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Smart City
MISSION TRANSFORM-NATION

Ministry of Housing and Urban Affairs
Government of India

150 YEARS OF CELEBRATING THE MAHATMA

स्वच्छ भारत
एक कदम स्वच्छता की ओर

EASE OF LIVING

Index 2019

Assessment Framework

DAY-NULM
Deendayal Antyodaya Yojana-National
Urban Livelihoods Mission

HRIDAY
Rejuvenating the Soul of Urban India

Atal Mission for Rejuvenation
and Urban Transformation

Urban Transport

Content

MESSAGE

Durga Shanker Mishra

Secretary, MoHUA

The world is witnessing the largest wave of urbanization. More than 50 percent of the world's population is now living in the cities. This ratio is expected to rise to 70 percent by 2050. In India, urban areas are currently home to over 31 percent of population and are projected to house more than 40 percent of its population by the year 2030. Also, the people migrating from rural to urban areas have dreams and aspirations to improve their quality of life with better facilities for living and livelihood that includes physical, social, institutional and economic infrastructure.

Ministry of Housing and Urban Affairs, through the flagship initiatives of Smart Cities Mission (100 cities); AMRUT Mission (500 cities); PMAY(U), SBM(U) and NULM (all cities/towns), is well-positioned in taking the lead to develop the cities of India by leveraging the 'city as a platform concept' for transformation of the economy and the society. However, India's exponential urban population growth, coupled with the growing challenges of urban governance in India, requires capacity strengthening in the urban ecosystem across the quadruple helix of society, government, academia and industry, at every level.

While a bouquet of programs and initiatives are being pursued to make this transformation happen, it is important to put in a place a system of data driven governance which truly empowers cities to plan their decisions in real time by being fully aware of the complex interplay between various sectors. With this in mind, Ministry of Housing and Urban Affairs

developed the Ease of Living Index in 2018, which has been taken to the next level by launching a more comprehensive assessment framework for Ease of Living 2019.

The Index aims to assess the ease of living of citizens living in the cities across three pillars of quality of life; economic ability; and sustainability, 14 categories (Education, Health, Housing & Shelter, WASH & SWM, Mobility, Safety & Security, Recreation, Economic Development, Economic Opportunities, Gini coefficient, Environment, Green spaces & building, Energy Consumption and City Resilience) and 50 indicators. An important aspect of this assessment is emphasis on collecting quality and reliable urban data through rigorous document check and physical audit. This would imbibe a culture of data driven governance in cities to effectively plan, implement and monitor city services in the future.

An exercise of this scale would not have been possible without the phenomenal leadership and teamwork of officers of the Smart Cities Mission and their supporting partners in designing such a comprehensive Assessment Framework. I appreciate the good work done by them.

PREFACE

Kunal Kumar

Mission Director, Smart Cities Mission, MoHUA

I welcome all stakeholders to this edition of the Ease of Living Index Framework, 2019. The first framework on 'Ease of Living' Index for cities was launched in June 2017 with use of indicators adapted from various national/international indicator sets and service level benchmarks. The objective of framing the index was to enable a shift to data driven approach in urban planning and management and promote healthy competition among cities. Post release of the first Ease of Living Index report in August, 2018, we received feedback from various stakeholders on ways to improve the approach and methodology of the index.

The current set of indicators has evolved as a result of those deliberations. An emphasis on making this edition more focussed on outcomes was seen and hence, it was decided that in this iteration, we will separate the enabling input indicators and the outcome indictors that were part of the original index when we assessed ease of living. This would lead to a more meaningful ease of living index focussing on output/outcome indicators, and the input or performance indicators that are the enablers can be assessed separately as a Municipal Performance Index that would assess the performance of cities based on their efforts to improve the quality of live, create infrastructure thereby enabling ease of living for its citizens.

Smart Cities Missions (SCM) has the objective of promoting cities that provide core infrastructure, give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. Ease of Living Index 2019 has been framed by aligning its pillars of assessment to the above objectives, and broadening them to the overall goal of

holistic development of Indian cities. The assessment of these outcomes forms the pillars of Ease of Living Index 2019 vis. Quality of Life, Economic Ability and Sustainability. This will help city administrations move towards outcome-based planning from the current input-based approach. With this, the Ministry has sought to facilitate Smart Cities and other million plus population cities in assessment of these three outcomes, that will eventually lead to better planning and management of cities.

The three pillars comprise 14 categories and 50 indicators which have been selected after multiple rounds of consultation with different stakeholders. The Index has a component of a citizen perception survey to gauge the pulse of the citizenry with regard to livability and the findings from the perception survey will help in mapping with the results of the Index to assess if the view of the citizens about city matches with the service outcomes. This framework also carries a discussion on the means through which data will be collected, validated and cleaned and delves into the method of scoring for the various indicators. Furthermore, the report also outlines the challenges that will be encountered while calculating the Index and the means to resolving them.

It is a transformative initiative of the Ministry of Housing and Urban Affairs to help the cities assess their ease of living vis-à-vis national & global benchmarks and is strongly linked to the Sustainable Development Goals (SDGs). I believe each city will now be able to undertake a 360-degree assessment of their strengths, weaknesses, opportunities, and threats. Wishing everyone the very best for this exciting exercise!

Introduction

It has been long been accepted that material well-being, popularly measured in terms of Gross Domestic Product (GDP), cannot fully explain the broader well-being of a region and its inhabitants. Even though economic growth has lifted billions around the world out of poverty over time, it has not been sufficient in ensuring the welfare of societies. The fundamental issue, thus, is to develop a more holistic outlook of development that encompasses aspects that are not limited to economic performance.

Keeping this in mind, ease of living becomes a worthy goal to pursue to improve well-being of citizens. Since the eventual aim of development is to improve liveability rather than just expansion of economic output, a robust measure of ease of living is crucial. These need to be especially looked upon in the context of urban centres within nations.

The latter focus is necessary because the world is moving towards cities at a rapid pace.

50% ⟶ **70**% by 2050

More than 50 percent of the world's population is now living in the cities. **This ratio is expected to rise to 70 percent by 2050**
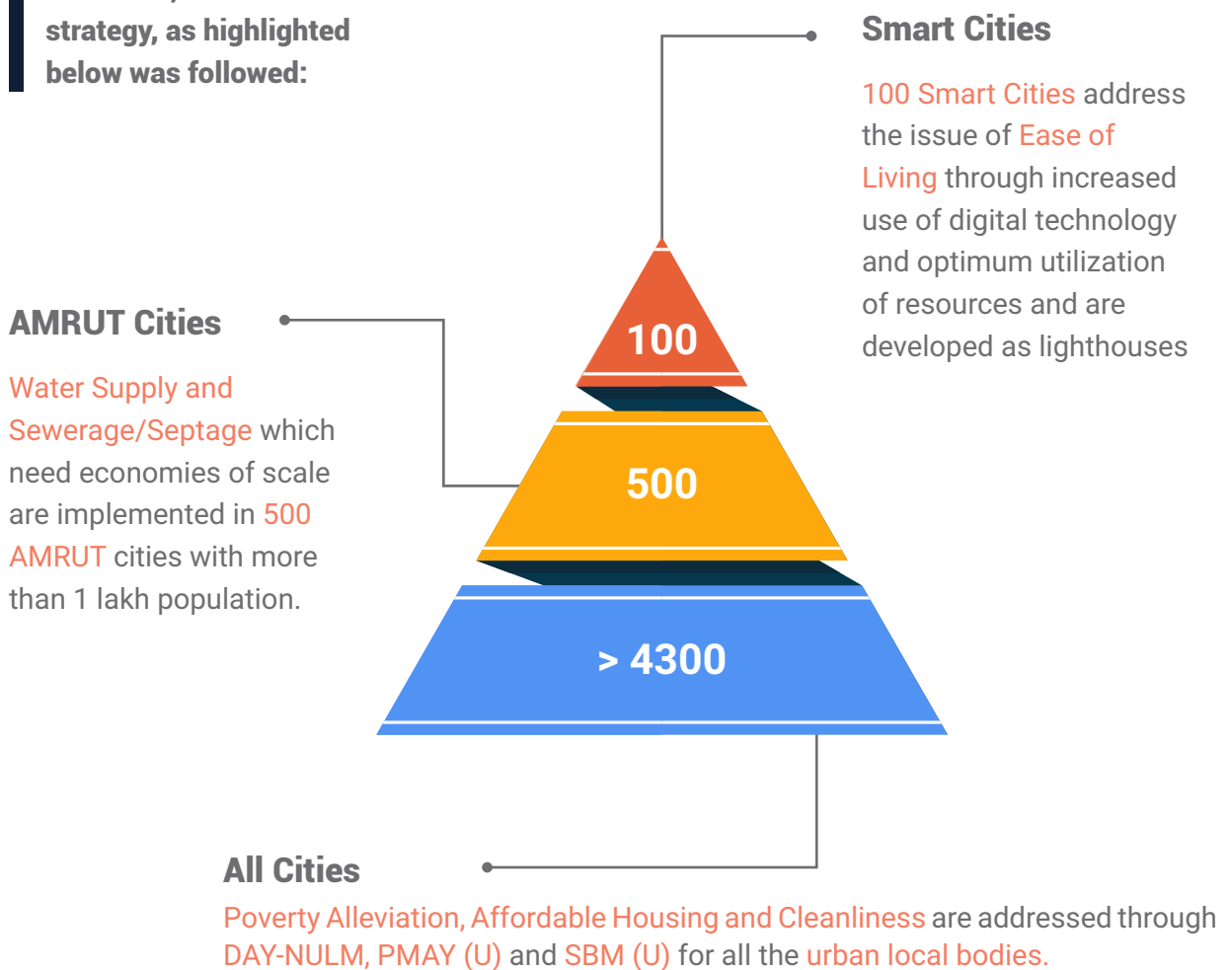
The same is true for India as well. As per the last Census in 2011, the urban population in India stood at 37.7 crores, which accounted for 31 percent of the country's population. This is projected to increase to 60 crores (40%) by 2030 and over 80 crores (50%) by 2050.

As more and more Indians migrate to cities with aspiration of a better quality of life and economic and social opportunities, it will become increasingly challenging to address the challenges that come with it. With a rising concentration of people and a limitation of resources, cities will require efficient management and planning to sustain themselves and drive well-being and prosperity.

The population migrating from rural to urban areas have dreams and aspirations to improve their quality of life with better facilities for living and livelihood that includes physical, social, institutional and economic infrastructure. All these pose huge challenges in view of rapid urban growth. Hon'ble Prime Minister saw these challenges as big opportunities to drive the economy forward—investments in infrastructure will create jobs, improve ease of living and employ citizens to best of their abilities in service of the nation.

Therefore, a three-level strategy, as highlighted below was followed:

Smart Cities

100 Smart Cities address the issue of Ease of Living through increased use of digital technology and optimum utilization of resources and are developed as lighthouses

AMRUT Cities

Water Supply and Sewerage/Septage which need economies of scale are implemented in 500 AMRUT cities with more than 1 lakh population.

100

500

> 4300

All Cities

Poverty Alleviation, Affordable Housing and Cleanliness are addressed through DAY-NULM, PMAY (U) and SBM (U) for all the urban local bodies.

a. At the first level, poverty alleviation, affordable housing and cleanliness are the three biggest challenges. Deen Dayal Antyodaya Yojana-National Urban Livelihood Mission (DAY-NULM), Pradhan Mantri Awas Yojana-Urban (PMAY-U) and Swachh Bharat Mission-Urban (SBM-U) are implemented in all the urban local bodies.

b. At the second level, basic infrastructure like water supply and sewerage/septage management, storm water drainage, non-motorised urban transport and green parks are in the focus. These sectors require economies of scale and are being implemented in 500 cities, with 1,00,000 and above population through Atal Mission for Rejuvenation and Urban Transformation (AMRUT). This covers over 65% of urban population.

c. Finally at the third level, 100 cities are being developed under Smart Cities Mission (SCM) to address the issue of ease of living by evolving new paradigms of urban governance with communities at the core and an increased use of digital technology to improve the urban infrastructure, services and optimum utilisation of resources.

Along with the strengthening of institutions, the need for urban transformation at speed and scale is fully recognized. While a bouquet of programs, initiatives are being pursued to make this transformation happen, it is important to put in a place a system of performance evaluation which truly reflects the evolution of the ease of living of Indian cities in consonance with these needs.

The Ease of Living Index has been developed by the Ministry of Housing and Urban Affairs with a similar intent. The Ease of Living 2019 will be the second edition of Ease of Living Index. The Index itself has been strengthened based on learnings from the last year's exercise and has also been expanded in scope with an accompanying Municipal Performance Index. The latter is meant to assess the performance of local bodies and their service efficiency while the former is aimed at assessing the outcomes of these services and the citizen perception of it.

The Index aims to quantify the ease of living of citizens living in the cities across three pillars: quality of life, economic ability, and sustainability. Therefore, we look at the livability of citizens within cities, which incorporates both quality of life and the economic opportunities available across these urban agglomerations. The Index has a component of a citizen perception survey to assess the sense of the people with respect to the livability within cities. The findings from the perception survey are meant to be mapped with the findings of the Index to assess if the view of the citizens about city matches with the service outcomes.

In all, the Municipal Performance Index and the Ease of Living Index, of which the citi-
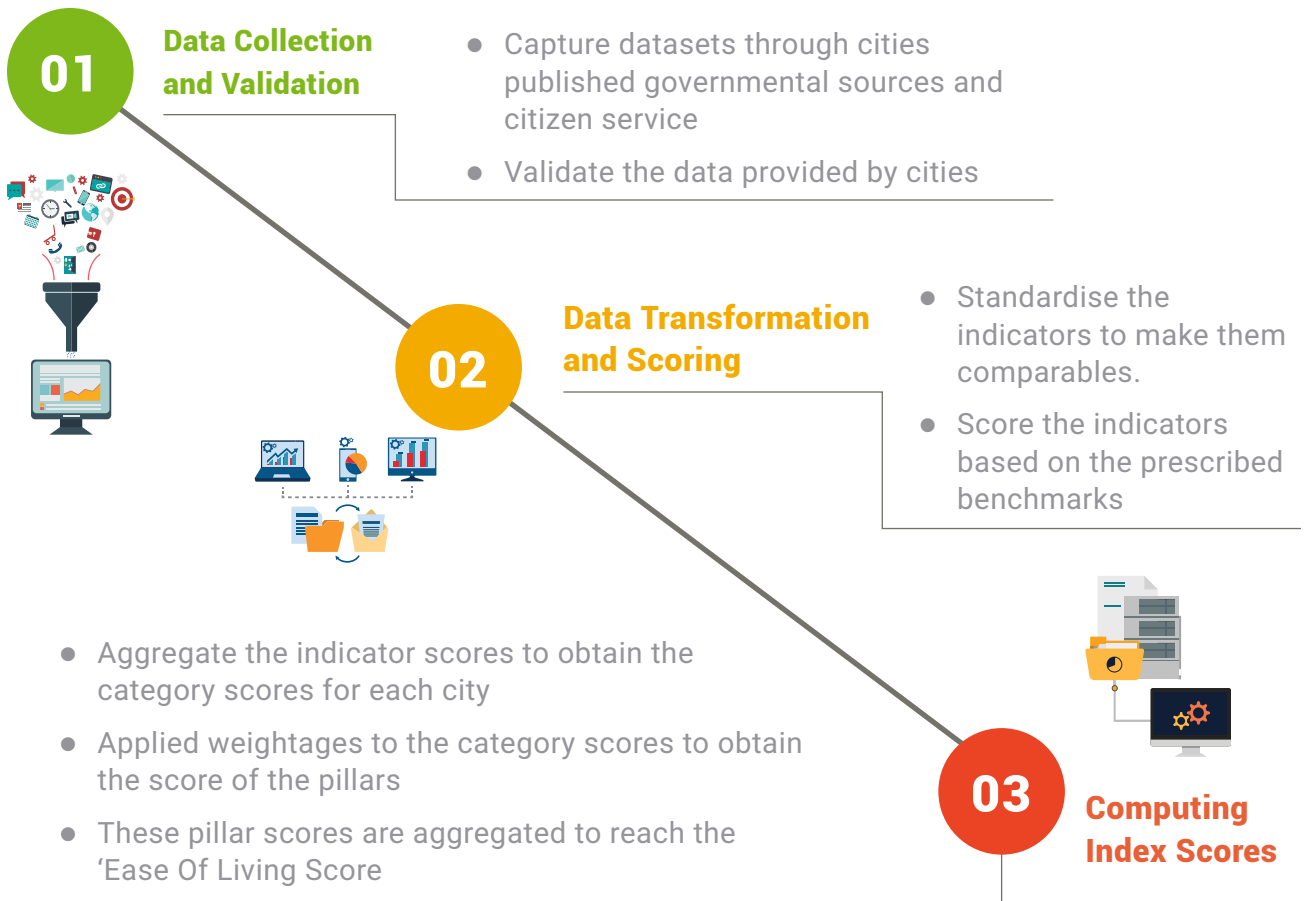
zen perception survey is a part, are aimed at providing a holistic view of Indian cities beginning from the services provided by local bodies, the effectiveness of the administration, the outcomes generated through these services in terms of the livability within cities and, finally, the citizen perception of these outcomes.

The key objectives of the Ease of Living Index are to:

- Generate information to guide evidence-based policy making;
- Catalyse action to achieve broader developmental outcomes including the Sustainable Development Goals;
- Assess and compare the outcomes achieved from various urban policies and schemes;

- Obtain the perception of citizens about their view of the services provided by the city administration.

This report outlines the methodology that will be adopted in calculating the Ease of Living Index and discusses the formulation of the survey. It carries a discussion on the means through which data will be collected, validated and cleaned. It then delves into the ways in which scoring will be done for the various indicators and describes them in detail. Furthermore, the report also outlines the challenges that will be encountered while calculating the Index and the means to resolving them.
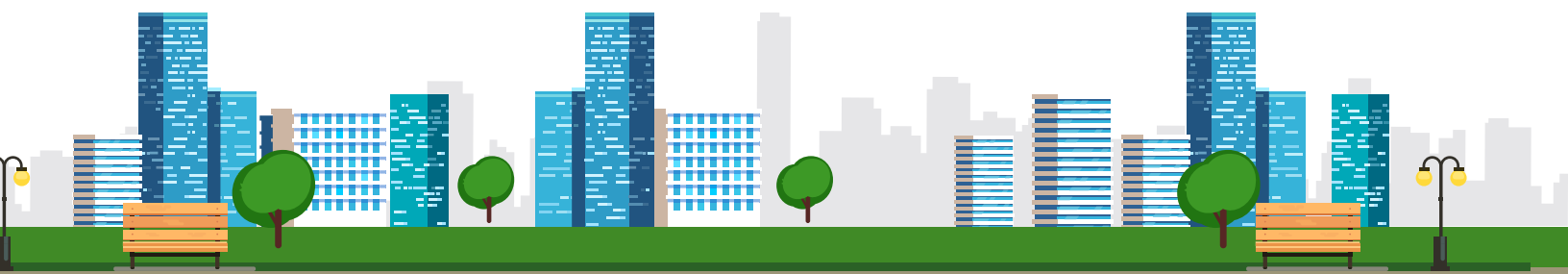
01

Data Collection and Validation

- Capture datasets through cities published governmental sources and citizen service
- Validate the data provided by cities

02

Data Transformation and Scoring

- Standardise the indicators to make them comparables.
- Score the indicators based on the prescribed benchmarks

- Aggregate the indicator scores to obtain the category scores for each city
- Applied weightages to the category scores to obtain the score of the pillars
- These pillar scores are aggregated to reach the 'Ease Of Living Score

03

Computing Index Scores

01

Framework
of the Index

The Ease of Living Index examines the liveability of Indian cities across a set of three pillars, which encompass the various aspects of well-being of citizens. The three pillars include a total of 14 categories and 50 indicators.

The framework of the Ease of Living Index 2019 is as follows:

Figure 1: Framework

Quality of Life	Economic Ability	Sustainability
Assessing Social Wellbeing	Economic Robustness	Managing Urban Spaces
• **Education** • **Health** • **Housing and Shelter** • **Wash and SWM** • **Mobility** • **Safety and Security** • **Recreation**	• **Level of Economic Development** • **Economic Opportunities** • **Gini Coefficient**	• **Environment** • **Green Spaces and Buildings** • **Energy Consumption** • **City Resilience**

EASE OF LIVING

The first pillar - "Quality of Life" is reflective of an individual's ability to survive and prosper in a particular area. It indicates whether a region can provide its citizens with the basic needs of survival such as safe and livable housing facilities, improved sources of water and sanitation, access to basic education and health facilities etc. The second pillar, "Economic-ability" 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, creation of greater employment opportunities, need for clusters etc. Lastly, the third pillar – "Sustainability" - aims at realising the need for greener cities and an emphasis on reduction of energy consumption. It is important to touch upon this aspect as it is an indicator everything that can hinder people from achieving their full potential in life.

Ease Of Living index

Quality of Life

Education

- Household Expenditure on Education
- Literacy Rate
- Pupil-Teacher Ratio
- Drop Out Rate
- Access to Digital Education
- Professionally Trained Teachers
- National Achievement Survey Score

Health

- Household Expenditure on Health
- Availability of Healthcare Professionals
- Accredited Public Health Facilities
- Availability of Hospital Beds
- Prevalence of Water Borne Diseases
- Prevalence of Vector Borne Diseases

Mobility

- Availability of Public Transport
- Transport Related Fatalities
- Road Infrastructure
  a. Road Density
  b. Footpath Density

WASH and SWM

- Water Supply to Household
- Households with Piped Water Supply
- Swachh Survekshan Score
- Amount of Waste Water Treated
- Connected to Sewerage Network

Housing and Shelter

- Households with Electrical Connections
- Average Length of Electrical Interruptions
- Beneficiaries Under PMAY
- Slum Population

Safety and Security

- Prevalence of Violent Crime
- Extent of Crime Recorded against Women
- Extent of Crime Recorded against Children
- Extent of Crime Recorded against Elderly

Recreation

- Availability of Open Space
- Availability of Recreation Facilities

Economic Ability

Level of Economic Development

- Traded Clusters

Economic Opportunities

- Cluster Strength
- Credit Availability
- Number of Incubation Centres / Skill Development Centres

Gini Coefficient

- Inequality Index based on Consumption Expenditure

Sustainability

Environment

- Water Quality
- Total Tree Cover
- Households using Clean Fuel for Cooking
- Hazardous Waste Generation
- Air Quality Index
  a. SO_2
  b. NO_2
  c. PM_{10}

Green Spaces and Buildings

- Availability of Green Spaces
- Does the City Incentivise Green Buildings? (Y/N)
- Green Buildings in the City

City Resilience

- Has the city implemented local Disaster Reduction Strategies? (Y/N)
- Number of Deaths and directly affected persons Attributed to Disasters

Energy Consumption

- Energy Requirement vs Energy Supplied
- Energy Generated from Renewable Sources
- Number of Energy Parks

The index calculated based on the data provided by cities (and validated through secondary sources) will be further validated through a citizen perception survey, which will carry 30 percent weightage.

There is no reason for us to believe that any of the categories is more important than the others. Therefore, they are given equal weightage. Since the number of categories vary under each pillar, the pillars receive different weights (Figure 2).

Figure 2: Weightages of Ease of Living Index

30% CITIZEN PERCEPTION

35% QUALITY OF LIFE

15% ECONOMIC ABILITY

20% SUSTAINABILITY

02
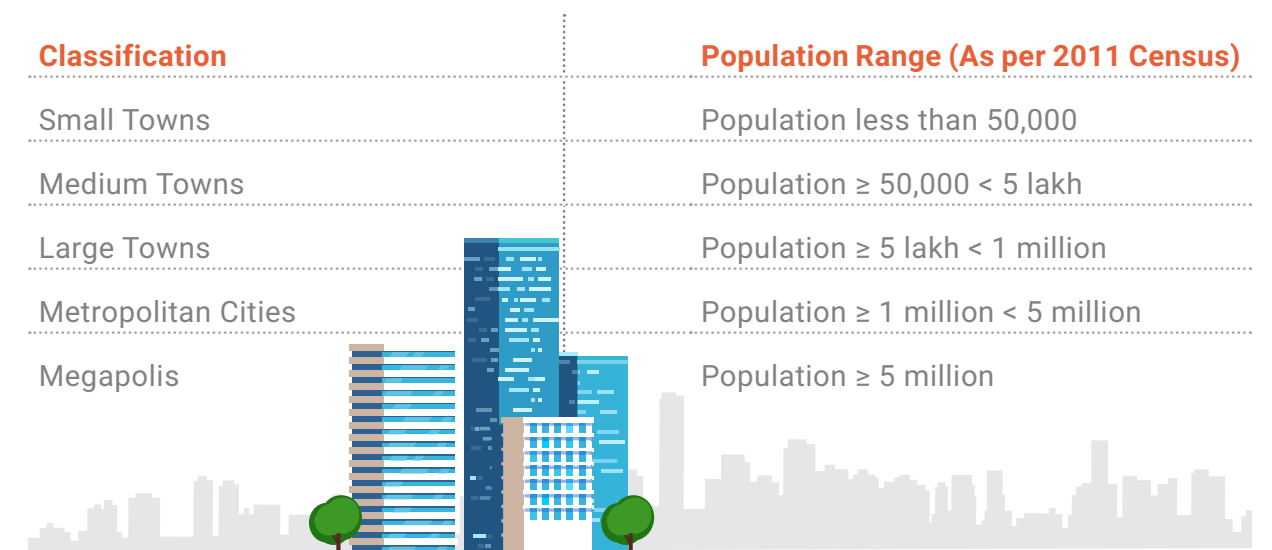
Methodology
of the Index

The set of 50 indicators that form the Ease of Living are 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 level of development and population sizes, it was 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 2011 Census)
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

Source: URDPFI Guidelines

The first stage of the project will include an analysis of 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.

Data Collection and Validation

We begin with the process of data collection and validation. The data for all the indicators will be collected through two sources. First, cities will be asked to submit the data. Second, data will be collected through publicly available government sources. This process will help in validating the data submitted by cities. However, in some cases the publicly available data is not at the city level. Therefore, we need to create methods to map city geographies with the district or state level.

There are two types of mapping required for the same:

District Level Mapping

There are some indicators for which the data is available at the district level. For instance, U-DISE provides the school level educational statistics – pupil teacher ratio, drop out ratio etc at the district level. This is also true for higher educational statistics available at AISHE, crime data available at NCRB and household level data available at NFHS.

For addressing this challenge, we will have to devise a mapping between the cities and districts. However, there are some overlaps. Such as Thane district has two cities – Kalyan and Thane. For such cases an approach based on scoring methods is devised to obtain city level data.

- All the cities that fall under the same district will be given the same value for ratios. For example, pupil teacher ratio will be the same for Kalyan and Thane.

- The data that is available in numbers such as the total number of parks, recreation clubs and drama centres will be divided between the cities based on population or area.

Mapping NSSO Data

NSSO surveys collect data for household expenditure on education, healthcare etc at the state and the district level. However, pin codes are provided in the data. These pin codes will be mapped to the city boundaries to get an approximation of these data points at the state level. But it should be kept in mind that below district level the sample size in NSSO becomes very thin which results in unrealistic approximations in some cases.

The validation data sources are provided against each indicator in the document. However, if cities are able to provide credible published governmental source then it may be used for the process of validation.

Scoring Methods

The data that is collected for the various indicators across the Index will be obtained in varied units. For instance, professionally trained teachers in schools will be a percentage of the total teachers while footpath density will be a ratio of total length of footpath to the total length of road. Each kind of such indicator will have a different scoring mechanism.

Percentage

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

Ratio

Similarly, to weigh the data for comparability some indicators will be obtained in the form of ratios. For instance, transport related fatalities are to be weighed by per lakh of 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 cities. For instance, the indicator assessing if city incentivises takes a similar form. For such a question, "yes" answer will result in a marking of 1 and "no" answer will result in a marking of 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 will be taken as a benchmark and each city will be scored based on the deviation from it. For instance, in the case of household expenditure on education as a percentage of total household expenditure, the mean expenditure proportion for all cities will be obtained and the deviation of each city 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 at

the primary level, 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, cities 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.

In cases where Service Level Benchmarks or national norms are not available city performance within its group will be treated as the benchmark. These city groups are provided in the city classification section.

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, the availability of public transportation is positively related with the ease of living of citizens while the prevalence of crimes reflects the challenges faced by the citizens. Therefore, the first step is to modify all the indicators in the set in a way that greater value means a higher score.

The table below presents a list of all the indicators that have to be inverted before the calculations.

	Categories	Indicator	Unit	Numerator	Denominator
Quality of Life	Education	Pupil-Teacher Ratio (Primary Level: Grade 1-5)	RATIO	Pupil-Teacher Ratio at the Primary Level across Govt and Private Schools	
		Drop Out Rate (Primary Level: Grade 1-5)	RATE	Drop Out Rate at the Primary Level across Govt and Private Schools	
		Pupil-Teacher Ratio (Upper-Primary: Grade 6-8)	RATIO	Pupil-Teacher Ratio at the Upper-Primary Level across Govt and Private Schools	
		Drop Out Rate (Upper-Primary: Grade 6-8)	RATE	Drop Out Rate at the Upper-Primary Level across Govt and Private Schools	
	Health	Prevalence of: • Water borne Diseases (Jaundice, Typhoid • Vector borne diseases (Malaria, Dengue)			

			SCORES	Total duration of electrical interruptions in a day	
Quality of Life	**Housing and Shelter**	Average length of electrical interruptions	SCORES	Total duration of electrical interruptions in a day	
		Slum Population	%	Slum population of the city	Total population of the city
	Mobility	Transport related fatalities	RATIO	Transport related fatalities	Per lakh of population
	Safety and Security	Prevalence of Violent Crime	RATIO	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, grievous hurt	Per lakh of population
		Extent of crime recorded against women	RATIO	Crimes against women	Per lakh of population
		Extent of crime recorded against children	RATIO	Crimes against children	Per lakh of population
		Extent of crime recorded against elderly	RATIO	Crimes against elderly	Per lakh of population
Sustainability	**Environment**	Hazardous waste generation	%	Total quantity of hazardous waste generation in metric tons	Total waste generation

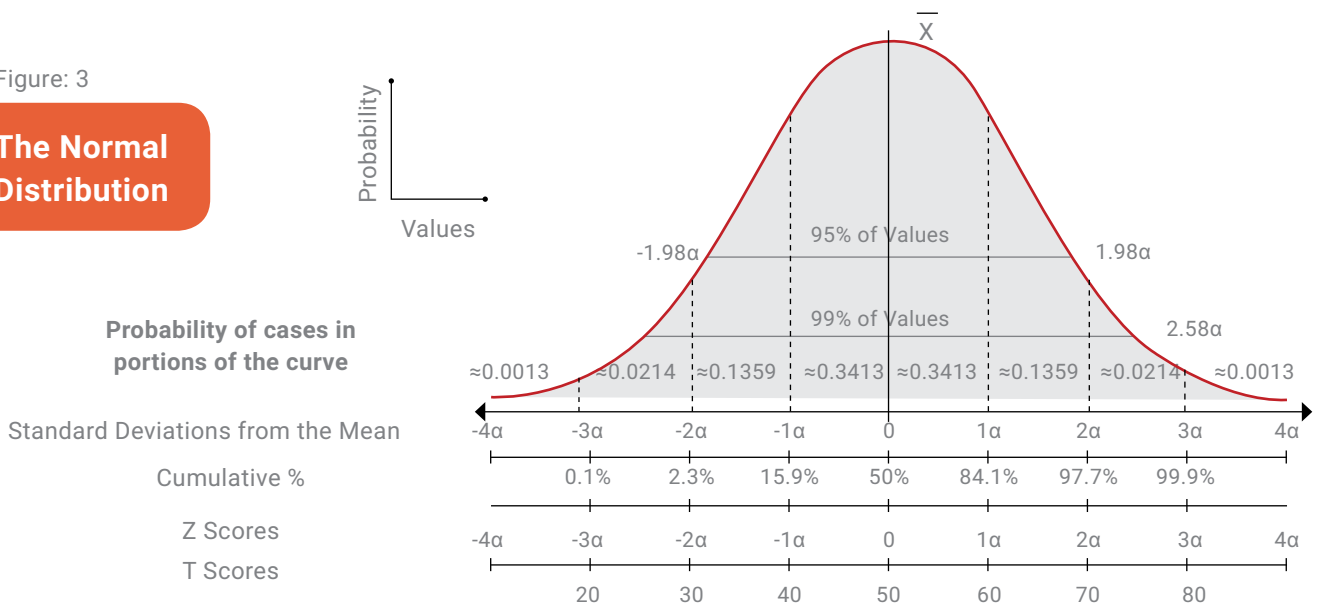|				
Energy Consumption	Energy Requirement vs Energy Supplied	DIFFER-ENCE	Energy Requirement of the city for the year	Energy Supplied by the city during the year
City Resilience	Number of deaths and directly affected persons attributed to disasters	RATIO	Number of Deaths due to disasters	Per lakh of popu-lation

Sustainability

Normalization

It is the step 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 the 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.

Figure: 3

The Normal Distribution

	-4α	-3α	-2α	-1α	0	1α	2α	3α	4α
Probability of cases in portions of the curve	≈0.0013	≈0.0214	≈0.1359	≈0.3413	≈0.3413	≈0.1359	≈0.0214	≈0.0013	
Standard Deviations from the Mean	-4α	-3α	-2α	-1α	0	1α	2α	3α	4α
Cumulative %		0.1%	2.3%	15.9%	50%	84.1%	97.7%	99.9%	
Z Scores	-4α	-3α	-2α	-1α	0	1α	2α	3α	4α
T Scores		20	30	40	50	60	70	80	

Standardization

Standardization helps solving the problem of non-comparability by making indicators unitless as it re-scales them with a mean of zero and standard deviation of one.
It is calculated using the following formula:

$$Z = (X - \mu)/\sigma$$

Z	represents the z-score	μ	is the mean
X	is the indicator value	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 percent weightage in the overall Ease of Living Scores and the Citizen Perception Survey has 30 percent weightage.

Category Scores

Each indicator under the category will be given equal weightage. The category values are calculated by summing the weighted scores using the following formula:

Category = ∑ (wi * indicator)

For instance, the category "Housing and Shelter" has four indicators, so the weight of every indicator for calculating the score for sector health will be 20 percent or 0.2.
This implies that:

Scores of Housing and Shelter = (0.2* Value of households with electrical connections + 0.2* Value of average length of electrical interruptions + 0.2* Value of beneficiaries Under PMAY+ 0.2* Value of Slum Population)

These scores will be transformed to a 0 to 100 scale. The calculation will be done using the following formula:

$$\frac{(X - \text{Minimum Score})}{(\text{Maximum Score} - \text{Minimum Score})}$$

X is the city score

This sector value is represented by A to N from in the table below.

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:

$$Pillar = \sum (w_i * \text{Category Scores})$$

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

Pillars	Category (Score of Category)	Score of Pillar
Quality of Life (35%)	Education (A)	
	Health (B)	
	Housing and Shelter (C)	
	Wash and SWM (D)	$O = (A+B+C+D+E+F+G)/7$
	Mobility (E)	
	Safety and Security (F)	
	Recreation (G)	
Economic Robustness (15%)	Level of Economic Development (H)	
	Economic Opportunities (I)	$P = (H+I+J)/3$
	Gini Coefficient (J)	
Sustainability (20%)	Environment (K)	
	Green Spaces and Buildings (L)	$Q = (K+L+M+N)/4$
	Energy Consumption (M)	

03

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.

Ease of Living - Perception Survey (Tentative)			
1. Quality Of Life			
1.1	**EDUCATION**	1	2	3
	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
1.2	**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
1.3	**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
1.4	**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
1.5	**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
1.6	**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
	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
1.7	**RECREATION**			
	How accessible are recreational facilities (parks, theaters and complexes) in the city?	Poorly accessible	Fairly accessible	Easily accessible

2. Economic Ability				
2.1	**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

3. Sustainability				
3.1	**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

3.2	**GREEN SPACES AND BUILDINGS**	35		
	How would you rate the availability of open spaces (parks and gardens) in your locality?	Poor	Fair	Good
3.3	**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
3.4	**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

	4. Public Services			
4.1	How would you rate the birth registration process in your municipality?	Poor	Fair	Good
4.2	How would you rate the death registration process in your municipality?	Poor	Fair	Good
4.3	How would you rate the process of obtaining building and construction permits?	Poor	Fair	Good

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

Ease of Living Index Scores

The Ease of Living index score is weighted average of the scores of all the pillars and the citizen perception survey. The index has 70 percent weightage and the survey has 30 percent weightage. This will be calculated using the following formula:

Ease of Living Index Scores = O.35*0 + 0.15*P + 0.20*Q + 0.30*(Scores of Citizen Perception Survey)

04

Indicator
Description

1.1.1

Household Expenditure
on Education

Vertical

Quality of Life

Sector

Education

Numerator	Household expenditure on education
Denominator	Total household expenditure
Unit	Scores
Validation Data Source	NSSO (pin code level data)
Scoring	Scores based on the deviation from mean expenditure on education
SDG Mapping	SDG Target 4.1: By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

1.1.2
Literacy Rate

Vertical

Quality of Life

Sector

Education

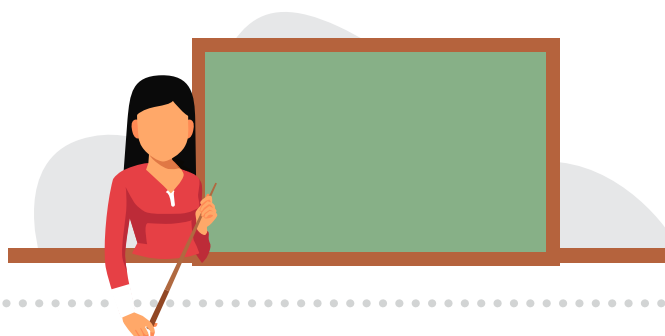| Indicator	Literacy Rate of the city population
Unit	Rate
City Data Source	• Data on literacy is compiled by every state, district and city, under the Unified District Information System of Education (U-DISE) Programme of the Ministry of Human Resources Development (MHRD). • Under U-DISE, school data is updated annually with 30th September as the reference date.
Validation Data Source	DISE (District level data)
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

1.1.3

Pupil-Teacher Ratio
at the Primary Level

Vertical

Quality of Life

Sector

Education

Indicator	Pupil-Teacher Ratio at the Primary Level (Grade 1-5) across Govt and Private Schools
Unit	Total household expenditure
City Data Source	The number of classroom teachers and other instructional staff (e.g. teachers' aides, guidance counsellors), shall not include administrators or other non-teaching staff. • Kindergarten or pre-school teachers and staff shall not be included. • Include data related to Grade 1-5. • Enrolment in schools is given as the number of students who are enrolled in a particular grade as on 30th September of the School Year. It shall include new entrants, promotees and repeaters • Data on school enrolment is compiled by every state, district and city, under the Unified District Information System of Education (U-DISE) Programme of the Ministry of Human Resources Development (MHRD). • Under U-DISE, school data is updated annually with 30th September as the reference date. • Data should include both public and private schools.
Validation Data Source	DISE (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

1.1.4

Drop Out Rate
at Primary Level

Vertical

Quality of Life

Sector

Education

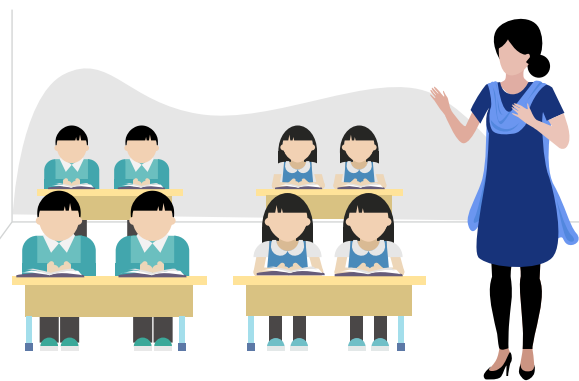| Indicator	Drop Out Rate at the Primary Level (Grade 1-5) across Govt and Private Schools
Unit	Rate
Validation Data Source	DISE (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	SDG Target: 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

1.1.5

Pupil-Teacher Ratio
at the Upper-Primary Level

Vertical

Quality of Life

Sector

Education

Indicator	Pupil-Teacher Ratio at the Upper-Primary Level (Grade 6-8) across Govt and Private Schools
Unit	Ratio
City Data Source	The number of classroom teachers and other instructional staff (e.g. teachers' aides, guidance counsellors), shall not include administrators or other non-teaching staff. ● Kindergarten or pre-school teachers and staff shall not be included. ● Include data related to Grade 6-8.

	• Enrolment in schools is given as the number of students who are enrolled in a particular grade as on 30th September of the School Year. It shall include new entrants, promotees and repeaters • Data on school enrolment is compiled by every state, district and city, under the Unified District Information System of Education (U-DISE) Programme of the Ministry of Human Resources Development (MHRD). • Under U-DISE, school data is updated annually with 30th September as the reference date. • Data should include both public and private schools.
Validation Data Source	DISE (District level data
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

1.1.6

Drop Out Rate at the Upper-Primary Level

Vertical	**Sector**
Quality of Life	Education

Indicator	Pupil-Teacher Ratio at the Upper-Primary Level (Grade 6-8) across Govt and Private Schools
Unit	Ratio
Validation Data Source	DISE (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	SDG Target: 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

1.1.7

Percentage of Schools with Access to Digital Education

Vertical

Quality of Life

Sector

Education

Indicator	Pupil-Teacher Ratio at the Tertiary Level
Unit	Ratio
City Data Source	• Schools with necessary infrastructure and connection to digital resources such as the National Knowledge Network (NKN) developed by the Government of India shall be counted. • Data (including for total number of schools) should include both public and private schools and can be obtained from the Education Department. • Where such data is not available the same may be obtained through ward-level surveys of sample schools
Validation Data Source	AISHE (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

1.1.8

Percentage of Professionally Trained Teachers

Vertical

Quality of Life

Sector

Education

Numerator	Number of Professionally Trained Teachers in city schools
Denominator	Total Number of Teachers in city schools
Unit	Percentage
City Data Source	• Consider both public and private schools • Data can be collected from U-DISE

Validation Data Source	DISE (District level data)
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

1.1.9

Nation Achievement Survey Score

Vertical

Quality of Life

Sector

Education

Indicator	Nation Achievement Survey Scores for Class 3, 5 and 8
Unit	Percentage
City Data Source	Nation Achievement Survey Scores
Validation Data Source	NCERT (District level data)
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

1.2.1

Household Expenditure
on Health

Vertical

Quality of Life

Sector

Health

Numerator	Household expenditure on health
Denominator	Total household expenditure
Method	Deviation from Mean
Validation Data Source	NSSO (District level data)
Scoring	Scores based on the deviation from mean expenditure on heal
SDG Mapping	SDG Target: 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all SDG Indicator: 3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income

1.2.2

Availability of
Healthcare Professionals

Vertical

Quality of Life

Sector

Health

Numerator	Total number of doctors (public + private) in the city
Denominator	Total population of the city
Unit	Ratio
City Data Source	• Qualified healthcare professionals will include Doctors (Allopathic), Doctors (AYUSH), Trained Nurses, Dentists, Pharmacists, and Auxiliary Nurse Midwives (ANMs). • Data can be obtained from the administrative records such as physicians registered with the Medical Council of India in the city. Information may also be obtained from the census, labour force statistics or other surveys which inquire occupation. available with the Health Department.

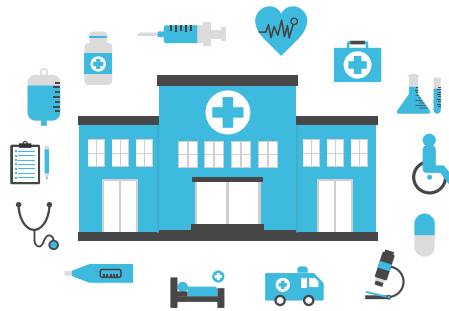| Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all 3.c.1 Health worker density and distribution

1.2.3

Accredited Public
Health Facilities

Vertical

Sector

Quality of Life

Health

| Numerator	Total accredited public health facilities
Denominator	Total number of public health facilities
Unit	Percentage
City Data Source	Only public health facilities should be considered.
Validation Data Source	NITI Aayog
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	1.4.1 Proportion of population living in households with access to basic services

1.2.4

Availability of
Hospital Beds

Vertical

Sector

Quality of Life

Health
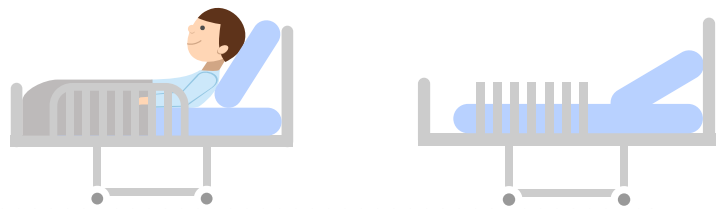
Numerator	Total number of hospital beds in city hospitals (public + private)
Denominator	Total population of the city

Unit	Ratio
City Data Source	• Data on hospital beds should include both public and private hospitals and should be sourced from the Health Department. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Scoring	25 beds per 10,000 population (Service Availability and Readiness Assessment, SARA, Reference Manual 2015, World Health Organization)
SDG Mapping	3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

1.2.5

Prevalence of **Diseases**

Vertical　　　　**Sector**

Quality of Life　　Health

Indicator	Prevalence of: Water borne Diseases (Jaundice, Typhoid) Vector borne diseases (Malaria, Dengue)
Unit	Ratio
City Data Source	Water Borne diseases • Only instances of water borne diseases like cholera, typhoid, dysentery etc. should be captured. Data can be obtained from the records maintained by the Health Department for the measurement period. • Alternatively, data available with government hospitals can be used as a basis to estimate the number of cases in the city. Data for remaining hospitals (non-government) can be proportionate to the number of private beds as compared to government hospitals. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population. Vector Borne Diseases • Only instances of vector borne diseases like malaria, dengue, chikungunya etc. should be captured. Data can be obtained from the records maintained by the Health Department for the measurement period. • Alternatively, data available with government hospitals can be used as a basis to estimate the number of cases in the city. Data for remaining hospitals (non-government) can be proportionate to the number of private beds as compared to government hospitals. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.

Validation Data Source	HMIS
Scoring	Lower the better Lowest city value
SDG Mapping	3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

1.3.1

Households with
Electrical Connections

Vertical	**Sector**
Quality of Life	Housing and Shelter

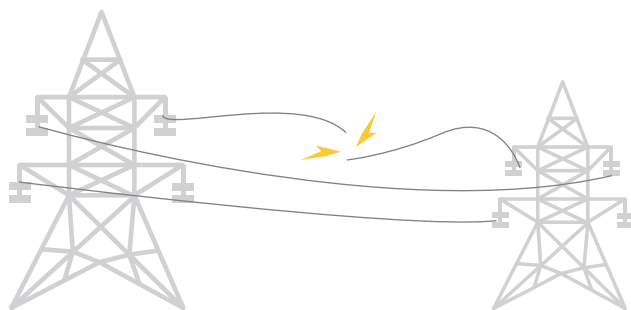| Numerator	Number of authorized electrical connections at household level
Denominator	Number of households in the city
Unit	Percentage
City Data Source	- Only household connections (residential consumers) shall be counted for the indicator. - Data can be obtained from local electricity distribution companies (DISCOMs). - Data on households can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Validation Data Source	NFHS
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	1.4.1 Proportion of population living in households with access to basic services 7.1.1 Proportion of population with access to electricity

1.3.2

Average Length of
Electrical Interruptions

Vertical

Quality of Life

Sector

Housing and Shelter

Numerator	Total number of sustained electrical interruptions in a year
Denominator	Total number of consumers (residential and commercial) served in the same year
Unit	Scores
City Data Source	• The calculation should include all types of consumers – residential, commercial and industrial. • Only instances of sustained power outages that last longer than 5 minutes (as defined by the North American Electric Reliability Corporation, NERC 1996) shall be included in the calculation • Capturing data over the period of an entire year allows the indicator to capture seasonal variations in efficiency of power distribution • Data can be obtained from local electricity distribution companies (DISCOMs)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	7.1: By 2030, ensure universal access to affordable, reliable and modern energy services

1.3.3

Beneficiaries
Under PMAY

Vertical

Quality of Life

Sector

Housing and Shelter

Numerator	Number of beneficiary households under PMAY
Denominator	Number of eligible households under PMAY
Unit	Percentage
City Data Source	Data on PMAY applicants and beneficiaries can be obtained the scheme records.

Validation Data Source	PMAY
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.

1.3.4

Slum Population

Vertical	**Sector**
Quality of Life	Housing and Shelter

Numerator	Slum population of the city
Denominator	Total population of the city
Unit	Percentage
City Data Source	• Data on slum will be the cumulative data for the city at the time of reporting for the PMAY scheme. • Slum households will be as per the last notified list of the ULB or as per Census (in case such listing is not available). • Data on total number of slum and EWS households in the city can be obtained from the records of the ULB.
Validation Data Source	ULB records
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

1.4.1

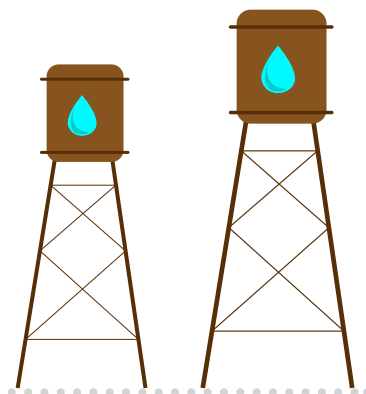# Deviation of Total Water Supplied
from Service-level Benchmark

Vertical

Quality of Life

Sector

WASH and SWM

Numerator	Total water supplied in litres per capita per day (lpcd)
Denominator	
Unit	Deviation from Mean
City Data Source	The information can be obtained from urban local bodies and authorised water supply companies which maintain record on water supplied, delivered, and consumed
Validation Data Source	None
Scoring	Lower the better Utopia: Lowest city value 135 lpcd
SDG Mapping	SDG Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity SDG Indicator 6.4.1: Change in water-use efficiency over time

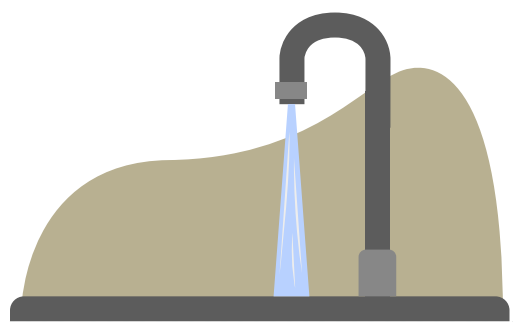# 1.4.2

Households with
Piped Water Supply

Vertical

Quality of Life

Sector

WASH and SWM

Numerator	Number of households with piped supply connections in the city
Denominator	Number of households in the city
Unit	Deviation from Mean
City Data Source	This will include households which receive municipal water supply at one common point, from where it is stored and distributed for all households (for e.g. as in apartment complexes).

	● Households supplied water through public stand posts or tankers should be excluded. Households completely dependent on other water sources such as bore wells, open wells, etc. should not be included. ● Data on number of connections can be obtained from the records available with ULB/ Water Utility or Public Health and Engineering Department (PHED), as applicable. ● Data on households can be obtained from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Validation Data Source	NFHS (District level data)
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	1.4.1 Proportion of population living in households with access to basic services 6.1.1 Proportion of population using safely managed drinking water services

1.4.3

Swachh Survekshan Score

Vertical

Quality of Life

Sector

WASH and SWM
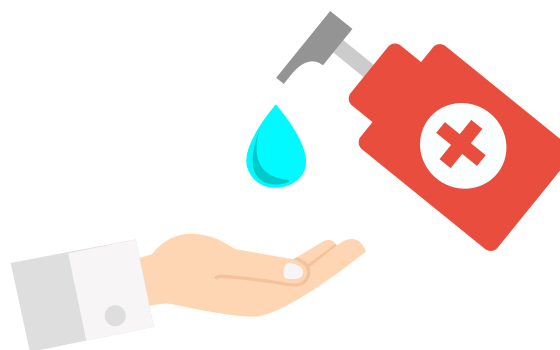
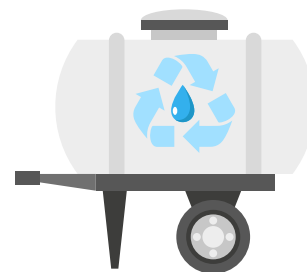| Numerator	Swachh Survekshan 2018 score
Denominator	
Unit	Score
City Data Source	Swachh Survekshan Survey Scores
Validation Data Source	Swachh Survekshan Survey
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water

1.4.4

Amount of
Waste Water Treated

Vertical

Quality of Life

Sector

WASH and SWM

Numerator	Amount of waste water treated
Denominator	Total water supplied to households
Unit	Percentage
City Data Source	Data regarding the waste water received at treatment plants and treated can be obtained from the municipal authorities and authorised water supply and treatment companies records of the ULB/ Water and Sewerage Utility, as applicable.
Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	6.3.1 Proportion of wastewater safely treated

1.4.5

Households Connected
to Sewerage Network

Vertical

Quality of Life

Sector

WASH and SWM

Numerator	Number of households with sewerage facility
Denominator	Number of households in the city
Unit	Percentage
City Data Source	• Total number of properties as per municipal records (not households) should be considered for the computation. A property may have multiple tenants/ households occupying it. • Only properties with access connection to centralised underground sewerage network, or decentralised sewerage or onsite systems such as septic tanks should be included.

	• Properties that connect their waste water outlets to storm water drains or open drainage systems should not be included. • Data can be obtained from the records available with the ULB/ Water and Sewerage Utility.
Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	1.4.1 Proportion of population living in households with access to basic services 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

1.5.1

Availability of
Public Transport

Vertical	**Sector**
Quality of Life	Mobility

Numerator	Number of public buses
Denominator	Per lakh of population
Unit	Ratio
City Data Source	• 'Public transport' shall include only buses. • Number of public transport vehicles operating in the city should be the actual buses in operation and as such the number can be lower than the number of vehicles owned by the public utility or major private operators. • Daily average values over a specific time period (e.g. a month) can be considered • Data on public transport can be obtained from the logs maintained by the state transport authority. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Validation Data Source	IUT-CMP

Scoring	>=0.6 (Service Level Benchmarks for Urban Transport, MoUD)
SDG Mapping	11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

1.5.2

Transport
Related Fatalities

Vertical

Quality of Life

Sector

Mobility

Numerator	Transport related fatalities
Denominator	Per lakh of population
Unit	Ratio
City Data Source	Data can be obtained from the Police Department. Latest reports published by the National Crime Research Bureau (NCRB) can also be used for obtaining the data.
Validation Data Source	NCRB
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	3.6.1 Death rate due to road traffic injuries

1.5.3

Road Infrastructure

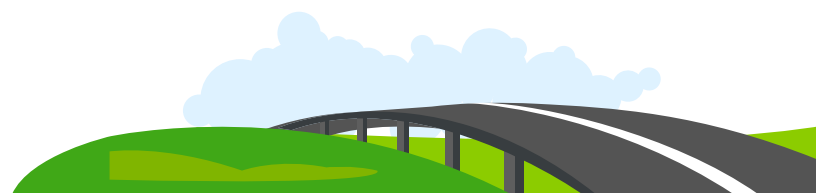**Vertical**

Quality of Life

Sector

Mobility

Numerator	Road Density: Total length of road/Total Area Footpath Density: Total length of footpath/Total length of road
Unit	Ratio
City Data Source	Data can be obtained from the records of relevant Transport Authority, Development Authority or Planning department of the ULB and verified through sample physical surveys

Validation Data Source	None
Scoring	Deviation from Mean
SDG Mapping	11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

1.6.1

Prevalence of
Violent Crime

Vertical

Quality of Life

Sector

Safety and Security

Numerator	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, grievous hurt
Denominator	Per lakh of population
Unit	Ratio
City Data Source	• Total number of cases should be based on the total number of cases registered with the Police department • Crime data can be obtained from the Police Department. Latest reports published by the National Crime Research Bureau (NCRB) can also be used for obtaining crime data. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Validation Data Source	NCRB (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	11.7.2: Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

1.6.2

Extent of **Crime Recorded against Women**

Vertical

Quality of Life

Sector

Safety and Security

Numerator	Crimes against women
Denominator	Per lakh of population
Unit	Ratio
City Data Source	• Total number of cases should be based on the total number of cases registered with the Police department • Crime data can be obtained from the Police Department. Latest reports published by the National Crime Research Bureau (NCRB) can also be used for obtaining crime data.
Validation Data Source	NCRB (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation

1.6.3

Extent of **Crime Recorded against Children**

Vertical

Quality of Life

Sector

Safety and Security

Numerator	Crimes against children
Denominator	Per lakh of population
Unit	Ratio
City Data Source	• Total number of cases should be based on the total number of cases registered with the Police department • Crime data can be obtained from the Police Department. Latest reports published by the National Crime Research Bureau (NCRB) can also be used for obtaining crime data.

Validation Data Source	NCRB (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	16.2: End abuse, exploitation, trafficking and all forms of violence against and torture of children

1.6.4

Extent of **Crime Recorded against Elderly**

Vertical	**Sector**
Quality of Life	Safety and Security

Numerator	Crimes against children
Denominator	Per lakh of population
Unit	Ratio
City Data Source	• Total number of cases should be based on the total number of cases registered with the Police department • Crime data can be obtained from the Police Department. Latest reports published by the National Crime Research Bureau (NCRB) can also be used for obtaining crime data.
Validation Data Source	NCRB (District level data)
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	11.7.2: Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

1.7.1

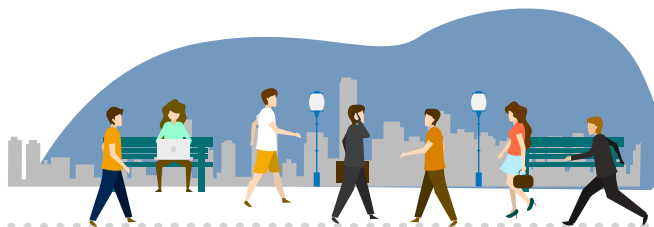## Average share of the total area **of Cities that is Open Space for Public Use**

Vertical	**Sector**
Quality of Life	Recreation

Numerator	Area open for public use
Denominator	Total area
Unit	Percentage
City Data Source	Data can be obtained from land use/ GIS plans and records available with the ULB/ Development Authority and corroborated through physical surveys.
Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

1.7.2

Availability of:
a. Music, Dance and Drama Centre
b. Parks
c. Recreational Club
d. Restaurants
e. Cinema Halls

Vertical	**Sector**
Quality of Life	Recreation

Numerator	Number of: a. Music, Dance and Drama Centre b. Parks c. Recreational Clubs

	d. Restaurants e. Cinema Halls
Denominator	per lakh of population
Unit	Scores
Benchmark	URDPFI Guidelines
Validation Data Source	None
Scoring	Deviation from service level benchmark
SDG Mapping	SDG Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities SDG Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

2.1.1

Traded Clusters

Vertical

Economic Ability

Sector

Level of Economic Development

Definition	The strength of a region's cluster portfolio is measured by summing up the performance of individual clusters. This performance is measured through four dimensions: ● Specialization ● Size ● Productivity ● Dynamism
Unit	Scores
Validation Data Source	PM-EAC
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	SDG Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors SDG Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.

2.2.1

Cluster Strength

Vertical : **Sector**

Economic Ability : Economic Opportunities

Definition	The strength of a region's cluster portfolio is measured by summing up the performance of individual clusters. This performance is measured through four dimensions: ● Specialization ● Size ● Productivity ● Dynamism
Unit	Scores
Validation Data Source	PM-EAC
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	SDG Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors
	SDG Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

2.2.2

Credit Availability

Vertical : **Sector**

Economic Ability : Economic Opportunities

Numerator	Credit disbursed
Denominator	Per lakh of population
Unit	Ratio
Validation Data Source	RBI (District level data)
Scoring	Higher the better Utopia: Highest city value

SDG Mapping	SDG Target 9.3: Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets
	SDG Indicator 9.3.2: Proportion of small-scale industries with a loan or line of credit

2.2.3

Number of **Incubation Centres / Skill Development Centres**

Vertical

Economic Ability

Sector

Economic Opportunities

Numerator	Number of Incubation Centres / Skill Development Centres
Denominator	Per lakh of population
Unit	Ratio
Validation Data Source	Atal Innovation Mission
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	SDG Target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
	SDG Indicator 4.4.1: Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

2.3.1

Inequality Index based on Consumption Expenditure

Vertical

Economic Ability

Sector

Gini Coefficient

Indicator	Inequality index based on consumption expenditure
Unit	Scores
Validation Data Source	NSSO (Pin code level data)

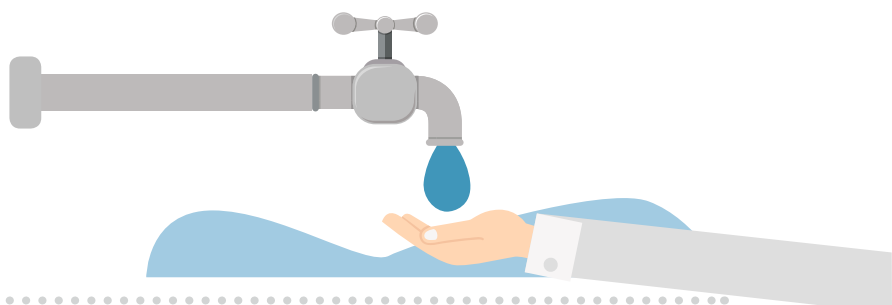| Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	SDG Target 10.1: By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average SDG Indicator 10.1.1: Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population

3.1.1

Water Quality

Vertical

Sustainability

Sector

Environment

Description	Average pH level of water
City Data Source	• The CPCB has classified water bodies into 5 categories based on the designated best use of the water bodies and prescribed water quality standards in terms of chemical requirements for each of the categories (Guidelines for Water Quality Management, 2008). • An inventory of surface water bodies in the city should be developed with the assistance of a base map, in discussion with ULB/ Planning Authority • Water samples from the various water bodies should be tested as per the Guidelines for Water Quality Monitoring, 2007 developed by the CPCB • Previous data collected by CPCB or respective State Pollution Control Boards (SPCBs) during the same year can be used to additionally obtain information for different times of the year.
Benchmark	$6.5 < pH < 8.5$
Validation Data Source	CPCB
Scoring	Deviation from Benchmark
SDG Mapping	SDG Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all SDG Indicator6.1.1 : Proportion of population using safely managed drinking water services SDG Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

3.1.2

Total **Tree Cover**

Vertical	**Sector**
Sustainability	Environment

Numerator	Total Tree Cover in sq. km.
Denominator	Total area of the city
Unit	Percentage
Validation Data Source	MoSPI
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

3.1.3

Households using **Clean Fuel for Cooking**

Vertical	**Sector**
Sustainability	Environment

Numerator	Number of Households using Clean Fuel
Denominator	Total Number of Households in the city
Unit	Percentage
Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	7.1.2 Proportion of population with primary reliance on clean fuels and technology

3.1.4

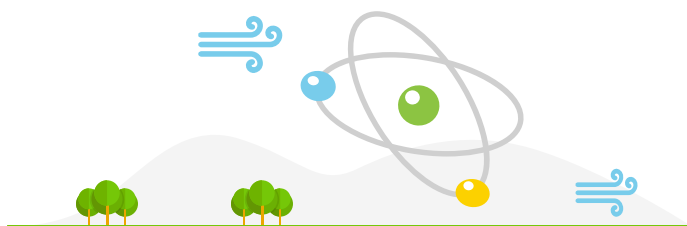## Hazardous Waste Generation

Vertical

Sustainability

Sector

Environment

Numerator	Total quantity of hazardous waste generation in metric tons
Denominator	Total waste generation
Unit	Percentage
Validation Data Source	CPCB
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	SDG Target: 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

3.1.5

Air Quality Index

Vertical

Sustainability

Sector

Environment

Indicator	Air quality index a. SO2 b. NO2 c. PM10
Unit	Scores
City Data Source	● The standards for acceptable level of air pollutants have been prescribed as part of the National Air Quality Standards (2009) by the CPCB. ● Air samples should be tested at various points in the city. Measurements may be carried out as per the guidelines for manual sampling and analysis provided by the CPCB (Guidelines for the Measurement of Ambient Air Pollutants Volume-I, 2011). Guidelines on choosing monitoring locations is also given by CPCB (Guidelines for Ambient Air Quality Monitoring, 2003). ● Previous data collected by CPCB or respective State Pollution Control Boards (SPCBs) during the same year can be used to additionally obtain information for different times of the year.

Validation Data Source	CPCB
Scoring	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
SDG Mapping	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

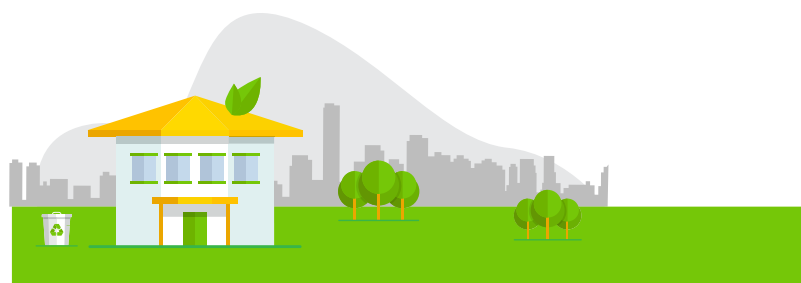# 3.2.1

Availability of
Green Spaces

Vertical	**Sector**
Sustainability	Green Spaces and Buildings

Numerator	Total area of green spaces in square kilometres
Denominator	Area of the city
Unit	Ratio
City Data Source	• Total area under urban greens will include recreational spaces, organized greens and common spaces such as flood plains, forest cover, vacant lands etc. as per URDPFI guidelines. • Data on area of urban greens can be obtained from the land use plan available with the ULB/ Planning Authority or Development Authority. Where an updated GIS database is available the same can be used. • Population data can be sourced from the decennial Census of India. Past census figures should be used as base, and annual growth rate should then be used to arrive at current population.
Validation Data Source	GIS
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

3.2.2

Does the City Incentivise Green Buildings?

Vertical

Sustainability

Sector

Green Spaces and Buildings

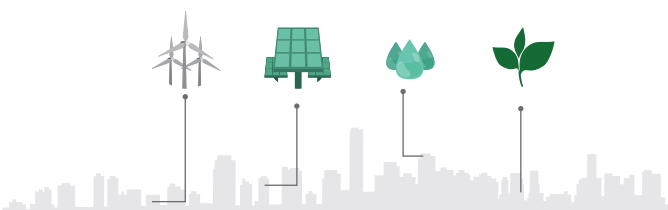| Indicator	Does the city incentivise green buildings? (Y/N)
Scoring	Binary Marking
SDG Mapping	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

3.2.3

Green Buildings

Vertical

Sustainability

Sector

Green Spaces and Buildings

Numerator	Number of green buildings in the city
Denominator	Total number of properties in the city
Unit	Percentage
City Data Source	• Buildings that have received a GRIHA, LEEDS or equivalent green rating should be included for calculating the numerator. • Data can be obtained from the ULB or Development Authority. Data may also be available with the MNRE regarding certification provided to buildings in various cities, or with rating agencies like GRIHA and LEEDS
Validation Data Source	None
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	7.3: By 2030, double the global rate of improvement in energy efficiency 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries 12.2: By 2030, achieve the sustainable management and efficient use of natural resources

3.3.1

Energy Requirement vs Energy Supplied

Vertical

Sustainability

Sector

Energy Consumption

Numerator	Energy Requirement of the city for the year
Denominator	Energy Supplied by the city during the year
Unit	Difference
City Data Source	Data on total energy requirement and supply can be obtained from local electricity distribution companies (DISCOMs)
Validation Data Source	Ministry of Power
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	SDG Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services

3.3.2

Energy Generated from Renewable Sources

Vertical

Sustainability

Sector

Energy Consumption

Numerator	Energy generated from renewable sources
Denominator	Total energy generation
Unit	Percentage
City Data Source	• Data for renewable energy installations in Government buildings (including ULB buildings) as well as households who have sought subsidy under schemes should be captured. • Data can be obtained from the various state nodal agencies for renewable energy. Data can also be obtained from the Ministry of New and Renewable Energy. • Data on total energy consumption can be obtained from local electricity distribution companies (DISCOMs)
Validation Data Source	CEA

Scoring	Higher the better Utopia: Highest city value
SDG Mapping	7.2.1 Renewable energy share in the total final energy consumption

3.3.3

Number of
Energy Parks

Vertical : **Sector**

Sustainability : Energy Consumption

Numerator	Number of Energy Park
Denominator	Area of the city
Unit	Ratio
City Data Source	● Consider solar and wind energy ● Data can be obtained from Ministry of New and Renewable Energy
Validation Data Source	Ministry of New and Renewable Energy
Scoring	Higher the better Utopia: Highest city value
SDG Mapping	SDG Target 7.b: By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support SDG Indicator 7.b.1: Investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services

3.4.1

Has the City Implemented Local
Disaster Reduction Strategies?

Vertical : **Sector**

Sustainability : City Resilience

Indicator	Has the city implemented local disaster reduction strategies? (Y/N)
Scoring	Binary Marking

SDG Mapping	1.5.4 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
SDG Mapping	SDG Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations SDG Indicator 11.b.2: Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

3.4.2

Number of Deaths
due to Disasters

Vertical

Sustainability

Sector

City Resilience

Numerator	Number of deaths and directly affected persons attributed to disasters
Denominator	Per lakh of population
Unit	Ratio
City Data Source	Latest reports published by the National Crime Research Bureau (NCRB) on Accidental Deaths and Suicides can be used for obtaining the data.
Validation Data Source	NCRB
Scoring	Lower the better Utopia: Lowest city value
SDG Mapping	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

05

Appendix

S.No.	INDICATORS	UNIT	NUMERATOR	DENOMINATOR
1. QUALITY OF LIFE				
1.1. EDUCATION				
1	Household expenditure on education (Deviation from average)	SCORES	Household expenditure on education	Total household expenditure
2	Literacy Rate	RATE	Literacy Rate	
3	Pupil-Teacher Ratio (Primary Level: Grade 1-5)	RATIO	Pupil-Teacher Ratio at the Primary Level across Govt and Private Schools	
4	Drop Out Rate (Primary Level: Grade 1-5)	RATE	Drop Out Rate at the Primary Level across Govt and Private Schools	
5	Pupil-Teacher Ratio (Upper-Primary: Grade 6-8)	RATIO	Pupil-Teacher Ratio at the Upper-Primary Level across Govt and Private Schools	
6	Drop Out Rate (Upper-Primary: Grade 6-8)	RATE	Drop Out Rate at the Upper-Primary Level across Govt and Private Schools	
7	Percentage of schools with access to digital education	PERCENTAGE	Number of schools (public and private) with facilities for using digital educational content (availability of necessary infrastructure and connection to digital resources such as NKN)	Total number of schools
8	Percentage of Professionally Trained Teachers	PERCENTAGE	Number of Professionally Trained Teachers in city schools	Total Number of Teachers in city schools
9	Nation Achievement Survey Score	SCORES	Nation Achievement Survey Scores	
1.2. HEALTH				
10	Household expenditure on health (Deviation from average)	SCORES	Household expenditure on health	Total household expenditure
11	Availability of healthcare professionals	PERCENTAGE	Total number of qualified healthcare professionals	Total population of the city
12	Accredited public health facilities	PERCENTAGE	Total accredited public health facilities	Total number of public health facilities
13	Availability of Hospital Beds	RATIO	Total number of hospital beds in city hospitals (public + private)	Total population of the city
14	Prevalence of diseases: Water borne Diseases (Jaundice, Typhoid) Vector borne diseases (Malaria, Dengue)			
1.3. HOUSING AND SHELTER				
15	Households with electrical connections	PERCENTAGE	Number of authorized electrical connections at household level	Number of households in the city
16	Average length of electrical interruptions	SCORES	Total number of sustained electrical interruptions in a year	Total number of consumers (residential and commercial) served in the same year
17	Beneficiaries Under PMAY	PERCENTAGE	Number of beneficiary households under PMAY	Number of eligible households under PMAY

18	Slum Population	PERCENTAGE	Slum population of the city	Total population of the city

1.4. WASH AND SWM

19	Deviation of total water supplied from service-level benchmark	SCORES	Total water supplied in lpcd	
20	Households with piped water supply	PERCENTAGE	Number of households with piped supply connections in the city	Number of households in the city
21	Swachh Survekshan score	SCORES		
22	Amount of waste water treated	PERCENTAGE	Amount of waste water treated	Total water supplied to households
23	Households connected to sewerage network	PERCENTAGE	Number of households with sewerage facility	Number of households in the city

1.5. MOBILITY

24	Availability of public transport	RATIO	Number of public buses	Per lakh of population
25	Transport related fatalities	RATIO	Transport related fatalities	Per lakh of population
26	Road Infrastructure: Road Density Footpath Density	RATIO	Total length of road Total length of footpath	Total area Total length of road

1.6. SAFETY AND SECURITY

27	Prevalance of Violent Crime	RATIO	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
28	Extent of crime recorded against women	RATIO	Crimes against women	Per lakh of population
29	Extent of crime recorded against children	RATIO	Crimes against children	Per lakh of population
30	Extent of crime recorded against elderly	RATIO	Crimes against elderly	Per lakh of population

1.7. RECREATION

31	Average share of the total area of cities that is open space for public use	PERCENTAGE	Area open for public use	Total area
32	Availability of : a. Music, Dance and Drama Centre b. Parks c. Recreational Club d. Restaurants e. Cinema Halls	SCORES	Number of: a. Music, Dance and Drama Centre b. Parks c. Recreational Clubs d. Restaurants e. Cinema Halls	per lakh of population

2. ECONOMIC ABILITY

2.1. LEVEL OF ECONOMIC DEVELOPMENT

33	Traded Clusters	SCORES		

	2.2. ECONOMIC OPPORTUNITIES			
34	Cluster Strength	SCORES		
35	Credit Availability	RATIO	Credit disbursed	Per lakh of population
36	Number of Incubation Centres / Skill Development centres	RATIO	Number of Inclubation Centres / Skill Development Centres	Per lakh of population
	2.3. GINI COEFFICENT			
37	Inequality index based on consumption expenditure			
	3. SUSTAINABILITY			
	3.1. ENVIRONMENT			
38	Water Quality		Average pH level	
39	Total Tree Cover		Total Tree Cover in sq km.	Total area of the city
40	Households using clean fuel for cooking	PERCENTAGE	Number of Households using Clean Fuel	Total Number of Households in the city
41	Hazardous waste generation	PERCENTAGE	Total quantity of hazardous waste generation in metric tons	Total waste generation
42	Air quality index a. SO2 b. NO2 c. PM10	SCORES	AQI Scores	
	3.2. GREEN SPACES AND BUILDINGS			
43	Availability of Green Spaces	RATIO	Total area of green spaces in square kilometers	Area of the city
44	Does the city incentivise green buildings? (Y/N)	YES OR NO	Does the city incentivise green buildings? (Y/N)	
45	Green Buildings	PERCENTAGE	Number of green buildings in the city	Total number of properties in the city
	3.3. ENERGY CONSUMPTION			
46	Energy Requirement vs Energy Supplied	DIFFERENCE	Energy Requirement of the city for the year	Energy Supplied by the city during the year
47	Energy generated from renewable sources	PERCENTAGE	Energy generated from renewable sources	Total energy generation
48	Number of Energy Parks	RATIO	Number of Energy Park	Area of the city
	3.4. CITY RESILIENCE			
49	Has the city implemented local disaster reduction strategies? (Y/N)	YES OR NO	Has the city implemented local disaster reduction strategies? (Y/N)	
50	Number of deaths and directly affected persons attributed to disasters	RATIO	Number of Deaths due to disasters	Per lakh of population

Ministry of Housing and Urban Affairs
Government of India