

VIJAYAWADA

City Fact Sheet

SUSTAINABLE CITIES
INTEGRATED APPROACH PILOT (SCIAP)

APRIL 2021

Sustainable Cities: Integrated Approach Pilot

URBAN SUSTAINABILITY ASSESSMENT FRAMEWORK

City Fact Sheet - Vijayawada

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Prepared for:



**Ministry of Housing
and Urban Affairs**
Government of India



Project Donors:



Prepared by:

UN HABITAT
FOR A BETTER URBAN FUTURE

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About SCIAP and USAF

The Sustainable Cities Integrated Approach Pilot (SCIAP) project, funded by GEF-6, is being implemented by UNIDO and UN-Habitat, in partnership with the Ministry of Housing and Urban Affairs (MoHUA) of the Government of India in Bhopal, Guntur, Jaipur, Mysuru and Vijayawada. The main goal is to infuse sustainability strategies into urban planning and management at the city level and create an enabling climate for investments in green infrastructure that would reduce greenhouse gas emissions, improve service delivery and enhance the quality of living for all citizens, thereby building resilience and strengthening the governance capacity of the cities.

A major component of the project is to develop an Urban Sustainability Assessment Framework (USAF) for spatial planning in India which is designed as a decision support tool for municipal commissioners and urban practitioners to support sustainable and resilient urban planning and management of cities in India. Urban diagnostics based on USAF cover 12 sectors, namely, urban form-public space and safety, housing and property, water, sanitation, solid waste management, transportation, social facilities and services, environment and ecology, clean energy, disaster risk management, governance and data management and finance and economy. The performance of these sectors is measured using national and international benchmarks, further refined by consultations with the pilot cities. USAF 'spatializes' several indicators for granular planning and to identify inequalities in service delivery, resource allocation, accessibility of essential utilities, and recreational opportunities, among others, within a city.

Furthermore, giving emphasis to spatially-informed planning, USAF equips city managers to model area-based development strategies and assess their impact on improving sectoral performance against benchmarks. Area-based development strategies developed through USAF, when combined with a financing plan, lay the ground work for capital investment plans thereby providing a critical link between urban planning, finance and governance. It can also help decision-makers prioritize projects to effectively direct resources towards targeted areas for maximum impact and benefit.

About this Fact Sheet

This fact sheet showcases preliminary analysis that has emerged after applying the USAF to Vijayawada. It highlights how the city fares across twelve USAF sectors on its primary indicators, draws attention to where the city functions well and aspects that need attention as per the benchmarks of the USAF. For detailed strategic diagnosis for Vijayawada, please refer to the City Profile and Diagnostic Report.

Please note that the data reported for the city is for the year 2018-19 & 2019-20 (data sourced from VMC SLB 2019-20/ notes on VMC development activities from various stakeholder consultations (2020) / Swachh Survekshan 2020/ Municipal Performance Index (2018-19)/ Ease of Living Index (2018-19)/ Climate Smart Cities Assessment Framework 2.0/ Zonal Development Plan/ VMC City GIS Database/ OpenStreetMap/ USGS (LandSAT Imagery)/ Global Human Settlement Layers (GHSL) from European Commission. Some of the data has also been sourced from the Krishna District Census Handbook 2011).

- USAF SECTORS
-  **01** PUBLIC SPACE, SAFETY AND URBAN FORM
 -  **02** HOUSING AND PROPERTY
 -  **03** WATER SUPPLY
 -  **04** SANITATION
 -  **05** SOLID WASTE MANAGEMENT
 -  **06** TRANSPORTATION
 -  **07** SOCIAL FACILITIES AND SERVICES
 -  **08** ENVIRONMENT AND ECOLOGY
 -  **09** CLEAN ENERGY
 -  **10** DISASTER RISK MANAGEMENT
 -  **11** GOVERNANCE AND DATA MANAGEMENT
 -  **12** FINANCE AND ECONOMY

Framework Scoring

Each scoring range is based on benchmarks derived from national standards and linked to global standards wherever possible. For quantitative indicators, indicator value over and above the set benchmark is categorised as excellent performance. The USAF has evolved from an initial 3-point to a 7-point scoring gradient. The range of 3-point scale (low-medium-high) has been used to interpolate and expand to a 7-point scoring scale (very low to excellent performance). The division of scoring range for continuous variables (or indicators) into seven defined breaks is based on equal intervals between the threshold and benchmark set for each indicator. On the other hand, indicators which are discrete or qualitative in nature are bifurcated only into three classes (very low – medium – excellent performance) and binary questions (yes/no) are classified as either very low or excellent. Indicators assessed on a 7-point scale result in a performance score which is less coarse in nature and better represents the continuum, making it more reliable than a narrower 3-point scale. Expanding the mid-range performance (lower medium to upper medium) especially, captures the variation better for average performance city values.

For representation, the range of performance follows a spectral colour ramp and varies from two shades of red (very low - low) to two shades of green (high - excellent) with three shades of yellow in between (lower medium - medium - upper medium).

Very Low (0)	Low (1)	Lower Medium (2)	Medium (3)	Upper Medium (4)	High (5)	Excellent (6)
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There are some indicators that are not included in the performance score of the city and are labelled as 'descriptive indicators' in the benchmark column. These indicators can either be quantitative (with specified formula to measure it) or qualitative (yes or no), but do not have a set benchmark for scoring. The information from these parameters along with few other benchmarked indicators would be helpful in formulating the profile of the city.

Indicators for which data is either currently awaited or is unavailable are denoted as '--' against the depicted indicator.

Descriptive Indicator	(--) Data awaited/unavailable
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The USAF serves primarily as a guide for orienting the priorities of a city and directing its resources to meet the desired vision and goals as outlined in its master plan. The conclusions of the framework thus point to the weak spots with respect to the city's sustainable development goals and efforts to build resilience. As part of SCIAP, following the City Profile and Diagnostic Report, a Sustainable City Strategy shall also be prepared which would serve as the spatial strategic plan for the city with key actions and interventions to achieve the its vision and goals.



VIJAYAWADA

Vijayawada is the second most populous city in the state of Andhra Pradesh, India and the largest commercial centre of Krishna district with bustling commercial, trade activities, automobile and agricultural-allied marketing activities. The city has locational advantage in terms of regional connectivity. Regional urban centres like Visakhapatnam, Hyderabad, Tirupati, Guntur, and Chennai are within 400Km of Vijayawada. The connectivity of Vijayawada through road, railways and airways enable the city to function as one of the key commercial and economic activity centres in the state. The city has evolved along the foothills of the Kanaka Durga temple and spatially spread along the major connectivity spines. Figure 1.1 indicates that the natural topographical features like the river in the south, hillocks in the east and west, impacts the city's spatial growth, leading to a fan-shaped expansion in the North-East direction. The scarcity of vacant land for development may be one of the factors for fragmented city development along the major road corridors.

Built up area per capita in the city has decreased (11%) from 27m/person in 2000 to 25m/person in 2014 with increase in population and developable land remaining the same.



12 Lakhs
POPULATION



193 PPH
POPULATION DENSITY



61.88 SqKm
AREA

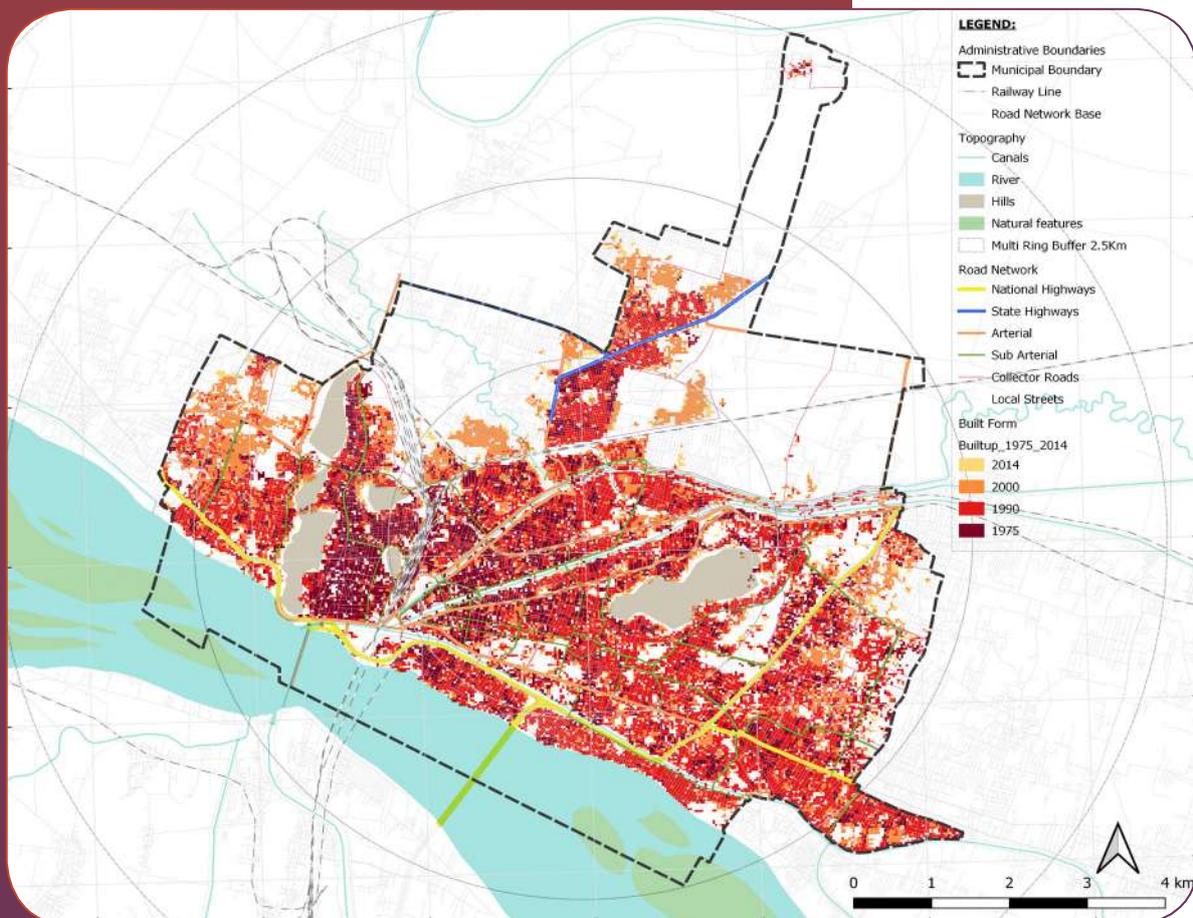


Figure 1.1: Multi-temporal classification of built-up presence (1975-2014)

VMC is divided into 64 wards spread across 61.88 sq.km. The decadal population growth rate of Vijayawada between 2001 – 2011 was 9.8% whereas the decadal population growth rate of the Krishna district was 7.86% and 9.21% for the Andhra Pradesh state. The annual growth rate of population was 2% between 2011 and 2019 with a population of 10.35 lakhs as per 2011 census and 12 lakhs and estimated 12 lakhs in 2019. Vijayawada's annual population growth rate is estimated at approx. 3% for 2019-2034 against the growth rate for Andhra Pradesh at approx. 0.25%. With an estimated city population of 12 lakh (2019), the population density of the city is 193 persons per hectare (UN suggested density is 150 persons per hectare). The Zonal Development Plan for Vijayawada projected the population of city to be 16.40 lakhs that could pose pressure on infrastructure provisions with a proposed density of 265 PPH without increase in ULB area.

Vijayawada Municipal Corporation (VMC) is the civic body that governs the city and carries out municipal functions and maintenance of assets. The city has a locational advantage with well-connected National Highway 15 and 65, South Central Zone railway line, and an international airport at Gannavaram. The old core of the city has mixed commercial, residential, and narrow road patterns. Figure 1.2 indicates that the central city zone has density ranging from 150 PPH to 300PPH, sometimes even higher, which is reflective of the overall character of this area marked by intense activities and concentration of built structures over decades.

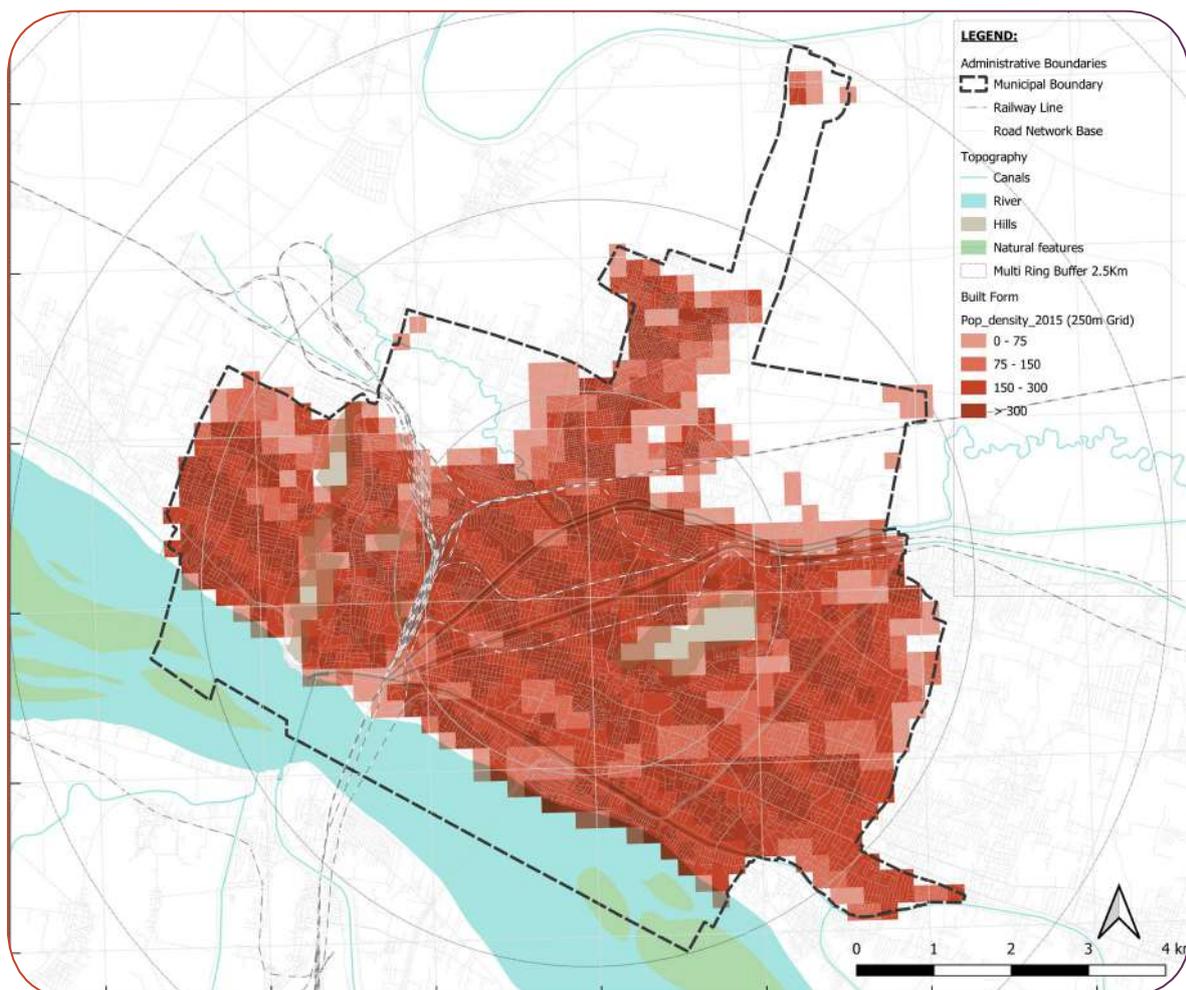


Figure 1.2: Residential population density estimates (2015)



View of Prakasam Barrage, a key city landmark connecting Krishna and Guntur districts.

Source: Imran Basha, UN-Habitat



01

PUBLIC SPACE, URBAN FORM & SAFETY



3.83 sqm/capita
open space



11% decrease
in built-up area per person
in last decade



63% population
has access to public parks
and open spaces within a
walking distance of 500m



No agricultural land
use area proposed for future
developable uses in the
Master Development Plan



100% roads
have streetlights

Total built-up footprint in 2014 increased to 3%, 26.4 Sq.Km from 25.7 Sq.Km in 2000. However, built-up area per capita in the city has decreased from 27m/person in 2000 to 25m/person in 2014.

Developable land scarcity may be one of the factor for the decrease in the built-up area per capita and per capita open spaces.

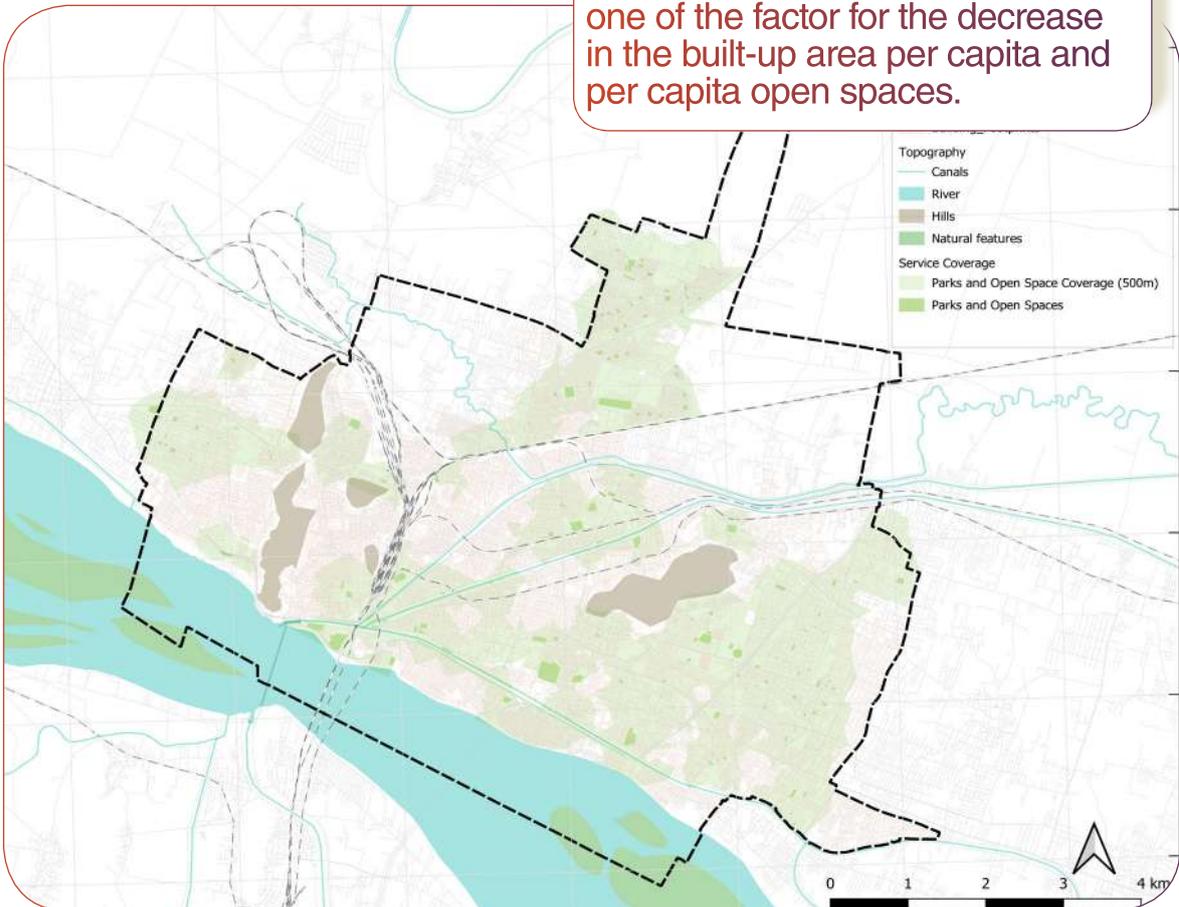


Figure 1.3: Population catchment area of public parks and open spaces (500m distance)



Raghaviah park one of the key city level accessible green space

Source: Imran Basha, UN-Habitat

Residential typologies near Kummaripalem, Indhrakeeladhri hills

Source: Imran Basha, UN-Habitat





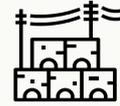
HOUSING AND PROPERTY

2,87,983 approx. slum population in 111 pockets cover an extent of 9 Sq.Km of the total ULB.

As per the VMC data, 94% of the slum population resides in areas with densities greater than 150PPH

Most of the slums are either concentrated on hilltops that are prone to landslides or in flood-prone areas.

29% urban households living in slums / squatter settlements



15% city area under slums/squatter settlements

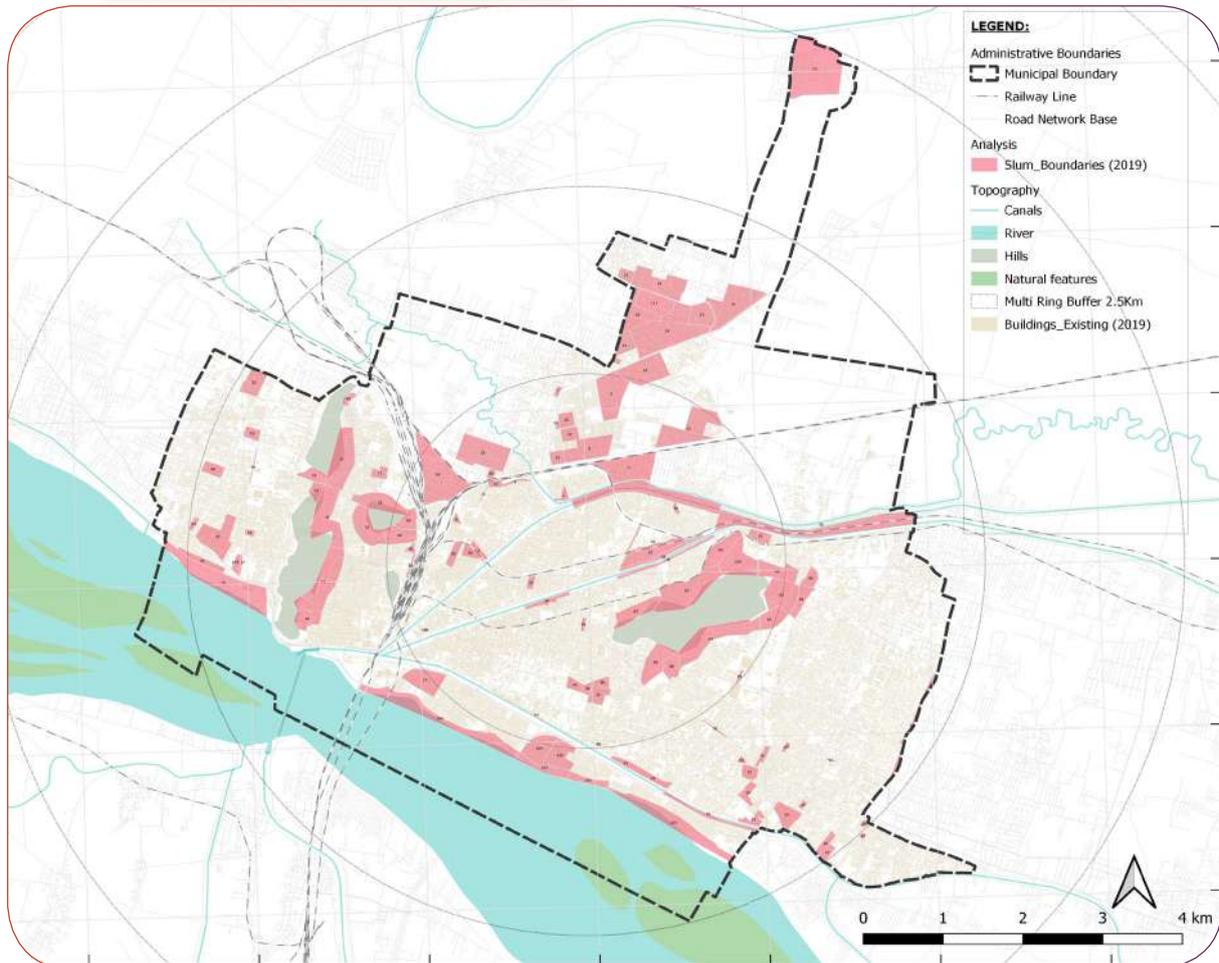


Figure 1.4: Distribution of slum settlements in the city, 2019 (Source: GIS Database, VMC)

Data awaited/unavailable
 Descriptive Indicator
 Excellent (6)
 High (5)
 Upper Medium (4)
 Medium (3)
 Lower Medium (2)
 Low (1)
 Very Low (0)



03

WATER SUPPLY



90% households have piped water supply connection



Conducted water resource assessment and management plan



100% water samples comply with national potable water quality standards



27% extent of non-revenue water

Krishna river and sub surface water from infiltration galleries are the key sources of supply.

248 million litres per day (MLD) is produced and after losses, 216 MLD total water is supplied

This sector is one of the major contributor of municipal revenues. SCADA system in place to monitor water supply system efficiently.



04

SANITATION



92% properties in the ULB connected to sewerage network



100% households have access to toilet facilities



85% sewage treated before discharge to surface water bodies



22% wastewater received at the treatment plant that is recycled or reused after appropriate treatment for various purposes



100% wastewater samples passed the specified secondary treatment standards from the total samples collected in a year

Treated wastewater is reused for cleaning of roads, maintaining of green spaces, and remaining into canals.

UNIDO SCIAP – Pilot intervention - STP upgradation.



Elevated Level Service Reservoir (ELSR) near Indra Gandhi stadium

Source: Imran Basha, UN-Habitat



Swachh Bharata Mission pay and use public toilets by VMC
Source: Imran Basha, UN-Habitat

05



SOLID WASTE MANAGEMENT

77% dry waste separated and classified for recycling/material recovery



24% total waste disposed off in open dumps / controlled dumps, water bodies / is burnt



91% wet waste collected is processed in compost plant



0% solid waste used for energy recovery (incineration)



Total 550 TPD waste is generated in the city. SWM is the topmost priority of VMC. City is focusing on transforming into Zero-Waste City.

100% legacy waste remediated in the city



SWM initiatives like bio-mining, remediation, plastic recycling, composting and MRF have been implemented by VMC.



Ongoing eco park development in remediated dump site by VMC
Source: VMC drone capture

Descriptive Indicator
 Excellent (6)
 High (5)
 Upper Medium (4)
 Medium (3)
 Lower Medium (2)
 Low (1)
 Very Low (0)



06

TRANSPORTATION



39% population has access to public transport stops within 500m



9% major road length have footpaths with width more than 1.2 m



No change in annual public transport ridership



0 km cycle track per 1,00,000 population



20.36 km/sqkm road density



53% shared vehicles operating on clean energy

Absence of bus shelters in the northern and western parts of the city lead to reduced intracity access to public transportation.

Presence of inter city railway line without connecting bridges/ underpasses is impacting spatial development in the north and west.

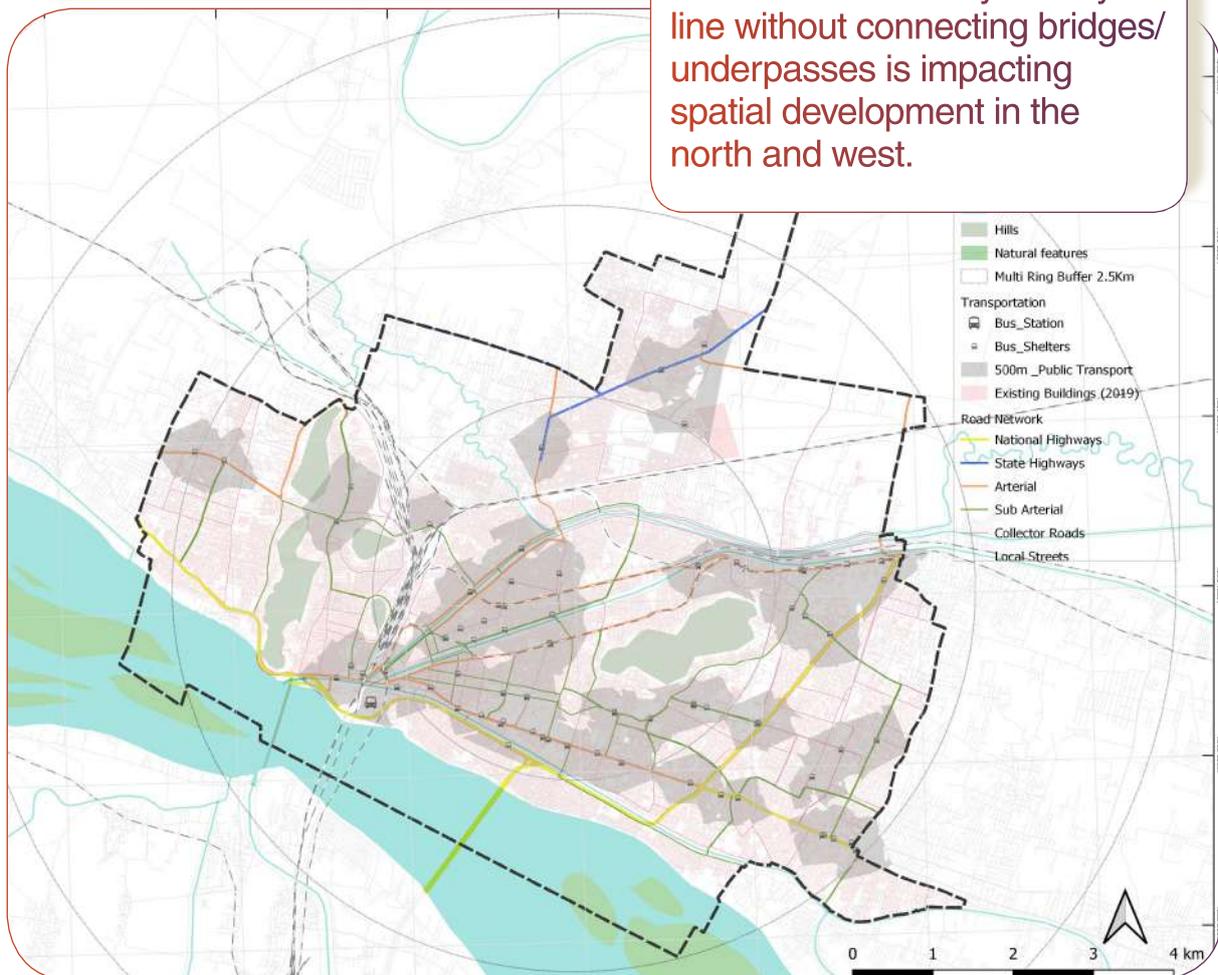


Figure 1.5: Population catchment area of public transportation stops (500m distance)

View of Eluru road one of the key primary road network abutting Besant road (market street)

Source: Imran Basha, UN-Habitat



Descriptive Indicator
 Excellent (6)
 High (5)
 Upper Medium (4)
 Medium (3)
 Lower Medium (2)
 Low (1)
 Very Low (0)



07

SOCIAL FACILITIES AND SERVICES



59% population has access to healthcare facilities within 800m



99% population has access to primary/secondary schools (public/private) within 800m



77% females of ages 7 and above who are literate

Healthcare facilities concentrated along primary road network and in decentralized nodes.

Existing 27 beds per 10,000 higher than the standard of 25 beds per 10,000 persons.

High access to educational facilities as city is an established educational hub.

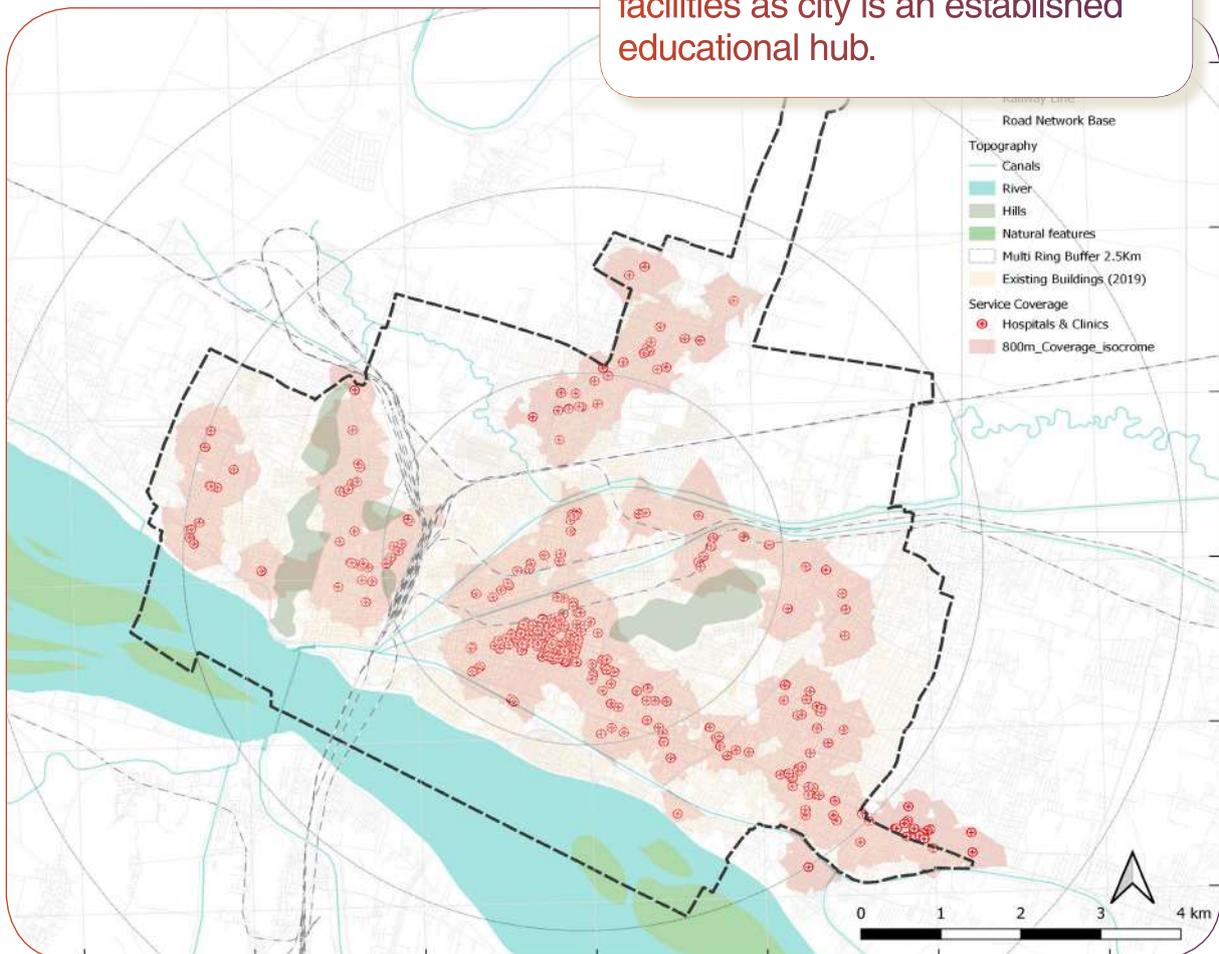


Figure 1.6: Population catchment area of healthcare facilities (800m distance)

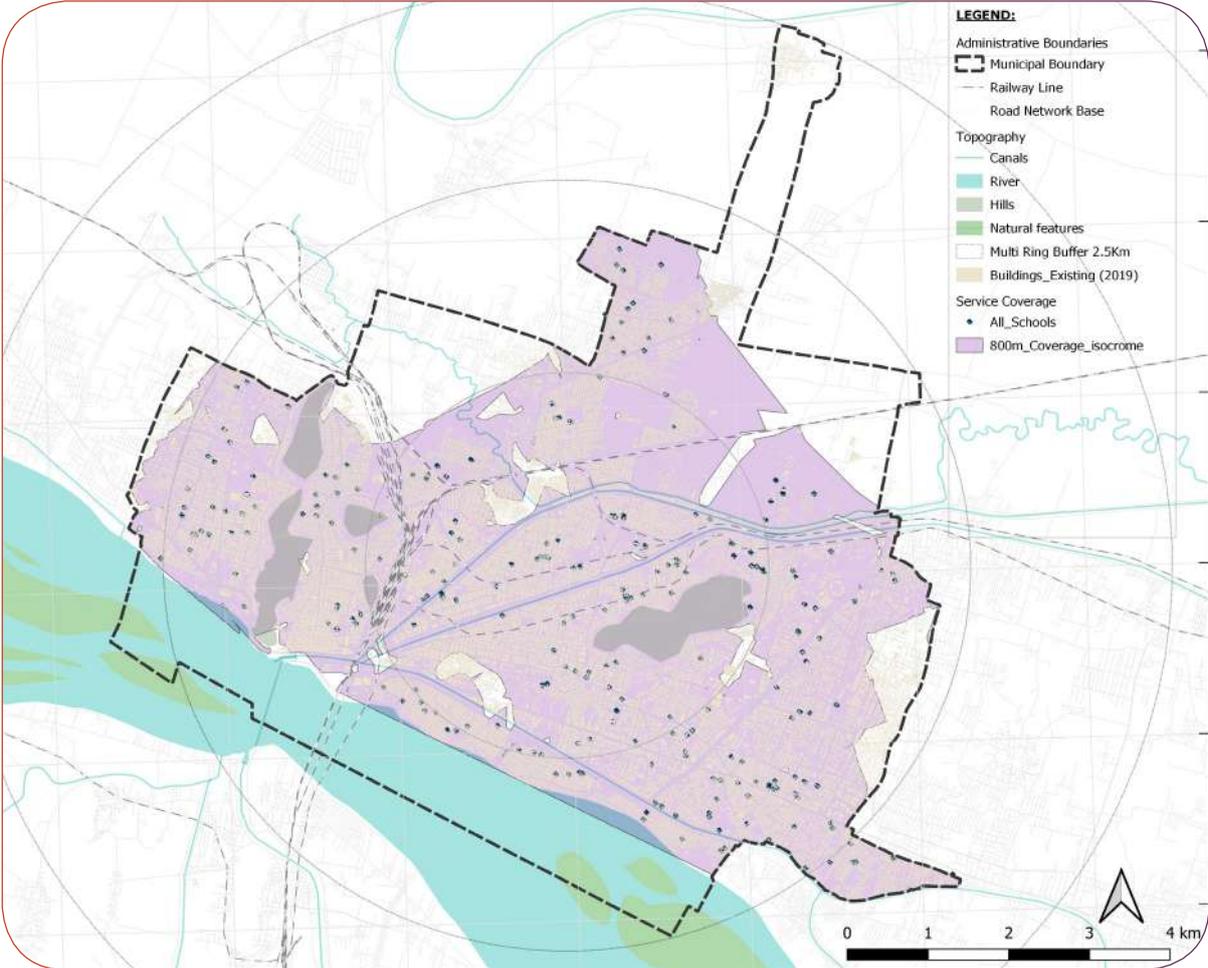


Figure 1.7: Population catchment area of schools (800m distance)

Data awaited/unavailable
 Descriptive Indicator
 Excellent (6)
 High (5)
 Upper Medium (4)
 Medium (3)
 Lower Medium (2)
 Low (1)
 Very Low (0)



08

ENVIRONMENT AND ECOLOGY



Presence of
Clean Air Action Plan and
pollutants source identification



3% tree cover
to the total ULB area



No
GHG emission
monitoring system



1 incentive
(structural and financial)
for green buildings
implemented



No actions
for protection, conservation
and management of urban
biodiversity



1.73 MtCO₂e/capita
annual (GHG) emissions

Third highest emissions in the
5 SCIAP pilot cities (2015-16).

As on 2015-16, total emissions
were 18,88,582 Mt CO₂e/q
from the stationary energy,
transportation, waste, and
other sectors.



09

CLEAN ENERGY



-- % households
using LPG/PNG for cooking



--% population
have access to renewable
energy



1% total electrical
energy
derived from renewable
sources



992 kWh /capita
energy use in a year



100% streetlights
are energy efficient

Streetlighting accounts 75% of
the total energy consumption
for municipal services (2019).

Stationary energy sector
emissions 1,235,184 MtCO₂
eq. is the largest contributor of
the total emissions (2015-16).

Andhra Pradesh Pollution Control Board
Amaravati CAAQMS Data 18-Feb-2021

Parameter	Conc.	Unit	Std
PM ₁₀	111	µg/m ³	100-24hr
PM _{2.5}	67	µg/m ³	60-24hr
SO ₂	13.53	µg/m ³	80-24hr
NO _x	13.30	µg/m ³	80-24hr

View of Continuous Ambient Air Quality Monitoring Station (CAAQMS) by APPCB near Polyclinic road. Source: Imran Basha, UN-Habitat

View of retaining wall along the river Krishna and the flood impact

Source: VMC drone capture



10



DISASTER RISK MANAGEMENT

Yes



Disaster Management Plan prepared at city level

Presence

hazard vulnerability maps/ risk maps (at city level)



City is prone to various natural hazards like cyclone, earthquake, floods, fire and landslides.

48% households at risk due to placement in areas of non-mitigable risk



Detailed risk assessment and mitigation plans are of high priority with real-time database.

98% buildings have access to emergency fire services within a distance of 4Km



VMC in collaboration with UNDP is in the process of preparation of 18 ward level disaster management plans.

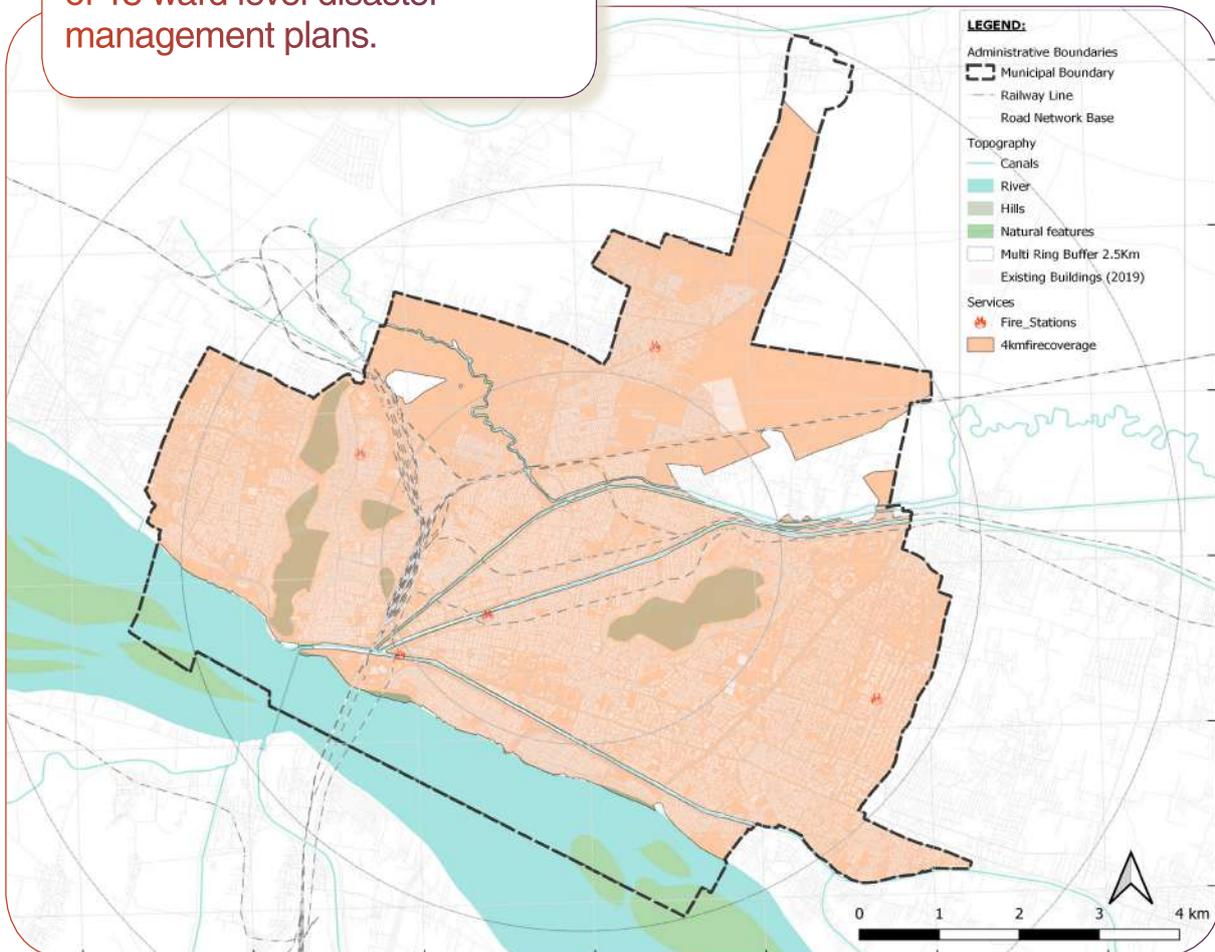


Figure 1.8: Buildings catchment area of fire service facilities (4km distance)

Data awaited/unavailable
Descriptive Indicator
Excellent (6)
High (5)
Upper/Medium (4)
Medium (3)
Lower/Medium (2)
Low (1)
Very Low (0)



11

GOVERNANCE AND DATA MANAGEMENT



18 functions

implemented by ULB as stipulated in the Twelfth schedule of Indian constitution



12 services

managed through a command and control centre in the ULB



3 planners

for every 14,000 population



Absence

of GIS based master plan for the city



14 years

since the enforced master plan was last updated

'Ward Planning and Regulation Secretary' has been appointed for every 1000-1200 households to enforce development control regulations and planning functions .

Zonal Development Plan revision is underway.

GIS database was prepared in 2019 for the city but has limited application in decision making.



12

FINANCE AND ECONOMY



74%

property tax collected as a percentage of total property tax billed



₹ /capita
GDP of the city



'A-'

Credit Rating of the ULB

VMC has surplus operating margin with 15 percentage of debt/loans in overall budget allocation.



36% grants

received from central & state governments to total revenue

Property tax, water, and drainage user charges, building licence fee, penalisation charges, hoarding fees are the key contributors to the revenue of VMC.



View of Vijayawada Municipal Corporation (VMC) office building
Source: Imran Basha, UN-Habitat

