BICYCLING IN ASIA

By Alan A. Parker

Why mass production of 100 million bicycles a year is an essential aid to eliminating widespread poverty in "developing" Asian nations

Today there are three billion Asians and two-thirds (700 million) of the world's bicycle fleet are in eleven developing Asian countries: China, India, Taiwan, Pakistan, Bangladesh, Malaysia, Thailand, Burma, Korea, Vietnam and Indonesia. By the year 2050 there will be 5.3 billion people in these countries, as many as the population of the world in 1992.

This article gathers facts about the constraints of poverty and overpopulation in developing Asia and how the bicycle is being increasingly used as an aid to development in the Asian industrial revolution now underway.

The developed economies of Japan and Singapore are not considered here and the words Asia or Asians are used here to refer to developing Asia and its inhabitants. It is argued that using limited resources to encourage bicycle transportation is a wise long term investment. It is concluded that if bicyclists are discriminated against by bad transport planning, with the result that cyclists are driven off the roads, it will slow down the rate of economic development and in the longer term prolong current levels of rural poverty and poor living conditions in urban areas.

ASIAN BICYCLE PRODUCTION

Building factories to produce bicycles over the last 30 years is one of the best things that was ever done in developing Asia, because it has lifted so many people out of poverty by enhancing their personal mobility and load carrying capacity.

The largest bicycle manufacturer in the world is the "Shanghai Phoenix Group" which makes just over six million bicycles a year (Cycle Press 1996). Another Chinese company, "Shanghai Forever" makes over four million bicycles and Hero Cycles of India another four million. In Asia there are hundreds of small scale producers of bicycles or bicycle parts and millions of people are employed repairing bicycles, freight tricycles and trishaws. What is holding back the demand for bicycles is not the lack of manufacturing facilities, but poverty generated by uncontrolled population growth.

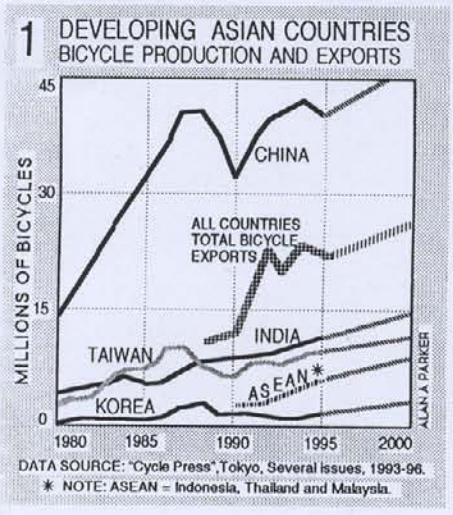
In 1995 Asian factories produced 15 million bicycles for export to OECD countries, generating an important source of foreign currency needed to buy plant and machinery for economic development. The growth of bicycle production for domestic use and export by the major national producers is shown in figure 1. Some smaller producers are not shown. For example Pakistan produces around 800,000 bicycles a year for domestic use and there are other small scale producers in other Asian countries not shown. About a million bicycles are exported between Asian countries, some of them illegally, but they also are not shown as exports in figure 1. What is important is a total of 72 million bicycles was manufactured in Asia in 1995 and around 57 million of them were sold to Asians. If present trends continue the Asian bicycle fleet should increase to 1.5 billion bicycles by 2010 (Parker 1996).

Unfortunately, simple trend projections give no idea of the long term potential for the productive use of bicycles in Asia. In the early stages of development there are limited resources available and high levels of bicycle production are an important aid in this process. The problem is that only so much can be done with the limited resources which should go to the most productive projects that benefit the most people. The material resources needed to make one car, for example, could be used to produce forty bicycles. Let's take a look at four hypothetical alternatives in manufacturing cars and/or bicycles. The options are (1) one million bicycles and no cars; (2) a mix of 5000 cars and 800,000 bicycles; (3) a mix of 12,500 cars and 500,000 bicycles; (4) just 25,000 cars and no bicycles. If a country were so poor it had no petrol resources and few export earnings to pay for the petrol to run the cars, the choice would be very clear.

Many years ago Maoist China, which was then off limits to capitalist investment, chose to produce millions of bicycles and no cars. Now they have a fleet of 450 million bicycles and are a lot better off. Now they are making a different choice, which approximates to the 5000 cars and 800,000 bicycles choice, in the hypothetical case. However, it will be a long time before there is one car for every ten people: which was the level of car ownership in the USA in 1920 and the UK in 1960. What is more likely is that light weight motorcycles will be used as family vehicles as is happening in Hanoi today and has happened in Bangkok and other Asian cities in the 1970s and 1980s. Sadly, in the early stages of development, transport economics for poor countries is brutally simple: Get the nation's collective ass on the bike and enhance its mobility and productivity now, because the vast majority of today's workers and peasant farmers will never drive a car.

The Asian Tigers were lucky they were not "off limits" to the limited amount of foreign investment available and had governments that put nation-building before democratic rights. Sadly, most Asians do not live in Tiger economies and their governments are faced with terrible problems of overpopulation, particularly in Pakistan and India. Even in China, where birth control is far more effective because the government's "one child family" policy comes before western style civil liberties, there are going to be very great problems. Without getting involved in the ethical, political and religious problems of Asia, from a practical perspective there is a real need to get a billion or more bicycles to the people who need them most.

Carrying the shopping (Changmai, Thailand)



POVERTY IN DEVELOPING ASIA

According to the United Nations World Health Organization, extreme poverty is the biggest single cause of death, disease and suffering worldwide. Many of the world's poor live in developing Asia where over 60% of households - and 70% of its villages- still lack access to public electricity supply. The gap between rich and poor is highlighted by the fact that half the population depends on traditional fuels like, firewood, dung and peat and have no access to commercial energy in any of its forms, not just electricity.

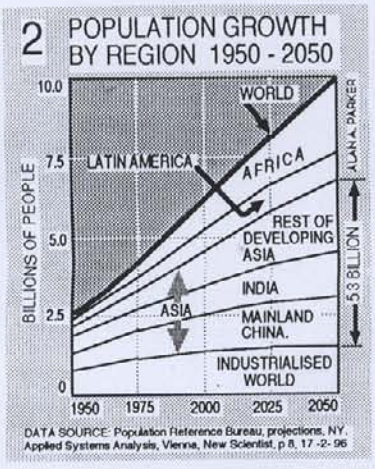
One quarter of the people in Bangladesh and India do not have safe drinking water and two thirds of the children are underweight. In Pakistan the figures are 45% and 40%. In Vietnam 40% of children of children are underweight and in China 21%. By the year 2050 there will be 5.3 million Asians, 2.3 billion more than today, as shown in figure

BICYCLING IN ASIA

2 portraying world population growth by region. In 1980, 75% of Asians were village dwellers engaged in farming and craft work. Since then there has been a massive exodus of people to the urban slums of the big cities and by 2010 there may be as many people living in poverty in the urban areas as there are in the rural areas.

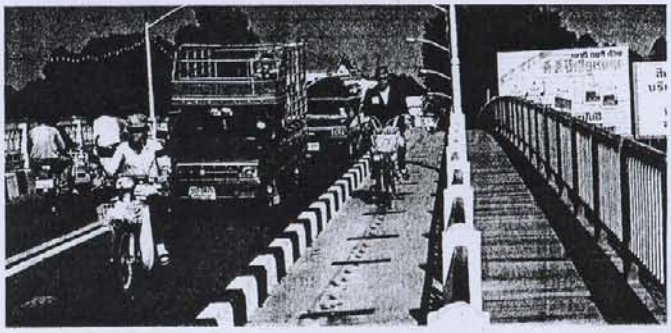
The proportion of the population living in poverty will depend on how frugally and how fairly the "leaders" manage to develop their economies and spread around the wealth from industrialization.

Sadly, a robust and reliable bicycle is beyond the means of many people. If poor Asian families could afford it now, there would another billion bicycles in use. Doubling, and in some of the poorer villages quadrupling, the current level of bicycle ownership would greatly improve the quality of life. Hopefully the very cheap and reliable bicycles now manufactured in Asia will continue to reach the people who need them most. This has already happened in China and is well underway in Malaysia, Thailand , Taiwan and South Korea, and starting to happen in parts of Indonesia. In the countries of the Indian sub-continent, the benefits of economic development are mostly being swallowed up by population growth. In some countries cyclists are already being driven off the roads.



THE ASIAN BICYCLE BOOM AND ECONOMIC DEVELOPMENT

There are three complementary and related reasons for the ongoing Asian bicycle boom. The first reason is the bicycle's mechanical advantage (compared to walking) in moving passengers or loads. The second reason is the growth of Asia's population, which has created much of the demand for transport. The third reason is that an industrial revolution brings together people and machines in new working relationships. The process of industrialization creates the system of factory production, that generates both urban growth and the means of mass producing sturdy and reliable bicycles at a price that is affordable. The bicycle was most productively first used during industrial revolutions in the UK and Europe to reduce passenger transport costs. The Asian industrial revolutions now underway will continue to generate a growing demand for bicycles. These are the reasons for the Asian bicycle boom which are detailed as follows.



Bike lane on bridge (Changmai)

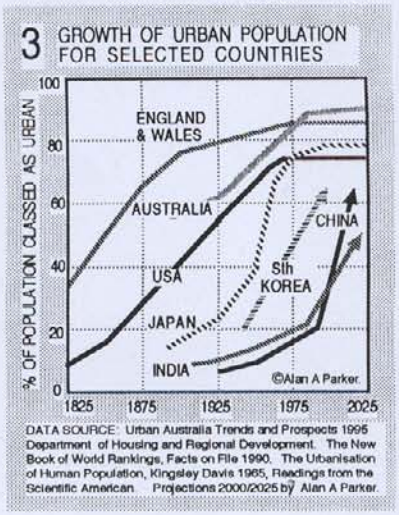
Visiting friends (Changmai)

1. The bicycle's mechanical advantage.

The bicycle uses the ergonomic advantage of pedaling over walking and enables the rider to go 3.5 times as far for the same physical effort as walking and provides access to around ten times the area. In this way an able bodied person can access far more urban and rural activities with the same effort. Bicycling is simply a way of doing more with less physical effort and bicycles are well used in Asia today to help people make a living. The photographs clearly shows their productive use. The ergonomic advantage of pedaling over walking also explains why in 1988 there were 3.3 million bicycle rickshaws in use world wide (Replogle 1992) including 1,700,000 in India, 633,000 in Bangladesh, and 500,000 in China.

The transport tricycle substitutes for the use of motorized taxis, light vans and lorries for moving all kinds of goods and people. The ergonomic advantage of pushing a loaded bicycle or tricycle, compared to carrying packs over difficult terrain, was illustrated by the Vietnamese in their defeat of the Americans in South Vietnam and the French at Dien Bien Phu. The Ho Chi Minh trail was the longest unsealed bicycle path in the world, along which bicycles with reinforced front forks, loaded with 100 kg or more of food, arms and ammunition and were pushed for thousands of kilometers through heavily forested country. The bicycle went where armored vehicles could not follow.

The Vietcong learnt well from the Japanese General Yamashita who in World War 2 masterminded the fall of Singapore when their infantry regiments cycled through the jungle down the Malay Peninsula and took Singapore from the rear. The British military, with its gormless upper class generals, could not even imagine the possibility of any enemy using bicycles to beat them in this way (McGonagle 1968). Most of the



1996 WORLD CYCLE SHOW LISTING

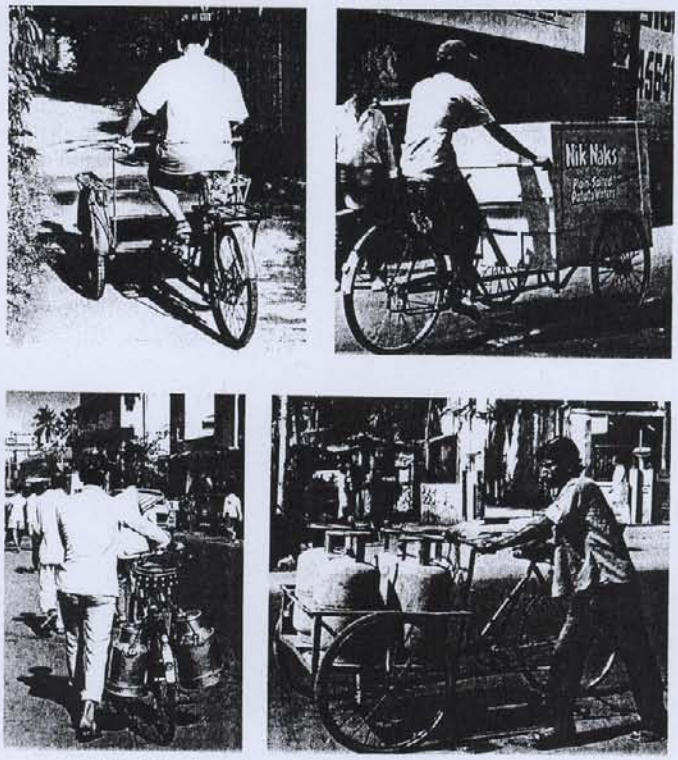
Moscow International Motor Show Moscow, Russia	**August 21—25**
Eurobike, Friedrichshafen, Germany	**Sept.4—8**
Interbike (west), Anaheim, USA	**Sept.19—22**
China International Bicycle Fair Shanghai, China	**Sept.23—26**
Bicycle Industry Trade Show Sydney, Australia	**Sept.28—30**
Cycle '96 Bilbao, Spain	**Oct.31—Nov. 3**
IFMA, Köln, Germany	**Oct. 2—6**
Interbike Eastern States Bicycle Expo Philadelphia, USA	**Oct.12—14**
Bicycle Industry Trade Show Melbourne, Australia	**Oct.19—21**
Japan International Cycle Show/Tokyo '96 Tokyo, Japan	**Oct.31—Nov.2**
Chicago Midwest Bicycle Show (CABDA) Chicago, USA	**Nov.2—Nov.4**

big guns in Singapore were located in anticipation of an attack by sea. Concreted in place, most could not be turned round to attack the Japanese bicycle infantry. Even the guns that could be turned around only fired armor piercing shells suitable for sinking ships and were hopelessly ineffective against bicycle infantry.

Today in Asia on the dirt access roads, millions of bicyclists can go to and from villages, even in the rainy season, when even four wheel drive vehicles have problems and cars are immobilized.

Ignorance of the mechanical advantage of cycling over walking by upper class power elites, and by the Australian transport bureaucracy, is humorously illustrated by an observer (Gluck J 1973) in the withdrawal from Hanoi of the defeated French Army after the cease fire. He describes the immaculately dressed French troops with their polished big guns and the bands playing, marching down to the port area of Hanoi to the waiting troop ships, and then shortly after the victorious Vietnamese army dressed in rags marching and pushing many thousands of bent and battered bicycles. Many of the North Vietnamese heavy weapons were dismantled and carried in pieces by another army of freight bicycles. Gluck said "he burst out laughing when he examined the bicycles because they were nearly all Peugeots". The fact that the French were partly defeated by one of their own products which they foolishly took for granted, is a high point in the history of the bicycle transportation and guerrilla warfare. A few years later the American military failed to learn from this mistake.

With the exception of China, transport planners in Asia have acted as habituated motorists do by ignoring the bicycle and in a few cases Like Jakarta have banned bicycles and trishaws on urban roads to make room for cars. Even in 1995 in Hanoi the young administrators told some foreign visitors, that they wanted to get cyclists out of the way to make way for motor cycle traffic. Indeed, one in ten people in Hanoi own lightweight motorcycles. Even so, it is poverty that is holding down bicycle sales in Vietnam more than anything else, because 80% of the Vietnamese still live in rural villages.



The bicycle and the Indian working man (Bombay)

2. Rapid population growth.

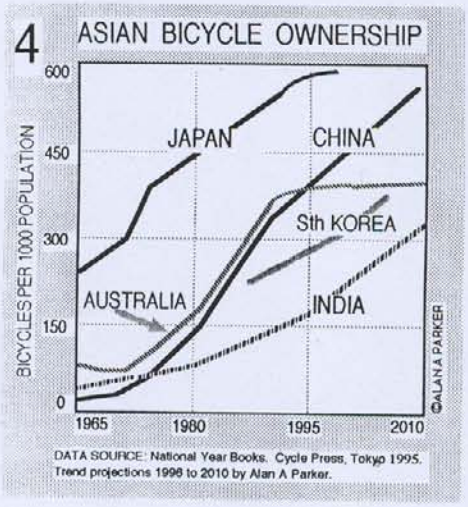
The failure to address the need to reduce the birth rate over the last 50 years has created many problems and compounded the problem of dwindling food and energy resources. Worst of all, it is further overpopulating vast areas already degraded by too much human activity. Deforestation for logging, crop production and/or to provide fire wood has increased the frequency of flooding and top soil is flushed down the rivers and into the oceans. Today the Asian population grows by 60 million a year and there is no longer anywhere left for any nation to dump its surplus population. All the berths on space ship earth are now fully booked and some are already dangerously overcrowded. Developing Asia is faced with problems far more difficult than those experienced by European nations when they industrialized. Unfortunately, there is little understanding of how the first industrial revolution was a success because war, disease and colonization relieved the pressure of population growth on available resources.

Even before the industrial revolution, the wealth of the European nations and Japan was assured by natural and man-made death control mechanisms. This is why the world's population which was around 250 million people at the time of Christ had only increased to one billion 1850 years later. From time to time the male population was culled by wars between nations, inter-city, or inter-clan wars. Religious wars to put down Moslems, Christians heretics or Jews, resulted in million of people killed and starved. Plagues were responsible for the deaths of millions. The survivors inherited the infrastructure, freeing them to do other things.

Building cities during the first industrial revolution, which was underway by 1830, generally enhanced the population-carrying capacity of nation states even though the cities were often built on good farming land. This was so because the productivity of the remaining agricultural land in total was more than enough for the small population. Asia has no such surplus of agricultural land. The British and Europeans were exporting people as colonists using their mastery of new transport technology and new weapons technology to take over and populate those parts of the world like Australia, Canada and the USA, which had few indigenous people. All they had to do was kill those who objected to the invasion of their homelands. Between 1880 and 1945 a further 100 million people were killed in wars in the lands between Lisbon to the west and Moscow to the east. An influenza epidemic (Spanish Flu) killed another 18 million between 1918 and 1920. The reason why the existing urban and industrial infrastructure was very productively used from generation to generation, was because there was no need to waste resources just to cope with a large increase in population.

After 1945, Europe was mostly rebuilding its cities, not building new one's. Birth control was practiced by more and more people and by 1995 Europe is very near to achieving zero population growth. The Japanese were industrialized before they started World War II but they entered the war in order to export their surplus population as colonists in their planned Pacific Empire. However, the allies culled Japanese soldiers and civilians instead. Japan then re-industrialized and rebuilt their bomb-devastated cities and transport infrastructure. They will achieve zero population growth around 2020, or maybe earlier if the earthquake predicted in the near future is really big.

The short term option of building on good agricultural land does exist in Asia , but to do that before the early stages of industrialization will destroy the capacity for self sufficiency in food production. This is why the successful Chinese birth control programme has greatly assisted long term economic development. If there are fewer people making use of the existing housing stock and good agricultural land, a better standard of living can be maintained. Like the Japanese, developing Asia will have to live with their growing population. The



BICYCLING IN ASIA

people cannot be exported as colonists nor will they go away, unless there are major wars, devastating natural calamities or great epidemics in the next twenty years (Karen 1996).

Another great change taking place in Asia is the revolution of rising expectations feeding off satellite TV networks, powering the growth of cities at a much faster rate than total population growth. Many million are leaving their villages to live in urban slums all over Asia, and even in China there are 100 million people on the move seeking work in the cities and posing a threat to Chinese political stability. United Nations demographers predict that the history of rapid urbanization due to industrialization in Europe in the 100 years after 1825 is already repeating itself in Asia and will be at an even faster rate in the next 30 years. Figure 3 shows the growth of the urban population in the USA, UK, from 1825 and a faster Japanese growth rate from 1850. The pattern for India, China and Korea is similarly upward.

Note that the trends for China and India in figure 3 are also typical for Indonesia. By the year 2000 there will be about 87 Asian cities with a population of more than one million and 21 cities with more than 5 million. Even worse, by 2010 there will be over 200 cities with more than one million population and 50 cities of over 5 million. If these cities turn into crime-ridden slums because of the lack of strategic planning then there will be no good life and a socially equitable form of economic development will become impossible.

3. The bicycle's role in industrial development.

In most developed countries between 1905 and 1950 bicycles played an important role as a cheap means of transport for both farm and industrial workers. At the start of the Second World War 49 million bicycles were in use (mostly by adults) in Germany, Great Britain, France, Italy, Belgium and Holland with a combined population of 212 million (Carter 1962). In these countries there were 237 bicycles per 1000 population which is the same as China in 1986 and Japan around 1935 and 1965.

Prewar Japan also had a bicycle fleet of 10 million in the late 1930s. There was a heavy concentration of bicycles in the fishing and rice growing areas and bicycles contributed towards the industrial revolution by providing access over the appalling road system. They used bicycles during World War 2, for post war reconstruction and there are now 70 million bicycles in use in Japan. Bicycle ownership rates per 1000 population for India, China, South Korea, Australia and Japan are shown in figure 4. The growth of the combined Indian and Chinese bicycle ownership rate over the last three decades is similar to that of Europe in the 30 years from 1900 to 1930. Even in the USA, where car ownership was high by 1930, there were still 12 million bicycles in use in 1940. That is 87 bicycles per 1000 population: a rate only reached in China around 1978.

China, India and Indonesia are now rapidly industrializing and making around 60 million bicycles a year to help them develop as rapidly as possible. China is following the same path as the developed nations between 1905 and 1955 but at a faster rate. Bicycle ownership in China has increased from around 20 per 1000 population in 1965 to 400 per 1000 in 1996, a twenty fold increase. China has the largest bicycle fleet in the world (450 million) and increasing at the rate of 30 million bicycles a year as it modernizes its economy and moves towards a stable human population of 1.6 billion in the year 2030. The growth of bicycle ownership per 1000 people will probably increase to 750 per 1000 by 2010. This will contribute to reducing transport costs and the hidden social costs of transport.

China with its 8% annual growth rate has begun building 25,000 kilometers of high speed roads and expanding its rail system with 4,800 km of new track for trains traveling

at 160 km per hour. However, without the mass use of the bicycles over the last 20 years China would have had to import or make a less sustainable alternative. This would have reduced the foreign technology it could afford to buy to build the new road and rail infrastructure. There were very few cars in China in 1994, no more than 8 per 1000 population and the new high speed roads will mostly be used for freight and commercial traffic because ownership of cars in China from 1997 will only increase on average by a million a year, until the year 2010. This will produce at the most, the same level of motor car ownership as in the USA in 1920

INDUSTRIALIZATION, BIRTH CONTROL AND BICYCLES

The first industrial revolution succeeded because there was population control in the form of war, disease and high emigration rates. Japan was the first nation in Asia to successfully industrialize (Parker 1993) and its population is nearly stable. The bicycle infrastructure Japan has provided to encourage the integration of bicycles and public transport is the best in the world. They have proved that bicycles are not a problem, but a significant part of the solution to economic development. The bicycle, far from being a symbol of economic backwardness, is rather a symbol of a society able to meet its passenger transport needs in the most cost effective and least environmentally damaging way, allowing scarce economic resources to be invested elsewhere (Hooke 1994).

China may be very successful in this regard, but India, Bangladesh and Pakistan are not. Even so, the boom in Asian bicycle ownership has expanded the world bicycle fleet to over one billion which will probably grow to two billion by the year 2010. The growth in bicycle numbers will be concentrated in developing Asia where 75% or more of their people live in rural areas, have limited natural resources and very low motor vehicle ownership rates.

If development is being retarded by an increasing human population it is unwise for governments to greatly increase the private car population as well because it is too resource intensive. The ecological rape of a continent by colonists symbolized by the great American dust bowl is really a one time event in human history. The nations that are making those kind of mistakes today will see millions of their people die. The model of a motorized lifestyle may persist in the USA, because they have the resources and the fire power to make other nations pay for it, but in Asia, a low urban density motorized life style for the many is a physical impossibility. It is a socially inequitable, technologically obsolete and ecologically obscene perception put into Asian homes by courtesy of the fantasy world of Hollywood and the satellite TV networks. Several of the more developed Asian nations will have serious problems in adjusting to this reality.

Apart from increased population growth and the uncontrolled drift of the rural poor to cities in Asia, there is also uncertainty about future resource availability - particularly oil after 2007. These problems will be compounded at an increasing rate by global warming which is predicted to reduce Asian production of wheat, rice and corn by 5%-10% (Houghton 1994). These and other problems are beyond the scope of this article, except to say that planning for the sensible and safe use of bicycles is a good risk management strategy for conserving resources, reducing emissions and ensuring a measure of social equity for future generations.

Elsewhere in the developing world, the Brazilian city of Curitiba (population: 2.2 million) is an excellent model for Asian city managers to study (Rabinovitch and Leitman 1996) for relevant transport and land-use initiatives to cope with high levels of urban growth. Curitiba has grown in a sustainable fashion despite a massive inflow of the rural poor. The sensitively designed developments in Curitiba show that bicycle friendly urban areas and a

US Bicycle Production and Shipment in unit

	Production	Import	Export
1991	7,582,000	6,669,000	389,000
'92	8,868,000	6,500,000	403,000
'93	7,676,000	7,193,000	934,000
'94	9,901,000	7,101,000	640,000
'95	8,467,000	7,273,000	605,000

Production in '94 and '95 includes infant bikes. (Source:Japan Bicycle Promotion Institute)

Japan's Imports of Bicycles (Jan.-May 1996)

Country	Quantity	96/95(%)	Value(1000yen)	96/95(%)
Taiwan	620,481	71.3	5,530,293	76.4
China	444,023	128.1	3,573,327	156.1
Korea	101,767	111.3	703,101	86.2
Indonesia	30,441	54.9	275,391	59.1
Hong Kong	15,263	124.8	127,053	147.9
USA	11,619	74.1	570,712	112.2
Italy	2,613	363.9	46,072	104.1
Malaysia	1,416	17.0	14,049	27.2
France	889	339.3	47,370	299.2
Others	553	186.8	56,198	217.3
Total	1,229,065	87.7	10,943,566	94.8

Source:Tariff Bureau of Finance Ministry

Taiwan Bicycle Exports (Jan.-Mar. 1996)

Country	Quantity	96/95(%)	Value (US$1000)	96/95(%)
USA	721,116	101.5	88,940	90.3
Japan	295,081	73.5	25,761	69.6
Germany	181,529	85.2	33,862	86.9
Holland	176,129	115.9	34,784	139.7
France	91,056	338.2	8,622	191.3
Norway	84,950	586.8	14,161	589.7
Sweden	82,421	185.2	8,322	132.8
UK	80,126	102.0	8,406	107.8
Austria	77,311	139.3	14,260	145.0
Canada	62,140	67.7	8,887	80.8
Belgium	50,157	115.5	9,605	200.1
Denmark	48,946	203.4	8,028	209.4
UAE	38,236	164.2	1,933	168.9
Switzerland	31,697	40.5	9,139	52.6
Finland	27,483	144.4	3,664	127.1
Australia	24,694	47.1	4,208	54.7
Israel	22,330	101.8	1,380	122.3
Spain	20,808	120.9	3,086	107.9
Italy	16,257	201.0	2,501	146.6
Argentina	11,302	51.3	1,037	42.0
Greece	10,297	227.6	762	256.8
Chili	10,068	33.2	597	37.4
Others	203,570	69.1	32,028	136.4
Total	2,367,704	97.5	308,478	98.7

Source:Taiwan Bicycle Exporters Assoc.

bicycle/public transport dual mode transport system are going to be essential, to reduce passenger transport costs for both the urban poor and the nation. It is an important innovation in bicycle transport planning to learn from.

It is important in the planning of urban areas that walking and cycling be greater encouraged because no matter what future technical improvements there are in motor vehicle technology, walking and cycling are after all the only non-polluting forms of transport.

Whether or not bicycle transportation flourishes after 2010 in Asia will depend on the developing nations learning how to green their own industrial revolutions, restraining both population growth and car usage and having the political will to make that happen.

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