Mysuru

August 2021

CITY PROFILE AND DIAGNOSTIC REPORT

Sustainable Cities Integrated Approach Pilot (SCIAP)

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Cover Page: Devaraja Market, one of the oldest markets near Mysore Palace (image source: UN-Habitat)

Mysuru

CITY PROFILE AND DIAGNOSTIC REPORT

Sustainable Cities Integrated Approach Pilot (SCIAP)

Component 1: Sustainable Urban Planning and Management

Acknowledgments

Mysuru

City Profile and Diagnostic Report

Contents

List of Acronyms

CandD	Construction and Demolition
CHESCOM	Chamundeshwari Electricity Supply Corporation
CMAK	City Managers Association Karnataka
DMA	Directorate of Municipal Administration
DTCP	Director of Town and Country Planning
DULT	Directorate of Urban Land Transport
EPCO	Environment Planning and Coordination Organization
FSTP	Faecal Sludge Treatment Plant
GEF	Global Environment Facility
GIS	Geographical Information System
GoK	Government of Karnataka
GPSC	Global Platform for Sustainable Cities
KIADB	Karnataka Industrial Area Development Board
KMDS	Karnataka Municipal Data Society
KRED	Karnataka Renewable Energy Development Ltd.
KSNDMC	Karnataka State Natural Disaster Management Centre
KSPCB	Karnataka Pollution Control Board – Mysuru Regional office
KSRTC	Karnataka State Road Transport Corporation
KSSIDC	Karnataka State Small Industrial Development corporation
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
KWSDB	Karnataka Water Supply and Drainage Board
LPA	Local Planning Area
MCC	Mysuru City Corporation
MoEFCC	Ministry of Environment, Forests and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MTD	Metric Tonnes per Day
MUDA	Mysuru Urban Development Authority
NGT	National Green Tribunal
NH	National Highway
NIUA	National Institute of Urban Affairs
NRW	Non-Revenue Water
NULM	National Urban Livelihoods Mission
ODF	Open Defecation Free
RTO	Regional Transport Office
SAPCC	State Action Plan on Climate Change
SCIAP	Sustainable Cities – Integrated Approach Pilot
SIUD	State Institute of Urban Development
TandCP	Town and Country Planning Department
UDDK	Urban Development Department Karnataka
UN-HABITAT	United Nations Human Settlements Programme
UNIDO	United States Agency for International Development
URDPFI	Urban and Regional Development Plans Formulation and Implementation

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01

Introduction

1.1 REPORT OBJECTIVES

The city profile and diagnostic report situates Mysuru in its regional context and provides a comprehensive outlook of the city's performance by applying the Urban Sustainability Assessment Framework (USAF)[1]. In addition, it builds on the desk review of existing plans, policy documents and development proposals by the state and local government to present a complete picture of each sector of the city. It also puts forth a cross-sectoral analysis to arrive at key issues and challenges that the city currently faces.

In this context, the main objectives of this report are:

- To build an understanding of the city's current performance across 12 sectors
- To assess intra-city spatial equity for each sector
- To employ an evidence-based approach to ascertain key cross-sectoral challenges and strategic opportunities
- To inform sectoral priorities, a strategic development plan and resource allocation for the sustainable and resilient development of the city

1.2 APPROACH AND METHODOLOGY

The evidence-based planning approach creates an all-encompassing, rich understanding of the spatial dynamics of an urban area. This is achieved by combining and comparing urban datasets such as demography, land use, natural features, accessibility analysis and service delivery parameters. The evidence (data) is collected as inputs for the USAF indicators, which are assessed against best practices, as well as global and national benchmarks for sustainable urban development. This brings to light the main developmental issues by sometimes quantifying them, and at other times by recording the availability of effective planning tools and instruments, presence of legal and institutional mechanisms and the financial soundness of the city. Such an approach can also help to assess future development projects by feeding their information as inputs to the indicators applied in the analysis.

The following elements are used in this evidence-based approach:

- Review of relevant existing plans, policies, and development proposals
- USAF performance by the city (indicator assessment)
- Spatial analyses of indicators to conduct granular, cross-sectoral analysis to investigate trends, causes and effects

The methodology adopted analyzes the interplay of socio-economic, spatial and environmental factors, first at a city scale and then at a more granular, ward-level scale to understand the degrees of influence. This helps to decipher the interdependencies within the city's physical development pattern and seeks the reasons for such interdependence to improve the functioning of that city.

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[1]   The Urban Sustainability Assessment Framework wad developed by UN-Habitat India as a part of the SCIAP project. Further details are available in the Urban Sustainability Assessment Framework Report.

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Regional Context

2.1 LOCATION

Mysuru lies along the Southern Plateau, in the southernmost part of the state of Karnataka in India. The physiographical region in which the district is found may be classified as partly maidan and semi *malnad* (or hilly). Mysuru is 140 km South West of the capital city of Bengaluru.

Mysuru district is further subclassified into eight administrative revenue boundaries called *talukas*.

The Mysuru Local Planning Area (LPA) falls under the Mysuru and Nanjangud Taluk, as shown in Map 2.1.

Mysuru district is washed by several perennial and non-perennial rivers. The Cauvery and Kabini rivers are the two major rivers within the LPA. The Cauvery River, the district's primary river system along with its tributaries, Kabini, Suvarnavathi Laxmanathirtha and others, traverses the Mysore plateau from the North-West to the East.
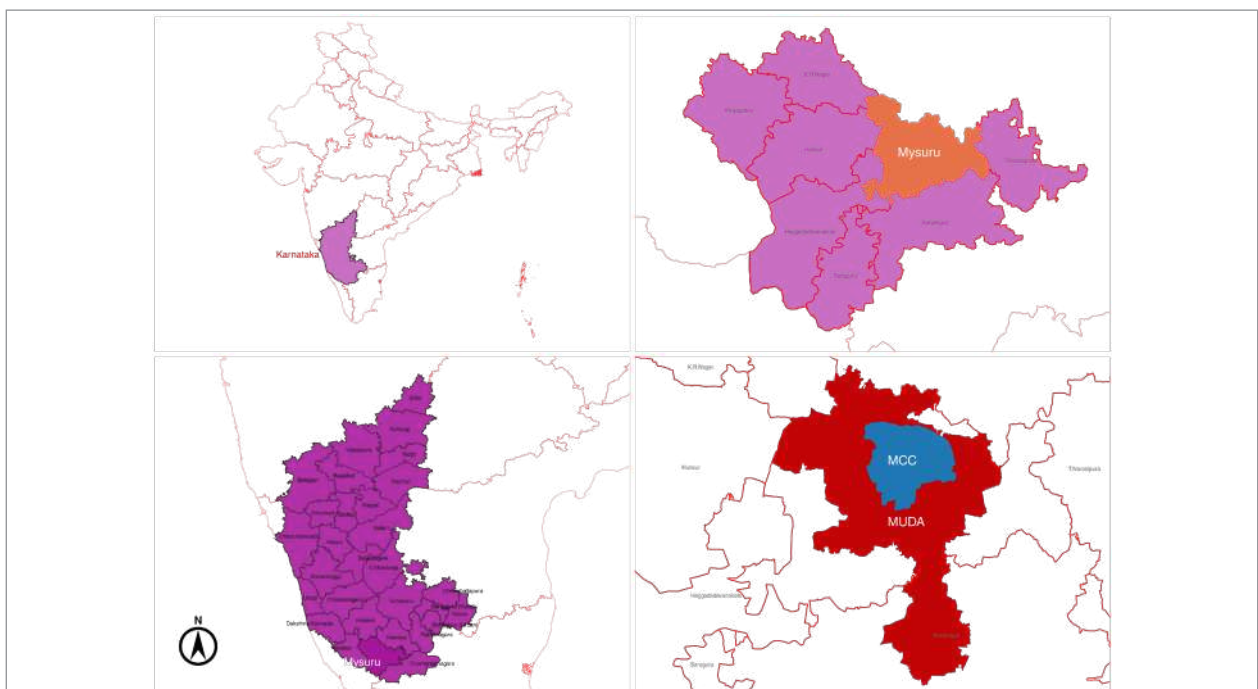
Map 2.1: Mysuru City Location Map

Source: UN-Habitat

2.2 REGIONAL CONNECTIVITY

Mysuru is located about 140 km from Bengaluru and well connected by rail and road to different parts of the state and country. Mysuru has a 42.5-km (26.4 mile) long, six-lane ring road that connects all the National Highways (NH) and State Highways (SH) passing through the region, decongesting the core area by allowing through-traffic to bypass the city.

Mysuru is connected by NH 212 to the state border town of Gundlupet, where the road forks into the states of Kerala and Tamil Nadu. SH 17, which connects Mysuru to Bengaluru, was upgraded to a four-lane highway in 2006, reducing travel time between the two cities. SH 33 and NH 275 connect Mysuru to HD Kote and Mangaluru, respectively.

Rail Connectivity

Mysuru Junction is the city's main railway station. The railway line from Mysuru goes to Bengaluru and Arsekere in the North and to Chamrajnagar in the South. There are daily trains to Bengaluru, Chennai, Hyderabad, Mangaluru, Kannur, Trichy, Madurai and Tirupati.

There are many trains available from Mysuru to Bengaluru and vice versa. Tippu Express is the most popular, covering a distance of 140 km in about 2.5 hours. Chamundi Express and Yeshvantapur–Mysuru Express are other daily trains between the two cities.

Air Connectivity

Mysuru Airport, which is nearly 11 km from the city towards Nanjangud, serves Mysuru as well as the industrial hubs to the South of the city. The Ude Desh ka Aam Nagrik (UDAN) scheme has benefitted Mysuru as domestic connectivity has improved significantly in recent years with three flight operators, namely Alliance Air (Bengaluru, Goa, Hyderabad, Kochi, Mangaluru), IndiGo (Hyderabad) and Tru-Jet (Belagavi, Chennai).

For international connectivity, Mysuru currently relies on the Bengaluru International Airport, which is about four hours away from Mysuru city (see Map 2.2). To improve air connectivity with the country's major cities, the first phase of upgrading and expanding the city's existing airport has been completed and opened for air traffic. In the second phase of expansion, the runway is planned to be lengthened, allowing jet aircraft such as the Boeing 737 and Airbus A320 to land at Mysuru Airport.

Port Connectivity

Within a four to five-hour travel distance, Mysuru has access to a major port (Mangaluru) and four minor ports (Kannur, Kasargod, Beypore and Ponnani) (see Map 2.2) that play a key role in attracting industrial investments to the area.

Map 2.2: Mysuru – Key transport connections

Source: UN-Habitat

2.3 REGIONAL URBAN FUNCTION

Mysuru is Karnataka's third-largest city, and according to the state government, it is poised to take off as the newest destination for investment in the industrial, educational and tourism sectors.

Over the decades, Mysuru has transformed itself into a destination for modern industries in the manufacturing, service and information technology (IT) sectors.

The major factors influencing the growth of Mysuru city include the saturation of Bengaluru as the centre of India's high-tech industry and, hence, the need for potential alternatives; and its proximity to the port

city of Mangaluru. These factors play a crucial role in Mysuru attracting investments from home and abroad.

Another factor influencing Mysuru's development is its proximity to Coimbatore, a major industrial city in Tamil Nadu, often known as the Manchester or Detroit of southern India. It is famous for the manufacturing of motor pump sets and varied engineering goods, acting as a competitor and alternative destination in the neighbouring state as well as an opportunity.
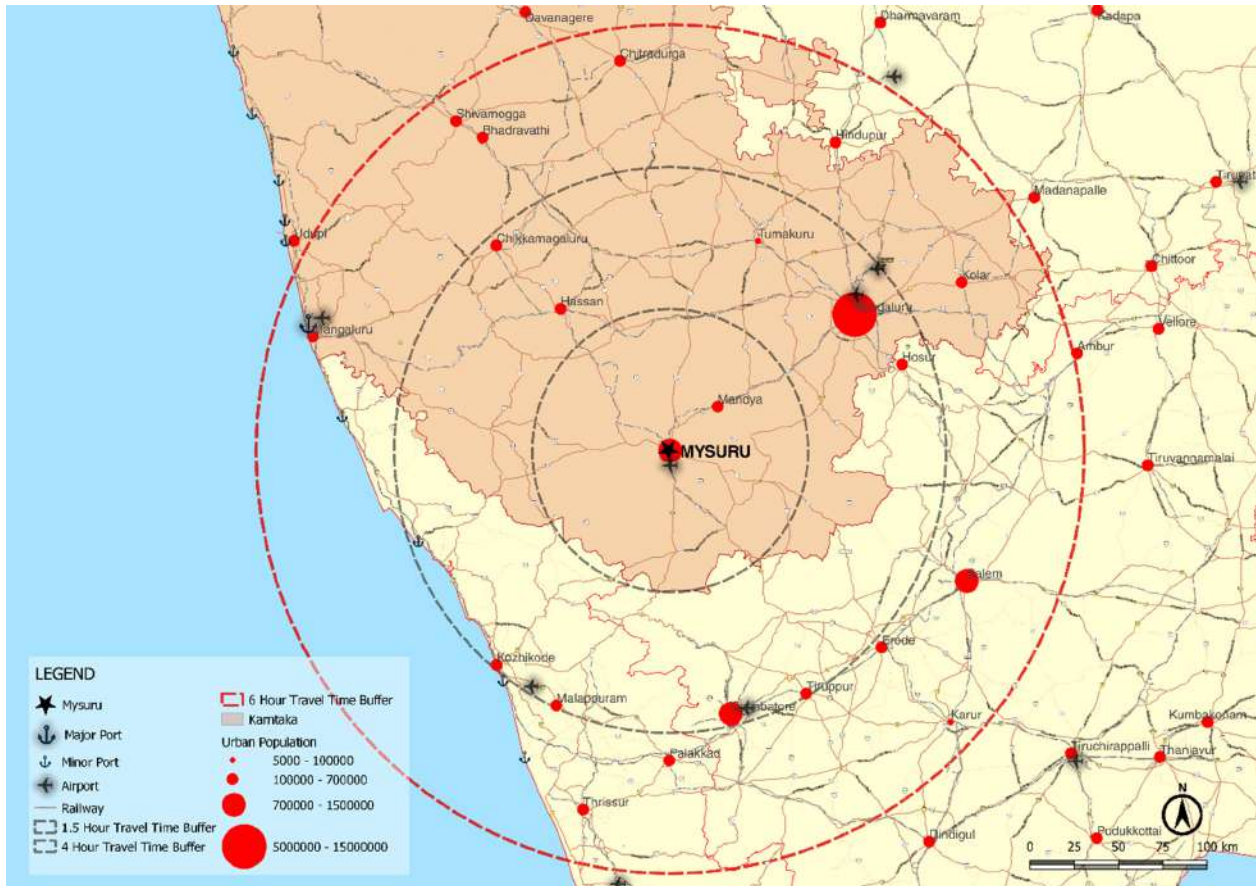
Map 2 3: Accessibility of Mysuru with neighbouring urban areas

Source: UN-Habitat

2.4 SOCIO-ECONOMIC CONTEXT

2.4.1 Demographic profile

Population

As per Census 2011, the population of Mysuru city was 9.20 lakh. The city's population makes up 30 per cent of the population of Mysuru district and 1.5 per cent of Karnataka's population. It also makes up 73.9 per cent of Mysuru district's urban population and 3.9 per cent of the state's urban population. In the last decade, Mysuru city has experienced twice the growth rate of the state and district (see Table 2.1).

The decadal growth rate for this decade is expected to be 30 per cent[2] as per the recent population projected by Mysuru City Corporation (MCC).

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[2] CSAF2.0 population projection

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Year	Mysuru City		Mysuru District		Karnataka	
	Population (in lakh)	Decadal growth rate (%)	Population (in lakh)	Decadal growth rate (%)	Population (in lakh)	Decadal growth rate (%)
1981	4.73	-	18.27	-	371.35	-
1991	6.17	28.11	22.81	24.84	449.77	21.12
2001	7.87	9.22	26.41	15.75	528.50	17.51
2011	9.20	30.35	30.01	13.63	610.95	15.60

Source: Census of India

As per Census 2011, Mysuru is the third largest populous city in Karnataka, next to Bengaluru (84.95 lakh) and Hubli–Dharwad (9.43 lakh).

Sex Ratio

In 2011, 49.92 per cent of the city's total population was female. The sex ratio in Mysuru was 999 female to 1,000 male citizens, which was higher than that of the Mysuru district and Karnataka (see Figure 2.1). It was also higher than the national average of 940.

Between 2001-11, the city witnessed an increase in female to male ratio from 964 to 999. However, in the age group of 0–6 years, female citizens constituted only 48.9 per cent. About 9.47 per cent of the population in the city is below six years.

Age Cohort

As per Census 2011, the working age population (15–64 years) of Mysuru city constituted 71.9 per cent of its total population, which was slightly higher compared than that of Mysuru district and Karnataka (see Figure 2.2). About 28.1 per cent of Mysuru's residents made up its dependent population (0–14 years and above 65 years).

The youth (15–39 years) in Mysuru city constituted 37.8 per cent of its total population, while they made up 45 per cent and 44.3 per cent of that of Mysuru district and Karnataka, respectively. In the city, the group between the ages of 35–64 years (working population other than youth) constituted 34 per cent of the total population. The age–sex pyramid of Mysuru city is shown in Figure 2.3.

Figure 2.1: Sex ratio in Mysuru city compared to Mysuru District and Karnataka

999 — Mysuru city
985 — Mysuru district
973 — Karnataka
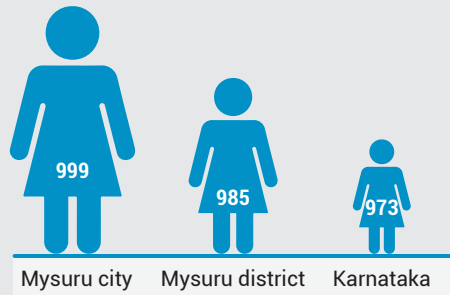
Source: Census of India

Figure 2.2: Percentage of working age (15-64 years) and dependant (0-14 years and above 65 years) population in Mysuru city, Mysuru District and Karnataka

Age group	Mysuru city	Mysuru district	Karnataka
0-14	22.1%	23.6%	26.2%
15-64	71.9%	69.7%	67.6%
65+	6.0%	6.6%	6.2%
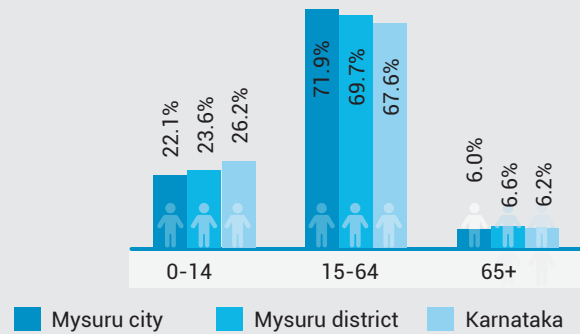
Source: Table C-14 City Population in five-year age group by Residence and Sex, Census 2011

Figure 2.3: Age-sex pyramid of Mysuru city

Female / Male

Age Group	Female	Male
65+	-26,909	28,511
40-64	-1,59,289	1,54,432
15-39	-1,70,864	1,77,045
0-14	-1,03,980	99,520
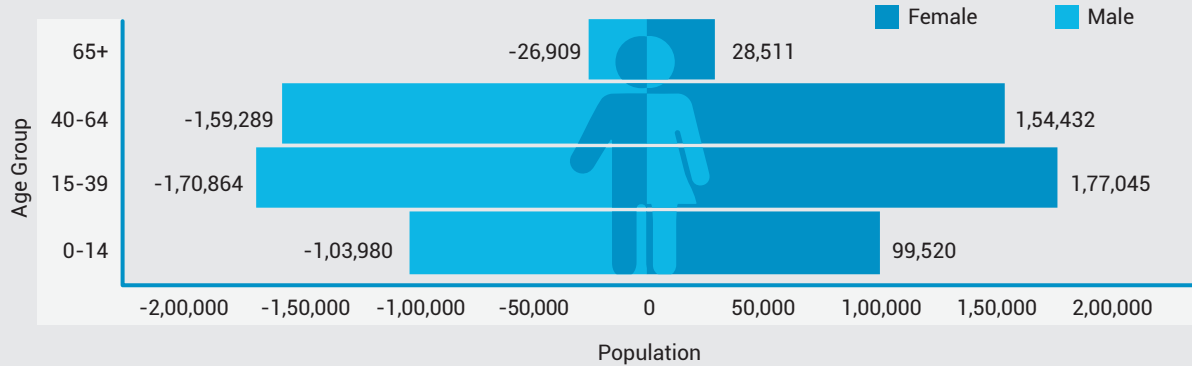
Population

Source: Table C-14 City Population in five-year age group by Residence and Sex, Census 2011

2.4.2   Social context

Literacy Rate

The literacy rate of Mysuru in 2011 was 87.7 per cent. As per Census 2011, the literacy rate of the city was higher than Mysuru district and Karnataka (see Figure 2.4). Despite having a high sex-ratio, the literacy rate among the female population in the city was only 84.8 per cent, whereas the male literacy rate was about 90.7 per cent.

Work Participation Rate

The work participation rate (WPR) of Mysuru city in 2001 was 33.2 per cent, which increased to 37.8 per cent in 2011. As per Census 2011, it was considerably less than Mysuru district and Karnataka (see Figure 2.5). This low rate was mainly because of the low female participation of merely 18.4 per cent in the city's workforce. During the same period, the female WPR in Mysuru district and the state was 26.3 per cent and 31.9 per cent, respectively.

Figure 2.4: Total, male and female literacy rates in Mysuru city, Mysuru District and Karnataka
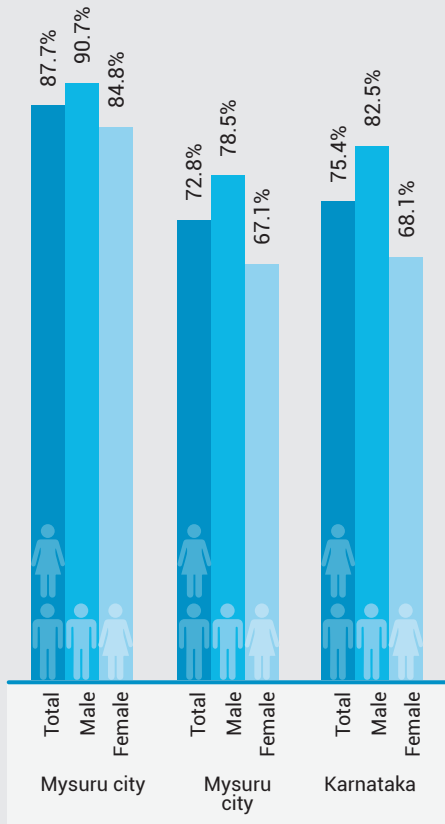
Source: Census of India 2011

Figure 2.5: Total, male and female WPR in Mysuru city, Mysuru District and Karnataka
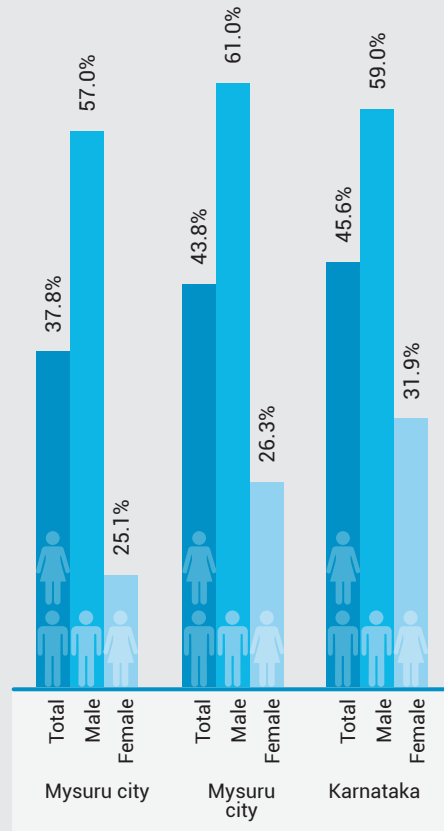
Source: Census of India 2011

Of the total workforce in the city, main workers constituted 88.23 per cent and marginal workers made up the remaining 11.77 per cent. The total workforce in the city was over 3.47 lakh. Of this, nearly 94.9 per cent was engaged in 'other' work, which included working in the service/ tertiary sector. The distribution of the workforce in Mysuru city is shown in Figure 2.6.

Figure 2.6: Distribution of workforce by occupation in Mysuru city

- Cultivation
- Agricultural
- Household Industry
- Other

Source: Census of India 2011

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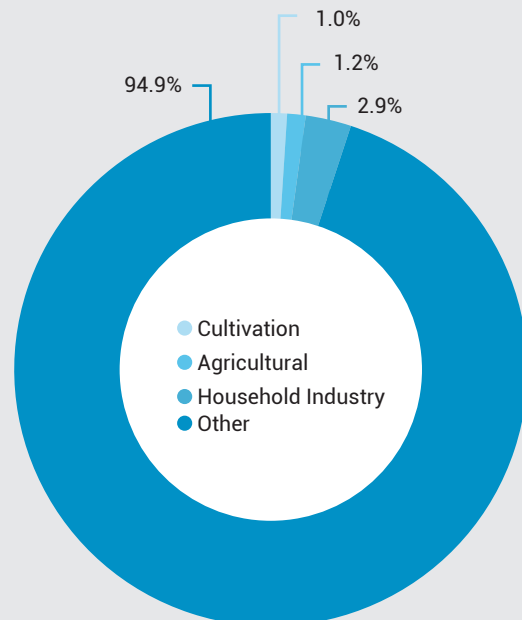
2.4.3   City economy

City economy data, such as the Gross Domestic Product (GDP) or per capita income, is not available for Mysuru city. The GDP of Mysuru district is INR 39.18 lakh, with a per capita income of INR 1,12,009, while the GDP of Karnataka is INR 16,990 billion.

The main sectors that contributed to the city's economic growth are tourism, information technology (IT) exports and forest-based industries. The tourism industry is a major driver of the city's economy. In 2012, Mysuru attracted 3.1 million visitors. Some of the prominent tourist destinations in the city is the Mysore Palace, Brindavan Gardens, Bandipur National Park, Lalitha Mahal and Somanathapura. The city is also the least polluted in the country, attracting both tourists and investors alike.

During the 2007-2012 period, Mysuru attracted an investment of INR 5.19 billion in the agriculture sector. Of the total area of 6,76,382 ha, about 4,87,052 ha is cultivated land, making agriculture the main source of income in the district.

In the state, 2,78,72,597 persons constituting 45.62 per cent of the total population have enumerated themselves as workers. Among them, 1,82,70,116 are male and 96,02,481 are female. In other words, 59.00 per cent of the total male population and 31.87 per cent of the total female population are workers.

Image 2.1: Devaraja Market

Source: UN-Habitat

03

Urban Governance

This chapter will cover the legal, institutional and regulatory context for urban governance in Karnataka and Mysuru. Karnataka's administrative structure shows a strong presence of parastatal bodies that work on planning, implementation, and advisory in their respective sectors, supporting all the urban local bodies (ULBs) across the state. This institutional structure has its advantages; the requirement of sector-specific experts drastically reduces manpower requirements, lessening the financial burden and improving the service delivery at the city level. A major downside, however, is the structure's fragmented approach to addressing problems and independent organizations providing sector-specific solutions rather than holistic ones.

3.1 LEGAL CONTEXT

In Karnataka, the ULBs are constituted within the legal framework of the Karnataka Municipalities Act, 1964, and the Karnataka Municipal Corporations Act, 1976. MCC, the administrative body of Mysuru city was constituted under the Karnataka Municipal Corporations Act, 1976.

The state government, under the provisions of the Karnataka Town and Country Planning Act, 1961, which provides for the regulation of planned growth of land use and development for urban areas, constituted a City Planning Authority for Mysuru to prepare development plans for the Mysuru LPA.

Karnataka (State)   MUDA (Urban Development Authority)   Mysuru City Corporation (ULB)

The planning authority, Mysuru Urban Development Authority (MUDA), was constituted under the Karnataka Urban Development Authorities (KUDA) Act, 1987. MUDA is responsible for the preparation of master plans, comprehensive development plans and mobility plans for the LPA.

The first Comprehensive Development Plan for the Mysuru city LPA was approved by the government in 1981. The LPA was subsequently extended during 1983 to include Nanjangud and its vicinity, when the total extent of the combined LPA became 495.32 sq. km.

The master plan was revised again in 2001 and 2011 for the horizon year 2031 (Revision II).

3.1.1 Planning instruments and procedures

Hierarchy of Plans

As per the KUDA Act, 1987, the state's respective UDAs are required to prepare a master plan for a 20 to-30-year horizon that is to be revisited at least every 10 years to adopt to the actual scenario. These master plans need to be subdivided into zonal development plans detailing each planning district and its requirements.

Master Plan 2011

Mysuru city's present master plan was notified in 2011 for the horizon year 2031. The Mysore–Nanjangud LPA was prepared for a LPA of 507 sq. km. Currently, the city's municipal area is 128 sq. km., with an urbanized area of 168 sq. km.

The city's historic growth trends, their development and direction, the current factors influencing its growth, the likely short-term developments in the next 10 to 15 years, as well as the next 20 to 25 years, as a

perspective plan for the city, have to be considered in approaching the master plan for Mysuru city and LPA.

The Mysore–Nanjangud master plan aims to achieve the following:
- To promote Mysuru city as an investment destination for non-polluting economic activities like IT, biotechnology, services and tourism.
- To promote and conserve the cultural heritage, and to preserve the natural characteristics of the city and its environs through special development regulations.
- To plan for an emerging metropolis with options for a mono/ metro rail system, peripheral roads and suitable linkages with surrounding settlements, access to urban infrastructure in peri-urban areas and de-concentration of economic activities through district commercial centres.
- Suitable planning measures to prevent the misuse of natural features like water bodies, hills and valleys by declaring a Special Eco-planning District.

3.2 INSTITUTIONAL CONTEXT

State and Regional Level

The Urban Development Department Karnataka (UDDK) facilitates, supervises and controls urban governance in the state under the Karnataka Municipal Corporations Act, 1976, and Karnataka Municipalities Act, 1964. The Directorate of Municipal Administration (DMA) and other parastatal agencies work under UDDK.

The DMA enforces the Karnataka Municipality Act and Karnataka Municipal Corporations Act. Municipal governance across the state's municipal corporations, city municipal councils, town municipal councils, town panchayats and notified area committees is facilitated through the DMA and the state government.

The DMA is also responsible for creating municipality laws, improving and maintaining infrastructure and civic amenities, as well as municipal services delivery for ULBs and other statutory authorities in Karnataka.

The Directorate of Town and Country Planning (DTCP) facilitates technical assistance to the UDAs and planning authorities in preparing master plans and development schemes/ layouts under the Karnataka Town and Country Planning Act, 1961, and KUDA Act, 1987.

Other important city level service providers are the Karnataka State Road Transport Corporation (KSRTC), under the Mysuru urban division, which runs public transport operations; the Mysuru traffic police who handle traffic management and enforce the Motor Vehicles Act; the Karnataka Pollution Control Board (KSPCB), which enforces the pollution control guidelines; and the Chamundeshwari Electricity Supply Corporation (CHESCOM), which supplies electricity.

Figure 3.1: Organization Structure
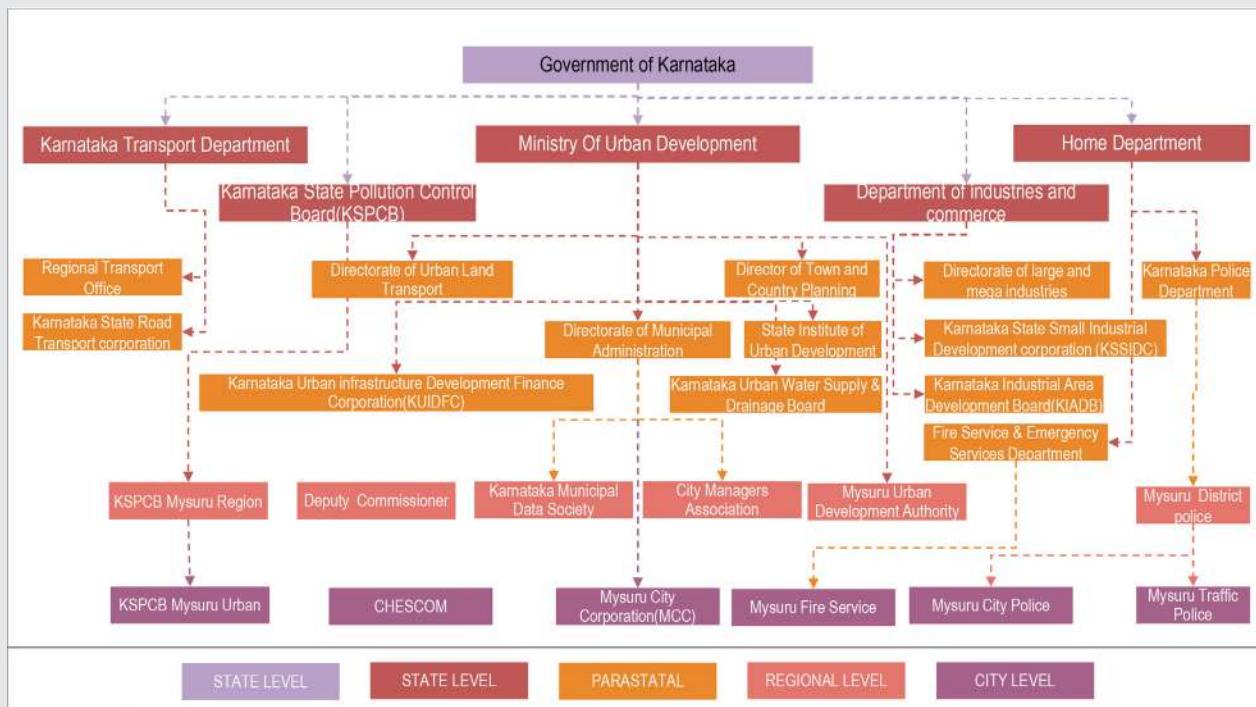
Source: UN-Habitat

Local Level

MCC, the city's administrative body, was constituted within the legal framework of the Karnataka Municipal Corporations Act, 1976, in 1983. The Municipal Commissioner, appointed by the state government, is the executive head of MCC. The mayor is the head of the MCC city council, an elected body of 65 ward corporators.

MCC's jurisdiction area is 89.9 sq. km., which is divided into 65 municipal wards. MCC comprises various departments, including administration, accounts, revenue, engineering, health, town planning, water supply, underground drainage, electrical and IT cells to monitor and provide respective services to citizens. Besides state government programmes, MCC implements national missions, such as the Swachh Bharat Mission[3] (Urban), Atal Mission for Rejuvenation and Urban Transformation (AMRUT)[4] and the Pradhan Mantri Awas Yojana (PMAY)[5].

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[3] Swachh Bharat Mission (Urban) 2014 aims to achieve open defecation free (ODF) status and scientific waste management in all urban areas.
[4] AMRUT 2015 aims to improve service levels of water supply, sanitation, public transportation, and green/ open spaces.
[5] PMAY 2015 aims to provide housing for all by 2022 by meeting the housing shortage in urban areas.

Table 3.1: Key roles and responsibilities of Tier II and III stakeholders

S. No	Organization	Key roles and responsibilities in Mysuru city
1	Mysuru District Collectorate (DC)	Plays a crucial role in disaster management, distributing civil supplies, monitoring and implementing various social welfare programmes. The District urban development cell (DUDC) office headed by the DC acts as an intermediatory between the state and city governments in fund distribution and utilization.
2	Mysuru City Police	Maintains law and order enforcement, and public safety in the city. Besides police stations, the city has special branches for women, traffic control, cyber security, crime records and intelligence gathering. The traffic wing handles road safety, vehicular traffic regulation and management.
3	Chamundeshwari Electricity Supply Corporation (CESC)	Supplies electricity to Mysuru city. The city has a circle office headed by a Chief Engineer and Executive Engineers who head two regional offices. CESC is responsible for distributing power for the following five districts of Karnataka—Mysuru, Chamarajanagar, Mandya, Hassan and Kodagu.
4	Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC)	Prepares, formulates and implements projects, schemes and programmes relating to infrastructure development in the state's urban areas and provides technical, financial, consultancy and other assistance to urban bodies for development schemes, including implementation of master plans. KUIDFC has been appointed as the nodal agency of the state for implementing various urban infrastructure development projects.
5	Directorate of Urban Land Transport (DULT)	Functions under the Urban Development Department of the State Government of Karnataka. The directorate oversees all urban land transport initiatives in urban area/LPAs of Karnataka to coordinate planning and implementation of urban transport matters in the state.
6	Karnataka Water supply and Drainage Board (KUWSDB)	An implementing body for water supply and underground drainage schemes in 276 urban areas of the state, except for Bengaluru city. The board aims to provide adequate water supply from assured and safe sources, with proper sanitation for all urban areas.
7	Karnataka State Fire and Emergency Services Department	Mysuru District Office is responsible for fire prevention, firefighting, community safety, rescue activities and disaster response. Mysuru city has three fire stations in the Mysuru region and one near Nanjangud Kanaka Nagar Industrial Area.
8	Karnataka Pollution Control Board (KSPCB)	Responsible for preventing, controlling and monitoring various forms of pollution such as air, water, land and noise; and improving the quality of the state's environment by effectively implementing environmental laws. The MUDA and MCC offices work in coordination with KSPCB Mysuru regional for various aspects of layout approvals and enforcement of Central pollution control board (CPCB) rules.
9	Karnataka State Natural Disaster Management Centre (KSNDMC)	Apex body in the state for disaster management. KSNDMCA supports districts, ULBs in the state in various aspects of hazard monitoring, hazard mapping, disaster management plans, scientific data analysis, emergency operations, response communications, capacity building, etc.
10	Karnataka State Road Transport Corporation (KSRTC)	Responsible for public transport bus service in the state. Mysuru has two regional offices. Mysuru Urban concentrates on the city bus service, while Mysuru rural handles regional connectivity.
11	State Institute of Urban Development (SIUD)	Established in 1999 by the Urban Development Department under the umbrella of Administrative Training Institute (ATI), SIUD caters to the training needs of officers, officials and elected representatives of the urban sector (ULBs and allied urban agencies).
12	Karnataka Industrial Area Development Board (KIADB)	The nodal agency for all industrial promotional activities in the state. KIADB has a zonal office in Mysuru. For the city's industrial development, KIADB has established four industrial areas around the city, namely Belagola, Belawadi, Hebbal (Electronic City) and Hootagalli areas.
13	Karnataka Renewable Energy Development Ltd. (KREDL)	Works under the purview of the Energy Department, State Government of Karnataka. It promotes renewable energy in the state and initiates all necessary actions for energy conservation. KREDL works through various governmental agencies, private organizations, NGOs and accredited energy auditors.

Source: UN-Habitat

3.2.1 Administrative boundaries

In 2017, the state decided to add peripheral zones neighbouring the city's South-West micro-market near Lingambudhi Kare to the ULB; while a few areas to the East near Alanahalli Village were excluded from the corporation boundary. Before this change, MCC's jurisdiction was 85.5 sq. km., and is now 89.9 sq. km. The entire area is residential and completely developed.

During the change in 2018, the total number of wards was kept at 65 but their internal boundaries were changed based on population density. As ward numbers were reshuffled, Census data from 2011 must be analysed with caution.
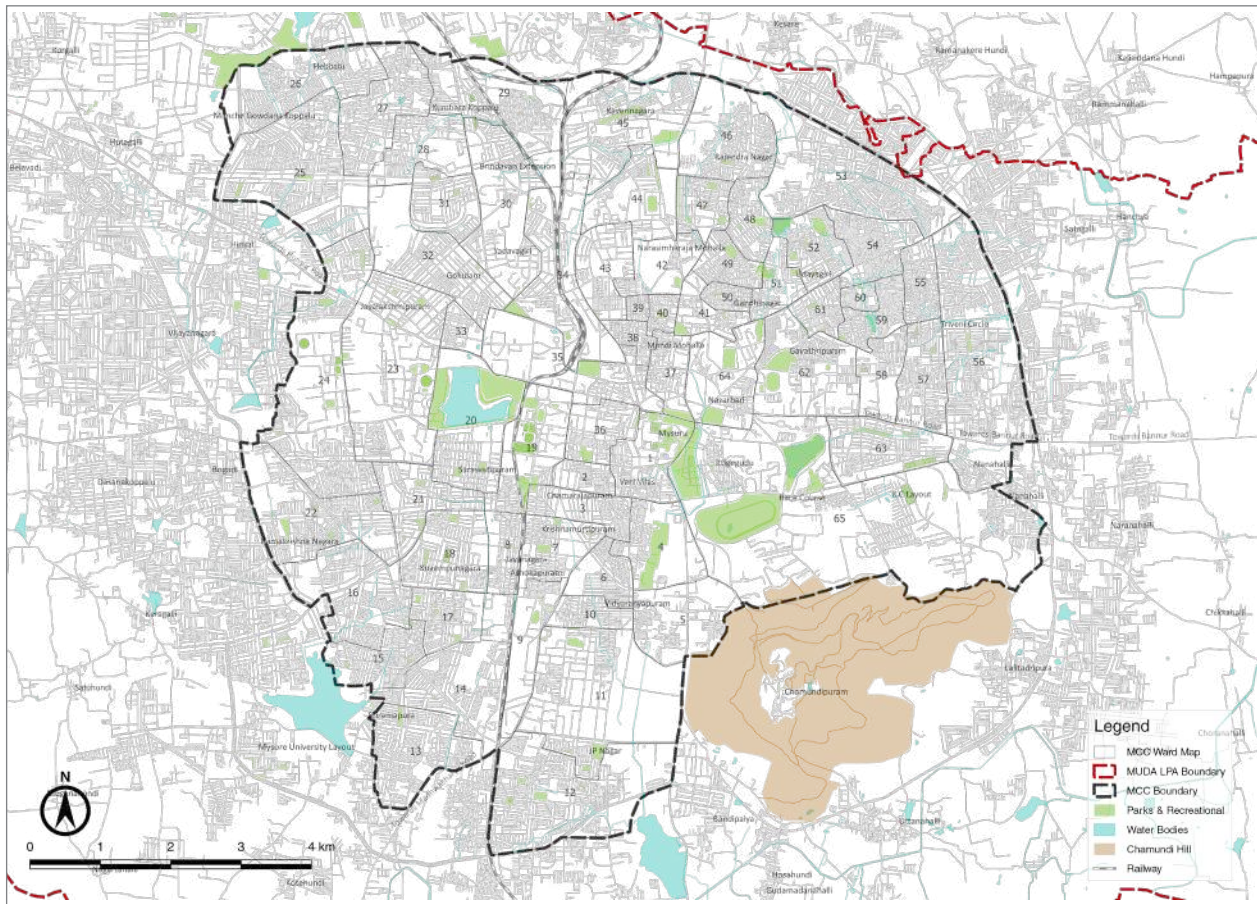
Map 3.1: Old Mysuru city and updated administrative boundaries

Source: UN-Habitat

04

Existing Urban Analysis

4.1 NATURAL TOPOGRAPHY

Mysuru city is located along the foothills of Chamundi Hills. It is elevated to the North-West as well as the South-East, creating a ridge that cuts the city into two. The elevation difference between the two parts of the city is 170 m, with the lowest point being 706 m and highest being 888 m.
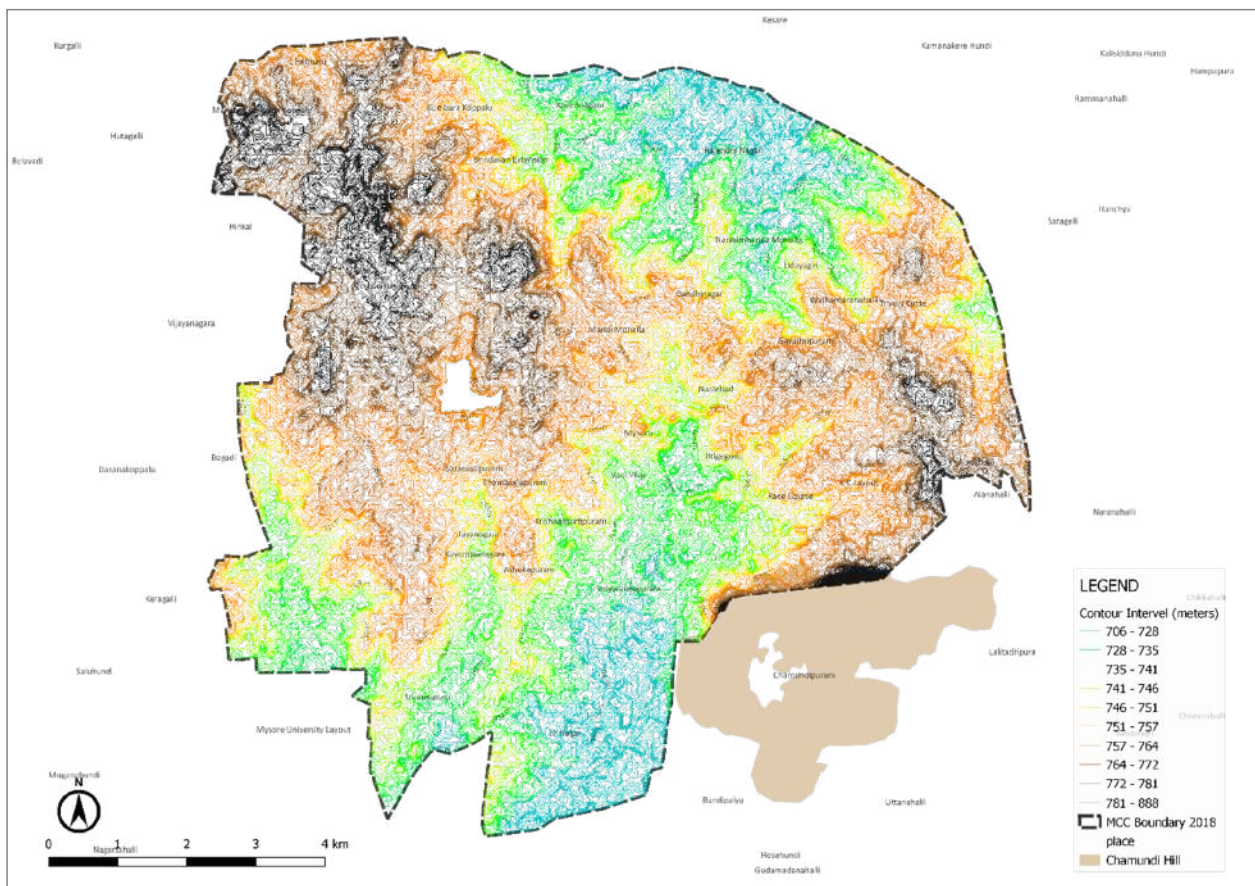
Map 4.1: Contour map of Mysuru city   Source: Aster DEM

4.1.1 Significant natural features

Mysuru city's landscape is characterized by water bodies, natural resources, forest lands, agricultural lands and built environment features that have influenced its growth and urbanization pattern.

Water Bodies

Mysuru city has a healthy green cover with eight lakes that add to its tranquil beauty. These major lakes, or tanks, are a source of open space within the rapid urbanizing city. The most visited of these lakes are Kukkarahalli and Karanji, which are popular as picnic spots, family outings, walking and jogging tracks, and other public activities. These tanks were originally created to provide drinking water to the city of Mysuru in the early nineteenth century.

Natural Resources/ Forests

Mysuru city and its surroundings are rich in flora and fauna. It has also managed to save large tracts of land as reserved forests and conserved green areas within the LPA. The largest of them being the Chamundi Betta Reserved Forest, which covers about 613 ha.
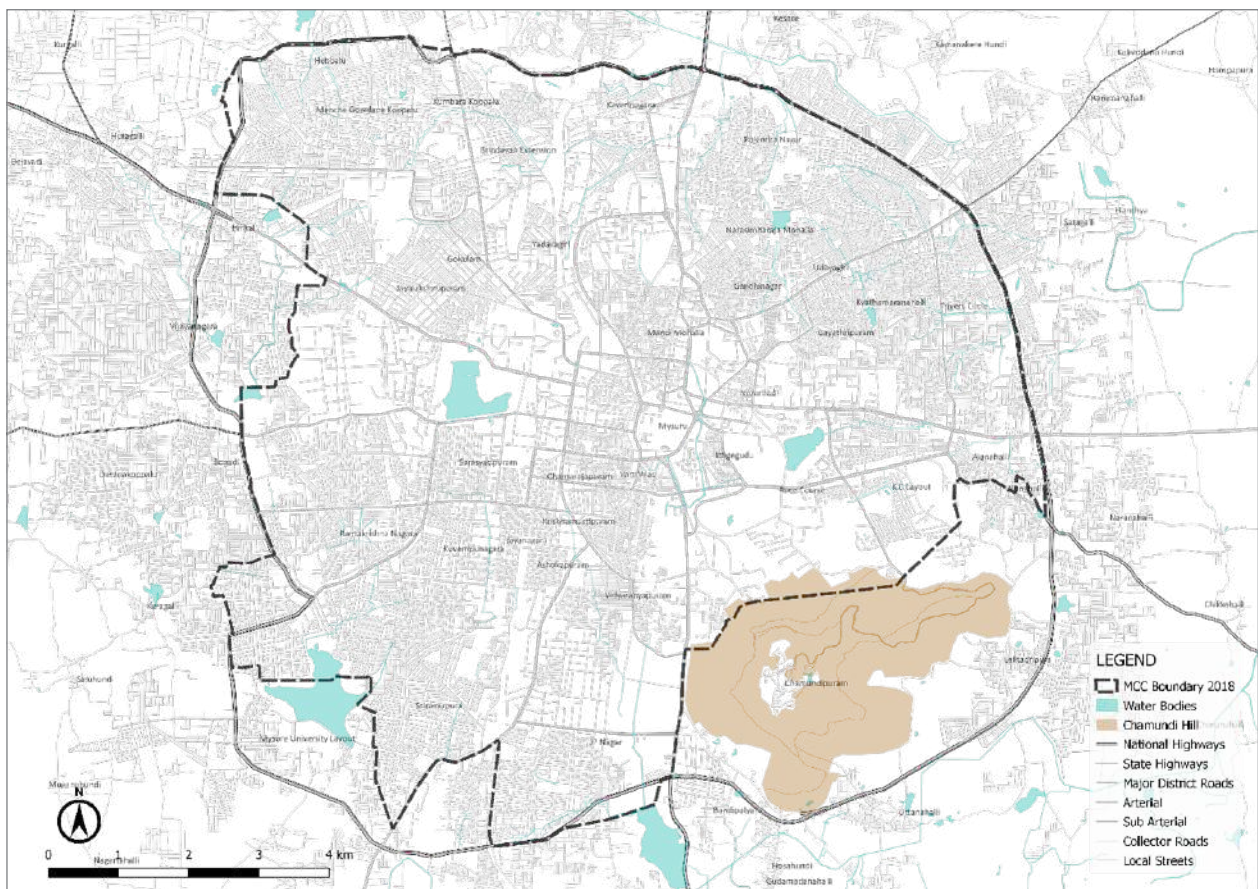
Map 4.2: Water bodies around Mysuru

Source: MCC

16

Agricultural Land

Major agriculture areas to the East and West of the developed areas of Mysuru and its LPA boundaries either have the approval for conversion of land use or are under consideration for change of land use from agricultural to non-agricultural. To the East of the LPA, the villages of Hanchya, Vajamangala, Bhugatagally, Chikkanahally, Choranahalli, Lalithadripura, Yandahally, Uthanalli, Madapar, Hosahundi, Bandipaliya and Marasatthanally are the areas where most of the agricultural land has been approved for non-agricultural use. While to the West of the LPA, the villages of Elwala, Huiyalu, Belavadi, Madagally, K. Hemanahally, Martikyatanahally, Kergally, Nagarathanally, Yadahalli, Halalu, Kenchanagudu and Dadahally are the areas where most of the lands are deemed to be converted to non-agricultural use. The villages of Bastipura, Hulikere, Belagula, Hongalli and Mogarahalli in the North and Mandakalli, Gude Madanahalli and Kadakola in the South, meanwhile, have been reserved for natural urban development. It may be noted that the urbanisation trend for the city of Mysuru will be more to the West, which is home to drier lands than the North and East. The northern part of the LPA is covered by wetlands under the KRS irrigation channels.

Built Landmarks

The rich and extensive history of the city of Mysuru is still reflected in most of its infrastructure. It is strewn with heritage structures like the Mysore Palace, Lalith Mahal Palace, and Brindavan Gardens. It is also an eco-sensitive city, surrounded by the Bandipur National Park, Nagarhole National Park and Ranganthittu Bird Sanctuary. In fact, the old city (core city area), which was planned with wide roads and a robust infrastructure is still in use today.

4.2 URBANISATION AND LAND USE PATTERNS

4.2.1 City development pattern

For the city of Mysuru, in the decades following 1890, individual buildings commanded large sections of the city with integrated and planned complexes. It is a city of long boulevards radiating from a well-defined central axis, with recessed public buildings balanced on either side of its wide roads. This is prominent from the city plan of 1861 and 1903 (see Figure 4.1, which shows the growth of Mysuru from 1865 to 1930). Mysuru also had the privilege of seeing the first City Improvement Trust Board in India.

The Board took up new extensions, parks, markets and a comprehensive system of drainage that was later developed and completed on elaborate lines by Sir M. Visveshwaraya in 1910.

Here, Figure 4.1 shows the city plan with wide roads, boulevards, housing layouts, public buildings, and large open green spaces that were developed by 1930.
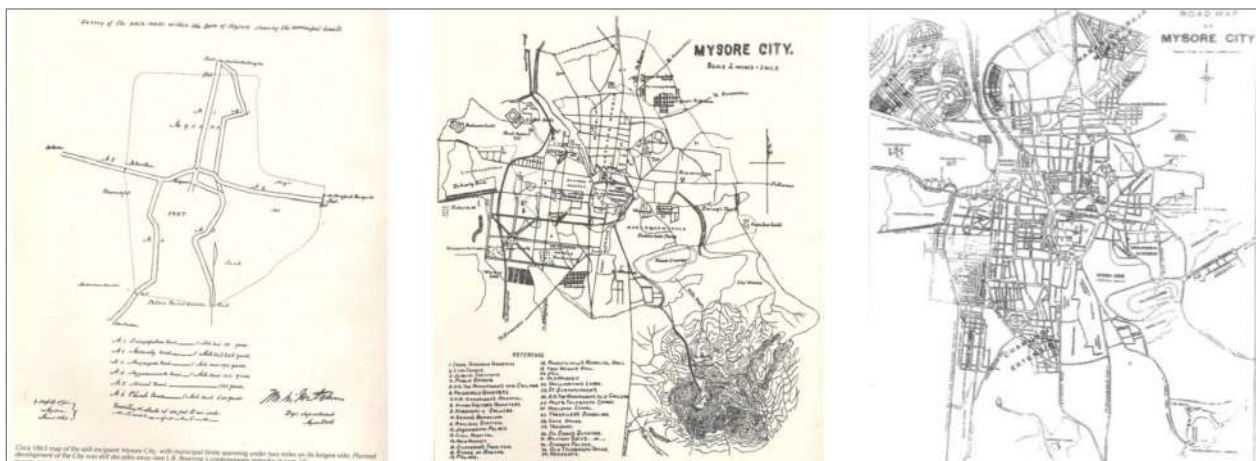
Figure 4.1: Growth of Mysuru from 1865 to 1930   Source: UN-Habitat
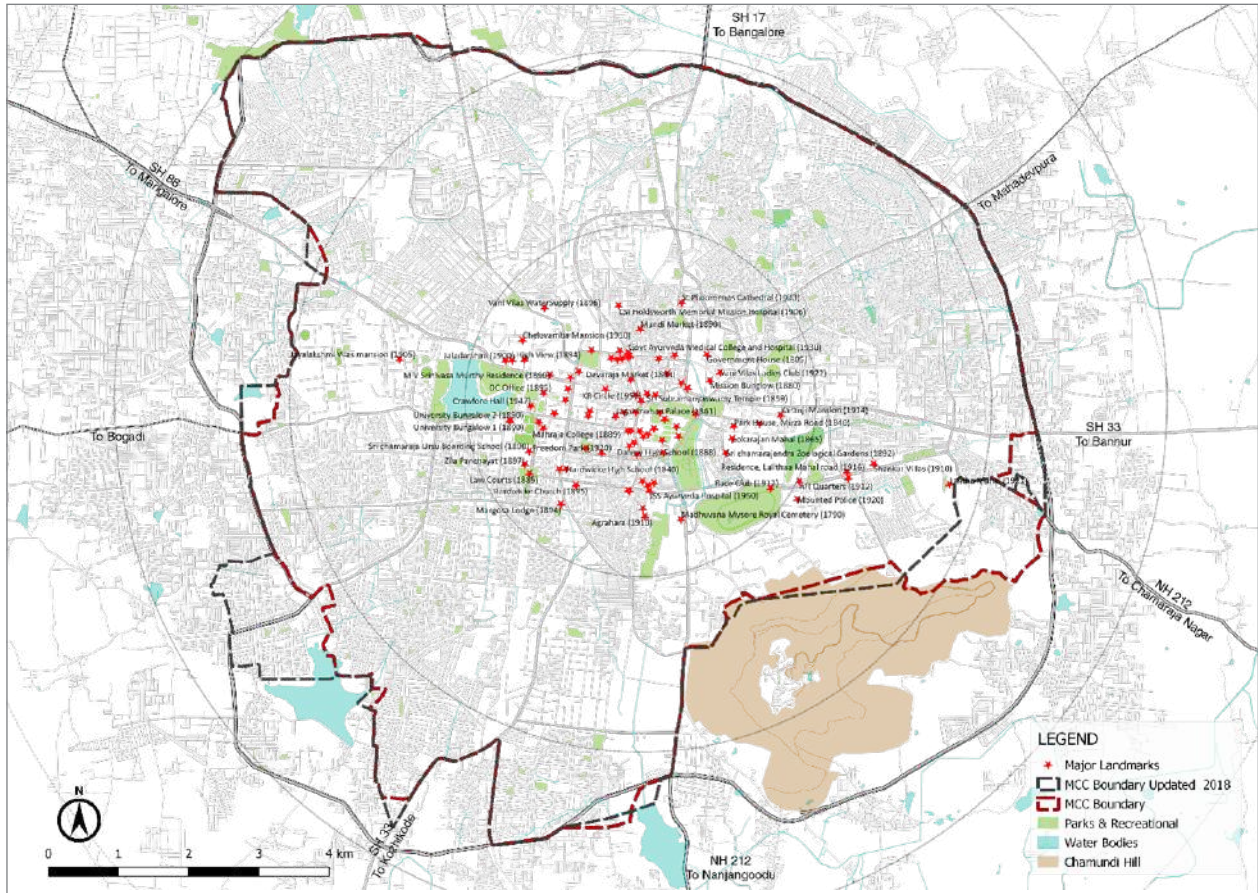
Map 4.3: Historic landmarks of Mysuru's growth over the decades   Source: UN-Habitat

In 1975, the city was developing in a linear pattern along the highways connecting it to Bengaluru in the North and Kozhikode in the South. Over the next few years, the city started to grow radially with a proclivity towards the North-West.

In recent decades, the growth of the IT industry and industrial area in northern Mysuru led to significant housing developments for the workforce in proximity to their workplaces, shifting the core city towards the North-West.

KIADB has developed industrial estates at five locations in the city's north western outskirts, namely Hebbal, Belavadi, Hootgalli, Belagola, and Metagally. Major industries like Bharat Earth Movers Limited (BHEL), Kirloskar, Jay Bearings, and Automotive Axel, as well as advanced technology and software training centres like Infosys, Wipro, L&T, Software Paradigms Infotech, etc, are also established in Mysuru. MUDA holds around 450 factories from varied industrial sectors like textiles, engineering products, wood and paper units, providing employment for most of the working population within its jurisdiction.

1975
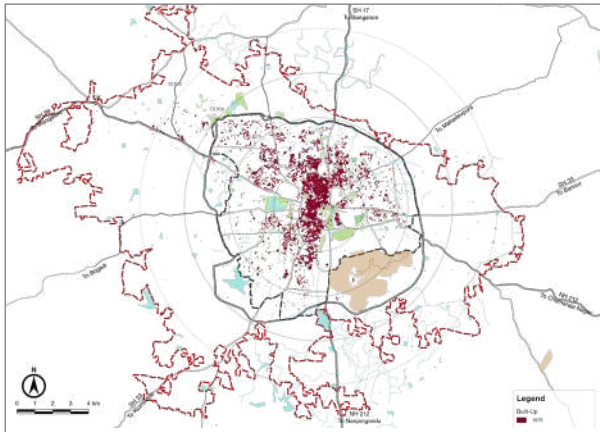
Area: 37.30 sq. km.
Population: 3.55 lakh

1990
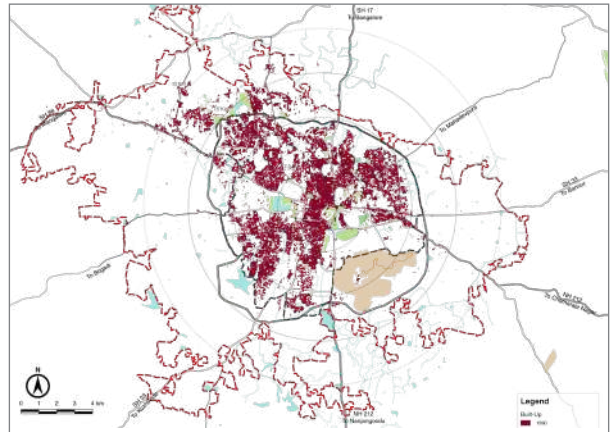
Area: 58.25 sq. km.
Population: 5.87 lakh

2000
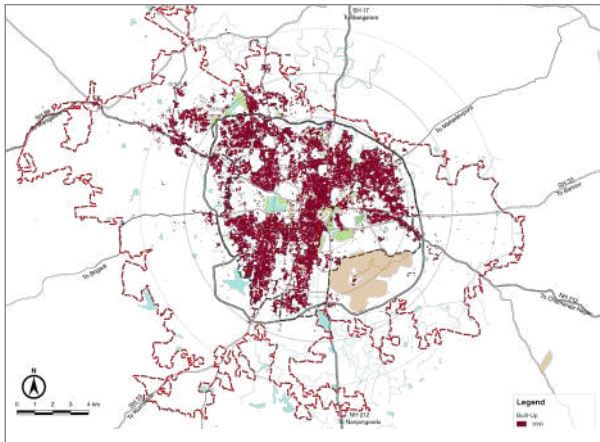
Area: 89.66 sq. km.
Population: 7.55 lakh

2014
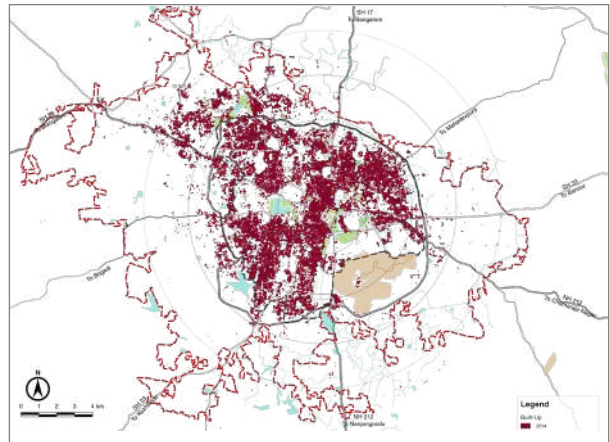
Area: 89.66 sq. km.
Population: 8.93 lakh

2020
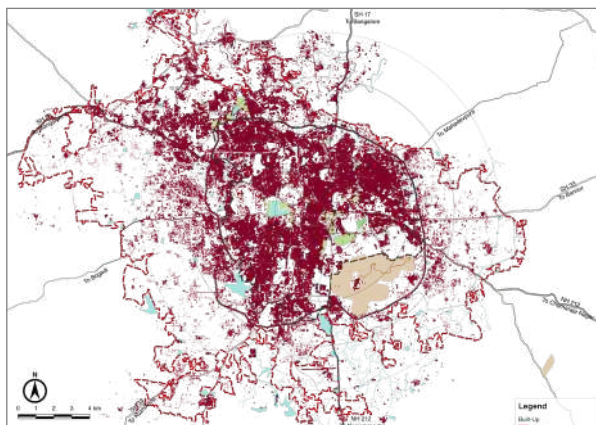
Area:89.9 sq. km.
Population: 11.54 lakh

Map 4.4: Change in built-up area over time in Mysuru city

Source: Multitemporal information layer on built-up presence as derived from Landsat image collections (GLS1975, GLS1990, GLS2000), and ad-hoc Landsat 8 collection 2013/2014, GHSL (10m) Sentinel-2 imagery (2020)

Table 4.1: Mysuru's population density over years

Year	Population (lakh)	Decadal growth (%)	MCC Area (Ha)	Population Density/Ha
1961	2,53,865		3,730	68
1971	3,55,685	40.1%	3,730	95
1981	4,70,433	32.3%	6,067	78
1991	5,87,648	24.9%	5,825	101
2001	7,55,379	28.5%	8,966	84
2011	8,93,062	18.2%	8,966	100

Source: Census of India

The population of Mysuru as per the Census of India in 1961 was 2.53 lakh. Between 1961 and 1981, the city recorded a decadal population growth rate of 40.1 per cent and 36.2 per cent, respectively. During the 1981 to 1991 decade, MUDA was established and a master plan prepared, which opened the lands around MCC's boundary. The new MUDA layouts attracted the High-Income Group (HIG) and Middle-Income Group (MIG) population leading to the reduction of decadal growth to 24.9 per cent. Between 2001 and 2011, due to large-scale investments in the North and North-West micro-markets, the population growth was noted in areas beyond MCC's jurisdiction, leading to a 10 per cent reduction in the decadal growth rate.

The MCC area of 128 sq. km. is subdivided into 65 wards with a population of 8,93,062 and a growth rate of 18.2 per cent over 2001 (as per Census 2011 and 2001). Even though the average population density of the city was 82 persons per hectare (PPH), it ranged from 13 PPH to 670 PPH across neighbourhoods. There are 12 wards in the city, with densities above 275 PPH, which have shown a particular growth trend over the ages along the Bengaluru–Mysuru corridor in the North-West. The growth has been noted towards the core city area and the densities over 2001 have been increasing towards the North-West, influenced by the Hebbal industrial area.

4.2.2 Spatial development pattern

Core City Area

Mysuru has retained its built character of a 'native' princely city, its ambiance and atmosphere primarily characterized by the Amba Vilas palace's towering presence, the city's focal point, its meticulous planning and symmetrical axis. The core city developed around the palace has numerous heritage buildings, gardens, boulevards and planned markets within a 1-km radius, making it a very compact city.

The core is surrounded by the residential localities of Mysuru called '*Mohallas*' or '*Agraharas*'. Many of these mohallas or agraharas were founded by the Maharajas of Mysore, some dating back more than 200 years, retaining their original names and more or less their original dense form.

4.2.3   Urban density

Based on the population figures from 2011, the projected average population density of Mysuru city is 102 PPH. However, there is a steep variation in urban density across different areas within Mysuru. The densest areas of the city carry as many as 670 persons per hectare, while the newly developed, low-density areas have approximately 13 persons per hectare.

Based on the current population estimate of the city at 11.50 lakh, the population density is closer to about 128 PPH. The proposed density based on the master plan lowers the existing density to 100 PPH.

The city should aim for strategic densification within pockets of low-density neighbourhoods to accommodate future growth.
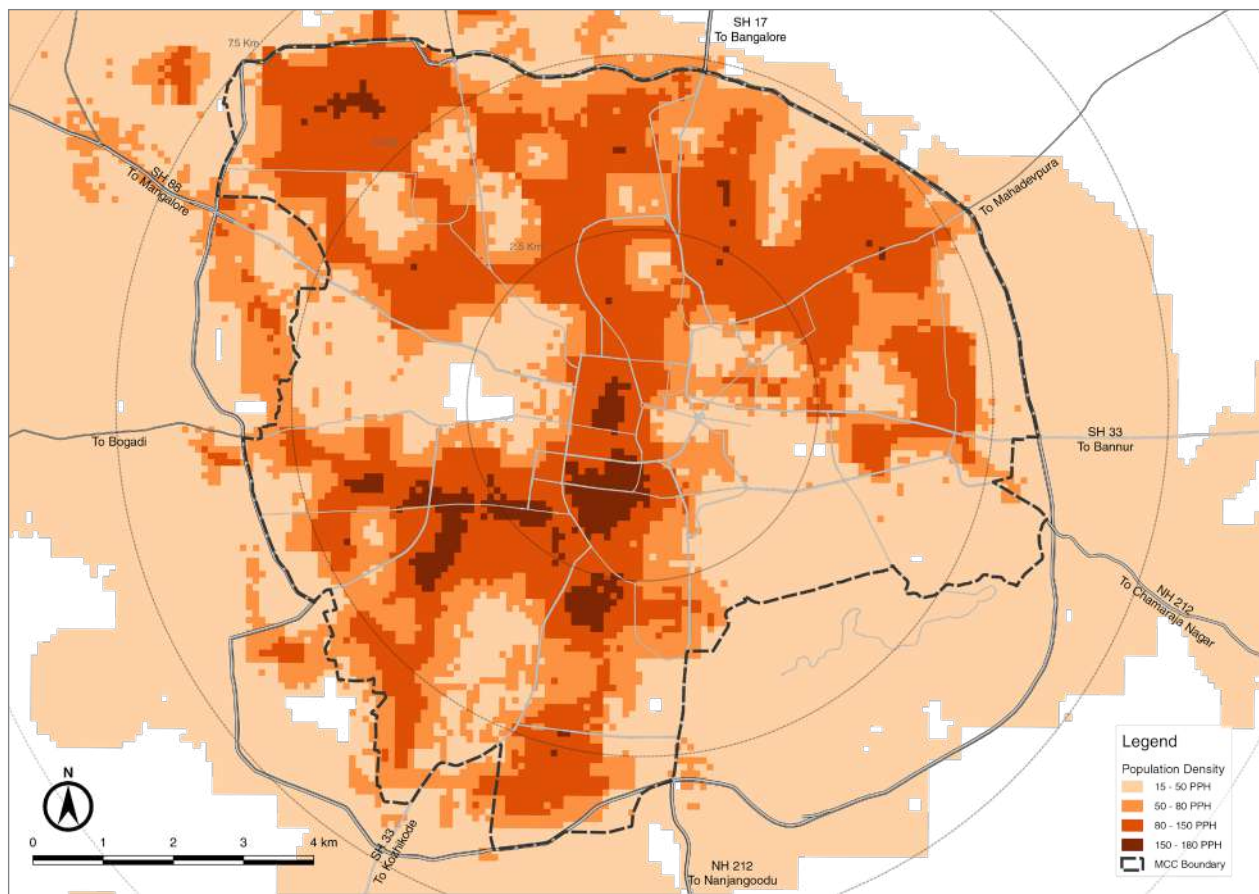
Map 4.5: Population density of Mysuru

Source: UN-Habitat

4.2.4   Existing and proposed land use patterns

Mysuru's rapid population growth has resulted in a sprawling development pattern. Mysuru's city planning authority was first constituted in 1966 for Mysuru city LPA, which included the entire Mysuru municipal area, 13 villages of Srirangapatna, and 43 villages of Mysuru taluk. However, to accommodate and plan for Mysuru's rapid growth, the LPA was revised by the government several times based on the State Town Planning Board's recommendations

to bring these additional areas under an urban development regulation, from time to time.

The development plans for this revised LPA was prepared and enforced by the city planning authority as provided under the provisions of the Karnataka Town and Country Planning Act (KTCP), 1961.

The ethos of the latest plan is to promote and conserve the culture and heritage of the royal city, while preserving the natural infrastructure and ensuring a slum-free, orderly and healthy development of Mysuru city.
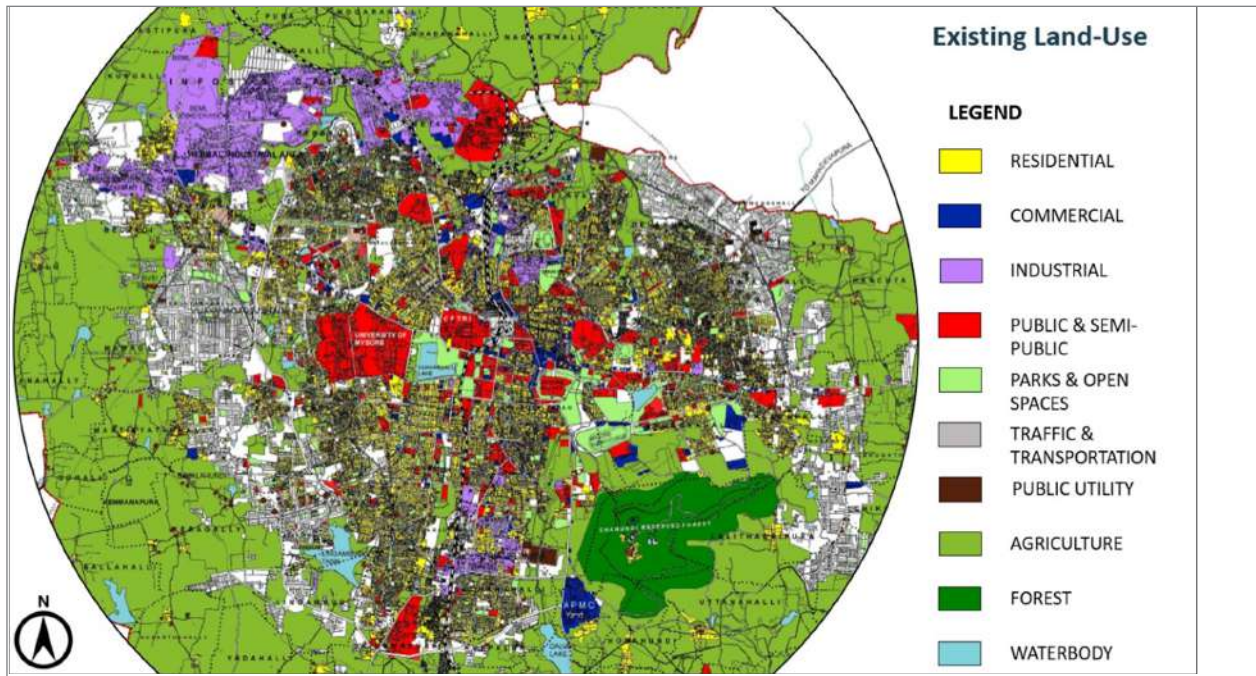
Map 4.6: Mysuru master plan 2031 (existing land use)   Source: Mysuru Master Plan 2031

The entire LPA is divided into 45 planning districts. The city's developed area can be observed in planning districts 1 to 31, while districts 31 to 45 cover the rural areas of the LPA. The planning district (PD-9) for Chamundi Hills is earmarked as an 'Eco-Sensitive Zone'. The city's existing land use pattern shows that the residential area (including the vacant land in the developed area) is 7,049.81 Ha. However, the residential area is proposed to be expanded to 15,735.06 Ha by converting agricultural land into residential use, which works out to be 53.81 per cent of the developed area with an average density of 100

PPH. Due to lack of phasing in the planning, large chunks of land were unlocked, leading to low-density layouts in the suburbs, which compounded the city's sprawling pattern.

This development pattern could cause high financial outpcomes for the municipal corporation in order to provide and sustain essential services because necessary infrastructure such as roads, drainage, electricity and water supply will have to be expanded to serve fewer people living in low-density dwellings.

Table 4.2: Existing and proposed land use categories

Land use category	Existing land use		Proposed land-use	
	Area (Ha)	Percentage to Total Area (%)	Area (Ha)	Percentage to Total Area (%)
RESIDENTIAL	7,049.81	24.1	15,735.06	53.8
COMMERCIAL	467.52	1.6	800.88	2.7
INDUSTRIAL	1,320.49	4.5	1,812.7	6.2
PUBLIC/SEMI-PUBLIC	1,551.69	5.3	1,981.33	6.8
PUBLIC UTILITY	107.2	0.4	192.48	0.7
OPEN SPACE	772.87	2.6	1,611.62	5.5
TRAFFIC AND TRANSPORTATION	3,413.73	11.7	4,568.26	15.6
AGRICULTURE	13,455.56	46.0	1,098.16	3.8
WATERBODY	336.1	1.2	372.68	1.3
FOREST	766.5	2.6	763.92	2.6
SPECIAL AGRICULTURAL ZONE			305.41	1.0
Total	29,241.48	100	29,242.51	100

Source: Mysuru Master Plan 2031
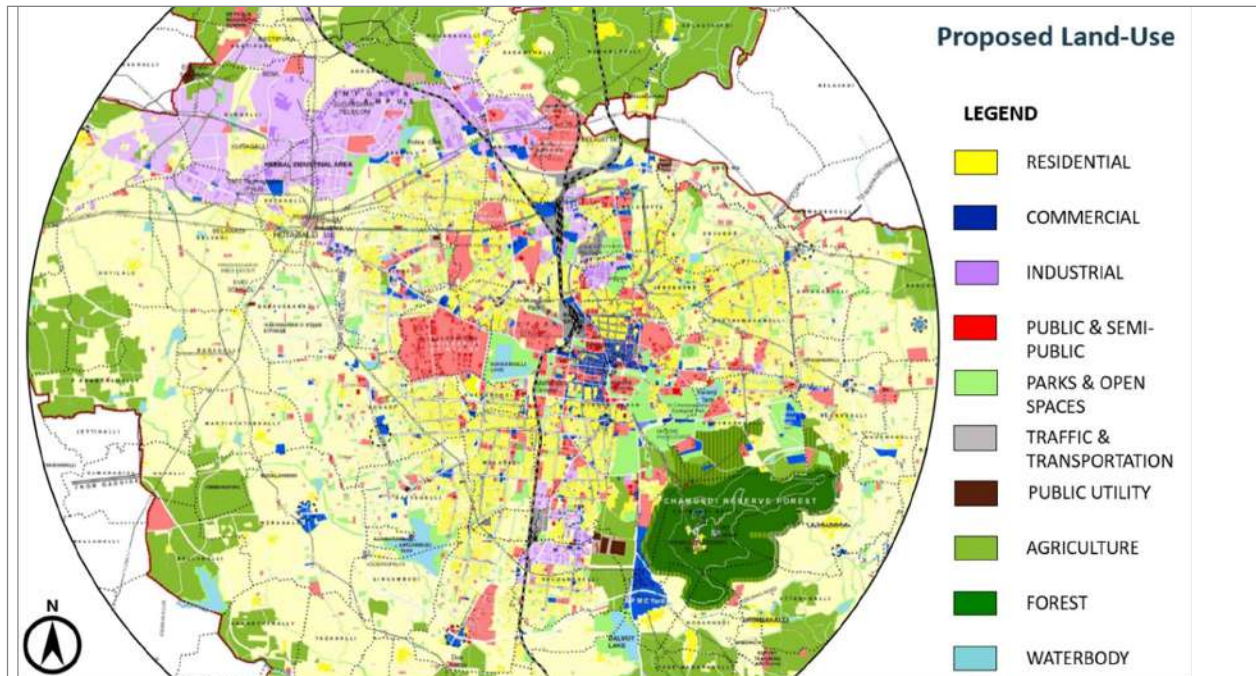
Map 4.7: Mysuru 2031 Masterplan (Proposed Landuse)

Source: Mysuru Master Plan 2031

Heritage is given prominence with 200 heritage buildings identified by the Mysuru Heritage Area Development and Preservation Expert Committee, constituted by the government. This committee of eminent architects, planners, academics and experts has recommended that the MUDA preserve these heritage buildings under the KTCP Act, 1961.

These buildings have been graded for heritage importance as category I, II, III and IV. Category I being the highest and category IV the lowest grade of significance. Special development regulations are enforced in heritage zones and the area surrounding heritage buildings, which stipulates the demolition of listed buildings and height regulations to maintain the prominence and vista of the site, and any construction activity is permitted only with approval from the committee.

4.3 GREEN HOUSE GAS EMISSION PROFILE

According to a GEF-UNIDO-MoUD study (2017)[6], the GHG emission in Mysuru during 2015-16 was 15,56,146 Mt CO_2-eq. The total CO_2, CH_4 and N_2O emitted were 14,32,030 Mt, 3801.30 Mt, and 66.72 Mt, respectively.

As shown in Figure 4.2, the stationary energy sector/ energy use emitted 8,29,106 Mt CO_2-eq, accounting for 53 per cent of the total GHG emissions during 2015-16. The transportation sector emitted 6,02,924 Mt CO_2-eq, which was 39 per cent of the total GHG emissions. The waste sector emitted 1,14,162 Mt CO_2-eq., which was seven per cent of the total GHG emissions. The agriculture, forestry and other land use (AFOLU) sector emitted 9,954.4 Mt CO_2-eq., which was one per cent of the total GHG emissions. There was no direct emission from Industrial Processes & Product use (IPPU)sector and, hence, emissions from the industry sector was considered to be zero. The annual CO_2 equivalent (GHG) emissions per capita in 2015-16 was 1.43 Mt CO_2-eq/capita.

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[6] GHG Accounting and Capacity Building for the Cities of Jaipur, Bhopal, Mysuru, Vijayawada and Guntur as a first step under the GEF-UNIDO-MoUD Project (2017)

Image 4.1: Devaraja Market, Mysuru

Figure 4.2: Sector-wise GHG emissions (Mt CO$_2$-eq.) in Mysuru during 2015-16

- Transportation
- Waste
- AFOLU
- Staionary Energy
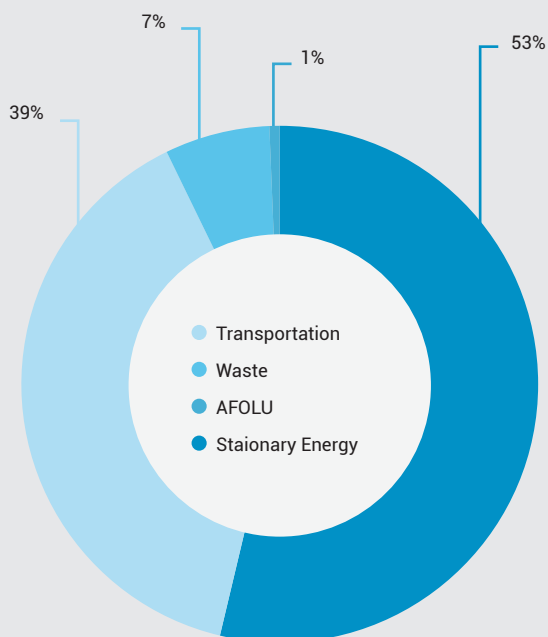
Source: GEF-UNIDO-MoUD Project completion report (2017)

4.4 SECTORAL CONTEXT

This section will cover Mysuru's assessment over 12 sectors, namely, governance and data management; finance and economy; housing and property; water; sanitation; waste management; clean energy; disaster management; environment; public space, safety and urban form; transport; and social facilities and services.

For Mysuru, 73 per cent of all indicators (96 out of the total 131 indicators) were collected, including 85 per cent of all primary indicators. As illustrated in Figure 4.3, the overall city score on the USAF is 3.5. The detailed performance of these sectors is provided in the Mysuru Urban Sustainability Indicators Report.

The following sections present an in-depth evaluation of each of the sectors based on the USAF sustainability indicators.

Figure 4.3: Average performance and percentage of indicators for the 12 USAF sectors
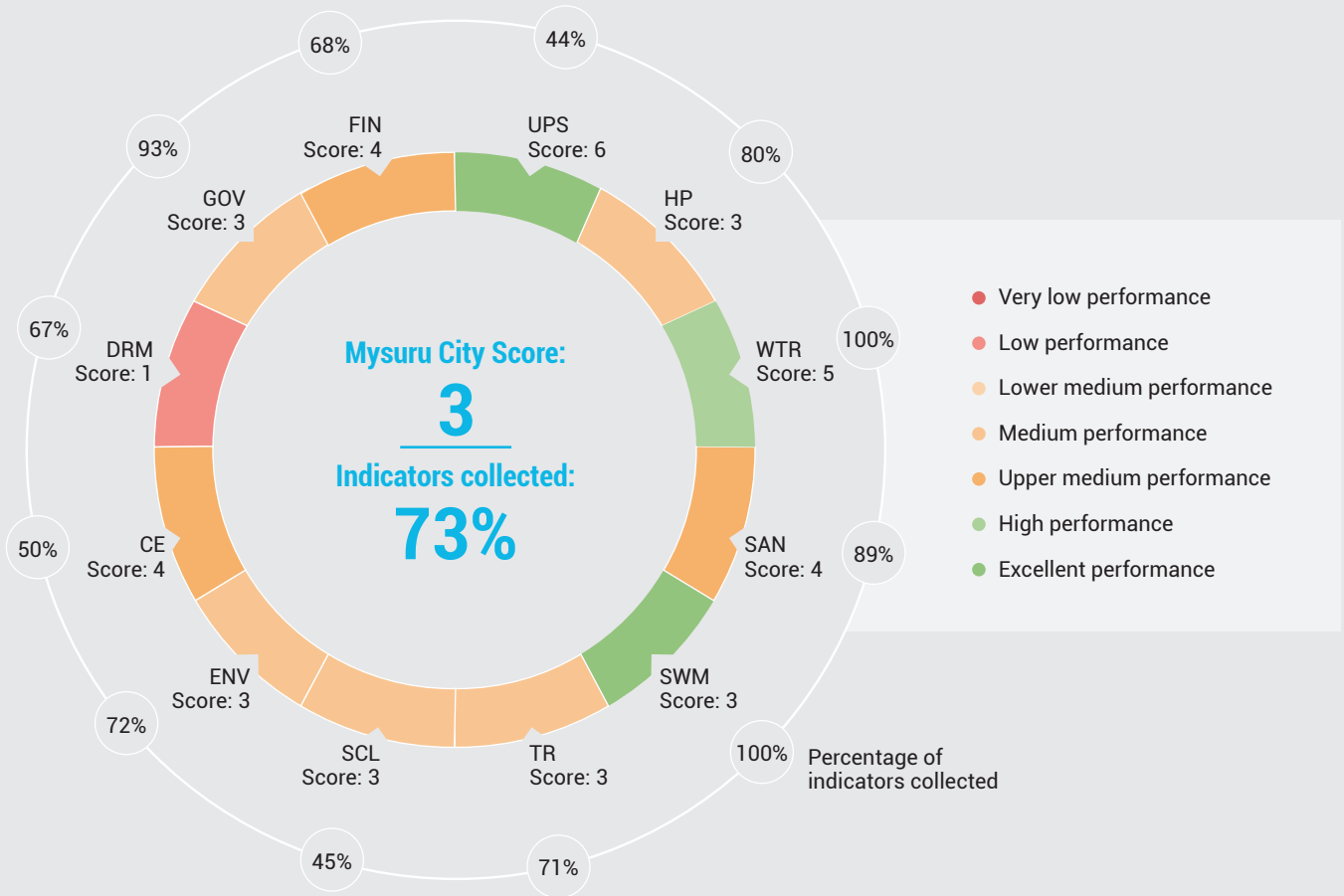
Source: UN-Habitat

4.4.1 Public space, urban form and safety

There are nine indicators in this sector, with four related to public spaces, two to urban form and three related to safety. For Mysuru, data was collected and analysed for four of these indicators. The overall performance of the city in this sector is 'excellent'.

Urban Form

The current MCC boundary is 89.9 sq. km., with a population of 1.05 million residing in a developed area of around 170 sq. km. As per the city's 2011 master plan, the projected population for the horizon year 2031 was 2.1 million; at 150 PPH, the city would require a development area of about 140 sq. km. Including the undevelopable land of 25.51 sq. km., this measures 165.51 sq. km. However, the area considered for the current master plan is 292.42 sq. km., grossly overestimating the city's expanding land needs, leading to the development of low-density sprawl.

Creating larger developable boundaries unlocked large chunks of land leading to leapfrog, low-density developments in the suburbs and disrupting the city's growth pattern. This development pattern could be environmentally and financially unsustainable for the municipal corporation, due to the high infrastructure cost serving fewer people.

![Public Space icon]

Public Space

In Mysuru, there are four large parks and 524 community, neighbourhood and housing area parks. They provide 88 per cent of the city's population with open, public green spaces within an 800-m. radius. The city has 6.26 sq. m. of open space per person, which is among the highest in the country.

Apart from parks, Mysuru is also home to public and semi-public institutions with open green spaces, like Gokulam, Defence Food Research Laboratory (DFRL) and Mysuru University, which occupy around 19.81 sq. km.

As per the spatial analysis illustrated in Map 4.8, newer developments near the city's industrial areas are the ones that have a visible shortfall in the distribution of open spaces.

Table 4.3: Classification of existing parks and green spaces

Sl.no	Type of parks	Area (sq. m.)	No of parks
1	Housing Area Park (HAP) (Less than 5,000 sq. m.)	5,000	424
2	Neighbourhood Park (NP) (5,000–10,000 sq. m.)	10,000	71
3	Community Park (CP) (10,000–50,000 sq. m.)	50,000	34
4	District Park (DP) (50,000–2,50,000 sq. m.)	250,000	3
5	Sub-City Park (SCP) (2,50,000 sq. m. and above)	250,000 & above	1

Source: Mysuru Master Plan 2031
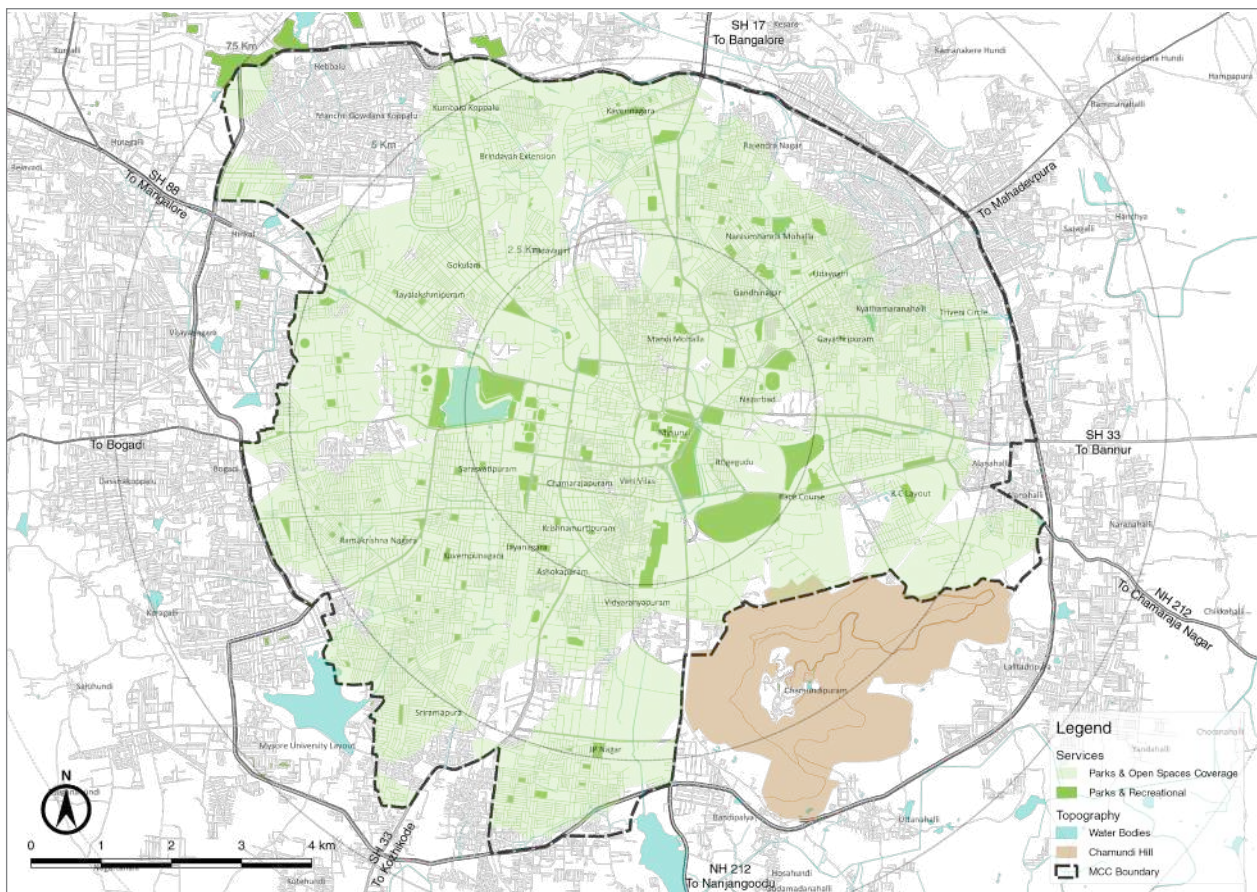
Map 4.8: Population catchment with access to public parks and open spaces within 500 m. radius

Source: UN-Habitat

Image 4.2: Mysuru city skyline from Chamundi Hill   Source: UN-Habitat, India

4.4.2   Housing and slums

There are five indicators in this sector measuring the housing demand and status of slums/ informal settlements in the city. For Mysuru, data was collected for four indicators. The overall performance of the city in this sector was 'medium'.

Mysuru is perceived as an arising IT centre changing the residential make-up of the city. While the expansion of apartment typology is a recent phenomenon, there is a limitation on high-rise buildings as it jeopardizes the city's heritage value.

As per the master plan, the current (2009) housing shortage remains at around 20,000 dwelling units in Mysuru. This lack is probably going to increment to around 40,000 by 2031. It could be seen from the existing land use that adequate developed land would be available for future residential development.

Informal Settlements

Less than eight per cent of the total population lives in slums accounting for one per cent of the municipal area. As per the latest survey conducted by Karnataka Slum Development Board (KSDB), 16,268 households living in 63 notified and 19 non-notified slums, are in need of proper housing or need to be relocated. Twenty out of the 83 slums are in the North and South flood catchment zones in the low-lying areas of the city.

PMAY and the Mysore housing schemes are concentrating on housing for all, but due to lack of funds the number of people who applied and were provided housing is less than 80 per cent.

27
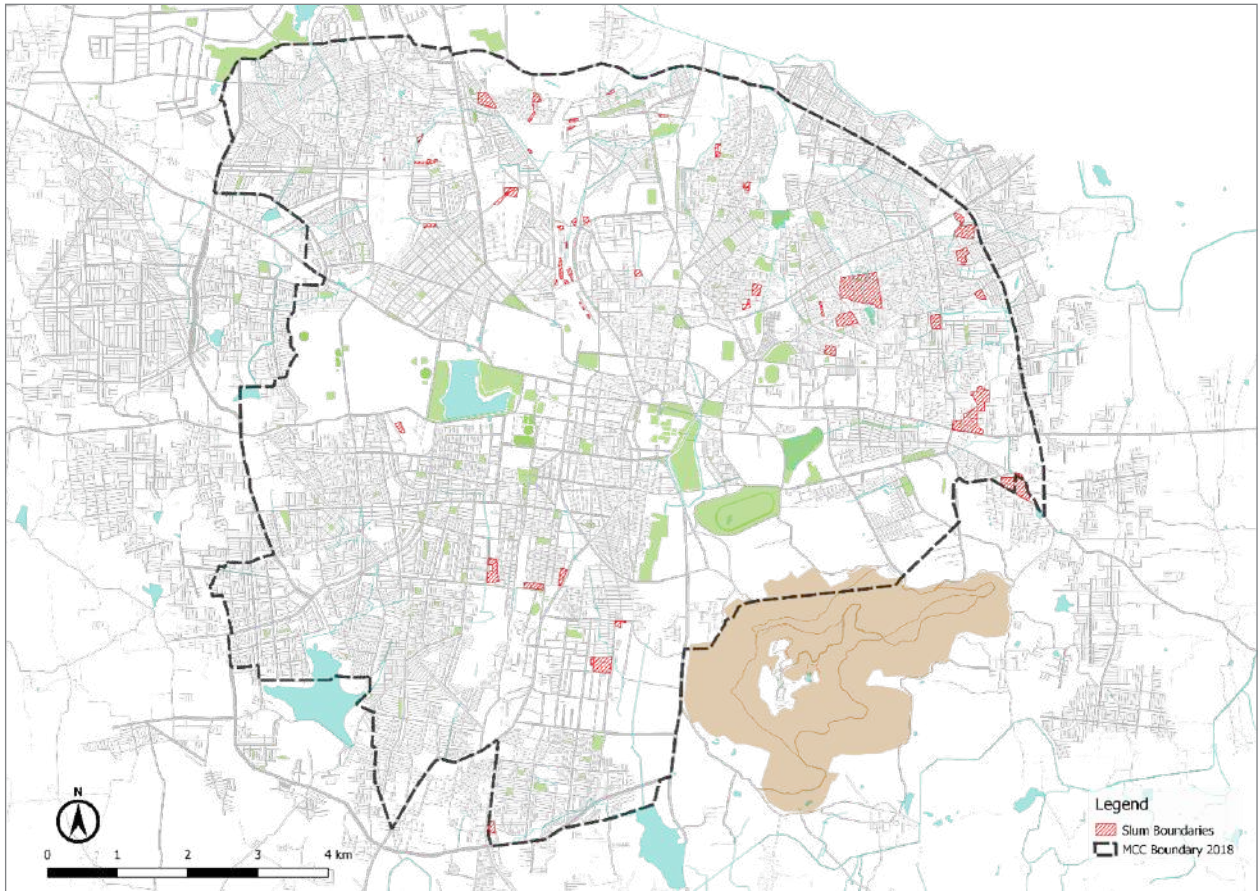
Map 4.9: Slum locations in the city   Source: UN-Habitat

4.4.3 Water supply

There are six indicators to assess the water supply management in the city including service coverage, quality of water and measuring the extent of non-revenue water. Data was collected for six indicators. The overall performance of the city in this sector was 'high'.

Water Service Coverage

Mysuru city mainly receives treated water from the Cauvery River with intake and treatment units at various locations downstream from the Krishnaraja Sagar Reservoir. The city of Mysuru got its first treated piped water in 1896 from the Belagola waterworks. As the city grew, new water supply schemes were added at frequent intervals. After

the Belagola Phase I project was commissioned, the second and third phases were commissioned, keeping the same source in 1924 and 1998. Further augmentation of the water supply system was taken up under ADB's assistance with intake works at Melapura on Cauvery River's right bank, downstream of Srirangapatnam.

As the network is built in different phases, the recently constructed water supply schemes have a Supervisory Control and Data Acquisition (SCADA) system, whereas the previously built system did not. Data is now unreliable due to the disintegration of the SCADA system.

As per the Master Plan 2031, the total demand estimated for a 2.1-million population by 2031 is 283.5 MLD, while the total quantum available is 351.66 MLD.

Mysuru has a 100 per cent piped connection, but the expansion of the network is affecting the operation and maintenance cost, and making revenue recovery very difficult to attain.

Figure 4.4: Water supply service coverage and quality in the city compared to national benchmarks
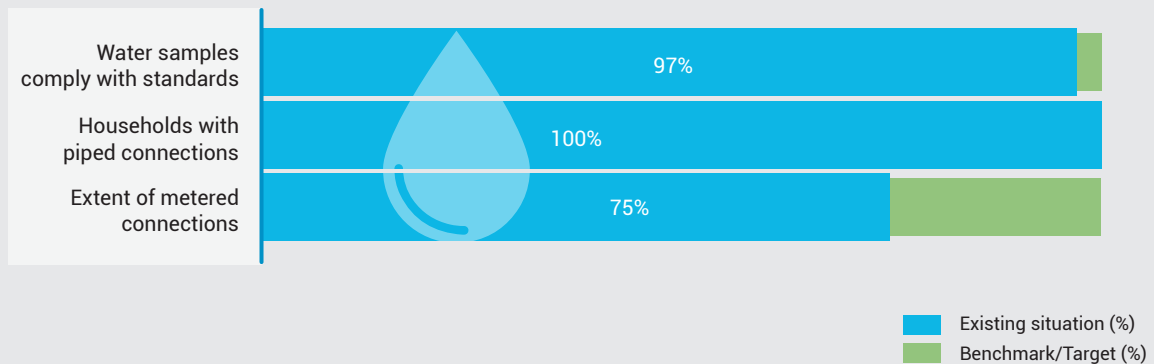
Source: UN-Habitat

Non-revenue Water

This indicator highlights the extent of water produced which does not earn the utility any revenue. This is computed as the difference between the total water produced (ex-treatment plant) and the total water sold expressed as a percentage of the total water produced. Non-revenue water (NRW) comprises—a) consumption, which is authorized but not billed, such as public stand posts; b) apparent losses such as illegal water connections, water theft and metering inaccuracies; and c) real losses, which are leakages in the transmission and distribution networks.

The reduction in NRW to acceptable levels is vital for the financial sustainability of the water utility. NRW can be reduced through appropriate technical and managerial actions, and therefore monitoring NRW can trigger such corrective measures. The reduction of real losses can be used to meet currently unsatisfied demand or to defer future capital expenditures to provide additional supply capacity. The reduction of NRW is desirable not just from a financial standpoint, but also from the economic and environmental benefits' point of view. The benchmark value for NRW may be considered at 20 percent, the levels achieved by most well-performing utilities in developed countries. NRW is also influenced by factors outside the control of the water utility such

as the topography of the city, age of the network, length of the network per connection and water uses per capita. Mysore has an indicator value of 25% and scores an average score of 3 in indicator assessment criteria.

4.4.4 Sanitation

There are nine indicators in this sector for assessing the performance of the city's coverage of sewerage network, toilet facilities, compliance with wastewater treatment norms and guidelines. For Mysuru, data was collected for eight indicators. The overall performance of this sector was 'upper medium'.

Mysuru was one of the earliest cities to have an underground drainage system (UGD) in India. The first efforts for providing UGD were made during 1904 when core areas were provided with it. In 1955, a comprehensive scheme for providing UGD was undertaken and areas like Ashokapuram, Mandimohalla, Narasimharaja Extension, Gandhinagar, Vanivilasapuram and Paduvarahalli were covered.

The city has currently two sewage treatment plants, one at the sewage farm in Vidyaranyapuram and the other at the Kesare sewage farm. During 2000-2002, under the Asian Development Bank (ADB) assisted Karnataka urban infrastructure development (KUID) project, the entire MCC area was divided into four drainage districts, namely A, B, C and D, and three sewage treatment plants—Rayanakere for drainage

Figure 4.5: Households with access to private and public toilets compared to benchmarks

Public toilets mapped on Google Maps		100%
Households with access to toilet facility		100%

Benchmark / Target (%)
Existing Situation (%)
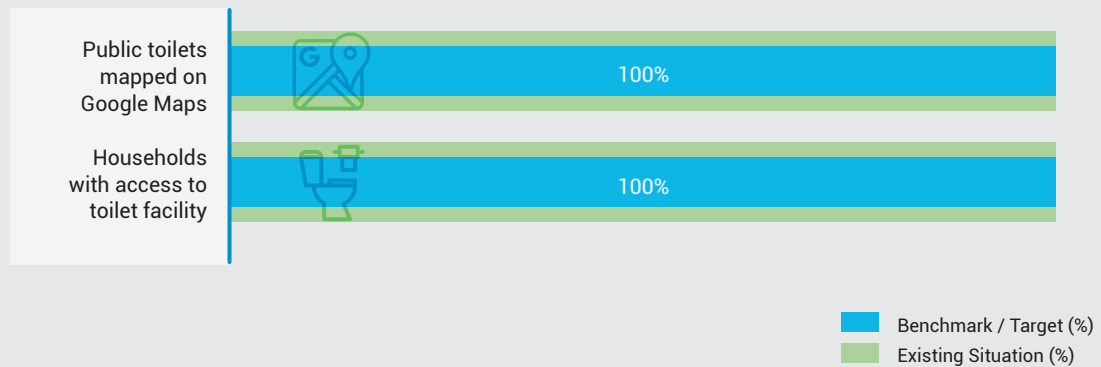
Source: GMC (2018-19)

districts A and D, Vidyaranyapuram sewage farm for drainage district B, and Kesare along the outer ring road—were constructed.

Coverage for Sewage Network Services

Mysuru's existing sewerage system covers 100 per cent of MCC's jurisdictional area and some areas under MUDA, covering approximately 84 sq. km. and servicing about 99 per cent of the city's population. The city's existing sewerage capacity is 158 MLD, while the required capacity for 2021 was 204.93 MLD (as per master plan 2011), which accounts for a shortage of 46 MLD.
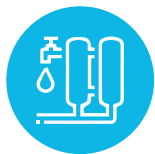
Wastewater Treatment

Even though there are no coverage issues in the city, the total quantum of sewerage treated before discharge into surface water bodies is only 60 per cent, of which only six per cent (10.5 MLD) is reused for landscaping maintenance and the rest is left to

flow into irrigation canals. The concern is that only 80 per cent of the water samples collected in a year passed the test for specified secondary treatment standards.

As the UGD network was laid under different schemes from 1904 to 2002 and as the life expectancy of the pipes is typically between 50–60 years, the older dilapidated network started falling apart. This led to increasing complaints regarding leakage of septage and pollution of the ground water in the core city area.

4.4.5 Solid waste management

There are 12 indicators in the sector to assess solid waste management (SWM) by a ULB, which includes the efficiency of waste collection, extent of waste processing and remediation of legacy waste in the city. Data was collected for all 12 indicators. The overall performance of the city in this sector was 'high'.

Waste Collection Efficiency

MCC undertakes 100 per cent door-to-door collection of waste in a segregated manner across all the 65

wards in the city. The segregated waste collected at source is maintained till the Zero waste processing/ disposal site. Thus, the city scored 'excellent' for both these indicators.

In the last few decades, municipal solid waste (MSW) generation in Mysuru has significantly increased due to rapid growth in population and economic conditions. Growing urban populations and limitations of available resources have made SWM a difficult problem. Following the release of Municipal Solid Waste 2000 Rules and the Karnataka Urban Drinking Water and Sanitation Policy (2002), MCC has taken it up as a challenge and adopted a hybrid model of integrated SWM (see Figure 4.6).

MCC has been a pioneer in adopting new technologies to achieve zero-landfill/ zero waste but even after the hybrid model of waste treatment, there is a gap of 90 MT at the landfill site, which can be reduced once segregation at source increases pace. As no scientific method of disposing off sanitary waste is followed by MCC, the same is still sent to landfills.

It was identified that as waste tracking is a huge issue in more than 47 wards, the collection is outsourced to different agencies. This is the main reason why the quantum of waste generated is not equal to the quantum of waste reaching the Zero Waste Management (ZWM) plants.

Figure 4.6: Integrated SWM strategy adopted by MCC
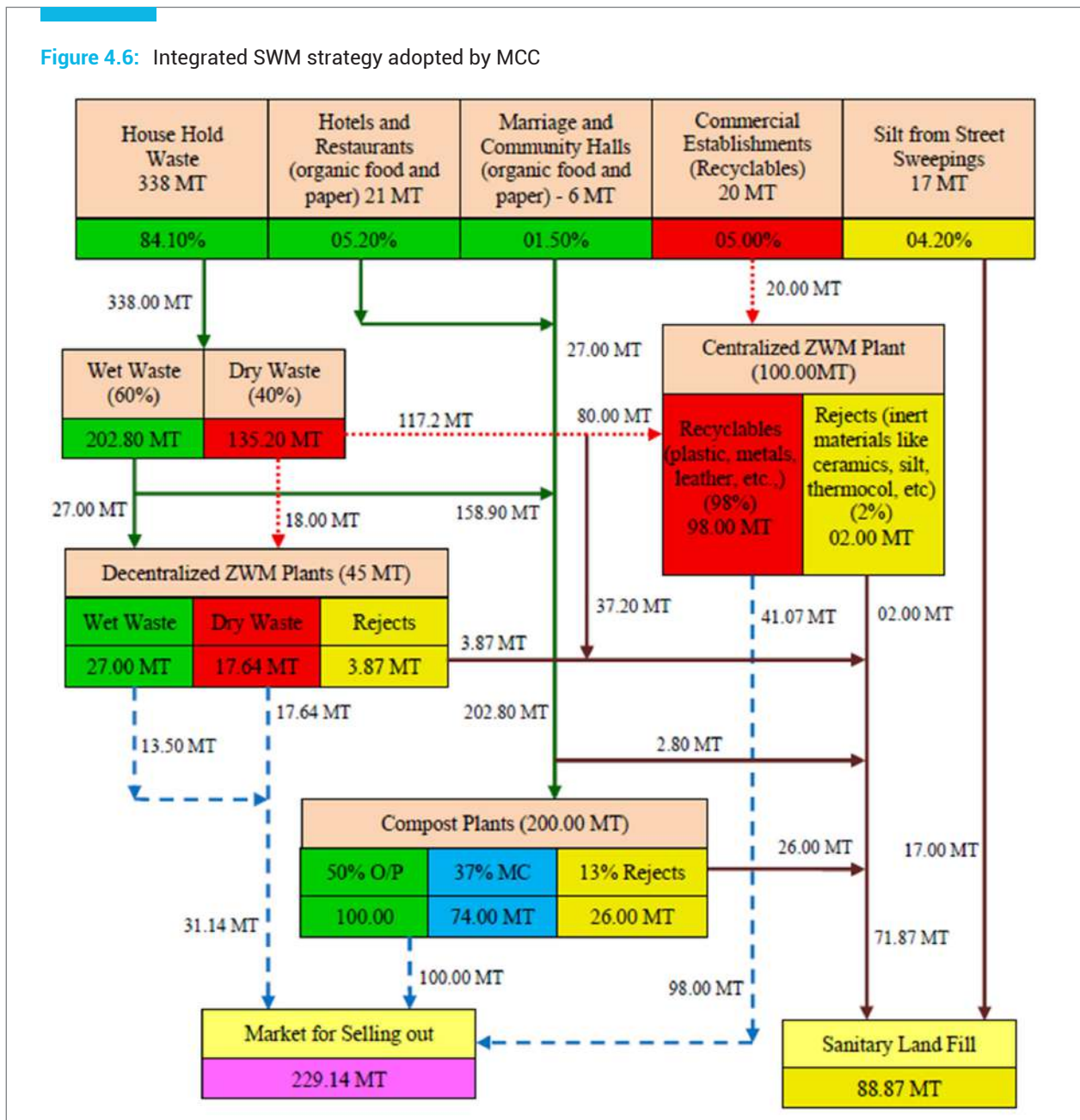
Source: MCC

ZWM plants are manually operated, which are not very effective. It is suggested that a combination of manual intervention and mechanical intervention will make it a better combination. To make it cost effective, it must be a self-sustaining machine that runs on solar power.

During 2015-16, the waste sector emitted 1,14,162 Mt CO_2-eq., which was 7.3 per cent of the city's total GHG emissions. MCC is also planning to address the issue of legacy waste accumulated at the Vidyaranyapuram sewage plant through bio-mining.

Cost recovery in solid waste seems to be the most daunting issue, with a recovery rate of 18 per cent. There is an immediate need for revision of charges to sustain the quality service delivery of SWM.

There is a lot of potential to increase the efficiency in operations in Mysuru by real-time monitoring of the

complete MSW system that would help better manage resource planning and improve the response time. This can also aid in capitalization of waste generated by tackling the informal economy developed over time.

4.4.6 Transportation

There are 14 indicators in the transportation sector for assessing a ULB's public transportation coverage, quality, safety, and investments towards environmentally friendly infrastructure. For Mysuru, data was collected for 10 indicators. The overall performance of the city in this sector was 'medium'. Mysuru is well connected via air, rail, and road transport, with major national and state highways passing through the city. A ring road connecting all the arterial roads in the city gives it a radial pattern.
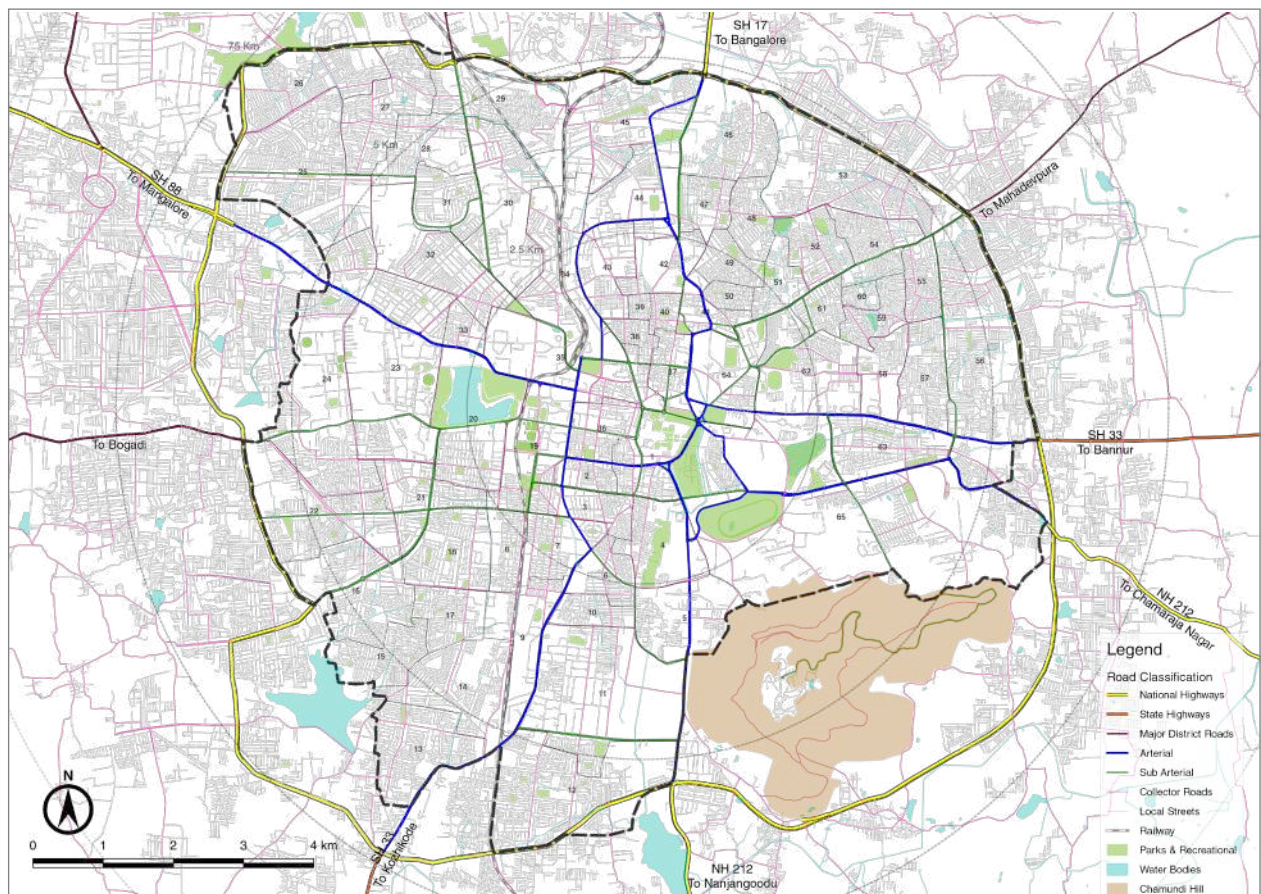
Map 4.10: Mysuru transportation network

Source: UN-Habitat

Public Transport Coverage

The KSRTC operates a city bus transportation service covering the suburbs. The bus service provides public transportation to 96 per cent of citizens within a 500-m. radius. However, due to disorganized growth, the transportation corporation has been incurring annual losses of INR 22 per running kilometre for increasing its service area. Without a cohesive growth strategy and optimum density planning to reduce sprawl, the public transportation system is heading towards a collapse if viability gap funding (VGF) is not provided for a year.

Major Transportation Nodes in the City

On an average, 50,000 vehicles are registered every year at the Mysuru East and Mysuru East Regional Transport Offices (RTOs); but the number of clean fuel vehicles is less than 10. During 2015-16, emissions from the transportation sector in the city were 6,02,924 Mt CO_2-eq, which constituted 38.7 per cent of the city's total emissions.[7]

The Chamundeshwari Electricity Supply Corporation (CESC) established the first electric vehicle (EV) station at Vijayanagar to improve the clean fuel share. CESC is planning two more stations at Kuvempunagar and Rajendranagar.
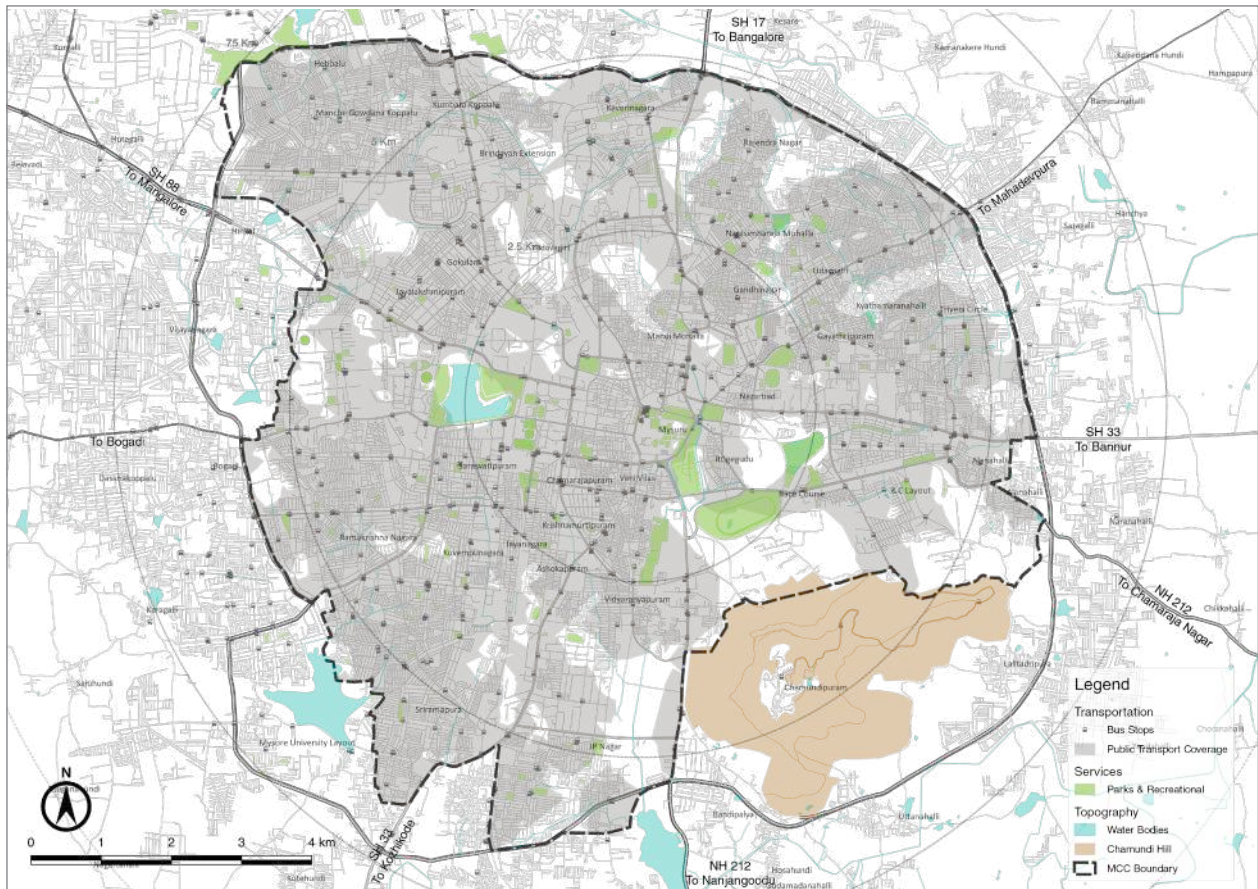
Map 4.11: Public transportation coverage within 500-m radius

Source: KSRTC, Open Street Mapping (OSM); Map source: UN-Habitat

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[7] GHG Accounting and Capacity Building for the Cities of Jaipur, Bhopal, Mysuru, Vijayawada and Guntur' as a first step under the GEF-UNIDO-MoUD Project (2017)

NMT Facilities

In Mysuru, 70 per cent of the roads have footpaths with a width of more than 1.2 m, but only one per cent of the road length has a dedicated cycle track. There is considerable scope to improve cycling in Mysuru as the climate is compatible throughout the year. Even with Tring-Tring, a public bike-sharing service that addresses the last mile connectivity issues with 50 docking points strategically spread across the city, the potential is not thoroughly utilized.

4.4.7   Social facilities and services

There are 11 indicators in the sector, two for assessing demography, five for health, one for Information and communications technology (ICT) and three for the status of education in the city. Data was collected for five indicators. The overall performance of this sector was 'medium'.

Since the fourteenth century, Mysuru's Wodeyar royal family has paid attention to social and cultural infrastructure, establishing well-equipped educational institutions, libraries, recreational clubs, cultural centres, and auditoriums.

Demography

As per Census 2011, the percentage of the city's dependent population was 13 per cent. The change in decadal population growth in the city between 1991-2001 and 2001-2011 was 18.2 per cent.

Healthcare

The healthcare infrastructure in Mysuru does not just serve the city but also the surrounding districts. Mysuru taluk has a total of 1,520 government and private hospitals with 10,271 beds. As per URDPFI guidelines for a population of 21 lakh projected for horizon year 2031 in the Mysuru urban area, there should be 202 hospitals of different grades with 19,667 beds. Even though the number of hospitals is more than that for the horizon year requirement, most of them are private clinics without bed facilities. Currently there is a shortage of 500 beds and there is a projected requirement of 9,396 additional beds by 2031.

At present, there are 21 Urban Primary Health (UPH) centres in Mysuru, most of which are concentrated in the core city area providing 70 per cent population access to healthcare within a 800-m. radius. With a higher concentration of healthcare services in the core precinct, the city outskirts have poor access to emergency healthcare, reducing the city's overall resilience in times of disasters or epidemics. There is a need to balance the distribution of healthcare facilities to ensure equal access for all residents of Mysuru.

New areas in the city periphery, even with a population greater than one lakh, are covered by Rural Primary Health (RPH) centres with a capacity to serve a population of 50,000. As these suburban developments are not within MCC's jurisdiction area, it is not mandatory to provide a UPH under the National Urban Health Mission (NUHM). However, they are an extension of the city, housing people who serve Mysuru and must be provided with the necessary infrastructure to live a decent quality of life.
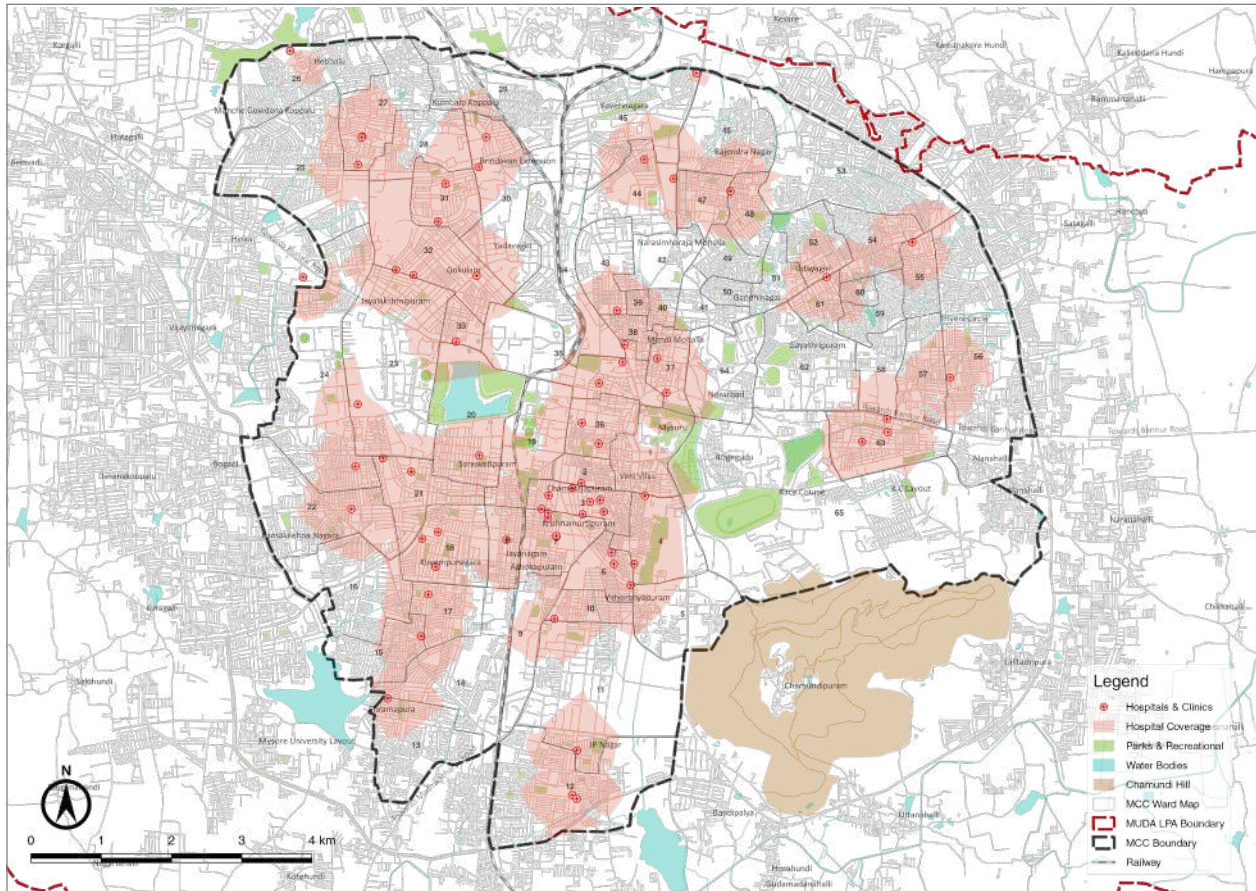
Map 4.12: Population catchment with access to healthcare facilities within 800-m. radius   Data source: OSM; Map source: UN-Habitat

Education

Mysuru has a high number of educational institutes for foundational as well as higher education. Some notable educational institutes are Christ College and JSS College etc. As of 2020-21, the city had 257 government schools that included 27 primary schools, 94 upper-primary, and 148 high schools. However, only about 65 per cent of the city's population has access to either a primary or secondary school within 800 m. of their residences. As a result, the city scores 'very low' for its access to educational facilities.

As per Census 2011, the female literacy rate in the city was 85 per cent. This was higher than the average female literacy rate in urban India (79.1 per cent) for

the same year. The city scores 'upper medium' for this indicator.

Data for the percentage of government and private schools with access to digital education was not available for Mysuru. Data for the ICT indicator highlighting the percentage of mobile network by 3G and 4G technology subscriptions was also unavailable.

4.4.8   Environment and ecology

There are 18 indicators in the sector to understand whether a city has a clean air action plan, if they are equipped to measure major pollutants and monitor emissions data for specific sectors. For Mysuru, data was collected for 13 indicators in this sector.

Clean Air Action Plan

Mysuru currently has no air pollutant monitoring mechanism and no clean air action plan. As a result, it scores 'very low' for this indicator.

Measuring GHG Emissions

KSPCB currently does not have any system in place to measure GHG and CO_2 emissions. The city scores 'very low' with regard to existence of GHG emission measurement and monitoring system.

Air Quality

With an annual AQI average of 43, although the city is performing well in this segment, the AQI spikes above 100 for a few days in the winter months (November to February). This occasional spike in air quality can have many side - effects ranging from moderate to adverse for sensitive groups among the city's residents.

Figure 4.7: Mysuru AQI from Dec 2019 to Jan 2020
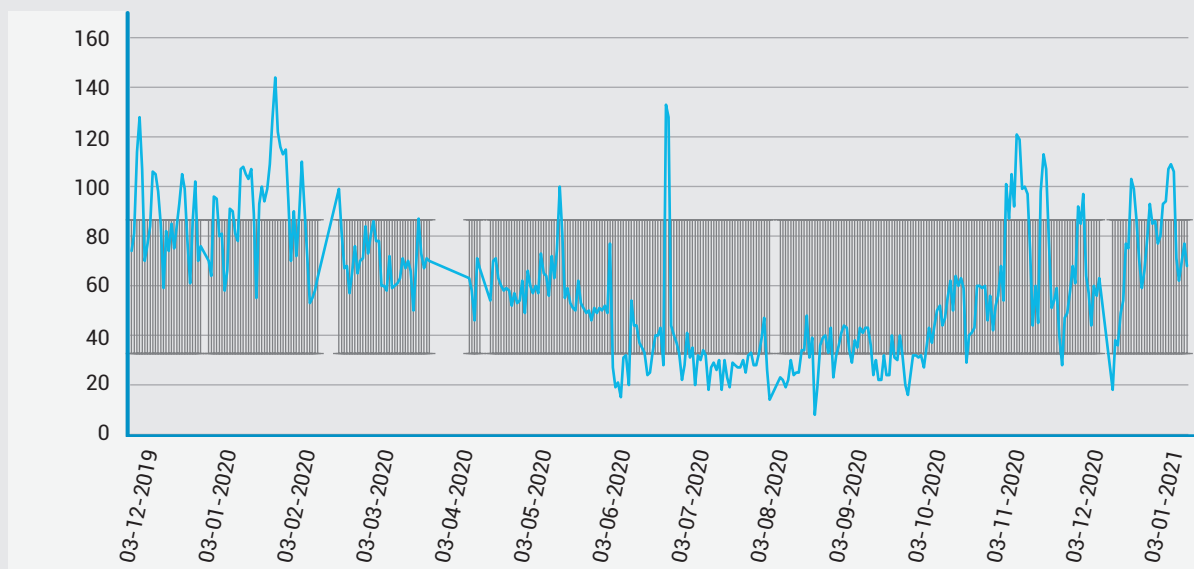
Source: KSPCB, yearly records

Noise Pollution

Mysuru has no regulations for monitoring and enforcement of noise pollution level and, thus, scores a 'very low' in this sector.

Tree Cover

Mysuru city has a phenomenal green cover alongside eight lakes that add to the city's magnificence and serenity. The total tree cover is 3% of the total ULB area. The most visited of these lakes are Kukkarahalli and Karanji, which are famous as outing spots, for family outings, strolling and jogging, and other public

exercises. These tanks were mainly created for providing drinking water to the city of Mysuru in the early nineteenth century.

Within the LPA, there are reserved forests and conserved green regions (see Map 4.13). The largest of them is the Chamundi Betta Reserved Forest, which covers an area of about 613 Ha. The rest lies to the West of the LPA at Yelwala, Bomannahalli and Bastipura. The total reserved forest area under the Forest Department is 950 Ha. Areas under the reserved forest are notified under the Karnataka Forest Act, 1963.

4.4.9   Clean energy

There are eight indicators in this sector to assess a city's current energy demand, access to renewable energy, energy efficiency, and accessibility of its households to natural gas for cooking. Data was collected for four indicators in case of Mysuru. The overall performance of the city in this sector was 'upper medium'.
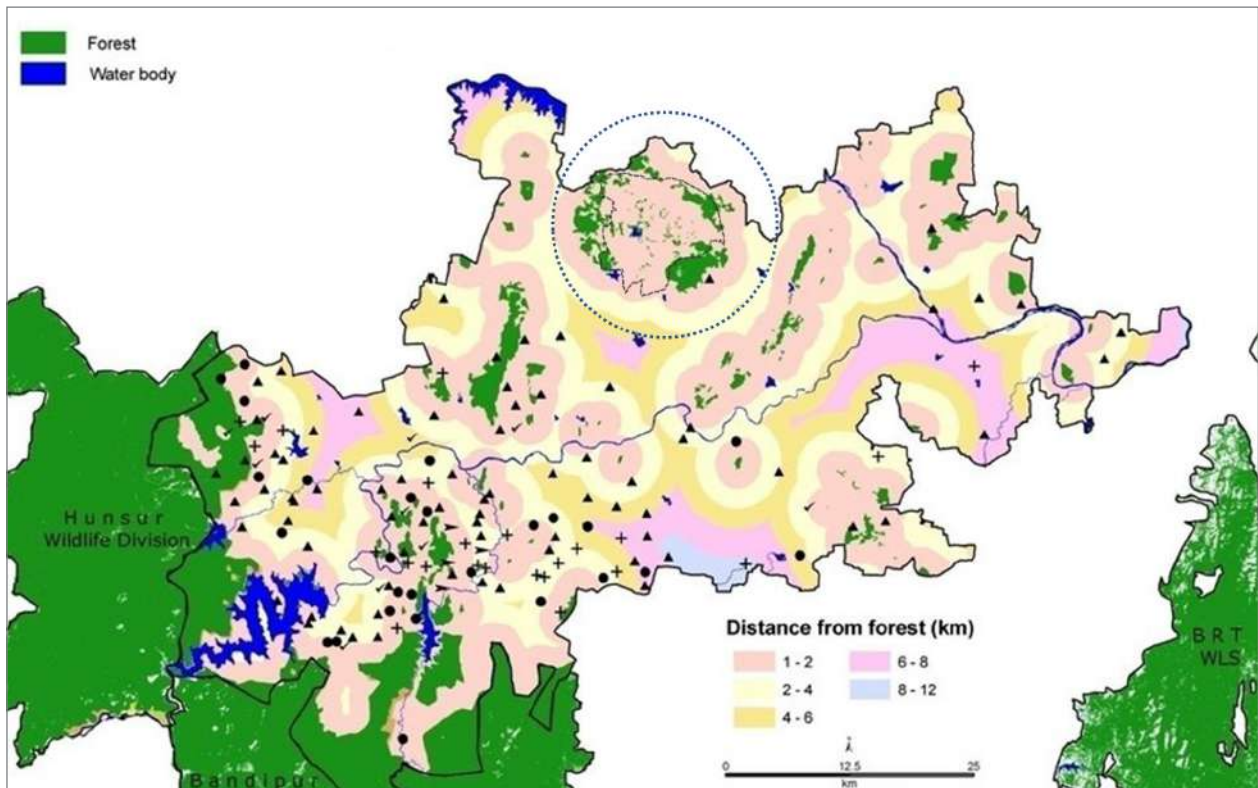
Map 4.13: Reserve forests in Mysuru District

Source: Karnataka Forest Department

Renewable Energy

Karnataka is at par with California when it comes to the generation and use of renewable energy. According to records, of a total of 30,063 MW capacity of power generated, 7,334 MW is solar energy, 4,823 MW from wind, 903 MW from mini-hydel projects, 1,731 MW from co-generation units, and 3,798 from hydro projects. A total of 49.6 per cent of energy is, hence, generated from renewable resources in the state, excluding hydro. Thus, the city scores 'excellent' for the percentage of renewable energy.

Energy Compliance Building Codes

The current Development Control Guidelines (DCR) prepared as part of the 2011 master plan does not have any special guidelines or incentives to promote eco-friendly techniques and use local/renewable material for building construction. But at the corporation level, MCC has passed a resolution on mandatory water conservation of plots above 300 square yards. In the new, revised master plan, MUDA is planning to incorporate other incentives for solar energy utilization and energy efficiency (lighting of common areas by solar energy/LED devices).

Energy Efficient Street Lighting

In Mysuru, only 16 per cent of the streetlights are energy efficient. There is a vast scope of improvement where 72,350 can be converted into LED streetlights, reducing 24,171 Mt CO_2 equivalent annually.

Figure 4.8: Electricity consumption rate in Mysuru

Legend:
- Temporary Connections
- Residential Areas
- Commercial Areas
- Small Scale Industries
- Large Scale Industries
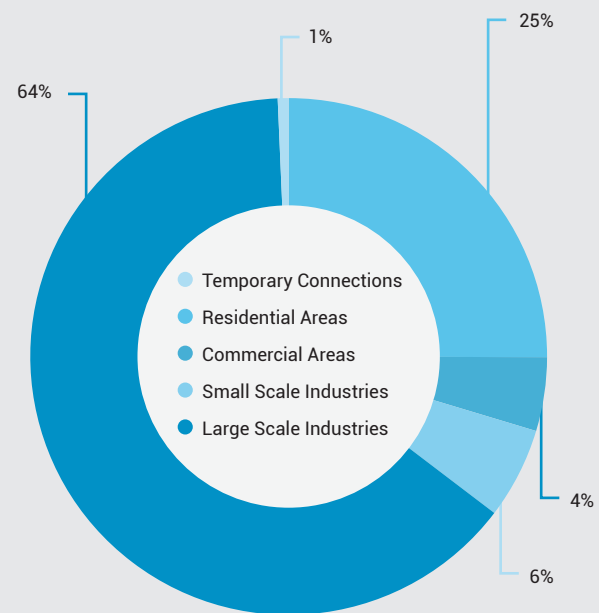
Source: CHESCOM

Energy Consumption

The moderate climate plays an essential role in per capita residential energy consumption of 502.3 Kwh (see Figure 4.8). T he industries in the city's outskirts consume 64 per cent of this total consumption. As per a 2015 emission study conducted by UNIDO, the stationary energy emissions led to 8,29,106 Mt CO_2-eq annually, accounting for 53 per cent of total emissions in the city.

4.4.10 Disaster risk management

There are six indicators in the sector to assess a city's preparedness in the event of natural disasters (floods, earthquakes, cyclones, etc.) and manmade disasters (incidence of fires). Data was collected for four indicators. The overall performance of the city in this sector was 'low'.

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[8] Source: https://www.researchgate.net/figure/a-Map-showing-distances-from-forest-to-villages-that-report-conflict-incidents-in-Mysore_fig9_234551772
[9] As the electricity generation is not carried out at a city level, state renewable energy numbers are considered as proxy for the city. Source(https://kredlinfo.in/Index_eng)

The national disaster management plan 2016 mandates a city-level disaster management plan. Mysuru city only has a district level plan as per the Disaster Management Act, 2005.

Mysuru lies in a less vulnerable earthquake zone II.[10] As the city is not prone to major disasters, except for occasional urban flooding (see Map 4.14) in areas such as Khythamanahalli Kere, Devanur Kere, JSS Hospital Road junction, Vidayaranyapuram, and Arch Gate junction etc. There are many unnotified informal settlements in these areas making them highly vulnerable in case of heavy rains.

In Mysuru city, three fire service stations (Saraswathipuram, Bannimantapa and Reserve Bank of India fire stations), providing access to about 70 per cent of the buildings in a 4-km radius. As per UDPFI guidelines, the existing number of fire service stations are less by three stations and unevenly distributed.

The city's western, southern and eastern precincts are away from the existing fire stations. Hence, there is a need to provide a fire station in the southern or western neighbourhoods of Mysuru city.
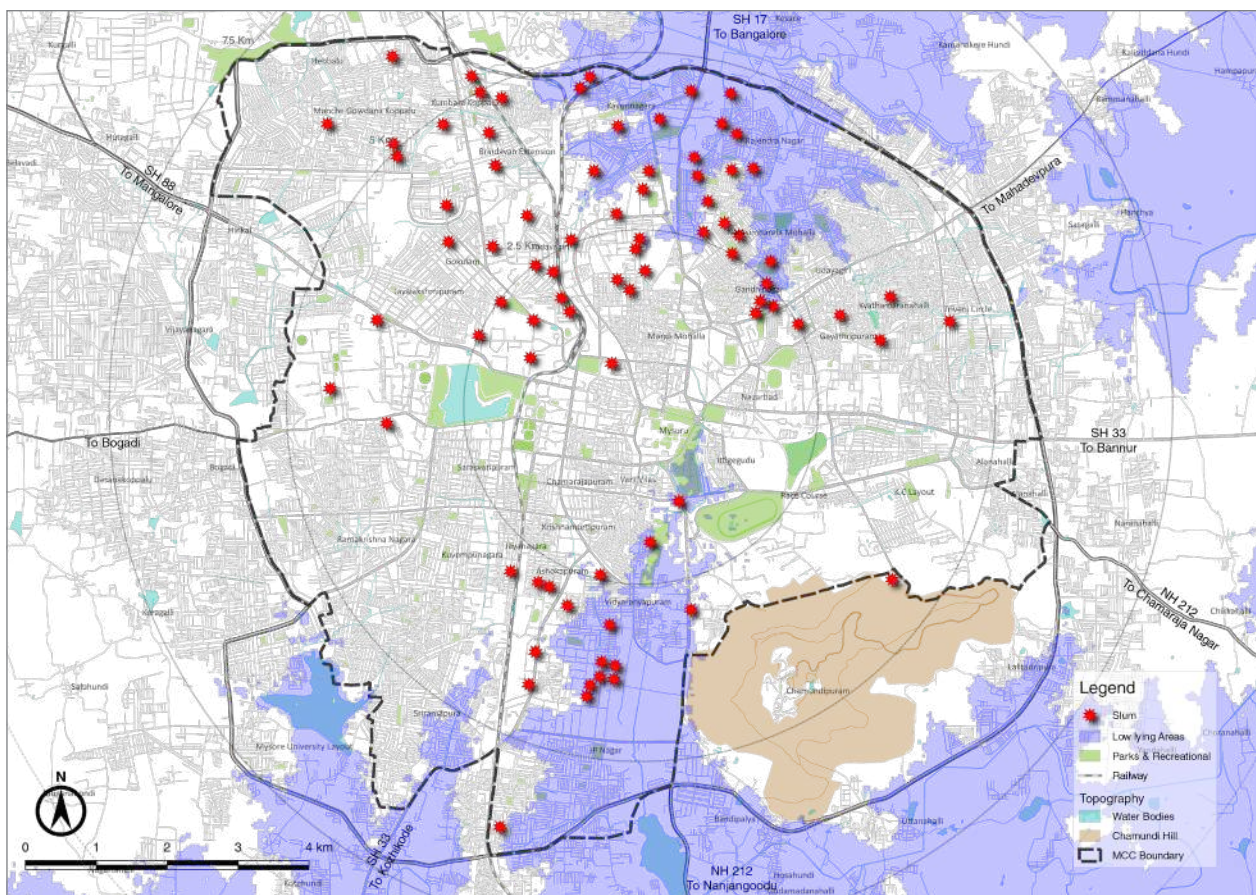
Map 4.14: Vulnerable urban flooding areas   Source: UN-Habitat

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[10] As per the seismic zoning and intensity map of India (https://nidm.gov.in/safety_earthquake.asp)
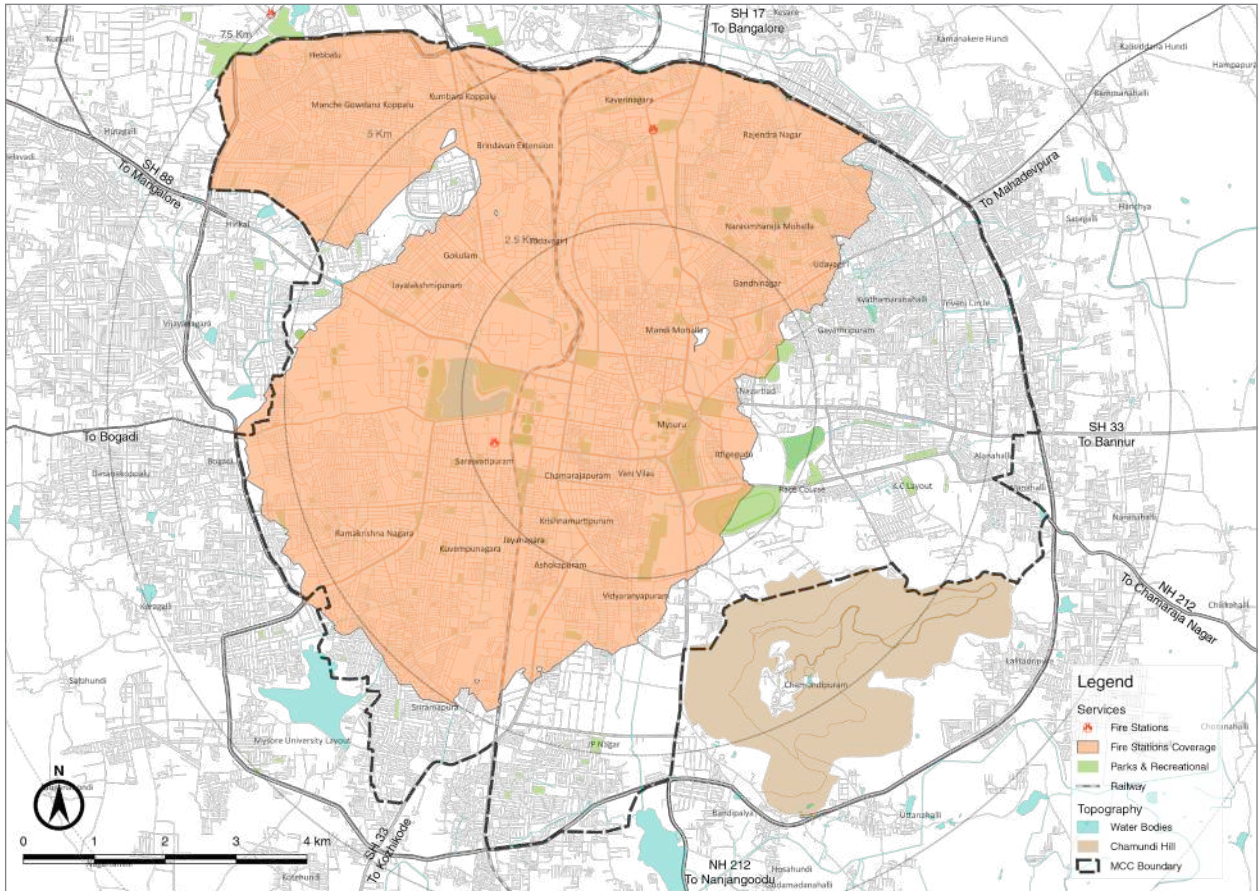
Map 4.15: Building catchment area of fire service facilities (4-km radius)   Data source: MCC; Map source: UN-Habitat

4.4.11 Governance and data management

There are 14 indicators to analyze the extent to which ULBs effectively direct the planning and management of a city. Data was collected for 13 indicators in case of Mysuru. The overall performance of the city in this sector was 'lower medium'.

MCC governs under the 74th Constitutional Amendment Act (CAA) and the Karnataka Municipal Corporation Act, 1976. Of the 18 functions stipulated in the Twelfth Schedule (Article 243W) of the Indian constitution, ten are under the jurisdiction of MCC, and five are run in partnership with other parastatal bodies, while other state and regional offices oversee the remaining three functions (see Table 4.4).

There is a lack of urban planners within the MUDA and MCC. Currently there are only 12 planners for a population of 1.3 million. As most of their time is spent on enforcement, the master plan is outsourced to private consultants. Consequently, the revision

period of 10 years, as per the Karnataka Town and Country Planning Act, 1961, is undermined or delayed. It is not undertaken except in case of public requests or project-based requirements for change in land use.

The MCC currently runs a command control centre, but only water supply and SWM services are monitored through the centre. There is no GIS-based municipal asset database for the city, nor does MCC have the capacity to utilize and maintain such a data base. Recently, the commissioner has initiated an asset mapping and dashboard monitoring tender for more transparent and productive governance.

The enforced master plan of Mysuru was approved in 2011 for the horizon period 2031. In that time, no interim review, or updation of the masterplan was undertaken, keeping in line with spatial growth, and infrastructure requirements. Therefore, the city scored 'Medium' with regard to review / updation of Master Plan. The review of master plan for the city for the horizon year 2031 is underway. The enforce Masterplan of the city and development control regulations are made accessible to the public through

Table 4.4: Distribution of functions across various urban bodies

Function	Category	Agency
Urban planning including town planning	🟥	MUDA
Regulation of land use and construction of buildings	🟩	
Planning for economic and social development	🟨	
Roads and bridges	🟩	
Water supply for domestic, industrial and commercial purposes	🟨	
Public health, sanitation, conservancy, and solid waste management	🟨	KUSWDB
Fire services	🟥	Fire Department
Urban forestry and environmental protection, and promotion of ecological aspects	🟥	
Safeguarding interests of socially disadvantaged sections of the population, including persons with disabilities	🟩	
Informal settlement improvement and upgradation	🟨	
Urban poverty alleviation	🟨	
Provision of urban amenities and open public facilities such as parks, gardens and playgrounds	🟩	
Promotion of cultural, educational and aesthetic aspects	🟩	
Burials and burial grounds, cremation grounds and crematoriums	🟩	
Cattle ponds, prevention of cruelty to animals	🟩	
Vital statistics, including registration of births and deaths	🟩	
Public amenities including street lighting, parking lots, bus stops and public conveniences	🟩	
Regulation of slaughterhouses and tanneries	🟩	

🟩 Functions under Corporations   🟨 Functions held in partnership   🟥 Functions held by other agencies

Source: MCC

the MUDA (urban development authority) website, thus the city scores 'excellent' for the initiative.

The city scored 'excellent' with regard to implementing various E-governance initiatives by the ULB such as availability of ULB website, Online Public Service Delivery and Grievance Redressal through both website, mobile application.

The proportion of female councillors in the corporation is 49 per cent, as reservation mandate is only 33 per cent; Karnataka mandated women reservation to 50 per cent. Even though the representation issue is resolved with the amendment in the Municipal Act 1974, the active participation still needs work.

4.4.12 Finance and economy

Out of the total 19 indicators in this sector, 13 indicators are related to assess the status of municipal finance in the city and the remaining six indicators

provides the performance of the city across various economic factors. Data was collected for 13 indicators. The overall performance of this sector is 'upper medium'.

Financial Performance

The total annual revenue of MCC has been increasing over the last five financial years. The total annual revenue of MCC has increased from INR 33,919.25 lakh in 2014-15 to INR 53,598.21 lakh in 2018-19 (see Figure 4.9). MCC's total annual expenditure of MCC in 2014-15 was INR 30,173.44 lakh and in 2018-19 was INR 53,693.03 lakh indicating that expenditure needs of MCC are also growing in proportion to its revenue base. MCC has recorded a deficit budget in 2018- 2019 (see Figure 4.10) thus scoring 'very low' performance.

Figure 4.9: Revenue and expenditure of MCC during five financial years (2014-15 to 2018-19)

INR in Lakh

2018-19	2017-18	2016-17	2015-16	2014-15
53,598.21	45,656.97	48,854.53	47,100.27	33,919.25
53,693.03	52,463.19	30,864.65	39,876.91	30,173.44

■ Revenue   ■ Expenditure
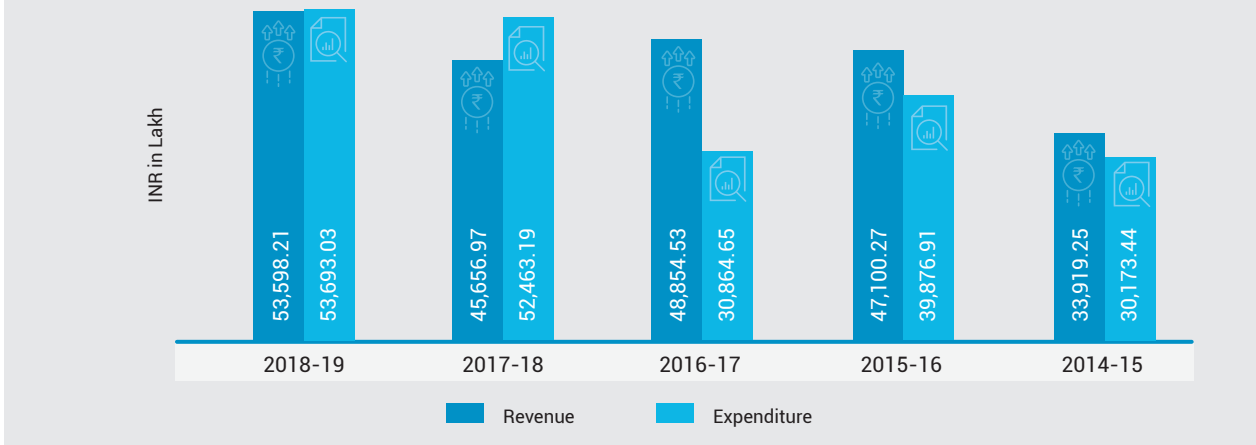
Source: GMC Municipal Budgets (2016-17 to 2020-21)

Own Source Revenue

In 2018-2019[11], the corporation's total revenue was INR 53,598.21 lakh, of which 41 per cent was its own source revenue (OSR). Over the last five years, Mysuru's OSR has consistently ranged from 40–50 per cent; wherein most of the revenue is from property tax.

Property Tax Collection Efficiency

The city collected 97 per cent of the total property tax billed in the same financial year, scoring an 'excellent' performance. Mysuru has recently started online tax collection for the convenience of its citizens to pay from their doorsteps.

Figure 4.10: Share of own source revenue to total revenue of MCC in five financial years

INR in Lakh

2018-19	2017-18	2016-17	2015-16	2014-15
21,759.28	22,615.52	18,893.41	16,204.06	14,842.82
53,598.21	45,656.97	48,854.53	47,100.27	33,919.25

■ Total Revenue   ■ Own Source Revenue
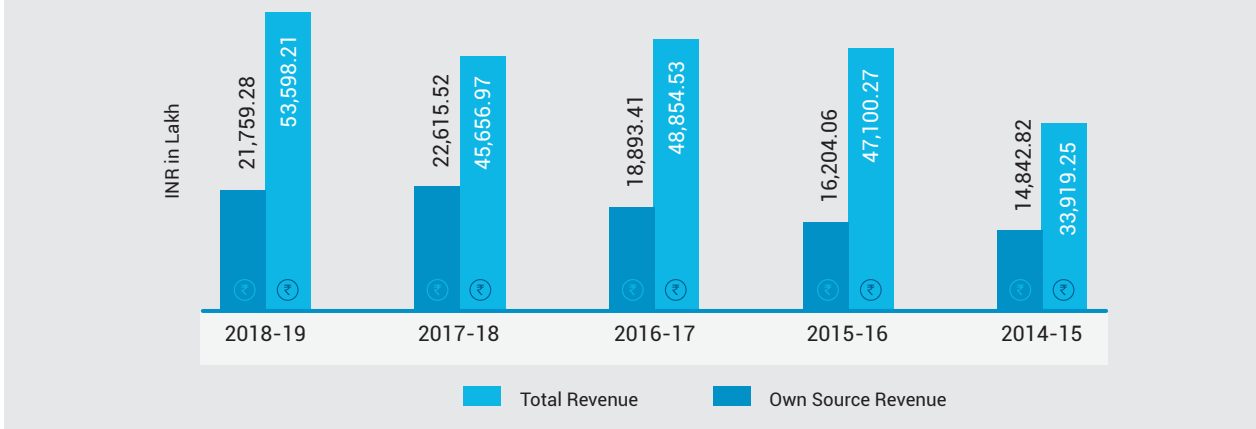
Source: MCC Municipal Budgets (2014-15 to 2018-19)

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[11] All the finance data is collected for the year 2018-2019

Figure 4.11: Cost recovery in water supply, sewerage (waste water) and SWM services during FY 2018-19 in MCC
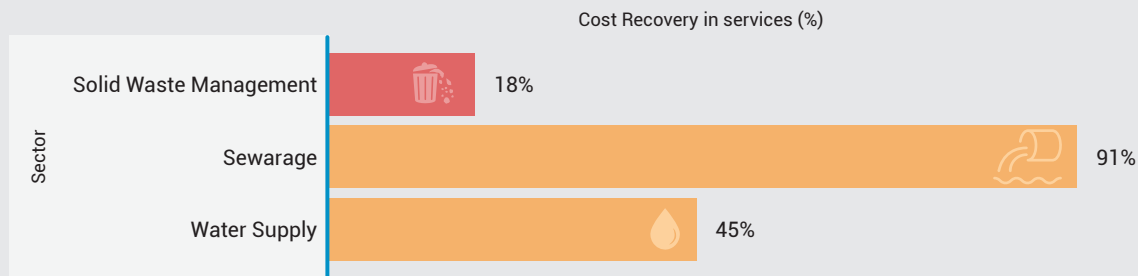
Source:MCC

Financial Dependency

The total grant amount received by MCC from Central and state governments under various schemes in 2018-19 was 59 per cent of its total revenues. This is quite high, earning the city a 'low' score for this parameter.

Cost Recovery of Services

In 2018-19, the total operating revenue of Mysuru towards water supply services, sewerage and SWM services with respect to their total operating expenses was 45 per cent, 91 per cent and 18 per cent, respectively. The city scored 'lower medium' for cost recovery in water supply, 'excellent' in sanitation services and 'very low' for solid waste management.

The operation and maintenance of three primary services water, sewerage, and solid waste account for 35 per cent of the total expenditure for MCC. The recovery rate for these services is only 40 per cent of the expenditure. Currently, the service rates for water are under revision, but there is an urgent need to revise solid waste rates. For the financial independence of MCC, this would play a key role.

Credit Rating

Overall, Mysuru performs well with a credit rating of 'A', earning the city a 'medium' score for this indicator. Currently, credit rating is conducted on a need basis, but as per the national AMRUT mission, MCC is planning to conduct one every financial year from 2021-22.

Economy

Like many cities in India, Mysuru city does not have a system for measuring GDP. However, the Directorate of Economics & Statistics Planning Programme Monitoring Department measures Gross District Domestic Product (GDDP) for Mysuru taluka.

The data for economic indicators such as the unemployment rate of persons aged 15 years and above, inequality index based on consumption expenditure (Gini coefficient), the percentage of workforce employed in the service sector, informal employment as percentage of total employment, GDP density as a percentage of the built-up area of the local government, etc., is not available.

05

Strategic Diagnosis

The results and findings of the USAF analysis conducted for the five pilot cities under the SCIAP project, place Mysuru among the high performing cities in most sectors. Mysuru's encouraging performance demonstrates the potential for it to be transformed into an exemplary city in the Indian context. Addressing some key strategic issues can help the city transition into a sustainable and inclusive growth centre in the coming years.

5.1 IDENTIFICATION OF KEY STRATEGIC ISSUES

Through the application of the USAF, subsequent exhaustive analysis of the results, secondary information gathered and stakeholder consultation, a few patterns, development trajectories and trends were identified. As illustrated in Section 4.2 earlier, strengths were observed in strong city governance and financial management, which effectively provides improved basic services. The proactive waste management initiatives scientifically treat and dispose the waste produced to keep the city clean. Collectively, these factors and trends brace Mysuru to achieve higher goals towards becoming a sustainable and resilient city. There are areas, however, where significant improvement is warranted, and Mysuru is lagging. These include improvements in the transportation sector, which has a direct impact on ambient air quality, and more focussed attention to the protection of the immediate ecosystem.

There are other multi-sectoral issues as well that were deduced after careful analysis of data. These are listed below and discussed in detail in the next section.

1. Sub-optimal use of non-motorized transportation (NMT)
2. Vulnerable environment and ecology
3. Weak governance and data management
4. Increase in urban sprawl

5.2   IN-DEPTH ANALYSIS OF KEY STRATEGIC ISSUES

5.2.1   Strategic issue 1: Sub-optimal use of NMT

Transportation has emerged as the foremost and concurrent issue across findings of the urban sector assessment and consultations with the municipal corporation and NGOs. The city performed poorly against five indicators in the transportation sector, which measure mobility, accessibility, safety, and associated sustainability levels in the city.

Sub-optimal use of NMT has repercussions across different sectors. Figure 5.2 and Annexure 5.1 demonstrate the interlinkage of NMT with the city's performance across different indicators.

0.9km
Kilometres of bicycle path per 100,000 population (km)
(USAF TR 6.2)
BM: above 25 km for every 1,00,000 population

0%
Percentage of shared vehicles operating on clean fuels, hybrid or electric vehicles (%)
(USAF TR 6.5)
BM: 25% of shared vehicles

33%*2012
Percentage share of NMT (cycling and walking) (%)
(USAF TR 6.8)
BM: NMT share national average - 33%

81
Fatal and serious injuries in road accidents per lakh population (number)
(USAF TR 6.11)
BM: Zero persons per lakh population

14%
Accessibility of differently abled groups to public buses (%)
(USAF TR 6.12)
BM: NA

Figure 5.1: Interlinkage of the indicators across USAF sectors
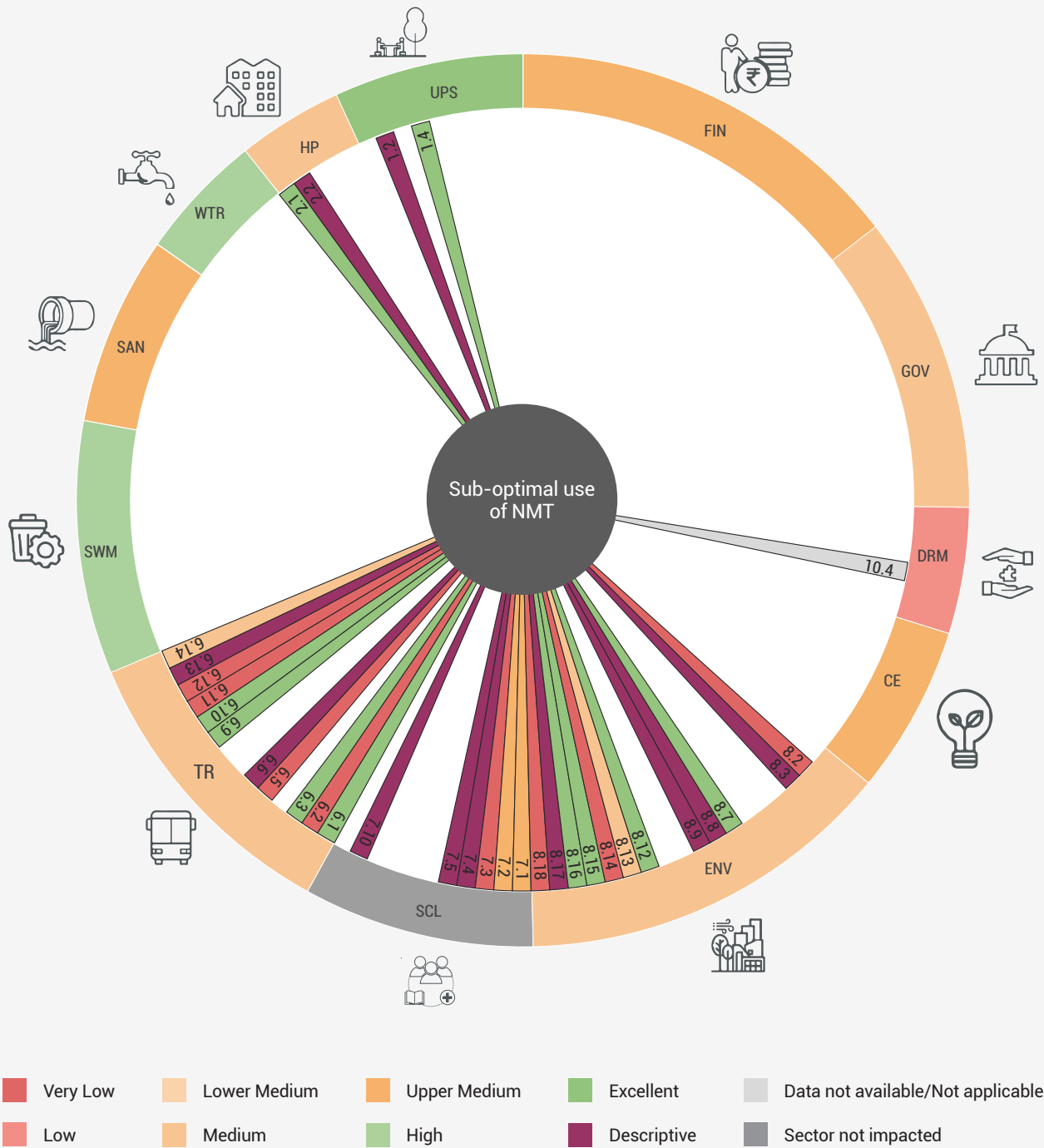
Source: UN-Habitat

Modal Share

The modal share of Mysuru in 2012 comprised 37 per cent private mode (car and two-wheelers) and 33 per cent share of NMT (23 per cent and 10 per cent for walking and cycling, respectively). While this figure sees a drop from 51 per cent of non-motorized share in 2005 for the city, it is still a significant share that the city must support by providing adequate infrastructure to reverse the trend.

The reduction in NMT modal share is due to many factors. A prominent one being the lack of safety measures for the pedestrians and bicyclists. There are no complete bike lanes or defined paths at major intersections, putting the cyclists at high risk of road injuries and fatalities. The city has witnessed an alarming number of serious and fatal accidents (81[12] accidents per lakh population), which have been generally due to the conflict of

pedestrian and bicycle traffic with vehicular traffic. By providing adequate and reliable infrastructure, the city can regain the confidence of citizens to adopt NMT, thereby increasing the NMT modal share.

Figure 5.2: Modal share in Mysuru

IPT 12.00%   Walk 23.00%
Bus 18.00%   Cycle 10.00%
Modal Share
Car 7.00%   Two Wheeler 30.00%
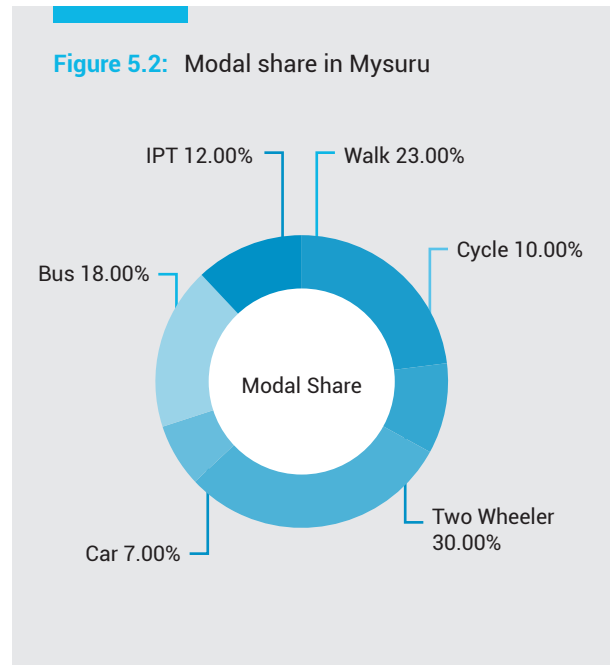
Source: Comprehensive Traffic and Transportation Plan, 2012

2014
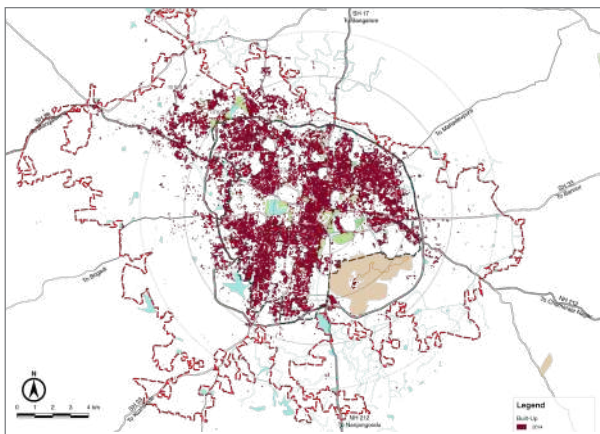
Area: 89.66 sq. km.
Population: 8.93 lakh
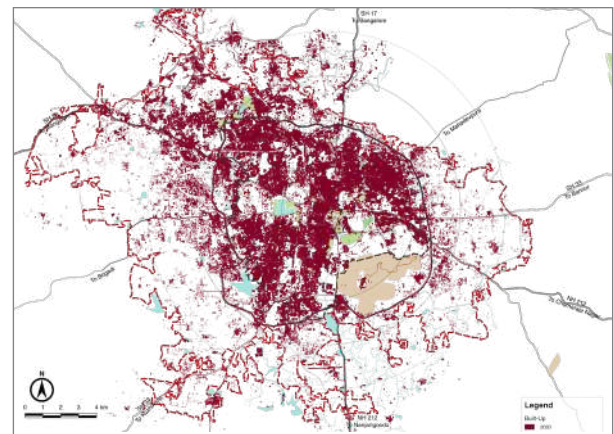
2020

Area: 89.9 sq. km.
Population: 11.54 lakh

Map 5.1: Built-up sprawl from 2014 to 2020

Source: UN-Habitat

[12] Mysuru City Traffic Police accident data, 2015

Longer Trip Lengths

In the last decade, Mysuru experienced an exponential increase in low density sprawl towards the North-West. During the same period, the average trip length increased from 2.5 km in 2005 to 7.43 km in 2012, as the city expanded towards lands farther away from the city centre. Longer trip lengths are more conveniently accomplished by private vehicular modes, resulting in a decline in the share of NMT. As more cars were added on city streets, higher levels of congestion, road rage, and increase in air pollution are seen. The goals of sustainable neighbourhood planning aim to build compact neighbourhoods that incentivize the use of NMT and reduce the number of and dependence on private vehicles.
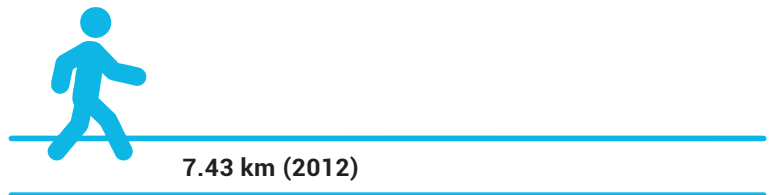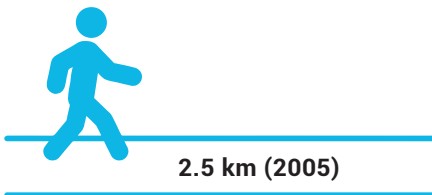
High Automobile Dependency

Sprawling development patterns create the need to travel large distances for work and to access various services/ facilities. The residents of Mysuru also rely mostly on personal motorised vehicles and auto rickshaws.

As per the urban transport SLB 2012[13] two-wheelers (30 per cent), public transport (18 per cent), intermediate public transport (12 per cent) like autos, and cars (seven per cent) mainly constitute the vehicular composition in the city. Due to sprawling development, the use of personalized motor vehicles tends to further increase, causing more GHG emissions. The absence of integrated public transportation with development in the city also contributes to increase in use of personal motor vehicles and fossil fuels.

2.5 km (2005)   **7.43 km (2012)**

36% → Transport sector contribution to total city emissions during 2015-16

Annual CO_2 equivalent emissions from the transportation sector in the city is 6,02,924 Mt CO_2-eq (USAF TR 8.9)

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[13] SLBs for Urban Transport, MoUD, Government of India, 2012.

Incomplete Network

As per the USAF analysis, Mysuru has only 0.9 km of bicycle paths per 100,000 population, falling short of the benchmark of 25 km per 100,000. Even with Tring-Tring, a public bike sharing initiative with 50 docking points strategically spread across the city, the potential is not fully utilized.

A successful public transportation system requires reliable, affordable and accessible public transport and relies on supporting NMT infrastructure like pedestrian footpaths and bicycle lanes to complete the network, offering greater choice and access to demographic groups in the city. Mysuru, with its moderate climate and falling yet significant modal share of NMT users, does not have supporting infrastructure to ensure the safety and comfort of pedestrians and cyclists.

With Mysuru's favourable climate, there is potential to expand the NMT network and tap into the multi-fold benefits that make the pedestrian and cycling realm safe, easy to use and enjoyable. Starting with the city core, which comprises prominent public, heritage and commercial amenities, the area could be retrofitted to enhance NMT infrastructure and make it a walkable urban centre. Non-motorized transport is a highly efficient and sustainable mode that serves the function of recreation and transportation in a city. Walking and biking offer deeper spatial penetration into city pockets, are affordable, without wait times and contribute to the environmental and physical well-being of the city and its residents.

Image 5.1: Challenges faced by cyclists and pedestrians in core city area

Source: UN-Habitat, India

5.2.2 Strategic issue 2: Vulnerable environment and ecology

Vulnerable environment and ecology have emerged as another important issue from the findings of the urban sector assessment along with consultations with MCC and NGOs. The city performed poorly for five indicators in the environment and ecology sector, which measure the environmental conditions, the current GHG and air quality levels in the city.

Public open spaces play a significant role in the reduction of greenhouse gases, mitigation of urban heat island effect, water conservation and overall public well-being and quality of life. As most urban development challenges, inadequate public open spaces and green cover is linked to many other environmental and urban life factors.

Reduction in Green Cover

Between 2015 and 2020, there was a significant reduction in green cover within the city limits. The proportion of tree cover to the total ULB area was only three per cent, far below the benchmark of 10 per cent. As the city continues to urbanize and expand, the declining green cover will result in poorer air quality, rising temperatures, and loss of local flora and fauna. The city has already witnessed an increase in PM2.5 levels from 43 in 2015 to 59 in 2020. Mysuru must consider preserving its green cover and increasing it over forthcoming years to offset the growth in population and other polluting factors.

NO
Clean Air Action Plan
(Planning and Implementation)
(USAF ENV 8.1)
BM: NA

NO
Existence of a GHG emissions
measurement system with a
monitoring system (Y/N)
(USAF ENV 8.2)
BM: NA

NO
Extent to which city is acting
for protection, conservation and
management of urban
biodiversity (USAF ENV 8.5)
BM: NA

59 µg/m³
Annual mean levels of PM2.5
(µg/m3)
(USAF ENV 8.14)
BM: Annual mean standard -
10 µg/m3 by WHO

NO
Existence, monitoring and
enforcement of regulations on
noise pollution (Y/N)
(USAF ENV 8.18)
BM: NA

Figure 5.3: Interlinkage to USAF sectors
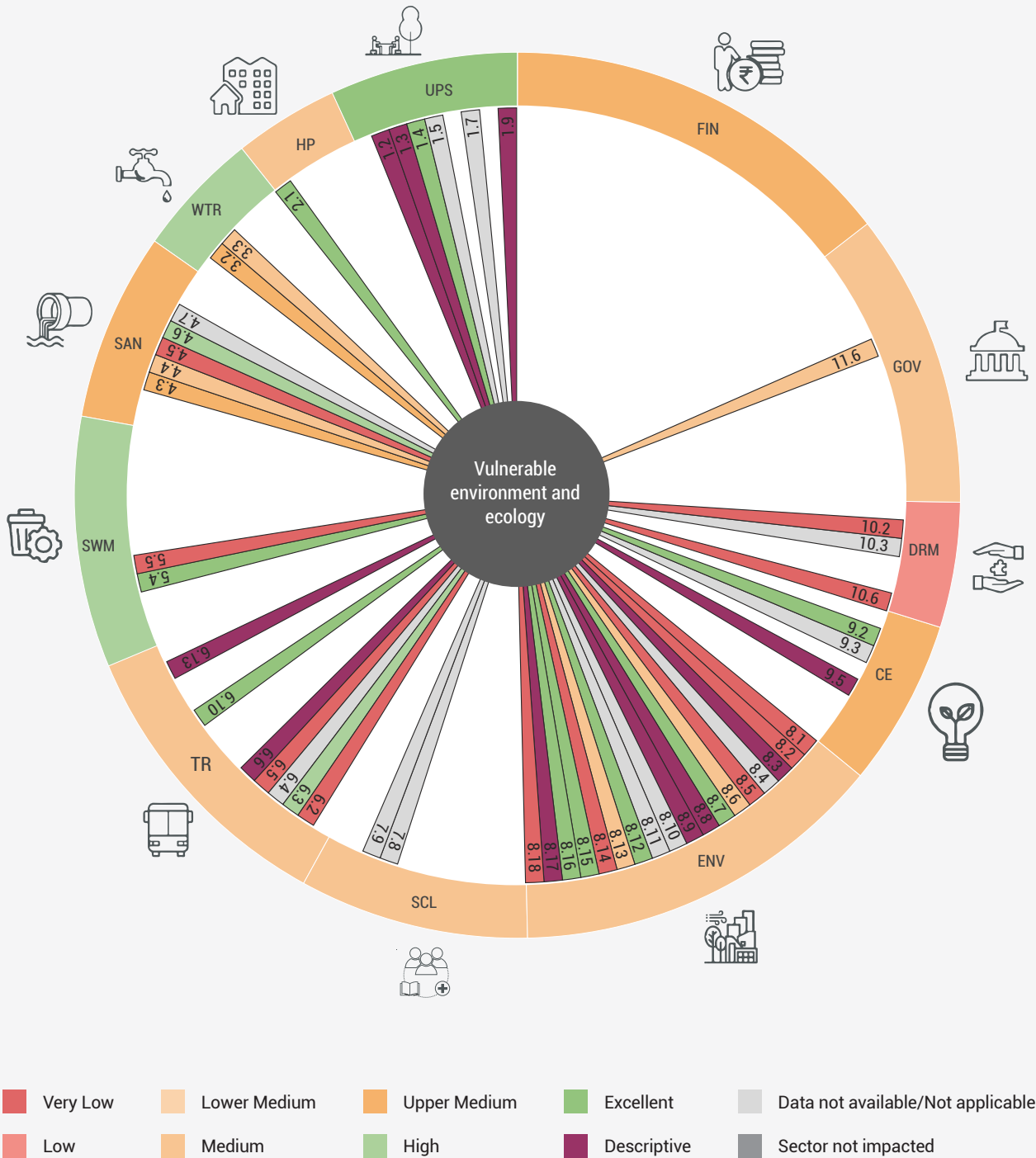
Source: UN-Habitat

Moreover, as established in Section 4.4.8, it is evident that Mysuru city is in an ecologically sensitive area surrounded by reserve forests and MCC's entire jurisdiction area falls within a 1-2 km buffer of the reserve forest. Mysuru needs to balance its growth in a strategic manner with the ecology of the region to build resilience.

Park Access and Condition

As per the USAF, 88 per cent of Mysuru's population has access to a park within a 500-m. walk. However, these parks are small and the overall area for

parks and open spaces is less than the defined benchmark of 35 per cent. As a result, there is 4.6 sq. m. of open space per person, far below the URDPFI defined benchmark of 10-12 sq. m. per person.

During a recent audit conducted across 588 parks in the city, they were classified into developed, semi-developed and undeveloped parks, based on the facilities information collected. When spatially mapped, it was evident that the undeveloped parks are concentrated along the outskirts of the North-East and North-West precincts of MCC's boundary (see Map 5.2). With the industrial hub located to the North, the 77 per cent parks that are either semi-developed or undeveloped present the opportunity to be designed and developed into active and programmed public spaces that double up as bio filters for the city.
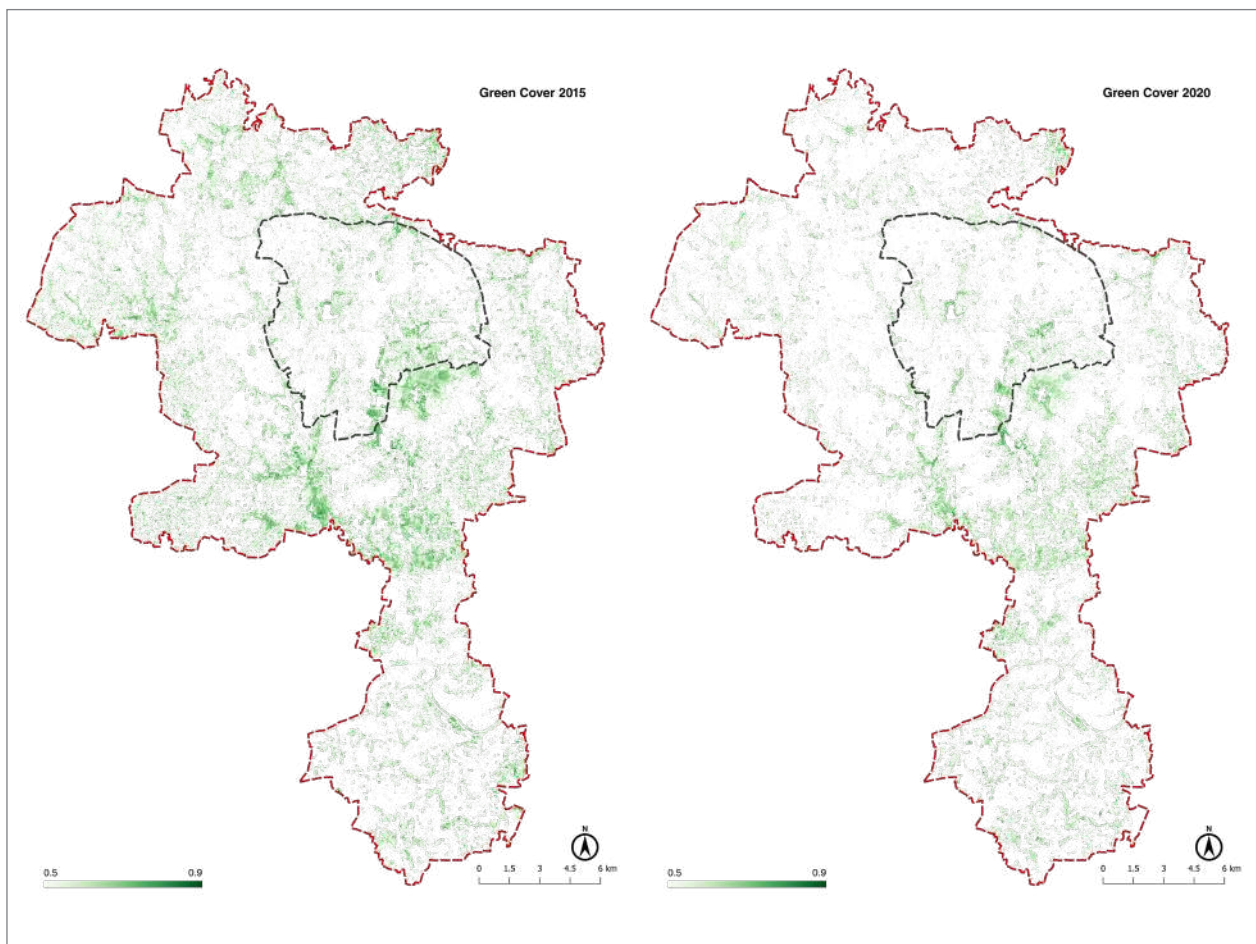
Map 5.2: Change in green cover from 2015 to 2020

Source: UN-Habitat
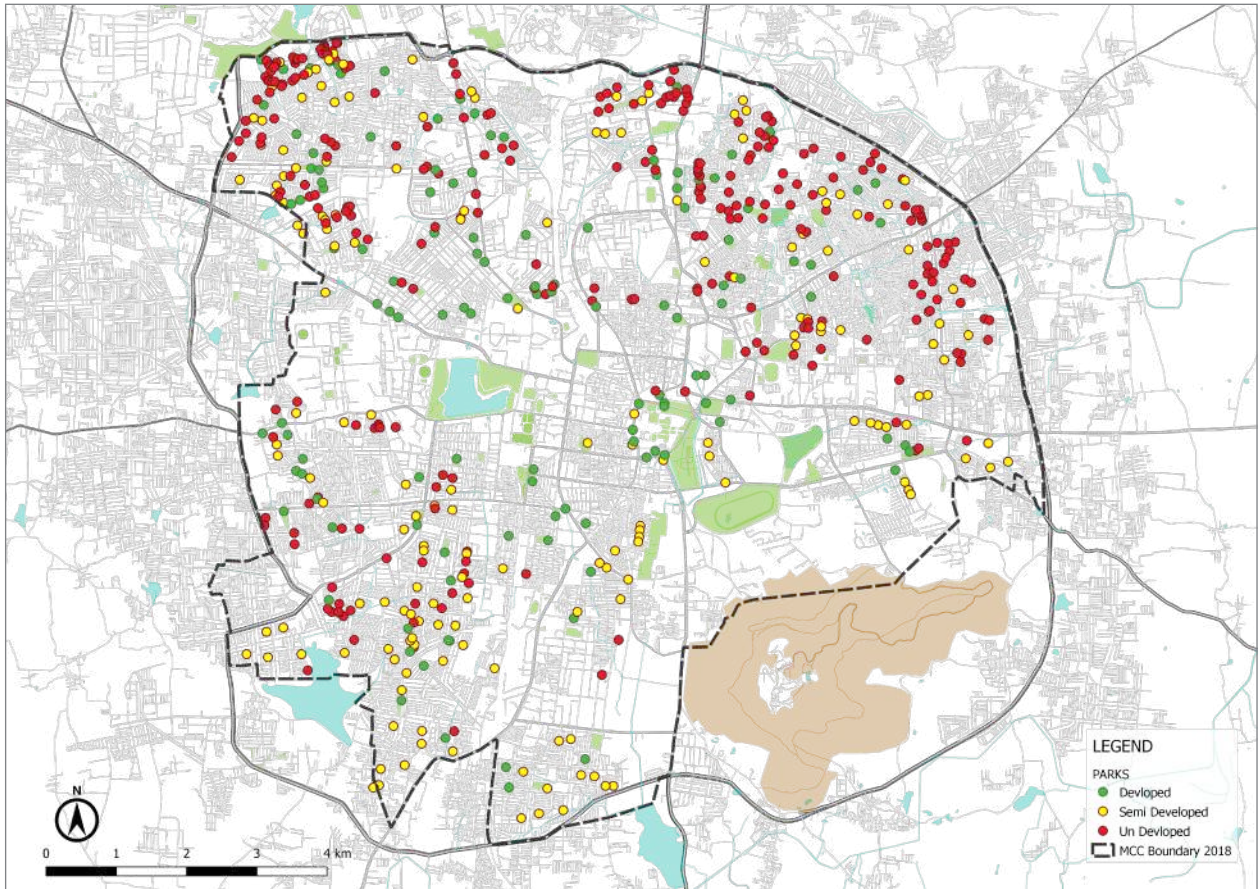
Map 5.3: Development status of parks in Mysuru

Source: UN-Habitat

| DEVELOPED | SEMI-DEVELOPED | UNDEVELOPED |

Image 5.2: Developed, semi-developed and undeveloped parks in Mysuru

Source: UN-Habitat, India

Figure 5.4: Classification of green spaces and parks

- Developed
- Semi-developed
- Undeveloped

47%

23%

30%
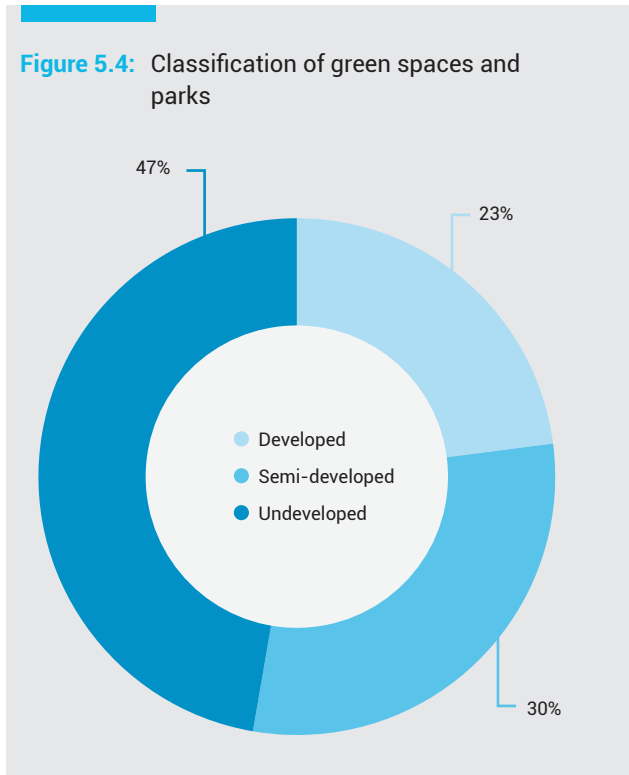
Source: UN-Habitat

5.2.3 Strategic issue 3: Lack of digital governance initiatives

Governance has emerged as a cross-cutting issue based on findings of the urban sector assessment, and consultations with MCC and NGOs. The city scored very low for five indicators in the governance sector, which measure the presence of governance tools and the level of digital maturity in the corporation.

THE USAF analysis for Mysuru's governance and data management section exposed gaps that can hamper the city's sustainable growth in the future. Without an efficient data management system in place, the city will struggle to make strategic decisions to leverage existing assets and manage its limited resources. The interlinkages of digital governance with other sectors are illustrated in Figure 5.5 and elaborated in the Annexures.

2

Number of services being managed through command-and-control system in the ULB (number)
(USAF GOV 11.)
BM: NA

Updated before 2015

Existence of Geographic information System (GIS) based master plan for the city (Y/N)
(USAF GOV 11.5)
BM: NA

Only exist offline

ULB's citizen charter and appeal mechanisms
(USAF GOV 11.11)
BM: NA

NO

Presence of city data officer (Y/N)
(USAF GOV 11.12)
BM: NA

NO

Digital governance: presence on open data portal (Y/N)
(USAF GOV 11.14)
BM: NA

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[14] Details of stakeholders are provided in the Mysore stakeholder mapping and consultation report.

Figure 5.5: Interlinkage of USAF indicators
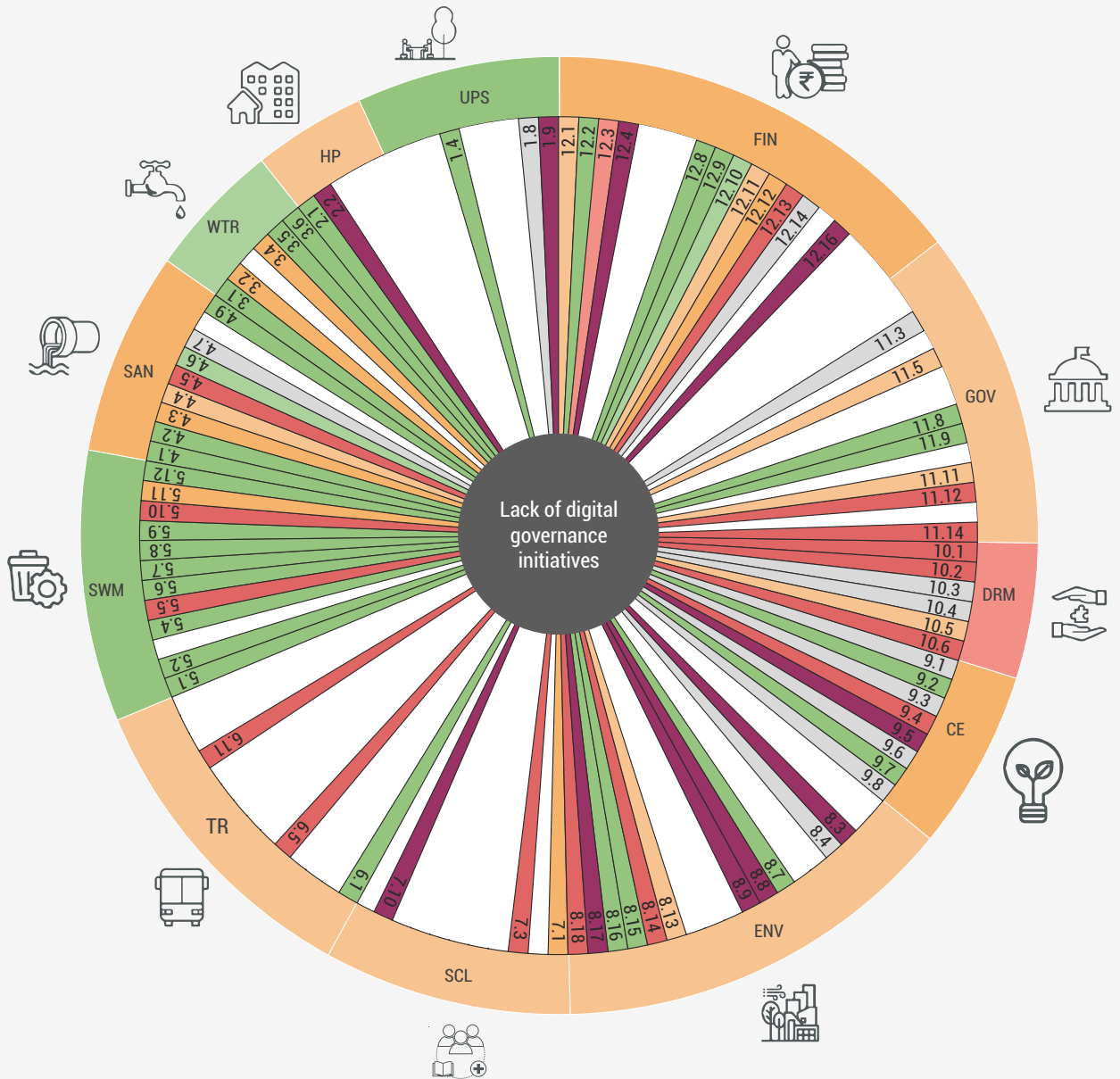
Source: UN-Habitat

Asset Mapping

Currently, Mysuru city's master plan is mapped on a GIS platform; however, there is no database of municipal assets nor is the information used for key decision making or selecting projects. Many of Mysuru's services and infrastructure have fallen into disrepair and need renovation or replacement.

Ageing infrastructure can increase the cost in financial terms as it leads to losses and inefficiencies but can also put the lives of residents at risk when not maintained over time.

The city has undertaken an initiative to map and build an inventory of all its assets along with their capacities and status. This database will improve the efficiency and performance of these assets and lead to evidence-based decision making.

Data Management

There is no dedicated city data officer present in the city to collect, collate and manage the different datasets and information that exists in siloed city departments. This uncoordinated and disaggregated form of data can lead to redundancies and increase inefficiency.

The city also has a very low ratio of planners per capita, alluding to the urgent need to build capacity and increase technical expertise in the planning department. The city must invest in creating a centralized database as well, with a data officer to manage and update data regularly.

Data Access and Sharing

Data is not available on any open-source web portal limiting access and engagement of urban professionals and civil society to become informed stakeholders in planning for the city's future. Once all the data is collected, it must be updated regularly in consultations with other departments to ensure accuracy and relevancy.

5.2.4   Strategic issue 4: Increase in urban sprawl

Urban sprawl has emerged as a cross-cutting issue based on findings of the urban sector assessment and consultations with the municipal corporation and NGOs. The city scored 'very low' for indicators that correspond to compact, high-density developments and scored 'high' in the categories that are a consequence of urban sprawl.

The interlinkages of urban sprawl are explored in Figure 5.6 and Annexures where it links to 49 indictors across the 10 sectors.
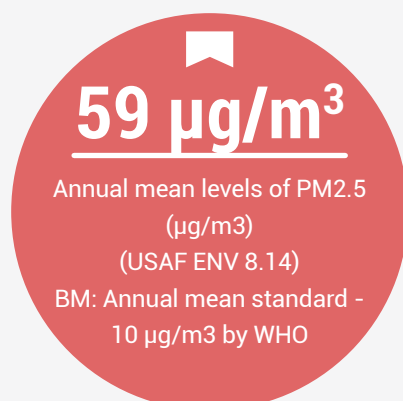
Figure 5.6: Interlinkage of USAF indicators
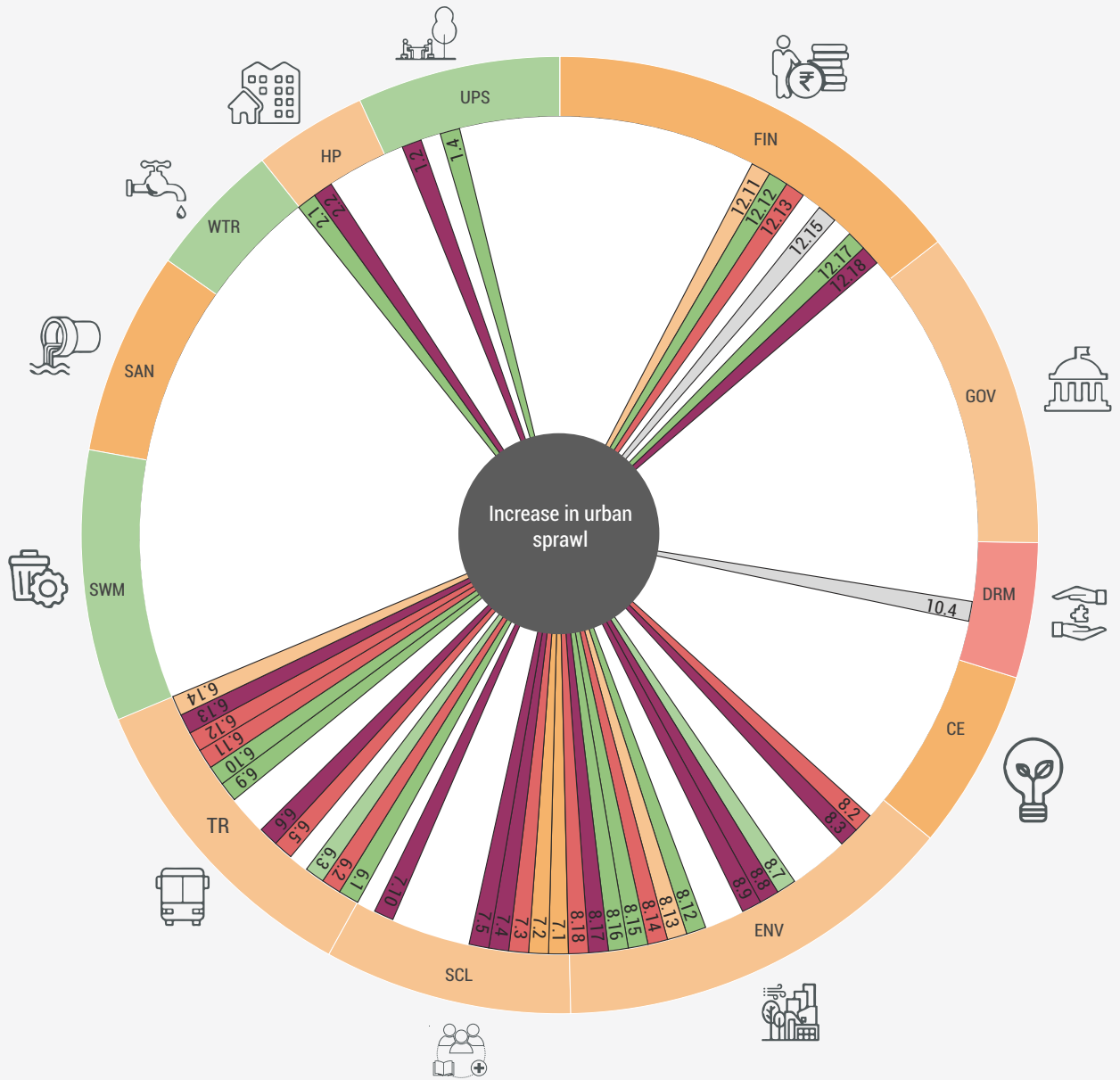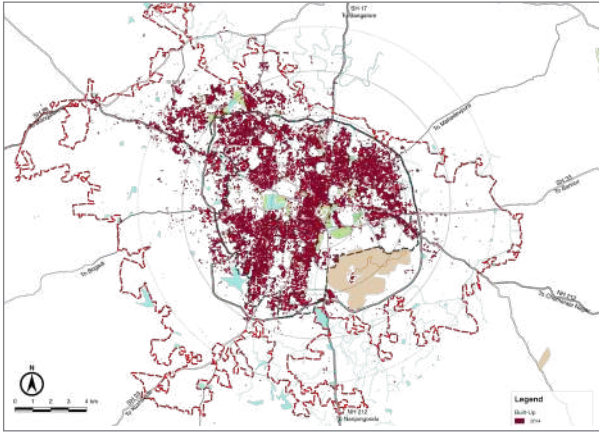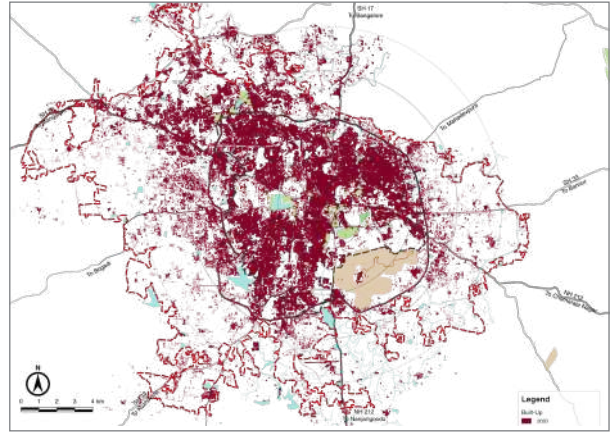
Source: UN-Habitat

Area: 89.66 sq. km.
Population: 7.55 lakh

Map 5.4: Change in built form from 2000 to 2020

Area: 89.66 sq. km.
Population: 8.93 lakh

Source: UN-Habitat

Overstated Growth Boundary

Mysuru's master plan 2011 expands the current development boundary multi-fold, from 8,966 ha to 29,242 ha, overestimating the future needs of the city. Considering the city's population growth projection, to accommodate 21 lakh people by 2031, the city only needs additional 5,000 ha of land at the UN recommended density of 150 PPH making the total area about 14,000. Owing to the large growth boundary, which is almost double of what is needed and converts all agricultural land into residential, there will be a 92 per cent loss in agricultural lands around the city by 2031.

An overstated growth boundary identified by the municipality can lead to ad hoc or leapfrog form of development in a sprawling pattern. This development pattern is contrary to the compact city form that is considered sustainable as it leads to vast natural or agricultural lands being converted to urban uses. These land uses demand infrastructure like water, sanitation, powerlines and roads to support them, which is resource intensive to build and maintain. Low density developments are also heavily reliant on private modes of transport to access jobs and city amenities, creating an urban environment that is not pedestrian friendly

or walkable. Thus, an overstated development boundary poses a threat for the city to grow in a planned and sustainable way.

Urban Morphology Analysis

A comparative analysis of the city's-built fabric across the city centre and peripheral areas highlight this sprawling pattern of development. In the city centre, 68 per cent of the 1-sq. km. land area is built, whereas this percentage reduces to a mere five per cent in the peripheral swatch.

Low Density Development

This low density still requires resources to service the area leading to land and economic inefficiencies while being environmentally unsustainable. Mysuru should consider infill development in areas within MCC's jurisdiction area, which have the capacity before converting agricultural or natural lands into urban settlements.
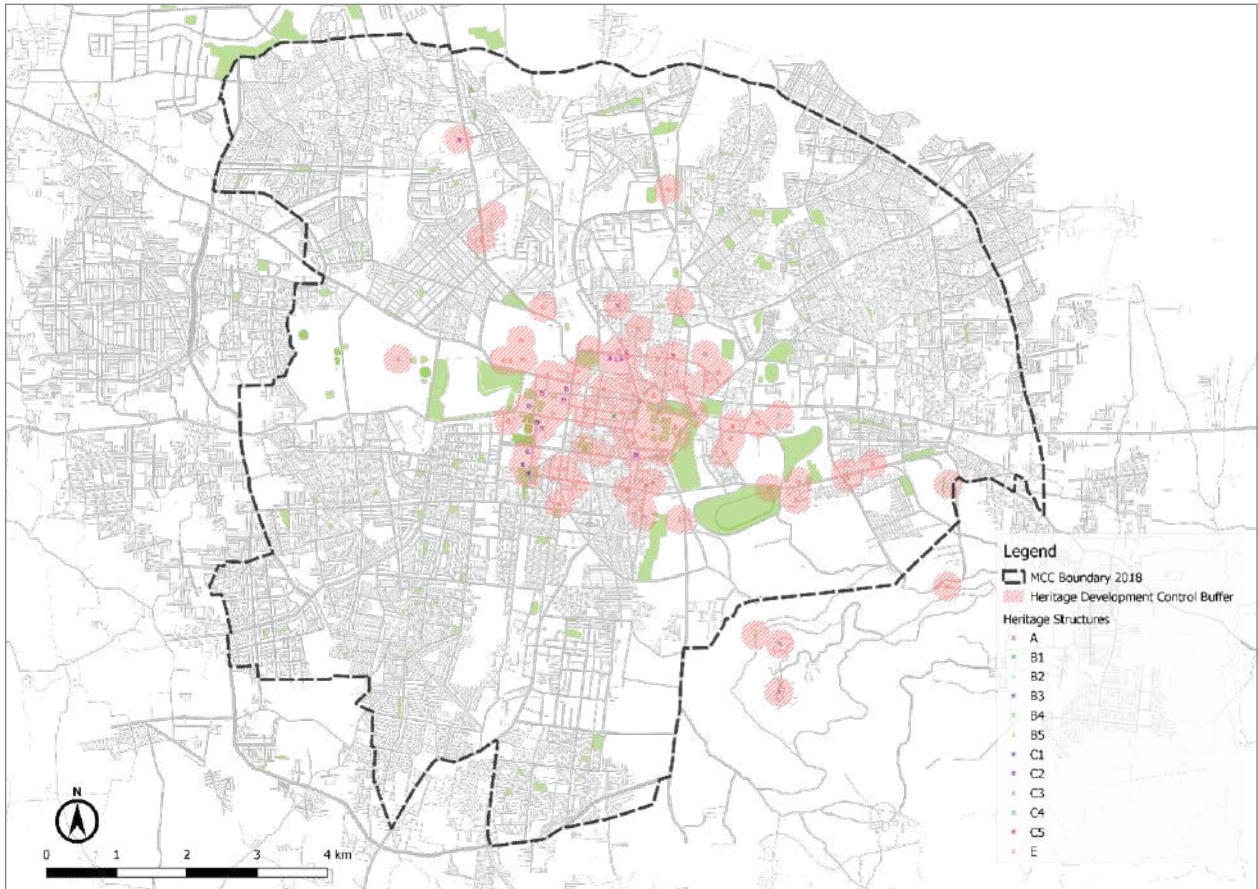
Map 5.5: Heritage development control buffer around heritage sites in Mysuru   Source: UN-Habitat
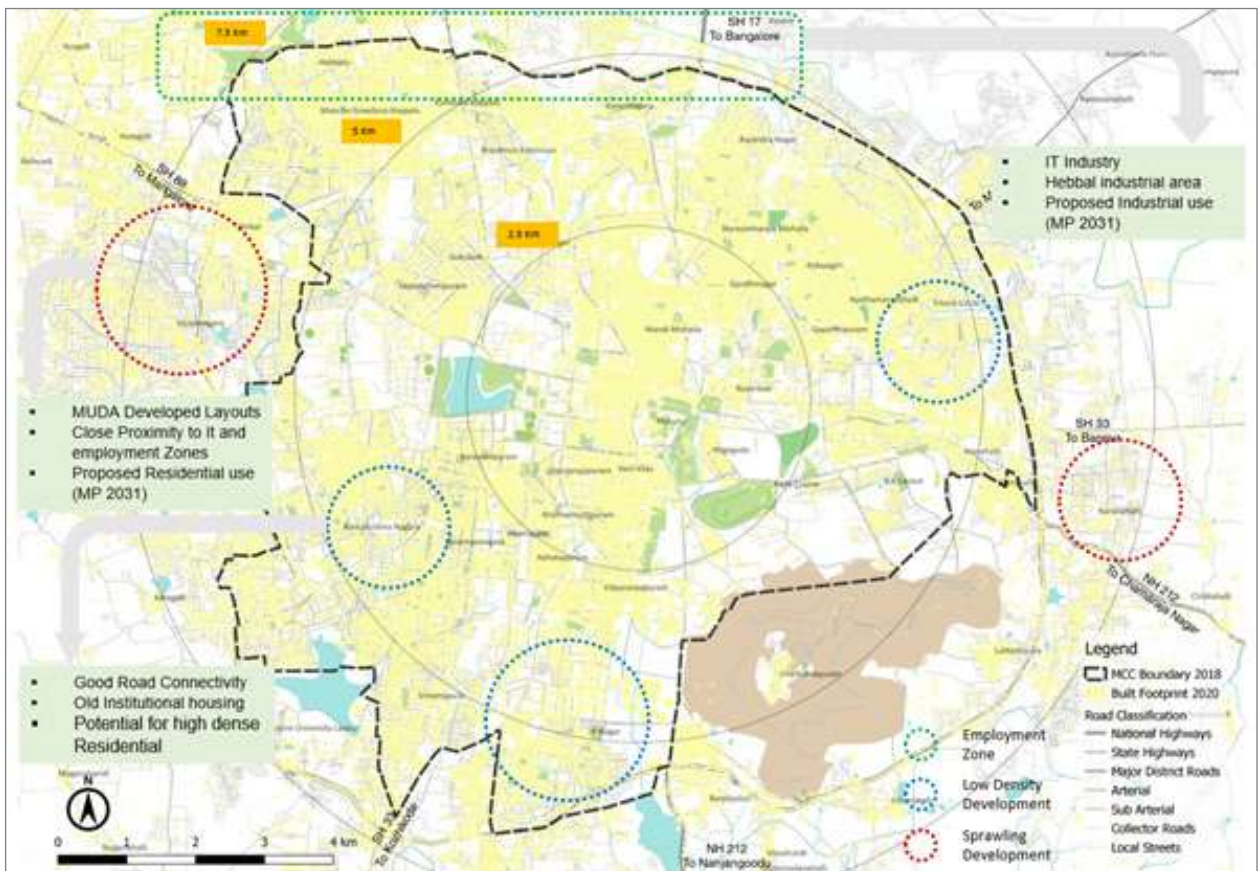
Map 5.6: Residential building footprint in 2020 in Mysuru   Source: UN-Habitat

The projected population growth of the city can be accommodated within the existing city limits with strategic densification strategies and infill development. The city must incentivize brownfield development over new, greenfield expansions wherever possible. By redefining the city's growth boundary, it can maintain optimum density and living standards in a sustainable way without encroaching on natural habitats and agricultural lands.

Land Carrying Capacity Analysis

As discussed in Section 4.2.3, an estimated population of 11.50 lakh resided in an area of 89.66 sq. km. in 2020, with a population density of 128 PPH. Sixty per cent of Mysuru's population resides in areas with less than 150 PPH and is spread across the peripheral zone of MCC's jurisdictional area. The projected population for 2021 and 2031 is indicated in Table 5.1.

UN-Habitat's five Principles for Sustainable Urban Development state that compact cities should aim at developing a recommended density of 150 PPH. If UN-Habitat's recommended density is applied to the present conditions of available vacant land, the current amount of vacant land within MCC's city limits could inhabit up to 78,080 people, which is about seven per cent of the existing city population, as per the population estimate of 11.5 lakh according to MCC's CSAF 2.0 data.

Table 5.1: Population growth pattern in Mysuru over the decades

Year	Population (lakh)	Decadal growth (%)	MCC Area (Ha)	Population Density/ Ha
2011	8.93	18.2	8,966	100
2020	11.50	-	8,966	128
2021[15]	16.50	58.6	29,242	56
2031	21.00	7.3	29,242	72

Source: Census of India, Master Plan 2031 and MCC

	1. City Swatch	2. Partial Development Swatch	3. Peripheral Swatch
Swatch Area (sq.km)	1	1	1
Built Footprint (% of Swatch area)	68%	39%	5%
Roads (% of Swatch area)	27%	23%	22%
Road Length (km)	44.7	21.0	23.6
Population Density (PPH)	166	78	1

Figure 5-7: City swatch analysis to study sprawl development

Source: UN-Habitat

[15] As per population projected in Mysuru Master Plan 2031 for the years 2021 and 2031

Table 5.2: Indicative land carrying capacity in Mysuru

Population of the city in 2020	11,50,363
Current gross population density in PPH (2019) in city area of 89.66 sq. km.	128
Total land available (approx.) in the city (Ha)5	610
Additional population (approx.) that can be accommodated as per UN suggested standard of 150 PPH	91,500
Additional population (approx.) that can be accommodated as per existing population density of 128 PPH	78,080

Source: UN-Habitat

Figure 5.8: Increase in percentage of private share

2005

Private 23.00%
NMT 51.00%
Public 26.00%
Modal Share

2012

Private 37.00%
NMT 33.00%
Public 30.00%
Modal Share
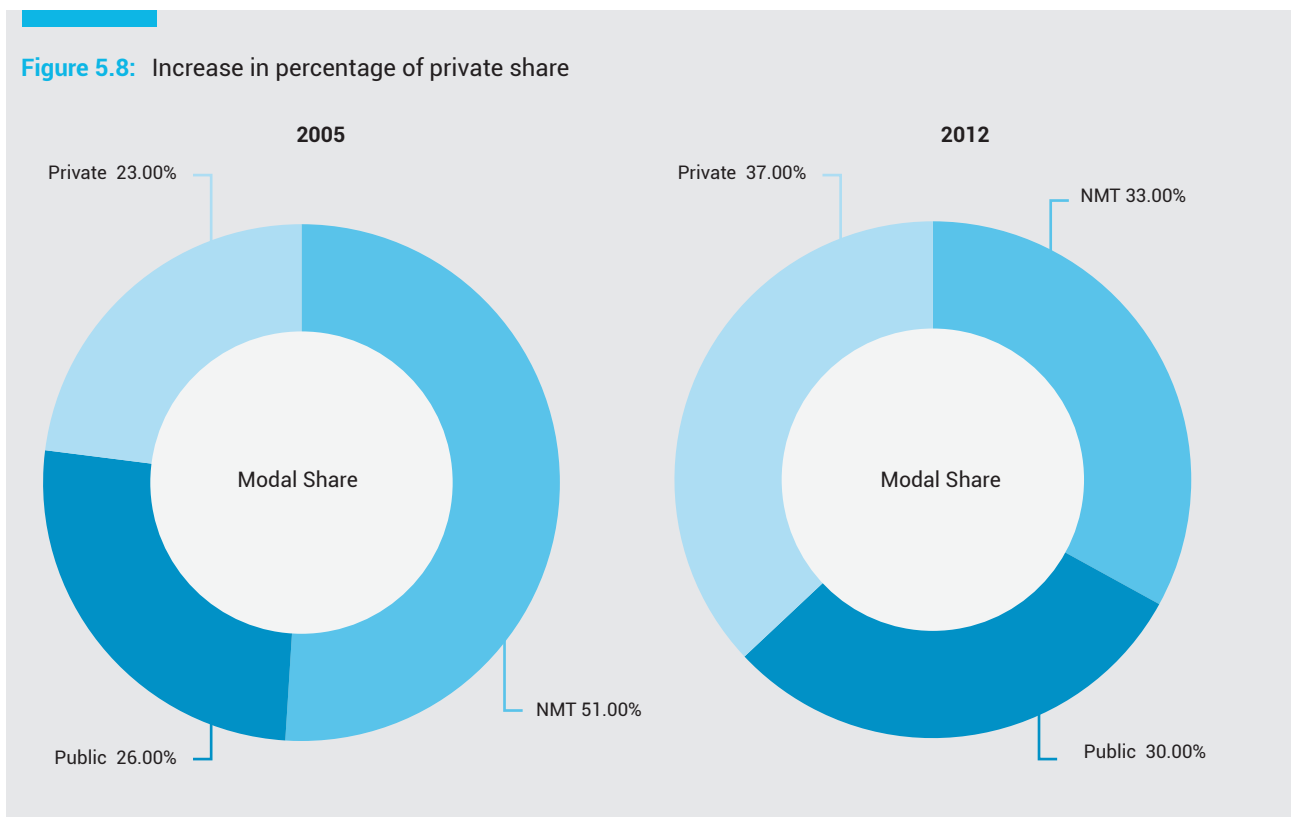
Source: EMBARQ India Integrated Transportation Report & Comprehensive Traffic and Transportation Plan, 2012

High Automobile Dependency

Sprawling development patterns create the need to travel large distances for work and to access various services/ facilities. Most residents of Mysuru also rely mostly on private motorized vehicles.

As per the Integrated Transport Report by EMBARQ, the percentage of private share has increased to 37 per cent, public transport has increased to 30 per cent, and NMT has decreased to 33 per cent. Due to sprawling development, the use of personalized motor vehicles tends to increase further, causing more GHG emissions. The absence of integrated public transportation with development in the city also leads to increase in use of personal motor vehicles and fossil fuels.

ANNEXURE

Annexure 4.1: Overall performance of Mysore across all USAF sectors

UPS
Code	Indicator
1.1	Street lighting coverage
1.2	Change in Built-up area
1.3	Agri to developable in MP
1.4	500m to parks/open space
1.5	Per capita open space
1.6	Pedestrian facilities %
1.7	Recreation all/open space %
1.8	Safety rating
1.9	ULB parks expenditure

HP
Code	Indicator
2.1	% Slum HHs
2.2	% city land under slum
2.3	% Owner occupied units
2.4	30% > income on accommodation
2.5	% HH 1 Room

WTR
Code	Indicator
3.1	% HH pipe connection
3.2	% quality of water
3.3	resource assessment plan
3.4	% non revenue
3.5	supply per capita
3.6	metering connections

SAN
Code	Indicator
4.1	% Sewage network connection
4.2	% HH toilet access
4.3	% Sewage treated before discharge
4.4	% Wastewater passed treatment standard
4.5	% Wastewater recycled
4.6	% Sewage treated in plant
4.7	% Industries complying CPCB
4.8	FSSM Action Plan/bye laws
4.9	% FT people maps

SWM
Code	Indicator
5.1	% Wet waste processed
5.2	% Dry waste separated recycling
5.3	% Solid waste for energy/processing
5.4	% Solid waste in dumps, water bodies, burnt
5.5	% Waste remediated
5.6	% Wards segregating waste
5.7	ICT monitoring C&T, GVP, staff
5.8	% waste pickers integrated
5.9	% C&D collected
5.10	% Hazardous waste processed
5.11	solid waste (kg/capita/day)
5.12	% Wards D2D collection

TR
Code	Indicator
6.1	% Pop. 500m PT
6.2	Km bicycle path/100,000
6.3	% Roads with footpath
6.4	% Increase PT ridership
6.5	% clean energy vehicles
6.6	Road density
6.7	Avg travel speed
6.8	% Share NMT
6.9	Street interaction density
6.10	% Road PT/100,000
6.11	road accidents/100,000
6.12	differently-abled bus accessibility
6.13	workplace accessibility >30min
6.14	% ULB area streets

SCL
Code	Indicator
7.1	% Pop. 800-m healthcare
7.2	% Female literate
7.3	% Pop. 300m schools
7.4	change decadal pop. growth
7.5	City dependency ratio
7.6	Under 5 mortality
7.7	Hospital bed density/10,000
7.8	% Reduction vector disease
7.9	% Reduction waterborne disease
7.10	% Schools capital access
7.11	% Mobile network subscriptions

ENV
Code	Indicator
8.1	Clean Air Action Plan
8.2	GHG measurement system
8.3	Annual GHG emissions
8.4	% Tree cover
8.5	Biodiversity conservation
8.6	No. of green building incentives
8.7	Annual AQI
8.8	Annual GHG/capital
8.9	Emissions from transport
8.10	Biochemical Oxygen Demand
8.11	Trees per inhabitant
8.12	Land use zoning environmental protection
8.13	Annual PM10
8.14	Annual PM2.5
8.15	Annual NO2
8.16	Avg daily SO2
8.17	Annual methane emissions
8.18	Noise pollution regulations

CE
Code	Indicator
9.1	% HH using LPG
9.2	% Energy from renewable sources
9.3	% Pop. Access renewable energy
9.4	% Energy efficient street lighting
9.5	Energy use/capita
9.6	% HH authorised energy connection
9.7	Building codes consider eco-technologies
9.8	System Average Interruption

DRM
Code	Indicator
10.1	Disaster Management Plan
10.2	Hazard/risk maps
10.3	% HH in risk area
10.4	% Buildings in 4km fire service
10.5	Hazard warning system
10.6	Flood risk plan

GOV
Code	Indicator
11.1	Planners/capita
11.2	Years since MP updated
11.3	No. Services Command Centre
11.4	No. of functions by ULB
11.5	GIS based MP
11.6	Environmental status report
11.7	% staff trained
11.8	No. of E-gov initiatives
11.9	MP accessible online
11.10	No. of ULB committees
11.11	citizen charter
11.12	City data officer
11.13	% Women councillors
11.14	Open data portal

FIN
Code	Indicator
12.1	Credit rating
12.2	% Property tax collected
12.3	% Grants received
12.4	GDP per capita
12.5	Change own source revenue
12.6	Operating margin
12.7	% Annual debt service
12.8	% Debt in overall budget
12.9	% Properties covered tax net
12.10	Capital expenditure quality
12.11	Water supply cost recovery
12.12	Sanitation cost recovery
12.13	Solid waste cost recovery
12.14	Unemployment rate
12.15	Inequality index/Gini
12.16	Workforce employed
12.17	% Capital expenditure
12.18	GDP density of built up
12.19	% Informal employment

UPS	HP	WTR	SAN	SWM	TR	SCL	ENV	CE	DRM	GOV	FIN
1.1 Street lighting coverage	**2.1** % Slum HHs	**3.1** %HH pipe connection	**4.1** % Sewage network connection	**5.1** % Wet waste processed	**6.1** % Pop. 500m PT	**7.1** % Pop. 800m healthcare	**8.1** Clean Air Action Plan	**9.1** % HH using LPG	**10.1** Disaster Management Plan	**11.1** Planners/capita	**12.1** Credit rating
1.2 Change in Built-up area	**2.2** % city land under slum	**3.2** % quality of water	**4.2** %HH toilet access	**5.2** % Dry waste separated recycling	**6.2** Km bicycle path/ 100,000	**7.2** % Female literacy	**8.2** GHG measurement system	**9.2** % Energy from renewable sources	**10.2** Hazard/risk maps	**11.2** Years since MP updated	**12.2** % Property tax collected
1.3 Agri to developable in MP	**2.3** % Owner occupied units	**3.3** resource assessment plan	**4.3** % Sewage treated before discharge	**5.3** % Solid waste for energy/processing	**6.3** % Roads with footpath	**7.3** % Pop. 800m schools	**8.3** Annual GHG emissions	**9.3** % Pop. Access renewable energy	**10.3** % HHs in risk area	**11.3** No. Services Command Centre	**12.3** % Grants received
1.4 500m to parks/open space	**2.4** 30% > income on accommodation	**3.4** % non revenue	**4.4** % Wastewater passed treatment standard	**5.4** % Solid waste in Dumps, water bodies, burnt	**6.4** % increase PT ridership	**7.4** change decadal pop growth	**8.4** % Tree cover	**9.4** % Energy efficient street lighting	**10.4** % Buildings in fire service	**11.4** No. of functions by ULB	**12.4** GDP per capita
1.5 Per capita open space	**2.5** % HH 1 Room	**3.5** Supply per capita	**4.5** % Wastewater recycled	**5.5** % Waste remediated	**6.5** % clean energy vehicles	**7.5** City dependency ratio	**8.5** Biodiversity conservation	**9.5** Energy use/ capita	**10.5** Hazard warning system	**11.5** GIS based MP	**12.5** Change own source revenue
1.6 Pedestrian facilities %		**3.6** metering connections	**4.6** % Sewage treated in plant	**5.6** % Wards segregating waste	**6.6** Road density	**7.6** Under 5 mortality	**8.6** No. of green building incentives	**9.6** %HH authorized energy connection	**10.6** Flood risk plan	**11.6** Environmental status report	**12.6** Operating margin
1.7 Recreation/open space %			**4.7** % Industries complying OHSA	**5.7** ICT monitoring C&T, GVP, staff	**6.7** Avg travel speed	**7.7** Hospital bed density/ 10,000	**8.7** Annual AQI	**9.7** Building codes consider eco-technologies		**11.7** % staff trained	**12.7** % Annual debt service
1.8 Safety rating			**4.8** FSSM Action Plan/bye laws	**5.8** % waste pickers integrated	**6.8** % Share NMT	**7.8** % Reduction vector disease	**8.8** Annual GHG /capital	**9.8** System Average Interruption		**11.8** No. of Egov initiatives	**12.8** % Debt in overall budget
1.9 ULB parks expenditure			**4.9** % FT goods maps	**5.9** % C&D collected	**6.9** Street intersection density	**7.9** % Reduction waterborne disease	**8.9** Emissions from transport			**11.9** MP accessible online	**12.9** % Properties covered tax net
				5.10 % hazardous waste processed	**6.10** % Road PT/ 100,000	**7.10** % Schools digital access	**8.10** Biochemical Oxygen Demand			**11.10** No. of ULB committees	**12.10** Capital expenditure efficiency
				5.11 solid waste (kg/capita/day)	**6.11** road accidents/ 100,000	**7.11** % Mobile network subscriptions	**8.11** Trees per inhabitant			**11.11** citizen charter	**12.11** Water supply cost recovery
				5.12 % Waste D2D collection	**6.12** differently-abled bus accessibility		**8.12** Land use zoning environmental protection			**11.12** City data officer	**12.12** Sanitation cost recovery
					6.13 workplace accessibility 30min		**8.13** Annual PM10			**11.13** % Women councillors	**12.13** Solid waste cost recovery
					6.14 % ULB arterial streets		**8.14** Annual PM2.5			**11.14** Open data portal	**12.14** Unemployment rate
							8.15 Annual NO2				**12.15** Inequality index Gini
							8.16 Avg. daily SO2				**12.16** Workforce employed
							8.17 Annual methane emissions				**12.17** % Capital expenditure
							8.18 Noise pollution regulations				**12.18** GDP density of built up
											12.19 % Informal employment

Annexure 5.2: Interlinkage of issue of vulnerable environment and ecology with indicators across USAF sectors.

UPS
No.	Indicator
1.1	Street lighting coverage
1.2	Change in Built-up area
1.3	Agri to developable in MP
1.4	500m to parks/open space
1.5	Per capita open space
1.6	Pedestrian facilities %
1.7	Recreation space %
1.8	Safety rating
1.9	ULB parks expenditure

HP
No.	Indicator
2.1	% Slum HHs
2.2	% city land under slum
2.3	% Owner occupied units
2.4	30% > income on accommodation
2.5	% HH 1 Room

WTR
No.	Indicator
3.1	% HH pipe connection
3.2	% quality of water
3.3	resource assessment plan
3.4	% non revenue
3.5	supply per capita
3.6	metering connections

SAN
No.	Indicator
4.1	% Sewage network connection
4.2	% HH toilet access
4.3	% Sewage treated before discharge
4.4	% Wastewater treatment standard
4.5	% Wastewater recycled
4.6	% Sewage treated in plant
4.7	% Industries complying CPCB
4.8	FSSM Action Plan/byelaws
4.9	% PT people maps

SWM
No.	Indicator
5.1	% Wet waste processed
5.2	% Dry waste separated recycling
5.3	% Solid waste for site (PW) processing
5.4	% Solid waste in dumps, water bodies, burnt
5.5	% Wards remediated
5.6	% Wards segregating waste
5.7	ICT monitoring C&T, GVP, staff
5.8	% waste pickers integrated
5.9	% S&D collected
5.10	% hazardous waste processed
5.11	solid waste (kg/capita/day)
5.12	% Wards D2D collection

TR
No.	Indicator
6.1	% Pop. 500m PT
6.2	Km bicycle path/100,000
6.3	% Roads with footpath
6.4	% increase PT ridership
6.5	% clean energy vehicles
6.6	Road density
6.7	Avg travel speed
6.8	% Share NMT
6.9	Street intersection density
6.10	% Road PT/100,000
6.11	Road accidents/100,000
6.12	differently-abled bus accessibility
6.13	workplace accessibility 30min
6.14	% ULB area streets

SCL
No.	Indicator
7.1	% Pop. 800m healthcare
7.2	% Female literate
7.3	% Pop. 800m schools
7.4	change decadal pop growth
7.5	City dependency ratio
7.6	Under 5 mortality
7.7	Hospital bed density/10,000
7.8	% Reduction vector disease
7.9	% Reduction waterborne disease
7.10	% Schools digital access
7.11	% Mobile network subscriptions

ENV
No.	Indicator
8.1	Clean Air Action Plan
8.2	GHG measurement system
8.3	Annual GHG emissions
8.4	% Tree cover
8.5	Biodiversity conservation
8.6	No. of green building incentives
8.7	Annual AQI
8.8	Annual GHG/capital
8.9	Emissions from transport
8.10	Biochemical Oxygen Demand
8.11	Trees per inhabitant
8.12	Land use zoning environmental protection
8.13	Annual PM10
8.14	Annual PM2.5
8.15	Annual NO2
8.16	Avg daily SO2
8.17	Annual methane emissions
8.18	Noise pollution regulations

CE
No.	Indicator
9.1	% HH using LPG
9.2	% Energy from renewable sources
9.3	% Pop. Access renewable energy
9.4	% Energy efficient street lighting
9.5	Energy use/capita
9.6	No. of green building connection
9.7	% HH authorized energy connection / Building codes consider eco-technologies
9.8	System Average Interruption

DRM
No.	Indicator
10.1	Disaster Management Plan
10.2	Hazard/risk maps
10.3	% HHs in risk area
10.4	% Buildings in 4km fire service
10.5	Hazard warning system
10.6	Flood risk plan

GOV
No.	Indicator
11.1	Planners/capita
11.2	Years since MP updated
11.3	No. Services Command Centre
11.4	No. of functions by ULB
11.5	GIS based MP
11.6	Environmental status report
11.7	% staff trained
11.8	No. of Egov initiatives
11.9	MP accessible online
11.10	No. of ULB committees
11.11	citizen charter
11.12	City data officer
11.13	% Women councillors
11.14	Open data portal

FIN
No.	Indicator
12.1	Credit rating
12.2	% Property tax collected
12.3	% Grants received
12.4	GDP per capita
12.5	Change Own source revenue
12.6	Operating margin
12.7	% Annual debt service
12.8	% Debt in overall budget
12.9	% Properties covered tax net
12.10	Capital expenditure efficiency
12.11	Water supply cost recovery
12.12	Sanitation cost recovery
12.13	Solid waste cost recovery
12.14	Unemployment entrate
12.15	Inequality index Gini
12.16	Workforce employed
12.17	% Capital expenditure
12.18	GDP density of built up
12.19	% Informal employment

Annexure 5.3: Interlinkage of issue of lack of digital government initiatives with indicators across USAF sectors.

UPS
- 1.1 Street lighting coverage
- 1.2 Change in Built-up area
- 1.3 Agri to developable in MP
- 1.4 500m to parks/open space
- 1.5 Per capita open space
- 1.6 Pedestrian facilities %
- 1.7 Recreational %open space %
- 1.8 Safety rating
- 1.9 ULB parks expenditure

HP
- 2.1 %Slum HHs
- 2.2 % city land under slum
- 2.3 % Owner occupied units
- 2.4 30% > income on accommodation
- 2.5 % HH 1Room

WTR
- 3.1 %HH pipe connection
- 3.2 %Quality of water
- 3.3 resource assessment plan
- 3.4 % non revenue
- 3.5 supply per capita
- 3.6 metering connections

SAN
- 4.1 %Sewage network connection
- 4.2 %HH toilet access
- 4.3 %Sewage treated before discharge
- 4.4 % Wastewater passed treatment standard
- 4.5 % Wastewater recycled
- 4.6 % Sewage treated in plant
- 4.7 %Industries complying CPCB
- 4.8 FSSM Action Plan/bye laws
- 4.9 % PT google maps

SWM
- 5.1 %Wet waste processed
- 5.2 % Dry waste separated recycling
- 5.3 % Solid waste for energy/processing
- 5.4 % Solid waste in dumps, water bodies, burnt
- 5.5 % Waste remediated
- 5.6 % Wards segregating waste
- 5.7 ICT monitoring C&T, GVP, staff
- 5.8 % waste pickers integrated
- 5.9 % C&D collected
- 5.10 % hazardous waste processed
- 5.11 solid waste (kg/capita/day)
- 5.12 % Wards D2D collection

TR
- 6.1 %Pop. 500m PT
- 6.2 Km bicycle path/100,000
- 6.3 % Roads with facepath
- 6.4 % increase PT ridership
- 6.5 % clean energy vehicles
- 6.6 Road density
- 6.7 Avg travel speed
- 6.8 % Share NMT
- 6.9 Street intersection density
- 6.10 % Road PT/100,000
- 6.11 road accidents/100,000
- 6.12 differently abled bus accessibility
- 6.13 workplace accessibility 30min
- 6.14 % ULB area streets

SCL
- 7.1 % Pop. 800m healthcare
- 7.2 % Female literacy
- 7.3 % Pop. 800m schools
- 7.4 change decadal pop growth
- 7.5 City dependency ratio
- 7.6 Under 5 mortality
- 7.7 Hospital bed density/10,000
- 7.8 % Reduction vector disease
- 7.9 % Reduction waterborne disease
- 7.10 % Schools digital access
- 7.11 % Mobile network subscriptions

ENV
- 8.1 Clean Air Action Plan
- 8.2 GHG measurement system
- 8.3 Annual GHG emissions
- 8.4 % Tree cover
- 8.5 Biodiversity conservation
- 8.6 No. of green building incentives
- 8.7 Annual AQI
- 8.8 Annual GHG /capital
- 8.9 Emissions from transport
- 8.10 Biochemical Oxygen Demand
- 8.11 Trees per inhabitant
- 8.12 Land use zoning environmental protection
- 8.13 Annual PM10
- 8.14 Annual PM2.5
- 8.15 Annual NO2
- 8.16 Avg daily SO2
- 8.17 Annual methane emissions
- 8.18 Noise pollution regulations

CE
- 9.1 % HH using LPG
- 9.2 % Energy from renewable sources
- 9.3 % Pop. Access renewable energy
- 9.4 % Energy efficient street lighting
- 9.5 Energy/capita
- 9.6 %HH authorized energy connection
- 9.7 Building codes consider eco-technologies
- 9.8 System Average Interruption

DRM
- 10.1 Disaster Management Plan
- 10.2 Hazard/risk maps
- 10.3 % HHs in risk area
- 10.4 % Buildings in fire service
- 10.5 Hazard warning system
- 10.6 Flood risk plan

GOV
- 11.1 Planners/capita
- 11.2 Years since MP updated
- 11.3 No. Services Command Centre
- 11.4 No. of functions by ULB
- 11.5 GIS based MP
- 11.6 Environmental status report
- 11.7 % staff trained
- 11.8 No. of Egov initiatives
- 11.9 MP accessible online
- 11.10 No. of ULB committees
- 11.11 citizen charter
- 11.12 City data officer
- 11.13 % Women councillors
- 11.14 Open data portal

FIN
- 12.1 Credit rating
- 12.2 % Property tax collected
- 12.3 % Grants received
- 12.4 GDP per capita
- 12.5 Change own source revenue
- 12.6 Operating margin
- 12.7 % Annual debt service
- 12.8 % Debt in overall budget
- 12.9 % Properties covered tax net
- 12.10 Capital expenditure efficiency
- 12.11 Water supply cost recovery
- 12.12 Sanitation cost recovery
- 12.13 Solid waste cost recovery
- 12.14 Unemployment across
- 12.15 Inequality index Gini
- 12.16 Workforce employed
- 12.17 % Capital expenditure
- 12.18 GDP density of built up
- 12.19 % Informal employment

Annexure 5.4: Interlinkage of issue of increase in low dense urban sprawl with indicators across USAF sectors.

Notes: