui and Guchu 1998]. Few footpaths have been provided and where they exist have not been maintained. Inaccessibility hinders the provision of public services such as latrine emptying and garbage collection, fire fighting emergencies, and the evacuation of people who are critically ill [Kunguru and Mwiraria 1991].

Public motorized transport system

4.18 The Nairobi public transport system, apart from some very limited commuter rail operations, consists entirely of road-based services, which are fully private. In addition, the system operates in a largely deregulated environment: there is little or no government control of, or even influence on, such crucial elements as route structure, licensing, operational practices, timetables or fares. The system consists of two entirely different sub-systems, which compete on the same routes as described in the following two sub-sections.

• Kenya Bus Services (KBS)

4.19 The KBS is a private company, which was operating some 370 large buses (110 passengers) on fixed routes and schedules in 1998. Most routes are radial, passing through the city center. This reduces the need for passenger transfers and provides a competitive advantage over the matatus, which are not permitted to enter the core of the city center. Market share currently stands at some 30%. This share has declined continuously since the legalization of matatu operations in 1973. The company now transports some 300,000 passengers per day, while the number of passengers transported per bus per day has been steadily declining over the past years: from a high of 1,500 passengers/bus/day in the mid-80’s to less than 1,000 in 1997). The network has been gradually reduced over time, as routes have been abandoned. One of the reasons for this has been deteriorating road conditions, especially to some of the informal settlements. Another has been competition and take-over of routes by matatus [Post Buckley International Inc. 1998].

4.20 In the fall of 1998 KBS was sold by its major owner, Stagecoach of the UK, to a group of Kenyan investors comprising some of the former management and the local insurance industry [Koster and Gachewa 1999]. The decision of Stagecoach to pull out of Kenya is highly significant, since they have been one of the most successful of international bus companies and were expected to introduce modern management and operating practices.

²⁰ There is a further cultural reason for the extraordinary level of congestion, at least in Tanzania, which seems at variance with the apparently low level of motorization. It is because: “these are cities of personalised dealings. Each appointment has to be done physically and in person. Telephone facilities are inadequate. Payments and other transactions like bills for telephone, water and electricity have to be paid in person and therefore involve a trip” [Lugalla 1990].
However, it is noteworthy that KBS’s previously exemplary operating record had been undermined in 1986 by the introduction of government subsidized bus services operated by the National Youth Service (the Nyayo Bus Services Corporation). This collapsed in 1992, but not before they had led to KBS abandoning its previous cross-subsidization of peri-urban routes that also served the outlying informal settlements. Also, the accompanying years of unprofitable operation by a company that was amongst the best of the large bus companies in Africa, had much to do with government interference in a formerly private sector preserve combined with its inaction in restraining matatu operations [World Bank 1990].

4.21 In an effort to survive KBS has introduced a number of service improvements for which a premium is charged so these are clearly not targeted on the poor. Also, much of their new fleet serves inter-urban routes. They retain discounts for schoolchildren, however, the route coverage is fairly limited.

• Matatu share taxis

4.22 Nairobi’s paratransit consists of privately owned matatus, mostly operating on the same routes as KBS, but without timetables. In theory there is still some government control of matatu operations. Transport Licensing Board regulations were introduced in 1999 requiring matatu operators to state and remain on the routes for which they were licensed, but it has not been possible to enforce this effectively. KBS recently estimated the number of matatus operating in Nairobi at 6,500, out of which 2,500 are 25-seaters and 4,000 are 12-seaters. Matatus largely ignore official bus stops and, especially in peak hours, depart only when fully occupied, and generally drive non-stop to the final destination. In off-peak periods, drivers try to pick-up as many passengers as possible on the way, which leads to erratic driving and stopping behavior. During congested periods, traffic rules are often ignored (e.g. using the road shoulders to by-pass traffic jams). Although formal route associations were banned some years ago for political reasons, they do exist informally. It is estimated that the matatu sub-system currently captures some 70% of the public transport market, or 700,000 passengers per day. This market share was estimated at some 50% in 1993/94, and has grown substantially over the years [World Bank and UNECA 1994b].

4.23 Private matatu owners reportedly do not pay taxes, whereas KBS does. This fact, combined with the differences in operating practices and in degrees of adherence to traffic rules, results in unfair competition. Buses and matatus share the regularly congested carriageway with other road users: dedicated infrastructure such as bus lanes, is absent, as is e.g. preferential treatment at controlled intersections. The most interesting feature about the system is that competition takes place on the same routes, in a deregulated environment, between two very different sub-systems. The question arises as to whether this has resulted in public transport provision that is beneficial to the users. This aspect will be explored further in Section 5.

Non-motorized wheeled transport

• Handcarts

4.24 Handcarts have two important functions as a: (i) source of employment; and (ii) means of goods transport for personal or occupational reasons. Studies in Nairobi found 65%
serving the main central markets, 24% around bus terminals, and the remaining 12% on the streets [Gatigwa 1992]. At the central localities (within 5 km of the CBD) flows of handcarts are significant with over 260 observed exiting the Wakulima Market onto one of the main roads within a five hour morning peak period. The location of such concentrated activities inevitably puts them in conflict with officials who see their main responsibility as maintaining the flow of motorized traffic. Handcarts are in great demand because they are cheap and reasonably available. Many women who are licensed hawkers and retailers depend on handcarts to ferry heavy and bulky goods. They offer costs that are a fraction of motorized pickups, which are also fairly rare.

• Bicycles

4.25 As will be shown in Section 5, bicycle use in Nairobi, either for personal or commercial reasons, is comparatively rare. Use and stakeholder surveys are unanimous in identifying the fear of accidents as the main reason for the decline in use. It is simply perceived as being too dangerous. This was not the case a few decades ago when use of bicycles was common and popular [Howe and Dennis 1993].

Planning for change

4.26 Transport in Nairobi has been subject to a number of major studies over the past thirty years – 1973, 1979, 1986, 1990, 1993, 1996 and 1998 – the most important of which are to be found in the list of references. They have tended to focus on improving the increasingly unsatisfactory conditions for the journey to and from work, as manifest in main road and junction congestion, slow journey times, high fares, etc. While most of the studies acknowledged the dominance of trips by walking and public transport, recommendations have tended to favor the latter, and by implication other motor vehicles. The issue of the affordability of public transport, its management in an increasingly laissez faire operating environment, and, as a consequence, the extension of services to the more remote communities, received little serious attention until the study in 1998. Similarly improved facilities for walking and the restoration of an environment that would reinstate cycling also received little attention until the 1998 report.

4.27 Few of the recommendations of these studies have yet been implemented. Lack of financial resources has been the main reason, but the failure of Nairobi City Council as both a political and administrative organization has also contributed to the stalemate. The result has been a steady deterioration in almost all transport infrastructure, and worsening congestion. The main transport modes used by the poor – walking and public transport – or which might be used by them (cycling) have been especially disadvantaged.

ELDORET

Background

History and physical geography

4.28 The urban development of Eldoret started with the completion of the rail extension to the area in 1925. It became a municipality in 1929 and its designated area has grown steadily until 1988 when it was extended to 147.9 sq. km [Mugai1993]. Eldoret's expansion has so far been governed by two factors: the escarpment that forms the edge of the Uasin Gishu Plateau has set the limit of the built-up area in the North, and the stony and steep Sosiani River valley, which bisects the existing urban area, has been a hindrance to expansion in the South. As a result, the town’s urbanized area sprawls along an east-west axis.

Commercial function

4.29 The town originally had an agricultural service function, but over the years has grown into an administrative, general commerce, and industrial center. Because of its location
astride major communication routes, Eldoret functions as a regional center providing services to a substantial area. Among the most significant factors that have contributed to Eldoret's relatively fast growth in size and regional functions are its location with respect to markets in Western Kenya, Uganda, Sudan and Central Africa; its position as a railway town; its rich agricultural hinterland; and availability of infrastructural facilities. This potential has been utilized by manufacturing and processing industries. Another important factor for Eldoret's growth has been the decision to locate major educational and public institutions within and around the area such as Moi University, Moi Teachers College, Eldoret (third national) Polytechnic, the Second Referral Hospital, an inland ports (container) depot and a terminal of the Kenya oil products pipeline. An international airport was recently opened that is used for horticultural exports.

Land use distribution
4.30 The narrow band of land between the Uasin Gishu Plateau and the Sosian River contains the main east-west transport corridors, original CBD, administrative and residential areas, and the early industrial estates, which are strung out along the arterial connections rather than grouped in one area. Subsequent residential and industrial development has tended to be south of the river, although the university complex is located out of the main urbanized area to the north. The original colonial land use segregation is still evident, although, as in Nairobi, the basis is now income, but it is of shrinking importance. Settlements have tended to locate where land was available with the least resistance.

4.31 High density housing development took place in the west, where employment opportunities were concentrated in the early industrial area. The eastern part of the town was developed for low density housing. The current industrial zone is comprised of disjointed sites within and along the boundaries of the town. Industrial location has mainly been determined by among others, the railway line and the T-shaped arterial road network, as well as availability of land. The recent Kenya Pipeline Oil Depot and Ports Authority Container Depot are locating in the north within the railway siding. In the mid-seventies, land belonging to the municipal council was designated for industrial growth in the town's structure plan to provide a more ordered growth pattern. Within the municipal boundaries are large tracts of agricultural land that are privately owned. This land lacks urban infrastructure and can only be acquired for urban development through direct purchase or compulsory acquisition by the council.

4.32 The main informal settlements are Langas (4 km south from the CBD), Mwenderi, Huruma (3 km west from the CBD), Bondeni and Kamukunji (1 km from the CBD). There are also low-income planned settlements built by the municipality. These are Shauri Yako, Kidiwa and Majengo. Younger people and industrial workers tend to live in Langas and Mwenderi. The settlements are essentially the same as described in Box 4.1. The main difference is that community groups are very well organized in Eldoret and each ward has area development committees [Matrix Development Consultants/USAID 1993].

Population
4.33 At independence in 1963 the population was around 21,200. Since then it has expanded rapidly at an estimated 8% per annum. Its current population is thought to be of the order of 300,000, with an average population density of around 2000 persons per square km, roughly half that of Nairobi. However, as with other major towns there is a huge disparity between densities in low-middle and high income areas (Box 4.1).
Employment and livelihood activities

4.34 Wage employment in Eldoret expanded from 21,500 in 1994 to 31,200 in 1999, or 7.7% per annum. The presence of a number of industries in Eldoret gives its population a better chance of finding regular waged employment compared with many other secondary cities in Kenya. There are no separate figures for growth of employment in the informal sector in the municipality, but in the Rift Valley Province it was estimated at an average rate of 12% from 1996-1999 [Republic of Kenya 2000]. Informal employment activities are concentrated in the CBD, around the municipal markets and along the main roads, but have also spread throughout the high density residential areas. They include low-income open-air jua kali basic goods and service activities as well as the more highly capitalized sales outlets of middle-class entrepreneurs operating out of fixed premises or their residences [Nyakaana 1995]. Their long opening hours, low prices, and willingness to sell in very small affordable amounts helps them attract customers.

4.35 Eldoret still has considerable open space, much of which is devoted to urban agriculture and livestock-keeping. As well, small livestock and poultry are kept especially in the high density residential areas by low-income households, in contravention of municipal health regulations. Most of this is subsistence-related farming, such that in the post-harvest season, municipal markets report a decline in sales [Nyakaana 1995]. Wealthier households with better access to land are engaged in urban agriculture for commercial purposes.

Poverty

4.36 It has not proved possible to locate separate poverty assessments for Eldoret. In national surveys it is subsumed in the category ‘other towns combined’ [Republic of Kenya 2000]. These exhibit a slightly higher proportion of their population living in absolute poverty than Nairobi, roughly 53%. Again, as in the case of Nairobi, because of Kenya’s highly skewed income distribution a significant proportion of the population is also unlikely to be very much better off than those living in absolute poverty.

Transport system

4.37 The Kenya-Uganda railway, which bisects the area, has no local transport function other than as the source and destination of goods for the hinterland and municipality’s industries. The backbone of the internal passenger and local goods system is road transport.

Road system

4.38 Eldoret has a current road network of about 240 km. Primary (19%) and distributor roads (5%), comprise a quarter of the system and access roads the remainder. Surveys in 1992 showed a worse situation than Nairobi with only 24% of the network surfaces in a good or adequate condition, the remainder requiring resurfacing or reconstruction. Drainage conditions were also unsatisfactory with 46% poor (under-designed) or very poor (non-functional), and 35% having no road-side drains or culverts [Ministry of Local Government 1993]. About 96 km (40%) were rehabilitated in 1996 with a surface dressing and asphalt surfacing, however, only 60% of the corresponding drainage works were done.

4.39 The various road categories form a rectangular grid within the town that stretches along the east-west axis in conformity with the disposition of the Sosiani River valley and the escarpment. Eldoret has grown up around its T-shaped arterial road system, which has historically served it well, but the high volumes of heavy traffic passing through its center now exact a heavy toll in noise, pollution and, crucially, road accidents. Planned by-passes have not materialized because of the cost.
4.40 The town has three road density zones that reflect a sequence of growth over the years: the CBD, the industrial area and the low density residential area of Elgon View. The low income areas have the lowest road density and most have no formal route system for the same reason as in Nairobi. Most of the residential estates are circumvented by tarmac surfaced routes that branch from the main primary distributors of Nairobi, Kisumu and Uganda roads and therefore provide accessibility from and to other areas.

**Public motorized transport system**

4.41 Public transport facilities in the town are composed of *matatus* and city center taxis, with the former concentrating on passengers to and from the hinterland. Due to the relatively high degree of car ownership in the low density residential areas, most of the *matatus* operate between the town center and the low income areas in the West (off Uganda road) and in the south (off Kisumu road). There are some 111 *matatus* and 42 taxis offering within town services. Outside town services are provided by a further 35 buses and 63 *matatus*.

**Non-motorized wheeled transport**

- **Handcarts**

4.42 There are about 50 handcarts within the town. Operations are confined mostly within the CBD and to the western side of the urban area. As in Nairobi they are an essential support to petty hawking and trading activities. They have difficulty serving the informal settlements to the south because there is only one bridge across the Sosiani River they can use necessitating long detours to get to places such as Langas and Kipkarren [World Bank and UNECA 1997b]. Also the steep gradients are difficult to negotiate when loaded. Eldoret handcart operators were organized into three distinct, non-competing groups. They were not officially registered and most did not own their vehicles, but hired them. No surveys of handcart operations in Eldoret were undertaken or found. However, they are likely to be similar to those of Kisumu, a neighboring and similar sized town (Box 4.2).

**Box 4.2: Handcarts in Kisumu**

Handcarts in Kisumu date from the 1930s and most are of a fairly rudimentary construction. They occupy a short-distance, niche market between human and bicycle-assisted goods carriage, and pickups and trucks. Payloads are up to 400 kgs and they are moved at an average speed of 3-5 km/h. Handcarts serve two distinct markets. Businesses (88% trip share), especially distributors and hawkers, and assisting travellers (12% trip share) with goods in their interchange between travel modes (rail, bus) or to places of residence. Totaling 1300 in 1991 they are thought to have increased in number five fold since 1983, in line with the growth of informal trading and hawking. Their ability to penetrate into markets and congested parts of the town - effectively closed to motor vehicle access - is a prized attribute. Much of their cargo is food products so they make a significant contribution to its distribution serving an estimated quarter of the population on a daily basis. All the operators are male and most (78%) are married. Their operations provide an income, which (theoretically) makes operators middle income earners.

Source: Otieno 1993

- **Bicycle transporters**

4.43 As will be apparent from Section 6, and in contrast to Nairobi, bicycles are still widely used and desired as a personal means of transport. Concern is increasing about the growing conflicts with motorized vehicles on the main arterial routes, but so far this does not seem to have deterred overall use.
4.44 Eldoret also provides an example – increasingly common in western Kenya and Uganda – of the use of bicycles to provide commercial passenger and goods carrying services. Bicycles have always been used for commercial activities, but these services started to emerge as a distinctive phenomenon, both in East and West Africa, about two decades ago at the height of economic depression [Malmberg-Calvo 1994]. The new services are different in the extent and nature of their operations and in being offered on a for hire rather than own account basis.

4.45 In East Africa they became known locally as boda boda services, a corruption of the English word ‘border’, as their main use was for smuggling goods, especially motor fuel, across the Kenya-Uganda border. Gradually these operations developed into offering passenger and goods carrying services around the main urban areas and market towns on both sides of the border. Recent research in Uganda shows these services to be highly profitable with the benefit:cost ratio of owner-operators exceeding 8:1 and hire-operators almost 5:1 [Heyen-Perschon 2000]. In Nigeria, Dahomey, Togo and Uganda motor cycle versions of these services have recently emerged, but do not yet seem to have crossed the border into Kenya, although they can be expected to do so [Howe and Oni 1996].

4.46 The bicycle and motorcycle services match the small parcel nature of passenger and goods demand among the poor. They have the ability to penetrate into areas that motor vehicles cannot go and at costs that the poor can afford. Also, they are able to service low density demands that would render the use of larger vehicles uneconomic. They also support an industry of operators, mechanics, and beverage and food stalls.

4.47 At the time of the studies only the goods carrying bicycle version was common in Eldoret, but it is possibly only a matter of time before the passenger version develops, to be complemented eventually by motor cycle-based services. The Eldoret services mainly transport farm produce from the Municipal market to the west market, and the matatu/bus stops within the town. A similar but reverse service has been observed in a near neighbor, Kampala, capital of Uganda [Grisley 1995]. It is of interest in documenting the conditions under which such services can flourish, and because of the scale of their operations which transports approximately a fifth of the vegetables in the local market (Box 4.3). The example also illustrates that these informal transport services are by no means as trivial as is often implied by the official efforts to suppress them.

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**Box 4.3: Transportation of agricultural commodities by bicycle**

The transportation of agricultural commodities on the Bombo Road leading into Kampala, Uganda, was studied with special reference to the role played by bicycle transporters. In total, an estimated 43,127 tons of agricultural commodities was transported down the Bombo Road during 1992. Bicycles transported 7,620 tons, or 18 percent, but were responsible for almost all transportation within a 1-day (bicycle) distance to the market. Within this range, motorized vehicles could not compete with bicycles. The key to the success of the bicycle along the Bombo Road was the ease of road access to local markets. Other roads leading into Kampala are narrow and congested and bicycles cannot compete with the heavy motorized vehicle traffic. Bicyclists also provide vital market information to farmers, and they are able to service their small-scale demands. Motorized transportation cannot fulfill these roles as efficiently.

Source: Grisley 1995
Planning for change

4.48 Until its recent, very rapid, expansion, Eldoret was a comparatively small urban area that did not warrant or receive elaborate transport planning. Simple engineering surveys sufficed for such limited investments as have been made. It was routinely included in the urban planning initiatives of the early 1990s, but until Kenya Urban Transport Infrastructure Project started in 1998 there was little in the way of actual investment, apart from three footbridges across the Sosiani River financed by the local Lions Club. Attempts to examine the travel needs and priorities of the majority of the population were individual rather than official initiatives [Muigai 1993, Broekema and Jaarsma 1994, Linden et al. 1995].

DAR ES SALAAM

Background

History and physical geography

4.49 Dar es Salaam also had colonial beginnings and like Nairobi grew at a comparatively slow rate until independence in 1961, when growth became more rapid [Lugalla 1990]. In 1973 attempts were made to restrain this growth by moving the political capital to the city of Dodoma 400 kms inland, but this has been a failure and few ministries have transferred.

4.50 The city is located on a coastal plain bounded by the Indian Ocean to the east and the Pugu Hills some 30 kms inland to the west. Rivers originating in the Pugu Hills flow through the coastal plain and have formed prominent elements in the natural landscape of Dar es Salaam that have affected the growth pattern of the city. The Mzinga river, and its associated Mzinga Creek, provide the natural harbor that gives the city its name and strategic location, but has acted as a barrier restraining expansion to the south. Harbor goods traffic and the necessity for rail access have also influenced the physical geography of the semi-circular city.

Commercial function

4.51 Beginning also as a colonial service center with a strong export function, the city has grown to be the industrial, commerce and government center of Tanzania, serving the nation (and several neighboring land-locked countries) though its natural harbor and communications linkages. It is the terminus of two international rail networks connecting Zambia, Malawi, Republic of the Congo, Rwanda, Burundi, and Uganda. However, it has never been able to match Nairobi as a regional or commercial center so wealth accumulation has been comparatively modest. In 1997 Tanzania's estimated real GDP per capita was at PPP $580, slightly less than half that of Kenya's at PPP $1190 [UNDP 1999]. Agriculture remains far more dominant in Tanzania's economy (48% value added to GDP in 1997) than Kenya's (29% value added) so recent declining returns to peasant farming are likely to have been the main cause of its rapid urbanization.

Land use distribution

4.52 The original highly centralized and racially zoned colonial land pattern has given way to one in which industry is much more dispersed around several centers. These have tended to stimulate informal settlements for their associated workers, but subsequently developing as more general accommodation for low income households [Banyikwa 1988]. From the mid-1980s activities providing industrial and other job opportunities were encouraged by the City Council to spread throughout the urban area so as to achieve a better balance between employment locations and the residences of the labor force [Banyikwa 1988].

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23 At the end of German colonialism in 1917 the city population was estimated at 22,500 and by 1957 this had grown to 129,000, an annual rate of 4.5% per annum. Ten years later the first post-independence census in 1967 indicated 273,000 inhabitants, a growth rate of 7.8% per annum [Lugalla 1990]. Growth between 1917-1957 was not even and its African population nearly doubled between 1948 and 1957 and were accommodated in separate, newly laid-out, suburbs designed especially for them [Leslie 1963].
4.53 The process appears to have been accompanied by a growing informal market in land due to the local authorities inability to deal with the increasing flood of immigrants. Between 1978-79 and 1991-92 the Dar es Salaam City Council received 261,668 applicants for plots but was able to provide and allocate only 17,751 (6.8%). The others had to look elsewhere. Currently it is estimated that about 70% of the city population live in unplanned and unserviced areas where invariably land has been obtained by informal means [Kombe 1999].

Official default in providing plots and the emergence of a dominant informal market are clearly linked, a process that did not favor the poor:

In Tanzania, a policy of displacing the poor from their land (with little or no compensation), relocating the poor (usually to distant locations) and the allocation of land so cleared to other people, has been taking place. The procedures adopted to get access to planned land, and low allocation of such land lots ensures that the poor are shut off from it. This is one factor leading to the prodigious growth of unplanned areas [Lusugga Kironde 1995].

4.54 Surveys in 1999, under the Sustainable Dar es Salaam project, indicate that there are about 54 informal settlements widely distributed throughout the most urbanized parts of the Dar es Salaam region (Figure 3.2). Some of the largest are located close to the main arterial routes, especially Kilwa, Morogoro, Nelson Mandela, and Pugu roads. They are located at varying distances from the CBD up to 24 kms [Amer and Thorborg 1996]. Occupying about 35% of the land area they are generally much less dense than in Nairobi where the comparable area is just 3%. One consequence of this is that visually there appears to be a more even mixing of the poor and non-poor. It is presently rare to find in Dar es Salaam the degree of service deprivation commonly found in Nairobi’s most dense informal settlements.

4.55 As in Nairobi the spatial distribution of informal settlements contradicts the stereotyping of the poor being located mostly on the periphery of cities. Some are, but many have similar notional accessibility levels to planned settlements, albeit that the extremes are clearly different. This can be shown objectively using aerial surveys of roof areas and composite accessibility criteria based on bus availability (Table 4.2). Almost 81% of unplanned residential area have very poor or poor access by bus compared to 74% of planned areas. Conversely 13% of planned residential areas have very good or good access compared to about 4% of unplanned areas.

Table 4.2: Relative accessibility of unplanned and planned residential areas in Dar es Salaam by bus

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Accessibility classes</th>
<th>Roof area % from each land use group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Unplanned residential</td>
<td>40.7</td>
<td>40.0</td>
</tr>
<tr>
<td>Planned residential</td>
<td>43.6</td>
<td>30.5</td>
</tr>
</tbody>
</table>

Source: Berhie 1998

24 Land can be obtained informally by way of occupation without permit, allocation by local leaders or land owners, inheritance or purchase. While spectacular land invasions such as those experienced in Latin America have not taken place in urban Tanzania, there are indications that slow land invasion does take place, particularly on marginal land. Typical methods of invasion include the use of land for cultivation for several seasons before eventually deciding to build; erecting makeshift structures before eventually deciding to make permanent ones; and invitation by an early settler to create solidarity groups. Quite often, government (planned) land is allocated informally through private dealings which involve the exchange of money [Lusugga Kironde 1995].
4.56 The last national census was in 1988, so all current figures are estimates. The city’s present population is thought to be around 2.8 million and although the last inter-census growth rate was 6.3% per annum, it is widely quoted to be growing at 8% per annum, one of the highest rates of urbanization in Sub Saharan Africa. Informed opinion, however, suggests that this figure is too high and growth is going down because of worsening economic conditions. The designated Dar es Salaam region has an area of 1393 square km, almost double that of Nairobi for a similar population, but this includes waste land and a small nature reserve south of the University. The heavily urbanized area is perhaps half of the nominal reserve.

4.57 Tanzania has experienced a major employment problem throughout the 1990s due to the weak performance of the economy in the 1980s and continuing economic stagnation [United Republic of Tanzania 1996]. The streamlining of the civil service in the late 1980s and early 1990s and the privatization of the public sector in the 1990s have contributed to the reduction of employment in the formal sector. The informal sector has taken up much of the slack. The National Informal Sector Survey indicates it to be growing at 2.4 % per annum [The Planning Commission 1998]. In one recent survey, 63% of urban residents in two low-income wards of Dar es Salaam were actively engaged in the informal sector [Mascarenhas 1999]. In Dar es Salaam, the informal sector is clearly divided between high and low-income pursuits. Middle-class informal sector participants generally invest in those activities with high capital entry costs like grocery kiosks, taxis, hairdressing saloons, or commercial urban farming including poultry keeping and dairy cattle [Lugalla 1997]. Because they tend to have
jobs in the formal sector, they depend on hired or family labor to run their businesses. By contrast, poor households are involved in less remunerative petty trading, hawking, and semi-skilled services. Women are highly prevalent in both types of activities, and tend to operate from a home-base [Mascarenhas 1999, Tripp 1997].

4.58 In terms of the urban mobility patterns of the poor, it is important to stress that energy and water provisioning often entails significant daily collection activities. As in rural areas, women are primarily responsible for this work. In a survey of Kigogo and Hanna Nassif wards of Dar es Salaam three times more women than men stated the problem of increased distances to walk arising from a poor urban environment [Mascarenhas 1999]. Women from poor households collected purchased water from better-off households’ stand-pipes (73% of the sample) or from nearby polluted streams (10%).

The time involved was generally less than half an hour, but was performed daily. Some 15% of the women also collected firewood from adjacent areas [Mascarenhas 1999].

4.59 Food provisioning also has a distinct gender pattern amongst poor households in Dar es Salaam. The Kigogo and Hanna Nassif surveys revealed that 36% of the households farmed, with women far outnumbering men. But almost half admitted that this provided only a little food. Only 16% said it provided more than half of their needs [Mascarenhas 1997]. Men, on the other hand, have greater responsibility for providing purchased food needs. Food purchase tends to consume a major share of poor households’ income and is carried out more frequently and in smaller amounts in poor households due to their lack of disposable cash at any one moment [Bryceson 1990, 1993].

In Kigogo and Hanna Nassif the gender allocation of food shopping effort was as follows:

Overall women had the greater responsibility but men’s food purchases had higher value. Food and related items were bought daily, on a weekly basis or once or twice a month...Men were seldom involved in the daily purchases, but were prominent in those made on a monthly basis. Daily shopping was the responsibility of women who spent more time than men on obtaining food for the household...Men also tend to buy in bulk and from distant sources, having greater facilities for travel, whereas women are more restricted in travel by their domestic responsibilities [Mascarenhas 1999: 70].

Poverty

4.60 Poverty in Tanzania has not been estimated on the same basis as in Kenya. According to the 1993 urban poverty profile, about 50% of all Tanzanians were classified as poor, with 36% hard core poor. However, the data in Table 4.1 suggests that wealth, or poverty, is much more evenly distributed in Tanzania than Kenya. Other measures of inequality bear out this conclusion. Tanzania’s Gini coefficient has been estimated at between 0.39 and 0.46 compared to Kenya’s 0.55.

4.61 All surveys indicate that poverty in Tanzania is less acute in urban than rural areas, although still a serious problem, especially outside of Dar es Salaam. In 1991/92 the basic needs poverty incidence for Dar es Salaam was 5.5% and for the other urban areas 41%. Unpublished estimates for year 2000 show that the poverty incidence level in Dar es Salaam may have increased to 9.2% and for other urban areas to 48%. However, the most recent assessment of poverty in Tanzania suggests that the figures for Dar es Salaam could be seriously underestimated due to the poverty lines being lower than those used elsewhere [Tanzania, National Bureau of Statistics 2000].

25 They collected 6 buckets per day totaling 120 liters, which amounted to 20 liters per household member, below the recommended amount for daily usage.
Transport system

4.62 The two international rail systems, which bisect the city, do not have a local transport function other than as the source and destination of goods for the harbor and local industries. The backbone of the internal passenger and local goods system is road transport.

Road system

4.63 There is some confusion about the extent and state of Dar es Salaam’s road network due to the various classifications used and whether or not they cover the entire region or just the most urbanized part. In 1995 the region had a road system of about 1150 km comprising arterial (13%), collector (27%), and access (60%) roads. Approximately 61% of the total system was unpaved [Dar es Salaam Road Master Plan 1995]. Most of the access roads are located outside the urban areas, so the effective network comprises the arterial and collector roads of some 460 km. Much of the central arterial system was re-surfaced and key parts widened under Japanese grant assistance of Tshs 22 billion (US$ 37m) in the mid-1990s. A more limited program of selected improvement has continued but will end this year. The rest of the network is severely deteriorated and prone to flooding as only a small proportion of the city has a functioning storm water drainage network. Small traders have invaded the rights of way of many of the collector roads forcing pedestrians into the carriageway. Also, along most collector and access roads the effective travel width has been reduced due to either a build up of sand and debris along the verge, or by the deterioration of the roadway edge.

4.64 Its physical geography imposes on Dar es Salaam an arterial road system with a strongly radial orientation focused on the harbor area that remains the central part of the city. There are four major routes radiating from the city - the Bagamoyo, Kilwa, Morogoro and Pugu roads. One arterial ring road exists, linking the four major routes and harbor. The Morogoro road provides the only real link with the rest of the country and neighboring countries. Neither the Bagamoyo road to the north, or Kilwa road to the south, provide effective coastal highways. The urban population has paid a high price for this network failure and resulting traffic concentration. Morogoro road comprises 22% of the principal arterial routes of the city, but it accounted for 55% of all, and 65% of pedestrian, accidents on the arterial system between 1996-98 [Kayoza 2000]. Similarly for those who must travel to the main employment centers the strongly radial orientation of the main public transport services is inconvenient. In 1998 out of 83 bus routes in the city, 53 (64%) arrived in the CBD zones [Berhie 1998]. There were few circular services inter-connecting the radial routes.

4.65 Dar es Salaam visibly suffers from a significant parking problem in the city center. There are less than 2500 on-street parking places and this leads drivers to search for a place which adds to the congestion.

Public motorized transport system

4.66 The public transport system in Dar es Salaam consists entirely of road-based services. The market for public transport services in DSM has gone through two main regimes. Near monopoly by state provision up to the mid-1980s, and de facto liberalization thereafter [Mbelle 1993]. Even during the period of monopoly the state provided services were rarely able to meet demands.26 Illegal share taxi services helped to fill the gaps; also many state organizations and other major employers maintained their own bus fleets. This practice was not confined to Tanzania, but has always been regarded as an indication of market failure due to the obvious inefficiency of a poor country having scarce capital.

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26 The bus route network tends to confine itself to the main roads. Because of their radial pattern the proximity of bus routes to passenger origins was found in a 1991 survey to vary from 0.5 –3 kms depending on the distance from the central area [Mosi 1993].
equipment idle for much of the working day. As an indication of the scale of this problem in 1985, two years after its monopoly was ended, the state provided fleet stood at 191 buses, but there were estimated to be 120 staff buses in DSM [Banyikwa 1988].

4.67 After the government allowed private operators to provide transport services for the city population in 1983 they quickly grew to dominate with a 90% market share by 1989 [United Nations Center for Human Settlements 1996]. Although the parastatal formerly providing stage bus services (UDA) is reportedly being (formally) privatized, this may be an action too little too late as its market share has reduced dramatically [Rwebangira 1999, Mtaki 1999]. In August 2000 UDA’s market share was reported to be just 2% with only 12 buses operating in the last full year.²⁷

4.68 Box 4.3 explains the nature of dala dala services in Tanzania. Their dominance and use of relatively small vehicles leads to obvious inefficiencies for trunk corridor services relative to conventional stage buses. These include relatively high operating costs, increased congestion, less economic road space utilization, and lower comfort levels [Mtaki 1999]. It is also frequently claimed that they have higher accident levels than stage bus services, but this has not been substantiated [Rwebangira et al. 1999].

4.69 Until recently there were thought to be around 7500 dala dalas operating in Dar es Salaam, but this number has been reduced by the removal of some of those operating illegally.²⁸ The Dar es Salaam Regional Road Transport Licensing Authority contrived this by an exercise of painting dala dalas with different colors for the different routes in the city. This exposed those with false insurance or taxi clearance certificates.

Box 4.3: Dala dala operations in Tanzania

Dala dala operate in almost all municipalities throughout the country. The fleet is very diverse in both type and capacity, but for the majority it ranges from 16 – 36 passengers. On most routes the 16-passenger capacity Toyota Hiace dominates. The majority of dala dala are imported as reconditioned vehicles or bought secondhand, from Japan and the Middle East. The routes operated range from less than 3 to approximately 30 kms, the latter being peri-urban routes. Services are not scheduled and vehicles only leave a rank when full. Dala dala drivers have reported starting work at approximately 0430 - 0500 and finishing as late as 2300 - 2400. Most vehicles have been operated for less than 8 years in the Dar es Salaam region, however, the average age may be up to or more than 10 years.

Driver remuneration is generally not fixed, but commission based. Other operators stipulate revenue targets to be achieved by their drivers. Both methods encourage speeding, overtaking, poor parking and frequent vehicle stoppages to pick up or drop passengers on their way to anticipated destinations. Most of the drivers employed in the business are very young. There are no laid down procedures for driver recruitment. For instance, a driver discharged by one operator can be re-engaged by another operator in a matter of hours without even ascertaining the reasons for dismissal. Consequently, driver turnover is very high. For the majority of drivers there are no training programs.

The majority of dala dala operators have an operating fleet of less than 15 vehicles and lack proper maintenance facilities or programs. Vehicle maintenance for minor repairs are carried out at backyard workshops after a persistent outcry from the driver about a particular fault. Major repairs are undertaken at external workshops, the majority of which belong to friends.

Source: Rwebangira et al. 1999

²⁷ Personal communication from UDA.
²⁸ There are in addition some 1200 regular taxis.
4.70 A feature of public transport that has developed since 1992 has been the proliferation of different types of vehicles, ranging from conventional buses to minibuses, microbuses, converted pick-ups and recently, Land Rovers. It is this change which has had a large impact on the urban space of the city. In particular, minibuses are now operating feeder routes off the main routes along dirt roads into interstitial areas from suburban hubs such as Ubungo, Mwenge, Mbezi and Kibamba. Land Rovers are being used in the same way along the even rougher tracks. The result has been to permit significant urban development at locations away from the arterial roads. As these areas become more densely settled, road upgrading by the City Council and, in some cases, private companies takes place, allowing in larger buses. The smaller buses and Land Rovers then get pushed out further into the next urban colonizer zones. A location next to a main road is no longer the pressing concern that it once was [Briggs and Mwamfupe 2000].

Private motorized transport

4.71 A further contributory factor to the process of urban expansion and densification has been the increase in private vehicle ownership in the 1990s. There has been a significant increase in car ownership among public-sector employees, but not because of rises in real wages; indeed, quite the opposite. Structural adjustment required tight control over public expenditure, resulting in retrenchment and reductions in real wages. The response by the government was to introduce a car allowance, payable on proof of ownership, as a way of raising incomes in the public sector. A typical middle-level state employee’s monthly salary was about TShs50,000, to which was added a monthly car allowance of TShs100,000. The means of access to what used to be quite inaccessible urban areas, largely because of a reliance on an inadequate and unreliable public transport system, became more widely available. The process was further encouraged, as far as state employees were concerned, as many were eligible for an additional monthly housing allowance of TShs100,000, similarly payable on proof of ownership. A 1997 survey showed that in some of the more recently expanding areas of the peri-urban zone about two-thirds of houses under construction were owned by state employees [Briggs and Mwamfupe 2000]. An estimated 20,000 state employees were thought to be benefiting from these arrangements.

Non-motorized wheeled transport

• Handcarts

4.72 These seem to have the same dual function as in Nairobi and to experience much the same problems. Numbers in use are not known but one estimate, derived from discussions with operators, gave handcarts less than a 5% share of goods transport in the city in 1993, although the basis for this figure is not clear [Nguma 1993]. The existence of a number of places where carts could be rented for US $0.5 -1.0 (two-wheel) or US $ 1-2 (tri-cycle) per day was cited as evidence of a growing market. In return an operator could expect a daily income of US $3 - 4, or US $6 for a tri-cycle.

• Bicycles

4.73 For normal bicycles the situation is the same as in Nairobi. Cyclists have been intimidated off the road system and in doing so the poor have lost the use of a potentially cheap and flexible mode of transport. However, Dar es Salaam has been the location of a successful innovation in transport that both serves and provides employment predominantly for the low-income segment of the population. The tricycle-powered gurudumu tatu of Tanzania (Box 4.4) is a rare example of successful technology transfer and adaptation. It greatly extends the range and speed of the handcart, and offers goods transport at a price below motorized alternatives. Operation also appears to be very profitable. Despite difficult economic conditions the market penetration has been remarkable given the limited resources put into promotion. Because of its size and the loads carried it is less easy for motorists to intimidate the operators of gurudumu tatu, although it does happen (Box 4.3).
Box 4.4: The *gurudumu tatu* of Tanzania

As the result of seeing a video at an international trade fair in 1990 a Dar es Salaam entrepreneur started to import kits of load carrying tricycles from China. Locally they are called *gurudumu tatu* – literally three wheelers. They normally have a flat load platform behind the operator and in Asia would be called a rickshaw van. In the first four years 200 were sold at cost as a promotion. To date the entrepreneur estimates that some 20,000 have been produced roughly half of which are thought to be in the Dar es Salaam region, although observation suggests this estimate is high. Only tires, chains and related accessories are now imported, the frame and body being fabricated locally. Two main versions are produced. One with bicycle wheels and tires for light duties carrying up to about 500 kgs payload and retailing at about $230, and a heavy duty version with motorcycle wheels and tires carrying a maximum payload of one tonne and retailing at approximately $275. The exact price depends on the body configuration specified by the client. Most are for all-purpose load carriage, but some have been equipped with an enclosed metal body for solid waste collection, and others for food distribution by vendors.

Many are apparently used in the Ifakara area of Morogoro region to ferry rice from field to the factory, and for firewood collection. Others have been converted into rural ambulances. Interviews showed that operation is commercial rather than personal, with both backward and forward employment linkages. Operating returns in urban area are reported as being as high as Tshs 5000-10000 per day ($6-12) implying a rapid return on the capital invested.

It is not necessarily easy money as operators complain of harassment by motorists. This is especially the case with pick-up drivers who see them, quite correctly, as competition as they can offer lower charges. One operator had this to say about his experience:

"Motorists harass us so much, especially when they see us carrying big luggage. One motorist asked me why I was carrying such a big luggage, much too big for my capacity. I told him it was none of his business. This led him to park his car by the roadside and we started fighting. I was so mad at him and both of us ended up at the police where we were put to task. You know with the police, nothing is small to them. We wasted a lot of time at the police station."

There are the usual problems in securing credit for the purchase of *gurudumu tatu*. Also complaints of unnecessary restraints on demand because of price inflation by the various taxes levied on a vehicle which tends to undermine its suitability for the poor. These are a 20% import tax on spare parts and materials and VAT at 20%.

Source: SSATP team surveys

Planning for change

Transport in Dar es Salaam has, like Nairobi, been the subject of a number of major studies with a similar traffic engineering orientation. Again little has been implemented for much the same reasons: finance as an ostensible constraint, but political and institutional paralysis as more compelling explanations. It has gone through a similar history of central government suspensions of its elected councils, apparently for maladministration, and the imposition of rule by Commission. The latest proposal is to separate the city administratively into its three component Districts: Kinondoni, Ilala and Temeke.

**MOROGORO**

**Background**

**History and physical geography**

Morogoro is located some 200 kms due west of Dar es Salaam at the foot of the Uluguru Mountains. It was an important center prior to colonization and functioned as a
staging post for journeys into the heart of the country. It has developed, along the line of its old and new road communication routes, as an important regional, rail and education center, with a number of secondary schools, several training institutes, colleges and Tanzania’s main agricultural university (Sokoine University of Agriculture).

4.76 The urbanized area is essentially flat and there are few roads with appreciable gradients. Parts of it are prone to flooding in the rainy season. Only in the southern part of the city have a small number of the high-income population started to construct residences on the slopes of the mountains. At an altitude of 400m it has a cooler climate than the coast that has aided the development of an extensive range of crops, and vegetables and fruits on the mountain slopes.

Commercial function
4.77 For many years Morogoro was an important center for the production of sisal, cotton, sugar, and vegetables for the Dar es Salaam market. It supported a number of light industries, but in recent years their fortunes have declined with the major export crops.

Land use distribution
4.78 Morogoro has a designated area of 480 square kms, about 21% of which is currently urbanized. There are four main unplanned residential areas occupying 3.1 square kms. This compares with a planned residential area of more than treble this, 10.2 square kms (10.1%). Even the largest of the unplanned areas (Chamwino) has no roads or open spaces. In 1994 it had a population density of about 10,500 persons per sq. km. The CBD and industrial zones are all reasonably accessible from the main unplanned areas by foot or bicycle, but more are developing in the peri-urban areas.

Population
4.79 Its estimated population in 1999 was 196,400 [United Republic of Tanzania 1996]. The last reliable (1988) inter-census growth rate was 11.1% per annum, but the long-term figure is 8%. These two figures imply a current (2000) population of 267,000 – 300,000. For planning purposes the Council has adopted a 1998 figure of 270,000 [Morogoro Municipal Council 2000].

Employment and livelihood activities
4.80 In 1993 the municipality had a population of about 188,000 with an estimated 87,000 in the active labor force (i.e. between 15-55 years of age). Of this total some 23% were in formal employment, 37% were self-employed and the remaining 40% unemployed. Such high levels of unemployment no doubt reflect the factory retrenchments that Morogoro had been experiencing under SAP. In the absence of the reopening of these factories, the informal sector would have mopped up much of this unemployment in the intervening years but no recent employment statistics are available.

4.81 There is no data on urban agriculture, but the good agricultural climate and soils of the area as well as the high incidence of urban agriculture in other Tanzanian cities of similar size [Bryceson 1993] suggest that urban farming would be an important supplement to low-income household earnings.

Poverty
4.82 Poverty assessments for Morogoro are normally included in the national survey results for other urban areas. The surveys are consistent in showing that outside of Dar es
Salaam the incidence of poverty is high and increasing. Updated estimates for Morogoro indicate a basic needs poverty incidence of around 48\%.

**Transport system**

**Road system**

4.83 Morogoro is entirely reliant on road transport for internal passenger and goods movements. About 80\% of the municipality falls within a planned area with clearly laid out streets and a well defined building line. The rest of the area is unplanned with houses close together and no well-defined hierarchy of streets. In 1996 the municipality had a road system of about 374 km comprising arterial (22\%), collector (23\%) and access (55\%) roads. With the exception of sections of the arterial network it is generally in a very deteriorated condition. The length of bitumen paved roads is around 20 km, including a section of the Tanzam and Dodoma highways (together totaling 15 km) which was in good condition in 1998. In the same year only three internal roads had a bitumen pavement in fair condition. Most of the collector roads in the area originally had a bitumen surface, but due to lack of maintenance they have deteriorated to such an extent that they are now effectively gravel or earth roads.

4.84 The Tanzam and Dodoma highways were constructed in the 1980’s as city by-passes, north of the center. Due to the subsequent growth of the city, important residential areas have now been developed north of the Tanzam highway. Gradually both routes are being absorbed into the built-up area and perform a significant urban as well as through traffic function. This conflict has led to a significant increase in traffic accidents and most of the city’s road accident fatalities occur on these sections of road.

**Public motorized transport system**

4.85 Morogoro has urban and peri-urban public transport services based on 12-seat minibuses, *dala dala*, with an estimated average occupancy of between 10 and 15 passengers per trip. Groups of private owners run these buses, with hired drivers and touts. The minibuses operate on fixed routes. Usually they wait at the starting point until they are almost full. The number of mini-buses currently registered is 192, but this is thought to be only 70-80\% of those actually operating. Each is estimated to carry an average number of 250 passengers per day (on 10 to 12 roundtrips). In 1998 the flat rate cost per trip in a *dala dala* was 100 Tsh (US$0.16). During off-peak periods (early afternoon and after 18.00 hrs) most mini-buses are idle, but in the peak they usually also have to wait for a short period before they have enough passengers to depart. In general the supply was a bit higher than the demand (in the 1996-1999 period, there was an increase in buses in 1996/97, partly as a result of mini-buses from Dar es Salaam (then a saturated market) trying their luck in Morogoro. It appears that this extra supply did not trigger a significant increase in bus ridership, but rather that it increased competition between the mini-buses. It seems that the increase in buses for that reason stopped at the end of 1997. The coverage of the urban area by bus routes appears to be good. In 1996, 77\% of the travellers stated that they could have used a bus for their trip, if they had wanted. There are also some 180 taxis operating within the main built-up area.

**Non-motorized wheeled transport**

- Handcarts

4.86 There are currently estimated to be about 130 handcarts in use. Their function is likely to be similar to that in Dar es Salaam and other urban areas.

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29 All the poverty lines proposed so far for Tanzania are absolute lines defining poverty in terms of some exogenous measurement of income or expenditure required for basic living. The Food Poverty Line reflects the cost of a basic food basket; the Basic Needs Poverty Line provides for other, non-food expenditure [National Bureau of Statistics 2000].

30 In 1999/2000 a program started to rehabilitate 14 km of internal main roads within the city center.
• Bicycles

4.87 As will be apparent from Section 6, and in contrast to Dar es Salaam, bicycles are popular in Morogoro. So much so that, uniquely among the study cities, there is a thriving hire market.

Planning for change

4.88 As in Eldoret, Morogoro, until its recent expansion in population, was a comparatively small urban area that did not warrant or receive elaborate transport planning. Simple engineering surveys sufficed for such investments as have been made, and there have been few of these for at least two decades. Rather lack of maintenance has implied a considerable degree of road infrastructure dis-investment, although some of its main roads are currently being rehabilitated.

SUMMARY

4.89 The poor in the above reviewed cities are not just confined to isolated slums or informal settlements, they are pervasive, especially in the metropolitan areas. They are a growing majority whose rapid emergence in the last three decades has come to dominate all aspects of city systems, including that of transport. While the secondary cities have not reached the same stage of transport congestion and inter-modal incompatibility, with higher rates of population growth they are heading rapidly in the same direction. In the metropolitan cities, there are concentrations of extremely poor people in informal settlements, and an increasing number are located in peripheral locations that give rise to extreme transport difficulties. But this knowledge should not distract attention from the fact that in total the low-income group and its movement demands is an increasingly dominating feature of the entire transport system of the metropolitan cities, rather than restricted to specific parts of those cities. Thus it is in a sense dangerous to attempt to isolate the movement needs of the poor, as it creates the impression of a special class amenable to special policies. Better to accept the dominance of urban poverty as a phenomenon and ask how this should determine urban transport sector strategies, policies and interventions.

4.90 The formulation of appropriate transport - or any other sector - responses to their needs, is severely circumscribed by the daunting list of difficulties that must simultaneously be confronted. First and foremost there is a huge, and continuously growing, backlog of demands for the most basic of human needs: housing, water, sanitation, refuse disposal and, especially in an urban context, employment. Second there are few obvious resources other than aid to tackle them. Both countries are significantly indebted, the economies have experienced long periods of recession, and industrialization and modern service development are both in their infancy. The trading and hawking, that have become such a feature of all urban areas in the last two decades, is primarily of a petty, survival, nature. The traditional backbone of their economies, agriculture, is weak and declining. Third, and perhaps most significant of all, is the extraordinary collapse of conventional instruments of organization - the urban administrations. This is most evident in the absence of conventional land controls and the demise of formally organized public transport. Both have been privatized, but not in the conventional (western) sense. They have not been taken over in a transparently organized manner by entities operating under a clear framework of law. Constituted rules and regulations have all but collapsed. A market operates, but in the freest possible sense, and there are few evident controls. In the short to medium term, planned ways out of the present crisis are thus difficult to envisage, other than they proceed in a bottom up fashion, because the urban administrations are ineffective and largely discredited in the eyes of those they are supposed to serve. This is illustrated by a few informal settlement upgrading projects and measures to address their internal transport systems. While positive attempts to deal with informal settlements go back to the 1970s, distinctive concern for the issue of their transport infrastructure is much more recent and shows modest success in the context of local projects.
that combine community participation with foreign donor intervention directed at general infrastructural improvement.
5 – METROPOLITAN CITIES: TRAVEL AND TRANSPORT PATTERNS

DUTCH-SPONSORED FIELD STUDIES

5.01 The main field studies were carried out at various times in the period 1993-1997 and provide snapshots of transport conditions and relationships. Survey sampling was purposive rather than random or stratified by poverty/income level. Locational logistics dictated this. While, all the study cities have wealthy residential areas, especially notable in the capitals with their diplomatic, senior government and expatriate enclaves, this is less so in the secondary cities. In Nairobi and Dar es Salaam, most of the poor are concentrated in, and readily identified with, unplanned settlements, but there are significant numbers scattered throughout the city in occupations such as house servants, gardeners, watchmen, and in various trading and service jobs that often combine workplace and residence.

5.02 Where possible the field surveys are compared with historical trends so that processes can be identified. The approach was broadly similar in each study area. Multi-disciplinary teams of 3 municipal staff (engineer, planner and social scientist) formed an Urban Mobility Unit (UMU) that planned and implemented the various studies. National teams of experienced professionals, representing the same three disciplines from a university or private sector background, were formed to advise and support the UMUs.

5.03 Studies in the metropolitan areas covered only a segment of each city, whereas the entire area of the secondary cities was studied. In the metropolitan areas a predominantly low-income area was chosen to represent typical residential, employment and service opportunities. It also experienced significant volumes of the main means of transport both used by and conflicting with the movement needs of the poor. Lastly it had to comprise a range of land-uses so as to represent the multi-functional interests of a diverse urban system.

5.04 In Dar es Salaam the study area was Temeke ward 14 a typical lower and middle-income residential area of some 150,000 inhabitants located about 8 km from the CBD. The Nairobi study area comprised one of the older parts of the city known as Eastlands with a population estimated at 450,000 including the Pumwani, Starehe and Makadara informal settlements with (1989) densities of 12 - 43,000 persons per square km. Due to its proximity to the main business and industrial areas (2-10 kms) and inclusion of the old railway employee and government worker’s accommodation, it probably contained a relatively higher proportion, even among the low income, of formal rather than informal sector employees.

5.05 A central part of each study was a household interview survey of mobility characteristics. This was complemented by a range of focus group, user and stakeholder discussions, as well as route condition inventories, and various traffic studies. The household surveys were based on samples of approximately 300 households totaling 1200 – 1900 people each [World Bank and UNECA 1994b, 1994f, 1995a, 1996a].

5.06 Tables 5.1 and 5.2 provide summaries of the socio-economic characteristics of the surveyed population in Kenya and Tanzania respectively. It should be noted that the sampled population was on average very young: in the Kenyan cities only 15% (Nairobi) and 22% (Eldoret) were over 36 years of age and in Tanzania 19% (Dar es Salaam) and 28% (Morogoro) were over 40. East African cities continue to be ‘young cities’ with a substantial proportion of the population being first generation urban dwellers. The sampling in Morogoro was biased towards women and this was corrected when working out averages for that city.

31 See footnote 4 and the bibliography.
5.07 A clear majority of the surveyed population was low-income earners: Nairobi (62%), Dar es Salaam (68%), and Morogoro (86%). In Eldoret, the sampling was highly skewed against low-income earners (8%) which unfortunately makes many of Eldoret’s results non-representative of the city as a whole and the city’s poor in particular. Occupationally, the survey data bears out what is generally known about the economy of East African cities over the past two decades (Section 3), employment in the informal sector in Dar es Salaam and Morogoro was roughly two times greater than that in the formal sector, whereas the opposite pertained amongst the men sampled in Eldoret because of the high income sampling bias. High-income men generally have formal and informal sector sources of income, but would tend to identify themselves occupationally as formal sector workers to emphasize their status. Interestingly, the same does not pertain to women. Even though they came from high income households, their involvement in the informal sector was almost twice as high as in the formal sector.

Table 5.1: Socio-economic characteristics of the Kenyan surveyed population (%)

<table>
<thead>
<tr>
<th>AGE</th>
<th>Nairobi</th>
<th>Eldoret</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-7</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>8-15</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td>16-25</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>26-35</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>36-45</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>45+</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INCOME</th>
<th>Nairobi</th>
<th>Eldoret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low &lt;Ksh3000/mo</td>
<td>62</td>
<td>8</td>
</tr>
<tr>
<td>High &gt;Ksh3000/mo</td>
<td>38</td>
<td>92</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WORK LOCATION</th>
<th>Nairobi</th>
<th>Eldoret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>CBD</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Industrial area</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>Nairobi</th>
<th>Eldoret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal employment</td>
<td>64.2</td>
<td>32.9</td>
</tr>
<tr>
<td>Skilled</td>
<td>56.3</td>
<td>30.6</td>
</tr>
<tr>
<td>Unskilled</td>
<td>7.9</td>
<td>2.3</td>
</tr>
<tr>
<td>Informal employment</td>
<td>35.0</td>
<td>58.4</td>
</tr>
<tr>
<td>Casual laborer</td>
<td>6.8</td>
<td>2.3</td>
</tr>
<tr>
<td>House servant</td>
<td>0.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Self-employed</td>
<td>28.2</td>
<td>30.6</td>
</tr>
<tr>
<td>Householdbased</td>
<td>0.0</td>
<td>23.8</td>
</tr>
<tr>
<td>Studying</td>
<td>0.2</td>
<td>2.7</td>
</tr>
<tr>
<td>Not working</td>
<td>0.6</td>
<td>6.0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.6</td>
<td>6.0</td>
</tr>
<tr>
<td>Retired</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SSATP Phase II Final Report 1995
Table 5.2: Socio-economic characteristics of the Tanzanian surveyed population (%)

<table>
<thead>
<tr>
<th>GENDER</th>
<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>51</td>
<td>49</td>
<td>38</td>
<td>62</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>Dar es Salaam</th>
<th>Morogoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-18</td>
<td>24.8</td>
<td>16.7</td>
</tr>
<tr>
<td>19-24</td>
<td>26.6</td>
<td>20.1</td>
</tr>
<tr>
<td>25-39</td>
<td>29.5</td>
<td>35.7</td>
</tr>
<tr>
<td>40+</td>
<td>19.1</td>
<td>27.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INCOME</th>
<th>Dar es Salaam</th>
<th>Morogoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>3.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Low</td>
<td>22.2</td>
<td>34.6</td>
</tr>
<tr>
<td>Lower-middle</td>
<td>41.8</td>
<td>44.0</td>
</tr>
<tr>
<td>Upper-middle</td>
<td>19.5</td>
<td>11.3</td>
</tr>
<tr>
<td>High</td>
<td>5.0</td>
<td>1.4</td>
</tr>
<tr>
<td>No response</td>
<td>7.9</td>
<td>1.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INCOME TYPE</th>
<th>Dar es Salaam</th>
<th>Morogoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>41.5</td>
<td>27.1</td>
</tr>
<tr>
<td>Small Irregular</td>
<td>27.2</td>
<td>49.7</td>
</tr>
<tr>
<td>Regular</td>
<td>31.3</td>
<td>23.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>Dar es Salaam</th>
<th>Morogoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal employment</td>
<td>24.2</td>
<td>26.8</td>
</tr>
<tr>
<td>Skilled</td>
<td>17.1</td>
<td>11.5</td>
</tr>
<tr>
<td>Unskilled</td>
<td>7.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Informal employment</td>
<td>46.3</td>
<td>60.8</td>
</tr>
<tr>
<td>Casual laborer</td>
<td>7.5</td>
<td>4.1</td>
</tr>
<tr>
<td>House servant</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Self-employed</td>
<td>17.7</td>
<td>26.5</td>
</tr>
<tr>
<td>Householdbased</td>
<td>18.4</td>
<td>27.5</td>
</tr>
<tr>
<td>Studying</td>
<td>16.1</td>
<td>10.8</td>
</tr>
<tr>
<td>Not working</td>
<td>13.3</td>
<td>11.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>11.0</td>
<td>7.2</td>
</tr>
<tr>
<td>Retired</td>
<td>2.3</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: SSATP Phase II Final Report 1995

5.08 For the two metropolitan cities this section analyses the travel behavior associated with low-income groups; their transport needs and problems as revealed by focus group and stakeholder discussions, and other sources of information. For time reasons no new coding of the original data was undertaken.

**Urban Travel Behavior**

5.09 The observations from the case studies which provide most insight into travel behavior are the mobility levels and their main determinants: modal choices and travel distances; factors influencing shifts between modes; trip purposes; and vehicle ownership. These are commonly used aspects in travel analysis and were the basis for the original field studies. It should be noted, however, that there is a common supposition in such studies of societies with a strong household coherence and in which commuting is a dominant travel
characteristic. This may consume much less time in societies dominated by informal sector livelihoods. Attempts were made to compensate for this problem by identifying the most important trip made by each interviewee, and the second most, etc., up to the fourth trip (Table 5.3). This table demonstrates that livelihood-related trips may not be regular in pattern but they nonetheless dominate reported mobility patterns in the study cities with service-oriented and social trips being far less prevalent. With regard to service-oriented trips, specifically water and fuel collection, the way trips were defined, may have resulted in considerable under-counting, particularly for women.

Table 5.3: Trip purpose in order of first, second and third most important trips (%)

<table>
<thead>
<tr>
<th>TRIP PURPOSE</th>
<th>Kenya</th>
<th>Tanzania</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eldoret</td>
<td>Dar esSalaam</td>
<td>Morogoro</td>
</tr>
<tr>
<td>Livelihood-related</td>
<td>75.5 59.7 42.6</td>
<td>53 52</td>
<td>56.8 54.9</td>
</tr>
<tr>
<td>Work</td>
<td>56.9 11.3 23.0</td>
<td>12 12</td>
<td>15.1 15.0</td>
</tr>
<tr>
<td>Business</td>
<td>0.8 20.6 0.0</td>
<td>25 25</td>
<td>19.4 17.6</td>
</tr>
<tr>
<td>Market/shop</td>
<td>17.8 27.8 19.6</td>
<td>16 15</td>
<td>22.3 22.3</td>
</tr>
<tr>
<td>Service-oriented</td>
<td>16.0 9.3 14.8</td>
<td>23 23</td>
<td>12.6 12.1</td>
</tr>
<tr>
<td>School</td>
<td>14.4 2.1 8.2</td>
<td>17 17</td>
<td>12.6 12.1</td>
</tr>
<tr>
<td>Healthcare</td>
<td>1.6 7.2 6.6</td>
<td>6 6</td>
<td></td>
</tr>
<tr>
<td>Social/Personal</td>
<td>5.4 19.6 32.8</td>
<td>11 10</td>
<td>16.7 11.9</td>
</tr>
<tr>
<td>Visiting</td>
<td>2.9 3.1 11.5</td>
<td>6 6</td>
<td>9.7 9.8</td>
</tr>
<tr>
<td>Personal errand</td>
<td>2.5 16.5 21.3</td>
<td>5 4</td>
<td>7.0 2.1</td>
</tr>
<tr>
<td>Other</td>
<td>3.0 11.3 9.9</td>
<td>14 14</td>
<td>13.9 13.9</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>1537 125 62</td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>

Source: SSATP Phase II Final Report 1995

Mobility levels

5.10 In the Nairobi study area, the average number of weekday (excluding Sunday) trips made by the adult (15+) population was 2.5 [World Bank and UNECA 1994b]. Adults from low-income households (<$60/month) made slightly fewer trips (2.4) than higher income (>=$60/month) households (2.8 trips). Children made an average of 2.0 trips per day. The DSM study area average adult trip rate was, at 1.9-2.0 per weekday, significantly lower than in Nairobi. This may reflect differences in wealth, vehicles ownership, or other factors that appear to influence mobility levels.

5.11 The average adult figure in Nairobi is significantly higher than that used in previous studies (1.8) due to the previous omission of many walking trips [Nairobi Urban Study Group 1972, Ministry of Local Government 1992]. However, it is not easy to decide whether this level of mobility adequately meets the needs of the population. Higher levels can be observed in other cities of comparable wealth, especially those with a significant share of two-wheeled traffic (bicycle or moped). For example, studies in metropolitan Ouagadougou (Burkina Faso) gave mobility levels of 3.1 trips/person/day for people walking, and 4.1 trips for people

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32 Interviews were mainly administered to those aged more than 15 years, i.e. the economically active population, thus service-oriented travel, especially school trips, was understated.
33 One-way movements from the home, including short trips to collect water or purchase items nearby unless the activity at the destination took more than 10 minutes in which case two trips were recorded. There is some evidence that this definition may not have been consistently applied and that in the case of Nairobi trips less than 15 minutes were excluded. This would lead to an underestimate of mobility levels and bias against neighborhood, especially subsistence-related trips.
cycling. For the moped and car the respective figures were 4.3 and 4.5 trips/person/day [INRETS 1993]. Other studies in metropolitan Bamako (Mali) and Ouagadougou gave the following variations in mobility levels, respectively: housewives (2.0 and 2.6); young jobless women (2.4 and 3.4); heads of households (3.2 and 3.6); girl pupils (3.2 and 3.8); young men with a job (3.8 and 4.1); and boy pupils (3.9 and 4.6) [Diaz Olvera, et al. 1998]. A comparable figure for the Netherlands would be 3.5 trips per person per day [CBS 1997].

5.12 The evidence on mobility levels is thus not straightforward. The variations in rates may simply be due to differences inter alia in income levels, the availability of a personal means of transport, the age and gender of the respondent, cultural norms in the local society, or the precise way that a trip was defined.

**Modal choice**

5.13 Despite significant differences in the apparent incidence of poverty in the two cities the weekday adult modal split was remarkably similar (Table 5.4). Walking dominates (46-47%), followed closely by public transport (bus and share taxi). Public transport accounts for 82-88% of all motorized and 42-44% of all trips. Since a trip by public transport often starts and ends with a substantial walk, then the modal share for walking was actually much higher than stated. In DSM those who use public transport were found to take an average of 30 minutes to walk from their residence to the bus stop [Nguma et al. 1993]. Further analysis suggests that up to 90% of all trips were wholly walking, or walking and public transport.

5.14 That cars accounted for only 6-7% of trips is in contrast to their apparent dominance in major road vehicle counts. The 1998 Nairobi Long-Term Transport Study (NLTSS) showed the proportion of cars and vans on the main roads out of total motorized vehicles averaged 73% ranging between 57-88% at different points, and public transport was 19% (range 8-32%) [Post Buckley International Inc. 1998]. Light and heavy goods vehicles constituted the remaining 8% ranging between 2-15%.

5.15 The disparity in these figures is more apparent than real. It depends on whether demand is measured in vehicles, ignoring their occupancy, or trips, and if all routes are considered not just the main traffic arteries. The traffic counts on the major roads can easily be shown to be consistent with the household trip data. For example, when adjusted for vehicle occupancy rates of 2 and 30 persons for car and public transport respectively, traffic counts give a 20% car and 80% public transport split on the main roads. In total these probably account for no more than half of all trips as most of those on foot avoid such routes. So car trips would comprise 50% of 20%, or approximately 10% of the total, which is similar to the proportions in Table 5.4.

5.16 This discussion is important in illustrating that the perspective adopted in measuring travel demands is likely to condition the prescriptions made in meeting them. From the viewpoint of ease of trip making for the urban population at large, the provisions for walking and public transport are evidently of paramount interest.

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34 These studies include trips by persons over 13 years of age, which would slightly increase trip rates compared to the 15 years of age cut-off used in East Africa. Also, much of the Saharan part of Francophone Africa has a “siesta” culture that increases mid-day and total daily travel.

35 The figures quoted are household averages. For specific destinations there may be significant variations. Thus, for trips from Eastlands (Nairobi) to the CBD, walking was 47% of trips as a household average; to the Industrial Area it comprised 65%; and locally 70%.

36 There is now evidence that this time may have been reduced (see para 4.70).
Table 5.4: Weekday adult modal split (excludes high income segment – 5-10% of the population)

<table>
<thead>
<tr>
<th>MODE</th>
<th>Dar-es-Salaam</th>
<th>Nairobi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Public Transport</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>Private Car</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Bicycle</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Other*</td>
<td>2*</td>
<td></td>
</tr>
</tbody>
</table>

Source: Rwebangira 2000, World Bank and UNECA 1994b
* employer’s bus and other means

5.17 Bicycles made a relatively insignificant contribution to modal split. This is in marked contrast to the situation prevailing 2-3 decades ago. Bicycle use was common and significant in many African cities. For example, in 1969 it accounted for 55% of commuters in Lusaka [Howe and Dennis 1993]. But they have become insignificant in the largest cities due to the increasingly hostile and unsafe environment created by motor vehicles and the absence of dedicated infrastructure at critical locations.

5.18 There was a difference in modal split depending on income (Table 5.5). This is most clearly shown for Nairobi. For the poorest group walking was even more dominant, with public transport use declining after the first and most important (work) trip. Car and bicycle use among this group as insignificant. As expected a higher income reduced the importance of walking and greatly increased car use.

Table 5.5: Weekday adult modal split and income

<table>
<thead>
<tr>
<th>MODE</th>
<th>Income &lt; $60 per month</th>
<th>Income &gt; $60 per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First trip %</td>
<td>Second trip %</td>
</tr>
<tr>
<td>Walk only</td>
<td>57</td>
<td>68</td>
</tr>
<tr>
<td>Public Transport (+walk)</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>Car driver or passenger</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bicycle</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: World Bank and UNECA 1994b

5.19 There is a problem in comparing the trip length data of the two cities because it is significantly affected by the study area definitions and the wealth distribution of their residents. The DSM study area was closer to the city center than in Nairobi so there would necessarily be fewer long trips.

5.20 Table 5.6 shows the variation of weekday adult modal choice with trip distance in the Temeke ward of DSM. Walking trips of more than 5 km were rare and virtually nobody had to walk more than 8 km. Other more remote areas would probably have produced trips distributed over a bigger distance range. In the large cities, and in the absence of the option to cycle, public transport (mostly informal share taxi services in mini and midi buses) was the

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Distances are preferred to travel times as experience suggests under-reporting of the latter due to the tendency to recall only in-vehicle time rather than that also spent waiting.
main carrier of trips that were too long to walk. However, walking accounted for 43% of all trips in excess of an hour (equivalent to 5-7 km) in the Nairobi study area. Surveys in Nairobi indicated that many residents preferred to use motor transport for trips longer than 30 minutes, but walk because the costs are not affordable [World Bank and UNECA 1994b].

5.21 Differences in the land-uses of the study areas may also have affected the mode choice and trip-distance relationship. Temeke (DSM) contains a mix of residential and employment uses, so 75% of trip making was within the study area. Eastlands (Nairobi) is predominantly residential so proportionally more people have to travel outside to work, and only a third of trips were in the immediate neighborhood.

### Table 5.6: Weekday adult modal choice and trip distance (Temeke, DSM) (% trips)

<table>
<thead>
<tr>
<th>MODE</th>
<th>Distance (km)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 – 2</td>
<td>2 – 5</td>
</tr>
<tr>
<td>Walk</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>Cycle</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Bus (PT)</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Car</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: De Langen and Tembele 2000

5.22 The surveys in Nairobi showed that two thirds of the survey area population had no alternative but the mode they presently used, and only 16% actually used different modes for the same trip [World Bank and UNECA 1994b]. Modal shift possibilities related almost entirely to walking and public transport, with an equal directional tendency for the shorter distance trips. Cycling was not considered as an alternative by any respondent not presently using a bicycle, due to the unsafe road conditions. Under the circumstances prevailing there was evidently a high modal captivity among the poor.

**Trip purpose**

5.23 Out of an average of 2.4 trips made by an adult respondent in a day, 1.7 (70%) were livelihood-related. These trip purposes were followed in importance by travel to services (including schools) and visits to friends (Table 5.3). This pattern closely agrees with other past studies. However, because of its maturity as a neighborhood, the proportions and ordering of trip purposes in the study area might not match those of newer low-income areas where most people are likely to have local informal sector occupations and spend more time on subsistence activities.

**Bicycle ownership**

5.24 For personal travel the only practical alternative to walking or use of public transport is the bicycle for the majority of the urban population. Table 5.7 shows the percentage of households in the study areas owning one or more bicycles. The apparently high ownership levels, are in marked contrast to the trip shares in Table 5.4, being an order of magnitude greater. However, further analysis of the Nairobi data indicates that there are two different and distinct bicycle use markets. The first covers the high and middle-income families who own bicycles mainly for their children’s recreation. The second market covers the low-income

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38 This is likely to be an underestimate of the real situation because new low-income settlements (e.g. Kayole and Komarock) are now to be found at peripheral points where travel distances to the city center are over 10 km.
families who use a bicycle as a basic means of personal transport, and for carrying goods in the course of trading or service occupations (e.g. messengers). In Nairobi’s Eastlands ownership was just 0.13 bicycles per household, and roughly double this in Dar es Salaam’s Tembeke. The low apparent utilization for the most important trips reflects the fear people have about using bicycles on the main roads [Howe and Dennis 1993].

Table 5.7: Bicycle ownership

<table>
<thead>
<tr>
<th>% Households with one or more bicycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSM</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>Nairobi</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>


**TRANSPORT SYSTEM PERFORMANCE**

**Public transport travel costs and service performance**

5.25 A recent household budget study of DSM did not contain any specific analysis of travel costs, but the 60 percent of household income spend on food items, and a mere 2 percent spent both on education and health care combined, and on non-consumptive expenses (such as buying a radio or refrigerator), are indicative of severe budget constraints [Tanzania, National Bureau of Statistics 2000].

5.26 For much of the urban population the main problem with public transport is simply its cost (Box 5.1). For the low-income in Eastlands this was estimated, at between 10-30% of the personal monthly income depending on trip length i.e. household location [World Bank and UNECA 1994c]. Many low-income users state that they can only afford public transport during the initial weeks of a month, when they have just been paid. Afterwards they walk.

**Box 5.1: The cost of public transport**

“The transport allowance of Tshs 1,200 (US $3) currently being paid by the Government does not take into account the realities of transport in the city. Personally I need to take three bus rides to work costing Tshs 50 (US $ 0.125 ) per ride. Each day I have to spend Tshs 300 (US $0.75). For the whole month I spend 300 x 20 = Tshs 6, 000 (US $15) which is literally my whole salary! Thus in an effort to save money I wake up early and walk to cover at least one or two bus rides while taking a bus for the remaining distance. In the evening I do the same”.

Source: Nguma et al. 1993

5.27 The gradual substitution of share taxis for scheduled buses was generally regretted by the bus-riding population. In the case of Dar es Salaam it led to a significant increase in real user costs, which has been estimated at from 9% of an average daily wage in 1978, to 22% in 1998 [Rwebangira and De Langen 1998]. The other cited problems of the changeover were over-concentration of share taxis on ‘busy routes’, leaving the more remote areas unserved; arbitrary termination of journeys so as to return to more lucrative route sections; and sudden hiking of fares, especially at night.

39 A rough estimate is that in 1978 the central government paid a 15% subsidy on fares, while the present operating profit margin of the largely *dala dala* services is about 30%. The total cost (excluding profit or subsidy) rose from 10 (1.15 x 9) to 15% (0.7 x 22) of an average wage.
**Comparison of performance of KBS buses and private matatus in Nairobi**

5.28 A recent study in Nairobi sought to determine if there was any evidence to support some of these complaints [Koster and Gachewa 1999]. Information was obtained on travel times, fares and service frequencies for a sample of origins and destinations. These were used to assess the difference in performance between the (formal) traditional bus and the informal minibus systems at a network level. Separate assessments were made for the morning, evening and off-peak periods, but only the results for the evening peak are given below in Table 5.8.

<table>
<thead>
<tr>
<th>TIMES/FARES/SPEEDS</th>
<th>Bus</th>
<th>Matatu</th>
<th>% difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average waiting time</td>
<td>0:25</td>
<td>0:14</td>
<td>-44%</td>
</tr>
<tr>
<td>Average trip time*</td>
<td>1:11</td>
<td>0:37</td>
<td>-48%</td>
</tr>
<tr>
<td>Average travel time**</td>
<td>1:36</td>
<td>0:52</td>
<td>-46%</td>
</tr>
<tr>
<td>Average fare/km (KS/km; 1KS =0.015 US$)</td>
<td>2.3</td>
<td>1.6</td>
<td>-30%</td>
</tr>
<tr>
<td>Average trip speed</td>
<td>11.5</td>
<td>18.0</td>
<td>+57%</td>
</tr>
<tr>
<td>Average travel speed</td>
<td>8.5</td>
<td>12.8</td>
<td>+51%</td>
</tr>
</tbody>
</table>

Table 5.8: Evening Peak Performance Comparison of KBS and Matatus at network level

Source: Koster and Gachewa 1999
* time taken from moment of vehicle departure to moment of arrival
** waiting time at bus stop plus trip time

5.29 These results suggest that overall system performance is low as regards travel time, for a city the size of Nairobi. Adding some 15 minutes for access and egress, average total travel time in the morning and evening peaks amounts to some 1 hour and 50 minutes for bus passengers, or more than 3.5 hours per day for work-related trips. The average matatu user spends some 2.5 hours commuting. Average trip and travel speeds are low, dropping to 11.5 and 9.5 km/hr respectively for buses in evening peak conditions. If traffic safety conditions allowed the use of bicycles in Nairobi, they would easily outperform the public transport system. It should be kept in mind that these travel times are averages, and figures can be much higher for the longer commuting trips: some 25% of bus trips in Nairobi exceed 25 km in length [Post Buckley International Inc. 1998].

5.30 The other noteworthy feature of this comparison is that the matatu sub-system easily outperforms the bus sub-system in every respect during all times of the day: waiting times, trip times and travel times are substantially lower as a result of higher frequencies and trip speeds, while fares are substantially lower.

5.31 Analysis of data collected on two routes on which KBS and matatus competed gave the following results (Table 5.9).

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40 A total of about 430 trips were made between two large low-income residential areas and nine different (employment) zones, using both the formal and informal systems. More than 50% of Nairobi’s entire route system was covered in this way.

41 This bears out the statement from the Nairobi Long-Term Transport Study which compared travel conditions in the city unfavorably with those of much larger and more motorized cities [Post Buckley International, Inc. 1998].

42 These figures tend to confirm the assertion quoted earlier (see para 4.16) from the Nairobi Long-Term Transport Study that the congested travel conditions in the city bore (unfavorable) comparison with those of much larger cities with higher levels of motor vehicle ownership.

43 The observation regarding waiting and travel times is only valid for the origin/destination relations included in the study. In view of the operating practices of matatus, waiting times (and, as a result, travel times) for passengers wanting to board at locations other than the terminals at the end of the routes, may be longer.
Table 5.9: Performance comparison of KBS and matatus at route level

<table>
<thead>
<tr>
<th>ROUTE PERFORMANCE</th>
<th>Bus</th>
<th>Matatu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles serving route</td>
<td>20 - 30</td>
<td>160 - 200</td>
</tr>
<tr>
<td>Interval (minutes)</td>
<td>9.5 -14</td>
<td>1.25 - 2.25</td>
</tr>
<tr>
<td>Occupancy (% of no. of seats)</td>
<td>75 - 150</td>
<td>60 - 120</td>
</tr>
<tr>
<td>Market share (%)</td>
<td>28 - 33</td>
<td>67 - 72</td>
</tr>
</tbody>
</table>

Source: Koster and Hop 2000

5.32 The differences in numbers of vehicles serving the routes, in combination with the respective market shares, illustrates the inefficiency, from a traffic management perspective, of the matatu sub-system: some four times more vehicles are on the road to transport the same number of people as buses do.\(^4^4\) On the positive side, the matatu sub-system is, in view of the large numbers of vehicles, a major employer, albeit in an insecure and difficult occupation (Box 5.2).

Box 5.2: Matatu drivers, conductors and stage workers

The matatu industry is almost entirely male-dominated. Most work under verbal contracts on a daily-paid basis. Hours of work among drivers and conductors are long (13-15 hours). Fatigue must contribute to the often remarked poor standard of road behavior and high accident rates. They receive few benefits other than their wages and lunch. Most regard the job as insecure and difficult, and wish to find other work.

In a survey of Nairobi matatu workers, 70% of those interviewed were married. A surprising half of the sample had reached a secondary level of education. Their acceptance of this work probably reflects lack of other opportunities. The overwhelming majority were from the local tribe and there were relatively few migrants.

Source: Khayesi 1997

5.33 The matatu sub-system offers much higher frequencies than KBS does. This results in considerably lower waiting times (even though, in view of the differences between the average intervals and the waiting times, passengers usually cannot board the first vehicle that departs). Matatus do not appear to be more overloaded than KBS buses, although standing in buses is less uncomfortable than in matatus. To this should be added that the differences in irregularities in the intervals between departures (standard deviation for KBS in the order of 8 minutes; for matatus 1.5 minutes) result in lower reliability for the KBS service.

5.34 Finally, Table 5.10 compares the performance of matatus on the two routes where they compete with KBS, and on the CBD-industrial area route, where they enjoy a monopoly.

\(^4^4\) The factor of four is estimated by noting that the matatu to bus ratio is roughly 8, but the market share of buses is only a half i.e. 8 x 0.5 = 4.
Table 5.10:

<table>
<thead>
<tr>
<th>PERFORMANCE MEASURES</th>
<th>Competition</th>
<th>Monopoly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval (minutes)</td>
<td>1.25 - 2.25</td>
<td>1.5 – 2.7</td>
</tr>
<tr>
<td>Occupancy (%)</td>
<td>62 - 117</td>
<td>66 - 95</td>
</tr>
<tr>
<td>Fare (US$/km)</td>
<td>0.018 - 0.027</td>
<td>0.012 – 0.028</td>
</tr>
</tbody>
</table>

Source: Koster and Gachewa 1999

5.35 It is evident from these figures that the absence of KBS competition on this route has not resulted in any significant differences in performance of matatus compared with the routes on which there is competition. The small difference in intervals is probably explained by the fact that not all matatus run from terminal to terminal on each trip: some instances occur where the vehicles turn around before reaching the terminal. This results in slightly longer average intervals. Although evidence is limited, as only one matatu-only route has been analyzed, it is possible that a matatu monopoly on routes does not necessarily lead to the adverse effects on users usually associated with monopolies. In view of the competition which exists between matatus operating on the same route, there may be enough reason to provide sufficient supply and high frequencies, and to keep fares down.

5.36 Public transport in Nairobi has mainly been provided by private operators (with a varying government minority shareholding in Kenya Bus Services). Deregulation has taken place over the last three decades, mainly by not enforcing existing regulations, rather than changing or abandoning them. The unfortunate action by government in subsidizing the Nyayo Bus Services Corporation from 1986 until its collapse in 1992, had a significant effect in further undermining KBS’s operations and the cross-subsidies it extended to peri-urban routes [World Bank 1990].

5.37 What is clear, however, is that this fully privatized and largely deregulated public transport system does not perform well from the user perspective, and results in major losses to the economy. Underperformance mainly concerns the low operating speeds and, for buses, the long waiting times. These parameters are obviously interrelated: low speeds result in lower frequencies and longer waiting times if the number of vehicles serving a route remains constant. As a result of an increasing number of private cars and the lack of traffic management measures, congestion has increased over the years and operating speeds have declined (e.g. by 40% on Stagecoach route 28 since 1993). The conclusion is inevitable that traffic management measures are now urgently required, including specific measures such as bus lanes. Such measures might result in lower travel times, increased frequencies, increased patronage, lower fares, or a combination of these. With a price elasticity of 1.0 for routes serving low-income areas [Post Buckley International Inc.1998] lower fares would also be beneficial to those who currently cannot afford public transport, as well as to the operators who would see increased patronage.

5.38 It is equally apparent that the manner in which the private and deregulated public transport system in Nairobi operates, is increasingly likely to result in adverse consequences for the user. Competition on the same routes between two entirely different sub-systems with different operational practices and degrees of conformity to tax laws and traffic rules, has created a situation where, what should in principle be the most efficient sub-system, is outperformed. As footnote 13 indicates, in the long-term the city is unlikely to benefit from ‘rewarding’ those with the least respect for the rule of law. The sale by Stagecoach Ltd. of its

45 Recent studies into the effects of a possible bus lane on Jogoo Road, one of the major corridors in Nairobi through the middle of the study area, suggest a benefit/cost ratio in the order of 3, mainly as the result of time gains for both bus/matatu operators and users, and other road users [Hop et al. 2000].
shares is a logical consequence of this situation, and there is no reason to assume that their successors will do any better, unless they adopt the *matatu* operating practices. It is most unfortunate, both for the city at large and for the many (potential) public transport users, that a continuation of the current situation may eventually result in the traditional bus company terminating its operations in Nairobi altogether, leaving the *matatu* operators a virtual monopoly. There is, however, no evidence to suggest that such a monopoly would necessarily result in reduced performance of the *matatu* sub-system from the user perspective.

**Comparative inter-modal travel costs**

5.39 Having reviewed the efficiency and convenience of different modes of urban transport, a modal choice and trip distance matrix can be used to examine the overall performance of the transport system in the study areas. To do so it is necessary to complement it with information on the cost and speed of the different modes of transport. The methods of doing this are described elsewhere [De Langen 1998].

5.40 Table 5.11 shows the travel cost matrix corresponding to Table 5.6, and gives the total costs of all daily urban trips made by inhabitants of the area. It is a robust approximation, but the overall picture that it transmits is thought to be reliable, because the data from the different sources have been used as checks and counterchecks on the credibility of calculations from each source. For example, estimates from the household survey data and traffic counts have been used as a check against each other.

<table>
<thead>
<tr>
<th>Table 5.11: Total travel cost matrix, Temeke, DSM (% of total)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODE</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Walk</td>
</tr>
<tr>
<td>Bus (PT)</td>
</tr>
<tr>
<td>Car</td>
</tr>
<tr>
<td>Cycle</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Source: De Langen 1998

* The total travel cost matrix is defined as: \( C_{ij} = x_{ij} d_{ij} c_{mi} + t_{ij} c_{t} \), and \( d_{ij} \) is the average trip distance in distance class \( j \); \( c_{mi} \) is the unit cost per km using mode of transport \( i \); \( c_{t} \) is the average value of travel time. \( \Sigma c_{ij} = \) the total travel costs in the system (per observation period, week, or year).

5.41 Only direct financial costs of travel have been included in Table 5.11. Time, road infrastructure, accident and environmental costs have been excluded. Were this done it would obviously increase the relative cost of motorized to non-motorized modes of transport. 100% corresponds to an annual expenditure on travel of 13 million US$, or an average cost of around 0.4 US$ per adult per calendar day. The estimated additional costs of the travel time involved are 4 million US$. The estimated area income (number of inhabitants of Temeke times their per capita income) in 1994 was 52 million US$ [Tanzania, National Bureau of Statistics 2000]. Thus around a quarter of total annual income in the area is spent on travel costs.

46 Travel time costs are estimated on the basis of the average minimum wage in DSM in 1994. Assuming 10 workable hours per day and 50% of the adults being able to use travel time savings productively, the value of travel works out at the equivalent of 10US cents per hour. Studies in Kenya have indicated that even for something as apparently unproductive as the collection of water the value people attribute to the time involved is approximately equivalent to the wage rate for unskilled labour [Whittington et al. 1990].
5.42 This percentage appears to be high, creating serious household budget problems and an obstacle to sound economic development. No proper international benchmarks are available, but historical data from Dar es Salaam indicate that during the 1970’s average household spending on travel in DSM, as a percentage of income, was less than half that in the mid-1990’s [Tembele et al. 1998]. It has been posited that the inability of a large number of people to afford higher spending on travel now significantly constrains the number of trips made [Sambali et al. 1998]. From this viewpoint the average of around 2 one-way trips per day per adult (including all trips on foot) can be considered to be low. By comparison, it is pointed out that in Dutch cities - where no travel cost constraints exist - the corresponding number is 3.5 trips per day.

5.43 Figure 5.1 shows the direct financial unit costs for travellers of the four main modes of transport in meeting their share of the total travel demand, including an allowance for the travel time involved. The obvious conclusions are firstly that walking and cycling have much lower costs than either the bus or private car. However, the real watershed in cost is between the private car and all other modes of transport. Secondly, cycling has by far the best performance (lowest total unit cost) of any urban transport option. Taking travel time into account, walking is not all that cheap. It is almost twice as expensive as cycling and not much cheaper than bus transport.

5.44 Figure 5.2 is a combined summary of the cost matrix and the mobility matrix. It shows the percentage of all urban trips served by each mode of transport and the percentage of total financial trip costs attributed to each mode of transport. It is apparent that the contribution private car transport is making to urban trips is small, and completely disproportional to the costs involved. To carry 6% of all trips (or 8% of all passenger-kms.), the cars consume 52% of the total costs. Conversely walking accounts for 47% of trips and only 1% of costs. Bus transport makes a more even contribution meeting 43% of the trip demand at 47% of the total costs. From an economic point of view this pattern of cost distortion relative to demand represents a serious misallocation of funds.

5.45 Because of inherent limitations in the categorization and measurement of travel characteristics, the previous data gives only a first indication of the behavioral responses of low-income groups. These were, however, amplified by user views on current travel problems and needs.

LOW-INCOME USERS’ PERSPECTIVE ON TRAVEL NEEDS AND PROBLEMS

5.46 These descriptions are derived mainly from discussions with low-income user focus groups and other study area stakeholders. The emphasis was on their access targets (non-transport) and the extent to which the transport system frustrated achievement. Their views have been triangulated with evidence from literature reviews covering a wider spectrum of sectors and experience. The resulting statements are necessarily negative, but, as in the construction of a Logical Framework argument, their inverse provides a clear statement of needs.

5.47 The structure of this section follows that of modal importance to the urban population - walking, public transport and cycling. It also goes beyond the issue of personal travel to consider goods transport by and for low-income groups, and problems associated with the use of handcarts.

Walking

5.48 The expense of public transport and lack of safe alternatives (e.g. cycling) determines that walking is the only personal travel option for much of the population. For a growing proportion walking trips are becoming longer as the cities expand, and formal employment
Figure 5.1: Direct and Time Costs in Dar-es-Salaam, Tanzania, 1996 (average)

Figure 5.2: Modal and cost share of the different modes of transport Dar-es-Salaam (Tanzania, 1996).
opportunities and the most important services remain centralized. Many peripheral settlements are in unattractive locations so income-generating activities and services are difficult to establish in their vicinity. The result is that some of the most poor are immobilized in remote slum settlements, dependant on a variety of informal sector activities. In Nairobi there is evidence that for such people, especially women, life has become more precarious in the last two decades [Nelson 1997].

5.49 Perhaps the most fundamental problem confronting the pedestrian is that many roads are only designed for motor vehicles. Sidewalks for pedestrians are non-existent or comprise the bare earth. If they do exist their condition is normally unsatisfactory due to lack of maintenance. Open manholes and trenches, resulting from vandalism and the incomplete activities of various public utilities – water, electricity, telecommunications, sanitation, etc. - are recurrent complaints. Conditions are particularly bad during the rainy seasons when pools of water present a major problem to pedestrians.

5.50 Walking is especially difficult during rush hours when many people have to compete for the restricted space. Most are forced to walk in the road or along the corridors between buildings in town. The end result is a congestion of human traffic that makes walking unpleasant, time consuming and tiring. It can also be very dangerous.

5.51 Waste, parked vehicles, or informal businesses often obstruct walking routes making them generally unsafe and inconvenient. Consequently pedestrians are again forced to walk in the carriageway, or on unprotected road shoulders, exposing themselves to traffic hazards. There are few constructed footways and those that exist are generally filthy and in very poor condition, since they frequently are used as dumping grounds for solid waste or serve as drainage channels. [Omwenga et al. 1993, Nguma et al. 1993].

5.52 The deteriorated state of road, path and drainage infrastructure was viewed by respondents as a major restraint on the development of economic activities. With an increase in population expected in most settlements, the deteriorated infrastructure was also seen as contributing to an increasingly inaccessible and unhealthy environment.

5.53 Some pedestrian routes are greatly extended by detours. These may be due to the lack of footbridges across rivers and swamps, obstructing buildings, or access prohibitions across government or private land. Nairobi provides a prime example with restrictions on the movement of pedestrians from the main residential areas in Eastlands - across Jogoo road (2-way hourly peak flows in the range 1300-1600 persons) - to the Industrial Area. These are separated by largely unused railway sidings, which either necessitate a long detour or the risk of a prosecution for trespassing.

5.54 Where road crossings are unavoidable there are few segregated places to prevent conflicts with motor vehicles. This is a major cause of accidents and discourages people from walking because it is too dangerous. Studies have demonstrated that the heavy traffic flows on major roads give rise to few gaps between vehicles that will permit a safe crossing on foot. Accident figures bear out user expressions of the prevalence of danger. In both countries accident rates are high in absolute terms and over the past few decades have been at +60 fatalities per 10,000 vehicles compared to a figure of 1-10 for developed countries [Jacobs and Cutting 1986].

5.55 As is commonly the case there is a disproportionate concentration of accidents in the metropolitan cities. DSM with less than 10% of the nation’s population accounts for more than a third of the national accident total [Ministry of Works 1996]. In both cities, road accidents of all kinds have been on a rising trend for several decades [World Bank and UNECA 1996b,
Kayoza 2000). Pedestrians and cyclists usually account for about half of all accident victims [Rukunga 1991]. There also appears to be a concentration on the main roads where traffic-pedestrian conflicts are most severe.

5.56 Children from low-income families normally walk the entire home to school journey while those from middle or high income households use either car or public transport. Trip distances may be extra long for the children of low-income families, since they will gravitate to schools demanding the lowest fees, which may not be the nearest [World Bank and UNECA 1994e].

5.57 Sometimes school pupils were forced to walk because they were refused entry to public transport during peak periods. This was because the government had imposed a special low student fare that was unattractive to the operator if a full-fare adult could be carried instead. Currently, the school pupil fare in Dar es Salaam is in theory between a third and half the adult fare. Also pupils are quite numerous as a group comprising 30-40% of the population, although many are not receiving regular education. The government could previously bring pressure to bear on the parastatal bus company to honor its obligation to carry school pupils. However, this is ineffective with dala dala operators who are not willing to offer the discretionary fare if it means displacing a full-fare adult [Mtaki 1999]. As a consequence children reported waking at between 4.00 and 6.00 am and sometimes not returning home until 8.00 pm due to travel problems (see Box 5.3) [World Bank and UNECA 1994e].

**Box 5.3: School pupils reasons for walking**

Unlike other bus users the student fare is low (Tshs 5)(1.5 US cts), officially imposed by the Government. But getting into the bus is problematic, especially the dala dala buses. Students are always given a last chance to board the bus when it is already full. At times one literally has to fight one’s way into the bus since the dala dala attendants may decide not to take any students even when the bus is not full. They are concerned with meeting the daily income requirement for the bus owner hence taking students means making a loss of Tshs 45 (12 US cents) a ride. Students revealed: “some of us have decided to walk to avoid such confrontations since whenever this happens it ruins ones concentration when one finally gets to school. For some of us it is more convenient this way.”

Source: Nguma *et al.* 1993

5.58 Women are especially concerned with the security aspect of walking and the risk of attack. (After concern for the cost of public transport this is the second most commonly voiced concern, especially in Nairobi). It is alleged that harassment comes from thugs, council officials and the police [Ambwere 1993]. To those who have to undertake long journeys to and from work, this is critical in the hours close to dark and at night. Lack of effective street lighting has jeopardized the whole issue of walking at night as there are dangers from traffic and a risk of violence. The general perception was that such risks were increasing [World Bank and UNECA 1994c]. As result some women are forced to incur the expense of public transport, even for short distances, or take long detours. For most women mobility is severely restricted by insecurity, especially in and around the informal settlements. This even extends to inhibiting their use of bicycles, because they fear that they would easily be stolen.
**Non-motorized wheeled transport**

* Cycling

5.59 The perceived danger of cycling was stated by 70% of respondents as the main reason why more use is not made of a mode of transport which is otherwise appealing [World Bank and UNECA 1994f].\(^{47}\) The aggressive and uncaring behavior of motorists is undoubtedly the single most important problem confronting cyclists. The poor condition of many routes, lack of secure facilities to park bicycles, and, in some areas fear of robbery, are also perceived as significant problems. The undisciplined behavior of cyclists themselves also contributes significantly to the very real danger of using a bicycle.

5.60 Notwithstanding this, insult is added to injury due to both the police and courts tending to blame cyclists for whatever accidents occur with motorists. Support for this common allegation comes from an examination of the relevant section of Kenya’s legal code and the practice of its courts [Motende 1993]. This found that the right of cyclists, pedestrians and handcart operators to use the highway was highly qualified in favor of motorized road users. Consequently, it was contended, courts tended to rule in their favor. Since this was also the common perception, few cyclists dared to seek legal compensation from motorists even when they might clearly be eligible.

5.61 Middle and high income households had a negative perception of cycling due to its danger and status. However, this did not apply to children cycling to schools, as long as there was a safe route on separated bicycle lanes that were provided with protective road crossings. In fact this was a purely hypothetical stipulation since: (i) such conditions do not exist in either city; and (ii) some schools have regulations barring the use of bicycles because of the perceived risks involved.

5.62 It was common practice for major employers, such as Kenya Railways and Twiga Chemicals, to facilitate the purchase of bicycles by their employees. Kenya Railways even incorporated bicycle paths and bridges in their housing development projects, and provided secure workplace parking. Few of the facilities are now active or in good order because of the decline in the use of bicycles.

* Handcarts

5.63 Despite being licensed by Nairobi City Council for a fee that entitles them to use the roads, handcart operators feel aggrieved that they are not provided with any facilities in the form of parking space, or special rights of way. As with cyclists they complain of constant harassment by motorists, council officials and the police. The operators cited the Traffic Act (Cap 403) Nairobi City By-Laws 1967 that governs their operations, and which was used to ban handcart use between 7.00 a.m. to 8.30 a.m. and in other rush hours. These are among the peak periods in the demand for their services. As a result the legislation has proved to be unrealistic, difficult to implement and open to abuse by the operators. When they find themselves in conflict with the council officials or police the operators also feel that the legal system invariably rules against them.

5.64 Bad road conditions have a severe effect on their operations. They also lead to unsafe behavior and an increased risk of accidents.

**Transport and Civil Society**

5.65 Although low-income transport users frequently see themselves as *victims*, they also accept collective responsibility for abuses of the system. General undisciplined road user

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\(^{47}\) The perception of danger is not without foundation. Nationally in Kenya, accidents increased by 53% between 1988-1998 and fatalities by 55%. However fatalities to cyclists increased by 217%. 
behavior, and its contribution to a high level of accidents, is freely conceded. In 1967 the report of a government working party on road safety in Kenya concluded that: “the overall picture is of a population largely unaware of the way the law and community agreed protocols requires them to behave on the road” [Ministry of Works 1967]. The absence of a comprehensive policy on road user education was seen as a key problem. The evidence from stakeholder and user discussions indicate that there is little reason to believe the situation has changed significantly. Both urban areas exhibit a high level of road accidents. At the heart of this situation lies a severe lack of education in road behavior protocols among all classes of users.

5.66 Vandalism of street lighting and the manhole covers of utilities, and the obstruction of sidewalks by hawkers and rubbish are some other examples of self-inflicted problems. Of course these responses may well in part be due to other reasons e.g. the frustration and desperation which poverty induces, lack of officially provided space for marketing, and inadequate rubbish collection services. However, they illustrate that re-instatement of deteriorated infrastructure is only part of the solution to creating a sustainable transport system.

5.67 In examining ways of tackling the previous problems one over-riding factor needs to be considered. This is the total lack of trust that exists between low-income users and the municipal governments. Box 5.4 summarizes views from the Tanzanian user platform. The frustration and deep cynicism implicit in these statements are eloquent testimony to how little has been done for low-income groups. Also, they underline the immense difficulty of restoring the credibility of official planning and call into question whether it is even sensible to pursue such an approach.

**Box 5.4: Tanzanian user platform views on municipal governments**

Most inhabitants see the municipal government primarily as either:

- “inefficient”, mainly talking instead of doing things, incapable of doing things because of lack of money, and rarely listening to the needs of the average low-income inhabitants (the most positive attitude), or
- “totally irrelevant” and unrelated to their struggle to survive, or
- “privatized”, in the sense of being concerned with private agendas of the municipal staff and politicians rather than with the public interest, or
- “criminal”. i.e. actively corrupt and having a negative effect on their struggle to survive, or even squeezing money out of them for personal profit making.

Source: Tembele 2000

**SUMMARY**

5.68 The studies confirm the dominance among the poor of walking and public transport. Up to 90% of all trips are wholly walking or walking and public transport. Evidence on individual mobility levels is less clear. There are, however, indications that they are constrained by a combination of high travel costs and low incomes. Livelihood-related travel dominates trip purpose responses, but non-commuting activities (business, market/shop) are equal to or more prevalent than work-focused journeys.

5.69 Analysis of transport system performance suggests a low-level of efficiency with around a quarter of total annual area income spent on direct travel costs. Travel by private car is markedly more expensive than any other mode, and meets just 6-8% of demand, but
incurs over 50% of total system costs in doing so. In contrast walking meets 47% of trip demands at 1% of total costs. As a result there is a severe distortion in the overall cost patterns, which represents a serious misallocation of economic resources.

5.70 Public transport is almost obligatory for many low-income households because of the growing distances between residences and work. Their main problem is simply cost at 10-30% of total monthly income depending on trip length.

5.71 Share taxis increasingly dominate public transport services. Stage buses have all but disappeared in DSM, but remain significant in Nairobi, although their future is precarious if the present (effectively) laissez-faire policies continue. Some of the poor have undoubtedly lost out from this transition, due to the removal of low-demand route cross-subsidies and the decline in effectiveness of reduced fares to school children and other concessionaires, that are not accepted by the share taxi industry.

5.72 While current bus/share taxi competition is fierce, the overall public transport system performance is low with disproportionately long travel times for the size of the cities. If safety conditions allowed bicycles to operate in Nairobi they would easily outperform the public transport system. Share taxis can outperform stage buses in almost all respects, however it takes four times as many vehicles to move the same number of passengers as a bus is able to do.

5.73 Notwithstanding its importance walking has been totally neglected as a mode of transport. As a result the poor suffer expensive and dangerous travel conditions. The absence of crossing facilities and a generally understood crossing protocol is a particular problem. Neglect of walking impinges particularly on women and children, especially in the more remote settlements, and restricts participation in activities that support livelihoods.

5.74 Cycling has been equally neglected and as a result has declined in the past few decades from a significant to an insignificant mode of urban travel in the metropolitan cities. The neglect of cycling has inhibited income-earning opportunities for the poor, because of its potential use in commercial activities.

5.75 The systemic marginalization that handcart operators experience belies their importance to the poor. They provide short-distance good transport for low-income users, especially the growing numbers in trading.

5.76 Most low-income users are deeply mistrustful of the civic authorities from whom they expect to receive little. This cynicism is a major obstacle to the credibility of centrally-initiated coordinating and development efforts.
6 - SECONDARY CITIES: TRAVEL AND TRANSPORT PATTERNS

6.01 This section analyses the travel behavior associated with low-income groups for the two secondary cities, Eldoret and Morogoro; their transport needs and problems as revealed by focus group and stakeholder discussions, and other sources of information.

6.02 The entire city comprised the study area since in both cases they were reasonably compact. Interviews were conducted in a random sample of households chosen to represent a cross-section of the main income groups. The package of surveys were, however, not as comprehensive as those in the metropolitan cities.

URBAN TRAVEL BEHAVIOR

Mobility levels

6.03 There were significant differences in the adult weekday trip rates exhibited by the two cities. In Eldoret it was 2.7-2.9, depending on age, or 2.6-3.2 depending on the zone of origin, and only 1.7 in Morogoro. It is not obvious why the difference in the averages should be larger than for the metropolitan cities, although relative wealth levels is a likely explanation.

6.04 Disaggregation of the data for Morogoro (Table 6.1) shows considerable variation in the average number of trips made by different segments of the population. The figures suggest that a person with a bicycle is as mobile as a car owner and one trip per day more mobile than a person without a vehicle. Overall people without access to a vehicle, and women in general, have low mobility levels. In Eldoret the level of mobility was again found to vary with income, but only in the range 2.6 (< $60 per month) to 3.0 (> $60 per month), which is well less than the variation among different segments of the population.

6.05 There may be a cultural explanation for the differences between the two cities. Eldoret is predominantly Christian and it has a number of active women’s groups, while Morogoro has a sizable Moslem population. Traditionally men in Morogoro take care of external relations, while women take care of the home. Women and their daughters’ movements are somewhat restricted.

Table 6.1: Weekday adult mobility of different population segments

<table>
<thead>
<tr>
<th>Population Segment</th>
<th>Average No. of Trips per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Adult Population</td>
<td>1.7</td>
</tr>
<tr>
<td>Men</td>
<td>2.1</td>
</tr>
<tr>
<td>Women</td>
<td>1.4</td>
</tr>
<tr>
<td>Person without access to a vehicle</td>
<td>1.5</td>
</tr>
<tr>
<td>Same, regular bus user</td>
<td>1.6</td>
</tr>
<tr>
<td>Same, seldom uses a bus</td>
<td>1.4</td>
</tr>
<tr>
<td>Person with a bicycle available</td>
<td>2.5</td>
</tr>
<tr>
<td>Person with a car available</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Source: Rwebangira 2000

Modal choice

6.06 Modal split in the two secondary cities showed significant differences (Table 6.2) from the metropolitan areas, with walking (48-67% of all trips) and cycling (12-23%) more
dominant. However, it is significant that in Morogoro 6% of the bicycles were hired, indicating that the market for cycling can be commercially attractive. The percentage of urban trips made by public transport (share taxi) was in the range 12-24% of all trips (60-75% of all motor vehicle trips). The higher proportion of walking and cycling trips in Morogoro, and correspondingly lower percentage by public transport or car, may result from it being a poorer and more compact city than Eldoret. The terrain is also flatter which encourages the use of both non-motorized modes. Correspondingly the proportionately higher use of public transport in Eldoret could result from a more dispersed pattern of low-income settlements, and a higher proportion of formal sector workers prepared to pay the fares.

6.07 The high car use figure in Eldoret (10% - the highest of any study area) may be a reflection of its historical legacy as the center of an area of large-scale farms with a corresponding industrial base. However, there is evidence of a strong bias in the survey, that resulted in very poor households being under-represented, and this would cause car ownership to seem higher than it actually is (see Table 5.1).

6.08 Modal splits were markedly different for men and women (Table 6.3). In Morogoro men were significantly more likely to cycle than women and less to walk. Other modal uses were broadly similar. It is not clear if these differences are an effect of income or culture restraints, although it is currently uncommon in Africa to find significant use of bicycles among women.

Table 6.2: Weekday adult modal split

<table>
<thead>
<tr>
<th>MODE</th>
<th>Eldoret</th>
<th>Morogoro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>48</td>
<td>67</td>
</tr>
<tr>
<td>Public Transport</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Private Car</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Bicycle</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Other*</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Source: Rwebangira 2000
* employer’s transport and other means

Table 6.3: Modal split of weekday adult trips in Morogoro

<table>
<thead>
<tr>
<th>MODE</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>52</td>
<td>83</td>
</tr>
<tr>
<td>Public Transport</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Private Car</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Bicycle, private</td>
<td>33</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Rwebangira 2000

6.09 Table 6.4 shows the variation in Morogoro of mode choice with trip distance [De Langen 1997]. Walking accounts for two thirds of all trips and dominates cycling up to distances of 8 km. As might be expected only 26% of all trips exceed 5 km compared to 38% in the larger metropolitan cities. The latter is a clear example of the disadvantages of scale associated with the larger cities, as discussed in the introduction to this report. Public transport dominates trips over 8 km, but they comprise only some 7% of the overall demand for travel.
Table 6.4: Weekday adult modal choice and trip distance in Morogoro (% trips)

<table>
<thead>
<tr>
<th>MODE</th>
<th>Distance (km)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 – 1.9</td>
<td>2 – 4.9</td>
</tr>
<tr>
<td>Walk</td>
<td>27</td>
<td>33</td>
</tr>
<tr>
<td>Cycle</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Bus (PT)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Car</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>44</td>
</tr>
</tbody>
</table>

Source: De Langen 1997

6.10 The study in Eldoret showed that of the most important trips made on foot, some 56% could not be made using other modes i.e. they were captive pedestrians. Over 90% of these were always made on foot [World Bank and UNECA 1996]. The main reasons given for walking by those who used routes with a public transport alternative, were: (i) saving (not having any) money (47% of respondents); (ii) quicker (19%); (iii) traveled with someone else (6%); and (iv) visiting en-route (5%).

6.11 In Eldoret about a third of the population had no alternative but the mode they presently used, half the proportion in the metropolitan cities. However, only 18% actually used different modes of transport for the same trip, about the same as in the larger cities. The perception of greater mode choice in the secondary cities may simply reflect the generally shorter trip distances, which permits increased substitution. As with the metropolitan cities the modal shift possibilities were mostly between walking and public transport. The main constraint to a modal shift to bicycles appears to have been the lack of financial means to purchase a bicycle.

**Bicycle ownership**

6.12 Table 6.5 shows the percentage of households in the study areas owning one or more bicycles. Although the figures might seem to be at variance with the modal trip proportions in Table 6.2 this is not the case. For example, in Morogoro approximately 50% of households own a bicycle. Each household comprised 5 persons and 3 adults, means that 16% of all adults have a bicycle available (i.e. 50% x 1/3), which is similar to the modal use proportion (17%) allowing for those that were hired. More significantly the data shows that where conditions are conducive each bicycle is intensively used at 2.5 adult owning trips per day. The corresponding figure for the Netherlands would be about 0.6 trips per bicycle per day.

Table 6.5: Bicycle ownership

<table>
<thead>
<tr>
<th>% Households with one or more bicycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eldoret</td>
</tr>
<tr>
<td>37</td>
</tr>
</tbody>
</table>


**Transport System Performance**

6.13 A similar calculation to that in Section 5 for the Temeke study area of Dar es Salaam was performed using the data in Table 6.4 for Morogoro. Figure 6.1 shows the combined cost and mobility matrix. As might be expected the main difference in the secondary cities is that...
the cost share of walking and cycling combined are even more out of all proportion to their dominant share of the overall trip total. They meet 84% of the demand, but account for just 10% of the costs. Conversely, cars meet 4% of the demand at 67% of the costs. Even buses meet only 12% of the travel demand, but account for 24% of the costs. The pattern of cost distortion relative to demand is even more skewed than in the metropolitan cities and represents an even bigger misallocation of resources. Overall it can be concluded that mobility problems in the secondary cities are substantially less than in the metropolitan areas. Trip distances are lower, taking less time and requiring lower expenditures. The increased use of walking and cycling supports this conclusion.

Figure 6.1  Modal and cost share of the different modes of transport in Morogoro (Tanzania, 1996)

6.14 Again, because of inherent limitations in the categorization and measurement of travel characteristics, the previous data provides only initial indications of the behavioral responses of the poor. These were, however, elaborated on by focusing on their expressed current travel problems, and thus needs, at user group discussions.

LOW-INCOME USERS’ PERSPECTIVES ON TRAVEL NEEDS AND PROBLEMS

6.15 While there were some area-wide problems in the secondary cities they seem to experience less of these than occur in the metropolitan areas. This supports the contention that there are diseconomies of scale effects associated with metropolitan-sized cities so far as the low-income groups are concerned. User concerns in the secondary cities were more focused on specific, localized problems. For example, in Eldoret the trunk route through the center of the urban area was viewed as unsafe and risky for all low-income users, with a specific junction seen as being especially dangerous for cyclists. Analysis showed these
fears to be amply justified with fatal accidents on this stretch of road increasing by 17% per annum between 1989-1995.

6.16 The secondary cities also appear more favorably disposed towards addressing the needs of all of their population. In the metropolitan areas social fragmentation is widespread, and kinship and neighborhood support do not seem as strong as in the secondary cities. In addition, in the metropolitan areas the poor are excluded from the mainstream social and economic activities and generally do not have a voice in local decision making [Matrix Development Consultants 2000]. By contrast a large number of user groups in Eldoret are organized through Area Development Committees (ADCs). These ADCs are unique in Kenya and comprise voluntary community committees that represent members’ views to Eldoret Municipal Council, central government departments, NGOs and others. There are 14 such committees, covering different sectors - three represent special transport interests: the Eldoret Bicycle Transporters, Mkokoteni handcart pushers, and Matatu Manambas and Operators [World Bank and UNECA 1997].

6.17 Among the general travel problems experienced by the urban population were the lack of effective land-use controls, weak road discipline among all user classes, and one that was similar in nature to the metropolitan cities - the lack of effective coordination between institutions responsible for the transport sector. A specific example of the latter is that in Eldoret the railway line, which bisects the city, cannot legally be crossed other than at a few designated places. These were seen as far too few in number, since they involve lengthy detours by pedestrians and cyclists. The city has grown so fast it has engulfed a facility, which ought to have been diverted away from such a heavily utilized area. But none of the stakeholders concerned could afford such an action, so its remains and will continue to inconvenience users, especially the poorest.

Walking

6.18 Many of the problems associated with walking - which restrict use if it is only an option rather than a necessity - were similar to but not so intense as those in the metropolitan cities. Chaotic traffic conditions again make concern with safety a dominant issue. In the secondary cities the central areas were perceived as being badly designed and maintained for walking. Inadequate space and inappropriate locations for markets, hospitals, public transport terminals and handcart parks contribute to the difficulty of moving around the CBD on foot. Obstruction of sidewalks by commercial activities, such as illegal retail shop extensions, petty trading and small manufacturing activities, and their generally poor condition - with open drains, broken slabs, missing utility access covers, etc. - often make walking a hazardous activity. Many roads simply do not have sidewalks and even when they are provided the routes are often littered with solid waste.

6.19 There were few designated and recognized road crossing places. Attempts to install effective zebra crossings for pedestrians have been frustrated by the lack of durable road marking materials, and a very real and pervasive confusion exists among users – motorized and non-motorized – as to how they are supposed to behave. In the face of such uncertainties these crossings have probably enhanced rather than reduced danger by creating a false sense of safety.

6.20 The main low-income residential areas do not have adequate connections for walking or cycling to the CBD and major employment centers. Those that exist are undesignated, rough and insecure tracks. The lack of designation means that those crossing private land could be severed by future developments.
Non-motorized wheeled transport

Cycling
6.21 The main problems experienced by cyclists were the absence of facilities – designated and well-maintained routes, parking space, road signs to alert other users to their presence, etc. – and lack of respect from motorists. The accident statistics provide adequate testimony to the allegations of the danger cyclists perceive, but field study observations suggest that their own behavior contributes significantly to the problem.

6.22 Given the severe deterioration of most urban roads in the study cities, a common effect of their rehabilitation is that the speeds of motor vehicles increase significantly, unless traffic calming measures are taken to prevent this happening. This can, as observed in Morogoro, have a negative effect on the safety of cyclists and pedestrians, which logically would lead to a drop in the modal share of cycling.\(^{48}\)

Handcarts
6.23 The main problems experienced by handcart operators are conflicts with motorists for road space, and the poor condition of the roads themselves. Travel through the main junctions is a particular difficulty because they lack positive traffic controls, such as signals, which creates a dangerous free for all.

Public motorized transport
6.24 In both cities public transport is said to function quite well, given that restricted travel distances and low incomes reduce demand. The city center taxi services are not used by the poor. The share taxis operate in a similarly gray institutional and regulatory environment to the services in the metropolitan cities. For the public the perceived problems are of a localized nature, but can be expected to grow as the city increases in size. The services are characterized by generally low operating standards with undisciplined loading and unloading. Additionally the more remote areas have to contend with a low and uncertain level of demand, which restricts the services offered. In both cities low demand levels means that services are limited to the main routes. Few major employers still provide bus transport for their workers because of increasing costs.

Summary
6.25 Walking and cycling are more dominant in the secondary than metropolitan cities with a corresponding reduction in the role of public transport. Implicit in these patterns is clear evidence of the disadvantages of scale associated with metropolitan areas that is especially significant to the poor located on the periphery. In the secondary cities there is little need to pay for transport and mobility problems are substantially less than in metropolitan areas. There are, however, significant gender differences, with women much more likely than men to walk and less likely to cycle. The pattern of cost distortion relative to demands is even more skewed than in the metropolitan cities and represents an even bigger misallocation of resources.

\(^{48}\) A similar effect was widely commented on in the press soon after the main streets of Dar es Salaam were resurfaced in the mid-1990s. Prior to rehabilitation speeds had been reduced to walking pace by the potholed surfaces. Under the CARE rehabilitation program in Addis Ababa access roads are deliberately left with a roughened surface so as to control vehicle speeds.
7 - POVERTY-FOCUSED TRANSPORT POLICIES AND INTERVENTIONS

7.01 As Section 5 indicates, in the metropolitan cities the history of poverty-focused transport policies and interventions is a comparatively short one. General transport policy formulation and interventions in the system have been overwhelmed by the administrative and financial crisis both cities have experienced for most of the period since the early 1970s. Little of the many plans has actually been implemented, and that little has rarely been targeted on the poor. The responsible central authorities have failed to deal well even with the management of the most visible problems - the primary transport routes and major traffic flows. They have been unable to prevent the deterioration of much of the road infrastructure - apart from sporadic, limited, donor-financed rehabilitation and improvement - and management of the traffic system has become less and less effective. The movement modes used by the majority of the poor - walking and public transport - have received little attention. The first has been - and continues to be - largely ignored, while the second has suffered from an informal privatization process at an unknown, but certainly significant cost to society at large [De Soto 1989]. Evident casualties have been the cross-subsidization of peri-urban routes and the concessionary fares offered to pupils by stage bus operators, that have proved unworkable in a public transport system dominated by share taxis.

7.02 In these circumstances it is unrealistic to expect officially-inspired transport policies and interventions to have focused strongly on the poor. The poor are badly positioned at the tertiary, or lower, levels of the supply-distribution chain and in the prevailing atmosphere of crisis management at the topmost levels, little can be expected to have percolated that far. Moreover, on most people’s lists of basic needs, transport would either not figure at all, or appear well after shelter, food, water, sanitation, etc. Since urban authorities have so signally failed with these higher order sectoral needs, success in the transport sector would be most unlikely.

EXISTING TRANSPORT IMPROVEMENT PROGRAMS IN THE METROPOLITAN CITIES

7.03 However, in both metropolitan cities there have been positive developments - albeit, promising rather than of significant impact - that have sought to change the downward spiral of deterioration in both transport infrastructure and the travel conditions experienced by the poor.49 Mostly they have been at the initiative of international aid agencies and NGOs, or groups of local stakeholders, who are advocates of various forms of participatory approaches. The discussion that follows describes some developments that seem likely either to have the most long-term influence on transport sector provisions for the poor, or which have already demonstrated impressive results.

7.04 First, is a brief discussion of general experience in providing transport infrastructure within informal settlements. Second, is a presentation of specific programs addressing low-income transport needs, namely: the Sustainable Cities Program (SCP), a joint undertaking of UNCHS (Habitat) and UNEP that supports more than 30 cities worldwide, and which Dar es Salaam joined in 1992. Third, is the upgrading of the drainage system in the Hanna Nassif settlement of Dar es Salaam with assistance from the ILO. Fourth, is the Dutch-funded Urban Transport component of the World Bank and UNECA Sub-Saharan Africa Transport Program (SSATP), from which the urban mobility and NMT pilot projects initiative emerged in 1993. Fifth, is the Nairobi Informal Settlements Coordination Committee (NISCC) set up in 1996 by the major secondary stakeholders - the Government of Kenya (GoK), Nairobi City Council

49 Road and path improvements have been components of earlier sites and services schemes, and in various initiatives aimed at improving other infrastructural conditions in informal settlements, but they have seldom been the focus for action, or large in absolute terms.
and civil society comprising NGOs, CBOs, representative associations, service clubs, churches and the private sector.

**Transport Infrastructure for Low-Income Settlements**

7.05 As mentioned in the summary to Section 4, transport infrastructure for low-income settlements has only recently emerged as a topic in its own right. However, attempts in SSA to deal with the problem of upgrading low-income, or informal settlements, go back at least two decades. Inevitably transport infrastructure has been implicit and sometimes explicit in these efforts. Annex III summarizes the available experience and discusses the main principles and methodologies that have emerged, discusses the problem of moving from project to program scale activities, and identifies likely impacts on poverty and sustainability of transport infrastructure interventions.

7.06 Given the will to tackle the problems of informal settlements, ways of doing so are now crystallizing. Typically transport infrastructure improvements are part of a package, often with drainage works to which they are closely related. Labor-intensive methods and community participation approaches are not just desirable, they are in effect obligatory, especially given the ineffectiveness of the civic authorities. Community contracting is a more ambitious but also very promising development. It carries with it the hope that an enhanced professional cadre of skills within the communities may help to address the still unresolved issue of sustainable infrastructure maintenance.

7.07 Given the piecemeal and scattered nature of investment, both at an urban area and individual settlement level, the transition from projects to programs remains problematic. Capacity building of all partners remains the favorite approach, but as will be explained subsequently, Nairobi has adopted the distinctive approach of a special coordinating committee just to deal with informal settlements.

7.08 Experience to date provides only general guidance on likely impacts from a distributional, employment, or economic growth and welfare perspectives. Quite apart from the poverty targeting implicit in the selection of the settlement in the first place, the poorest can be favored by means of a commitment to the use of employment-intensive methods, the level of emoluments paid for work (wages, food or a mixture), and recruitment procedures to ensure gender parity. The poor are also the direct beneficiaries of the improved mobility and accessibility that result. The case study of a settlement upgrading in Tanzania, with the assistance of the ILO, provides rare specific evidence on poverty-focused impacts.

**Sustainable Cities Program (SCP)**

7.09 The overall aim of the SCP is managing the growth and development of the city. It aims at strengthening local capacity to plan, co-ordinate and manage the environmental and developmental interactions; and at preparing long-term, dynamic, and integrated development plans, and investment strategies. The City Council of Dar es Salaam is the government project implementing agency. Achievements of SCP to date included the production of a city environmental profile and the establishment of a geographical information system (GIS) unit. The program has formulated action plans and a number of projects, some of which have already started such as the Community Infrastructure Project (CIP) in Tabata and Kijitonyama settlement, the introduction of a successful one-way road system in the city center, and privatization of solid waste collection and parking facilities. The program has also produced a draft Strategic Urban Development Plan for Dar es Salaam City.

**Hanna Nassif Settlement Drainage Upgrading**

7.10 The Hanna Nassif project - which included road and footpath works and was executed with the cooperation of the ILO - provides the best documented example of a
poverty-focused transport intervention (Annex IV). The focus is explicit in the choice of location, and the technology and mechanisms used to execute the work. Hanna Nassif is a predominantly low-income, informal settlement. The choice of employment-intensive techniques was part of a deliberate policy shift by ILO and other agencies to replicate in urban areas the success in promoting their use for the construction and maintenance of rural infrastructure for the past 20 years, mainly feeder roads [Howe and Bantje 1995].

7.11 The ILO started pilot projects on the upgrading of urban infrastructure in a number of East African countries in 1993. Hanna Nassif was one of these, and it has progressed to a second phase. It was among the first projects outside of South Africa to extend the idea of employment-intensive works into transport sector infrastructure. The use of community contracting has rapidly emerged as a *quid pro quo* for works in informal communities.

7.12 The project shows that: first, transport components – road and footpath improvement – can be successfully embedded in a diverse program of employment-intensive works. Improved mobility and facilitation of solid waste collection were immediate effects. Short-term employment creation was a significant poverty-alleviating benefit while longer-term skill creation and materials provisioning provided forward and backward linkages, respectively. Improved productivity, health and reduction in house repair benefits, were due to the concomitant flood relief. Despite the considerable infrastructural improvements, there was no immediate evidence of rent increases resulting, but the issue of maintenance of the improvements was not fully resolved.

Dutch-funded SSATP urban mobility initiative

7.13 This program’s pilot interventions were conducted in all four of the previously cited cities between 1996 and 1999. They were selectively focused on trying to increase mobility for the low-income inhabitants of the study areas in each city. Directly tackling public transport provision was deemed too complex and expensive, although indirect effects did result from making traffic flows more disciplined and safer. The main emphasis was on improving the efficiency of walking and cycling. Further interventions are planned under the SCP, but sufficient lessons have been learned to provide indications of what works best and how this can be achieved. These are described in detail elsewhere; only a summary of findings and recommendations is given in Annex V [De Langen and Tembele 2000].

7.14 The project’s first aim was to improve the safety and efficiency of the pedestrian route network. Second, efforts were directed at the *other* modes of transport, one by one, in order of highest basic performance/cost ratio, i.e. lowest unit cost of travel per passenger km). The modal ranking was: (i) bicycle (up to 12 km trip distance); (ii) bus transport; then a big gap in unit costs with (iii) motor scooter (high safety risk); and (iv) car.

7.15 The target was cost reduction for individual travellers and urban households. In the longer run, the effect of the policy ought to be that a significantly lower percentage of the city income is spent on transport. East African experience is that in low-income households in a large city, the percentage of income that is spent on daily transport (bus fares) can reach as high as ± 30%. Experience from the case studies is that even this level of expenditure only allows the income earners, and other members, a few incidental bus trips per month. All other trips have to be made on foot or cannot be made at all. The practical possibilities to

50 Since 1993, Care-Ethiopia has also been developing a Community Infrastructure Improvement / Urban Food-For-Work Program in Addis Ababa. By December 1999 it had constructed 94 kms of stone paved and/or select material roads on existing tracks that were previously inaccessible; 28 reinforced concrete bridges, and 1536 foot crossings and other civil structures [Care-Ethiopia 2000]. It is one of the few to have made the transition from project to program status and the intention is to cover the entire city.

51 Costs include financial, time and indirect costs.
reduce a household's total cost of travel (direct plus travel time costs) were found to be: (i) increased walking speed; (ii) reduced trip distance; (iii) reduced bus fare (and in case of significant congestion, increased bus speed); and (iv) availability of a bicycle to make the trip.

7.16 Feasible measures to achieve each of the four household travel cost reductions are summarized in Box 7.1.

Box 7.1: Measures to reduce household travel costs*

Increase walking speeds (25%)
- general provision of better pedestrian access tracks
- separated walkways along collector roads and urban corridors, with enough capacity for uncongested flow
- safe pedestrian crossings

Reduce trip distances (25 to 50%)
- construction of NMT-only shortcuts, to create networks of direct pedestrian and bicycle routes.
- increased economic production and service provision in residential areas, due to, area upgrading (in which good access infrastructure plays a significant role).

Reduce bus fares (20 to 40%)
- effective competition from more efficient and attractive pedestrian traffic.
- competition from safe bicycle traffic.
- efficient bus bays (pedestrian / bus interface).
- other measures unrelated to NMT (first priority: bus lanes on congested roads).

Increase urban cycling (50%)
- restoration of safe travel conditions, making urban cycling possible again.
- provision of a coherent bicycle route network (most of it in calmed-down mixed traffic).
- targeted program to enable cycling by women and secondary school children.

Source: de Langen and Tembele 2000
* The figures in brackets are the estimated percentage reduction in travel costs that could potentially result from the specific measure. Based on project results, it is estimated that overall household travel costs could be reduced by 50% within a decade.

Nairobi Informal Settlements Coordination Committee (NISCC)

7.17 As the most recent intervention, the NISCC has as yet little to show on the ground, but it is of interest because it is a committee whose primary focus is the poor. Also it owes its very existence to the realization that conventional approaches have failed. It has drafted a ‘Development Strategy for Informal Settlements’ and, after approval by the Nairobi District Development Committee, an Action Plan to implement the strategy and provide a frame of reference for organizations wishing to make interventions in informal settlements [Republic of Kenya 1997]. NISCC is a coordinating mechanism - it does not implement, but gives purpose and direction to those who do. Following a workshop in May 2000, four working groups are being strengthened to take the process further, including one on shelter physical planning and infrastructure.

7.18 NISCC’s strategy rests on a shared set of assumptions and vision that see's Nairobi's informal settlements as a situation of crisis. It is argued that the Kenyan government does not have the resources to improve facilities in informal settlements through conventional public services and housing programs, therefore the way ahead is to assist communities to mobilize
their own resources to improve their living conditions. The program advocates a participatory approach in the physical planning and upgrading of settlements, on the basis that self-governance is the key to effective participation of the people in development. This approach embraces the use of labor-intensive methods of construction and maintenance of roads and drainage. It is argued that much can be done to encourage the development of micro-enterprises, but the Nairobi Council must change its approach from one of controlling and policing, to one of enabling and supporting their development. This is especially relevant to fostering the growth of local neighborhood transport services.

**Existing Poverty-focused Transport Policies and Interventions in the Secondary Cities**

7.19 In the secondary cities the situation has been similar to that in the metropolitan cities, but with differences in the scale and intensity of problems. There has been little in the way of deliberate poverty-focused transport policies and interventions. Transport policy and intervention measures have been overwhelmed by the administrative and financial crisis both have experienced for most of the period since the early 1970s. Again, there has been planning for change, but little in the way of implementation. As a result the responsible authorities have similarly failed to deal even with the management of the most visible problems of primary transport routes and major traffic flows, and have been unable to prevent the deterioration of the primary infrastructure. The walking, cycling and public transport modes have largely had to fend for themselves. At present the problems they experience are of a different order of magnitude to those of the metropolitan areas, but in a climate of laissez faire they are headed down the same destructive path.

**Employment-intensive urban Infrastructure upgrading**

7.20 To date neither of the secondary cities has been involved in employment-intensive programs to any significant extent. The main constraint appears to be finance, as well as the need to undertake necessary capacity building at all levels.

**SSATP urban mobility initiative**

7.21 There are few distinctive lessons from the secondary cities that are not covered in those from the metropolitan areas (Annex V). However, for a number of reasons they are of potentially greater significance because: (i) there are many more secondary than metropolitan cities; (ii) those in East Africa reflect experience elsewhere in growing faster than the metropolitan cities; and (iii) there is still time to prevent conditions becoming as bad as they are in the metropolitan cities. This last aspect will be discussed further in Section 8 under lessons learnt.

**Sectoral Influences on Basic Needs Satisfaction and Distributional Impacts**

7.22 The lack of substantive investment in the transport sector, and the monitoring and evaluation studies that would have accompanied this, has restricted the evidence that is available on sectoral influences on basic needs satisfaction and distributional impacts. However, other trends that have influenced the urban transport sector in the case study cities over the past two to three decades give indications of the likely direction, if not the magnitude, of these influences.

7.23 In both countries the lack of investment in either road maintenance or improvement have had clear implications for transport services through the deterioration of route conditions, as corroborated by evidence from independent sources. Since the tertiary levels of the networks have been the worst affected, especially those providing access to informal settlements, then the poorer sections of the population are likely to have been most influenced. The trends that have affected the urban transport sector have had both negative
and positive influences. Discussion is limited only to the most obvious impacts, secondary effects are ignored.

**Negative influences**

7.24 The two main negative influences have been the deterioration of route infrastructure, and the progressive change in the business culture of the passenger transport service providers.

**Deterioration of route infrastructure**

7.25 It is well established that as road conditions deteriorate, first there is an increase in the charges for motorized services, then they gradually withdraw altogether [Carapetis *et al.* 1984]. The least robust vehicles cease operations first, but with continued deterioration all services stop. Stage service urban buses are often among the first vehicles to withdraw because their long-wheel base makes them particularly vulnerable to severely potholed or uneven surfaces. (This is known to have been the case with KBS in Nairobi.) A single catastrophic event, such as a bridge or culvert collapse, leads to immediate service withdrawal.

7.26 The withdrawal of motorized transport services indirectly increases overall travel costs as slower modes (e.g. walking) have to be substituted. In extreme cases the journey may not be possible, or a shorter journey (another destination) is substituted. With high levels of un- and under-employment among the poor, mobility is necessary for work search. Anything which reduces mobility necessarily reduces the chances of finding work. Since the area of search is proportional to the square of the range, enforced dependence on walking greatly reduces the number of possible opportunities to find work.

**Change in service passenger transport providers**

7.27 In both countries there has been a progressive change in the suppliers of passenger transport services from public (Tanzania), or public-private but well regulated (Kenya), stage bus services, to private and essentially unregulated share taxis. Currently these are less dominate in Kenya than Tanzania, but even in Nairobi the future for urban bus services does not look very secure if the present *laissez faire* situation continues.

7.28 The main consequences of this trend have been: (i) the loss of subsidies to the poor due to the ending of route cross-subsidization by the bus operators: only in some cases have these routes been taken over by share taxis; and (ii) a reduction in the number of school children who are availed concessionary fares. Although no specific instances were mentioned it seems possible that other poor fare concessionaires (the elderly and disabled) may also been disadvantaged by the reduction in regulated bus services.

**Positive influences**

7.29 The two main positive influences in the past two to three decades have been due to changes in employment induced by sectoral trends, and progressive changes in the transport service providers for both passengers and goods.

**Employment**

7.30 In the study cities the initiation of employment-intensive infrastructure works, targeted on informal settlements occupied predominantly by low-income households, has undoubtedly had a positive effect on income distribution and thus meeting the basic needs of the poor. With this type of sectoral intervention distributional targets can be made explicit in the geographical, wage and gender targeting norms adopted. These aspects have received

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52 This relationship also works in reverse. Route improvement can lead to the rapid generation of services.
considerable attention by the ILO and other agencies in rural areas [Bryceson and Howe 1993, Keddemman 1997]. Although, there is yet only limited experience in urban areas it is growing [Care-Ethiopia 1999].

7.31 Valuable lessons have been learnt from the urban initiatives on employment-intensive infrastructural works (Annex IV), as will be further discussed in the next section of the report, but since they have not so far progressed beyond a demonstration scale their impact has been limited. Also, much work remains to be done to establish sustainable maintenance systems.

*Change in service providers*

7.32 The increased importance of informal - at the expense of formal - transport services can also be presumed to have had a positive influence on income distribution and basic needs satisfaction. The substitution of informal (share taxi) for formal (bus) services provides relatively more employment opportunities to the unskilled and thus poor. Driver skill requirements are lower - whether they should be is a separate issue - making it an occupation suited to the less qualified. Similarly the maintenance of the smaller share taxis is simpler and less skill-intensive than for a bus. In the case of handcarts and bicycle transporters, there is both employment for the poor and the creation of services that previously may not have existed at all.

*New transport services*

7.33 The case studies showed evidence of a symbiotic relationship between the increase in petty hawking and trading, that has been a feature throughout urban SSA in the past two decades, and the growth in use of non-motorized forms of goods transport. Such services are able to penetrate into low-income settlements and markets; they have carrying capacities, speeds and range capabilities in sympathy with demands; and they are therefore both available and affordable. As such they clearly have a positive influence on both the satisfaction of basic needs and desirable income distributional objectives.

**SUMMARY**

7.34 Due to the administrative and financial hiatus of the past few decades there have been few officially inspired urban transport policies and interventions focused on the poor. These have mostly been at the initiative of international aid agencies and NGOs, or groups of local stakeholders, and have been at a project rather than program-scale. Progress has been made with the improvement of transport infrastructure in informal settlements and the SSATP pilot interventions to increase the mobility of low-income inhabitants. However, these initiatives need to be expanded from a project to a program scale if they are to have a significant impact.

7.35 Negative influences on basic needs satisfaction and distributional impacts, have clearly resulted from infrastructure deterioration and the consequent withdrawal of transport services. The change to largely unregulated passenger services provision has also had identifiable negative impacts on the poor, especially increasing fares. Positive influences have resulted from the employment-intensive infrastructure works, and (perversely) from the changes in passenger service provision, which employ more unskilled labor. New goods

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53 Since, as demonstrated in para 5.32, share taxis need approximately four times as many vehicles to transport the same number of people as do buses, and each has a driver and from 1-3 conductors, then perversely they provide more unskilled employment than do the services they have replaced.
transport services, especially those provided by NMT, bring both direct and indirect benefits to the poor.
8 – QUESTIONS AND ISSUES

8.01 The above cited case studies and other observations provide a number of useful insights that can assist policy formulation and the identification of interventions, but they also have significant limitations. To see clearly what these are it is necessary to reconsider the conceptual basis of studies to travel behavior.

STUDIES OF TRAVEL BEHAVIOR RE-VISITED

8.02 Traditionally, and largely for convenience, studies of travel behavior have been based on the observed characteristics of travellers – e.g. their trip rates, travel times, costs and distances, modal preferences, etc. These are often taken as indicating the demand for travel and interpreted accordingly, but in reality they represent the equilibrium situation under existing supply and economic conditions. Moreover, trip rates, purpose proportions and modal split estimates are crucially dependent on the definition used for trip and even the whole notion of transport. If these exclude very short-distance movements then they are likely to under estimate: (i) total household demands; (ii) the time devoted to transport; (iii) subsistence purposes; (iv) the contribution of both women and children; and (v) the role of walking. Since such studies have often in the past been undertaken for computer modeling purposes, and because of the difficulty respondents have in recalling numerous small activities, it has been conventional to focus only on major trips from the household. Thus, walking trips have either been ignored altogether, or included only if longer than a certain study-defined threshold, say 400 meters or 15 minutes [Ortuzar and Willumsen 1990]. Short-distance walking trips are precisely those which would be undertaken by the poorest households - especially the very young, old, disabled or sick - to fulfill subsistence needs, such as water collection, or for the acquisition of fuel and other household supplies. Lack of money and storage (refrigeration) means that frequent short trips are a feature of everyday life in such households.

8.03 These travel demands can be expected to impinge particularly on single-parent households, because of the time expended. In total they would be unlikely to dominate in the way that has been shown for many rural households, however, for the poorest households it may still be significant [Barwell 1996, Dennis 1999]. The evidence on this issue is weak since the only study of urban household travel characteristics that appears to have been made on a comparable basis to those in rural areas was undertaken in Ghana some 15 years ago [Barwell and Howe 1987]. The data cannot be satisfactorily dis-aggregated to reveal the situation of the poorest, but as an overall average urban households spent only about a quarter of their time on such activities and a tenth of the time on water collection as those in rural areas.

8.04 The studies in Ghana are, perhaps, more interesting for their methodological than factual basis. They were among the first to move away from inferring demands from travel-based, or mobility studies, and giving greater emphasis to the issue of access. They were founded on the belief that the notion of mobility is open to a number of ambiguous interpretations that make it unsatisfactory as a means for understanding the travel needs of the poor. It is, for example, difficult to say whether more or less travel is preferable, and

54 The studies were made in three urban areas with populations between 40,000 and 140,000. Average urban household size was, at 5.7 persons, half that resulting from the practice of extended families living together in rural areas. Thus, the only meaningful comparisons are per person. Urban residents made about 66% as many trips per annum as their rural neighbors, but took only half as long presumably because desired facilities were more accessible. In urban areas four categories of household trips were distinguished: work, school, others within, and those external to the urban area. The average hours spent on each of these categories was 523, 317, 289 and 87 per annum, respectively. So travel outside the urban area was, at 7%, not very significant, but non-work or non-school-related travel consumed almost a quarter of the total household time.
whether more or fewer trips are better [Jones 1987, Ross 2000]. There are strong reasons for preferring the concept of accessibility.

**DISTINGUISHING MOBILITY AND ACCESSIBILITY**

8.05 In the simplest terms, ‘mobility’ is a measure of the ability of people to move themselves or their goods around. An inherent difficulty in assessing mobility is the problem of measuring an ability or ‘potential’ to travel. Due to the difficulty of measuring movement which could take place but does not - for some reasons of cost, time or effort - studies of mobility have tended to use data on actual movements.

8.06 There are, however, some problems in equating mobility with the observed level of travel. Care in interpretation of travel statistics is particularly needed in connection with economic or social welfare. A community showing high levels of travel may indicate low travel costs (in terms of time, money or both), but may alternatively indicate heavy travel requirements to meet survival needs in the form of water, firewood or food. Similarly a community in which little movement is undertaken may represent an efficiently planned settlement which has few external needs, or conversely a community where lack of mobility imposes a real restriction on people's desired activities. In general, these contrary interpretations can be distinguished by defining the travel mode and purpose of travel in more detail. Frequent motorized vehicle trips are more likely to represent a highly mobile affluent community than frequent foot journeys; similarly trips to fetch water are likely to be a high proportion of travel in poor communities. The units in which movement is measured will also affect the interpretation of travel statistics. The daily time spent travelling to collect water may, for example, be ambiguous. The time required for one trip will decrease as mobility increases, but water demand is likely to rise as travel becomes easier.

8.07 A further, and from a poverty perspective perhaps the major, limitation of the concept of mobility, is that it does not take spatial accessibility into account. This is particularly important in assessing the impact of mobility on economic or social welfare, since individual needs are met at particular destinations. An individual's welfare will depend not only on personal mobility, for example access to a bicycle or bus service, but also on the distance which must be traveled by any particular means to satisfy the individuals reason for the journey. In recognizing that demand for movement is a derived demand, incurred in satisfying other needs, we approach the concept of accessibility.

8.08 Accessibility is closely related to the concept of mobility, but has more potential to examine social and economic benefits. ‘Accessibility’ can be defined as a measure of the ease with which people can travel and move goods to the various destinations they wish to reach. In essence, accessibility differs from mobility in taking into account, choices of destinations and their locations relative to the starting point of a journey.

8.09 To define accessibility in practice, the desired destinations must be specified. In general, the destinations will be places offering opportunities for a desired activity. Accessibility is then measurable in term of the number of opportunities or destinations reachable in a given time or distance, or as the inverse of travel costs to the desired activity/destination.

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55 Based on Anderson et al. 1988.
56 The UK Transport Research Laboratory (TRL) initiated a program of studies in the late 1970s that established this as the main research approach [Heraty 1980, Jacobs et al. 1980].
57 In this case, mobility could be measured more effectively by defining units in terms of volumes carried, viz, hours per litre per day, not hours per day.
8.10 For the poor the accessibility to, or standard of, a service depends in some cases on movement by visitors from outside the community. For example, the standards of health and education services are obtained to a significant extent by visits from central staff and deliveries of supplies. This *inward* access of services or goods can be embraced in the concept of accessibility by specifying access to an activity rather than to a place, for example access to functioning health facilities rather than a specific clinic.

8.11 Annex II provides an example of the accessibility principle being applied to the analysis of health care facilities in Dar es Salaam. It uses a GIS-based approach to match the distribution of health care facilities provided by different suppliers – public, private, voluntary (NGO) – with their utilization by different income strata as part of their health-seeking behavior. It can use sophisticated measures of accessibility, for example, to generate a whole range of acceptable locations for the construction of new dispensaries rather than one mathematically optimal location. For the decision maker visual information is easy to assimilate and it is much more useful to work with a set of acceptable locations, rather than just one, as it allows for other factors (economic, political, etc.) to be incorporated in the decision process.

8.12 Key aspects of poverty and transport are their spatial characteristics and in both cases these are quite complex. GIS-based approaches have the advantage that it is relatively easy to explore the interactions that might take place as access is altered either by changes to the health facility or transport system. Geo-information technologies also permit the spatial distribution of low-income demand (i.e. low-income settlements) to be more efficiently monitored. ITC,\(^{58}\) the institution developing this approach, has also applied it to the spatial analysis of urban public transport accessibility in Dar es Salaam, the typology and spatial growth of unplanned settlements, urban growth and terrain modeling [Birhie 1998, Hakuyu 1995, Sliuzas et al. 1999].

8.13 A problem the accessibility concept could be used to explore is employment-seeking behavior and how this is influenced by spatial location and the transport system. For the urban poor employment is the key to income and hence an enhanced quality of life. It is also evident that spatial location and mobility combine to influence opportunities to find employment or even to maximize sales for those who are self-employed in trading and hawking. However, there is little understanding of the inter-relationships between these aspects beyond general observations.

8.14 In the context of addressing the issues associated with extreme poverty, a useful starting point for measuring accessibility might seem to be the identification of core basic needs requirements, and the measurement of average travel cost to reach destinations where these essential activities can be realized. Based on these kinds of considerations Integrated Rural Accessibility Planning (IRAP) has been promoted by the ILO as the most practical way of identifying the travel and transport needs of the *rural poor*. There is now experience with using the IRAP approach from a range of countries, although evaluation of the resulting interventions has yet to be accomplished.\(^{59}\)

8.15 For *urban* areas there have to date been only the previously mentioned studies in Ghana and a study in two suburban villages of Colombo, Sri Lanka [Vonesch 1997]. However, as a means for better understanding the travel needs of the poor an approach based on the application of accessibility criteria has much to be commended. It should not be

\(^{58}\) Division of Urban Planning and Management, International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, The Netherlands.

\(^{59}\) IRAP-type studies have been conducted in Bangladesh, Burkina Faso, Cambodia, Ethiopia, Ghana, India, Laos, Malawi, Philippines, Sri Lanka, Tanzania, Uganda, Zambia, and Zimbabwe.
difficult to develop an urban equivalent to IRAP although careful consideration will need to be given to the specification and measurement of accessibility, and its links to the categorization of poverty and opportunities for employment [Dixon-Fyle 2000].

**SUMMARY**

8.16 The majority of the attempts to explore the relationships between poverty and urban transport have done so on the basis of mobility criteria. There has also been a tendency to exclude the shortest trips that are of crucial importance to the poorest households. Blanket measures to improve mobility are in and of themselves unsatisfactory because they can be interpreted ambiguously, and do not easily allow for spatial differentiation. This is important in accounting for variations in poverty characteristics, which are also strongly spatial.

8.17 The notion of accessibility provides a more useful means of understanding the travel and transport needs of the poor, takes account of locational and mobility characteristics and has been successfully utilized in African rural areas. There are convincing reasons for believing that it would be equally sensible in urban areas.
9 – BEST PRACTICE AND LESSONS

9.01 Attempts to understand, and particularly to address, the special needs of the urban poor, as they relate to transport, are comparatively recent, and of a very modest size relative to the scale of their problems. This is especially the case when judged from the more comprehensive and complex view of the nature of poverty that has gained prominence in the past decade. Given this, it is important not to overstate the important of what has been accomplished in this field in the study countries to date.

BEST PRACTICE WITH A NEED TO KNOW MORE

9.02 A modest and promising beginning can be claimed in two specific areas of direct concern to the poor: (i) upgrading of the infrastructure in low-income settlements; and (ii) improving the mobility of the low-income population. The work on both aspects has been discussed in this report and some basic guidelines have been identified. It is important to note that the scale of activities of the case studies has been at project rather than program level. There are significant problems in scaling-up from project to program level activities with which there is currently little experience in an urban context.60

9.03 Replication of project experience is needed, but has to be complemented by a better understanding of the travel needs and behavior of the poor than has resulted from the mobility-based criteria used to investigate these aspects to date. The lack of spatial discrimination is a crucial weakness that hinders investigation of the travel needs of specific locations and how these might be met.

9.04 Accessibility analysis has already been established as a useful tool for precisely this purpose. It has been used in exploring the travel and transport needs of the rural poor, and defining appropriate transport sector interventions [Dennis 1998]. It is increasingly being complemented with livelihoods analysis as a means of giving greater poverty discrimination in the identification and design of interventions [Carney 1999]. The same approach seems equally applicable in urban areas and some research on these lines is currently being conducted in Karachi [UK/DFID 2000, Sohail 2000].

9.05 There are a number of broader issues that emerge from the case studies that are relevant to the World Bank’s aim of ensuring that specific objectives linked to the reduction of poverty be efficiently included from the start within the urban transport planning and programming process. First, it is important that the orientation of investment identification and planning, be changed from a focus on vehicles to one on people. As this analysis has shown, travel problems, modes of use and many other characteristics look very different depending on whether they are viewed from the (poor) household upwards, or the transport system downwards. An accessibility-based approach would ensure more of a people-focused planning process.

9.06 Second, at a macro scale three clear problems have been distinguished: (i) a crisis of confidence in civic administration; (ii) informal land privatization; and (iii) increasing dominance of a largely unregulated public transport system. Problems (ii) and (iii) are evidently strongly linked to (i). It is outside the remit of this study to address these issues, but it is germane to signal that their continuance will only work against the interests of the poor, and prejudice the transition from successful project to program-scale activities in the transport sector.

60 CARE in Ethiopia has been working at program-level in Addis Ababa’s urban renewal, but only limited information about their work is currently available in the literature at present.
LESSONS FROM PRESENT PREDICAMENTS

9.07 A number of useful lessons are mentioned in the previous section summaries. However, there are broader considerations that relate to the current transport problems of the metropolitan areas, and which are particularly pertinent for ensuring a better transport future for the secondary cities.

Metropolitan cities

9.08 The list of the causes of metropolitan transport problems is long and numerous. Some are beyond the realm of city government and can be influenced only to a limited extent (the growth in car ownership) or at the national policy level (pricing mechanisms). However, many of the main causes of transport problems in major cities, especially as they influence the poor, are related to the way in which city governments have allowed the city and its transport system to develop. These can be summarized under the following headings.

Land use policies and controls

9.09 Successive city governments have allowed employment concentration in the CBD and the major industrial zone to continue, mainly by failing to provide attractive alternatives. In addition, adequate space has often not been reserved or preserved to cater for increased traffic flows.

Transport policies

9.10 These have focused on facilitating vehicle movements rather than people. Although the modal share of the private car is at maximum only some 15-20% (which is high for East African cities), the emphasis has been on the provision of urban transit roads for motorized vehicles towards the CBD. At the same time, the major movement modes (public transport, non-motorized transport) have been neglected. This neglect relates not just to traffic safety, but also the lack of access for public and non-motorized transport to and within the housing, commercial/administrative, and employment areas. Such policies are mutually reinforcing: the segregation of urban functions increases trip lengths and concentrates traffic flows, while the transport system resulting from these policies strengthens the locational concentration of employment opportunities and services.

The need to re-direct urban growth

9.11 As in other parts of the world, the scale and complexity of the transport problems their cities are facing overwhelm the governments of SSA’s major cities. With further population growth, increases in car ownership and use, and a continued lack of funding, these problems are set to get worse rather than better. It therefore seems essential that a breathing space is created for the major cities. If the process of further urbanization can be re-directed towards the secondary cities, the governments of major cities may have a better chance of tackling their transport problems and challenges.

Pro-poor policies

9.12 For the largest cities, with weak civic and professional institutions, that will have to be painstakingly rebuilt, we conclude that the most effective immediate pro-poor policies would combine: (i) restoration of an efficient network of walking routes by rebuilding sidewalks and construction of missing links, especially footbridges; (ii) direct targeting of the severe access problems experienced in the informal settlements; and (iii) measures to reduce accidents on the arterial roads where they are concentrated. Main road traffic improvements should finance themselves through appropriate user pricing measures. Bank finance should be reserved for those who cannot stand on their own commercial feet with the aim of making

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61 This is a general figure for Nairobi reflecting the wealthier parts of the city. In the nominally low-income study area of Eastlands a single figure share (7%) is more typical.
their environment internally efficient and providing a quality impulse to the unplanned parts of the cities. In many cases these improvements will in fact provide for the majority of the urban population and possibly its area.

9.13 Experience in Dar es Salaam suggests that the potential road accident reduction be of an order of magnitude, with damage cost reductions alone justifying the interventions. Both access improvement and road safety measures would also encourage walking and other forms of non-motorized transport. The evidence is emphatic - unsafe conditions are the most important single cause of reduction in cycling as a mode of transport. Anecdotal evidence also supports the contention that it is a significant restraint on walking e.g. schoolchildren and women.

**Secondary cities**

*Preventing secondary problems becoming major headaches*\(^{62}\)

9.14 East African experience supports the view that while overall urbanization rates are high, they are slowing in the metropolitan areas, and being superceded by the growth rates of the secondary cities. Rapid growth puts a severe strain on the already limited resources of the secondary city governments for basic infrastructure provision. The poor are invariably the biggest losers from this. From a transport sector perspective the major challenge facing all countries is to prevent travel conditions in their secondary cities changing from their rather benign current state to the seemingly intractable problems experienced in the metropolitan areas. Fortunately the experience of the metropolitan cities provides the necessary lessons.

**Transport policy principles**

9.15 Eldoret illustrates the relatively benign urban transport scene of many secondary cities. The city size is such that, even at low land use densities, it allows for relatively short trips (maximum 5 km to CBD). Although services are concentrated in the CBD, many employment opportunities are dispersed along the two major transport arteries, which traverse the town. With the exception of these roads (which, in addition to being regional/national highways, also have urban transit and access functions), congestion is non-existent. Although traffic safety is an increasing concern on some main roads, elsewhere in the town motorized vehicles do not yet dominate. As a result, cycling, with a modal share of some 10% for work-related trips, is a more important mode than is the case in Nairobi [Broekema and Jarsma 1994].

9.16 Yet, at current growth rates, the population of Eldoret is set to increase to 650,000 in the next 10 years or so (a size which could be accommodated within the current municipal boundaries). Learning from the lessons provided by major cities like Nairobi, what would be the sensible strategies for governments of secondary cities like Eldoret to adopt?

9.17 Such strategies should, first and foremost, be based on the *prevention rather than cure* principle. Experience in many major cities shows that remediing urban transport problems is extremely difficult, for a mix of economic, political and social reasons. Uprooting settlements for infrastructure provision is often socially unacceptable. Acquiring developed land for expanding the transport system may be well beyond the financial means of the city government, while implementing dedicated bus lanes on existing roads at the expense of road capacity for private cars is often perceived to be political suicide (rightly or wrongly) by many a politician.

9.18 Within the principle of prevention rather than cure, the following combination of approaches is worth considering:

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\(^{62}\) Based on De Langen and Koster 1998.
• Use the urban transport network as a land-use planning instrument
  From an urban transport perspective, a dispersal of employment opportunities and services over the city is desirable as this will restrict trip lengths, avoid concentration of traffic flows, and provide for better accessibility for the majority of the population. In the absence of adequate land-use legislation, zoning enforcement and control mechanisms, the urban transport network may be the only, yet powerful instrument at the disposal of city government with which to achieve this objective.

• Plan for uncertainty
  Although it seems certain that secondary cities will continue to grow, many uncertainties remain. The rate of growth, developments in disposable income and the like are difficult to predict accurately over long periods. These uncertainties suggest an approach that keeps options open. This relates in particular to reserving and preserving land for future main transport arteries.

• Implement active safety policies
  Even in large cities of up to one million inhabitants, cycling remains an efficient and economically attractive mode, both at the level of the individual and for the city as a whole. A safe traffic environment is crucial for the survival and development of this mode. In addition, especially when employment and services are dispersed through the city, walking may well remain the major mode for many trips. The need to protect pedestrians is self-evident.

• Maintain reasonable levels of quality throughout the city
  To maintain the dispersal of employment opportunities and services throughout the city, existing built-up areas should not be left to degrade, while new developments should be planned to provide reasonable levels of quality. By maintaining or providing good access, primarily for NMT, to and within these areas, and by avoiding densification through maintaining open spaces, such areas remain attractive for residents, businesses and services. This approach will help to prevent the segregation of land-uses and income groups which has led to the highly inefficient and economically unsustainable transport systems found in many major cities.

Transport strategies

9.19 Secondary cities like Eldoret and Morogoro are in the relatively enviable position of being able to apply these preventive approaches in guiding their further growth. They could be translated into a strategy that would concentrate on incrementally providing a low-density network of major traffic arteries, together with providing access to and within newly developed low-income areas.

9.20 To promote the dispersal of employment and services throughout the expanding city, the main traffic arteries (2-3 km apart) should primarily have an access function, while at the same time functioning as transit routes for the public transport network. Constructing service roads and walkways along them would ensure such access to adjoining land, which as a result would be attractive locations for businesses and services. The service roads would also serve as cycling through routes. The development of residential areas behind such commerce/service strips would contribute to maintaining low average trip distances.

9.21 The reservation for major arteries should be sufficiently wide to cater for service roads and for a city wide, congestion-free public transport system, in addition to a carriageway for motorized traffic. Such priority bus lanes could be constructed incrementally
next to the carriageway as and when the inevitable congestion builds up. The option to construct a light rail system in the future should be kept open by reserving sufficient rights-of-way.

9.22 The reservation of land for, and subsequent incremental implementation of, these main arteries will eventually result in a congestion free high quality public transport and NMT network which will serve the businesses and services alongside. The main arteries would also provide access for motorized traffic, while the transit function of these roads would by definition be restricted. The road system within the areas formed by the grid should be such that motorized through traffic will at least be discouraged.

9.23 In allocating financial resources for access to and within new developments, priority should be given to low-income areas. This will ensure wise use of scarce resources, as these are the areas where the majority of the population will live. Priority should be given to providing good quality access for NMT. Access for private motor vehicles to and within high income residential areas should not be provided from scarce public resources, but be paid for by the developer or allowed for when setting land prices.

9.24 Maintaining traffic safety is a third crucial element of transport strategies for secondary cities. As the main traffic arteries would have an access rather than transit function, speeds of motorized vehicles on the main carriageways could and should be restricted, if necessary by physical means. Safe NMT crossings should be provided at regular intervals.

9.25 Public transport operators should be disciplined from the earliest possible moment with regard to routes, speed, and the use of designated areas to pick up/drop off passengers. Road safety education could wisely be introduced into the primary school curriculum, as well as being disseminated to the adult population through the local media.

9.26 The above are the main elements of what would appear to be a sensible, preventive transport strategy for rapidly growing secondary cities. Although such a strategy has not yet proven itself in practice, it may nevertheless be worth pursuing as the alternative clearly does not work. Unfortunately, there are too many major cities all over the world that prove this point.
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Review of Dutch Experience with respect to Poverty and Urban Transport

ANNEX I: TERMS OF REFERENCE

REVIEW OF EXPERIENCE WITH RESPECT TO POVERTY AND URBAN TRANSPORT

Background
1. The World Bank is undertaking an Urban Transport Strategy Review. This will be the first comprehensive and detailed examination of this subject since the previous Urban Transport Strategy was published in 1986. A Draft Concept Note for the Review is attached as Annex 1. The Review is to be informed and supported by a series of position papers collating experience and best practice on different topics in urban transport. These papers will identify critical problems and issues, the outcome of interventions, organizational models, etc. The papers will be widely disseminated as the basis for improving understanding and collaboration in the field of urban transport in developing countries. The Strategy Document will reflect this digest of experience, though any policy statements will be the responsibility of the Bank and not attributed to authors of the review papers.

2. In support of this activity the Netherlands Trust Fund in the World Bank is funding a number of reviews of relevant Dutch experience in urban transport. The general objective of the program of studies is to identify the lessons learned, and determine how, and under what conditions, Dutch experience in urban transport planning and administration in large and medium towns is applicable to other countries.

Objective
3. The objective of the study is to investigate the transport circumstances of the poor, and to determine how, and through what mechanisms, the creation and development of an active urban transport market may assist in integrating the urban poor in the urban and suburban markets for employment, housing and other services. It is also intended to cast light on how transport interventions may improve, or damage the interests of the poor.

Scope of Work
4. The primary mission of the World Bank is to assist client developing countries in their alleviation of poverty. While a substantial knowledge base has been established for the role of transport in alleviating poverty in rural areas, at present little is known of the extent to which urban transport in developing countries constrains, exacerbates, or facilitates poverty alleviation. A World Bank Discussion Paper (“Poverty and Transport”, TSU-30, 1997), which included a survey of World Bank transport projects, concluded that there was very limited accounting of the gainers and losers of transport projects, especially the impact on low income groups and the poor. Moreover, it appeared that least had been established about ways in which urban transport projects impacted upon the poor. In addition, ways in which the effectiveness of poverty alleviation programs in other sectors (for example, health, education, slum upgrading, employment creation) were affected by prevailing transport conditions was essentially unexplored. Under this study it is intended to capture experiences and insights worldwide about the relationship between poverty alleviation and transport in urban areas.

5. The study is to be focused on urban areas in developing countries. Its purpose is to enhance understanding of the major direct and indirect ways in which the well-being of poor households located within or on the periphery of urban areas is shaped by the availability and nature of transport infrastructure and services. The Tasks to be undertaken by the consultant are to:
a) define who and where the urban poor are, with reference to level of income, distance from the main economic centers, quality of housing;

b) examine the relationship between the locations of the poor and the non-poor and accessibility to the locations of the main income earning opportunities;

c) describe and summarize available data on the actual urban travel behavior of poor and low income individuals (with attention to transport modes and facilities used, trip distance/time/cost, and trip purpose);

d) describe any available data recording the travel needs, and problems actually expressed by the poor (service availability and affordability and responsiveness to fares and quality of service);

e) identify policies and related actions undertaken in the past specifically to benefit the less favored areas and populations: rationale, measures (quality and price of service, etc.), impacts, etc.;

f) identify the circumstances under which the supply and operation of transport infrastructure and services, and government policies that affect urban transport in general, have been supportive of, or harmful to, poor and low income groups in their efforts to satisfy their basic needs;

g) identify lessons learned from past urban transport operations and policies about their distributional impact especially on poor and low income groups, including explanations for the degree of success/failure of those interventions (covering infrastructure, services and subsidies) specifically targeted at improving the accessibility and mobility of the poor;

h) offer broad guidelines which may be used in making sure that specific objectives linked to the reduction of urban poverty be efficiently included from the start within the urban transport planning and programming process;

i) identify the major lessons learned, best practices, and major outstanding questions concerning relationships between urban transport and poverty alleviation which are relevant to formulating policy and designing operations together with approaches for their further examination.

6. The study is to be conducted on the basis of a review of existing quantitative and qualitative information: including, for example, previous reviews of this subject, urban transport studies, project evaluations, social impact and poverty assessment studies, ex-post assistance reports of international agencies and bilateral donors, urban transport and poverty research studies, urban poverty and health delivery and education effectiveness studies, digests of consultations with the poor, social and household surveys, censuses, longitudinal panel studies involving poor households, and urban labor market studies.

7. New primary data collection is not envisaged; the review should be based on available information i.e., secondary research. At the same time, existing information and findings of studies should be assessed for their potential (re) interpretation and/or implications for poor households. A major task will be to design and conduct as exhaustive a search as practical and possible within the constraints. (See further on this under Approach and Scope below.)

8. The study should assemble a concise annotated and collated inventory ("data base") of the most significant sources; the inventory should be suitably classified for example: case
studies, projects, household surveys, empirical analyses, and data sets; taxonomy of transport-poverty relationships; lessons from, and efficacy of, different policy instruments. (It should be available in electronic form - see under Reporting below.)

9. Given the resource and time constraints, a comprehensive search and review of all countries will not be possible. Therefore, the study will be based on in-depth review of three or four urban areas in countries in which Dutch development assistance has been given. The selection of the countries, and the urban areas in those countries, should be based primarily on the availability of specific quality information that is directly pertinent to the study objectives. Identification of this information will call for a preliminary search. If possible, a variety of countries/cities should be chosen, for example, based on population size (including national capital and regional centers), rate of growth (including rural - urban migration), per capita income of the city (including large poor populations - based on the lower two income deciles), national per capita income, and public transport conditions.

Supervision
10. The consultancy is procured by the World Bank under the normal conditions applying to the Netherlands Trust Fund. The World Bank will nominate an officer to supervise the work and to liaise with the consultant on its content and scope.

Resources
11. It is expected that the review will require up to 4 person months. The work will be conducted primarily in the Netherlands: this requires that the consultants have a first-hand knowledge of issues in developing countries and of the related solutions and debates related to them. The consultant team should be composed of one or two experts who have an easy access to all available relevant documentation, in public as well as private libraries and data bases.

Schedule and Reporting
12. A short inception report in five copies will be submitted within three-four weeks of instructions to proceed with the project. The inception report will outline an assessment of data availability and the cities proposed for evaluation.

13. The final report (100 pages at most, including appendixes) shall contain:

* The presentation of the issue, in all due dimensions,
* The presentation of each case: background, history, physical and institutional framework, issues, relevancy of adopted action, general comments,
* A synthesis, stating if, and in which way, proposed solutions actually were a relevant response to the problem
* An overall conclusion and comments on the possibility of transfer of the solutions which were proven efficient on a specific case to another situation,
* Appendices,
* An annotated bibliography.

14. The draft final report will be submitted in ten copies within twelve-sixteen weeks of instructions to proceed with the project. The report will be delivered to the World Bank in a provisional version, in English after 4 months. The World Bank will deliver comments within 15 days. The final report in twenty copies will be submitted in English, within two weeks of receiving comments on the draft final report from the World bank.

15. Each report (inception, draft final, and final) will be submitted in an electronic format acceptable to the Bank (for example, Microsoft Word). All raw data files, intermediate
calculations, and final calculations and spreadsheets, graphics, model runs (if any), and working papers files will also be submitted in electronic format.
ANNEX II: PLANNING PUBLIC HEALTH CARE FACILITIES IN DAR ES SALAAM, TANZANIA: USERS, INTERACTION PATTERNS AND UNDER-SERVICED AREAS. 63

1 INTRODUCTION

The objective of this paper is to describe an approach that was used to identify existing intra-urban spatial inequalities in public health care provision in the city of Dar es Salaam, Tanzania. The results presented here are based upon a more elaborate study which was commissioned by the Dar es Salaam Urban Health Project with the aim to guide planning interventions in such a way that the spatial relationship between the need for and the availability of public health care facilities is improved [Amer and Thorborg, 1996]. Findings are based upon empirical data collected during a sample-based field survey, which was carried out in 1995 and supplemented in 1996. The survey was restricted to outpatient services only. Some of the key characteristics of the main user groups of governmental health care provision are touched upon and an insight is given into the spatial pattern of user-provider interaction. On the basis of observed regularities in utilisation behaviour, a straightforward GIS based approach is pursued which identifies the areas that are currently under-serviced by public health care and suggests priority areas for the construction of new governmental dispensaries.

2 SETTING

The city of Dar Es Salaam is facing serious problems of urban poverty and unhealthy living conditions with much room for the prevalence of many health problems. Although reliable disaggregate statistics do not exist, large differences in health status occur between the better off and the poor. In the underprivileged sections of the urban population, for example, infant and child rates of morbidity and mortality may be three or four times higher than the city average. Comparable differences in health status are observed in many other aspects of health as well.

In this situation of expanding demand for health services, the publicly funded health system - with free health services for all - could no longer be maintained. Severe financial constraints (economic stagnation, impact of structural adjustment programmes) induced two important policy changes in the early 1990s. First, a system of cost recovery, where patients pay a fee for treatment and medication, was gradually introduced in governmental facilities. Second, for-profit private medical practice was legalised with the aim to take on a larger role in providing curative services [Ministry of Health 1994]. The number of private facilities has rapidly proliferated throughout the city ever since.

The Dar es Salaam Urban Health Project (financed on the basis of an intergovernmental agreement between Switzerland and Tanzania) operates in this context and is responsible for the structural and functional rehabilitation of governmental health care delivery. As rehabilitation of existing governmental facilities is nearing completion, the project is now turning to the identification of priority areas for construction of new facilities. Planning for health care interventions in a situation of scarcity of public funds and increasing demand for services, as illustrated above, requires that available funds are carefully targeted to those most in need. Proper planning also requires sufficient information. Because data on actual

63 This is based on a Paper presented at the International Health Geographics Conference, 16-18 October 1998, Baltimore, U.S.A. by S. Amer, Division of Urban Planning and Management, International Institute for Aerospace Survey and Earth Sciences, Enschede, The Netherlands
health seeking behaviour was virtually non-existent, a field survey had to be undertaken to collect the necessary data. The aims of the survey were to produce an insight into: (a) the importance of governmental health care delivery in relation to other providers; (b) the characteristics of the main user groups of public facilities; and (c) the spatial pattern of user-provider interaction. Some aspects of the first two elements are covered in the next section. The spatial pattern of user-provider interaction is discussed in more detail in section 4. The delineation of catchments and identification of priority areas for intervention is the topic of section 5.

3 IMPORTANCE OF PUBLIC HEALTH CARE PROVISION

Despite the changes that are occurring in the Tanzanian health system, the results of the survey clearly show that governmental health care provision remains of vital importance to the functioning of the health care system in general: almost half of the respondents usually visit a governmental facility. A quarter of the respondents normally visit a health facility in the private sector. Voluntary facilities -predominantly operated by charitable organizations with a religious orientation- attract a share of around 15%. The remaining respondents obtain health care at special clinics provided by their employer.

A welfare index was constructed to see if governmental facilities serve particular segments of the population. The index is a relative measure that describes the degree of prosperity or deprivation of respondents. It was constructed using criteria such as housing conditions, the availability of basic infrastructure (water, electricity) and possession of transportation and consumer goods. The results strongly support the general assumption that governmental facilities mainly serve the poorer population groups. Almost three-quarters of the people visiting a governmental health care facility can be considered as (very) deprived. Somewhat surprising, is that half of the patients of private facilities belong to the same category. This category of patients, however, mainly opts for low-cost private facilities as a result of dissatisfaction with the lack of drugs and the indifferent attitude of medical personnel at public facilities. In general there is dissatisfaction with the quality of treatment at these low-cost private facilities as well. This tallies with findings of the World Bank (1995) which indicate that parts of the private sector, may satisfy consumer demand by providing prescriptions, but that the contribution of these facilities to improved health care for the urban poor may be very limited. This situation is not expected to change until an efficient system of supervision and maintenance of quality standards, inspecting, and monitoring is effectuated. Until then, therefore, the private sector as a whole cannot be considered as a reliable and affordable alternative for lower income groups.

The main clients of public health care -in terms of age and sex- are females in the reproductive age groups (35%), and young mothers accompanied by children under 5 years old (40%). It is evident that, given the high fertility rate, very high percentages of women seek health care because of health problems associated with pregnancy, and with infant and early childhood morbidity. This underlines the importance of mother-and-child health care (MCH) services at governmental dispensaries. It is important to note here that private sector dispensaries normally do not provide these types of services. The picture that emerges is that: (a) the urban poor largely depend on governmental health care; (b) private facilities normally do not provide the range of services required by a large proportion of patients; and (c) the private sector is not a medically reliable alternative for lower income groups.

4 SPATIAL PATTERN OF USER–PROVIDER INTERACTION

To adequately capture and examine the spatial dimension of user-provider interaction at a city-wide scale, a suitable spatial resolution needed to be determined for the representation of patient mobility. Given the situation that an up to date city map did not exist at the time of the
survey, that Dar es Salaam spans an area of up to 20 kilometres from east to west and 30 kilometres from north to south, and that a system of street names and house numbers does not exist in unplanned settlements, spatial interaction was captured in the following way. First, a mosaic of aerial photographs depicting the entire urban area was created at a scale of 1:12,500. Second, a hexagonal shaped grid was generated to encode spatial interaction behaviour in a uniform manner. The hexagonal grid was scaled in such a way that one grid cell represents an area of 250 x 250 meters. The combined use of the aerial photography and the hexagonal grid allowed for adequate capture and easy encoding of spatial interaction behaviour during the field survey.

The survey indicates that around 75% of all health care seeking movements in Dar es Salaam involves walking to the clinic (dispensary, health centre or district hospital), while in some 20% of all cases public transportation is used. Other means of transportation (car, taxi, bicycle) together cater for the remaining 5% and, therefore, are of limited importance. These general figures - comprising health seeking behaviour across welfare levels for all levels of health service (i.e. hospitals, health centers, dispensaries) provision - actually under-represent the importance of pedestrian mobility. If mobility patterns are broken down according to the level of provision it becomes clear that the overwhelming majority of patients - over 90% - travel to the dispensaries of their choice on foot. Most patients seek health care in the immediate vicinity of their home and, depending on the available options, walk relatively short distances to reach the dispensary of their choice (see Figure 1).

A typical reduction in the intensity of service use occurs when travel distance increases. Only very few patients (less than 5%) walk distances that exceed 1750 meters. In other words, patients normally do not walk more than approximately 30 minutes to reach the facility of their choice. This is not surprising, if we consider that the main users of public dispensaries are young women, often accompanied by young children. Dispensaries, therefore, have a strong local function. Patients are prepared to walk somewhat larger distances to reach higher order services: health centres and hospitals attract 90 - 95% of their patients from an area within respectively 2000 and 2250 meters from the centre itself.

Observed spatial patterns of user-provider interaction can be visualised very well through the use of desire lines. Desire lines depict spatial interaction by drawing a straight line between two discrete points in space, normally the origin and destination of a trip. In this case, the desire lines connect the location of the facility with the location of the patient's home. Groups of desire lines together depict aggregate spatial behaviour and provide an excellent insight into the actual size and shape of the areas from which facilities attract their patients (see Figure 2).
It is evident that facilities share parts of the area from which they attract patients with other facilities nearby. These ‘overlapping’ catchment areas clearly indicate that spatial competition exists between facilities. Patients do not necessarily go to the closest facility but make a choice on the basis of the available (affordable) options known to them in the vicinity of their homes. It does, however, mean that people who live outside the catchment of a facility will normally not make use of it. The closer two facilities are together, the larger the degree of spatial competition or catchment overlap generally is. Higher order services do not only attract patients from larger walking distances than dispensaries but also ‘reach’ further into the catchments of dispensaries while the reverse only applies to a limited extent. Higher order facilities are probably more attractive because they offer a wider range of services and have more specialised personnel.

5 IDENTIFICATION OF SUITABLE LOCATIONS FOR NEW DISPENSARIES

Since most patients walk to the facility of their choice and indicate that distance is an important criterion influencing that choice, health service areas are defined on the basis of geographic distance. The approach makes use of the network analysis capabilities of a GIS to allocate service areas to facilities based on travel distance along the road network.

The complete road network of urban Dar es Salaam including minor roads and tracks and the location of all public facilities were stored in the GIS. Facilities are then assigned to the nearest road using a proximity analysis. The allocation procedure of the GIS subsequently identifies those parts of the road network that are within the maximum specified travel distance from the facility. In the examples presented here, the chosen distance thresholds are equivalent to the maximum physical distance that patients are generally prepared to walk to obtain treatment (see section 4). This means that the resulting catchments are dimensioned in such a way that 90-95% of all health seeking movements occurs within them. Distance thresholds can be varied at will. To come from allocated roads to serviced areas, the allocated road sections are combined with the hexagonal base map. All hexagons, whose centre points are located within a user-specified distance of allocated road sections, are selected. Selected clusters of hexagons are then aggregated to composite catchment areas (see Figure 3).
The resulting catchment areas are compared with the residential areas in the city. The areas, which are shaded in the lightest gray tone, are serviced. Residents that live in the areas shaded in darker red tones are under-serviced by governmental health care (see Figure 4). By using different red tones, an indication is given of the variations in population density in under-serviced residential areas. Population density categories are indicative only as they are derived through interpretation of aerial photography with limited field confirmation. It must also be noted that population density categories are derived from aerial photographs that depict the situation in 1992. More recent aerial photography does not exist. Density changes that have occurred since then are, therefore, not incorporated in current estimates. Further efforts will need to be devoted to improve on population estimation.

The analysis so far has only revealed which residential areas are currently under-serviced by public health care. The question that remains to be answered is what are suitable locations for the construction of new dispensaries. Once again, a geographic perspective is taken. Use is made of the location profile, a well-known geographical measure for determining the accessibility of a certain location. The location profile is a graph for a single location that represents the cumulative number of opportunities in relation to some measure of distance. In this case, a simple location profile is generated that shows the number of hexagons that can be reached from every individual hexagon given a user-specified distance threshold (see Figure 5). The larger the number of hexagons that can be reached, the better the accessibility of that particular (set of) location(s) is. Once again, the chosen distance thresholds are equivalent to the maximum physical distance that patients are generally prepared to walk to obtain treatment.
Given the absence of reasonably accurate population estimates, no attempt is made to incorporate these figures in the calculation of the location profile. De Jong and Ritsema van Eck (1997) have developed more advanced accessibility measures based on the location profile.

![Fig. 4 Service Area of Public Health Care Facilities](image)

The main advantage of the above-described approach is that it produces a whole range of acceptable locations for the construction of new dispensaries rather than one mathematically optimal location. For the decision-maker it is much more useful to work with such a set of acceptable locations, rather than just one, as it allows for other factors (economical, political etc.) to be incorporated in the decision making process.

![Fig. 5 Proximity Count with a User-specified Distance Threshold](image)

Visual interpretation of study results in combination with local knowledge finally led to the identification of a number of priority areas for the construction of new governmental health care facilities. Prime targets were densely populated residential areas with poor living conditions at accessible locations.
6 CONCLUSIONS

One of the main conclusions that can be drawn from the above description is that there is much
room for improvement and refinement of the approach. An important shortcoming is that areas
are now either serviced or under-serviced while in reality this transition will be a gradual one.
Also, at this moment there is no provision to compare the capacity of facilities with the demand
for health care within catchments. At the same time, however, the study has demonstrated that
it is possible to produce valuable practical information for health officials in a situation where
data are extremely scarce, within a reasonably short period of time.
ANNEX III: TRANSPORT INFRASTRUCTURE FOR LOW-INCOME SETTLEMENTS

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1 Present situation of urban transport infrastructure within low-income settlements

The rapid urban population growth in many developing countries has not been matched by the provision of adequate shelter. Large numbers of, mostly poor, people live in unplanned settlements, which lack basic infrastructure and services. It has been noted that: “These settlements are often on marginal land, which may be too expensive to develop: common locations include steep hillsides and low-lying areas prone to frequent flooding” [Cotton and Franceys 1991].

In large towns the most favoured low-income settlements are close to employment opportunities. Population densities tend to be very high to provide enough dwellings and reduce costs. Since land values can be high as well, pressure from developers may increase [Cotton and Franceys 1991].

Many unplanned settlements are difficult to access due to their physical characteristics (steep hills, flood prone and/or highly congested). Poor community access roads, tracks and footpaths and a lack of bridges to cross streams further limit accessibility. The main problems occur in the rainy season, when flooding and erosion may make roads and tracks impassable and streams and rivers impossible to cross.

Most city councils are unable to provide adequate transport infrastructure for the urban population, especially within low-income settlements. Rehabilitating and maintaining primary and secondary roads is already beyond their capacity, and tertiary roads, bicycle lanes and footpaths are therefore generally not prioritised. Better accessibility within low-income settlements may however improve the mobility of the urban poor considerably, as the case study of Hanna Nassif illustrates (Annex IV). On the other hand, the improvements could also result in higher rents caused by absentee landowners, forcing the poor out of their houses (see section 4.1).

Accessibility within the settlement may be improved through various mechanisms:

- The provision of storm-water drainage. This prevents flooding and results in better all year access, less damage to transport infrastructure, and less erosion.
- Improvements in transport infrastructure, including roads, bicycle lanes and footpaths.
- Relocation of services to reduce transport needs.
- Provision of appropriate means of transport.

For the first two options this paper describes principles and methodologies, moving from projects to programmes, the impact on poverty and sustainability, and best practices.

2 Principles and methodologies

Two rather separate international schools of thought can be distinguished. One considers the most appropriate and sustainable option is to upgrade low-income settlements. Though transport infrastructure receives little attention by this group, poor urban communities frequently mention inadequate transport infrastructure as a constraint. Within this school of thought, the following trends can be distinguished:1
• Concentration on improvements of infrastructure within existing low-income settlements instead of construction of new shelter.
• A growing belief that community participation is essential for the success and sustainability of infrastructure facilities within low-income settlements.
• Continued attention to appropriate standards of infrastructure.
• Piloting the urban application of labour-based technologies.
• Prioritisation of operation and maintenance, particularly through cost-recovery.

This section will look at these trends. The second school of thought, considered in section 3, is concerned with the limited success in moving from pilot projects to large-scale programmes. It argues that the capacity of all partners should be strengthened through decentralisation, planning mechanisms and partnerships, and that without such capacity building, transport infrastructure provision within low-income settlements will remain isolated, small-scale activities.28

Upgrading of low-income settlements – an historical perspective

Since the late 1970s, upgrading of unplanned settlements - including providing transport infrastructure - has been an alternative to the provision of new shelter through public housing and site and service schemes.64 Alternatives were required to overcome the constraints of the existing approaches [Liu 1998, Werlin 1999]. These constraints included:

• A shortage of unoccupied land for new construction.
• The expense of providing adequate new shelter for the rapidly growing urban population, in particular the poor.65
• The poor did not always occupy the new shelter, since houses tended to be expensive, land allocation procedures did not always favour the poor, or the location was unfavourable (far from employment opportunities and markets).
• Maintenance and operation arrangements were often inadequate.

New shelter provision for the poor was thus seriously constrained. In the 1970s, governments were simultaneously demolishing unplanned settlements, to such an effect that the United Nations estimated they were destroying more low-income housing than they were building. In the mean time, the urban population in the affected countries had grown by more than 50%. The effects of these policies were felt by the poor. In Nairobi, for example, 49 illegal settlements were destroyed in November 1970, displacing about 40,000 people. As a result, housing demand swelled and supply decreased resulting in higher rents [Werlin 1999].

Cheaper and more sustainable solutions were sought to improve the living and working environment of the urban poor in low-income settlements, by a process of upgrading. Existing (community) initiatives were taken as the starting point and local organisations and resources were used if and when appropriate. However, it has become clear that these approaches are not sustainable by themselves either. One of the problems that needs to be addressed is the complex and often illegal land ownership within low-income settlements. Evidence suggests that residents are less willing to pay for public services and to improve their dwellings without secure tenure, which seriously affects the sustainability of public

64 The need to upgrade unplanned settlements may have been recognised at the international level, but at the local level many planners and engineers still prefer demolition and reconstruction. In addition, various City Councils have not yet legalised unplanned settlements. In site and service schemes, public infrastructure is provided by the government, while residents construct their own houses.

65 World Bank upgrading projects in the 1970s cost on average US$ 38 per household, against US$ 1,000 to 2,000 for core housing in a site and service scheme and US$ 10,000 for a low-cost public house or apartment [Werlin 1999].

2.2 Community participation in transport infrastructure provision
Community participation in infrastructure works can be defined as: “A process whereby people - as consumers and producers of infrastructure services and as citizens - influence the flow and quality of infrastructure services available to them.” [Schubeler 1996]. The process can involve all stages of transport infrastructure provision, while the level of participation can vary widely as well. At one extreme, communities may only be consulted in the planning stage, while at the other, communities manage the infrastructure provision from planning to construction and maintenance by themselves. This variation in responsibility makes community participation an ambiguous and often misused concept.

It is important to establish that it is impossible to standardise the most appropriate level of community participation in transport infrastructure provision within low-income settlements. This should be established by the community in partnership with other stakeholders. However, some rules of thumb can be established:

- In low-income settlements, the residents are the main users of transport infrastructure and high levels of community participation are therefore appropriate.
- In densely populated unplanned settlements, high levels of community participation in infrastructure provision are required, particularly if houses are likely to be demolished. Transport provision requires land, a scarce resource in most unplanned settlements. Without proper community consultation in planning, design and construction, this is likely to cause major conflicts within the settlement.
- If the community is expected to contribute to construction and/or maintenance of transport infrastructure, it should actively participate in all stages of infrastructure provision.

Residents can be involved in transport infrastructure provision through the participation of community organizations. They can be involved in a process of Community Action Planning, which has been adopted by various projects with reasonable success (Box 1). In addition, the opinion of a wider group of residents can be established through related participatory tools.

Community participation may be a requirement to provide transport infrastructure within low-income settlements, but it is not without risks. It can provide an unfair burden for the residents, who are already poor and time-constrained since they have to work long hours to scrape together a livelihood. The burden is particularly unfair if community participation is seen as a cost reduction strategy for local government, whereby residents have to put in additional resources to receive services that are elsewhere provided for free. In addition, it should be realised that community participation is a time-consuming process [Schubeler 1996].

66 Upgrading unplanned settlements remains a second best solution, while better advanced planning may result in even better, cheaper and more sustainable solutions for new low-income housing [Okpala 1999].

57 Urban communities tend to be heterogeneous and fluid. Many community organisations in larger settlements therefore do not manage to reach out to all residents. It is thus recommended to countercheck the opinion of the residents through simple participatory tools, including questionnaires and user group/focus group discussions.
Box 1: Community Action Planning (CAP)

CAP is built on the understanding that the poor are not ignorant, but can contribute to their own development. It is an approach in which a community group identifies and prioritises its problems and solutions and plans the implementation of solutions. Formal or informal community groups are the key actors, while support is needed to monitor workshops. Participatory appraisal techniques may be used to map the settlement and identify problems, solutions and resources. The community group involved in CAP can also be involved in implementation and evaluation of the plans. One of the advantages of CAP is that it can be linked to planning by local or central government. One of its disadvantages is that it involves a relatively small group of residents, which may not represent the heterogeneous urban community.

2.3 Community contracting

Community contracting is a promising method to involve communities in (transport) infrastructure provision. In community contracting, the contractor that rehabilitates or maintains the transport infrastructure is from within the community and is therefore at the same time the beneficiary of the created assets. The contract establishes the roles, rights and obligations of each partner. It should be in the local language, simple and short, and avoid technical jargon, but should at the same time provide adequate (legal) rights and obligations [Tournee and van Esch 1998, Liu 1998].

As in any contract, the partners of a community contract are the client/funding agency, contractor and consultant. The client/funding agency is normally the city council with possible donor support, giving a contract to rehabilitate or maintain transport infrastructure to a community group. A consultant designs the infrastructure and assesses the quality of work. Technically more complicated work may be sub-contracted to a private contractor [Tournee and van Esch 1998].

In addition to the normal contracting arrangements, technical assistance should be given to the community contractor. The reason is twofold. First, most community groups have inadequate technical skills to rehabilitate or maintain transport infrastructure without technical backup and training. Second, most community groups have inadequate managerial skills to manage contracts. To ease management, large works should be split into small contracts that community groups can oversee [Tournee and van Esch, 1998, Sohail and Cotton 2000]. Three kinds of contracts can be given to community groups [Tournee and van Esch 1998]:

- Labour-only contracts: the community only provides and organises the labour input.
- Labour and material contracts: the community provides and manages labour and materials needed for construction and maintenance. The required inputs should be well defined.
- Full contracts: the community provides and manages labour, materials, and tools and equipment. Since the community group is a full contractor, it manages the whole process. Though only limited equipment is needed if a labour-based approach is adopted, it is still a bottleneck for community groups. Innovative solutions may include equipment pools and renting or leasing facilities.

Community contracting has significant advantages and disadvantages (see Box 2). It has been applied successfully in a number of pilot projects, including the Hanna Nassif project in Dar es Salaam and the Kalerwe project in Kampala, as well as in programmes by the

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68 The community group can be a Community Based Organisation (CBO) or an (economic) interest group from within the settlement.
Box 2: Key advantages and disadvantages of community contracting

**Key advantages**
- E Community contractors are beneficiaries of the created assets and have a vested interest in high quality work at a low cost. Their community contacts will facilitate flexible local solutions for problems at a low cost.
- Local capacity is created for rehabilitation and maintenance of transport infrastructure.
- The local economy is boosted through employment creation. Funds, tools and equipment remain within the community for further use.
- Contract procedures can be simple.

**Key disadvantages**
- Most local authorities are not geared towards working with community groups. Contracting procedures tend to be too rigid and most municipal staff have a negative attitude and a lack of adequate skills towards work with community groups.
- Considerable time is needed to ensure full participation of the community, discuss contract proposals and reach agreements.
- Community groups require technical and managerial training to operate as a community contractor.

Source: Tournee and van Esch 1998

2.4 Appropriate standards for transport infrastructure

Three issues should be considered in deciding what standards of transport infrastructure are appropriate for low-income settlements: local needs, investment costs and maintenance/cost-recovery:

**Local needs**
Low-income settlements tend to have light vehicular traffic, with most residents walking. The transport infrastructure network may thus limit the number of roads suitable for motor vehicles and concentrate on access for non-motorised transport. This has an additional benefit: the provision of roads, especially tarred roads, may increase the status of a settlement and result in the replacement of the poor. It is advisable to use the existing street pattern as a starting point and avoid house demolitions when possible. In this light, the provision of bicycle tracks and footpaths are thus advisable as well.

**Investment costs**
Investment costs differ widely between the various infrastructure standards. The cheapest option is to provide storm water drainage and reshape the roads. This is feasible with low traffic densities in a conducive physical environment. With higher traffic densities or a more difficult physical environment, road surfacing may be required (see Box 3).

A key investment will be the land for transport infrastructure, which provides another reason for the construction of narrow access tracks for non-motorised transport [Cotton and Franceys 1991].

**Maintenance and cost-recovery**
The key reason for inadequate maintenance is a lack of recurrent funding. It is therefore advisable to assess the willingness and ability to pay of all partners and set infrastructure
standards on that basis. If the community is expected to maintain the infrastructure, it is advisable to set community contributions at that level from the start. The tendency exists to de-emphasise the quality of construction in community projects, particularly if standards of infrastructure are low. Due to inadequate supervision, contractors can get away with sloppy work. Consequently, facilities will rapidly deteriorate [Werlin 1999]. With appropriate infrastructure standards and high quality of construction, on the other hand, maintenance costs can be reduced. An example is the construction of stone-paved roads in low-income settlements in Addis Ababa. Since stones and labour are cheap in Addis Ababa, extremely durable roads could be constructed using local labour at a low cost. Care-Ethiopia provided stringent supervision.

**Box 3 : Technical options for storm water drainage and transport infrastructure**

**Storm water drainage**
- Earth, brick or concrete channels
- Open or closed channels
- Roads as drain
- Buried pipelines

**Key disadvantages**
- Most local authorities are not geared towards working with community groups. Contracting procedures tend to be too rigid and most municipal staff have a negative attitude and a lack of adequate skills towards work with community groups.
- Considerable time is needed to ensure full participation of the community, discuss contract proposals and reach agreements.
- Community groups require technical and managerial training to operate as a community contractor.

Source: Davidson and Payne (ed) 2000, Cotton and Franceys 1991

**2.5 Labour-based technology**

Labour-based technology involves the use of labour as the dominant resource, while cost-effectiveness and quality of work are ensured. It differs from what may be called *employment-intensive* approaches, where the use of labour is maximised [ILO 1999a]. In rural labour-based works, the technology has been used cost-effectively for the construction of access roads. At the same time employment is created and the local economy stimulated (see Box 4).

In many low-income settlements the question of technology choice does not arise: equipment simply cannot enter the congested area. What remains is to make the most effective use of local labour with light equipment and tools. This requires proper labour management, including payment based on realistic tasks, and proper handling of materials, tools and light equipment. Use can and should be made of rural labour-based experiences, realising that the urban environment is different and requires an adjusted approach.  

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69 Differences between rural and urban labour-based works include: the ‘cut and fill’ procedure, where soil excavated from drains is used to build the camber of the road, may not always work in an urban setting due to solid waste in the ground and the need to construct storm water drains. Urban sites are more congested and difficult to manage. The soil may be filled with garbage, water pipes or other obstructions. However, urban environs often have more enterprises and skilled labour.
Box 4: Employment and investment impact of technologies

<table>
<thead>
<tr>
<th>Gravel roads</th>
<th>Equipment-based</th>
<th>Labour-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost (index-100)*</td>
<td>100</td>
<td>70-100</td>
</tr>
<tr>
<td>Foreign exchange requirement (index=100)</td>
<td>100</td>
<td>40-90</td>
</tr>
<tr>
<td>Employment generated per unit of investment (index=100)</td>
<td>100</td>
<td>200-400</td>
</tr>
<tr>
<td>Equipment cost as % of total cost</td>
<td>80-85</td>
<td>30-40</td>
</tr>
<tr>
<td>Labour-cost as % of total cost</td>
<td>10-15</td>
<td>40-60</td>
</tr>
</tbody>
</table>

Source: ILO 1999a

Project experience with urban approaches has been obtained in various countries in the last 10 years, including Ethiopia, Kenya, Tanzania, Uganda, Lesotho and Zambia. The experiences are encouraging, but more work is needed to maximise the use of local labour, while simultaneously evolving activities into long-term programmes.

2.6 Maintenance

In 1994, the Operations Evaluation Department of the World Bank considered only 47% of its urban projects ‘sustainable’. The main challenge was to acquire sufficient and recurrent funding for maintenance [Werlin 1999]. Recurrent funding can be secured from government channels and/or from the community. Governments are increasingly adopting road funds, based on fuel levies, which are applied for road maintenance, but few if any of these are yet sufficiently mature to generate funding for community-level works. Communities can also adopt various strategies to obtain funds, but none of them is easy.

Experience from World Bank projects indicates that cost-recovery of services in low-income settlements, even of income-generating activities such as water supply, is extremely difficult. A key problem is that governments are often not collecting their taxes. In Jakarta, for example, only 1 per cent of parking fees are collected. In Madras, on the other hand, cost recovery stood at 96% in 1986 when evictions were pursued in the case of serious arrears of payment. This requires both title deeds for residents of low-income settlements and commitment of the local government [Werlin 1999].

Maintenance of low-volume roads, bicycle paths and footpaths is technically not complicated. The key to success is to maintain the stormwater drains, and the camber of the roads and paths. Maintenance may be conducted by a community contractor or by community length persons, who are given responsibility to maintain a particular stretch of road, path and/or drain. Maintenance skills and organisational strengthening can be initiated during construction works. Periodically, roads may need resurfacing. These costs can be reduced drastically with good maintenance. However, larger costs may occur in time requiring some form of advanced savings provision within the local authority or community.70

3 From projects to programmes

The last decade of experience with urban infrastructure works has re-affirmed that pilot projects do not automatically result in large-scale programmes. Considerable attention has therefore been given to capacity building of all partners through concepts such as the

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70 With limited resources, both community organisations and city councils are under pressure to spend their reserves on other priority needs. This may cause problems once funding is needed for emergency repairs or surfacing.
enabling government, decentralisation and integrated planning. These are considered to be missing links in the replication process.

3.1 The enabling government
It is more and more accepted that city councils should play an enabling role, while the private sector and/or the community should be involved in the provision of shelter, including transport infrastructure [ILO 1993, UNCHS 1996, Fox 1994]. This principle is reflected in various international policies, including the Global Strategy for Shelter to the Year 2000 of UNCHS, the Limuru Declaration of Habitat International and the United Nations Conference on Environment and Development. The changing roles of the partners can be summarised as follows [UNCHS 1996]:

The **Central Government**, to an increasing extent, decentralises its functions and concentrates on creating policies and laws that enable others to provide adequate shelter.

The **City Council** adopts a more coordinating role, instead of trying to deliver all services itself. The Council could thus plan the delivery of services, together with its partners, and manage and monitor the institutions engaged in implementation.

**Community Based Organisations (CBOs)** can implement and maintain community based infrastructure and assist in delivering public services, in cooperation with the City Council. The works may include construction and maintenance of roads, paths and drains.

The **Private Sector** can deliver the services of the City Council if and when appropriate, under the guidance of the City Council. This may include rehabilitation and maintenance of roads and tracks.

**Consultants** can supervise the delivery of services by the private sector and CBOs on behalf of the City Council.

**Donor organisations** and **NGOs** can assist in changing the roles of the partners, through advice and funding, without however aiming to organise and manage the work themselves.

3.2 Decentralisation
Many countries are decentralising power and authority from the central government to district and local governments or other agencies at that level. The main objective of decentralisation is to bring decisions and services closer to the people. This allows planning at the local and settlement level to address the specific needs of the population. Since transport infrastructure within low-income settlements should be based on local planning to identify problems and solutions, decentralisation is a prerequisite.

Decentralisation should be accompanied by an adequate transfer of capacity, finances and resources to the district and local level to perform the increasing number of responsibilities. This is often underestimated, leaving many districts and councils without adequate capacity and resources to tackle their new responsibilities [Davidson 2000]. Small city councils in Kenya and Tanzania, for example, require urgent training on contracting procedures. To allow them to work in low-income settlements, they would require additional training in community participation, appropriate standards of infrastructure and labour-based road works.

3.3 Integrated planning
The recent international attention to integrated planning illustrates the need to address urban development and poverty alleviation in an integrated approach\(^{71}\). In many towns, however,

\(^{71}\) Integrated planning approaches include the Comprehensive Development Framework of the World Bank. The approach looks at structural elements (competent governance), human development,
transport infrastructure planning tends to focus on the impact of motorised and public transport on traffic congestion, environmental impact and economic growth. Poverty alleviation and social policy receive less attention and transport infrastructure within low-income settlements or foot and bicycle paths may never enter the discussion. In addition, transport planning is rarely linked to land use planning, while better land use planning may reduce the transport needs considerably. Integrating the various aspects of planning may improve accessibility for all at a relatively low cost [World Bank 2000].

Box 5: Example of the need for integrated planning at settlement level for road rehabilitation

Before any intervention, the prioritisation and routing of roads and paths requires the use of community participation tools, and insight into the likely impact on the local economy and accessibility of services and employment. After all, road rehabilitation may not be the best tool to improve accessibility.

A level of community participation should be maintained during construction to prevent conflict on the routing of the infrastructure. After the intervention, maintenance and operation systems must be in place with strong local partners. Recurrent funding and strong organisations thus must be arranged.

Furthermore, the protection of urban roads requires functioning storm water drainage, which in turn requires solid waste management to prevent blockages of drains.

Lastly, it may be considered to create local employment in the rehabilitation.

Planning transport infrastructure within low-income settlements will have to integrate engineering, environmental, social and community development approaches to work towards sustainable development (Box 5). This requires a planning process and implementation at the community level linked to city level planning, in partnership with communities and other stakeholders. Positive examples of such planning processes include the Nairobi Informal Settlement Co-ordinating Committee (NISCC).

4 Targeting the poor

All described methodologies aim to support an efficient provision of transport infrastructure for the urban poor in one way or another. The methodologies may have a direct or indirect impact:

- Direct impact on the poor:
  - Transport infrastructure provision within low-income settlements directly benefits the poor through better access, unless it results in replacement of the poor.
  - Community contracting and labour-based technologies within and outside low-income settlements create employment, skills and enterprise development.

- Indirect impact on the poor:

physical concerns and sectoral concerns [World Bank 2000]. The Sustainable Livelihoods approach of DFID also takes an integrated approach, based on slightly different elements.
- All transport infrastructure provision has the potential to create local economic growth through backward and forward linkages. The use of local contractors and labour-based technology has more impact on economic growth through employment creation and contractor development.

A summary of the effects of the described methodologies on poverty, sustainability and replicability are given in Table 2.1.

4.1 Better access as a direct impact: who benefits?
Providing transport infrastructure within low-income settlements geographically targets a high proportion of the urban poor. Access within the settlements will improve through the provision of all weather roads and paths, or through storm water drainage. However, house owners – who tend to be from the middle or high income groups – may be the main beneficiaries of the improvements by increasing the rent. In some cases the poor may be forced out of the improved environment. In Calcutta in the 1980s, for example, rents in improved **bustees** (low-income settlements) increased by 43 per cent, as against 16% in unimproved **bustees** [Gannon and Liu 1997, Werlin, 1999].

How can this be prevented? Increases in house rent mainly reflect higher land values and a shortage in the housing market for the poor. The value of land is closely related to the location of the settlement and its accessibility. Hence, the construction of a highway improving access to the settlement may have more impact on gentrification than improved transport infrastructure within the settlement. Transport infrastructure within the settlement is likely to result in replacement of the poor, if it improves the status and – linked to that – the value of land within the settlement. Limiting such affects may possibly be accomplished by.

- Improving access within low-income settlements for transport by foot and other NMTs, but not for vehicles, which would be likely to increase the status of the land and the land values. Road rehabilitation – if required – can best be done to a lower standard, to limit its impact on status and land value. This obviously needs to be balanced against costs and sustainability.
- Involving house and land owners in the improvements, through contributions or agreements on rent levels. The agreements may limit rent increases for some time, while contributions follow the principle that the benefactor pays. By-laws may also stipulate rent increases. However, enforcement of such agreements could be problematic.
- Increasing the housing stock and availability of land for the poor. Increased competition will reduce house rents.
- Legalising unplanned settlements and providing title deeds for house owners. This may make the house market more transparent.

4.2 Employment creation in construction and maintenance
The ILO notes that “investment policies are perhaps the most powerful tool at the disposal of municipal authorities for job creation” [ILO 1998]. Direct employment creation in construction and maintenance of transport infrastructure can play an important contribution, but is often not given the attention it deserves. More employment can be created by adopting labour-based approaches when feasible and by giving priority to secondary and tertiary infrastructure, which is more labour-intensive by nature. Using local contractors will further increase the benefits for the local economy [ILO 1998].

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72 No in-depth studies were found on strategies to limit the replacement of the poor in upgraded settlements.
Within low-income settlements, many governments promote employment creation through income-earning possibilities to encourage cost-recovery for maintenance [Werlin 1999]. Examples are room renting in site and service schemes, bicycle taxis, water kiosks and solid waste collection by NGOs or hawkers. Roads and paths can be maintained by lengthmen or local contractors.

Construction within low-income settlements tends to be more employment-intensive, since the high congestion limits possibilities for use of machines. Adopting labour-based technology can further increase the creation of productive employment, as case studies in Kenya, Tanzania, Uganda, Ethiopia, South Africa and Zambia illustrate. In rural labour-based road works, 60% of the project cost are spent on wages, compared to only 15% in equipment-based projects. Since labour-based works provides mainly unskilled labour, employment creation for the poor is significant [ILO UNDP 1994, Lupala et. al. 1997, Tournee and van Esch 1998, ILO 2000].

4.3 Economic growth and welfare as an indirect impact
The World Bank notes that infrastructure provisioning enhances welfare and fosters economic growth. However, the precise linkage between the two remains open for debate. [World Bank 1994]. The case study of Hanna Nassif indicates a positive impact of improved transport infrastructure within low-income settlements on welfare and employment creation and to a lesser extent on enterprise development. It illustrates that drainage control can have a major impact on accessibility, health, labour productivity and expenditures on house repairs and furniture. In addition, it illustrates that the use of community contracting can create local capacity and the trust to apply that capacity in initiating new activities and supporting similar activities in other settlements. The organisation now wishes to register as a contractor. Importantly, rents in Hanna Nassif did not increase, probably since no new roads were opened. Effects on long-term employment creation can be contributed to the use of labour-based approaches, with more and better job opportunities for ex-labourers (see Annex IV).
Table Annex III: Effects of methodologies to provide transport infrastructure within low-income settlements on poverty, sustainability and replicability

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Effects on the poor</th>
<th>Effects on sustainability and replicability</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Improve transport infrastructure in low-income settlements instead of new shelter provision | - More people can be reached at a lower level of service.  
- Upgrading of low-income settlements may result in increases in rent. | - Maintenance arrangement must be in place at city council and/or community level.  
- Sustainability and replicability requires careful planning and design (see comments). | - Key issues to be solved include land regularisation of unplanned settlements and developing local and participative planning tools to address real needs.  
- Transport infrastructure within low-income settlements should be valued as economic infrastructure. |
| Plan development at the local level (decentralisation, integrated planning, process orientation) | - Aims to bring decisions and services closer to the people, allowing targeting of infrastructure provision and construction methods towards the specific needs of the urban poor in each settlement. | - Urban planning, governance and management are essential for sustainability and replicability. Capacity building of all partners must be considered before an initiative is implemented. | - Ineffective decentralisation may result in poor or absent service provision.  
- Bureaucracy and other forms of poor governance and management may negatively effect the services for the urban poor. - Process planning can target transport interventions to the perceived needs of the urban poor in a participative process. |
| Public-private partnerships                       | - Indirectly the poor may benefit from more efficient services.                     | - A strong local private sector can replicate and sustain transport infrastructure if funding and contract management is available. | - Public-private partnership aims at making public works more effective. |
| Community participation                           | - Targets transport interventions to the specific needs of the urban poor.  
- May strengthen community organisation and empower the community. | - Communities who participated in transport infrastructure provision are more motivated to maintain the assets. However, appropriate maintenance arrangements must be in place.  
- Community participation and organisation requires considerable and continued support. | - The impact will depend on the level and stage of participation in transport provision.  
- Community participation is an ambiguous concept. The appropriate form and level of participation will mainly depend on local conditions and local partners. |
| Community contracting                             | - Creates skills and employment on rehabilitation and maintenance within the community.  
- Strengthens community organisation and empowers the community.  
- May create contractors. | - Skills and organisations can be used for maintenance.  
- Community contracting can be adopted at a large scale. | - Community contractors require considerable training and support to rehabilitate and maintain transport infrastructure.  
- Tends to require changes in rigid contract administration. |
| Appropriate standards for transport infrastructure | - More people can be reached at the appropriate level of service (cheaper).  
- Standards of infrastructure address real needs of population. | - Appropriate standards are cheaper and easier to construct and rehabilitate. | - Tends to require changes in rigid construction standards.  
- Standards must be flexible enough to respond to the specific needs of the urban poor (for example: adjust road width to available space and transport needs). |
| Labour-based technology                           | - Creates local employment and skills in construction and maintenance.  
- Backward linkages (purchasing materials, tolls and equipment) and forward linkages (spending income within settlement) occur. | - Local skills and organisation can be used for maintenance.  
- Less foreign exchange and investments are needed. | - Municipal staff tends to be unaware of labour-based approaches. Training is needed. |
| Prioritise maintenance                            | - Longer benefit from transport infrastructure.  
- Employment creation in maintenance. | - Maintenance is the key to sustainability of the assets.  
- Local organisation and recurrent funding are needed. | - Maintenance arrangements must be ensured before transport infrastructure is rehabilitated. |
ANNEX IV: HANNA NASSIF PROJECT:
TRANSPORT INFRASTRUCTURE FOR THE URBAN POOR

Jan Fransen, Institute of Housing Studies, Erasmus University Rotterdam

Background to the Hanna Nassif Project
Hanna Nassif is an unplanned settlement in Kinondoni, Dar es Salaam, Tanzania, located 4 km from the city center. The settlement of 20,000 inhabitants is predominantly a low-income area, with a small number of middle-income residents. It is a very densely populated residential area (400 persons/ha). Due to its proximity to the city centre, services and facilities are relatively easily accessible. However, within the settlement accessibility used to be a major problem due to flooding and poor roads and footpaths (Box 1).

<table>
<thead>
<tr>
<th>Box 1: Hannah Nassif in figures (1998 data).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (1998)</td>
</tr>
<tr>
<td>Household size</td>
</tr>
<tr>
<td>Annual resident turn-over</td>
</tr>
<tr>
<td>Percentage of tenants</td>
</tr>
<tr>
<td>Population structure:</td>
</tr>
<tr>
<td>Adults</td>
</tr>
<tr>
<td>School age</td>
</tr>
<tr>
<td>Below 5 years ago</td>
</tr>
<tr>
<td>Level of education</td>
</tr>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>Secondary</td>
</tr>
<tr>
<td>Tertiary</td>
</tr>
<tr>
<td>Land use:</td>
</tr>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Commercial/residential</td>
</tr>
<tr>
<td>Commercial</td>
</tr>
</tbody>
</table>

Source: UCLAS/ ILO, 1999
* Calculated from tenure status of houses

In 1991 Hanna Nassif flooded severely, which left various houses uninhabitable. The community then decided to organise themselves in a Community Development Association (CDA) to address the problem of flooding and started looking for assistance from the City Council and ILO. This resulted in the first phase of the community and labour-based project (1994 - 1996). In this phase, the CDA - with technical assistance from ILO - constructed drains, roads and footpaths to prevent flooding and improve access in the settlement. The community priorities are reflected in the fact that close to 90% of construction costs were drains, including lined site drains. Through community contracts and direct financial contributions to the CDA, the CDA obtained control of the construction works [Sheuya, 1997, Fransen 1999].
Box 2: Construction activities phase 1

<table>
<thead>
<tr>
<th>Activity</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main drain</td>
<td></td>
</tr>
<tr>
<td>Open drain</td>
<td>295 meters</td>
</tr>
<tr>
<td>Covered drain</td>
<td>149 meters</td>
</tr>
<tr>
<td>5 Vehicular culverts</td>
<td>34 meters</td>
</tr>
<tr>
<td>Footbridges</td>
<td></td>
</tr>
<tr>
<td>Outfalls</td>
<td>120 meters</td>
</tr>
<tr>
<td>Footpaths</td>
<td>678 meters</td>
</tr>
<tr>
<td>Roads</td>
<td></td>
</tr>
<tr>
<td>Road rehabilitation</td>
<td>1043 meters</td>
</tr>
<tr>
<td>Spot improvements</td>
<td>300 meters</td>
</tr>
<tr>
<td>Bridges</td>
<td>5</td>
</tr>
<tr>
<td>Drifts</td>
<td>18</td>
</tr>
<tr>
<td>Culvert crossings</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Fransen. 1999

The roads and storm water drains were constructed using employment-intensive methods\(^{73}\). The CDA employed the residents of the area, which resulted in local employment creation and skills development. Box 2 provides an overview of all construction activities under Phase 1.

The project conducted animation work among the population to improve their capacity to manage their living and working environment. The CDA members have been trained in management, bookkeeping, leadership skills etc., while the organisation of the CDA has been strengthened and legalised to become a strong representative of the community.

The CDA maintains the created assets itself. It has set up a road toll, approved by the city commission, under which each vehicle entering Hanna Nassif pays a fee. This provided sufficient local funds for maintenance. Unfortunately this system has been suspended\(^{74}\). Trained local residents, with assistance of the City Commission engineer, maintain the assets.

In April 1997, the second phase of the project started\(^{75}\). This phase aims to improve drainage, roads, and footpaths in the remaining part of the settlement. Due to the success of the first phase the community wanted to address its other problems as well. Hence, the second phase also looks at water provision, sanitation, solid waste management, and credit schemes for micro-enterprises. This case study will however only consider the impact of phase 1, since it would be complicated to assess the impact of phase 2, which is still ongoing.

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\(^{73}\) Employment-intensive methods / labour-based technologies are here defined as a technology, in which labour, supported by light equipment, is used as a cost-effective method of providing or maintaining infrastructure to a specified standard.

\(^{74}\) City Commission abolished the road toll, since the approach was misused in other settlements where people collected road tolls without permission. Phase 2 of the project now considers other options.

\(^{75}\) Phase 2 is implemented by the University College of Lands and Architectural Studies (UCLAS) in Dar es Salaam with support from ILO and is funded by NIGP/UNDP and the Ford Foundation. It will construct about 2 km of gravel roads, 35 road crossings, and 2 km of main storm water drainage.
Improved mobility
The mobility of the poor within the low-income settlement has significantly improved, through the construction of a drainage system and the rehabilitation of roads and footpaths. Before the project, more than half of the settlement flooded severely during the rainy season. By contrast, the El Ninjio rains in 1997 and 1998 have not resulted in major flooding in Hanna Nassif at all, while other settlements in Dar es Salaam suffered considerable flooding and poor access. As the chairman of the community-based organisation, Mr Nesthory, states, and as was confirmed by the 1998 physical survey, “90% of the problem of flooding was solved by us”. This fact alone has improved all-year access to houses and enterprises within Hanna Nassif. Still, about 25% of the Hanna Nassif community complains about flooding; a problem which is being solved by phase 2 of the project [UCLAS/ ILO, 1999].

Transport infrastructure has been improved through rehabilitation of main access roads, minor access roads and footpaths. The community made a strict decision not to demolish houses or construct more roads. 59% of the houses has no vehicular access, but since hardly anyone in Hanna Nassif owns a car, vehicle access was only an issue for a few households and enterprises. These are largely located along the access roads and have thus been catered for. Hence, the rehabilitated roads and footpaths meander through the settlement and vary in widths from 1 to 9 meters. Due to the drifts, corners and narrow roads, car speed is very low. No footpaths have been widened to provide access for cars, instead footpaths have been rehabilitated to provide all year access to the houses by foot [UCLAS/ ILO 1999].

Little information is available on individual trips of the residents of Hanna Nassif. However, it is known that Hanna Nassif has a market, two primary schools, dispensaries, churches, mosques and primary healthcare facilities. Each family has on average one income earner, of which 30% work in Hanna Nassif and another 39% within a 4km range. There is no public transport available within Hanna Nassif, but since it is a small and highly congested area most trips are within 15 minutes walking distance. Non-motorised transport is mainly walking. It is thus reasonable to assume that most trips take place by foot and are within Hanna Nassif or its close vicinity. Hence, improving transport infrastructure within the settlement is likely to have improved the mobility of people considerably.

Transport outside Hanna Nassif is available. Matatus (minibuses) pass by on the main road and provide regular transport to the city centre. Taxis now venture into Hanna Nassif on occasion, which was not the case before the project.

A direct impact of the improved transport infrastructure is that it facilitates solid waste collection. Without accessible roads and footpaths this would not be feasible. A women’s group in Hanna Nassif, Kimwoda, has been contracted by Dar es Salaam City Commission to collect waste. Though the initiative is still in its infancy a significant percentage of the waste is collected from the households for a fee (Tshs 200). As a result, dumping of waste in open pits has reduced from 39% to in 1994 to 19% in 1998 [UCLAS/ ILO 1999].

Poverty alleviation through labour-based and community-managed infrastructure
The project has alleviated poverty through various means, including improved mobility. The impact is particularly felt in the fields of employment creation, reduction in water-borne diseases and a reduction in expenditure on house repairs. However, the impact on self-esteem and empowerment should not be underestimated either.

Short-term employment: All infrastructure works were undertaken by the community through labour-based technology. In phase 1 alone 24,430 worker-days were created, of which 35% were women days. Hence, the project created significant access to short-term employment.
US$ 49,381 was ploughed back into the local economy as income from labour. Most labourers are the sole earner of a household and work for the project since their families need income. The income has thus benefited particularly the poorer families in Hanna Nassif [Lupala et al. 1997, Muteta, Ngoi, Sheuya 1998, Fransen 1999].

**Long-term employment (forward linkages):** While labour-based technology has an important and valuable effect on short-term employment, its effect on long-term employment is often debated. The potential effects are forward, i.e. labourers find long-term employment due to training, capacity building and investments of income, or backward, i.e. local materials are used for construction, creating employment. In Hanna Nassif, community foremen and labourers were trained in labour-based construction and CDA members in community contracting. Twenty ex-labourers were interviewed in a 1998 study, of which 5 were unemployed before the project started [Muteta, Ngoi, Seuya 1998]. After the project, several respondents had found permanent employment (4) or were able to be more independent through self-employment. In three cases ex-labourers were successfully self-employed in a skill in which the project had trained them (plumber, carpenter and construction worker). Income from the project was greatly appreciated and half of the ex-labourers had invested part of their money in small businesses (mainly trade and farming).

**Long-term employment (backward linkages):** Backward linkages from the infrastructure works include the provision of local materials and tools. Only local materials were used, for a total of US$ 122,000 (40% of total construction costs). However, no data is available on its impact on employment.

**Less water borne diseases:** Flood control and improved solid waste collection significantly reduced the number of water borne diseases. The total number of reported water borne diseases in Hanna Nassif reduced from 4,137 in 1994 to 2,520 in 1998 (a 39% reduction). In the same period, the number of water borne diseases in Dar es Salaam as a whole increased. As a statement notes: 'There has been almost no incidence of cholera in this area (Hanna Nassif) during the just ended rainy season (March to June 1998), from the epidemic which was spread throughout the city' [UCLAS/ ILO 1999].

**Less expenditure on house repairs:** In 1994, house owners were spending up to Tshs 8,000 (US$ 10) per annum on minor repairs of their properties caused by floods. In 1998, hardly any flooding occurred at all and most of these costs were saved. Considering a normal household income in Hanna Nassif of Tshs 30,000 to 70,000 per month (US$ 35 - 85), these savings are considerable. Adding expected savings in health services of 39%, cost savings for a household can add up to US$ 18 per annum [UCLAS/ ILO 1999].

**Rent levels – no increase:** despite the improved living and working conditions the average rent remained at Tshs 4,000 (US$5) per month for a room. This is remarkable, since urban upgrading tends to result in higher rents, which may result in an exodus of the urban poor – the original target group of the exercise. In Hanna Nassif this has not happened. Possible explanation are that buildings have not been improved and the availability of rooms in other low-income settlements kept rents low [UCLAS/ ILO 1999].

**Community credit scheme available:** The CDA has set up a credit scheme with Ford Foundation funding, which is very successful. By July 1998, Tshs 21 million (US$ 26,250) of credit had been distributed to 263 individuals, of which 73% are women. Repayment is still 100% and includes 24% interest.

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76 The same report notes that households were spending Tshs 15,000 per year (US$ 19).
Improved community organisation: The CDA and a women’s organisation collecting waste (Kimwoda) have been strengthened by the project. The CDA has managed to obtain a contract for the second phase of the project to address more community problems and to maintain the created assets. However, it was reported that the community organisation was not yet strong after phase I of the project, and the involvement of community members was still inadequate. These are points of attention for phase 2 of the project [UCLAS/ ILO 1999, Lupala et al. 1997].

Self-esteem and empowerment: Infrastructure upgrading may have an important impact on the pride of people. In Hanna Nassif, the community leaders are very proud of their achievements and eager to continue improving the living and working environment. Satisfaction with living conditions in Hanna Nassif is generally positive [UCLAS/ ILO 1999]. Many entrepreneurs mentioned that nowadays they are no longer ashamed of mentioning they work in Hanna Nassif, since conditions improved and cars are now willing to enter the settlement [Muteta, Ngoi, Sheuya 1998].

Replication: The Hanna Nassif project has been replicated in the Community Infrastructure Programme (CIP), which works in three low-income settlements in Dar es Salaam. In addition, trained labourers from Hanna Nassif have supported urban community works of NGOs in two other settlements (Buguruni and Barafu). UCLAS, which implements phase 2 of the project, has also established a network for CBOs with Ford Foundation funding (Tujenge Pamoja project).

Enterprise development
Improved (transport) infrastructure can have a significant impact on enterprise development. Labour productivity can increase due to better education and less illnesses. Production costs may decrease and the number of clients increase due to better economic infrastructure and access. Improved infrastructure may attract new entrepreneurs. Such linkages have been assessed by the ‘Regional Program on Enterprise Development’ (RPED) of the World Bank in various African countries. In Hanna Nassif, one linkage may be added: labour-based construction works may result in enterprise development as well. These linkages were assessed in a 1998 study, with mixed results on the actual linkages [Muteta, Ngoi and Sheuya 1998].

Improved labour productivity: In Hanna Nassif, labour-productivity has significantly increased due to the flood control and waste management. Most entrepreneurs (91%) see a positive effect on their health and many (39%) mentioned it helps in reducing the occurrence of diseases. By comparison, entrepreneurs operating in other settlements stated the high risk of contracting diseases due to stagnant (rain) water [Muteta, Ngoi and Sheuya 1998].

Reduced costs for medium-scale enterprises: For those enterprises using private transportation, road improvement has reduced delivery costs during the rainy season. However, the majority of enterprises uses walking and public transport to obtain their inputs and outputs. Sometimes handcarts are used to carry their material from the major road to their homes or premises. For them cost savings are limited to time reductions and the effect of the upgrading is rather one of making the walk more comfortable, faster and safer [Muteta, Ngoi and Sheuya 1998].

77 This conclusion is in line with the conclusion of RPED survey in Kenya, which concludes that infrastructure problems particularly affect medium-sized firms. Micro-enterprises (1-5 employees) and large firms (more than 500 employees) are less affected by the contracts [Muteta, Ngoi, Sheuya 1998].
Clients: the number or composition of clients has not significantly changed for firms along the rehabilitated roads. Interestingly, the number of clients in adjoining areas has increased, which may indicate increases in the mobility of clients. When asked, entrepreneurs stated that the infrastructure provision was not of prime importance for their businesses. Working capital, good reputation and client-relationships are more central in the improvement of their businesses [Muteta, Ngoi and Sheuya 1998].

Location of enterprises in upgraded settlement: many enterprises (38%) are located at the place of residence, normally to save costs or for family reasons. The state of infrastructure plays no part in that decision. Some other enterprises are ambulant (19%). Of those which select a specific location for their enterprise (43%), the presence of clients is the predominant factor. Even though those entrepreneurs claim that infrastructure plays no role in their decision, all but one were located along the main road. Entrepreneurs are thus attracted to an environment that is conducive, visible and attractive for clients; an environment that is provided by upgrading the environment.

Linkages from infrastructure works (see also the section on ‘long term employment’): The most direct linkage is that the Hanna Nassif CDA has been trained and is considering registration as a contractor. The CDA would be interested to provide routine maintenance for the council and to collect waste.

A second direct linkage in phase 2 of the project is the use of private contractors in urban labour-based works in Hanna Nassif. In the start of the works, private contractors were hesitant to employ community labour and apply labour-based technology. However, they are now very enthusiastic about community labour and even employ community foremen in their work. They indicated that they will continue to use people from Hanna Nassif in their further work.

Improved access for the urban poor
The inhabitants of Hanna Nassif enjoy better access to services, markets and jobs within and outside the settlement through better transport infrastructure. Since most trips are likely to be of short distance within the settlements and on foot, the all-weather roads and footpaths provide a significant improvement. There are indications that access to enterprises and credit within Hanna Nassif improved as well. Community-managed and labour-based approaches have created an additional impact on employment creation, community organisation and self-esteem.

Cost-benefit analysis
The total cost of construction activities in phase I of the project (direct and indirect costs) add up to US$ 60 per household. By comparison, the costs are slightly less than an average monthly income of a household in Hanna Nassif. Costs have been kept low by concentrating on priority infrastructure, applying appropriate standards of infrastructure (gravel roads and footpaths of variable width) and adopting labour-based technologies.

On the other hand, the benefits for households include savings in medical expenses and house repair, which may add up to US$ 18 per household per year. Other benefits, which are more difficult to quantify, include improved access and skill and employment creation. Due to the community-managed and labour-based approach, the community is willing and able to maintain the assets. The social and economic benefits are thus major and appear to justify the costs [Fransen 1999].
### Box 3: Construction activities phase 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Length (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main drain</td>
<td></td>
</tr>
<tr>
<td>Open drain</td>
<td>295</td>
</tr>
<tr>
<td>Covered drain</td>
<td>149</td>
</tr>
<tr>
<td>5 Vehicular culverts</td>
<td>34</td>
</tr>
<tr>
<td>Footbridges</td>
<td></td>
</tr>
<tr>
<td>Outfalls</td>
<td>120</td>
</tr>
<tr>
<td>Footpaths</td>
<td>678</td>
</tr>
<tr>
<td>Roads</td>
<td></td>
</tr>
<tr>
<td>Road rehabilitation</td>
<td>1043</td>
</tr>
<tr>
<td>Spot improvements</td>
<td>300</td>
</tr>
<tr>
<td>Bridges</td>
<td>5</td>
</tr>
<tr>
<td>Drifts</td>
<td>18</td>
</tr>
<tr>
<td>Culvert crossings</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Fransen. 1999
ANNEX V: DUTCH-FUNDED SUB-SAHARAN AFRICAN TRANSPORT PROGRAM
URBAN MOBILITY INITIATIVE

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BACKGROUND
The majority of cities in Africa have a very low income (city product). Urban transport systems suitable for high-income cities - based on private cars and relatively expensive public transport - cannot provide for the mobility needs of their populations, because they are financially out of reach and will almost certainly remain so during the next few decades. The pursuit of such systems in large cities has:

• failed to provide a large number of the very low-income inhabitants with the minimum level of mobility required for economic and social participation in an urban community;
• imposed a high burden on the average low-income household: expenditures of up to 30% of household income and long travel times;
• failed (increasingly) to provide adequate accessibility within the city to the small higher-income group that can afford to have a private car or motorcycle; and
• resulted in a high level of traffic accidents and environmental degradation.

Over the last decade, mobility problems have increased significantly, as a result of the continued growth of urban areas and a corresponding increase in trip distances. Unchanged transport policies cannot prevent a similar growth of mobility problems in the next decade.

OBJECTIVES
Building the economy of African cities requires adequate mobility at an affordable cost. This is complex task as it requires rehabilitating the urban transport system itself rather than rehabilitating roads (or constructing new ones). There are three parts to this:

(i) reconsidering the role and contribution that the different modes of urban transport can make;
(ii) improving the efficiency and safety of each mode of transport; and
(iii) achieving a cost-effective balance between the use of different modes of transport.

APPROACH
Pedestrian traffic is the backbone of mobility in African cities. In the metropolitan cities roughly half of all trips are entirely on foot and those that make use of a bus involve a significant amount of walking. In medium-sized and smaller cities, the share of all-pedestrian trips increases to 60 -70 %, and cycling often plays a significant role as well.

The mobility of people (and freight) is an input into urban production, and its present cost is high compared to its contribution to product output. Under prevailing economic conditions transport should not cost more than 10-15% of the direct costs and 10% of the available productive time. In reality it often costs as much as 25% of the direct costs (and even worse than that in terms of foreign currency), and up to 15-20% of the productive time. The cost of road infrastructure is only a small percentage of the total cost of urban transport. Typically it is well below 10%. The rest is the total direct costs of making the trips, the productive time spent on urban travel, traffic accidents and negative environmental effects (primarily health effects).
For economically important trips (where the value of time is significant), the average low-income person cannot reduce his cost by deciding to walk instead of taking a bus. On average, the value of the extra time required for a ± 5 km walk is equal to the cost of the ticket of a ± 5 km long bus trip. Now that the urban bus services are almost entirely provided by private minibus operators, it appears that the prices charged depend on the willingness of passengers to pay, and not on the cost of providing the bus trip. The expectation that prices would go down due to the privatization of the bus services and beneficial effects of competition, has not yet proved the case.

Where this conclusion holds (bus ticket price = willingness to pay = value of time required for trip on foot), it means that the main form of competition that can force prices down is more efficient walking. If walking distances are reduced by providing more direct routes, and speed improved by better walkways with enough capacity to avoid pedestrian congestion, this will significantly reduce time costs, and thereby create competitive pressure on operators that cannot be eliminated by arrangements within the bus sector.

In the medium-size and smaller cities, the mobility situation is in general better, because trip distances are significantly smaller. For those with a bicycle available there is in fact no mobility problem. They can make all desired trips and neither the costs nor travel time involved exceed 10-15% of their financial or time budget. The challenge is to prevent development in these medium-size and smaller cities towards current big city conditions.

**Recommendations**

The main recommendations from the SSATP pilot project interventions are summarized in the following table. All of the suggested investments are capable of markedly reducing travel costs for that portion of the urban poor who cannot afford motorized transport, or who currently use it only at the expense of other household needs.
Improving urban pedestrian and bicycle infrastructure can have a positive impact on the efficiency of all traffic flows, motor vehicles included. The main components of improvement are:

• provision of facilities for non-motorized traffic.
• a program of traffic calming.

Investments in these components have a high benefit/cost ratio. In tests the estimated returns were:

• pedestrian walkway pavement: B/C = 2 to 5, depending on the pedestrian volume;
• traffic calming on a collector road: B/C = 1.5 (accident reduction benefits only)

Serious traffic accidents to pedestrians and cyclists can almost be eliminated by a suitable program of road and intersection re-design, and traffic calming.

In medium-size cities, cycling provides significantly improved mobility to users: 50% more trips and longer trip distances than non-cyclists, at a unit cost of 1 US ct/km. (compared to a unit cost of ±3 US ct/km for a bus ticket). Most cycling is on mixed traffic roads, with average motor vehicle speeds of 20-30 km/hr and maximum speeds of 50 km/hr. With relatively simple and low-cost measures, cycling can be made attractive for, and available to, a much larger proportion of the population. In cities with a significant amount of cycling, the highest potential for increased cycling is among adult women and secondary school children, as many adult men already cycle. In non-cycling cities, young adult males should be the first target group.

Municipal governments require systematic training and organizational support over a long period of time to enable them to develop the ‘corporate knowledge’ to:

• identify mobility problems,
• plan and design a program of interventions and transport policies, and
• supervise the implementation by contractors and consultancy firms.

The opportunity to test expected improvements on a small scale first proved to be highly productive.

Where the conditions for success were met, user participation created a positive public opinion and political platform, and basis for cooperation during planning and implementation.

Pedestrian and bicycle infrastructure design standards recommended for African cities differ from those in Europe or America. Concepts and principles are similar, but practical design recommendations are different. For African cities the emphasis is on:

• a simple, uniform and transparent road hierarchy;
• roads that can efficiently and safely accommodate a mixture of motor vehicles and a high volume of non-motorized traffic;
• high construction strength and cost effectiveness, i.e. robustness against damage by overloaded trucks, inconsiderate drivers, and periods of inadequate maintenance; and
• robustness against violation of traffic rules and dangerous behavior by all road users, i.e. the roads should have self-enforcing speed limits and safety characteristics.

Source: de Langen and Tembele 2000