9 THE ROLE OF NONMOTORIZED TRANSPORT

Despite its economic importance to the poor—both as a mode of transport and a source of income—and its environmental advantages, the potential of nonmotorized transport is often unmobilized or even actively suppressed. A combination of infrastructure investment, traffic management, and financial measures can make nonmotorized transport safer and more attractive, to the benefit not only of the very poor, who are economically captive to nonmotorized transport, but also of the less poor.

THE IMPORTANCE OF NONMOTORIZED TRANSPORT

Nonmotorized transport (NMT) has an unambiguously benign environmental impact. In many cities it is the main mode of transport for the poor, and in some a significant source of income for them. It therefore has a very significant poverty impact. Where NMT is the main transport mode for the work journeys of the poor, it is also critical for the economic functioning of the city. Despite these obvious merits, NMT has tended to be ignored by policymakers in the formulation of infrastructure policy and positively discouraged as a service provider. The purpose of this chapter is to understand why that has happened, and in light of the evidence on its characteristics, role, costs, and benefits, to suggest a framework within which NMT's potential may be better exploited.

Some governments appear to have an ideological preference for motorized over NMT because they regard it as technologically more advanced. The World Bank concern for NMT is certainly not based on any ideological preference for low technology in urban transport. Indeed, the environmental impacts of motorized transport are often accentuated by outdated engine and fuel technology, while modern nonmotorized vehicles may benefit from advanced materials technology. Rather an explicit strategy for NMT is necessary to redress a historic vicious policy circle that has biased urban transport policy unduly in favor of sacrificing the interests of pedestrians and cyclists to those of motor vehicle users. Because of this policy, NMT becomes less safe, less convenient, and less attractive, making the forecast decline of NMT a self-fulfilling prophecy. That process is unacceptable, because it stems from a failure to recognize some of the external effects of motorized transport that distort individual choice against NMT, and hence militates particularly against the poor who do not have the means to use even motorized public transport.

The two major modes of NMT are walking and various forms of cycling, which can be personal or public transport. The NMT public transport sector, which is particularly important in South Asia, comprises many load-carrying variants. Particularly in higher-income countries, many people also walk or bicycle for exercise and pleasure. We exclude such activities from our consideration here to concentrate on NMT only as a mode of necessary transport. NMT accounts for between 40 and 60 percent of all trips in several major cities in Asia. In the poorer cities in Africa, that proportion is even higher.

WALKING IS TRANSPORT

For very short trips, walking is the main mode of transport in most societies, rich or poor. Indeed, most trips in all countries involve some walking as access and egress to the main mode. The modal share of walking can be very high. Recent studies show that between 25 and 50 percent of trips in the major Indian cities,[1] and around 50 percent of all trips in major African cities, are entirely on foot, and that trips undertaken primarily by public transport also involve significant walking distances. In medium and smaller cities, the share of all-walking trips increases to 60 to 70 percent. Clearly, walking dominates for shorter trips, but even in terms of distances traveled, walking accounts for over 50 percent of all trips in Morogoro, Tanzania.[2]

The political attitude toward pedestrians is often neglectful or curiously hostile. Pedestrian space is continually being eroded. Fewer than one-half of the major roads in most Indian cities have sidewalks, and those that exist are frequently occupied by street vendors, encroached upon by shop premises, or blocked by parked cars, motorcycles, and bicycles.[3] As city authorities have found it difficult to manage and control street market and footway activities, the trend has been toward getting rid of them altogether, rather than taking a functional approach to road hierarchy, whereby the functions of some roads could be for pedestrians and market activities and not for fast-flowing motor vehicle traffic. Whereas in many industrialized countries the advantage of pedestrianization of shopping streets has been recognized by shoppers and traders alike, it remains difficult to give priority to pedestrians in developing countries.

In some very rapidly growing countries, such as China, there has been an attempt to plan for pedestrians—though planning for pedestrians has lagged behind planning for vehicles. Attempting to cater to fast and free-flowing motor vehicle traffic has resulted in the gradual physical segregation of pedestrians by overpasses, subways, and barriers, many of which are poorly designed. Locations are often chosen for convenience of construction rather than to best satisfy pedestrian desire lines. While physical segregation can provide safe facilities for pedestrians to cross roads, it also results in severance and inconvenience for them.

WALKING ON WHEELS

Bicycles are a desirable mode of transport in many cities, but it is important to analyze who is using them, what the prevailing social and political attitudes are to the use of the mode, and whether there are particular obstacles to their use by women.

WHO BICYCLES?

The bicycle represents a trade-up from walking. In many of the poorer developing countries, only middle-income households can afford bicycles. For example, in 1996, 54 percent of bicycle users in Delhi had a monthly family income of over 2,000 rupees (about US$41), and only 19 percent of the users earned less than 1,500 rupees (about US$31). A similar survey in León, Nicaragua, showed 89 percent of users to be relatively well-off.

Data from Guangzhou, Delhi, León, and Accra show that the NMT share of each age cohort correlates closely with its share in total mobility, the age cohort 25 to 35 dominating both NMT use and overall mobility. In Vietnam, however, nearly all secondary-level schoolchildren go to school by bicycle, while motorcycles are rapidly taking the place of the bicycle as a means of transport for the age group 25 to 35. Men dominate the use of bicycles in most countries, with the exception of China and Vietnam.[4]

In some large countries, the proportion of bicycle trips has declined, and is continuing to decline, as incomes increase and as the perceived safety and security of cycling diminishes. Even in traditional cycling cities, such as Guangzhou and Delhi, those using NMT are apparently doing so

because there is no affordable alternative—that is, they may be viewed as (at least temporarily) captive passengers. But there are exceptions. In some European countries, already at high income levels, the use of bicycles as a mode of transport is steady or increasing, both as a main mode and as a subsidiary or feeder mode.

ATTITUDES TOWARD THE BICYCLE

Some insight into attitudes toward cycling can be obtained from a survey carried out in five different cities across the world (Accra, Delhi, Gangzhou, León, and Lima) in 1996.[5] Most bicycle users in these cities preferred bicycle to bus primarily because it was less expensive, but the majority also found it more flexible in routing, faster, and more reliable. The survey did suggest, however, that many would change to motorcycles except for the cost. In Ouagadougou, a city almost exclusively dependent on two-wheeled transport, and having made better provision for it than most, bicycles were still clearly viewed as an inferior mode to be abandoned as soon as the household could afford a motorcycle.

In two of the cities, public transport users were also asked about the relative merits of bicycle and public transport. Interestingly, most of the perceived benefits of cycling were the same as those perceived by the cyclists, namely, cost, speed, and flexibility. The main disadvantages that this group perceived (which by definition were clinching in their decision to use public transport) were the danger of cycling, the risk of thefts and assaults, the lack of bicycle paths, and the motorists' lack of respect for traffic laws (also by implication safety concerns). Only a minority quoted excessive trip distance or topography as clinching factors. One implication is that if these factors could be overcome, the use of NMT might be even greater. Another, less-comfortable implication is that if private motorized transport could be afforded and were to have the same flexibility as NMT, it would be preferred. Certainly that would seem to be consistent with the recent rapid increases in motorcycling in the richer developing countries.

The attitudes of public authorities toward the modes are often inconsistent with individuals' responses. While efforts have been made to segregate motorized and NMT in China, relatively little is being done elsewhere on a national basis, and improvement in the conditions for NMT depend heavily on the enthusiasm of specific municipal governments. Only a few (as for example, Bogotá under Mayor Penalosa) have attempted major initiatives. As far as public NMT is concerned, a number of governments—most notably that of Indonesia—have taken positive actions to eliminate it.

The reasons for these official attitudes appear to be rather complex, as Chinese experience shows (box 9.1). There is almost certainly a lack of interest by engineers (a lack of interest shared, until comparatively recently, in industrialized countries), who favor dealing with more technically rewarding road and bridge design. Police often focus on the difficulties of enforcing NMT routes and the lack of respect of cyclists for traffic regulations. Similarly, the richer and more politically influential classes are likely to be car users and to have a vested interest in reducing the nuisance offered by slow-moving and congesting NMT. Lack of transport-planning skills and design solutions appropriate for the large NMT volumes found in developing countries also contributes. Where local government is dependent on central government for road infrastructure funding (not the case in China), this may also limit local initiatives in providing for NMT.

WOMEN AND BICYCLING

In many countries women are largely excluded from the use of bicycles. This is partly a consequence of general economic and social norms, which can be addressed by community awareness programs to overcome cultural constraints to women's use of NMT. There are often more direct transport policy constraints—associated with access to credit mechanisms, design of vehicles, and personal safety and security during travel—that may impinge more on women than on men and that should be addressed in a policy package.

BOX 9.1 SOME RECENT EXPERIENCE WITH FACILITIES FOR CYCLING IN CHINA

In ***Shanghai,*** the development of NMT routes has been slow; the pace of development has superseded many proposals. But such problems did not affect the rapid development of motorized vehicle routes. In retrospect, it would appear that the Shanghai agencies saw the creation of NMT routes as a way of increasing the capacity and facilitating the operation of motorized vehicle routes, rather than providing safer and easier passage for NMT on a network of routes. The NMT routes suffered from problems of motorized vehicle access and parking.

In ***Guangzhou,*** the piecemeal development of elevated city-center routes has severed NMT and pedestrian routes, and again, the development of segregated NMT routes was seen by the Guangzhou agencies as a way of improving capacity for motorized vehicles.

In ***Urumqi,*** NMT volumes have decreased dramatically since 1992 with the introduction of minibuses, particularly in the central area. Weather and geography also result in NMT volumes lower than in other Chinese cities. Consequently, existing and previously physically segregated NMT lanes in the city have been converted into service roads and footways. Cycle lanes on central area roads are being converted to bus lanes.

In ***Beijing,*** NMTs are increasingly being squeezed by motorized vehicle parking in physically segregated NMT lanes and by the reallocation of space in wide NMT lanes to through motorized vehicle traffic. On the Second Ring Road, the outside half of the NMT lane has been reassigned to motorized vehicles, and the inside half is used by buses and taxis. NMT parking at work units is increasingly being moved to distant, inconvenient locations to provide more convenient space for motorized vehicle parking. A recent high-profile closure to NMTs of a commercial street at Xidan in Beijing epitomizes current practice.

Source: Frame 1999.

THE POLICY PACKAGE

In most countries NMT has developed spontaneously and remains largely outside the normal processes of transport planning. Provision for NMT, if made at all, tends to be "retrofitted" to existing infrastructure, and to concentrate on minimizing the disturbance that it causes to the flow of motorized traffic. The consequence is that the provisions are not only expensive but often inconvenient for NMT (for example, open pedestrian footbridges for crossing busy roads). Even where it is necessary to retrofit, the chances of designing an attractive NMT package are much greater when there is a willingness to modify elements of the system not originally designed for NMT. For example, measures of traffic calming to reduce speed differentials between motorized and nonmotorized traffic may be an essential requirement if pedestrians are to be kept safe and bicycle traffic is to be attracted to unsegregated roads.

The more successful schemes, whether providing for NMT as a feeder mode or a main mode, have been incorporated in initial urban system design. For example, the plan for Tama New Town in Tokyo provides for pedestrian and bicycle access to town centers and railway stations completely segregated from vehicular road traffic. The basis for such comprehensive attention to NMT is a combination of national strategy and local implementation planning.

Unless bicycle infrastructure networks are sufficiently dense, continuous, and direct, and both links and intersections perceived as safe, the impediments to cycling will continue to be strong. That will involve understanding desire line flows and identifying missing links, safety black spots, and other major impediments to bicycle use. Many attempts to mobilize the potential of NMT have failed because the attempts did not contain the minimum package of elements to ensure that NMT became an attractive proposition to a significant number of people. Given the need for a safe, secure, and direct transit, this minimum package would need to include the provision of safe, adequately segregated infrastructure; direct routings without major intersection conflicts with motorized traffic; secure bicycle parking to preclude theft; and financially affordable means of vehicle procurement. Hence, it is desirable that there be a local cycling master plan that should be the basis both for planning infrastructure specifically for bicycles and for incorporating cycling into general traffic infrastructure and management planning. Such plans have been drawn up and implemented in Dutch cities such as Delft.[6] An ambitious bicycle master plan for Bogotá, Colombia, has recently been published (box 9.2).

Local planning alone may not be enough. At the national level, it is necessary to identify objectives for the sector and to ensure that the crucial elements of the facilitating framework that can only be handled at the national level (such as the creation of a legal basis for traffic management, promotional campaigns, financing instruments, and so on) are put in place. The Dutch Bicycle Master Plan specifies a general objective and identifies a number of "spearheads" for action; the plan is an element of the long-term transport strategy for the Netherlands. A similar central government initiative has recently been taken by the government of South Africa in establishing a national bicycle transport partnership (box 9.3).

INFRASTRUCTURE POLICIES

Network planning must be supplemented by detailed road section planning (what to do with the layout: separation or mixing) and junction and intersection planning. This will involve a combination of measures to determine the function, physical characteristics, and use of each element in the network.

The starting point is function. There are several different functions (such as access, distribution, or transit) for each kind of mode. Since the inter-

BOX 9.2 THE BOGOTÁ BICYCLE MASTER PLAN

In year 2000 the municipality of Bogotá, Colombia, published a master plan for bicycles in the city. The plan includes the construction of 320 kilometers of cycleways over a nine-year period at an estimated cost of $120 million. It also provides for the necessary ancillary infrastructure, including bicycle parking, urban street furniture, landscaping, and traffic signals. The plan has been subject to detailed economic and environmental appraisals. For a shift in modal split to the bicycle of 2.5 percent, an economic rate of return of 15 percent was estimated. Higher shifts give correspondingly higher returns.

The launch of the first phase of the plan, for the construction of 200 kilometers of cycle track at a cost of $50 million, was accompanied by an ambitious marketing effort. This showed the program to be well integrated with parallel development of the TransMilenio urban public transport scheme and other transport facilities, as well as offered links to neighboring municipalities.

Source: Mauricio Cuellar, from local Bogotá press reports .

BOX 9.3 SHOVA LULA (RIDE EASY): A NATIONAL BICYCLE TRANSPORT PARTNERSHIP

In his 2000/01-year budget speech, the minister of transport of South Africa announced a plan to promote greater self-reliance through a national bicycle transport partnership. The minister himself is the champion of this partnership and has the overall authority to define its course. The national department of transport is responsible for overall project management and implementation.

At the core of the partnership is a project called the National Bicycle Transport Demonstration Program. The aim of this program is to demonstrate the transport benefits of bicycle promotion targeted at low-income users in relatively low-traffic rural and medium-size city areas. It consists of a road show to raise awareness and to leverage support, including targeting women, girls, and youths; procuring and providing low-cost new and used bicycles; training in riding and maintenance skills; developing a container microbusiness outlet to support users; reviewing infrastructure safety; and providing detailed training, planning, and evaluation exercises.

This program is funded by the national department of transportation (NDoT), with the aim of leveraging additional support from other parties. The objective of Phase 1 (2000/01) is to implement at least 10,000 bicycle transport packages at one or more sites in each province across South Africa. The objective of Phase 2 (2001/02) is to implement a further 15,000 bicycle packages at the nine existing and eight new sites. Phase 3 (2002/03) aims to implement 50,000 bicycle packages at the 17 existing and 18 new sites.

In addition to the national demonstration program, the partnership has also developed rural and urban pilot projects. The urban project is a partnership between the NDoT and the Midrand Local Council. As part of their Ecocity initiative, Midrand has committed 300,000 rands (about US$30,675) to promoting 1,000 subsidized bicycle transport packages in the township of Ivory Park, east of Johannesburg, together with a container microbusiness. Midrand, together with its partners, has also designed six kilometers of bicycle infrastructure in Ivory Park in order to ensure safety and maximize the promotion of township cycling.

Source: De Langen and Tembele 2000.

ests of various modes may differ (and conflicts are endemic), the planner must develop a functional classification of roads and road hierarchy and identify the appropriate measure to reconcile conflicts. If the functions for different modes are incompatible—such as the use of "rat-runs" through residential areas as segments of main trunk movement routes—it will be necessary to judge on priorities and modify both physical characteristics and regulation of use accordingly. Some cases (for example, major arterials designated for faster, longer-distance movements or urban busways) might justify the exclusion of nonmotorized vehicles on both efficiency and safety grounds. Nevertheless, even in those circumstances, it is important that steps are taken to avoid serious severance of short-distance movements. Moreover, any decisions to restructure roads (for example, to introduce new restraints on categories of use or to take away protected bicycle lanes) should be appraised in terms of the net benefit to all types of user and not merely in terms of the speed of motorized traffic.

Intersection design and design of motor vehicle access to buildings on NMT routes are both extremely important, particularly, as in China, where bicycle volumes may be very high.

It may often be possible to reconcile functions of a road section by changing its physical layout. Motorized and nonmotorized traffic can coexist in three ways.

a. Full integration gives no exclusive right or special protection for bicyclists or pedestrians using a mixed road and relies on driving behavior to protect the more vulnerable categories.

b. Partial segregation reserves a strip on the carriageway for bicyclists or pedestrians, but does not protect it physically.

c. Full segregation gives exclusive rights to pedestrians or cyclists and makes it physically difficult for motorized traffic to trespass on that right. Even in this case, however, it is likely that there will be at best only partial segregation at major intersections.

These alternatives are in ascending order of capital cost but descending order of enforcement cost. The choice between them will depend on the traffic mix, primary road function, relative free flow speeds, and traffic volumes. Experience in Africa (Ghana) and Latin America (Peru) have shown that if the volume of bicyclists is too low, it will invite infringement, at least by pedestrians, particularly if there is no pedestrian alternative.

Where NMT volumes are high, it will not only be safest but also most efficient in terms of travel speed for all categories of traffic to provide for full segregation. It may then also be efficient, as increasingly practiced in larger cities in China, to provide for grade separation of traffic at intersections, though there may be a danger that, for cost reasons, cyclists are assigned a cumbersome route that reduces the relative comfort of that mode. At the very least, it will be justified to provide for separate NMT phases in signal-controlled intersections.

Where motorized traffic volumes are low and the location sensitive (for example, in residential areas), it may be more appropriate to use traffic-calming devices to slow all movements to speeds at which they are safely compatible (as in the Dutch "woonerf"—sharing space between vehicles and pedestrians). The adoption at the national level of advisory standards for traffic separation is one basis on which a more NMT-sensitive attitude to road design can be effectively disseminated.[7]

TRAFFIC MANAGEMENT

Survey evidence makes it clear that safety is the most critical feature for the preservation and development of NMT. Physical separation of space for NMT can be made largely self-enforcing. Where there are no physical barriers to infringement, separation will only work if there is a sufficiently powerful combination of monitoring, enforcement, and legal penalties, particularly on vehicle infringements to run or park in NMT space. Most difficult of all is the protection of NMT in shared space; evidence in many countries suggests that this will have to be done through strong, physically enforced, traffic calming. Experience in the Netherlands and elsewhere shows that traffic-calming measures in neighborhoods and shopping or market areas are among the most effective supports to NMT programs.

Theft is a strong deterrent to bicycle ownership. A household survey in Guangzhou in 1995 revealed that each household had on average one bicycle a year stolen from it, and that 62 percent of these thefts occurred in residential areas. Protection against theft has proved elusive. Nearly all the stolen bicycles in Guangzhou were locked. They were also registered with the police, who were, however, unwilling even to record the thefts and who recovered fewer than 10 percent of the stolen bicycles. (In Jiangmen City, where a new bicycle number plate practice is in place, results

are different.) Guarded parking facilities, common in Japan and the Netherlands, offer better protection.[8] Unfortunately, most cities do not have suitably located or sufficiently inexpensive parking facilities at major destinations (stations, markets, offices, and so on).

SAFETY EDUCATION AND TRAINING

An important requirement of a strategy to promote NMT is to establish and make known to the general public the rights and responsibilities of pedestrians and cyclists, as well as the traffic rules that deal with safety. In many Organisation for Economic Co-operation and Development (OECD) countries, these rights and rules are clear. In contrast, in many developing countries cyclists and pedestrians are often mentioned in legislation only for definition purposes and have no specified legal rights in the use of road space. Traffic law should clearly define the rights and responsibilities of nonmotorized users of roads, as well as those of motorized users.

Establishing rules is only one part of the solution to the problem. The second part is to get them known and applied. Training and educating children to understand more about traffic rules can be addressed both by incorporation of such training in the school curriculum and by campaigns outside school. In the longer term, knowledge of the rights of pedestrians and cyclists should be incorporated in driver license testing. In the shorter term, the problems are twofold: many existing drivers are unlicensed, and few police have been educated to think of the safety of pedestrians and cyclists as a responsibility of drivers of motorized vehicles. Treatment of NMT should thus be a central part of comprehensive road-safety programs (see chapter 5).

MUNICIPAL INSTITUTIONS AND ORGANIZATION

Provision for NMT in urban areas is almost exclusively a municipal responsibility. As such it suffers from the typical paucity of municipal funding in developing countries. The virtual impossibility of charging users directly for the infrastructure provided accentuates this disadvantage. Even secure bicycle parking, which is provided commercially in some industrialized countries, is difficult to finance in developing countries.

In some of the higher-income developing countries, it may be possible to learn from more industrialized countries, where adequate provision for NMT—especially walking—is a planning requirement for commercial shopping mall development. But that requires both a degree of effectiveness of development controls and a political commitment to adequate provision for NMT. The critical question is how such commitment and capability can be developed.

One approach, being pursued in some African cities, is to set up a special-purpose multidisciplinary and interdepartmental team within the municipal authority to take initiatives, to plan, and to implement interventions. Such a team might support intensive user participation in the planning and design process and focus on widely supported interventions with a high benefit-to-cost ratio (value for money). A template for such an approach has been provided for African cities.[9]

That approach is most likely to be effective where the modal share of NMT is large and its importance is already recognized. In less propitious circumstances, it may be more important to create alliances rather than to risk further fragmentation of responsibility for urban infrastructure. It may then be more effective to build capacity by embedding NMT expertise in existing forums, such as municipal engineering departments, national road-safety councils, road fund administrations, and so on. In either case, the starting point needs to be recognition of the potential for NMT and a commitment to providing for it.

STAKEHOLDER PARTICIPATION

It might be expected that user and stakeholder participation would improve the quality of the

decisions by exploiting local knowledge and desires, and spotting and solving potential problems, as well as by smoothing the execution of public sector interventions. In practice, experience with user participation in NMT schemes has been very variable. In the NMT project in Lima, staff and authorities showed little commitment to participation, and ad hoc meetings were organized only in response to local protests. Similarly, the Kenyan authorities lacked commitment in implementing the Sub-Saharan Africa Transport Program (SSATP), and success was limited. However, in Tanzania the SSATP results were positive, partly because of the urgency of the problems and the expectation that the outcome of the entire process would be positive for the user group involved (box 9.4).

FINANCING

Many of the impediments to cycling and walking arise from the inadequacy of infrastructure that is not addressed through the traditional funding mechanisms. For example, none of the recently developed second-generation road funds appears to pay any attention to NMT or to have NMT interests represented in the roads authority boards managing the funds. Given that the commercial rationale of user involvement in fund management is that those who benefit should pay, and vice versa, this is perhaps not surprising. Nevertheless, it highlights a weakness of the device in addressing the interests of noncommercial stakeholders.

While the operating costs of cycling are very low and the benefits very great where no other alternative is affordable, the cost of bicycles is a serious impediment to cycling in many countries (especially where the probability of loss by theft is high). Previous efforts to overcome this impediment have had mixed success but offer some useful lessons for design of future schemes.[10] For example:

- A World Bank–funded credit program directed to the poorer sections of the urban population of Lima met its credit targets, but was hampered by the mutual distrust between staff of the Caja Municipal and the poor in the administration of the scheme.
- An African pilot scheme giving incentives for employers to establish credit and savings schemes failed in situations where the credits were to be prefinanced by employers.
- Bicycle sale-on-credit programs have had limited success in pilot projects in Africa, due

BOX 9.4 STAKEHOLDER PARTICIPATION IN NONMOTORIZED TRANSPORT DEVELOPMENT IN TANZANIA

In experiments undertaken in East Africa as part of the SSATP, different forms and roles of user participation were employed at different stages of the projects. For example, in Dar es Salaam 64 user groups of about 10 people each discussed general problems with mobility and NMT and provided information on problems, road-use behavior, potential solutions, and priorities to the planners. Subsequently a general user platform of about 20 nonpolitical, nongovernmental citizens was asked to review, articulate, and prioritize the problems mentioned by user groups; this user platform acted as an intermediary between the authorities and the community. Local user platforms were used to create and review plans, and propose changes; to provide control during construction; to mobilize resources; to organize repairs; and so on. Finally, formal user associations with legal status and able to mobilize finances through contributions of members or users may also have a part to play. In the case of Dar es Salaam, a garden park was planned that is to be handed over to a user association for maintenance and protection.

Source: De Langen and Tembele 2000.

to the perceived high risk of lending to poor clients.
- In Morogoro, Tanzania, entrepreneurs who rent or lease bicycles welcomed the concept of bicycle lease contracts, though they were unable to prefinance enough bicycles.
- In contrast, a scheme for promotional bicycle sales to women and children entering secondary school in Morogoro, showed a high price elasticity of demand for bicycles, and suggested possibilities of extending bicycle use by identifying promising target groups.

CONCLUSIONS: A STRATEGY FOR NONMOTORIZED TRANSPORT

The major elements of a strategy for NMT should include the following:

- Clear provision for the rights, as well as responsibilities, of pedestrians and bicyclists in traffic law
- Formulation of a national strategy for NMT as a facilitating framework for local plans
- Explicit formulation of local plans for NMT as part of the planning procedures of municipal authorities
- Provision of separate infrastructure where appropriate (for safe movement and for secure parking of vehicles)
- Incorporation of standards of provision for bicyclists and pedestrians in new road infrastructure design
- Focusing traffic management on improving the movement of people rather than of motorized vehicles
- Training of police to enforce the rights of NMT in traffic priorities, as well as in accident recording and prevention
- Incorporation of responsibilities for provision for NMT in road fund statutes and procedures
- Development of small-scale credit mechanisms for finance of bicycles in poor countries.

NOTES

1. Sachdeva 1998.
2. De Langen and Tembele 2000.
3. Sachdeva 1998.
4. Men's share in New Delhi, Accra, Lima, and León is 100 percent, 99 percent, 84.6, and 90 percent, respectively.
5. Interface for Cycling Expertise 1997.
6. Interface for Cycling Expertise 2000.
7. Interface for Cycling Expertise 2000.
8. At one of the very few places in Lima where you can park your bike—the Catholic University—students have to show their identification before entering the university compound. So far, not a single bike has been reported stolen.
9. De Langen and Tembele 2000.
10. Interface for Cycling Expertise 1997.