URBAN OUTCOMES FRAMEWORK

PART 2

CONTENTS

ONE

INTRODUCTION

Trajectory of India's Urban Growth

Cities are increasingly becoming the epicentre of development in India, playing diverse roles as focal points for economic growth, jobs, and innovation. As a result, India is witnessing a wave of rapid urbanisation in recent times.

By 2030 India is projected to have a

60 crore (40%) **population living in the urban areas compared to** **37.7 crore (31%)** in 2011.

Moreover, urban India plays a vital role in the country's economic development through various economic activities that take place in the cities. According to the 2011 census, urban parts of the country contribute 63% to the country's GDP,

which is projected to increase up to **75% by 2030.**

which will boost job creation, improve ease of living and employ citizens to the best of their abilities in service of the nation. To tackle these challenges and access the best opportunities in the cities, the Government has launched several initiatives such as the Swachh Bharat Mission (SBM-U), Smart Cities Mission (SCM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana (PMAY-U), Deen Dayal Antyodaya Yojana-National Urban Livelihood Mission (DAY-NULM) under Ministry of Housing and Urban Affairs. These missions collectively seek to foster better quality of life for India's urban citizens through improving urban governance, city planning, and the availability of quality urban infrastructure.

Need for data to measure urban outcomes

We live in a time where data and information have rapidly emerged to play a key role in growth and development of organisations and society, bringing along its own sets of opportunities and unique challenges. One of the most significant benefits of having access to reliable data is in using it to frame fair and effective policies. This is an opportune time for evidence-based policymaking, which facilitates in-depth research and targets positive results. Good data is a strategic asset that presents the strengths and weaknesses of any initiative. Numbers can tell us where to invest more for higher impacts and where losses are incurred. Data-driven evidence enables us to use what we already know to build more knowledge for the future. It is the key to unlocking more equitable policies and building a sustainable society.

This scale of rapid urbanisation brings an opportunity to ensure inclusive and sustainable growth with an increase in standard of living and quality of life for all. Such rapid urbanization offers India an incredible window for further transforming the economy and fuelling growth. However, this opportunity comes with the challenge to provide equitable access to quality healthcare, education, infrastructure, clean air and employment opportunities. Moreover, it also poses a challenge to make Indian cities safer, accessible, and inclusive for all. These are some of the arduous tasks that lie ahead in this fast-paced process of urban growth.

The Hon'ble Prime Minister has considered these challenges as unique opportunities to drive the economy forward—via investments in infrastructure

In this light, Urban Outcomes Framework 2022 is an initiative to develop a transparent and comprehensive database based on cross-city outcomes across sectors such as Demography, Economy, Education, Energy, Finance, Environment, Governance & ICT, Health, Housing, Mobility, Planning, Safety and Security, Solid Waste Management, Water and Sanitation.

The central objective of this recurring exercise is to generate a robust database so that time series analysis and progress tracking can be conducted in order to achieve aspired social and economic progress through generating data that will drive evidence-based policymaking. Most importantly, the **Urban Outcomes Framework 2022 aims to democratise** data by making it accessible to all urban stakeholders in the Government, academic institutions, citizenry and industry- the 'quadruple helix'.

By providing access to information on the variables affecting day to day life such as ecology, health, water and sanitation, the exercise focuses on providing information to the last mile, that will further democratise the cities and strengthen transparency and citizen-centric governance.

Urban Outcomes Framework 2022 and SDG

An important way to tackle urban issues is to achieve Sustainable Development Goals (SDG) which attempt to facilitate development with universality and sustainability. The Government of India (GoI) is strongly committed to the 2030 Agenda, including SDGs. To quote the Hon'ble Prime Minister - "These goals reflect our evolving understanding of the social, economic and environmental linkages that define our lives". India will play a leading role in determining the success of SDGs globally.

One way to drive faster achievement of SDGs is through a data revolution. Globally, data is used to track carbon footprint, energy consumption and other information to understand how far communities have progressed in SDGs. Data is used to create indices and for ranking the best performers and worst performers of the goals. New insights gleaned from data mining can promote innovative strategies for an equitable future. The United Nations itself has created an open SDG data hub where data providers, managers and users can understand and communicate patterns in progress toward SDGs. **The Urban Outcomes Framework 2022 aims to facilitate the process of achieving sustainable development and socio-economic progress by making data available on the crucial issues pertaining to development.**

Urban Outcomes Framework 2022 and Data Democratisation

Data democratization is the process of enabling everybody within a society to comfortably access and use data. There are no gatekeepers, and citizens feel empowered and confident to voice their concerns and make informed decisions. **Through developing an open and transparent data ecosystem, the Urban Outcomes Framework 2022 is a step in moving towards data democratisation.** Furthermore, clarity and simplicity are the keys to unlocking good governance. Data democratization also involves educating the people on how to use digital platforms and what the numbers indicate. It is about raising awareness and sensitizing the people to safely incorporate data in their decision-making process. If successful, this can accelerate the pace of building transparent and strong democratic institutions in a country.

Urban Outcomes Framework 2022 and Data to the Common People

Free flow of information is the marker of a healthy democracy. It will help citizens voice their concerns and exercise well-informed choices. Information and data will also enable citizens to hold governments accountable and monitor the progress of various policies. This will create a platform for people to enter into an informed dialogue with their representatives, strengthening democratic institutions. Inclusive policies requires the participation of all sections of the population. This is possible only when common people have easy access to information and data, which affects their daily lives. In the digital and communication technology era, it is easy to disseminate information to large sections of the population. Therefore, **through the development of the Urban Outcomes Framework 2022 the intent is to use technology to benefit citizens and promote equitable access to information.**

Urban Outcomes Framework 2022, Public Transparency and Strengthening Citizen-Centric Effective Governance

The Urban Outcomes Framework 2022 aims to build public transparency and strengthen the citizen-centric effective governance by providing extensive data on a single platform pertaining to urban India. Public transparency is a critical element to building an informed citizenry and gaining people's trust. A lack of trust amplifies fear, leading to a breakdown of governance structures. SDG 16 aims to promote peace, justice and strong institutions. The core element of this goal is increasing transparency through improved access to information. Ensuring effective citizen-centric governance entails understanding citizens' needs and priorities. It also involves providing the people with accurate information to make an informed choice. Transparency and citizen-

centric governance are mutually reinforcing, with circular flows of information creating bonds of trust between government and the people and between the people in their daily activities. The most recent example of dealing with the pandemic shows how transparency improved citizen responses and misinformation led to harmful behaviour.

Urban Outcomes Framework 2022 and Improving Data Quality for Effective Governance

Lastly, the Urban Outcomes Framework 2022 attempts to improve data quality and management in India for effective governance. Good quality data is essential for good governance and decision making. Data is extremely sensitive and vulnerable to misuse. If not correctly interpreted, it can lead to ineffective and regressive policymaking. Therefore, ensuring the authenticity and quality of data is crucial. Good data will be accurate, complete, consistent, valid, and reasonable. Therefore, meticulous, and careful handling of data is important. However, if the quality is ensured, data is the most loyal friend and guiding light for policymakers. It will increase productivity, accuracy and transparency within the system and provide a high impact for stakeholders. This can foster trust and promote good relations within the society. It is also important to achieve productivity and ease in doing business, promoting investments and economic growth in a country. **The opening of database created from Urban Outcomes Framework 2022 will nudge cities to correct their data and maintain its quality.**

A Shift from Indices to Data

In order to measure the performance of cities across India, SCM has undertaken initiatives such as the Ease of Living Index (EoLI), Municipal Performance Index (MPI), Climate Smart Cities Assessment Framework (CSCAF) and Data Maturity Assessment Framework (DMAF). The central objective of these indices is to assess the cities across varied sectors that impact the nature of growth in the cities.

The purpose of this exercise is to shift focus from indices to data with a comprehensive list of indicators. The datasets will be regularly updated by the cities and data points will be accessible in the public domain for the consumption of researchers, academics and for public audit. In past, data has been collected through frameworks at different times and cycles, thus having issues like overlapping, duplicity and more time and effort being expended in the exercise. **Through the Urban Outcomes Framework 2022, data across 14 sectors will be streamlined so that there is an increased focus on data collection and disaggregated data can be analysed and used for ranking by domain experts. This also provides the opportunity for creating an ecosystem to create new frameworks based on open data.**

Ease Of Living Index – EOL 2022

The swift pace of urban expansion brings the promise of immense economic growth. It is estimated that Asia, and particularly countries like India will be at the forefront of this expansion. The rise in the concentration of the urban population vastly outpaces the capacity of local city administration catering to the needs of the people. Inadequate infrastructure, depleting resources, the concentration of slums, rising poverty, and environmental degradation coupled with vast social and economic inequalities are just some of the burning issues that require immediate attention. However, without a diagnostic tool to assess the level of development and extent of issues in India's urban agglomerations, it becomes increasingly difficult to tackle such challenges.

The Ease of Living Index presents itself as an evaluation tool that reflects the ease of living in Indian cities. It seeks to examine the impact of urban development programs and the quality of life and economic and social opportunities available to the citizens.

The Index is a composite measure of the processes and outcomes that affect the lives of people. The index can be created for any region; however, the approach of the given ease of living index is to percolate to cities and understand the quality of life. The understanding of city-level becomes all the more relevant due to the presence of vast differences across districts in India. India, as a nation has multiple layers of variations, regionally, wherein the districts within the states also show significant variations, further requiring the need for assessment of districts of India.

It measures the ease of living across three pillars: Quality of Life, Economic Ability, and Sustainability. The index is further strengthened by a fourth pillar, the Citizen Perception Survey, which aims to obtain and incorporate the views of the citizens regarding the services provided by their city administration.

Ease Of Living Index

Quality of life	**Economic Ability**	**Sustainability**	**Citizen Perception Survey**
• Education • Health • Housing and Shelter • Wash And SWM • Mobility • Safety and Security • Recreation	• Level of Economic Development • Economic Opportunities	• Environment • Green Building • Energy Consumption • City Resilience	

Pillar 1:
Quality of life

uncovers an understanding of the different aspects contributing to a decent urban life. It is reflective of an individual's ability to survive and prosper in a particular area. By examining provisions for necessities such as affordable housing, access to clean water, basic education, healthcare facilities, safety and security, and recreation avenue, the goal has been to assess a holistic impression of the quality of life in India's urban cities.

Pillar 2:
Economic Ability

captures the economic well-being of citizens by evaluating the level of economic development and inequalities that they encounter in a particular city. It focuses on the economic building blocks of the individuals and city as a whole and takes into account the need for growth and change in the economic well-being in terms of increase in wages, the creation of greater employment opportunities, need for clusters etc.

Pillar 3:
Sustainability

aims at realising the need for greener cities and an emphasis on the reduction of energy consumption. It evaluates sustainability along the lines of availability of green spaces, promotion of green buildings, level of energy consumption, the quality of natural resources such as air and water, and the city's ability to withstand natural disasters.

Pillar 4:
The Citizen Perception Survey (CPS)

was conducted to strengthen the index further. It provides a perception of the city residents and allows them to evaluate the level and quality of development in their respective cities. Furthermore, the survey acts as a source to validate the findings of the index and examine whether they comply with the results of the data provided by the cities.

METHODOLOGY (EOL)

The Ease of Living Index evaluates the well-being of Indian citizens in cities, across various parameters that consist of four pillars: Quality of Life, Economic Ability, Sustainability, and Citizens Perception Survey. In totality, 49 indicators will be examined under 14 sub-pillars.

Classification of States

Given the distinct levels of development of cities across India and their varying population size, cities will be classified into different tiers to help bring forth better analysis. A thorough investigation is conducted, consisting of all cities with a population of greater than 1 million as per the projected population till 2019 (all metropolitan and megapolis cities), and all cities covered under the Smart Cities Mission, (regardless of their population size). Conclusively, a total of 111 cities are selected for evaluation in the Ease of Living Index. These cities will be primarily bifurcated into two categories: 1) "Million+" populated cities (with a population of more than a million); and 2) "Less than Million" (with a population of less than a million).

Data is collected from cities and publicly available government sources. The latter aids in invalidating the data provided by city administrative authorities. In case data from public sources is not available for specific data points, city geographies are mapped at the district and state levels.

Scoring Method

The data collected for the 49 indicators across the Index is obtained in various units. For instance, professionally trained teachers in schools is a percentage of the total teachers, while footpath density is a ratio of the total length of the footpath to the total length of road. Each of these indicators has a different scoring mechanism.

Percentage: Since cities vary in population sizes and economic strength, most indicators need to be weighed for comparability. For instance, the total number of households connected to sewerage network needs to be weighed against the total number of households in the city. These indicators, therefore, take the form of percentages. These do not require any scoring mechanisms but will be standardised.

Ratio: Similarly, to weigh the data for comparability, some indicators are obtained in the form of ratios. For instance, transport-related fatalities are weighed by per lakh of population. Again, these did not require scoring mechanisms but will be standardised.

Binary Marking: Some indicators take the form of yes or no questions to the cities. For instance, the indicator assessing if the city Incentivises green buildings takes the form of a question. The response to this is binary, with the "yes" answer marked as 1 and the "no" answer marked as 0.

Deviation from Mean: Some indicators have no fixed benchmarking or optimal value. For instance, it is difficult to fix the optimal expenditure on health and education by a house. In such cases, the average of all cities was taken as a benchmark, and each city was scored based on the deviation from it. For instance, in household expenditure on education as a percentage of total household expenditure, the mean expenditure proportion for all cities will be obtained. The deviation of each city from it is used to assess its scores. Any positive deviation is better in such cases.

Benchmark: In some cases, like pupil-teacher ratio at the primary level, where there is a benchmark given by The Right of Children to Free and Compulsory Education (RTE) Act at 30:1, there is a capping benchmark. Cities with a higher pupil-teacher ratio like 25:1 will be awarded the same score as the one with 30:1. However, those with a lower pupil-teacher ratio than 30:1 will be penalised depending on the deviation from the benchmark. If Service Level Benchmarks or national norms are not available, the city performance within its group will be treated as the benchmark.

Data Transformation

Some indicators are negatively correlated with the overall index. For example, public transportation availability is positively related to citizens' ease of living while the prevalence of crimes reflects the challenges faced by the citizens. Therefore, negative indicators are modified to ensure that a greater value means a higher score.

Normalisation

Normalisation is required to make the indicators comparable with each other. It is critical to normalise the data before making any data aggregation as indicators have different units. The normalisation procedure is carried out to transform all the data into dimensionless numbers. This is done using z-scores that can be placed in a normal distribution. The z-score or the standard score indicates how many standard deviations an indicator value is from the mean. It ranges from -3 standard deviation to +3 standard deviation.

Standardisation

Standardisation helps solve non-comparability by making indicators unitless as it re-scales them with a mean of zero and a standard deviation of one. It is calculated using the following formula: $Z = (X - \mu)/\sigma$, Where Z represents z-score; μ is the mean; X is the indicator value, and σ is the standard deviation.

Aggregation

The aggregation methodology of the Ease of Living Index is based on three elements, i.e. indicators, categories and pillars of the index, and the Citizen Perception Survey. The index has 70 per cent weightage in the overall Ease of Living Scores, and the Citizen Perception Survey has 30 per cent weightage.

Category Scores

Each indicator under the category has been given equal weightage. The weights for pillars have been decided based on consultation with experts and proportionality of the said indicators across pillars. The category values are calculated by summing the weighted scores using the following formula: Category = Σ (wi * indicator).

The scores have been transformed to a 0 to 100 scale. The calculation has been done using the following formula: (X- Minimum Scores) / (Maximum Score–Minimum Score), where X is the city score.
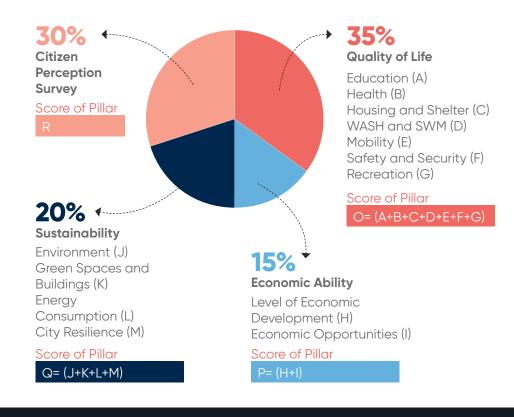
Pillar Scores

The scores of the categories under each pillar will be aggregated to arrive at the pillar score. This will be calculated using the following formula: Pillar = Σ (wi * Category Scores).

The figure below presents the weights and the complete methodology for each pillar.

30%
Citizen Perception Survey

Score of Pillar
R

35%
Quality of Life

Education (A)
Health (B)
Housing and Shelter (C)
WASH and SWM (D)
Mobility (E)
Safety and Security (F)
Recreation (G)

Score of Pillar
O= (A+B+C+D+E+F+G)

20%
Sustainability

Environment (J)
Green Spaces and Buildings (K)
Energy Consumption (L)
City Resilience (M)

Score of Pillar
Q= (J+K+L+M)

15%
Economic Ability

Level of Economic Development (H)
Economic Opportunities (I)

Score of Pillar
P= (H+I)

Ease of Living Index (100%)

Score of Pillar
0.35*O+0.15*P+0.2*Q+.3*R

Ease of Living Index Score

The framework for the Ease of Living Index thus includes the pillar scores and the scores generated from the citizens' survey. The pillar levels scores account for 70% of the Index, whereas the Citizen Perception Survey accounts for 30% of the final Index scores.

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
	EDUCATION					
QUALITY OF LIFE	Household expenditure on education	Scores	1. Average annual household expenditure on education (only students studying till higher secondary level) 2. Average annual household consumption expenditure	Household expenditure on education	Total household expenditure	Scores based on the deviation from mean expenditure on education
	Literacy Rate	Rate	1. Literacy Rate	Literacy Rate		Higher the better Utopia: Highest city value
	Pupil-Teacher Ratio (Primary Level)	Ratio	1. Total number of students enrolled in grade 1-5 (public and private) 2. Total number of teachers teaching in grade 1-5 (public and private)	Pupil-Teacher Ratio at the Primary Level across Govt and Private Schools		Lower the better Utopia: Lowest city value
	Drop Out Rate (Secondary Level)	Rate	1. Dropout rate from grade 8-10 (public and private)	Drop Out Rate at the Secondary Level across Govt and Private Schools		Lower the better Utopia: Lowest city value
	Pupil-Teacher Ratio (Upper-Primary)	Ratio	1.Total number of students enrolled in grade 6-8 (public and private) 2. Total number of teachers teaching in grade 6-8 (public and private)	Pupil-Teacher Ratio at the Upper-Primary Level across Govt and Private Schools		Lower the better Utopia: Lowest city value
	Percentage of schools with access to digital education	Percentage	1.Total number of schools with access to digital education (public and private) 2.Schools (Grade 1 to 10) in the city as of 31st March 2021 (public and private)	Number of schools (public and private) with facilities for using digital educational content (availability of necessary infrastructure	Total number of schools	Higher the better Utopia: Highest city value

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
		and connection to digital resources such as NKN)			
Percentage of Professionally Trained Teachers	Percentage	1. Total number of teachers (permanent as well as contractual) that are B.Ed or equivalent teaching in grade 1-8 (public and private) 2. Total number of teachers (permanent as well as contractual) teaching in grade 1-8 (public and private)	Number of Professionally Trained Teachers in city schools	Total Number of Teachers in city schools	Higher the better Utopia: Highest city value
Nation Achievement Survey Score	Scores	Nation Achievement Survey Scores	Nation Achievement Survey Scores		Higher the better Utopia: Highest city value

HEALTH

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Household expenditure on health	Scores	1. Average annual household expenditure on healthcare 2. Average annual household consumption expenditure	Household expenditure on health	Total household expenditure	Scores based on the deviation from mean expenditure on health
Availability of healthcare professionals	Percentage	1. Total number of registered doctors (Allopathic) in the city 2. Total number of registered doctors (AYUSH) in the city 3. Total number of registered trained nurses in the city 4.Total number of registered dentists in the city 5. Total number of registered licensed pharmacists in the city 6. Total number of multipurpose healthcare workers (male and female) 7. Total number of accredited healthcare activists in the city 8. Total population of the city	Total number of qualified healthcare professionals	Total population of the city	Higher the better Utopia: Highest city value

QUALITY OF LIFE

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
QUALITY OF LIFE	Accredited public health facilities	Percentage	1.Total number of accredited public facilities (primary, secondary and tertiary) with accreditation certificates by a standard quality assurance program (NQAS/NABH/ISO/AHPI) 2. Total number of public health facilities	Total accredited public health facilities	Total number of public health facilities	Higher the better Utopia: Highest city value
	Availability of Hospital Beds	Ratio	1. Total number of hospital beds 2. Total population of the city	Total number of hospital beds in city hospitals (public + private)	Total population of the city	25 beds per 10,000 population (Service Availability and Readiness Assessment, SARA, Reference Manual 2015, World Health Organization)
	Prevalence of diseases: a) Water borne Diseases (Jaundice, Typhoid) b) Vector borne diseases (Malaria, Dengue)	Ratio	1. Total number of reported cases of malaria 2. Total number of reported cases of dengue 3. Total population of the city	Total number of reported cases of malaria ; Dengue	Total population of the city	Lower the better Lowest city value
HOUSING AND SHELTER						
	Households with electrical connections	Percentage	1. Authorized electrical connections (only residential electrical connections) 2. Number of households in the city	Number of authorized electrical connections at household level	Number of households in the city	Higher the better Utopia: Highest city value
	Beneficiaries Under PMAY	Percentage	1. Total number of beneficiaries under the PMAY scheme 2. Total number of eligible applicants under PMAY	Number of beneficiary households under PMAY	Number of eligible households under PMAY	Higher the better Utopia: Highest city value
	Slum Population	Percentage	1. Total number of people residing in slums 2. Total population of the city	Slum population of the city	Total population of the city	Lower the better Utopia: Lowest city value

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
WASH AND SWM					
Deviation of total water supplied from service-level benchmark	Scores	1. Average water supplied	Total water supplied in lpcd		Lower the better Utopia: Lowest city value
Households with piped water supply	Percentage	1. Total number of households covered with piped water connections 2. Number of households in the city	Number of households with piped supply connections in the city	Number of households in the city	Higher the better Utopia: Highest city value
Swachh Survekshan score	Scores				Higher the better Utopia: Highest city value
Amount of waste water treated	Percentage	1. Total amount of wastewater treated 2. Total water sold by the ULB	Amount of waste water treated	Total water supplied to households	Higher the better Utopia: Highest city value
Households connected to sewerage network	Percentage	1. Total number of households connected to sewerage network 2. Number of households in the city	Number of households with sewerage facility	Number of households in the city	Higher the better Utopia: Highest city value
Coverage of Stormwater Drainage Network	Percentage	1. Total length of covered stormwater drains (pucca construction) 2. Total Road Length	Length of storm water drains	Total road length	Higher the better Utopia: Highest city value
MOBILITY					
Availability of public transport	Ratio	1. Total number of seats in public transport buses or bus equivalent run/ operated by the city 2. Population of the city	Number of public buses	Per lakh of population	>=0.6 (Service Level Benchmarks for Urban Transport, MoUD)
Transport related fatalities	Ratio		Transport related fatalities	Per lakh of population	Lower the better Utopia: Lowest city value
Road Infrastructure	Ratio	1. Total road length of the city 2. Total Area of the city	Total length of road	Total area	Deviation from Mean

QUALITY OF LIFE

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
SAFETY AND SECURITY					
Prevalance of Violent Crime	Ratio	1. Total number of murders in the city 2. Total number of attempt to murders in the city 3. Total number of culpable homicides in the city 4. Total number of riots and arson in the city 5. Total number of foeticides and infanticides in the city 6. Total number of grievous hurt cases in the city 7. Total number of dowry deaths in the city 8. Total number of kidnapping and abduction cases in the city 9. Population of the city	Total Violent Crimes: Murder, Attempt to murder, culpable homicide not amounting to murder, dowry deaths, kidnapping and abduction, dacoity and robbery, riots and arson, rape, foeticide and infanticide, grevious hurt	Per lakh of population	Lower the better Utopia: Lowest city value
Extent of crime recorded against women	Ratio	1. Total number of crimes recorded (FIRs) against women in the city 2. Population of city	Crimes against women	Per lakh of population	Lower the better Utopia: Lowest city value
Extent of crime recorded against children	Ratio	1. Total number of crimes recorded (FIRs) against children in the city 2.Population of city	Crimes against children	Per lakh of population	Lower the better Utopia: Lowest city value
Extent of crime recorded against elderly	Ratio	1. Total number of crimes recorded (FIRs) against elderly in the city 2. Population of city	Crimes against elderly	Per lakh of population	Lower the better Utopia: Lowest city value
RECREATION					
Average share of the total area of cities that is open space for public use	Percentage	1. Total open area available for public use in the city 2. Total Area of the city	Area open for public use	Total area	Higher the better Utopia: Highest city value

QUALITY OF LIFE

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
QUALITY OF LIFE	Availability of : a. Music, Dance and Drama Centre b. Community Halls c. Restaurants d. Cinema Halls (Number of Screens)	Scores	1. Total number of music, dance and drama centre/ theatres (public and private) 2. Total number of community halls (public and private) 3. Total number of restaurants (public and private) 4. Total number of Cinema halls (Number of Screens) 5. Population of the city	Number of of : a. Music, Dance and Drama Centre b. Community Halls c. Restaurants d. Total number of Cinema halls (Number of Screens)	Per lakh of population	Deviation from service level benchmark

ECONOMIC-ABILITY	**LEVEL OF ECONOMIC DEVELOPMENT**					
	Traded Clusters	Scores				Higher the better Utopia: Highest city value
	Cluster Strength	Scores	1. Cluster Strength			Higher the better Utopia: Highest city value
	ECONOMIC OPPORTUNITIES					
	Credit Availability and Accessibility	Ratio	1. Total amount of credit disbursed by banks among the population of the city 2. Population of the city	Credit disbursed	Per lakh of population	Higher the better Utopia: Highest city value
	Number of Incubation Centres / Skill Development centres	Ratio	1. Number of incubation centres & skill development centres (public and private) 2. Population of the city	Number of Inclubation Centres / Skill Development Centres	Per lakh of population	Higher the better Utopia: Highest city value

SUSTAINABILITY	**ENVIRONMENT**					
	Water Quality	Number		Average pH level		Deviation from Benchmark (6.5<pH<8.5)
	Total Tree Cover	Ratio		Total Tree Cover in sq km.	Total area of the city	Higher the better Utopia: Highest city value
	Households using clean fuel for cooking	Percentage	1. Number of households with LPG/PNG connections 2. Total Number of Households in the city	Number of Households using Clean Fuel	Total Number of Households in the city	Higher the better Utopia: Highest city value

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
SUSTAINABILITY	Air quality index a) SO2 b) NO2 c) PM10 d) PM2.5	Scores	1. Annual mean concentration of SO2 2. Annual mean concentration of NO2 3. Annual mean concentration of PM10 4. Annual mean concentration of PM2.5	AQI Scores		Benchmarking against service level benchmarks as per CPCB: a. Annual mean concentration of 50 µg/m3 OR Mean concentration over 24 hours of 80 µg/m3 b. Annual mean concentration of 40 µg/m3 OR Mean concentration over 24 hours of 80 µg/m3 c. Annual mean concentration of 60 µg/m3 OR Mean concentration over 24 hours of 100 µg/m3
	Rainwater Harvesting Structures	Ratio	1. Total number of properties with functional rainwater harvesting structures 2. Total Number of Properties in the city	Total number of properties with functional rainwater harvesting structures	Total number of properties in the city	Higher the better Utopia: Highest city value
GREEN BUILDINGS						
	Does the city incentivise green buildings? (Y/N)	Yes or No	Has the city implemented any measures that are aimed at incentivizing green buildings?	Does the city incentivise green buildings? (Y/N)		Binary Marking
	Green Buildings	Percentage	1. Total number of buildings in the city that have received green ratings from green building rating/ certification agencies 2. Total number of properties in the city	Number of green buildings in the city	Total number of properties in the city	Higher the better Utopia: Highest city value
ENERGY CONSUMPTION						
	Energy Requirement vs Energy Supplied	Difference	1. Total energy consumed 2. Estimated energy demand	Energy Requirement of the city for the year	Energy Supplied by the city during the year	Lower the better Utopia: Lowest city value

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
SUSTAINABILITY	Energy generated from renewable sources	Percentage		Energy generated from renewable sources	Total energy generation	Higher the better Utopia: Highest city value
	Number of sustained Electrical Interruptions	Number	1. Sustained (> 5 minutes), scheduled electrical interruptions			
	CITY RESILIENCE					
	Does the city have a Disaster Management Plan in place?	Yes or No	Does the city have a Disaster Management Plan (DP) in place?	Does the city have a Disaster Management Plan in place? (Y/N)		Binary Marking
	Number of deaths and directly affected persons attributed to disasters	Ratio	1. Total number of deaths due to disasters 2. Total number of persons directly affected due to disasters 3. Population of the city	Number of Deaths due to disasters	Per lakh of population	Lower the better Utopia: Lowest city value
	Is Early Warning System (EWS) in place for hazards?	Yes or No	Are Early Warning Systems (EWS) in place for hazards?	Is Early Warning System (EWS) in place for hazards?		Binary Marking

Citizen Perception Survey

The Ease of Living Index calculated using the above methodology will also be accompanied with a citizen perception survey. The aim of the survey will be to validate whether the experience of the citizens with service delivery is in consonance with the findings of the index. The citizen perception of the role of public administration and their assessment of public services is crucial because it provides valuable information to improve service delivery and governance of cities. This is because the citizens have direct experience of the efficiency, adequacy, accessibility and reliability of public services. The information that will be obtained from these surveys can provide city administration with actionable feedback on how their services are being perceived by their recipients and also an opportunity to investigate and resolve these problems. These surveys will ask citizens simple questions that can be mapped with the three pillars of the index. For instance, the education and health pillars will carry questions based on the affordability, accessibility and quality of these services. A typical question will be on a three-point Likert scale with 1 being the worst to 3 being the best. The following table shows a tentative perception survey. The questions are only representational in nature and subject to change after discussions with experts.

QUALITY OF LIFE	EDUCATION			
	Do you think education services in the city are affordable?			
	How would you rate the quality of education services in the city?	Poor	Fair	Good
	How accessible (in terms of distance) are education services in the city?	Poorly accessible	Fairly accessible	Easily accessible
	HEALTH			
	How would you rate the affordability of health services in the city?	Not affordable at all	Moderately affordable	Extremely affordable
	How would you rate the quality of health services in the city?	Poor	Fair	Good
	How accessible (in terms of distance) are health services in the city?	Poorly accessible	Fairly accessible	Easily accessible
	HOUSING AND SHELTER			
	How affordable are owned housing facilities in the city?	Not affordable at all	Moderately affordable	Extremely affordable
	How affordable are rental housing facilities in the city?	Not affordable at all	Moderately affordable	Extremely affordable
	Do you face a challenge renting a property?			
	How would you rate the availability of housing in the city?	Poor	Fair	Good
	WASH AND SWM			
	How would you rate the availability of water supply in the house?	Poor	Fair	Good
	How would you rate the quality of water supplied to your house?	Poor	Fair	Good
	How would you rate the garbage collection facility in your house?	Poor	Fair	Good
	How would you rate the cleanliness of your locality?	Poor	Fair	Good
	MOBILITY			
	How would you rate the availability of road facilities to pedestrians and cyclists?	Poor	Fair	Good
	How would you rate the adequacy of public transport in your city?	Poor	Fair	Good
	How would you rate the affordability of public transport?	Not affordable at all	Moderately affordable	Extremely affordable
	SAFETY AND SECURITY			
	How would you rate the safety standards of the city?	Poor	Fair	Good
	How would you rate the emergency response time of the police?	Poor	Fair	Good

QUALITY OF LIFE				
	How would you rate the emergency response time of the fire department?	Poor	Fair	Good
	How would you rate the emergency response time of the ambulance services?	Poor	Fair	Good
	RECREATION			
	How accessible are recreational facilities (parks, theaters and complexes) in the city?	Poorly accessible	Fairly accessible	Easily accessible

ECONOMIC-ABILITY				
	ECONOMIC OPPORTUNITIES			
	How would you rate the availability of job opportunities in the city?	Poor	Fair	Good
	How would you rate the presence of women in your workplace?	Poor	Fair	Good

SUSTAINABILITY				
	ENVIRONMENT			
	How do you rate the air pollution in the city?	Poor	Fair	Good
	How would you rate the noise pollution in the city?	Poor	Fair	Good
	How would you rate the government efforts to address air/noise pollution?	Poor	Fair	Good
	GREEN SPACES AND BUILDINGS			
	How would you rate the availability of open spaces (parks and gardens) in your locality?	Poor	Fair	Good
	ENERGY CONSUMPTION			
	How would you rate the reliability of electricity supply in the home?	Poor	Fair	Good
	How affordable is the electricity supplied to your home?	Poor	Fair	Good
	CITY RESILIENCE			
	How would you rate the city's resilience to disasters?	Poor	Fair	Good
	How would rate the city's response time to disasters?	Poor	Fair	Good

PUBLIC SERVICES				
	How would you rate the birth registration process in your municipality?	Poor	Fair	Good
	How would you rate the death registration process in your municipality?	Poor	Fair	Good
	How would you rate the process of obtaining building and construction permits?	Poor	Fair	Good

GOVERNANCE				
	How would you rate the community involvement efforts by your municipality?	Poor	Fair	Good
	How approachable is the elected official from your municipality?	Not approachable	Fairly approachable	Very approachable
	How satisfied are you with the grievance redressal facilities of the city?	Not satisfied	Moderately satisfied	Very satisfied
	How would you rate the average response time of grievances raised?	Poor	Fair	Good
	How satisfied are you with the city's efforts to disclose reports on finances and service delivery?	Not satisfied	Moderately satisfied	Very satisfied

Municipal Performance Index – MPI 2022

A vast majority of the world's population resides in urban areas. It is believed that there has been an emergence of a new geological epoch in the world, called the "urban century". Cities have thus, come to play a central role globally, especially for India, which displays one of the highest urbanization rates. As per the United Nation World Urbanization Prospects, 2018, India's urbanization level nearly doubled since 1950, reaching 34 percent in 2018. This rate is expected to double in size. Thus, India's urban expansion holds a great promise for its growth. However, it also brings persisting challenges for government bodies and policymakers.

The Municipal Performance Index assesses the sectoral performance of municipalities, serving as a guide for informed policy decisions, and helping achieve broader development outcomes and the Sustainable Development Goals across cities. The evaluation will also bring forth the outcomes achieved by municipal bodies and provide citizens with crucial insights into the functioning of local bodies and build dialogue between stakeholders. The index focuses on municipalities because they are the critical enablers in improving citizens' quality of life and bringing development to the grassroots. The Urban Local Bodies or ULBs now serve as a critical link between governance structures in cities since the 74th Amendment Act, 1992, has designated municipal bodies as the third-tier governance in cities. Therefore, it is significant to understand municipal bodies' functioning based on their level of power, role, and responsibilities.

Municipal Performance Index

Services
- Education
- Health
- Water and Wastewater
- SWM and Sanitation
- Registrations and Permits
- Infrastructure

Finance
- Revenue Management
- Expenditure Management
- Fiscal Responsibility
- Fiscal Decentralisation

Planning
- Plan Preparation
- Plan Implementation
- Plan Enforcement

Technology
- Digital Governance
- Digital Access
- Digital Literacy

Governance
- Transparency and Accountability
- Human Resource
- Participation
- Effectiveness

Pillar 1:

Services

One of the fundamental responsibilities of government authorities is to provide access to services to the citizens, notwithstanding the fast pace of urbanisation and limited resources and amenities. Developing countries particularly encounter this problem on a large scale, with the impending need to achieve developmental goals and better quality of life. Inadequacy in infrastructural capacity, provisions for healthcare, and schooling can severely impact cities' development outcomes. However, some services such as Education and Health are not under the mandate of all municipalities. Identifying the roadblocks that obstruct quality service delivery to people is paramount. The vertical on Services attempts to assess municipalities' service delivery across six sectors of Education, Health, Water & Waste Water, SWM & Sanitation, Registration & Permits, and Infrastructure.

Pillar 2:

Finance

Finance is a crucial measure of the political and administrative autonomy of governance bodies. In fact, one of the major purposes of decentralizing local governance was to empower municipal bodies both administratively, as well as financially. Municipal bodies need to be fiscally healthy in order to effectively administer and ensure service delivery in cities. The performance of municipalities is thus crucially dependent on their overall financial health, and ability to attract resources that can boost urban infrastructure and planning initiatives while ensuring a standard quality of life for its residents.

Pillar 3:

Planning

The rapid pace of urbanisation has been concentrated in Indian cities, wherein it is expected that India's urban population will grow by 416 million by 20508. With Sustainable development goal 11, which seeks to make cities and human settlements inclusive, safe, resilient and sustainable, efforts must be made to guide urbanisation in a planned and sustainable manner, addressing the rising challenges of climate change and poverty enabling economic growth. It thus becomes a crucial device in guiding this urbanisation, with urban local bodies becoming catalysts in enabling planning policies and practices at the local level. Planning of urban settlements has major implications on the economic development, society, environment and welfare of communities residing within them.

Pillar 4:

Technology

Technological advancement has become one of the most lucrative aspects of socio-economic progress. Successful development outcomes cannot take place without facilitating reforms that enable technological progress. Initiatives that sanction internet connectivity, propagate digital literacy and deploy e-Governance are therefore crucial. The vertical for Technology evaluates municipalities based on three verticals of Digital Governance, Digital Access, and Digital Literacy. While India has made commendable strides in digitalising the economy, there are significant constraints within the system.

Pillar 5:

Governance

In determining the functions and efficacy of urban governance, the role of local governance structure and administration cannot be overlooked. Challenges surfacing due to the rapid expansion of Indian cities can only be addressed by urban governance that proves to be more efficient and incorporates inclusive and sustainable practices. As the role of local Municipalities becomes increasingly essential, it also becomes more and more challenging. It is, therefore, necessary to measure governance practices across municipalities in India. The vertical consists of four distinct verticals of Transparency & Accountability, Human Resources, Participation, and Effectiveness.

METHODOLOGY (MPI)

The set of 100 indicators that form the Municipal Performance Index is a combination of metrics that have varied nature and specifications. So, a series of steps have to be followed to standardize the data for comparability across the Index. These have been outlined in this section.

City Classification

Since cities across India show wide variations in the level of development and population sizes, it deemed fit to bifurcate them into different tiers for better comparison. The cities will be classified based on population in the following manner.

Classification	Population Range (As per Census 2011)
Small Towns	Population less than 50,000
Medium Towns	Population ≥ 50,000 < 5 lakh
Large Towns	Population ≥ 5 lakh < 1 million
Metropolitan Cities	Population ≥ 1 million < 5 million
Megapolis	Population ≥ 5 million

The index will include an analysis of municipalities from all metropolitan and megapolis cities, i.e. all cities with a population greater than 1 million as per 2011 Census, including all the cities covered under the Smart Cities Mission irrespective of their population size. Any learnings gathered from the process will be used to improve upon the existing framework. The study will be later expanded to more cities in upcoming editions.

Scoring Methods

The 100 indicators selected for the analysis vary in terms of their units of value and differ in their nature and significance. The data points are standardized for comparability across the index. For instance, vacancy of teachers in municipal schools will be a percentage of the actual staff strength to total sanctioned staff strength. At the same time, road density will be a ratio of total road length within the municipality to the total municipal area. Each indicator will differ in its scoring mechanism (percentage, ratio, binary marking, and deviation from mean).

Percentage: Since cities vary in population sizes and economic strength, most indicators need to be weighed for comparability. For instance, Land under encroachment needs to be weighed against the total municipality area. Indicators like these take the form of percentages. These do not require any scoring mechanisms but will be standardised.

Ratio: Similarly, to weigh the data for comparability some indicators will be obtained in the form of ratios. For instance, the number of digital literacy centres created in a municipality is to be weighed by per lakh population. Again, these do not require scoring mechanisms but do need to be standardized.

Binary Marking: Some indicators take the form of yes or no questions to the municipalities. For instance, the indicator assessing if the audited accounts of the municipality have been published in the last three years takes a similar form. For such a question, each "yes" answer will result in a marking of 1 and each "no" answer will result in a marking of 0. If a municipality answers "yes" for two years and "no" for the third, it will be awarded a total of 2 marks out of three. Similar scoring will be done across municipalities.

Deviation from Mean: Some indicators have no fixed benchmarking or optimal value. For instance, it is difficult to fix the optimal expenditure on health and education by a municipality. In such cases, the average of all municipalities will be taken as a benchmark and each municipality will be scored based on the deviation from it. For instance, in the case of expenditure on education as a percentage of the total municipality budget, the mean expenditure proportion for all municipalities will be obtained and the deviation of each municipality from it will be used to assess its scores. Any positive deviation will be considered better in such cases.

In some cases, like pupil-teacher ratio, where there is benchmark given by The Right of Children to Free and Compulsory Education (RTE) Act at 30:1, there will be capping at the benchmark. That is, municipalities with higher pupil teacher ratio like 25:1 will be awarded the same score as the one with 30:1. However, those with lower pupil-teacher ratio than 30:1 will be penalised depending on the deviation from the benchmark.

Data Transformation

The indicator set includes some indicators that are positively correlated with the phenomenon that we are trying to capture through the index while some other indicators that are negatively correlated with the overall index. For example, total households covered by piped water connections is positively related with the performance of municipalities while the average number of days in which birth and death certificates are issues reflects negatively about the functioning of municipalities. Therefore, the step is taken to modify all the indicators in the set in a way that greater value means a higher score.

Normalization

The process is required to make the indicators comparable with each other. It is critical to normalize the data before making any data aggregation as indicators have different units. For example, coverage of sewerage network is captured as a percentage of the total road length while the pupil teacher ratio is a proportion. These indicators are not comparable by any standards. The normalization procedure is carried out to transform all the data into dimensionless numbers. This is done using z-scores that can be placed in a normal distribution. The z-score or the standard score indicates how many standard deviations an indicator value is from the mean. It ranges from -3 standard deviation to +3 standard deviation.
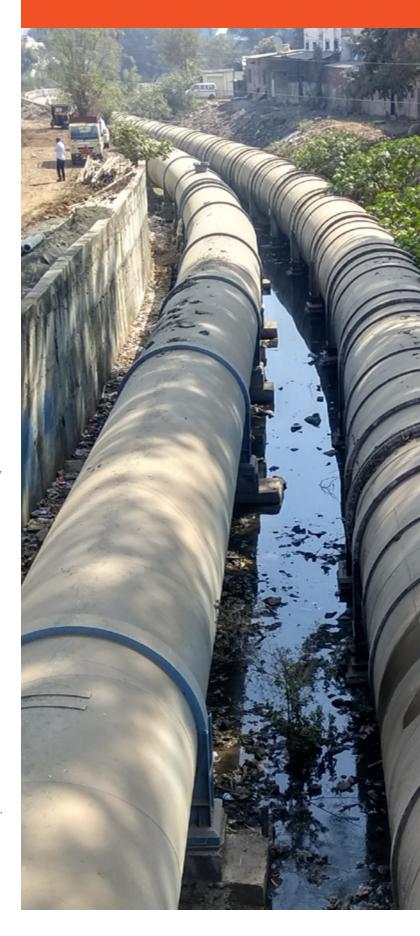
Standardization

It helps in solving the problem of non-comparability by making indicators unitless as it rescales them with a mean of zero and standard deviation of one. It is calculated using the following formula: $Z = (X - \mu)/\sigma$ where Z-score; X Indicator value; μ Mean ; σ Standard Deviation.
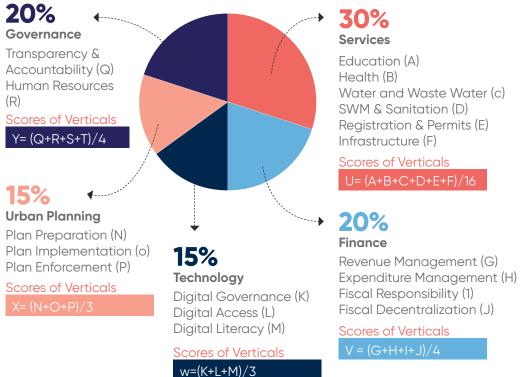
Aggregation

The aggregation methodology of the Municipal Performance Index is based on three elements i.e. indicators, sectors and verticals. Each indicator under the sectors will be given equal weightage. The sectors values are calculated by summing the weighted scores using the following formula: Sectors = Σ (w_i * indicator).

These scores will be transformed to a 0 to 100 scale. The calculation will be done using the following formula: (X- Minimum Scores) / (Maximum Score- Minimum Score), where X is the City Score.

The sector value is represented in the figure below

20%
Governance

Transparency & Accountability (Q)
Human Resources (R)

Scores of Verticals

$Y = (Q+R+S+T)/4$

15%
Urban Planning

Plan Preparation (N)
Plan Implementation (o)
Plan Enforcement (P)

Scores of Verticals

$X = (N+O+P)/3$

15%
Technology

Digital Governance (K)
Digital Access (L)
Digital Literacy (M)

Scores of Verticals

$w = (K+L+M)/3$

30%
Services

Education (A)
Health (B)
Water and Waste Water (c)
SWM & Sanitation (D)
Registration & Permits (E)
Infrastructure (F)

Scores of Verticals

$U = (A+B+C+D+E+F)/16$

20%
Finance

Revenue Management (G)
Expenditure Management (H)
Fiscal Responsibility (1)
Fiscal Decentralization (J)

Scores of Verticals

$V = (G+H+I+J)/4$

Vertical Scores

The scores of the sectors under each vertical will be aggregated to arrive at the vertical score. This will be calculated using the following formula: Vertical = Σ (wi * Category Scores)

Municipal Index Scores

The municipal index score is a weighted average of the scores of all the verticals. This will be calculated using the following formula: Municipal Index Scores = O.30*U + 0.20*V + 0.15*W + 0.15*X + 0.20*Y.

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
EDUCATION					
Vacancy of Teachers in municipal schools	Percentage	1. Staff strength of teachers (actual) in municipal schools for grade 1-10 2. Staff strength of teachers (sanctioned) in municipal schools for grade 1-10	Actual staff strength of teachers in municipal schools	Total sanctioned staff strength of teachers in municipal schools	Lower the better Utopia: Lowest city value
Pupil-Teacher Ratio	Ratio	1. Student enrollment in municipal schools for grade 1-5 2. Student enrollment in municipal schools for grade 6-10 3. Staff strength of teachers (actual) in municipal schools for grade 1-10	Total number of students in municipal School	Total number of teachers (on roll) in municipal School	Relative benchmarking Utopia: 30:1
Deviation of expenditure on education from average	Scores	1. Expenditure on education by the ULB 2. 2. Total budgeted revenue of the ULB	Expenditure on education by the ULB	Total budget of the ULB	Deviation from Mean
HEALTH					
Number of municipal primary healthcare institutions	Ratio	1. Number of municipal primary healthcare institutions managed or run by ULB 2. Population	Number of municipal primary healthcare institutions	per lakh of population	Higher the better Utopia: Highest city value
Vacancy of doctors, lab assistants and nursing staff in municipal hospitals	Percentage	1. Staff strength of doctors, nurses and lab assistants (actual) in municipal hospitals 2. Staff strength of doctors, nurses and lab assistants (sanctioned) in municipal hospitals	Actual staff strength of doctors, nurses and lab assistants in municipal hospitals	Total sanctioned staff strength doctors, nurses and lab assistants in municipal hospitals	Lower the better Utopia: Lowest city value
Deviation of expenditure on healthcare from average	Scores	1. Total expenditure on healthcare by the ULB 2. Total budgeted revenue of the ULB	Expenditure on healthcare by the ULB	Total budget of the ULB	Scores based on the deviation from mean expenditure on health
Number of community healthcare workers	Ratio		Number of community healthcare workers	per lakh of population	Higher the better Utopia: Highest city value
WATER AND WASTEWATER					
Total Household covered by piped connection	Percentage	1. Total number of households covered with piped water connections 2. Total number of Households in ULB	Total Household covered by piped connection	Total number of Households in ULB	Higher the better Utopia: Highest city value
Deviation of total water supplied from service level benchmark	Number (lpcd)	1. Average water supplied	Total water supplied in lpcd		Deviation from Mean

SERVICES

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Number of households with metered water supply connection	Percentage	1. Total number of households with metered water supply connections 2. Total number of Households in ULB	Total number of households with metered water supply	Total number of Households in ULB	Higher the better Utopia: Highest city value
Amount of wastewater treated	Percentage	1. Total amount of wastewater treated 2. Total water sold by the ULB	Amount of wastewater treated	Total water supplied	Higher the better Utopia: Highest city value
Coverage of storm water drainage network	Percentage	1. Total length of covered stormwater drains (pucca construction) 2. Total road length maintained by ULB	Length of storm water drains	Total road length	Higher the better Utopia: Highest city value
Coverage of sewerage network	Percentage	1. Total length of sewerage network in the ULB 2.Total road length maintained by ULB	Length of sewerage network	Total road length	Higher the better Utopia: Highest city value

SWM AND SANITATION

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Garbage Collection: Percentage Coverage of area (wards) under door-to-door collection system	Percentage	1. Garbage Collection (Swachh Survekshan)	To be taken from Swachh Survekshan scores		Higher the better Utopia: Highest city value
Street Cleanliness: Percentage of commercial areas undertaking daily sweeping and cleaning	Percentage	1. Street Cleanliness (Swachh Survekshan)			Higher the better Utopia: Highest city value
Waste Disposal: Percentage of collected waste transported to processing unit for disposal within the same day	Percentage	1. Percentage of Households/Commercial Establishments connected to a Closed Sewerage System (Swachh Survekshan)			Higher the better Utopia: Highest city value
Waste Treatment: Percentage of wet waste treated either by decentralized or centralized planning?	Percentage	1. Waste Treatment (Swachh Survekshan)			Higher the better Utopia: Highest city value
Total Sewage treatment capacity of the ULB	Percentage	1. Total installed sewage treatment capacity of the ULB 2. Total sewage generated in the ULB	Total Sewage treatment capacity of the ULB	Total sewage generated in the ULB annually	Higher the better Utopia: Highest city value
Total number of households connected to sewerage network	Percentage	1. Total number of households connected to sewerage network 2. Total number of Households in ULB	Total number of households connected to sewerage network	Total number of Households in ULB	Higher the better Utopia: Highest city value

SERVICES

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
REGISTRATIONS AND PERMITS					
Registration Efficiency: a. Birth certificates b. Death certificates	Scores	"1. Average number of days taken by the ULB to issue a birth certificate 2. Average number of days taken by the ULB to issue a death certificate"	Average number of days in which (a) birth and (b) death certificates are issued (application to issue date)		Lower the better Utopia: Lowest city value
Online Registration: a. Birth certificates b. Death certificates	Percentage	1. Total number of birth registrations completed online 2. Total number of birth registrations completed 3. Total number of death registrations completed online 4. Total number of death registrations completed	Number of (a) birth registrations and (b) death registrations completed online	Total number of birth registrations	Higher the better Utopia: Highest city value
Ease of obtaining permits	Scores	1. Average number of days taken by the ULB to issue building and construction permits	Average number of days in which building, and construction permits are issued (application to issue date)		Lower the better Utopia: Lowest city value
Online issuance of building and construction permit registrations	Percentage	1. Total number of building and construction permits issued online 2. Total number of building and construction permits issued	Number of building and construction permits completed online	Total number of building and construction permits issued	Higher the better Utopia: Highest city value
Number of licenses awarded by the municipality	Number	1. Total number of types of licenses provided by the ULB	Number of licenses awarded by the municipality		Higher the better Utopia: Highest city value
Online Presence of Licenses: Number of licenses with online application facility as a proportion of total licenses awarded by municipality	Scores	"1. Total number of types of licenses with online application facility 2. Total number of types of licenses provided by the ULB"	Number of licenses with online application facility	Total licenses awarded by municipality	Higher the better Utopia: Highest city value
INFRASTRUCTURE					
ULB roads provided with street lights	Percentage	1. Total road length of ULB provided with street lights 2. Total road length maintained by ULB	Road length of ULB provided with street lights	Total road length under ULB operation and maintenance	Higher the better Utopia: Highest city value
ULB street lighting with LED	Percentage	1. Total number of energy efficient street lights in the ULB 2. Total number of street light poles in the ULB	Total no. of street light poles with LED under ULB	Total no. of street light poles under ULB	Higher the better Utopia: Highest city value

SERVICES

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Deviation of expenditure on road maintenance	Scores	1. Total expenditure on road maintenance			Scores based on the deviation from mean expenditure on road maintenance
Road Density	Ratio	1. Total road length maintained by ULB 2. Total area of the city under the jurisdiction of the ULB	Total length of the road	Total municipal area	Higher the better Utopia: Highest city value
Footpath density	Ratio	1. Total footpath length of the ULB 2. Total road length maintained by ULB	Total length of footpaths	Total length of roads	Higher the better Utopia: Highest city value
Community services a. Community Centre b. Crematorium c. Parks d. Music, dance and drama centre e. Recreational Club f. Care centre for physically /mentally challenged g. Burial grounds/ Cremation ground h. Fitness centres/ GYM i. Working women – men hostel j. Night Shelter k. Old Age Home l. Orphanage/ Children's Centre	Scores	1. Total number of music, dance and drama centre/ theatres (public and private) 2. Total number of community halls (public and private) 3. Total number of care centers for physically/ mentally challenged operated by ULB 4. Total number of night shelters (permanent) operated by ULB 5. Total number of hostels for working women/ men operated by the ULB 6. Total number of crematoriums operated by ULB 7. Total number of burial grounds/ cremation grounds operated by ULB 8. Total number of fitness centres/ gyms operated by the ULB 9. Total number of old age homes operated by ULB 10. Total number of orphanages/ children's centers operated by the ULB	Number of Community centre	per lakh of population	SLB: a. Community Centre: URDPFI Guidelines b. Crematorium: URDPFI Guidelines c. Parks: URDPFI Guidelines d. Music, dance and drama centre: 1 per lakh population e. Recreational Club: 1 per lakh population f. Care centre for physically /mentally challenged: 1 per 10 lakh population g. Burial grounds/ Cremation ground: 1 per 5 lakh population h. Fitness centres/ GYM: 1 per 5 lakh population i. Working women – men hostel: 1 per lakh 10 population j. Night Shelter: 1 per lakh 10 population k. Old Age Home: 1 per lakh 5 population l. Orphanage/ Children's Centre: 1 per lakh 10 population Data will be capped at these benchmarks and any deviation below it will be penalised.

SERVICES

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
REVENUE MANAGEMENT					
Own Revenue Vs Total revenue (three-year average)	Percentage	1. Total own revenue generated by the ULB 2. Total revenue generated by the ULB	Own Revenue of your ULB (in Rupees)	Total revenue of your ULB including grants (in Rupees)	Higher the better Utopia: Highest city value
Tax Revenue Vs Total Own Revenue (three-year average)	Percentage	1. Total tax revenue generated by the ULB 2. Total tax revenue generated by the ULB	Tax Revenue of your ULB (in Rupees)	Total Own Revenue of your ULB (in Rupees)	Lower the better Utopia: Lowest city value
Tax coverage Efficiency	Percentage	1. Number of properties in the city covered under the tax net 2. Total number of properties within the ULB	Number of properties covered under the tax net	Total properties within the municipality	Higher the better Utopia: Highest city value
Properties mapped on GIS	Percentage	1. Total number of properties within the ULB mapped on GIS 2.Total number of properties within the ULB	Total properties mapped on GIS	Total properties	Higher the better Utopia: Highest city value
Tax Collection Efficiency (three-year average)	Percentage	1. Total property tax collected by the ULB 2. Total property tax billed by the ULB	Total amount of property tax collected (out of billed for previous financial year) by ULB (in Rupees)	Total amount of property tax billed by ULB in the previous financial year (in Rupees)	Higher the better Utopia: Highest city value
Review of property Tax	Yes Or No	1. Is the ULB mandated to review property tax rates from time to time as per the applicable municipal act?	Is the municipality mandated to review property tax rates from time to time as per the applicable Municipal Act?		Binary Marking
Last Revison of Taxes	Point Marking	Year of last revision of property tax rates as per the municipal act	If yes, when was the last revision due as per the Act? Has it been carried out? And when?		Binary Marking
Accrual Based Double entry accounting system	Yes Or No	Is accrual based double entry accounting system implemented by ULB?	Whether Accrual Based Double entry accounting system implemented in your ULB?		Binary Marking
Alternate sources of financing raised by ULB (PPP, Municipality bonds, CSR, Land Monetisation, Open Market Borrowings, Value Capture Finance, External Financing)	Percentage	Total earnings/borrowings raised by the ULB from alternate sources of financing.	Earnings from alternate sources of financing	Total earnings	Higher the better Utopia: Highest city value

FINANCE

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Budget Efficiency for the last three years	Difference	1. Total actual revenue (revised estimates) of the ULB 2. Total budgeted revenue of the ULB	Actual Revenue (Revised Estimates)	Budgeted Revenue	Higher the better Utopia: Highest city value
EXPENDITURE MANAGEMENT					
Central Grants Expenditure Efficiency (three-year average)	Percentage	1. Total value of central grants that were spent by the ULB 2. Total value of central grants that were received by the ULB	Amount of central grants spent	Amount of central grants received	Higher the better Utopia: Highest city value
State Grants Expenditure Efficiency (three-year average)	Percentage	1. Total value of state grants that were spent by the ULB 2. Total value of state grants that were received by the ULB	Amount of state grants spent	Amount of state grants received	Higher the better Utopia: Highest city value
Capital Expenditure Vs Total Expenditure (three-year average)	Percentage	1. Total value of the capital expenditure by the ULB 2. Total value of the total expenditure by the ULB	Total Capital Expenditure of your ULB (in Rupees)	Total Expenditure of ULB	Higher the better Utopia: Highest city value
Establishment Expenditure Vs Total Expenditure (three-year average)	Percentage	1. Total value of the establishment expenditure by the ULB 2.Total value of the total expenditure by the ULB	Total Establishment Expenditure of your ULB (in Rupees)	Total Expenditure of ULB	Deviation from Mean
Salary Expenses Vs Total Own Revenue (three-year average)	Difference	1. Total salary expenses of the ULB 2. Total own revenue generated by the ULB	Total Own Revenue of your ULB (in Rupees)	Salary Expense of your ULB (in Rupees)	Higher the better Utopia: Highest city value
Preparation of Budget Estimate	Yes Or No	1. Budget estimate prepared by the ULB	Whether Budget Estimate are being prepared in the last three years?		Binary Marking
Capital Expenditure per capita	Ratio	1. Capital expenditure per capita	Total Capital Expenditure of your ULB (in Rupees)	Total population of city	Higher the better Utopia: Highest city value
Establishment expenditure per capita	Ratio	1. Establishment expenditure per capita	Total Establishment Expenditure of your ULB (in Rupees)	Total population of city	Deviation from Mean
Budget Deficit / Surplus (three-year)	Percentage	1. Percentage of budget deficit/surplus of the ULB	Percentage of Budget Deficit / Surplus for the last three years		Lower the better Utopia: Lowest city value
FISCAL RESPONSIBILITY					
Participatory Budgeting	Percentage	1. Proportion of the ULB budget allocated through participatory budgeting	Percentage of ULB budget allocated through participatory budgeting (direct citizen inputs)		Higher the better Utopia: Highest city value

FINANCE

	Indicators	Unit	Data Points	Numerator	Denominator	Scoring
FINANCE	Budget Variance	Difference	1. Amount of total actual expenditure (revised estimates) 2. Amount of budgeted expenditure of the ULB	Actual Expenditure	Budgeted Expenditure	Higher the better Utopia: Highest city value
	External Audit (last three years)	Yes Or No	1. Are externally audited financial statements of the ULB available?	Existence of externally audited financial statements (last three years)		"Binary marking Utopia: 3"
	Data Sharing	Yes Or No	1. Is the financial and operational statistics of the ULB for the last financial year made available in public domain?	Availability of latest data on financial and operational parameters		Binary Marking
	Internal Audit	Yes Or No	1. Are any internal audits or controls and risk conducted last fiscal year (and presence of such documents)?	Whether Internal Audits or controls and risk conducted last fiscal or not (and presence of such docs)		Binary marking Utopia: 2 (1 for each question)
	Publication of Audited Accounts	Yes Or No	1. Were the audited accounts (internal and external) published by the ULB	Whether audited accounts (internal and external) have been published for the last three years?		Binary marking Utopia: 3
	FISCAL DECENTRALISATION					
	Tax Collection Powers	Yes Or No	Does the ULB have power to set/fix and collect the following taxes: 1. Property tax 2. Local body tax 3. Professional tax 4. Advertisement rights 5. Entertainment tax	Does the municipality have power to set and collect the following revenue sources - property tax, local body tax, professional tax, advertisement rights, entertainment tax and any other? (Y/N)		Higher the better (Scores will depend on the number of taxes that municipality can collect) Utopia: Highest city value
	Borrowing Powers	Yes Or No	1. Does the ULB have powers to borrow and invest funds without state approval (including under debt-limitation policies)?	Does it have powers to borrow and invest funds without State approval (including under debt-limitation policies)?		Binary marking
	Credit Rating	Scores	1. Credit Rating of ULB	What is the credit rating of your municipality?		Point marking based on Credit Rating

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
DIGITAL GOVERNANCE					
Does the ULB have the following e-governance initiatives: a. Web Portal (Y/N) b. Online Public Service Delivery (Services provided online as a proportion of total Services provided) c. Online Public Service Delivery on Mobile (Services provided via mobile as a proportion of total Services provided) d. Online Grievance Redressal (number of grievances received online as a proportion of total grievances received) e. Online Grievance Redressal on Mobile (Services provided via mobile as a proportion of total Services provided)	Point Marking	1. Does the ULB have a web portal? 2. Does the ULB have online public service delivery? 3. Does the ULB have online public service delivery on mobile? 4.Does the ULB have online grievance redressal? 5. Does the ULB have online grievance redressal on mobile?			Higher the better Utopia: 5
How many of your services are being managed through a command and control system? E.g. SCADA, ICCC etc.	Point Marking	How many of the services are being managed through a command and control system out of: 1. Water, 2. Wastewater, 3. Traffic management, 4. Streetlights, 5. Environmental pollution, 6. Flood monitoring, 7. Grievance redressal, 8. SWM, 9. Revenue collection, 10. MIS	How many of your services are being managed through a command and control system out of water, wastewater, traffic management, streetlights, environmental pollution, flood monitoring, grievance redressal, SWM, revenue collection, MIS?		Higher the better Utopia: Highest value
Number of tenders finalized through e-tendering in the last financial year	Percentage	1. Total number of tenders awarded through e-tendering 2. Total number of tenders awarded by the ULB	Total number of tenders finalized through e-tendering in the last financial year	Total no of tenders finalized in last financial year	Higher the better Utopia: Highest value
Value of tenders finalized through e-tendering in the last financial year	Percentage	1. Total value of tenders awarded through e-tendering 2. Total value of tenders awarded by the ULB	Total value of tenders finalized through e-tendering in the last financial year	Total value of tenders finalized in last financial year	Higher the better Utopia: Highest value
Does the city have an open data policy?	Yes Or No	1. Does the city have an open data policy?	Does the city have an open data policy?		Binary Marking

TECHNOLOGY

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Has the city appointed a city data officer (CDO)?	Yes Or No	1. Has the city appointed a city data officer (CDO)?	Has the city appointed a city data officer (CDO)?		Binary Marking
Has the city formed a city data alliance?	Yes Or No	1. Has the city formed a city data alliance?	Has the city formed a city data alliance?		Binary Marking
Does the city have presence on an open data portal?	Yes Or No	1. Does the city have presence on an open data portal?	Does the city have presence on an open data portal?		Binary Marking
DIGITAL ACCESS					
Internet Access	Percentage	1. Total number of Wi-Fi hotspots provided by ULB 2. Total municipal area	Number of Wi-Fi hotspots provided by municipal corporation or smart city company	Total municipal area	Higher the better Utopia: Highest city value
Average number of Wi-Fi users per hotspot provided by municipal corporation or smart city company	Percentage	1. Total number of unique Wi-Fi sessions provided by ULB 2. Total population	Number of Wi-Fi users per hotspot provided by municipal corporation or smart city company (measured by no. of registrations)	Total population	Higher the better Utopia: Highest city value
DIGITAL LITERACY					
Does the municipality run digital literacy programmes?	Yes Or No	1. Does the ULB run digital literacy programmes?	Does the municipality run digital literacy programmes?		Binary Marking
Number of digital literacy centres created	Ratio	1. Total number of Digital Literacy Centers 2. Population	Number of digital literacy centres created	per lakh of population	Higher the better Utopia: Highest city value
Number of people who have completed digital literacy courses provided by municipality or smart city company as a percentage of total population in slums	Percentage	1. Number of people who have completed digital literacy courses provided by ULB or smart city company from? 2. Number of persons living in slums	Number of people who have completed digital literacy courses provided by municipality or smart city company	Total population in slums	Higher the better Utopia: Highest city value

TECHNOLOGY (vertical label)

PLAN PREPERATION					
Does the city have an updated development plan? (Updated in the last ten years)	Yes Or No	1. Does the city have a development plan/master plan which was updated in the last 10 years?	Master plan/City Development Plan made or not		Binary Marking
Is the current development plan of the city built on a GIS platform?	Yes Or No	1. Is the current development plan of the city built on a Geographic Information System (GIS)?			Binary Marking

PLANNING (vertical label)

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Is the development plan preparation and implementation done by qualified town planners?	Yes Or No	1. Is the land-use plan preparation done by qualified town planners?			Binary Marking
Does the MC follow the practice of local area planning?	Point Marking	1. Does the ULB follow the practice of local area planning?	Has the town planner implemented plan through town planning schemes (TPS schemes)? If yes, then how many were implemented over the last three years?		Point Marking Utopia: Highest City Value
PLAN IMPLEMENTATION					
Land-Titling Law	Yes Or No	1. Does the ULB have a land titling law?	Does the municipality have a land titling law?		Binary Marking
Land-Pooling Law	Yes Or No	1. Does the ULB have a land pooling law?	Does the municipality have a land pooling law?		Binary Marking
Single-Window Clearance	Yes Or No	1. Is there a single-window clearance in place for building and construction projects (that take affirmative action like affordable housing)?	Is there a single-window clearance in place for building and construction projects (that take affirmative action like affordable housing)?		Binary Marking
Does the city incentivise green buildings?	Yes Or No	1. Has the ULB implemented any measures that are aimed at incentivising green buildings?			Binary Marking
PLAN ENFORCEMENT					
Plan Violations	Ratio	1. Total number of building plan violations in the ULB 2. Total number of building plans sanctioned by the ULB	Plan violations	Total plans sanctioned	Lower the better Utopia: Lowest city value
Penalty Efficiency	Ratio	1. Total number of penalties levied on plan violations by the ULB	Penalties levied on plan violations	Violations detected in the last year	Higher the better Utopia: Highest city value
Land under encroachment	Percentage	1. Total area of ULB land under encroachment 2. Total area of the city under the jurisdiction of the ULB	ULB land under encroachment (Acres)	Total municipality area	Lower the better Utopia: Lowest city value

PLANNING

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
TRANSPARENCY AND ACCOUNTABILITY					
Disclosure of Assets	Yes Or No		Are the elected and government officials mandated to disclose their income and assets?		Binary Marking
Budget Publication	Yes Or No	1. Has the ULB published its budgets and accounts?	Has the municipality published its budgets and accounts in the last three years?		Point Marking Utopia: 3 (1 for each year)
Publication of Performance Reports	Yes Or No	1. Are service-level performance reports regularly published in public domain by the ULB every year?	Are service-level performance reports regularly published publicly by the municipality every year?		Binary Marking
Published of environmental status report	Yes Or No	1. Has the ULB published an environmental status report with action plans for the following periods?	Has the municipality published an environmental status report with action plans for the last three years		Point Marking Utopia: 3 (1 for each year)
Number of municipal employees charged under corruption cases in the last year	Percentage	1. Number of employees with registered corruption charges 2. Total staff on roll with the ULB (permanent)	Number of municipal employees charged under corruption cases in the last year	Total municipal employees	Lower the better Utopia: Lowest city value
HUMAN RESOURCE					
Adequacy of ULB staff	Percentage	1. Total staff on roll with the ULB (permanent) 2. Total staff sanctioned in the ULB (permanent)	Actual staff strength	Sanctioned staff strength	Higher the better Utopia: 100 percent
Gender Equality	Scores	1. Number of women working in the ULB (permanent) 2. Percentage of elected women officials in the ULB	Deviation of the percentage of women in municipality workforce from the norm		Deviation from Mean
Leadership Stability	Scores	1. Total number of commissioners who worked for ULB in last five years	Number of Commissioners in the last five years		Lower the better Utopia: Lowest city value
Average tenure of mayor in the last five years	Scores	1. Total number of mayors worked for ULB in last five years	Mayor tenures over the last five years		Higher the better Utopia: Highest city value
Is the mayor directly elected?	Yes Or No	1. Is the mayor directly elected?			Binary Marking
PARTICIPATION					
Voter Turnout: Voter turnout in municipal elections	Percentage	1. Number of citizens who voted during the last municipal election 2.Number of citizens that were eligible to vote during the last municipal election	Number of citizens who voted during the last municipal election	Number of citizens that were eligible to vote during the last municipal election	Higher the better Utopia: Highest city value

GOVERNANCE

Indicators	Unit	Data Points	Numerator	Denominator	Scoring
Local Representation	Ratio		Number of local officials elected	per lakh of population	Higher the better Utopia: Highest city value
Community Involvement	Ratio	1. Total number of ward committees in the ULB 2. Total number of administrative wards of the ULB	Number of Municipal Ward Committees formed	Total number of wards	Higher the better Utopia: Highest city value
EFFECTIVENESS					
Citizen Charter	Yes Or No	1. Does the ULB have a citizen charter?	Whether ULB has a Citizen Charter?		Binary Marking
Establishment Expenditure vs Total Human Resources	Value	2. Total number of staff in ULB available with the authority (permanent and contractual)	Total establishment expenditure of ULB in Rupees in last financial Year	Total human resources (including contractual)	Scores based on the deviation from mean city value
Capacity building	Percentage	1. Total number of staff in ULB that underwent training 2. Total number of staff in ULB available with the authority (permanent and contractual)	Total staff trained during the year	Total staff	Higher the better Utopia: Highest city value
Presence of Ombudsman	Yes Or No	1. Is an ombudsman present for service level related queries and grievance redressal?	Presence of an ombudsman for service level related queries and grievance redressal		Binary Marking

GOVERNANCE

ClimateSmart Cities Assessment Framework 3.0

The Smart Cities Mission under the Ministry of Housing and Urban Affairs (MoHUA) launched "ClimateSmart Cities Assessment Framework" in February 2019. This framework was first-of-its-kind city assessment framework on climate relevant parameters. The "ClimateSmart Cities Assessment Framework" serves as a tool for cities to assess their present situation and provides a roadmap for cities to adopt and implement relevant climate actions. In addition, the dissemination of best practices adopted by Indian cities has supported in setting contextual standards in green, sustainable and resilient urban development.

The objective of this framework is to provide a roadmap for Indian cities in combating climate change. The ClimateSmart Cities Assessment Framework 3.0 is broadly categorised into 5 themes with 28 indicators. The framework provides assessment of both, mitigation and adaptation measures. The indicators are progressive in nature to support cities in assessing where they stand and encourage them to adopt appropriate actions enabling them to improve their score in the future and consequently build climate resilience. Each of these indicators have a maximum of 5 levels representing different stage of development each with a corresponding weightage.

The assessment framework 3.0 attempts to address both the mitigation and adaptation measures and the weightage for each theme has also been given in accordance with its relation to mitigation or adaptation potential. In terms of mitigation, thematic areas such as transportation, waste, energy consumption and green cover are most important while for adaptation, sectors such as water, biodiversity, urban planning and land-use play an important role.

In the first phase, the assessment had established a baseline for 96 cities that participated. In 2020 in the second phase, a total of 126
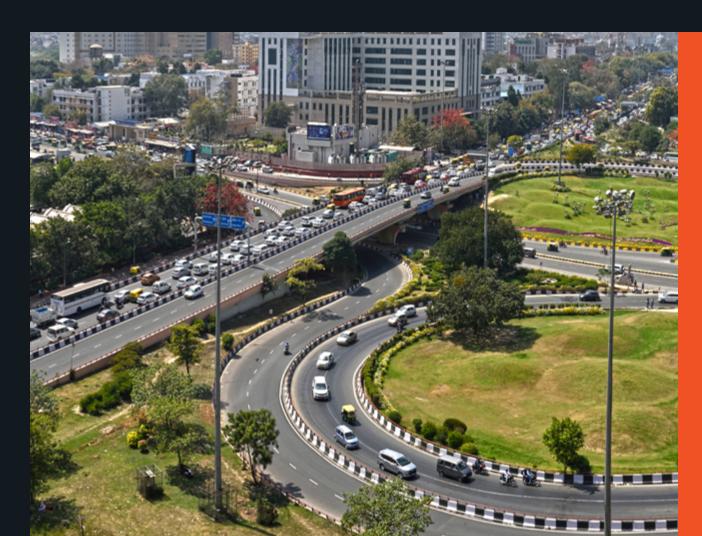
cities including 100 Smart Cities, capital cities and other cities impacting more than 140 million people were encouraged to explore the ideas of low carbon development, rapid deployment of energy-efficient technologies, and investment in climate-resilient infrastructure at the local level were encouraged to explore the ideas of low carbon development, rapid deployment of energy-efficient technologies, and investment in climate-resilient infrastructure at the local level. The objective was to enable cities assess their preparedness to tackle climate change and help them with a roadmap to achieve sustainable climate actions on the ground. The "ClimateSmart Cities Assessment Framework 3.0" will further allow cities to learn from their performance in the previous assessment and help them scale up contextual best practices. This will in turn help cities to improve their performance standards in accordance with some of the international guidelines in creating green, sustainable and resilient urban habitats.
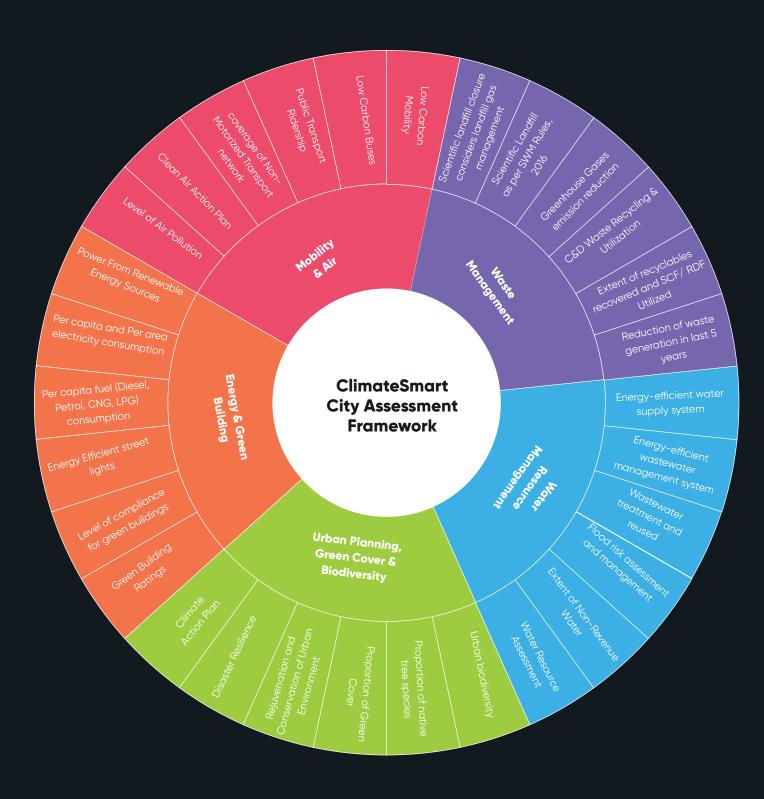
Thematic areas

The ClimateSmart Cities Assessment Framework 3.0 is broadly categorised into 5 themes with 28 indicators. Each of these indicators have a maximum of 5 levels representing different stage of development each with a corresponding weightage. The following sections give details of the themes, indicators and levels included in the assessment framework.

CSCAF 3.0 consists of 28 diverse indicators across five themes namely;
(i)   Urban Planning, Green Cover and Biodiversity.
(ii) Energy and Green Buildings,
(iii) Mobility and Air Quality,
(iv) Water Management, and
(v) Waste Management.

ClimateSmart City Assessment Framework

Mobility & Air
- Low Carbon Mobility
- Low Carbon Buses
- Public Transport Ridership
- coverage of Non-Motorized Transport network
- Clean Air Action Plan
- Level of Air Pollution

Waste Management
- Scientific landfill closure considers landfill gas management
- Scientific Landfill as per SWM Rules, 2016
- Greenhouse Gases emission reduction
- C&D Waste Recycling & Utilization
- Extent of recyclables recovered and SCF / RDF Utilized
- Reduction of waste generation in last 5 years

Water Resource Management
- Energy-efficient water supply system
- Energy-efficient wastewater management system
- Wastewater treatment and reused
- Flood risk assessment and management
- Extent of Non-Revenue Water
- Water Resource Assessment

Urban Planning, Green Cover & Biodiversity
- Climate Action Plan
- Disaster Resilience
- Rejuvenation and Conservation of Urban Environment
- Proportion of Green Cover
- Proportion of native tree species
- Urban biodiversity

Energy & Green Building
- Power From Renewable Energy Sources
- Per capita and Per area electricity consumption
- Per capita fuel (Diesel, Petrol, CNG, LPG) consumption
- Energy Efficient street lights
- Level of compliance for green buildings
- Green Building Ratings

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Urban Planning, Green Cover, & Biodiversity	Rejuvenation & Conservation of Water Bodies & Open Areas	Does city prioritize rejuvenation and conservation of water bodies and open areas?	Level 1: No Action Initiated	(Yes/No)
		Has city mapped water bodies and open areas?	Level 2: Assessment of urban water bodies and open areas	(Yes/No)
		Has city allocated any financial resources for rejuvenation and conservation of urban water bodies and open areas?	Level 3/4: Allocation of budget and implementation	(Yes/No)
		Is the city reviewing and monitoring urban water bodies and open areas and maintaining rejuvenated/conserved water bodies and open areas?	Level 5: Monitoring, review and maintenance	(Yes/No)
	Proportion of Green Cover	1.Area of green cover in sq.km. 2.Municipal area in sq.km.	Level 1: 0% to <5% Green Cover	Percentage
			Level 2: 5% to 9% Green Cover	
			Level 3: 9 % to <12 % Green Cover	
			Level 4: 12% to <18 % Green Cover	
			Level 5: ≥ 18% Green Cover	
	Urban Biodiversity	Has the city prioritised urban biodiversity management?	Level 1: No Action Initiated	(Yes/No)
		Has the city established a city level biodiversity management committee?	Level 2: Institutional Set-up	(Yes/No)
		Has the city conducted baseline assessment for urban biodiversity management?	Level 3: Baseline Assessment	(Yes/No)
		Has the city identified measures to increase the urban biodiversity with sufficient resources allocated for its implementation?	Level 4: Urban Biodiversity improvement measures	(Yes/No)
		Has the city implemented measures identified in level 4?	Level 5: Implementation of Actions	(Yes/No)
	Disaster Resilience	Has the city initiated a city level disaster management plan?	Level 1: Disaster and Risk Reduction is yet to be prioritized	(Yes/No)
		Has the city instituted a disaster management cell or emergency operation centre (EOC) within ULB?	Level 2: Institutional Mechanism Established	(Yes/No)
		Has city prepared disaster management plan including ward-level Hazard Risk, Vulnerability and Capacity Assessment along based on NDMA guideline?	Level 3: Disaster Management Plan	(Yes/No)

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Urban Planning, Green Cover, & Biodiversity	Disaster Resilience	Has the city established early warning systems for priority risks/ hazards?	Level 4: Plan Implementation	(Yes/No)
		Does the city monitor, update and mainstream its disaster management plan?	Level 5: Monitoring, Updating Mainstreaming	(Yes/No)
	City Climate Action Plan	Has the city considered a climate action plan?	Level 1: Climate Action Plan not considered	(Yes/No)
		Has the city prepared a climate action plan?	Level 2: Institutional Mechanism Established and Plan prepared	(Yes/No)
		Has climate action plan been implemented in the city?	Level 3: Implementation	(Yes/No)
		Does regular monitoring and streamlining of climate relevant actions happen in the city?	Level 4: Regular Monitoring and Streamlining	(Yes/No)
Energy & Green Buildings	Electricity Consumption in the City	1. Total electricity consumption for the city for the assessment year (kWh). 2. Total population of the city.	Level 1: > 10X compared to the city with lowest electricity consumption per capita	kWh per capita
			Level 2: > 4X & < 10X as compared to the city with the lowest electricity consumption per capita	
			Level 3: > 2X & < 4X as compared to the city with the lowest electricity consumption per capita	
			Level 4: > 1.1 X & < 2X as compared to the city with the lowest electricity consumption per capita	
			Level 5: Up to 1.1X as compared to the city with the lowest electricity consumption per capita	
	Total Electrical Energy in the City Derived from Renewable Sources	Does the city generate power from renewable sources?	Level 1: No electrical energy generated from renewable sources	(Yes/No)
		1. Total electric energy consumption from all on-grid renewable energy sources that are used in the city (kWh). 2. Total electricity consumption in the city (kWh). 3. Cumulative installed capacity (kW) of off-grid renewable energy sources for self-consumption.	Level 2: Renewable Energy contribution of less than 5%	Percentage
			Level 3: Renewable Energy contribution of 5- 10%	
			Level 4: Renewable Energy contribution of 10-15%	

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Energy & Green Buildings	Total Electrical Energy in the City Derived from Renewable Sources	4. Total connected electrical load in the city (kW).	Level 5: Renewable Energy contribution of > 15%	Percentage
	Fossil Fuel Consumption in the City	1. Total diesel consumption (kL). 2. Total petrol consumption (kL). 3. Total CNG consumption (kL). 4. Total LPG consumption (kL). 5. Total population of the city.	Level 1: > 10X compared to the city with lowest fuel consumption per capita	Tons CO_2 equuvivalent Per Capita
			Level 2: > 4X & < 10X as compared to the city with the lowest fuel consumption per capita	
			Level 3: > 2X & < 4X as compared to the city with the lowest fuel consumption per capita	
			Level 4: > 1.1 X & < 2X as compared to the city with the lowest fuel consumption per capita	
			Level 5: Up to 1.1X as compared to the city with the lowest fuel consumption per capita	
	Energy Efficient street lights	Does the city have energy efficient street lights?	Level 1: No streetlights in the city is energy efficient	(Yes/No)
		1. Total number of street lights in the city. 2. Total number of energy efficient street lights in the city.	Level 2: Up to 25% streets lights in the city are energy efficient	Percentage
			Level 3: Up to 50% streets lights in the city are energy efficient	
			Level 4: Up to 75% streets lights in the city are energy efficient	
			Level 5: All streets lights in the city are energy efficient	
	Promotion of green buildings	Has the city implemented any measures to promote green buildings?	Level 1: No measure implemented	(Yes/No)
		1. Has the city implemented the Inclusion of Part 11 of National Building Code (NBC 2016) and/or Energy Conservation Building Codes (ECBC 2017) & Eco-Niwas Samhita 2018 and/or minim level of green building rating systems notified in City Development Control Regulations (DCRs/GDCRs) and building rules/bye laws?	Level 2: One measure implemented	(Yes/No)

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Energy & Green Buildings	Promotion of green buildings	2. Does the city have a functioning of Green building cell in ULB for the purpose of knowledge dissemination, creating public awareness, empanelling green building vendors, designing green building schemes and their promotions, verification and faster approvals for green buildings in the city? 3. Does the city have promotional or penalty schemes available for code compliance, pre-certification, certification of green buildings? 4. Does the city have a functioning high-level Green Building committee or equivalent, comprising of ULB's commissioner and representatives of ULB's green building cell, SPV, PMC, UDD, town planner, PWD, green building certification agencies, developers and building professional associations. The committee will provide strategic advice for the promotion and adoption of energy efficient and green buildings in the city?	Level 3: Two measures implemented	(Yes/No)
			Level 4: Three measures implemented	(Yes/No)
			Level 5: All four measures implemented	(Yes/No)
	Green Building Adoption	Are there any certified green buildings in the city? (Yes/No)	Level 1: No indication of green buildings in the city	
		1. Total Built up area of Green Buildings in Residential sector 2. Total Built up area of Green Buildings in Institutional sector 3. Total Built up area of Green Buildings in Commercial sector 4. Total Built up area of Green Buildings in Industrial sector 5. Estimated population of the City	Level 2: The occupant load in green buildings is 1-200 persons for every 10,000 population	
			Level 3: The occupant load in green buildings is 201-400 persons for every 10,000 population	
			Level 4: The occupant load in green buildings is 401-600 persons for every 10,000 population	
			Level 5: The occupant load in green buildings is >600 persons for every 10,000 population	
Mobility & Air	Clean Technologies Shared Vehicles	Does the city have clean technology shared vehicles?	Level 1: No clean technology shared vehicles available	Percentage
		1. Total number of buses (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric) in the city.	Level 2: Clean technology shared vehicles <5%	

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Mobility & Air	Clean Technologies Shared Vehicles	2. Total number of taxis (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric). 3. Total number of autos (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric). 4. Total number of e-rickshaw (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric). 5. Total number of privately operated buses (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric) 6. Total number of ferries (based on clean fuel like CNG, LPG, Hybrid, Biofuels, Electric). 7. Total number of shared vehicles in the city. 8. Total number of Other fuel shared vehicles in the City	Level 3: Clean technology shared vehicles 5% to <15% Level 4: Clean technology shared vehicles 15% to <25% Level 5: Clean technology shared vehicles >25%	Percentage
	Availability of Public Transport	Does the city have public transport?	Level 1: Public Transport is not available	(Yes/No)
		1. Fleet size of bus. 2. Fleet size of metro coach. 3. Fleet size of sub urban rail coach. 4. Fleet size of ferries. 5. Estimated existing population of the city.	Level 2: Availability of Public Transport (<0.2) Level 3: Availability of Public Transport (0.2–0.4)* Level 4: Availability of Public Transport (0.4–0.6)* Level 5: Availability of Public Transport (≥0.6)*	Public Transport Unit (PTU)
	Percentage of coverage of Non Motorized Transport network (pedestrian and bicycle) in the city	1. Total length of NMT network in the city (km) 2. Total road network length (km).	Level 1: NMT Coverage: Less than 15% Level 2: NMT Coverage: 15% to <25% Level 3: NMT Coverage: 25% to < 35% Level 4: NMT Coverage: 35% to < 50% Level 5: NMT Coverage: ≥ 50%	Percentage
	Level of Air Pollution (Monitoring)	Does the city recognise air pollution levels and its associated hazards?	Level 1: No Consideration	(Yes/No)
		Does the city monitor PM10, PM2.5, NOx, Sox as per Central Pollution Control Board Guidelines and CO, NH3, Pb and O3 etc. as per NAAQS?	Level 2: Basic Monitoring	(Yes/No)
		Does the city make pollutant data available in the public domain?	Level 3: Availability of Data in Public Domain	(Yes/No)

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Mobility & Air	Level of Air Pollution (Monitoring)	Does the city demonstrate reduction trend or incremental improvements in air pollution?	Level 4: Air Pollution Reduction Trend	(Yes/No)
		Does the city's air quality comply with National Ambient Air Quality Standards?	Level 5: Achievement of National Air Quality Standards	(Yes/No)
	Clean Air Action Plan (Planning and Implementation)	Are there any existing air pollutant monitoring stations or/and Clean Air Action Plan (CAAP) in the city?	Level 1: No Air Pollutant Monitoring Clean Air Action Plan in the city and/or Clean Air Action Plan in the city	(Yes/No)
		Does the city have monitoring stations for measuring ambient air quality or/and Clean Air Action Plan (CAAP)?	Level 2: Air Pollutant Monitoring and/or Clean Air Action Plan in the city	(Yes/No)
		Does city perform pollutant source identification or emissions inventory?	Level 3: Clean Air Action Plan and Pollutants Source Identification	(Yes/No)
		Have measures from clean air action plan been implemented?	Level 4: Implementation of Clean Air Action Plan	(Yes/No)
		Is an assessment of impacts of Clean Air Action Plan being conducted?	Level 5: Assessing impacts of Clean Air Action Plan implementation	(Yes/No)
Water Management	Water Resources Management	Has city conducted any assessment of their existing water resources?	Level 1: No water resource assessment has been carried out	(Yes/No)
		Has city carried out any study to assess the existing water resources (For Example, assessment of quantum of water available, allocation of water to domestic, commercial, industrial and Other sectors), future demand projection, water quality test reports at source and at treatment facilities for last five years?	Level 2: Assessment of current water resources along with future demand and water availability for at least five years	(Yes/No)
		Does city have a water resource management plan with short, medium and long term actions (For example, demand management plan and augmentation of existing water resources through recharge, rejuvenation and rain water harvesting)?	Level 3: Water Resource Management (WRM) Plan is prepared with Short, Medium- and Long-Term Actions	(Yes/No)
		Has city reviewed and revised the water resource management plan to include climate change factors and initiated any actions/work specified in the Water Resource Management Plan?	Level 4/5: Actions for Water Resource Management	(Yes/No)

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Water Management	Extent of Non-Revenue Water	Has the city conducted NRW Study or collected any information on the water produced or sold?	Level 1: NRW study is not conducted by city	(Yes/No)
		1. Total water produced and put into the transmission and distribution system in MLD for the last twelve months i.e. June–July 2020 to July–August 2021. 2. Total water sold in MLD (Total water billed) for the last twelve months i.e. June–July 2020 to July–August 2021	Level 2: NRW study is conducted by the city and the most recent NRW of the city during 2018–21 is >40%	Percentage
			Level 3: Most recent NRW of the city during 2018–21 is >30% to 40%	
			Level 4: Most recent NRW of the city during 2018–21 is ≥20% to 30%	
			Level 5: Most recent NRW of the city during 2018–21 is <20%	
	Wastewater Recycle and Reuse	Does the city recycle and re-use the waste water?	Level 1: No reuse	(Yes/No)
		1. Water supplied to the city in million litres per day in MLD for the last twelve months i.e. June–July 2020 to July–August 2021. 2. Total wastewater treated in MLD for the last twelve months i.e. June–July 2020 to July–August 2021 3. Total recycled wastewater that is reused in MLD for the last twelve months i.e. June–July 2020 to July–August 2021	Level 2: < 5% treated wastewater recycled and reused	Percentage
			Level 3: 5 to <10%Treated Wastewater recycled and reused	
			Level 4: 10 to <20%Treated Wastewater recycled and reused	
			Level 5: ≥20% Treated Wastewater recycled and reused	
	Flood/ water stagnation risk management	Has city carried out any flood/ water stagnation risk assessment in last five years i.e. from 2017 to 2021?	Level 1: Flood/ water stagnation risk assessment not conducted	(Yes/No)
		Has city conducted a rapid flood/ water stagnation risk assessment which may include hotspots, frequency and reasons for flooding/ water stagnation?	Level 2: Rapid flood/ water stagnation risk assessment	(Yes/No)
		Has city prepared a detailed flood/water stagnation risk assessment and prepared a management plan?	Level 3: Detailed flood risk assessment and preparation of management plan	(Yes/No)
		Has city implemented the measures specified in flood/water stagnation management plan, urban flood management SOP of Urban flood alert and early warning systems?	Level 4/5: Implementation of actions for flood/ water stagnation management	(Yes/No)

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Water Management	Energy efficient water supply system	Has city conducted the energy audit for water supply system in the last Five Years (2016-2021)? If yes, please enclose the evidence template and energy audit reports	Level 1: City has not conducted the Energy Audit including for pumping stations and treatment plants	Percentage
			Level 2: City has conducted the Energy Audit and the most recent energy reduction reported per MLD by the city during 2017-21 is <10% of baseline data	
			Level 3: Most recent energy reduction reported per MLD by the city during 2017-21 is >10% to 15% of baseline data	
			Level 4: Most recent energy reduction reported per MLD by the city during 2017-21 is >15% to 20% of baseline data	
			Level 5: ≥Most recent energy reduction reported per MLD by the city during 2017-21 is >20% of baseline data	
	Energy efficient wastewater management system	Has city conducted the energy audit for wastewater management systems in the last Five Years (2016-2021)? If yes, please enclose the evidence template and energy audit reports	Level 1: Energy audit for wastewater pumping stations and treatment plants not conducted pumping stations and treatment plants. Most recent energy reduction reported per MLD by the city during 2017-21 is <10% of baseline data	Percentage
			Level 2: City has conducted energy audit for wastewater	
			Level 3: Most recent energy reduction reported per MLD by the city during 2017-21 is >10% to 15% of baseline data	
			Level 4: Most recent energy reduction reported per MLD by the city during 2017-21 is >15% to 20% of baseline data	

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Water Management	Energy efficient wastewater management system	Has city conducted the energy audit for wastewater management systems in the last Five Years (2016-2021)? If yes, please enclose the evidence template and energy audit reports	Level 5: Most recent energy reduction reported per MLD by the city during 2017-21 is >20% of baseline data	Percentage
Waste Management	Waste minimization initiatives undertaken by the City	1.8 Plastic Waste Management Rules: Whether City has banned single use plastic including plastic with <50 micron during all festivals/ social gatherings/events?	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement
		1.9 3R Principles: Whether measures taken to reduce generation of Dry/ Wet Waste? If yes, share details		
		2.5 Percentage of total domestic hazardous waste collected is treated, either by decentralized or centralized processing		
		2.9 Percentage of Bulk Waste Generators (BWG), including those generating more than 100 Kgs (or less as notified by the State/city) of waste per day, practicing on site processing of their wet waste or outsourced to private agency -processing not outsourced to ULB. However, cities with <1 Lakh population can outsource to ULB on a commercial rate.		
		2.11 Percentage of households processing their wet waste at Home/ Community Level (Households under RWAs will qualify under the BWG definition)		
	Extent of dry waste recovered& recycled	2.3 Percentage of generated dry waste (excluding plastic and domestic hazardous waste) collected that is actually processed/Re-used/recycled, either by decentralized or centralized facilities	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement
		2.4 - Percentage of total plastic waste collected is treated/ Re-used/recycled, either by decentralized or centralized processing		
	Construction & Demolition (C&D) waste management	2.6 Any mechanism in place to manage Construction & Demolition (C&D) waste as per C&D Waste Management Rule, 2016? Whether plans in place to initiate processing of C&D Waste?	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement

Thematic area	Indicator	Data points	Progressive levels	Unit of Measurement
Waste Management	Extent of Wet Waste Processed	2.2 Percentage of wet waste generated actually processed, either by decentralized or centralized facilities.	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement
	Scientific Landfill availability & operations	2.8 Is the landfill in the city a sanitary landfill ? Or landfill not required/ Zero landfill city	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement
	Landfill/ dumpsite Scientific Remediation	2.7 Remediation of existing dumpsites undertaken and the stage of the same or no legacy waste (dumpsite)	As per Swachh Survekshan 2020 Service Level Indicators	As per Swachh Survekshan 2020 Unit of Measurement

METHODOLOGY

The set of 28 indicators that form the ClimateSmart Cities Assessment Framework 3.0 are a combination of metrics that are varied in nature and specifications. A series of steps have been followed to standardize data across all indicators.

The nature of the indicator determines the nature of the data that is collected, and its units of measurement. This may vary considerably across categories. Each indicator will have a different scoring mechanism, the different data types used in this framework are elaborated within the subsequent subsections.

Percentage
Several indicators mark the performance of a city in terms of coverage of services, amenities provided, achieved or natural offsetting means available, marked against a larger total.

Ratio
Similarly, to weigh the data for comparability, some indicators will be obtained in the form of ratios of one aspect against the other, and the higher the ratio, the better.

Binary Marking
Some indicators take the form of yes or no questions to the municipalities, and the levels go directly between 1 and 5.

Benchmarking
Some indicators fix an ideal or optimal value (either 100% or a certain unit of universal achievement) as benchmarking, while others take the best (or worst) performing city in the same tiers of comparison as a benchmark to be measured against. There are no indicators that use a deviation from mean as measurement, as they all have progressive marking across levels.

Aggregation
The aggregation methodology of the Climate Smart Cities Assessment Framework 3.0 is based on three elements namely Thematic areas, indicators, and performance evaluation levels. The thematic sector wise score is calculated by adding the scores against each of its indicators. The thematic sector wise list of indicators and maximum score allocated is as per the Table below

Thematic area	Indicators	Maximum Assigned Score	Score Obtained	Aggregate Category Score
Urban Planning, Green Cover, and Biodiversity (500 Marks)	Rejuvenation & Conservation of Water Bodies & Open Areas	100	Z_1	$A = (Z_1 + Z_2 + Z_3 + Z_4 + Z_5)$
	Proportion of Green Cover	100	Z_2	
	Urban Biodiversity	100	Z_3	
	Disaster Resilience	100	Z_4	
	City Climate Action Plan	100	Z_5	
Energy and Green Buildings (600 Marks	Electricity Consumption in the City	100	Z_6	$B = (Z_6 + Z_7 + Z_8 + Z_9 + Z_{10} + Z_{11})$
	Total Electrical Energy in the City Derived from Renewable Sources	100	Z_7	
	Fossil Fuel Consumption in the City	100	Z_8	
	Energy Efficient Street Lighting in the City	100	Z_9	
	Promotion of Green Buildings	100	Z_{10}	
	Green Building Adoption	100	Z_{11}	
Mobility and Air Quality (500 Marks)	Clean Technologies Shared Vehicles	100	Z_{12}	$C = (Z_{12} + Z_{13} + Z_{14} + Z_{15} + Z_{16})$
	Availability of Public Transport	100	Z_{13}	
	Percentage of coverage of NonMotorized Transport network (pedestrian and bicycle) in the city	100	Z_{14}	
	Level of Air Pollution	100	Z_{15}	
	Clean Air Action Plan (Planning and Implementation	100	Z_{16}	
Water Management (600 Marks)	Water Resources Management	100	Z_{17}	$D = (Z_{17} + Z_{18} + Z_{19} + Z_{20} + Z_{21} + Z_{22})$
	Extent of NonRevenue Water	100	Z_{18}	
	Wastewater Recycle and Reuse	100	Z_{19}	
	Flood/ water stagnation risk management	100	Z_{20}	
	Energy efficient water supply system	100	Z_{21}	
	Energy efficient wastewater management system	100	Z_{22}	
Waste Management (600 Marks)	Waste minimization initiatives undertaken by the City	100	Z_{23}	$E = (Z_{23} + Z_{24} + Z_{25} + Z_{26} + Z_{27} + Z_{28})$
	Extent of dry waste recovered & recycled	100	Z_{24}	
	Construction & Demolition (C&D) waste management	100	Z_{25}	
	Extent of Wet Waste Processed	100	Z_{26}	
	Scientific Landfill availability & operations	100	Z_{27}	
	Landfill/ dumpsite Scientific Remediation	100	Z_{28}	
Total Maximum Assigned Score		2800	Aggregated Score (A+B+C+D+E)	

ClimateSmart City Score

It is pertinent that the aggregated score presents the cities' efforts towards mitigating and adapting actions but does not represent the actual impact of such actions. Therefore, to negate this, a ClimateSmart City score is calculated based on each sector weightage and score. The thematic wise score is calculated by summing the weighted scores against each indicator.

CSC Score: [(A X 0.050) + (B X 0.042) + (C X 0.040) + (D X 0.025) + (E X 0.025)]

Assessment Titles

The idea of the ClimateSmart Cities Assessment Framework 3.0 is to provide cities with indicators to evaluate their own performance and facilitate peer to peer learning along with ranking on the basis of their performance. In addition to assessment and ranking, the framework intends to help cities understand their current status regarding climate actions and make efforts to improve their efforts in specific thematic areas. Based on the overall scores, the cities shall be given the corresponding titles

Criteria for assigning Climate Smart Cities Assessment Titles

⭐ ⭐ ⭐ ⭐ ⭐

Five Stars – Cities that have showcased implementation of climate actions and are monitoring impacts.

⭐ ⭐ ⭐ ⭐

Four Stars – Cities that have initiated implementation of climate measures or have allocated budgets.

⭐ ⭐ ⭐

Three Stars – Cities that have initiated climate action planning or have established institutional mechanisms to enable planning.

⭐ ⭐

Two Stars – Cities that have initiated data collection to conduct assessments or have established committees to guide the development of climate strategies.

⭐

One Star – Cities that are in the early stages and are yet to conduct studies to inform the adoption of climate actions.

FOUR

DATA MATURITY ASSESSMENT FRAMEWORK – DMAF 3.0

Indian cities are leveraging both established and emerging technologies for better governance. Data is at the core of this new thinking around technology as an enabler to drive growth. The push for data-driven governance has an intense interest at all levels of the government. Specifically, cities are seeking new ways to create greater value from data and enable data-driven governance and policy making at the local level. They are looking to leverage data generated by systems and processes for generating business intelligence and improving their operational efficiency.

Data is an asset which needs to be exploited with full potential for the larger public good. This is possible by investing in the building blocks of the data ecosystem i.e. People, Process and Platform as outlined in MoHUA's flagship initiative – DataSmart Cities Strategy. The Smart Cities Mission launched the DataSmart Cities Strategy in February, 2019 as a roadmap for harnessing the potential of data to address complex urban challenges across 100 cities. To successfully implement this initiative, the Data Maturity Assessment Framework (DMAF) was launched. This Framework aims to encourage cities to strengthen their data ecosystem and facilitate them in assessing their readiness and maturity on data.

DMAF has concluded its first two cycles and seeks to encourage cities to plan and incorporate actions on data initiatives. It has seen participation from 100 cities and have been able to guide them in creating a 'culture of data'. The results of and recommendations for participating cities can be viewed at https://dmaf.mohua.gov.in/

DMAF 3.0 consists of 2 pillars - Systemic Maturity and Sectoral Maturity pillar and the first two cycles focused on assessing cities on five key components of the Systemic Maturity pillar - Policy, People, Process, Technology and Outcomes. Maturity in the components of the systemic pillar was expected to help these cities build a solid foundation which will serve as the base to create an effective data ecosystem. Several capacity building activities were conducted for the City Data Officers to ensure compliance and successful completion of these cycles. In this assessment cycles, a number of cities made efforts towards achieving a high score, and made efforts in becoming 'DataSmart'.

Since many cities have reached a good level of understanding of leveraging data as building blocks of an evolved ecosystem, in this cycle of DMAF, the Sectoral Maturity Pillar has been introduced. This will help cities assess their data readiness throughout the lifecycle of at least one selected sector. Going forward as the maturity of cities increases, multiple sectors can be included for evaluation under this pillar in future assessments.

Data Maturity Assessment Framework 3.0	
Systemic Maturity (80%)	**Sectoral Maturity (20%)**
Policy (15%)	Data Availability (30%)
People (15%)	Data Usage (30%)
Process (20%)	Data Shareability (20%)
Technology (25%)	Data Management (20%)
Outcomes (25%)	

DMAF Pillars

Pillar 1 – Systemic Maturity Pillar

This pillar lays down the cornerstone of a city's ability to ensure effective data governance, enhanced usage of data in decision-making processes, and drive cities towards better inter-departmental, inter-agency, and systemic collaboration. It assesses the city's capacity to become 'DataSmart' from the perspectives of people, processes, technology, policies, and outcomes at the city level.

Policy: Existence of robust policy mechanisms in the city around data governance, empowerment, protection, collaboration and innovation

People: Presence of empowered city officials with the capacity to guide the development of city data policies, manage data governance, drive inter-departmental and inter-agency data exchange and build city data alliances

Process: Effectiveness of the city's processes around data collection, usage, management, security, privacy, empowerment, collaboration and innovation

Technology: Quality and robustness of the city's information and communications technology infrastructure including digital platforms, sensors, IoT devices, data exchanges, big data and artificial intelligence

Outcomes: Quality of outcomes around data driven governance, collaboration and innovation in the city

Pillar 2 – Sectoral Maturity Pillar

Sectoral Maturity measures the ability of cities to harness the power of data by focusing on availability, usage, sharing and control management of data in key urban sectors. This pillar recognizes that while data is the underlying language with which cities can identify, analyse and solve urban challenges, solutions are sector-specific. The effectiveness with which problems are solved becomes a function of the maturity of data systems, governance, resources, and collaborations in each sector.

Availability: This component measures the availability of real-time, reliable, systemic data in each sector that is geospatially enriched and integrated with key functions and processes.

Usage: This component measures the effective usage of data to drive decision making, improve service delivery, manage departmental functioning, foster inter-agency cooperation and ecosystem collaboration

Shareability: This component measures the existence of data sharing processes, anonymization and machine readability of datasets and publication of open data in keeping with the City Data Policy and/or NDSAP guidelines

Management: This component measures the existence of effective structures, systems and processes to manage data access and controls over departmental and sectoral data sets, robust backup and retention policies and plans to deal with data loss and/or system failures.

Scoring Methods and Normalization

The data that is collected for the various indicators across the framework will be obtained in varied units. For instance, the presence of elements in the City Data Policy like data classification, data categorization, data flow and approval frameworks would be measured as a binary yes or no, while the appointment of Data Coordinators in departments would be measured as a percentage of actual appointment/nominations to the total number of departments, and the number of datasets published on an open data portal will be a step-based marking. Each of these indicators necessitates a different scoring mechanism.

Scoring Methods

Percentage: Since cities vary in population sizes and economic strength, most indicators need to be weighed for comparability. For instance, total number of departments with electronic data collection processes needs to be weighed against the total number of departments in the city administration. These indicators will, therefore, take the form of percentages.

Binary: Some indicators take the form of yes or no questions in the cities. For instance, the indicator assessing if the city data policy has been approved takes a similar form. For such a question, each "yes" answer will result in maximum marking and each "no" answer will result in the minimum marking (of 0) allocated for that question.

Step marking: Some indicators' scores are finalized based on a range of values. For example, the score for number of datasets published by a city will fall in steps of values based on which the scoring is done.

Relative marking: Some indicators have no fixed benchmarking or optimal value. For instance, it is difficult to fix the optimal budget for data related initiatives in a city. In such cases, a benchmark will be created using the highest percentage and each city will be scored based on the achievement against this benchmark in a graded manner.

Aggregation: The aggregation methodology is based on three elements viz. indicators, components, and pillars.

Component Scores: Each indicator under a component will be assigned a weightage for each cycle. The component scores are calculated by summing the weighted scores of indicators using the formula: **Component Score = ∑ (Wi * Indicator Scores)** where Wi is the weightage allocated for the indicator within each component.

Pillar Scores: The scores of the component under each pillar will be aggregated to arrive at the pillar score. This will be calculated using the formula: **Pillar Score = ∑ (Wc * Component Scores)** where Wc is the weightage allocated for the component within each pillar.

DMAF Score: The DMAF Score will be the weighted average of each pillar.
- **Systemic Maturity Pillar Score:** 0.15*Policy + 0.15* People + 0.20* Process + 0.25* Technology + 0.25*Outcomes
- **Sectoral Maturity Pillar Score:** 0.30*Data Availability + 0.30*Data Usage + 0.20* Data Shareability + 0.20* Data Management
- **City DMAF Score:** (Systemic Maturity Pillar Score) *80% + (Sectoral Maturity Pillar Score) *20%

Indicator Details

Systemic Maturity Pillar

Indicator	Question	Description / Guidance	UOM	Scoring
POLICY				
Approval of City Data Policy	Has the city formally approved the City Data Policy?	For details on City Data Policy, refer to the DataSmart Cities Strategy and the City Data Policy Guidance document.	Yes/ No	Binary marking
City Data Policy Components	Does the City Data Policy have the following sections/ components: 1.b.1 – Data Classification 1.b.2 – Data Categorization 1.b.3 – Data Flow / Approval Framework 1.b.4 – Data Archival and Retention 1.b.5 – Data Security and Privacy 1.b.6 – SoP for data collection 1.b.7 – SoP for electronic data collection	The City Data Policy must preferably have the mentioned sections, SOPs, and guidelines for setting up an inclusive data ecosystem at the city level. For further details, please refer to the National Data Sharing and Accessibility Policy (NDSAP), the DataSmart Cities Strategy and the City Data Policy Guidance document.	Yes/ No	Binary marking

(Left margin: SYSTEMIC MATURITY)

Indicator	Question	Description / Guidance	UOM	Response
	1.b.8 - SoP for data processing and cleaning 1.b.9 - SoP for quality assessment of datasets 1.b.10 - SoP for data publishing as per Open Data Norms 1.b.11 - SoP for engaging stakeholders to assess the data needs 1.b.12 - SoP for data collection, processing and analysis for on field survey 1.b.13 - Do the Processes defined include provisions for data analysis			
Budget for Data-related Initiatives (2020-2021)	Has the city/municipality earmarked budget in its Annual Budget 2020-21 for data-related initiatives/ activities? If Yes, i) Allocated Budget for data initiatives ii) Budget Spent on data activities iii) Total Municipal Budget	Includes any budget that the smart city has earmarked for: implementation of activities specified in the City Data Policy, other data related activities including trainings, workshops etc. to build capacities for data handling	Yes/No; INR	Relative benchmarking based on city values
Budget for Data-related Initiatives (2021-2022)	Has the city/municipality earmarked budget in its Annual Budget 2021-22 for data-related initiatives/ activities? If Yes, i) Allocated Budget ii) Total Municipal Budget	Includes any budget that the smart city has earmarked for: implementation of activities specified in the City Data Policy, other data related activities including trainings, workshops etc. to build capacities for data handling	Yes/No; INR	Relative benchmarking based on city values
PEOPLE				
City Data Officer	Does your city currently have City Data Officer? If Yes, choose from: 1. CDO appointed, but not full-time 2. Full time CDO but not as per Job Description 3. Full time CDO as per Job Description	Appointment of City Data Officer as per the DataSmart Cities Strategy and the HR guidelines issues by the Smart Cities Mission for the SPV.	Yes/ No	Step marking based on city values
Data Coordinators	What is the percentage of Departments which have appointed Data Coordinators? 1. Total number of departments in which data coordinators have been appointed 2. Total number of departments in the ULB	Appointment of Data Coordinators in Government Departments as per the DataSmart Cities Strategy. In case there is more than one data coordinator in one department, it will be counted as one for calculation purpose.	Percentage; Number	Step marking based on city values
Data Team	What are the number of members in your data team with their roles and responsibilities?	Includes all other team members in the data initiative, including Data Scientists, Architect, Analyst, open data expert, interns, outreach experts, and excluding the CDO, data coordinators data champions.	Number	Step marking based on city values

SYSTEMIC MATURITY

Indicator	Question	Description / Guidance	UOM	Scoring
Capacity Building – Ministry Initiative	How many trainings or workshops on data has the city attended to build capacity of its data team for executing the DataSmart Cities Strategy from 1st Jan 2021 onwards?	Includes all trainings, workshops, VCs etc. for city officials.	Number	Step marking based on city values
Capacity Building - City Initiative	How many trainings or workshops on data has the city conducted to build capacity of its data team for executing the DataSmart Cities Strategy from 1st Jan 2021 onwards?	Includes all trainings, workshops, VCs etc. for city officials.	Number	Step marking based on city values
PROCESS				
City Data Alliances	How many data-related alliances has the city formed as envisaged in the DataSmart City Strategy?	Any partnerships/ MoU signed, and alliances formed for the City Data Alliance as per the DataSmart Cities Strategy.	Number	Step marking based on city values
Data Hackathons / Data Challenges	Has your city conducted Data Hackathon/Data Challenge for various stakeholders to help solve city issues through data?	These refer to events conducted in the city encouraging innovation/ collaboration/ problem solving. They may involve stakeholders including Academia, students, research institutes, Start-ups etc.	Yes/No	Binary marking
Analytics Capability	What kind of analytics are being practiced at the city level? If Yes, which ones: Descriptive Diagnostic Predictive Prescriptive	Type of analytics: - Descriptive analytics describes the use of a range of historic data to draw comparisons. - Diagnostic Analytics examines data or content to answer the question, "Why did it happen?" It is characterized by techniques such as drill-down, data discovery, etc. - Predictive Analytics predicts what is most likely to happen in the future. - Prescriptive Analytics recommends actions you can take to affect those outcomes.	Yes/No; Number	Step marking
TECHNOLOGY				
Sensors for Data Collection	Does your city have sensors/field devices that collect data at source?	Sensor / field devices may include measurement of (but not limited to) – - Pollution Management - Traffic Management - Waste Management - Smart Street Lights - Water Leakage Management	Yes/No	Binary marking

SYSTEMIC MATURITY

Indicator	Question	Description / Guidance	UOM	Scoring
Number of Open Datasets	What is the total number of machine-readable open datasets published by the city online on any government web portal?	City may publish datasets in accordance with NDSAP for use by other stakeholders on various national, state and city portals, including the Smart Cities Open Data Portal. Machine readable formats are: - CSV (Comma separated Values) - XLS (spread sheet- Excel) - ODS (Open Document Formats for Spreadsheets) - XML (Extensive Mark-up Language) - RDF (Resources Description Framework) - KML (Keyhole Mark-up Language used for Maps) - GML (Geography Mark-up Language) - RSS/ATOM (Fast changing data e.g. hourly/daily)	Number	Step marking based on city values
Updating of Datasets on Smart Cities Open Data Portal	How many datasets has the city updated on the Smart Cities Open Data Portal from 1st Jan 2021 onwards?	A compliance table for the schedule of updating needs to be prepared against each catalogue/ resource published on Open Data Portal by the city. The datasets need to be updated on the portal accordingly.	Number	Step marking based on city values
Dynamic Data Sharing	Does the city share any data through APIs/IUDX?	Data sharing through customized APIs or IUDX	Yes/No	Binary marking
Spatial Readiness	How many data layers of the city (such as roads, water bodies, properties etc.) are mapped on GIS?	GIS refers to the geospatial data that the city may have collected. Data may be in the form of shape files, geojson, kml.	Number	Step marking based on city values
Data Integration with ICCC	How many line departments in the city have integrated their data with the ICCC? 1. Number of departments integrated with ICCC 2. Total number of departments in the city	This should capture data flows to and from the Integrated Command and Control Centre (ICCC) for the identified departments.	Percentage	Step marking based on city values
OUTCOMES				
Data Stories/Blogs Published	How many data stories/blogs has your city published on the Smart Cities Open Data Portal?	Data stories highlighting the various uses of data in the city should be uploaded on the blogs section of the SCODP.	Number	Step marking based on city values
Data-related Use Cases	How many use cases/SoPs of data is the city working on?	Use cases here are defined in response to the top urban challenges. This will include any concept / prototype / pilot /solution identified by the city to tackle urban challenges.	Number	Step marking based on city values

SYSTEMIC MATURITY

Indicator	Question	Description / Guidance	UOM	Scoring
SYSTEMIC MATURITY Development of Portals/Applications	How many services are being delivered through applications based on the city's datasets?	Identify the published apps/portals developed by the city which are used for service delivery and eventually aid the data activities. Against each app, give description, datasets used, active users and key features demonstrated by app. In case the city has an integrated App, the number of services provided by using city's datasets may be entered.	Number	Step marking based on city values
Alerts and Notifications	How many service alerts is the city sending to its citizens? (traffic, disaster, health, water, electricity, environment, etc.)	Alerts may be via ICCC or any other system being used by the city for sending notifications to the citizens.	Number	Step marking based on city values

Sectoral Maturity Pillar

Under this pillar, all questions are to be answered for any 1 chosen sector of the city. The sectors can include inter alia, water, energy, mobility and transport, environment, waste management, and health.

Indicator	Question	Description / Guidance	UOM	Scoring
SECTORAL MATURITY		**DATA AVAILABILITY**		
Machine-readable Datasets	How many datasets for this sector are available in a machine-readable format at city level?	City may collate datasets in machine readable formats including: - CSV (Comma separated Values) - XLS (spread sheet- Excel) - ODS (Open Document Formats for Spreadsheets) - XML (Extensive Mark-up Language) - RDF (Resources Description Framework) - KML (Keyhole Mark-up Language used for Maps) - GML (Geography Mark-up Language) - RSS/ATOM (Fast changing data e.g. hourly/daily)	Number	Step marking based on city values
Electronic Data Collection Process	How many of these datasets are collected electronically for this sector?	Electronic data collection system may include any web-based or mobile-based applications, interactive voice response systems, online surveys, sensors, etc. through which the city may be collecting data.	Number	Step marking based on city values
Real-time Data	Does the city have real-time data being collected with time-stamps for this sector?	Real-time data is information that is delivered immediately after collection. Data may be collected in real-time through IoT Devices, Mobile apps, sensors, etc.	Yes/No	Binary marking
Geospatial/ Geo-tagged Data	Does the city collect geospatial/ geo-tagged data for this sector?	Geospatial data refers to data with location information, i.e. Latitude and Longitude or GPS Coordinates.	Yes/No	Binary marking

Indicator	Question	Description / Guidance	UOM	Scoring
Data Integration with ICCC	Is the city integrating data for this sector with the ICCC?	Data disseminated through Web-based, Mobile based Services or IoT devices and can be accessed at Integrated Command and Control Centre (ICCC) - a secure room in a facility that provides centralized monitoring, control and command of a situation.	Yes/No	Binary marking
DATA USAGE				
Management Information System (MIS)	Does the city have a Management Information System (MIS) for monitoring of indicators under this sector?	An MIS is an IT tool used to gather and analyze data from multiple systems to aid the management in decision-making.	Yes/No	Binary marking
Applied Analytics and Data Visualizations	Is the city using visualization or analytics on real-time/GIS/other datasets/feeds for this sector?	Data Visualization: Graphical representation of data using visual elements like charts, graphs, and maps to provide an accessible way to view and understand trends, outliers, and patterns in data collected by the city. Data Analytics: Process of inspecting, cleansing, transforming, and modelling data with the goal of discovering useful information, and supporting decision-making.	Yes/No	Binary marking
Data Integration for Service Delivery	Is the city integrating the data for this sector on a central platform (web or mobile) for service delivery?	Combining data from multiple sources can help provide a unified, single view of the data through a web portal or mobile app which can be accessed and utilized by citizens.	Yes/No	Binary marking
Data Stories/ Blogs	Has the city shared any data stories pertaining to this sector on the Smart Cities Open Data Portal or India Urban Observatory website?	Data stories or blogs shared or published on the Smart Cities Open Data Portal or India Urban Observatory website.	Yes/No	Binary marking
DATA SHAREABILITY				
Data Sharing Process - Government Bodies	Are there any processes adopted by city for sharing data under this sector with government bodies?	List of processes through which data is getting shared with State or Central Government, Autonomous Bodies and Parastatal Agencies under the government.	Yes/No	Binary marking
Data Sharing Process - External Stakeholders	Are there any processes adopted by the city for sharing data under this sector with external stakeholders?	List of processes through which data is getting shared with other external stakeholders - Academia, Industry, Civil Society, etc.	Yes/No	Binary marking
Publication of Open Datasets	Has the city published machine-readable open datasets related to this sector online on any government web portal?	Datasets published on any government web portal for this particular sector, including Smart Cities Open Data Portal/India Urban Observatory website/ any other official government website.	Yes/No	Binary marking

SECTORAL MATURITY

Indicator	Question	Description / Guidance	UOM	Scoring
Data Ano-nymization	Does the city follow any standard processes for anonymization of personal datasets/feeds for sharing the information and data for this sector?	Data anonymization is one of the techniques that can be used to adhere to strict data privacy regulations that require the security of personally iden-tifiable information (PII), such as health reports, contact information, and financial details.	Yes/No	Binary marking
DATA MANAGEMENT				
Data Catego-rization and Classification	Has the city implemented any Data Categorization and/or Data Clas-sification method for managing city data for this sector?	Data categorization and data clas-sification as per the use of data are necessary to maintain information security. Data Categorization may be done in terms of - Personal Data and Non-Personal Data. Data Classification may be done in terms of access, i.e. - Public/Shareable Data, Negative List, Restricted Data and Sensitive Data. More details can be sourced from the DataSmart Cities Strategy and City Data Policy guidance document.	Yes/No	Binary marking
Data Ac-countability Framework	Has the city implemented any data accountability framework for this sector?	Once the data is collected, various stakeholders may be involved in its movement from source to destination. This movement needs to be efficiently monitored to maintain data accuracy. Specific approval flow should be defined and followed by the officers nominated/appointed for this purpose.	Yes/No	Binary marking
SOPs for Data Management	Does the city follow any Standard Operating Procedures for manage-ment of data for this sector?	SOPs must cover each stage of data handling as defined in the DataSmart Cities Strategy & the City Data Policy guidance document. It will include: SoP for electronic data collection, SoP for data processing and cleaning, SoP for quality assessment of datasets, SoP for data publishing, SoPs for data archival & retention, SoP for data collection, processing and analysis for on field survey, provisions for data analysis, SoPs for data security and privacy.	Yes/No	Binary marking

The left side of the table is labeled vertically: **SECTORAL MATURITY**

Ministry of Housing and Urban Affairs

Government of India