Singapore and India

Partnering for Liveable and Sustainable Cities

INDIA

Srinagar
Jammu
Chandigarh
Panchkula
Shimla
New Delhi
Gurugram
Jaisalmer
Lucknow
Gangtok
Itanagar
Dispur
Patna
Shillong
Kohima
Imphal
Gandhinagar
Bhopal
Ranchi
Kolkata
Aizawl
Ahmedabad
Bhubaneshwar
Mumbai
Hyderabad
Amaravati
Panaji
Chennai
Pondicherry
Coimbatore
Kavaratti
Port Blair
Thiruvananthapuram

SINGAPORE

CENTRE for
LiveableCities
SINGAPORE

सत्यमेव जयते
Town and Country Planning Organisation
Government of India

42
NUMBER OF CITIES

340.000.000
URBAN POPULATION

32.5
% OF TOTAL POPULATION

2030 forecast

68
NUMBER OF CITIES

590.000.000
URBAN POPULATION

40.0
% OF TOTAL POPULATION

Figures based on "India's Urban Awakening: Building Inclusive cities and sustainable economic growth," McKinsey Global Institute, 2010.

MINISTRY OF FOREIGN AFFAIRS
SINGAPORE

CENTRE for
LiveableCities
SINGAPORE

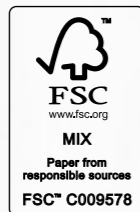CLC is a division of
MND
SINGAPORE

Set up in 2008 by the Ministry of National Development and the Ministry of the Environment and Water Resources, the Centre for Liveable Cities (CLC) has as its mission "to distil, create and share knowledge on liveable and sustainable cities". The CLC's work spans four main areas—Research, Capability Development, Knowledge Platforms, and Advisory. Through these activities, the CLC hopes to provide urban leaders and practitioners with the knowledge and support needed to make our cities better. For more information, please visit www.clc.gov.sg.

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Foreword

India's urban transformation presents both challenges and opportunities. Urban areas account for well over half of the country's GDP and represent an ever-growing proportion of its population. Recognising this, Prime Minister Narendra Modi put forward a vision of building 100 Smart Cities in India. He also sought to study Singapore's development experience for examples of transforming urban areas into highly liveable cities.

It is therefore fitting that "Smart City Development and Urban Rejuvenation" is a key pillar of the India-Singapore Strategic Partnership. We are happy to contribute a small part to India's urbanisation journey by sharing our experiences, not only in town and city planning, but in addressing challenges like waste and water management, sustainability and social urban planning. The collaboration between Singapore's Centre for Liveable Cities and India's Town and Country Planning Organisation on an Urban Planning and Governance Programme is highly commendable and helps to form important partnerships among the urban planning community in both countries.

I am pleased to note that this book captures case studies of how Indian cities can lead the way in urbanisation and how Singapore can play a role. I am confident that this will serve as a relevant and useful resource for all urban practitioners, and help contribute towards the deepening of Singapore-India relations.

Dr Vivian Balakrishnan
Minister for Foreign Affairs
Singapore

Over the years, Singapore has emerged as one of the finest city-states of the world, redefining the very essence of urbanisation by blending it with sustainable development. With its business friendly environment, successes in urban planning and improved quality of life, Singapore consistently figures among the top smart cities in the world.

We can learn immensely from Singapore in this field. Smart City Development and Urban Rejuvenation is, therefore, an important component of the multifaceted India-Singapore Partnership. Cooperation in Smart City and Urban Planning was one of the 5-S Planks (Five areas of cooperation to enhance bilateral relations), agreed upon during my visit to Singapore in August 2014. I am delighted that this cooperation has evolved and today India and Singapore collaborate in the areas of urban planning, smart cities development, skills development, smart mobility, waste management and water.

During the visit of the Honourable Prime Minister of India, Shri Narendra Modi, to Singapore on 23-25 November 2015, a Memorandum of Understanding (MoU) was signed between the Town and Country Planning Organisation (TCPO) of the Government of India and the Singapore Cooperation Enterprise in the area of Capacity Building in Urban Planning and Governance. The MoU, executed by the Centre for Liveable Cities (CLC) in Singapore, has imparted training to 99 Indian officials. I commend TCPO and CLC for their tireless efforts to implement the initiative. I am grateful to the Prime Ministers of India and Singapore for their vision. The benefits of this training program will have long-lasting impact.

India is growing at an unprecedented rate and urbanising at a rapid pace, with hundreds of millions likely to join the urban population in the next two decades.

We have to build new cities and towns. We have to look for smarter ways to make our cities clean, green, habitable and future oriented. Increasing efficiency and improving the overall quality of life of every Indian is one of the core objectives of our Government. We are striving in the best possible fashion to improve the quality of life of our people. In this context, the Smart Cities Mission, under the Ministry of Housing and Urban Affairs, has acquired key significance. Acquiring Singapore's expertise in this endeavour will be beneficial.

I am certain that the India-Singapore partnership in urban planning will become a major milestone in our bilateral relationship. This book will be an extremely useful academic resource for policy makers and urban planners.

Smt. Sushma Swaraj
External Affairs Minister
India

About the organisations

About CLC

Set up in 2008 by the Ministry of National Development and the Ministry of Environment and Water Resources, the Centre for Liveable Cities (CLC) has as its mission to "distil, create and share knowledge on liveable and sustainable cities." CLC's work spans three main areas: Research, Capability Development and Knowledge Platforms. Through these activities, CLC hopes to provide urban leaders and practitioners with the knowledge and support needed to make our cities better.
www.clc.gov.sg

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About TCPO

The Town and Country Planning Organisation (TCPO) under Ministry of Housing and Urban Affairs, Government of India, is the apex technical and advisory organisation for all matters concerning Urban and Regional Planning in the Country. The TCPO came into existence in 1962 when the erstwhile Town Planning Organisation (TPO), which was created at the instance and initiative of Hon'ble Prime Minister Pandit Jawaharlal Nehru, and Central Regional and Urban Planning Organisation were merged together. TCPO is providing advice of the highest competence to the Central and State Governments, Public Sector Undertakings and Local Authorities on all matters pertaining to Urban and Regional Planning and Development.

सत्यमेव जयते

Town and Country Planning Organisation
Ministry of Housing and Urban Affairs
Government of India

Preface

Singapore and India share a strong historical connection. India was among the first countries to officially recognise Singapore as an independent sovereign nation back in 1965. Even our country's name, Singapore, can be traced to "Singapura", Sanskrit for Lion City. Our shared colonial past has left common legacies in law and administration. Singapore's development is owed in part to the hardworking men and women of the Indian diaspora.

Till today, we have continued to pursue mutually beneficial partnerships. When Singapore and India's partnership level was raised to that of Strategic Partner, the Centre for Liveable Cities Singapore worked closely with our counterpart, the Town and Country Planning Organisation (TCPO) of India's Ministry of Housing and Urban Affairs, to provide capability development exchange to senior State and Federal officials from 2016 to 2017. Furthermore, Singapore has been assisting to develop Amaravati's new master plan in Andhra Pradesh since 2014, our first Government-to-Government urban project.

Our shared Asian values will continue to facilitate closer relationships. We commonly feel the urgency to grow sustainably and address the effects of climate change to build resilient, inclusive cities. This urgent development must be built on the principles of integrated planning and dynamic urban governance to build competitive economies and sustainable environments and ensure that residents have a rising quality of life. It requires an urban systems based approach to solving the complex problems which our cities face today. Singapore and India can work together on urban solutions—in infrastructure, water, planning and transport—to build a more sustainable world. Use of smart technologies can be an important enabler and springboard, if harnessed smartly and sensibly. Some of the case studies in this book already share some excellent examples of how Indian cities are leading the way.

The Centre would like to thank the Ministry of Foreign Affairs, Singapore, and TCPO, and all our programme participants and resource persons who have contributed their knowledge, expertise and time to make this publication possible.

We hope to continue to build on our strong foundations and see more partnerships in years to come.

Khoo Teng Chye
Executive Director
Centre for Liveable Cities

Introduction and Report on the Urban Governance and Planning programme

The year 2015 was a milestone in India-Singapore relations. As the two countries celebrated 50 years of diplomatic ties, a historic joint statement was inked by Prime Minister Lee Hsien Loong and Prime Minister Narendra Modi that November, which elevated the relationship to a Strategic Partnership. The strategic agreement committed the two countries to cooperating in several areas including urban planning and development.
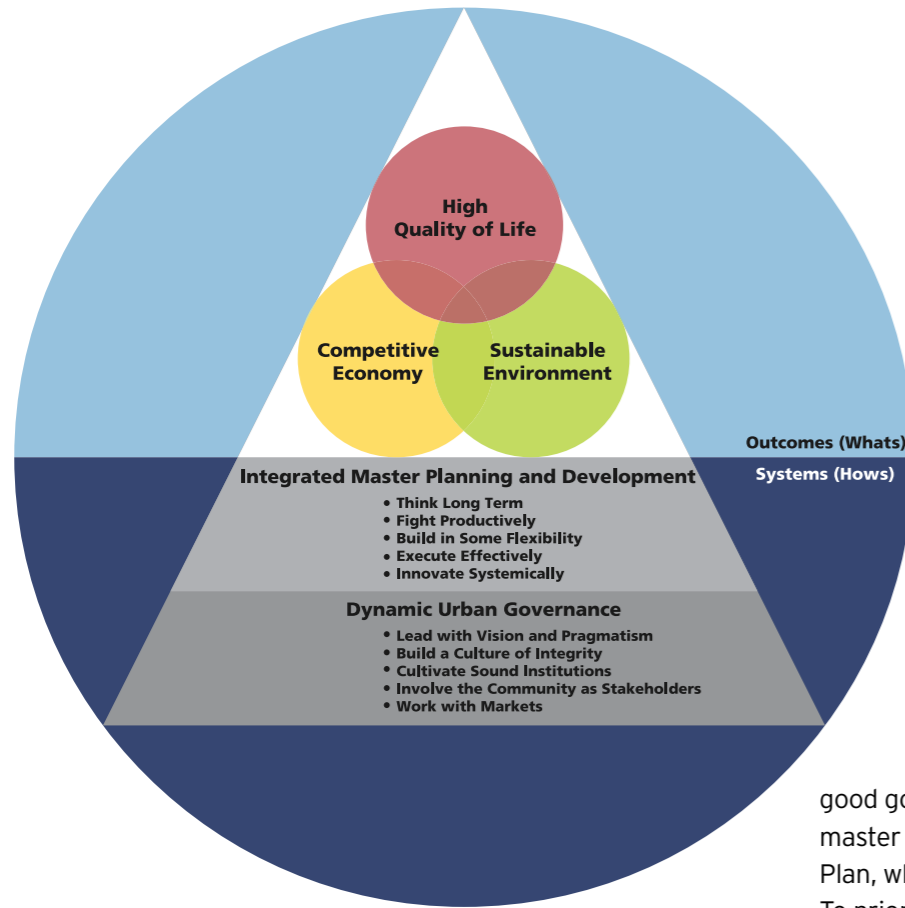

Prime Minister Modi had assumed office at a critical turn in India's developmental story. While cities are home to 33% of India's population and contribute to more than half of India's Gross Domestic Product (GDP), they face the challenge of having to house an additional 300 million urban residents by 2050. The existing urban infrastructure is already under severe strain. Prime Minister Modi recognised this challenge and made sustainable and equitable urbanisation one of his key policy thrusts. Targeted programmes launched under his premiership such as the *Swachh Bharat Abhiyan, Atal Mission for Urban Regeneration and Transformation (AMRUT)*, and the *Smart Cities Mission* address, respectively, issues of urban cleanliness and sanitation, equitable urban rejuvenation, and the harnessing of technology for urbanisation.

Struck by Singapore's rapid success in overcoming its spatial and resource constraints and transforming itself from a third world to a highly liveable first world city-state today,

Prime Minister Modi sought to tap the country's urban planning experience. During a visit to Singapore in March 2015, he consulted with Singapore's Emeritus Senior Minister Goh Chok Tong on the possibility of collaborating in the area of urban development. Prime Minister Modi's request was then formalised in the strategic agreement, with Singapore committing itself to train up to 100 Indian officials in urban governance and integrated planning.

Singapore's Ministry of Foreign Affairs thus partnered with the Centre for Liveable Cities (CLC), under Singapore's Ministry of National Development, to curate and deliver a capability development programme drawing on the lessons from Singapore's urban development for the past five decades This programme, the "Urban Governance and Planning Programme", was delivered in partnership with the Town and Country Planning Organisation (TCPO), the planning arm of India's Ministry of Housing and Urban Affairs (MoHUA).

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The Singapore Liveability Framework for Liveable and Sustainable Cities

Integrated Planning and Dynamic Urban Governance: Key principles for sustainable development

The CLC's capability development programme is centred around the Singapore Liveability Framework, which captures the processes and mechanisms by which Singapore sought to achieve the three outcomes that characterise a liveable city: a competitive economy, a sustainable environment and a high quality of life.

At the heart of Singapore's successful urban development are its long-term and integrated approach to master planning and development, and its efforts to institutionalise

good governance. A key pillar of the integrated master planning approach is the Concept Plan, which considers a 50-year time horizon. To prioritise the competing uses for land, the plan is created through inter-agency efforts to ensure all key land-use requirements are met.

Taking a long-term view also helps the government anticipate future challenges and work towards meeting them. Even so, given that the future is unpredictable and no plan is perfect, Singapore's planners recognise the need to build in some operational flexibility and periodically revisit their plans in the light of changing conditions. Furthermore, as a plan is only as good as its successful implementation, effective execution through careful preparation and sound policy is key. Finally, resource constraints, whether natural, physical or financial, will inevitably place limits on urban development. To overcome these, there is a need to systematically engage in innovation, whether in physical or policy aspects.

The best intentions in planning can come to naught if a city's governance is ineffective. Hence, Singapore places a premium on good governance. The Singapore concept of dynamic urban governance involves five implicit principles. The first is that governance requires **leading with vision and pragmatism**, which highlights that decision-makers must have the political will to push through policies that may not be popular but will benefit the country in the long term. The second principle is **building a public sector culture of integrity**, where corruption is absent and there is accountability and transparency. It is this culture of integrity that will give politicians and public sector officials the legitimacy to carry through unpopular policies. The third is **cultivating sound institutions**, that is, the structures and processes needed to ensure that planning and development transcend beyond human whims. Apart from formal institutions, this principle also involves informal institutions—the norms of governance such as a rational approach to policy, respect for sound professional competence, the separation of politics and the professional services, meritocracy, and the aforesaid culture of integrity. The fourth is about **involving the community as stakeholders** since creating a liveable city is a complex undertaking and needs the support of its residents for it to be sustainable. The final principle involves **working with market forces** to incentivise behaviour and improve efficiency.

> 66 1.1 million Indians come here [Singapore] every year. And it is nothing to do with an ancient heritage, beautiful forests, national parks or whatever. It is the totality of this experience. The lesson to draw from here is that it is possible to imagine and then create something—the tangible with the intangible. 99

Mr Jawed Ashraf, High Commissioner of India to the Republic of Singapore
18 August 2017

Participants at Singapore's Bishan-Ang Mo Kio Park, which is an example of an "Active-Beautiful-Clean Waters" project integrated with a park.

From Singapore to India

Singapore's training commitment to India was realised between 2016 and 2017 with the holding of four runs of a week-long training programme for 99 urban planners, engineers and administrators from TCPO and various state planning agencies hailing from 31 of India's States and Union Territories.

The structure and contents of the programme were formulated by the CLC in close discussion with TCPO, led by then Chief Planner Mr Kishore Kumar Joadder. Lecture topics and site visits were carefully designed to reflect the needs of the leaders, planners, engineers and other officials attending the programme. Lectures were held across the various urban domains such as integrated planning, housing, water,

sustainable environment, greening, transport, industrial economy, urban financing, land acquisition and resettlement, and conservation and heritage. Site visits were also held– carefully curated to demonstrate many of the principles at work in enabling Singapore's urban transformation. Participants were brought to Toa Payoh township–the first planned township– to demonstrate the application of integrated planning; to Bishan-Ang Mo Kio park to learn how Singapore's "Active, Beautiful, Clean Waters" programme had enabled the transformation of drab, concrete drains into lively public spaces besides being used for flood management; and to the Tuas South Incineration plant to get a glimpse of Singapore's waste management strategy and see for themselves how such a Waste-To-Energy plant worked.

> ❝ The Capacity Building programme organised by the Centre for Liveable Cities was an excellent programme, comprehensive and well structured, with a wide-ranging syllabus covering relevant subjects, a judicious mix of informative and interesting lectures and presentations, field visits and assignments, lively question and answer sessions, and highly experienced professionals as faculty. Overall, it was a great value-addition for planning professionals. ❞

Mr Sompalle Surendra, Additional Chief Planner, TCPO

Lastly, and most importantly, participants workshopped action plans to address urban challenges they faced in their home cities. These workshops were facilitated by Singapore's urban experts.

It is these discussions that have been captured in this publication. Not all of them could be featured here; only a handful were selected to provide an overview of the broad range of topics that were covered. The discussions reflected the spirit of daring to dream and of breaking organisational silos to solve complex urban challenges. It is hoped that India's urban planners will be imbued with the same spirit as they take on the daunting task of addressing the pressures of rapid urbanisation in the coming years.

Participants at lectures, during action plan discussions and during site visits.

LAND
PLANNING AND
MANAGEMENT

Amaravati
Partnering for a new capital city

Faced with the monumental task of building a new capital, the Government of Andhra Pradesh sought to tap Singapore's experience in building a world-class sustainable and liveable city. This case study looks at how it has partnered Singapore in embarking on master planning, institution building, adopting a development strategy and capacity building.

Amaravati

When the Indian state of Andhra Pradesh was split into two on 2 June 2014, the residuary state faced the challenge of building a new capital as it was given 10 years to cede its existing capital, Hyderabad, to the newly minted state of Telengana. Hyderabad is shared by the two states currently. Thus, in September 2014, the State Assembly of the new Andhra Pradesh (AP) passed a resolution to establish a greenfield capital on the banks of the Krishna River in the middle of the state, between Vijayawada and Guntur cities. The name "Amaravati"–abode of the gods or place for immortals–was picked for the new city after a well-known historical Buddhist town nearby.

The challenge
The need to plan and develop a greenfield city

Mr Chandrababu Naidu, the first Chief Minister of the new AP, began to embark systematically on two key steps to kick-start the work of building the capital city. The first was assembling the land required through a lan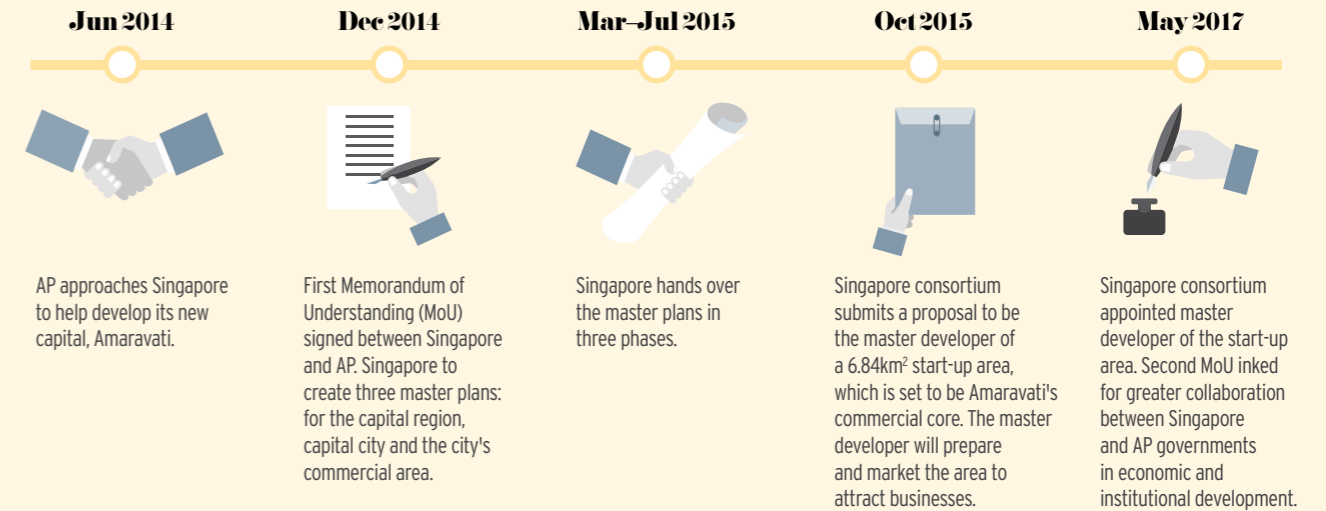d pooling exercise,[1] with land acquisition considered only as a last resort. The second major step was setting out the vision and master plan for the city. While there are numerous international urban planning consultancies which could deliver city-scale master plans, Chief Minister Naidu and his team were aware that the task at hand would entail a holistic approach going well beyond mere master planning to the effective execution of those plans.

Andhra Pradesh partners with Singapore

A longtime admirer of Singapore, Chief Minister Naidu approached its government to partner AP in the master planning and development of Amaravati. As the Singapore Government already had a committee looking to further strategic and economic ties with India, a team comprising Singapore's Ministry of Trade and Industry, Ministry of Foreign Affairs, the then International Enterprise Singapore,[2] Singapore Cooperation Enterprise, the Centre for Liveable Cities (CLC), and the Building and Construction Authority was able to respond quickly to the request. A Memorandum of Understanding (MoU)

Source: *Challenge* magazine, Singapore Public Service Division.

Jun 2014

AP approaches Singapore to help develop its new capital, Amaravati.

Dec 2014

First Memorandum of Understanding (MoU) signed between Singapore and AP. Singapore to create three master plans: for the capital region, capital city and the city's commercial area.

Mar–Jul 2015

Singapore hands over the master plans in three phases.

Oct 2015

Singapore consortium submits a proposal to be the master developer of a 6.84km² start-up area, which is set to be Amaravati's commercial core. The master developer will prepare and market the area to attract businesses.

May 2017

Singapore consortium appointed master developer of the start-up area. Second MoU inked for greater collaboration between Singapore and AP governments in economic and institutional development.

was signed in December 2014 for collaboration in master planning and the construction of Amaravati as a modern, vibrant, sustainable and smart city with a strong economy, excellent social amenities and efficient transport and logistics networks. It included selecting an initial "seed" or start-up area for a Singapore private sector group to start the process of implementing the master plan. Through the partnership, it was envisaged that AP officials would be able to adapt Singapore's experiences to their context.

The challenge then lay in coming up with a comprehensive approach to master planning, development and governance that would fulfil several objectives: serving as a common reference for all implementing agencies, providing direction for government officials on prioritising development, setting up institutions and processes which would give clarity to potential investors and developers, and maintaining public confidence in the capital city effort.

CM Naidu being briefed on the planning and development of Singapore's Marina Bay by CLC and Urban Redevelopment Authority officials during his visit to Singapore in November 2014.

CM Naidu and AP officials at Toa Payoh Mass Rapid Transit station in November 2015 being briefed by urban planners on how Singapore integrates its residential townships with mass transit facilities.

1 A scheme whereby landowners voluntarily give up their lands in return for smaller plots in the built capital but with added value such as sewerage, electricity connections and other amenities. For Amaravati, landowners also obtained an annuity along with other benefits.
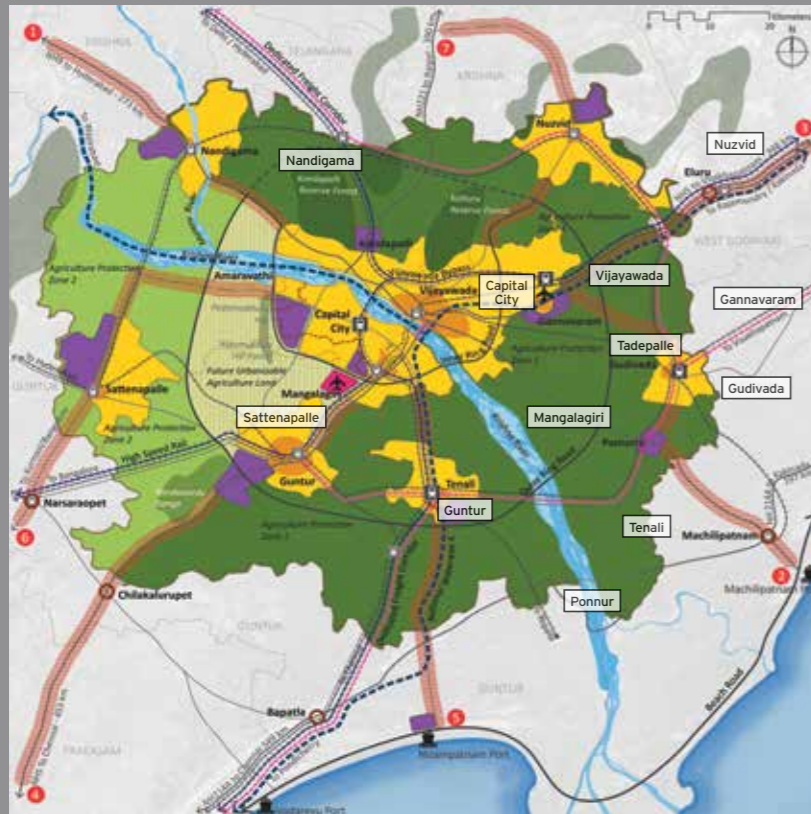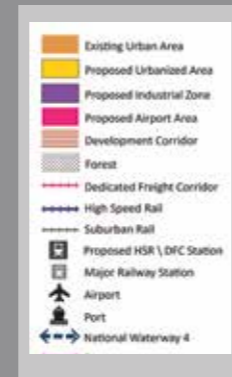
2 International Enterprise Singapore is known as Enterprise Singapore as of 1 April 2018.

CAPITAL REGION CONCEPT PLAN

Legend:
- Existing Urban Area
- Proposed Urbanized Area
- Proposed Industrial Zone
- Proposed Airport Area
- Development Corridor
- Forest
- Dedicated Freight Corridor
- High Speed Rail
- Suburban Rail
- Proposed HSR \ DFC Station
- Major Railway Station
- Airport
- Port
- National Waterway 4

Top pic View of the Amaravati region from the Undavalli caves
Bottom pic Bustling Vijayawada city

> **CM Naidu is keen to work with Singapore, and benefit from our experience, to realise his vision for the capital city. This partnership is also an excellent example of how Singapore and Singapore companies can seize opportunities and contribute our expertise in urban planning, development and governance to Indian Prime Minister Modi's plan to develop Smart Cities for India.**

Mr S. Iswaran, Minister for Trade and Industry, December 2014

Master planning

Drawing on Singapore's urban planning experience from its early days when it was helped by a United Nations Development Programme (UNDP) team,[3] the Singapore inter-agency team advocated an integrated approach, beginning with a long-range plan for the AP capital region. This would be a plan not just for the capital city in isolation but one that also considered the city's broader economic role and how it is physically connected with other cities in the region such as Vijayawada and Guntur. The other components of the plan are a capital city plan and, given the scale of the endeavour, the "seed area plan", which is a plan for a priority development area.

AP's newly set-up Capital Region Development Authority (CRDA) and other state agencies in their nascent stages of establishment needed to have the master plans quickly so that they could focus more attention on the implementation aspects. Hence, Surbana International Consultants and Jurong International,[4] two Singapore urban planning firms which began as government planning units and have proven track records in developing cities, townships and industrial parks in Singapore, India and globally, were chosen to work in consultation with CRDA and CLC to draw up three master plans:[5] the Capital Region plan involving a 7,325 km² area within the Vijayawada-Guntur-Tenali-Magalagiri boundary, the Capital City plan involving 125 km², and a detailed

"seed area" master plan for 8 km². The endeavour included a regional socio-economic analysis and demographic study and recommended a set of strategies to enhance connectivity and undertake transit-oriented urban development while protecting agricultural zones, nature reserves and heritage areas.
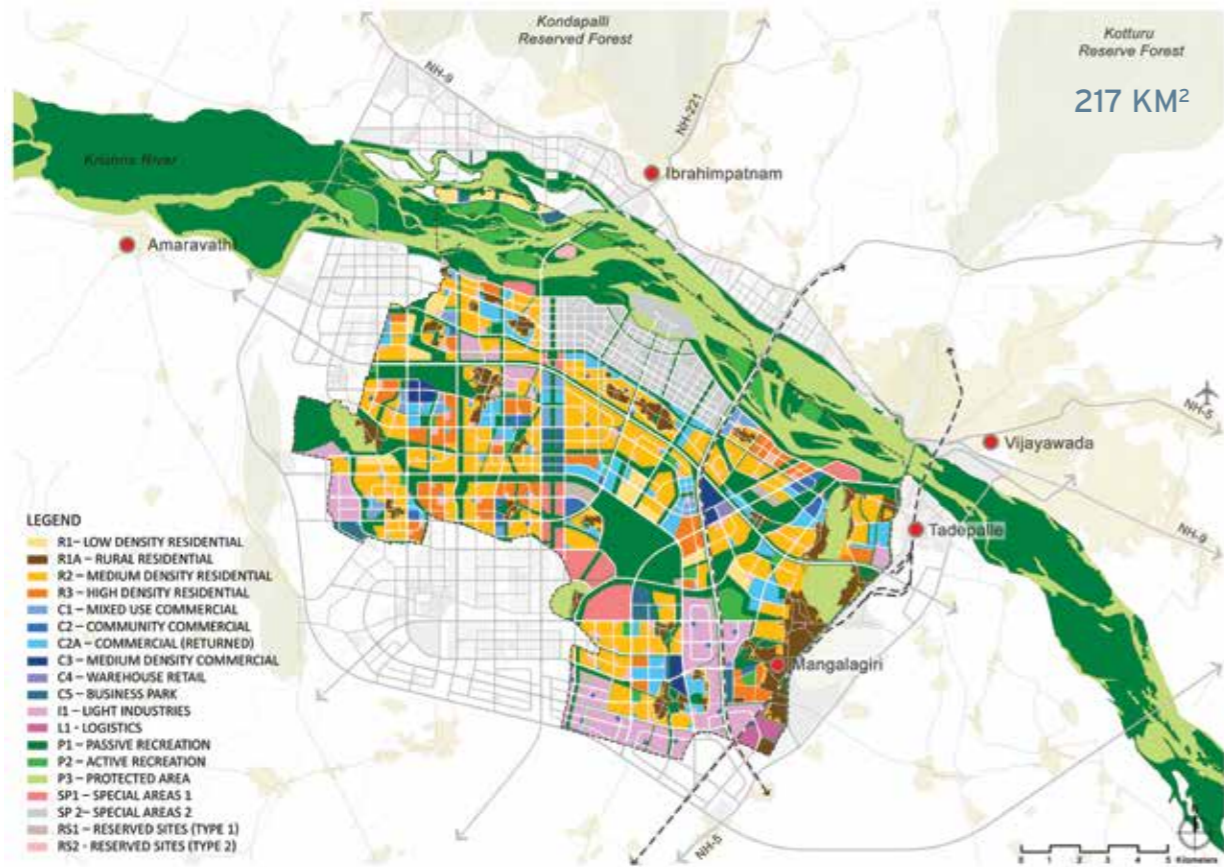
To grow the economy, the master plan proposed envisaging the city as a commercial hub for existing regional industries such as agri-businesses and logistics and new ones such as information technology-enabled services and biotechnology. Besides a Central Business District, commercial and industrial zones near residential neighbourhoods were proposed to promote job creation while reducing commuting time. The plans also laid out transport provisions via a Bus Rapid Transit system that can eventually be upgraded to a Mass Rapid Transit system complemented by non-motorised transport choices, and infrastructure provisions, namely flood management, water and power supply, sewerage and solid waste systems. To leverage Amaravati's location beside the Krishna River, a blue and green plan connecting existing greenery and waterways was proposed to be integrated with residential and recreational areas for residents. Innovative approaches such as combining water bodies as flood control-water storage facilities and as locales for public enjoyment were included in the plans.

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3 In 1962, Singapore had requested technical assistance from the United Nations and help was delivered in three stages: a systematic urban renewal strategy for the overcrowded and slum-filled Central Area known as the Lorange plan, a strategy of project-based action programmes spearheaded by government agencies and coordinated by an overall physical guiding concept called the Koenigsberger plan, and the State and City Planning project with a planning consultancy engaged by UNDP working alongside Singapore government officials seconded to the project for a smooth transition to implementation.
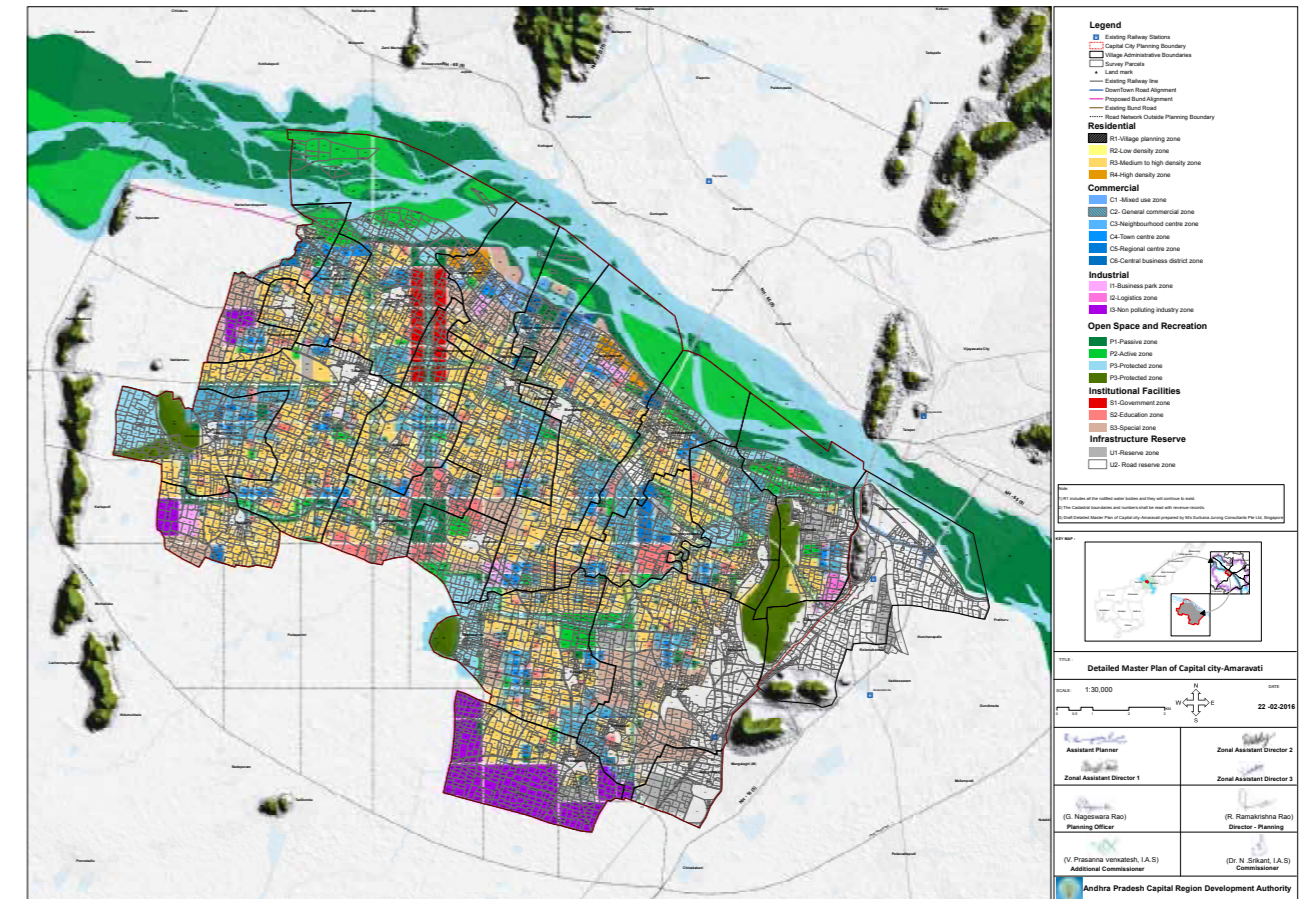
4 Today known as Surbana-Jurong Private Limited.

5 The areas covered by the master plans were adjusted in consultation with CRDA during the drafting process. The master plans have also since undergone adaptation by CRDA, which gave first notification of these changes to the public in February 2016.

217 KM²

LEGEND
R1 – LOW DENSITY RESIDENTIAL
R1A – RURAL RESIDENTIAL
R2 – MEDIUM DENSITY RESIDENTIAL
R3 – HIGH DENSITY RESIDENTIAL
C1 – MIXED USE COMMERCIAL
C2 – COMMUNITY COMMERCIAL
C2A – COMMERCIAL (RETURNED)
C3 – MEDIUM DENSITY COMMERCIAL
C4 – WAREHOUSE RETAIL
C5 – BUSINESS PARK
I1 – LIGHT INDUSTRIES
L1 – LOGISTICS
P1 – PASSIVE RECREATION
P2 – ACTIVE RECREATION
P3 – PROTECTED AREA
SP1 – SPECIAL AREAS 1
SP2 – SPECIAL AREAS 2
RS1 – RESERVED SITES (TYPE 1)
RS2 – RESERVED SITES (TYPE 2)

Capital City Master plan as delivered by Surbana Jurong to CRDA in May 2015, The CRDA has since revised this plan with changes made to the land-use, zoning, phasing etc, and notified the public in February 2016.
Source: Surbana Jurong

Progress

Institution Building and Governance

Even the best master plans can languish on paper if a city lacks good governance and strong institutions to carry through those plans. Hence, as the master plans got underway, CRDA worked to strengthen its institutional set-up by examining aspects of Singapore's legislation which could be useful references, especially in the areas of land-use and transport planning as well as land management. A series of discussions between CRDA and CLC, beginning with the inaugural "Andhra Pradesh Leaders in Urban Governance Programme" (APLUGP) in January 2015, were carried out to craft CRDA's overall vision and mission statements and refine its organisational structure, key work processes and the professional and technical competencies required to staff the authority.

Development Strategy

Obtaining in-depth insights into what is entailed in planning and managing a city is best achieved by working together on a concrete project. This is why, from the outset, Singapore conveyed the need for a "seed development" to serve as a demonstrative project.

Singapore also recommended a master developer approach as the development strategy for the start-up area. The vehicle for this would be a Singapore private entity(ies), a developer of international repute with strong engineering and financial resources and a proven track record of developing projects in Singapore, India and the region.

Updated Capital City Master Plan showing plots to be returned to land pooled owners. CRDA notified plan in April 2016. Source: Surbana Jurong

The master developer approach was proposed for several reasons: For the AP Government, it would benefit from the developer's commitment and partnership with it to develop value over a long term such as adapting best practices from Singapore to AP's context. More importantly, the master developer would contribute to on-the-ground capacity building and knowledge transfer. Another tangible contribution would be the developer's ability to catalyse investments into the state by tapping onto its client networks and partners. Also, having a master developer would mean greater consideration for consistency in urban design and architecture, which would help to enhance the built environment.

Artist's impression of the gateway to Amaravati

❝Sustainable urbanisation must become part of our planning DNA, for both planners in Singapore and India. It must be intrinsic and integral in the way we think about developing our cities.❞

Minister Lawrence Wong, 15 November 2016

Artist's impression of bird's eye view of Amaravati

Left pic Andhra Pradesh Leaders in Urban Governance Programme 2015
Right pic News clipping on the handing over of the final master plan, *Straits Times*, 21 July 2015, https://www.straitstimes.com/business/final-master plan-handed-over

> I have very good relations with the Singapore government, and I admire this government because of its integrity, efficiency and continuous development. So I came to Singapore, and requested help to prepare a Master Plan to build a world-class city. There are so many cities that are very good, but Singapore is a truly liveable city. Other cities may be more beautiful, but Singapore is sustainable and liveable; it has law and order, greenery, shopping, offices, urban transportation, everything. This is how I want to build one of the best cities in Andhra Pradesh.

CM Chandrababu Naidu, Interview with CLC, September 2015

Andhra city project

Final masterplan handed over

PUBLISHED JUL. 21, 2015, 5:00 AM SGT

Final piece of six-month process to design state's new capital city given to chief minister

Nirmala Ganapathy India Bureau Chief

Capping a six-month-long process to design Andhra Pradesh's new capital city, Singapore has handed over the masterplan to develop the heart of Amaravati in southern India.

The seed development masterplan, covering a 16.9 sq km area, is the final of three masterplans, including one for the entire city and another for the capital region handed over in March and May respectively, created by Surbana Jurong.

This third masterplan includes government buildings and the Central Business District.

The project, which opens up business opportunities for Singaporean companies, is one of the largest infrastructure projects in India.

"What our planners are trying to do is to capture a vision and the aspirations of the people of Andhra Pradesh and, at the same time, create a foundation for a city which is vibrant, liveable and has good infrastructure, good economic development," Mr S. Iswaran, Second Minister for Home Affairs and Trade and Industry, said yesterday, after handing over the masterplan to Andhra Pradesh's Chief Minister N. Chandrababu Naidu.

"The next important stage is the development stage when plans are turned into reality.

"We are looking forward to continuing our partnership with Andhra," said Mr Iswaran.

Amaravati, named after an ancient Buddhist city, is being created from the ground up in the Guntur Vijayawada area after Andhra Pradesh lost its capital Hyderabad to the new state of Telangana, created last year. Geographically, Hyderabad falls under the new state.

Mr Naidu is seeking to lay the foundation stone, marking the beginning of construction, for the new city on Oct 22 and is looking at completing the first of five phases of the seed development masterplan that includes government buildings, by 2018 - ahead of state elections in 2019.

It is estimated that 300,000 people will be living in the city centre, which has been designed based on the principles of Vaastu - an ancient science of architecture.

Ahead of that, the Andhra Pradesh government will choose an Amaravati Development Partner to oversee the construction through a bidding process.

Urban planning is currently in focus in India with Prime Minister Narendra Modi launching an initiative to create 100 modern cities to cope with an urban population expected to grow from 31 per cent to 40 per cent by 2030.

Mr Teo Eng Cheong, chief executive of International Enterprise Singapore, said: "This masterplan demonstrates Singapore's capabilities and paves the way for future partnerships in India, across sectors such as urban planning, infrastructure and supporting services."

A version of this article appeared in the print edition of The Straits Times on July 21, 2015, with the headline 'Final masterplan handed over'. Print Edition | Subscribe

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On 30 Oct 2015, a Singapore Consortium (SC) of two established Singapore companies, Ascendas-Singbridge Pte Ltd and Sembcorp Development Ltd, submitted a proposal to the AP Government to master-develop a start-up area of 6.84 km². The proposal was submitted via the Swiss Challenge method,[6] before being subjected to open competition, which closed at end-February 2017. SC won the award on 15 May 2017 and then formed a joint venture with the AP Government's Amaravati Development Corporation, named Amaravati Development Partners, to serve as the master developer.

The seed development, it is hoped, will not only kick-start economic activity in the Amaravati Capital Region, but will also enhance the value of land in the region, benefitting the local population. In support of this effort, Singapore agencies such as the recently established Amaravati Partnership Office, Enterprise Singapore, and the Building and Construction Authority have been working closely with the AP Government to attract Singapore companies to pursue opportunities in AP's industrial and business clusters of high potential.

Capacity Building

Singapore's partnership with AP recognises the importance of human resource capacity building in undergirding effective master planning, development and governance. Numerous teams of AP administrative and operations officials dealing with water infrastructure, social housing, street-side greenery and building control visited Singapore between 2015 and 2016 to study these areas through discussions and site visits.

OVERALL SEED PLAN

Water engineers from Andhra Pradesh and Singapore on a site visit to Krishna River near Pulichinthala Dam, June 2015

Beyond the study visits and APLUGP, CLC in 2017 launched a series of "deep dive" workshops, which delved into various topics such as land-use and transport planning, development promotion, urban design, housing and building construction, water infrastructure, power, and solid waste management. Helmed by seasoned practitioners who held senior management positions in relevant Singapore government agencies, these workshops have been attended by close to 200 staff from CRDA and AP's state agencies.

Singapore's capacity building efforts have extended beyond planning and development issues to the areas of security, education and public libraries.

Moving ahead

It is hoped that AP's collaboration with Singapore in pursuing an integrated master planning and development approach, and in institution building and governance, delivered via capacity building platforms, will contribute to the building of a liveable capital region for AP. A successful collaboration in this respect will not just be a milestone in AP-Singapore relations but could also have a demonstration effect for other Indian states as they continue to meet their urbanisation challenges.

6 A form of public procurement process that requires a public authority which has received an unsolicited bid for a public project to publish the bid and invite third parties to match or exceed it.

24

Unlocking potential through planned development in Coimbatore

Coimbatore
Redrawing the master plan

Coimbatore

The challenge

Coimbatore in Tamil Nadu is among India's fast growing tier II cities, with a population of over 1.6 million.[1] Its vibrant manufacturing and IT industries have attracted a continuous stream of labour, and the resulting new settlements have stretched the city's limits to 642.12 km². This unplanned and uncoordinated development has led to traffic congestion, inadequate sanitation and depleting water resources.

The solution

Coimbatore decided to develop a comprehensive master plan that integrates peripheral developments with the city core and aligns regional water and sanitation infrastructure plans with the city's requirements. With a planning horizon of 25 years, the new GIS-based plan is for a larger area of 2,869 km² with a projected population of 3 million. It adopts Transit-Oriented planning and mixed-use developments as a key strategy to ensure compact development. The plan, which is in its final phase of drafting, will be integrated with Coimbatore's Smart City proposal and its draft mobility plan.

PARTICIPANT TAKEAWAY

Coimbatore needs to have a broad planning strategy similar to Singapore's Concept Plan that can set the long-term planning vision. Taking an integrated approach, the land-use plans should also incorporate multi-sector requirements. Implementation of the new plan should be undertaken in phases, with high-priority, high-impact projects taken up first. In-house planning capabilities also need to be strengthened, working with retired government planning professionals and academicians.

Mr Shambhu Kallolikar, Commissioner Town and Country Planning, Government of Tamil Nadu

1 2011 Census

TRANSIT

Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

Objectives

Providing basic services to households and building amenities in cities that will directly improve the quality of life for all, especially the poor and the disadvantaged, is a national priority for India.

On 25 June 2015, the Government of India launched the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) with a view to:

(i) ensuring universal coverage of water supply and substantial coverage in provision of sewerage facilities;

(ii) increasing the amenity value of cities by developing greenery and well-maintained open spaces (e.g., parks); and

(iii) reducing pollution by constructing facilities for non-motorised transport (e.g., walking and cycling).

The Mission focuses on the following thrust areas:
- Water supply;
- Sewerage facilities and septage management;
- Storm water drains to reduce flooding;
- Pedestrian, non-motorised and public transport facilities and parking spaces; and
- Enhancing the amenity value of cities by creating and upgrading green spaces, parks and recreation centres, especially for children.

COVERAGE. AMRUT covers 500 cities under the following categories:
- All Cities/Towns that have populations exceeding 1 lakh (100,000) ;
- All Cities/Towns classified as Heritage Cities under the HRIDAY Scheme for heritage city development;
- 13 Cities/Towns on the stems of the main rivers that have populations above 75,000 but less than 1 lakh (100,000) each;

- 10 Cities from hill states, islands and tourist destinations (not more than one from each State).

REFORMS. A cornerstone of AMRUT is the implementation of 11 urban reforms such as e-governance, constitution of professional municipal cadres, devolving funds and functions, review of building bylaws, setting up of financial intermediaries, improvement in the assessment and collection of municipal taxes and fees, credit rating of Urban Local Bodies (ULBs), energy and water audits, and citizen-centric urban planning.

Funding

The total outlay is Rs. 50,000 crores (S$10 billion) for five years from FY 2015-16 to FY 2019-20 and the Mission will be operated as a Centrally Sponsored Scheme. AMRUT may be continued thereafter following an evaluation by the Ministry of Housing and Urban Affairs (MoHUA).

Progress

The programme outcomes have been valued by citizens, particularly women. The following steps have been taken so far:
- The State Annual Action Plans of all 36 States/ Union Territories (UTs) have been finalised, with a total proposed investment of Rs. 77,640 crores (S$16 billion), of which Rs. 35,890 crores (S$7 billion) is the Central Government's share;
- 310 projects costing Rs. 190.78 crores (S$38 million) have been completed;
- 1,657 projects costing Rs. 34,454 crores (S$6.9 billion) have been awarded;
- Tenders have been invited for 769 projects worth Rs. 12,504 crores (S$2.5 billion);
- Detailed Project Reports (DPRs) for 1,160 projects worth Rs. 11,002 crores (S$2.2 billion) have been approved;
- In keeping with the incentive-based approach to reforms, a sum of Rs. 900 crores (S$181 million) has been released to the States/UTs for the years 2016-17 and 2017-18.

Gurugram
Getting on board

The challenge

Located just outside New Delhi, Gurugram[1] is a bustling economic powerhouse. With a population of 1.5 million,[2] the city faces a severe shortage of public transport services. There is only one metro line linking the city to New Delhi and a light metro rail. Its handful of ageing public buses ply limited routes. As a result, traffic snarls are endemic.

The solution

Gurugram's strategy is to massively overhaul its bus transport system and expand its rail system. To ensure professional management and operation, the Gurugram Metropolitan City Bus Limited has been formed. Bus infrastructure will be ramped up, with 500 new buses to ply new routes and an addition of five bus depots. By mid-2018, 100 new buses are expected to hit the roads. Bus wait times will be shortened to 7.5-10 minutes and commuters will soon be able to get live updates via mobile apps. Commuter surveys have been undertaken to identify service gaps and determine last mile connection needs. Once the improvements are in place, daily bus ridership is expected to be in the range of 300,000.

ACTION PLAN SHARING

At the programme, we discussed that public transport based on a bus system is a lower cost and more flexible option for a start. In Singapore, public transport is seen as a public good. Routes are now planned centrally, the number of bus operators has been cut, and buses have dedicated lanes, traffic light priority and right-of-way. Comfort and reliability of services with a reasonable fare structure that does not penalise modal transfers is a vital component. Car usage and ownership is also heavily discouraged.

Mr Wong Kai Yeng, CLC Panel of Experts on Planning and Infrastructure

1 Gurugram was formerly known as Gurgaon

2 2011 census

Thoroughfare in Gurugram

Gangtok
Transit in the skies

Gangtok

Ropeways open up alternative spaces for public transport

The challenge

The Himalayan city of Gangtok, capital of Sikkim, has a density of more than 5,000 persons per km^2, with 100,286[1] persons spread over 19 km^2. It faces severe congestion: its topography is characterised by steep gradients and irregular road alignments, resulting in narrow carriageways. This limits conventional public transport services to only 2% of modal share.

The solution

Gangtok's goal was to adopt alternative transport systems that are reliable, easy to install, operate and maintain, have minimal environmental impact, allow intermodal integration, provide good internal rates of return (IRR), and can boost the residents' quality of life. The State of Sikkim decided on a ropeway system, which suits the city's topography and can potentially bring about transformational change. Gangtok currently has one tourist cable car and plans to expand its network.

A key ingredient for designing a successful ropeway system was the availability of GIS spatial data. Community engagement uncovered concerns for safety, particularly over power outages; these were addressed through system design. The detailed plans for the ropeway transit system are currently awaiting approval from the Ministry of Housing and Urban Affairs. If approved, the Ministry will fund up to 90% of the cost, with the State of Sikkim providing the remainder. The Government of Sikkim is also considering supporting infrastructure such as public rugged escalators, FoB (foot over bridge), and transit-oriented developments to ensure the project is a success.

ACTION PLAN SHARING
We discussed that Gangtok could consider compact, integrated planning around the stations to attract higher patronage. Beyond that, extraneous traffic and loading and unloading of vehicles should be diverted from main roads.

Mr Mohinder Singh, CLC Panel of Experts on Transport

1 2011 census data

HERITAGE CONSERVATION

Heritage City Development and Augmentation Yojana (HRIDAY)

Objectives

India is endowed with rich and diverse natural, historic and cultural resources. However, it is yet to explore the full potential of these resources. Past efforts at conserving historic and cultural resources in India's cities and towns have often been carried out with little consideration for the main development challenges they face and in isolation of the needs and aspirations of local communities. Heritage city development is not about protecting and conserving a few monuments; rather, it is about comprehensive planning and development of the entire city—from infrastructure provision, delivery of basic services, growing the local economy and providing for the livelihoods of the people, ensuring the quality of life of communities, and reinvigorating the soul of the city.

The Ministry of Housing and Urban Affairs launched the Heritage City Development and Augmentation Yojana (HRIDAY) on 21 January 2015. HRIDAY offers tremendous opportunity for an integrated, inclusive and sustainable development of India's heritage cities. Its main objective is to preserve the character and soul of the heritage city and facilitate inclusive heritage-linked urban development by exploring various avenues, including harnessing the private sector.

The duration of the Mission is four years starting in December 2014 and ending in November 2018.

COMPONENTS AND STRATEGY. The Mission covers 12 cities, namely: Ajmer, Amaravati, Amritsar, Badami, Dwarka, Gaya, Kanchipuram, Mathura, Puri, Varanasi, Velankanni and Warangal.

The heritage city of Varanasi on the banks of the Ganges River

The Mission broadly focuses on four theme areas for reviving and revitalising the soul of heritage cities, i.e., Physical Infrastructure, Institutional Infrastructure, Economic Infrastructure and Social Infrastructure.

The projects can be funded directly or through support from other stakeholders, including the private sector. The following is a broad indicative list of components under the four broad themes, which can be refined, based on the needs of each city:
• Preparation of a City HRIDAY Plan;
• Heritage revitalisation linked to service provision;
• City information/knowledge management and skills development.

Funding

The Mission is fully funded by the Central Government. The total outlay is Rs. 500 crores (S$101 million).

Progress

Thus far, 66 projects have been approved at a cost of Rs. 420.44 crores (S$85 million), and 46% of the funds have been released. Of these, three projects have been completed and 52 contracts are ongoing.

Jaisalmer
Preserving the Golden City

Jaisalmer Fort has been adapted to modern uses, sometimes at the expense of heritage values.

The challenge

Jaisalmer, in the State of Rajasthan, stands out for its heritage dominated by *havelis* (ancient mansions) and monuments built with yellow stone. At its centre lies Jaisalmer Fort, a UNESCO World Heritage site. Its heritage buildings are in need of protection and preservation while modern amenities are incorporated. Present-day construction techniques and materials using exposed cement, glass and steel have affected the aesthetics, grandeur and heritage value of the buildings. Telephone poles, electric lines and billboards further mar the city's skyline. The lack of funds has deterred the state and private building owners from undertaking costly conservation works.

The solution

With inputs from the Archaeological Survey of India, the Municipal Board, and the Urban Improvement Trust, Rajasthan's Department of Town Planning formulated the "New Building Regulations" in 2015 to balance current needs, heritage character and visual integrity. The city will be divided into zones, each with specified development guidelines. Street facades are to be unified and all utilities to be placed underground. A Heritage Fund will be established to raise funds for building conservation through tourist contributions.

Draft Site Management Plans are being finalised. A Jaisalmer Fort Management Authority will be set up to perform municipal functions, implement regulations and undertake repairs of heritage properties. Residents will be incentivised to maintain their properties or resettle elsewhere if their properties are uninhabitable without development. The Rajasthan Government has allocated Rs. 2 crores (S$403,000) for the preservation of the fort and its surrounds.

ACTION PLAN SHARING

Singapore was able to conserve its heritage areas by understanding their tourism value. Its tourism growth was a result of deliberate economic and physical planning. The heritage areas were enhanced through pedestrianisation, integrated development, and pro-business initiatives. Likewise, Jaisalmer would benefit if conservation and tourism go hand in hand. Tourism development will yield more funds for conservation through heightened business and employment opportunities.

Ms Lim Swee Keng, Deputy Director, CLC

Ahmedabad
Balancing the Old with the New

Unchecked growth, neglect of its built heritage and the lack of development controls had led to a degradation of the architecture and splendour of what is commonly known as the walled city of Ahmedabad. How did this city make a remarkable transition to a UNESCO World Heritage city? This case study looks at the measures the Historic City of Ahmedabad took towards regaining its past glory and the challenges that remain.
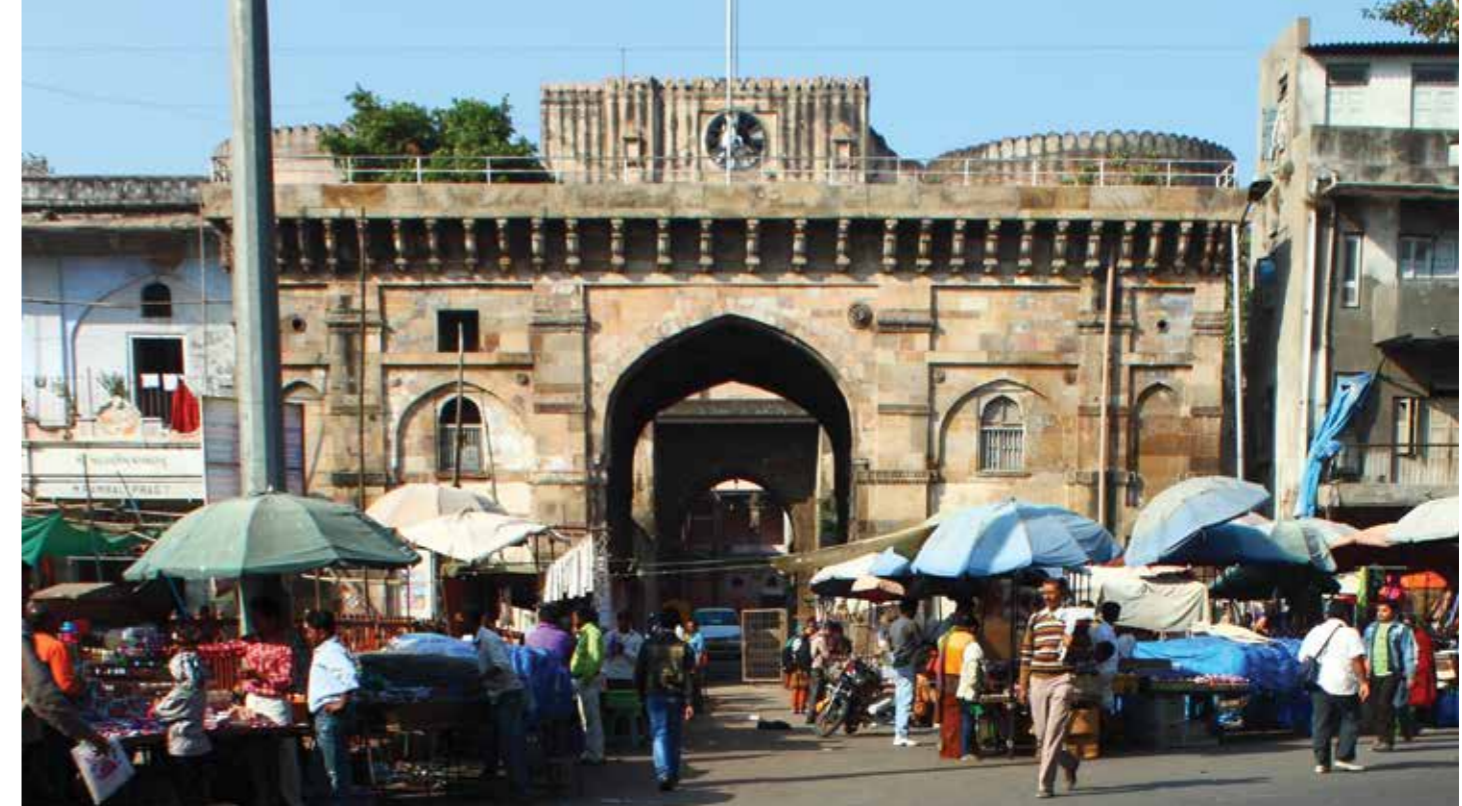
In 2012, Ahmedabad received Special Mention under the Lee Kuan Yew World City Prize, an international award honouring outstanding achievements in the creation of liveable, vibrant and sustainable urban communities, for a series of urban redevelopment projects it undertook, namely the Bus Transport System, the Kankaria Lake redevelopment and the Sabarmati Riverfront projects, Ahmedabad sought to make itself a liveable, equitable and sustainable metropolis.

❝...As it displays the first sign of dramatic physical transformation, Ahmedabad sends a message of hope to cities that are seeking to rise above the proliferating problems of pollution, worsening traffic conditions and inadequate affordable housing...❞
Jury's Citation, Special Mention, 2012 Lee Kuan Yew World City Prize

The challenge

Ahmedabad is the State of Gujarat's largest city, a modern commercial metropolis with a population of 5.57 million[1] spread over 464 km². It enjoys a rich cultural and historical legacy. The city is at once home to 600-year-old heritage structures and the post-modernist buildings of Le Corbusier, Louis Kahn and Frank Lloyd Wright. One of its most celebrated features is its historic city, a 5.35 km² fortified enclave located in the city centre. Established in 1411 by Sultan Ahmed Shah and continuously occupied since, the Historic City is an architectural treasure trove and a living heritage, with 2,600 heritage sites, 28 protected monuments,[2] and 600-odd *pols* or traditional housing clusters with nearly 375,000[3] residents. However, the Historic City could not escape the pressures of modern day development, which have taken a toll on its character and led to its decline in recent decades.

The Historic City is defined by its close-knit urban settlement form, rooted in ancient town planning wisdom. The *pols* capture the essence of community living and lend the Historic City its unique pulsating character. A typical *pol* precinct is structured around narrow meandering streets, flanked by two-storeyed houses and punctuated with markets, *chowks* (squares), community wells and *chabutros* (bird feeders). The *pol* houses have intricate carvings on their facades and were designed to be climate responsive, with internal open courtyards that filter sunlight, shafts that circulate cool air, underground rainwater tanks, and efficient distribution of space within tight plot sizes. The 15th–16th century monuments of the Historic City showcase a fine fusion of Indo-Islamic design principles and aesthetic values.

Top pic Haphazard developments around Bhadra Fort gate
**Bottom pic** Life in the *pols*

1 2011 census
2 Ancient monuments which are of national importance in India are called protected monuments and are managed by the Archaeological Survey of India (ASI).
3 "Urban Conservation Initiatives in the Walled City of Ahmedabad", in *Urban Heritage in Indian Cities: Compendium of Good Practices* (India: National Institute of Urban Affairs, 2015), 9–14.
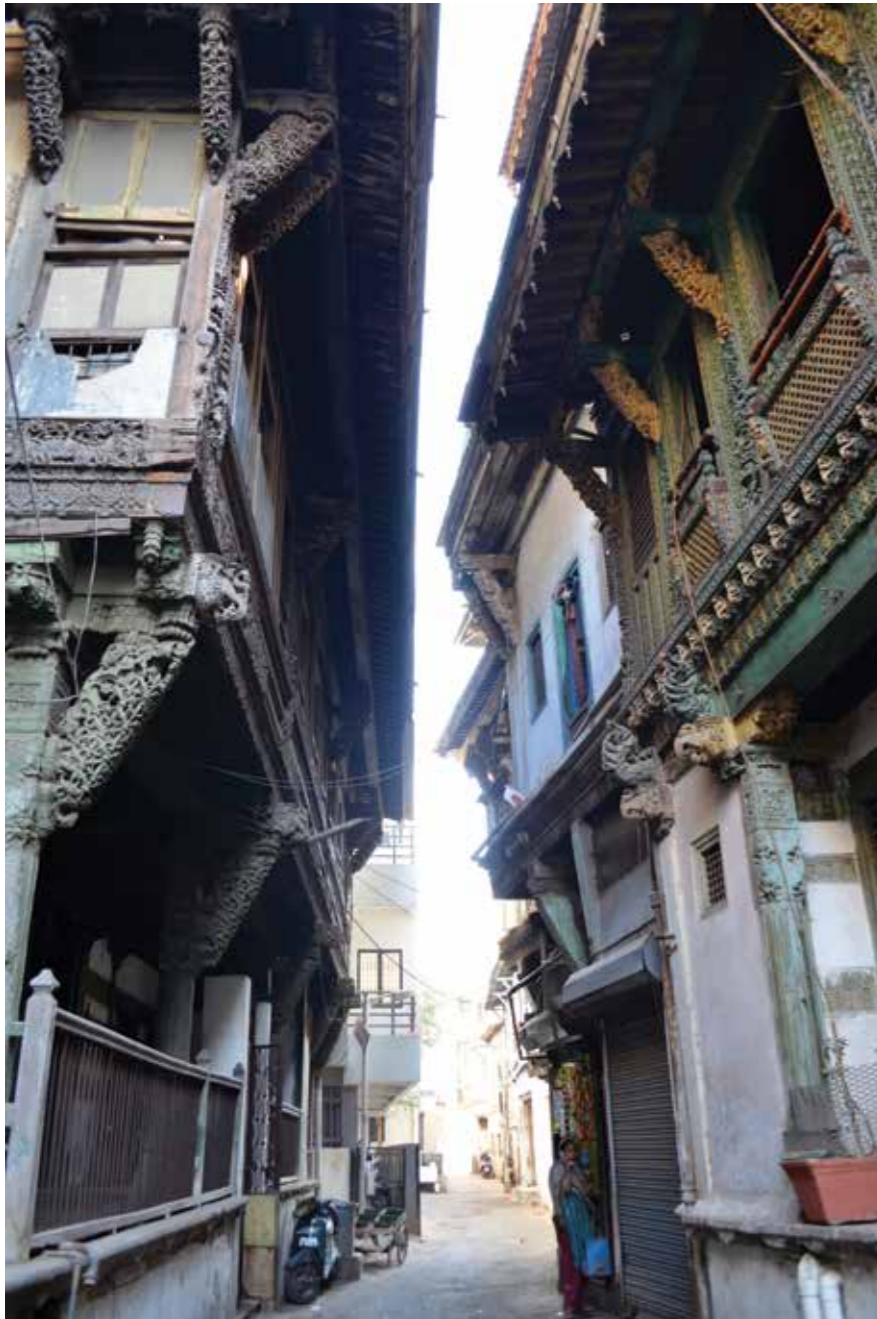
Despite its splendour, the Historic City faces unrelenting development pressures. Owing to a lack of modern-day amenities and changes to the social fabric, several families emigrated to the western parts of Ahmedabad, leaving the *pol* houses vacant and in a state of neglect. For higher rents, some owners let out these houses for commercial activity, including for non-compatible uses such as warehousing and manufacturing. Narrow streets originally designed for pedestrian movement are heavily congested with two-wheelers, auto-rickshaws and buses. Sections of the city walls were demolished to make way for wider roads. Inadequate development controls have resulted in the mushrooming of illegal and insensitive developments. Restoration of these properties is often beyond the means of their owners, some of whom have found it far more lucrative to sell off to real estate developers.
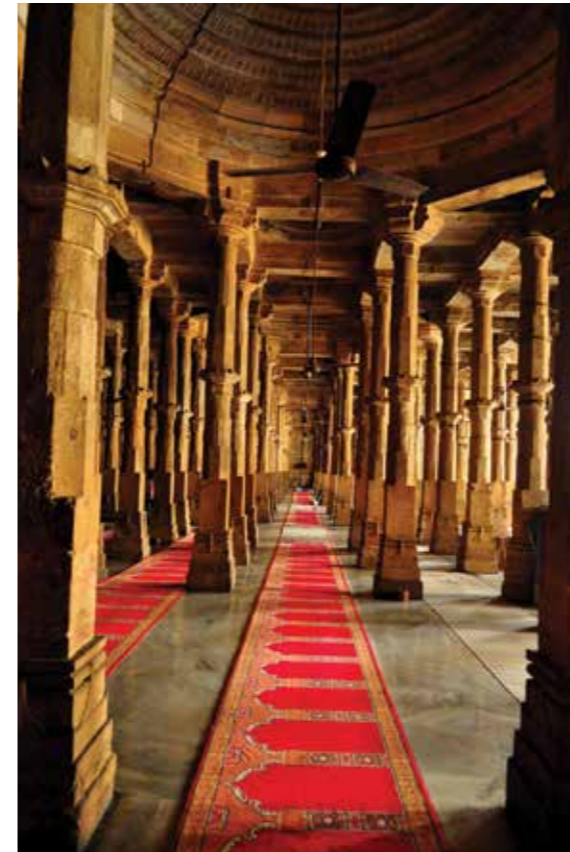
The solution

Preserving and maintaining centuries-old built heritage in a rapidly growing city is a complex endeavour. In the case of the Historic City, it has involved careful planning, administrative reforms, collaborations and the involvement of civil society.

On the institutional side, concerted efforts began in 1984, when conservationists, together with the Ahmedabad Municipal Corporation (AMC) and the Ford Foundation, instituted a study to initiate conservation policies. Following this, in 1996, AMC, with assistance from the Conservation and Research of Urban Traditional Architecture (CRUTA) Foundation, set up a Heritage Cell, becoming the first Indian city-level administration to have a dedicated heritage department. Over the next few years, the Heritage Cell, through a series of collaborations, rolled out a conservation and urban regeneration plan.

A "Walled City Revitalisation Plan" was drafted, which highlighted the need to modify the old heritage regulations and reduce the density allowed for new constructions.[4] New regulations prohibiting the demolition of heritage structures were introduced. These were later amended to make it mandatory for heritage property owners to seek the Heritage Cell's advice and approval before undertaking repair and renovations. Further, a Heritage Conservation Committee was formed by the Gujarat State Government to oversee conservation activities, not only for the walled city but also for urban areas that are part of the greater Ahmedabad urban agglomeration, managed by the Ahmedabad Urban Development Authority (AUDA). AUDA's Development Plan 2021 introduced regulations exclusively for the Historic City, defining building uses, setbacks, permissible extensions, floor space indexes (FSI) and guidelines for parking provisions.

4 "Urban Conservation Initiatives in the Walled City of Ahmedabad", in *Urban Heritage in Indian Cities: Compendium of Good Practices* (India: National Institute of Urban Affairs, 2015), 9-14.

Collaborations have been effectively used as a way of gaining insights into new-age conservation methods and raising local and international interest in the Historic City's heritage value. AMC partnered the French government to survey and create an extensive database of the Historic City's heritage structures and carry out restoration works. The Dutch government was roped in to restore the city's Dutch-era buildings. Several restorations projects are being undertaken with the Archaeological Survey of India, which manages the listed buildings and their precincts. With time, the Heritage Cell built up its in-house technical capabilities on conservation and restoration works.

In a bid to make renovation financially viable, AMC and AUDA partnered the Housing and Urban Development Corporation Ltd to offer subsidised-interest loans for repair and restoration. Local banks and religious trusts also lent financial assistance for restoration works. Recently, AUDA introduced the "Tradable Development Rights (TDR)" policy[5] for listed heritage structures whereby a tradable FSI ranging between 0.3 and 0.5 is assigned to each building according to its heritage value. Property owners can trade their FSIs to generate revenue for restoration works.

The activities of the Heritage Cell also successfully drew on Ahmedabad's vibrant civil society, the *pol* residents and the entrepreneurial acumen of its generations-old wealthy families who were patrons of the city's art and architecture. These activities included heritage walks through the historic quarters and "soft" activities such as poetry recitals and street-plays to generate interest in the *pols*. Reviving age-old traditions of community-led discussions, the Heritage Cell also held meetings in the *pols* with the residents to understand their concerns and generate buy-in for the conservation plans.

5 Using the TDR, property owners can sell development rights to another person or agency, who may use it for development in other parts of the city.

❝ At the programme we discussed the challenges rapidly urbanising cities such as Ahmedabad, Delhi, Jaipur, Bhubaneswar and Mumbai face in conserving their built heritage. In this context, Singapore's heritage conservation strategy offers practical insights that can be adapted by cities elsewhere. An important learning from Singapore's approach is that heritage conservation can be sustainable when buildings are safeguarded and their economic value is unlocked. Investment opportunities need to be created through selective densification, injection of new uses, improved access, provision of amenities and place management involving the local community. ❞

Mr SCL Das, Joint Secretary, Ministry of Home Affairs, India

Progress

The two decades of efforts have borne fruit. In 2011, Ahmedabad was nominated for UNESCO's World Heritage City status. Over the next six years, a team of conservationists, architects and students from the Centre for Conservation Studies and CEPT University diligently studied and documented the Historic City in granular detail, and prepared a Heritage Management Plan. In recognition of the richness of its 600-year old living heritage, in 2017, the Historic City of Ahmedabad was inscribed as a UNESCO World Heritage City.

Restoration works and community engagement activities have helped to recreate interest in the *pols*. Private entrepreneurs have invested in the restoration of some of the *havelis* (ancient mansions) and transformed them into boutique hotels, museums, performing art spaces, etc. The city's heritage status is expected to increase tourist inflows and generate revenue, which can be channelled for conservation works.

View of the conserved Chinatown district in Singapore, visited by programme participants

While much has been done to preserve heritage, several complex challenges prevail. Basic services, such as garbage management, as well as pollution and ageing infrastructure require urgent attention. Illegal demolition of heritage structures continues. Attempts to regulate vehicular movement have yielded mixed results, and congestion continues unabated. Significant funds are needed to undertake all the heritage management plans and projects proposed in the dossier presented to UNESCO.

In its Heritage Management Plan, AMC has identified a list of immediate action steps that will be taken in the short to medium term. These include preparation of a Local Area Plan, heritage bylaws, urban design plans, strengthening of the regulatory framework, dissemination of conservation guidelines, restoration of traditional water harvesting systems, public awareness and several restoration projects. The administration assesses that now is the best time to roll out new plans, nudge social behavior towards greater civic responsibility and garner more community support to sustain the conservation efforts.

As the Historic City pushes forward its conservation plans, it can take heart from the fact that some of those who had once left the city are slowly returning to reclaim its old glory and continue its legacy as a living heritage.

Opposite pic
The Shaking Minarets, a rich 15th century architectural legacy
Left pic Bird feeders, dotting the *pol* landscape

AFFORDABLE HOUSING

Pradhan Mantri Awas Yojana (Urban)
Housing for All Mission by 2022

Objectives

Rapid movements of people from rural to urban areas have meant a lack of affordable housing, poor quality housing and homelessness in many of India's urban areas. On 25 January 2015, the Indian Government launched the "Pradhan Mantri Awas Yojana (Urban)–Housing for All Mission by 2022" with a view to ensuring housing for all in the urban areas. The Mission, intended to be implemented during 2015–2022, provides Central Government assistance to eligible families/beneficiaries across all 4,041 statutory towns.

Aside from quantity and quality of housing, best practice housing integrates facilities, services and job opportunities within close distance.

The Mission has the following four verticals:

(i) In-situ Slum Redevelopment (ISSR): A grant of Rs. 1 lakh (S$2,000) per house is available for all houses built for eligible slum dwellers. The scheme involves using land as a resource and envisages the participation of private developers.

(ii) Credit-Linked Subsidy Scheme (CLSS): Beneficiaries from the Economically Weaker Section (EWS)/Low Income Group (LIG), Middle Income Group (MIG)-I and Middle Income Group (MIG)-II seeking housing loans from banks, housing finance companies and other such institutions for acquiring/constructing houses are eligible for an interest subsidy of 6.5%, 4% and 3% on loan amounts up to Rs. 6 lakh (S$12,000), Rs. 9 lakh (S$18,000) and Rs. 12 lakh (S$24,000), respectively.

(iii) Affordable Housing in Partnership (AMP) with the public or private sector: Assistance of Rs, 1.5 lakh (S$3,000) per EWS house is provided by the Central Government where these are in housing projects containing at least 250 houses, at least 35% of which should be in the EWS category.

(iv) Beneficiary-led Individual House Construction/ enhancements (BLC): Central Government assistance of Rs. 1.5 lakh (S$3,000) per house is available to eligible individual families from the EWS category.

Progress

- The Central Government has approved assistance for 30 lakh (3 million) houses; of these, 21 lakh (2.1 million) have been constructed, and 75% of them have since been occupied by the beneficiaries.
- Home loan subsidies have been disbursed to about 1 lakh (100,000) beneficiaries from the EWS, LIG and MIG categories.
- A Schedule of Rates (SoR) has been prepared for three new technologies that will be adopted in this project. Funds have been allocated for Technology Sub-Mission activities such as the global construction challenge.

Bihar
A future with a home

The challenge

While the level of urbanisation is lower in Bihar at 10.5%, compared to the national average of approximately 28%, its urban poverty level is much higher, at 32.91%, compared to the national average of 23.62%. This has resulted in an affordable housing deficit of 1.2 million dwelling units. Naturally, long term residents are reluctant to be uprooted from slums, affecting effective action. Much resident engagement is needed for households to agree to move from slums to better housing options to improve the quality of life.

The solution

The Bihar government is addressing this through its "Affordable Housing Policy", which supports projects under private partnership. Innovative initiatives under the new scheme include: redevelopment of existing slum land with grants of Rs. 1–1.5 lakh (S$2,000–3,000) per house, subsidies for economically weak communities and lower income groups, provision of public housing through parastatal agencies, or integrating affordable housing into private developments. A demonstration precinct is also being developed as a model for future development . The project is supported by the "Housing for All" national scheme.

Participants visited the Housing and Development Board (HDB) showroom to get a glimpse of the Singapore's available public housing types.

> 66 Public Housing like the one in Singapore can take India out of a huge housing crisis. Clear political vision supported by responsible and committed technocrats is the right way to development. 99
>
> Mr Iftikhar Ahmed Hakim, Director Planning and Coordination, Project Management Unit, Jhelum Tawi Flood Recovery Project, Government of Jammu & Kashmir

Madhya Pradesh
Building affordable homes

View of the affordable housing project in Chhindwara, Madhya Pradesh

The challenge

Madhya Pradesh has an estimated urban affordable housing shortage of 1.1 million.[1] This shortage is acutely felt among the urban poor, classified as the Economically Weaker Section (EWS) and Low Income Group (LIG). The supply and uptake of government-built affordable houses is constrained owing to issues of affordability, high land and development costs, poor housing design, banks' lending reluctance and low private sector participation.

The solution

In 2014, the state set a target of constructing 500,000 EWS and LIG homes by 2018.[2] The housing policy was redesigned and aligned with the Central Government's "Housing for All" programme. On the demand side, affordability has been improved through government-facilitated debt restructuring involving loan repayment guarantees, an interest subsidy (5%) and a low monthly instalment scheme. On the supply side, land required for these projects will be released expediently at token rates. More mixed-income and mixed-use projects are planned, whereby revenue from the sale of commercial and higher-priced units will subsidise the cost of building low income units. Housing designs are also being customised according to the residents' lifestyle needs. So far, 75,000 affordable housing units have been constructed and 200,000 are under construction.

PARTICIPANT TAKEAWAY

Discussion of Singapore's public housing experience, particularly the shift from rental to an ownership housing model, the concept of no-fence public housing estates, use of innovative construction technologies and design of identical housing units with pre-set customisation options, has been extremely insightful. While Madhya Pradesh's Affordable Housing programme has innovated with design and financing models, there are some ideas from Singapore which can be adapted for better programme implementation.

Mr Anand Singh, Director, Urban Development and Housing Department, Government of Madhya Pradesh

1 Madhya Pradesh Housing and Infrastructure Development Board
2 Madhya Pradesh 2018 Vision document

Singapore's Bishan-Ang Mo Kio Park is part of the "Active, Beautiful, Clean (ABC) Waters" programme"—the park is not only a popular recreational space and green lung, but also doubles as a means of flood management.

SMART SOLUTIONS

Smart Solutions

AMRUT Cities
Using GIS to enhance master planning

The challenge

Urban settlements in India have experienced rapid population growth: the percentage of India's population living in urban areas more than doubled from 14% at the time of independence to 31.8% in 2011[1]. By 2051, India is expected to be considered an urban nation, with more than 50% of the population living in urban areas.

As part of a series of efforts to ensure that urban development is equitable and sustainable, the Indian Government launched the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in June 2015. The objective of AMRUT is to ensure that 500 selected cities have, among other things, universal coverage of water supply, substantial coverage in provision of sewerage facilities and ample facilities for non-motorised transport.

The tools for delivering coherent and sustainable urban development missions such as AMRUT are Master Plans/Development Plans. These allow for optimum land-use. Most Master/Development Plans are formulated for 20-year periods, in phases of five years for periodic review and revision. The formulation of a master plan starts with base map preparation, existing land-use surveys, collection of the socio-economic data necessary for reviewing the existing situation and then proposing a future land-use plan. The most crucial information required is an accurate and updated base map of the planning area, showing roads and building layouts, spatial extent of development, information on the use of each parcel of land, etc.

Gathering topographical data for input into GIS layers

Conventional mapping and data gathering mechanisms, however, cannot keep pace with rapid population growth and frenetic urban growth: these trends make it hard to track the spatial growth of towns/cities, land-use status and the status of the country's physical infrastructure.

The solution

Advances in remote sensing and Geographic Information Systems (GIS) can expedite the Master Plan process through the integration of both spatial and attribute data. These systems enable detailed real-time monitoring, updating and assessment of elements such as the spatial growth of towns/cities, land-use status, and physical infrastructure in anticipation of projected population growth. Preparation of base maps from Very High Resolution Satellite (VHRS) images and GIS technology can be a time- and cost-effective solution.
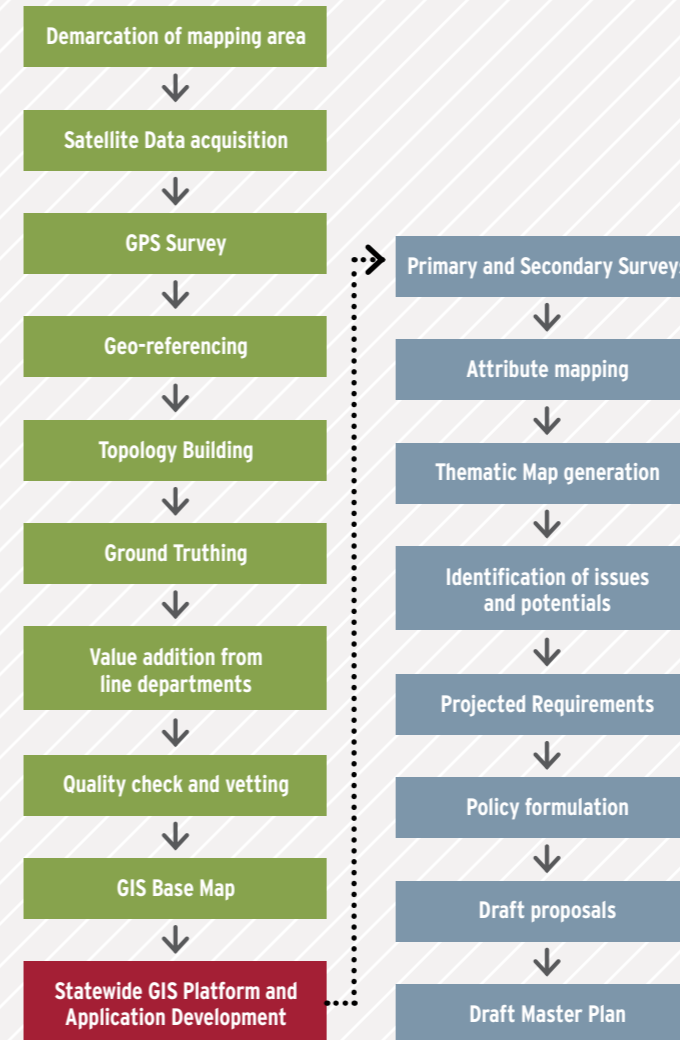
The formulation of GIS-based Master/Development Plans is one of the key reforms under AMRUT. The reform was approved in October 2015 as a 100% centrally funded sub-scheme.

OBJECTIVE OF GIS-BASED MASTER PLANS FOR AMRUT. To develop common digital geo-referenced base maps and land-use maps using GIS and Master Plan formulation for 500 cities selected under the AMRUT Urban Mission.

COMPONENTS. The major components of this AMRUT sub-scheme are Urban Database Creation at the scale of 1:4000 according to the prescribed Design and Standards, Formulation of Master Plans on the GIS base map, and Capacity Building.

TIMELINES. The total time period for base map generation, including data acquisition, geo-referencing, GPS (Global Positioning System) surveys, data processing, ground-truthing, generation of thematic layers, etc., according to the Design and Standards for 500 cities is 24 months. The time period for urban data collection, data analysis and master plan formulation up to the draft proposal stage is 36 months.

PROCESS.

Demarcation of mapping area →
Satellite Data acquisition →
GPS Survey →
Geo-referencing →
Topology Building →
Ground Truthing →
Value addition from line departments →
Quality check and vetting →
GIS Base Map →
Statewide GIS Platform and Application Development

Primary and Secondary Surveys →
Attribute mapping →
Thematic Map generation →
Identification of issues and potentials →
Projected Requirements →
Policy formulation →
Draft proposals →
Draft Master Plan

Source: TCPO

BUDGET. The total cost of this sub-scheme under AMRUT is Rs. 515.00 crores (S$104 million), with the following breakdown:
- geo-spatial database creation: Rs. 115.90 crores (S$23 million);
- plan formulation, including data collection & analysis: Rs. 388.25 crores (S$78 million); and
- capacity building: Rs. 10.85 crores (S$2 million).

IMPLEMENTATION MECHANISM. Although, all the reform activities under AMRUT are reviewed on a regular basis, this particular reform will be monitored as follows:

At State Level: The State Level Technical Committee (SLTC) will oversee the progress of the technical implementation of the reform and the State Level High-Powered Steering Committee will look into overall coordination and implementation of the reform.

At Central Government Level: Periodic and detailed monitoring and review of the reform state-wise will be carried out by the Space Technology Application Cell created at the Town and Country Planning Organisation (TCPO) by the Ministry of Housing and Urban Affairs. The Cell will submit its recommendations to a National Monitoring and Review Committee. The Monitoring and Review Committee will in turn report to the Technical Advisory Committee which will further report to the Apex Committee, of AMRUT. The Apex Committee will monitor/review the overall progress and achievements of the reform and address any inter-agency issues.

Progress

National meetings involving 218 State Mission Directors/State Nodal Officers were held in June and October 2016 and September 2017 to discuss the modalities of implementing the scheme. A National Monitoring & Review Committee, under the chairmanship of TCPO's Chief Planner has been set up and two meetings have been held so far, in November 2017 and January 2018.
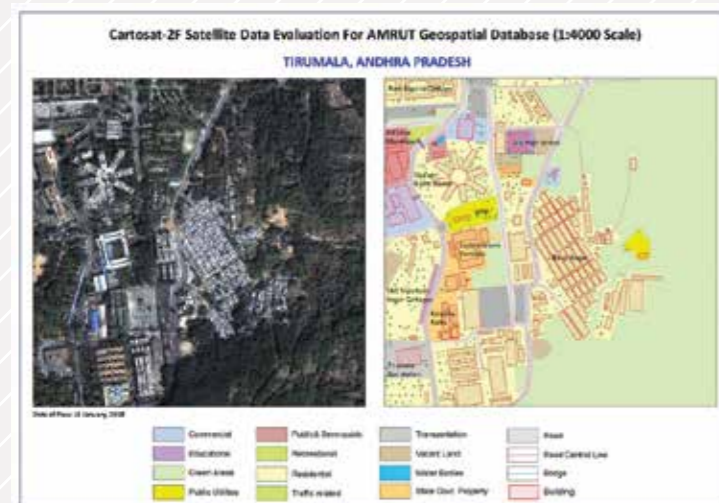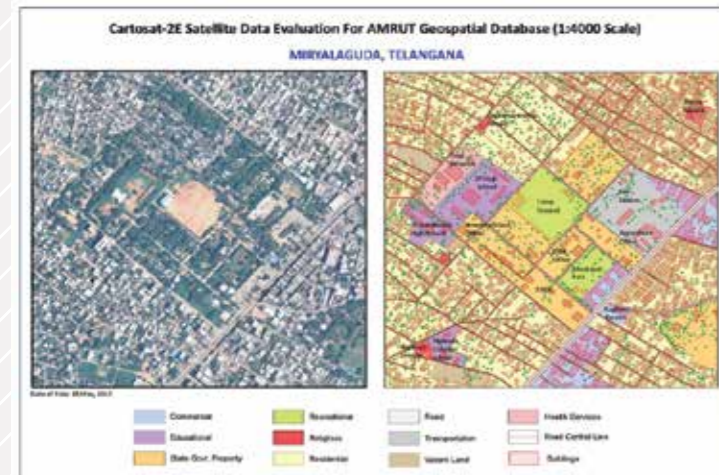
1 2011 census

FINANCIAL PROGRESS. Thus far, funds have been released to 26 States (300 Towns). The total approved cost for these 26 States is Rs. 258.63 crores (S$52 million), of which a sum of Rs. 49.19 crores (S$10 million) has been released as a 20% advance and first instalment. Proposals from another four States are under consideration.

PHYSICAL PROGRESS

(i) **Geo-database Creation:** TCPO has prepared and published the Design and Standards document for geo-database creation. Satellite images have been acquired in 17 States (185 towns), Data Processing has been completed in 9 States (70 towns), Thematic Map Creation and Generation of Draft Maps have been completed in 9 States

(69 towns), and draft maps have been delivered in 7 States (40 towns) for vetting and attribute database collection.

(ii) **Master Plan Formulation:** Calls for Expressions of Interest have been issued in 9 States (61 towns), Requests for Proposals have been floated in 10 States (50 towns), and work has been awarded to consultants in 6 States (12 towns).

(iii) **Capacity Building:** The capacity building programme has begun in coordination with two national-level institutes (BISAG in Gandhi Nagar and NESAC in Shillong). It has so far trained 79 participants from State Governments in four training programmes held between December 2017 and February 2018.

Cartosat-2E Satellite Data Evaluation For AMRUT Geospatial Database (1:4000 Scale)
MIRYALAGUDA, TELANGANA

Cartosat-2F Satellite Data Evaluation For AMRUT Geospatial Database (1:4000 Scale)
TIRUMALA, ANDHRA PRADESH

Source: TCPO

PARTICIPANT TAKEAWAY

Singapore's GIS portal (www.onemap.sg) is much appreciated. The level of information embedded, both spatial and non-spatial, is very useful for urban planning and development; it can be replicated in the Indian context while implementing the AMRUT Sub-scheme on formulation of GIS-based Master Plans for our 500 cities. The overall knowledge gained from Singapore will help in better planning and governance in India.

Mr Mohd. Monis Khan, Town and Country Planning Organisation, Ministry of Housing and Urban Affairs, Government of India

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Smart Solutions IN BRIEF

Smart Cities Mission

Objectives

The Ministry of Housing and Urban Affairs (MoHUA) launched the "Smart Cities" Mission on 25 June 2015. The objective of this bold, new initiative is to promote cities that provide core infrastructure and give a decent quality of life to citizens, deliver a clean and sustainable environment and apply "Smart" solutions. The focus is on sustainable and inclusive development. The idea is to look at compact areas and create a replicable model that will act as a beacon to other aspiring cities, both within and outside the Smart City, thus catalysing the creation of similar Smart Cities elsewhere in the country.

The core infrastructure elements of a Smart City include:

(i)   Adequate water supply;
(ii)   Assured electricity supply;
(iii)   Sanitation, including solid waste management;
(iv)   Efficient urban mobility and public transport;
(v)   Affordable housing, especially for the poor;
(vi)   Robust IT connectivity and digitisation;
(vii)   Good governance, especially e-governance and citizen participation;
(viii) Sustainable environment;
(ix)   Safety and security of citizens, particularly women, children and the elderly; and
(x)   Health and education.

COVERAGE AND STRATEGY. The Mission will cover 100 cities for a duration of five years (FY2015–16 to FY2019–20). The selection of Smart Cities is based on the idea of competitive and cooperative federalism and follows a challenge process to select cities in two stages.

The strategic components of the Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

Funding

The Mission will be operated as a Centrally Sponsored Scheme and the Central Government proposes to give financial support of Rs. 48,000 crores (S$9.6 billion) over five years, i.e., an average of Rs. 100 crores (S$20 million) per city per year. A matching amount will have to be contributed by the State/Urban Local Body (ULB).

Progress

A total of 99 Smart Cities have been selected since January 2016. A total investment of Rs. 2,03,979.00 crores (S$41 billion) has been proposed by these 99 under their Smart City Plans:

• Projects focusing on revamping an identified area (Area Based Development) are estimated to cost Rs. 1,63,138 crores (S$33 billion).

• Smart initiatives across the city (pan-city initiatives) account for Rs. 38,841 crores (S$77 billion) of investments.

• An amount of Rs. 2,000 crores (S$402 million) has been kept aside for operations and maintenance and other contingencies.

Pondicherry

From backwater towards lifestyle hub

Pondicherry Canal planned for rejuvenation

The challenge

Dutch town planning and French architectural influences abound in Pondicherry, a small 19.62 km² city in South India known for its eclectic mix of east and west. The Grand Canal, which bisects the old French and Tamil quarters, reflects this heritage. Yet, years of neglect had left the canal derelict. Built as a stormwater drain by the French around 1765, it had become polluted and an eyesore.

The solution

The year 2015 marked the canal's renaissance. Cleaning commenced in conjunction with the Central Government's Swacch Bharat mission,[1] and the Smart Cities Mission was subsequently identified as the vehicle to catalyse the transformation of the canal and surrounding areas.

Ideas were then sourced worldwide on how best to transform the canal. Singapore lent inspiration with the Singapore River clean-up and the transformation of Clarke Quay into a lifestyle hub. Singapore's "Active, Beautiful, Clean Waters" programme too demonstrated how concrete canals could be transformed into vibrant public spaces.

Draft Site Management Plans are being finalised. Pondicherry Smart City Development Limited, a Special Purpose vehicle, was subsequently set up in September 2017 to execute the canal's transformation, with the French government promising funding and technical assistance. Extensive public consultations were held, combining global best practices with local voices to ensure social inclusion.[2]

1 "Municipality cleans up Grand Canal", *The Hindu*, 14 August 2015, http://www.thehindu.com/news/cities/puducherry/municipality-cleans-grand-canal/article7537944.ece

2 Puducherry Smart City Proposal, http://pondicherrysmartcity.in/images/pdf/Puducherry%20Smart%20City%20Proposal%202017.pdf

Completed in 1987, the Singapore river clean-up enabled Singapore's riverine transformations. The clean-up included strengthening environmental infrastructure and regulations, which unlocked the potential contained in the areas surrounding Singapore's waterways. Clarke Quay, formerly a major trans-shipment and trade passageway, was one such area. It had been earmarked for transformation into a festive commercial and heritage zone by the 1985 Singapore River Concept Plan and 1986 Conservation plan respectively. The government land sales programme for conservation sites then allowed for a public-private partnership to create a lively entertainment zone in Clarke Quay while keeping its heritage.

Top pic Singapore River prior to then Prime Minister Lee Kuan Yew's call for a clean-up. **Source: Singapore Press Holdings Limited**
Bottom pic Singapore River today.

PARTICIPANT TAKEAWAY

The transformation of the Grand Canal is in its nascent stages, and its success depends on steady progress and aligning the project with the overarching idea of transforming Pondicherry into a smart city. Singapore's urban transformation is an inspiration and its Clean Up–Plan–Execute Approach to the Singapore River provides a deep insight and cue for emulation to transform the Grand Canal. Also, as seen from Singapore's "Active, Beautiful, Clean Waters" programme, public engagement will be key to ensure the canal's cleanliness.

Mr Jawahar P, CEO, Puducherry Smart City Development Ltd

SUSTAINABLE ENVIRONMENT

Swachh Bharat Mission (Urban)

Objectives

Close to eight million Indian households in 4,041 statutory towns have no access to toilets;[1] they defecate in the open. The Swachh Bharat Mission (SBM) arises from the Indian Government's vision articulated in the President's address to a Joint Parliamentary Session on 9 June 2014: "We must not tolerate the indignity of homes without toilets and public spaces littered with garbage." The Mission was launched in October 2014 with a view to ensuring hygiene, waste management and sanitation across the nation. SBM is being implemented by the Ministry of Housing and Urban Affairs (MoHUA) in the 4,041 statutory towns.[2]

The main objectives of the Mission are:
- To eliminate open defecation;
- To eradicate manual scavenging;
- To provide modern and scientific municipal solid waste management;
- To generate awareness about sanitation and its linkage with public health;
- To effect behavioral change regarding healthy sanitation practices;
- To augment capacity for Urban Local Bodies (ULBs) to create an enabling environment for private sector participation.

COVERAGE AND STRATEGY. The Mission's components include: construction of household toilets (including conversion of insanitary latrines into pour-flush ones), construction of community/public toilets, and solid waste management.

The strategy includes:
- comprehensive sanitation planning, i.e., the formulation of a State sanitation concept and strategy and of city-level sanitation plans;
- formulation and implementation of a behavioural change strategy and an information, education and communication campaign to create public awareness of sanitation and hygiene issues; and
- creation of an enabling environment for private sector participation.

Funding

- The estimated cost of implementing SBM (Urban) based on unit and per capita costs for its various components is Rs. 62,009 crores (S$12.5 billion).
- The Central Government's share is Rs. 14,623 crores (S$2.9 billion).
- A minimum additional amount equivalent to 25% of the Central Government's share of Rs. 4,874 crores (S$980 million) will be contributed by the States.
- The balance will be generated through various other sources, which are, but not limited to: (i) private sector participation, (ii) beneficiary shares, (iii) user charges, (iv) land leveraging, (v) innovative revenue streams, (vi) corporate social responsibility contributions, (vii) borrowing on the market, and (viii) external assistance.

Progress

- As of March 2018, Rs. 6,134 crores (S$1.2 billion) has been spent.
- Toilets constructed thus far:
  › 432,2776 individual household toilets;
  › 280,347 community/public toilets.
- Solid waste management:
  › Door-to-door collection and transportation: 100% achieved in 51,734 wards;
  › Processing and disposal: up to 27.11% achieved.

1 2011 Census
2 The Ministry of Drinking Water and Sanitation is implementing the programme in rural areas.

Maharashtra
Greening its cities

Roadside greenery management is crucial for success in Maharashtra **(Above)** and Singapore **(Below)**

The challenge

Rapid urbanisation and widespread sprawl in Maharashtra has depleted green cover and increased urban vulnerability to climate change. India's urban populations have less than 1 m² of green space per capita, or less than 0.1 trees per capita.

The solution

The Government of Maharashtra launched an initiative named "AMRUTVAN" (nectar forest) under its "Greening Policy" to increase green cover up to 15% in urban areas. The programme is funded under the Central Government's Atal Mission for Rejuvenation and Urban Transformation (AMRUT) programme.

AMRUTVANs are envisioned not only to enrich local biodiversity, but also to be heat mitigation centres amidst urban infrastructure. The State has appointed landscaping agencies, regularised green space development to include at least 80% of total project costs for "green" components, created plant specifications to ensure optimum survival of plants and encouraged the reuse of waste materials. It has also promoted the composting of organic waste, launching its own brand, Harit: Maha City Compost.

Thus far, 128 greening projects have been approved. As a result, tree cover, excluding forest areas, has increased by 18.8% (1,562 km²). The amount of carbon dioxide absorbed by forest paths increased by 16.65%.

PARTICIPANT TAKEAWAY

The programme has given deep insight into contemporary urban issues. It provided a wide range of solutions to tackle urban issues such as river pollution, solid waste management and green cover, including environment management. The key successful practices of Singapore can be retrofitted into the State of Maharashtra.

Ms Manisha Mhaiskar Patankar, Secretary to the Government Urban Development Department and Mission Director AMRUT, Maharashtra Government

Ambikapur

Turning trash into cash

From humble beginnings, Ambikapur catalysed a change in solid waste management throughout Chhattisgarh through a comprehensive waste management programme. The key to its success was its programme design, which included elements of citizen engagement, improving perception of garbage collection, providing a source of livelihood for poor urban women, and turning waste into an income-generating resource.

Ambikapur

The challenge

The Municipal Corporation of Ambikapur, a mid-sized city in Chhattisgarh with a population of 112,449 people,[1] was once straining to provide an effective solid waste management system. The city suffered from choked drains, littered public areas and illegal dump sites. Hygiene and public health were affected as a result. Where waste was collected, it was largely landfilled, with the remainder being informally sorted by rag pickers, indiscriminately buried, or burnt.

Like most Indian cities, Ambikapur struggled to comply with the national Solid Waste Management Rules, introduced in 2000. Initiatives based on public–private partnerships (PPPs) often suffered from financial unsustainability owing to a lack of scale. Furthermore, PPPs were often criticised as being "profit centric [rather] than service centric",[2] owing to their uneven services and high cost to users. Clustering of municipal waste collection services was often not an option owing to the large distances of 50–80 km between Urban Local Bodies (ULBs).

Left pic The new system uses lightweight vehicles suitable for women to operate and which can access all parts of the city.
Top pic Participants visited Singapore's Gardens by the Bay; its Waste to Energy plant supplies energy to its greenhouses.

1 2011 Census

2 Sain, Ritu. *Swachh Ambikapur: A Waste Management Innovation.* Commonwealth Association for Public Administration and Management (CAPAM), 2016, https://www.capam.org/knowledge/articles/2017/swachh_ambikapur.html

3 Ibid.

The solution

The Ambikapur Municipal Corporation sought to solve the problem through consultation with its stakeholders and civil society. Through these consultations, parameters were set for an ideal Solid and Liquid Waste Management (SLWM) model,[3] namely, that it would:

A. Be cost efficient;
B. Be simple to implement, not requiring high technology;
C. Support the livelihoods of the urban poor;
D. Be driven by community-based structures, ideally dominated by women;
E. Support the scientific disposal of waste;
F. Be environmentally and financially self-sustaining; and
G. Add a level of dignity to the collection and management of waste.

Based on these parameters, a door-to-door collection system with solid waste sorting and recycling was preferred. The design of the programme was critical to its success. The "Pillars" of the "Garbage Clinic" model were:

1. Door-to-door collection of both organic and inorganic waste: households were educated on the need to segregate waste into organic (green bin) and inorganic (red bin) materials, on sanitation, and on the importance of beneficiary charges.
2. Waste collection and segregation en-route to and in Garbage Clinics: garbage collectors were trained to identify and sort 156 types of waste products.
3. Tertiary segregation for conversion of waste into recyclables: Where waste could be re-used, it was cleaned and sorted.
4. Sale of segregated waste: proceeds from the sale were used for wage payments, operations and maintenance.
5. Use of technology to improve efficiency: leveraging appropriate technology, the SLWM system stayed transparent and accountable.
6. Citizen participation: the resident population was mobilised through education campaigns to support the new system.

A key success factor was the organisation and training of committed and capable collectors. To begin with, waste collection was projected as a safe and honourable occupation, dignified by none less than Mahatma Gandhi himself. This instilled a sense of dignity to the collectors. Women, gathered into a federated society of 20 self-help groups (SHGs), were recruited as collectors. Some 600 were recruited and trained, even though only 300 were required. The buffer was in recognition of the considerable domestic constraints women face in holding employment. The women were provided medical check-ups and tools so they could work effectively. Recruits were trained in the dynamics of team-work, the use and importance of safety gear, the importance of punctuality, personal hygiene and conflict management when dealing with hostile customers.[4] Remuneration was based not on wage labour terms but on a community structure, which improved worker efficiency.

Another factor was the level of segregation that the system envisaged in order to ensure maximum returns from the waste. Non-organic and organic waste, already sorted at source, was to be further segregated into 156 types of waste. Organic waste was to be separated by type, for example, fruit peels and eggshells. Cows were bought to consume fresh kitchen waste and in turn produce milk and cow dung, the latter required for composting.[5]
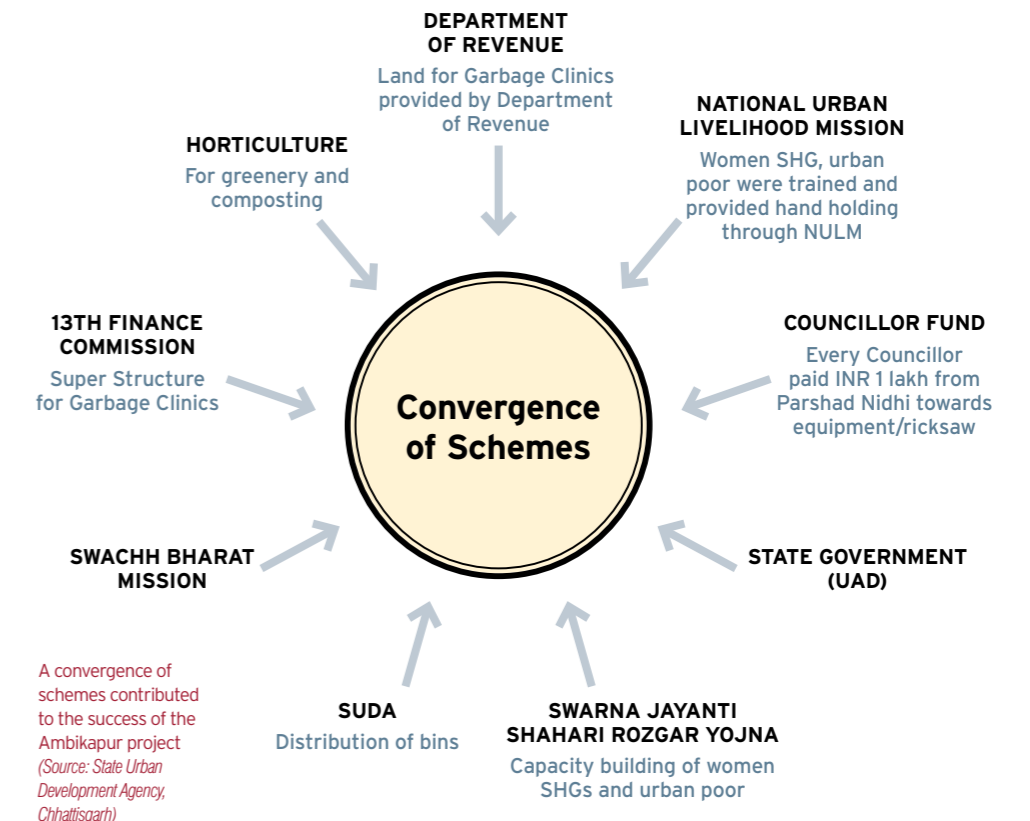

4 Ibid.

5 Ibid.

6 Ibid.

The remaining organic waste was to be composted and biogas was collected. For non-organic waste, collectors were trained to undertake fine grain segregation down even to the level of recyclable grade and potential for cash returns. For example, discarded plastic bottles were to be separated into three sub-categories: the lid/neck ring, the body of the bottle, and the label, in recognition of the difference between Poly propylene plastic (PP) and High Density Poly Ethylene (HDPE).[6]

Furthermore, appropriate technology was adopted to enhance efficiency. Garbage collection routes are tracked by GPS, user charges are collected through electronic point-of-sales means, which allows real-time receipt issuing, Solid and Liquid Resource Management (SLRM) centres are monitored through CCTVs, and staff attendance is tracked through biometric sensors. Operational statistics are monitored in real time to ensure transparency and accountability.

Another key to the success of the Ambikapur SLWM model was the ability of disparate government departments and schemes to work together as an integrated whole. Some of the key agencies involved are identified in the figure below.

DEPARTMENT OF REVENUE
Land for Garbage Clinics provided by Department of Revenue

HORTICULTURE
For greenery and composting

NATIONAL URBAN LIVELIHOOD MISSION
Women SHG, urban poor were trained and provided hand holding through NULM

13TH FINANCE COMMISSION
Super Structure for Garbage Clinics

COUNCILLOR FUND
Every Councillor paid INR 1 lakh from Parshad Nidhi towards equipment/ricksaw

Convergence of Schemes

SWACHH BHARAT MISSION

STATE GOVERNMENT (UAD)

SUDA
Distribution of bins

SWARNA JAYANTI SHAHARI ROZGAR YOJNA
Capacity building of women SHGs and urban poor

A convergence of schemes contributed to the success of the Ambikapur project (Source: State Urban Development Agency, Chhattisgarh)

Progress

Ambikapur's Solid and Liquid Waste Management system has catalysed change in the city. Not only has it reduced the Municipal Corporation's expenditure by up to 52%,[7] mainly due to a reduction in logistics costs, but it has also converted more than Rs. 80 lakhs (S$160,000) into recyclable waste in the two years since it has been adopted (2015–17). Among the beneficiaries of the system, 70% pay user charges, and 84% provide garbage. The service now covers 100% of the ULB. Ambikapur now has cleaner roads and drains, is free of leachate contamination, and is Solid Waste Management Rules (2000) compliant. It is a certified dustbin-free city. In 2017, Ambikapur won the *Swachhata Sarvekshan* for being the cleanest city in India.

The stakeholders continue to improve the design of the programme. For example, the Solid Liquid Waste Management Centres were rebranded "Garbage Clinics" as they held greater appeal in the public perception.

EXPENDITURE REDUCTION MODEL
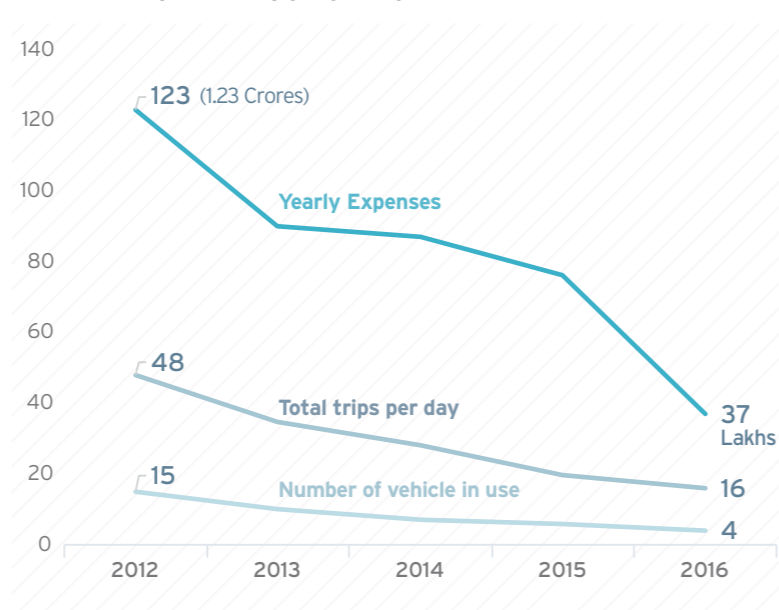
The introduction of the SLWM Model led to a reduction in expenditure. *(Source: Ambikapur Municipal Corporation video)*

Head	2012-13	2013-14	2014-15	2015-16	2016-17	2017-8 (up to Jan 18)
Source segregation of waste	0	0	0	0	40.71	51
Household level coverage	0	0	0	0	100	100
Efficiency in redressal of complaints	68%	70%	59%	68%	100%	100%
SLWM cost recovery	22%	25%	30%	22%	70%	75%
No. of Households covered by each worker	0	0	341	0	67	67
Extent of segregation of MSW	0%	0%	10%	0%	100%	100%
Extent of MSW recovered	0%	0%	0%	80%	100%	100%

TABLE 1
Statistics Showing the Success of the Ambikapur Model

Criteria	Refuse Derived Fuel	Waste to energy (WTE)	Ambikapur Model
Amount of waste	Suitable for waste up to 400 (TPD)	Suitable for waste more than 400 TPD	Suitable for all ranges
Focus Area	Refuse-derived fuel from waste	Energy Combustion	Recycling and segregation
Transportation	Transportation is high as done in cluster-based model	Transportation is high as done in cluster-based model	Minimal as decentralized model
Success in Chhattisgarh	Not implemented	Partially Implemented	Very successfully implement in Ambikapur
Pollution	Municipal Solid Waste compliant	High cost: pollution controllers needed	Municipal Solid Waste compliant

TABLE 2
Comparison of the Ambikapur Model to other Waste Management Systems

When the State of Chhattisgarh rolled out its "Mission Clean City" plan, it reviewed all possible large-scale waste management models for adoption (See Table 2). As most of its ULBs generated between 6 to 50 Tonnes per Day (TPD) of waste, it identified the Ambikapur model as most suited for state-wide adoption. Furthermore, the Ambikapur model is highly suitable owing to the kind of waste generated in Indian cities, its ease of operation, its scalability, and the fact that it does not require high technical expertise, is less capital intensive and is financially sustainable.

The Government thus allocated Rs. 222 crores (S$44 million) for upscaling the Ambikapur model across the State. By early 2018, the model had been rolled out to 168 ULBs, 153 of which have populations of less than 50,000.[8] This has resulted in 348 Garbage Clinics, 226 segregation centres and 104 composting sheds established and functioning in the State.[9] More than 8,000 women are engaged in collection and segregation,[10] with each earning Rs. 8000–10,000 (S$160–201) a month. Some 1.78 km² of land has been reclaimed from dump sites for remediation.

7   Ibid.

8   State Urban Development Agency, Department of Urban Administration and Development. Government of Chhattisgarh.

9   Ibid.

10 Ibid.

○

Action Planning Sharing

❝The Ambikapur model is an excellent example of an urban body developing a customised plan to best serve its needs and goals. We discussed that as an urban body grows, its waste management strategy and plans would have to be revised as waste profiles change. Medium- and long-term plans are necessary to address these changes and additional waste streams, just as Singapore had reviewed and revised its strategy and plans to manage the increase in residential, commercial and industrial waste as our city evolved.❞

Mr Ong Seng Eng, CLC Panel of Experts for sustainable environments

❝The Singapore discussions with experts validated that the Ambikapur model is on par with global standards and boosted us to take the initiative to the next level. It also strengthened the concept of micro planning in any project and shed light on how to enhance it in our model.❞

Dr Rohit Yadav, Special Secretary, Urban Administration and Development Department, Government of Chhattisgarh

Note: unless otherwise indicated, all figures and table material are from the State Urban Development Agency, Department of Urban Administration and Development, Government of Chhattisgarh.

Annex: List of Participants and Resource Persons

Indian participants in Singapore's capacity building training in the field of Urban Planning and Governance, held in Singapore between 2016 and 2017.

RUN 1 12-16 Sept 2016

1. **Ms Manisha Mhaiskar Patankar** IAS (Leader of Delegation) **Secretary** Urban Development Department, & Mission Director AMRUT, Government of Maharashtra
2. **Dr S Murali Krishna** IAS **Additional Chief Executive Officer in-Charge** Gujarat Urban Development Mission, MD AMRUT and Smart Cities Mission, Govt. of Gujarat
3. **Mr HVL Zarzoenga** **Joint Director** Town & Country Planning Urban Development and Poverty Alleviation Dept, Govt. of Mizoram
4. **Mr Ken Keditsu** **Director** Urban Development, Urban Development Department, Kohima, Govt. of Nagaland
5. **Mr Rajesh Pradhan** **Additional Chief Town Planner** Urban Development and Housing Department, Govt. of Sikkim
6. **Mr V K Goyal** **Chief Town Planner** Town & Country Planning Department Govt. of Haryana
7. **Mr Harnek Singh Dhillon** **Chief Town Planner** Housing and Urban Development, Govt. of Punjab
8. **Mr Dinesh Chandra Gupta** **Senior Planner** Town & Country Planning Department Govt. of Uttar Pradesh
9. **Mr S T Putta Raju** **Chief Town Planner and Ex Officio Joint Secretary** Town & Country Planning Department, Govt. of Goa
10. **Mr Sayanti Majumdar** **Asst. Architect** Govt. of West Bengal
11. **Mr Anand Singh** **Director** UD&HD Govt. of Madhya Pradesh
12. **Mr Noreshwar Raghunathrao Shende** **Director** Town & Country Planning & Valuation Department Govt. of Maharashtra
13. **Mr Yogesh Kumar Meena** **Controller of Accounts** MoUD, Govt. of India
14. **Mr Rajendra Pratap Singh** **Under Secretary - AMRUT** MoUD, Govt. of India
15. **Mr Rajeev Kumar Das** **Under Secretary - UD II** MoUD, Govt. of India
16. **Mr Deen Dayal** **Under Secretary - MRTS I** MoUD, Govt. of India
17. **Mr R. Srinivas** **Town & Country Planner** TCPO, Govt. of India
18. **Mr Pawan Kumar** **Asso. Town & Country Planner** TCPO, Govt. of India
19. **Ms Anjali Pancholy** **Asso. Town & Country Planner** TCPO, Govt. of India
20. **Mr Nitin Kumar Azad** **Asst. Town & Country Planner** TCPO, Govt. of India
21. **Mr G. Sankara Narayanan** **Admin. Officer& DDO (Coordinator)** TCPO, Govt. of India

RUN 2 28 Nov-2 Dec 2016

1. **Mr Shambhu Kallolikar** IAS (Leader of Delegation) **Additional Secy & Commissioner** C & TP, Directorate of Town and Country Planning, Govt. of Tamil Nadu
2. **Mr Narendra Kumar Singh** IAS **Additional Secretary UD&HD** Urban Development and Housing Department, Govt. of Bihar
3. **Mr Rajesh Kumar Sharma** IAS **Director** SUDA, Urban Development & Housing Department, Govt. of Jharkhand
4. **Mr Hari Shanker Singh** **Assistant Planner** UD & HD, Govt. of Bihar
5. **Mr Natarajan Kanagasabapathy** **Chief Planner CMDA** Housing & Urban Development Department, Govt. of Tamil Nadu
6. **Mr Indra Vikram Singh** IAS **Municipal Commissioner** Govt. of UP
7. **Mr Rakesh Kumar Mishra** IAS **Director ULB** Urban Local Bodies, State Mission Director, AMRUT, Govt. of UP
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RUN 3 24-28 Apr 2017

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4. **Mr Sandeep Kumar** IAS **Director** Town and Country Planning Department
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6. **Mr Amlan Dha** **Executive Engineer Electrical** Kolkata Municipal Corporation, Water Supply Dept
7. **Mr Gitkumar Singh Nepram** **Chief Town Planner & Director MAHUD** Chief Town Planner & Director MAHUD
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13. **Mr G. Vijaya Kumar** **Under Secretary** MoUD, Nirman Bhawan, New Delhi
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Annex: List of Participants and Resource Persons

RUN 4 14–18 Aug 2017

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CLC Panels of Experts, Fellows, Senior Government and Private Sector Resource Persons

The following experts helmed the learning sessions during the four runs of the programme:

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Housing	Mr Chionh Chye Khye Mr Sng Cheng Keh Mr Alan Tan Hock Seng
Transport	Mr Mohinder Singh Mr Gopinath Menon
Greening	Mr Chua Hock Seong Mr Simon Longman
Sustainable Environment	Mr Loh Ah Tuan Mr Joseph Hui Mr Ong Seng Eng
Water	Mr Yap Kheng Guan
Urban Financing	Mr Dileep Nair Mr Lee Kok Fatt
Industrial Infrastructure	Mr Sia Kheng Yok (Association of Aerospace Industries, Singapore)
Land	Mr Gaw Seng Suan (LLP Consult)
GIS in Urban Planning	Mr Benjamin Chan (JTC Corporation) Mr Ragunath Babu Guduru (Surbana Jurong) Mr Lim Liyang Mr Lau Tack Guan

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Singapore and India: Partnering for Liveable and Sustainable Cities is a product of this cooperation. It is the second collaboration between the Centre for Liveable Cities, under Singapore's Ministry of National Development, and the Town and Country Planning Organisation of India's Ministry of Housing and Urban Affairs. The first was the "Urban Governance and Planning Programme", where 99 senior urban practitioners from all over India attended a capability development programme in Singapore over four runs between 2016 and 2017. This book features case studies from the various urban governance and planning projects discussed during those programmes. Examples of case studies featured include how the new capital city of Andhra Pradesh, Amaravati, was conceptualised, how urban challenges were systematically addressed in Ahmedabad, and how grassroots participation and innovation have combined to deliver optimal results in waste management in Ambikapur. Other case studies have covered land management and planning, affordable housing, transit, smart solutions, and sustainable environment.

❝The International training programme jointly organised by the Centre for Liveable Cities and the Town and Country Planning Organisation as part of the Memorandum of Understanding between Singapore and India provided a brilliant opportunity for Indian planners and administrators to learn, interact and share Singapore's experience with experts and veterans who were part of what Singapore is today. The exposure and learning will go a long way to boost India's contemporary initiatives in urban planning and development.❞

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