Non-Motorized Vehicles in Asian Cities

Michael Replogle
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Non-Motorized Vehicles in Asian Cities

Michael Replogle
Non-motorized vehicles—bicycles, three-wheelers, and carts—play a vital role in urban transport in much of Asia. NMVs account for a larger share of vehicular trips in many Asian cities than anywhere in the world. With increasing income, ownership of all vehicles, including NMVs, is growing rapidly throughout Asia.

However, the future of NMVs in many Asian cities is threatened by growing motorization, loss of street space for safe NMV use, and changes in urban form prompted by motorization. Transport planning and investment in most of Asia has focused principally on the motorized transport sector and has often ignored the needs of NMVs.

Without changes in policy, NMVs may decline precipitously in many Asian cities in the coming decade. Large-scale replacement of NMVs with motorized transportation would have major negative impacts on air pollution, traffic congestion, global warming, energy use, urban sprawl, and the employment and mobility of the poor.

As cities in Japan, the Netherlands, Germany, and several other European nations demonstrate, the modernization of urban transport does not require total motorization, but rather the appropriate integration of walking, NMV modes, and motorized transport. As in European and Japanese cities, where a major share of trips are made by walking and cycling, NMVs have an important role to play in urban transport systems throughout Asia in coming decades.

This paper provides an overview of the current use of NMVs in Asian cities, environmental and economic aspects of NMVs, the characteristics of NMVs and facilities that serve them, and policies that influence their use. The paper identifies conditions under which NMVs should be encouraged for urban transport, obstacles to the development of NMVs, and makes recommendations for action by the World Bank and other donors.
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Foreword

Asia has the widest variety and greatest number of non-motorized forms of transport in the world. They provide the backbone of the transport system for the poor in many cities for both personal and goods movements. The potential for the development of non-motorized transport and its integration within city transport systems has been an area of growing concern within the development community for several years. A more concerted effort is needed now and in the future throughout Asia toward encouraging non-motorized vehicle use where it is appropriate within urban transport systems. As part of the Asia Technical Department’s review of the urban transport sector in Asia, this technical paper demonstrates how this can be achieved and how development agencies such as the World Bank can assist in the development of non-motorized transport as an attractive form of transport in an environmentally conscious world.

Daniel Ritchie
Director
Asia Technical Department
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Acronyms and credits

ADB         Asian Development Bank
ASTIN       Asia Technical Infrastructure Division (World Bank)
EDI         Economic Development Institute
ESCAP       Economic and Social Commission on Asia and the Pacific
IFC         International Finance Corporation
NMT         Non-Motorized Transport
NMTS        Non-Motorized Transport Strategy
NMV         Non-Motorized Vehicle
PRE         Policy, Research, and External Affairs (World Bank)
UNCTAD      United Nations Commission on Trade and Development
UNDP        United Nations Development Program

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page 40, left   Japan Bicycle Parking Association
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This paper provides an overview of the current use of non-motorized vehicles (NMVs) in Asian cities. It discusses environmental and economic aspects of NMVs, the characteristics of NMVs and facilities that serve them, and policies that influence their use. The paper identifies conditions under which NMV use should be encouraged for urban transport, obstacles to the development of NMVs, and makes recommendations for action by the World Bank and other donors in this area.

NMVs offer low cost private transport, emit no pollution, use renewable energy, emphasize use of labor rather than capital for mobility, and are well suited for short trips in most cities regardless of income, offering an alternative to motorized transport for many short trips. Thus, they are appropriate elements in strategies dealing with poverty alleviation, air pollution, management of traffic problems and motorization, and the social and economic dimensions of structural adjustment. NMVs have a most important role to play as a complementary mode to public transportation.

Introduction

NMVs—bicycles, cycle-rickshaws, and carts—play a vital role in urban transport in much of Asia. NMVs account for 25 to 80 percent of vehicle trips in many Asian cities, more than anywhere else in the world. Ownership of all vehicles, including NMVs, is growing rapidly throughout Asia as incomes increase.

However, the future of NMVs in many Asian cities is threatened by growing motorization, loss of street space for safe NMV use, and changes in urban form prompted by motorization. Transport planning and investment in most of Asia has focused principally on the motorized transport sector and has often ignored the needs of non-motorized transport. Without changes in policy, NMV use may decline precipitously in the coming decade, with major negative effects on air pollution, traffic congestion, global warming, energy use, urban sprawl, and the employment and mobility of low income people.

As cities in Japan, the Netherlands, Germany, and several other European nations demonstrate, the modernization of urban transport does not require total motorization, but rather the appropriate integration of walking, NMV modes, and motorized transport. As in European and Japanese cities, where 30 to 60 percent of trips are made by walking and cycling, NMVs have an important role to play in urban transport systems throughout Asia in coming decades.

Transport investment and policy are the primary factors that influence NMV use and can have an effect on the pace and level of motorization. For example, Japan has witnessed major growth of bicycle use despite increased motorization, through policies providing extensive bicycle paths, bicycle parking at rail stations, and high fees for motor vehicle use. Denmark and the Netherlands have reversed the decline of bicycle use through similar policies.

China has for several decades offered employee commuter subsidies for those bicycling to work, cultivated a domestic bicycle manufacturing industry, and allocated extensive urban street space to NMV traffic. This strategy reduced the growth of public transport subsidies while meeting most mobility needs. Today, 50 to 80 percent of urban vehicle trips in China are by bicycle and average journey times in China's cities appear to be comparable to those of
Bicycles play a vital role in Japan's modern and efficient urban transport systems, thanks to supportive public policies and the provision of extensive facilities for cyclists, such as this bike lane in Tokyo.

many other more motorized Asian cities, with much more favorable consequences on the environment, petroleum dependency, transport system costs, and traffic safety.

Extent of ownership and use

Bicycles are the predominant type of private vehicle in many Asian cities. Bicycle ownership in Asia is now more than 400 million and growing rapidly. Bicycle ownership in China increased more than 50 fold between 1952 and 1985, to 170 million, with nearly half in cities. Since then it has risen to 300 million and is anticipated to grow to 500 million by 2000. In many Chinese cities, bicycle ownership rates are one bicycle per household or more. Between 1980 and 1988, the number of bicycles in Beijing grew more than 12 percent a year to 7.3 million. In India, there are roughly 25 times as many bicycles as motor vehicles and urban bicycle ownership is growing at a fast pace.

The majority of the world's 3.3 million cycle rickshaws and goods tricycles are found in Asia. Despite recurrent efforts made by some local authorities to suppress cycle rickshaws in preference to motorized transport modes, the number and use of these vehicles is growing in many cities in response to otherwise unmet transport needs. The number of cycle rickshaws in India is expected to increase from 1.3 million in 1979 to 2.2 million by 2001.

In Bangladesh, the cycle rickshaw fleet is estimated to grow from two-thirds of a million in 1988 to over one million by 2000. More than three-fourths of Bangladesh's cycle rickshaws are in urban areas. These urban cycle rickshaws each annually account for an average of over 30,000 passenger-miles and nearly 100 ton-miles of goods movements. Together, bicycles, rickshaws, bullock carts and country boats account for three-fourths of the value added, 80 percent of employment, and 40 percent of vehicle assets in Bangladesh's transport sector.

In Indian cities, bicycles typically account for 10 to 30 percent of all person trips (including walking) and for 30 to 50 percent of the traffic on primary urban roads. Walking and cycling account for 60 percent of total trips and 40 percent of work related trips in Karachi, Pakistan. Cycle-rickshaw traffic typically accounts for 10 to 20 percent of the traffic on primary urban roads and for 5 to 20 percent of all person trips in Indian and Pakistani cities. These vehicles, along with hand-carts, account for a major share of urban freight movement in Chinese cities and the majority of all freight movement in Bangladesh.

Many low income people in Asian cities cannot afford even subsidized public transport fares and, if they lack a bicycle, have no choice but to walk, even when traveling 10 to 20 km. Lack of access to commercial credit is a major barrier to greater use of NMVs among the poor. Many are unable to save enough to buy a bicycle, even though the cost may be less than a year's worth of bus fares. When incomes of the poor increase slightly, as is the general trend in Asian cities in recent years, the most affordable way of boosting mobility is through purchase of a bicycle. There is evidence to suggest that the use of bicycles by the poor enables them to upgrade their housing conditions by reducing their transport expenditures.

Travel time savings offered by the bicycle attract many people of all income levels to bicycles in many cities. As traffic congestion in cities increases, public transport schedule reliability and average travel speeds both decrease, making bicycles competitive at longer trip lengths due to their flexibility, convenience, and greater reliability.

Small informal sector enterprises, as well as formal private sector firms, have played and will continue to play a major role in non-motorized transport systems. Promotion of the NMT sector can stimulate substantial employment growth and microenterprise development, especially in low income cities, particularly benefiting the poor. Where cycle-rickshaws are declining, frequently due to regulatory suppression, taxes, licensing requirements, bans, and even confiscation, hundreds of thousands of low income people are threatened with loss of employment.

NMVs play an important role in getting people to and from express public transport services, particularly railways. It is common to see hundreds or even thousands of bicycles parked at stations in India and
Bicycles are the predominant means of urban mobility in China, thanks to several decades of supportive government policies that have produced the most resource efficient urban mobility systems in the world.

China. As in Japan and much of Europe, bicycle access expands the potential market area of high-speed public transport services at low cost. This is one of the most valuable potential functions of bicycles in large cities with long average trip lengths, for sustaining mixed NMV/motor vehicle traffic systems in cities with higher levels of motorization, for re-integrating NMVs into the transportation system of motor vehicle dependent cities, and for dealing with network capacity saturation in NMV dependent cities.

**Conditions under which NMVs should be encouraged**

Non-motorized modes are the most efficient means of mobility over short distances in cities, while motorized modes offer greater efficiency for longer trips. The distance at which motorized modes become more efficient than non-motorized modes for consumers depends on income levels, the value of time, and the price and speed of various transport modes. For societies as a whole, it depends as well on how environmental costs, social costs, and other externalities related to transport are assessed.

Determination of the most efficient modal mix for a city also requires consideration of constraints on street space, patterns of land use, existing investments in transport vehicles and infrastructure, and funds available for new investment and transport operations. It should also take into account current and anticipated problems in the overall transportation and land use system, such as traffic congestion, air pollution, economic impacts of growing petroleum use, access of housing to employment, motorization trends, and goals for poverty alleviation. Given the wide variation in these factors, urban non-motorized transport strategies must be tailored for different types of cities. The integration of urban development and transport planning and policy is vital to expanding opportunities for NMT use.

For a given amount of road or corridor space, the most efficient modes of transportation are generally...