



HAL
open science

Meta-analysis of travel of the poor in West and Southern african cities

Roger Behrens, Lourdes Diaz Olvera, Didier Plat, Pascal Pochet

► **To cite this version:**

Roger Behrens, Lourdes Diaz Olvera, Didier Plat, Pascal Pochet. Meta-analysis of travel of the poor in West and Southern african cities. WCTRS, ITU. 10th World Conference on Transport Research - WCTR'04, 4-8 juillet 2004, Istanbul, Turkey, 2004, Lyon, France. pp.19 P. halshs-00087977

HAL Id: halshs-00087977

<https://shs.hal.science/halshs-00087977>

Submitted on 8 Oct 2007

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

**META-ANALYSIS OF TRAVEL OF THE POOR IN WEST AND SOUTHERN
AFRICAN CITIES**

Dr. Roger Behrens*, Dr. Lourdes Diaz-Olvera (*corresponding author*)**,
Dr. Didier Plat** and Dr. Pascal Pochet**

* Department of Civil Engineering, University of Cape Town, Private Bag,
Rondebosch, 7701, South Africa. Email: rbehrens@ebe.uct.ac.za

** Laboratoire d'Economie des Transports, ENTPE-Universit  Lumiere Lyon 2-CNRS, rue
Maurice Audin, 69518, Vaulx-en-Velin Cedex, France. Email: diaz@entpe.fr;
plat@entpe.fr; pochet@entpe.fr

ABSTRACT

There have been few attempts in the past to compare travel survey findings in francophone and anglophone African countries. The low-income populations of West and Southern African cities however share many socio-economic characteristics that influence travel behaviour (e.g. high levels of under- and unemployment, limited household resources, low levels of private vehicle ownership, etc.). It is argued that an analysis of travel behaviour findings across these contexts would be beneficial to transport planners and policy-makers in Africa to bridge the French-English language divide. The aim of the paper is therefore to identify similarities and differences in travel behaviour amongst low-income populations in francophone and anglophone African countries, and to discuss their implications for the formulation of policies and strategies directed at improving the travel conditions of the poor. The available French and English literature on travel behaviour in African cities is reviewed, which, together with the experiences of the authors in analysing passenger travel data collected in Burkina Faso, Mali, Niger, Senegal and South Africa, enables a meta-analysis of African travel survey findings amongst low-income populations in particular. The paper concludes with a discussion on the implications its findings have for the formulation of policies and strategies directed at improving the travel conditions of the poor. Particular attention is paid to the importance of walking as a travel mode, and to its equitable and efficient accommodation in policy and practice.

Key words: Africa, travel behaviour, poverty, walking

Topic category: Transport in Developing Countries

1. INTRODUCTION

In sub-Saharan Africa there are approximately 250 million people, that is about 45% of the overall population, surviving on less than one US dollar per capita per day (World Bank, 1997). However, this measure of poverty in only monetary terms largely underestimates the number of poor and a multidimensional approach would indeed give a larger figure. At present the majority of the poor live in rural areas but sub-Saharan Africa is experiencing the most rapid urbanisation in the world (almost 5% per year), which combined with an unfavourable economic and social environment, points to a considerable future increase in urban poverty. Addressing urban poverty in this region is thus at stake.

Since the sixties, the main African cities have experienced strong demographic growth accompanied by rapid and unplanned urban sprawl, with a split between residential zones on the one hand and zones for employment, trade, administrative and health services on the other. The deregulation processes in the macro-economic sector advocated by international agencies have important consequences for everyday life. The private sector, non-governmental organisations, users and associations are strongly encouraged to take over from the failing public authorities in the supply of urban infrastructure and services (Therkildsen and Semboja, 1995) but the results for the moment are still quite unclear. With regard to transport, rapid liberalisation resulted in the decline or even disappearance of state-owned public transport companies, and in the development of private, occasionally speculative, companies, which generally consist of small entrepreneurs. In most African cities, private operators now provide virtually all urban passenger transport services and, due to the absence of a supervisory transport authority, they tend to focus on the most profitable routes and clientele. In spite of the vitality and proliferation of informal transport operators, the current transport systems cannot cope with the rate of urban demographic and spatial growth, and fail to meet the basic needs of city inhabitants, particularly the poorest (Godard, 2002).

Of course, the situation with regard to transport is considerably better in cities than in rural areas where most people who do not live in a village that is on a road and have no choice but to walk (Porter, 2002). But in large cities transport becomes more and more problematic for urban dwellers if they have to travel outside their residential neighbourhood, especially for daily constrained activities such as work and attending school, or any other activities like shopping and visiting. Populations living in unplanned peripheral districts, with poor facilities and few employment opportunities, are affected by this situation even more as the lengthening of travel distances implies that trips must be made by more expensive mechanised means of transport.

In a context where the majority of households are poor or survive just above the poverty line, the ownership of a private vehicle is unaffordable to most people and long-lasting economic crises tend to decrease the rate of household vehicle ownership even more. Moreover, it is difficult for households to allocate a share of their household budget for daily public transport travel. This situation results in the majority of households with low incomes, and therefore almost no room to manoeuvre, experiencing great difficulties in accessing urban services and infrastructure. In sub-Saharan African cities where qualitative and quantitative deficiencies in current public transport supply are numerous and regular access to public transport is unaffordable for low-income populations, the poor level of service provision in outlying areas reinforces the patterns of urban segregation, poverty and social exclusion (Diaz Olvera et al., 2003).

Thus, walking is the only affordable means of travelling for the majority of urban

populations. For a great number of inhabitants, daily travel is carried out entirely on foot, sometimes over long distances, as has been noted by a number of studies. For instance, 70% of working people in Addis-Ababa and 70% in Lusaka commute on foot (Transport Road Laboratory, 2002 ; Narayan et al., 2000). For others, the use of motorised vehicles, predominantly public transport, is limited to the most essential trips depending on the activity to be carried out and on the financial resources available at the time, as has been shown to be the case amongst female petty traders in Accra (Grieco *et al.*, 1996). In sub-Saharan Africa, as in other cities of the South, transport infrastructure benefits mainly the high-income minority who have access to private motor vehicles (Vasconcellos, 2001). In contrast, walking is carried out under difficult conditions due to the absence of sidewalks, the edges of streets clogged by stalls, parked vehicles and illegally dumped garbage, the absence of public lighting, and in rainy season, floods and damaged roads and bridges.

The aim of this paper is to reveal key features of the daily travel characteristics of poor populations in sub-Saharan cities. Due to the fact that daily travel is dominated by walking, we are particularly interested in trips on foot and by people using walking as their only means of transport. As will be shown in the following sections, these people are amongst the most underprivileged of urban populations because they do not have sufficient resources to use public transport and therefore remain “confined” to their neighbourhood.

The statistical data presented in this paper have been collected in household surveys of daily travel in large sub-Saharan African cities: Bamako, Cape Town, Dakar, Niamey and Ouagadougou (Boxes 1 and 2). The contexts of these cities are quite different from several perspectives (e.g. historical, economic, political, urban, etc.), as well as from the specific perspective of public transport provision. All these cities are located in French-speaking West Africa, with the exception of Cape Town. However, the case of Cape Town allows an interesting cross-city comparison between Western and Southern Africa, where the social development trajectory has been radically different. Despite the numerous differences amongst these cities, a great share of city dwellers are poor and the findings of this analysis suggest that various features of the daily travel patterns of this group are consistent.

The modal splits in the selected cities show that walking is the main mode of transport (Section 2). Even though walking is mostly used for short-distance trips, a still significant proportion of walking trips is made to reach distant locations. Findings from the cases of Cape Town and Dakar reveal different walking behaviours when considering household standard of living measured by income or expenditure (Section 3). When household income or expenditure decreases, the share of walking increases rapidly and conversely the share of motorised trips drops. Poor people undertake activities in the vicinity of the home more often than wealthier people. However, poor populations are not homogenous and travel behaviours vary considerably according to the socio-economic status of people, as is highlighted by the case of Dakar (Section 4). Amongst poor “confirmed pedestrians”, women, irrespective of whether they work or not, are clearly more disadvantaged than other population groups, due mainly to deep-rooted social constraints. Having established that the use of walking in sub-Saharan cities as a main travel mode is correlated closely with poverty and social inequality, Section 5 turns to a case study of Cape Town to investigate whether walking is analysed adequately in household travel surveys. The conclusion offered in section 6 concerns three items: the need to consider walking in public policies as a main means of transport like other modes, the need for the active participation of public authorities in urban planning, and the need to enhance knowledge on walking behaviour.

Box 1: The household travel survey in Cape Town

Cape Town is a medium-sized city with an ethnically diverse population currently estimated at 3.2 million. The economy has tended to perform better than other South African cities in recent years, recording a mean annual growth rate of 2.5% for the period 1996-2000 (vs. a national growth rate of 2.1%). Unemployment remains an important problem however, with some 18% of the economically active population unemployed and some 22% employed in the “informal sector”.

Cape Town’s transport system is notable for its dualistic mode of operation in terms of the supply of services to two clearly distinguishable and roughly equally sized passenger market segments. The first segment cannot afford the costs associated with vehicle ownership and are therefore captive to whatever public transport services are provided, and to walking. The second segment have higher incomes and, while presented with a choice of modes, utilise their cars extensively. By South African standards the city has an extensive fixed road and rail infrastructure. The rail network is essentially radial, with multiple branch lines radiating from the city centre. Radial freeways also emanate from the city centre, overlapping an irregular grid of primary and secondary arterials. The public transport vehicle fleet and rolling stock is comprised of trains, scheduled buses, and unscheduled and partially regulated 15-seater minibus-taxis.

The household travel survey reported upon here took the form of a 24 hour recall activity diary interview using computer-assisted personal interviewing (CAPI) software. With the available resources it was only possible to survey 204 households (and 678 persons). In strict statistical terms the best that can be claimed is that one can be 95% confident that the actual mean of a simple dichotomous variable falls within 15.2% to 17.6% on either side of the sample mean, depending on the sampling area.

The sample was stratified into three equally sized – high, middle and low – combined household (gross) income bands. The 1996 census data were analysed to determine the cut off points for these bands, and these 1996 values were then adjusted, using a Consumer Price Index, to relate more accurately to incomes at the time of data collection (October 2000 to February 2001). The sample was distributed proportionately across these three bands. High-income households were defined as those earning more than R5 500/month (equivalent to more than US\$685/month at the prevailing exchange rate). Middle-income households were defined as those earning between R1 800 and R5 00/month (equivalent to between US\$224 and US\$685/month). Low-income households were defined as those earning less than R1 800/month (equivalent to less than US\$224/month). Assuming a mean low-income household size of 3.5 persons, this is equivalent to US\$2.07/day/person. It would be expected therefore that a significant number of households within the low-income band earned less than the benchmark international monetary poverty line of US\$1/day/person. The sample of households was also clustered into selected transport zones (TZs) of the metropolitan area. For each income stratification, two TZs were selected. Thus about 34 households were surveyed in each of the six TZs. The two TZs were selected on the basis of ease of access to commercial and employment opportunities. The first was a residential neighbourhood with a mixed pattern of land use, and an open, pedestrian-oriented street pattern. These ‘inner location’ TZs have local access (meaning within a 2.5-3 km walking distance) to commerce and employment opportunities. The second was a residential neighbourhood with little or no local access to (formal) commerce and employment opportunities, and a closed, car-oriented street pattern. These were called ‘outer locations’. Households were selected at random from a sampling frame in each of the sampling areas. The sampling frame took the form of an inventory of street or shack addresses. Only households falling within the appropriate income band were interviewed. Randomly selected households who fell into the wrong band were substituted, as were households unable to provide previous day recall diaries for at least 70% of household members (who were either independently mobile or generated their own individual activity schedule).

Box 2: The household travel surveys in Western Africa capitals

The household travel surveys in Western Africa were undertaken in four capitals with different characteristics from several viewpoints. Dakar is one of the largest cities in this African region (around 2.5 million inhabitants in 2000). At the time of surveys, Ouagadougou and Bamako had about 800,000 inhabitants (1992 and 1993, respectively) and Niamey only 600,000 inhabitants (1996). Also, Dakar, like Cape Town is located near the sea on a peninsula. Conversely, the other cities are the capitals of landlocked countries. In Dakar a great proportion of jobs from the public and formal sectors are concentrated in the CBD, in the farthest zone of the peninsula, in a relatively narrow area. Bottlenecks are frequent at peak-hours and globally accessibility is poor. Access to employment opportunities is therefore problematic as commuting distances and travel times are long.

Concerning the organisation of the transport sector, each capital represents a different pattern depending on the characteristics of public transport supply and private vehicles. At the time of the survey, the transport system in Ouagadougou was dominated by two-wheelers, mostly motorised – that is why it is called “the city of two-wheelers”. Limited public transport was supplied by a state-owned company. In Bamako, the proportion of two-wheelers is smaller than in Ouagadougou and public transport depends mainly on small-scale unregulated operators. In Niamey, private vehicle ownership is still lower (mostly cars) and like Bamako, unregulated operators dominate the public transport market, even though a public company still operates. In Dakar, public transport is supplied by various types of regulated and unregulated operators (shared taxis and minibus of different sizes and types), most of them owning only one or two vehicles. At the time of the survey, the public company did not operate any more (it ceased its activities in 1999).

Even though the surveys were undertaken at different periods of time, the survey methodology was very similar in all four (Diaz Olvera et al., 1998, 2002; Syscom, 2001). The metropolitan area was stratified according to various indicators concerning living standards, availability of urban facilities and infrastructure, and accessibility. The sample of households was then clustered into selected zones. For instance, the stratification of the Dakar metropolitan area resulted in 15 types of zones and between 10 and 18 survey zones were then selected for each type. In most zones, 15 households were selected at random in each zone.

Three types of data were collected by survey questionnaires in a paper-assisted personal interview (PAPI) at the home: general data on the household and housing, personal data for individuals aged 14 years and over, and data on all trips made the day before the interview for these same individuals and collected in chronological order. The Dakar survey, funded by CETUD (*Conseil Exécutif des Transports Urbains de Dakar*) and undertaken by Syscom (Syscom, 2001), collected additional data, such as household expenditure, access to urban services, residential mobility, etc. Data on the household and housing were furnished by the household head, while the other data were furnished separately by each household member (family or not) aged 14 years and over. In all surveys, special attention was paid to the collection of data on all walking trips, whatever their distance. For each trip made the day before, the following data were collected: time of departure and arrival, location of departure and arrival, purpose of trip, main mode of travelling (excepting with Dakar, where trip chaining was collected), cost of trip for the Dakar survey.

The final survey samples are the following: 753 households and 3,862 individuals in Ouagadougou; 251 households and 1,666 individuals in Bamako, 757 households and 2,732 individuals in Niamey, and 2,301 households and 8,658 individuals in Dakar.

2. THE PREDOMINANCE OF WALKING IN MODAL SPLITS

In the household travel surveys that we have undertaken in various African cities, all trips were recorded, whatever travel mode was used and whatever the distance. Consequently, contrary to other travel data collection methods where walking is partially or totally excluded¹, findings from the surveys we have administered provide us with a good picture of the nature and extent of walking as a main travel mode.²

According to these surveys, the share of walking in daily travel varies roughly within a range of 40% to 75% of trips in sub-Saharan African cities (Table 1). It should be noted that the share of walking is calculated for the population aged 14 years and over in the case of West-African cities, which was the surveyed population, while for Cape Town data concerns all individuals, whatever their age. In both cases, the relative importance of walking as a travel mode in the overall travel pattern is underestimated in main mode use analysis as walking segments are frequently attached to both ends of public transport trips and sometimes to an end of motor car trips as well. Also, the share of walking is underestimated in the West-African cities as children and youngsters aged less than 14 years old make most of their trips on foot.

Table 1: Trip generation (number of trips/person/weekday) and modal split (%) in various sub-Saharan African cities

Mode use distribution (%)	Bamako (Mali)	Cape Town (South Africa)	Dakar (Senegal)	Niamey (Niger)	Ouagadougou (Burkina Faso)
Walk	57	36	74	69	42
Non-motorised vehicles	2	1	<1*	2	10
Motorised two-wheelers	15	0	1	8	39
Car	9	47	3	11	6
Public transport	17	16	22	11	3
All	100	100	100	100	100
Number of trips/person/day	3.1	2.7	3.2	4.4	3.9

* Mostly carts

These figures suggest that access to motorised vehicles, and more generally to mechanised vehicles (i.e. carts, bicycles, motor vehicles), remains very limited. This trend is even more marked in the case of private vehicles because the large majority of households cannot afford to own a motor vehicle due to high purchase and operating costs. In West Africa, amongst the population aged 14 years and over, 96 % of inhabitants of Dakar, 84 % of inhabitants of Niamey and 70 % of those of Bamako do not have access to a private mechanised vehicle, against 37% of inhabitants of Ouagadougou. In Cape Town, car-access is much higher than in the West-African cities and there are approximately 190 cars/1000 people. Data from 1999 indicate that 46% of households do not have access to a car, while 54% have access to one or more cars.

In this cross-city comparison, the share of walking in daily travel is the lowest in the cases

¹ In numerous travel surveys, trips made entirely on foot are taken into account only if they are longer than a fixed distance, which usually eliminates from data collection a great number of short-distance walking trips. Similarly, walking segments in multi-mode trips usually are not identified.

² In the case of multi-mode trips, we define 'main travel mode' as that mode which covers the greatest travelled distance. Main mode walking trips are typically trips in which only one mode is used, as the walking segment or segments of multi-mode trips are seldom longer than the other trip segments undertaken by mechanised modes.

of Ouagadougou and Cape Town, where the rates of private vehicle-access (mainly motorised two-wheelers in Ouagadougou and cars in Cape Town) are high relative to the other cities. In Ouagadougou, where the average income level is quite low, the use of private motor vehicles certainly improves accessibility but a significant part of the household budget must then be devoted to transport expenditures, which represents a heavy burden on limited budgets (i.e. 20% on average, 25% for the low-income households).

The use of modes is closely correlated to the spatial characteristics of trips. Walking is the means of transport mostly used for short distances, that is, for trips within the neighbourhood or in nearby areas. In Ouagadougou, nearly 45% of walking trips are less than 2 km in length, 25% are 2 to 4 km long and only 5% are more than 8 km long. Mean main mode walking trip lengths in Cape Town are in the region of 1 957 m. In terms of the time length of walking trips, in Bamako nearly 60% take 10 minutes or less, in Niamey about two-thirds last less than 12 minutes, in Dakar 85% do not exceed 15 minutes, and in Cape Town 51% take 10 minutes or less.

These data should not conceal the fact that a still significant proportion of walking trips are long and that they may be hard going, especially if they include the outward and return journeys, given that the urban environment is very unfavourable to walking. In terms of overall daily trips, the proportion of walking trips lasting at least 30 minutes is 11% in Cape Town, 10% in Bamako, 8% in Niamey and less than 5% in Dakar. The share for Dakar seems low but considering the figures in number of trips, the values for the largest cities, i.e. Cape Town and Dakar, are close but they are lower than those for Bamako and particularly Niamey. These findings suggest that in cities with a larger surface area and a certain level of public transport provision, walking cannot be considered as the only means of transportation for carrying out activities which take place elsewhere than in the immediate vicinity of the home.

In the current context of sub-Saharan cities, where rates of personal vehicle-access are low, public transport provision is poor, and household budget for transport expenditure is limited, walking plays a dominant role in transport systems. A significant proportion of urban dwellers rely on walking as the main or sole means of transport and they must “trust their feet” (Kinda, 1987 : 491) to carry out out-of-home activities.

The walking behaviour described above corresponds to average situations within the overall urban population. Findings differ markedly, however, if analysis takes into account the level of household monetary resources (measured in household income or expenditure), as shown through the case studies of Cape Town and Dakar.

3. DIFFERENCES IN WALKING BEHAVIOUR IN CAPE TOWN AND DAKAR, ACCORDING TO HOUSEHOLD MONETARY RESOURCES

In Cape Town the greater spending power of wealthier households results in relatively higher out-of-home activity participation and therefore higher overall trip generation (Table 2). Trip generation declines steadily with decreasing income and, on average, trip generation of members of low-income households represents less than 60% of trip generation of members of high-income households.

The trip generation pattern is quite different in Dakar (Table 3). The level of monetary resources, measured by household expenditure, has apparently no influence on overall trip generation and the mean level of mobility remains steady across the three expenditure groups. This situation has also been observed in other West African cities like

Ouagadougou and Niamey (even though in these cases household monetary resources were measured in household income). In all these cases the difference in trip patterns between groups lies more in the use of modes than in the total number of daily trips, as will be seen below. However, before analysing the use of modes, we will examine two factors that have some impact on variations in mobility patterns according to household monetary resources: the proportion of individuals who do not undertake any travel, and the proportion of households who have access to a car.

Table 2: Trip generation by household income in Cape Town

	High income	Middle income	Low income
Number of trips/person/weekday	3.4	2.4	2.0
Household income (US\$/month)	> 685	224 - 685	< 224
Mean household size	2.7	4.2	3.6

Table 3: Trip generation by household expenditure* in Dakar

	High expenditure	Middle expenditure	Low expenditure
Number of trips/person/weekday	3.1	3.2	3.2
Household expenditure (US\$/capita/month)	146	43	18
Household expenditure (US\$/month)	497	288	169
Mean household size	4.1	6.8	9.7

* Households have been ranked in quintiles according to the household expenditure per capita. The low-expenditure group includes quintiles 1 and 2 (the poorest), the middle-expenditure group quintiles 3 and 4 and the high-expenditure group quintile 4 (the wealthiest).

Significantly more lower income household members undertook no travel activity at all during the period surveyed. In Cape Town 22% and 21% amongst middle and low-income household members vs. 5% amongst high income household made no trips at all. In Dakar, 13% of individuals aged 14 years and over did not make any trip. This proportion is similar amongst the high- and middle-expenditure groups (12%) and the low-expenditure group (13%). However, given that the latter group is larger than the former due to larger household size, amongst people who did not undertake any travel, 14% are members of high-expenditure households, 34 % belong to middle-expenditure households, and 53% to low-expenditure households.

Vehicle availability declines sharply with reduced income. In Cape Town, 94% of high-income households have access to the use of at least one motor car. This figure is 50% for middle-income households and only 3% for low-income households. In Dakar, as it has been shown in the former section, the rate of household car availability is very low compared to Cape Town. The availability of personal vehicles is nevertheless still concentrated among wealthier households. 30% of high-income households, 16% of middle-income households and only 2% of low-income households have access to a car.

This highly differentiated pattern of access to personal vehicles is reflected in mode use findings according to household income. Table 4 illustrates main mode use for all trips in Cape Town. Travel by car is common among the high income population, and its influence diminishes sharply for the middle and low-income populations. Conversely, the share of

walking increases rapidly as household incomes decline. Public transport ridership increases with declining income as well. Members of low-income households not only undertake less travel than members of high-income households but they also use walking more as the main mode of travelling, be it measured in mode share percentage or in number of trips. Mean walking trip generation is 1.0 trips/day for members of high and middle income households and 1.2 trips/day for members of low-income households.

Table 4: Main mode use for all trip purposes by household income in Cape Town (%)

	High income	Middle income	Low income
Walk	9	43	61
Car	88	39	7
Public transport	4	17	30
Other	0	0	2

A similar pattern of mode use is observed in Dakar, except for public transport (Table 5). As would be expected, the share of car trips is extremely small, even for individuals from the wealthiest households. This is the result of very low rates of household car ownership and large household sizes, particularly amongst low-expenditure households. With regard to public transport, contrary to the Cape Town case, ridership follows a similar trend to car use, that is, it decreases as household expenditure decreases. At least two closely interlinked factors may explain this situation. On one hand, the out-of-home activities of the low expenditure population take place essentially in the neighbourhood or in nearby areas where trip distances make the use of public transport unnecessary (when supply exists). On the other hand, public transport may be unaffordable for the poorest households and their members tend to limit public transport use to absolutely essential activities. Walking appears then as the main mode of transport in this West Africa capital, irrespective of household income. However, it is noteworthy that members of middle and more particularly low income households have little access to motorised trips and their daily travel patterns are consequently based on walking. Mean walking trip generation is 1.7 trips/day for members of high income households, 2.3 trips/day for those from middle income households and 2.6 trips/day for those of low-income households.

Table 5: Main mode use for all trip purposes by household income in Dakar (%)

	High expenditure	Middle expenditure	Low expenditure
Walk	54	72	81
Car	13	4	1
Public transport	32	23	17
Non motorised vehicles	0	0	1

In Cape Town, while walking seldom accounts for more than 10% of trips amongst members of high-income households (with the exception of recreation), it has the largest share for numerous trip purposes amongst members of middle and low-income households (Table 6). Amongst low-income households in particular it has the largest mode share in most trip purpose categories, with the exception of livelihood activities (business and work), and personal business.

Table 6: Percentage of walk by trip purpose and household income in Cape Town

	High income	Middle income	Low income	All households
Work and education	7	34	44	26
Household management	5	46	58	28
Social and recreation	8	49	88	47
Other	33	67	-	50
All purposes	9	43	61	36

Table 7 shows that walking is the main mode used in Dakar, for all trip purposes and for the entire population, excepting trips to work and education activities by members of high income households. For all types of activities the share of walking increases with decreasing income and it is for the least discretionary activities, i.e. work and education, that it is less used. Conversely, in the three income groups, most trips related to household management are made on foot, as destinations are usually located near the home.

Table 7: Percentage of walk by trip purpose* and household income in Dakar

	High expenditure	Middle expenditure	Low expenditure	All households
Work and education	37	58	69	60
Household management	76	83	91	86
Social and recreation	61	76	83	78
Other	46	64	76	67
All purposes	54	72	81	74

* The classification of trip purposes takes account of the importance of constraints in activity patterns. Work and education concern trips related to these activities. Household management includes activities necessary for the reproduction of the household, like shopping, health, serve passenger, etc. Social and recreation activities include social visits, social and religious ceremonies, and leisure activities. A few trips which could not be included in the former groups constitute the other purpose category which is marginal as it represents 2% of all trips. Each group of trip purposes includes outward and return journeys.

In both case studies, the in-depth analysis of travel behaviour by household income or expenditure reveals that travel patterns relying heavily on walking go hand-in-hand with low-income. Recent work undertaken by TRL and DFID in Kampala (Uganda) and Harare (Zimbabwe) revealed similar findings in smaller survey samples (Bryceson et al., 2003). In Kampala, the percentage of walking in modal splits drops from 60% of trips for the low-income group to 20% for the high-income group. In Harare, these figures are 71% and 12%, respectively. The activities for which individuals use walking as a travel mode are various, depending on the level of household monetary resources. Globally, for every trip purpose the share of walking increases as household income decreases. Consequently, for all activities, poor people are more often obliged to use local nearby facilities than more well-off people. Work is the only exception to this travel behaviour, given that employment opportunities are scarce and household providers must try to keep theirs or get one, even if it is distant from home. This pattern is more visible in the case of Dakar and it suggests that daily travel may be a determinant factor in the poverty trap.

Given that greater walking is closely related to low income, and that socio-economic status presents different budgeting and expenditure constraints, what effect does walking have on livelihoods and participation in out-of-home activities?

4. IS WALKING A FACTOR IN SOCIAL INEQUALITY? THE CASE OF DAKAR

For a better understanding of walking as a travel mode and of the access to urban space that it enables, we will now focus on city dwellers who made all their trips by foot during one weekday period (the day before the interview). They will be referred to as “confirmed pedestrians” from now on. This distinction does not mean that these people never have access to other means of transport than walking for their daily travel. However, taking into account the scarcity of motorised modes and their high cost for users, the selection of this group for further analysis allows us to highlight statistically specific constraints.

By characterising individuals according to their use of travel mode the day before (weekday), half of the inhabitants of Dakar, aged 14 years and over, are “confirmed pedestrians”. As would be expected, they are unequally distributed amongst the population according to household expenditure, i.e. 54% belong to poor households, 36% to middle-expenditure households and only 10% to privileged ones. This section will focus only on “confirmed pedestrian” members of low-expenditure households. However, to investigate whether walking furthers urban segregation, it is judicious to compare their travel behaviour with that of the users of other travel modes belonging to the same income group and who will be called from now on “users of other modes”.

Earlier research has revealed that gender and employment status are the most determining factors of travel behaviour in West African cities (Diaz et al., 1998). Men and women have exclusive social roles and divisions of labour which may be observed in travel patterns and access to personal vehicles. Employment status implies that daily activity patterns are constrained by regular activities, like work or attending school, which in turn determine travel behaviour patterns. In addition, the employment situation of workers furnishes them with several types of resources i.e. monetary resources (income), relational resources and cognitive resources related to a usually better acquaintance with urban space. These resources, mainly income, are also determining factors in the ability to pay for daily travel through access to personal vehicles (motorised or not) and the use of public transport. Hence, on the basis of gender and employment status, a categorisation of the population into five social groups was elaborated: working men, working women, non-working men, non-working women, and pupils & students.

Compared to the overall population (14 years old and over) belonging to poor households, the share of working men who walk is lower, whereas amongst the users of other modes, the share of working men increases and that of non-working women decreases (Table 8). This finding confirms the hypothesis that, at the individual level, having an income furthers the use of mechanised or motorised means of transport. Indeed, amongst pedestrians, 83% of working men are non-salaried workers, which means that their incomes are generally irregular in amount and timing. This figure decreases to 58% amongst users of other modes - the other 42% are salaried-workers whose income is more regular in both amount and timing. Salaried as well as non-salaried workers belonging to poor households have severe financial resource constraints, but the more insecure situation of non-salaried workers makes paying for transport for daily travel more unpredictable than for salaried workers. Yapi-Diahou (2000) cites the case of workers in Abidjan who commute by bus only when the weather is bad. The money that is saved when commuting by foot allows them to buy their lunch without affecting their household budget.

Table 8: “Confirmed pedestrians” and “users of other modes” in low-expenditure households in Dakar by socio-economic group (%)

	Confirmed pedestrians	Users of other modes	All*
Pupils-students	14	14	13
Non-working women	29	16	29
Working women	23	23	22
Non-working men	12	9	11
Working men	22	38	25
All	100	100	100

* This includes “confirmed pedestrians”, users of other modes of transport and people who did not travel at all belonging to low-expenditure households.

Several interesting findings about travel patterns may be observed from Tables 9 and 10.

Table 9: Number of trips and time budgets for “confirmed pedestrians” and “users of other modes”, in low-expenditure households in Dakar

	Number of trips/weekday		Time budget/weekday (min)	
	Confirmed pedestrians	Users of other modes	Confirmed pedestrians	Users of other modes
Pupils-students	4.4	3.8	57	103
Non-working women	3.4	3.0	33	110
Working women	3.6	3.3	40	85
Non-working men	4.2	4.1	44	105
Working men	4.3	3.7	47	129
All	3.9	3.5	42	110

Table 10: Mean trip time-length and share of local trips for “confirmed pedestrians” and “users of other modes”, in low-expenditure households in Dakar

	Mean time-length/trip (min)		Share of trips in the residential area (%)	
	Confirmed pedestrians	Users of other modes	Confirmed pedestrians	Users of other modes
Pupils-students	13	27	74	42
Non-working women	10	37	89	37
Working women	11	26	81	40
Non-working men	10	26	84	36
Working men	11	35	75	25
All	11	31	81	34

Firstly, women make less trips than the other socio-economic groups, in both “confirmed pedestrians” or “users of other modes” categories. As in other African contexts, cultural and social norms stipulate that women’s activities concern mainly the family and household management, and that out-of-home activities are limited (Yameogo, 1987 for Ouagadougou; Sountalma, 1991 for Niamey; and Mainbourg, 1986 for Mali, particularly the Bambaras).

Secondly, pedestrians travel more than the users of other modes, by roughly 0.5 of a trip, depending on the group of people, with the exception of non-working men who travel a similar amount. Conversely, pedestrians’ daily time budgets vary roughly from half an hour (for non-working women) to one hour (for pupils-students), whereas for the users of other modes time budgets vary from one hour and a half (for working women) to two hours

(for working men).

Lastly, pedestrians stay mainly in their residential area and mean trip time-length is only about 10 minutes. In contrast, the users of other modes make significantly fewer trips in the neighbourhood and their mean trip time-length is three times longer, i.e. around half an hour. Their travelling is definitely more spatially extensive. However, the spatial reach of travelling varies from one population group to the another and analysis of trip-purpose distribution gives an insight into this (Tables 11 and 12).

Table 11: Trip-purpose distribution for “confirmed pedestrians”, in low-income households in Dakar (%)

	Work and education	Household management	Social and recreation	Other purposes
Pupils-students	53	21	24	2
Non-working women	2	68	28	2
Working women	41	38	19	2
Non-working men	8	39	49	4
Working men	49	18	32	1
All	30	38	29	2

Table 12: Trip-purpose distribution for “users of other modes”, in low-income households in Dakar (%)

	Work and education	Household management	Social and recreation	Other purposes
Pupils-students	57	16	26	2
Non-working women	5	51	41	3
Working women	45	29	25	2
Non-working men	6	32	60	1
Working men	61	16	22	2
All	42	25	29	2

Amongst “confirmed pedestrians”, half of the travel by working men and pupils-students is related to work and education activities. Compared to other groups, they travel a little farther away given that employment sources and education centres (mainly medium- and higher- level education for individuals aged 14 years and above) are scattered across urban space. The case of working women is quite different given that they have to combine professional and household activities in their everyday activity pattern and therefore their workplace is frequently located near or even at home. Working women make as many trips for work as for household management, and most of their trips cover short distances. Having almost no professional activities, both non-working groups make most of their trips within the neighbourhood but trip-purpose patterns are quite different given their respective social roles. Non-working women’s travelling concentrates on household related activities, while that of non-working men concerns social and leisure activities in the first place and household management in the second place.

Compared to “confirmed pedestrians”, the “users of other modes of transport” carry out diverse activities in areas distant from the residential area, with the exception of working men and to a lesser degree pupils-students whose activity patterns are largely determined by their “professional” activities, i.e. work for the former, school attendance for the latter. For working and non-working women and non-working men, the share of household management trips decreases and, conversely, the share of social and leisure activities increases. For working women, the share of work trips increases slightly. This trend is

observed more markedly for pupils-students and particularly for working men, as men are traditionally considered as the household providers.

The above findings show that the use of mechanised or motorised means of transport enables a wider range of out-of-home activity participation and destination choices than walking. For poor populations this is essential. Social resources, which represent a security net for deprived people, may more easily be diversified, developed and be called upon when needed (Dubresson, 1996; Werner, 1997). The range of possible livelihood activities is considerably enlarged, for men as well as for women, which means that the availability of financial resources is potentially less critical. For children and youngsters, for whom education must be a priority, they may attend schools located in more distant areas.

Confirmed pedestrians are amongst the most disadvantaged people, because they either mainly belong to low-income households or they do not have a personal income themselves, or both which is the most unfavourable situation given that personal poverty compounds household poverty.

Substantial differences in daily travel patterns are observed amongst poor social groups. For women, urban space is frequently limited strictly to the residential neighbourhood, which severely limits the range of possible non-domestic out-of-home activities. For men urban space is vaster, but their longest trips are related to non-discretionary activity locations, i.e. work and other livelihood activities. In all cases, walking is used as a means of travelling because there is no other means of transport available or affordable. Thus, the prevalence of walking as a means of transport indicates serious household and individual economic restrictions, a great need to carry out livelihood activities and the difficulties that poor people encounter in financing daily travel. Moreover, walking-based travel patterns highlight social constraints, which are conveyed in different ways according to gender. Life cycle stage and underlying social roles largely determine the place of men and women in the domestic and non-domestic environment, and consequently, their out-of-home activities and travel needs. In this context, women and non-working people are the individuals most effected by urban space restrictions created by a dependence on walking as the only available means of transport.

5. IS WALKING ANALYSED ADEQUATELY IN TRAVEL SURVEYS ? THE CASE OF CAPE TOWN

Having established in the preceding case study of Dakar, that the use of walking in sub-Saharan cities as a main travel mode is correlated closely with poverty and social inequality, this section turns to a case study of Cape Town to investigate whether walking is analysed adequately in household travel surveys, and more specifically, whether these transport-poverty linkages can be properly understood.

A combination of apartheid policies that dictated an analytical focus on the daily transportation of the black South African labour force in and out of cities, and a focus on the problem of traffic congestion and highway construction in the predictive four-step traffic forecasting models and their data requirements in past South African travel analysis, led to a particular analytical scope. In many, if not most, instances the travel demand models developed were calibrated for the weekday morning peak period when congestion is generally worst, and consequently travel data were collected on motorised trips occurring within this period. The implicit underlying assumption was that a transport system which satisfies the need for motorised travel during the commuter peak, will be able to satisfy other travel needs as well. Most representations of travel needs and behaviour have therefore been restricted to either motorised commuting or travel occurring

within peak periods and both correspond to the travel patterns of working male populations (this approach to daily travel analysis has of course also been observed in more developed countries). Baseline data were collected on variables like trip purpose, origin, destination, mode use, travel time, timing and distance. In some instances, as a primary contributor to trips during peak periods, only data on home-based work trips were collected and modelled.

As a result of this analytical scope little is currently understood of non-home-based, non-work, off-peak and non-motorised trip-making generally, and how this behaviour varies across different individuals and households. There have of course been exceptions to the purely motorised, commuter and peak period focus that provide insights into non-work, off-peak and non-motorised travel needs and behaviour, but these are limited and many had as their underlying purpose the development of trip generation rates for use in the first stage of the four-stage travel demand forecasting procedure, rather than the development of a thorough understanding of travel behaviour, choices and constraints.

The Cape Town survey reported upon in this paper purposefully extended the scope of analysis to include all travel undertaken by all persons, for all purposes and at all times, in order to draw conclusions on the extent to which conventional travel surveys misrepresent the true diversity and complexity of travel behaviour and underestimate the importance of walking more specifically.

Table 13 illustrates the survey’s findings with regard to mean household all mode and walking trip generation. These trip generation data demonstrate that the focus on motorised modes in past travel analysis has prevented an examination of the full extent of trip-making disproportionately amongst different sectors of the population. Because lower income households generate considerably more walking trips, the exclusion of these trips from data collection clearly omits a greater proportion of their travel behaviour from analysis than is the case amongst higher income households.

Table 13: Walking trip generation by household income in Cape Town

	High income	Middle income	Low income
Number of all mode trips/household/weekday	11.1	9.7	8.2
Number of walking trips/household/weekday	1.0	4.2	4.9

Table 14 illustrates the survey’s findings with regard to main mode use by trip purpose. The data demonstrate that, while accounting for a relatively small share of commuter mode use, walking is a very important travel mode amongst lower income households for other trip purposes. Past work trip surveys in Cape Town have found that this mode accounts for only 5-15% of main mode splits, sometimes creating a perception that travel by foot is relatively unimportant. The exclusion of walking in past surveys and models has therefore distorted analyses of travel patterns across income bands to different degrees and in different ways.

Table 14: Main mode use by trip destination activity purpose and household income in Cape Town (%)

		Work	Educ.	Shop.	Bus.	Social	Pers. bus.	Rec.	Serve pass.	Home
high-income	walk	9	7	10	5	8	0	16	6	9
	p. trans	4	16	1	9	0	0	0	0	2
	car dr.	79	39	57	82	55	70	47	61	53
	car pas.	7	37	31	5	37	30	37	34	34
	other	2	1	0	0	0	0	0	0	0
middle-income	walk	19	63	47	17	53	75	44	18	45
	p. trans	43	16	20	0	3	0	11	0	19
	car dr.	22	6	17	48	14	25	15	52	15
	car pas.	16	15	16	36	30	0	31	30	21
	other	0	0	0	0	0	0	0	0	0
low-income	walk	23	62	73		92	38	73	100	61
	p. trans	59	33	15		3	48	20	0	31
	car dr.	2	0	0		0	0	3	0	1
	car pas.	3	5	11		4	14	3	0	6
	other	12	0	0		0	0	0	0	2

Note: work= trips to the site of a person's place of employment or income generation, educ.= trips to education activities, shop.= trips to retail establishments irrespective of whether a purchase is actually made, bus.= trips undertaken during working hours for business purposes, social= trips to social activities (e.g. visiting family and friends), pers. bus.= trips to personal business activities (e.g. to health and dental care facilities, welfare offices, police stations, possible employers, etc.), rec.= trips to recreational activities (e.g. cinemas, restaurants, sports facilities, etc.), serve pass.= trips undertaken for the purpose of transporting someone else to or from an activity site, home= trips to a place of residence.

Table 15 illustrates seven-day week trip purpose distribution findings across the three income bands. The table suggests that the proportion of trips to education activities remains fairly constant across income bands, while the proportion of work trips is relatively smaller amongst higher income households – due probably to greater trip chaining associated with journeys to or from work. Higher income households were found to undertake relatively more shopping and business trips at the expense of social and personal business (e.g. healthcare, job-seeking) trips. These trip purpose data indicate that past analyses of travel behaviour that have focussed exclusively on home-based work trips, have excluded some 80% of trip-making. The table illustrates that this restriction in past travel analysis would have distorted examinations of travel patterns across income bands in different ways. In the case of higher income households the nature and extent of business and shopping trips, and in the case of lower income households the nature and extent of social and personal business trips, would not have been fully analysed. In both cases the full importance of home-based education trips on travel patterns would have been overlooked.

Table 15: Home-based trip purpose distribution by household income (%)

	High income	Middle income	Low income
Work (h-b)	12	17	21
Education (h-b)	15	17	17
Shopping (h-b)	19	14	6
Business (h-b)	2	1	0
Social (h-b)	10	17	20
Personal business (h-b)	3	1	11
Recreation (h-b)	11	18	14
Serve passenger (h-b)	5	3	0
Non-home-based	23	13	10

The conventional focus on motorised modes, commutes and peaks in past travel surveys and models has therefore certainly prevented rigorous investigation of groups in society with greatest transport disadvantage and more generally of the relationship between transport systems and social exclusion, and has in all likelihood distorted widely held perceptions of travel needs and patterns. More specifically a perception has probably been created that non-motorised, non-work and off-peak trips are quantitatively and qualitatively significantly less important than motorised, work and peak trips. In particular, as a result of often being excluded or underestimated in past travel surveys, the importance of walking trips – in terms of their roles in satisfying travel needs and in analysing road safety problems – has not been fully understood. As discussed earlier, main mode walking trips in Cape Town are particularly important in satisfying the travel needs of middle- and low-income households (accounting for 43% and 61% of all trip main mode use respectively – see Table 4). At best these limitations on the scope of travel analysis have introduced a routine bias in the way in which the urban transportation problem has been framed and has skewed transport planning resources away from local and non-motorised network issues, and at worst, because the greatest misrepresentation of travel needs occurs amongst lower income households, has led to neglect in the planning and design of infrastructure improvement for the poor and vulnerable road users.

6. CONCLUSION

A number of lessons can be drawn from the study of walking as a means of transport and of the travel behaviours of people using it as their main mode of travelling.

The first concerns the predominance of walking in the travel patterns of the majority of African city dwellers and its consequences for the social and economic development of these cities. Even in large cities such as Dakar and to a lesser degree Cape Town, populations rely heavily in walking. However, findings from both cities reveal that low income people are the most disadvantaged as modal choice is very limited. The walking patterns of “confirmed pedestrians” may be described on the one hand as minimal because activities take place mostly in the vicinity of the home, and on the other as unequal because people do not have access to the city and its facilities, which contributes to maintaining and reproducing poverty. Housewives from poor households are confined in their neighbourhood; youngsters are less attentive in school or have little time for

homework or leisure after long-distance trips to and from school; working people living in poor outlying neighbourhoods must choose between either low-wage jobs in the neighbourhood, a limited but expensive public transport services, or commuting by strenuous long distance walking trips that may reduce productivity at work. Confinement in the residential district may enhance local solidarity but it does not favour social exchanges at a city-wide scale or contribute to solutions to alleviate poverty.

The second lesson derives from the former. In the short term, walking cannot be replaced as the main means of travelling in these cities. Motorised modes are too expensive. Attitudes towards bicycle use are too negative and one cannot expect that it may represent a realistic alternative in the near future. The only other alternative is to improve the environment in which trips on foot take place, and accessibility to existing and future facilities (de Langen, Tembele, 2000; Diaz Olvera, Kane, 2002). However, the first step to implement solutions in favour of pedestrians is to acknowledge the importance of walking in urban life and consider it explicitly in urban and transport policies along with the other modes of transport. At the same time other alternatives concerning motorised and non-motorised means of transport must also be developed and the performance of public transport services need to be improved considerably. Moreover, in sub-Saharan African cities accelerated urbanisation and deficiencies in the transport sector reinforce urban segregation and increase social welfare gaps. Current transport services and infrastructure are not sufficient to remove the numerous physical barriers and obstacles to daily travel. The participation of public authorities is therefore essential to improve the provision of facilities and accessibility throughout the city, which are two interdependent aspects to alleviate poverty and prevent social exclusion.

The final lesson refers to a methodological issue. Travel and accessibility studies should better take into account trips on foot, whether walking is the main travelling mode or used to complement other means of transport. Developing better knowledge of walking behaviour is evidently a prerequisite for effectively incorporating walking as a means of transport in urban transport policies and planning practices in sub-Saharan African cities.

REFERENCES

- Behrens, R., accepted for publication 2004. Understanding travel needs of the poor: towards improved travel analysis practices in South Africa, *Transport Reviews*.
- Behrens, R., Wilkinson, P. (unpublished manuscript). Metropolitan transport planning in Cape Town, South Africa: a critical assessment of key difficulties, 17 p.
- Bryceson, D.F., Maunder, D.A.C., Mbara, T.C., Kibombo, R., Davis, A.S.C., Howe, J.D.G.F., 2003. Sustainable livelihoods, mobility and access needs. TRL-DFID, Report 544, Berkshire, TRL (downloadable from website www.transport-links.org/transport_links/publications/).
- Diaz Olvera L., Kane C., 2002. M comme Marche... ou crève. In Godard, X. (Dir.), *Les transports et la ville au sud du Sahara*, Karthala, Paris, pp. 191-202.
- Diaz Olvera L., Plat D., Pochet P., 1998. *Villes africaines au quotidien*. LET, coll. Etudes et Recherches, Lyon.
- Diaz Olvera L., Plat D., Pochet P., 2002. *Mobilité quotidienne et pauvreté. Méthodologie et résultats. Enquête sur la mobilité, le transport et les services urbains à Dakar. Rapport final pour le CETUD, ARTUR*, Lyon.

- Diaz Olvera L., Plat D., Pochet P., 2003. Transportation conditions and access to services in a context of urban sprawl and deregulation. The case of Dar es Salaam. *Transport Policy* 10 (4) 287-298.
- Dubresson, A., 1996. Crise(s) et peuplement des villes en Afrique au sud du Sahara. In J. Coussy, J. Vallin (eds), *Crise et population en Afrique*, CEPED, Études du CEPED n° 13, Paris.
- Godard, X.(ed.), 2002. *Les transports et la ville au sud du Sahara*. Karthala, Paris.
- Grieco, M., N. Apt and J. Turner, 1996. *At Christmas and on rainy days*. Avebury, Hampshire.
- Kinda, F., 1987. *Ménages populaires à Ouagadougou*. Thèse de Doctorat en Sociologie, Université de Nantes, Nantes.
- Langen M. de, Tembele R., 2000. *Productive and Liveable Cities. Guidelines for pedestrian and bicycle traffic in African cities*. Report for the World Bank, IHE, Delft.
- Mainbourg, E., 1986. *Manger et boire à Bamako (Mali)*. Etude d'anthropologie sociologique. Thèse de doctorat de troisième cycle en sociologie, Université François Rabelais, Tours.
- Narayan, D., Patel, R., Schafft, K., Rademacher, A., Koch-Schulte, S., 2000. *Voices of the Poor: Can Anyone Hear Us?* OUP for World Bank, New York.
- Porter, G., 2002. Living in a walking world: rural mobility and social equity issues in Sub-Saharan Africa. *World Development*, 30 (2), 285-300.
- Sountalma, Z., 1991. *Espace et pratiques de l'habitat urbain. La concession à Niamey (Niger)*. Thèse de doctorat en histoire et civilisation, Université Paris VII, Paris.
- Syscom, 2001. *Enquête sur la mobilité, le transport et les services urbains à Dakar (EMTSU) 2000*. Rapport pour le CETUD, Syscom, Dakar.
- Therkildsen, O., Semboja, J., 1995. A new look at service provision in East Africa. In: Semboja, J., Therkildsen, O. (eds.). *Service provision under stress in East Africa. The State, NGOs & people's organizations in Kenya, Tanzania & Uganda*. Centre for Development Research, Copenhagen, pp. 1-34.
- Transport Road Laboratory, 2002. *Scoping Study. Urban Mobility in Three Cities : Addis Ababa, Dar es Salaam, Nairobi*. The World Bank, SSATP Working Paper n°70, Washington D.C.
- Vasconcellos, E. A., 2001. *Urban transport, environment and equity. The case for developing countries*. Earthscan, London.
- World Bank, 1997. *Guinea. A socioeconomic assessment of well-being and poverty*. World Bank, Africa Region, Washington, D.C.
- Yameogo, 1987. *Habitat traditionnel, habita moderne : la case et la villa au Burkina Faso*. Thèse de doctorat de troisième cycle en sociologie, Université de Nice, Nice.
- Yapi-Diahou, A., 2000. *Baraques et pouvoirs dans l'agglomération abidjanaise*. L'Harmattan, Paris.
- Werner, J.-F., 1997. *Itinéraires individuels à la marge : études de cas sénégalais*. In Marie, A. (ed.), *L'Afrique des individus*, Karthala, Paris, pp. 367-403.