

# URBAN SPATIAL DATA FRAMEWORK FOR SMALL AND MEDIUM TOWNS

## RESEARCH STUDY

A Research Study conceptualized as part of the GIZ  
Sustainable Urban Development - Smart Cities (SUD-SC) initiative



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# RESEARCH STUDY

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# EXECUTIVE SUMMARY

India is at the forefront of rapid urbanization with over 31% of its population living in urban areas (census 2011). This is further expected to increase significantly in the coming decades. India's urban population also accounts for 11% of global urban population (NITI Aayog, 2021). With an accelerating rate of urbanization, India faces various challenges especially related to climate induced disaster risks and vulnerabilities. To respond to such rapid transformation, India's urban areas need to be planned in a sustainable manner. Urban spatial planning has emerged as a tool for ensuring sustainable urban development in the cities of global south.

Historically, only large cities and metropolitan areas were considered to be the 'engines of economic growth'. The focus of various government policies, programs, schemes, etc. related to urban spatial planning was largely focused on development of metropolitan areas and large cities. More recently however, it has been acknowledged that these Small and Medium Towns (SMTs) play a vital role in maintaining the hierarchy of urban structure and inducing overall growth within the region (Tacoli, 2017). These towns may also play a vital role in providing socio-economic linkages to both cities and rural areas (Saitluanga, 2019). SMTs require equal attention and priority in driving them towards planned growth in the future.

Nearly 60% of India's urban population resides in towns with populations typically below half a million (five Lakhs) (Census, 2011). These SMTs have lacked the necessary focus in terms of preparation and frequent revision of urban spatial plans as they are often placed low in the hierarchy of the urban structure and are assumed to be slow growing. The process of preparing comprehensive urban spatial plans [typically called the Master Plans (MP) or Development Plans (DP)] for most the SMTs in India is at a nascent stage. These plans are rudimentary and largely focus on allocation of land for various purposes based upon the projected requirements of the town for the future. Urban spatial plans thus prepared do not necessarily address the immediate needs of the SMTs. Moreover, the plans are prepared for a long-term period (10-20 years) and seldom in response to an urgent need or issue. SMTs further have limited technical and financial capacities to deploy a focused approach for urban plan preparation as well as its implementation. Hence, their development continues to be largely haphazard. India traditionally has had a long history of systematically collecting spatial data for the preparation of spatial plans, yet

## Key Highlights

- Urban spatial Planning has emerged as a tool for sustainable urban development globally.
- Small and Medium Towns (SMTs) play a vital role in the urbanization process and require equal priority for their planning and development.
- Process of spatial plan preparation in most SMTs in India is rudimentary.
- Few constraints in spatial planning of SMTs includes:
  - i. Focus only on allocation of land uses for various purposes
  - ii. Plans prepared for long-term (10-20 years)
  - iii. Plans prepared with limited technical and financial capacity at local level.

### Key Highlights

- Towns and cities in India traditionally struggle in data collection and departmental collaboration is low.
- Recent initiatives in India have stressed the importance of data-driven and evidence-based approach to planning.
- Significant shift is observed in data collection, documentation, and storage of geospatial data, especially in larger cities.
- SMTs struggle in preparing data heavy spatial plans due to lack of capacity.
- There is a need for SMTs to adopt a focused approach for preparing spatial plans by adopting a contextual framework for spatial planning and data capturing.

SMTs have struggled to capture reliable datasets for preparing these plans. Moreover, various organizations at the national and state level, have historically acted in a compartmentalized manner. There has been a lack of collaborative efforts and sharing of data or applications has been limited, not only for citizens and the private sector but also for other government agencies (Walsam & Sahay, 1999); (Singh 2005). The Government of India's (GoI) recent initiatives however have outlined the importance of solutions that deploy a data-driven and evidence-based approach to planning (MoHUA, 2021). This approach requires towns and cities to deploy technological solutions that continuously collect accurate, reliable, and up-to-date data for real-time planning and decision making in urban areas.

To facilitate the data-driven and evidence-based approach to planning, the GoI, along with the state governments, has turned its focus on improving the urban spatial data frameworks for plan preparation over the last few decades. Formulation of various schemes, missions, and policies such as the Urban Mapping Scheme (UMS), National Urban Information System (NUIS), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Digital India, Smart Cities, etc. have stressed on the importance of access to reliable spatial data for planning. These initiatives have institutionalised the need for Spatial Data Infrastructure (SDI) which includes a collection of relevant base technologies, policies, and institutional arrangements that facilitate the availability of and access to spatial data (GSDI, 2009). This has further induced a substantial shift in the collection, documentation, and storage of geospatial inputs to the spatial planning process especially at the state level, especially for their higher-order cities.

SMTs still lack the basic institutional capacity, infrastructure, and finances to extensively undertake the preparation of such data heavy master plans according to the 'Design & Standards' specified under the various government schemes such as NUIS, AMRUT, etc. Adopting a focused approach for preparing urban spatial plans is crucial for SMTs. This would require SMTs to adopt a context-specific spatial planning and data capturing framework for their sustainable development. In this context, the study suggests the following key recommendations at central level, state level, and local or SMT level, for spatial planning of SMTs in India:

1. Key Recommendations at central level require following policy initiatives:

**1. Key Recommendations at central level** require following policy initiatives:

- Formulating **specific guidelines for preparing context specific spatial plans** for SMTs in India.
- As part of the specific guidelines for SMTs, prioritizing collection of essential and relevant spatial data attributes based on the degree of relevance of data for the SMTs.

**2. Key recommendations at state level** include the following initiatives:

- Adopting **strategic planning approach** and prioritizing **preparation of micro-level plans** within the state planning framework to focus on implementation of Master Plans and Development Plans.
- Formulating **policy for promoting departmental collaboration** amongst state level institutes, departments, etc. to facilitate secure and easy data sharing.

**3. Key recommendations at local or SMT level** include three key initiatives:

- Adopting a **data-driven and evidence-based approach** to spatial planning in SMTs by institutionalizing spatial data infrastructure (SDI) at local level for better collection, documentation, storage, accessibility, and sharing of data. For this, SMTs must **adopt cost efficient technological solutions** for planning.
- Promoting a **collaborative approach to data collection** and planning in SMTs which primarily includes **community-based approach to data collection**. Such participatory methods may include crowdsourcing, participatory community data collection, and mapping, participatory GIS, etc.
- Developing basic **technical capacities** within the appropriate planning authorities at local level.

### Key Highlights

- A contextualized urban spatial planning and data framework for SMTs requires:
  - i. Adopting a Strategic planning approach
  - ii. Prioritizing collection of essential and relevant data
  - iii. Adopt a data-driven approach to planning
  - iv. Promote a collaborative approach to data collection, issue identification and overall plan preparation process
  - v. Capacity building at local level

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# LIST OF DEFINITIONS

- **Data:** Distinct pieces of factual information, especially information organised for analysis or used to reason or make decisions. Data is usually formatted in a special way and presented in a variety of forms.
- **Data Collection:** Data that has one or several common elements and that has been assembled by these common elements to form a data set.
- **Data Culture:** Data culture in context of spatial planning may be defined as the arrangements within the planning departments and organizations that prioritizes data-driven decision making by deploying relevant policies, technologies, and institutional arrangements.
- **Data Custodian:** An organisation responsible for the continued physical existence, collection, storage, maintenance, availability, and dissemination of the data.
- **Data Layers:** The thematic data sets that may be documented spatially over a map.
- **Data Sets:** The data inputs collected during the plan preparation process that may be individually or in combination with other data be documented in a thematic category pertaining to a particular subject.
- **Data Specification:** A detailed description of a data set or dataset series together with additional information that will enable it to be created, supplied to, and used by another party.
- **Decision-maker(s):** An individual (or group of individuals) who uses a cognitive process to select a final option between several other scenarios. The final decision should result in an action.
- **Framework Data:** Common base map data that provides spatial reference to physical features and other types of information that is linked to geography and provides a foundation for integrating other kinds of data.
- **Geo Linked Data:** Data that is referenced to an identified set of geographic features without including the spatial description of those features. It is normally attributed data in tabular form (such as population counts) that refers to a known jurisdiction (such as provinces), where the elements (the provinces) are referred to by their unique identifier (such as the province name).
- **Geoportal:** A type of Web portal used to find and access spatial information and associated geographic services (display, editing, analysis, etc.) via the Internet.
- **Geoprocessing:** Use of computers - specifically GIS operations - to acquire, analyse, store, display, and distribute information about geographic features.
- **Geo-referencing:** The process of assigning a geographic location to a piece of information.
- **Geospatial Data:** Data with implicit or explicit reference to a location relative to the Earth's surface.
- **Global Spatial Data Infrastructure:** A set of policies, standards, practices, technologies, and relationships to facilitate the flow of geographic data and information at all levels across government, academic, and private sectors globally. It is the top level of a hierarchical structure, linking multiple levels of jurisdictions' (municipal, state, regional) spatial data infrastructures.
- **Information architecture:** In terms of software design, a reusable software template, or skeleton, from which key enabling and supporting services can be selected, configured, and integrated with application code.
- **Interoperability :** The ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, to exchange information in a useful and meaningful manner. There are three aspects of interoperability: semantic, structural, and syntactical.
- **Layer:** Basic unit of geographic information that may be requested as a map from a server.

- 
- **Legacy Data:** Information stored in an old or obsolete format or computer system that is difficult to access or process.
  - **Legal Framework:** A set of ideas, rules, or beliefs from which a legal structure is developed and on which decisions are based.
  - **Linked Data:** Creates links to data residing in other databases on the Web that are universally available.
  - **Open Data:** A philosophy and practice that makes data easily and freely available - without restrictions from copyright, patents, or other mechanisms of control - by way of portals, metadata, and search tools to enable reuse of the data in new and unforeseen ways. Open data relies on 1) a permissive licensing model that encourages reuse, 2) data discoverability, and 3) data accessibility.
  - **Open Source:** The special licenses governing the use and sale of software to ensure that the software source code remains in the public domain (free to all), though companies are allowed to sell products that include some or all of the source code.
  - **Open Standards:** An open standard is one that 1) is created in an open, international, participatory industry process; 2) is freely distributed and openly accessible; 3) does not discriminate against persons or groups; and 4) ensures that the specification and license are technology neutral (its use must not be predicated on any proprietary technology or style of interface).
  - **Portal:** An online service that allows users to find, evaluate and access resources (data, services, and organisations). Brings together suppliers (those providing resources) and users (those using the resources).
  - **Small and Medium Towns:** Towns typically defined in the URDPFI guidelines as having population between 5000 to 5,00,000; and having a municipal board (nagar panchayat) or municipal council (nagar palika) as its ULB.
  - **Spatial Data Infrastructure (SDI):** is the relevant base collection of technologies, policies, and institutional arrangements that facilitate the availability of and access to spatial data (GSDI, 2009). The relevant base collection of technologies, policies, and institutional arrangements that facilitate the availability of and access to spatial data. It is provided for users and suppliers within all levels of government, the commercial sector, the non-profit sector, academia, and citizens in general.
  - **Spatial Data Set:** A specific packaging of spatial information provided by a data producer or software, also known as a feature collection, image, or coverage.
  - **Stakeholder:** A stakeholder in a program is any person or institution that has a controlling influence, benefits in some way from the program, has an interest in its process or outcome, or has resources invested in the program.
  - **Thematic Data:** Datasets that describe the characteristics of spatial features or provide information on specific topics or themes, such as forest types, water contamination, historical flood areas or disease patterns and trends.
  - **Topology:** Spatial relationships between adjacent or neighbouring features; properties that define relative relationships between spatial elements, such as adjacency, connectivity, and containment.



# ABBREVIATIONS

AMRUT	:	Atal Mission for Rejuvenation and Urban Transformation
DAs	:	Development Authorities
DDA	:	Delhi Development Authority
GIS	:	Geographical Information System
Gol	:	Government of India
LAP	:	Local Area Plan
MoHUA	:	Ministry of Housing and Urban Affairs
MP/DP	:	Master plan / Development Plan
NCRPB	:	National Capital Region Planning Board
NUIS	:	National Urban Information System
SDI	:	Slum Dwellers International
SDI	:	Spatial Data Infrastructure
SMT	:	Small and Medium Towns
SUDA	:	State Urban Development Authority)
TCPDs	:	Town and Country Planning Directorates
TCPO	:	Town and Country Planning Organization
TPS	:	Town Planning Scheme
UDA	:	Urban Development Authorities,
ULBs	:	Urban Local Bodies
URDPFI	:	Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines



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# 1

## INTRODUCTION

### 1.1 BACKGROUND

### 1.2 NEED FOR THE STUDY

### 1.3 STUDY OBJECTIVES

### 1.4 RELEVANCE OF DATA - DRIVEN AND EVIDENCE - BASED APPROACH TO SPATIAL PLANNING AND DATA CAPTURING

### 1.5 APPROACH FOR THE STUDY

- Urban Spatial Planning and Data Initiatives Globally
- Urban Spatial Planning and Data Capturing Programs, Policies and Schemes In India

# 1.1 BACKGROUND

India is a rapidly urbanising country and one of the fastest-growing economies in the world. The country is expected to be the 5th largest economy in the world by 2024 (focus-economics, 2021). This is both fuelled by and reflected in the rapid growth of its urban areas, especially in the past two decades. According to the World Bank estimate, nearly 35% of India’s population lived in urban areas as of 2019 and is expected to grow to 50% by 2050 (SNS, 2019). If the country, is to accommodate such levels of urbanisation in an organised and sustainable manner, our urban areas must facilitate the future demand through innovations in urban spatial planning to achieve the vision for Indian towns and cities in the 21st century.

Nearly 60% of India’s urban population resides in towns with less than one million (10 Lakh) population (IIHS, 2012). These towns, primarily classified as Small and Medium Towns (SMTs) as per the URDPFI guidelines (TCPO, 2014), have played an integral role in India’s rapidly changing urbanisation dynamics. The development of these SMTs is now being observed as a driver of growth in the broader regions (Himanshu, 2017). Subsequently, there has been a gradual increase in non-primary sector economic activities in these towns as well as in villages in the vicinity of these towns. This shift is largely attributed to the development of allied activities such as construction, transportation, logistics, and service sector related activities (CPR, 2018). It is thus imperative to embrace planned growth for SMTs of India in the immediate future.

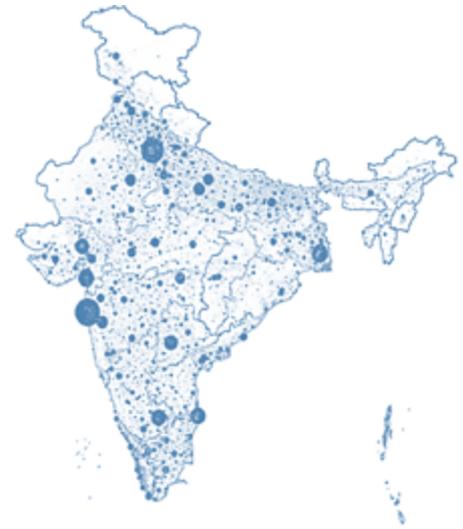


Figure 1: Urbanisation in India: concentration of urban population  
Source: (IIHS, 2012).

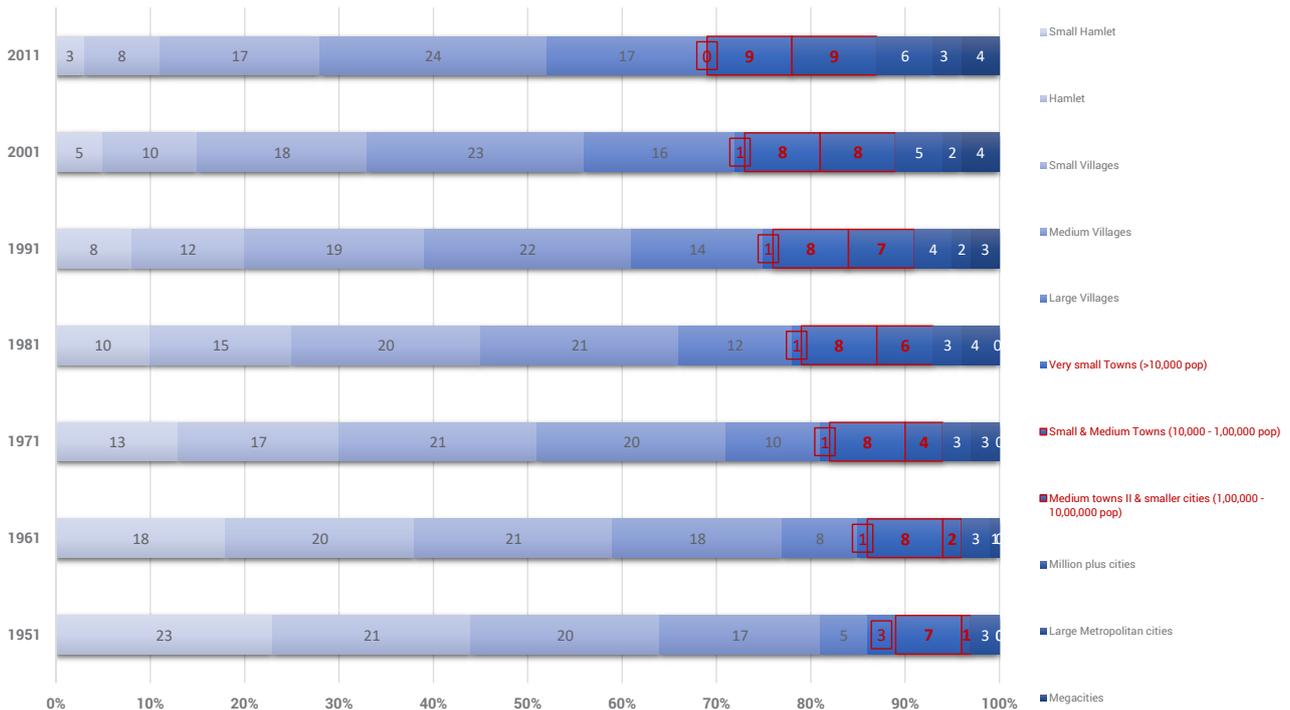


Figure 2: Increase in percentage of Small and Medium Towns over the years from 1951 to 2011.  
Source: (Census, 2011)

## 1.2 NEED FOR THE STUDY

### Key Highlights

- Need for this study stems from the following key factors:
  - i. Spatial plans in SMTs often prepared to fulfil the statutory requirements and seldom in response to the immediate and urgent needs of the towns
  - ii. Spatial plans for SMTs are very basic and focus primarily on preparation of a land use plan
  - iii. SMTs lack easy access to reliable data sets for plan preparation. Acquiring data takes time and leads to evident delays in plan preparation
  - iv. SMTs lack technical and financial capacity. They typically struggle to deploy relevant technological and human resources.

India has around 7,935 towns (Census, 2011) out of which only 2,717 towns have a statutory spatial plan {typically called Master Plans (MP) or Development Plans (DP)} available (TCPO, 2019). Of this, less than 100 towns (typically large and metropolitan cities) have been able to update their spatial plans regularly at 5-10 years of interval. SMTs have particularly lacked the necessary focus in terms of preparation and frequent revision of urban spatial plans as they are often placed low in the hierarchy of the urban structure and are assumed to be slow growing. The need for this study stems from the following key factors:

1. The spatial plans (typically MP/ DP), especially for SMTs are prepared as a result of **statutory requirements** by the various state governments. The plans are prepared for a long-term period (10-20 years) and seldom in response to an urgent need or issue within the town.
2. The process of preparing comprehensive urban spatial plans for most SMTs in India is at a **nascent stage**. The spatial plans prepared for SMTs **largely focus on allocation of land uses** for various purposes based upon the projected future requirements of the town.
3. SMTs typically **struggle to collect reliable data sets** for plan preparation. Although various organisations at the national and state level in India have traditionally collected spatial data sets, they have historically acted in a compartmentalised manner. **Sharing of data or applications has been limited**, not only for citizens and the private sector but also between government agencies (Walsam & Sahay, 1999); (Singh 2005). This has led to lack of access to reliable data and evident delays in plan preparation process.
4. SMTs further have **limited technical and financial capacities** to deploy a focused approach for plan preparation and implementation. Due to this they also **struggle to deploy technological tools and qualified human resource** for plan preparation.

Urban spatial plans especially in case of SMTs are rudimentary. The plan preparation fails to adopt a focused approach and consequently does not address the immediate needs of the town. The development of SMTs continues to be largely haphazard.

All towns and cities are largely built on spatial layers having both physical and non-physical attributes of data. This spatial data plays an integral part in the planning of urban areas. A key function of planning is to derive future scenarios and predict the future needs of the city based on existing trends.

### 1.3 DATA - DRIVEN APPROACH TO SPATIAL PLANNING

This study analyses the existing spatial planning and data framework for SMTs in India. It aims to suggest various strategies to standardise the spatial planning and data capturing approach for SMTs in India. In this context, the key objectives of this study are:

1. To critically **review urban spatial planning and data standards** and protocols for urban planning globally and in India.
2. To **analyse the efficacy of policy, legal, and technical frameworks** related to spatial planning and data framework in SMTs in India.
3. To **review innovative approaches of urban spatial data collection, documentation, storage** etc.
4. To **suggest policy recommendations** for creation of a suitable urban spatial planning and data framework in SMTs in India.

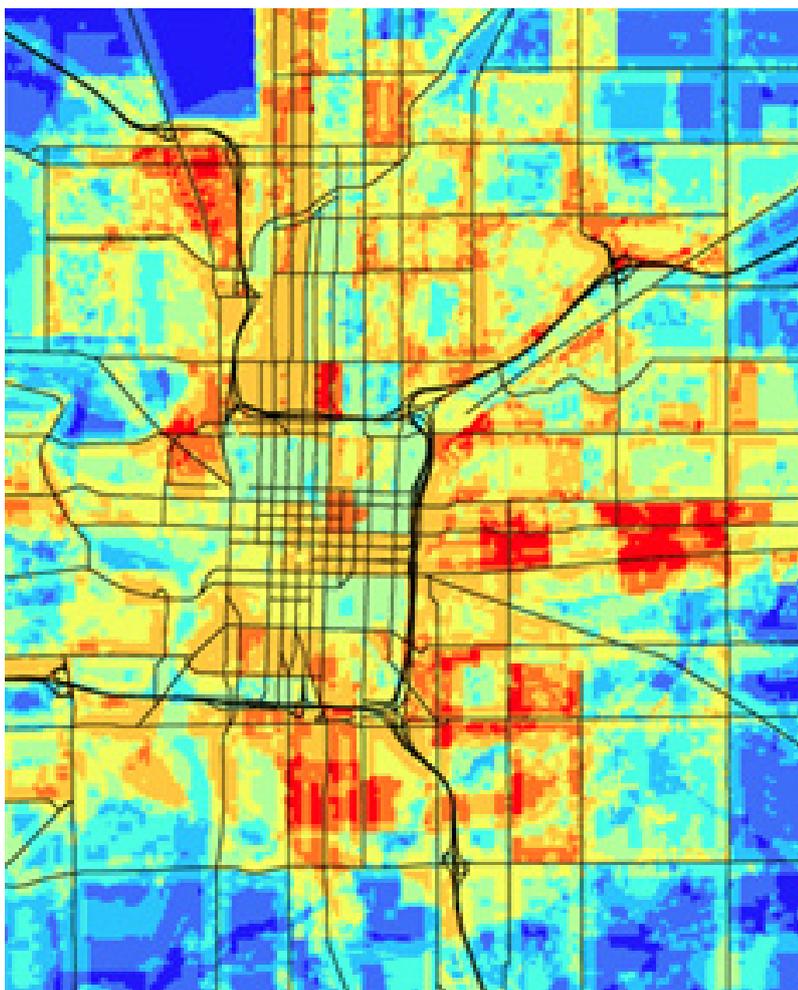


Figure 3: An illustrative example of land suitability analysis through data modelling tools (Source: GISlounge, n.d.).

## 1.4 RELEVANCE OF DATA-DRIVEN AND EVIDENCE-BASED APPROACH TO SPATIAL PLANNING AND DATA CAPTURING

### Key Highlights

- Accurate location-based data helps build correlation between various trends and changing dynamics in the urban areas.
- Advancements in technology such as GPS, GIS, Satellite imagery, and web-based applications etc. has further enabled access to reliable datasets for plan preparation and decision making.
- Higher emphasis on data-driven and evidence-based approach to planning.

Data-driven solutions make it possible to estimate the widest range of impact to predict and project future requirements for urban areas. For example, land suitability analysis and maps are extremely useful in identifying the non-developable spaces and directing future development directions for the city [Refer image 3]. Hence, location-based information helps in building correlation and relevance of the nearby events which shows trends of the changing dynamics of the urban areas.

Recent times have seen significant advancements in the use of technology such as the use of satellite images, drones, high-resolution cameras, and Internet of Things (IOT) sensors for spatial data capture. These geographically referenced data sets help in building a common language for planning sustainable and resilient urban areas. Further, technological advancements have also enabled ease of data mapping, analysis, storage, accessibility, and sharing across digitally enabled internet-based platforms. The role of reliable data sets and relevant technology in sustainable urban planning is vital, which in turn emphasises the relevance of a data-driven and evidence-based approach to planning.

### 1.4.1. Urban Spatial Planning and Data Initiatives Globally

Globally, various innovative initiatives have deployed a data-driven approach to planning. Many cities especially in the global north have adopted technological solutions for evidence-based plan preparation as well as for their day-to-day urban management functions. These towns and cities identify a framework for narrowly enabling the collection, documentation, and sharing of geospatial information within an organisation or more broadly for use at a national, regional, or global level. This comprehensive approach to data collection, documentation, storage, sharing, and accessibility forms the basis of a Spatial Data Infrastructure (SDI).

Spatial Data Infrastructure (SDI) is a framework tool for creating, applying, and using information and communication technology for spatial data collection and dissemination in the context of towns, cities, and urban environments. It is leveraged to implement trans-disciplinary evidence-based research and practices that have a crosscutting impact on three broad domains: people, place, and technology. Thus, SDI provides an institutionally sanctioned, automated means for posting, discovering, evaluating, and exchanging geospatial information by the participation of both the

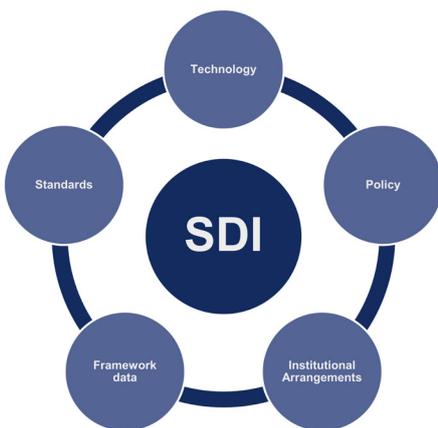


Figure 4: Components of Spatial Data Infrastructure (SDI).

information producers and users. Moreover, SDI intends to create an environment that enables a wide variety of users to access the data in the most cost-effective way to better achieve the objectives at the appropriate political and administrative level. Consequently, it acts as an umbrella of policies, standards, technology, data, and institutional arrangements under which organisations and technologies interact to foster more efficient use, management, and production of geospatial data for urban planning (refer image 4).

Globally, Spatial Data Infrastructure (SDI) is established and used at various geographical levels. SDI projects are often initiated at the National level and further established at the regional and city level as each city has its unique context and requirements (Kim, 2010) (refer image 5). The key element in such SDI is the technological solutions primarily through a web-enabled digital platform for operationalising the various functions of data. There are various examples of such initiatives at regional and national scales that deploy digital platforms across the globe:

1. The Global Earth Observation System (GEOSS) shares environmental data of more than 70 countries (GEO, 2019).
2. Infrastructure for Spatial Information in the European Community (INSPIRE) is a continental level SDI, which enables spatial data sharing among public organisations across Europe.
3. The United States (US) has a national level SDI called Data.gov providing access to government open data at the national level. The US also has a second SDI project established by the United States Geological Survey (USGS) called the USGS earth explorer. It provides access and downloading of topographic information regarding elevation, geographic names, hydrology boundaries, transportation, etc.

Similarly, many countries such as Australia, China, South Korea, and Japan have also invested in developing National level SDIs [refer image 6].

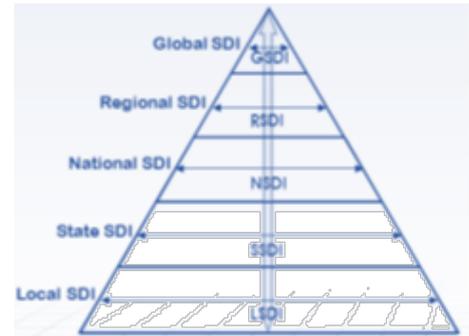


Figure 5: Republic of Korea's SSDI hierarchy  
Source: (Kim, 2010)

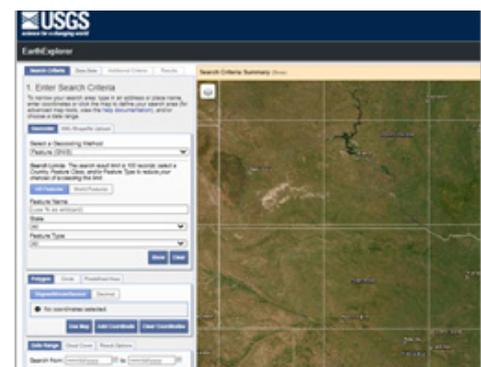
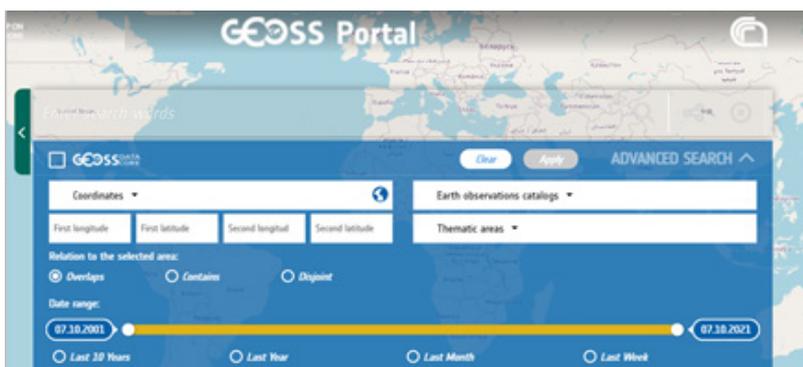


Figure 6: GIS enabled web portals: GEOSS portal and USGS  
Source: (GEO, 2019), (USGS)]

Various cities across the globe have also used interactive digital platforms for urban planning and management functions as well as making the data available for the public. The city of New York is amongst the pioneers for using such a dynamic digital platform for data collection and sharing (NYC Planning labs, 2021). The platform provides thematic maps and includes data layers such as aerial imagery, street, public spaces, zoning information, flood risk areas, etc. (refer image 7.)



Figure 7: The New York City's GIS enabled web portals

Source: (NYC Planning labs, 2021)

### Key Highlights

- Cities, regions, and nations in the global north have adopted data-driven approach to planning by institutionalizing Spatial Data Infrastructure (SDI).
- Key element of SDI are the technological and digital solutions for planning and management functions of a city.
- SDI requires contextualisation before adoption for towns and cities in developing countries.
- SDI for developing countries must adopt innovative and cost-efficient ways of capturing data such as participatory GIS and community-driven data collection techniques.
- SDI initiatives and approaches for towns in developing countries require a long-term vision, investment, and technical capacity building at the local level.

The developing countries around the globe are gradually realising the need for institutionalising SDI at the National level. They are often presented with significant challenges in managing growth and providing urban infrastructure. It is also observed that GIS and the underlying spatial data infrastructures appear to offer significant potential to assist in managing human settlements in developing countries (Bishop, Escobar, Suwarnarat, & Yaqub, 2000). However, the experiences of cities from developed nations do not usually provide a direct solution to issues in developing countries (Dekolo & Oduwaye, 2014). Hence there is a persistent need for exploring alternative innovative solutions and contextualisation of SDI for solving issues of the towns and cities in the global south.

One of the most integral elements to the success of any SDI in the context of towns in developing countries is for the infrastructure to be affordable and easy to operationalise for the local governments. The capturing of data in this regard is often the most challenging task for local governments which are often financially fragile. Traditionally, the responsibility of collecting and updating reliable and demonstrable data has been understood primarily as the government's responsibility, especially in developing nations.

However, more recently there have been various innovative approaches to data collection and collating such as Community-driven data collection and Participatory GIS (refer image 8).

Although SDI provides apparent solutions, there are various challenges in successfully adopting a framework, especially for the towns in developing countries. Various evidence from cities such as Nigeria in developing countries suggests that the lack of technical capacity at the local level often results in limited utilisation of such initiatives. Thus, SDI initiatives and approaches for rapidly urbanising towns in developing countries require a long-term vision, investment, and technical capacity building at the local level (Dekolo & Oduwaye, 2014).



Figure 8: Slum Dwellers International (SDI) community driven data collection and mapping initiatives in Kampala, Uganda

Source: (SDI, 2014)

#### 1.4.2 Urban Spatial Planning and Data Capturing Programs, Policies and Schemes In India

Various organisations at both the central and state levels have historically produced a comprehensive and rich database of spatial information in the form of 2-dimensional maps (refer table 1). These maps traditionally have been produced systematically through various surveys such as topographic surveys, geological surveys, soil surveys, cadastral surveys, land use surveys, various natural resources inventory programs, and the use of remote sensing images. However, up till very recently, this map data was widely used as hardcopies in the form of paper which has been a mainstay for a wide variety of applications and decision-making in most towns and cities in the country (Ministry of Science and Technology, 2021).

The Government of India (GoI) along with the various state governments have turned its focus on improving the urban spatial data framework for plan preparation over the last few decades. The preparation and use of integral spatial data sets are

Table 1: Agencies and organisations collecting data for various projects in India

Name of Agencies	Major Projects / Data Contents
Survey of India (SOI)	Base maps and topographical maps
Indian Space Research Organization (ISRO)	NRDB (Natural Resource Database) initiative, which is pulling data from NRIS (Natural Resource Information System- over 25 GIS layers relating to bio-physical and demographic features for 17 states; FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land-based observations); Nationwide wasteland mapping; Nationwide wetlands mapping; Nationwide natural resource census; Village Resource Centre (VRC) for remote areas etc.
National Remote sensing Centre (NRSC)	Acquisition, processing, and supply of areal and satellite remote sensing data
Ministry of Housing and Urban Affairs (MoHUA)	One stop resource for urban mapping and management under various schemes such as NUIS and AMRUT GIS based Master Plans
Census of India (COI)	Nationwide demographic and socio-economic data-based survey every 10 years
Forest Survey of India (FSI)	Biennial monitoring of forest resources in India
Geological Survey of India (GSI)	Geo-scientific database developed over a period of 150 years
Central Ground Water Board (CGWB)	Ground water occurrence in different terrains
National Atlas and Thematic Mapping Organization (NATMO)	Large number of atlases and thematic maps on environment and associated aspects
Ministry of Agriculture	Crop Acreage and Production Estimation (CAPE)/ FASAL
Indian Meteorological Department (IMD)	Meteorological information
National Bureau of Soil survey and Land Use Mapping (NBSSLUP)	Nationwide soil survey and mapping
Natural Resource Data Management System (NRDMS)	Micro planning data on experimental basis

Source: (singh, 2009)

### Key Highlights

- The focus of central and various state governments has turned towards improving the spatial data framework by using technological tools and solutions for urban spatial planning.
- Various initiatives at national and state level have established digitally enabled geo data base and portals.

constantly improving as more spatially referenced data on wider thematic layers is being documented by many towns and cities. The thematic layers of data sets (such as land use, demography, economics, employment, physiography, topography, climate, hydrology, agriculture, etc.) are being produced, stored, transferred, operated, and analysed in digital form by various organisations and government departments. Further, the advancements in technology such as the use of Geographical Information System (GIS) and the Global Positioning System (GPS) have provided significant advancement in this process [refer image 9]. It has enabled access to precision, high-resolution satellite images, which has enhanced the accuracy and dynamics of these spatial datasets or maps.

At the national level, the GoI constituted a task force in 2000 to suggest ways and means to create a Spatial Data Infrastructure (SDI) in India. The task force recommended 'NSDI: Strategy and Action Plan' which provided a blueprint for National Spatial Data Infrastructure (NSDI) in India (Singh, 2009). Based on the outline

provided by NSDI, multiple state governments have undertaken attempts to establish a state-level spatial data infrastructure. States such as Kerala, Karnataka, Uttarakhand, Delhi, West Bengal, Haryana, Odisha, and others have institutionalised internet-based geoportals having multiple thematic datasets such as political and administrative boundaries, natural resources, transportation, demography, agro and socio-economy, etc. (Choudhary , 2017).

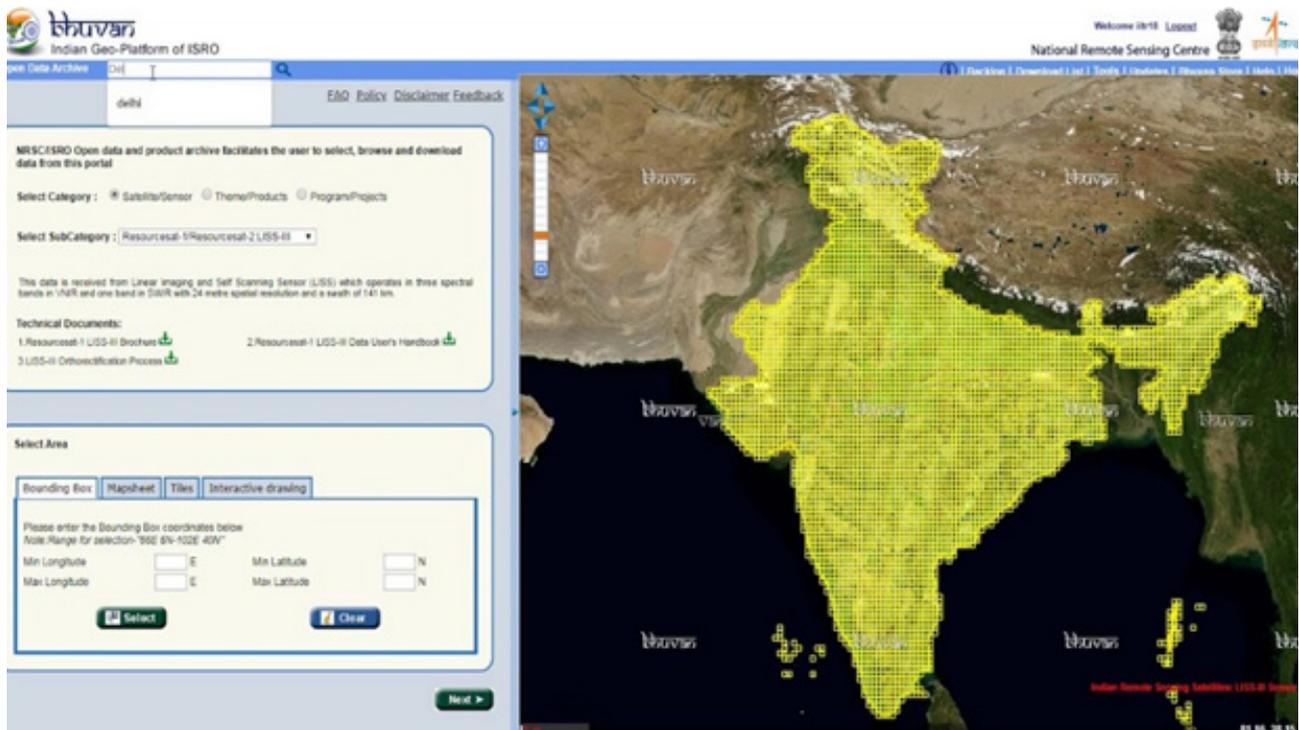


Figure 9: India's GIS enabled spatial data portal 'BHUVAN' uses GIS and Remote Sensing technology for data capturing, documentation, and sharing.

In the context of plan preparation for towns and cities, the GoI over the years has formulated various schemes, policies, and programs for enabling smooth collection and documentation of key spatial data and information (refer Image 10). These initiatives have been enabled at varied timelines for varied purposes such as base map preparation, land use mapping, mapping of various thematic layers including physical features, utilities, amenities, environmental features, transportation infrastructure, data bank creation, agricultural data collection, mapping of revenue records, etc. Some of the key policies and schemes in this regard are:

1. The Urban Mapping Scheme, 1991;
2. National Urban Information system (NUIS), 2006;
3. AMRUT Formulation of GIS-Based Master Plan, 2016; and,
4. AMRUT Formulation of Drone-based Master Plans for Small and Medium Towns, 2020.

#### Key Highlights

- Various policies, schemes and programs in India have focused on comprehensive collection and documentation of key spatial data sets.

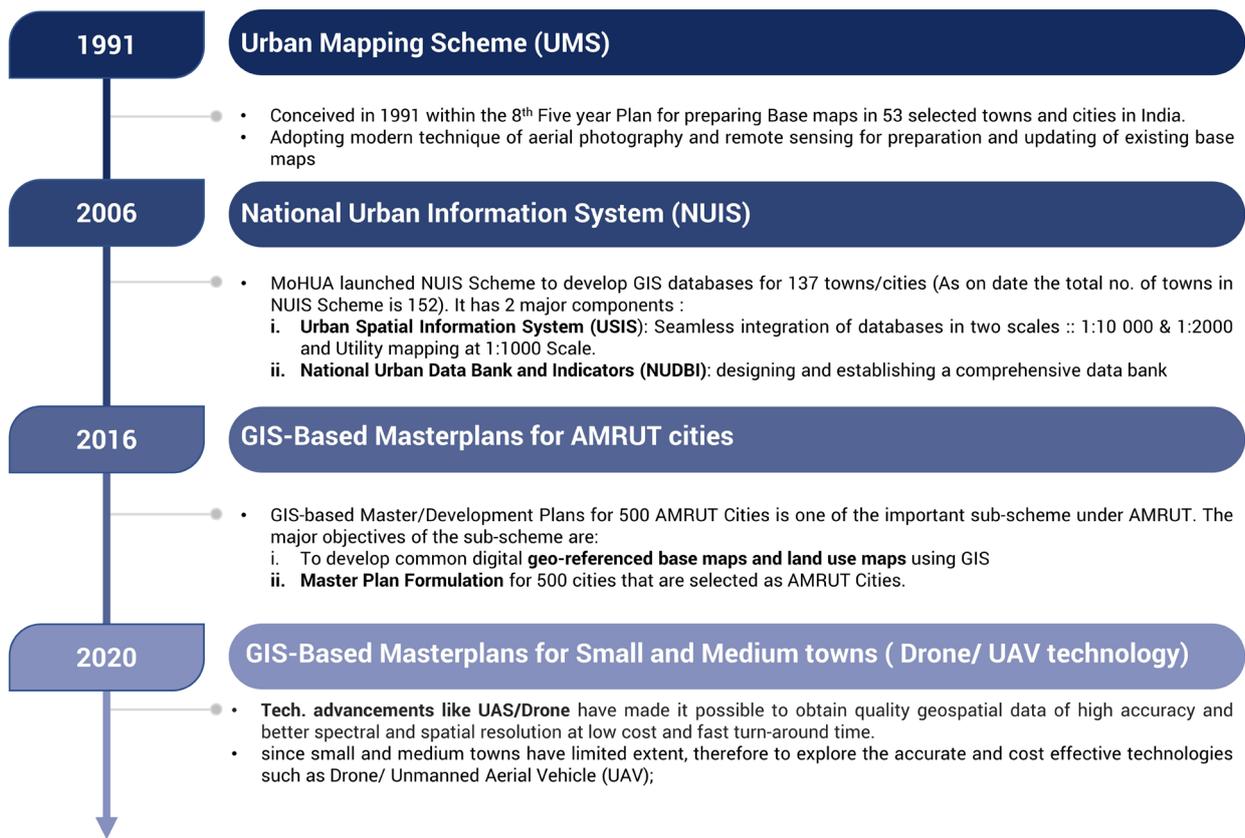


Figure 10: Various policies and schemes in India over the years for collection and documentation of spatial data

Source: (TCPO, 2019)

The urban mapping scheme conceptualised in 1991 focussed on preparing only the base layer for the selected cities. Over the years, the standards for data attribute collection and mapping required under these policies have constantly increased. Schemes such as NUIS and AMRUT require substantial spatial layers to be mapped. Each spatial layer has a requirement for mapping various class and sub-class attributes of data. The sub-scheme for 'Formulation of GIS-based Master Plans under AMRUT mission' encompasses mapping of the eight broad spatial layers which further comprises of 69 classes and approximately 540 sub-classes of spatial attribute data (refer image 11). The primary focus of such policy initiatives in Indian cities has been on undertaking a comprehensive spatial data collection as well as creating an urban spatial data bank repository.



Figure 11: Broad categories of spatial data layers required for mapping under the sub-scheme 'Formulation of GIS-based Master Plans' under AMRUT mission.

## 1.5 APPROACH FOR THE STUDY

### Key Highlights

- Various policy initiatives for data capturing in India have primarily focused on large and metropolitan cities.
- The standards for data capturing suggested within the existing policies may be challenging for SMTs to undertake efficiently.
- Need to adopt a more contextualized framework for spatial planning in SMTs in India

The various policy initiatives have mainly focussed on spatial data collection and mapping in large cities and metropolitan areas in India. The design standards under the initiatives have continuously emphasised a data-hungry approach towards the collection and mapping of various spatial attributes and layers. However, the focus is now swiftly turning towards the planning of SMTs in the country. The recent initiatives from the GoI in 2020 have laid down design standards for using drone-based spatial data collection and mapping for Small and Medium Towns in India. However, the standards prescribed under these initiatives are as exhaustive as those laid down for data collection and mapping of the larger cities under the AMRUT mission. It may hence be challenging for these SMTs to successfully undertake these policy initiatives as they often have limited technical and financial capacity at the local level.

Various state governments have traditionally also undertaken the preparation of spatial plans such as MP and DP in many SMTs. The approach for the preparation of such spatial plans is significantly basic and often a result of the requirements mandated under the state planning legislations. Since the SMTs have a significantly smaller scale and complexities of issues, there is a need felt to adopt a more contextualised approach for preparing their spatial plans.

The research study is structured to first understand the key differences in the approach of the central and state governments towards spatial planning and data framework in India under chapter 2. The study would further investigate the status of spatial plan preparation and data framework in Small and Medium Towns in the states of Gujarat, Rajasthan, Haryana, and Tamil Nadu under chapter 3. Subsequently, the study intends to suggest key recommendations and strategies for adopting a standard spatial planning and data capturing framework for spatial plans preparation in SMTs under chapter 4. In this context, the research study adopts the following methodology:

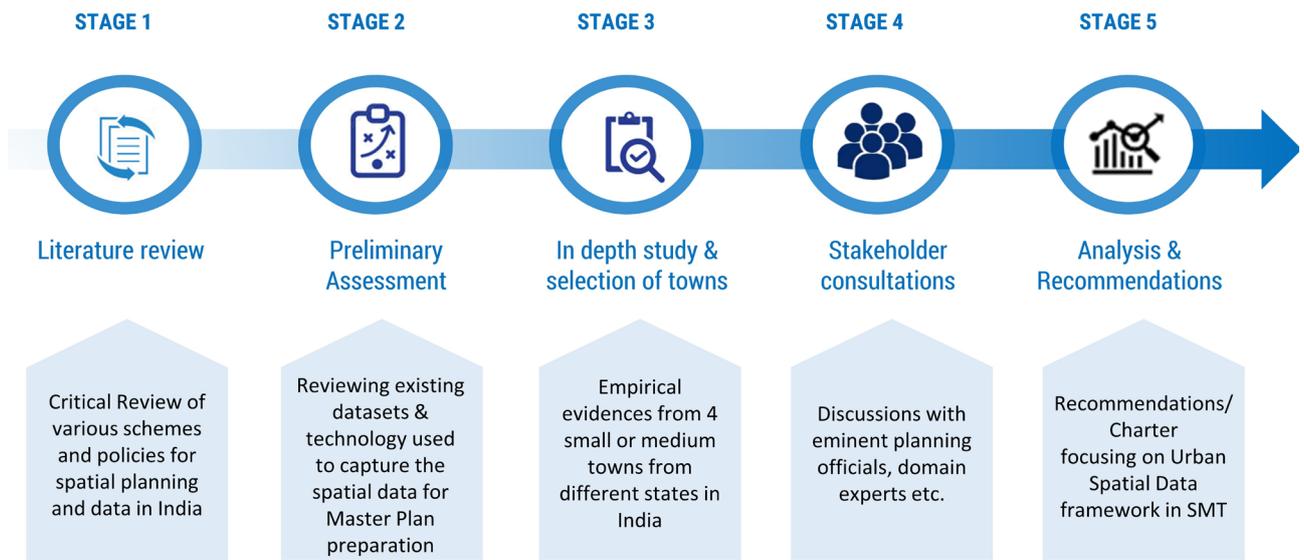


Figure 12: Broad Methodology for the Research Study



# 2

## URBAN SPATIAL PLANNING AND DATA IN INDIA

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**2.1 NATIONAL GUIDELINES AND POLICIES FOR  
SPATIAL PLANNING IN INDIA**

**2.2 SPATIAL PLANNING AT STATE LEVEL**

**2.3 KEY DIFFERENCES IN SPATIAL PLANNING  
APPROACH AT CENTRAL AND STATE LEVEL**

## 2.1 NATIONAL GUIDELINES AND POLICIES FOR SPATIAL PLANNING IN INDIA

The Government of India (GoI) plays a crucial role in the overall urban development in the country. Over the years, the GoI has laid down the framework and direction for planned urban growth for regions, cities and towns in the country. In this regard, the GoI plays an 'advisory' role for promoting orderly urbanisation and providing financial as well as technical support to the State and Local Governments through initiatives undertaken by its various departments for multiple purposes (NITI Aayog, 2021). Various departments, organisations, and institutes under the broader umbrella of the Ministry of Housing and Urban Affairs (MoHUA) contribute towards providing this direction in the form of preparing policy instruments, guidelines, missions, schemes, etc. from time to time.

In the context of spatial planning, MoHUA extends support and guidance to state governments for preparing various types of spatial plans. An important initiative by MoHUA has been the preparation of comprehensive guidelines to help state governments to undertake, prepare, and implement various types of Urban Development Plans. These Guidelines called the 'Urban Development Plans Formulation & Implementation (UDPFI) Guidelines' were first prepared in 1996 to streamline the plan-making process. As India experienced rapid urbanisation in the subsequent decades due to the liberalisation of the economy, these guidelines were revised in 2014, as 'Urban & Regional Development Plans Formulation & Implementation (URDPFI) Guidelines', 2014 (NITI Aayog, 2021). These guidelines provide a comprehensive understanding and guidance w.r.t. various types of plans to be prepared by state governments based on the varying purposes, scales, and scope. These broadly include perspective plans, regional plans, Development Plans, and local area plans to be undertaken as part of the core spatial planning of towns and cities. The guidelines also suggest specific plans and investment plans be prepared such as specific purpose plans, annual plans and projects/ schemes, or research [refer annexure 6 for detailed types of plans and its contents suggested in URDPFI guidelines].

There has been a shift in approach towards plan preparation and the subsequent data requirements have also evolved over the last few decades. The UDPFI guidelines of 1996 had initially acknowledge the need to adopt a different approach for planning large cities and SMTs. The subsequent URDPFI guidelines in 2014 however do not emphasise on adopting a different approach for planning larger cities and SMTs. Moreover, the UDPFI guidelines stressed primarily on preparation of Master Plan (MP) and Development Plan (DP) at



Figure 13: UDPFI 1996 and URDPFI 2014; guidelines prepared by MoHUA to guide spatial planning process in the country.

### Key Highlights

- The central government (GoI) primarily plays an "advisory" role and provides guidance and assistance to various state governments for undertaking the various functions related to urban spatial planning.
- The URDPFI guidelines prepared by the GoI in 2014 provide detailed guidance for preparing various types of spatial plans at varied scales for different purposes.
- The shift in approach for spatial plan preparation (from UDPFI to URDPFI guidelines) lacks emphasis on adopting a different approach to planning SMTs.
- The URDPFI guidelines however emphasize on preparing urban spatial plans of different types and at various scales based on the context. It specifically provides emphasis on preparing Micro Level Plans (LAPs) and strategic plans (special purpose plans).

the city level. The objective for preparing such MP or DP is primarily focussed on the planned expansion of cities into peri-urban areas. The plans focussed on projected future requirements of the towns based on their existing situation and growth trends. Over the years, towns and cities in India have continued to develop by peripheral expansion. However, improvement and upgradation of core inner-city areas have been neglected and consequently continued to deteriorate or have remained as it is.

The URDPFI guidelines in 2014 acknowledged the need to focus both on improving existing urban areas as well as planning the larger regions. The guidelines specifically provide emphasis on preparing micro-level plans such as the Local Area Plans (LAPs) primarily for the improvement of existing developed areas and addressing area-specific critical issues within the city. The plans are proposed to be prepared within the overall framework of MP and DP and focus on area-specific development proposals, plan implementation, and specific development projects (refer image 14).



Figure 14: The difference in scope of Master Plans and Local Area Plans proposed under the URDPFI Guidelines.

Additionally, the URDPFI guidelines have also laid down the need to prepare strategic plans (referred to as special-purpose plans) for addressing the town-specific issues and challenges (TCPO, 2014). The URDPFI guidelines further suggest few strategic plans that the towns can prepare based on their immediate needs and context (refer image 15)

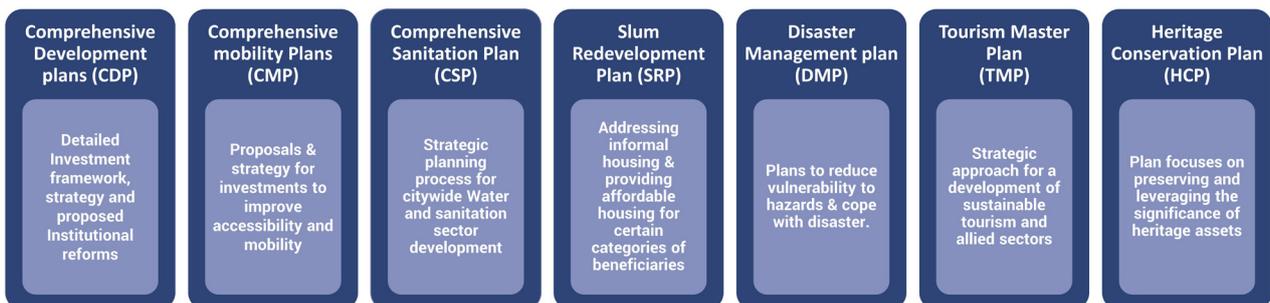


Figure 15: Various types of strategic plans for addressing the immediate town specific needs.

## 2.2 SPATIAL PLANNING AT STATE LEVEL

The responsibility of spatial planning in towns and cities was primarily entrusted to state governments post-independence as 'Land' became a state subject under the 7<sup>th</sup> Schedule Article 246 (Part XI) of the Constitution of India (NITI Aayog, 2021). The urban areas in India had realised the need for the planned expansion of their existing areas. Subsequently, the foundation of town planning in India was laid down with the statutory establishment of Delhi Development Authority (DDA) and Town and Country Planning Organization (TCPO). The DDA undertook the integrated development of India's Capital through the formulation of the Delhi Master Plan in 1962 as per the legislative provisions of the Delhi Development Act 1957 (refer figure 16).

Most of the state governments and their existing Town Improvement Trust Acts in force at the time did not have provisions for the preparation of spatial plans such as Master Plans. Subsequently, a need was felt to have a comprehensive Town and Country Planning (T&CP) act on the lines of the United Kingdom's. Accordingly, the Town and Country Planning Organisation (TCPO) drafted the Model Town and Regional Planning and Development Law in 1962. This Model Act formed the basis for various states to enact Town and Country Planning Acts, with modifications to suit local conditions. The Model Law provided three steps for the administration of this law:

1. Preparation of **existing land use map**.
2. Preparation of an **Outline Development Plan and Comprehensive Development Plan** and their enforcement.
3. Preparation of **detailed schemes of development or redevelopment** as envisaged in the plans and their implementation.

Over the years, various state governments have enacted their town planning acts which outlined how urban spatial planning shall be carried out in the urban areas within the particular state. The state governments subsequently prepare rules to implement the mandates laid down within the planning legislation. The state governments may from time to time also update the provisions within the planning acts and rules to amend the planning mechanism within the state.

Since the state governments enact their planning legislation based upon their context, the provisions under these acts usually vary from state to state. This in turn results in the existence of a **'varied**

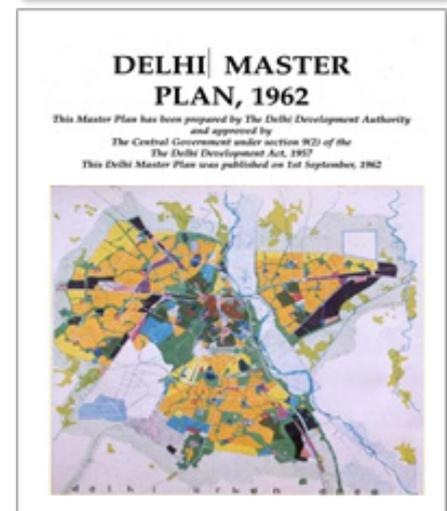


Figure 16: Formation of Delhi Master Plan 1962 under the DDA Act 1957

Source: (DDA, 2015)

### Key Highlights

- In India, the primary responsibility for spatial planning of urban areas is with State governments.
- Each state enables their own T&CP acts to administer and govern the planning process. Thus, every state has a varied planning culture.

<sup>1</sup>Town and Country Planning Organization (TCPO) was set up in 1962 with the merger of the erstwhile Town Planning Organization (TPO) and Central Regional and Urban Planning Organization (CRUPO).

planning cultures' in each state which is deep-rooted within the state legislative frameworks. The states of Haryana, Rajasthan, Gujarat, and Tamil Nadu for instance, laid down the town planning framework in their states through the following state-level planning acts (refer figure 17, 18):

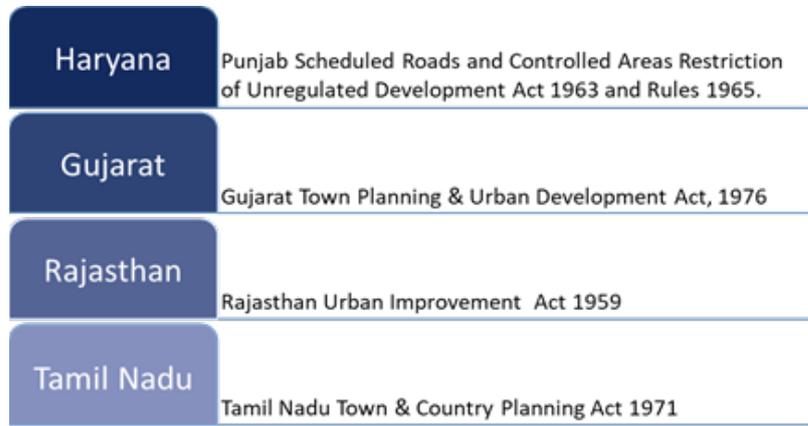


Figure 17: Town Planning Legislation governing Urban Planning in states of Haryana, Gujarat, Rajasthan, and Tamil Nadu



Gujarat Town Planning & Urban Development Act, 1976

The states of Gujarat and Tamil Nadu have enacted their planning acts to provide a comprehensive approach to the planning of the towns and cities. In Haryana, the act and subsequent rules are prepared to provide control of the periphery of the towns and cities. Rajasthan however has not enacted a comprehensive planning act and the urban Improvement trust act continues to provide a framework for preparing spatial plans such as master plans and development schemes especially in the SMTs.

The typical provisions under the planning acts of each state vary mostly in terms of the types of spatial plans required to be prepared and the various contents of these plans (refer table 2).

Section	Subject	Pages
1.	Short title and extent	1
2.	Definitions	2
3.	Prohibition of unregulated development	3
4.	Declaration of controlled area	4
5.	Prohibition of unregulated development in controlled area	5
6.	Provision for extension of controlled area	6
7.	Prohibition of unregulated development in controlled area	7
8.	Power of State Government	8
9.	State Planning Committee	9
10.	Functions of State Planning Committee	10
11.	Composition of State Planning Committee	11
12.	Term of office of State Planning Committee	12
13.	Removal of State Planning Committee	13
14.	Officers and other persons	14
15.	Power of State Government	15
16.	State Planning Committee	16
17.	State Planning Committee	17
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Punjab Scheduled Roads and Controlled Areas Restriction of Unregulated Development Act 1963; Rules 1965

Section	Subject	Pages
1.	Short title and extent	1
2.	Definitions	2
3.	Prohibition of unregulated development	3
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49.	State Planning Committee	49
50.	State Planning Committee	50

Rajasthan: Rajasthan Urban Improvement Act 1959

Section	Subject	Pages
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Tamil Nadu: Town & Country Planning Act 1971

Figure 18: Snapshots of the Town planning acts enacted in the states of Gujarat, Haryana, Rajasthan, and Tamil Nadu.

Table 2: Various types of plans mandated to be prepared at various scales and for different purposes under the state planning acts of Gujarat, Haryana, Rajasthan, and Tamil Nadu.

Type of Plan	Scale (Urdpfi)	Gujarat [Gtpud Act 1976]	Haryana [Pscarcud Act 1963]	Rajasthan [Rui Act 1959]	Tamil Nadu [T&Cp Act 1971]
Regional Plan	1:50,000-1:10,000	N.A.	N.A.	N.A.	Regional Plan
Master Plan/ Development Plan	1:10,000 -1:8,000 (As Per State Provision)	Development Plan	Development Plan	Master Plan	Local Planning Area Master Plan
Zonal Plan/ Sector Plan	1:8000 - 1:4000	Town Planning Scheme / Local Area Plans	Sector Plan	Zonal Plans	N.A.
Development Schemes	1:5,000 1:1,000 (As Per State Provision and Requirement)	Town Planning Scheme / Local Area Plans	N.A.	Improvement Schemes	Detailed Development Plan
Layout Plans / Projects	1:1000 -1:500 (As Per The Scale of The Layout)		Private Colonies By Colonizers		

The provisions within the legislative framework for planning in all four states focusses largely on the preparation of the MP/ DP at the town level. The mandates for each state also suggest preparation of sub-city spatial plans such as Zonal plans, sector plans, development schemes, etc.

The various planning acts of these states elaborately provide requirements for the 'Contents' to be included while preparing these plans. The 'Contents' mandated within the legislative framework for preparing these spatial plans are integral as they lay down the outline of the data sets that the appropriate planning authorities eventually collect for plan preparation. The various data sets for preparing MP/ DP are broadly indicated in table 3 below:

#### Key Highlights

- The planning legislation of the state lays down the outline for the 'contents' of various types of spatial plans.
- This further outlines the data sets that the planning authority collects during the preparation of these spatial plans.

Table 3: The various data layers required within the legislative framework for preparing Master Plans/ Development Plans in the state of Gujarat, Rajasthan, Haryana, and Tamil Nadu.

Sr. No.	Key Thematic Data Required For Master Plan / Development Plans	Gujarat [Sec 12, Gtpud Act 1976]	Haryana [Sec 5, Pscarud Act 1963]	Rajasthan [Sec 3, Rui Act 1959]	Tamil Nadu [Sec 7, T&Cp Act 1971]
1	Existing Land Use			N.A.	N.A.
2	Proposed Land Use/ Zoning				
3	Land Reservation For City Level and Community Level Amenities And Services			N.A.	
4	Land Designation for Green and Environmentally Sensitive Areas			N.A.	N.A.
5	Transportation Network and Infrastructure			N.A.	
6	Transport Circulation	N.A.		N.A.	
7	Physical Infrastructure			N.A.	N.A.
8	Land Reservation for Government Establishments and Institutions		N.A.	N.A.	
9	Conservation of Natural and Heritage Areas and Precincts			N.A.	N.A.
10	Land For Industrial Development			N.A.	
11	Strategies for Agricultural, Warehousing and Water Pollution Control			N.A.	N.A.
12	Land Development			N.A.	
13	Development Phasing			N.A.	
14	Development Control Regulations			N.A.	
15	Existing Areas Improvement			N.A.	
16	Management of Water and Air Pollution			N.A.	N.A.
17	Development Plan Report (Note on Proposals)			N.A.	N.A.
18	Framework for Micro Planning (Schemes)			N.A.	N.A.
19	Other Public Purposes			N.A.	

The various state planning acts mandate the requirements of broad data layers mentioned in table 3. However, these requirements vary significantly from state to state. E.g., the Rajasthan Urban Improvement Act, 1959 only mandates the preparation of a proposed Land Use Plan. The Master Plan or Development Plan preparation process for all towns within the various states requires preparing a **proposed land use plan** at the very least.

The planning acts in various states also suggest preparation of micro-level plans or '**development schemes**' under the framework of the MP/ DP. These schemes provide a framework for the appropriate authority to implement MP/ DP proposals. The planning legislation

in each state also mandate various 'contents' required for preparing these schemes which outlines collection of relevant data sets for their preparation. The requirements for such data are broadly listed under table 4 below:

Table 4: The various data layers required within the legislative framework for preparing development schemes under the broader framework of Master Plans/ Development Plans in the state of Gujarat, Rajasthan, Haryana, and Tamil Nadu.

Sr. No.	Key Thematic Data Required For Development Schemes	Gujarat [Sec 40, 76a, Gtpud Act 1976]	Haryana [Pscrcrud Act 1963]	Rajasthan [Section 29, Rui Act 1959]	Tamil Nadu [Sec 20, T&Cp Act 1971]
1	Land Ownerships		N.A.	N.A.	
2	Land Acquisition	N.A.	N.A.		
3	Laying out or Relaying out of Land		N.A.		
4	Leveling of Low-Lying Areas		N.A.		
5	Construction and Alteration to Built Structures		N.A.		
6	Street Network Layout and Improvement		N.A.		
7	Land Readjustment and Reconstitution of Plots		N.A.		
8	Land Reservation for Various Purposes Residential, Commercial, Industrial, Open Spaces, Social Amenities, Etc.		N.A.		
9	Physical Infrastructure		N.A.		
10	Transport Infrastructure		N.A.		
11	Sews/ Pap Housing		N.A.		
12	Heritage Preservation		N.A.		
13	Sale of Land		N.A.		
14	Development Regulations		N.A.		
15	Development Phasing		N.A.		
16	Finance		N.A.		
17	Plan Report		N.A.		
18	Others		N.A.		

The requirements for the preparation of various development schemes in the states of Gujarat, Rajasthan, and Tamil Nadu are quite comprehensive. The planning acts specify detailed requirements for the preparation of these development schemes [refer table 4 above]. However, the planning legislation in the state of Haryana does not mandate the preparation of such schemes by the planning authorities. Hence, the responsibility of implementation of Development Plans largely lies with the private developers and colonisers in the state of Haryana.

## 2.3 KEY DIFFERENCES IN SPATIAL PLANNING APPROACH AT CENTRAL AND STATE LEVEL

### Key Highlights

- The central government plays an 'advisory' role and provides guidance and assistance to the state government for spatial plan preparation.
- The state governments lay down the technical and institutional framework within the state for preparing urban spatial plans.
- The state governments contextualize the guidance provided by the central government based on their context and legislative requirements.
- The URDPFI guidelines don't provide guidance for preparing basic spatial plans specifically for SMTs.

The central government plays an 'advisory' role by providing guidance and assistance to state governments. The state governments however are responsible for preparing the spatial plans for its urban areas within the state's institutional framework and capacity. The differences in approach towards spatial planning at the central and state level primarily stems from this difference in their roles and responsibilities. The study identifies the following key differences in approach for urban spatial planning at the central and state level:

- 1. Common guidelines at central level vs varied planning cultures at state level:** The central government provides a comprehensive framework (primarily through URDPFI guidelines) for preparing various types of spatial plans. However, the various state governments use this framework only as guidelines. The primary objective of appropriate planning authorities in each state is to prepare spatial plans under the state's respective T&CP acts. For this purpose, the planning authorities adopt some guidance from the entire framework suggested at the central level.
- 2. Comprehensive requirement for data layers in the URDPFI guidelines vs requirement of broader thematic land use proposals within the T&CP acts at state level:** The URDPFI guidelines specify requirement for various thematic proposals especially for preparation of urban Spatial plans (MP /DP) at city level. However, the requirements under the state planning legislation are often in the form of thematic land use proposals. The legislation does not specify the data attributes required to be collected for formulating the required land use proposals. Consequently, each state and their planning authorities collect data sets for plan preparation based on the mandates and requirements under the state planning legislations which in turn creates a varied culture for undertaking preparation of spatial plans in every state (refer table 5).
- 3. Extensive requirements for spatial plan preparation at central level vs requirement for fundamental guidance for SMTs at state level:** The comprehensive framework for spatial planning under the URDPFI guidelines is broadly suggested to be adopted by all types of urban areas (including metropolitan areas, large cities and SMTs). State governments often require very basic guidance for preparing spatial plans for SMTs within the limited technical and financial capacity available in the state. Specifically, for SMTs the suggestions provided within the URDPFI guidelines are not extensively utilized by local planning authorities.

Table 5: Key differences in data requirements for spatial planning under URDPFI guidelines and state specific planning legislations.

Sr. No.	Broad Layers Suggested For Spatial Plan Preparation Under Urdpfi Guidelines	Gujarat [Gtpud Act 1976]	Haryana [Psrarud Act 1963]	Rajasthan [Rui Act 1959]	Tamil Nadu [T&Cp Act 1971]
<b>1</b>	<b>Existing Situation Assessment</b>				
1.1	Background:				
1.2	Site Background & Analysis				
1.3	Demographic Profile				
1.4	Land Profile				
1.5	Economic Profile				
1.6	Transportation				
1.7	Social Infrastructure & Facilities				
1.8	Physical Infrastructure: (benchmarks)				
1.9	Environmental Profile				
1.10	Shelter (both formal and informal)				
1.11	Administrative profile				
1.12	Existing situation thematic Maps & Plans:				
1.13	Gap analysis				
<b>2</b>	<b>Projections/ Projected Requirements</b>				
2.1	Population				
2.2	Economic base and employment				
2.3	Shelter				
2.4	Transportation				
2.5	Social Infrastructure				
2.6	Physical Infrastructure				
2.7	Land use requirement for various purposes				
2.8	Disaster management infrastructure assessment				
<b>3</b>	<b>Development Vision And Proposals</b>				
3.1	Vision formulation				
3.2	Proposed Land use Plan:				
3.3	proposal for Street network				

Sr. No.	Broad Layers Suggested For Spatial Plan Preparation Under Urdpfi Guidelines	Gujarat [Gtpud Act 1976]	Haryana [Psrarud Act 1963]	Rajasthan [Rui Act 1959]	Tamil Nadu [T&Cp Act 1971]
3.4	Redevelopment schemes and proposals				
3.5	land development proposals				
3.6	proposals for Physical Infrastructure				
3.7	Proposal for Housing/ affordable housing				
3.8	Proposal for environment and Heritage preservation				
3.9	Comprehensive Mobility Plan:				
3.10	Infrastructure Plan/ Utility Plan:				
3.11	Special Area Planning:				
3.12	Development Promotion Rules / regulations				
3.13	Conservation and Improvement of Environment				
3.14	Compliance of Government Policies				
3.15	Zoning Regulations				
3.16	Development Regulations				
<b>4</b>	<b>Implementation Plans &amp; Projects</b>				
4.1	Prioritizing and phasing				
4.2	Land resource mobilization				
4.3	Investment Strategy				
4.4	Resource Mobilization and Implementation				
4.5	Implementation framework				
4.6	Detailed maps				



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# 3

## REVIEW OF URBAN PLANNING MECHANISM IN SMALL AND MEDIUM TOWNS OF INDIA

### 3.1 SELECTION OF SMALL & MEDIUM TOWNS FOR THE STUDY

### 3.3 CRITICAL CHALLENGES FOR SPATIAL PLANNING IN SMALL AND MEDIUM TOWNS IN INDIA

### 3.2 STATUS OF SPATIAL PLANNING AND DATA IN SELECTED TOWNS

- Spatial Plan Preparation Process
- Data Collection, Documentation and Storage
- Institutional Capacity of Local Planning Authorities
- Existing Policies and Schemes Aiding Spatial Planning and Data (Amrut Gis Based Masterplans)

### 3.1 SPATIAL PLANNING IN SMALL AND MEDIUM TOWNS IN INDIA

Urban spatial plans for Small and Medium Towns (SMTs) are prepared within their state's spatial planning framework. The preparation of such urban spatial plans is undertaken by town planning departments, local planning authorities, urban local bodies, and other designated planning authorities within the state. Additionally, various central government's policies, schemes, missions, and other initiatives play an important role in guiding and aiding the preparation of spatial plans in these SMTs from time to time. Both the central government and state governments also lay down the comprehensive requirements and standards for spatial plan preparation through various guidelines, policies, and legislative mandates.

The SMTs in India have lacked the necessary focus for both preparing and frequently revising urban spatial plans. They are often placed low in the hierarchy of urban structure and are assumed to be slow growing. The preparation of urban spatial plans in SMTs is consequently still at a nascent stage. The emphasis of these plans is on allocating land uses for various purposes based on the projected requirements of the towns for the future. SMTs also struggle to capture relevant geospatial data and undertake the preparation of comprehensive and implementable plans. This could be attributed to the limited technical and financial capacity at the local level for preparing and subsequently implementing these plans. Moreover, the plans are largely prepared for a long-term horizon period and seldom prepared proactively for addressing town's immediate needs. Urban spatial plans thus prepared are rudimentary and do not essentially address the immediate needs of the SMTs. Hence, the development of SMTs in India continues to be largely haphazard.

It is essential to draw empirical evidence across a few selected SMTs and critically understand the challenges and limitations in the existing spatial planning framework in SMTs in India.



Figure 19: Typical morphology of Small and Medium Towns (SMTs) in India

source: Pinterest

## 3.2 SELECTION OF SMALL AND MEDIUM TOWNS FOR THE STUDY

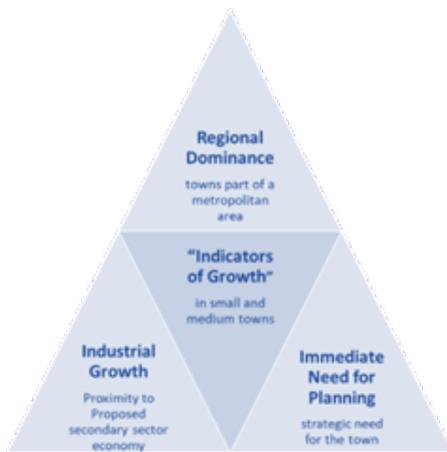


Figure 20: Indicator of growth for Small and Medium Towns identified for the study.

For understanding the planning culture and planning mechanism in SMTs, towns from the states of Gujarat, Haryana, Rajasthan, and Tamil Nadu were considered for detailed analysis. A rationale for selection of one town in each of these four states was identified [Refer Annexure 1 and Annexure 2 for detailed methodology for selection of SMTs]. The rationale for selection of SMTs for the study broadly includes the following methodology:

1. **Defining SMTs in the Indian context:** The SMTs are defined as towns with population between 5,000 and 500,000, as defined in the URDPFI guidelines (TCPO, 2014). These SMTs are further classified into four sub-categories: small town 1, small town 2, medium town 1 and medium town 2 [Refer table 6 below].
2. **Identifying all SMTs:** All SMTs in the selected states were shortlisted based on the criteria used for defining SMTs in Indian context above [Refer Annexure 2 for detailed list of shortlisted SMTs].
3. **Identifying indicators of growth:** All SMTs identified in the selected states were further shortlisted based on their growth potential in the future [Refer Annexure 2 for detailed list of criteria for shortlisting SMTs for the study]. The potential of growth was identified considering the following key criteria:
  - » Increasing population growth trends over the last few decades.
  - » SMTs with at least a municipal council (nagar palika) as its urban local body.
  - » SMTs part of dominant regions or metropolitan areas [refer image 20].
  - » Proximity to industrial growth corridors proposed for development in the future [refer image 20].
  - » Immediate need for planning in SMTs [refer image 20].
4. **SMTs prioritized for development under the government's policy initiatives:** SMTs were further shortlisted based on their selection under the existing central government's AMRUT mission's sub-scheme- "Formulating of GIS-based Master Plans'.

Based on the above identified broad rationale and criteria, one town from each of the selected states of Haryana, Rajasthan, Gujarat, and Tamil Nadu were shortlisted. These towns include Rewari in Haryana, Alwar in Rajasthan, Mehsana in Gujarat, and Dindigul in Tamil Nadu [refer figure 21 below].

Table 6: Comprehensive criteria for defining Small and Medium Towns for the study

Sr. No.	Population Range	Classification of Town (As per census of India)	Classification of small and medium towns (Sub categories as per URDPFI guidelines)	Governing Local Body (As per URDPFI guidelines)	Towns Shortlisted under AMRUT GIS-based MP sub-scheme
1.	5,000 - 20,000	Class 4, 5	Small Town I	Municipal Board (Nagar Panchayat)	✗
2.	20,000 - 50,000	Class 3	Small Town II	Municipal Board (Nagar Panchayat) / Municipal council (Nagar Palika)	✗
3.	50,000 - 1,00,000	Class 2	Medium Town I	Municipal council (Nagar Palika)	✗
4.	1,00,000 - 5,00,000	Class 1	Medium Town II	Municipal council (Nagar Palika)	✓



Figure 21: Selected towns for detailed study: Rewari, Haryana; Alwar, Rajasthan; Mehsana, Gujarat; and Dindigul, Tamil Nadu

The selected towns of Rewari, Alwar, Mehsana, and Dindigul act as the district headquarters within their respective states. These class I towns have a typical population between 1 lakh to 5 lakhs (Census, 2011). The towns have experienced rapid urbanisation with significantly high decadal growth rates between 2001 and 2011 (Rewari – 42.05%, Mehsana- 34.85%, Alwar- 21.17%, and Dindigul- 13.22%). The towns are expected to grow further as access and proximity to proposed industrial corridors provides economic opportunities in newer sectors within the town's economy [refer table 7].

The Town of Rewari in Haryana lies within the National Capital Region (NCR). The town traditionally has brass metal works, ornamental, and shoe industries. In the past few years, key industrial investments have been proposed in the proximity of the town. The town is in close proximity to the proposed Delhi Mumbai Industrial Corridor (DMIC). Additionally, the Dharuhera and Bawal investment region in the town's vicinity is also an upcoming automobiles and auto-ancillary industrial area.

The town of Alwar in Rajasthan is similarly situated within the NCR and in close proximity to the DMIC corridor. The town is traditionally an important tourist destination with abundant historic and cultural vibrancy. The proposed investment areas such as khushkhera-bhiwadi-neemrana investment region proposed in the town's proximity has accelerated the demand for housing in Alwar. The town is expected to swiftly urbanize in the coming decades.

Mehsana is an important upcoming urban centre in the northern region of Gujarat. Like Rewari and Alwar, Mehsana also lies in close vicinity to the DMIC corridor's influence area. Traditionally, the town had dairy and agro-based industries. More recently, the establishment of Special Investment region (SIR) of Mandal-Bechraji in Mehsana's close proximity has initiated automobile and auto-ancillary industries. These investments in the secondary sector economy in and around Mehsana have played a key role in the town's high growth rates over the last decade. This is expected to grow further in the coming decade.

The town of Dindigul lies within the Madurai region of Tamil Nadu and is proposed as an important node in the Chennai Kanyakumari industrial corridor (CKIC). The town traditionally had silk related commerce and industries. It also has a vibrant flower and fruit market that serves the region. The town is located near ecological resources and reserved forests. Recently, the growth of Dindigul and its surrounding agglomerations has experienced haphazard development and formation of informal settlements. Dindigul is expected to continue growing in the future as access to the CKIC corridor has increased demand for logistics and related economic activities in the region.

Table 7: Brief profile of selected towns for study

Sr. No.	State	Selected Towns	Population (as per census 2011)	ULB type (as per census 2011)	Decadal Growth Rate (2001-2011)			Selection Criteria			Status of Master-plan Preparation	Strategic Need for Planning
					Pop 2001	Pop 2011	Decadal growth rate (%)	Part of Metropolitan Area	Proposed Dedicated Freight Corridor	proposed Investment Region / Industrial development		
1	Haryana	Rewari	1,43,021	Municipal council (Nagar Palika)	100684	143021	42.05	National Capital Region	Delhi Mumbai Industrial Corridor (DMIC)	Rewari Manesar Bawal investment region (node 6)	Final Development Plan sanctioned in 2020	<ul style="list-style-type: none"> <li>Automobiles and auto-ancillary industries in Dharuhera and Bawal industrial area.</li> <li>Other traditional industries: brass metalwork, ornamental shoes;</li> <li>Proximity to DMIC corridor</li> </ul>
2	Rajasthan	Alwar	3,22,568	Municipal council (Nagar Palika)	266203	322568	21.17	National Capital Region	Delhi Mumbai Industrial Corridor (DMIC)	Khushkhera-bhiwadi-neemrana investment region (node 7)	Final Master Plan Sanctioned in 2013	<ul style="list-style-type: none"> <li>Historic town and an important tourism hub</li> <li>Proximity to DMIC corridor</li> </ul>
3	Gujarat	Mahesana	1,84,991	Municipal council (Nagar Palika)	141453	190753	34.85	National Capital Region	Delhi Mumbai Industrial Corridor (DMIC)	mandal bechraji SIR	Preliminary Draft Development Plan sanctioned 2020	<ul style="list-style-type: none"> <li>Oil and natural gas, automobile, dairy, and agro based industries</li> <li>Proximity to DMIC corridor</li> </ul>
4	Tamil Nadu	Dindigul	2,07,327	Municipal council (Nagar Palika)	331108	374886	13.22	Madurai Region	Chennai Kanyakumari Industrial Corridor (CKIC)	Phase 1-Madurai-Dindigul-Virudhunagar-Theni	Draft Master Plan for 2031 under preparation	<ul style="list-style-type: none"> <li>Large percentage of population in Informal settlements</li> <li>Haphazard development in the urban agglomeration area</li> <li>Traditional silk related commerce and industries</li> <li>Proximity to ecological areas and reserved forest</li> <li>Proximity to CKIC</li> </ul>



### 3.3 STATUS OF SPATIAL PLANNING AND DATA CAPTURING IN SELECTED SMTs

The selected SMTs of Rewari, Alwar, Mehsana, and Dindigul over the years have undertaken preparation of various spatial plans especially Master Plans (MPs)/ Development Plans (DPs). The plans were prepared under the respective state's legislative framework of spatial planning.

As part of this study, multiple rounds of stakeholder consultations were carried out with key planning officials and eminent domain experts from selected towns. The consultations aimed to understand the overall mechanism of spatial planning within these selected SMTs. The questions to the stakeholders were designed to develop an understanding of the following:

1. The **legislative requirements** for preparing spatial plans and the subsequent **Master Plan (MP)/ Development Plan (DP) preparation process**.
2. The current data infrastructure including **data collection, documentation, storage process etc.** for preparation of MPs/ DPs.
3. The status and impact of various central level policies such as **AMRUT GIS-based Master Plans** on the preparation of spatial plans in SMTs.
4. The **key data requirements for planning SMTs** in Indian context.

These subsequent sections highlight key findings from the stakeholder consultations.

#### 3.3.1 Spatial Plan Preparation Process

The urban spatial plans in Rewari, Alwar, Mehsana, and Dindigul have all been prepared with a similar approach. The preparation of MP/ DP in these towns is largely driven by the statutory requirement to prepare such plans rather than a need-based approach for planning. Additionally, the preparation of MP/ DP is focused mainly on the allocation of land for various uses based on the projected requirements for a horizon year. The contents of the plans are broadly similar and includes data layers as shown in figure 22.

The spatial plans show various thematic areas including natural features, town/village abadi areas, housing scenarios, transportation and traffic scenario, environment and pollution scenario, public amenities, public utilities and facilities, and land use classifications for various purposes including residential, commercial, public-semi-public, etc. Beyond this the scope of these spatial plans do not address pertinent issues and strategies for climate change resilience, disaster risk mitigation, safety

#### Key Highlights

- Master Plans or Development Plans are typically prepared to serve the statutory requirement of the state to prepare spatial plans for urban areas.
- Spatial plans are prepared for long term period of 10-20 years. These are seldom prepared or updated on a need-based approach.
- They have limited scope and largely focus on preparing a land use plan.

and security, informal sector economy, etc. Further the plans are prepared for a long-term period of 10 -20 years in all four towns. These are usually only revised beyond the completion of the plan's horizon period. The spatial plans thus prepared in all four town address the basic requirements under the state's planning framework.



Figure 22: Typical data layers for preparation of Master Plans/ Development Plans in Rewari, Alwar, Mehsana, and Dindigul

### 3.3.2 Data Collection

**Key Highlights**

- There is a lack of infrastructure for continuously collecting and updating spatial data.
- Data sharing between various governments departments takes significant time.
- Community perception during data collection is not suitably correlated.

The data collection process is a key exercise for preparing spatial plans. Various data sets are collected using both primary and secondary sources for preparing the spatial plans in selected SMTs. On-ground data is collected primarily through the help of survey consultants and secondary data is collected from various state and central government departments, institutes, organisations, etc. [refer image 22]. From the consultations with key stakeholders, the following key challenges in data collection process were identified:

1. Data collection for plan preparation in SMTs takes copious amounts of time. This may be attributed to the low frequency of data collection exercise, which is primarily carried out only before the preparation of spatial plans. As the spatial plans across all selected towns are prepared once in 10-20 years, the subsequent collection of data is also carried out within similar timeframes.
2. There are frequent delays in data collection which primarily is a result of departmental approvals and processes

followed by the government organisations for sharing data. The stakeholder consultations suggested that the political or bureaucratic urgency often acts as a catalyst for swift data sharing between various government departments.

3. Further, the data sets collected by the planning authorities are often not correlated with community's perceptions leading to scepticism and uncertainty. Much of the data collection exercise deploys limited participatory approaches such as community-based data collection, mapping, etc.

### 3.3.3 Documentation of Data

The culture of documenting spatial data within the various planning departments has evolved significantly over the past decades. Most of the data documentation including data registry and spatial mapping makes use of digital platforms such as Microsoft Office tools and Computer-Aided Design (CAD) software. More recently, the planning departments, especially at state level, have initiated the use of Geographical Information Systems (GIS) technology for spatial data mapping. This shift has been supplemented through central and state government's initiatives for establishing infrastructure and facilities at the regional and state level for using GIS. However, at the local level there are a few challenges in successfully institutionalizing the use of GIS in documenting spatial plans:

1. The planning departments still vastly rely on CAD over GIS software for spatial mapping. The use of a GIS for mapping especially at the local level is limited. Further, the limited extent of the use of GIS in planning departments is primarily limited to the digitisation of existing CAD data layers to shapefile data layers.
2. The planning departments rely heavily on experts and consultants in using GIS for analytical interpretation of spatial data and for deriving various scenarios and trends which is a key part of the spatial planning exercise.

### 3.3.4 Data Storage

The storage of data in all selected towns is primarily undertaken at state level. The department responsible for said storage of data varies from state to state, however state planning departments primarily take up the responsibility for storing spatial data. Traditionally, the data within the planning departments is stored as hardcopies, however the culture is swiftly evolving towards digital storage of data even at local level. The state governments are also establishing state-level centralised servers that would enable digital storage of collected data on a digital platform in the selected SMTs. For example, the state of Rajasthan through the Department of IT (DoIT) has established a centralised server system called the 'Bahamashah' server situated in Jaipur. Such server provides for booking storage spaces as per the requirements of the local

#### Key Highlights

- Use of GIS software in spatial plan preparation is limited to only digitization of CAD layers to GIS.
- Local planning departments often rely on experts and consultants for using GIS software for analytical interpretation of spatial data.

**Key Highlights**

- Storage of most data sets in selected SMTs continues to be done as hard copies. This often leads to difficulties in locating relevant data in responding to critical planning and administrative issues and thus, duplication and re-collection of data.
- There is a lack of access to appropriate hardware at local level. SMTs rely on states IT infrastructure for digital storage of data sets.

governments and development authorities.

The transition from storage of data as hard copies to digital medium has been slow; most of the data in the selected SMTs continues to be stored as hard copies. The storage of key data in hardcopy medium presents challenges, especially for swift planning and decision making. The planning authorities often face difficulties in locating relevant data in responding to critical planning and administrative issues. There is often duplication and re-collection of data.

This slow transition into digital storage of data may also be attributed to the lack of access to appropriate hardware and other infrastructure for storage at local level. The local bodies and planning authorities primarily rely on state government's IT infrastructure for storage of data in large volumes if required. Further, there is a clear lack of standardized guidance for local authorities for appropriately storing data so that it could be easily accessed and used from time to time for various purposes.

### 3.3.5 Institutional Capacity of Local Planning Authorities

The state planning departments typically make provisions for deputation of town planners at the local planning authorities or local bodies. In Rewari and Alwar, the respective state planning departments appoint a deputy town planner in charge of the planning cell. In Mehsana, a town planning officer of the state is deputed at the ULB. In case of Dindigul, the planning departments assigns a planner as the member secretary of the local planning authority. These professionals are further assisted with planning professionals which typically includes assistant town planners, planning assistants, draughtsman, Jr. engineers, patwari etc. Furthermore, senior planners of the state government are tasked to overlook planning activities at a regional level.

The planning authorities have adequate capacity especially at the senior or managerial level for undertaking the procedural and statutory aspects of the plan preparation process. However, at the technical level, the capacity to execute the preparation and implementation of urban plans is often insufficient. Plan preparation is an intense activity that requires professionals to manage between technical knowledge, use of technology, decent communication skills, ability to manage public and political expectations, and handling departmental coordination. This requires a substantial number of qualified professionals at the technical level for successful preparing and implementing urban spatial plans. Through stakeholder consultations, it was understood that the process of appointment of planning professionals at technical level is a relatively slow process. There is a continued need for assistance from private consultants and other planning professions in preparing urban spatial plans, especially for the selected SMTs.

**Key Highlights**

- Planning departments have adequate capacity at the senior level but lack capacity at the technical level, especially in case of SMTs.

### 3.4 STATUS OF EXISTING POLICIES AND SCHEMES FOR SPATIAL PLANNING AND DATA CAPTURING IN SMALL AND MEDIUM TOWNS

The GoI over the years, has formulated various schemes, policies, and programs for enabling smooth collection and documentation of key spatial data and information generally for higher order cities and metropolitan areas. Small and Medium Towns, however, have not been the primary beneficiaries to these schemes as they are often considered to be slow growing. Various schemes such as the Urban Mapping Scheme (UMS), 1991; National Urban Information system (NUIS), 2006; and AMRUT mission's sub-scheme for Formulation of GIS-Based Master Plan, 2016 have focused on facilitating data capturing for spatial plan preparation in large cities and metropolitan regions. However, now the central government has acknowledged the need to focus on SMTs in India and subsequently introduced "design standards for formulating drone-based Master Plans" for SMTs in 2020.

Initially under the UMS, the primary focus was to capture spatial data for preparation of base layers in 53 cities in India. Subsequently, with improvement in satellite imagery and remote sensing technology, more data sets were identified for spatial plan preparation. The NUIS was subsequently conceptualized to collect comprehensive spatial data for 152 cities across India in 2006. The central government's sub-scheme under the AMRUT mission in 2016 was conceptualized for formulation of GIS-based Master Plans in 500 selected towns and cities in the country. Within the 500 towns prioritized for this scheme, medium-sized towns in each state were considered along with the large cities and metropolitan regions for aid in data capturing and spatial plan preparation.

The towns of Rewari, Alwar, Mehsana, and Dindigul were also selected as one of the 500 selected AMRUT towns. The Scheme extensively identifies the design standards for the collection and mapping of physical features. The design standards in this scheme specify the collection and mapping of 8 broad spatial layers which are further subdivided into 69 Classes and 475 sub-classes. The scheme also specifies the collection of 25 non-spatial data layers having approximately 92 attributes to be collected by the Urban Local Bodies (ULBs) [refer appendix 8 for detailed list of layers and attributes]. Under this scheme, the current status of preparation of GIS-based Master Plans in the selected towns are as shown in figure 23 below:

Mehsana, Gujarat	Rewari, Haryana	Alwar, Rajasthan	Dindigul, Tamil Nadu
The Final base map is prepared at 1:4000 scale. Additionally, the final master plan is also prepared and submitted to the GoI.	Currently, no base map or masterplan submitted to GoI	A Final base map has been prepared but preparation of masterplan is yet to be completed.	A Final base map has been prepared but preparation of masterplan is yet to be completed.

Figure 23: Status of AMRUT GIS-based Master Plans in selected SMTs

### 3.5 CRITICAL ANALYSIS OF SPATIAL PLANNING PROCESS IN SMALL AND MEDIUM TOWNS

The study ascertains that broad principles for spatial planning could be broadly established for all towns and cities. However, preparing spatial plans is a localized and context specific exercise. In India, the guidance for preparing spatial plans is disseminated by the central government through various guidelines, policies, schemes etc. The spatial plan preparation is undertaken at the state level within the state's town planning framework. The framework of planning in each state is broadly similar but varies depending upon the state's planning mandates, legislations, institutional framework, and socio-political stance from time to time. Primarily across all states in India, the focus is on development and planning of large cities and metropolitan regions. The preparation of urban spatial plans is not prioritized in SMTs across all states in India.

From the stakeholder consultations with key professionals and officials in the selected SMTs the following critical information can be inferred:

1. Preparation of GIS-based master plans under the AMRUT mission in selected SMTs is being undertaken as a separate exercise to that of statutory spatial plan preparation.
2. Under AMRUT, the emphasis is on mapping the existing infrastructure and conditions through detailed data input using technological inputs such as GIS-based software. On the contrary, statutory spatial plans such as Development Plans and Master Plans typically focus on allocating land for various purposes based on projected requirements for the future in the SMTs. The SMTs may adopt the relevant information from the AMRUT plans while preparing their statutory plans.
3. The AMRUT guidelines suggest comprehensive collection of data attributes and the standards for documentation [refer appendix 8 for detailed list of layers and attributes] as compared to the mandates for statutory Master Plan preparation. SMTs usually collect spatial data as per the requirement under the state's planning mandates and socio-political requirements at the time of spatial plan preparation.
4. The standards for collection of data attributes for plan preparation under AMRUT GIS-based master plan and statutory spatial plans lack emphasis on collection of various non-physical data attributes. Key data attributes such as informal housing, informal economy, climate change, safety and security, etc. may not be extensively collected and/or mapped.

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5. Both the AMRUT guidelines as well as the state mandates on spatial plan preparation lack emphasis on plan implementation. Guidelines for preparation of micro-level plans focusing on detailed implementation is considered a separate exercise.
  6. The preparation of GIS-based master plans and the statutory spatial plans requires substantial capacity at technical level especially for mapping on GIS platforms. As the local governments do not have such capacity of trained personnel as well as infrastructure, this extensive exercise is often undertaken in a centralised manner by state town planning departments and other state level institutes. For example, Bhaskaracharya Institute for Space Applications and Geo-Informatics (BISAG) is undertaking the preparation of AMRUT GIS-based Master Plans for all towns in Gujarat. The states of Haryana, Rajasthan and Tamil Nadu have outsourced the preparation of Master Plans to private organisations on a consultancy basis.
  7. Across all selected SMTs there has been an initiation of a data-driven approach to spatial planning. The study suggests that Institutionalized use of technology in data capturing, documentation and trend analysis are now prerequisites in the town planning departments across all selected SMTs.

The GoI under its recent AMRUT 2.0 guidelines, is now focusing on extending support in formulation of GIS-based Master Plans for more medium-sized towns across the country. Geo-database will be created as per the design and standards approved by MOHUA namely “Design & Standards for Formulation of GIS based Master Plans for AMRUT Cities” and “Design & Standards for Application of Drone/UAV technology for Formulation of GIS based Master Plans for Small and Medium Towns”.





# 4

## CONCLUSION & RECOMMENDATIONS

**4.1 KEY OBSERVATIONS AND LIMITATIONS TO SPATIAL PLAN PREPARATION IN SMALL AND MEDIUM TOWNS IN INDIA**

**4.2 KEY RECOMMENDATIONS**

## 4.1 KEY OBSERVATIONS AND LIMITATIONS TO SPATIAL PLAN PREPARATION IN SMALL AND MEDIUM TOWNS IN INDIA

The study suggests that over the years, the Government of India (GoI) has stressed on solutions that deploy a data-driven and evidence-based approach to spatial planning. Various schemes, missions, polices, etc. have suggested greater focus on collection of geo-spatial data through use of technological solutions such as remote sensing and Geographic Information system (GIS). The use of such technological solutions allows towns and cities to continuously collect accurate, reliable, and up-to-date data for real-time planning and decision making in urban areas. This has induced a substantial shift in the collection, documentation, and storage of geospatial inputs to the spatial planning process especially at the state level.

Much of the data-driven planning efforts are focused on higher order cities and metropolitan areas. The 'Design Standards' specified under the various government schemes such as NUIS, AMRUT, etc. have over the years emphasized on collection of comprehensive data attributes for spatial mapping. Small and Medium Towns however lack the basic institutional capacity, infrastructure, and finances to extensively undertake the preparation of such data heavy spatial plans. Small and Medium Towns often require aid from the state governments for preparing basic land-use plans. Adopting a focused approach for preparing urban spatial plans is crucial for SMTs. Such a focussed approach allows SMTs to put greater emphasis on solving their immediate needs and concerns. This can be achieved by adopting a time-bound and contextual spatial planning and data capturing framework for the preparation of spatial plans. The study draws the following key observations and limitations to spatial plan preparation in SMTs in India:

- 1. Lack of synergy between central policy instruments and state-level planning mandates and requirements:** The central government provides policy instruments for guiding states and local bodies for urban planning. However spatial planning culture in India is diverse and varies significantly from state to state. Spatial planning in SMTs is regulated through requirements under the state legislative frameworks for planning. Additionally, these mandates primarily require towns to prepare only land-use plans with limited scope for addressing other critical areas of concern. The preparation of spatial plans especially in SMTs thus continues to be rudimentary. Furthermore, various central policies and programs such as the proposed industrial corridors program

have significant impact on the SMTs and their influence areas. However, SMTs remain outside the active ambit of planning for these special projects due to lack of synergy between the central and state governments.

**2. Lack of an evidence-based approach to spatial planning:**

The scope of spatial plans in SMTs is limited as the primary emphasis is on preparing a land use plan proposal. There is significantly low priority on collection and synthesis of relevant data for identifying and solving town's immediate needs and issues. Consequently, the critical issues and challenges of immediate concern to the towns are often discounted. Additionally, decision making by the authorities is often not backed up by relevant data, information, and knowledge.

**3. Emphasis of central policy instruments on rigorous collection and mapping of physical data layers and attributes:**

Various policies and schemes by central government over the years, have stressed on comprehensive mapping of physical data layers and attributes. Although the policies have primarily focused on larger cities, the evolution of these schemes and policies such as NUIS, AMRUT, etc. have subsequently increased the requirement for the collection of data attributes and standards for their mapping. Often non-physical data attributes such as informal housing, informal sector economy, climate change impact, disaster risk, etc. are not prioritized for mapping. These policies have thus focussed largely on mapping existing situations in towns and cities. The formulation of context sensitive and place specific planning proposals and their implementation strategies are overshadowed by the herculean mapping exercise.

**4. Deficient data culture:**

Data culture in context of spatial planning may be defined as the arrangements within the planning departments and organizations that prioritizes data-driven decision making by deploying relevant policies, technologies, and institutional arrangements. The data culture especially at the local level is non-existent. The collection of various types of data is not standardised. Further, the documentation and registry of data vary in every state and local body. Currently, the mapping of data layers and preparation of plans also deploys the use of multiple platforms such as CAD, GIS, etc. based upon the availability and easy accessibility. Further, the storage of data, especially in SMTs, is dated due to the lack of guidelines for storing data over digitally enabled platforms. As a result, the overall data culture in SMTs is primitive.



**5. Arduous data collection process:** The collection of relevant and reliable data is the foremost step for plan preparation. However, the data collection process especially in SMTs is quite tedious. This process is often initiated only at the time of preparation of spatial plans, i.e., once in 10-20 years. Accessibility to relevant data with various government departments is low. Further, there is a high reliance on political and bureaucratic support for relatively swift sharing of data, especially in SMTs. The lack of access and slow sharing of data, leads to delays in the overall plan preparation process.

**6. Low reliance on technological and digital tools:** Technological and digital tools such as use of satellite imagery, remote sensing, Geographical Information Systems (GIS), web-enabled geo-portals, etc. play an important role in planning in the modern era [refer section 1.4 for detailed benefits of data-driven approach to planning]. However, there is significantly low penetration of such technology in the plan preparation process in SMTs in India. The undertaking of various functions of planning such as data collection, documentation, storage, access, and sharing can all administer the use of technology for producing reliable outputs.

**7. Lack of synergy between various government departments:** The various government departments have historically acted in a compartmentalised manner. Sharing of data between government departments often takes significant time with due departmental procedures before the release of data. This situation is compounded as the spatial plan preparation requires various layers and attributes of data to be collected from various departments. This leads to delays in the overall plan preparation process.

**8. Lack of capacity at the local level:** The key deterrent for preparing spatial plans in SMTs is the lack of both technical and financial capacity at the local level. There is a high reliance on state and central governments to provide both the technical support as well as funds for preparing spatial plans in the SMTs. Consequently, the preparation of spatial plans especially for SMTs is often outsourced wholly or in parts to private consultants.



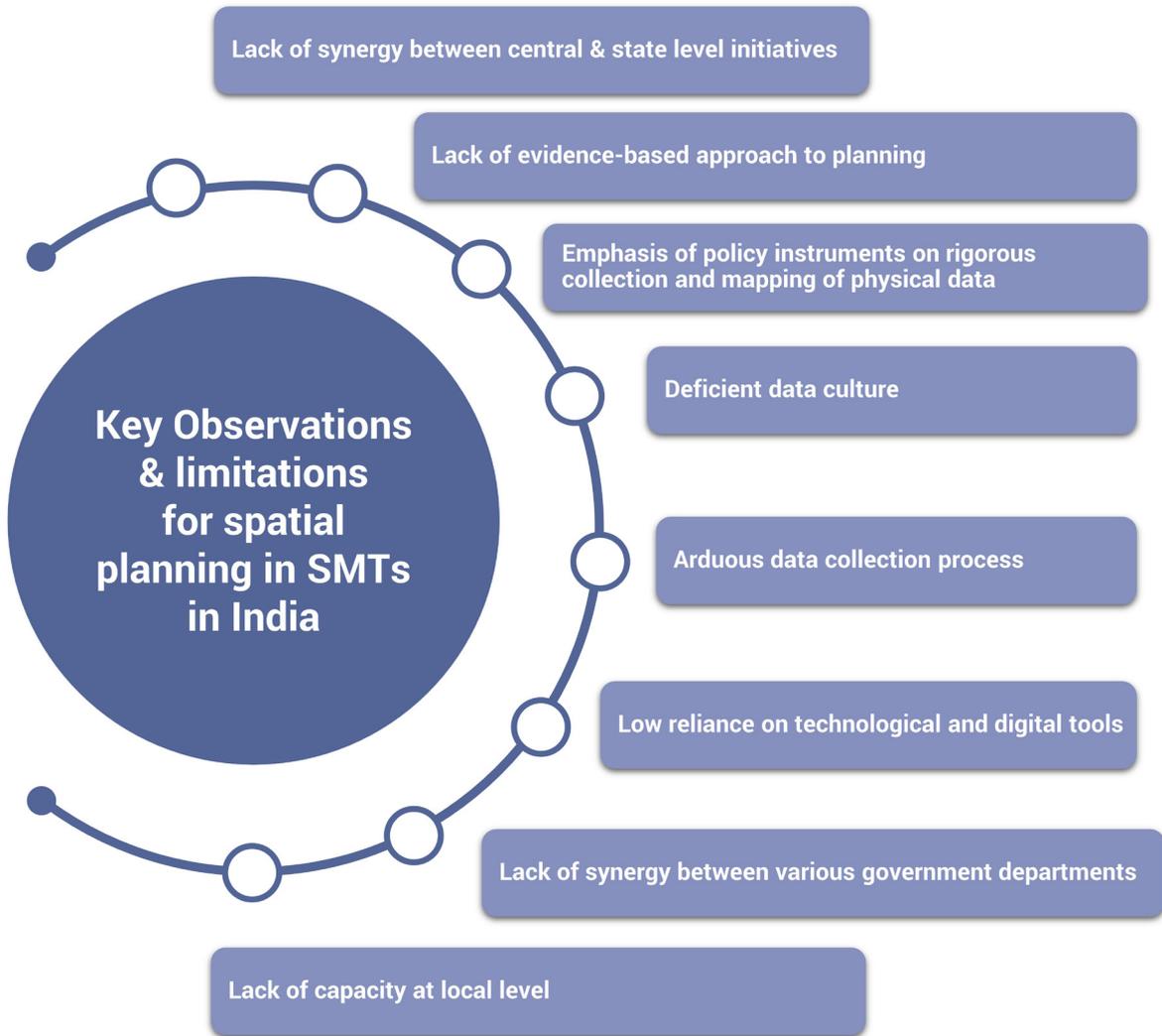


Figure 24: Critical challenges for spatial planning in Small and Medium Towns in India

## 4.2 KEY RECOMMENDATIONS

The Small and Medium Towns (SMTs) in India require a contextual framework for preparing spatial plans. Based on the critical challenges and limitations identified in the study, key recommendations at central-level, state-level, and local or town-level are identified. These key recommendations suggest a broad framework for adopting a sustainable and implementable approach for preparing spatial plans for SMTs in India.

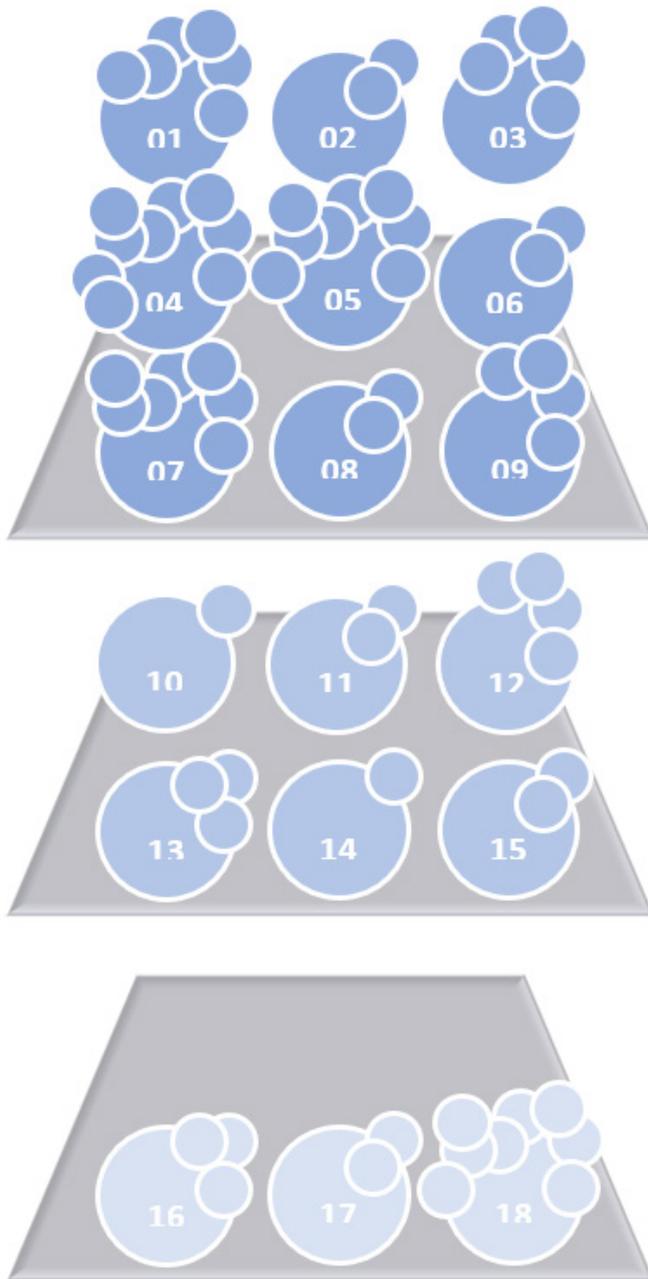
### 1. Key Recommendation at Central Level.

#### a. Specific guidance for preparing spatial plans for SMTs in

**India:** The central government provides comprehensive guidance for preparing spatial plans for urban areas in the URDPFI Guidelines. These guidelines provide detailed understanding of various types of plans to be prepared at various scales and for various purposes. The guidelines provide considerable focus on preparation of spatial plans considering the context of larger cities and metropolitan regions. SMTs in India usually have significantly smaller spatial extent. Furthermore, most SMTs typically face similar issues related to accessibility, transportation, infrastructure, etc. There is a need for specific guidance for SMTs to prepare more concise and context specific spatial plans. In this context, specific guidelines for preparing spatial plans for SMTs in India should be prepared at the central level for prioritizing and solving their typical needs and issues.

#### b. Prioritizing collection of essential and relevant data

**attributes for SMTs:** The scale and complexities of SMTs is usually less than larger cities and metropolitan areas. The specific guidance for preparing spatial plans in SMTs requires prioritising various thematic areas based on the context. The various data layers and attributes must be prioritised for collection in SMTs. This prioritisation of data layers and attributes should be based on the degree of relevance of data for SMTs. Additionally, the relevant data attributes could be broadly categorised into based on the town's priorities. SMTs can clearly identify three broad categories including: a) Essential Data Layers; b) Additional Data Layers; and c) Desirable Data layers (refer image 25 and table 8 below). Further, data collection must emphasise collection of non-physical data layers such as climate change impact, disaster risk, informal economy, informal housing, etc.



**Essential Data Layers**

Base Map, Existing Land Use, Topography Map, Green and Blue Map, Transport and Mobility Map, Physical Infrastructure Map, Social and Civic Amenities Map, Land Ownership, Housing and Informal Settlements Map

**Additional Data Layers**

Water Table Map, Land Rates Map, Demography Map, Key Economic Centres Map, Ongoing/ Proposed City Level Projects Map, Development Trend Analysis Map

**Desirable Data Layers**

Heritage and Tourism Map, Development Suitability Map, Development Potentiality Map

Figure 25: Prioritisation and classification of key data layers for Small and Medium Towns in India

Table 8: Prioritising of spatial data layers for spatial plan preparation in Small and Medium Towns.

Sr. No.	Key Thematic Data Layers	Key data sets								
1	Base Map	Administrative boundaries (including Village, Municipality, Municipal Corporation, Authority, Taluka, District etc.)	Plot boundaries	Existing Road and rail networks	Reserved forest areas	Water bodies and canal networks	ASI marked and other listed heritage monuments			
2	Existing Land Use	Existing Land uses of all the land parcels within Development Area	Existing building footprints							
3	Topography Map	Contours	Ridges and valleys	Catchments and watersheds of bigger streams	HFLs (past 30 years)	CRZ regulation lines				
4	Green and Blue Map	Natural drains	Rivers	Water bodies	Water courses	Flood prone areas	Canal network	Forest areas	Environmentally sensitive areas	Open and green spaces
5	Transport and Mobility Map	Regional roads (NHs, SHs and Expressways)	District roads (MDRs and ODRs)	City roads	Public transport routes	Existing and proposed public transport nodes	Existing and proposed city level Parking facilities	Accident prone nodes/zones	Review of CMPs, if any	
6	Physical Infrastructure Map	Networks- water, sewerage, storm water, electricity, solid waste collection, Gas, telephone/ internet	Locations of STPs, WTPs, Solid waste dumping site/s, bio waste, electric sub stations etc.							
7	Social and civic amenities map	Schools	Hospitals	Institutions	Sports facilities	Recreation,	Health center	Community parks		
8	Land ownership	Government land	Private land							
9	Housing and Informal settlement map	city level mapping of informal settlements	housing surveys and location of samples	Major townships	Housing needs assessment with housing pyramid					
10	Water table Map	Ground water levels								
11	Land rates map	Circle/ collector guidelines/ Ready reckoner rates/ Jantri rates	Market value rates							
12	Demography map	Population density	Growth rate	Workforce participation	Primary and Non primary economic activities					
13	Key economic centers map	Primary-APMC	Secondary-Logistic park, railway, stations, airport	Tertiary-Airport, CBD, Bus station, railway station						
14	Ongoing/proposed city level projects map	city level projects								
15	Development trend analysis map	Agricultural to Non Agricultural land conversions	Development Permissions							

Legends:  Essential Data Layers  Additional Data Layers  Desirable Data Layers

Sr. No.	Key Thematic Data Layers	Key data sets								
16	Heritage and tourism map	ASI marked heritage monuments	Listed heritage monuments	Tourist attraction spots						
17	Development suitability map	Non developable areas based on characteristics - water bodies, areas under HFL AND FTL of major water bodies, forests, high slopes, environmentally sensitive areas and habitats	Non developable areas based on regulations - CRZ and other environmental guidelines from state and central government, high tension electrical lines, oil and gas lines and their buffers etc.							
18	Development potentiality map	Accessibility (proximity to hierarchy of road)	Proximity to developed areas	Proximity to job centres	Agriculture potential (single cropped and double cropped land)	Consideration of heritage regulations around ASI marked monuments and other listed monuments	Consideration of airport funnel	Existing settlements – gamtals, industrial areas etc.	Tourist attractions	

Legends:

Essential Data Layers
  Additional Data Layers
  Desirable Data Layers

## 2. Key Recommendations at State Level

### a. Adopting a strategic planning approach

The scope of spatial plans for SMTs in India must be conceptualized beyond just proposing land uses as part of the Master Plans / Development Plans for the horizon period. The SMTs must focus on addressing the immediate town-specific issues. For this, the SMTs may adopt preparation of alternate plans within the larger legislative framework for preparing spatial plans. The alternate plans may include:

- i. **Micro-level plans:** Preparation of micro-level plans such as development schemes and area improvement schemes must be prioritized for addressing area-specific issues, infrastructure upgradations and Implementation of Master Plan and Development Plan.
- ii. **Strategic plans:** Various strategic plans to address specific issues within the SMTs could be further prepared. Based on the context of the town, a strategic plan could be prepared for comprehensively addressing the most critical issues within the SMTs. Such strategic plans may include City Development Plans (CDPs), Disaster Management Plans (DMPs), Comprehensive Mobility Plan (CMPs), City Sanitation Plan (CSP), Slum Redevelopment Plan (SRP), Tourism Master Plan (TMP) etc.

### b. Promoting departmental collaboration amongst state level institutions, departments, etc.

The spatial plans are prepared under the state spatial planning framework. Various state level departments, institutes, organisations etc. play a crucial role in data collection and sharing at various stages of plan preparation. It is essential to facilitate ease in data sharing process amongst various government departments. In this context a collaborative approach incorporating higher level of departmental cooperation for smooth data sharing between various departments is vital. A policy for facilitating secured data sharing between various government departments must be adopted. Further, the policy may also adopt strategies for sharing essential non-sensitive data with public and private stakeholders.

### 3. Key Recommendations at local or Small and Medium Town Level

#### a. Adopting a data-driven approach to planning in SMTs

Most SMTs in India do not have a specific culture for data collection, documentation, and storage at the local level. It is essential to institutionalise contextualised data culture in SMTs. For this purpose, a contextualised and integrated Spatial Data Infrastructure (SDI) should be adopted for better collection, documentation, storage, accessibility, and sharing of data. Further, SMTs must adopt cost efficient technological solutions for planning.

Institutionalising technology generally requires large investments. However, various cost-effective technological solutions and alternatives could be easily used for adopting the use of technology in planning. The various open-source GIS platforms provide a relatively low-cost alternative for mapping and data synthesis. Further, options for customisation of tools on digital platforms such as cityscope, Tosca, etc. are also highly desirable options. Cloud-based solutions should be adapted from the state governments to have one platform which can be used by all at the local level for data collection. Having a centralised solution that is accessible at the local level makes it easy and cost-effective for all the stakeholders. This will have a standard data format for all the data captured via this platform. Software as a service would help all the organizations work on the same software's without purchasing them individually at local level.

#### b. Promoting a collaborative approach to data collection and planning in SMTs

There is a need for a shift from a hierarchical approach to a more participatory and collaborative approach in planning SMTs. The collaborative approach primarily includes community-based approach to data collection. The planning authorities may use innovative alternative methods including crowdsourcing, participatory community data collection and mapping, participatory GIS, etc. These methods would also enable continuous updating of data sets through a participatory approach. Additionally, the participatory approach for data collection would provide low-cost options to the local bodies. Use of mobile applications to collect the data would help citizens to participate without any additional requirement of technical skills.

**c. Capacity building at local level**

Planning authorities especially in SMTs require basic capacity building for operating the digital platforms and technology for their basic functions. More advanced technical functions may be supported in a centralised manner at the state level.

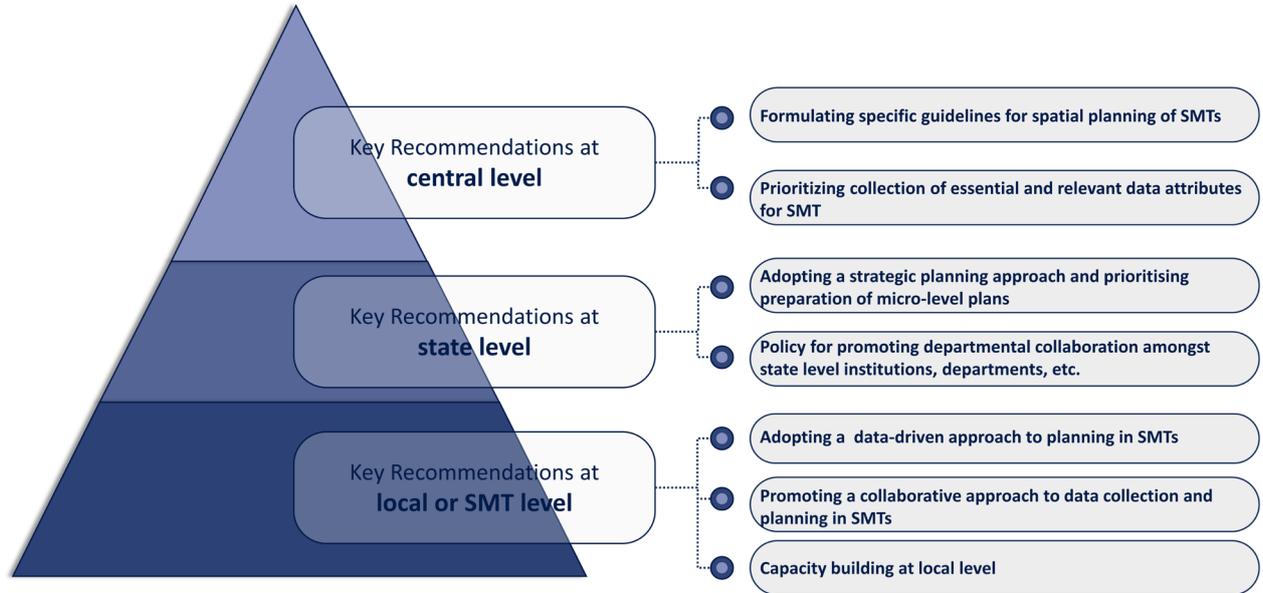


Figure 26: Key recommendations for spatial data framework for Small and Medium Towns.

# REFERENCES

- Bishop, I., Escobar, F., Suwarnarat, K., & Yaqub, H. (2000). SPATIAL DATA INFRASTRUCTURES FOR CITIES IN. Melbourne: Elsevier.
- Census. (2011). Census of India. New Delhi: Ministry of Home Affairs.
- Choudhary, M. (2017, June 19). State Spatial Data Infrastructures in India – Challenges and Recommendations. Retrieved from geospatialworld.net: <https://www.geospatialworld.net/blogs/state-spatial-data-infrastructure-current-state-challenges-and-recommendation/>
- CPR. (2018, May 14). Understanding Economic Processes in Small Towns. Retrieved from cprindia.org: <https://cprindia.org/news/6862>
- DDA. (2015, April 11). fdocuments. Retrieved from India Documents: <https://fdocuments.in/document/delhi-master-plan-1962.html>
- Dekolo, S. O., & Oduwaye, L. (2014). Building Spatial Data Infrastructures for Spatial Planning in African Cities: the. Lagos: Researchgate.
- focus-economics. (2021, February 16). The World's Top 5 Largest Economies in 2024. Retrieved from focus-economics.com: <https://www.focus-economics.com/blog/the-largest-economies-in-the-world>
- GEO. (2019). Group on Earth Observation. Retrieved from earthobservation.org: <https://earthobservations.org/geoss.php>
- GISlounge. (n.d.). Center Township Indianapolis. Retrieved from gislounge.com: <https://www.gislounge.com/wp-content/uploads/2014/04/site-selection.png>
- GSDI. (2009). What is SDI. Global spatial data infrastructure newsletter.
- Himanshu. (2017, April 25). Making small towns a priority for growth. Retrieved from livemint.com: <https://www.livemint.com/Opinion/1duwvJZqyB5oZKVFFxm55H/Making-small-towns-a-priority-for-growth.html>
- IGNOU. (2014). Urbanization In India. In H. Spodek, City Planning in India under British Rule (p. Unit 8). Delhi: IGNOU press.
- IIHS. (2012). Urban India 2011: Evidence. Indian urban Conference.
- Kapoor, N. (2014, April 20). Favel Issues. Retrieved from Wordpress: <https://favelissues.com/2014/04/20/streets-of-the-bombay-improvement-trust/>
- Kim, E. H. (2010). National Spatial Data Infrastructure- The case of Republic of Korea. Washington DC: World Bank.
- liu, X. s., Chen, Y. I., & Weng, H. x. (2005). RESEARCH ON THE CONSTRUCTION OF URBAN SPATIAL DATA. ISPRS Workshop on Service and Application of Spatial Data Infrastructure (pp. 184-186). Hangzhou, ISPRS.

- Masser, I. (1998). *Governments and Geographic Information*. Sheffield: Taylor & Francis Ltd.
- McCall, M. k. (2004). *Can Participatory-GIS Strengthen Local-level Spatial Planning? Suggestions for better practice*. GISDECO.
- Ministry of Science and Technology. (2021, September 6). *National space data infrastructure*. Retrieved from [dst.gov.in](https://dst.gov.in): <https://dst.gov.in/national-spatial-data-infrastructure>
- MoHUA. (2021). *AMRUT 2.0*. New Delhi: MoHUA, Gol.
- NITI Aayog. (2021). *REFORMS IN URBAN PLANNING*. New Delhi: NITI Aayog, Government of India.
- NYC Planning labs. (2021, October 26). *Street Maps* . Retrieved from NYC.gov: <https://streets.planning.nyc.gov/?lat=-73.9919&layer-groups=%5B%22arterials%22%2C%22citymap%22%2C%22name-changes%22%2C%22pierhead-bulkhead-lines%22%2C%22street-centerlines%22%2C%22zoning-districts%22%5D&lng=40.7156&zoom=13.08>
- Puusepp. (2017). *Estonia Human Development Report 2019/2020*. Retrieved from <https://inimareng.ee/>: <https://inimareng.ee/en/data-driven-spatial-planning.html>
- Saitluanga, B. L. (2019). *Role of Small and Medium Towns in Regional Development: The case of Northeast India*. Mizoram: Research Gate.
- SDI. (2014, october 24). *Slum Developers International*. Retrieved from SDInet.org: <https://sdinet.org/gallery/uganda/>
- Singh, P. k. (2009). *Spatial Data Infrastructure in India: Status, Governance*. *International Journal of Spatial Data Infrastructures Research*, 359-388.
- SNS. (2019, May 22). *Urban population in India may go beyond 50% by 2050: MoHUA Secretary*. Retrieved from [thestatesman.com](https://www.thestatesman.com): <https://www.thestatesman.com/business/urban-population-india-may-go-beyond-50-2050-mohua-secretary-1502757868.html>
- SNS Web. (2019, May 22). *Urban population in India may go beyond 50% by 2050: MoHUA Secretary*. *The statesman*. Retrieved from <https://www.thestatesman.com>: <https://www.thestatesman.com/business/urban-population-india-may-go-beyond-50-2050-mohua-secretary-1502757868.html>
- Tacoli, C. (2017). *Why small towns matter*. London: International Institute for Environment and Development (IIED).
- TCPO. (1991, October 4). *Urban Mapping Scheme*. Retrieved from [tcpo.gov.in](http://tcpo.gov.in): <http://tcpo.gov.in/urban-mapping-scheme>
- TCPO. (2006, October 4). *National Urban Information System*. Retrieved from [tcpo.gov.in](http://tcpo.gov.in): <http://tcpo.gov.in/national-urban-information-system>
- TCPO. (2014). *Urban and Regional Development Pans Formulation and Implementation Guidelines*. Delhi: MoHUA.
- TCPO. (2015). *AMRUT formulation of GIS-based Masterplans*. Delhi: MoHUA.

- TCPO. (2019). AMRUT Formulation of Drone/ UAV based Masterplans for small and medium towns. New Delhi: Ministry of Housing and Urban Affairs.
- Tonchovska, R., Stanley, V., & De Martino, S. (2012). Spatial Data Infrastructure and INSPIRE. Europe & Central Asia: World Bank.
- Verbrugge, L. (2018, October 2018). KEEP CALM AND USE ICT4D. Retrieved from <https://wpmu.mah.se/>: <https://wpmu.mah.se/nmict182group2/2018/10/23/the-power-of-maps-participatory-gis-for-disaster-prevention/>
- Walsam, G., & Sahay, S. (1999). GIS for District-Level Administration in India: Problems and Opportunities. MIS Quarterly.

# ENDNOTE

- i. Approximate figure calculated based on study conducted by Indian Institute of Human Settlement (IIHS) on India's Urbanization trends as per Census 2011 (IIHS, 2012).
- ii. Small and Medium Towns (SMTs) are towns with population typically between 5000 and 500000 as defined in the URDPFI guidelines.
- iii. Town and Country Planning Organization (TCPO) was set up in 1962 with the merger of the erstwhile Town Planning Organization (TPO) and Central Regional and Urban Planning Organization (CRUPO).
- iv. Abadi area is a term typically used for land area lying within the inhabited areas of the panchayat or local government of the village.
- v. Medium Towns II category under the URDPFI guidelines are towns with population between 1 lakh and 5 lakhs and having a functional municipal council or nagar palika.
- vi. Status Report based on stakeholder discussions as of September 2021.





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