



## BICYCLE RESEARCH REPORT NO. 1

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### **THE BICYCLE: VEHICLE FOR A SMALL PLANET**

#### **The Bicycle: tomorrow's vehicle number one worldwide?**

#### The Key Facts

At present there are roughly twice as many bicycles in the world as cars. According to the Worldwatch Institute in Washington, environmental and road safety problems and the car's high energy consumption will effectively prevent the extension of mass motoring to the countries of the third world. Instead the earth's future transport vehicle number one can and must be the bicycle, which is both socially acceptable and environment-friendly.

#### Contents

Although it is the car which shape lifestyles and land use in many countries, there are about twice as many bicycles as cars in the world - 800 million altogether. In some third world countries especially, bicycles, rickshaws and tricycles are responsible for a great deal of passenger and goods transport.

Data compiled by the Worldwatch Institute show that Asia has the most bicycles; there are about 300 million in China alone. Long before the ordinary Chinese could afford bicycles, Pu Yi, the last Emperor of the Quin dynasty was busily cycling round the forbidden city. In China alone there are more bicycles sold per year than cars sold throughout the world. In cities in Denmark, the Netherlands and Germany as well, where there are real incentive for cycle use, bicycles form a significant proportion of the traffic. By his own example Carlos Menem, the President of Argentina successfully persuaded people to switch to bicycles, thus relieving the pressure on them of sharply rising fuel costs.

Statistics show that people in the industrialized countries not only have the most cars but also the most bicycles. In West Germany there are four times as many bicycles as in China in proportion to the population, whilst other parts of the third world, eg. African countries such as Malawi, are almost totally without cycles. (See table 1). Only in the USA and some third world countries where bicycles are still almost unknown are there fewer cycles than cars. (table 2).

The consequences of motor traffic are disastrous. Despite safety precautions about a quarter of a million people world-wide die in road accidents; city-



dwellers are poisoned by smog from car exhausts, and the third world in town and countryside requires a large proportion of its limited financial and spatial resources to accommodate the motor vehicle. Thus the Worldwatch Institute study concludes that the car cannot ever become the world's primary means of transport.

By contrast a bicycle requires less than 1/50 of the energy of a car (table 3) only 1/4 to 1/6 of the surface area of land (table 4), and in some cases less than 1/100 of the capital. Thus the bicycle would seem to be the only vehicle offering both mobility and the chance of long-term survival on a planet with finite resources.

- Research "The Bicycle: Vehicle for a small planet" by Marcia D Lowe. Published by Worldwatch Institute, Worldwatch Paper 90, Washington 1989, ISBN 0-916468-91-7, price \$ 4.
- Address Worldwatch Institute, 1776 Massachusetts Avenue, NW, Washington DC, 20036 USA.

**Table 1. Bicycles per Person in Selected Countries, circa 1985**

Country	Bicycles Per Person
Netherlands	.79
West Germany	.74
Japan <sup>1</sup>	.49
United States <sup>1</sup>	.42
Australia <sup>1</sup>	.42
China <sup>1</sup>	.27
Mexico	.16
South Korea	.15
India	.06
Malawi	.01

<sup>1</sup> 1988

Sources: Worldwatch Institute, based on United Nations, *Bicycles and Components: A Pilot Survey of Opportunities for Trade Among Developing Countries* (Geneva: International Trade Center UNCTAD/GATT, 1985); and other sources.



**Table 2. Bicycles and Automobiles in Selected Countries,  
 circa 1985**

Country	Bicycles (millions)	Autos (millions)	Cycle/ Auto Ratio
China <sup>1</sup>	300.0	1.2	250.0
India	45.0	1.5	30.0
South Korea	6.0	.3	20.0
Egypt	1.5	.5	3.0
Mexico	12.0	4.8	2.5
Netherlands	11.0	4.9	2.2
Japan <sup>1</sup>	60.0	30.7	2.0
West Germany	45.0	26.0	1.7
Argentina	4.5	3.4	1.3
Tanzania	.5	.5	1.0
Australia <sup>1</sup>	6.8	7.1	1.0
United States <sup>1</sup>	103.0	139.0	.7

<sup>1</sup> 1988

Sources: Worldwatch Institute, based on Motor Vehicle Manufacturers Association, *Facts and Figures* (Detroit, Mich.: various editions); MVMA, various private communications; United Nations, *Bicycles and Components: A Pilot Survey of Opportunities for Trade Among Developing Countries* (Geneva: International Trade Center UNCTAD/GATT, 1985); *Japan Cycle Press International*, various editions; and other sources.



**Table 3. Production of Bicycles and Automobiles, Selected Countries, 1987**

Country	Bicycles	Automobiles
	(millions)	
China	41.0	.00 <sup>1</sup>
Taiwan	9.9	.20
Japan	7.8	7.89
United States	5.8	7.10
Soviet Union	5.4 <sup>2</sup>	1.33
India	5.3	.15
West Germany	2.9	4.37
South Korea	2.6	.79
Brazil	2.5 <sup>2</sup>	.68
Italy	1.6	1.71
Poland	1.3 <sup>2</sup>	.30
United Kingdom	1.2	1.14
Canada	1.2	.81
Others	10.5	6.54
<b>WORLD TOTAL</b>	<b>99.0</b>	<b>33.01</b>

<sup>1</sup> In 1987 China produced 4,045 automobiles.

<sup>2</sup> 1986 estimate.

**Sources:** Worldwatch Institute, based on Motor Vehicle Manufacturers Association, *Facts and Figures '89* (Detroit, Mich.: 1989); *Japan Cycle Press*, various editions; and other sources.

**Table 4. Energy Intensity of Selected Transport Modes, United States, 1984**

Mode	Calories per Passenger Mile
Automobile, 1 occupant	1,860
Transit bus	920
Transit rail	885
Walking	100
Bicycling	35

**Sources:** Mary C. Holcomb et al., *Transportation Energy Data Book: Edition 9* (Oak Ridge, Tenn.: Oak Ridge National Laboratory, 1987); President's Council on Physical Fitness and Sports, private communication, June 23, 1988.



**Table 5. Number of Persons per Hour that One Meter-width of Lane Can Carry, Selected Travel Modes**

<b>Mode</b>	<b>Operating Speed<sup>1</sup></b>	<b>Persons<sup>1</sup></b>
	(kilometers per hour)	(per meter-width of lane per hour)
Auto in mixed traffic	15-25	120-220
motorway	60-70	750
Bicycle	10-14	1,500
Bus in mixed traffic	10-15	2,700
Pedestrian	4	3,600
Suburban railway	45	4,000
Bus in separate busway	35-45	5,200
Surface rapid rail	35	9,000

<sup>1</sup> Ranges adjusted to account for vehicle occupancy and road speed conditions in developing countries.

Source: United Nations, *Transportation Strategies for Human Settlements in Developing Countries* (Nairobi: Center for Human Settlements (Habitat), 1984).