

Beyond Public Transport

The Pedestrian Environment and Non-Motorized Transport (NMT)

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ESMAP
Energy Sector Management Assistance Program

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Cluster 5/Module 3 (C5/M3): The Pedestrian Environment and Non-Motorized Transport (NMT)

This presentation is one of the support materials prepared for the capacity building program **Building Leaders in Urban Transport Planning (LUTP)**.

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- The World Bank
- Australian Agency for International Development Aid,
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Objectives

- **Understand the relevance of walking, the pedestrian environment and Non-Motorized Transport (NMT) for urban transport**
- **Review the status of today's NMT**
- **Discuss the challenges and benefits of today's NMT**
- **Identify the factors to consider for promoting safe and accessible use of NMT**
- **Share lessons and examples from successful NMT initiatives**

The objectives for this module are to:

- Understand the relevance of walking, the pedestrian environment and Non-Motorized Transport (NMT) within the larger context of urban transport
- Review the status of today's NMT
- Discuss the challenges of today's NMT
- Identify the factors to consider for promoting safe and accessible use of NMT
- Share lessons and examples from successful NMT initiatives.

Opening Exercise Walking and Cycling in Your City



- How important are walking and cycling in your city as modes of transportation?
- What special efforts have been undertaken to improve these modes?
- What work still needs to be done?

Our opening exercise is designed to get you to start thinking about the important role that walking and cycling play in your city. The importance of planning for these transport modes often is overlooked.

Thinking about your city, please answer the following questions:

- How important are walking and cycling in your city as modes of transportation?
- What special efforts have been undertaken to improve these modes?
- What?

Take about 5 minutes to do this exercise.

Unmet Needs and Constraints in Urban Transport

- **Users tend to be captive riders as they rely on:**
 - **Walking as main mode of transport**
 - **Informal services, and**
 - **Non-motorized forms of transport**
- **There are differences in mobility patterns and needs across income and social groups:**
 - **Poor urban residents often face tradeoff among residential location, travel distance and travel mode**
 - **Mobility needs and patterns differ by gender**
 - **People with disabilities face environmental challenges**



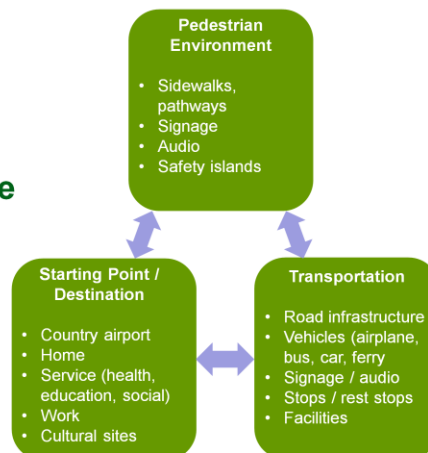
In urban areas of developing countries, where high rates of urban growth, large poor populations, and high densities prevail, walking is the only option available to a significant portion of the population.

In many countries, the travel environment for pedestrians and non-motorized transport can be unsafe, declining or non-existent. This trend is particularly unfavorable for the urban poor as they are typically “captive riders”, meaning that they cannot afford an alternative and often dependent on public transit for access to employment and on walking as their main mode of transport to reach their daily needs.

The transport patterns of poor people in developing countries often reflect a complex tradeoff among residential location, travel distance, and travel mode, in an attempt to minimize the social exclusion associated with low earning potential. Differences in land prices in developing countries generally reflect variations in accessibility to the city center or centers of employment. Since good transport contributes to accessibility, it tends to drive up land rents and drive out poorer residents, who can only afford to live closer in as pavement dwellers or in slums which are often inaccessible to motorized transport and are very difficult to inhabit.

Why is Walking Important?

- **All trips involve walking**
 - To/from another mode (e.g., public transport, auto/parking) or
 - For the entire travel distance (competes as a mode)
- **A cornerstone of safe and accessible trip chain**
 - Increasing the use of public transport
 - Replacing motorized trips



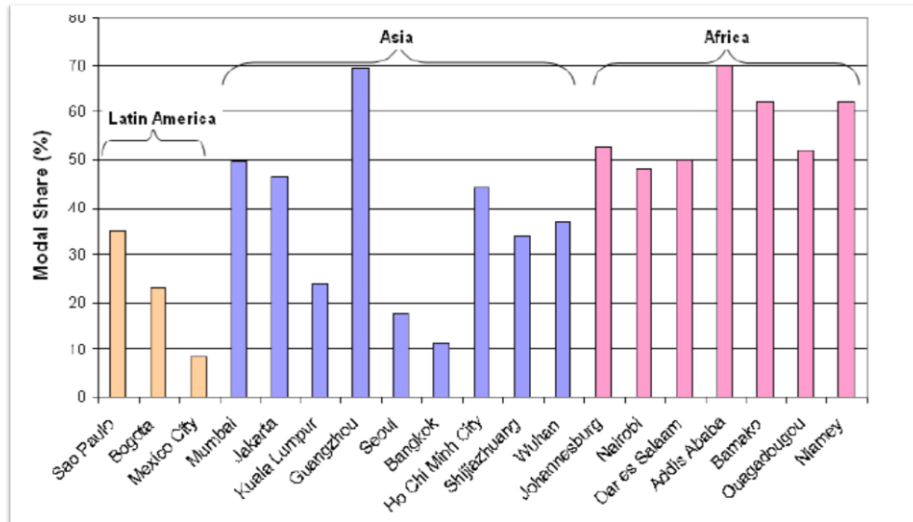
First, we should think about why walking is important.

Walking plays an essential role in personal travel: It is the first mode of transportation that everyone can use to travel; it is free and even presents health benefits. All trips involve walking from a point of origin to access transportation; to connect to and from another mode; from transportation to the destination (diagram).

The ease of walking may affect our choice of whether to use a bus or car for a trip. In many urban areas people do not have access to private motorized forms of transport or do not have access to transportation, either because it is not available, accessible or affordable (supply).

Where demand for transport is not adequately met by public transport systems in urban and peri-urban areas (problems on the supply side), people may not be fully mobile or may switch to private motorized travel. This can lead to congestion, pollution, and land price issues as we are witnessing in many rapidly growing developing cities.

Walking Modal Share in Select Developing Cities



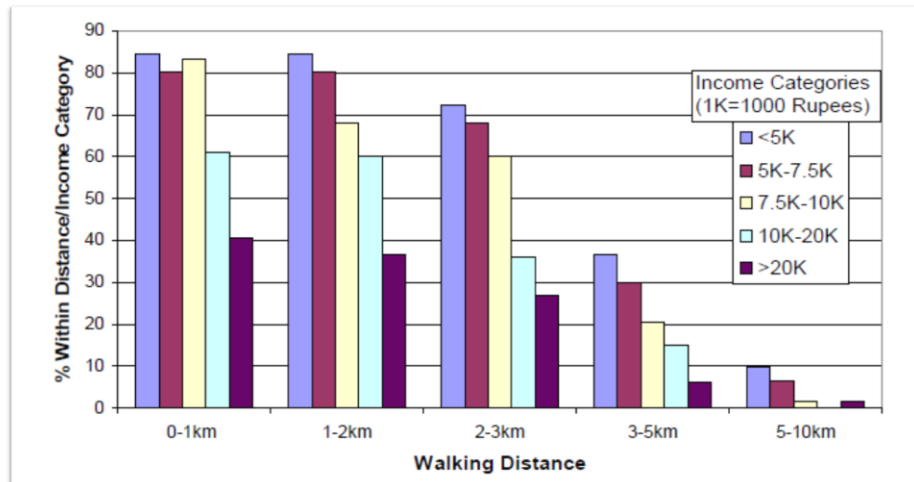
Source: World Bank 2008

The modal share of walking in urban areas can be very high, particularly in developing countries, where high rates of urban growth, large shares of poor populations, and high densities prevail. Walking is the only option available to a significant portion of the population.

Recent studies show that between 25 and 50 percent of trips in the major Indian cities, 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 Tanzania.

The Importance of Walking in Journey to Work

Walking Commute Distance by Income in Mumbai



The importance of walking in the journey to work for lower income households has been confirmed in a substantial study in Mumbai, India. The figure shows (with a couple of very minor exceptions) that a higher proportion of the households in each income category walk to work than is the case for those in the next higher income group. In practice, households in the lowest income quintile account for between twice and five times as many walkers as do those in the highest quintile.

The Pedestrian Environment is Often Neglected in Urban Transport Planning

- **Unsafe, declining or non-existent pedestrian environments affect mobility patterns and needs across income and social groups:**
 - **Pedestrian space is eroded; encroached or blocked**
 - **Lack of sidewalks and safe crossing is commonplace**



In many countries, the travel environment for pedestrians and non-motorized transport can be unsafe, declining or non-existent.

In many countries, the 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.

As city officials often have difficulty in managing sidewalks and controlling 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.

This trend is particularly unfavorable for the urban poor as they are typically “captive riders”, meaning that they cannot afford an alternative and often dependent on public transit for access to employment and on walking as their main mode of transport to reach their daily needs.

Guidelines for Walkable and Safe Pedestrian Environments

- **Safety**
 - **Pathways**
 - Wide enough to allow two-direction walking
 - Physically separated from high-speed vehicle traffic
 - Well lighted, open and without hiding places
 - **Street Crossings**
 - Pedestrian-safe crossing infrastructure and technology
 - 50-150 meters apart depending on environment
- **Accessible sidewalks, pathways**
 - **Continuous, no gaps**
 - **No obstructions** (e.g., parked cars, vendors, merchandise)
 - **Minimal level changes, if possible ramps not stairs**
- **Interesting, lively adjacent land use**
 - **No parking lots, blank walls**
 - **Adjacency minimizes walking distances**
 - **Benches and resting areas**
- **Street information and signage**

There are a few key guidelines for developing walkable and safe pedestrian environments.

Safety must always be considered. The pathways should be physically-safe — wide enough to allow two-direction walking and physically separated from high-speed vehicle traffic. The pathways should provide a sense of personal security — well lighted and open, without hiding places. Street crossings should emphasize pedestrian safety crossing infrastructure and technology (zebras; traffic lights; speed bumps; grade-separated pedestrian crossings when possible) and spaced 50-150 meters apart.

Sidewalks and pathways should be continuous with no gaps. There should be no obstructions such as vendors, merchandise stands, or parked cars. Curb cuts and ramps (<5%) should be included and when needed at crossings. Stairs and level changes should be avoided.

Walkable environment need interesting, lively adjacent land uses, not parking lots and blank walls. These land uses attract walking trips and minimize the perception of long walking distances.

Finally, good signage and street information is needed to guide pedestrians.

What are Non-motorized Modes of Transport (NMT)?

- All forms of transport that do not include motorized transport
- The two major modes of NMT are walking and various forms of cycling

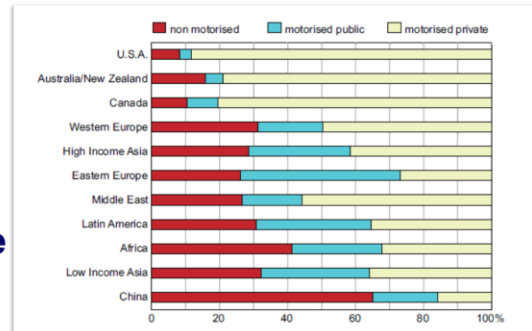


NMT includes all forms of transport that do not use mechanized power. The two main forms of infrastructure that support NMT are bikeways and walkways.

The Role of Non-motorized Transport

- The main mode of transport for the poor in many cities
- A significant source of income, with impact on poverty
- When NMT is the main transport mode for work journeys, it is critical for a city's functions

Broad Categories of Modal Split by Region



Source: Kenworthy & Laube, 2002

In some cities, NMT is the main mode of transport for the poor and can also be a significant source of income. Because of this, NMT has the potential to play a significant role in determining poverty levels in developing countries.

The two main modes of NMT are walking and cycling. Cycling in the realm of NMT exists in three major forms: personal transport, public transport, and freight transport. Like Motorized Transport, Non-motorized public transport is used in both developing and developed countries. In South Asia for example, NMT is an important form of load-carrying transport. In higher income countries, many people choose to walk or bicycle for exercise and pleasure.

In several cities in Asia, NMT accounts for between 40 and 60 percent of all trips. The above figure demonstrates that the share of trips by NMT is 30% or higher in most Asian, African, and Latin American regions, and even in Japan and Western Europe. In the poorer regions of Africa, that proportion is even higher.

The Benefits of NMT

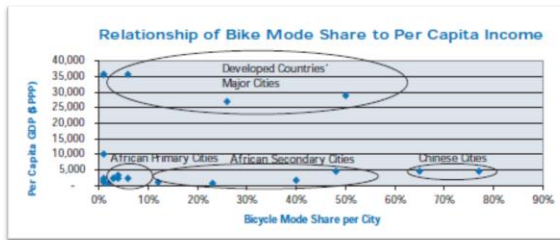
- **Meets growing service gaps between formal and informal demand, as well as commercial opportunity**
- **Effectively responds to congestion, high transportation costs, and transit restrictions**
- **Promotes reductions in CO₂ emissions**
- **Promotes short and accessible trips**
- **Exists as a low cost alternative in shared fixed-route services**
- **Feeder services linking inaccessible housing areas to the main transport routes**

Non-motorized transport provides alternative forms of transport for vulnerable and excluded groups. Because NMT is user driven (rather than route or rail driven), NMT tends to be less expensive, more flexible in routing, quicker, and more reliable than motorized transport.

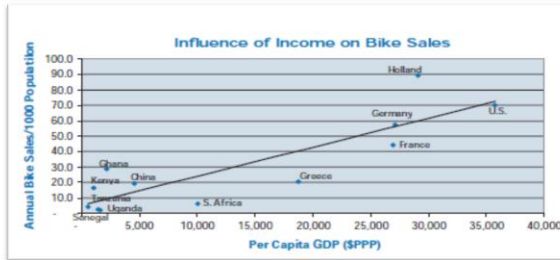
The ease and flexibility of bicycle travel makes it a desirable mode in many cities. Through analysis of user profiles, social attitudes towards bicycles, as well as political attitudes toward bicycles, it is possible to further increase the effectiveness of this transport mode. It is also important to consider the unique obstacles women face when using this mode of transport.

Though NMT modes exist primarily in the informal sector of transport, they play a very important role in the overall transport of a given city. If NMT modes are displaced by other modes, there will be a significant impact on the poor and other populations which rely on NMT as a main form of transport.

The Potential of the Bike Market



- The bicycle industry is growing faster than the automobile industry



- Bicycles are used for both recreational and utilitarian purposes

The bicycle industry is growing faster than the automobile industry based on per units sold. While the richest markets for future bike sales will still be the wealthy countries, the growth market in the 21st century will be in the developing world.

Bike sales are mainly a function of per capita income, though the level of bicycle use for both recreational and utilitarian cycling is the next most important factor. Countries above the trendline in Figure 2 tend to use bicycles for commuting and utilitarian use whereas those below the trendline tend to use bicycles for recreation and sport.

Prospects of NMTS on CO₂ Emission Reductions

CO₂ Reduction Potential and Cost Per TCO₂ Reduced Using Public Transit Policies in Typical Latin American Cities

| Transport measure | GHG reduction potential (%) | Cost per tCO ₂ (US\$) |
|---|-----------------------------|----------------------------------|
| BRT mode share increases from 0-5% | 3.9 | 66 |
| BRT mode share increases from 0-10% | 8.6 | 59 |
| Walking share increases from 20-25% | 6.9 | 17 |
| Bike share increases from 0-5% | 3.9 | 15 |
| Bike mode share increases from 1-10% | 8.4 | 14 |
| Package (BRT, pedestrian upgrades, cycleways) | 25.1 | 30 |

Source: Wright and Fulton, 2005.

The prospect for the reduction in CO₂ emissions by switching from cars to NMT is dependent on local conditions. Predictions for typical Latin American cities show that a moderate shift to NMT could result in important energy savings and reductions in congestion, emissions, and accidents.

Current Urban Transport Infrastructure Does Not Meet NMT Needs



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Pedestrians and Transit Oriented Development (C5/M2)

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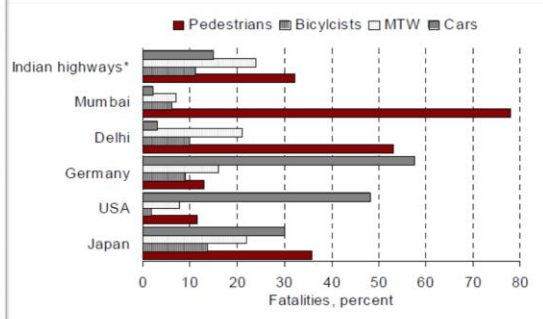
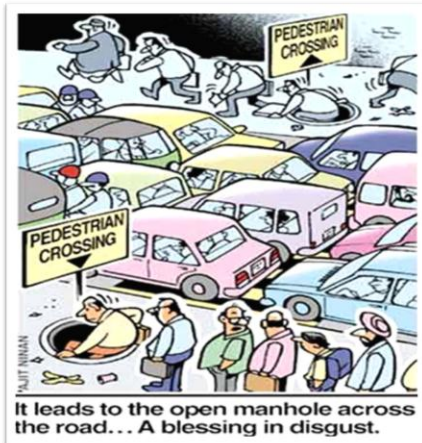
The current urban transport infrastructure does not adequately meet the needs of NMT in many countries. The infrastructure is characterized by many things, including:

- Traffic congestion
- Increasing numbers in the ownership of private cars and two-wheelers
- Narrow, poorly maintained, unpaved and limited road networks
- Inadequate number of parking spaces
- Motorized and non-motorized transport sharing roadways
- Inadequate roadway accommodations for buses and NMT
- A lack of traffic signals and poor traffic control and management
- Overcrowded, non-accessible, and inefficient public transport systems
- Alarming levels of pollution and noise
- A lack of transport infrastructure specifically designed for pedestrians and cyclists.

The pictures from Pune, India demonstrate poorly designed roads that are not friendly to pedestrians or cyclists. Traffic is not disciplined and during peak hours, all vehicles, both motorized and non-motorized vie for the same limited road space. To make matters worse, illegal parking is common, signals do not always work, and there is an insufficient number of police officers to regulate the traffic. The pictures above demonstrate average roads. Some areas may be better and some may be worse.



NMT Constitute Large Share of World Road Fatalities



Source: Transportation Research and Injury Prevention Program (TRIPP), IIT Delhi, April 2004

Increasing safety is the main reason for promoting and developing NMT. Pedestrians constitute a large share of road fatalities around the world. NMT users have a much higher risk of being involved in an accident than those using cars, especially in developing countries where most NMT users cannot afford to own a car.

There are many ways of improving safety, including better engineering of traffic and campaigns to better educate drivers.

Bicycle Facilities

- **Bicycle lanes on mixed traffic roads**
- **Mixed traffic service parallel to a transit MT carriageway**
- **Separated bicycle — or NMT — only tracks**
- **Bicycle parking facilities and bike lockers / theft prevention**



Separation of bicycle tracks on mixed traffic roads can help solve safety issues in sections, but are less effective in intersections. Further, the lack of visibility of cyclists, as well as drivers' lack of awareness of cyclists are ongoing issues. When road capacity is a problem, assigning separate lanes to cyclists on a combined carriageway is the first preference. Another helpful step in increasing safety is to keep speed levels low, below 50 km/hr. At intersections, sufficient designated space should be reserved for cyclists (including crossing islands and medians).

Mixed traffic service parallel to a transit MT carriageway. The possibility of cycling along the major urban corridors is essential to enable cycling throughout a city. The advantage: that traffic on the main road is not obstructed. The disadvantage is that the difficulty for crossing NMT is increased.

Separated bicycle- or NMT-only tracks. A bicycle lane is an insufficient solution when speed of MT remains high. Separated bicycle- or NMT-only tracks are a potential solution. However, it is essential that MT speed is still decreased at intersections. Another factor to consider is the density of cyclists and pedestrians. Constructing a bicycle-only track without considering the needs of pedestrians could result in a chaotic, ineffective solution. If pedestrians do not have sufficient, designated space, they will make use of the cycle path to increase their ease and safety. Another factor to consider: is the volume of cyclists sufficient to ensure that the path is not appropriated by other users?

Bicycle parking facilities and bicycle lockers can be as simple as bicycle racks or larger bicycle lockers to provide protection from the elements and be more secure than conventional bike racks.

Pedestrian Facilities

- **Walkways**
- **Construction of missing walk route links**
- **Pedestrian crossings, combined with vehicle speed reduction**
- **Raised zebra crossings, speed humps and pedestrian crossing islands to reduce speed of cars**
- **Separation between road shoulder and carriageway**

Walkways: Pedestrian speed in urban areas is generally low due to an absence of walkways, pedestrian congestion, bad pavement quality, and waiting time for crossing roads. An average walking speed of around 3 km/hr is quite common. The average walking speed can be improved significantly through the implementation of low cost and efficient measures.

Construction of missing walk route links: Oftentimes, pedestrians may need to make significant detours to reach their destinations. Fenced plots, lack of bridges, and nonnegotiable roads can cause major increases in trip time.

Pedestrian crossings, combined with vehicle speed reduction: In many cities, pedestrians face problems when crossing the road. A major share of fatalities and injuries among NMT-users is when pedestrians cross streets and are hit by a car or bus. Motorized vehicles traveling at high speeds and/or a sudden crossing at an inappropriate place are the main contributing factors to this problem. Solutions have to be established for both problems: i.e., traffic speeds should be slowed and road crossings made at safe, well-marked, and clearly visible crossing points.

Raised zebra crossings, speed humps, and pedestrian crossing islands: These can effectively reduce the speed of cars up to 30 km/hour, thereby providing safer road crossings to pedestrians and cyclists.

Separation between road shoulder and carriageway: An open shoulder along urban roads significantly increases traffic accident hazards. The grey zone along the shoulder (where no barriers are constructed) creates conflicts between various purposes: walking, cycling, trading, parking, overtaking, etc., Facilities (such as bollards or concrete T-blocks) should be made at intersection corners, bus bays, speed humps, and shoulders opposite pedestrian crossing islands and 25 meters on either side of a raised zebra-crossing.

Increasing Safety Measures for NMT

- Provide alternative connections so that users may avoid unsafe connections
- Do not allow mopeds on cycle paths or walkways
- Ensure sufficient path width
- At junctions, reduce car speed, and add traffic lights or multi-level crossings
- Ensure good layout at junctions
- Eliminate obstacles (poles, containers, badly parked cars, etc.)
- Add facilities that decrease speed or MT intensity, such as shrubbery or street objects
- Limit number of NMT-connections that cross major car corridors
- Raise awareness on the rights and responsibilities of NMT

Increasing safety and convenience is key for encouraging more cycling and walking. The general approach to safety is to minimize the encounters between NMT and high volumes of speeding motorized transport. This can be achieved by segregation of modes, or by traffic calming.

Traffic calming and safety measures can include intersection re-design to increase safety and efficiency for NMT, speed humps, raised zebra crossings, pedestrian crossing islands, medians, road narrowing with bicycle slips, and bus bays.

A fourth set of interventions include **campaigns to make the rights and responsibilities of pedestrians and cyclists known** to the general public as well as the traffic rules that deal with safety. Training and educating children in and outside of schools helps them to understand traffic rules. Further, driver's license tests should pay more attention to MT drivers' interface with NMT-users. One of the best strategies is to get car-drivers cycling (or walking). This way they will better understand the needs and problems that NMT-users encounter.

Increasing Convenience

- **Design standards for appropriate infrastructure for NMT**
- **Adequate maintenance and proper enforcement regarding encroachment by street traders and minibus operators**
 - **Control and regulate vendors**
 - **Incorporate proper space for vendors**

When designed properly, NMT facilities should allow a rapid and comfortable flow of NMT with a capacity large enough to prevent pedestrian and bicycle congestion. Cycling and walking should also be possible at a steady speed without any hindrance caused by bumps and potholes, gradients, or the need to stop at junctions.

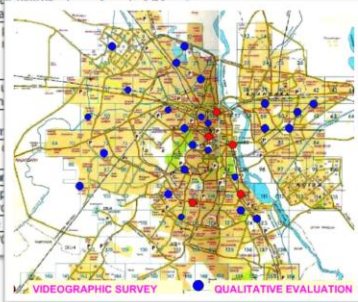
If unrestrained, hawkers and vendors will often encroach on newly built walkways and cycles which ultimately results in reduced capacity and wasted NMT investment.



Evaluating 'Walkability' and the Pedestrian Space

Sidewalk Level of Service Along Chelmsford Road, India

| Attribute | Description | Satisfaction Rating | Relative Weight |
|----------------------------------|--|---------------------|-----------------|
| Footpath Surface | Reasonable quality, walking is comfortable | 4 | 3.92 |
| Footpath Width | 2-3 meters | 4 | 3.80 |
| Obstruction | Too many obstructions (Hoarding, signboards) | 2 | 3.06 |
| Encroachment | Slight to well with | 3 | 3.03 |
| Potential for Vehicular Conflict | Well with | 3 | 3.03 |
| Continuity | Few down | 3 | 3.03 |
| Pedestrian Volume | High | 3 | 3.03 |
| Safety | Safe only | 3 | 3.03 |
| Comfort | Uncor | 3 | 3.03 |
| Walk Environment | Access | 3 | 3.03 |
| Cumulative Score | | | |
| Level of Service | | | |



(Source: Parida, Najamuddin and Parida, 2007)

- Research on the functionality of the pedestrian environment now considers factors of 'walkability' to rate ease of walking as a primary mode of transport
- Factors that are evaluated to consider pedestrian characteristics, design factors and the perceived level of service by users such as comfort, convenience, safety, security and attractiveness

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Interventions to improve pedestrian facilities and safety do not obtain the full effect if these are randomly planned. Like with interventions for bicycles, a comprehensive approach should be followed, linking urban planning and traffic strategies with interventions for other transport modes.

Walkability can take into account the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security, and comfort for walking. Each of these facets of the pedestrian environment impacts the use of walking as a primary mode of transport.

A study in India was conducted at various locations in Delhi with a total sample size of 600 men and women. These people were asked to rate both importance and satisfaction for five different aspects of the sidewalk: its width, surface quality, presence of obstructions, sense of security, and comfort. On average, ratings were similar across gender except for security, for which women gave higher importance ratings and lower satisfaction ratings. Women also seemed more willing to compromise physical factors in favor of security and comfort. For instance, while men might consider sidewalk vendors as an inconvenient obstruction, women might feel that they help establish a sense of vibrancy and security.

This method of evaluating walkability offers a simplified approach for evaluating sidewalks and for identifying the types of improvements necessary.



Bike Sharing Schemes

- Relatively easy to implement and inexpensive compared to other transportation projects
- Offer a host of benefits, including decreasing air pollution, easing traffic jams, opening up space consumed by cars, and reducing the burden of high fuel costs on residents

Bike Sharing Scheme in Hangzhou, China



Photo courtesy: ITDP

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Bike sharing schemes are relatively easy and inexpensive to implement compared to other transportation projects. They offer a host of benefits such as cutting air pollution, easing traffic jams, opening up space consumed by cars, and reducing the burden of high fuel costs on residents.

The number of bike-sharing services in ten European countries (Austria, Belgium, Czech Republic, France, Germany, Italy, Poland, Spain, Sweden, and the United Kingdom) has leapt from “only a few” a decade ago to about 400 today (Choice GmbH).

The Public Bicycle System in Hangzhou, China, a city of 6.77 million people, started a bike sharing program with 2,800 bikes spread across 61 locations around the city. The bike share program became the world’s largest with 60,600 low-cost, low-tech bikes and more than 2,400 stations spaced out every 200 meters. Since the introduction in 2008, more than a dozen other cities in China have launched cycle-hire schemes.

The provincial capitol is home to seven million people and boasts a network of 50,000 bikes with 2,050 stations. The program managers hope to expand to 175,000 bikes over the next ten years. For most users, the program is practically free. All riders get their first hour of rental at no cost unless they are transferring from a bus, in which case they get 90 minutes. Uniquely, China provides insurance if an accident happens during a trip. This is quite rare.



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NMT Project in Pune, India

Proposed Feeder Roads for Improvement (in Blue)



The Improved Situation after Project Implementation

Source: Wang, Fang and Shi, 2010

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The Pune NMT project (India) aims to provide better access to urban activity centers for pedestrians and cyclists and to make the roads a safer place on which to travel. Separate lanes for cyclists and pedestrians, wider roads, and leveled pavements free of debris and other obstacles will make walking and cycling attractive alternatives to using motorized vehicles. Visual signs in the form of road markings will be put up and distinctive paving material used. The facilities created specially for pedestrians and cyclists will make motor vehicle users conscious of the rights and privileges of the pedestrians and cyclists on the road. A more equitable distribution of road space will be achieved for motorized and non-motorized traffic.

The map on the left shows the scale and location of the project. The project streets are marked in blue. The total length of the feeder roads to be renovated is 41.5 km, with 23.8 km in the vicinity of BRTS1 (Satara Road) and 17.7 km on BRTS2 (Sholapur Road). The average width of the feeder roads is 20 meters. The construction includes footpaths, cycle tracks, cycle stands, underpasses, and trees. The width of the footpaths and cycle tracks are two meters each.



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Bogotá's Bike Path – Reaching Out to the Poorest Areas

- Integrated with TransMilenio bus system
- Most extensive bike path network with 300,000 to 400,000 trips daily
- Ridership more than 4% of total daily trips



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In Bogotá in 1998, 70% of private car trips were under 3 km. This percentage is lower today due to Bogotá's increased and improved bike and pedestrian facilities. The street design was so hostile to bicycle travel that by 1998, bicycle trips accounted for less than 1% of total trips. After 250 km of new bicycle facilities were constructed by 2001, ridership increased to 4% of total trips.

Bogotá's bike path network is now the most extensive in the world. It spans over 300 km and is also integrated with the TransMilenio bus system which has bicycle parking facilities. Since the construction of the network, bicycle use has quintupled in the city and it is estimated that there are between 300,000 and 400,000 trips made daily by bicycle in Bogotá. A large portion of this use is in southern, poorer areas.

The bottom picture shows a sheltered bike path in Bogota, along Calle 26 (Avenida El Dorado). This is one of many paths that connects very poor areas with the city center, as well as surrounding neighborhoods.



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Summary: Why Care and What to Do About the Pedestrian Environment and NMTs?

- The walking environment affects mobility and transport choices
- NMT is an important mobility option for the poor, with potential for emission and local air pollutant reductions
- NMT is a viable option for short trips and an important link to public transport
- Two sets of interventions should be central
 1. Area wide speed reduction or traffic calming schemes
 2. Provision of an integrated walking and cycle route network
- Maintenance of infrastructure and proper enforcement regarding encroachment by street vendors and drivers is critical
- Unless the traffic situation is safer, cycling does not have significant potential for increase in large cities

Improvement to NMT environment, mainly used by the poor because of its lower cost, could be a way to increase urban productivity and thus decrease poverty.

NMT also has potential for mitigating GHG emissions and local air pollutants.

NMT options therefore need to be cultivated so that they become a more viable mode of transport for short trips. NMT also serves as an important link to public transport.

NMT infrastructure consists of:

- Dedicated walkways
- Measures to prevent motor vehicles from driving and parking on road shoulders and walkways
- Construction of missing links and short cuts
- Construction of bicycle lanes
- Dedicated cycle tracks.

Interventions to improve pedestrian facilities and safety do not obtain the full effect if these are randomly planned. A comprehensive approach should be followed, one that is linked to urban planning and traffic strategies as well as interventions for other modes of transport.

Two sets of interventions should be put central: 1) Area-wide speed reduction or traffic calming schemes; 2) Provision of an integrated walking and cycle route network

For the next decades, provision of proper pedestrian infrastructure must have the highest priority in urban transport investments to achieve major urban productivity gains and contribute directly to poverty alleviation.