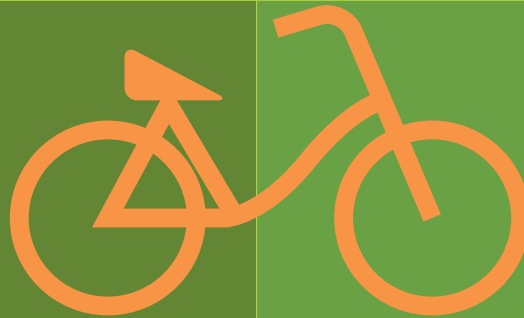




PEDALLING TOWARDS A GREENER INDIA

A report on promoting cycling in the country



Study supported by
All India Cycle Manufacturers' Association (AICMA)

Peddalling Towards A **GREENER INDIA**

A report on promoting cycling in the country

Study supported by the
All India Cycle Manufacturers' Association (AICMA)



The Energy and Resources Institute

© The Energy and Resources Institute 2014
All rights reserved
Published 2014

For more information

Akshima T Ghat

T E R I

Darbari Seth Block

IHC Complex, Lodhi Road

New Delhi – 110 003

India

Tel. 24682100 or 24682111

E-mail akshima@teri.res.in

Fax 2468 2144 or 24682145

Web www.teriin.org

India +91•Delhi (0)11

Contents

Project Team	v
Acknowledgement	vii
Foreword	ix
Preface	xi
Executive Summary.....	xiii
CHAPTER 1: Promoting cycle ownership in India.....	1
Key trends related to cycle ownership in India	1
Low level of cycle ownership in India	1
Negative correlation between cycle ownership and economic growth.....	2
Slow growth in cycle ownership	3
Stagnant/ declining cycle ownership levels in states and larger cities.....	3
Reasons for slow growth in cycle ownership	4
Ownership among low-income households.....	4
Ownership among middle- and high-income households.....	9
Recommendations	10
Promoting cycle ownership amongst low-income households.....	10
Increase ownership of cycles by school children: Case for considering cycle distribution schemes for school children.....	16
CHAPTER 2: Promoting cycling in urban areas	19
Key trends related to cycling in urban areas	19
Declining modal share of cycling in cities	19
Declining cycle ownership in cities	20
Declining safety levels of cyclists.....	20
Key reasons for declining cycle shares in urban areas	21
Lack of infrastructure and risk of road accidents	21
Recommendations	29
Developing cycling infrastructure in cities, introducing cycle-sharing schemes and promoting awareness campaigns.....	29
CHAPTER 3: Promoting growth and competitiveness of Indian bicycle industry	37
Bicycle industry in India	37
Structure of bicycle industry in India.....	38
Industry trend analysis.....	38
Production capacity	38

Contents

Bicycle sales	39
Exports and imports.....	40
Key issues facing the bicycle industry	42
Technology gaps.....	43
Quality Aspects: Product standards and testing facility	44
Issue of unsafe/low quality and imported products penetrating in domestic market.....	45
Issues related to export competitiveness	46
Recommendations	47
Technology upgradation/transfer support	47
Establishing state-of-the-art bicycle R&D and testing facilities.....	50
Monitoring mechanism to ensure adherence of safety standards by manufacturers	52
Enhancing export competitiveness of the industry	52
References	55
Annexures	
Annex 2.1: Urban road cross-sections provided in the IRC codes (IRC 86:1983) and UDPFI guidelines.....	57
Annex 2.2: Traffic levels in Indian cities indicate the need for provision of cycle tracks in accordance with the IRC codes/UDPFI Guidelines.....	58
Annex 2.3: Cycle tracks in Pune, Chandigarh, and Noida: Are they being really used by cyclists?.....	59
Annex 2.4: Experience of bicycle sharing schemes in Delhi and Bangalore.....	62
Annex 2.5: Review of urban transport related advisories/guidelines issued by the MoUD.....	66



Project Team

Project advisor

S Sundar, Distinguished Fellow

Principal investigator

Akshima T Ghate, Fellow

Co-principal investigator

Seema Singh, Research Associate

Team members

Megha Kumar, Research Associate

Rahul Raju Dusa, Research Associate

Secretarial assistance

Sonia Khanduri

TERI IT team (Support for online surveys)

Harsha Sinha, Asst. Manager, Online Communications

Raman Kheterpal, Web Production Coordinator

TERI Press

TERI Press Team



Acknowledgement

TERI would like to express its deep gratitude to All India Cycle Manufacturers' Association (AICMA) for supporting this study. We would specifically like to thank the four AICMA members, Hero Cycles, Tube Investments (TI) Cycles, Atlas Cycles, and Avon Cycles for their support and cooperation during the study, especially in terms of sharing the relevant data related to the cycle industry. In particular, we would like to thank Mr Rajesh Gulati of Hero Cycles for his constant support, valuable comments, and useful insights at various stages of the study.

TERI gratefully acknowledges the support of a large number of stakeholders, including sector experts, government agencies, private sector stakeholders, NGOs, online cycling groups, such as the Bangalore Bikers Club (BBC) and Delhi Cycling Club (DCC), and Microfinance Institutions (MFI's) for their valuable comments and views on the study. In particular, TERI would like to express its gratitude to the following individuals for sparing their valuable time and providing constructive inputs that were helpful in writing the report.

- Dr K B Thakur, Additional Chief, National Manufacturing Competitiveness Council (NMCC)
- Mr Ashok Bhattacharjee, Director, Unified Traffic and Transportation Infrastructure (Planning & Engineering) Centre (UTTIPPEC), Delhi Development Authority (DDA)
- Mr Pushkar Chopra, Greenolution, Delhi
- Mr S Narayanan, Planet Green Bikes, Delhi
- Officials at Sonata MFI, Jagdishpur, UP
- Mr Alok Prasad, CEO, Microfinance Institutions Network (MFIN), Gurgaon
- Mr Tarun Kumar Singh, Assistant Director, Rashtriya Gramin Vikas Nigam (RGVN), Patna
- Mr Neelesh Sinha, Programme Coordinator, Rashtriya Gramin Vikas Nigam (RGVN), Patna
- Ms Rashmi Sinha, Senior Advisor (HR and Non-financial linkages), Saija Finance Pvt Ltd (SFPL), Patna
- Mr Jack Leenars, DelhiByCycle
- Officials of ATCAG, I Cycle, and Namma Cycle, the three bicycle rental providers in Bangalore

TERI had constituted an Advisory Group comprising experts from industry, government, and NGOs. TERI is grateful to the Advisory Group members for sharing their thoughts with the project team at the project initiation stage. Their inputs helped the project team in developing a comprehensive outline for the study.

The project team would also like to thank TERI's local offices at Bihar and UP for all their help and support provided to the project team for focus group discussions in villages in these two states. In particular, we would like to thank Mr Mohd. Naseem and Mr Sanjeev Kumar in Jagdishpur and Patna field offices, respectively for arranging the field visits and helping organize the focus group discussions in villages.



Acknowledgement

The project team would also like to thank TERI's IT team for its support in conducting the online survey for choice cyclists. TERI is also grateful to all the respondents of the online survey and field surveys in six cities; the study team gained tremendously from the responses of all the survey participants. The project team is also thankful to the entire TERI Press team for helping with the publication of this report.



Foreword

Increase in India's population and income levels has increased the demand for mobility across the length and breadth of the country. The massive growth in road transportation and increase in the vehicular population have created serious problems of congestion, poor air quality and a range of other problems which require the development of alternatives to the growing reliance on automobiles.

Cycling is amongst the most sustainable modes of mobility. Having zero dependence on fossil fuels and zero emissions, cycles have zero environmental impact and present an affordable transport option for millions of Indians who cannot afford any form of motorized transport. Cycles enhance the socio-economic growth opportunities of low-income households in the country by enabling them to access jobs, markets, schools, and medical facilities in a fast and affordable manner. From the perspective of attainment of the Millennium Development Goals, use of cycles by our low income population can have a significant role in poverty alleviation, enhancing school enrolment, gender empowerment, and enabling faster access to health facilities.

In the current situation, where we are concerned about the growing energy, carbon and environmental footprint of transport, cycling presents a mitigation option that addresses all these concerns while also generating significant health benefits. The role of cycling in promoting physical activity and healthy lifestyles is critical in a country like India which is witnessing a sudden upsurge in diseases linked to unhealthy lifestyles. Nearly half of all the deaths in India are primarily due to non-communicable diseases, many of which are linked to inactive and unhealthy lifestyles.

Given the positive social and environmental impacts of cycling, high levels of cycle ownership and use are extremely desirable in any country aiming to promote inclusive development and sustainable mobility. Unfortunately, however, cycle ownership and use of cycles as a mode of transport in India is steadily declining. Furthermore, India's cycle industry is also facing serious challenges in terms of meeting domestic demand and staying globally competitive. There is hence an urgent need to examine the issues constraining the growth of cycling in India.

I am pleased that TERI in its endeavour to promote sustainable mobility has undertaken this study on promoting cycling in India and has looked into the issues and challenges constraining the growth of cycling in the country. The study provides policy recommendations for the government on how to arrest the declining trends in cycling and promote this green and healthy mode of transport. I hope that governments at the national, state and local levels will find this report of value, and adopt the strategies and measures suggested to promote cycle ownership and use in the country.



(R K Pachauri)

Director-General, TERI



Preface

This report is on a critical, but neglected mode of transport, i.e., cycling. Despite meeting the mobility needs of millions of Indians and despite its positive social and environmental externalities, cycling in India has not grown in numbers over the last decade. The number of households in India who own cycles as compared to China is low. For example less than 50% households in rural India own cycles as compared to almost 100% households in rural China. The use of cycles has declined in most of our cities largely due to the way we have planned our cities and transport infrastructure to cater to the needs of motorized transport. The common perception of cycling as an unsafe and a poor man's mode has also discouraged the use of cycles as a choice mode of transport. For low income households for whom cycling is not a mode of choice, the price of cycles is a deterrent; the price of the cheapest cycle in rural India is about 15% of the annual per capita rural income as compared to about 2.5% in rural China. There is also no mechanism in India to provide low cost finance for the purchase of cycles although cycles are widely used to access employment and business opportunities.

The trends on the supply side have also not been encouraging despite India being the second largest manufacturer of cycles in the world. The Indian cycle industry is facing serious challenges in terms of meeting the domestic demand and staying competitive globally. The industry caters primarily to low-income population, both within and outside the country, and is witnessing a very slow growth in domestic sales and exports even as there is a rapid increase in imports from China. Exports from India are also to markets in South Asia and Africa and not to the high-end markets in the developed world. What is constraining the growth of the Indian industry is the technology gap across all product segments, which makes Indian products uncompetitive in terms of safety and quality.

There is an urgent need to arrest the decline in the ownership and use of cycles and give an impetus to the cycle industry. The Report examines in some depth the trends in the ownership and use of cycles and makes specific recommendations on the interventions necessary to promote cycling in the country. Important among these recommendations are the need to provide infrastructure and facilities for cycling in urban areas, making cycles less expensive for low income groups and providing micro finance. The recommendations also address the need for making cycles and cycling safe.

The report also examines the problems faced by the cycle industry in India and suggests what needs to be done to make the industry globally competitive. Principal among the recommendations is the need to bridge the technology gaps by establishing a Cycle industry Up gradation Fund Scheme (CUFS), facilitate imports of components not manufactured in India and to establish internationally accepted testing facilities to provide quality assurance to export markets.

Given the concerns over energy security and the environmental and climate change impacts of transport, we need to put our transport systems on a sustainable and low carbon path. As part of this endeavour, we need to ensure that the share of cycling in India is maintained, if not increased,



through the adoption of a package of policy measures aimed at promoting cycling and reviving the industry. It is unfortunate that while the more energy-intensive and less environment-friendly modes like automobiles have been given fiscal incentives to stimulate demand, cycling has not received any attention. It is hoped that this report will draw the attention of policy makers to provide an impetus to this clean and inclusive mode of transport.

A handwritten signature in black ink, appearing to read 'S Sundar', written over a light grey rectangular background.

(S Sundar)

Distinguished Fellow, TERI





Executive Summary

Cycling is amongst the most sustainable modes of mobility, which has zero dependence on fossil fuels and zero emissions unlike the motorized modes of transport, which have huge negative externalities, namely, accidents, congestion, fossil energy use, and environmental degradation. Cycling, in fact, is associated with positive externalities like health improvements, congestion reduction, lessening of air pollution and greenhouse gas (GHG) emissions, and minimizing energy use. In addition to these positive impacts, in the context of a developing country like India, cycling presents the most affordable and efficient means of travel for low-income households who find it difficult to afford most motorized transport options. Cycling enables low-income households to access jobs, markets, schools, and medical facilities in a fast and affordable manner and enhances their socio-economic growth opportunities.

Given the positive social and environmental impacts of cycling, high levels of cycle ownership and its use are extremely desirable in any country aiming to promote inclusive development and sustainable mobility. This, however, is not the case with India. India is witnessing a very slow growth in cycle ownership and a decline in the use of cycles as a mode of transport. Furthermore, India's cycle industry is also facing serious challenges in terms of meeting the domestic demand and staying competitive globally. The industry caters primarily to low-income segments, both within and outside the





country, and is witnessing a very slow growth in domestic sales and exports, while there has been a rapid increase in imports from China.

The report focuses on examining the key trends and issues with regard to growth in cycle ownership and its use, as well as the growth of Indian cycle industry. Specific recommendations on promoting cycling in India have been suggested in the report. The following sections provide a summary of the key trends, issues, and recommendations for promoting:

- Cycle ownership in India;
- Use of cycles in Indian cities; and
- Indian cycle industry's growth and competitiveness.

Cycle ownership in India

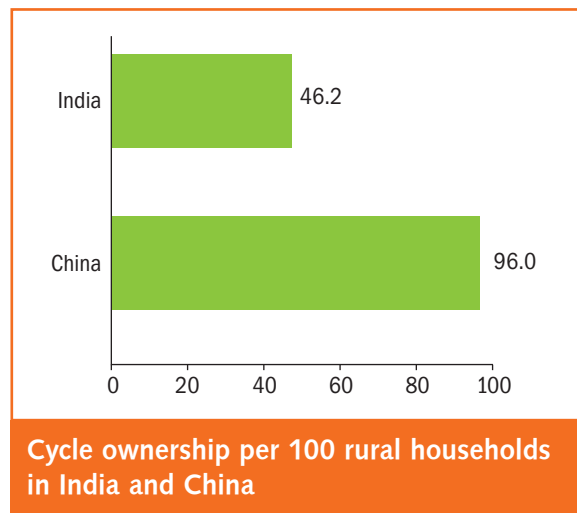
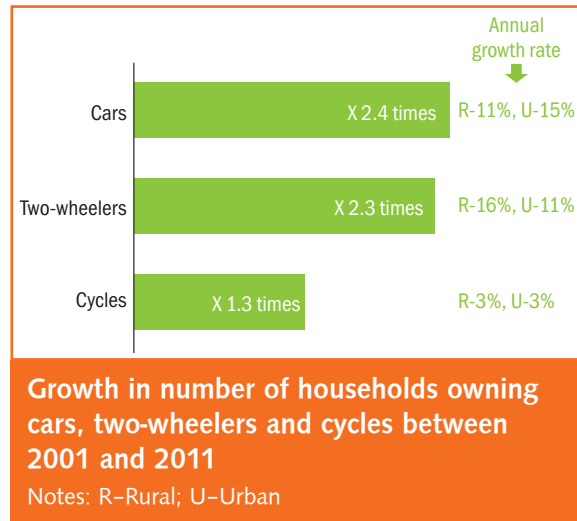
Key trends

Growth in cycle ownership in India over the last one decade has been very slow. Household cycle ownership increased at a rate of about 3% per annum between 2001 and 2011. Nearly 45% households, i.e., about 111 million households in India owned bicycles in 2011. This was just marginally high as compared to 2001; 44% households (84 million households) owned cycles in 2001. A comparison with China indicates that almost every household in rural China owns a cycle, as compared to less than 50% households in rural India. China's urban cycle ownership level is also higher as compared to India.

Reasons for slow growth in cycle ownership

Price of cycle versus income of low-income households

Even if we consider that low-income households are the primary users of cycles in India, the ownership of cycles amongst low-income





households in India is low. It is low perhaps on account of the bicycle price being high as compared to their low income and lack of availability of finance for purchase of cycles.

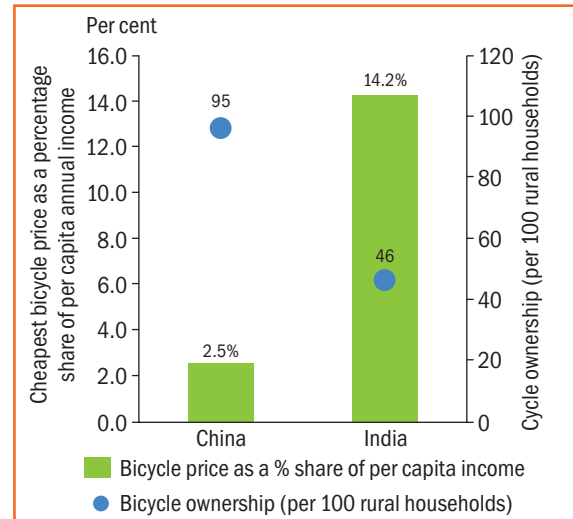
A comparison of the price of the cheapest available bicycle as a percentage share of per capita annual income in rural India shows that the price of cheapest available bicycle in India is about 15% of the annual per capita income in rural areas. A comparison of this situation with China indicates that the price of the cheapest cycle in China represents only 2.5% of the annual per capita income in rural areas. Given this difference between India and China, it would not be difficult to argue that rural population in China would find it easier to buy a cycle than their rural counterparts in India. The inference is supported by the difference in level of cycle ownership amongst rural households in the two countries; China's rural cycle ownership level is almost double than that of India. The inference also remains valid if the analysis is done at an all-India level instead of only the rural areas.

Focus group discussions in five villages in Uttar Pradesh and Bihar and a survey of 1,200 cyclists in six urban areas (Meerut, Jhansi, Jaipur, Surat, Bangalore, and Delhi) by TERI also indicate that low-income households find it difficult to purchase a cycle.

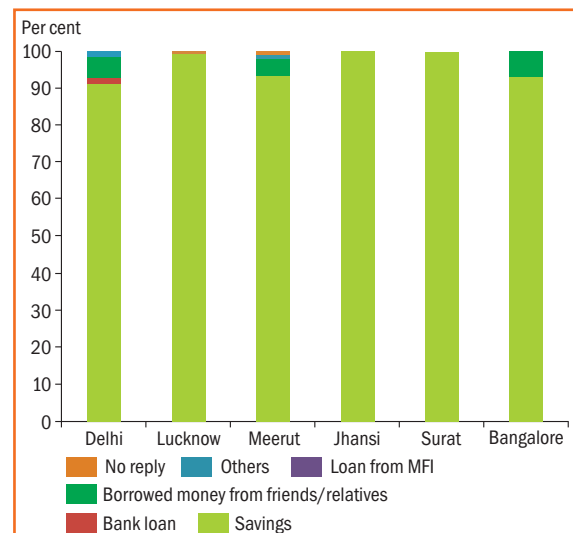
Issue of lack of financing

Presently, savings are the key means for purchasing a cycle. In TERI's surveys, it was found that almost all cyclists who were surveyed had purchased cycles from their own money/savings or informal loans from friends, relatives, and other villagers, and had not taken a formal loan for purchasing cycle. Survey respondents stated that lack of finance was a major constraint in the purchase of bicycles. These findings point to three critical points.

- **The fact that most cyclists are purchasing cycles from their own money/savings does not imply that there is no demand for formal loans for**



Comparison of bicycle ownership and bicycle price as a percentage share of per capita annual income in rural India and rural China



TERI's survey findings: Means to purchase cycle





cycles. In fact, it indicates that perhaps loans for cycles are not easily available.

- **The other key point is that since households are dependent on their own savings for cycle purchase,** there is a gestation period in the realization of a decision to purchase a cycle, as savings over a long period need to be done in order to raise the required amount.
- **Given the affordability issue, low-income households are able to purchase only one cycle for the household, which is typically used by the head of the household.** Other household members, especially schoolgoing children, are left with walking as their only mobility option.

Recommendations: Promoting cycle ownership amongst low-income households

Make cycles affordable: Case for reducing prices of cycles costing less than Rs 5,000 as these are purchased by low income population

One of the ways of reducing the price of the cycle for low-income population could be by the way of exemption of taxes on cycle production and sale. Taxes, including excise duty, central sales tax (CST), and value-added tax (VAT) constitute 12% of the total price of a cycle and are passed on to the consumers, who belong primarily to low-income groups.

Government should waive the taxes on cycles bought by low-income population, i.e., cycles costing less than Rs 5,000

It is proposed that the government should waive the taxes on cycles consumed by low-income population. If the 12% tax component (6.8% going

“
Finance for cycle purchase is not available to low-income households”



“
Government support of nearly Rs 300 crores needed to make cycles cheaper for low-income households”





to central government and 5.2% going to state government) is absorbed by the government, the price of the cheapest cycle can be brought down and we can expect the cheapest cycles in the country to cost in the range of Rs 2,500–Rs 4,500. Discussions with stakeholders and surveys indicate that this customer segment is highly price sensitive and any decrease/increase in price of cycle can affect their ability to purchase the cycle.

Data from domestic cycle manufacturers shows that they sold nearly 5 million cycles in 2012–13 that had a price below Rs 3,000 (average price of about Rs 2,900) and nearly 1.6 million cycles that had a price range between Rs 3,000–6,000 (average price of about Rs 4,500). If we would have subsidized these many cycles, i.e., about 6.6 million cycles in 2012–13, which are primarily bought by low-income population by waiving 12% tax component, the burden on the exchequer would have been to the tune of nearly Rs 260 crore (about Rs 150 crore for central government and Rs 110 crore for state government).

Would exemption of taxes burden the exchequer?

While this annual subsidy to the tune of Rs 260 crore or more may seem high, it is to be noted that it is way lower than the subsidies being given to the users of motor vehicles in the form of fuel subsidy, despite the fact that there are much larger societal costs associated with the use of motor vehicles. In 2012–13, the Government of India shelled out nearly Rs 92,000 crore as petroleum subsidy, the largest chunk (60%) of which went to the transport sector. In addition to fuel subsidy, the automobiles in the most recent budget of the government (Vote-on account interim budget for 2014–15) received heavy excise duty cuts. The central and state governments have also been subsidizing the cleaner vehicle technologies like hybrid and electric two-wheelers and cars with an aim to promote adoption of these environment-friendly technologies by the population.



“
Motor vehicles given heavy subsidies – petroleum subsidy, excise duty cuts, subsidies for clean vehicles
 ”





If motor vehicles/fuels can be subsidized, then why not cycles?

Cycles are one of the most clean and the most sustainable forms of transport. In addition to their environmental contribution, cycles for low-income population are a means to enhance their socio-economic well-being. A subsidy of Rs 260 crore or more to cycles does not seem to be high, given that we are spending thousands of crores for subsidizing personal vehicles despite huge negative externalities associate with them. It is hence strongly recommended that exemption of all taxes on cycles be considered by the Government of India and state governments from the perspective of making this environment friendly and socio-economically important mode of transport available to the low-income population.

Ensure easy availability of cycle finance: Case for inclusion of cycles under priority sector lending

Financing for cycles is not available to the low-income households. Loans for cycles are not being dispersed under the priority sector lending scheme on account of the small ticket price of the loan and non-recognition of cycles as income generating/productivity enhancing assets for low income households. Cycles, however, are a direct income-generating asset for many low-income individuals in cities, towns, and villages. Cycles are used for a number of income-generating purposes, like to transport farm products from villages to markets; for selling and delivery of a variety of products, clothes, food items, plants, milk, newspapers, liquid petroleum gas (LPG) cylinders, etc., all of which lead to direct income generation. Cycles are also an enabler to income generation as they provide a cheap, but faster mode of mobility to low-income population.

“
Cycling – zero environmental impact, provides low cost mobility solution for low-income households
”





Ensure availability of finance for cycle purchase; bring cycle financing under priority sector lending

It is recommended that there should be a dedicated effort to promote availability of cycle finance to poor population. This can happen by bringing cycles under priority sector lending. It is, therefore, strongly recommended that cycles should be specifically brought under the priority sector lending guidelines in order to promote cycle finance by banks and non-bank financial companies (NBFCs).

Increase ownership of cycles by school children: Case for considering cycle distribution for school children

Cycles play a vital role in enhancing social development of low-income communities. Enabling access to schools (especially secondary and higher secondary schools that serve several villages and towns) in a cost-effective and time-efficient manner is specifically a great social contribution by cycles.

- In Bihar, free cycle distribution to girls has increased girl's enrolment in secondary schools by 5% and has also reduced the gender gap in enrolment by 25%.
- In Chhattisgarh, enrolment of girl students in secondary schools doubled over a period of five years due to free cycle scheme for girls.

Introduce special cycle schemes for school children

Given the positive social development impacts that cycles can have in terms of increasing education levels, especially of girls, and the success of the existing free cycle distribution schemes of state governments, it is strongly recommended that special schemes for promoting ownership of cycles by school children should be considered/continued by

“Cycles—both a direct and indirect income-generating asset for low-income households”





the state governments and the Government of India.

Cycling as a mode of transport in urban areas

Key trends

The share of cycling as a mode of transport in Indian cities has been steadily declining despite average trip lengths in these cities being convenient for cycling. In addition to the declining modal share trends for cycles, Indian cities are also witnessing declining level of cycle ownership by households. There has also been an increase in deaths of cyclists in road accidents. According to the data released by Ministry of Road Transport and Highways (MoRTH), the number of cyclists who died in road accidents in 2012 was 6,600, as compared to 5,443 in 2009.

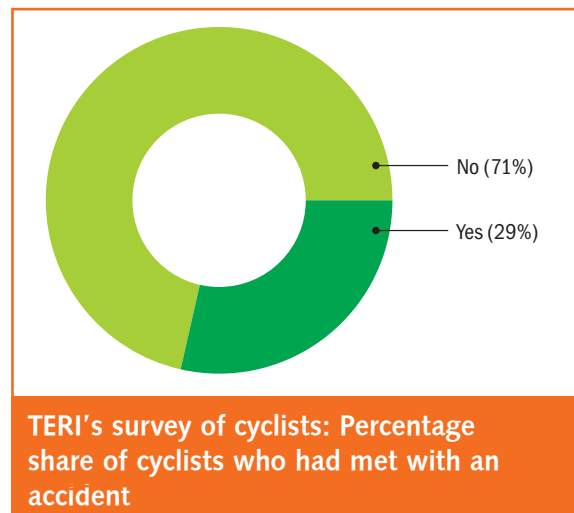
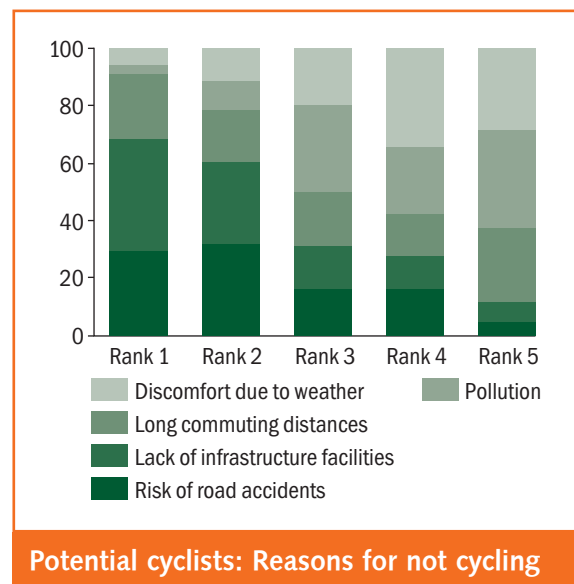
Reasons for declining cycling trends in urban areas

Decline in use of cycles in urban areas can be attributed to the following factors:

- Lack of safe cycling conditions in the cities;
- Lack of innovative cycle promoting schemes like bicycle sharing; and
- Social perception about cycling and preference of motorized personal transport over cycles.

Inadequate cycling infrastructure in cities

Despite its role in ensuring safe cycling conditions, dedicated infrastructure for cycling is not being provided in Indian cities. This, however, is not a result of lack of provision for cycle infrastructure in the norms and standards for urban road design and construction, but due to inadequacy in their implementation. The Indian Roads Congress (IRC) code for urban roads, Urban Development Plans Formulation and Implementation (UDPFI)





guidelines and the new Code of Practice for design of Urban Roads prepared by the Ministry of Urban Development (MoUD), all clearly provide for cycle tracks as an important cross-sectional element of urban roads.

Very few cities in the country, however have constructed cycle tracks. These networks have problems related to bad design, lack of maintenance, encroachment, inadequate lighting, etc. There are no dedicated investments proposed for cycle tracks in city budgets and city mobility plans.

Lack of cycle-sharing schemes in Indian cities

The concept of formal, well-planned, and organized bicycle-sharing systems has not yet picked up by Indian cities. Till date, cycle sharing has been formally introduced only in three cities in India namely Delhi, Bangalore, and Mumbai. Currently, cycle-sharing services are operational in parts only in the cities of Delhi and Bangalore.

Recommendations: Promote cycling in urban areas by developing cycling infrastructure in cities, introducing cycle-sharing schemes, and promoting awareness campaigns

Ensuring provision and maintenance of cycling infrastructure in cities

Given the severe lack of cycling infrastructure in cities, the following suggested approach needs to be urgently adopted at the city level in order to ensure development of quality cycling infrastructure in cities.

- Interventions at the stage of urban road





design (design of new roads and retrofitting on existing roads) and at the stage of planning circulation networks for the city

- ensure translation of existing codes/design standards to actual road design including provision of cycle tracks on all arterial and sub-arterial roads, and safe interface of cyclists with motorized traffic, as provided in the codes.
- guarantee development of complete network of cycle tracks in the city at the stage of development of city-level circulation networks and master plans.
- Interventions at the stage of appraisal
 - ensure that road design and city mobility networks include cycle tracks as a key element.
- Interventions at the operational stage
 - ensure proper maintenance of cycle tracks and associated facilities/amenities like lighting, landscaping, etc.
 - ensure strict enforcement mechanism to check parking, encroachments, waste dumping, etc., on cycle tracks; prohibit motor vehicles from using cycle tracks.

Make non-motorized transport (NMT) projects a mandatory requirement for central funding

It is strongly recommended that the MoUD, while implementing the JNNURM or its succeeding scheme, ensures provision of cycling infrastructure in cities by making provision of NMT infrastructure a mandatory requirement.

Provision of cycling infrastructure should be ensured by cities in all the urban transport-related detailed project reports (DPRs) submitted to MoUD; the cost of constructing and maintaining cycling facilities should be included in the overall cost of the project and indicated clearly in the DPR. Appraisal and evaluation mechanisms for Central funding established by MoUD should ensure provision of cycling infrastructure and utilization of



“
Provision of infrastructure for NMT should be mandatory for cities for getting central assistance”





approved central assistance for the same purposes.

Cities should implement city-wide cycle-sharing schemes

It is recommended that cities should start planning city wide cycle-sharing schemes rather than isolated projects serving specific locations. Following elements need to be critically considered while designing cycle-sharing schemes for cities.

- Proper network design
- Adequate cycles and infrastructure
- Quality bicycles
- Easy-to-use system

The Ministry of Urban Development should encourage and provide incentives to state and city governments to introduce and promote cycle-sharing systems. Linking provision of bicycle-sharing systems to funding schemes or programmes like JNNURM can prove to be an important step in promoting bicycle-sharing systems in Indian cities. State and city governments should also promote bicycle sharing and invest in provision of cycling infrastructure at the city level to promote cycling as a mode of transport, especially for short-trip lengths.

Government of India should initiate awareness campaigns for promoting cycling

Mass awareness campaigns need to be taken up to highlight the benefits of cycling, namely, health benefits, environmental benefits, and mobility benefits. It is recommended that a nation-wide awareness campaign be designed and initiated by the Government of India with the following key ministries as partners—Ministry of Health, Ministry of Education and Sports, Ministry of Environment and Forests, and Ministry of Urban Development. The focus of such an awareness campaign should be to highlight the benefits of



“
Need to highlight the health,
environmental, and mobility
benefits of cycling”





cycling to individuals and society at large, and change perceptions like cycles are a poor man's mode of mobility; cycles are an unsafe mode of transport; exposure to pollution while cycling cause health problems, etc. There should be a sustained awareness campaign preferably through visual media along with nation-wide events on cycling, which are endorsed by politicians, celebrities, and people who can set an example for the common public. Such awareness initiatives coupled with provision of cycling infrastructure can have a significant impact in terms of reducing health costs to the economy. In Denmark, e.g., it is estimated that the use of cycles as a result of such initiatives has helped the country save about €40 million annually on health care costs.¹ India, which is starting to experience the growing health and environmental costs of increased use of motorized transport, needs to look at cycling as a solution for eliminating negative externalities of current pattern of transport growth in the cities.

“ Need to change the social perception of cycling as an unsafe and a poor man's mode ”

Indian bicycle industry

Key trends

Production capacity

In 2012–13, India produced nearly 15.5 million bicycles. There has been a moderate average annual growth of 4% in bicycle production in the last five years. An important aspect of bicycle production capacity in India is the dominance of low-value bicycles/standard bicycles (i.e., bicycles having Basic Dealer Price or BDP < Rs 3,000), which constitute nearly 60% of the total production.

Bicycle sales

In 2012–13, about 12 million bicycles were sold in India. Bicycle sales are growing with a moderate growth rate of about 6% over the last 5 years.

GLOBAL BICYCLE SUPPLY

- China – 67%
- India – 10%
- Taiwan – 4%
- Brazil – 4%
- Germany – 2%
- Japan – 67%
- Other – 67%

GLOBAL BICYCLE DEMAND

- China – 30%
- Europe – 20%
- America – 17%
- India – 10%
- Japan – 17%
- Taiwan – 17%
- Others – 17%

¹ <http://www.euractiv.com/health/bicycle-highway-projects-europe-news-518865>, last accessed on June 13, 2014





Small towns and rural areas in the country have been witnessing faster growth and have a larger market for bicycles as compared to large urban areas.

Exports and imports

The level of exports by Indian manufacturers is quite low. Indian manufacturers export only about 5% to 7% of their annual production to two low-end (standard/children segments) markets, i.e., Africa and South Asia. The Indian manufacturers have an insignificant share in the global high and medium value bicycle exports, a segment dominated by Chinese and European bicycles. While the exports have grown at an average rate of about 10% per annum in the last five years, India has imported bicycles at a much faster rate of about 25% per annum during the same period, primarily from China.

Key issues

Technology gaps

Indian bicycle industry is facing technology-related challenges in both the low and high-end product segments in the domestic as well as export markets. The key technology gaps are:

- **Raw materials:** Indian bicycle producers manufacture steel-based components and do not manufacture aluminium (alloy), carbon, and titanium-based components due to lack of availability of right specification of raw materials and their own lack of competence in dealing with these materials.
- **Special components:** India does not have the capability to produce derailleurs (rear and front), suspension forks, shifters, disk brakes, etc. These components are being imported from other countries. India also does not have the requisite components for electric bicycles. The bicycle components/parts in India are made in small-scale manufacturing units with low-end and obsolete machinery.

“
Slow growth in bicycle
production and sales
”

“
Huge technology gaps exist
across all product segments
”





- **Production technology:** Indian plants practice manual welding and manual assembly as against international trend of robot-based welding and automated assembly. Also, Indian plants lag behind in painting technology and testing facilities.
- **Lack of R&D infrastructure for advanced bicycle technologies:** There is almost insignificant R&D infrastructure in the country for advanced technologies for bicycles.

Quality aspects: Product standards and testing facility

Bureau of Indian Standards (BIS) have prescribed technical standards for Indian bicycles, which are primarily adopted from the international standards prescribed by the International Organization for Standardization (ISO). A review of the ISO standards adopted for India indicates that these standards are in line with the European standards set by the European Standardization Committee (CEN) in terms of the requirements set for each of the bicycle components. However, the European standards are more stringent than the Indian/ISO standards in terms of testing methods for both bicycles as well as components.

Indian manufacturers send their products for testing to the Research and Development Centre for Bicycle and Sewing Machine, Ludhiana (Punjab), which was established by the Punjab government with assistance from United Nations Industrial Development Organization (UNIDO)/United Nations Development Programme (UNDP) to provide testing facility for bicycles. As per the bicycle manufacturers, the tests conducted or the certification provided by the Centre is not accepted in the European/US markets, which require far more stringent testing methods. Lack of domestic testing facility for bicycles, which is at par with the international facilities, has been identified as a critical bottleneck.

“Lack of state-of-the-art testing and R&D facility”





Issue of unsafe/low quality and imported products penetrating in domestic market

Several new small-scale players have emerged in the Indian market and have been assembling bicycles, which are sold at prices which compete effectively with the bicycles of large manufacturers. Despite the standards being prescribed by BIS for bicycle safety for all the products that go in the market, small-scale manufacturers generally do not send their products for testing. Indian market is also witnessing increasing penetration of imported bicycles; compliance of these imported products with the BIS standards is not being ensured and raises safety concerns.

Export competitiveness

The technology gaps related to raw materials, components, and production technology are the key barriers for the industry to be able to produce competitive products for export markets like Europe and USA.

There are several special components required for high-end cycles that are not available in India and are being imported. The basic import duty on these components is 20%. Other duties on components include countervailing duty (CVD) – 12%, additional CVD – 4%, education cess – 2%, and secondary and higher education cess – 1%. On account of all these duties and cess, imported components end up being about 40% more expensive as compared to their export price. Such high import duties on the components required for the export products make Indian manufacturers uncompetitive in the global market, especially in comparison to China, which has the domestic manufacturing capacity for these special components.

Another key concern with regard to export competitiveness is the high share of domestic freight cost in the total cost of the export bicycle price (CIF price). Interestingly, the cost of domestic freight for export products is higher as compared to sea freight cost to countries in

“
Lack of compliance of cycles
in Indian market with safety
standards”





Europe. The high share of domestic freight cost in India leads to a price disadvantage for Indian manufacturers in the global market, especially in comparison with China, which gives freight subsidy to its industry.

Between 2011–12 and 2012–13, there has been an overall decline in the exports by Indian manufacturers; even exports to Africa, the most dominant export market for Indian bicycles, and limited exports to Europe have declined. This is being attributed by the industry to the capturing of the global market of India by China and also by Bangladesh, Sri Lanka, and Vietnam. In Europe, Chinese manufacturers are able to export their bicycles via Bangladesh, Sri Lanka, and Vietnam, as these countries enjoy Most Favoured Nation (MFN) status (0% duty) in Europe as compared to 10.5% import duty on Indian bicycles.

In the low-value export segment also, Indian manufacturers have started facing stiff competition from Chinese manufacturers, who have the advantage of low cost of capital, freight subsidy, lower energy cost, duty drawbacks, etc., leading to a lower production cost (around 15%–20% lower) than India, which gives them a comparative advantage in the African market.

Recommendations: Promoting growth and competitiveness of Indian bicycle industry

Technology upgradation/transfer support

It is strongly recommended that a technology support **scheme is designed for the bicycle industry to provide support to component manufacturers and bicycle manufacturers to upgrade to advanced technologies** that will help them become competitive (in both price and quality) in the domestic and global

“ **Issues:**

- Export competitiveness
- High import duty
- High domestic freight cost
- Competition from China
”




markets. The **Cycle industry Upgradation Fund Scheme (CUFS)** can be designed based on the following guiding principles.

- Beneficiaries -
 - Small- and medium-scale component/parts manufacturers units
 - Large original equipment manufacturer (OEM) units involved in final product manufacturing
- Both existing and new units shall be eligible for CUFS support
 - Existing units will get support for technology upgradation
 - New units will get support for setting up state-of-the-art technology that enhances the competitiveness in the domestic, as well as international markets
- Type of support
 - Interest reimbursement
 - Capital/margin money subsidy on technology upgradation projects
 - Reimbursement of license fee for technology transfer

It is also recommended that a dedicated cell in the Department of Industrial Policy and Promotion (DIPP) should be created to look into the challenges and requirements related to the growth of this industry.

In addition to the technology upgradation support from government, several other measures would also be required for technological advancement of the industry. Some of these include:

- Promoting indigenous production of advanced raw materials (aluminium, carbon, and titanium) as per bicycle industry's specifications.
- Promoting technology transfer for both bicycle components and bicycles. Additionally, incentives should be designed to encourage foreign investors to collaborate with Indian manufacturers.

“
Industry needs technology
upgradation support from the
government”





Establishing state-of-the-art bicycle research and development and testing facilities

The existing bicycle research and testing facility in Ludhiana should be upgraded to meet international standards and requirements for testing. To begin with, the Centre should be provided with a one-time grant to upgrade its facilities. The Centre should get support from all the key stakeholders, i.e., the Central and the concerned state governments and the industry.

Centres similar to Ludhiana should also be established in a few other locations where bicycle manufacturers are concentrated. These Centres should be required to widen their scope of work beyond testing and certification, take up innovative research and development projects in collaboration with the industry, and get involved in incremental research.

Monitoring mechanism to ensure adherence of safety standards by manufacturers

Regulations should be put in place to ensure that no components/bicycles are sold in the market unless they are tested for safety. It is equally important to establish institutional machinery to implement these regulations.

Enhancing export competitiveness of the industry

Reducing import duty on components/parts

Government can consider reducing import duty on bicycle components/parts that are specific to high-end bicycles and are not manufactured by the domestic component industry.

“ **Need to upgrade the Ludhiana centre** ”

“ **Need policy interventions to enhance export competitiveness** ”





Freight subsidy for domestic freight

Government should consider giving freight subsidy to the industry at least towards the domestic freight costs, as this would enhance the competitiveness of the industry in the global market.

Negotiating import duty on Indian bicycles in Europe

It is recommended that the Indian government considers negotiating reduction in the import duty in order to ensure that the Indian export market in Europe is not affected by distortions in import duty structures.



1 Promoting cycle ownership in India

Cycling is one of the most sustainable forms of transport and has tremendous positive externalities, both for the society and individuals. High levels of cycle ownership, therefore, are extremely desirable in any country aiming to promote inclusive development and sustainable mobility. While there may not be an exact correlation between cycle ownership and its use, one does expect that this relation would be positive. It is, therefore, very important that cycle ownership witnesses positive and fast growth trends. This, however, is not the case with India. As would be discussed in the following sections, India is witnessing very slow growth in cycle ownership. Many of the large urban centres in the country, in fact, are witnessing negative cycle ownership trends. A negative correlation is observed between economic growth and growth in cycle ownership in the country, which shows that as incomes rise, captive cycle users opt for other modes of transport. These key trends in cycle ownership along with their causes are discussed in detail in the following sections. Specific recommendations on how to increase cycle ownership have been suggested towards the end.

Key trends related to cycle ownership in India

Low level of cycle ownership in India

Nearly 45% households, i.e., about 111 million households in India owned bicycles¹ in 2011 (Gol 2011). This was just marginally high as compared to 2001; 44% households owned cycles in 2001 (Figure 1.1; Gol 2001). Distribution across rural

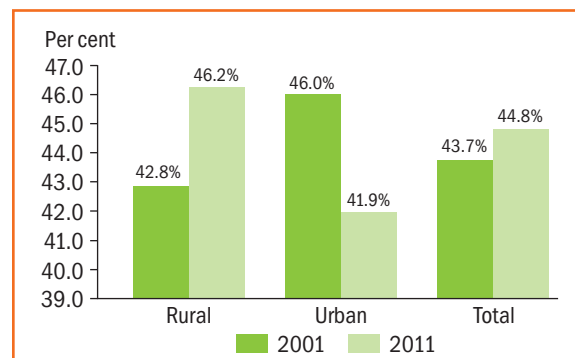


Figure 1.1: Percentage share of households owning cycles (2001–2011)

Source: Gol (2001) and Gol (2011).

¹ Distinction between cycles for adults and cycles for children has not been made in the Census data (Gol 2011). Also, the Census data doesn't clarify whether the household owns just one cycle or more than one cycle.





and urban areas indicates 46% rural households owning cycles in 2011 as compared to 42% in urban areas. A comparison with China indicates that almost every household in rural China owns a cycle, as compared to less than 50% households in rural India (Box 1.1; National Bureau of Statistics China 2010).

An ownership level of 45 cycles per 100 households in India translates into per capita cycle ownership level of 0.09 in 2011², as compared to 0.37 cycles per capita in China³ (Figure 1.2). While it may be true that cycle is a 'poor man's mode' and is prevalent more in countries that are poor and less motorized, cycle ownership levels in many developed and highly motorized countries are much higher because cycling is a choice mode of transport in these countries unlike developing countries, where it is essentially used by captive

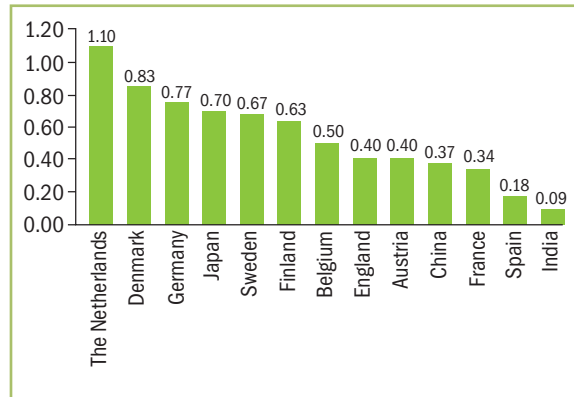


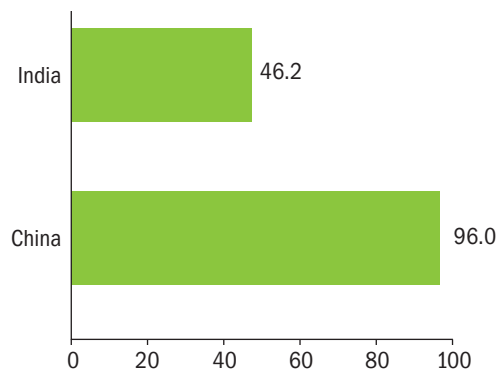
Figure 1.2: Per capita cycle ownership in a few countries

Notes:

- (i) Data for India and Japan is for 2011, data for China is for 2007, and for the remaining countries, data is for 2004.
- (ii) Per capita cycle ownership for India and China is derived from per 100 household cycle ownership numbers, as discussed above. Sources: Gol (2011), National Bureau of Statistics China (2007), Shaheen et al. (2011)
- (iii) Source of per capita cycle ownership data for European countries, Ministry of Transport, Public Works and Water Management, The Netherlands and Expertise Centre for Cycling Policy, The Netherlands (2009).
- (iv) Source of per capita cycle ownership data for Japan Bike Market (2014).

BOX 1.1 COMPARISON WITH CHINA

96 out of 100 rural households in China own bicycles as compared to 46 in India.



Cycle ownership per 100 rural households in India and China

China data for 2010;
Source: National Bureau of Statistics China (2010)
India data for 2011; Source: Gol (2011)

users who have no other modal choice due to income constraints (Figure 1.2). In India also, cycles are still predominantly the poor man's vehicle and have not become a mode of choice, and this is reflected in low levels of cycle ownership in the country.

Negative correlation between cycle ownership and economic growth

Correlation with average per capita income levels⁴ for different states in India indicates a very weak negative correlation (-0.2) between per capita income level of states and their cycle ownership level (share of households owning

² Per capita cycle ownership derived according to this formula: Cycle ownership per 100 households/(100×Average household size). Source: Gol (2011).

³ Per capita cycle ownership derived according to this formula. Cycle ownership per 100 households/(100×Average household size). Data used for China is for the year 2007, as data for national-level cycle ownership was available for 2007 only; for years later than 2007, only rural cycle ownership level was available. Source: National Bureau of Statistics China (2007) for average size of households, Shaheen et al. (2011) for national cycle ownership level per 100 households.

⁴ Per capita Net State Domestic Product (SDP) taken as a nearest indicator of per capita income, as per capita income numbers for states were not available.





cycles) (Figure 1.3).⁵ Low-income states are found to have the highest level of cycle ownership (43%), followed by states having highest income levels (38%).⁶ States with middle-income levels show the lowest level of cycle ownership; only 29% households (average) own cycles in these states. Contrary to the trends of cycle ownership, ownership of motorized private vehicles (two-wheelers and cars) has a strong correlation (1.0) with per capita income of states; two-wheeler and car ownership increases as the per capita income of states increases (Figure 1.3).

Slow growth in cycle ownership

The percentage share of households owning cycles in rural areas has increased in the last one decade (from 43% to 46%), while urban areas have witnessed a decline (from 46% to 42%) in the share of households owning a cycle (Figure 1.1). The result is nearly stagnant growth with regard to ownership level of cycles in the country over the last one decade in terms of percentage of households owning cycles.

In absolute terms, 111 million households owned cycles in 2011, as compared to 84 million households in 2001. While the numbers may show an addition of 27 million households owning cycles between 2001 and 2011, the key concern is the slow growth rate in cycle ownership. Household cycle ownership increased at a rate of about 3% per annum between 2001 and 2011. This was largely due to lack of easy availability of finance to buy a cycle and the price of cycle being much higher as a percentage share of the income of the low-income households, who are the main consumer segment of cycles in India. On the other hand, due to free availability of finance for two wheelers and cars, and the increasing affordability among middle-income households, two-wheelers and cars have seen a much faster growth of more than 10% in both rural and urban areas (Figure 1.4).

Stagnant/declining cycle ownership levels in states and larger cities

Spatial distribution of cycle ownership in 2001 and 2011 indicates that almost all hilly states have less than 20% households owning cycles and

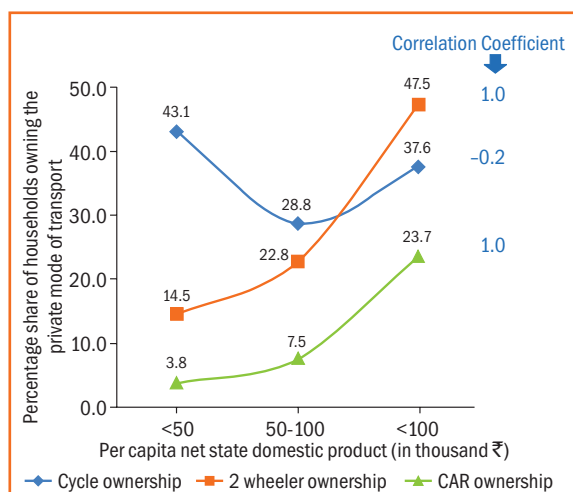


Figure 1.3: Relationship between per capita net State Domestic Product (SDP) and ownership of cycles, cars, and two-wheelers (2011-12)
Sources: MoSPI (2012) and Gol (2011)

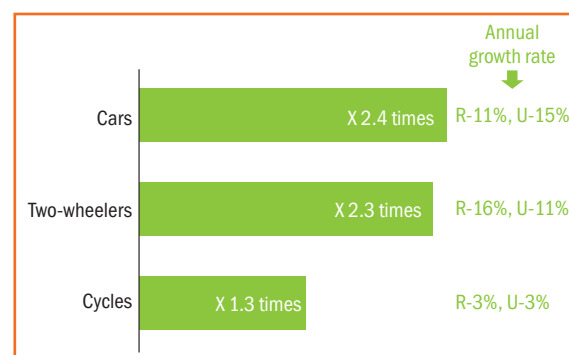


Figure 1.4: Growth in number of households owning cars, two-wheelers, and cycles between 2001 and 2011
Source: Gol (2011)
Note: R-Rural, U-Urban

⁵ States are categorized based on their Net SDP, into three categories: <Rs 50,000; Rs 50,000-1,00,000; and >Rs 1,00,000. Average incomes in these categories were correlated with average cycle ownership in these categories.

⁶ The high cycle ownership level in high-income states could be perhaps due to more choice cyclists in these states, however, there is no data for establishing this.





this has remained unchanged between 2001 and 2011 (Figure 1.5). Only four states, Uttar Pradesh, Odisha, Punjab, and Chattisgarh, had more than 60% households owning cycles in 2011. These states are amongst the low-income⁷ states in the country as classified in Figure 1.3.⁸ As shown in Figure 1.3, low-income states usually have higher level of cycle ownership; these states reiterate a similar trend.

States of Rajasthan, Haryana, and Gujarat witnessed a decline in cycle ownership between 2001 and 2011, while states of Kerala and Assam witnessed a marginal increase in cycle ownership. Most other states maintained similar level of cycle ownership between 2001 and 2011. Unlike cycle ownership trends, where cycle ownership in most states has either remained unchanged or has declined, two-wheeler and car ownership in most states has witnessed an upward trend (Figures 1.6–1.7).

Reasons for slow growth in cycle ownership

Ownership among low-income households

As discussed earlier, even if we consider that low-income households are the primary users of cycles, the ownership of cycles amongst low-income households is low. This however does not indicate that these households would not want to buy cycles. It is perhaps on account of the bicycle price being high as compared to their low income and lack of availability of finance for purchase of cycles that they are unable to purchase and use this cheapest mode of mobility. These two points are discussed below.

Price of cycle versus income

A comparison of price of the cheapest available bicycle as a percentage share of per capita annual

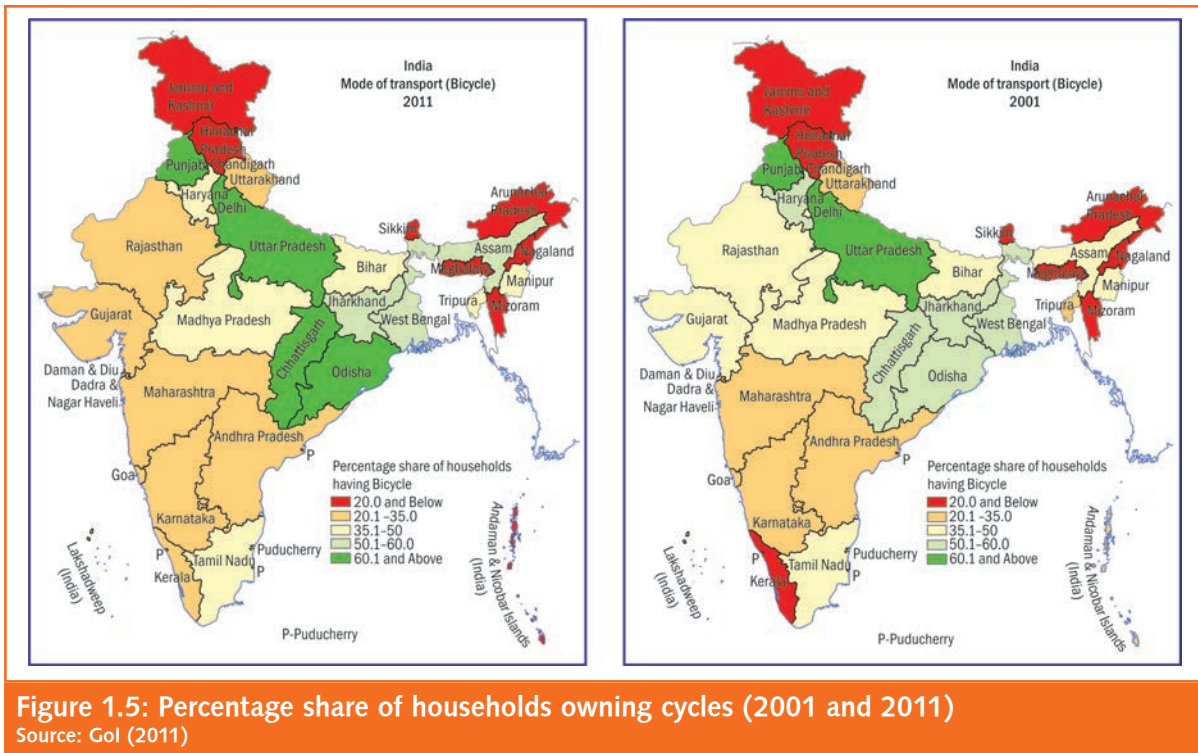


Figure 1.5: Percentage share of households owning cycles (2001 and 2011)
Source: GoI (2011)

⁷ Per capita Net State Domestic Product (in thousand).
⁸ Except Punjab, which is one of the medium-income states.



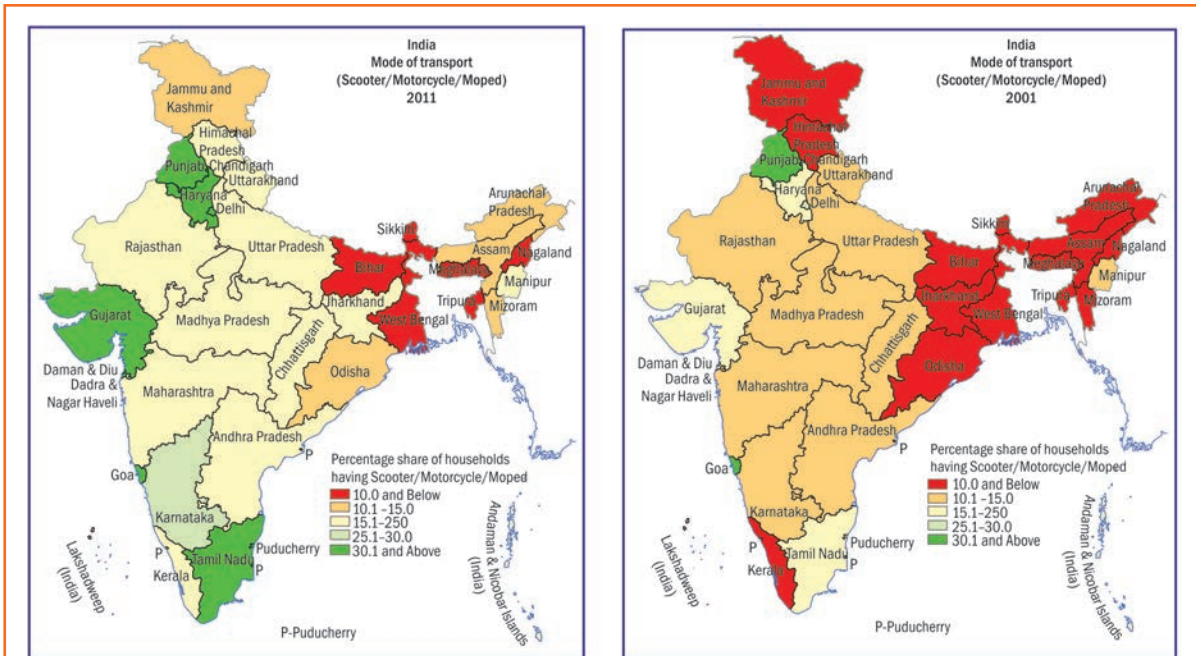


Figure 1.6: Percentage share of households owning motorized two-wheelers (2001 and 2011)
Source: Gol (2011)

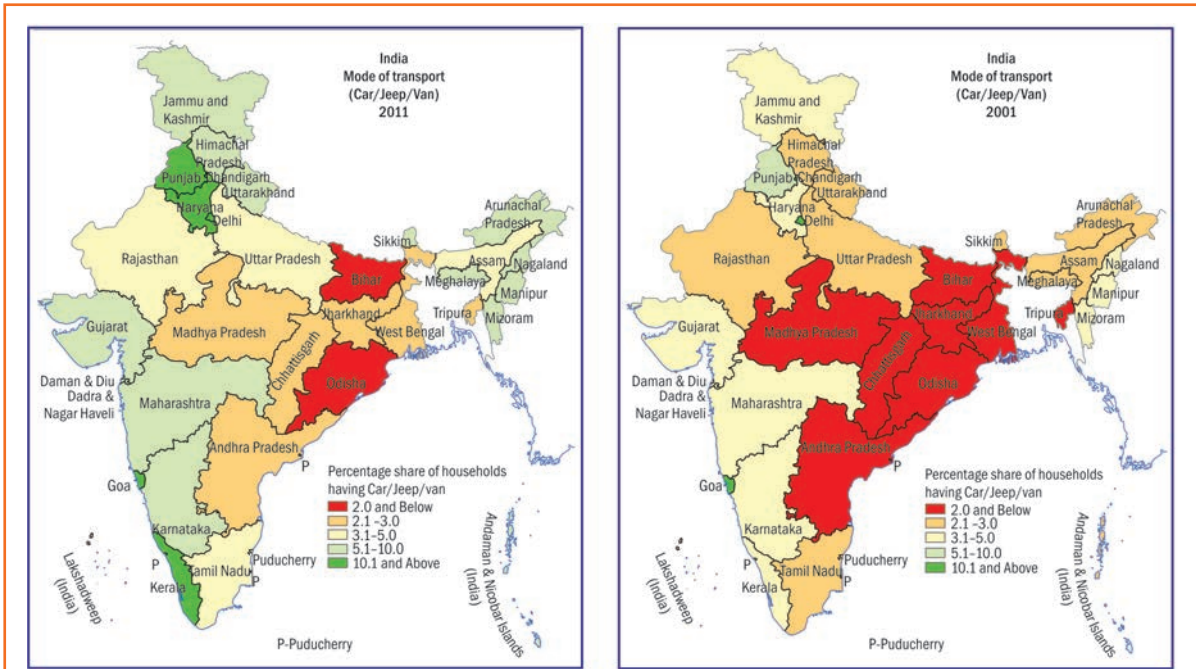


Figure 1.7: Percentage share of households owning cars (2001 and 2011)
Source: Gol (2011)

income in rural India shows that the price of cheapest bicycle available in India is about 15% of the annual per capita income in rural areas

(Figure 1.8). Even if this analysis is done at the household level, the situation would not change much, as typically in rural India, there is a single



income earner. A Comparison of this situation to China indicates that the price of cheapest cycle in China represents only 2.5% of the annual per capita income in rural areas (Figure 1.8). Given this difference between India and China, it would not be difficult to argue that rural population in China would find it easier to buy a cycle than their rural counterparts in India. The inference is

supported by the difference in the level of cycle ownership amongst rural households in the two countries as shown in Figure 1.8. The inference also remains valid if the analysis is done at all-India level instead of the rural areas (Figure 1.9).⁹

As part of this study, TERI conducted surveys in a few rural and urban areas in the country. The survey findings also indicate that low-income

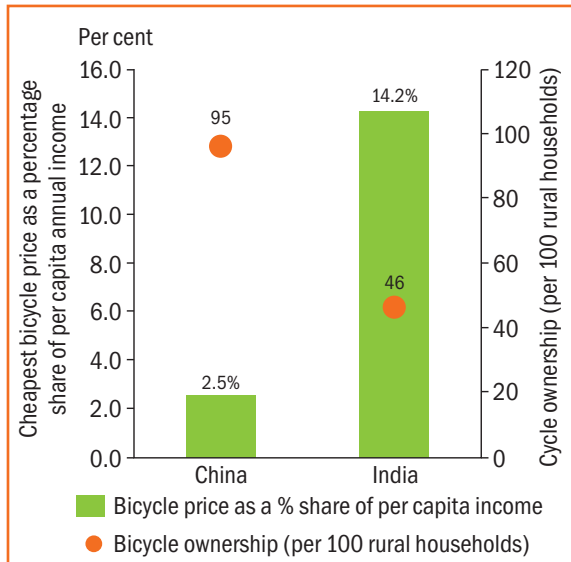


Figure 1.8: Comparison of bicycle ownership and bicycle price as a percentage share of per capita annual income in rural India and China¹⁰

Note: China data for 2010 and India data for 2011.

Sources:

- (i) All data for China—National Bureau of Statistics China (2010).
- (ii) Bicycle ownership data for India—GoI (2011).
- (iii) Per capita net income data for rural India (at current prices)—The Economic Times article titled 'India lags several nations in per capita income: Govt' dated December 19, 2012.¹¹

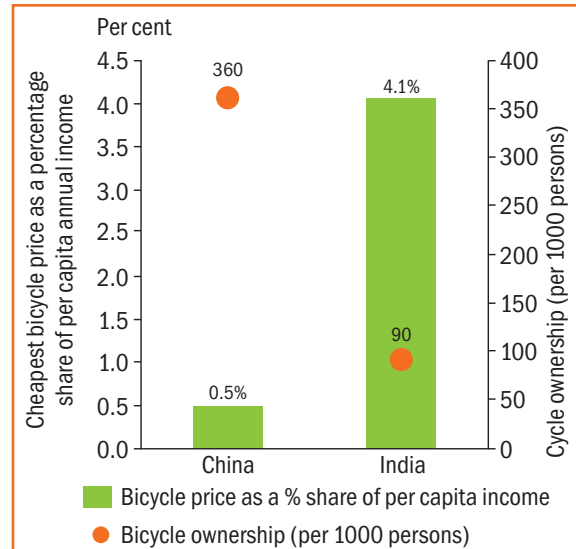


Figure 1.9: Comparison of bicycle ownership and bicycle price as a percentage share of per capita annual income in India and China (national level)

Notes:

- (i) Data for India is for 2011, data for China is for 2007.
- (ii) Per capita cycle ownership for India and China is derived from per 100 household cycle ownership numbers as discussed in the earlier sections.
- (iii) Income numbers at current prices, derived from annual gross national income.

Sources:

- (i) Income data for China—National Bureau of Statistics China (2010).
- (ii) Income data for India—Ministry of Finance (2013).

⁹ Note: It should be noted that for both the countries, bicycle prices as in the country context (and in local currency) were considered. They are hence not comparable due to purchasing power parity considerations. Hence, this data and discussion should not be used to conclude that China is able to manufacture cycles much cheaply. This information should be used only to understand the difference in price of cheapest cycle as a percentage share of per capita annual income in the two countries..

¹⁰ TERI would like to acknowledge a 2008 Report titled 'Bicycle for Development' – written by Gaurav Singhal, available at <http://www.bicyclepotential.org/> last accessed on March 25, 2014. A similar comparison of per capita income and cycle ownership has been done in the report. Finding the comparison very interesting to highlight the issues, TERI has also carried out a similar comparison for latest years using data from authentic sources.

¹¹ Available at http://articles.economictimes.indiatimes.com/2012-12-19/news/35912626_1_income-at-current-prices-net-national-income-capita-income, last accessed on March 25, 2014. It should be noted that the per capita rural income given in the article is quoted from the written reply of Minister of State for Parliamentary Affairs and Planning, Shri Rajeev Shukla to the Lok Sabha. The article quotes the minister's reply as follows: "The Central Statistics Office has been compiling estimates of rural and urban break up of Per Capita Net Domestic Product (NDP), for the base years of National Accounts Statistics (NAS) series, "The latest base year is 2004–05. The per capita income at current prices for the year 2004–05 is estimated at Rs 16,414 in rural areas and Rs 44,172 in urban areas." Assuming 20% growth in rural per capita income from 2004–05 to 2011–12, TERI has estimated rural per capita income level in 2011–12 as Rs 19,696.80.





households find it difficult to purchase a cycle. Focus group discussions in five villages in Uttar Pradesh and Bihar brought forward that rural households found bicycles unaffordable. The basic model of bicycle costs between Rs 3,000–3,500, which was expensive for them. Survey of 1,200 cyclists in six urban areas (Meerut, Jhansi, Jaipur, Surat, Bangalore, and Delhi) also indicated that price of a cycle was a deterrent in owning a cycle. The surveyed cyclists had monthly household income levels primarily ranging between Rs 3,000–10,000 (Figure 1.10). Though most of them owned the cycle that they used, they all cited high price of the cycle as a barrier. Interestingly, to address this barrier, many of the surveyed cyclists in urban areas preferred to buy second-hand cycles, which they can buy in almost half the price of a new cycle (Figure 1.11). Even those who bought it first hand, found it difficult to pay the price at one go, but they had to because they didn't have any other mobility choice.

The financing issue

Given the above discussion, it is imminent that purchasing cycles would require the low-

income households tap their savings or take a loan. Currently, savings are the key means for purchasing a cycle. In TERI's surveys, it was found that almost all cyclists who were surveyed in urban centres had purchased cycles from their own money/savings and had not taken a formal loan for the same (Figure 1.12). Focus Group Discussions (FGDs) in rural areas also indicated similar results, where either one's own savings or informal loans from friends, relatives, and other villagers were being taken to purchase cycles. No one in the FGDs had bought a bicycle on a micro finance institution (MFI)/commercial bank loan, and they all agreed that lack of finance was a major constraint for limited bicycle ownership in the villages. These findings point to three critical points.

- **The fact that most cyclists are purchasing cycles from their own money/savings does not imply that there is no demand for formal loans for cycles.** In fact, it indicates that perhaps loans for cycles are not easily available, a point that was confirmed during discussions with rural households and MFIs. Surveys in

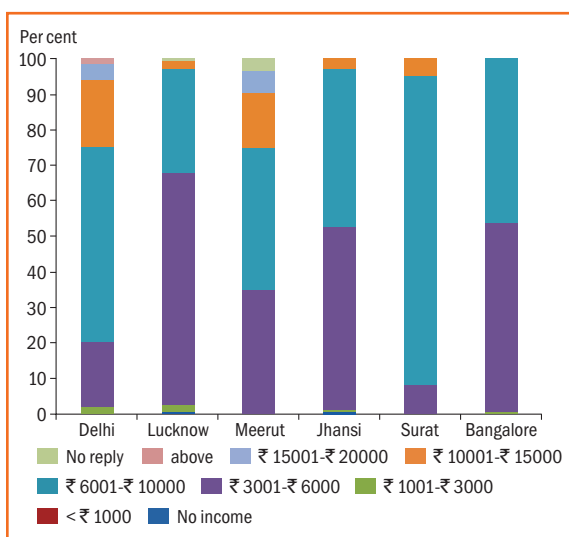


Figure 1.10: TERI's survey findings: Monthly household income of cyclists
 Note: A total of 1,200 cyclists were surveyed in the six cities (200 cyclists per city).
 Source: TERI's surveys

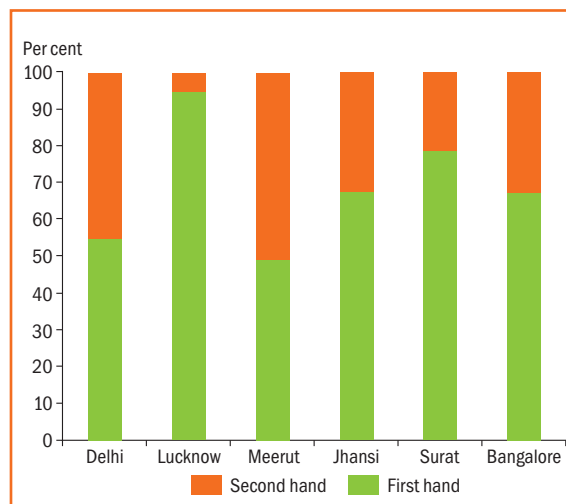


Figure 1.11: TERI's survey findings: Percentage share of cyclists who had purchased second-hand cycle
 Note: A total of 1,200 cyclists were surveyed in the six cities (200 cyclists per city).
 Source: TERI's surveys



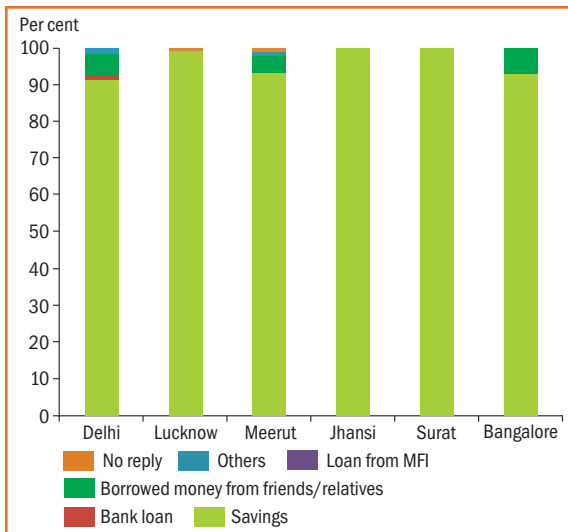


Figure 1.12: TERI's survey findings: Means to purchase cycle
Source: TERI's surveys

urban and rural areas have pointed out that people are unaware if loans for cycles are provided by banks and MFIs. They believe that no institution will provide such small loans. They, however, were keen to have some easy financing schemes for purchasing cycles in which they would not have to shell out Rs 3,000–4,000 at one go, but in very small instalments.

Also, discussions with several MFIs, except a few, indicate that they are not providing financing for cycles. From their perspective, they are bound by Reserve Bank of India's (RBI's) requirements of priority sector lending, which requires loans to be targeted to income-generating activities. This point will be discussed in detail later.

- **The other key point is that since households are dependent on their own savings for cycle purchase, there is a gestation period in the realization of a decision to purchase a cycle, as savings over a long period need to be done in order to raise the required amount.**
- **Given the affordability issue, low-income households are able to purchase only one cycle for the household, which**

is typically used by the head of the household. Other household members, hence, are left with walking as their only mobility option. School going children specifically cannot use the household cycle for commuting to school. In the surveys conducted by TERI in urban areas, all 1,200 cyclists who were captured were males above 18 years. They were the sole users of cycles in the household and used cycles primarily to commute for work (Figures 1.13, 1.14, and 1.15). This indicates that essentially,

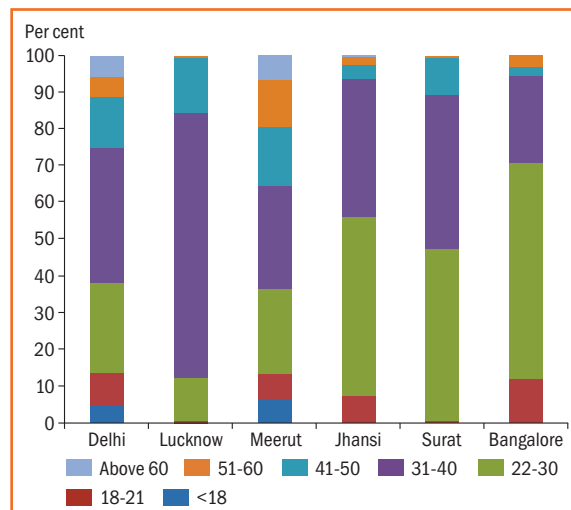


Figure 1.13: TERI's survey findings: Age profile of cyclists surveyed
Source: TERI's surveys

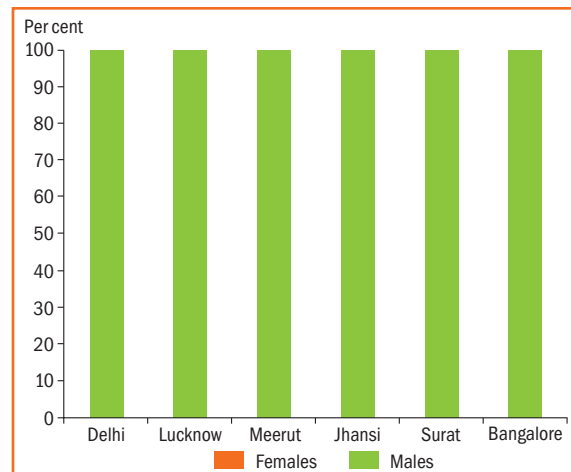


Figure 1.14: TERI's survey findings: Gender profile of cyclists surveyed
Source: TERI's surveys



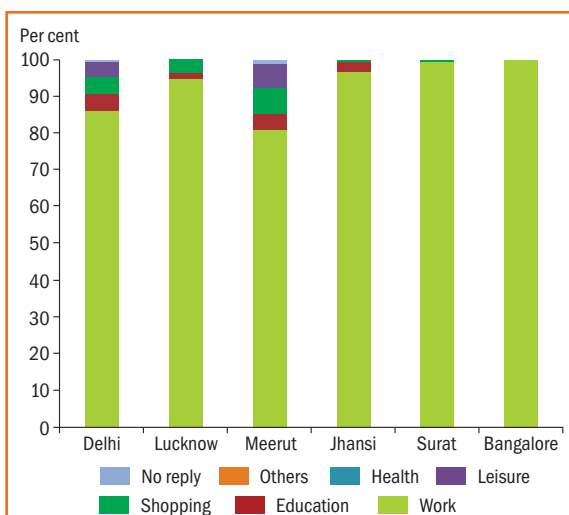


Figure 1.15: TERI's survey findings: Purpose of cycling trip

Source: TERI's surveys

the working male members in households use the cycle in the family.

The above discussion helps conclude that cycle ownership amongst low-income households can perhaps be enhanced by either making bicycles cheaper for this population group and/or making available finance for purchase of cycles. Also, there is a need to identify ways/schemes by which cycles can be made available to other members of the low-income households, especially, schoolgoing children, as studies have shown that making cycles available to school children increases the schoolgoing rate amongst children of low-income households, especially the girl child. Specific recommendations on how this can be done are discussed in the next section.

Ownership among middle- and high-income households

While ability to purchase a cycle may be a key barrier for low-income households, for middle- and higher-income population, decision to own and use a cycle is based on different

considerations. In fact, these households may be willing to pay more for a quality/safe product unlike low-income households. These households have the choice to own and use a personal motorized mode of transport like a motor cycle, scooter, moped, car, etc. Given the easy availability of finance for these vehicles, it is easier for households to purchase private vehicles, as financing is available up to 90%–95% cost of the vehicle (sometime even 100%) and is processed very fast.¹² It is interesting to note that the increase in the number of middle-income households (about 40–45 million since 2005) matches closely with the increase in the number of two-wheelers since 2005 (about 56 million), indicating the growth in ownership of two-wheelers as the number of middle-income households in the country are increasing. A similar, in fact, a higher growth in cars has been observed relative to the increase in number of upper, middle, and high-income groups. The trends indicate a preference to buy motor vehicles; easy finance could be one reason for this trend, but there are other related and perhaps equally important reasons like perception of savings in travel time due to use of motor vehicle, social status associated with ownership of motor vehicle, and perception that personal modes may be perhaps more safer, which influence decision to buy motor vehicles. Given that these income groups are concerned about safety, social perception, and travel time related to a mode, promotion of cycle ownership, and use amongst these income groups would require making cycling safer, socially acceptable/fashionable and faster, all of which is possible by infrastructure, education, and awareness interventions. Specific recommendations on how to address these issues are discussed in the next chapter; this chapter focuses only on recommendations for promoting cycle ownership amongst low-income households.

¹² Many banks promise sanction of loan within a few hours.





Recommendations

Promoting cycle ownership amongst low-income households

The previous discussion helps conclude that cycle ownership amongst low-income households can perhaps be enhanced by either making bicycles cheaper for this population group and by making finance for purchase of cycles available. Also, from the perspective of enabling school children to use cycles for commuting to school, special schemes could be considered for cycle distribution. Specific suggestions on how these measures could be realized are discussed below.

Make cycles affordable: Case for reducing prices of cycles costing less than Rs 5,000 as these are purchased by low-income population

Cheapest cycles: The tax component

It is commonly known that the cheapest cycle currently available in India costs around Rs 3,000 to the consumer. However, as discussed in the previous sections, affording a Rs 3,000 cycle is not easy for the low-income households. So, a key question that arises is whether we can reduce the price of the cycle for low-income

population? One of the ways to do this could be by exemption of taxes on cycle production and sale. The tax structure of one of the cheapest cycle in India, which costs between Rs 2,800 to Rs 3,000, is given in Table 1.1.

It can be observed from Table 1.1 that taxes including excise duty, CST, and VAT constitute 12% of the total price of a cycle and are passed on to the consumers, who belong primarily to low-income groups. Given the price sensitivity of population belonging to these income groups, it is strongly believed that even small reductions in the price of bicycles can help increase ownership of cycles. This has also been observed in a few countries which have experimented with taxation on cycles, and there are interesting instances from these countries where it has been found that bicycle ownership increases if cycles are made inexpensive. In Shanghai, a 360% increase in bicycle ownership was witnessed during 1980 to 1990 when a subsidy was provided on the bicycles.¹³ In Kenya, due to a tax cut from 80% to 20% between 1986 and 1989 (i.e., about 1/3rd price reduction), bicycle sales increased by 1500%.¹⁴ Similar increases were witnessed in Lima (Peru), where low-interest loans were made available to low-income families for the purchase of bicycles; modal share of cyclists in the city increased by 8% (from 2% to 10%)

TABLE 1.1 Tax structure of one of the cheapest cycle in India		
Basic price of one of the cheapest cycle is Rs 2,455 which is including excise duty cost of Rs 97 (4%); this excise duty is on account of raw material/component suppliers paying excise duty on raw material/components		
BDP (Ex-factory price)		Rs 2,455
Excise duty on bicycle paid by cycle manufacturer	2.06%	Rs 51
CST	2.00%	Rs 50
Dealer margin (example)		Rs 200
VAT	5.50%	Rs 152
Price to customer		Rs 2,907
Taxes in the supply chain		Rs 350 (12%)
Source: Data provided by HERO Cycles		

¹³ <http://www.bicyclepotential.org/2009/01/impact-of-bicycles-for-india.html>, last accessed on February 22, 2014

¹⁴ Ibid.





between 1990 and 2000, as a result of increased cycle sales.¹⁵

Recommendation: Government should waive the taxes on cycles costing less than Rs 5,000 as these are purchased by low-income population

It is proposed that the government should waive the taxes on cycles consumed by low-income population. If the 12% tax component (6.8% going to central government and 5.2% going to state government) is absorbed by the government, the price of the cheapest cycle can be brought down and we can expect the cheapest cycles in the country to cost in the range of Rs 2,500 to Rs 4,500. Discussions with stakeholders and surveys indicate that this customer segment is highly price sensitive and any decrease/increase in price of cycle can affect their ability to purchase the cycle. A 12% drop in the price of the cycle can hence bring cycles within the reach of a significant number of low-income households.

Would this burden the exchequer?

Data from domestic cycle manufacturers shows that they sold nearly 5 million cycles in 2012–13 that had a price below Rs 3,000 (average price of about Rs 2,900) and nearly 1.6 million cycles that had a price range between Rs 3,000–6,000 (average price of about Rs 4,500) (Figure 1.16). If we would have subsidized these many cycles, i.e., about 6.6 million cycles in 2012–13, which are primarily bought by low-income population by waiving 12% tax component, the burden on the exchequer would have been to the tune of nearly Rs 260 crore (about Rs 150 crore for central government and Rs 110 crore for state government).

While this annual subsidy may seem higher, it is to be noted that it is way lower than the subsidies being given to users of motor vehicles in the form of fuel subsidy, despite the fact that

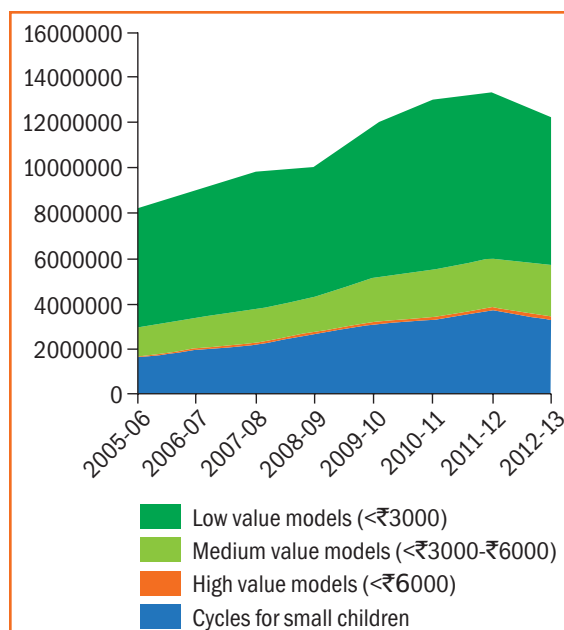


Figure 1.16: Product-wise sales of bicycles in India

Source: Data provided by All India Cycle Manufacturers' Association (AICMA) members

there are much larger societal costs associated with the use of motor vehicles. In 2012–13, the Government of India shelled out nearly Rs 92,000 crore as petroleum subsidy, largest chunk (60%) of which went to the transport sector (Table 1.2). This is reflected in a recent report of the Ministry of Petroleum and Natural Gas (MoPNG) where it is estimated that the largest chunk of petroleum subsidy goes to diesel using vehicles. MoPNG estimates that out of the total under recovery of Rs. 92,061 crore on account of diesel during 2012–13, about Rs 12,100 crore (13%) went to owners of private cars and utility vehicles (UV); about Rs 8,200 crore (9%) to commercial cars and UVs; about Rs 26,000 crore (28%) to HCV/LCV; about Rs 8,800 crore (10%) to buses; and about Rs 12,000 crore (13%) to agriculture sector; and the remaining 27% to other sectors. In addition to fuel subsidy, the automobiles in

¹⁵ Ibid.





the most recent budget of the government (vote-on account interim budget for 2014–15) received heavy excise duty cuts. Excise duty for small cars was reduced to 8 % from 12%, on SUVs from 30% to 24 %, on medium cars from 24% to 20%, and on two-wheelers also down to 8%.

Indian government has also been subsidizing the cleaner vehicle technologies like hybrid and electric two-wheelers and cars with an aim to promote adoption of these environment-friendly technologies by the population. Ministry of New and Renewable Energy in a scheme under the Eleventh Five Year Plan set aside a fund of Rs 95 crore and gave incentives up to 20% on ex-factory prices of hybrid and electric vehicles (Box 1.2). The National Electric Mobility Mission Plan 2020 unveiled by the Government of India in 2013 is expected to announce new scheme of incentives to promote adoption of these clean vehicle technologies.

In addition to the incentives offered by the central government, certain states, and union territories (UT) offer additional incentives to electric vehicles. Delhi, Rajasthan, Uttarakhand, and Lakshadweep do not levy any VAT on electric vehicles, and Chandigarh, Madhya Pradesh, Kerala, Gujarat, and West Bengal offer partial subsidy on VAT. In Maharashtra, the VAT was reduced from 12.5% to 5% and in Tamil Nadu, it was reduced from 12.5% to 4%. Maharashtra has also decided not to impose road tax on electric vehicles; it is 9% for petrol cars and 11% for diesel cars. The state of Karnataka has also cut VAT on electric vehicles from 14% to 5%. The highest incentives for electric vehicles

are given by the Delhi government; tax rebates up to 29.5% of the cost (15% subsidy on the base price of the vehicle, along with 12.5% VAT exemption, and 2% road tax and registration charge refund) are given for electric cars. The costs of such subsidies are funded by Air Ambience Fund, which is created from the environment cess of 25 paise per litre of diesel sold in the UT of Delhi.

The above discussion indicates that the precedents for subsidization of private modes of transport exist. Indian government is heavily subsidizing auto fuel (diesel), despite the negative externalities of the same. Cars and two-wheelers have also been provided excise duty cuts lately. The central and state governments are also subsidizing clean vehicles on account of their environmental contribution. Additionally, the state governments are waiving off significant amount of taxes on such clean technologies.

Cycles are one of the most clean and the most sustainable form of transport. In addition to their environmental contribution, cycles for low-income population, as discussed, are a means to enhance their socio-economic well-being. A subsidy to the tune of Rs 260 crore or more to cycles hence does not seem higher, given that we are spending thousands of crores for subsidizing personal vehicles. It is strongly recommended that exemption of all taxes on cycles be considered by the Government of India and state governments from the perspective of making this environment-friendly and socio-economically important mode of transport available to the low-income population.

TABLE 1.2: Petroleum subsidy provided under the Budget of Government of India

Sector	Actuals 2005-06	Actuals 2006-07	Actuals 2007-08	Actuals 2008-09	Actuals 2009-10	Actuals 2010-11	Actuals 2011-12	Budget 2012-13	Revised 2012-13	Budget 2013-14
Petroleum Subsidy	2683	2724	2820	2852	14951	38371	68484	43580	96880	65000

Source: MoPNG (2013)





BOX 1.2: INCENTIVES ON PURCHASE OF HYBRID AND ELECTRIC VEHICLES

During the Eleventh Plan period (in November 2010), the Ministry of New and Renewable Energy (MNRE) announced to offer incentives to Electric Vehicle (EV) manufacturers during the remaining period of 2010–11 and for the entire period of 2011–12 to increase the sale of EVs. The scheme set aside a fund of Rs 95 crore and gave incentives up to 20% on ex-factory prices of vehicles. The maximum incentive limits offered to each type of vehicles under the scheme are given in the table given below.

Incentive limits offered to different categories of vehicles under the MNRE's scheme for giving incentives to EV manufacturers

Electric vehicle type	Incentive cap
Low-speed electric two-wheelers	Rs 4,000
High-speed electric two-wheelers	Rs 5,000
Electric cars	Rs 1,00,000

The subsidy under the above-stated scheme of (MNRE) was given to the customers by the manufacturers who then claimed it from the government. But to avail this incentive, the manufacturers had to meet certain criteria set by the government. The three main criteria were: (i) the manufacturer must have significant presence in the retail side of the industry, (ii) minimum 30% of the manufactured vehicle was required to have indigenous components, and (iii) the ability of the manufacturer to provide after-sales service through its own outlets. MNRE had announced to give subsidy to 140 electric cars, 10,000 electric high-speed two-wheelers, 20,000 electric low-speed two-wheelers, and 100 electric three-wheelers during 2010–11. The scheme led to an upsurge in the sales of electric vehicles, however, it came to an end in March 2012 and as a result, a 65% decline in the sales of electric vehicles was observed. It was, therefore, decided that the MNRE subsidy would be extended till August 2012 till proposals under the National Mission for Electric Mobility (NMEM) were implemented. NMEM was unveiled by the Government in 2013 and incentives for hybrid and EV purchase are expected to be announced under this Mission.

Ensure easy availability of cycle finance: Case for inclusion of cycles under priority sector lending

As discussed, for a low-income household in India, taking out Rs 3,000–3,500 at one go is difficult; households, therefore, prefer to take micro loans to meet their needs. Financing for cycles, however, isn't available to the low-income households as has emerged from TERI's surveys and discussions with key stakeholders including MFIs. While small value loans like loans to farmers for agriculture and allied activities; micro and small enterprises; poor households for housing, emergency, consumption, etc.; students for education; and other low-income groups and weaker sections are encouraged under the priority-sector lending, loans for cycles are not being dispersed under the scheme on account

of the small ticket price of the loan and non-recognition of cycles as income generating/productivity enhancing assets for low-income households.

Under priority sector lending, micro credits, not exceeding Rs 50,000 per borrower, are given directly by banks to individuals and their SHG/JLG, provided the borrower's household annual income in rural areas does not exceed Rs 60,000, and for non-rural areas does not exceed Rs 1,20,000. Channelled primarily through MFIs, micro credits are given for creation of income-generating assets and they include loans for emergency and consumption purposes. MFIs are, however, required to ensure that the aggregate amount of loan, extended for income-generating activity, is not less than 70% of the total loans given by MFIs; their focus, hence, is on finance for income-generating





activities. Discussions with MFIs provided an insight that recognition of cycles as income-generating assets under priority sector lending would make it easier and attractive for MFIs to start focusing on cycle finance, the demand for which would be substantial according to many of the MFIs. Cycles, hence, need to be looked at from two perspectives in the context of low-income households.

Cycles as direct income-generating asset

Cycles are a direct income-generating asset for many low-income individuals in cities, towns, and villages. Cycles are used for a number of income-generating purposes, such as to transport farm products from villages to markets; for selling a variety of products, clothes, food items, plants, etc. Bicycles are also used extensively for delivery of milk, newspapers, LPG cylinders, all of which lead to direct income generation. There is, however, no data on such economic activities that use cycles, making it difficult to understand the magnitude of population dependent on cycles for livelihood. It is nevertheless recognized that this number would be quite large, given the economics of doing business on cycles for a very low-income individual. It is estimated that just the newspaper vendors/delivery boys in the country could be to the tune of several lakhs. About 3 lakh vendors and beat boys are estimated to deliver some 50 million copies of newspapers every morning in over 5,000 cities and towns in the country.¹⁶ A report presented by Sharma (2011) estimates that there are about 15,000–20,000 newspaper vendors/delivery boys in Delhi alone. Almost all the newspaper delivery boys use cycles for delivering newspapers because of zero transport cost of such a business. There are several others who are directly dependent on cycles for their livelihood, be it delivering milk, LPG, vegetables and fruits, or other products of household

consumption; the total population dependent on cycles for livelihood could, therefore, be quite large.

Cycles as an enabler to access employment (faster travel time and least cost)

Cycles, as discussed above, could either be a direct source of livelihood for low-income population or an enabler to income generation by providing a cheap, but faster mode of mobility for accessing the workplace. In such cases, cycles may not lead to direct income generation, but would enhance the income-earning potential of the person by reducing his/her time spent on travel and enabling him/her to access workplaces that may be located at longer distances and which cannot be managed by walking; in such cases, cycles provide the cheapest mode of transport. Cycles, hence, enhance economic opportunities for poor population in a time-saving and cost-efficient manner. This has been established in many studies carried out in the developing countries (Box 1.3).

Recommendation: Ensure availability of finance for cycle purchase; bring cycle financing under priority sector lending

Given the role cycles play in increasing the income-generation potential of low-income households, either directly or indirectly, they could be an important tool for reducing poverty of low-income population. Increasing the ability of low-income population to purchase cycles, hence, becomes vital, especially when it is being established that an amount of Rs 3,000 (or even Rs 2,500 after subsidizing) to purchase a cycle would be large enough for a low-income household earning as low as Rs 2,000 a month. Access to finance for cycle purchase, hence, becomes critical. Studies have shown that bicycle ownership and its use increase after microfinance is made available to low-income

¹⁶ <http://www.inma.org/blogs/marketing/post.cfm/india-s-thriving-print-market-depends-on-robust-distribution-network>, last accessed on March 20, 2014.





BOX 1.3: BICYCLES ENHANCE INCOME-GENERATION POTENTIAL OF LOW-INCOME POPULATION

Bicycles are three times faster than walking, offering effective ranges of movement nine times that of walking, and carrying loads of up to 100 kg.¹⁷ Available literature suggests that bicycles have a significant potential in increasing a poor man's income by providing increased mobility, increased access to services, and increase in carrying capacity. Various studies conducted by various organizations in different countries clearly brought out that promoting bicycle ownership have led to savings in travel time, travel costs and an increase in income. Results of a few such studies and their findings are discussed below:

Cost benefit analysis of bicycle ownership was undertaken by the The Institute for Transportation and Development ITDP in Uganda, Africa. As part of the study, 300 bicycles were distributed among poor households in different regions of Uganda and a one-time guidance was provided on how to utilize the saved time in carrying out some other allied productive work. The survey findings clearly show that bicycle ownership led to savings in transport time (up to 2 hours per day per household), more frequent visits to markets and medical facilities, and an increase in income by as much as 35%.

Source: Heyen-Perschon, Jürgen. "Non-Motorised Transport and its socio-economic impact on poor households in Africa", *Cost-Benefit Analysis of Bicycle Ownership in Rural Uganda. Results of an Empirical Case Study in Cooperation with FABIO/BSPW*. Jinja, Uganda. 2001.

Another study was taken up by International Labor Office to assess the impact of bicycle ownership in context to agricultural production in sub-Saharan Africa. Around 100 households were surveyed in the Makete district, Tanzania. Results suggest that bicycles enabled the farmers to cultivate bigger fields and strongly impacted the agricultural production. Household's owning bicycles marketed nearly two fifth more than the comparable non-NMT households. Almost 80%–90% of the households stated that the main barrier in purchasing of a bicycle was the relatively high procurement cost and their inability to afford it.

Source: Sieber, N. (1998). Appropriate transport and rural development in Makete district, Tanzania. *Journal of Transport Geography*, 6(1), 69-73.

Under the World Bicycle Relief's bicycle distribution program, 24,000 free bicycles were distributed in Sri Lanka to assist the survivors recover from the after-effects of Tsunami and re-establish their livelihoods. Nearly 220 bicycle owners were surveyed to assess the impact made by bicycles. The findings clearly suggest that bicycles had a number of direct and indirect impacts on livelihoods. Bicycle ownership helped in saving around 10%–20% (and 30% in case of extremely poor households) of the households' annual income earlier spent on transportation. If the income and time savings were redirected to productive endeavors, then more than 17% increase was observed in the household income.

Source: World Bicycle Relief and Tango International "Impact of Bicycle Distribution on Tsunami Recovery in Sri Lanka", World Bicycle Relief Impact Evaluation - Sri Lanka Tsunami Response (2011).

Available at http://www.worldbicyclerelief.org/storage/documents/wbr_disaster_relief_field_report.pdf

population for the purpose of purchasing cycles. In Lima (Peru), modal share of cycles in daily trips increased from 2% in the mid-1990s to 10% in 2000, after low-interest loans were made available to low-income families for the purchase of the bicycle and extensive bike paths were built.¹⁸

It is recommended that there should be dedicated effort to promote availability of cycle finance to poor population. This can happen by bringing cycles under priority sector lending. Currently also, priority sector lending sets a few precedents of including indirect income-generating assets like off-grid solar and other

¹⁷ <http://www4.worldbank.org/afr/ssatp/resources/html/gender-rg/Source%20%20documents%5CTool%20Kits%20%20Guides%5CDesigning%20Projects%5CTLPRO4%20Gender%20Sensitive%20Bike%20Component/TLPRO4.1%20%20Rationale%20for%20bike%20integraton.pdf>, last accessed on March 13, 2014.

¹⁸ <http://www.bicyclepotential.org/2009/01/impact-of-bicycles-for-india.html#more>, last accessed on March 6, 2014.





off-grid renewable energy solutions that enable/enhance income-generation potential and well-being of low income. It is, hence, strongly recommended that cycles should be specifically brought under/mentioned in the priority sector lending guidelines in order to promote cycle finance by banks and Non-Banking Financial Companies (NBFCs). This would need to be accompanied by awareness generation amongst low-income households that they can avail finance for cycles from these institutions.

Increase ownership of cycles by school children: Case for considering cycle distribution schemes for school children

As discussed earlier, availability of bicycles enhances the income-earning potential of low-income population, who cannot afford to use the other forms of motorized transport. Additionally, cycles play a vital role in enhancing social development of low-income communities; access to schools (especially to secondary and higher secondary schools that serve several villages and towns) in a cost-effective and time-efficient manner is specifically a great social contribution of cycles.

Realizing the importance of bicycle ownership in promoting education, various state governments have been distributing free bicycles or subsidizing bicycles in order to promote social objectives like girl education. One of the most famous schemes is the “Mukhyamantri Cycle Yojana”¹⁹ introduced by the Government of Bihar in 2006. As per the official blog of the Chief Minister, Government of Bihar, this scheme was introduced to address the issue of poor enrolment among girls in high schools. Under this scheme, school girls get financial assistance of Rs 2,000 on passing

class VIII to buy a bicycle, if they are enrolling for class IX. In 2007–08, the state government spent Rs 32.60 crore and provided assistance to 1.63 lakh girls to buy bicycle. In 2009–10, the amount spent by the government increased to Rs 87.33 crore and the number of beneficiaries rose to 4.36 lakh. In total, 8.71 lakh school girls were provided financial assistance to purchase a bicycle in three years. The scheme has not only helped reduce the dropout rate of girls, but has had a wider social impact as the school girls were previously being married at an early age as they stopped going to schools at an early age²⁰. As per Murlidharan and Prakash (2013), this cycle scheme increased the girl’s enrolment in secondary schools by 5% points and it also reduced the gender gap in enrolment by 25%.

A similar scheme, named, “Saraswati Bicycle Scheme” has been introduced in Chattisgarh.²¹ As per the ‘Evaluation Study of Saraswati Bicycle Supply Scheme (Free) in Chhattisgarh’, Government of Chhattisgarh, the state identified that its secondary education suffered from issues of lack of access, low participation, and high levels of gender inequity. As per the report, the gross enrolment Ratio (GER) of boys was 44.26 per cent against 35.05 per cent for girls as on September 2004. Under this scheme, free bicycles are distributed to all Scheduled Caste (SC)/Scheduled Tribe (ST)/Below Poverty Line (BPL) girl students who enrol themselves in the ninth standard. The scheme has led to significant increase in enrolment of girl students in secondary schools (Figure 1.17)

As per a report by Aga Khan Foundation (2010), which was submitted to the Government of India, similar schemes have been introduced in many other states like, Karnataka, Tamil Nadu, Gujarat, Rajasthan, Uttar Pradesh, Punjab, etc. Analysis of various papers and reports like

¹⁹ Chief Minister’s Cycle Scheme.

²⁰ Mukhyamantri Balika Cycle Yojna, Chief Minister’s official blog, Government of Bihar; <http://nitishspeaks.blogspot.in/2010/04/mukhyamantri-balika-cycle-yojna.html>, last accessed on November 15, 2013.

²¹ State Council for Educational Research & Training (SCERT), Evaluation Study of Saraswati Bicycle Supply Scheme (Free) in Chhattisgarh, Raipur, Chhattisgarh.





Muralidharan K, Prakash N (2013), Ghatak, Maitreesh, Chinmaya Kumar, and Sandip Mitra (2013), Government of Chhattisgarh (2013), Aga Khan Foundation (2010), shows that such schemes have been well received by the beneficiaries and their impact has gone well beyond the classroom. Such schemes have increased the security of school girls as the girls

pedal to school in groups. Bicycle ownership has also empowered them and they do not have to depend on anyone to reach them to school any more. Bicycle ownership has also unburdened the parents as they do not have to spend on the transportation or take out their productive time in arranging for a secure transportation for their girl child. Some of the studies suggest that bicycling by women was earlier considered socially unacceptable, however, with increased number of women/girls bicycling, such a perception has faded away. Bicycle ownership has undoubtedly helped address the issue of continuation of education by girl child; many of bicycle distribution schemes have also been extended to boys in order to retain/encourage gender equity in schools.

Recommendation: Introduce special cycle schemes for school children

Given the positive social development impacts that cycles can have in terms of increasing education levels, especially of girls, and the success of the existing schemes of state governments, it is strongly recommended that special schemes for promoting ownership of cycles by school children should be considered/continued by the state governments and the Government of India. While these schemes may load the public exchequer a little, the social impact of these schemes will be manifold.

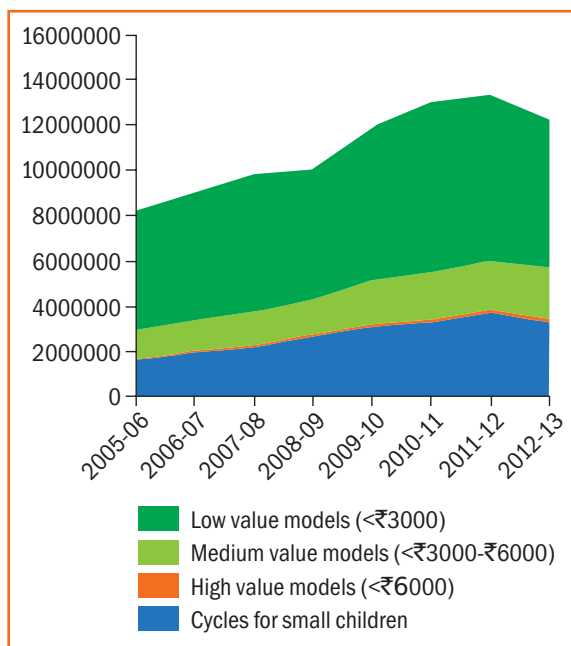


Figure 1.17: Increase in enrolment of school girls in Chattisgarh

Source: State Council for Educational Research & Training (SCERT), Evaluation Study of Saraswati Bicycle Supply Scheme (Free) in Chhattisgarh, 2013, Raipur, Chhattisgarh







2

Promoting cycling in urban areas

Key trends related to cycling in urban areas

Declining modal share of cycling in cities

The share of cycling as a mode of transport in Indian cities has been steadily declining (Figure 2.1). In larger cities with population above 1 million, more than 60% trips are by motorized modes of transport including public transport modes while less than 15% trips are

by cycling despite the fact that these cities have average trip lengths (7 km) that can be conveniently covered by cycling. Cities with population 0.5–1.0 million indicate similar trends with nearly 50% trips by motorized modes and about 20% trips by cycling; average trip length in these cities is about 3.5 km, a distance ideal for cycling. In contrast to the popular perception, smaller cities (<0.5 million population) have a very low share of cycling in daily trips despite average trip lengths below 3 km. According to Tiwari and Jain (2010), though the absolute number of cycling trips has been increasing, the modal share in favour of cycling is now limited to only 13%–21% in most of our medium (1–3 million) and large cities (3–5 million), 7%–15% in very large cities (population above 5 million), and 7%–10% in mega cities.

The modal share of cycling in most of the cities is declining over the past few decades. In a mega city like Delhi, bicycling has witnessed a decline of more than 30% in the mode share in the past five decades. In 1957, mode share of cycling was 36%, the highest among all other modes, whereas in 2008, its share was only 4%.¹ A comparison with Chinese cities indicates that the modal share of cycles in Chinese cities ranges from 11% to 47% (CAI-Asia, 2010); in Beijing the cycle share is as high as 32% (LTA, 2011). Cycle shares in Chinese cities, in fact, are experiencing an upward trend after witnessing decline for a long period of time (Dimitriou, 2011).

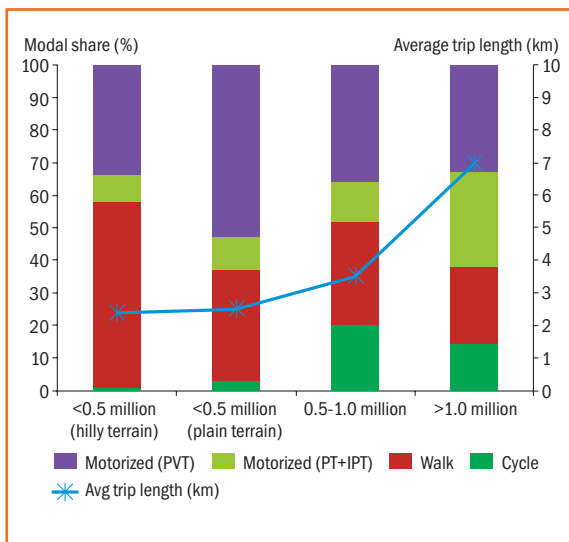


Figure 2.1: Share of motorized modes in Indian cities higher than the share of cycles
Source: MoUD and WSA (2008).

¹ Operations Research Group, Household Travel Surveys in Delhi, Final Report, New Delhi, September 1994, in "Road Designs for Improving Traffic Flow, A Bicycle Master Plan for Delhi", Geetam Tiwari, TRIPP, IIT Delhi, 1998.





Similar to modal share trends, the share of cycles in city traffic has also been witnessing a continuous decline; it fell to an average of about 12% in 2007 in about 80 cities in the country as compared to 33% in 1994, according to a study supported by the Ministry of Urban Development (MoUD and WSA, 2008). The share of fast moving vehicles in the traffic, however, has increased from 70% to 88% during the same period. The declining share of cyclists in traffic can also be noted in Table 2.1; mega cities like Delhi, Mumbai, and Bangalore have witnessed a decline in cycle traffic share over the last 3–4 decades. This share is expected to further drop as the cyclists in Indian cities are essentially captive users who are expected to shift to other modes once they have a choice. And, given that Indian cities are not taking any significant initiatives to create safe cycling environment, attracting choice users to cycling does not seem to be likely in the coming years.

Declining cycle ownership in cities

In addition to the declining modal share trends for cycles, Indian cities are also witnessing declining level of cycle ownership by households. Urban areas in India have witnessed a decline in the share of households owning a cycle from 46% in 2001 to 42% in 2011 (Gol, 2011). Data for seven

TABLE 2.1: Share of bicycles in traffic (Percentage share)				
Delhi				
Year	1969	1984	1991	2002
Delhi (Inner area)	40.3	17.8	10.1	4.0
Delhi (Middle area)	39.4	17.6	7.7	3.0
Delhi (Outer area)	35.6	10.9	22.0	16.0
Mumbai				
Year	1979		2002	
Mumbai Island	3.4		3.8	
Mumbai Suburbs	6.4		3.1	
Bangalore				
Year	1965	1988	1998	2002
Bangalore	70.0	20.0	5.0	5.0

Source: Ravinder et al. (2005)

Indian cities, with population more than 1 million, indicates these trends. Cycle ownership in most of these cities has declined significantly over the last one decade (Figure 2.2). The declining cycle ownership trends have an impact on the choice of cycling as a mode of transport. Unavailability of a mode affects the decision of a commuter to use it (Schneider, 2013), and expectedly, cities are witnessing a decline in cycle modal shares as discussed in the earlier section.

Declining safety levels of cyclists

In India, reliable data on road accident victims is not available because of the manner in which data is recorded by the police. For example, a cyclist killed by a truck is shown as a truck victim and not as a cyclist (Sundar and Ghate, 2013). The road accidents related data, reported by MoRTH and National Crime Record Bureau (NCRB), are hence not very reliable. In fact, the numbers reported by the two agencies are also different, and hence, cannot be relied. However, given that there is no other pan-India data on road accidents, there is no other choice, but to use this data. According to the data released by MoRTH, the number of cyclists who died in road accidents in 2012 was 6,600, as compared to

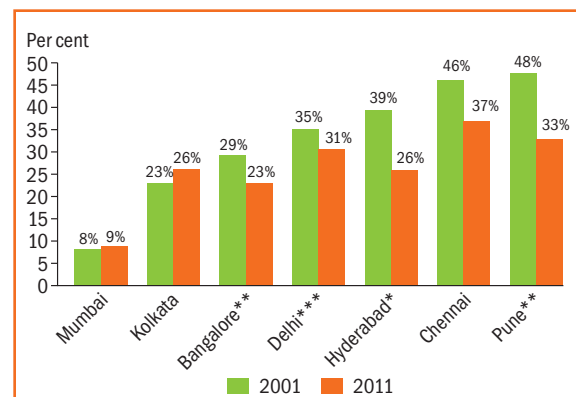


Figure 2.2: Cycle ownership (percentage households owning cycles) in seven cities in India in 2001 and 2011

Source: Gol (2011).

* Includes Secunderabad

** District's urban data taken

*** Data for NCT of Delhi





5,443 in 2009 (Figure 2.3).² The figures provided by MoRTH are significantly higher than the figures reported by NCRB. The NCRB reported 3,069 deaths of bicyclists in 2012, a figure less than half of the MoRTH data (Figure 2.3).

Going by the MoRTH data, bicyclists constituted nearly 5% of the total fatalities due to road accidents in 2012 (MoRTH, 2013). While this share of cyclists in road accident deaths may not seem very high, the number of cyclists injured in road accidents is more although such data is not reported. Accurate data on fatalities and injuries together would have given a better magnitude of vulnerability of cyclists to road traffic-related accidents.

Unlike accidents related to motor vehicles where the drivers are typically at fault for causing the accident, fault of cyclists in causing road accidents is very low. In 2012, nearly 80% road accidents were due to the fault of the drivers of motor vehicles; only 1.2% accidents occurred due to the fault of the cyclists indicating that the cyclists are usually the victims of road-related accidents (Figure 2.4) (MoRTH, 2013).

Analysis of cyclists' deaths in road traffic-related accidents in different cities is presented

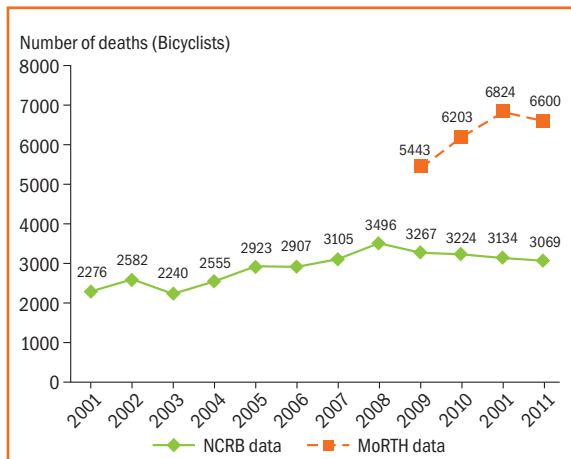


Figure 2.3: Number of cyclists' deaths in road accidents
 Source: MoRTH (Various years), NCRB (Various years)
 Note: MoRTH data on cyclists' deaths in road accidents was not available before 2009.

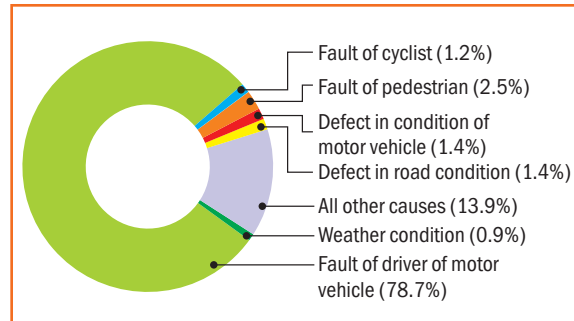


Figure 2.4: Cause of road accidents in 2012
 Source: MoRTH, 2013

in Figure 2.5. An interesting observation can be made from the figure, which shows that smaller cities with more cyclists have a higher share of cyclists' accidents as compared to the mega cities. Hence, there seems to be a higher probability of cyclists to be a victim of road accidents in smaller cities, as compared to the mega cities (cities with population more than 4 million).

Key reasons for declining cycle shares in urban areas

Lack of infrastructure and risk of road accidents

Indian cities are unable to capture the latent demand of cycling and this is evident from the declining modal shares of cycling. The potential cyclists in Indian cities do not choose to cycle, primarily due to two key reasons, i.e., lack of infrastructure for cycling and risk of meeting road accidents. An online survey of potential and existing choice cyclists in India conducted by TERI indicated that majority potential cyclists do not cycle due to these two factors (Figure 2.6). These factors are also a key concern for existing choice cyclists (Figure 2.7). Captive cyclists, on the other hand, continue to cycle even if cycling conditions are not safe. As has emerged from TERI's surveys in six cities, despite a significant number of captive cyclists meeting road accidents (Figure 2.8), they

² Data on cyclists' deaths in road accidents from MoRTH is not available before 2009.



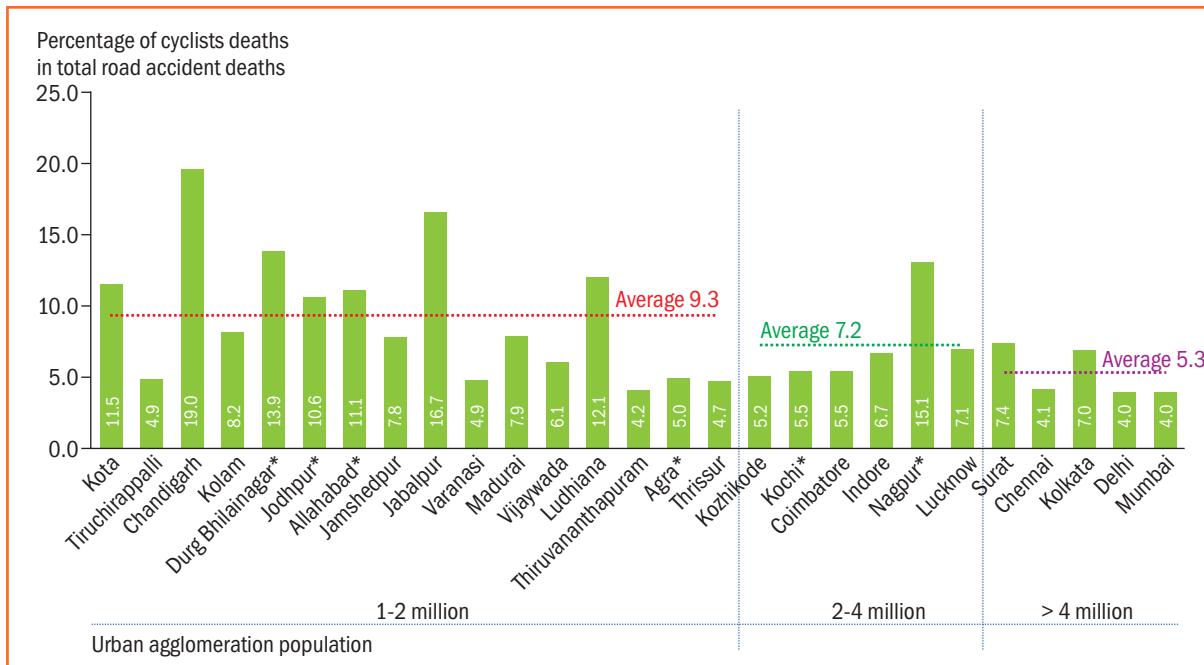


Figure 2.5: Percentage share of cyclists' deaths in total road accident deaths in Indian cities belonging to different population sizes (2012)

*Data for 2011
Source: NCRB (2012) and NCRB (2011)

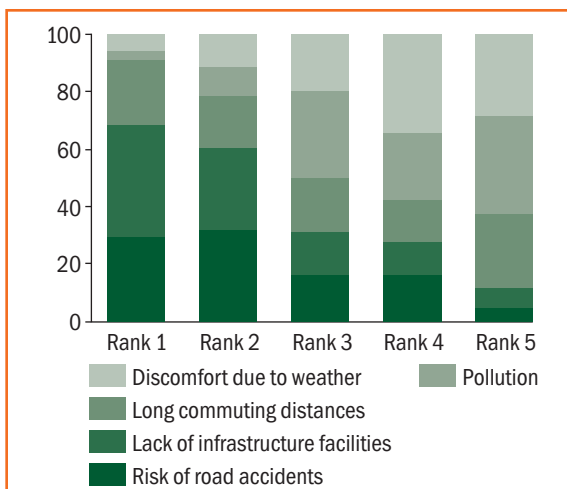


Figure 2.6: Potential cyclists: Why they do not cycle?

Source: TERI's online survey of potential and existing choice cyclists (300 + respondents).

continue cycling because they cannot afford to spend on other modes of transport (Figure 2.9). This, however, does not imply that they do not want safe cycling conditions; the captive cyclists surveyed by TERI suggested cycling improvements

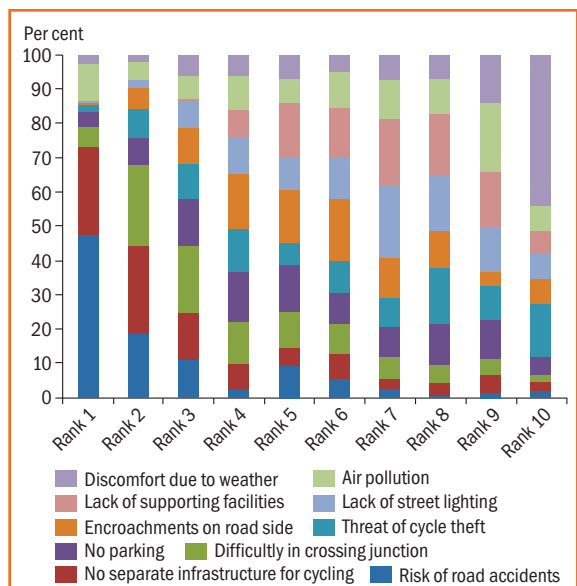


Figure 2.7: Existing choice cyclists: Problems faced

Source: TERI's online survey of potential and existing choice cyclists (300 + respondents).

like segregated cycle tracks, cycle parking facilities, maintenance of existing roads, etc., in order to ensure their safety (Figure 2.10).



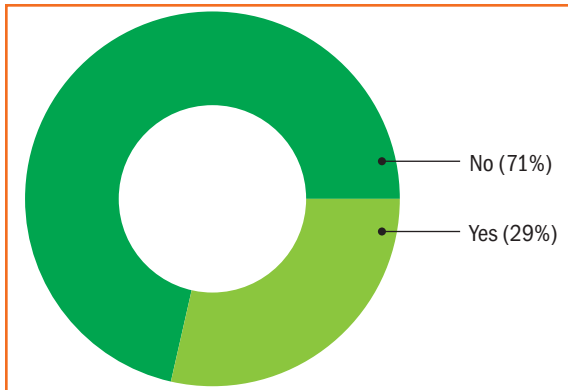


Figure 2.8: TERI's survey of captive cyclists in six cities: Percentage share of cyclists who had met with an accident
 Source: TERI's survey of 1,200 cyclists in six cities.

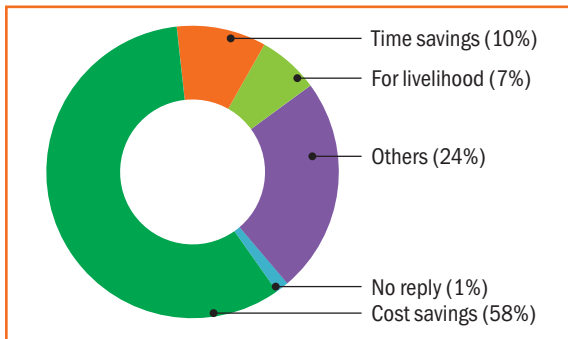


Figure 2.9: TERI's survey of captive cyclists in six cities: Reasons for cycling
 Source: TERI's survey of 1200 cyclists in six cities.

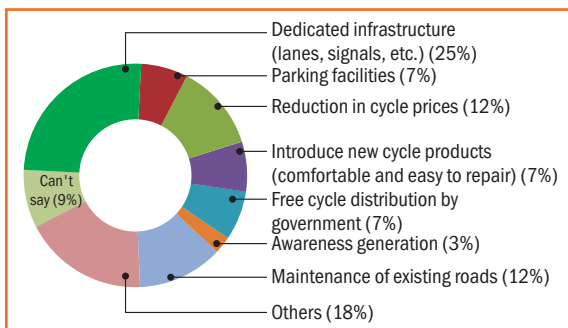


Figure 2.10: TERI's survey of captive cyclists in six cities: Cycling improvements suggested
 Source: TERI's survey of 1,200 cyclists in six cities.

The ongoing discussion clearly indicates that providing infrastructure for cycling is a prerequisite for attracting potential (choice) cyclists to start cycling in Indian cities. While there may be other factors also that may influence choice of cycling, infrastructure is considered to be the most critical one. Provision of cycling infrastructure would also help provide safe cycling conditions for existing cyclists and may perhaps retain their share, which otherwise will keep eroding as cycle is not their choice mode. TERI's surveys in six cities indicated that captive cyclists would want to shift to other modes of transport as their income increases (Figure 2.11) and the key reason for this would be time savings, increase in comfort levels due to other modes, and perception that the other modes of transport are safer. Safe and quality cycling conditions may influence their decision to shift to other modes. Infrastructure provision, hence, emerges as being most critical. In addition to dedicated infrastructure for cycling, innovative and new concepts like public bicycle sharing schemes can have a significant impact in increasing the share of cycling in cities. Such systems can help address the issue of first and last mile connectivity to public transit systems,

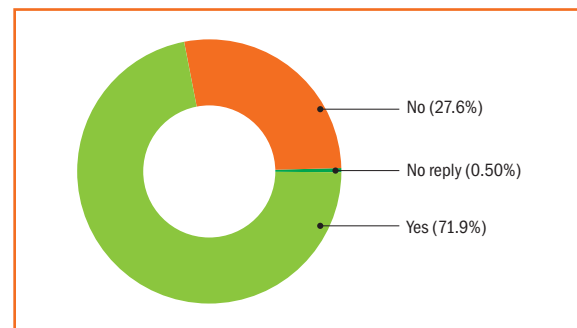


Figure 2.11: TERI's survey of captive cyclists in six cities: Would captive cyclists shift to other modes as their income increases?
 Source: TERI's survey of 1,200 cyclists in six cities.





and in turn, increase the share of both public transport and NMT modes in cities; the current status of implementation of bike-sharing schemes in Indian cities is discussed later in the chapter.

State of cycling infrastructure in Indian cities

As is emerging from the above discussion, provision of segregated cycle tracks is important in Indian cities, at least on roads with heavy and fast motorized traffic; roads with heavy traffic affect cyclists by reducing their speeds and roads with fast moving traffic are highly unsafe for cyclists. As stated earlier, safety is a key reason why many potential cyclists do not choose to cycle on a daily basis to places of work, education, shopping, etc. Many of the existing (captive) cyclists may also move away from cycling in the long run due to safety reasons; they may choose to use safer and faster modes of transport, as their income levels rise. Dedicated cycle tracks can help improve safety of cyclists and increase their travel speeds. In Delhi, where dedicated cycle track has been provided on bus rapid transit (BRT) corridor length of 5.6 km, conditions for cyclists have improved in terms of reduction in their travel time and exposure to road accidents (Box 2.1).

BOX 2.1: IMPACT OF PROVIDING DEDICATED CYCLE TRACKS

Provision of dedicated cycle tracks (on both sides) on the Delhi BRT corridor stretch of 5.6 km has led to the following positive impacts for cyclists:

- 50% increase in speed of cyclists from 8 kmph to 12 kmph after implementation of dedicated cycle tracks
- Per km time (minutes)-saving for cyclists is 2.5 minutes
- Risk exposure of pedestrians and cyclists to accidents reduced from 0.263 to 0.002 (99% reduction)

Source: Tiwari and Jain (2013)

Lack of cycling infrastructure: Road design standards not an issue, but their implementation

Despite its role in ensuring safe cycling conditions, dedicated infrastructure for cycling is not being provided in Indian cities. This however is not a result of lack of provision for cycle infrastructure (cycle lanes and cycle tracks) in the norms and standards for urban road design and construction, but due to inadequacy in their implementation. The Indian Roads Congress (IRC) code for urban roads³ clearly provides for cycle tracks as an important cross-sectional element of urban roads. The provision in the standard is stated below:

“Separate cycle tracks should be provided when the peak hour cycle traffic is 400 or more on routes with motor vehicle traffic of 100–200 vehicles per hour. When the number of motor vehicles using the route is more than 200 per hour, separate cycle tracks are justified even if cycle traffic is only 100 per hour.”

Exactly similar provision is provided in Urban Development Plans Formulation and Implementation (UDPFI) guidelines, which are followed by all cities while preparing their urban development plans, projects and schemes. Urban road cross-sections provided in the codes and guidelines are given in Annex 2.1; cross-sections suggested in codes/guidelines clearly provide for cycle tracks on all arterial, sub-arterial and collector roads. This implies that as per the standards/norms prescribed for urban road design, cycle tracks are a must for roads with heavy motorized traffic. However, even though these standards and guidelines have been in existence since last three decades, large Indian cities have not designed and constructed these cycle tracks despite traffic levels being much more than 200 vehicles per hour on most of their main roads; Annex 2.2 shows peak hour traffic levels in a few cities.

³ IRC: 86-1983, Geometric Design Standards for Urban Roads in Plains. Indian Roads Congress, New Delhi.





In addition to the already mentioned IRC code and UDPFI Guidelines, MoUD has got prepared a new Code of Practice for design of Urban Roads.⁴ It has been circulated to all states/UTs, and MoUD is advising cities to use the new Code for designing of urban roads. Part-I of the new Code provides norms and standards for urban road cross-section design; it states that exclusive lanes for slow moving vehicles—bicycles and rickshaws, and pedestrians along with spaces for street vendors, are also essential in urban roads in addition to provision of carriage way that caters to the needs of motor vehicles. The code recommends segregated cycles tracks on arterial and sub-arterial roads and cycle lanes on distributor/collector roads⁵ (Table 2.2). Unlike the IRC code for urban roads, the new Code of MoUD does not link provision of cycle tracks/lanes with level of motor vehicle/cycle traffic, hence directing that all roads expected to have heavy motor traffic (arterials and sub-arterials) should have segregated cycle tracks.

The new Code also recommends that “At NMV junctions on arterial roads where high vehicular volume and speed results in higher risks for bicyclists and lesser priority to crossing bicycle traffic, a grade separated crossing facility

may be preferred for cyclists and pedestrians to reduce their delays and increase safety. Grade separated crossings may be provided at major signalized intersections, roundabouts and other un-signalized locations where crossing of only bicyclists and pedestrians is to be allowed and at grade crossing is considered unsafe and inefficient.”

The provision for cycling infrastructure on urban roads in the design standards, hence, clearly indicates that the real problem why cycle tracks are not being provided is not because the design standards/guidelines do not prescribe them, but because the design standards/guidelines are not being translated to actual road design and construction. There are only a few cities in the country that have constructed cycle tracks that offer safe cycling environment to cyclists. Delhi is one such city that has undertaken some initiatives to build cycle tracks.

Delhi BRT corridor has dedicated cycle tracks on both sides of the road in addition to cycle tracks in some part of central Delhi (New Delhi Municipal Corporation Area). In addition to Delhi, a few more cities have constructed segregated cycle tracks or provided cycle lanes; Table 2.3 provides a list of cities that are known

TABLE 2.2: Recommendations related to cycle tracks in new Code of Practice for design of Urban Roads by MoUD

	Arterial Roads	Sub Arterial Roads	Distributory Roads	Access Roads
Non-motorized Vehicle	Segregated Cycle Track	Segregated Cycle Track	Cycle Lane	Mixed traffic
Location	Between Carriageway or street parking and footpath on either edge of the carriageway	Between Carriageway or street parking and footpath on either edge of the carriageway	On the edge of the carriageway, adjacent to the footpath or parking	
Gradient	1:12–1:20	1:12–1:20	1:12–1:20	1:12–1:20
Lane Width	2.2 to 5.0 m	2.2 to 5.0 m	1.5 to 2.5 m	Mixed with motorized vehicular traffic
Minimum Width	2.5 for a two-lane cycle track and 1.9 m for a common cycle track and footpath	2.0 for a two-lane cycle track and 1.7 m for a common cycle track and footpath	1.5 m	1 m (painted)

⁴ Available at http://urbanindia.nic.in/programme/ut/urban_transport.htm, last accessed on February 10, 2014.

⁵ In case ROW of distributor road is >20m (in residential zone) or >25m (in commercial zone), segregated cycle track is recommended.





to have constructed cycle tracks. It should be noted that many of the cities listed in Table 2.3 and some other cities that are constructing/will construct cycle tracks are really not developing

them as complete cycling networks in the city, but are taking them up as part of their BRT projects. The only city that has taken up cycle track construction without linking it to BRT

TABLE 2.3: Cycle tracks in different Indian cities

	City	Constructed Length (km) of cycle track/lane	Remarks
1	Delhi	Cycle tracks have been constructed on both sides of the 5.8 km long Delhi BRTS from Ambedkar Nagar to Moolchand; the remaining length of 8.7 km of BRTS has cycle tracks in some stretches. Cycle tracks have also been constructed on a few roads in the New Delhi Municipal Corporation area.	The cycle tracks along the BRTS face enforcement issues like encroachment, parking of vehicles, and use of cycle track by motorized vehicles. As per the Audit findings on NMV lanes in Delhi ⁶ , cycle tracks constructed in the NDMC area have the following issues: “deviated from the guidelines issued by Unified Traffic and Transportation Infrastructure (Plg. & Engg.) Centre (UTTIPEC) on street design. The NMV lane also did not fully meet the intended objective due to lack of continuity throughout the length of roads on account of obstructions like bus stops, plaza and road crossings in the middle of NMV track.”
2	Mumbai	13-km cycle track constructed at Bandra Kurla Complex	The cycling track is not used by cyclists; instead it is being used as a parking lot for cars.
3	Ahmedabad	Of the total 51 km BRTS corridor that is operational, 20 km has a cycle track	Some of the cycle tracks are witnessing low usage due to encroachment of tracks or use of these tracks by motorized vehicles. The cycle tracks have been planned only on roads which are wider than 100 feet. At certain stretches where even sufficient width is available, the cycle tracks have not been developed as number of cycle users is believed to be less.
4	Pune	134 km of cycle track (as per government figures)	As per survey conducted by Parisar, an NGO, only 88 km of cycle tracks were existing in the city. Parisar also observed that the usage of cycle tracks is low due to lack of continuity, low levels of security, and poor designs.
5	Chandigarh	160 km of cycle tracks were constructed during 2001–2003	Navigation at roundabouts and road intersections is a key problem. Other problems include potholes, bad lighting, parking of cars, dumping of waste on tracks. ⁷ Tracks are also used by cars and two-wheelers during peak hours. ⁸
6	Mysore	4 km-long cycle track has been constructed on a road with high traffic	The city plans to expand the network of cycle track.
7	Nashik	8.5 km of cycle track constructed in 2012	The civic authority is planning to develop more cycle tracks in the city.
8	Bangalore	40 km of cycle lanes marked in the Jaynagar area in 2012	The cycle lanes are encroached by parked vehicles; these are not segregated tracks but lanes painted to indicate cyclists’ ROW.
9	Noida	3 km length of cycle track exists	For most of its length, the cycle track is unusable due to encroachment and parking.
10	Rajkot	Cycle tracks along Phase-I of BRTS corridor of 10.7km length have been constructed	-

⁶ Performance audit report on XIX Commonwealth Games (CWG 2010).

⁷ ‘Cyclists’ safety goes off track — Stretches meant for peddlers damaged, unlit, encroached upon by four-wheelers’, Available at <http://www.tribuneindia.com/2013/20131006/cthl.htm>, last accessed on December, 2013..

⁸ ‘For cyclists, Chandigarh is unsafe’, Available at <http://www.indianexpress.com/news/for-cyclists-chandigarh-is-unsafe/630092/>, last accessed on December 13, 2013.





construction is Pune. Pune has a cycle track network of about 132 km (official figure). Chandigarh also has a city wide network of cycle tracks; a length of about 160 km. These cities, however, have their own problems with regard to use of these cycle tracks; Annex 2.3 discusses the problems related to cycle track networks in these cities. Some of the key problems include

- encroachment of tracks,
- parking by motor vehicles on tracks,
- use of cycle tracks by motor cycles and scooters,
- poor surface quality and maintenance of tracks,
- lack of continuity of cycle tracks, and
- low levels of security due to inadequate street lighting, etc.

State of cycle-sharing schemes in Indian cities

While many cities in India have some sort of informal cycle rental stores/shops that provide cycles on rent on a daily basis, the concept of formal, well-planned, and organized bicycle-sharing systems is still in its nascent stage and has not been able to pick up. Till date, cycle sharing has been formally introduced only in three cities in India, namely, Delhi, Bangalore, and Mumbai. Multiple private operators have stepped in these three different cities from time to time to provide cycle-sharing services. But limited success of these initiatives has led to closure of most of these initiatives. Currently, the cycle-sharing services are operational in parts only in the cities of Delhi and Bangalore. Details of the bicycle-sharing systems in the two cities are discussed in Annexure 2.4. Public bicycle-sharing systems are also being planned to come up in Bhopal, Gurgaon, Mysore, and Rajkot; however, not much progress has been made till now on this front.

Primary surveys were undertaken by TERI in late 2013 in Delhi, as well as Bangalore, to understand the main barriers in implementing, operating, and promoting the use of public bicycle-sharing systems in our cities. The surveys

brought forward several issues in the existing bicycle-sharing systems and also barriers that hinder the further scaling up of these systems; the key findings of TERI's surveys are discussed below:

Lack of support from government agencies:

The global experience strongly indicates that government support plays a crucial role in provision and promotion of bicycle rental schemes. Despite finding a place in National Urban Transport Policy (NUTP 2006), bicycle sharing has not received adequate attention and has suffered from lack of interest and support from the concerned government agencies. Though, the current pilot projects are on public private partnership (PPP) model where the private parties are responsible for building and operating the system over a decided concession period, the government has been reluctant in providing necessary financial assistance or other support like land, leading to unnecessary delays in setting up of the systems. For instance, Delhi Metro Rail Corporation (DMRC) had signed a contract with Greenolution, a private advertising company to set up 20 bike-sharing stations on a Build Operate and Transfer (BOT) basis in 2007. However, the company has been able to set up only one station even after five years of signing of contract. The operator highlighted that the lack of interest and unwillingness to devote resources on part of DMRC are the main reasons for the delay in scaling up of services and also closure of bicycle-sharing services in case of Delhi.

Lack of integrated planning:

Currently, there are multiple operators working in isolation in Delhi as well as Bangalore to provide service in different parts of their respective cities. Most of these initiatives started as pilot projects in different city areas. Due to lack of an integrated or strategic city level plan to develop a city-wide bike-sharing facility, there is no integration among these different systems run by different operators. In a few cases like Planet Green Bikes in Delhi, there is no integration amongst





the various stations of the same operator. Each station serves as a separate cycle rental and not as a cycle-sharing system, i.e., a person who rents a cycle from one station has to return it to the same station and cannot return it to any of the other stations of Planet Green Bikes. This defeats the entire purpose of a bicycle-sharing facility and makes it extremely inconvenient for the users.

Lack of a city wide network/incomplete network of stations: Location and network of stations is one of the most important components that have a direct impact on the usability of the system. A complete city wide network assures availability of stations near both the probable origin and destinations of the travellers. It is also important to ensure provision of the facility near important nodes and transit stations to promote use of bicycle sharing as feeder mode.

In India, currently, the pilot projects taken up have been only at a very small scale, mostly along the metro line or BRT line (as in case of Planet Green Bikes in Delhi) with no network connectivity at the area level. This is one of the biggest reasons for low acceptability and low ridership of these services among the citizens.

Inefficient operations: Majority of the pilots taken up till date (except Delhi Cycles and ATCAG) run on manual operations and have appointed guards who are responsible for on the spot registration, rental procedures, security of cycles, and maintenance of records. A commuter is generally required to submit original identity cards as a security deposit which discourages many choice users from using the system. Also, return of bicycles at the same station where they were hired is mandatory in such manual systems making the use of system very inconvenient.

Lack of NMT infrastructure: It is another major challenge in promoting choice cycling in our cities. Even where the infrastructure is provided or available (e.g., dedicated cycle lanes along the bike stations on the BRT corridor),

either the quality of infrastructure is poor or face enforcement issues, e.g., use of dedicated cycling lanes by motorist vehicles, for parking purposes or other encroachments, as discussed in the previous section.

Poor quality of cycles: Cycles provided at the stations are not of very good quality and are not maintained properly. During the survey, it was observed that some cycles standing at the stations were punctured and rusted indicating poor maintenance of the existing infrastructure.

Financial constraints/losses: Though the rental charges have been kept low, revenues generated from renting a bicycle are not enough to cover up their operation and maintenance costs. Supported largely by advertisements revenues, none of the schemes can be considered a financial success. However, this is true for most of the big bicycle-sharing programmes in cities abroad. However, steps have been taken in these cities to promote cycle sharing as it helps increase public transport ridership. In Hangzhou (China), for instance, the local authority is promoting public transit ridership by financing explicitly an almost free bike-share service.

Lack of awareness: Apart from the above-mentioned issues, lack of awareness amongst users of the existence of bike-sharing facilities and its benefits is also a major concern. Not many efforts have been made to spread awareness among the locals about the availability of the facility or promote its usage. Majority of the potential users of the bicycle sharing systems surveyed around the metro stations in Delhi reported that they were unaware of the availability of such services in the vicinity.

Thefts and vandalism: Theft and vandalism is another important concern of the operators of these services in Indian cities. Currently, to check cycle thefts and vandalism, certain operators (like Planet Green Bikes, Greenolution, etc.) require the users to submit their identity proofs





in original while renting cycles. Also conditions like only residents with local address proofs (Delhi and Gurgaon only) can rent cycles prohibits people from other places, residing around the station, to rent bicycles.

The Indian experience clearly brings forward that the lack of support from government agencies and lack of vision for a city wide cycle-sharing system have been among the major barriers in promoting bicycle sharing in India. It is realized that the governments should at all levels recognize and acknowledge the benefits associated with cycle-sharing systems as a mode of transport and make efforts to introduce and promote public cycle sharing systems in cities.

Key issues: Summary

The above discussion helps conclude the following key points on the state of cycling infrastructure and cycle-sharing schemes in Indian cities.

Cycling infrastructure

- Few cities in the country have constructed/ planned to construct cycle tracks.
- Only Pune and Chandigarh have wider city-level network of cycle tracks. These networks, however, have problems related to bad design, maintenance, encroachment, lighting, enforcement, etc.
- Most cities, which have cycle tracks, are mostly taking it up as part of the BRTS project or a stand-alone project, and not as an initiative to develop a complete cycle network for the city.
- The road design norms, standards, and guidelines, all provide for provision of cycle tracks on all arterial and sub-arterial roads. These standards, however, are not translated into actual road designs and hence indicate that attention needs to be given towards:
 - Capacity/awareness of urban road engineers to translate codes/guidelines into actual road design;
 - Appraisal mechanism for urban road design;

- Monitoring during road construction;
- Dedicated focus on creation of cycling circulation networks for cities.

- There are no dedicated investments proposed for cycle tracks in city budgets and city mobility plans; it is assumed to be part of investments earmarked for roads. However, as discussed earlier, though the road design codes require provision of cycle tracks on specific category of roads, construction of cycle tracks does not happen on ground.
- Most importantly, there seems to be a lack of political will for promoting cycling as a mode of transport and this is reflected in insignificant allocation of funds for cycling infrastructure and facilities in local budgets.

Cycle-sharing schemes

Only two cities, Delhi and Bangalore, have experimented with cycle-sharing pilots. These, however, are not city wide networks and have not been successful due to several reasons as discussed earlier.

Recommendations

Developing cycling infrastructure in cities, introducing cycle-sharing schemes and promoting awareness campaigns

Ensuring provision and maintenance of cycling infrastructure in cities: Suggested approach

Given the above-discussed issues related to lack of cycling infrastructure in cities, the following suggested approach needs to be urgently adopted at city level in order to ensure development of quality cycling infrastructure in cities.

- Interventions at the stage of urban road design (design of new roads and retrofiting





on existing roads) and at the stage of planning circulation networks for the city:

- ensure translation of existing codes/design standards into actual road design and ensure
 - provision of cycle tracks on all arterial and sub-arterial roads, and
 - safe interface of cyclists with motorized traffic, as provided in the codes.
 - Ensure development of complete network of cycle tracks in the city at the stage of development of city-level circulation networks and master plans.
- Interventions at the appraisal stage
- At the stage of appraisal of road design, city mobility plans, transport DPRs, master plans, etc., ensure that road design and city mobility networks include cycle tracks as a key element
- Interventions at the operational stage:
- Ensure proper maintenance of cycle tracks and associated facilities/amenities like lighting, landscaping, etc.
 - Ensure strict enforcement mechanism to check parking, encroachments, waste dumping, etc., on cycle tracks; prohibit motor vehicles from using cycle tracks.

Need a push from MoUD: Make NMT projects a mandatory requirement for central assistance to cities

While the above-listed approach/interventions may seem simple and doable, the absence/state of cycling infrastructure in Indian cities indicates that city authorities have not been adopting this approach towards developing the cycling infrastructure. This is no different from how cities have addressed other infrastructure sectors also till the JNNURM⁹ was taken up. While JNNURM has helped address infrastructure

backlogs in several sectors, including transport, infrastructure for NMT modes has not received adequate attention. Utilization of JNNURM funds in urban transport sector has primarily been focused on roads-related projects and/or capital-intensive public transport projects; low cost NMT projects targeting provision of infrastructure have not received much attention (Box 2.2). The lack of focus on NMT infrastructure is also reflected in the urban transport related advisories/guidelines issued by the MoUD to cities as part of JNNURM; review of these guidelines indicates that till now there has been no comprehensive advisory/guideline by the ministry to promote NMT (Annex 2.4). However, there is a significant learning from the experience of JNNURM, i.e., in terms of success of more and more public transport projects being taken up by the city governments, which indicates that like public transport projects if NMT projects are also pushed under the ambit of JNNURM or similar schemes and are linked to the funding requirements under the programme, more cities can be expected to take up NMT projects. This would also help in achieving the objectives of the National Urban Transport Policy, which recommends promoting the non-motorized transport systems in the cities. It is hence recommended that the MoUD, while implementing the JNNURM or its succeeding schemes, ensures provision of cycling infrastructure in cities by making provision of NMT infrastructure, a mandatory requirement in the following areas:

- City Mobility Plans (CMPs)
- DPRs of all public transport projects — for grant of central assistance
- DPRs of roads/flyovers
- DPRs of other urban transport like construction of parking facilities, etc.

Additionally, cities should be required to prepare plans for retrofitting/making provision for

⁹ Jawaharlal Nehru National Urban Renewal Mission



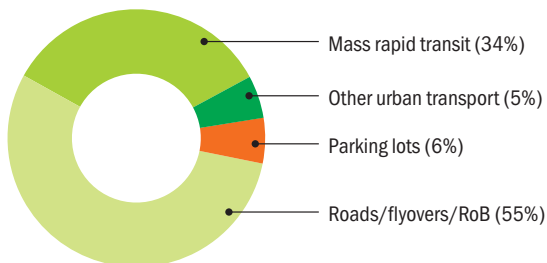


cycle tracks on the existing road infrastructure.

Provision of cycling infrastructure should be ensured by cities in all DPRs submitted to MoUD; the cost of constructing and maintaining cycling facilities should be included in the overall cost of the project and should be indicated clearly in the DPR. Appraisal and evaluation mechanisms for central funding established by MoUD should ensure provision of cycling infrastructure and utilization of approved central assistance for the same purposes. It should be noted that MoUD had issued a few advisories in 2007 and 2008, which promoted provision of NMT infrastructure. The advisories are mentioned in Box 2.3. Implementation of these advisories, however, hasn't taken place, as

BOX 2.2: LACK OF FOCUS OF JNNURM FUNDING ON NMT PROJECTS

As on March 2012, more than 100 urban transport projects had been sanctioned by MoUD under Urban Infrastructure and Governance (UIG), one of the schemes of JNNURM. Sanctioned only to JNNURM cities, a sum of Rs 15,374 crore was allocated for urban transport projects (total approved cost) and an additional Rs 4,724 crore for the purchase of buses (Gadgil 2013). Distribution of urban transport funds indicates that no dedicated funding was provided for NMT projects, including projects focusing on promoting development of cycling infrastructure; more than 50% funding was allocated to roads, flyovers, and over bridges, and nearly 34% to mass rapid transit projects. While it can be argued that road designs would include provision for NMT (i.e., sidewalks and cycle tracks), this is not actually happening as discussed at length in the previous section.



JNNURM Fund Allocation (Urban Transport)

Source: Gadgil 2013 (based on data provided by MoUD)

reflected in fund allocation under JNNURM. It is, therefore, necessary that MoUD outlines a clear requirement for provision of NMT infrastructure and ensures its implementation by making it a mandatory requirement for grant of funds for urban transport projects.

Cities should implement city wide cycle-sharing schemes

As discussed in the previous sections, cycle-sharing schemes can help promote both the share of cycling and public transport modes. Given the experience of cycle sharing in Delhi and Bangalore, it is recommended that cities should start planning city-wide cycle-sharing schemes rather than isolated projects serving specific locations. Cities need to assess the economics, technologies, logistical issues, service area, and other challenges before designing and implementing a bicycle-sharing system and need

BOX 2.3: PAST ADVISORIES OF MoUD THAT PROMOTE PROVISION OF NMT INFRASTRUCTURE

1. Promoting pedestrianization and non-motorized transport, January 2, 2008 [D.O.No.K-14011/07/2007-UT]

Advisory recommends that cities should provide for cycle tracks and pedestrian infrastructure as per guidelines/norms of UDPFI. Though the advisory was issued in 2008, there has not been much action taken by cities on construction of sidewalks and cycle tracks/networks. There is a need to revive the advisory, add on the MoUD's Urban Roads Manual requirements to it, and then make it a binding upon cities to follow it in order to receive central funding.

2. Incorporating urban transport at the urban planning stage and encouraging integrated land use and transport planning, January 23, 2007, [D.O.No.K-14011/07/2007-UT]

Advisory suggests provision of pedestrian and NMT infrastructure along with reserving lanes for high-capacity public transit systems.





to provide support to private operators for successful execution of cycle-sharing projects. The following elements need to be critically considered while designing cycle-sharing schemes for cities.

- **Proper network design:** Develop a complete network of cycle stations at the area or city level so as to enable an individual to pick up a cycle from any of these stations and return it to any other station.

The minimum coverage area covered by a system should be 10 sq.km, large enough to contain a significant number of user origins and destinations. Smaller areas may drive down system usage.¹⁰

- **Adequate cycles and infrastructure:** The system must ensure availability of sufficient number of cycles and stations to match user demand in the coverage area. Also, a proper distribution system should be ensured to ensure availability of cycles at the stations at all times.
- **Quality bicycles:** Bicycles should be durable, attractive, and easy to use; they should be customized to meet the needs of local users. The bicycles should also have specially designed security features, which discourage theft and resale¹¹.
- **Easy to use system:** The system must allow users to easily and comfortably rent, use, and return the cycles.

Apart from the above mentioned elements, the government should pay significant attention to marketing of the scheme and awareness generation among the masses.

The following actions are suggested to promote cycle-sharing in cities.

- MoUD should encourage and incentivize state and city governments to introduce and promote cycle-sharing systems. Linking

provision of bicycle-sharing systems to funding schemes or programmes like JNNURM can prove to be an important step in promoting bicycle-sharing systems in Indian cities. While there has been an advisory by the MoUD on similar lines [Advisory dated August 30, 2013, (No.K-14011/1/2007-UT-IV) inclusion of feeder buses, public bike sharing, and pedestrianization in the influence zone of MRTS projects], its translation into DPRs of public transit projects is yet to begin. It is, hence, important that MoUD encourages and makes it mandatory for cities to plan cycle-sharing projects along with the public transit systems.

- State and city governments should also promote bicycle sharing and invest in provision of cycling infrastructure at the city level to promote cycling as a mode of transport, especially for short trip lengths. Bicycle sharing should form an important component of Comprehensive Mobility Plans and all developments should be done in line with these plans.
- To ensure proper implementation and success of the cycle-sharing schemes, innovative models of implementation executed abroad and features of successful initiatives should be studied in detail and evaluated for their applicability in the Indian context.

Government of India should initiate awareness campaigns for promoting cycling

Cycling in India is considered as a poor man's mode; as the incomes of households increase, they choose to shift from cycling to other motorized modes of transport like two-wheelers, auto rickshaws, cars, etc. This perception coupled with unsafe cycling conditions in cities overshadows the benefits of cycling to individuals and society, and discourages use of cycles by middle- and high-

¹⁰ <https://go.itdp.org/display/live/Riding+the+Bike-Share+Boom%3A+The+Top+Five+Components+of+a+Successful+System>, last accessed on January 15, 2014

¹¹ <https://go.itdp.org/display/live/Riding+the+Bike-Share+Boom%3A+The+Top+Five+Components+of+a+Successful+System>, last accessed on January 15, 2014





income individuals. This trend, however, needs to be reversed in order to realize the benefits of cycling, especially the health and environmental benefits (Boxes 2.4 and 2.5). This would require creating enabling cycling environment in cities, as suggested earlier and changing the perception of cycling. Mass awareness campaigns need to be taken up to highlight the benefits of cycling, namely:

- Health benefits
- Environmental benefits
- Mobility benefits¹²

It is recommended that a nation-wide awareness campaign be designed and initiated by the Government of India with the following key ministries as partners:

- Ministry of Health

BOX 2.4: CYCLING AND HEALTH

According to the Annual Health Report (2011) of the Ministry of Health and Family Welfare, Government of India, nearly half of all the deaths in India are primarily due to non-communicable diseases (See figure), many of which are linked to inactive and unhealthy lifestyles like cardiovascular diseases, diabetes, diseases resulting from obesity, etc. Most of these diseases affect the person in the productive years and are largely attributed to unhealthy lifestyles, lack of physical activity, and the resulting increased rates of obesity among the masses. The World Health Organization (WHO) listed obesity and lack of physical activity as two of the five leading global risks for mortality. WHO estimated that obesity is responsible for the following global disease burdens: 44% of diabetes; 23% of ischaemic heart disease; and 7% to 41% of certain cancers.¹³ Estimates for physical inactivity burdens were 27% of diabetes, 30% of ischaemic heart disease, and 21% to 25% of breast and colon cancers.¹⁴

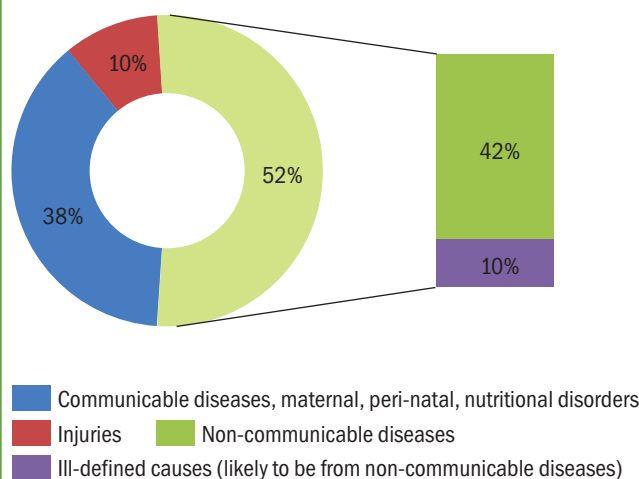


Figure: Causes of deaths in India

Source: Annual Report to the People on Health (2011); Ministry of Health and Family Welfare, Government of India

Considering the high cost and long duration of treatment, these diseases are not only a financial burden to the common man but also a huge cost to the economy. The Harvard School of Public Health has, in a study on economic losses due to non-communicable diseases (NCDs), estimated that the economic burden of these ailments for India will be close to \$6.2 trillion for the period 2012–30, a figure that is equivalent to nearly nine times the total health expenditure during the previous 19 years of \$710 billion.¹⁵ To effectively control these ailments, it is critical to promote healthy lifestyles, especially in Indian cities where active transport options like cycling can play an important role. Active transportation, i.e., walking and cycling helps bring in moderately intense physical activities in the daily routine life of the people. The health benefits of cycling, specifically, are well established which includes better fitness, reduced risk for cardiovascular disease, and lower rates of obesity and diabetes.¹⁶

¹² Congestion, reduction, and promotion of sustainable modes of transport.

¹³ WHO. Global health risks: Mortality and burden of disease attributable to selected major risks. Geneva:WHO Press; 2009 [cited December 13, 2011]. Available at http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/index.html, last accessed on February 18, 2014.

¹⁴ Ibid.

¹⁵ Jha, D N (Sep 7, 2013). Lifestyle diseases to cost India \$6 trillion, study estimates from the Times of India, Posted on <http://timesofindia.indiatimes.com/india/Lifestyle-diseases-to-cost-India-6-trillion-study-estimates/articleshow/22385056.cms>, last accessed on March 19, 2014.

¹⁶ Kretzman Stewart S, Johnson DC, Smith WP. Bringing Bike Share to a Low-Income Community: Lessons Learned Through Community Engagement, Minneapolis, Minnesota, 2011. http://www.cdc.gov/pcd/issues/2013/12_0274e.htm, last accessed on March 19, 2014.





BOX 2.4: CONTD...

Data from national surveys of travel behaviour and health indicators show that countries with the highest levels of cycling and walking have the lowest obesity rates.¹⁷

Studies indicate better fitness levels in people who commute by active transport modes (walking or cycling) as compared to the ones who use motorized transport modes for daily commuting. It has been found in a study in Britain, men who cycled at least 25 km per week had less than half the risk of non-fatal and fatal coronary heart disease of those who were not physically active.¹⁸ Another study to assess the impact of physical activity in relation to type 2 diabetes conducted among middle-aged Finnish men and women indicated a 35% reduction in risk with at least 30 minutes per day of commuting by bicycle or on foot, a greater reduction than with physical activity during leisure time or at work.¹⁹

A recent study in India by the Imperial College, London and the Public Health Foundation of India analysed physical activity and health information of 4,000 participants. The study found that half of people who travelled to work by private transport and 38 per cent who took public transport were overweight, as compared with only a quarter of people who walked or cycled to work. The study found similar patterns for rates of high blood pressure and diabetes.²⁰ The study concluded that walking and cycling was associated with reduced cardiovascular risk in the Indian population,²¹ and hence, the government policies and programmes should encourage active modes of transport to reduce mortality risk of the population due to diseases associated with inactive lifestyles.

Despite the health benefits of cycling, there has been a lot of criticism on promoting cycling due to the associated risks from external factors including risk from traffic-related injuries and exposure to air pollution. A study conducted by British Medical Association to quantify the trade-offs between benefits and risks of cycling estimated a benefit risk ratio (years of life gained versus lost) of 20 to 1 and concluded that “in spite of the hostile environment in which most cyclists currently ride, the benefits in terms of health promotion and longevity far outweigh the loss of life years in injury on the roads.”²² Various other studies conducted from time to time to analyse and weigh the benefits and risks associated to cycling unanimously support that there is a large net health benefit of increased cycling, since the risk of fatal injury is greatly outweighed by the reductions in mortality afforded by increased physical activity. Air pollution risks and benefits have smaller impacts in either direction.²³

Given the above, the best approach would be to reap the large benefits of cycling as a means to address the widespread levels of physical inactivity and unhealthy lifestyles in Indian cities while at the same time adopt measures to manage the associated risks of cycling.

- Ministry of Education and Sports
- Ministry of Environment and Forests
- Ministry of Urban Development

The focus of such an awareness campaign should be to highlight the benefits of cycling to

individuals and society at large and change the perceptions like cycles are a poor man’s mode, cycles are an unsafe mode of transport, exposure to pollution while cycling will cause health problems, etc. Cycling should be promoted as the most sustainable mode of transport, given

¹⁷ K Teschkea, C C Reynolds, F J Riesch, B Gougec, and M Wintersd (2012). “Bicycling: Health Risk or Benefit?” Available at http://www.ubcmj.com/pdf/ubcmj_3_2_2012_6-11.pdf, last accessed on March 19, 2014.

¹⁸ J Morris, D Clayton, M Everitt, A Semmence, E Burgess. “Exercise in leisure time: Coronary attack and death rates”, *British Heart Journal*, 1990(63): 325–34.

¹⁹ K Teschkea, C C Reynolds, F J Riesch, B Gougec, and M Wintersd (2012). “Bicycling: Health Risk or Benefit?”, Available at http://www.ubcmj.com/pdf/ubcmj_3_2_2012_6-11.pdf, last accessed on March 19, 2014.

²⁰ Wong, S. (June 11, 2013). Walking or cycling to work linked to health benefits in India. http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_11-6-2013-10-39-44, last accessed on April 28, 2014. 28/04/2014>

²¹ Millett C, Agrawal S, Sullivan R, Vaz M, Kurpad A, et al. (2013) Associations between Active Travel to Work and Overweight, Hypertension, and Diabetes in India: A Cross-Sectional Study. *PLoS Med* 10(6): e1001459. doi:10.1371/journal.pmed.1001459, last accessed on April 28, 2014.

²² British Medical Association (1992). *Cycling: Towards Health and Safety*. Oxford: Oxford University Press.

²³ K Teschkea, C C Reynolds, F J Riesch, B Gougec, and M Wintersd (2012). “Bicycling: Health Risk or Benefit?”





BOX 2.5: CYCLING AND ENVIRONMENT

India is witnessing unprecedented levels of motorization. The massive increase in the use of two-wheelers and cars by the population to meet their mobility needs has brought along negative externalities—increase in vehicular pollution, dependence on fossil fuels, and GHG emissions. Not surprisingly, most of the large Indian cities having a very high share of personal vehicle use are amongst the most polluted cities in the world.

Given the increasing impact of growing motorization, it has become necessary to promote the use of cleaner modes of transport like walking, cycling, and public transport. Cycling, specifically offers several environmental benefits including no atmospheric pollution, no noise levels, and zero energy consumption. It is estimated that a 1% shift in distance undertaken by car to a non-motorized transport mode reduces energy consumption and pollution emissions by 2%–4%.²⁴

Various studies suggest that promoting bicycle use in urban areas can lead to a modal shift from cars to bicycles, and hence, a reduction in emissions and improved environmental conditions. Few studies and their main findings are discussed below.

In Bogota, the impact made by Cicloruta, the 340 km extensive cycle network connecting the city's BRT ("TransMilenio") routes, parks, and community centres was studied. From 2000 to 2007, the cumulative CO₂ emission reductions have been calculated as more than 36,000 tonne CO₂ eq, based on 7% of Cicloruta users leaving their cars at home, i.e., shifting from high to low-impact modes.²⁵

In a study undertaken by UNEP (2011), the impact of public transport and NMT related infrastructure development in three Indian cities namely Delhi, Patna, and Pune has been examined. Three different scenarios—improving only bus infrastructure, only NMT infrastructure, and both bus and NMT infrastructures—were developed and compared with the baseline scenario. With regard to NMT, the study brought forward the following.

- Improved NMT infrastructure in cities is likely to shift 30% of the trips shorter than 5 km from motorized two-wheelers (MTW), three-wheelers, and buses to NMT.
- Better NMT infrastructure in Pune resulted in reduced fuel consumption of gasoline by 3%, CNG by 22%, and diesel by 8% along with reduced CO₂ emissions by nearly 3%. Similarly, in Patna, the fuel consumption was reduced by 11% in gasoline and 7% in diesel along with reduced CO₂ emissions by 11%. About 55,000 kg of CO₂ reduction was also calculated in case of Delhi by improving NMT infrastructure.
- As per the analysis of the various scenarios under the study, maximum reduction in emissions is achieved when NMT infrastructure is improved along with bus infrastructure for all the three cities.

Source: UNEP (2013) NMT Infrastructure in India: Investment, Policy, and Design

that our cities and economy will not be able to handle the growing number of automobiles. There should be a sustained awareness campaign preferably through visual media along with nation-wide event on cycling, which are endorsed by politicians, celebrities, and people who can set an example for the common public.

Such awareness initiatives coupled with provision of cycling infrastructure can have a significant impact in terms of reducing health costs to the economy. In Denmark, e.g., it is estimated that the use of cycles as a result of such initiatives has helped the country save about €40 million annually on health care

²⁴ T Litman (2007). TDM Encyclopedia, Victoria Transport Policy Institute, www.vtpi.org/tdm/tdm12.htm, last accessed on May 13, 2014.

²⁵ "Share the Road: Investment in Walking and Cycling Road Infrastructure" UNEP, November 2010; <http://www.unep.org/transport/sharetheroad/PDF/SharetheRoadReportweb.pdf>, last accessed on May 14, 2014.

C40 Cities, Climate Leadership Group (2010) Best practices: Transport in Bogota, Colombia—Cycling System, www.c40cities.org/bestpractices/transport/bogota_cycling.jsp.





costs.²⁶ India, which is starting to experience the growing health and environmental costs due to increased use of motorized transport, needs

to look at cycling as a solution for eliminating negative externalities of current pattern of transport growth in the cities.

²⁶ <http://www.euractiv.com/health/bicycle-highway-projects-europe-news-518865>, last accessed on June 13, 2014.



3

Promoting growth and competitiveness of Indian bicycle industry

The previous chapters focused on the factors affecting the demand of bicycles/cycling and examined the key demand-side barriers that are leading to a decline in bicycle ownership and use. Specific recommendations on how to increase the demand for bicycles as a mode of transport for different commuter categories have been suggested in these chapters. This chapter shifts the focus to supply-side trends, i.e., growth trends witnessed by the Indian bicycle industry, as it is recognized that while it is critical to address the demand-side barriers, it is equally important to look at supply-side trends and preparedness for meeting the future domestic and export demand. The chapter focuses on providing an overview and analysis of the key trends witnessed in the Indian bicycle industry and suggests measures for higher growth and enhancing competitiveness.

Bicycle industry in India

The bicycle industry in India has been in existence since 1951 and has made a significant contribution to the Indian economy in terms of employment generation and contribution to the GDP. With a distinction of being the second

largest bicycle producing industry after China, the 1.5 billion USD¹ Indian bicycle industry produced nearly 15.5 million² bicycles in 2012–13, i.e., 10% of the total bicycles manufactured globally and employs about 1 million³ people in the country (Table 3.1).

The industry has been witnessing a slow growth in the demand for bicycles; the domestic demand of bicycles has been growing at a very moderate growth rate of 6% per annum, as is also reflected in the near stagnant growth in bicycle ownership discussed in the previous chapters. The demand in the domestic market is concentrated primarily in the entry-level/low-value (standard bicycles) and children segments and is highly price sensitive. The industry caters primarily to the domestic market and exports a very small share of about 5% to 7% of its annual production, primarily to the developing countries in Africa and South Asia. These exports, however, are also predominantly in the low-value product/standard segment and face stiff competition from bicycles manufactured in China. The domestic market is also starting to witness a competition from imported products in all segments and the industry faces real

¹ Estimate for size of industry in 2013 by ASSOCHAM (2014).

² Data provided by AICMA members.

³ ASSOCHAM (2014).





TABLE 3.1: Global Bicycle Industry: Share of countries in global supply and demand

Global Bicycle Supply	Global Bicycle Demand
China – 67%	China – 30%
India – 10%	Europe – 20%
Taiwan – 4%	America – 17%
Brazil – 4%	India – 10%
Germany – 2%	Japan – 9%
Japan – 1%	Taiwan – 1%
Others – 12%	Others – 13%

Source: Data provided by AICMA

challenges in terms of improving both its cost and quality competitiveness in order to survive successfully in the future.

Structure of bicycle industry in India

The bicycle industry in India has a two-tier structure wherein the production of bicycle components/parts occurs in small/medium-scale units and bicycles are assembled in large-scale units. The large-scale manufacturing companies belonging to the organized sector, manufacture bicycle frames, chains, and rims for captive consumption, in addition to carrying out bicycle assembly and production, whereas components, spares, and accessories are produced by the small/medium-scale units.⁴

In the large-scale manufacturing segment, the industry is dominated by four big companies—Hero Bicycles, TI Bicycles, Atlas Bicycles, and Avon Bicycles. These companies have a combined share of 88% in the total annual production of bicycles in the country, the remaining 12% being produced by comparatively much smaller and new players.

About 3,500–4,000 small and medium-scale units manufacturing bicycle components meet the needs of the large bicycle manufacturers.

BOX 3.1: CYCLE INDUSTRY IN PUNJAB

Punjab holds an 80% share in India’s production of bicycle parts. Ludhiana is the hub for bicycle manufacturing in India with over 40,000–50,000 cycles being manufactured every day (ASSOCHAM 2014). There are about 3,500 to 4,000 MSMEs in the city that make bicycle components and provide employment to about 0.5 million people located in the city.

Sources: UPCMA website and ASSOCHAM, 2014

These units, which depend mainly on unskilled and semi-skilled workers have grown over time in an unorganized and informal manner and are engaged largely in producing bicycle components and parts, such as pedals, chains, carriers, nuts and bolts, levers, tyres and tubes, spokes, axles, saddle, freewheel, hubs, bearings and mudguard, etc. Given the unorganized and small-scale nature of their production, which is dependent significantly on manual work and conventional technologies, this industry faces several challenges with regard to upgrading to more promising materials, special components/parts, automated assembly, and globally accepted testing facilities.

Industry trend analysis

Production capacity

In 2012–13, India produced nearly 15.5 million bicycles. Although production has dipped in the previous year, i.e., between 2012–13 and 2011–12, there has been a moderate average annual growth of 4% in bicycle production in the last five years. For the last five years, the industry exports nearly 5% to 7% of the domestically manufactured bicycles (Figure 3.1). As against the export trends, the imports of bicycles, predominantly from China, have been increasing rapidly; in 2012–13, India imported nearly 0.7 million bicycles.

⁴ http://nmcc.nic.in/pdf/LABOURINTENSITY_REPORT_I6 May2008.pdf, last accessed on January 12, 2014.





An important aspect of bicycle production capacity in India is the dominance of entry-level/low-value bicycles (i.e., bicycles having BDP < Rs 3,000), which constitute nearly 60% of the total production, followed by bicycles for children (35%), medium-value bicycles (Rs 3,000–6,000) which account for 4%, and high-value models (>Rs 6,000) which are less than 1%.⁵ This composition of different product segments in the production indicates that the domestic demand for bicycles is essentially concentrated in the low-income population and children segments—a user category that is highly price sensitive. A small increase in bicycle prices by the large manufacturers are also rejected by these user segments, who are ready to compromise on quality of bicycle for price considerations. Several new bicycle manufacturers, hereafter referred as new players, have created a niche for themselves in this segment by offering products at very competitive prices. These manufacturers, however, do not get their bicycles tested as per

the requirements of BIS standards for bicycles. This raises issues with regard to the quality (safety features) of their bicycles. The share of these new players in the production capacity has gradually increased and has reached the level of about 12% of the total production capacity in the country (Figure 3.2).

Bicycle sales

In 2012–13, about 12 million bicycles were sold in India. Growing with a moderate growth rate of about 6%, bicycle sales in the country are dominated by sales of entry-level/low-value models (60%) and bicycles for children (35%); remaining sales (5%) being in the medium value and high-value segments (Figure 3.3).

Analysis of spatial distribution of bicycle sales indicates that small towns and rural areas in the country have been witnessing faster growth and have a comparatively larger market for bicycles as compared to large urban areas (Figure 3.4).

Data of state-wise sales of three companies (HERO, TI, and AVON) indicates high growth of bicycle sales only in a few states, i.e., West Bengal, Uttar Pradesh, Bihar, Tamil Nadu, Karnataka, Assam, Kerala, and Chhattisgarh (Figure 3.5). All these states have government or foundations/

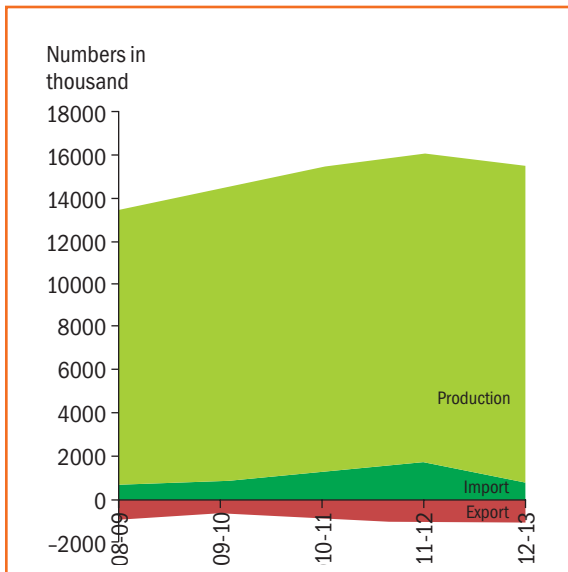


Figure 3.1: Bicycle production, exports, and imports

Source: Data provided by AICMA members; Director General of Commercial Intelligence and Statistics (DGCI&S).

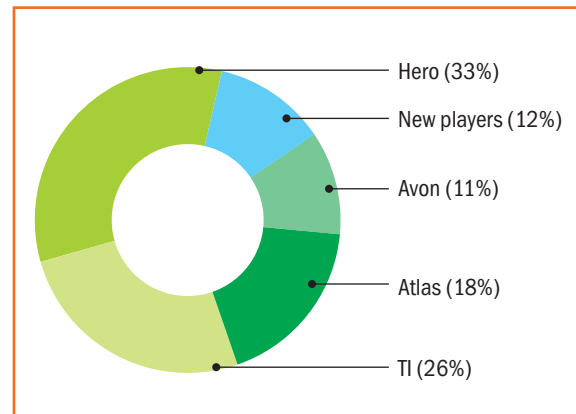


Figure 3.2: Share of companies in bicycle production (2012-13)

Source: Data provided by AICMA members

⁵ Data provided by AICMA members.



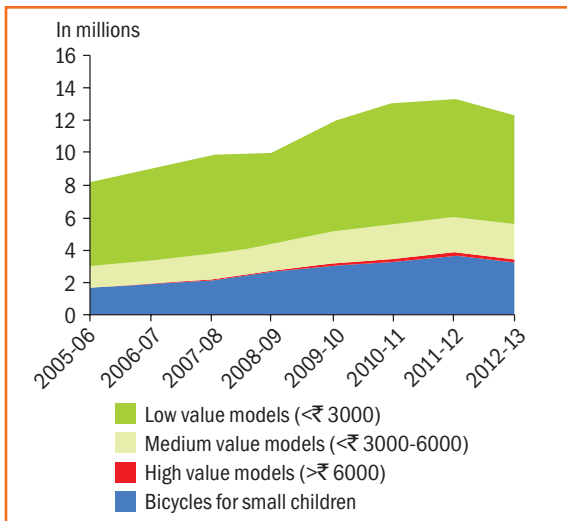


Figure 3.3: Product-wise bicycle sales
Source: Data provided by AICMA members

NGOs driven bicycle distribution schemes, which can be attributed for higher sales of bicycles in these states as compared to a near stagnant growth in bicycle sales in the remaining states. Some of these schemes are discussed in Box 3.2.

Exports and imports

As observed in Figure 3.1, the Indian bicycle industry largely caters to the domestic market and the level of exports by Indian manufacturers is quite low. Indian manufacturers export only about 5% to 7% of their annual production to two low-end (standard/children segments) markets, i.e., Africa and South Asia. 54% of the total exports in 2012–13 were directed for the African market,

BOX 3.2: SCHEMES FOR DISTRIBUTION OF FREE/SUBSIDIZED BICYCLES

Distribution of free/subsidized bicycles has become increasingly popular among the state governments over the last decade. Aimed primarily at addressing the issue of huge dropout rates after primary education, especially that of girls in rural areas, these schemes focus on incentivizing the students to continue secondary school education. The main objective of many of these free/subsidized bicycle distribution schemes is, therefore, to promote girl education by providing free/subsidized bicycles after a certain class to ensure school enrolment and retention among the schoolgoing girls. The schemes initially targeted only girls, however, with time many of the schemes have also been extended to include schoolgoing boys. A few of the popularly known schemes are discussed below.

Mukhyamantri Bicycle Yojna, Bihar: Started in the year 2006, the scheme focused on distribution of free bicycles to Class IX girl students. An amount of Rs 2,000 was given to school girls upon passing Class VIII, and on enrolment in Class IX, to buy a bicycle. Cash was awarded to avoid procedural delays and corruption issues. The scheme was a huge success and it helped in reducing the dropout rate of girl students from 25 lakh to 11 lakh in the first three years of the launch of the scheme.⁶ Later in 2010–11, the scheme was extended to include schoolboys as well.

Saraswati Bicycle Supply Scheme, Chhattisgarh: The scheme was started in 2004 by the state government. Under this scheme, bicycles are distributed free of cost to all SC/ST/BPL girl students who enrol in Class IX. Education and tribal welfare departments of the state are the nodal agencies responsible for effective execution of the bicycle distribution scheme.⁷

Free Bicycle Distribution Scheme, Karnataka: Free bicycle distribution scheme was also launched by the Government of Karnataka in the year 2006–07. Bicycles were freely distributed among the girl students who enrolled themselves in class VIII and belonged to BPL (Below Poverty Line) category. Later in the same year, the scheme was extended to include VIII class schoolboys as well.⁸

Apart from Bihar, Karnataka, and Chhattisgarh, Tamil Nadu, Assam, West Bengal, Kerala, and a few other states have also taken up similar schemes. These schemes have got an overwhelming response in almost all the states and have helped in reducing the dropout rates in schools, especially among girls, and consequently, narrowing the gender divide. Bicycles have, in fact, acted as an ‘agent of social change’ and have helped in raising the status of girls and bridging the gender divide to a great extent in rural India.

⁶ <http://nitishspeaks.blogspot.in/2010/04/mukhyamantri-balika-bicycle-yojna.html>, last accessed on April 18, 2014.

⁷ Evaluation Study of Saraswati bicycle Supply Scheme (Free) in Chhattisgarh (2012–13) by Midstream Marketing & Research (MMR), New Delhi.

⁸ http://www.schooleducation.kar.nic.in/Tenders/bibicycle_scheme_evaluation_tender_2011-12.pdf, last accessed on April 18, 2014.



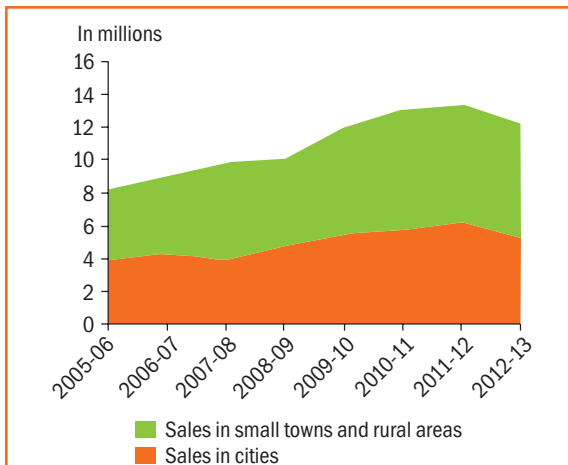


Figure 3.4: Area-wise bicycle sales
Source: Data provided by AICMA members

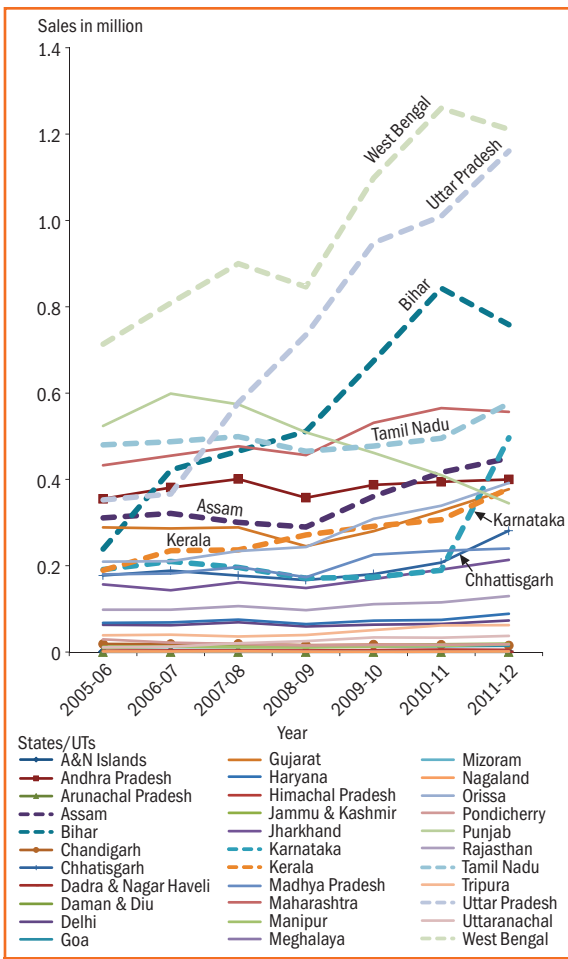


Figure 3.5: State-wise bicycle sales (Sales data for only HERO, TI, and AVON)
Source: Data provided by three cycle manufacturers (HERO, TI, and AVON)
Note: Sales data in the figure does not include bicycles for children

followed by South Asia (26%), Europe (14%) and other countries (6%) (Figure 3.6). The Indian manufacturers have an insignificant share in the global high- and medium-value bicycle exports, a segment dominated by Chinese and European bicycles.

While the exports have grown at an average rate of about 10% per annum in the last five years, India has imported bicycles at a much faster rate of about 25% per annum during the same period, primarily from China (Figure 3.7). Between 2007–08 and 2011–12, there was a 1.4 times increase in exports from 0.8 million to 1.1 million, as against 4 times increase in imports from 0.4 million to 1.7 million.⁹ The value of imports and exports in 2012–13 was about Rs 180 crore and Rs 250 crore, respectively (Figure 3.8).

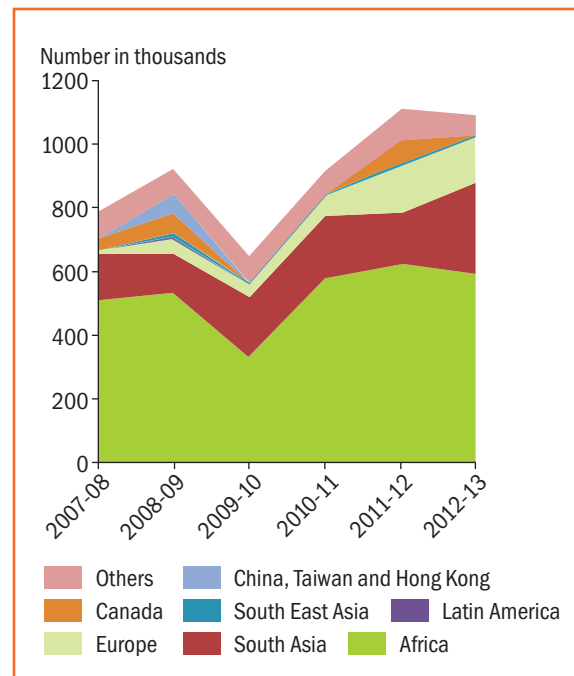


Figure 3.6: Exports of bicycles
Source: DGCI&S

⁹ Between 2011–12 and 2012–13, imports declined by 0.5 times and exports were nearly stagnant.



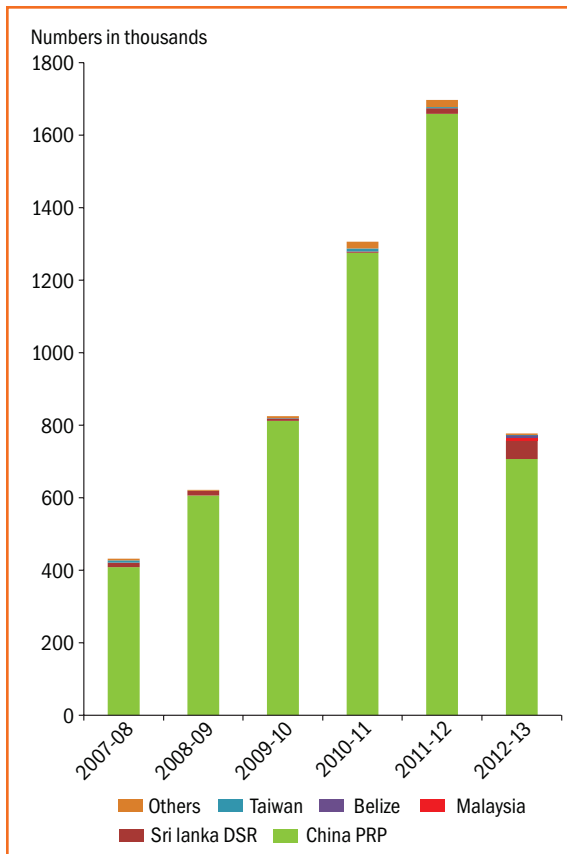


Figure 3.7: Imports of bicycles
Source: DGCI&S.

Key issues facing the bicycle industry

Globally, the Indian bicycle industry is the second largest industry in terms of production capacity. It, however, lags far behind the topmost global position as held by China in terms of production capacity, domestic sales, and exports (Table 3.2). As discussed in the previous sections, the industry is witnessing a very moderate growth in domestic sales (6% p.a.) and exports (10% p.a.), and a rapid growth in imports (25% p.a.). While the moderate demand of bicycles in the country can be linked to several factors as discussed in the previous chapters on bicycle

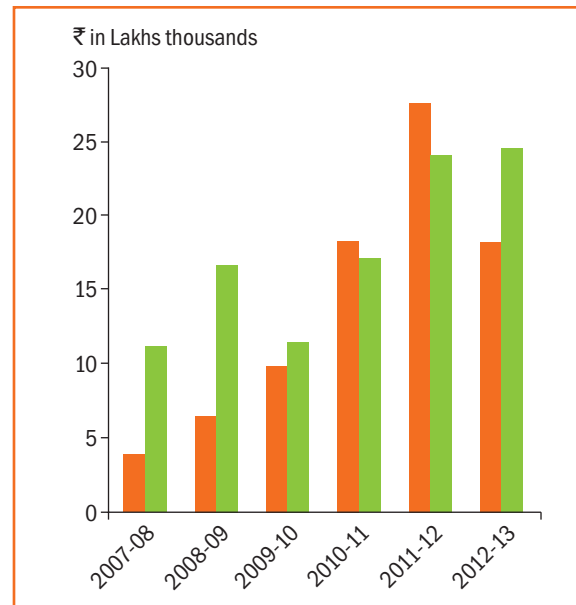


Figure 3.8: Value of bicycle exports and imports
Source: Data provided by AICMA members; DGCI&S

ownership and choice cycling, the inability of the domestic industry to capture domestic and export markets is linked to two major issues—the high price sensitivity of its user consumer segment and technology gaps across the value chain to produce bicycles for high-end domestic and export markets. These issues are discussed in detail in the following sections.

TABLE 3.2: Comparison—Bicycle industry of India versus China (2012–13)

	India	China
Production capacity	14 million	83 million
Domestic sales	12-13 million	26 million
Exports	1 million	57 million
Imports	1.7 million ¹⁰	NA
Industry size ¹¹	1.5 billion USD	8 billion USD
NA – Not available		
Source: Data provided by AICMA members		

¹⁰ As in 2011–12.

¹¹ ASSOCHAM (2014).





Technology gaps

Indian bicycle industry is facing technology-related challenges in both the entry-level and high-end product segments in domestic as well as export markets. The price sensitivity of consumers of low-value products, limits the technology upgradation of products in this segment and the issues related to the availability, prices, and manufacturing capability with regard to raw materials, components, and final product assembly, limit the ability of Indian manufacturers to manufacture high-end bicycles. The broad technology gaps faced by the industry in different product segments are discussed in Table 3.3. It can be observed that in the case of entry-level/low-value product segments, the material used is steel and the production technology involves significant manual inputs. In the case of premium bicycle segments, raw materials and components required are not manufactured domestically and have to be imported by the manufacturers, which leads to substantial increase in the cost, and hence, price disadvantage in the export market.

As is evident from Table 3.3, the following are the main technology gap areas for the domestic industry.

- **Raw materials:** Indian bicycle producers manufacture steel-based components and do not manufacture aluminium (alloy), carbon, and titanium-based components due to lack of availability of right specifications raw materials and their own lack of competence in dealing with these materials. For example, India is not able to produce 1 mm thickness Al tubes with seamless features, and currently, these tubes are being imported primarily from China for further assembly, in spite of the fact that India is one of the prominent producers of aluminium.
- **Special components:** India does not have the capability to produce derailleurs (rear and front), suspension forks, shifters, disk brakes, etc. These components are being imported from other countries. India also does not have the requisite components for electric-bicycles and is yet to make a beginning in this product segment.

The bicycle components/parts in India are made in small-scale manufacturing units with low-end and obsolete machinery. The component industry needs to upgrade its production technology in order to meet the future needs of domestic manufacturers.

S. No	Type of Market	Market Demand %	Raw Material		Special Components		Production Technology	
			Global	India	Global	India	Global	India
1	Mass Standard	53.45	Steel	Steel	-	NA	Robot-Based welding, automated assembly, high GR painting and exhaustive testing	Manual welding, manual assembly, conventional painting, and basic testing facilities
2	Mass Fancy	33.15	Al (Alloy)	Steel	Derailleurs, Suspension Fork, Disk Brake, Shifters, Dynamo, Reflectors, electric Drive unit	NA		
3	Mass Premium (*)	12.10	Carbon and Titanium	Not Yet have domestic production		Not Yet have domestic production		
4	Premium (*)	1.30						
5	Super Premium (*)	Almost Negligible						

Note :1 (*) Indian plants are currently importing Al (Aluminium alloy) tubes & special components from other countries, mostly China; NA – Not applicable
Source: Data provided by AICMA members





- **Production technology:** Indian plants practice manual welding and manual assembly as against international trend of robot-based welding and automated assembly. Also, Indian plants lag behind in painting technology and testing facilities, and are thus unable to produce international quality products. Indian plants need to switch over to world-class bicycle manufacturing technologies to be a leader like China in this segment.
- **Lack of R&D infrastructure for advanced bicycle technologies:** There is almost insignificant R&D infrastructure in the country for advanced technologies for bicycles.

There is an urgent need to derive concurrent lessons from China's technological transformation in bicycle R&D and manufacturing, especially in the area of materials and bicycle assembly, and its resultant global market penetration including supply of world-class bicycles to meet demand of high-end markets like USA and Japan. Box 3.3 provides an overview of China's bicycle market.

Quality Aspects: Product standards and testing facility

Bureau of Indian Standards (BIS) have prescribed technical standards for Indian bicycles, which are primarily adopted from the international standards prescribed by the International Organization for Standardization (ISO). The ISO standards have been taken as a national standard for bicycles by European countries¹² and many other countries outside Europe.¹³

A review of the ISO standards adopted for India indicates that these standards are in line with the European standards set by the European Standardization Committee (CEN) in terms of the requirements set for each of the bicycle components with a few exceptions. However, the European standards are more stringent than the Indian/ISO standards in terms of the testing methods for both bicycles as well as components. Interactions with industry players indicate that based on BIS as well as standards of other countries to which Indian

BOX 3.3: OVERVIEW OF CHINA'S BICYCLE MARKET

China, also known as the kingdom of bicycles, is the world's largest bicycle producer. In 2012, China produced nearly 83 million bicycles. Out of the total bicycles manufactured, nearly 57 million bicycles worth a total value of US\$ 3.18 billion were exported by China to the other countries. The United States, Japan, and Indonesia are the top three export countries, accounting for nearly 53.7% of the country's total exports. The other countries where Chinese bicycles are exported include Russia, Australia, Malaysia, Korea, Canada, India, and UAE. The ASEAN region is also an important bicycle export market for China, with nearly 8.1 million bicycles exported to ASEAN countries in 2012.

Apart from cycles, China also exports bicycle parts. In 2012, bicycle parts worth a total value of US\$ 2.21 billion were exported out of China which included frames, rims, spokes, chain wheels, pedals, etc. Bicycle parts are exported to various countries including Taiwan, Germany, Hong Kong, Brazil, Indonesia, Russia, Japan, Netherlands, Italy, etc.

China is also the leading e-bike (electric cycle) manufacturer in the world. In 2012, China produced 35.05 million e-bikes. Out of the total e-bikes manufactured, only 665,000 units were exported to countries like US, Netherlands, Germany, Japan, Brazil, Vietnam, Belgium, Indonesia, and UK; remaining e-bikes were consumed in the domestic market.

Source: Profile of the Chinese market, CBES 2013-14 (<http://biketaiwan.com/resource/article/6/157/article-03.pdf>, last accessed on April 22, 2014.)

¹² European standards for bicycles (CEN TC-333 norms).

¹³ <http://www.bike-eu.com/Laws-Regulations/Safety-standards/2013/4/New-International-Standard-in-Final-Stage-1157586W/>





producers are exporting, bicycle manufacturers are manufacturing bicycles of different standards to meet the requirements of different markets.

Indian manufacturers send their products for testing to the Research and Development Centre for Bicycle & Sewing Machine, Ludhiana (Punjab), which was established by the Punjab government with assistance from UNIDO/UNDP to provide testing facility for bicycles. The main objective of establishing the Centre was to create a facility that provided various technical facilities for uplifting the technology level of the small-scale industries.¹⁴ As the name suggests, the Centre currently deals in bicycles and sewing machines.

Interaction with the officials of the Centre reveals that in the segment of bicycles, the Centre serves as an open platform for innovation and provides multiple services like research facilities in design and development, consultancy services, testing and calibration facilities for full bicycles, sub-assemblies, as well as bicycle components, and many more related services. However, it is interesting to note that as per the bicycle manufacturers, the tests conducted/ certification provided by the Centre is not accepted in the European/US markets, which require far more stringent testing methods. Lack of domestic testing facility for bicycles, which is at par with the international facilities, has been identified as a critical bottleneck, as Indian manufacturers have to send their products for testing to international facilities like in Hong Kong to meet the test requirements of European/US markets. Upgradation/establishment of existing/new domestic testing facilities, hence, is critical in order to ensure quality testing, which is acceptable to international market. Such a testing facility should also get involved with the industry in innovative and futuristic R&D projects that can make the industry internationally competitive.

Issue of unsafe/low quality and imported products penetrating in domestic market

As stated earlier, several new small-scale players have emerged in the Indian market and have been assembling bicycles, which are sold at prices which compete effectively with the bicycles of large manufacturers. Given that majority of the existing cyclists in India fall in the captive group, there is a huge market for this rapidly growing informal bicycle industry. Despite the standards being prescribed by BIS for bicycle safety for all the products that go in the market, small-scale manufacturers generally do not send their products for testing. Therefore, there is requirement for having strict enforcement mechanism for ensuring adoption of standards by all the manufacturers including the small-scale manufacturers. The central government may also consider introducing mandatory “Quality Control Orders” for both imports and domestic bicycle production.

Indian market is also witnessing increasing penetration of imported bicycles, primarily from China. India imported nearly 1.7 million bicycles in 2011–12 despite a high import duty rate.¹⁵ Increasing imports from China are also finding way into India from Bangladesh and Sri Lanka, countries that enjoy low import duties in India under the South Asia Free Trade Agreement. Import duty on bicycles from these countries is about 6.4%¹⁶ as against duty of 30% on bicycles from China. Importing Chinese bicycles via Bangladesh and Sri Lanka is also lucrative given that the cost of Chinese bicycles is 15%–20% lower than the Indian products. Compliance of these imported products with the BIS standards is not being ensured and raises safety concerns. Increasing imports are also giving stiff competition to the Indian industry, which

¹⁴ http://bsrdindia.org/laboratory_testing_i.htm.

¹⁵ An imported cycle with cost, insurance, freight (CIF) price of Rs 10,000 in India would have an import duty component equivalent to Rs 4518.94 (~45%)

¹⁶ ASSOCHAM 2014





has experienced slow growth despite very fast growth in imports, which indicates that the increase in domestic demand is being captured gradually by the imports.

Issues related to export competitiveness

Technology gap and issue of import duty

As discussed earlier, the technology gaps related to raw materials, components, and production technology are the key barriers for the industry to be able to produce competitive products for the export markets like Europe and USA. Products of Indian manufacturers are hence concentrated primarily in countries with demand for products in low-value segment, while very limited exports are being made to the European market. The key components (complying with European standards), which are not available in India are listed below.

- Derailleurs (rear and front)
- Suspension fork
- Disk brake
- Shifters
- Dynamo
- Reflectors (K rating)
- Chain
- Coaster hubs
- Lighting systems
- For e-bikes—Electric Drive Unit (EDU), controller, and e-motor
- Aluminium components
- Carbon and titanium components
- Sophisticated rubber and plastic components

Import duty on the above-listed components is 20%.¹⁷ The import duty structure for bicycle components is discussed below.¹⁸

- Basic customs duty – 20%

- Countervailing duty (CVD) – 12%
- Additional CVD – 4%
- Education cess – 2%
- Secondary and Higher education cess – 1%
- Total duty – 40%

This duty structure implies that an imported component having a CIF¹⁹ value of Rs 1,000 will have an import duty of about Rs 400 (~40% of CIF value). Such high import duties on the components required for the export products make Indian manufacturers uncompetitive in the global market, especially in comparison to China, which has the domestic manufacturing capacity for these special components.

Issue of high freight cost

Another key concern with regard to export competitiveness is the high share of domestic freight cost in the total cost of the export bicycle price (CIF price). Given that a significant number of manufacturers are distantly located from the ports, primarily in Ludhiana, the domestic freight cost to the ports becomes significant in the export cost. Interestingly, the cost of domestic freight for export products is higher as compared to sea freight cost to countries in Europe. An example of cost break-up for an export product from Ludhiana to Germany is

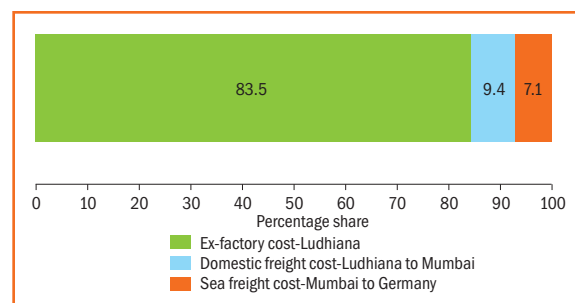


Figure 3.9: Exports from Ludhiana to Germany: Share of domestic and sea freight cost in CIF price at Germany

Source: Data provided by HERO Cycles

¹⁷ <http://www.cbec.gov.in/customs/cst2013-14/chap-87.pdf>, last accessed on June 13, 2014.

¹⁸ https://www.icegate.gov.in/Webappl/duty_details.jsp?cth=87149910&cntrycd=, last accessed on June 13, 2014.

¹⁹ CIF - Cost, insurance and freight price





given in Figure 3.9. The high share of domestic freight cost in India leads to price disadvantage for Indian manufacturers in the global market, especially in comparison with China, which gives freight subsidy to its industry.

Issue of high import duty for Indian products in European market

Between 2011–12 and 2012–13, there has been an overall decline in the exports by Indian manufacturers; even the exports to Africa, the most dominant export market for Indian bicycles, and limited exports to Europe have declined. This is being attributed by the industry to the capturing of global market of India by China and also by Bangladesh, Sri Lanka, and Vietnam. In Europe, Chinese manufacturers are able to export their bicycles via Bangladesh, Sri Lanka, and Vietnam, as these countries enjoy MFN status (0% duty) in Europe as compared to 10.5% import duty on Indian bicycles. Indian manufacturers can also adopt the same route to export their bicycles to Europe, but Indian bicycles, as discussed earlier, face the challenge of meeting European quality standards and are also unable to produce high-end bicycles demanded in the European market due to several constraints, as discussed in the section on technology gaps. In the low-value export segment also, the Indian manufacturers have started facing stiff competition from Chinese manufacturers, who have the advantage of low cost of capital, freight subsidy, lower energy cost, duty drawbacks, etc., leading to a lower production cost (around 15%–20%²⁰ lower) than India that gives them a comparative advantage in the African market.

Recommendations

During the last six decades, the Indian bicycle industry has grown in terms of volume and has been able to secure the distinction of being the second largest bicycle producing industry globally. The industry has been able to achieve this primarily by

employing the conventional bicycle manufacturing technologies. The use of conventional technologies and dependence on manual inputs, however, will have to change in the emerging domestic and global market scenario where the Indian bicycle industry is facing challenges from cheaper and superior bicycles of foreign producers both in the domestic and international markets. This, however, would happen gradually and would require policy, regulatory, financial, and infrastructure support by the government. Specific recommendations on how the bicycle industry's competitiveness can be improved are discussed below.

Technology upgradation/transfer support

As discussed earlier, there are several technological gaps that impede the Indian bicycle industry's ability to produce technologically advanced products that are at par with the global products. The Indian industry currently lacks both adequate technology to produce components or bicycles matching to global standards as well as the testing facilities to check the conformity of the Indian components or bicycles with the international standards. The industry faces this challenge across all its product segments for the domestic and export markets. Specifically, the inability of the Indian manufacturers to meet the European/US technical standards has adversely affected the export potential of the Indian bicycle industry to these high-end markets.

Apart from gearing up for the high end export market, the industry also needs to become competitive and meet the domestic needs of choice/high-end cyclists, who otherwise resort to imported brands to meet their requirements of a quality product. Given the significant contribution of the industry in the socio-economic development of the country and contribution of cycling as a mode of transport, it is important that government supports and promotes the industry

²⁰ ASSOCHAM (2014)





in increasing its productivity and its overall development. The industry needs to leapfrog in three vital areas, namely, advanced raw materials, special components and automated production technologies, for which it would be ideal if it can receive technology upgradation support, as was given to the textile industry (Box 3.4). This will be necessary for repositioning the industry, preventing it from stagnating, and ensuring that it is able to survive the stiff competition in the domestic and international markets.

The industry also needs dedicated attention from the government and a nodal agency to which it can represent its concerns on issues related to policies, regulations, export/import duties, etc. It is hence recommended that a dedicated cell in DIPP should be created to look into the challenges and requirements related to the growth of this industry.

Given the success of TUFS in the textile industry, it is strongly recommended that a similar **scheme is designed for the bicycle**

BOX 3.4: TECHNOLOGY UPGRADATION FUND SCHEME FOR THE TEXTILE INDUSTRY

The Indian textile industry contributes about 14% to the industrial production, 4% to the GDP, and 17% to the country's export earnings. It is also the second largest employment provider, after agriculture, offering direct employment to over 35 million people.²¹

Until 2004, the world trade in textiles and garments was governed by the Multi-Fibre Agreement (MFA). Approximately three-quarters of Indian textile exports were destined to countries, which imposes restrictions under Multi-Fibre Agreement (MFA).²² Phasing out of MFA in 2005 led to the removal of the Indian quota to the other countries and brought in global competition not only in the international market but also in the domestic market. This, however, also brought along a huge opportunity in terms of enormous potential for the expansion of Indian textile exports in the global market. Realization of this potential, however, required modernization and technology upgradation of the textile industry as the industry had been suffering from technology obsolescence and lack of economies of scale.

To address the challenges faced by the industry and make it more competitive in the global market, the Ministry of Textiles, Government of India, launched a Technology Upgradation Fund Scheme (TUFS). The scheme was first launched on April 1, 1999 for a period of 5 years, and was subsequently extended up to 2007. This Scheme aims at making funds available to the domestic textile industry for technology upgradation of existing units as well as to set up new units with state-of-the-art technology so that its viability and competitiveness in the domestic as well as international markets may enhance.²³ To ensure investments in the low focus areas and balanced growth across the value chain, the scheme was restructured w.e.f. 28.4.2011 and was approved up to 31.03.2012.

The Scheme provides capital to the existing as well as new units for modernization and technology upgradation at international interest rates. There is no upper limit on the amount of funding under TUFS. However, the technology levels are benchmarked in terms of specified machinery. Segments such as spinning, cotton ginning and pressing, silk reeling and twisting wool scouring, combing and carpet industry, synthetic filament yarn texturizing, crimping and twisting, Viscose Filament Yarn (VFY)/Viscose Staple Fibre (VSF), weaving/knitting, fabric embroidery, and technical textiles including non-wovens, garment, design studio, made-up manufacturing, processing of fibres, yarns, fabrics, garments and made-ups, and the jute industry are eligible to avail subsidy under this Scheme for their technology upgradation requirements. Investments in common infrastructure or facilities by an industry association, trust, or co-operative society and other investments specified are also eligible for funding under the scheme.

²¹ Thamotharan, G; Technology upgradation fund scheme for textile growth. <http://www.fibre2fashion.com/industry-article/4/351/technology-upgradation-fund-scheme-for-textile-growth1.asp>, last accessed on January 3, 2014.

²² <http://www.eximbankindia.org.in/old/techno-up.html>, last accessed on January 15, 2014.

²³ http://www.ministryoftextiles.gov.in/faq/faq_tuf.pdf, last accessed on December 23, 2013.





BOX 3.4: CONTD...

It is to be noted that government funding under the Scheme is only limited to interest reimbursement or capital/margin money subsidy on technology upgradation projects corresponding to eligibility criteria laid under the Scheme.

Benefits under TUFS

- 5% reimbursement of the normal interest charged by the lending agency on rupee term loan (RTL); or
- Coverage of 5% exchange fluctuation (interest and repayment) from the base rate on foreign currency loan (FCL); or
- 15% credit linked capital subsidy for the SSI textile and jute sector; or
- 20% credit linked capital subsidy for the power loom sector; or
- 5% interest reimbursement, plus 10% capital subsidy, for specified processing machinery.
- 25% capital subsidy on purchase of the new machinery and equipment for pre-loom and post-loom operations, handlooms/upgradation of handlooms and testing and quality control equipment, for handloom production units.

Source: G Thamocharan; Technology upgradation fund scheme for textile growth

A wide network of financial institutions (comprising three nodal agencies, 36 nodal banks, and 108 co-opted primary lending institutions or PLIs) has been created for sanction and disbursement of government funds to the industry. Loans under the scheme are extended by the nodal agencies/co-opted institutions to the identified segments of the industry for the projects in conformity with the scheme and financial norms of the financial institutions concerned.²⁴

The Scheme saw limited success in its initial years and only picked up post 2004–05. The investments done in the textile sector under the scheme have helped in overcoming the technological disadvantage faced by the industry to a certain extent. An independent evaluation of the Scheme by a professional consultant, M/S CRISIL, has revealed that TUFS has facilitated an increase in productivity; cost and waste reduction; and improved quality across the value chain.²⁵ Till date, an overall investment of more than Rs 2,10,000 crore has been brought in the textile sector under the Scheme. The Scheme has significantly helped the industry evolve from being a “quantitatively restricted textiles trade” to “market-driven global merchandise”.²⁶

industry to provide support to component manufacturers and bicycle manufacturers to upgrade to advanced technologies that will help them become competitive (in both price and quality) in the domestic and global markets. Learning from the success of the TUFS in the textile industry, a similar **Cycle industry Upgradation Fund Scheme (CUFS)** can be established; the guiding principles for such a scheme for the bicycle industry are suggested below.

- Beneficiaries:
 - Small and medium-scale component/parts manufacturer units
 - Large OEM units involved in final product manufacturing

Conditional requirement—All recipients of components/products manufacturing units under CUFS shall adhere to the BIS standards.

- Both existing and new units shall be eligible for CUFS support

²⁴ Ibid

²⁵ http://www.ministryoftextiles.gov.in/faq/faq_tuf.pdf

²⁶ http://www.ministryoftextiles.gov.in/faq/faq_tuf.pdf





- Existing units will get support for technology upgradation
 - New units will get support for setting up state-of-the-art technology that enhances the competitiveness in the domestic as well as international markets
- Type of support:
 - Interest reimbursement
 - Capital/margin money subsidy on technology upgradation projects
 - Reimbursement of license fee for technology transfer
 - There should be no upper limit on the amount of funding/support under CUFS provided that the technology levels are benchmarked in terms of specified machinery.
 - Industry Association expects this initiative to be taken up by the concerned administrative department of the Government of India, i.e., DIPP.
 - Nodal financial institutions should be identified for sanction and disbursement of funds.

In addition to the technology upgradation support from government, several other measures, as discussed below, would be required for technological advancement of the industry.

Indigenous production of advanced raw materials

As discussed earlier, Indian industry suffers due to lack of availability of aluminium, carbon, and titanium components. It is recommended that the concerned administrative ministries should facilitate indigenous production of these critical materials (according to the requirements of the bicycle industry) for which the industry is otherwise dependent on imports. It should be noted that there would have to be adequate demand for these materials in the domestic market for the concerned agencies like National Aluminium Company Ltd. (NALCO) to invest

in the production of these materials. Bicycle industry should provide a clear estimate of present and future demand of these materials to the concerned ministries to enable them to take decision regarding investment in these materials.

Technology transfer

An appropriate technology transfer mechanism needs to be established by the concerned administrative ministry in order to facilitate technology transfer for both bicycle components and bicycles. Additionally, incentives should be designed to encourage foreign investors to collaborate with Indian manufacturers.

Establishing state-of-the-art bicycle R&D and testing facilities

As discussed earlier, lack of adequate testing facilities within the country and non-acceptance of technical tests conducted by the sole Indian testing agency in Ludhiana by the European and other high-end export markets indicate an urgent need to upgrade the existing facility and also establish new testing facilities in the country that are at par with the international requirements.

As a first and foremost step, the existing bicycle research and testing facility in Ludhiana should be upgraded to meet international standards and requirements for testing. To begin with, the Centre should be provided with a one-time grant to upgrade its facilities. Recurring support from the government should also be considered to ensure continuous upgradation of the Centre. Most importantly, the Centre should get support from all the key stakeholders, i.e., the Central and the concerned state governments and the industry like in case of automobile sector where state-of-the-art facilities for R&D and testing of automobiles have been set up by the government and industry partnerships (Box 3.5). The Centre should have a Governing Council comprising





members of all stakeholders including industry for its real-time existence and contribution.

Centres similar to Ludhiana should also be established in a few other locations where bicycle manufacturers are concentrated. These Centres should be required to widen their scope of work beyond testing and certification and should be required to take up innovative R&D projects in collaboration with the industry and should get involved in incremental research. It is also important that these Centres keep abreast with international developments and get regular international exposure. These Centres should eventually become knowledge centres for the industry and should lead in:

- Testing and certification
- Process/incremental R&D in collaboration with the industry
- Creating and managing knowledge repository (national and international) related to the bicycle industry

It is also recommended that all these Centres along with the BIS must keep abreast with international standards and testing requirements for bicycles and its components so that the Indian standards and testing methods are at par with the international standards, specifically that of the European and US markets.

BOX 3.5: CASE OF MOTOR VEHICLES – SAFETY STANDARDS AND VEHICLE TESTING

Under the Rule 126 of Central Motor Vehicles Rules (CMVR) 1989, every manufacturer of motor vehicles and their components is mandated to submit a prototype of the vehicle to be manufactured for test by any of the below listed testing agencies. If the prototype is approved, a certificate is issued by that agency indicating compliance of provisions of the Act and Rules. Six institutes have been authorized by the central government for testing and type approval of motor vehicles as listed in the table below.

Table: Safety standards and testing facilities—automobile industry	
	Automobiles
Jurisdiction	Central Government
Acts/Rules	Motor Vehicles Act, 1989 Central Motor Vehicles Rules (CMVR), 1989
Safety Standards	CMVR—Technical Standing Committee Automotive Industry Standards Committee (AISC) Bureau of Indian Standards (BIS)
Testing and vehicle certification agencies	Automotive Research Association of India (ARAI), Pune Vehicle Research and Development Establishment (VRDE), Ahmednagar, Central Farm Machinery Testing and Training Institute (CFMTTI), Budni (MP) Indian Institute of Petroleum (IIP), Dehradun Central Institute of Road Transport (CIRT), Pune International Centre for Automotive Technology (ICAT), Manesar

Majority of the above-listed institutes are supported directly or indirectly by the government and are established in partnership with the industry. ARAI, for instance, was established in collaboration between Ministry of Industries, the Government of India, and the automotive industry. Similarly, ICAT is a centre under the National Automotive Testing and R&D Infrastructure Project (NATRiP), an initiative between the Government of India, a number of state governments, and Indian automotive industry to create a state-of-the-art Testing, Validation, and R&D infrastructure in the country.





Monitoring mechanism to ensure adherence of safety standards by manufacturers

Poor implementation of bicycle safety standards is one of the major concerns in the bicycle industry. Currently, there is no monitoring mechanism to check whether all the manufacturers, especially, small-scale informal players get their components tested and certified before sending them out in the market. As a result, there are a large number of uncertified/unsafe bicycles being sold/used on Indian roads which compromises the safety of the cyclists. Regulations should be put in place to ensure that no components/bicycles are sold in the market unless they are tested for safety. It is equally important to establish institutional machinery to implement these regulations.

Enhancing export competitiveness of the industry

Reducing import duty on components/parts

As discussed earlier, for the export quality/high-end bicycles, Indian manufacturers are importing special components/parts that are not available in India. This leads to cost disadvantage for the industry in the export market.

While the industry is planning for the indigenous production of these materials/components in three to five years' time and which can be supported by a technology upgradation scheme as recommended earlier, there is a need for short-term support to the industry for import of these components. As discussed earlier, these components having a basic import duty of 20%, end up being 40% expensive as compared to their landed cost in India, hence affecting the competitiveness of the industry. It is hence important that a short-term support of three to five years is provided to the industry by reducing import duty on these components/parts that are specific to high-end bicycles and that are not manufactured by the domestic component

industry. This support should be provided without withdrawing the benefit of export duty drawback that is being given to the industry currently. While such a support is provided, the industry should be simultaneously pushed to start investing in indigenous production. This should, hence, be only a short-term support with an overall goal of promoting indigenous production of components in the long term. Specific categories for which import duty should be reduced are listed below.

- Derailleurs (rear and front)
- Suspension fork
- Disk brake
- Shifters
- Dynamo
- Reflectors (K rating)
- Chain
- Coaster hubs
- Lighting systems
- For e-bikes — Electric Drive Unit (EDU), controller, and e-motor
- Aluminium components
- Carbon and titanium components
- Sophisticated rubber and plastic components

(In order to protect the domestic component industry, it should be ensured that import duty reduction is applicable only on components required for export quality bicycles and that are not manufactured in India.)

Freight subsidy for domestic freight

As discussed earlier, high share of domestic freight cost in export-bound bicycles is a disadvantage for the industry. Government should consider giving freight subsidy to the industry at least towards the domestic freight costs, as this would enhance the competitiveness of the industry in the global market.

Negotiating import duty on Indian bicycles in Europe

As discussed in the previous sections, high import duty in Europe (10.5%) for Indian bicycles as compared to 0% import duty on





bicycles imported from Bangladesh, Sri Lanka, and Vietnam has led to a decline in the demand for Indian bicycles in European market; Chinese bicycles are exported to Europe via these countries. It is recommended that the Indian

government considers negotiating reduction in this import duty in order to ensure that Indian export market in Europe is not affected by such distortions in import duty structures.







References

- Aga Khan Foundation. Scholarships and Financial Assistance Schemes for School Education in India: A compilation of schemes and incentives offered by the Government of India and seven State Governments (Andhra Pradesh, Bihar, Delhi, Gujarat, Maharashtra, Rajasthan, and Uttar Pradesh). New Delhi: Aga Khan Foundation, 2010. Available at: http://www.akdn.org/publications/2010_AKF_India_Scholarship_Directory.pdf
- Bike Market. *Special Reports, The China Market: Primed for Growth*. Bike Market/CBES 2013-2014, 2014. Available at: <http://www.biketaiwan.com/resource/article/6/157/article-04.pdf>
- CAI-Asia. "Non-motorized Transportation: Introduction to Cycling in Asia", Pasig, Philippines: CAI-Asia Factsheet No. 26. October 12, 2010.
- Dimitriou, H T and R Gakenheimer. *Urban Transport in the Developing World: A Handbook of Policy and Practice* (Google eBook). 2011. Available at: <http://books.google.co.in/books?id=09kM2SfGTwsC&printsec=frontcover#v=onepage&q&f=false>
- Gadgil, R. "Review of Twelfth Plan Proposals for Urban Transport, Review of Urban Affairs", *Economic and Political Weekly (EPW)*, 68: 48, November 30, 2013.
- Ghatak, Maitreesh, Chinmaya Kumar, and Sandip Mitra. *Cash Versus Kind: Understanding the Preferences of the Bicycle-programme Beneficiaries in Bihar*. London: International Growth Center, 2013.
- Gol. Census of India. New Delhi: India, 2001.
- Gol. Census of India. New Delhi: India. 2011.
- Government of Chhattisgarh. State Council for Educational Research and Training (SCERT), Evaluation Study of Saraswati Bicycle Supply Scheme (Free) in Chhattisgarh 2013. Raipur: Chhattisgarh, 2013.
- Government of Karnataka. A Critical Study of Secondary and Pre-University Sectors in Karnataka.
- Karnataka Evaluation Authority Department of Planning, Program Monitoring and Statistics, September 2012; Available at: <http://www.karnataka.gov.in/keabangalore/evaluations/external-evaluations/CriticalStudy-SecondaryEducationinKarnatakaState.pdf>
- Kumar, Nitish. Mukhyamantri Balika Cycle Yojna, 2010. Available at: <http://nitishspeaks.blogspot.com/2010/04/mukhyamantri-balika-cycle-yojna.html>
- LTA. "Passenger Transport Mode Shares in World Cities", *Journeys*, November 2011: 60–70. Singapore: Land Transport Authority (LTA) Academy. Available at: <http://ltaacademy.gov.sg/doc/11Nov-p60PassengerTransportModeSHares.pdf>; accessed on January 24, 2014.
- McKinsey Global Institute. *The 'Bird of Gold': The Rise of India's Consumer Market*. McKinsey Global Institute, 2007.
- Ministry of Finance. Economic Survey. New Delhi: Government of India, 2013
- MoRTH. Road Accident Statistics, 2012. New Delhi : Ministry of Road Transport and Highways (MoRTH), Transport Research Wing, Government of India, 2013.
- MoRTH. Road Accident Statistics. New Delhi : Ministry of Road Transport and Highways (MoRTH), Transport Research Wing, Government of India, Various years.





- MoSPI. Statement: Per Capita Net State Domestic Product at Current Prices, as on 01-03-2012. New Delhi: Ministry of Statistics and Programme Implementation (MoSPI), 2012. Available at: http://mospi.nic.in/Mospi_New/upload/State_wise_SDP_2004-05_14mar12.pdf
- MoUD and WSA. Study on Traffic and Transportation Policies and Strategies in Urban Areas in India. Ministry of Urban Development. New Delhi, India: Prepared by Wilbur Smith Associates (WSA) for Ministry of Urban Development (MoUD), 2008.
- MoPNG. 2013. Indian Petroleum & Natural Gas Statistics 2012-13
New Delhi: Government of India, Ministry of Petroleum and Natural Gas (MoPNG), Economic Division, 175 pp
- Muralidharan, K and N Prakash. "Cycling to School: Increasing Secondary School Enrollment for Girls in India". 2013. National Bureau of Economic Research (NBER) Working Paper Series, Working Paper 19305. Available at: <http://www.nber.org/papers/w19305>
- National Bureau of Statistics China. Annual Data for the year 2007. China: China Statistics Press, 2007. Available at: <http://www.stats.gov.cn/english/Statisticaldata/AnnualData/>
- National Bureau of Statistics China. Annual Data for the year 2010. China: China Statistics Press, 2010. Available at: <http://www.stats.gov.cn/english/Statisticaldata/AnnualData/>
- NCRB. Accidental Deaths and Suicides in India. Delhi: National Crime Records Bureau, Ministry of Home Affairs, Government of India, Various years.
- NCRB. Accidental Deaths and Suicides in India. New Delhi: National Crime Records Bureau (NCRB), Ministry of Home Affairs, Government of India, 2011.
- NCRB. Accidental Deaths and Suicides in India. New Delhi: National Crime Records Bureau (NCRB), Ministry of Home Affairs, Government of India, 2012.
- NUTP. *National Urban Transport Policy*. New Delhi: Ministry of Urban Development, Government of India, 2006.
- Ravinder, K, S A Jalihal, and T S Reddy. "Traffic characteristics of India", *Proceedings of the Eastern Asia Society for Transportation Studies*, edited by K. Satoh, Japan, Tokyo: Eastern Asia Society for Transportation Studies, 5: 1009–1024, 2005.
- Schneider, R J. Theory of Routine Mode Choice Decisions: An Operational Framework to Increase Sustainable Transportation, *Transport Policy*, 25: 128–37, January 2013. <http://dx.doi.org/10.1016/j.tranpol.2012.10.007>
- Shaheen, S, H Zhang, E Martin, and S Guzman. "China's Hangzhou Public Bicycle Understanding Early Adoption and Behavioural — Response to Bikesharing", *Transportation Research Record: Journal of the Transportation Research Board*, 2247: 33–41, Washington D.C.: Transportation Research Board of the National Academies, 2011. Available at: http://76.12.4.249/artman2/uploads/1/China___s_Hangzhou_Public_Bicycle.pdf
- Sharma, A. "Do You Know How a Newspaper Reaches You?" A Case Study of Newspaper Circulation in New Delhi (CCS Working Paper No. 253). New Delhi: Centre for Civil Society, 2011.
- SMC. Comprehensive Mobility Plan of Surat. Surat, Gujarat, India: Surat Municipal Corporation, 2006.
- Sundar, S and A T Ghate. "Accidents and Road Safety : Not High on the Government's Agenda", Mumbai: *Economic and Political Weekly (EPW)*, 2013.
- The Netherlands. "Cycling in the Netherlands". Published by Ministry of Transport, Public Works, and Water Management, The Netherlands and Expertise Centre for Cycling Policy, 2009. Available at: <http://www.fietsberaad.nl/library/repository/bestanden/CyclingintheNetherlands2009.pdf>
- Tiwari, G and H Jain. "Discrete Route Choice Model for Bicyclists in Pune, India", *Urban Transport Journal*, 9 (2): 4–12, 2010.
- United Cycle and Parts Manufacturers Association. <http://www.ucpma.net/index.html>, last accessed on June 12, 2014.
- UNEP. NMT Infrastructure in India: Investment, Policy, and Design. Available at http://www.unep.org/Transport/lowcarbon/Pdf%27s/NMTInfrastructure_India.pdf
- UNEP, 2013. Director General of Commercial Intelligence and Statistics (DGCI&S). <http://www.dgciskol.nic.in/>, last accessed on June 12, 2014.





Annex 2.1:

Urban road cross-sections provided in the IRC codes (IRC 86:1983) and UDPFI guidelines



Source: Geometric Design Standards for Urban Roads in Plains (IRC 86:1983)





Annex 2.2:

Traffic levels in Indian cities indicate the need for provision of cycle tracks in accordance with the IRC codes/UDPFI Guidelines

The IRC code for Geometric Design Standards for Urban Roads implies that segregated cycle tracks should be built on roads in case the motor vehicle traffic is more than 200 vehicles per hour even if the cycle traffic is only 100 cycles per hour. The analysis of peak hour traffic across different Indian cities shows that at most of the locations the number of motorized vehicles is

more than 200 and the number of cycles on the same location exceeds the count of 100 cycles. The following table shows the analysis of peak hour traffic volumes in three cities, namely, Pune, Jalandhar, and Faridabad for which the required data could be collected from various secondary sources.

Peak hour traffic volume on roads in a few cities				
City	Locations with high traffic in the city	Traffic data used to derive hourly traffic	Hourly traffic	
			No. of motorized vehicles	No. of cycles
Pune*	ROB near Sancheti hospital	Average hourly traffic (assessed by dividing the 12 hour traffic by 12)	5746	316
	ROB near Koregaon park		6475	108
	Yerwada bridge		9923	502
	Sangam bridge		8962	210
Jalandhar	Midblock—Mahavir Marg (Direction—Guru Nanak Mission Chowk to Ambedkar Chowk)	Average hourly traffic (assessed by dividing the 12 hour traffic by 12)	2280	465
	Midblock—Mahavir Marg (Direction—Ambedkar chowk to Guru Nanak Mission Chowk)		2255	436
	GT road (Direction—BSF Chowk to BMC Chowk)		1692	275
	GT road (Direction—BMC Chowk to BSF Chowk)		1797	322
Faridabad	Mathura road (Direction—Delhi to Faridabad)	Average hourly traffic (assessed by dividing the 7 hour traffic by 7)	1985	187
	Mathura road (Direction—Faridabad to Delhi)		2139	149
	Pul Prahaladpur road (Direction—MB road to Faridabad)		1433	112
	Pul Prahaladpur road (Direction—Faridabad to MB road)		1931	152

Sources:
Pune Municipal Corporation, Pune CMP, 2008, <http://www.punecorporation.org/pmcwebn/Mobility%20Plan.aspx>
RITES Survey, April 2006 in Comprehensive Mobility Plan for Jalandhar; <http://jda.gov.in/wp-content/uploads/2013/05/reportfinal2.pdf>
Department of Town and Country Planning, Haryana, City mobility plan for Faridabad, Ballabgarh Complex, 2010.





Annex 2.3:

Cycle tracks in Pune, Chandigarh, and Noida: Are they being really used by cyclists?

Pune: Poor quality cycling infrastructure discourages cycling

Background

Pune was once known as the cycling city of India,¹ as the city started planning for cycle infrastructure soon after Independence. The City Development Plan, 1966 proposed to develop cycle infrastructure in the city. The Development Plan of 1987 also proposed to develop a network of cycle tracks and cycle only bridges across the city. However, currently, the situation of the cycling infrastructure is dismal in the city.

Current development

As per the official records, the Pune Municipal Corporation (PMC) has developed 20 cycle tracks, extending to a total length of 132 km.² Despite the presence of 132km cycle tracks in the city, the number of cyclists in the city has remained rather low.

Issues with the current cycle network

A survey by the city-based civil society organization called, Parisar, reveals that the

key reason for low usage of the existing cycle infrastructure is the poor quality of cycling infrastructure in the city. The surveys by Parisar bring forward that 45km length of the 132km bicycle tracks are in an unusable state, hence, the city is left with only 87km of cycle network. Of the 87km, 30km is the length of missing links. This leaves the city with a meagre 57km of cycle tracks. This length of cycle tracks has numerous obstructions and lack continuity. The poor surface quality of the cycle tracks lead to low quality of cycling experience. The prime objective of developing cycle tracks is to ensure safety to the cyclists. However, violations like use of cycle tracks by motorized vehicles seriously threaten the



Photo 1: Use of cycle track by motorist

Source: <http://www.mid-day.com/news/2012/jun/060612-Pune-News-Unusable-cycle-tracks-in-Pune-puncture-cyclists-enthusiasm.htm>

¹ Tiwari G, Jain H, Discrete Route Choice Model for Bicyclists in Pune, India, IUT Journal, Vol. 9, No. 2, Dec 2010; available at: http://tripp.iitd.ernet.in/publications/paper/planning/discrete%20route_himani_IUT2010.pdf

² 'Unusable cycle tracks in Pune puncture cyclists' enthusiasm', Mid-day, Jun 3, 2012, Available at: <http://www.mid-day.com/news/2012/jun/060612-Pune-News-Unusable-cycle-tracks-in-Pune-puncture-cyclists-enthusiasm.htm>





Photo 2: Poor maintenance of cycle track
Source: <http://www.mid-day.com/news/2012/jun/060612-Pune-News-Unusable-cycle-tracks-in-Pune-puncture-cyclists-enthusiasm.htm>



Photo 3: Obstruction on cycle track
Source: <http://www.mid-day.com/news/2012/jun/060612-Pune-News-Unusable-cycle-tracks-in-Pune-puncture-cyclists-enthusiasm.htm>

safety of cyclists, and hence, discourage people from taking to cycling.

Chandigarh

The city of Chandigarh is one of the few cities in India having provision for movement of cyclists throughout the city in the Master Plan. It was planned that the city would have a network of dedicated cycle tracks in the form of V-8s, across the city for convenient movement of cyclists. The city has started building the cycling infrastructure

between 2001 and 2003 when 160 km of cycle tracks were built. In a recent development, the city has finalized a proposal which would ensure safe cycling environment in the city. The city has proposed to construct cycle underpasses at major intersections in the city.³ This measure would provide seamless connectivity to the cyclists.

State of cycling infrastructure

The existing cycling infrastructure in the city is in a poor state. The cycle tracks are poorly maintained and, pot holes, etc., pose risk of accidents to the cyclists. The cycle tracks do not even have facility of street lighting, making the tracks vulnerable to unsocial activities. There are also enforcement issues, and the cycle tracks are used by the local residents as parking lots for their vehicles. At times, these cycle tracks are also used by motorists, posing a serious safety threat to the cyclists. As per a city-based NGO, called Yuvsatta, there are also design issues with the cycle tracks in Chandigarh. The cycle tracks start and terminate at intersections, which forces the cyclists to enter the high speed motorized traffic stream at the intersections.⁴ Lack of facilities for cyclists, such as cycle parking and integration of



Photo 4: Parking of vehicles on cycle track
Source: <http://www.tribuneindia.com/2013/20131006/cth1.htm>

³ "Now, cycle underpasses for main roads", *Times of India* Chandigarh, October 19, 2013, http://articles.timesofindia.indiatimes.com/2013-10-19/chandigarh/43199134_1_cycle-track-main-roads-underpasses.

⁴ "Cyclists' safety goes off track Stretches meant for peddlers damaged, unlit, encroached upon by four-wheelers", *Chandigarh Tribune*, October 6, 2013, <http://www.tribuneindia.com/2013/20131006/cth1.htm>, last accessed on October 18, 2013.



cycling network with other modes of transport are some of the other critical issues due to which cycling has not been popular in the city.

NOIDA

The city of Noida has been going forward with building of bicycle infrastructure. As per information in the newspaper, 20km of cycle tracks have been planned for the city.⁵ Currently, five cycle tracks have been constructed in the city along the arterial roads, measuring 3km in length.⁶ However, poor enforcement has rendered these cycle tracks unusable. Obstructions by street furniture, lack of continuity, unavailability of cycle parking are some issues which discourage cyclists from using the cycle tracks. But the major problem has been identified as the encroachment of cycle tracks by illegal parking and commercial property users (mostly temporary in nature).⁷ It has also been observed that motorists use the cycle tracks, forcing cyclists to use the carriageway.



Photo 4: Encroachment of cycle track by parked vehicles in Noida

Source: <http://www.dailymail.co.uk/indiahome/indianews/article-2309541/Akhileshs-bright-bike-idea-falls-flat-Noida-thanks-poor-cycle-track-maintenance.html#ixzz2lpOhvoxS>

⁵ "Pedaller's delight: Cycle tracks planned in Noida", *Times of India* Noida, August 10, 2012, http://articles.timesofindia.indiatimes.com/2012-08-10/noida/33136800_1_noida-stadium-noida-greater-noida-expressway-construction-work, last accessed on October 18, 2013.

⁶ "Cycle tracks not for cyclists", *Dainik Jagran City Plus*, August 10, 2013, http://cityplus.jagran.com/city-news/cycle-tracks-not-for-cyclists_1376124621.html, last accessed on October 18, 2013.

⁷ Akhilesh's bright bike idea falls flat in Noida thanks to poor cycle track maintenance, *Mail Online India*, April 15, 2013; <http://www.dailymail.co.uk/indiahome/indianews/article-2309541/Akhileshs-bright-bike-idea-falls-flat-Noida-thanks-poor-cycle-track-maintenance.html#ixzz2lpOhvoxS>





Annex 2.4: Experience of bicycle sharing schemes in Delhi and Bangalore

Delhi

City population : 13,481,997 (Census 2011)¹

Delhi was the first city in India to experiment with the concept of bicycle sharing in 2007. Since then, multiple operators have stepped in to provide bicycle sharing services in different parts of the city. However, not much has been achieved by any of these pilot projects and bicycle sharing still remains a distant idea/vision in Delhi. Most of these operators have closed operations due to low ridership and lack of government support (see Table given below). All the schemes in Delhi are based on Public Private Partnerships (PPP) and involve advertising companies who use the bicycle stations to display advertisements all the

year around. Currently, bike sharing in Delhi is operational only along the BRT corridor and at Vishva Vidyalaya metro station (University area).

A primary survey was conducted by TERI in September 2013 to understand/assess the usability of the three systems in Delhi and their operations. The survey brought out the following points.

PLANET GREEN BIKES: Started first in 2008, Planet Green Bikes currently offers bicycle rental services from nine stations (including Andrews Ganj, Moolchand, Defence Colony, Pant Nagar, Chidiyaghar, Siri Fort, Chirag Delhi, Seikh Sarai and Khanpur) along the 5.8 km-long

Operator	Status	Type of operation	No. of stands	No. of cycles	Fare structure
Greenolution(2007)	Operational (8am to 8pm)	Manual	1	20	Rs 10 for 4 hours; Rs 10 every additional hour
Planet Green Bikes (2008)	Operational along the BRT line (8 am to 7pm)	Manual	9	80-90	Rs 10 for 4 hours; Rs 5 every additional hour
	Closed (Metro stations) (8 am to 7pm)	Manual	9	90	Rs 10 for 4 hours; Rs 5 every additional hour
Delhi Cycles (2010)	Closed (7 am to 10 pm)	Automated (Prepaid smart cards)	4	40	First half an hour — Rs 3; Every additional 15 min, Rs 3

¹ Census 2011, Government of India. http://censusindia.gov.in/2011-prov-results/paper2/data_files/India2/Table_2_PR_Cities_1Lakh_and_Above.pdf, last accessed on December 12, 2013.





BRT line. The system was started on a PPP model between Planet Advertising Group, a private advertising agency and Delhi Integrated Multi-Modal Transit System Ltd (DIMTS).

The average ridership recorded at each of the Planet stations was recorded to be as low as 8–10 users per day. The user category includes primarily schoolgoing children who use it for going to nearby markets, tuition classes or generally for recreation purposes and tourists. Though the 5.8 km-long BRT stretch has dedicated lanes for cycling on both sides of the BRT line; however, the lanes are mostly encroached by car parking and are also being used by motorized two-wheelers making cycling unsafe even on the dedicated lanes and also indicating enforcement issues.

Planet Green Bikes group later also signed an agreement with Delhi Metro Rail Corporation (DMRC) to run cycle sharing services from several metro stations in Delhi (including Patel Chowk, Rajendra Place, R K Ashram, Barakhamba road, Mandi house, Pragati Maidan, Indraprastha, Akshardham, Botanical Garden, etc.). However, operations were closed down in 2012. The reasons for the closure of these services, however, are not clear.

GREENOLUTION is another private advertising company currently running bicycle-sharing services from only one metro station, i.e., Vishvavidhalaya metro station since 2008. The land was provided by DMRC. Surrounded by a large number of colleges and university area, the user group primarily includes the student population especially hostellers. The average ridership was recorded to be around 25–30 users per day, and increased in winter and monsoon months.

DELHI CYCLES: Started in June 2010, Delhi Cycles was started as a pilot by two private

entrepreneurs forming a company called Delhi Cycles Private Ltd. (DCPL). The land was provided by DMRC and Municipal Corporation of Delhi. The system closed operations in 2011. Delhi Cycles was one of the few systems based on a smart card system with a registration procedure similar to that of mobile phones. The users had to pay an initial registration fees equal to Rs 350, out of which Rs 300 was refundable. The users were required to produce their original id proofs at the time of registration and were hence saved of the hassle of carrying and submitting their original documents whenever they wanted to rent a bicycle unlike the case of Planet Green Bikes and Greenolution. The system closed operations in less than a year (May 2011) due to several reasons. Lack of government support in terms of reluctance in devoting land for setting up the stations was one of the primary reasons. Also, the company shared one-fourth of the revenues generated from the rental services with DMRC and with added restrictions on advertising by DMRC, the system suffered heavy financial losses.

Bangalore

Metropolitan city population: 8,425,970 (M.Corp, Census 2011)²

Bangalore, a city known for its pleasant weather is observing a promising change in the approach of people towards cycling as a mode of transport. Apart from the regular milk or newspaper vendors, cycling is being taken up for office commuting, leisure, sports, and environmental campaigns. Cycle renting and sharing services have been picking up lately to encourage people to take up cycling.

As seen in the case of Delhi, Bangalore also does not have a city-wide cycle sharing system. Rather, there are multiple operators providing services in different parts of the city. The three

² Census 2011, Government of India. http://censusindia.gov.in/2011-prov-results/paper2/data_files/India2/Table_2_PR_Cities_1Lakh_and_Above.pdf, last accessed on December 15, 2013.





major operators providing bicycle sharing/renting services are ATCAG, Namma Cycle, Icycle. In addition to these, there are individuals who share/rent their cycles either personally or through a common portal such as BOTS Market place.

The table below gives the details of the different main operators and their scale of operations:

ICYCLE: Icycle is a private entity comprising a team of cycling enthusiasts based in Bangalore. Primarily involved in organizing cycle events or trips (single day or longer) in and around Bangalore and Karnataka, Icycle recently started a bicycle renting facility in Bangalore running operations from only one station (near Mahalakshmi layout). The station is equipped with around 20 well-maintained mountain bikes or MTB (KHS Alite 150).

To rent a bicycle, a person is required to register online and also submit his/her address proof in original. It is to be noted that the rental charges of the facility are as high as a minimum of Rs 200 a day making it unaffordable for many and catering to a certain user group only. Also, any cost incurred due to damage or repair to the cycles during the rental period, is to be borne

by the customer (punctures, part-replacement, wheel-band, etc.).³ In addition to the regular renting of bicycles, Icycle also offers regular single and multiple day cycling trips in and around regularly. Advertisements also form a major source of revenue for sustaining business by these operators.

ATCAG: Launched in 2011, ATCAG is an advanced automated cycle renting initiative started by Keberon Automations with support from Bangalore Metro Rail Corp Ltd, Bruhat Bengaluru MahanagaraPalike (BBMP) and Directorate of Urban Land Transport (DULT). The service is currently operational from nine stations in the city along the metro line, namely, Biyappanahalli Metro Station, CMH Road, Halsoor Metro, SV Road, Trinity Metro, Unity Building, War Memorial, MG road Metro, Bible Society. Anyone with valid government ID and Address proof⁴ is eligible to use the system. On registration, a prepaid smart card is issued which allows a person to access cycles from any of the automated docking stations. The system has an automatic redistribution system in place to maintain balance of the number of cycles at the stations.

Started with bicycle renting for public, ATCAG is currently expanding its services into

Operator	Status	PPP	Type of operation	No. of stands	No. of cycles	Fare structure
ICYCLE (2010)	Operational (9.00am – 9.00pm)	No	Manual operations	1	20	Rs 200/- for weekdays and Rs 350/- on weekends
ATCAG (2011)	Operational (6.00am – 10.00 pm)	Yes	Automated (Prepaid smart cards)	9	90	First hour free, Rs 10/hour. (Rs 1000/- refundable deposit for lifetime membership)
NAMMA CYCLES (2012)	Operational (8.30am– 6:00 pm)	Yes	Manual operations	5	50	First 30 min free, Rs 5/- for next 30 min, Rs 10/- hour from there on.

³ <http://www.icycle.in/bikes-for-rent/>, last accessed on December 16, 2014.

⁴ <http://www.keberonautomations.com/bikeShare.php>, last accessed on December 16, 2014.





educational and business campuses, renting bicycles for tourism and providing smart and easy parking facilities with electronic authentication and electromechanical locking systems for cycles.

NAMMA: The Namma Cycle is a joint initiative between Centre for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP), Indian Institute of Science (IISc), and Ride A Cycle Foundation (RACF). Also supported by

EMBARQ India and Gubbi Labs, the initiative is currently operated within IISc campus. Bruhat Bengaluru MahanagaraPalike (BBMP) and BESCOM were the key sponsors for the programme. Over 150 numbers of cycles have been sponsored by TI Cycles India, Muruguppan Group, and ZED BCIL has sponsored the Bicycle Racks for the initiative. A service level agreement has been made between the government and the operator in this initiative.





Annex 2.5:

Review of urban transport related advisories/ guidelines issued by the MoUD

Advisory	Key features	Requirements for cities	Inclusion of NMT
<p>Additional Central Assistance (ACA) for procurement of up to 10,000 buses and ancillary infrastructure for urban transport under JNNURM covering all cities/towns/urban agglomerations in India August, 2013 [D.O.No.K-14011/18/2013-UT-I]</p>	<p>ACA to cities for:</p> <ol style="list-style-type: none"> i) Procurement of up to 10,000 buses ii) Intelligent Transport Systems (ITS) iii) Ancillary infrastructure like construction/upgradation of depots/terminals/control centres, etc. 	<p>Preparation of DPR in the format suggested by MoUD</p> <p>Conditions to be met by the cities</p> <ul style="list-style-type: none"> • Setting up of city-specific SPV • Placing the purchase order for buses • Depot land/ depot for workshop facilities be transferred to the SPA • Furnishing the proof of tying-up with financial intermediary for the cost of the buses <p>Other reforms</p> <ul style="list-style-type: none"> • Nominating a single department at state level to deal with all urban transport issues • Setting up of an umbrella institution for infrastructure at state level — should have a UT cell • Setting up of city-level UMTA • Setting up of dedicated urban Transport Fund at state and city level • Change in bye-laws and master plans to integrate land-use and transport - densification along MRTS corridors and areas around stations • Setting up mechanism for periodic revision of fares for PT and IPT • State govt. to waive off/reimburse all taxes on urban buses and city bus service/BRTS • Preparation and notification of CMP • Development of advertisement policy, parking policy • Establishment of modern city bus transport system • Multi-modal integration and single ticketing • Setting up of Traffic Information Management Control Centre 	<p>Ancillary infrastructure to be funded as part funding support for buses includes only bus-related infrastructure like depots, Control rooms, etc. Funding of NMT infrastructure in catchment area of bus system is not included in the reforms that should be initiated by the cities</p>





Advisory	Key features	Requirements for cities	Inclusion of NMT
<p>Funding for purchase of buses for urban transport systems under JNNURM January 12, 2009 [D.O.No.K-14011/48/2006-UT(Pt.)]</p>	<p>Central financial assistance in the form of grant shall be provided for procurement of buses under JNNURM (for mission cities only)</p> <p>Guidelines in the Advisory suggest that all million plus cities would be required to have either dedicated bus lane or demarcated bus lane on all arterial roads</p>	<p>DPR in the format suggested by MoUD</p> <p>Reforms</p> <ul style="list-style-type: none"> • Setting up of city-level UMTA for all million-plus cities • Setting up of dedicated urban Transport Fund at state and city level • Change in bye-laws and master plans to integrate land-use and transport - densification along MRTS corridors and areas around stations • Nominating a single department at state level to deal with all urban transport issues • Setting up mechanism for periodic revision of fares for PT and IPT • Setting up of city-specific SPV • State govt. and ULB to waive off/reimburse all taxes on urban buses and city bus service/BRTS • Development of advertisement policy, parking policy • Multi-modal integration and single ticketing • Setting up of Traffic Information Management Control Centre 	<p>Suggestion on reserving lane (dedicated or demarcated) for buses on all arterial roads. However, no suggestion on NMT infrastructure in catchment area of bus system</p>
<p>Inclusion of feeder buses, public bike sharing, and pedestrianization in the influence zone of MRTS projects August 30, 2013 [No.K-14011/1/2007-UT-IV]</p>	<p>DPRs of MRTS projects should include feeder buses, public bike sharing, and pedestrianization in the influence zone of stations and include their cost in the project cost</p>	<p>Include feeder buses, public bike sharing and pedestrianization in the DPRs of MRTS projects</p>	<p>While it suggests provision of feeder buses, bike sharing, and pedestrianization in influence zone of MRTS stations, it doesn't clearly indicate the provision of infrastructure for cyclists like cycle lanes/tracks, cycle parking, etc.</p> <p>Also the Advisory refers to metro rail projects only and not the other public transport projects</p>
<p>Promoting pedestrianization and non-motorized transport January 2, 2008 [D.O.No.K-14011/07/2007-UT]</p>	<p>New road construction/road widening should provide for</p> <ol style="list-style-type: none"> i) dedicated paths for pedestrians and cyclists. ii) traffic calming measures to limit the maximum speed of motorized vehicles to 30 kmph or so. 	<p>No requirements specified</p>	<p>Advisory clearly indicates that cities should provide for cycle tracks and pedestrian infrastructure as per the guidelines/norms of UDPFI.</p>





Advisory	Key features	Requirements for cities	Inclusion of NMT
	<p>iii) New flyovers being constructed should take care of needs of pedestrians and cyclists.</p> <p>iv) Master Plans should incorporate complete network of bicycle tracks.</p> <p>v) New urban developments like townships, SEZs, should provide for cycle tracks and pedestrian infrastructure, the Advisory clearly states that cities need to adhere to UDPFI Guidelines, 1996 for urban road design, which includes provision of sidewalks and cycle tracks on urban roads</p>		<p>Though the Advisory was issued in 2008, there hasn't been much action by cities on construction of sidewalks, cycle tracks/networks.</p> <p>There is a need to revive the Advisory, add on the Urban road Manual requirements to it and then make it a binding upon cities to follow it in order to receive funding under JNNURM</p>
<p>Reserving lane for public transport/high capacity bus system/high occupancy vehicles December 13, 2007 [D.O.No.K-14011/07/ 2007/ UT]</p>	<p>Suggestion to cities to reserve lane for public transport/high capacity bus system/high occupancy vehicles on all new road links or widened roads connecting important cities with their suburbs, wherever there are three or more lanes on either side</p>		<p>Advisory suggests reserving lane for PT and high occupancy vehicles only</p>
<p>Incorporating urban transport at the urban planning stage and encouraging integrate land use and transport planning January 23, 2007 [D.O.No.K-14011/07/2007- UT]</p>	<p>Suggestion that cities should provide for mass rapid transit system on pre-defined transport axes. Roads should have provision for pedestrianization, non-motorized traffic on all roads, and provision for dedicated corridor for bus-based transit system on major arterial roads</p> <p>Banning development on 500 m on the sides of new bypass; development should take place along pre-defined major transport axes in a linear form than in radial form</p>		<p>Provision of pedestrian and NMT infrastructure suggested along with reserving lanes for high-capacity public transit systems. Advisory also promotes integrated land use and transport development</p>
<p>Other advisories –Sustainable city bus transport system [K.14011/18/20/2013-UT-I, dated October 28 2013]</p>	<p>Focus- financial sustainability of public transport systems ; setting up of urban transport fund at city-level and state-level</p>	<p>Undertaking from State/UT government that they will bear operational losses in operation and maintenance of city buses, if the same cannot be met from dedicated transport fund at city/state level States/UTs should give city permit for city bus service to city-specific SPV only</p>	



Contact Us

Centre for Research in Sustainable Urban Development and Transport Systems (CRSUD&TS)

Sustainable Habitat Division

The Energy and Resources Institute (TERI)

Darbari Seth Block, IHC Complex, Lodhi Road,

New Delhi - 110 003, INDIA

Web: www.teriin.org

