

## Urbanisation in India and the Environment



### Introduction

About 31 percent of India's population (377 million) lived in areas defined as urban (Census, 2011), and this proportion could be as high as 50-60 percent if more flexible descriptions were used. How can urban India simultaneously improve living conditions and fulfil developmental priorities in an environmentally sensitive manner?

### I. Environmental Context

Due to the sheer numbers and consumption patterns involved, India's urbanisation process will simultaneously put immense pressure on available resources while adding significantly to pollution. While urban boundaries are determined administratively, environmental stocks and flows transcend such boundaries and impact large rural areas.

### II. Environmental Impacts of Urban India

The major environmental impacts in India arise in the following sectors:

#### 1. Buildings

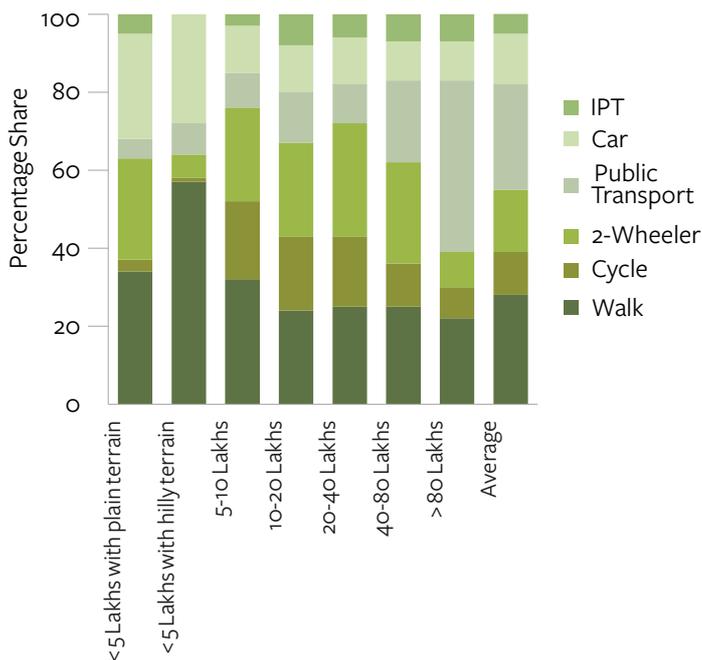
Nearly 70 percent of the building stock in India is yet to be constructed, and hence environmental impact related to buildings will increase sharply in the coming decades. High levels of operational and embodied energy in buildings are influenced by total floor, space and energy consumption per square unit.

The current Energy Conservation Building Code (ECBC) specifies minimum energy performance of buildings only of commercial buildings having a high connected load. Nearly 50 percent of commercial buildings and residential buildings have therefore not been taken into account. Much of the current policy focus has been on reduction of operational energy of buildings; however, embodied energy consumed in all building processes is also likely to be significant. Many building materials have a range of adverse environmental consequences, like sand mining impacts on river courses, depletion of top soil, etc.

## 2. Transportation<sup>1</sup>

The key environmental impacts of the transportation systems are fuel consumption and vehicular emissions, and resultant air pollution. Three key determinants of emissions are: number and length of trips, modal split, and fuel mix and efficiency standards.

Modal Split of Trips by Type of Cities (2007)



High proportion of walking and cycling trips, and mixed use and high densities (in core) of most cities, help reduce the impact of transportation systems in Indian cities. Yet, India's vehicle ownership rate is expected to increase with economic growth. But, adequate development of public transport infrastructure could reduce environmental impacts by delinking vehicle ownership from ridership.

<sup>1</sup> It policy brief focuses on the environmental impacts of urban systems, for a comprehensive analysis of particular sectors, see related policy briefs in this series.

## 3. Urban Form and Density

particularly, density and land use pattern, combined with transportation, determine the energy consumption of cities. Global evidence suggests that a combination of high densities, mixed-use and public transport save energy.<sup>2</sup> There is agreement that newer developments in peripheries of most Indian cities are low density. Inappropriate urban planning and real estate is leading to destruction of lakes and other surface bodies in and around cities due to encroachment of lakebeds, and closure of natural drainage channels, leading to flooding during higher-than-normal rainfall events.

<sup>2</sup> There are competing claims about overall densities of Indian cities, often the outcome of differing measures of densities. Further detailed studies are required in this regard,

## 4. Energy

Energy consumption will increase in urban areas, primarily driven by building (residential and commercial) and transportation sectors. The residential sector energy demand is expected to increase by six times over the 2011-2051 period, while commercial sector demand would increase by an order of 20 over the same period (WWF, 2014). Business as usual analysis suggests that electricity and biomass (of significance in the residential sector) would be key energy sources. A significant proportion of this is dependent on coal. The transportation sector is a significant user of petroleum fuels.

## 5. Water and Waste Water

Urban areas pose two problems: making water available for its growing population, and letting out untreated wastewater. Key impacts are surface and ground water pollution, and the growing water demand. The increasing water demand from cities is constrained by decreasing per capita water availability. Inadequate provision of safe water by Municipalities has led to increased dependence on groundwater and its consequent depletion. Many urban areas are located in water scarce basins and are forced to depend on far-off surface and ground-water sources.

Fecal contamination due to inadequate and unsafe collection, conveyance and treatment is a serious challenge. Around 80 percent of wastewater is let off untreated into the environment<sup>3</sup>. Groundwater contamination is becoming common in cities.

<sup>3</sup> CPCBCPCB. (2009). Status of Water Supply, Wastewater Generation and Treatment in Class-I Cities & Class-II Towns of India. New Delhi: Central Pollution Control Board, CPCB. (2005). Status of Sewage Treatment in India. New Delhi: Central Pollution Control Board

## 6. Solid Waste Management

Indian cities produce roughly 57-68 MT of solid waste per year at per capita waste generation of 0.5 kg which is low by global standards.<sup>4</sup>

Waste collection systems are woefully inadequate or absent in most Indian cities. Littering and open dumping is prevalent in all cities, with only a handful of engineered landfills. Segregation or formal recycling is minimal,

Though informal recycling chains exist in most cities. Solid Waste Management services in most cities rarely include the informal recycling systems in their planning and design, thus affecting livelihoods of waste pickers and decreasing recycling.

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<sup>4</sup> Annepu (2012), Sustainable Solid Waste Management in India, Master's Dissertation- Columbia University.

## 7. Industries and Manufacturing

Key impacts are water pollution, disposal of both hazardous and non-hazardous waste, and air pollution. Polluting industrial sites are often located within and around urban areas thus putting populations at risk.

Industrial corridors could concentrate development in particular regions over a short period of time, increasing its demand of water, energy and other resources, as well letting out large amounts of waste into the environment.

**Climate Change:** Cities are both contributors to climate change, and also sites where the impacts of climate change are felt. Indian cities can play a significant role in climate risk reduction by transforming the building and transportation sectors. They also need to put appropriate adaptation measures in place, particularly to safeguard the interests of the urban poor and vulnerable communities.

## III. Legal and Institutional Arrangements

Environmental laws were introduced in India in the 1970s after the formation of the Ministry of Environment and Forests to safeguard forest resources and address air and water pollution. The Mission for Sustainable Habitat, as part of the National Action Plan for Climate Change, 2010, brought environmental issues to the forefront. Some sector policies like the National Urban Transportation Policy, and National Urban Sanitation Policy have prescribed environmental safeguards specific to sector activities. In addition, the Judiciary has played an active role through a series of influential judgements on instances of air and water pollution, industrial effluents, and solid waste management.

The Govt. of India has created state-level institutions like State Pollution Control Boards. In sectors like public transport and water and sanitation, the primary responsibility for service provision lies with the state governments Utilities and Urban Local Bodies. The GoI exerts influence through policies and programme design, financing, and setting standards. In other sectors like energy, most of the policy and institutional responsibility lies with the GoI. The environmental concerns of these sectors are accordingly regulated: air pollution and water pollution are legislated through various national Acts, some like water conservation are legislated through State Acts or city-level bye-laws. Many of the smaller buildings or infrastructure projects remain largely unregulated.

Environmental impacts of each of the sectors extend beyond city and often state boundaries. The GoI has an important role to mandate environmental standards strengthen and legislation, setting up monitoring frameworks, and strengthening institutions and capacities for environmental management. Environmental impacts of national level programmes will need to be scoped and mitigation measures specified. State governments and city-level agencies will need to incorporate environmental measures in master plans and building bye-laws.

## Key Actions

1. Regulate building effectively and use a variety of instruments

All buildings need to ensure minimal environmental performance. It is necessary to include environmental measures in bye-laws and building construction permits, in line with the National Building Code. The ECBC code/ BEE Rating Programme needs to be modified to create equivalence between non-air conditioned and air-conditioned buildings.

2. Increase Sustainability of Materials used in construction

The use of sustainable materials needs to increase by a mix of research-demonstration projects and making these materials more readily available. Steel and cement industries need to be made more efficient. Recycling and reuse of materials needs to be encouraged.

## TRANSPORTATION

### 3. Invest in Public and Intermediate Public Transport Networks

The modal share of public transport should be increased. Cities can aim to incrementally increase bus fleets and before signal prioritisation, before investing in Bus Rapid Transport Systems (BRTS). Smaller and medium-size towns, can invest, encourage and promote Intermediate Public Transport, like shared autos and mid-sized vehicles.

### 4. Increase Fuel Efficiency

Vehicles need to shift to cleaner fuels, which further need to be made readily available. Fuel efficiency of vehicles must increase.

## ENERGY

### 5. Cleaner Coal

Cleaner coal technologies for power production must be encouraged even as we move towards renewable sources.

### 6. Increase share of renewables

Share of renewables for different end-uses should be increased. Facilitating consumer-centric adoption (off-grid and on-grid) of renewable energy sources (e.g. rooftop solar) is important.

## URBAN FORM AND DENSITY

### 7. Reduce sprawl

Retain and promote mixed land-use and high densities in the core of cities. Prevent haphazard, low density development in the peripheries by planning through metropolitan committees and other appropriate regional development agencies.

## WATER AND WASTEWATER

### 8. Regulate Ground Water

Appropriate regulations for groundwater should be put in place.

### 9. Treat and Recycle Wastewater

All Waste water must be treated along with sludge from on-site systems. Wastewater recycling and reuse must be ensured, and re-using it for appropriate purposes.

## SOLID WASTE MANAGEMENT

### 10. Reduce and Recycle

Reduce the amount of waste that goes into landfills by a. composting organic wastes, b. recycling wood, glass, paper and plastic.

### 11. Ensure proper treatment:

Construct scientific land-fills, and avoid open dumping. Use efficient incinerators for hospital and other hazardous wastes.

## INDUSTRIES AND MANUFACTURING

### 12. Improve EIA implementation

EIA implementation must be strengthened.

## INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING

### 13. Build capacities

Build capacities for environmental management in urban local bodies, and appropriate state departments. Explore the possibility of starting a state cadre for environmental officers.

**Incentivise:** Build incentives for State agencies, para-statals and urban local bodies to initiate above set of actions.

### Suggested Readings

IIHS (2014). "Urbanisation in India and The Environment", IIHS-RF Paper on Urban Environment.

Sanyal S et al. (n.d), Urbanisation and Sustainability in India: An Interdependent Agenda, WWF.

NTDPC, 2014. India Transport Report - Moving India to 2032 (Volume II - Main

Report), New Delhi: Routledge

India Energy Security Scenarios 2047, <http://indiaenergy.gov.in/>