



Urban Transport and Poverty in Developing Countries

Analysis and Options for Transport Policy and Planning



Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

Division 44, Environmental Management, Water, Energy, Transport

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Abbreviations

ATC	Air Traffic Control
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development)
BRT	Bus Rapid Transit
CBD	Central Business District
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit und Entwicklung (German Technical Cooperation)
HOV	High Occupancy Vehicle
LPT	Local Public Transport
LRT	Light Rail Transit
MPT	Motorised Private Transport
MRT	Mass Rapid Transit
NMT	Non-motorised Transport
UN	United Nations
UTS	Urban Transport Strategy

Foreword

Cities are growing the world over. According to UN estimates, well over 50 percent of the world population will already be living in urban agglomerations by 2025. While the urbanisation process is partly coming to a halt in the industrialised countries, growth of cities in the developing countries is in full swing and far from over. Between 2000 and 2005, urban population is set to double in Latin America, Africa and Asia. Largely, this will be accompanied by a worsening of the existing pressing poverty and transport problems. This is why many cities are already hardly worth living in today.

Transport management in the metropolises is already facing considerable problems owing to non-sustainable transport structures, high local levels of air pollution, noise, traffic jams even outside the peak traffic times as well as decreasing safety levels for non-motorised road-users. In some cities, the external costs of transport have been estimated at more than 10 percent of the urban gross domestic product (e.g. Bangkok); this share is spent year for year on municipal welfare measures. The above problems have a particular impact on poorer sections of the population that rely heavily on non-motorised means of transport and are therefore particularly vulnerable to road accidents. Further disadvantages arise from insufficient or lacking connections of poor settlements to public transport, considerable health hazards owing to settlements being built along roads or on the periphery of urban districts causing high levels of environmental pollution and, partly, high individual costs arising from transport expenditures. In the cities of many developing countries, poor families sometimes spend up to 20 percent of their income on transport, while the average family does not even require half that sum for its mobility needs. Moreover, lacking or low mobility among the poor reduces their prospects of earning income and access to education and health care. This stifles attempts to attain better living standards, which is why improving urban mobility represents an important step in combating poverty.

The pressing question arises how the rapid development of cities can be influenced in a way that will enable an urban environment worth living in to evolve that provides all citizens with access to economic, technical, cultural and social development. Here a focal aspect is coping with problems arising from poverty. For some time, the issue of ecologically, economically and socially sustainable urban development has been addressed by several multilateral, international, national and local initiatives and forums. Examples here are the Habitat and Urban 21 discussion processes and the wide range of Agenda 21 processes. Since the problem of poverty has still remained unsolved world-wide, the heads of states and governments opted for a prioritisation of combating

poverty at the UN Millennium Summit in September 2000. The aim is to halve the share of extremely poor people among the world population by 2015. The Federal Government has adopted this project as a core element of German development co-operation by launching the campaign “Fighting Poverty – a Global Task”. In view of the dynamics urbanisation has assumed, a considerable share of poverty combating has to take place in the cities.

GTZ has been commissioned by the Federal Ministry for Economic Cooperation and Development (BMZ) to carry out an intensive survey of the problem of poverty and transport and come up with solutions to it. Important results are already being successfully implemented in Technical Co-operation projects, with urban poverty alleviation gaining more and more importance. The study now on hand represents an important step towards a more intensive appraisal of the issue in question and a practical development of poverty-oriented urban transport strategies. It is also aimed at contributing to creating more sensitivity among those involved in development co-operation to interrelations between transport and poverty in cities and the significance of a sustainable urban transport policy. We would like to thank the BMZ for its financial support, which enabled the compilation of this study in the framework of the sector project “Transport Policy Advice”.

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Introduction

Already, 40 percent of the population in developing countries are living in cities. In 1975, the share of the urban population in developing countries was still less than a third. In spite of falling growth rates, forecasts so far reckon with this share growing to more than 50 percent by 2010. And the cities are playing an increasingly important role in the respective economies. In several developing countries, the contribution the cities make to the gross national product is over 50 percent, while in some cases, their share of overall economic growth is already at 80 percent.¹

At the same time, around half of the population in cities (approx. 800 million people) are marginalised, living in informal settlement districts on the outskirts of cities or also in inner-city poor districts (slums, favelas, Pueblos jóvenes, etc.) and as homeless people (pavement dwellers), often in inhumane conditions.²

Although the statistical periodicals issued by the World Bank indicate that the share of extremely income-poor people (with an income the equivalent of less than one dollar in purchasing power a day) has hardly changed over the last 10 years, the share of marginalised people with poor access to essential facilities has risen in most of the cities.³ In particular, the poor living on the urban periphery have to make a considerable physical effort and spend a large amount of time to gain access to sources of income (of the formal or informal sector) and to health and educational institutions, and to a degree, they are excluded from societal and political life in the city.

The requirement for transport to reduce poor access is the consequence of a derived demand and depends on urban land use as well as the spatial distribution of income sources, land and rent prices and the existing basic infrastructure in the respective urban districts the poor are living in.

In the cities and megacities of the developing countries, the need for mobility is increasing in sync with the growth of the cities themselves. As a rule of thumb, it can be assumed that for every 1,000 additional inhabitants, a further 350 incidents of daily

¹ Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ): Eine Zukunft für Städte schaffen - Entwicklungspolitik im urbanen Jahrhundert – in „BMZ spezial 015“; 05/2000, page 4.

² Kreditanstalt für Wiederaufbau (KfW): Stadt und Kommunalentwicklung in der FZ; in „Arbeitshilfen, Materialien, Diskussionsbeiträge“ Nr. 25; Frankfurt 06/2000, page 8.

³ World Bank: World Development Report 2000/2001 – chapter 3 “Growth, inequality and poverty”.

conveyance arise; every square km of area expansion induces 500 new incidences of daily conveyance.⁴

In spite of the as yet low country-wide motorisation per inhabitant (38 vehicles / 1,000 inhabitants compared to 585 vehicles / 1,000 inhabitants in Western Europe)⁵, the transport situation is catastrophic in most cities in the developing countries and is accompanied by the corresponding negative impacts on urban economic productivity, increasing environmental pollution through the emission of harmful substances and the high incidence of road accidents.

Urban transport policy and planning over the last few decades has been anything but sustainable in most of the developing countries. Following the example set by the industrialised countries, developments have been biased towards promoting the motorised private transport (MPT) urban road infrastructure. In the cities of the poorer developing countries, the MPT share still lies below 15 percent on average of overall transport and traffic demand (52 percent in Germany, by comparison).

Considering that a motorbike requires an annual investment and operating cost of approx. US\$ 1,500, the population at large (with an average per capita income of 600 US\$ / year in the least developing countries) in these countries, let alone the poor among the population, cannot afford the possession of a motorised vehicle.⁶ Even by 2025, just 3 percent of households will be owning a car in India and China.⁷

Therefore, transport policy geared to MPT predominantly catered for the demands of a small upper strata of society. Public funds used to this end (approx. 15 – 25 percent of the municipal budget)⁸ were withdrawn from the investments urgently required for the development of local public transport (LPT) or infrastructure measures aimed directly at poverty alleviation. Non-motorised transport (footpaths, bicycles, rickshaws, etc.), which accounts for more than 50 percent of the total traffic volume in cities with more than a million inhabitants, especially in Asia and Africa, was hardly considered in communal transport infrastructure planning; on the contrary, it was marginalised as a symptom of ostensible backwardness.

⁴ Booth, D. / Hanmer, L. / Lovell, E. (ODI): Poverty and Transport – a report prepared for the World Bank in collaboration with DFID; chapter 4 “Transport and urban poverty”; 06/2000, page 53.

⁵ World Bank: World Development Report 2000/2001; Statistics: No. 3.12 “Traffic and congestion”.

⁶ Hook, W.: Making Urban Transport sustainable; gate 3/98.

⁷ Pendakur, V. S.: The Role of Non-motorized Transport; WB UTS Review, Yokohama, 12/2000.

⁸ World Bank: Cities on the move, Urban Strategy Review-Draft; 01/2001, Chapter 2.

As a rule, the prestigious billion-dollar projects for modern rail rapid-transit systems in some take-off countries of Southeast Asia were also planned without taking the transport demands of the poor into account. The sophisticated technical systems favoured above all by the delivery firms in the context of private sector participation resulted in high investment costs, so that, as a rule, the urban poor could not afford the tariffs needed to cover costs. In spite of private sector participation, public-budget-funded subsidies for investments and operating costs were required in most cases (owing to passenger volumes and corresponding ticket sales failing to materialise). This resulted in an additional swallowing up of resources to the detriment of the poor.

So it comes as no surprise that in multi- and bilateral development co-operation, urban transport projects have so far tended to be given a critical appraisal in terms of their sustainability and orientation on the needs of the poor. In the framework of German Development Co-operation, no co-ordinated concept has been worked out for the promotion of sustainable, integrated urban transport and traffic development in developing countries. Neither has any comprehensive analysis been made of the connections between urban passenger transport and poverty in developing countries.

This requires a clearer combination of the approaches contained in German Development Co-operation concepts and projects.⁹ Except for the GTZ project on the promotion of non-motorised transport in Surabaya, Indonesia, there is no “integrated urban transport project” referring explicitly to poverty in the present project portfolio of German development co-operation. In contrast, the World Bank declared urban transport a priority area in the framework of the “Urban Transport Strategy (UTS) Review”. A large number of studies and presentations prepared for the regional UTS conferences also deal with the topic of urban passenger transport and poverty.

The aim of the study on hand is to sensitise the key players in German development co-operation to the problem field of urban transport and poverty. Not only have the most important contributions of the latest literature been researched and evaluated (in particular by using the World Bank’s UTS website) to this end, the Appraisal Reports of six urban transport projects financed by the World Bank over the last three years and statistics of the World Development Report 2000/2001 have also been analysed.

⁹ Cf. e.g. the relevant statements in the BMZ Sector paper on the issue of road transport (BMZ-aktuell No. 107, 01/2000), the BMZ and KfW papers on the issue of urban development and the GTZ study “Beitrag des Arbeitsfeldes Transport und Mobilität zur Armutsminderung”, which assigns possible poverty-oriented strategies for the transport sector as a whole (passenger and goods transport in rural and urban regions) to the present priority areas of GTZ organisational units.

In spite of the extensive amount of literature that has been published, the data available on sufficient, comparable and updated statistics is not sufficient to compile an empirical analysis for the cities in developing countries world-wide that would give due account of the complexity of causal relations and chains of effectiveness of various factors. Given the differences in local conditions, a generalisation of specific local circumstances is only justified to a limited degree.

By and large, this restriction also applies to the case studies and statistics of various cities used in the study on hand. They demonstrate the diversity in the respective local conditions and interdependencies while supporting and explaining a deductive line of argumentation as well.

Chapter 1 first of all discusses some key topics and core problems:

- Who is poor in the city?
- How are economic growth, transport and poverty mutually conditioned and influenced in the city?
- Can poverty-oriented urban transport planning be economically and ecologically sustainable?

In Chapter 2, the study then seeks answers to the following questions:

- How do transport supply and the specific transport demand among the poor relate?
- What has the impact of MPT-oriented transport policy and planning been on the poor?
- How important are regulated LPT, the informal “paratransit” sector and non-motorised transport for the transport requirements of the urban poor?
- How are poverty-oriented urban, area use and transport planning mutually conditioned?

1. Key issues and core problems

1.1 Income poverty / poor access, who is poor in the city?

Defining urban poverty solely via income poverty and measuring it with normative concepts such as the World Bank's definition of extreme poverty (< the equivalent of 1 US\$ in purchasing power a day) falls short of what the issue requires and cannot reflect the reality of the poor in the cities with more than a million inhabitants of the developing countries. There is no unambiguous definition of poverty.

Rather, poverty is a multidimensional problem that can be encountered in different forms depending on the local conditions in the cities of the developing countries. The street beggars and inhabitants of rubbish tips in Madras, the kiosk vendor living in the Favelas in the hills of Rio de Janeiro and the cafe waiter in Buenos Aires living on the outskirts and supporting a family of five may have different monetary resources, but poor access is common to all of them:

- poor access to secure income sources;
- poor access to health facilities (doctors, midwives, hospitals);
- poor access to educational institutions (primary and secondary modern schools, vocational training institutions, higher education institutions);
- poor access to safe accommodation;
- poor access to social policy and other socio-cultural institutions enabling them to actively participate in public affairs.

The various forms and combinations of poor access can be identified among almost 50 percent of the inhabitants of cities in the developing countries (while the purely income and consumption related statistics refer to "merely" 25 – 30 percent poor).

First of all, appropriate urban and land use planning is required to reduce poor access. As a derived demand, a transport infrastructure enabling low-cost transport (access) can make a crucial contribution to poverty reduction. However, the magnitude of the problem referred to above shows that sustainable, poverty-oriented urban transport and traffic policy has to focus on the majority of the population rather than on marginalised groups, as has often been claimed.

This first of all requires considering the present spatial distribution and financial scope of the poor. However, since the spatial and socio-economic patterns change in the

course of time, transport infrastructure, in the sense of anticipatory planning, has to anticipate these changes in order to meet the poor majority's future mobility needs.

To this end, a comprehensive, consistent and continually updated statistical data basis has to be established as a result of household and traffic interviews, close co-ordination with urban and area use planning and participation of the target groups (the poor). Concrete solutions can only be found in a local context; abstract, uniform approaches applying world-wide do not exist.

1.2 Economic growth, transport and poverty in the city: causal relations and interdependencies

So far, urban transport planning in most developing countries has been aimed at boosting economic growth, particularly that of the inner-city areas. Road extensions, new expressways and inner-city underground railways are meant to serve those participating actively in business life. The anticipated productivity gains are represented mainly in the shape of time saved in economic cost-benefit analyses (assessed in monetary terms as opportunity costs of economic power otherwise lost by the average user) in order to meet the requirements of the international donor organisations. In addition, forecasts often assume a (sometimes unrealistically high) increase in per capita income.

However, benefits of this kind do not affect the lower income strata and the impoverished poor, for in these section of the population, only a very small, if any, contribution can be made to the economy. This is why transport projects serving the “poor” majority of the urban population in developing countries hardly pay for themselves using the traditional monetary assessment criteria.

Even so, the assumption prevails that a trickle-down effect develops, with urban economic growth which has been boosted by a suitable transport infrastructure resulting in new jobs and, ultimately, unqualified “poor” employees finding new sources of income, especially in the service sector. And yet results over the last 20 years show

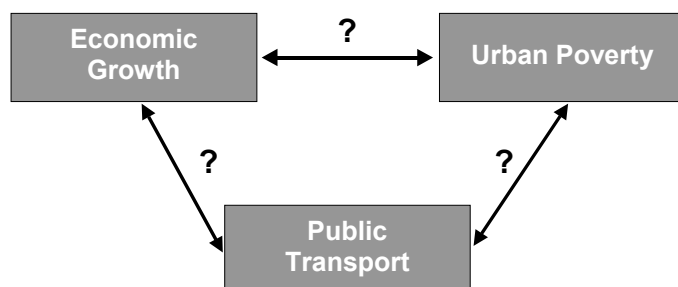


Fig. 1

that, except for cases in a few Southeast Asian take-off countries, the effect has so far hardly occurred. There are various reasons for this:

- An improved transport infrastructure is a necessary but by no means sufficient condition for increased economic productivity in the city.
- Economic growth and growth in the gross urban product are anything but sufficient for a reduction of urban poverty. In fact, many economists nowadays doubt whether they are even necessary conditions.

MPT-oriented transport and traffic planning mentioned in the considerations made in the introduction has, as a rule, been planned without taking account of the needs of the majority of the urban population in the developing countries. However, all inhabitants of a city are affected by the negative external impacts of MPT (high area requirements, accidents, emissions of harmful substances).

The question arises whether and how urban transport and traffic planning can directly target the needs of the poor without jeopardising economic and ecological sustainability.

1.3 Targeting poverty and sustainable, integrated urban transport planning: complementarity and conflicting aims

Until the seventies, urban transport projects were initially planned on the premise of being beneficial to the population as a whole, which was expressed in the overall economic (net) benefit on the basis of cost-benefit analyses. With the introduction of environmental impact assessments in the eighties, ecological sustainability gained increasing importance. At the same time, the economic efficiency and competitiveness of urban transport systems came to the fore against the background of increasingly deficit-ridden budgets in the cities of the developing countries. A large number of LPT privatisation schemes and private sector participation programmes in investment projects were subsequently introduced.

However, in most cities in the developing countries, traditional transport planning resulted in worsening conditions of LPT access for the (growing) poorer sections of the population. This is why, over the last two years, targeting poverty has been introduced as an additional element of urban transport policy and planning in the framework of the new poverty alleviation policy the international donor organisations have adopted.

However, targeting poverty only remains a partial goal of sustainable urban transport policy and planning, alongside objectives such as economic and operational efficiency and long-term ecological sustainability.

Optimising these targets in a manner that will ensure an overall maximum of benefit has so far not been achieved in most cities of the developing countries. The conflicts of aims are obvious:

- For example, a comprehensive underground railway network with a low per capita energy consumption (supplied if possible by clean and partially renewable energy sources), low noise emissions, no direct discharge of harmful substances and low accident rates would be desirable. However, a concept of this kind is doomed to failure because of the low purchasing power of the poor in society (the majority), who cannot afford the tariffs required to cover the high investment costs. In the developing countries, the public budgets of the local communities usually cannot compensate for deficits via payment of subsidies. Even if budgetary means are available, putting resources to use for a high-quality, expensive LPT system often makes little sense from an economic point of view given the opportunity costs of lost public investments (council housing, hospitals, educational institutions).
- An LPT system with used, old minibuses can be affordable for the poor in certain corridors with a high demand, and the informal paratransit operators can run it with a profit and without depending on public subsidies in the short and medium term. In the long run, however, the external costs of environmental pollution, accidents, etc. can lead to a negative profitability in terms of the economy as a whole.
- In certain corridors, private operators can run a cost-covering, high-quality and even ecologically sustainable service (suburban trains with air-conditioning and stations as shopping centres) for affluent customers without depending on public subsidies. However, the fares that need to be paid for this service rule out its use by the poor.

Finding the right LPT mix to optimise the diverging targets for the system as a whole is the challenge urban transport and traffic planning has to address.

What is certain is that, all in all, years and years of focusing on MPT has not been sustainable. On the other hand, the potential of non-motorised transport for economically efficient, ecological sustainable transport and traffic planning targeting the poor has hardly been considered.

Urban Transport Policy Spectrum

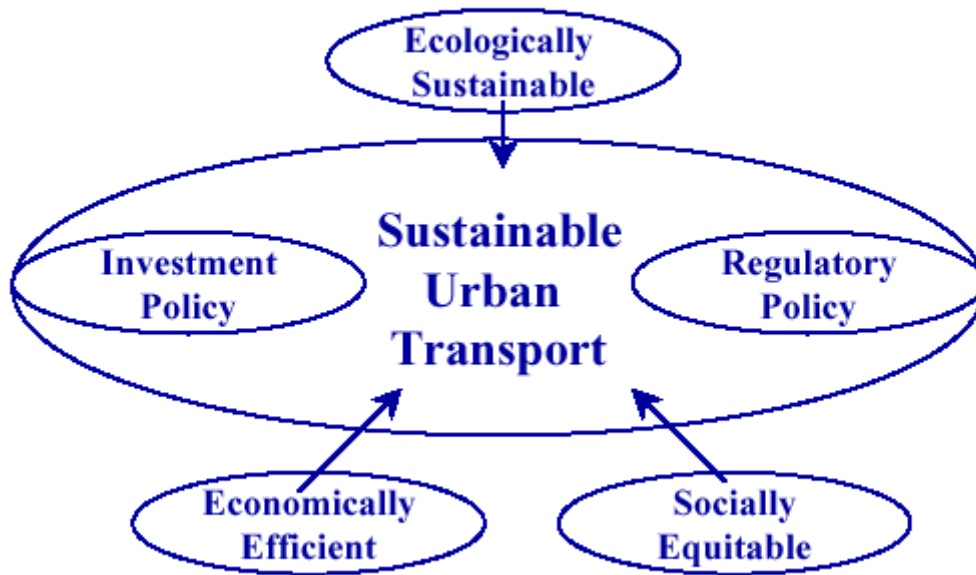


Fig. 2

The following chapter analyses the status quo of urban transport demand and supply for the poor for selected cities with more than a million inhabitants in developing countries.

2. The status quo: facts and figures

2.1 Supply and demand: characterising mobility of the urban poor

Transport is a service that cannot be stored. Supply and demand have to coincide at the same time, which is why transport planning must anticipate and optimise this coinciding of supply and demand. Given that several years are required for construction of transport infrastructure and considerable investments have to be made for the means of transport, high demands are made on the accuracy of forecasts and planning in the case of LPT in particular.

The chief determinant of transport supply is the physical infrastructure of roads, cycle and footpaths, railways and waterways. The extent and state of the transport routes influence the operational options of the means of transport using them (cars, buses, trams, LRT, metro, pedestrians, bicycles, etc.). Different technologies and modes of operation used by these transport systems result in different frequencies, journey time, capacities and costs/tariffs. A restricted ability to form networks is in the nature of guided means of transport.

Demand is shaped chiefly by the existing physical infrastructure. In reverse, unlike with consumer goods, there are hardly any short-term adaptations of supply to the needs of the potential users.

The status quo situation of transport demand in cities represented in Chapter 2.1.2 therefore has to be interpreted as the result of the usually limited transport supply and does not reflect any preferential decisions (maximisation of transport users for utility) in an optimised diversified transport system (as is the case in many European cities).

2.1.1 Transport supply

Transport supply is determined by the existing physical infrastructure (roads, railways, footpaths, etc.) and the means of transport operating on it with different modes of operation and transport management systems.

Figure 3 shows the average cross-section efficiencies (system capacities as demonstrated in practice) and the accessibility of various means of transport (LPT/ Non-motorised transport (NMT)), with a traffic route of approx. 3 – 5 m width taken as a basis. Since it is, as a rule, mostly irrelevant for the poor, MPT has not been considered. (With a system capacity of approx. 3,000 p/h/direction and average speeds of 10 – 12 km/h, the car would be in group 1.)

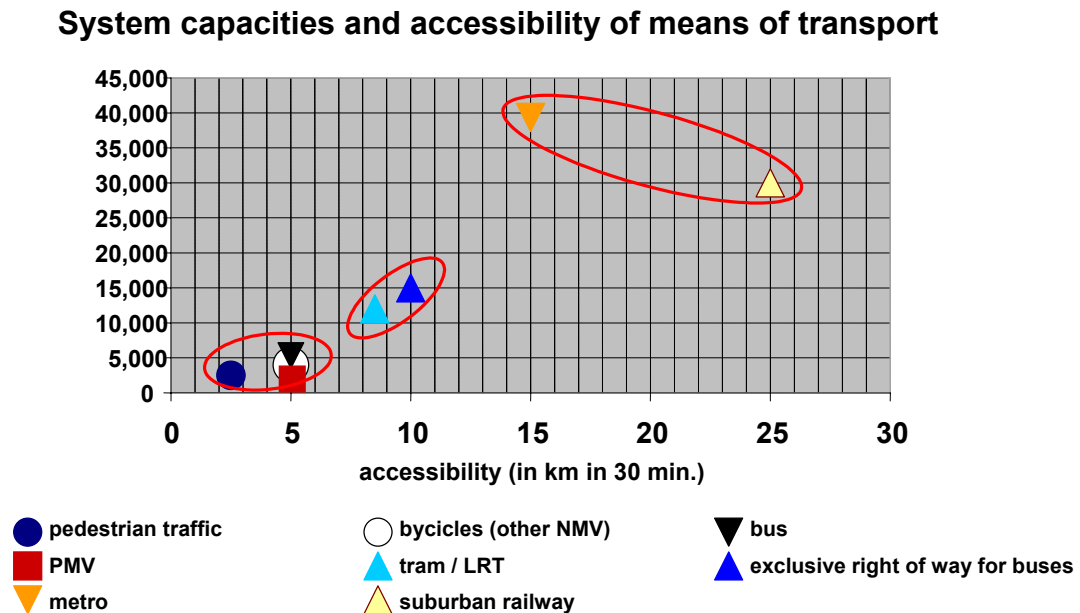


Fig. 3

So if we assume that traffic area demand is limited by the economic and social costs in the cities with more than a million inhabitants of the developing countries and journey times approx. 30 minutes, which are reasonable for the users of transport, this results in a system-conditioned suitability of means of transport for certain distances and traffic volumes.

Based on accessibility and system capacity, the following grouping of means of transport results (see clusters in diagram):

Group 1 (normal bus, public motor vehicle (PMT), bicycle / tricycle taxis, bicycle, pedestrians):

- Low system capacity: 2,000 – 5,000 persons/hour/direction
- Commercial speed: 5 – 10 km/h;
- Accessibility (in 30 min.): 2.5 – 5 km;

- Suitable for periphery connections (intra and inter) and feeder services to more efficient mass transport means and (to a degree) for distribution traffic in the inner-city area.

Group 2 (exclusive bus ways, tram with its own right of way / LRT)¹⁰

- Medium system capacity: 10,000 – 15,000 persons/hour/direction;¹¹
- Commercial speed: 15 – 30 km/h;
- Accessibility (in 30 min.): 8 – 10 km;
- Suitable for medium and large volumes of traffic and periphery-to-centre journeys of distances up to 20 km (cities of approx. 1-1.5 million inhabitants, such as La Paz, Quito, Accra); possibly also for periphery-to-periphery transport and as a feeder in megacities.

Group 3 (elevated or underground metros, suburban railways):

- High system capacity: 30,000-40,000 p/h/direction (in individual cases up to 80,000 p/h/direction – e.g. Hong Kong);
- Commercial speed: 30-50 km/h;
- Accessibility (in 30 min.): 15-15 km;
- Suitable for principal axes of traffic (periphery-centre, in the centre) of large cities with more than a million inhabitants and megacities (more than 2-3 million inhabitants).

An affordable fare adapted to low household budgets is a priority for the poor. This is why transport and traffic policy and planning targeting the transport needs of the poor should provide special support for means of transport with low investment and operating costs (taking the external costs of environmental pollution, accidents, etc. into account).

The cost of means of transport can be compared within the above-mentioned groups; as a rule, cost comparisons of means of transport from different groups do not make any sense since the respective system itself rules out their substitution.

¹⁰ see Annex for present system capacities

¹¹ In the meantime, these limits have been raised considerably. In Turkey and Brazil, 25,000 p / h / direction has been exceeded, the Transmilenio Project in Bogotá has approx. 25,000 p / h / direction on its main route in the peak traffic period.

The volume of mass transit on a suburban railway in full use cannot be substituted by normal bus transport. And although it would be comfortable and use modern technology, an above-ground light railway system would be just as unsuitable as a replacement for an underground railway or an elevated metro for inner-city transport in the principal traffic corridors of megacities.

However, this cost comparison should be carried out within the groups. Setting out from the approximate investment and operating costs, the result could look as follows in many cases:

Group 1: footpaths and cycle-paths;

Group 2: exclusive bus ways and Bus Rapid Transit (BRT);

Group 3: suburban railways (use of existing railway lines).

Of course the respective local conditions (topography, climate, existing railway lines, socio-cultural restrictions, etc.) have to be taken into account.

Unfortunately, real transport supply in the cities with more than a million inhabitants of the developing countries does not correspond to the above system. MPT-oriented transport policy for the upper income tenth of the population and the accompanying construction and extension of urban roads has led to an almost exclusive focus on road-bound means of LPT; traffic route planning and integration of non-motorised transport does not exist as a rule.

For the transport demands of the poor, LPT is dominated by public or private bus companies (institutionalised and regulated) and by private paratransit operators (usually informally and hardly regulated). In addition to minibuses and rebuilt pickups and vans ("jeepneys"), the paratransit sector also makes use of tricycles and bicycles.

Especially in South America, public bus services are run by private operators in nearly all cities with more than a million inhabitants. In many African cities, regular LPT services are hardly existent nowadays owing to the collapse of the former state-owned bus companies. On profitable routes, supply is provided by the informal sector, usually with minibuses. In Southeast Asia, small lorries that have been rebuilt and bicycles and tricycles account for a considerable portion of LPT supply.

Owing also to the insufficient range of networks, rail-borne mass transport systems often meet just a small share of overall LPT demand. As a rule, modern metro and light railway train systems are hardly affordable for the poor owing to the high fares that are charged.

The range of LPT supply lessens from the centre to the periphery. For the poor living on the urban periphery, non-motorised transport (the footpath) remains the only alternative for transport within the periphery. And long distances have to be covered on foot to get to the LPT stops for further transport into the city centre. What is lacking is infrastructure and route planning that is oriented on non-motorised transport as well as its integration with the LPT supply.

2.1.2 Transport demand

2.1.2.1 Travel frequency, distances and purpose

There is no major difference between the number of daily routes the poor have to cover and the conveyance frequency of more affluent income groups. However, there are considerable differences in cases of motorised conveyance (MPT and LPT). The majority of the poor are dependent on their own physical ability to move around (going on foot, cycling, etc.). Figures 4 and 5 demonstrate this with the examples of the African cities of Cairo (Egypt) and Ouagadougou (Burkina Faso).

Cairo, mobility according to income group			
Household income / month	Distribution in GCMA ¹⁾	trips/persons/day	trips on foot
Under £ 300	22%	1.31	46%
£ 300 - £ 500	32%	1.39	39%
£ 500 - £ 1,000	23%	1.54	31%
£ 1,000 - £ 2,000	6%	1.64	21%
In excess of £ 2,000	2%	1.78	12%
No answer	15%		
¹⁾ Greater Cairo Metropolitan Area source: 1998 interview among households (SYSTRA-DRTPC) £ 1 (EGP) = 0.30 EUR (09/00)			

Fig. 4

Travel frequency of poor and rich (number of trips per day)			
	all trips	mot. trips	on foot
Ouagadougou			
poorest	3.5	1.7	52%
richest	4.7	4.3	10%
multiplier	1.3	2.5	
Cairo			
poorest	1.31	0.75	46%
richest	1.78	1.56	12%
multiplier	1.4	2.1	
World Bank Urban Strategy Review; The case of Cairo, 11/2000; chapter 3.2, table 3.2.1 (1998)			
SITRASS-Report: Poverty and Urban Infrastructure, 09/2000; Annexe 1.5 "Le cas de Ougadougou", Tableau 6, 1999 figures			

Fig. 5

The respective travel distances differ considerably and depend on the location (close to the centre, on the periphery) of the settlements housing the poor. They include extreme cases, like in the black townships in South African cities with more than a million inhabitants, some of which are up to 30 km way from the city centre. The other extremes are the Favella hills of Ipanema and Copacabana (Rio de Janeiro) close to the city centre or the inner-city slums of Madras, the inhabitants of which can reach the Central Business District (CBD) on foot in less than 30 minutes.

Owing to the need to have several sources of income at different places and different times, especially in the informal sector, the poor, and among them, in particular, the women, also depend on a flexible LPT system that covers a wide area.

The insufficient LPT supply in the poor districts of the peripheral urban zones and the low household budget of the poor induce long distances to walk and frequent changing and therefore, especially in the case of long travel distances, travel times that may take up to more than 3 hours a day (more than 50% of all journeys in Bogotá, 10% of the workers in Mexico for more than 5 hours a day).¹²¹³ For the poor, the main purpose of journeys is to get to income sources and educational institutions (in India: 90%; in Morocco: 80%; in Brazil: 67%).¹⁴

¹² World Bank: Cities on the move, Urban Strategy Review-Draft; 01/2001, Chapter III.

¹³ Peñalosa, E. (Former Mayor of Bogotá): Bogotá's Experience and Achievements in Urban Transport; WB UTS Review, Santiago Conference; 11/2000.

¹⁴ Allport, R. (Halcrow Fox): Transport Services for the Urban Poor; conference paper "Infrastructure for Development"; 31 May - 2 June 2000, London, page 3.

Mobility needs of a woman in Dakar

A young widow from Dakar in a precarious situation and having several children has been followed up during eight years. J. F. Werner reports four types of social networks according to the nature of the support which she can obtain. He compares them to concentric circles with the concerned individual at their center (Werner, 1997: 381-383).

The *main* network is spread all over the town and elsewhere because it is made of relatives and close friends providing a continuous affective and material support and who remain reliable.

On the opposite the *secondary* network is very close in space, located in the immediate surrounding but it can only be requested from time to time (but not too often) for assistance given on a one-off-basis.

The *subordinate* (client type relations) and *latent* (random activated relations) networks are located in the whole urban space. In order to maintain this capital of relations and change it into an economic capital, this woman from Dakar permanently has to do courtesy visits and participate to family ceremonies and public activities.

Thus she has to move all the time, on long distances sometimes. The weakness of her financial means obliges her to walk (she is qualified as "the walker") and she is very often absent from home giving then the impression of neglecting her home and her children.

Box 1

In many African cities, a network of social contacts is particularly important for survival and coping with economic problems. In Bamako (Mali), Dakar (Senegal) and Ouagadougou (Burkina Faso), about 20% of daily trips are made solely to establish and maintain social contacts. Here, the social network in the immediate vicinity of the district one is living in (accessible on foot) is of particular importance. However, since the individual districts are losing more and more homogeneity in terms of their ethnic composition and the origins of the inhabitants, access to other urban districts is also growing in significance. This trend is illustrated with the example of a woman in Dakar (cf. Box 1).¹⁵

2.1.2.2 Choice of means of transport and the modal split

Unfortunately, there is no sufficient data basis to represent the transport demand of various income groups for a sufficient number of cities world-wide, as illustrated in the diagram for the example of Surabaya. However, it can generally be concluded that non-motorised transport (footpaths, cycle-paths, etc.) is of overwhelming significance to the poor.

¹⁵ Diaz, O. / Godard, X. (Sitrass): Poverty and Urban Transport - French experience in developing cities; World Bank TWUTD, 09/2000, page 14.

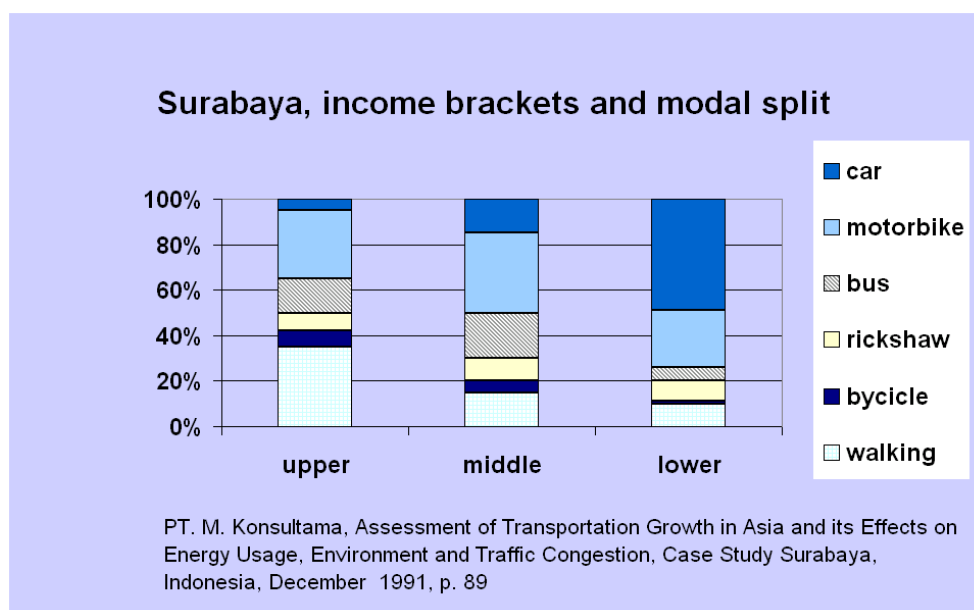


Fig. 6

In many African cities, there are no mass rapid transport systems; LPT is run by decrepit bus companies and informal minibuss operators. In some Asian cities (Hanoi, Surabaya, Jakarta), where fuel and vehicle prices are subsidised, poorer households also have access to motorcycles, so that MPT accounts for a significant proportion of the modal split, with a high share of 25-40% of all trips. In the cities of Bangladesh, China and India, the share of trips with non-motorised bicycles and tricycles is very high.

Modal split in urban city transport of selected African cities					
(in % of all trips)					
	Dakar	Ouagadougou	Kairo	Dar es Salaam	Nairobi
number of inhabitants 8)	1,801	716	14,524	1,436	1,598
NMT	46	52	36	49	48
walking	44	42	36	46	47
bicycle (others)	1	10	0	3	1
LPT	45	3	47	42	42
MPT	9	45	17	9	10
motorbike, etc.	3	39	4	2	2
car	6	6	13	7	8
Average journey time to work (1993, in min.)	45	22	60	30	48
SITRASS-Report: Poverty and Urban Infrastructure, 09/2000; Annexe 1.2, 1.5 World Bank Urban Strategy Review; The case of Cairo, 11/2000; Table 3.2.1., chapter 2.1 Howe, J. and Bryceson D.: Poverty and Urban Transport in East Africa, Review of Research and Dutch Donor Experience; 1 World Bank Development Indicators 2000, 3.112/2000, Table 5.4					

Fig. 7

In South American cities with more than a million inhabitants, public bus transport, which has usually been franchised to private companies, forms the backbone of motorised transport for the poor. In some Brazilian cities, the suburban railways are used by poor passengers to a disproportionately high degree.

Modal split in urban transport of selected Asian cities (in % of incidents of transport)										
	Dhaka	Surabaya	Jakarta	Bangalore	Chennai	Shanghai	Phnom Pen	Manila	Hanoi	Bangkok
number of inhabitants 4)	9,000	2,473	13,048	4,472	5,651	13,000	920	9,286	2,154,900	5,647,799
NMT	60.00	43.00	36.00	56.00	42.00	65.00	51.00	8.00	71.00	17.00
walking	22.00	20.00	23.00	43.00	22.00	38.00	7.00	8.00	8	17
bicycle (others)	38.00	23.00	13.00	13.00	20.00	27.00	44.00		63	0
LPT	32.00	15.00	26.00	34.00	50.00	28.00	30.00	68.00	3	58
MPT	8.00	42.00	38.00	10.00	8.00	7.00	19.00	24.00	26.00	25.00
Average journey time to work (1993, in min.)		23	38	18	22	47		120		
1) Modal split: Presentation given by W. Setty Pendakur at the WB UTS Seminars in Yokohama, 12/2000 2) Population statistics 1993: WB, World Development Indicators 2000, 3.11 and Fischer Weltalmanach 2000 3) journey time to work: WB, World Development Indicators 2000, 3.11 4) in thousands										

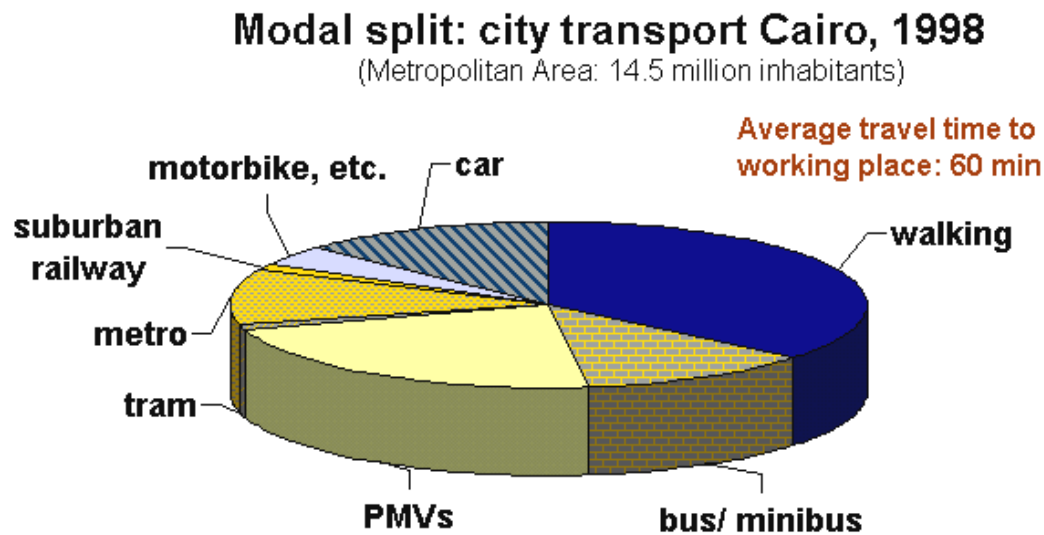
Fig. 8

To a large extent, the choice of means of transport depends on the physical existence of transport supply. So this restriction has to be borne in mind when discussing the status-quo analyses in the modal split comparisons. Therefore, if the very limited LPT supply were extended, the cost-benefit considerations of the poor could result in a completely different modal split.

Cairo, mot. modal split according to income brackets (1998)							
Household income / month	PMV	CTA	BUS	metro	car	taxi	motorbike no statements
Under £ 300	38%		28%	16%	7%	2%	1%
£ 300 - £ 500	33%		23%	19%	13%	4%	0%
£ 500 - £ 1,000	24%		15%	19%	25%	6%	0%
£ 1,000 - £ 2,000	14%		7%	14%	39%	11%	0%
In excess of £ 2,000	8%		3%	7%	57%	13%	0%
No answer	28%		20%	16%	20%	6%	1%
source: 1998 interview among households (SYSTRA-DRTPC) £ 1 (EGP) = 0.30 EUR (09/00)							

Fig. 9

The example of Cairo demonstrates that, with a suitable infrastructure, and in addition to PMTs and public bus transport, even the metro, a relatively expensive means of transport, is used by the lower income groups (thus scoring a tariff gain/cost relation of 1.68, which covers the operating costs).¹⁶



Quelle: World Bank Urban Strategy Review; The case of Cairo, 11/2000
World Bank, World Dev. Indicators 2000, 3.11

Fig. 10

2.1.2.3 The household budget and transport costs

No data basis that would be comparable on a world-wide scale is available for this topic either. The data collected from various case studies shows average values of 10 – 15%, putting transportation costs in second or third place in the overall household budget.

The percentages hardly differ from those in developed countries (Germany: 14%, France 15%). However, the composition of transportation costs does differ. In the developed countries, a large proportion of this expenditure is accounted for by the maintenance and running costs of a privately owned car; in the cities of the developing countries, these costs arise mainly from the use of LPT.

¹⁶ World Bank: Urban Transport Strategy Review – The Case of Cairo Egypt; 11/2000, page 42.

This area also lacks a reference data basis. The existing statistics do not demonstrate any link between transportation costs, travel distances and the choice of means of transport. So a low percentage of transport costs can also result from an insufficient LPT supply, and therefore need not arise from optimising expenditure in the available household budget.

An initially suspected higher relative strain on the budgets of “poor” households cannot be demonstrated with the existing data material; instead, as the examples of the west African cities of Ouagadougou and Dakar show, the people in the higher income brackets in

fact have a higher percentage of transport costs than the poor. This can be explained mainly by the choice of “more valuable” means of transport by the “rich” and the leaps in costs this entails (e. g.: bicycle < cheap bus services / MRT system < private car).

Average household budget share of expenditure on transport (West Africa)	
city	in %
Dakar	8.2
Wagadougou	15.6
Cotonou	9.8
Niamey	11.9
Abidjan	9.5
Bamako	11.2
Lomé	8.3
Enquête UMEOA (Union Economique et Monétaire Ouest-Africaine), 1996	

Fig. 11

Transport expenditures and overall consumption (according to income groups)		
	Dakar	Ouagadougou
lowest 20%		
expenditures/year/budget (in US\$, 1996)	1,362	854
percentage of transport expenditures	5.3	5.9
top 20%		
expenditures/year/budget (in US\$, 1996)	13,736	4,778
percentage of transport expenditures	10.7	21.8
Enquête UMEOA (Union Economique et Monétaire Ouest-Africaine), 1996		

Fig. 12

Of course, percentage distribution also has to be regarded in connection with the absolute initial value of the household incomes. From that perspective, at a tenth of the expenditure available for transportation, the strain on households living at subsistence level must be attributed much more importance than the 20% transport costs in the case of a household income ten times as big in the affluent part of society.

Moreover, there are extreme cases, as well. For example, the poor households in Delhi spend approx. 20-25% of their available income on daily mobility, up to 30% in the suburbs of Dar Es Salaam, and over 20% in many Brazilian cities. Interviews with selected target groups in poor urban districts of Buenos Aires showed that these inhabi-

tants had to spend an average of 20-30% of their household income on transportation, corresponding to approx. 2 hours of their daily earned income.¹⁷

2.2 Motorised private transport and opportunity costs

For decades, urban transport infrastructure in the developing countries has been oriented on MPT, following the example of the developed countries. Bilateral and international donor organisations have been supporting this transport policy.

Unlike in the developed countries, MPT road infrastructure, financed out of public funds, has usually only benefited a small, affluent minority (with a motor vehicle of their own). Even in relatively highly motorised Latin American cities, the average income of car-owners is two to three times higher than that of the rest of the population.

MPT use and income in selected cities of Latin America				
	MPT share (of modal split)	average income in US\$ (with car)	average income in US\$ (without car)	average income difference
Bogotá	19%	462	197	2.3
Buenos Aires	40%	607	299	2.0
Lima	20%	1,157	312	3.7
(1) JICA-Chodai: Master Transpiration Plan of Bogotá. , Bogotá, 1996 (income statistics of 1995, 1 US\$= 1000 Pesos)				
(2) Universidad de Buenos Aires: Estudio de Transporte y Circulacion Urbana, 1999. (income statistics of 1994)				
(3) Apoyo, Opinion y Mercadeo: Profile of Socio-economic levels in Metropolitan Lima, 1999 (income statistics of 1999)				

Fig. 13

In Santiago de Chile, the average annual costs of a motor car amounted to approx. 4,200 US\$ in 1998, while an employee was earning an annual average income of approx. 4,000 US\$.¹⁸

Public resources hence were misguided at the expense of LPT from which households would have benefitted more.

¹⁷ Ferrarazzo, A. / Arauz, M.: Pobreza y Transporte, Consultación con Grupos de Foco en Buenos Aires, Informe Final, WB UTS Review, Santiago Conference; 11/2000.

¹⁸ Zegras, C.: "The costs of transportation in Santiago de Chile: analysis and policy implications", Transport Policy, Vol. 5, n°1, pp. 9-21, 1998.

The example of the Colombian capital, Bogotá, is typical of the majority of cities with more than a million inhabitants in the developing countries. Here, MPT accounts for approx. 95% of all transport infrastructure but only handles 16% of all passenger trips.¹⁹

However, the external costs of MPT caused by traffic jams, emission of pollutants and road accidents impact on the population as a whole, and affect the poor in particular (opportunity costs). For instance, in the Latin American megacities of Santiago, Sao Paulo and Rio de Janeiro, additional operating costs of buses arising from congestion account for between 5 and 15% of the fares the bus-users, who are usually poor, have to pay.

External costs of MPT in selected cities with more than a million inhabitants s (in % of regional GNP, in the respective conurbation)	
Bangkok	6 - 11
Buenos Aires	4,5 - 6
Dakar	9 - 13
Mexico City	6
Santiago	7
Sao Paulo	5 - 7
World Bank: Cities on the move; a World Bank Urban Strategy Review, 02/2001, Chapter 2, Table 2.3	

Fig. 14

Many Asian cities with more than a million inhabitants and a high population density used to feature a high land-use mix (residential and commercial areas), so that travel distances for the poor living in the city centre were only short, and usually involved non-motorised transport.

The construction of privately financed MPT access routes or expressways to the new residential areas of the more affluent people in the higher income brackets, which received massive funding over the last decade, is increasingly destroying this socio-economic structure. The land requirements of the new urban roads is marginalising non-motorised transport and cheap LPT and forcing up real estate prices near the centre, and therefore the accommodation costs of the urban poor; traditional residential areas are being destroyed (resettlement) or segmented.

¹⁹ Peñalosa, E. (Former Mayor of Bogotá): Bogotá's Experience and Achievements in Urban Transport; WB UTS Review, Santiago Conference; 11/2000.

Motorised bicycles

The high share of motorbikes in the modal split - that can also be observed among the poorer sections of the urban population - is a special phenomenon in some Southeast Asian countries (Indonesia, Malaysia, Vietnam, Thailand). For example, approx. 80-90% of the households in the Vietnamese metropolis of Ho Chi Minh City have access to a motorcycle.²⁰

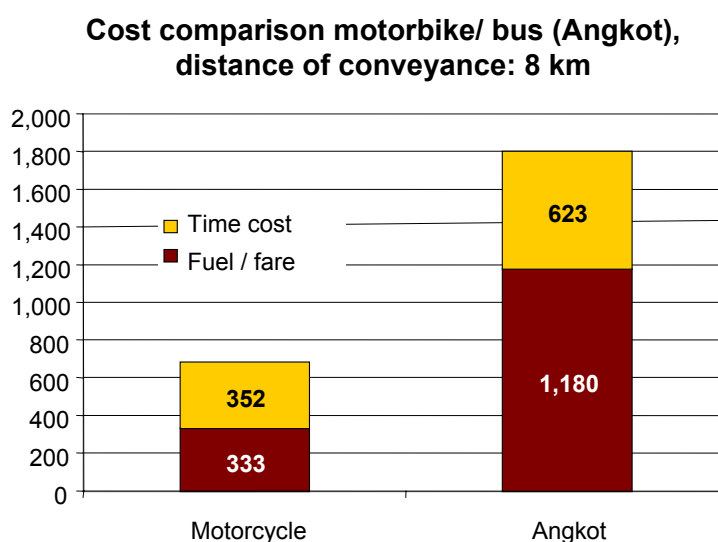


Fig. 15

In the Indonesian city of Surabaya, which has 2.5 million inhabitants, the share of motorbike trips in the extended modal split is approx. 30% (more than 60% of all motorised passenger trips), while it is 52% in Denpasar (65%).

There are various reasons for this phenomenon. On the one hand, the procurement and maintenance costs are very low. These countries often have a motorbike industry of their own or plants that assemble imported components. Import duties on spare parts are very low, and fuel prices are subsidised. The high motorbike share usually coincides with an insufficient (and often expensive) LPT supply. Another aspect is that, just like the car for the rich, motorbikes play a status role for the poorer people, giving them the feeling of greater comfort and “freedom”.

The example of the Bali city of Denpasar (1.5 million inhabitants) demonstrates the consequences a misguided government motorbike funding policy can have. Here, the tariffs of the public transport bus operators (Angkot) are 3.5 times higher than the pure operating costs of a motorbike (without depreciation and repairs), while the time costs

of slower bus transport are put at 1.8 times those of motorbike transport. Even if public transport were free of charge, LPT time costs would still be higher than the direct operating and time costs of the motorbike.²¹

Two-stroke engines, which have mainly been in use so far, pollute the urban environment with their high emissions of pollutants (in particular hydrocarbons, carbon monoxide and sulphur dioxide). This is why four-stroke engines are being used more and more. However, they are more expensive.

Comparison of pollutant emissions in Denpasar, 1995²²

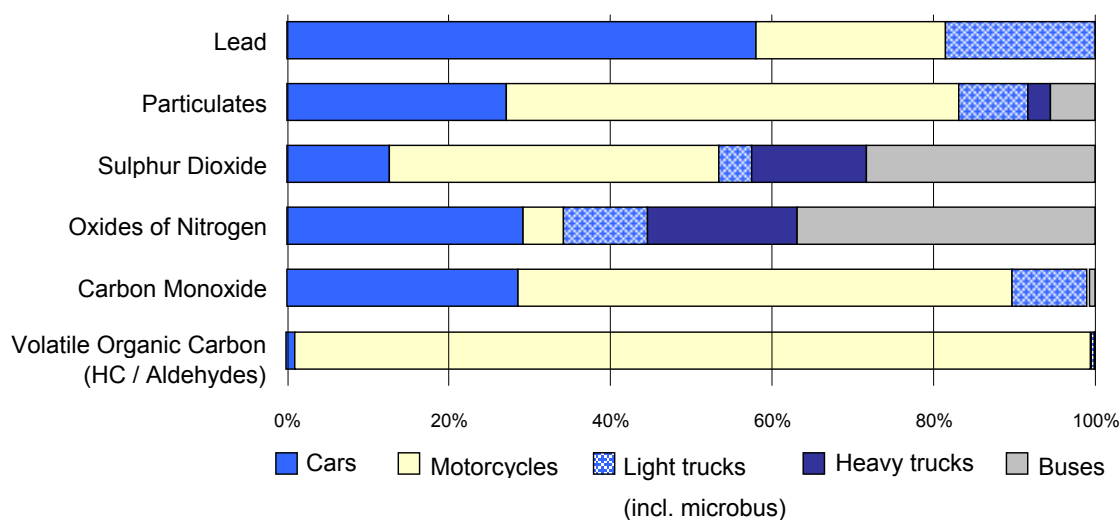


Fig. 16

Ouagadougou in Burkina Faso is a special case in Africa. Here too, motorbike transport accounts for approx. 40% of the extended modal split (and 70% of motorised transport).²³ Burkina Faso also has national motorbike production plants. There, low urban population density, the deficit-ridden LPT supply and the possibility to buy motorbikes on a hire-purchase basis are the main reasons for the use of this means of transport, which is also available to the poor majority.

²⁰ Ministry of Transport Japan, PADECO: Urban Transport Development – Final Report, Chapter 13; 08/2000, S. 13-2.

²¹ World Bank: Bali Urban Infrastructure Project, Public Transport Study, Volume 1 Greater Denpasar, 2000, S. 3-34.

²² World Bank: Bali Urban Infrastructure Project, Public Transport Study, Volume 1 Greater Denpasar, 2000, S. 3-30.

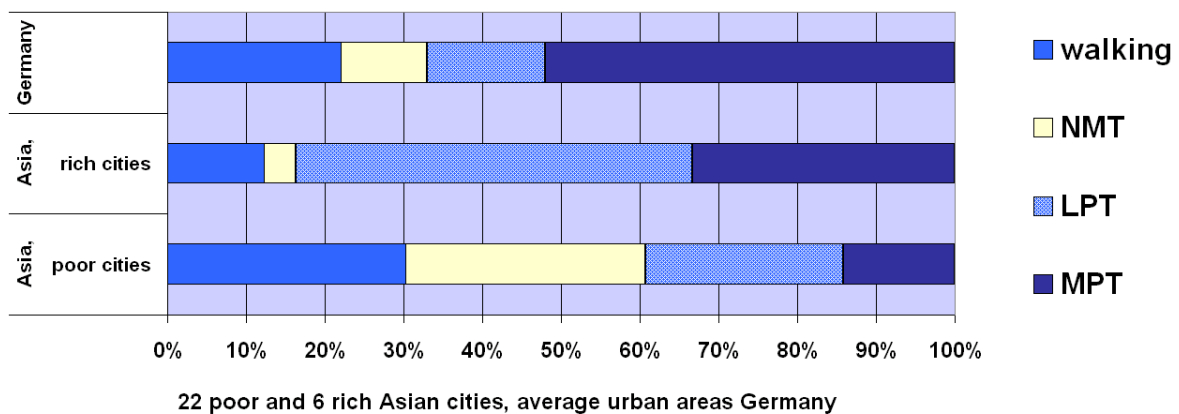
²³ Diaz, O. / Godard, X. (Sitrass): Poverty and Urban Transport- French experience in developing cities; World Bank TWUTD, 09/2000, page 76.

2.3 Local public transport (LPT)

In the majority of the cities with more than a million inhabitants in the developing countries, local public transport (LPT), and here in particular road-bound bus transport, forms the backbone of urban transport alongside non-motorised transport for the majority of the poor population living there.

As the tables on transport demand in Chapter 2.1.2 demonstrate, the local transport share of the extended modal split in the developing countries is approx. 40-50%, and its share of motorised transport is 70-80%. In comparison, the LPT share is just 10-15% (20% of the motorised modal split).

LPT share of modal split, comparison of Asia and Germany

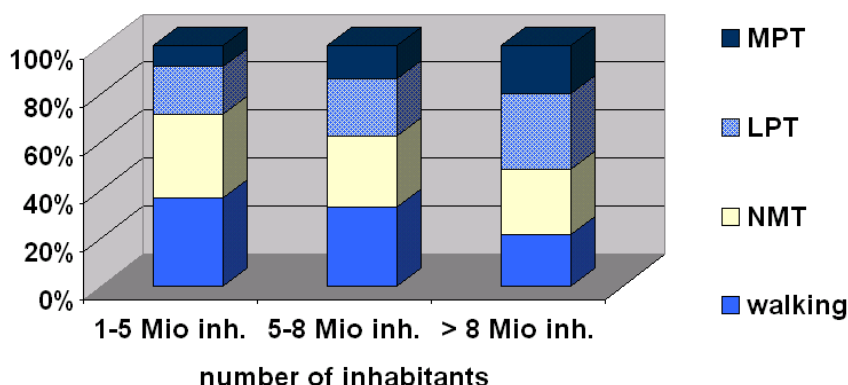


Susantono, Bambang: Key Urban Transport Issues in Asia; WB UTS-Review, Yokohama-Konferenz, 12/2000
 GTZ, FB44: WB-UTS-Review, paper Experiences from Germany and Zurich, Eschborn, 01/2001

Fig. 17

The example of selected cities in Asia shows that there, the LPT share is significantly higher in the richer cities than it is in the poorer ones. As a rule, a higher number of inhabitants also coincides with a higher local public transport share.

Modal split according to size of city (in 22 Asian cities)



Susantono, Bambang: Key Urban Transport Issues in Asia; WB UTS-Review, Yokohama-Konferenz, 12/2000

Fig. 18

Given average distances from the centre to the urban periphery of 10-15 km²⁴ and the maximum non-motorised transport range of 3-6 km (at 30 min. of walking or travelling time), LPT is of crucial importance above all to the poorer sections of the population living on the urban periphery.

However, the poorest of the poor – those without any means – cannot afford LPT even if tariffs are subsidised. Thus they depend on their own physical abilities (NMT) and therefore only enjoy a limited mobility access radius.

The relatively high percentage of the modal split mentioned above should not hide the fact that LPT is usually in a completely desolate situation and offers poor service quality. Urban districts with no LPT connections, long journey and waiting times, no timetables, non-existent or insufficient connecting of services, scattered tariffs (no interconnecting tariff system) and overcrowded buses are typical of the LPT scene in developing countries.

In nearly all the cities of Africa as well as in many Asian cities, an institutionalised LPT supply is hardly in existence. Years of focusing transport planning on MPT, a lack of public resources for investments and subsidies for operating costs as well as mismanagement and corruption have resulted in government LPT monopolies going bankrupt. Here, it is mainly the private, informal (partly regulated) paratransit sector (with mini-buses, motorised tricycles, rebuilt pick-ups, etc.) that provides the urban transport sup-

²⁴ Calculated for 20 selected cities in Africa, Asia and Latin America; setting out from the urban area as a circle.

ply for the poor population. In Manila, the paratransit LPT share (jeepneys, tricycles) is almost 70%.²⁵ Chapter 2.4 describes the prospects and risks of paratransit for urban transport for the poor.

By contrast, an institutionalised LPT supply exists in most of South America (usually bus transport). However, over the last 10 years, and also in response to pressure from the international donor organisations, it has been franchised entirely to private companies. It is interesting to note that the majority of the developed donor countries in Western Europe and North America continue to provide LPT services mainly via government (and usually communal) utility companies. Chapter 2.3.2 shows the experience made with privatisation and the consequences of “free” competition for the transport needs of the poor.

In the megacities (more than 5 million inhabitants) of the developing countries in particular, “normal” bus transport has been stretched to its system limits in terms of conveyance capacities, speeds, frequencies and distances (accessibility). Mass transport means (Mass Rapid Transit, MRT) such as underground railways, urban and suburban railways and exclusive right of way for buses have to supplement local public bus transport supply.

The following chapter describes the effects tariffs and subsidies have on the poor LPT users.

2.3.1 Costs, tariffs and subsidies

Low LPT tariffs that poor people can also afford and covering costs (at least operating costs) are two hardly reconcilable targets in many cities of the developing countries. LPT is heavily subsidised in most of the cities of Europe’s developed countries. There, an average of just 50-70% of the operating cost is covered by income from passenger fares; in Germany, the level of cost covering was 40% in 1993. As a rule, the investment costs for LPT are 100% public-funded.

This low level of cost covering in the developing countries is due on the one hand to the correspondingly expensive high level of technical standards and comfort criteria and on the other to low rates of capacity utilisation; there too, however, tariff increases can only be introduced in small steps and meet with considerable resistance.

²⁵ Cal, P.C.: Impacts of Urban Transport on the Poor in Manila; WB UTS Review, Yokohama Conference, 12/2000.

Against the background of enormous deficits in the public budgets of the developing countries and, in particular, the precarious financial situation of the megacities and the urgently required public resources for health and education (opportunity costs), the scope for public subsidies for local transport is, however, very small. As a rule, the need to cover LPT operating costs is an inevitable consequence. However, this can only be achieved if:

- there are high rates of capacity utilisation,
- technical standards (including environmental norms) resulting in cost increases and LPT comfort criteria, also for cost reasons, lie below the corresponding provisions made for the systems in developed countries (appropriate technology),
- the organisational and administrative framework conditions do not cause huge administrative costs (as is the case in Europe),
- poor LPT users are subsidised via more affluent income groups.

At present, there are no surveys on LPT cost structures that would be comparable on a world-wide scale. Based on the investment costs, the “exclusive right of way for buses” and “rehabilitated suburban railway” systems at least come close to covering costs. There are a wide range of LPT tariff structures in developing countries:

Tariff zones

In most of the cities in the developing countries, non-distance-dependent area tariffs are charged for urban agglomerations, especially in institutionalised public bus services. In many countries (e.g. China, Indonesia), these tariffs even apply to all municipalities nation-wide.

Usually, the area tariffs above all are aimed at cross-subsidising the poor living on the urban periphery via the users of short routes in the city centre (assumption: more affluent user groups). However, in cities with a high share of poor people in districts close to the city centre, this only results in the poor subsidising the poor.

Distance-dependent tariffs

This type of pricing is used in particular by the informal paratransit operators – also within the urban agglomeration. Here, in contrast with institutionalised LPT, it is easier to establish distance-dependent tariffs and ticket inspections, since the vehicles are smaller.

So for short distances, paratransit supply is often more convenient than institutionalised LPT. However, this also means that the paratransit sector siphons off the passenger potential of the short routes required for the above-mentioned cross-subsidising, resulting in an undermining of the area tariff logic.

Network tariffs

The municipal administrations in the cities of the developing countries are overtaxed with the organisational and administrative requirements for a working comprehensive and integrated public transport network with a corresponding tariff structure. It is especially difficult to establish a cohesive transport system in cities with LPT that has been franchised to private companies and a large number of operators. (One example of this is the LPT system in Buenos Aires, which has been completely franchised to private companies; so far, attempts to introduce a network tariff system have failed, also owing to resistance on the part of the operators).

The negative consequences, above all for the poorer LPT users, are obvious. Even if the operator changes for the same means of transport (e.g. road/bus), this will result in a multiplication of the fare (because of the area tariff, the entire fare for the short connecting journey with an additional bus operator increases disproportionately measured against the distance). A survey among selected poor target groups in Buenos Aires underscores these negative impacts of a lacking connecting tariff. In particular, people in the informal sector (craftsmen, domestic helps) who have to switch from workplace to workplace in the course of the day cannot pay for the corresponding fares and have to relinquish possible sources of income.²⁶

Weekly and season tickets

Weekly and season tickets are easier for the operator to implement than the interconnecting tariff. With regular daily journeys (with the same operator), the fare per journey for a monthly or quarter-year ticket is often only the equivalent of 30-50% of the normal tariff (for a single journey). This option is mainly taken advantage of by school pupils, students and public-sector employees in combination with other tariff reduction schemes. However, it is particularly the unemployed poor and people working in the informal sector who cannot make use of the offer of weekly and season tickets owing to LPT relations that cannot be planned. Neither does the financial situation of the poor

²⁶ Ferrarazzo A., Arauz M.: Pobreza y Transporte, Consultación con Grupos de Foco en Buenos Aires, Informe Final, WB UTS Review, Santiago Conference; 11/2000.

allow for the tickets to be paid in advance in many cases. So paradoxically, it is often the poorest of the poor who pay the expensive full price for a single journey.

Illustrations 19 and 20 show the example of tariff design in the metropolis of Cairo, which has a relatively diversified LPT supply.²⁷

Cairo, LPT tariffs (1998)						
means of transport	Tariffs (10km- distance, in €)					
	normal journey 2)	tariff	/ season ticket / 3 months 2)	season ticket / journey 1)	season ticket / 3 months, student	season ticket / journey, student 2)
PMV		0.12				
bus		0.08	4.56	0.03	1.82	0.01
minibus		0.12				
tram		0.08				
metro		0.15	12.16	0.08	3.34	0.02
suburban railway		0.08				
1) at an average of 2 journeys a day on 26 working days a month						
2) at a journey distance of 10 km Conversion rate: 1 Egyptian Pound = 0.30 € (09/2000)						
source: WB Urban Transport Strategy Review: The Case of Cairo Egypt: 11/2000, S. 26, 31, 33, 36, 38						

Fig. 19

Unlike with the example in Cairo (cf. Box 2), subsidies for operating costs are paid to the respective, usually private operators in most LPT systems in the developing countries with the aim of enabling affordable tariffs for the low-income sections of the population.

Cairo, cost / profit comparison bus, metro (1998)			
Means of transport		bus	metro
Costs (€/PKM) ¹⁾	Operating	0.008	0.004
	incl. depreciation	0.02	0.018
Profit/PKM ¹⁾		0.013	0.007
Operating cost covering		163%	175%
Overall cost covering		65%	39%
Normal tariff/PKM ²⁾		0.008	0.015
season ticket/Pkm ²⁾		0.003	0.008
season ticket/Pkm (student) ²⁾		0.001	0.002
1) for the system as a whole			
2) for a journey of 10 km			
Conversion rate: 1 Egyptian Pound = 0.30 € (09/2000)			
source: WB Urban Transport Strategy Review: The Case of Cairo Egypt; 11/2000, p.42			

Fig. 20

²⁷ World Bank Urban Transport Strategy Review: The Case of Cairo Egypt; 11/2000.

LPT tariff system in Cairo

Where the normal tariff applies, and also in connection with the respective season tickets, the public bus (CTA) is the cheapest means of transport. Setting out from the normal tariff (single journey with an average journey distance of 10 km), the fare/pkm is 0.08 €. At 0.013 €, the average profit per person kilometre is much higher. This allows for the conclusion that, for the poor in particular, affordable season tickets for buses are hardly used and journey distances are, as a rule, below 10 km, so that the bus is used for short, single journeys.

Trams and suburban railways are just as cheap as buses for journeys up to 10 km. However, the limited network and insufficient service quality result in a modal split share of just 1% each (see Fig. 10), rendering them irrelevant for conveying the poor.

Although the public motor vehicle is more expensive than the bus for journeys up to 10 km, it is still cheaper than the metro; here, season tickets are not available. Owing to a flexible and cheap supply, the PMT is favoured in particular by the sections of the population with the lowest income (see Fig. 9), and in the lowest-income group, it scores a modal split share of 38%.

With a single-journey fare of 0.15 €, the metro is the most expensive means of local public transport, but fares are still only 1.5 times those of the bus. Moreover, metro season tickets are available, as well. Related to an average of 2 daily journeys on each working day, a journey with a “normal” three-month season ticket costs 0.08 €, which is less than 50% of the normal tariff. The average profit per PKM is 0.007 € taking the respective value of the season ticket into account (at 10 km travel distance). Unlike with the bus, the season ticket is made use of in an appropriate way for the metro, and longer journey distances are covered. At 16%, the modal split share of the metro among the lower income groups is very high in comparison to other cities, and it hardly differs from the values for the middle (next higher) income group (see Fig. 9). In addition to the tariff structure, the spatial distribution of the poor in urban districts close to the centre and the routes of the Cairo Metro result in the unusual situation that this means of transport is used by the poor. In view of the high level of utilisation, the operating costs/PKM are just half those of the operating costs for buses, resulting in an (operational) cost-cover percentage of 175%. However, at 39%, overall cost coverage (including depreciation of investments) is below that of the bus (65%). And here, the shares of costs of investments in roads for bus transport have probably not been considered.

The cheap season tickets for the bus and the metro are available for school children, students, government civil servants and members of the armed forces, so they do not target the poorest of the poor.

Box 2

This type of subsidising bears various risks:

- the subsidies do not specifically target the poor but at best, they benefit all LPT customers;
- the subsidies are often pocketed by the operators via “inflated” statements of costs without actually reaching the LPT users;
- subsidies granted by the public sector are often not based on specially earmarked budgets, so that the agreed subsidies frequently cannot be paid. Services (e.g. poorly frequented routes to the urban periphery) are subsequently reduced or suspended;
- lump-sum subsidies in particular distort competition among the various operators.

In many cities, increased attractiveness of districts on the urban periphery with a subsidised LPT supply are made use of as a reason for land and home owners to raise rent and lease. Often, this puts the same, or an even higher, strain on the household budgets of the poor population living there. So direct, individual payments of subsidies to the poor users of LPT are far more effective, even though they may be more difficult to administrate.

In the Brazilian cities, the so-called Vale system has been in use among firms with more than 9 employees since 1978. Here, the employee notifies his company of the tickets he needs for a month. A small proportion of his wages (wage tax-deductible) is retained, while the rest is subsidised by the employer. However, this system only benefits people working in the formal sector (approx. 40% of the working population).

In Lima (Peru), reduced LPT tickets are sold at kiosks and other booths in urban districts with a high proportion of poor sections of the population (on the urban periphery). The bus operators can hand in the reduced tickets at the responsible public authority and are given the balance of the tariff agreed in the franchising contract in return.²⁸

The two examples mentioned above are certainly a step in the right direction. However, many alternatives of directly targeting the poor are conceivable that have so far hardly been made use of.

2.3.2 Competition and privatisation

In the early nineties, bilateral and multilateral donor organisations believed privatisation of LPT to be the patent recipe for solving the transport problems in the cities of the developing countries; today, almost all bus networks as well as track-bound MRT operators are in private hands in South America. Privatisation was aimed at making use of the private sector's advantages in terms of efficiency; competition between the different operators was supposed to result in cost cutting and lessening the strain on the transport budget among the mainly poor LPT users via tariff reductions.

However, these high expectations have not been fulfilled to any significant extent so far. On the contrary, the rapid privatisation of the bus sector in Chile resulted in the doubling of tariffs and a surplus of obsolescent buses with the corresponding negative impact on road safety, the environment and traffic density. However, improvements in services and productivity were also achieved in many cases.

²⁸ Ministry of Transport Japan, PADECO: Urban Transport Development – Final Report, Chapter 13; 08/2000, 13-7.

In the case of rail systems, which only a handful of cities dispose of anyway, some of the operators continue to receive direct subsidies for operating costs, frequently in the framework of negative franchising.

The partly negative consequences of involving the private sector have different reasons:

- Competition can only be established to a limited degree in LPT. On road corridors or suburban railways with heavy traffic, operating conditions rule out the involvement of several private operators. And the low density of LPT networks in the cities of the developing countries frequently does not allow for any acceptable alternative routes for the respective users. In many cases, competition in franchising is watered down by a lack of transparency owing to additional agreements being made later on. In many cases, government monopolies are replaced with private monopolies.
- In most cases, the rapid privatisation of local private transport was not supported by an adequate institutional environment and was not integrated into consistent transport, traffic and urban planning. Now, 6 years after the privatisation of the MRT systems, a transport master plan is being worked out for Buenos Aires; given that the franchise agreements cover periods of 20 to 30 years, alternative options are virtually non-existent.
- Mismanagement, corruption and (party-) political interference are important arguments that speak against public transport systems in developing countries. However, this situation has hardly changed since privatisation, especially where no efforts were made to establish a competitive market structure to accompany privatisation.

So LPT privatisation is certainly not a panacea to improve mobility for the poor. In an appropriate institutional and political framework, and with appropriate regulatory institutions in place, LPT privatisation results in productivity gains and the reduction or termination of subsidy payments in many cases.

2.4 The informal “paratransit” sector

The following framework conditions are typical of formal LPT:

- requirement of official permission,
- statutory obligation to undertake transportation,
- tariff equality (in defined areas and over defined periods),
- requirement to publicise tariffs,
- fixed timetables and routes,
- vehicles with a large passenger-carrying capacity,
- compliance with technical standards.

The informal paratransit sector either lacks these regulations altogether or it only applies them to a limited degree. While some cities in the developing countries have an authorised or at least tolerated informal transport sector, the paratransit sector has no legal foundations in other cases but still applies the above-mentioned criteria.

In many African and Asian cities, the informal paratransit sector virtually dominates urban passenger transport since the formerly government-owned LPT operators have left a vacuum behind owing to mismanagement, corruption and political abuse or, as is the case in many Asian cities, a regular LPT supply was never established in the first place.

Thanks to non-regulation, the paratransit operators can quickly and flexibly adapt to changes in the time and space patterns of demand. Tariffs can be fixed according to requirements, and in many cases, the transport charges are negotiated ad hoc. Given the low operating costs (old vehicles without technical inspections, no or only low tax, illegally employed drivers and staff), the paratransit operators have a clear competitive edge on formal LPT supply.

This is why publications referring to the issue nowadays often argue that it is the paratransit supply that meets the transport requirements of the poor best in terms of fares and flexibility, and in some cases, a symbiosis of paratransit and the poor is assumed. In addition, the impressive job creation effects are stressed that arise thanks to the use of small-capacity vehicles (motorised tricycles, rebuilt pick-up trucks, mini-vans).

In Manila, the overall modal split share of trips with motorised tricycles and jeepneys (rebuilt old buses and jeepneys) is 52%; the paratransit sector employs approx. 210,000 people, which is almost half of all employees in urban passenger and goods transport.²⁹

The negative consequences and the price of this dominance of the paratransit sector are obvious:

- high emission levels of pollutants,
- overcrowding of inner-city roads,
- revenue shortfalls,
- inhumane working conditions,
- Mafia-style structures.

So should urban transport policy bow to the status quo and attempt to at least partly integrate the paratransit sector, making it an element of formal LPT supply? The majority of international experts are in favour of such an approach. However, it means ignoring the conventional laws of transport economics, urban and transport planning, environmental and constitutional aspects.

If the paratransit sector really were to be regulated, almost all of the advantages it has been praised for so far would disappear in accordance with the laws of transport economics. A half-hearted regulation in part would allow for a large proportion of the negative impacts and external costs to continue to exist.

This is why the question has to be turned around: how can a formal LPT supply be provided in a flexible and cheap way for the majority of the – usually poor – urban population taking economic, ecological and social sustainability into account? In this context, the integration of non-motorised transport is of particular importance.

²⁹ Cal, P.C.: Impacts of Urban Transport on the Poor in Manila; WB UTS Review, Yokohama Conference, 12/2000.

2.5 Non-motorised transport (NMT)

As already demonstrated by modal split distribution in various African and Asian cities (Figs. 6 – 8), non-motorised transport, in particular walking, dominates urban transport among the population at large and above all the poor.

In China, Vietnam and India, even in the cities with more than a million inhabitants, bicycle transport accounts for between 20 and 50% of the overall urban modal split. In addition to private transport, NMT also plays a significant role in LPT in some cities, as is the case with rickshaw transport in Bangladesh (approx. 100,000 rickshaws).³⁰

Share of conveyance incidents with the bicycle in India (% of modal split in selected cities with more than a million inhabitants)

Ahmedabad	21
Indore	16
Jaipur	32
Kanpur	30
Lucknow	34
Ludhiana	23
Pune	16
Varanasi	21

Fouracre, A.; Astrop A. And Maunder DAC: Accessibility for the Urban Poor, unpublished Project Report at TRL for DFID; 1999

Fig. 21

Cross-section efficiency (capacity) and average speeds (see Fig. 3) of bicycle transport are in the magnitude of the “normal” bus or even higher. Dutch and Chinese surveys have established a cross-section efficiency of approx. 8,000 p/h/direction given a lane width of 3.50 m.³¹

In terms of ecological, economic and social aspects, NMT certainly attains the highest level of sustainability among all alternatives of urban transport.

However, since it requires the use of physical strength and is vulnerable to the direct impact of the weather, NMT does have its limitations regarding possible transport distances. This is why integrating NMT into the rest of LPT supply is an essential requirement particularly for the poor living on the urban periphery.

In spite of the importance NMT has in reality and the existing potential it bears, it has been given hardly any consideration by transport planners in the cities of the developing countries; this type of transport was regarded as backward and was sometimes massively campaigned against. The extreme results of this anti-NMT policy were for-

³⁰ Gallagher, R.: The Rickshaws of Bangladesh, Dhaka; University Press Limited; 1992.

³¹ Narvin, F.: Bicycle Traffic Flow Characteristics. Experimental results and comparisons; ITE Journal; 03/1993.

bidding the use of bicycles and rickshaws on inner-city roads and even getting rid of rickshaws altogether by official decree.

The influence of positive experience made with reviving NMT in the European countries and a change of thought among the bilateral and multilateral donor organisations has contributed to this negative attitude. Even in Latin American cities such as Lima and Bogotá, an important role has since been attributed to pedestrian and cycle traffic in urban traffic planning. For example, a total of 350 cyclepaths are to be built in Bogotá (investment costs: 52 million US\$), enabling 300,000 cyclists to cycle safely every day.³²

One problem the bicycle bears as a means of transport for the poor is the relatively high purchase price it has in several countries, which results from the absence of national production and, partly, higher import duties.

Just 12 countries produce 90% of all bicycles world-wide. As a result of the anti-NMT policy, a luxury tax has been imposed on bicycle imports in Africa ranging from 200 to 300%. In many countries of Africa and Asia, the purchasing price is the equivalent of 10 times the income of households in the poor population, 19 times the income in Nigeria, and in Ethiopia, three years of income. This is why second-hand offers and government-supported credit schemes are necessary to enable the poor population to buy bicycles as well.³³

However, a new NMT-oriented transport policy ought to promote the bicycle as a means of transport for the population as a whole, and not only for the poor, in order to counter the negative image cycling has in society.

Summing up, a new NMT strategy ought to contain the following measures:

- drawing up an NMT strategy in its own right in the framework of national and communal transport policy and planning;
- NMT-oriented amendments of the highway code and traffic management;
- construction of separate footpaths and cyclepaths – especially in the peri-urban districts – with the appropriate infrastructure (lighting, traffic lights, etc.);

³² Peñalosa, E. (Former Mayor of Bogotá): Bogotá's Experience and Achievements in Urban Transport; WB UTS Review, Santiago Conference; 11/2000.

³³ Guitink, P. / Holste, S. / Lebo, J.: Non-motorized Transport: confronting poverty through affordable mobility; World Bank Infrastructure Notes (UT-4); 04/1994.

- integration of NMT with LPT (bike and ride); parking spaces, connections with other means of transport, possibility to take along a bike on bus, tram and railway trips, etc.;
- public awareness campaigns for NMT;
- government-supported credit schemes for purchasing a bicycle aimed especially at the poor.

2.6 Urban land use and transport planning

Transport supply and urban land use are mutually dependent. Improving access for the poor can only be achieved if urban transport planning is co-ordinated with urban development and land use planning and takes the special economic limitations and transport needs of the poor into consideration. Of course the transport system cannot be oriented solely on particular groups but has to account for all transport users. The example of Curitiba is regarded as best practice of sustainable urban and transport planning, and a summary presentation of it is given in Box 3.³⁴

³⁴ Ceneviva C.: Land Use and Transport Integration - The Curitiba, Brazil Experience; WB UTS Review, Santiago Conference, 11/2000.

Case Study Curitiba

Framework conditions

- 1950: 300,000 inhabitants, 1990: 2.3 million inhabitants.
- Integrated urban land use and transport planning since the beginning of the seventies. Promotion of intensive industrial growth in the centre and along the main traffic axes close to the centre. Creation of housing along the traffic axes on the periphery (including 17,000 council houses).
- Priority given to LPT with exclusive bus ways (Bus Rapid Transit System).

Infrastructure

- From the city centre (CBD), 5 radial main axes with exclusive bus ways ("Canaleta Exclusiva") and a range of approx. 20 km and lane width of 7 m lead to the urban periphery.
- The normal buses ("Linhas Expressas") travel along these lanes at speeds of $v=20$ km/h, there are bus-stops every 500 m, and stops for interchange and feeder buses every 4.5 km.
- The express buses ("Linhas Diretas") only stop every 3-4 km and achieve speeds of $v=32$ km/h.
- Feeder buses ("Linhas Alimentadores") connect the individual urban districts with the interchange stops of the main traffic axes.
- Since 1981, preboarding tubes have been in operation. They are completely covered and on a level with the buses, so that passengers can board as soon as the bus doors are opened. This innovation reduced boarding time to just 1/8 (this successful system has since been introduced in other cities of Brazil and Latin America).

Operating

- The main traffic axes and bus ways are served mainly by articulated buses ("Ônibus biarticulado") that can carry 270 passengers and arrive at a headway of 2 minutes. Present operating tests with headways of 1 minute show that a system capacity of 18,000 passengers/hour/direction is feasible.
- A total of 1.3 million passengers are conveyed by LPT every day (year of reference: 1999); since the system was introduced, 28% of former MPT users switched to LPT.
- LPT operations have been franchised to 10 private bus contractors.

Tariffs/subsidies

- Since 1979, a standard area and connecting tariff ("tarifa única") has been applied: users of the long routes (usually poorer people on the urban periphery) are cross-subsidised by users of more profitable short routes (usually more affluent user groups).
- The costs of the permanent infrastructure are funded by the municipality; operating by private contractors does not require any further subsidising (revenue has been taken in centrally by the municipal administration since 1986 and allocated to the contractors via a ratio of distribution - per vehicle km, and observing fixed efficiency and quality parameters. The system works thanks to good regulation and control.

Result

- Setting out from a master plan with systematic planning, LPT was integrated into a consistent urban and area use plan. This implementation was only made possible with the aid of full political support. Transport supply has been oriented on the needs of the poorer groups of the population and enables the system to have its own internal distribution mechanism.
- The system is economically and ecologically sustainable.
- Per capita fuel consumption in Curitiba is less than 30% of that in comparable Brazilian cities. Compared to other Brazilian cities, Curitiba has one of the lowest air pollution levels.

Box 3

3. Conclusions, outlook and options for action

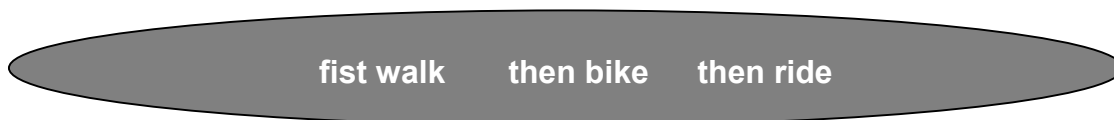
Transport has a crucial impact on access and therefore on the living conditions of the mainly poor population in the cities of the developing countries. Here, a strong interdependence exists with the respective urban and area use planning. The local geographic, socio-economic and economic and political conditions result in very different forms of transport supply and demand and therefore require specific concepts that have been adjusted to the local circumstances.

Generally, the following conclusions can be drawn:

- Urban transport policy and planning so far, which was geared to MPT, has proved neither economically nor ecologically sustainable and in no way oriented on the needs of the poor majority of the population. Rather, it was designed to meet the requirements of a small, privileged minority.
- The (revived) poverty approach of the bilateral and multilateral organisations is also setting new priorities for future transport planning in the cities with more than a million inhabitants in the developing countries.
- Non-motorised transport is of overriding importance for the mobility of the poor, and at best, it has so far been neglected or even actively prevented. It now has to be given special support.
- In terms of their system capacities, the LPT transport systems and means of transport are to be designed according to the respective demand flows, and in terms of their life-cycle costs they are to be optimised to harmonise tariffs and cost covering in the long run. The integration of LPT and NMT and the introduction of interconnecting transport systems substantially contributes to improving mobility conditions for the poor population, who depend on them.
- The possibility of involving the private sector to establish a working urban transport system also has to be explored in all cases.
- Co-ordinating of planning and implementing procedures in various sectors with transport planning at communal level and appropriate support by national administrations is of importance.
- Involving the target groups in the planning and decision-making process has to be supported by an active policy of empowering the poor in society.

- Public awareness measures are of considerable importance regarding the acceptance of desired changes. Charismatic integration personalities have proved just as elementary for processes of change (e.g. Jaime Lerner in Curitiba and Enrique Peñalosa in Bogotá).

Poverty-oriented urban transport policy and planning in developing countries can be summed up with the following slogan:



This is the principle that the strategy system for sustainable transport planning builds on that was presented by transport expert V. Setty Pendakur at the regional World Bank conference in the framework of the Urban Transport Strategy Review in Yokohama. The system has been developed according to sizes of cities and time horizons. (cf. Fig. 22).³⁵

Transport policy and planning in the cities of the developing countries that is oriented on the transport needs and household budgets of the population at large, the majority of whom are poor, ought to give priority to integrating non-motorised transport into LPT supply in future. Economic cost-benefit analyses in selected cities of Africa, Asia and Latin America underscore this demand. For example, related to a ten-year observation period (2000-2009), the economic benefit of the planned cyclepath network in Bogotá (300 km) is approx. 1.3 billion US\$, and the cost-benefit ratio is 1:7.3.³⁶

The Dutch study that was recently published in the World Bank's Urban Transport Strategy Review shows further examples and gives a detailed description of policy and planning options; the problem and target hierarchies presented in Annexes 7 and 8 provide an overview.

In cities of up to 5 million inhabitants, a network of segregated or exclusive right-of-way bus-lanes ought to form the backbone of motorised LPT. In comparison to track-bound overground systems (LRT) with similar system capacities, the investment and operating costs are significantly lower (approx. 50%).

³⁵ Pendakur V. S.: The Role of Non-motorized Transport; WB UTS Review, Yokohama Conference, 12/2000.

³⁶ I-ce, Interface for Cycling Expertise: The significance of non-motorised transport for developing countries – strategies for policy development; Utrecht; 12/2000, pages 71-74.

Planning horizon	Major modes	TSM strategies	Investment and regulatory policies
Planning Framework for Cities of 1 – 2 Million People			
1 – 10 years	Dominant: Bicycle & walk Other: Buses & negligible motorised modes	<ul style="list-style-type: none"> ▪ Increase intersection capacity ▪ Traffic separation NMV / MV ▪ Increase bus efficiency ▪ Staggered work hours ▪ Land use & transport coordination 	<ul style="list-style-type: none"> ▪ Increase the number of buses & routes ▪ Do not restrict NMV modes ▪ Rationalise NMV / MV conflicts ▪ Establish traffic codes for motorcycles ▪ Grade separated bikeways & some exclusive lanes
10 years	Dominant: Bicycle & walk	<ul style="list-style-type: none"> ▪ ATC systems ▪ Bikeways 	
12 years	Frequent: Bus	<ul style="list-style-type: none"> ▪ Some busways 	<ul style="list-style-type: none"> ▪ Extensive exclusive busways
20 years	Other: Negligible motorised modes	<ul style="list-style-type: none"> ▪ Coordination with transport of location of local enterprises 	<ul style="list-style-type: none"> ▪ Increase numbers of buses, trolleys & routes ▪ Examine need for LRT / MRT
Planning Framework for Cities of 2 – 5 Million People			
1 – 5 years	Dominant: Bicycle, walk & buses Other: Buses & negligible motorised modes	<ul style="list-style-type: none"> ▪ Increase intersection capacity ▪ Traffic separation NMV / MV ▪ Increase bus efficiency ▪ Signal timings with preference for buses & bicycles 	<ul style="list-style-type: none"> ▪ Increase the number of buses & routes ▪ Do not restrict NMV modes ▪ Rationalise NMV / MV conflicts ▪ Establish traffic codes for motorcycles ▪ Grade separated bikeways & some exclusive lanes
5 years	Dominant: Bicycle & walk		<ul style="list-style-type: none"> ▪ Exclusive busways & bikeways ▪ More buses & routes
7 years	Frequent: Bus Other: Negligible motorised modes	<ul style="list-style-type: none"> ▪ Intersection grade separation ▪ Large ATC systems ▪ Strict land use coordination ▪ Strict set back controls 	<ul style="list-style-type: none"> ▪ Feasibility studies of LRT / MRT ▪ Protection of rights-of-way for LRT / MRT ▪ Reduce trips & trip lengths by land use coordination ▪ Coordination with transport of location of new enterprises ▪ New technology & HOV acquisition
12 years			<ul style="list-style-type: none"> ▪ Increase numbers of buses, trolleys & routes ▪ Examine need for LRT / MRT
20 years			<ul style="list-style-type: none"> ▪ Negotiate financing of LRT / MRT
Planning Framework for Cities of over 5 Million People			
1 – 5 years	Dominant: Bicycle, walk & buses Other: Buses & negligible motorised modes	<ul style="list-style-type: none"> ▪ ATC-Systems ▪ Grade separated ▪ Rationalise signal ▪ Staggered work hours ▪ Control locations of new enterprises ▪ Rationalise NMV / MV 	<ul style="list-style-type: none"> ▪ Feasibility of MRT ▪ Rights-of-Way for MRT ▪ Rationalise NMV / MV conflicts ▪ No restrictions on NMV ▪ Traffic codes for motorcycles ▪ Grade separated bikeways & busways ▪ Exclusive bus lanes
5 years	Dominant: Bicycle & walk Frequent: Bus Other: Negligible motorised modes		<ul style="list-style-type: none"> ▪ Reduce trips & trip lengths by land use coordination ▪ Coordination with transport of location of new enterprises ▪ Feasibility studies of MRT
8 years		<ul style="list-style-type: none"> ▪ Increase bus efficiency ▪ Land use set back controls ▪ Feasibility studies of MRT 	<ul style="list-style-type: none"> ▪ Protection of rights-of-way for MRT ▪ Review financing feasibility of LRT / MRT
12 years		<ul style="list-style-type: none"> ▪ Larger ATC systems 	<ul style="list-style-type: none"> ▪ New technology acquisition: LRT / MRT, HOV, ATC systems ▪ MRT construction

Fig. 22

The urban transport project currently being carried out by Deutsche Gesellschaft für Technische Zusammenarbeit in Surabaya (Indonesia – cf. Box 4) takes the above-mentioned considerations into account and sets priorities for the reorientation of urban transport policy in developing countries. However, the project is an individual case. So far, the urban transport sector has played little role in the framework of targeting poverty in German development co-operation.

Sector project “Sustainable Urban Transport Surabaya / Indonesia”

No systematic results were available on the use of measures to reduce CO₂ emission. This project was aimed at assessing the feasibility of transferring tried and tested options from industrialised countries with the concrete example of Surabaya. The project target is: “Options to reduce CO₂ emissions in urban transport in developing countries are developed with the example of Surabaya, Indonesia”.

Context at the beginning of the project:

- Low LPT share of just 32% of all motorised journeys. No appropriate public transport system; non-motorised transport is being ousted owing to an insufficient infrastructure and, partly, by prohibitions.
- Subsidised fuel prices are supporting private motorisation.
- Blurred delimitation of overall government, provincial and urban issues, insufficient professional training standards among the responsible officials, lack of environmental awareness, lack of awareness and knowledge among broad sections of the population regarding sustainable forms of urban and transport development.

Today's situation:

In the framework of the decentralisation of decision-making in Indonesia, the responsible officials of the province and the city of Surabaya were supported, a common understanding of policy guidelines on urban transport was developed in a collaborative effort, regulations and guidelines were drawn up, detailed plans to promote non-motorised transport and to improve public transport were compiled (improved bus system, conditions for franchising of routes), and approval was obtained from the city parliament. Refitting minibuses for natural gas operation was tried out, and trial runs demonstrated that it was economical. All technical, regulatory and financing mechanisms for minibus operators were developed, very successful public awareness campaign (for the responsibility of the information office) was established, including ongoing activities such as Car Free Day (3 Car Free Days in 2001), etc. The institutional reform of administration was supported, proposals were worked out for an improved application of economic instruments to tax private transport were worked out and partly approved by the responsible officials, suggestions were made for the introduction of an inspection and maintenance system for vehicles in Surabaya, etc.

At various national and international conferences (e.g. the Clean Air Initiative for Asia, initiated by the World Bank, ADB, the International Energy Agency, GEF, Citynet, ICLEI) this project met with considerable interest thanks to its holistic concept and participatory approach. Several international delegations have already visited the project. It is regarded as a successful “low-cost” approach aimed at a holistic treatment of urban transport focusing on sustainability in which urban development aspects, the budget problems of the cities (no elaborate solutions are possible) and the reduction of local and global emissions are addressed on a par. In the course of the project, it became apparent that sustainable success in reducing gases with an impact on the climate can only be achieved if transport policy is addressed as a whole and all groups are involved in the decision-making process. Attitudes are changing in the city. The issue of public transport and cycle and pedestrian traffic including tricycle-riders is being perceived, and a number of decisions to improve the traffic situation in Surabaya with a view to a sustainable transport system have been taken. GTZ consultancy has significantly enhanced the status of the municipal employees in relation to central administration.

Outlook:

The project is suitable as a model project for the implementation of the concept of sustainability in cities with 1 to 7 million inhabitants in Asia, but also beyond that continent. Currently, the city of Surabaya is awaiting the implementation of important project recommendations and is seeking new sources of finance for further support.

Homepage: www.sutp.org

Box 4

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Annex: Current system capacities in “Mass Rapid Transit”

by: Lloyd Wright (Status: 4th quarter 2001)

city / line	system	capacity in passengers per hour per direction	source
Hong Kong	Underground railway	81,000	World Bank 2001
Sao Paulo Linha Este	Underground railway	60,000	World Bank 2001
Santiago La Moneda	Underground railway	36,000	Menckhoff 2001
London Linha Victoria	Underground railway	25,000	Transport for London 2001
Sao Paulo 9 de julho	Bus Rapid Transit	34,911	Meirelles 2000
Recife Caxanga	Bus Rapid Transit	29,800	Meirelles 2000
Porto Alegre Assis Brasil	Bus Rapid Transit	28,000	Meirelles 2000
Porto Alegre Farrapos	Bus Rapid Transit	25,600	Meirelles 2000
Bogota TransMilenio	Bus Rapid Transit	25,000	Hidalgo 2001
Belo Horizonte Cristian Machado	Bus Rapid Transit	21,100	Meirelles 2000
Curitiba Eixo Sul	Bus Rapid Transit	15,000	Município de Curitiba 2000
Quito Trolebús	Bus Rapid Transit	15,000	World Bank 2001
Goiania Anhangüera	Bus Rapid Transit	11,500	Meirelles 2000
Bangkok BTS	Local rail transport	50,000	World Bank 2001
México Línea B	Local rail transport	39,300	World Bank 2001
Kuala Lumpur PUTRA	Local rail transport	30,000	World Bank 2001
Panamá Tren Ligero (plan.)	Local rail transport	12,000 – 18,000	Ministerio de Obras Públicas

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Bundesministerium für
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