MIXED-USE DEVELOPMENT AS A SOLUTION TO URBAN SPRAWL

Thesis Submitted in Partial Fulfillment of the requirements for the award of the degree of

Thesis Report Submitted by:

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I, **Kritika Shukla (1230152010),** hereby declare that this thesis titled **' Mixed-Use Development as a Solution to Urban Sprawl '** submitted by me, in partial fulfilment of the requirements for the award of the degree **Master of Planning (with specialization in Urban Planning)**, by the School of Architecture and Planning, Babu Banarasi Das University, Lucknow is a record of my work. The matter embodied in this thesis is original and has not been copied, either in part or in full, or submitted to any other institution for the award of any degree or diploma. Wherever data, in full or in part, has been borrowed for this thesis, the Author/s of the same has been duly acknowledged.

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EXECUTIVE SUMMARY

The thesis on Mixed-Use Development as a Solution to Urban Sprawl – A Case of Kalyanpur-Mandhana addresses the urgent need for planned, sustainable urban growth in peri-urban areas of Indian cities. Kalyanpur-Mandhana, located on the fringe of Kanpur Nagar, is experiencing rapid but unplanned expansion, resulting in dispersed settlements, underutilized land, lack of infrastructure integration, and growing socio-environmental challenges.

The study explores the current development patterns of Kalyanpur-Mandhana and identifies critical issues associated with urban sprawl, such as low-density growth, inefficient land use, and increased dependency on private transport. It further examines national and international case studies to derive context-sensitive strategies for applying mixed-use development (MXD) as a sustainable planning solution.

Key findings and recommendations emphasize the need to promote higher density and compact urban form, integrate residential, commercial, institutional, and recreational land uses, enhance accessibility through transit-oriented design, ensure inclusivity, affordability, and adequate public spaces, engage local stakeholders in planning processes, and foster sustainability, walkability, and infrastructure efficiency.

The thesis emphasizes the need for collaboration among local authorities, policymakers, and stakeholders to implement these recommendations and continually monitor and evaluate the integrated tourism facilities. By prioritizing the needs of pilgrims and ensuring their comfort and convenience, Ayodhya can strengthen its position as a leading pilgrimage destination, providing a spiritually fulfilling experience for devotees from around the world.

By implementing these mixed-use principles, Kalyanpur-Mandhana can evolve into a more efficient, liveable, and balanced urban zone, reducing the negative impacts of sprawl while enhancing the quality of life for residents.

The thesis underscores the importance of coordination among urban planners, local authorities, and community stakeholders to ensure effective implementation of the proposed development model. With proper planning and governance, Kalyanpur-Mandhana can serve as a replicable model for managing urban expansion in other Tier-II and Tier-III Indian cities.

UNDERTAKING

I, Ms. Kritika Shukla , the author of the thesis titled "**MIXED-USE DEVELOPMENT AS A SOLUTION TO URBAN SPRAWL** ", hereby declare that this is an independent work of mine, carried out towards fulfilment of the requirements for the award of the Masters in Urban Planning at the Department of Architecture and Planning, BBDU, Lucknow. The work has not been submitted to any other organization / institution for the award of any Degree/Diploma.

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CONTENTS

Chapter- 01
INTRODUCTION

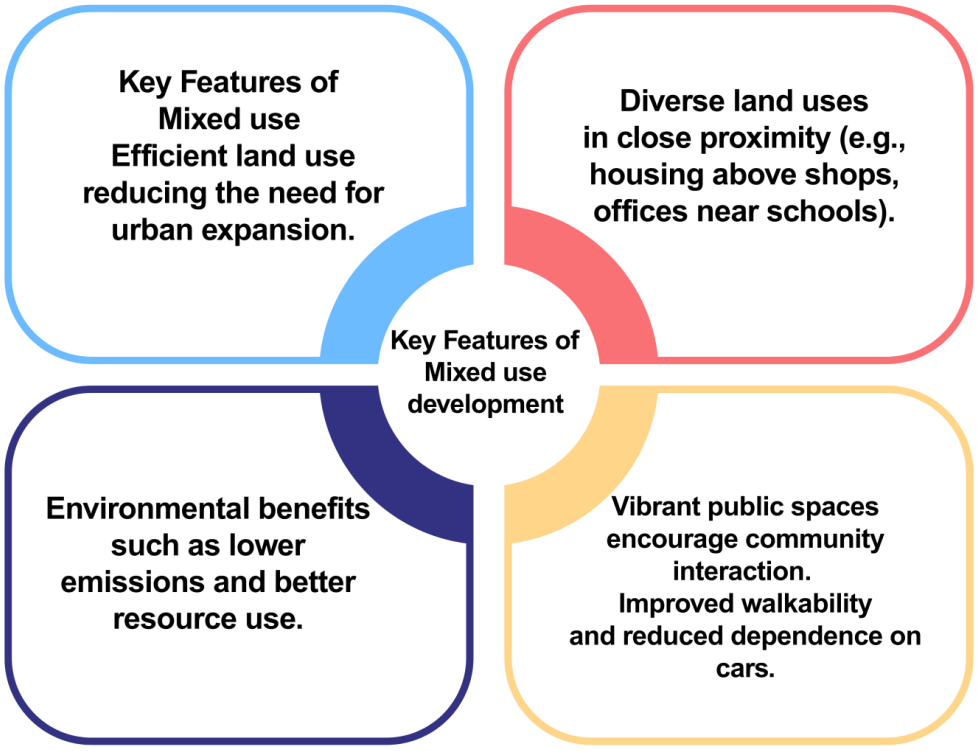
Introduction

Urbanization in India has accelerated rapidly in recent decades, leading to the uncontrolled horizontal expansion of cities, commonly known as urban sprawl. This phenomenon is characterized by low-density, fragmented, and automobile-dependent growth, resulting in the inefficient use of land, degradation of environmental resources, increased travel distances, and escalating infrastructure costs. The unchecked nature of such expansion severely compromises urban sustainability and livability.

In response to these challenges, Mixed-Use Development (MXD) has emerged as a progressive urban planning approach that promotes compact, walkable, and integrated communities. By combining residential, commercial, institutional, and recreational functions within a unified urban fabric, MXD fosters vibrant, self-sufficient neighborhoods that reduce the need for extensive commuting, enhance social interaction, and optimize infrastructure usage. This model supports the principles of smart growth, transit-oriented development (TOD), and sustainable urbanism, offering a viable alternative to conventional mono-functional zoning.

Mixed use development

Mixed-use development integrates various land uses—like housing, commerce, and recreation—into one area to create compact, walkable communities and reduce long-distance travel.



By combining multiple uses in one area, mixed-use development promotes sustainable growth and counters urban sprawl.

Commercial spaces (retail stores, offices, restaurants, cafes)

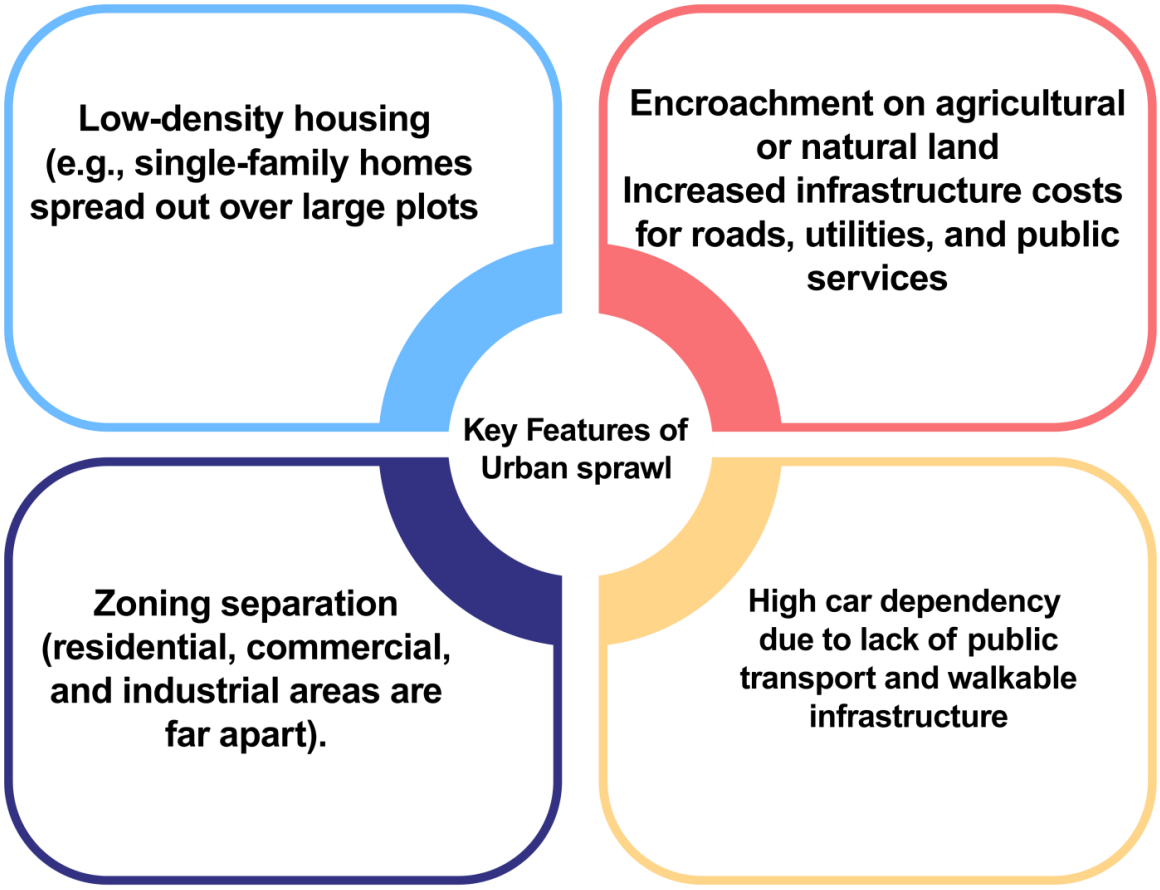
Residential spaces (apartments, or townhouses)

Recreational or public spaces (parks, plazas, community centers

industrial or institutional uses (such as schools or healthcare facilities)

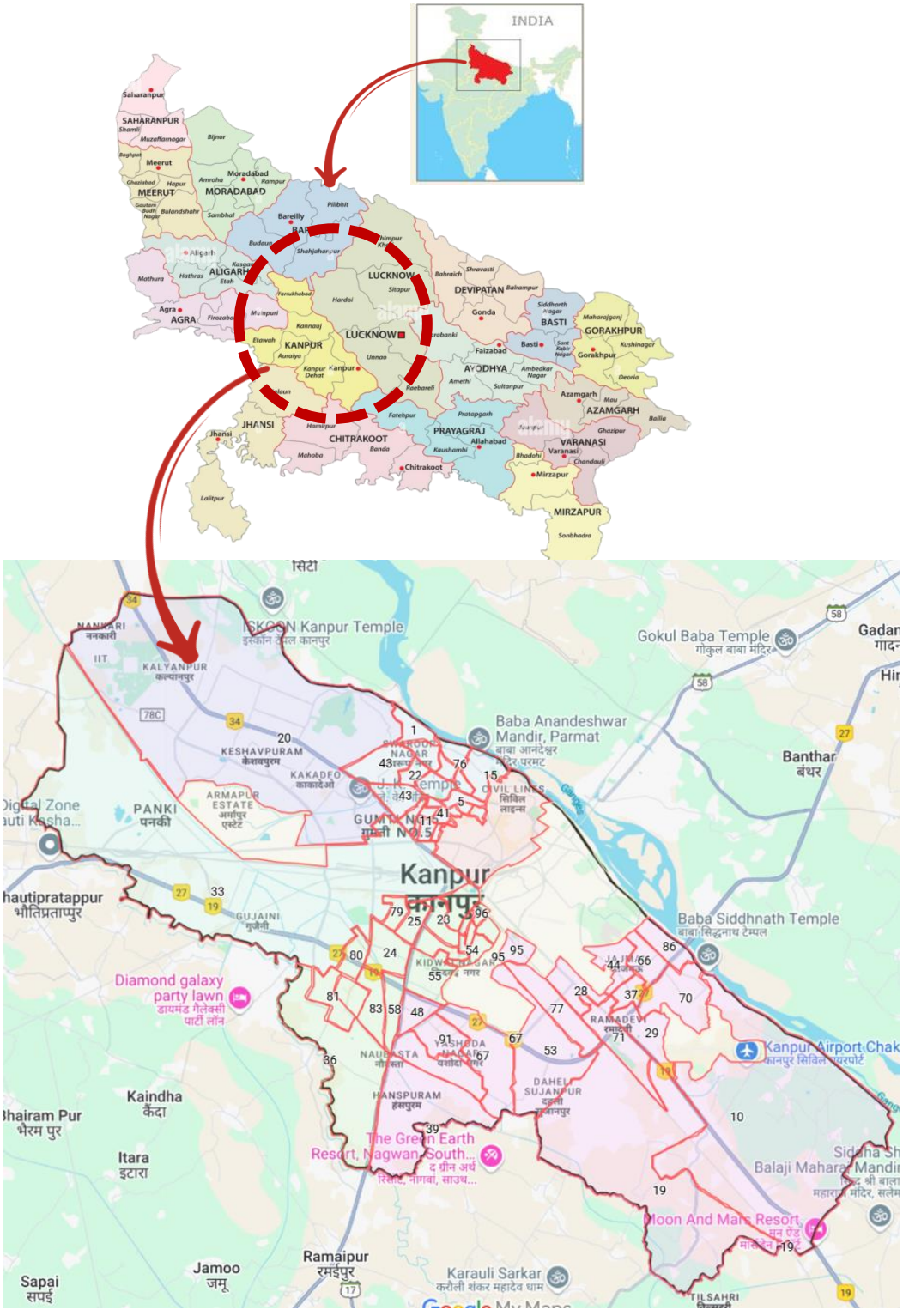
Urban Sprawl

Urban sprawl is the unplanned expansion of cities into rural areas, leading to low-density, car-dependent development with inefficient land use and environmental impacts.



Mixed-use development encourages sustainable growth by concentrating diverse functions in one place, providing an effective alternative to urban sprawl.

AREA LOCATION



Source: Rana PB Singh.IIT . Kanpur (2020)

Need for the Study

The **Kalyanpur–Mandhana corridor** in Kanpur, Uttar Pradesh, represents a critical urban transition zone where the pressures of unregulated urbanization are visibly manifesting. Historically characterized by semi-rural landscapes and agricultural land use, this corridor is now undergoing a rapid and unplanned transformation due to **expanding urban footprints, migration, and real estate speculation**. The current pattern of growth is **fragmented, low-density, and spatially inefficient**, a hallmark of **urban sprawl**.

This unchecked expansion has resulted in several **urban challenges**:

- **Dispersed development patterns** lacking coordination or a unifying urban design framework.
- **Inadequate infrastructure provisioning**, including roads, water, sanitation, and public transport.
- **Encroachment upon agricultural land and green spaces**, leading to ecological degradation.
- **Increased dependency on private vehicles**, contributing to traffic congestion and pollution.
- **Weak enforcement of land use controls** and absence of comprehensive planning instruments.

Given its strategic position—**connecting the urban core of Kanpur with its rural hinterlands**—the corridor presents a unique opportunity for **redefining peri-urban growth through sustainable planning interventions**.

One such intervention is **Mixed-Use Development (MXD)**, which integrates residential, commercial, institutional, and recreational functions within compact, walkable neighborhoods. This model promotes **land use efficiency**, **reduced travel distances**, **social integration**, and **economic vitality**, making it a compelling alternative to the current mono-functional, sprawling growth.

The study is therefore essential to:

- **Diagnose the spatial and socio-economic impacts** of urban sprawl in the corridor.
- **Evaluate the feasibility and benefits of implementing mixed-use zoning** as a control mechanism.
- **Formulate context-sensitive, scalable urban design and policy recommendations**.
- **Demonstrate how MXD can serve as a catalyst** for resilient, inclusive, and planned urban expansion.

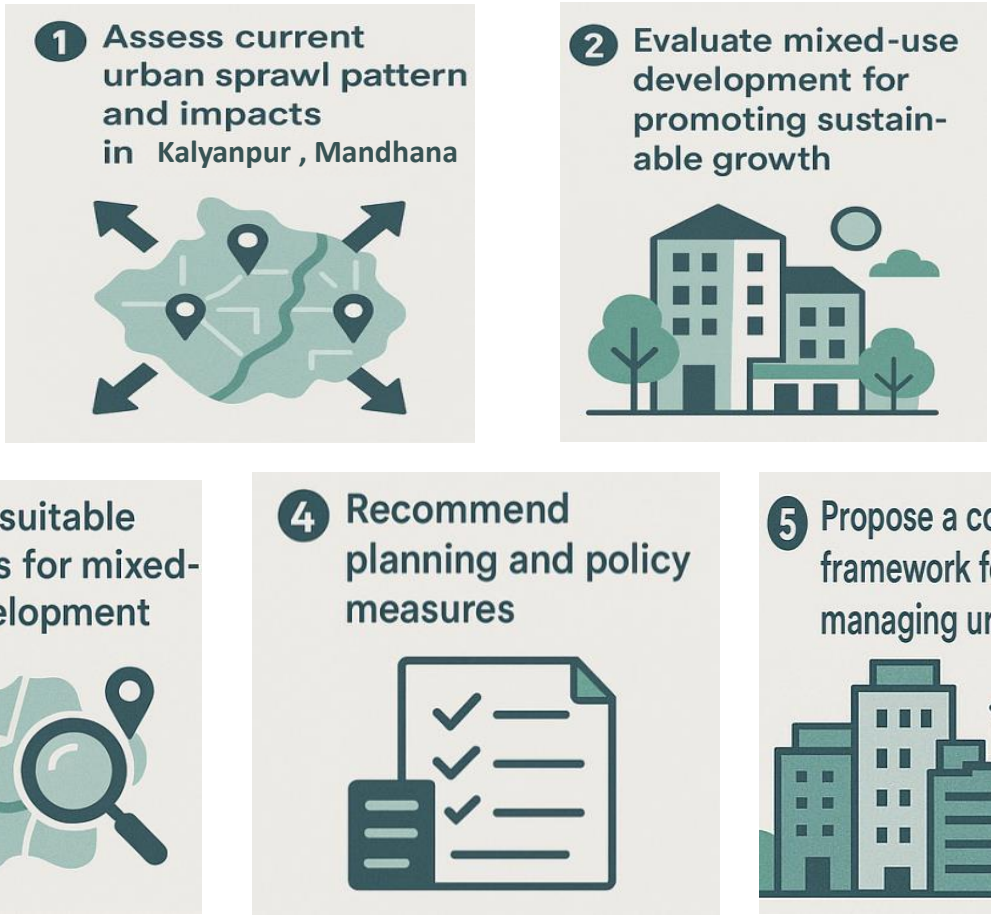
By investigating the applicability of mixed-use development within the Kalyanpur–Mandhana context, the study aims to provide **a replicable planning model for other rapidly urbanizing peri-urban corridors** in India facing similar challenges.

Aim

To analysis, promotes mixed-use development to control urban sprawl by encouraging sustainable, compact, and integrated land use OF Kalyanpur , Mandhana.

Objectives

1. To assess the current patterns and impacts of urban sprawl in Kalyanpur , Mandhana.
2. To evaluate the potential of mixed-use development in promoting compact and sustainable urban growth.
3. To identify suitable locations in Kalyanpur , Mandhana for implementing mixed-use development.
4. To recommend planning and policy measures that support mixed-use development and control urban sprawl.
5. To propose a planning and policy framework supporting mixed-use development for managing urban growth in Kalyanpur , Mandhana .



Source: Kritika shukla2025), Primary Survey

Scope

Geographical and Contextual Focus: Target fast-growing fringes like Kalaynpur & Mandhana to fix land use and infrastructure gaps.

Mixed-Use Development Focus: Blend land uses to build walkable, compact communities and limit sprawl.

Stakeholder Engagement : Engage stakeholders through forums, partnerships, and surveys for coordinated planning.

Policy and Planning Recommendations: Enable flexible zoning, boost transit options, and incentivize sustainable development.

Implementation and Monitoring : Set clear metrics and use feedback to adapt mixed-use strategies effectively.

Limitation Of the Case Area

Limited availability of high-resolution, updated land-use data.

The study's implementation proposals are conceptual and require further technical detailing for execution.

Socio-political and economic variables influencing real-world applicability may extend beyond the scope of this research.

Limited Infrastructure Base

Lack of public transport, water, and sanitation hinders dense, mixed-use zones.

Data Gaps

Lack of reliable urban data (land use, mobility patterns, service coverage) hampers evidence-based planning.

Rigid Land Use Patterns

Single-use zoning and informal settlements impede mixed-use land redevelopment.

Weak Urban Governance

Weak coordination and capacity limit integrated development efforts.

Public Awareness and Resistance

Limited understanding of mixed-use concepts can slow adoption.

Low Investment Attraction

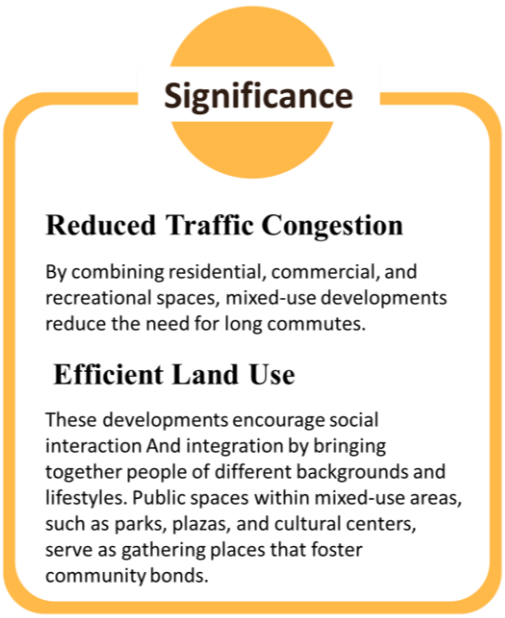
The city struggles to attract investment due to low returns and infrastructure gaps.

Research Scope

Comparative Study: Analysis of successful **mixed-use development models** in Indian cities like **Pune, Ahmedabad**, and select **global urban corridors** to identify applicable best practices.

Impact Analysis: Evaluation of the **social, economic, and environmental impacts** of existing and proposed development patterns in the **Kalyanpur–Mandhana corridor**.

Policy Framework: Examination of current **urban planning and land use policies** in Uttar Pradesh and Kanpur; suggestions for **policy reforms** to support sustainable mixed-use .

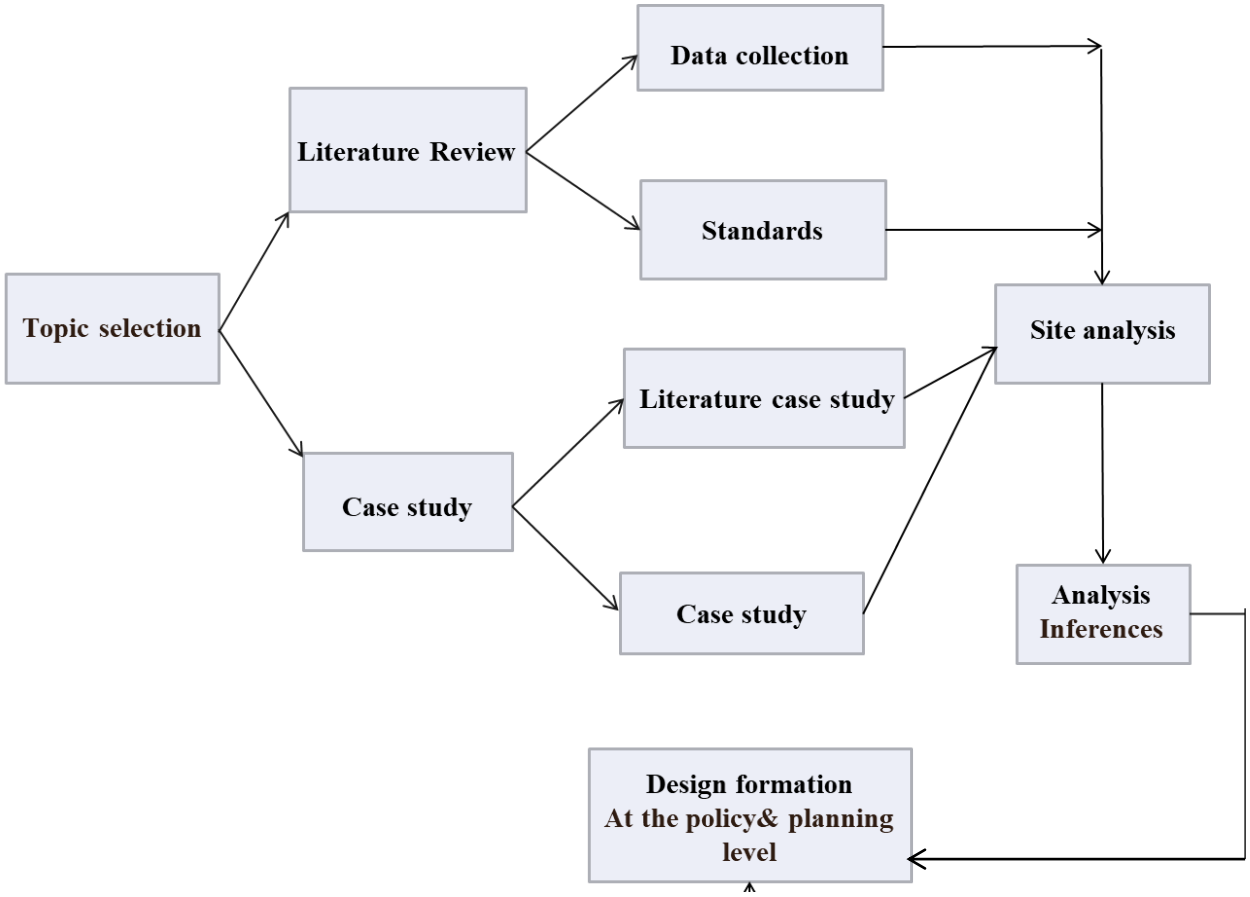


Significance of the study

Source: Kritika shukla2025), Primary Survey

Methodology

Figure 1.3 Methodology



Source: Kritika Shukla (2025), Primary Survey

Primary Surveys

– Assess resident and business opinions, land use patterns, and mobility habits.

GIS Mapping

– Identify urban sprawl hotspots and potential zones for mixed-use development.

Comparative Case Studies

– Analyze successful mixed-use models from Pune, Ahmedabad, Portland, and Vancouver.

Statistical Modelling

– Use MLR and SEM to understand how infrastructure and policy impact urban sprawl.

Chapter- 02
CONCEPT

2. **Concepts**

The **Kalyanpur–Mandhana corridor** is a rapidly developing urban fringe in the **northwestern part of Kanpur**, Uttar Pradesh. It stretches along the **Grand Trunk Road (NH-91)**, connecting **Kalyanpur** (a semi-urban suburb) to **Mandhana**, which lies closer to the city's rural-urban edge. The corridor is strategically located between **Kanpur city core** and **rural hinterlands**, making it a key zone for planned urban expansion.

Historical Context and Evolution of Mixed-Use Development

- The concept of mixed-use development is not new. Historically, many cities, particularly pre-industrial ones, were designed with mixed-use principles in mind, where homes, shops, and workplaces were interwoven within the urban fabric.
- The medieval village is a perfect example of a functional, productive, community, incorporating all of the rules of mixed-use development. Mixed-use development has evolved over time and in each era it has been either, a natural, an undesirable, or a preferred occurrence depending on the external trends of the time.
- Trajan's Market (110 AD) of ancient Rome with both shops and apartments built in a multi-level structure.

Market of Thanjavur (chola dynasty)

The medieval village is a perfect example of a functional, productive, community, incorporating all of the rules of mixed-use development.

Mixed-Use Development (MXD) refers to a planning approach that combines residential, commercial, institutional, recreational, and transport functions within a compact and walkable urban form. It is designed to **maximize land use efficiency**, reduce the need for long commutes, and encourage **vibrant, inclusive communities**.

Definition of mixed use development

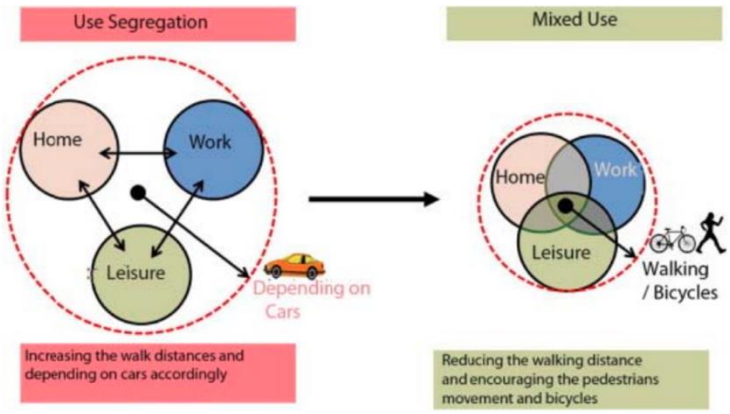
- **Mixed-use development** is often mentioned but rarely defined; it typically refers to a site combining **three or more functions** like residential, commercial, or institutional uses. (*McDonald, 2008)*
- Mixed-use development is an ambiguous, multi-faceted concept. *(Rowley, 1996)*
- As per MPD-2021, mixed use means the provision for non-residential activities in residential premises. The mixed land use concept in today's time is oriented towards the integration of the commercial and residential land uses on a scale that is-

1.Smaller

2. Pedestrian friendly

3. Linked to transit

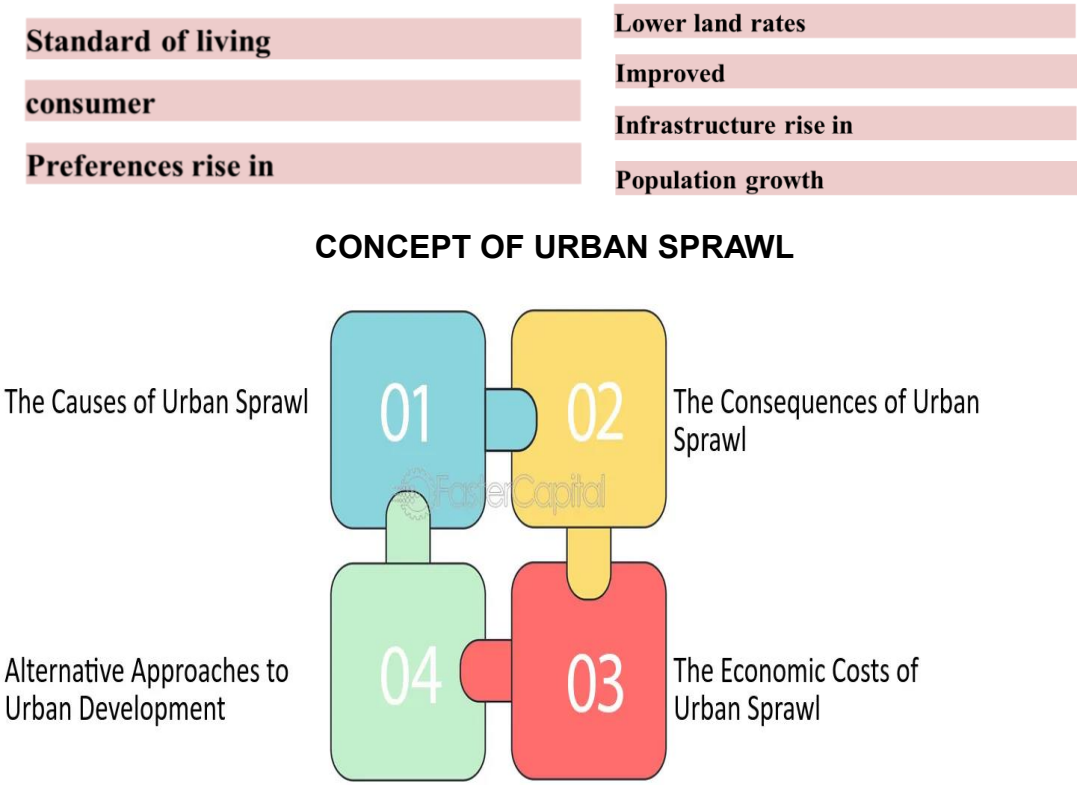
CONCEPT OF MIXED USE DEVELOPMENT



Definition and concept urban sprawl –

Urban growth is a critical cause of Sprawl –

- As cities get bigger, they expand around their Peripheries. But sprawl is more specific in nature, it is defined as 'uncoordinated growth': the expansion of a community without a real concern for consequences of poor environmental conditions or environmental impact.
- **Urban sprawl** is also known as 'horizontal spreading' or 'dispersed urbanization'. The uncontrolled and disproportionate expansion of an urban area into the surrounding countryside. *(UNICEF, 2012)*



(Planning Portal, 2009)

Existing Land Use

Mix of residential colonies, educational institutions, vacant land, scattered commercial strips, and agricultural plots

Key Landmarks

IIT Kanpur, Axis Colleges, Kanpur Metro (under expansion), and local commercial markets

Growth Drivers

Proximity to IIT Kanpur, improving road and metro connectivity, demand for affordable housing, and educational migration

Challenges in the Area:

- **Uncontrolled linear urban sprawl** along the highway
- Fragmented land parcels and unregulated plot development
- **Lack of integrated planning**—residential, commercial, and institutional land uses are not coordinated
- Inadequate infrastructure for drainage, public transport, and green spaces
- Risk of **loss of agricultural land** and environmental degradation due to unchecked growth

Opportunities for Mixed-Use Development:

- Presence of **anchor institutions** like IIT Kanpur supports research, innovation, and service-sector employment
- Upcoming **Kanpur Metro expansion** makes the corridor ideal for **Transit-Oriented Development (TOD)**
- Large pockets of **underutilized or vacant land** are available for compact, mixed-use zoning
- Demand from **students, faculty, and working professionals** creates potential for residential-commercial integration

Strategic Importance:

- Acts as a **growth corridor** for north Kanpur
- Can **reduce congestion** in the Kanpur city core if planned sustainably
- Offers a **model zone for implementing mixed-use policies** in emerging urban peripheries

Geographical Location & Setting

- **Location:** Northwest edge of Kanpur city, Uttar Pradesh, along **NH-91 (GT Road)**.
- **Extent:** The corridor stretches from **Kalyanpur** (urban periphery of Kanpur Nagar) to **Mandhana** (semi-rural edge zone).
- **Proximity:**

  ~15 km from Kanpur city center

  ~3 km from Indian Institute of Technology (IIT) Kanpur

  ~20 km from Ramadevi intersection (core traffic node)

- **Natural Setting:** Mostly flat terrain, interspersed with peri-urban farmland and fallow lands.

Policy Relevance

Mixed-use development in Kalyanpur–Mandhana can:

- Prevent fragmented low-density sprawl
- **Promote vertical growth** and mixed-use zoning near metro stations
- Enable **walkable neighborhoods** with residential, commercial, and recreational synergy
- Align with **Smart City & AMRUT goals** for sustainable urban development
- Serve as a **pilot corridor** for Kanpur's peripheral planned expansion model

Demographic & Socio-economic Dynamics

- **Primary Inhabitants:**
  - Local Kanpur Nagar residents
  - Migrant students and faculty (IIT & other colleges)
  - Low-income laborers and informal vendors
- **Income Mix:**
  - Middle-income residential colonies (Kalyanpur)
  - Low-income rental housing (near IIT)
  - High potential for affordable + mid-segment development
- **Lifestyle Trends:**
  - Walk-to-coachings / bike to colleges
  - Mixed demand for rental, retail, recreational spaces

Types of mixed-use developments:

Vertical Use Buildings

Combo of different users within the same building o generally the lower floor would be utilized by a commercial user with residential use located above.

Horizontal Mixed Use

In one mixed area, there are several building blocks with different functions. Each building has a single function (both public and private functions). Buildings with public functions and private functions are integrated into one mixed area.

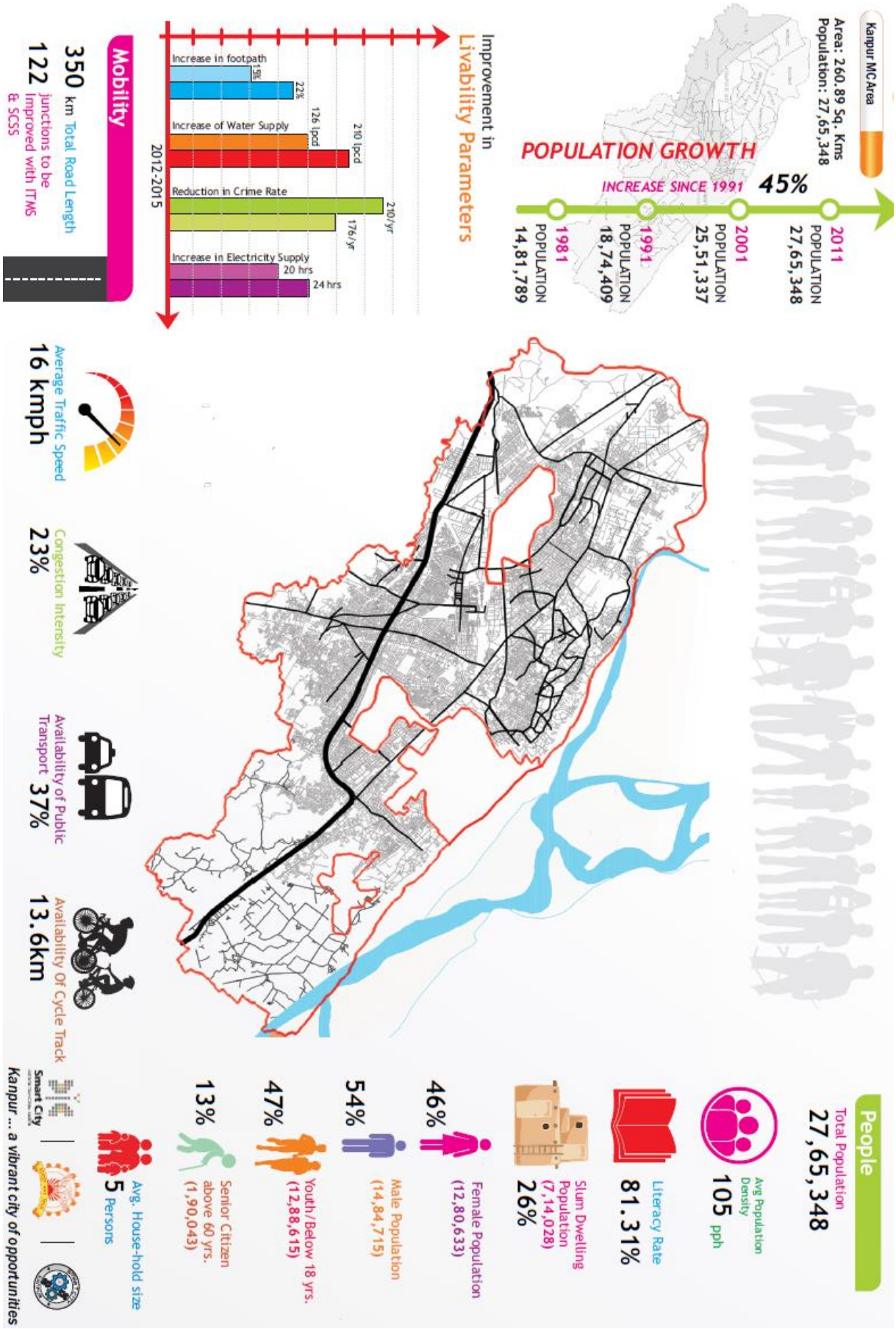
Mixed-Use Walkable Areas

- Combines vertical and horizontal Mixed Areas in one area, with an average reach distance to **Mixed-use development** the activity centre of about 10 minutes on foot.

  This type combines vertical and horizontal forms of development in one area.

Chapter- 03
CITY PROFILE

CITY PROFILE



City Profile: Kanpur

Geographical Location

Kanpur is a prominent industrial city located in the state of Uttar Pradesh, northern India. Situated on the southern banks of the Ganga River, it lies at an average elevation of 126 meters above sea level. The city spans a total area of approximately 403.7 sq.km, characterized by dense urban development, expanding suburban zones, and emerging peri-urban corridors. Once known as the "Manchester of the East," Kanpur is now a key center for manufacturing, education, and trade, while also facing challenges from rapid urbanization and infrastructure pressure.**Demographics**

As per the 2025 estimate:

Population (Census 2011):

- Urban agglomeration: ~2.92 million
- City proper: ~2.76 million
  (Estimated to exceed 3 million by 2025)

Climate: Subtropical (hot summers, cool winters, moderate rainfall).

Topography: Flat terrain, prone to urban flooding due to improper drainage.

Connectivity:

- **Road**: NH-19 (G.T. Road), NH-86, SH-58, and expressways.
- **Rail**: Major railway junction (Central Railway).
- **Air**: Chakeri Airport (Kanpur Airport), upcoming expansion into a commercial terminal.

Economy:

- Historically a major industrial center ("Manchester of the East").
- Key sectors: Leather, textiles, engineering, fertilizers, defense (Ordnance Factory).

Urban Challenges:

- Rapid unplanned growth and urban sprawl.
- Environmental degradation (especially river pollution).
- Traffic congestion and inadequate public transport.
- Slum proliferation and housing shortage.

Planning Jurisdiction:

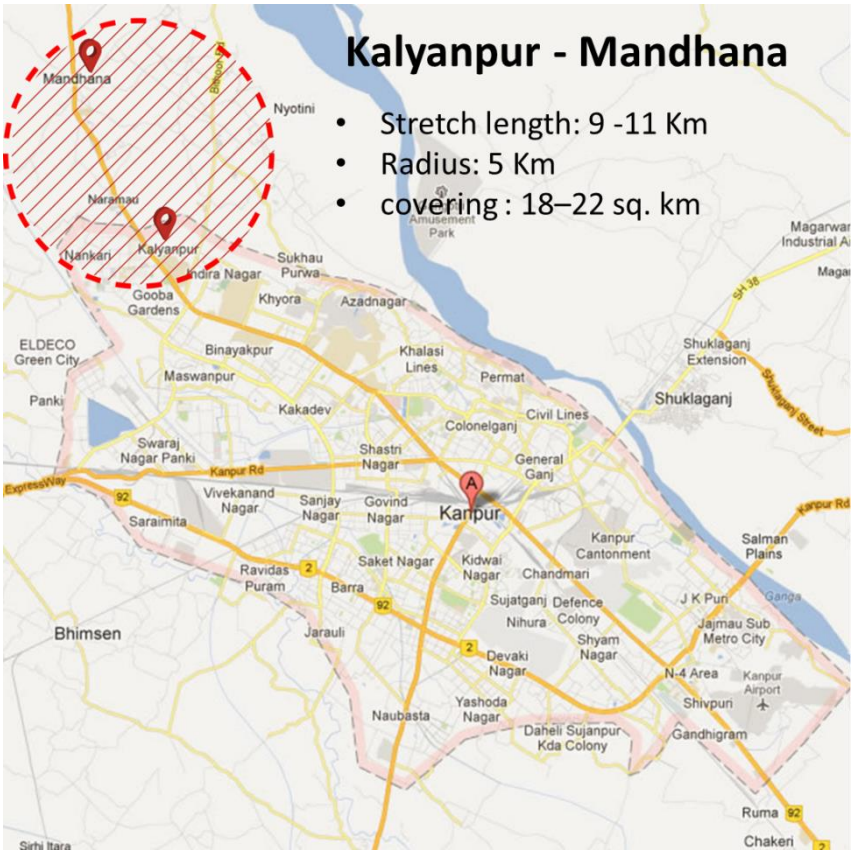
Kanpur Development Authority (KDA) – Master Plan 2021 and Draft Master Plan 2031.

Urban Form:

- Core: Dense mixed-use and commercial (Cantonment, Civil Lines, Bada Chauraha).
- Periphery: Emerging corridors like Kalyanpur–Mandhana under urban transition and sprawl pressure.

CASE AREA KALAYNPUR

Kalyanpur is a rapidly urbanizing locality in the northwestern part of Kanpur, Uttar Pradesh. Strategically situated along the Grand Trunk Road (NH-91), it serves as a key urban corridor linking Kanpur city to Mandhana and IIT-Kanpur. The area lies at an average elevation of 126 meters above sea level and covers approximately 18.5 sq.km, featuring a mix of residential colonies, educational institutions, commercial activity, and peri-urban agricultural land. Kalyanpur is witnessing significant growth due to increasing institutional development, transit connectivity, and suburban expansion.



Source: Kritika Shukla (2025), Primary Survey

Population (Census 2011)

- Kalyanpur Zone (Ward-level estimate): ~150,000–180,000
- Rapid population increase due to institutional growth and urban expansion. (Estimated to cross 220,000 by 2031)

Climate:

- Subtropical: Hot summers, mild winters, and moderate monsoon rainfall.

Topography:

- Flat terrain with scattered agricultural patches; some areas prone to waterlogging due to poor drainage.

Connectivity:

- Road: Located along NH-91 (GT Road); connected to Kanpur Central via arterial roads.
- Rail: Nearby stations – Kalyanpur, Rawatpur; 11 km from Kanpur Central Junction.
- Air: ~24 km from Chakeri Airport (Kanpur Airport), currently under commercial upgrade.

Economy:

- Primarily residential with growing commercial pockets and educational economy.
- Proximity to IIT-Kanpur, DAV College, and other institutions driving real estate and service sector growth.

Urban Challenges:

- Unplanned growth due to residential sprawl and institutional pressure.
- Mixed land-use conflicts and lack of integrated infrastructure.
- Traffic congestion on arterial roads and lack of last-mile connectivity.
- Encroachment of peri-urban land and inadequate green cover.

Planning Jurisdiction:

- Falls under Kanpur Development Authority (KDA) – governed by Kanpur Master Plan 2021; proposed updates in Draft Master Plan 2031.

CASE AREA MANDHANA

Mandhana is a fast-urbanizing locality on the northern fringe of Kanpur, Uttar Pradesh, strategically located along NH-91. At an elevation of 129 meters and covering around 9–10 sq.km, it features a mix of residential, institutional, and agricultural land. With growing connectivity to IIT-Kanpur and spillover from Kalyanpur, Mandhana is emerging as a key node in Kanpur's urban expansion corridor.

Population (Census 2011)

- Estimated population: ~40,000–50,000
- Projected to increase due to spillover from Kalyanpur and growth of IIT-Kanpur ecosystem.

Climate:

- Subtropical: Characterized by hot summers, cool winters, and seasonal monsoons.

Topography:

- Gently undulating terrain with peri-urban and agricultural land; limited stormwater drainage in built-up areas.

Connectivity:

- Road: Located on NH-91, providing direct access to Kanpur city and northern districts.
- Rail: Nearest railway station is Bithoor Road station; ~13 km from Kanpur Central.
- Air: Approx. 28 km from Kanpur Airport (Chakeri); access via city road networks.

Economy:

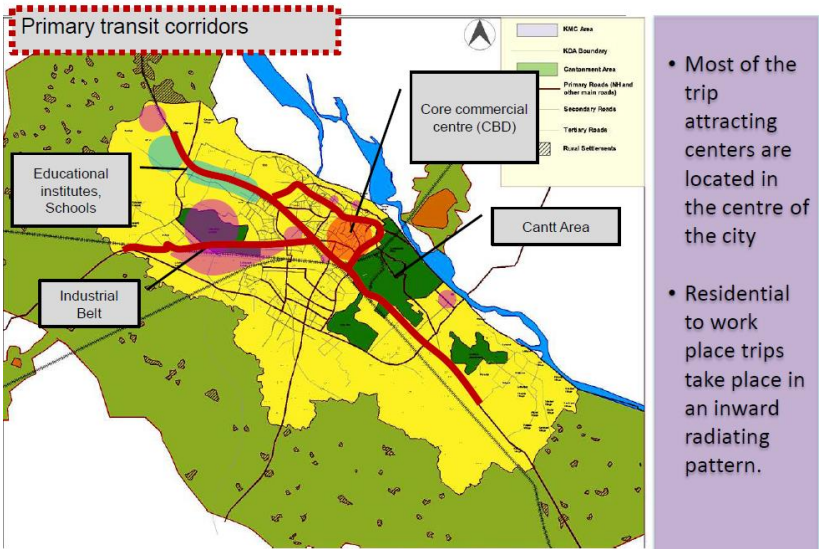
- Predominantly peri-urban with agrarian roots; now shifting toward education and services.
- Proximity to IIT-Kanpur Technology Park and proposed industrial zones stimulating economic activity.

Urban Challenges:

- Unregulated peri-urban expansion and land use transformation.
- Poor infrastructure and limited access to public services.
- Growing traffic due to corridor development without supporting transit infrastructure.
- Environmental stress due to land conversion and lack of waste management systems.

Planning Jurisdiction:

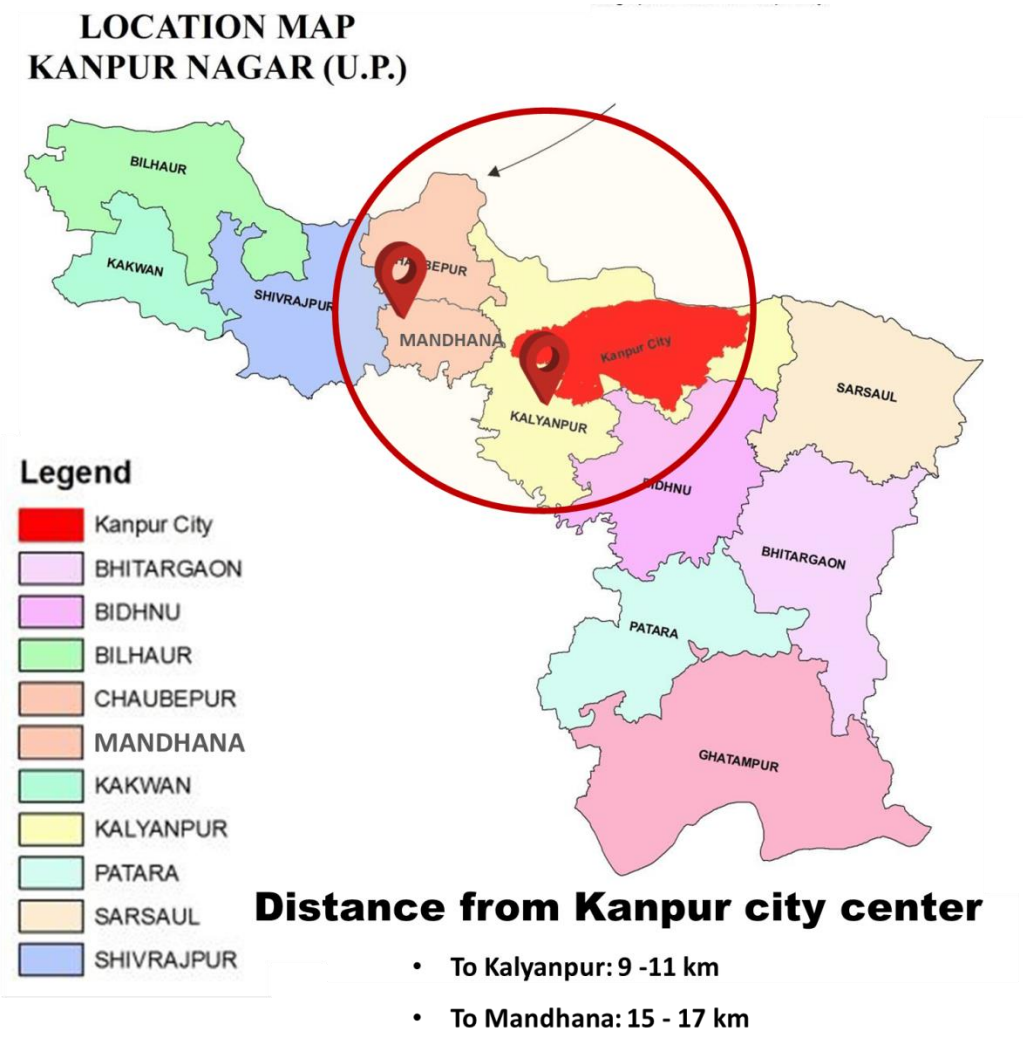
- Under Kanpur Development Authority (KDA); categorized as urban expansion zone in the Draft Master Plan 2031.



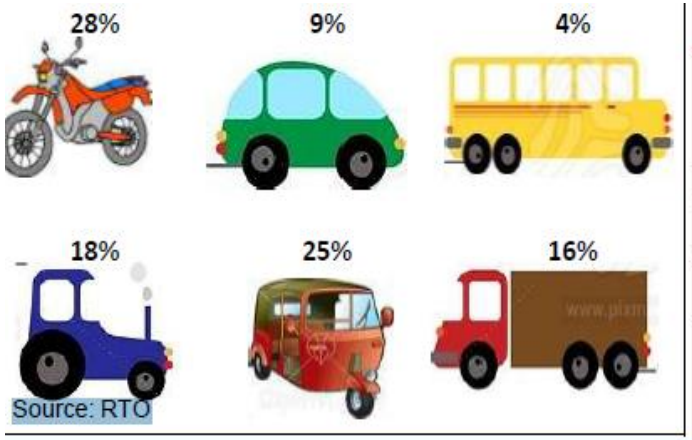
Overview

The **Kalyanpur–Mandhana corridor**, spanning approximately **18 to 22 square kilometers**, forms a critical transitional zone in **Kanpur**, Uttar Pradesh. Geographically positioned between the dense urban neighborhoods of Kalyanpur and the peri-urban village of Mandhana, the corridor represents a dynamic stretch undergoing **rapid socio-economic and physical transformation**.

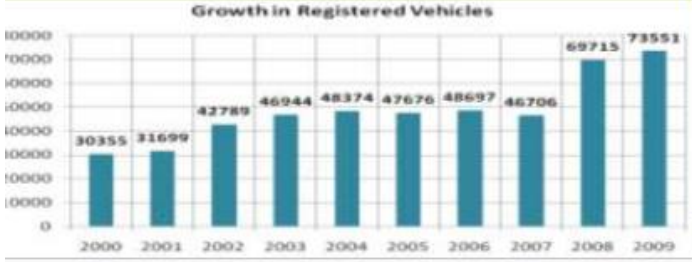
In recent years, this area has seen a surge in **real estate development**, **private institutional investments**, and **infrastructure upgrades**, prompted by its strategic location along **major national highways (NH-19 and NH-27)** and proximity to educational hubs like **IIT Kanpur**. As a result, the corridor is emerging as a future growth center, yet remains highly **fragmented and unregulated**, lacking cohesive planning, infrastructure integration, and mixed-use synergy.

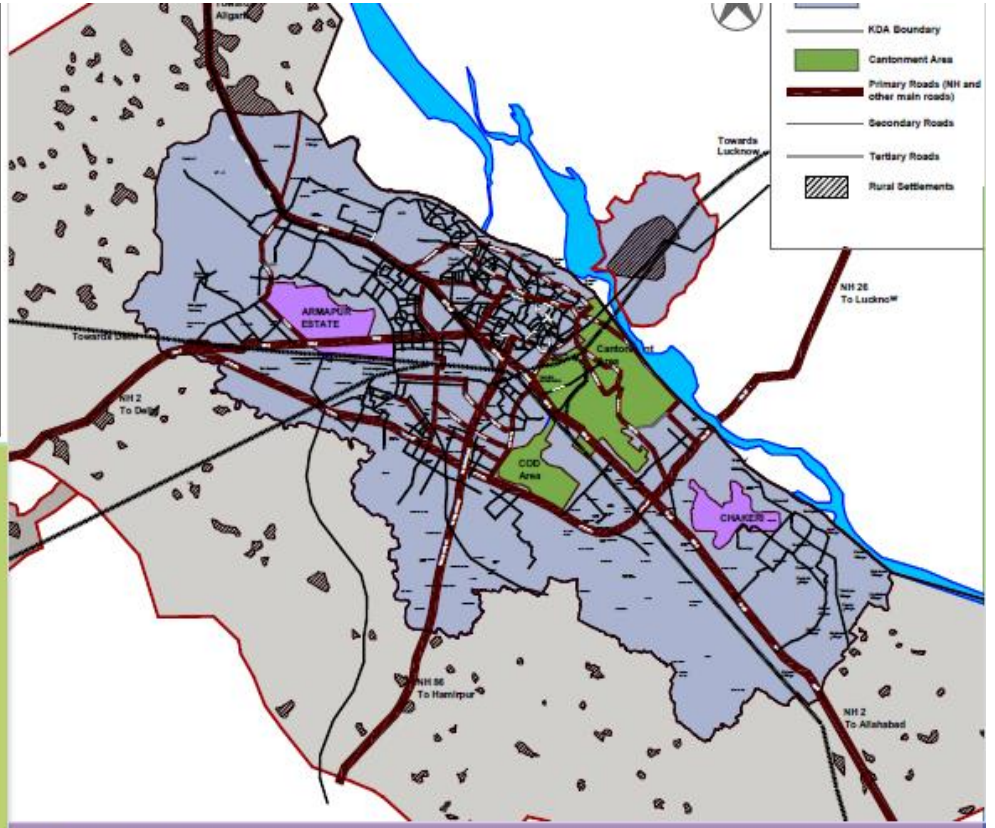


Overview of City



- Total vehicle population has grown by almost 44%
- Population density of about 97.6 persons per hactare
- Population Growth Rate- 28.6%
- Density of core area – 6 times outer areas

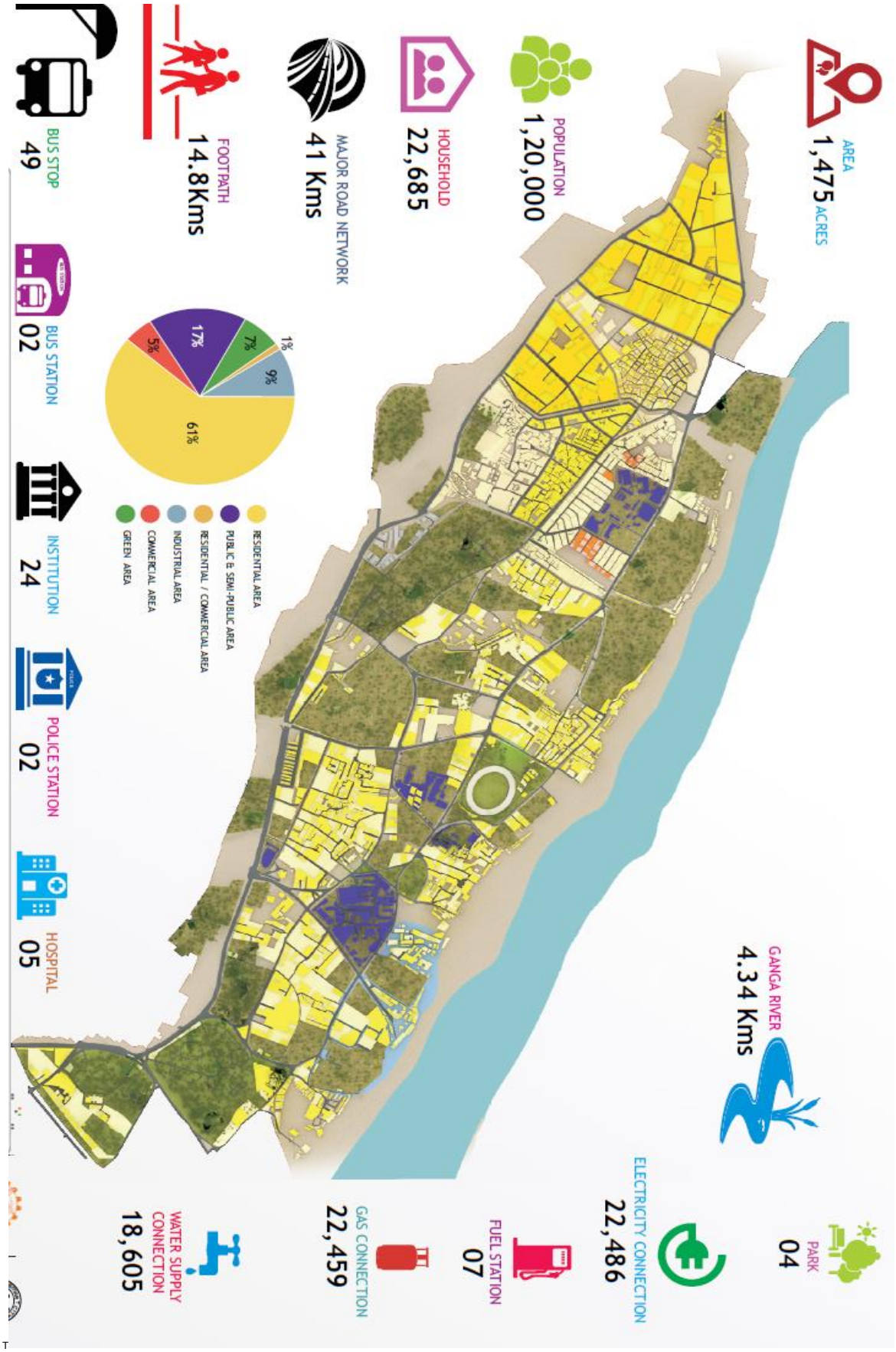




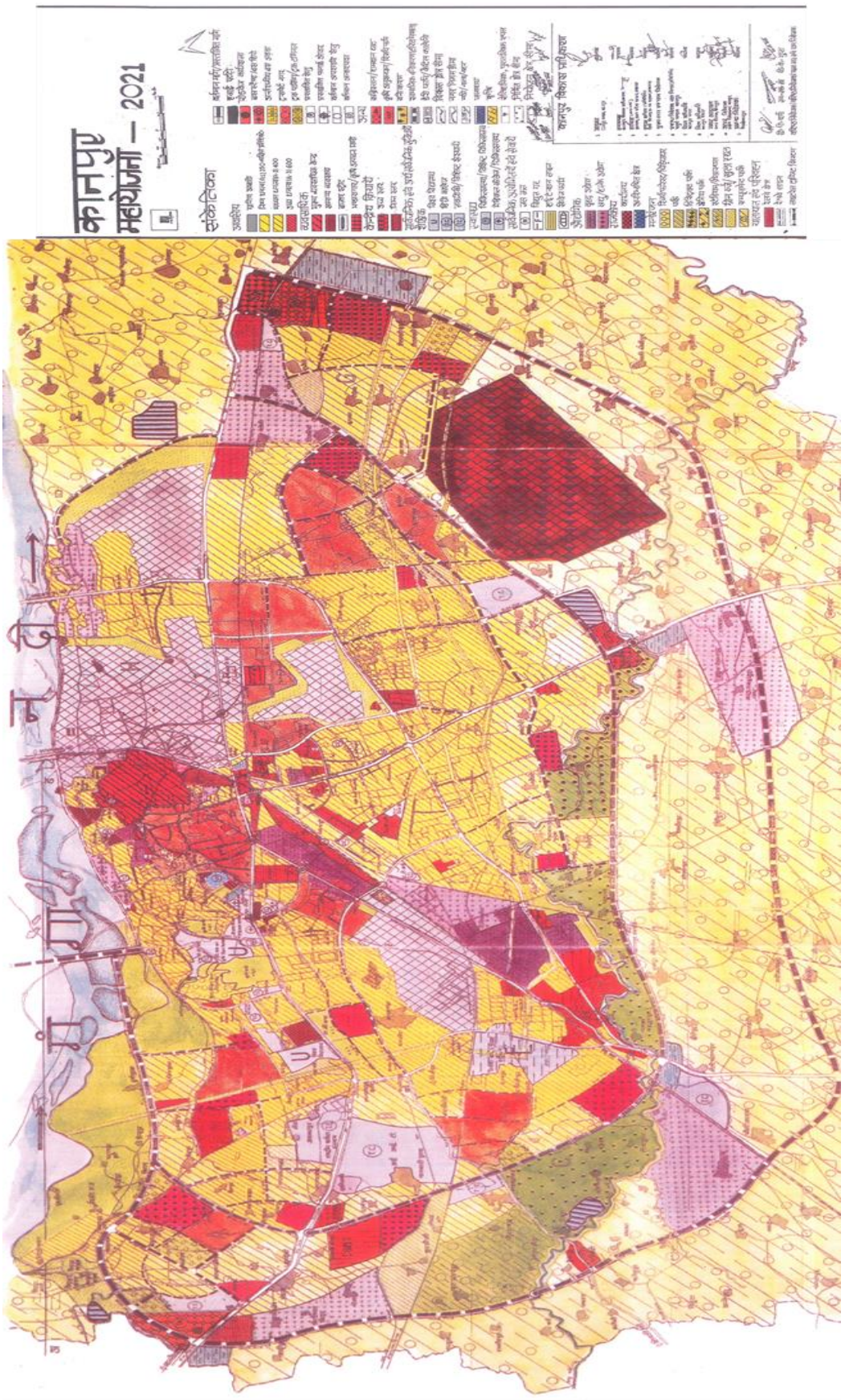
Study Area

- Kanpur Development Authority area – incl. KNN limits extending upto 8k m.
- Kanpur Nagar Nigam area - 261.50 sq. km.

AREA BASED PROFILE



Master Plan of Kanpur – 2031



Master Plan Vision Linked to Mixed-Use

- **Planned, Compact, and Inclusive Urban Growth**
- Promote **decentralized self-sufficient zones** with residential, commercial, institutional, and recreational land uses integrated.
- Discourage haphazard peri-urban growth by **strengthening mixed-use corridors**.

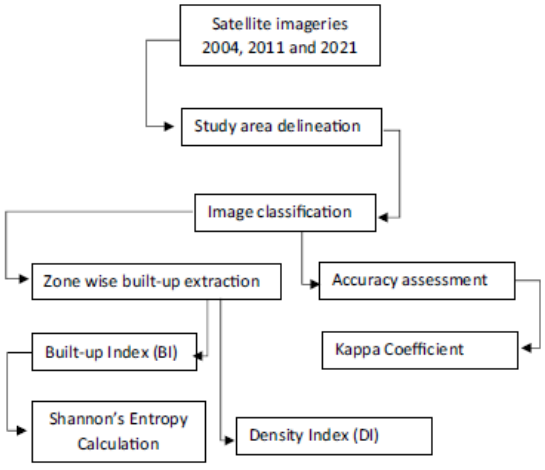
Identified Issues of Urban Sprawl in Kanpur

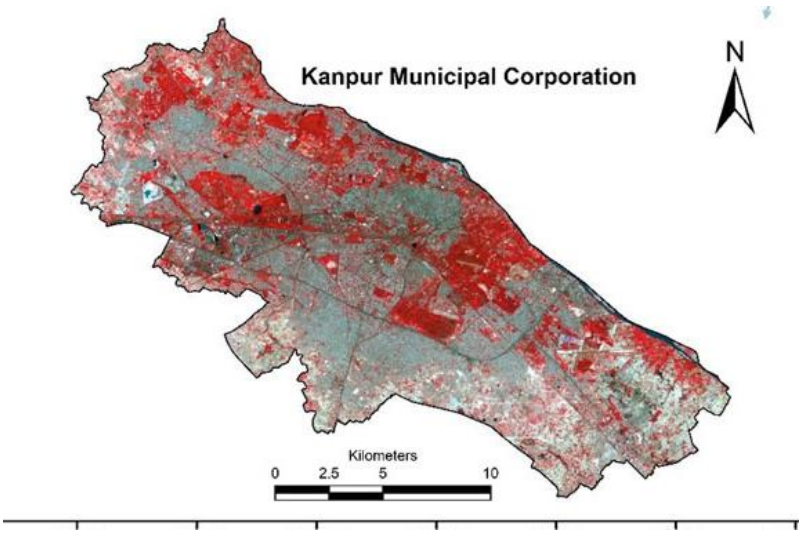
Issue	Master Plan Strategy (MXD Response)
Rapid peri-urban expansion	Promote *compact mixed-use growth* in Kalyanpur–Mandhana
Mono-functional land zoning	Encourage *integrated land use zones*
Traffic congestion and long commutes	Propose *Transit-Oriented Mixed-Use Zones* (TOD-MXD)
Inefficient land utilization	Introduce *vertical mixed-use developments*
Loss of agricultural fringe land	*Planned densification* with mixed-use clustering

Monitoring Urban Sprawl Using Geo-Spatial Technology: A Case Study of Kanpur City, India

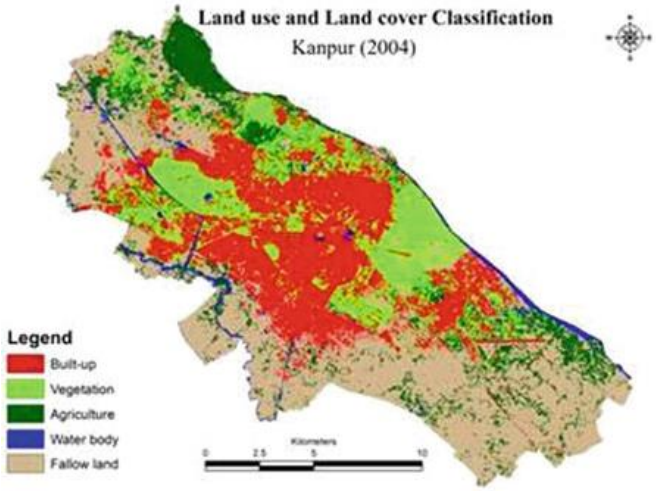
The input database for the current study consists of multispectral and multitemporal Landsat satellite imageries. The imageries were acquired from the official website of the US Geological Survey (USGS) Earth Explorer. Kanpur city boundary was digitized from Kanpur Municipal Corporation (KMC) portal.

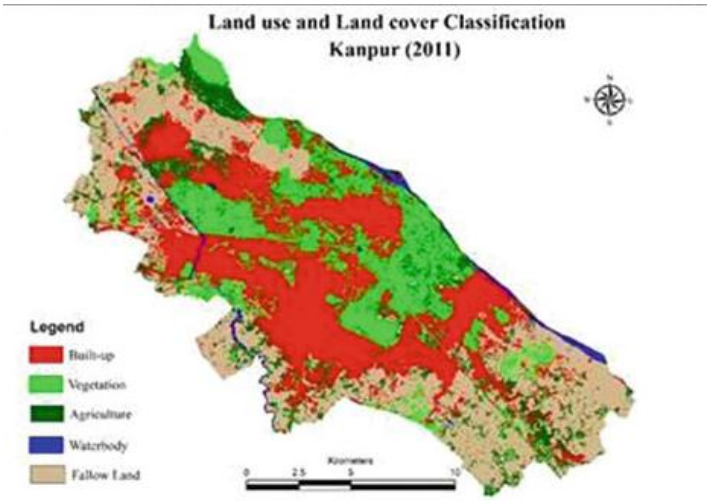
Methodology

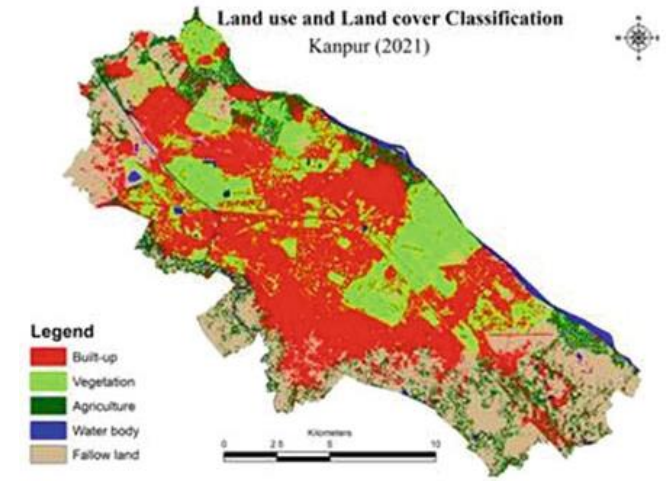


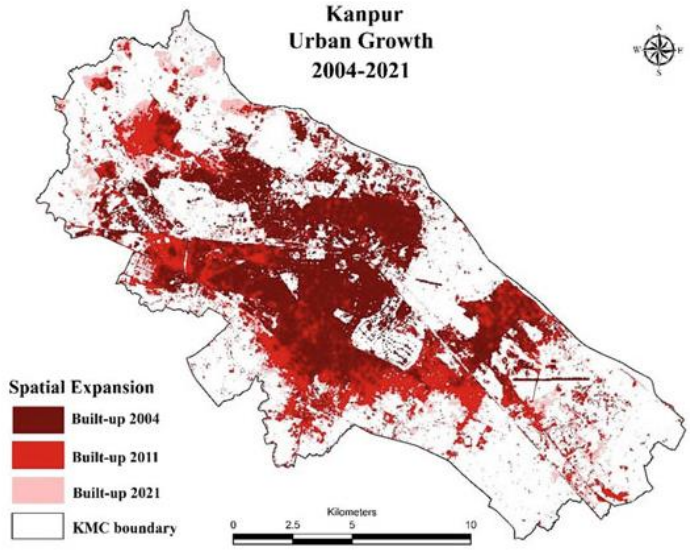


Land use and land cover classified image 2004, 2011, 2021

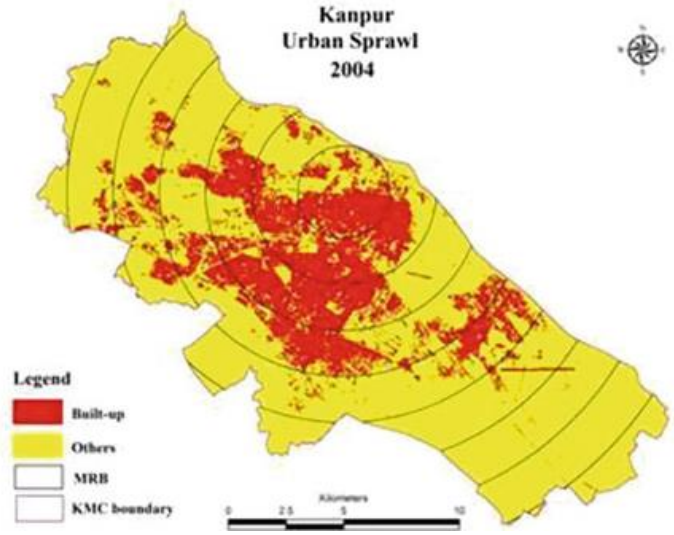


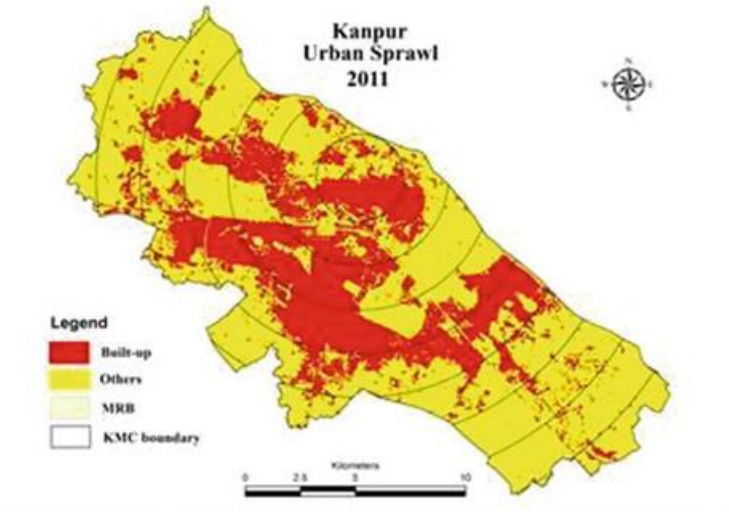


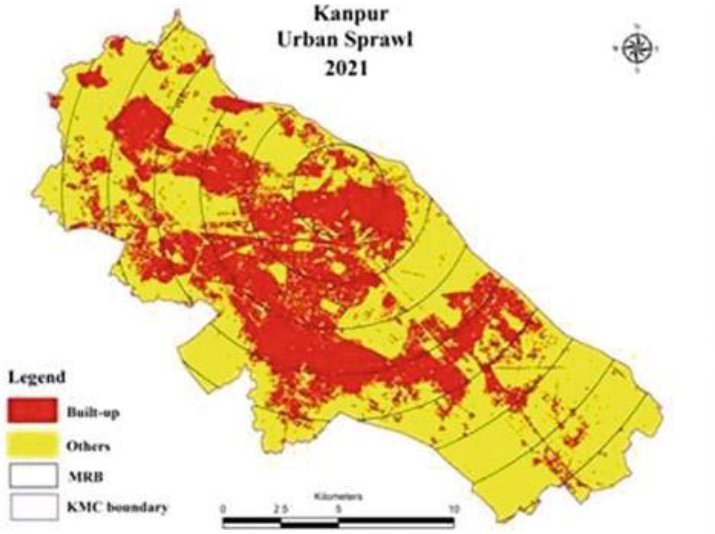




Urban Sprawl Multiple Ring Buffer (MRB) Analysis

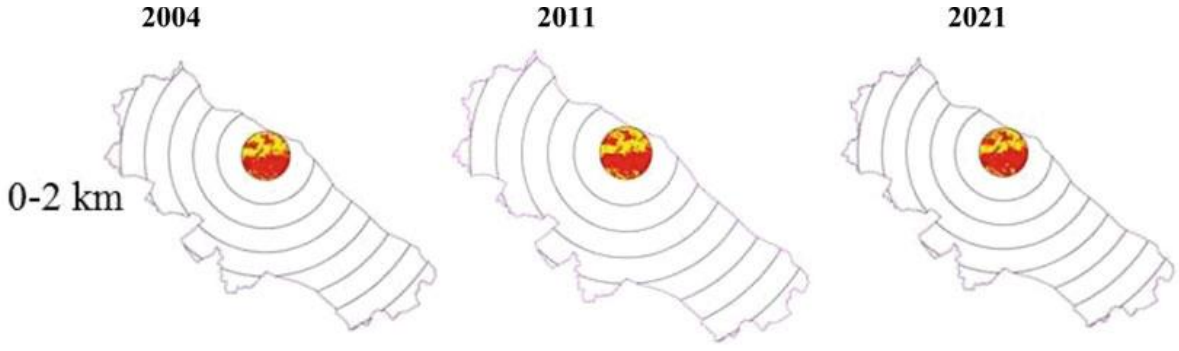


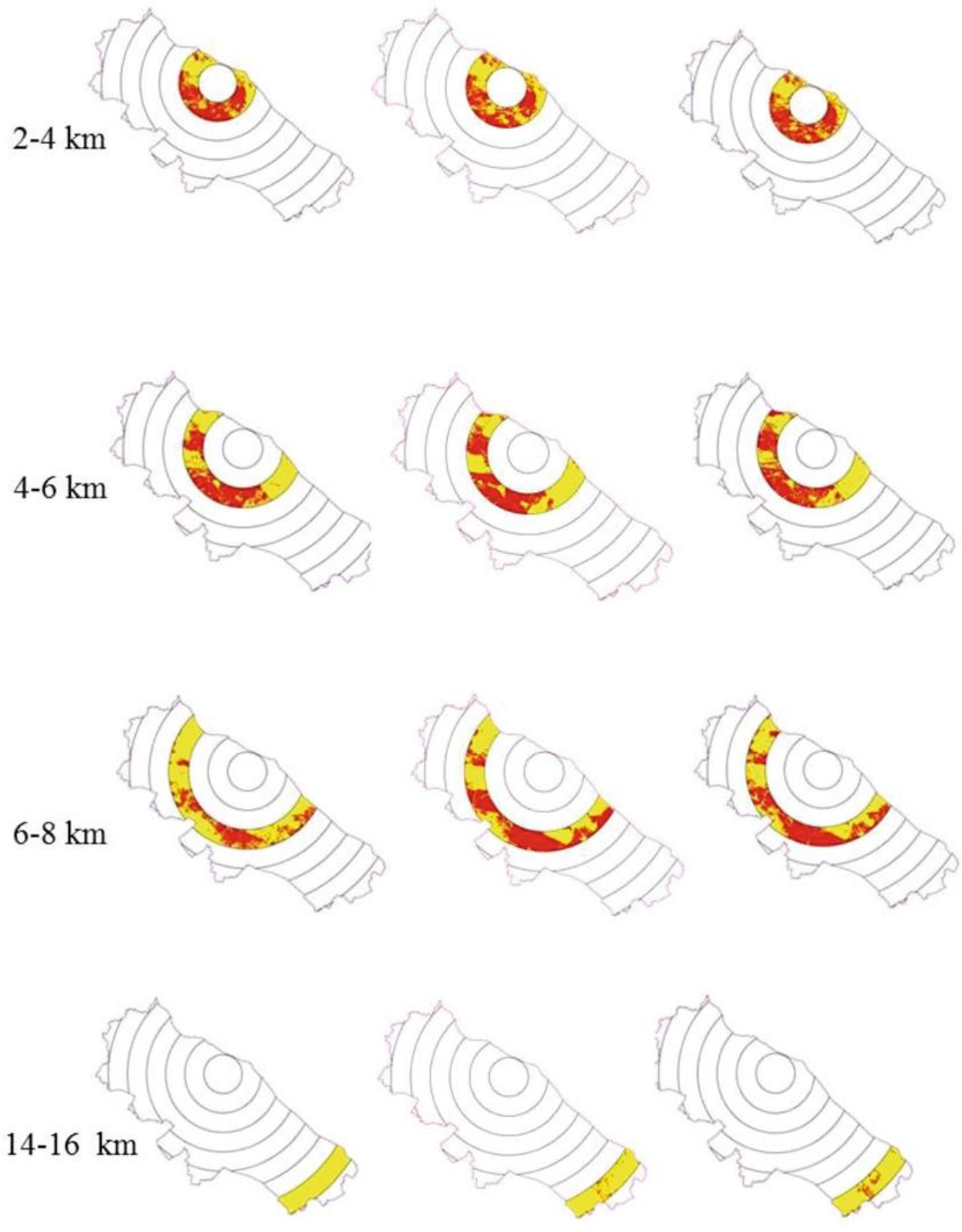




Conclusion

Multiple ring buffer maps for built-up area of years 2004, 2011 and 2021





Anderson JR,

Satellite_LULC_Kanpur_2023

Demographics Data

According to projections for **2025**, the combined population of the corridor exceeds

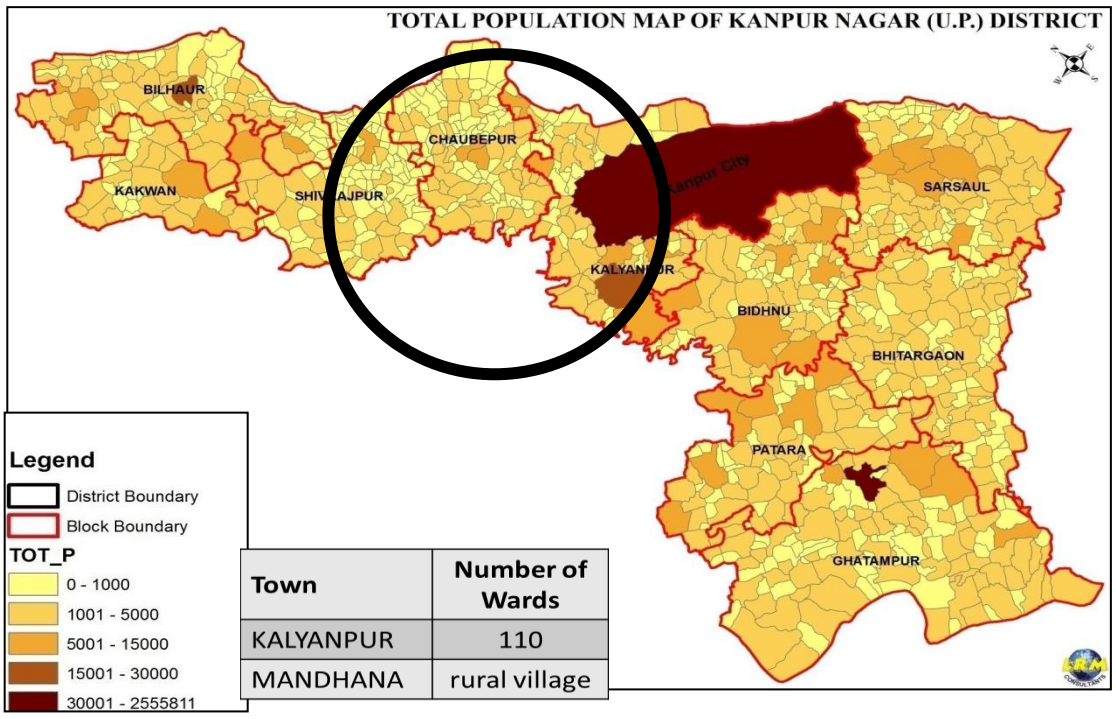
261,000, distributed as follows:

- **Kalyanpur:** Approx. **260,000**, reflecting its urbanized character
- **Mandhana:** Approx. **1,150**, primarily agrarian and sparsely populated
  Kalyanpur is typified by **multi-storey residential buildings**, **student housing**, and **dense commercial pockets**, while Mandhana retains a **semi-rural village structure** with isolated farms and small-scale housing units.

Key demographic trends include:

- **High population density** in Kalyanpur (over 10,000 persons per sq km in core areas)
- **Gender ratio imbalances** and overcrowded housing conditions in certain wards
- Increased **urban migration**, particularly by students, workers, and lower-middle-class families
  Gradual transformation of **Mandhana's agrarian population** toward informal urban employment and housing

Demography Analysis



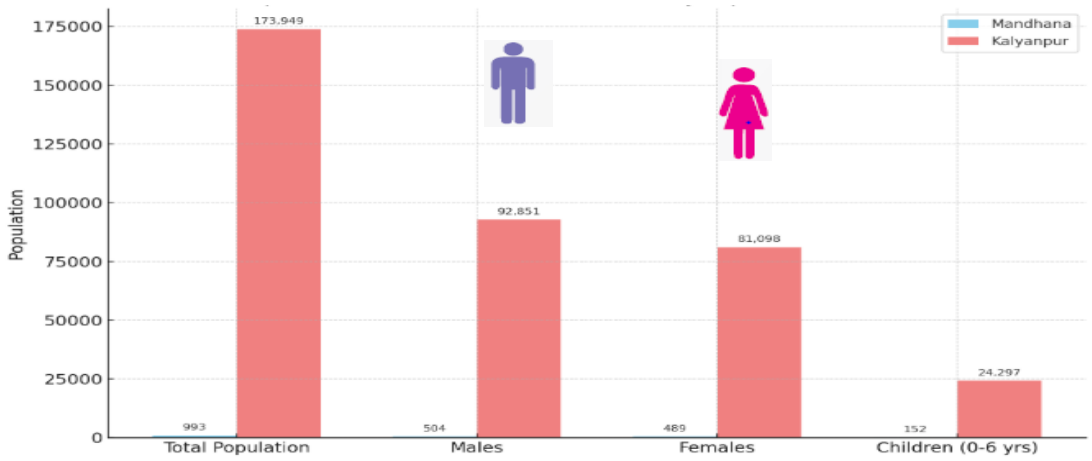
Town	Number of Wards
KALYANPUR	110
MANDHANA	rural village

Census_Kanpur_Nagar_2011

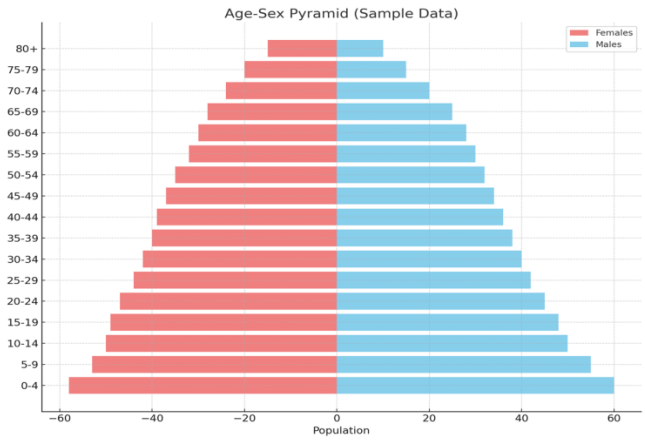
Demography Overview of case area

DEMOGRAPHY OVERVIEW					
Town	**Population (2011)**	**Area**	**Population Density (persons/km²)**	**Estimated Population (2025)**	**Number of households**
Kalyanpur	223,491	29 .01 Sq. Km	7,704	~260,000	8,728
Mandhana	993	1.18 Sq. Km	842	~1,150	1,335

Population by Gender



Mandhana has a population of 993 (504 males, 489 females), while Kalyanpur is much larger with 173,949 people (92,851 males, 81,098 females). Children (0–6) make up 152 in Mandhana and 24,297 in Kalyanpur.



Census_Kanpur_Nagar_2011

Chapter- 04
CASE & LITERATURE STUDY

Gujarat International Finance Tec-City, Gandhinagar

Introduction

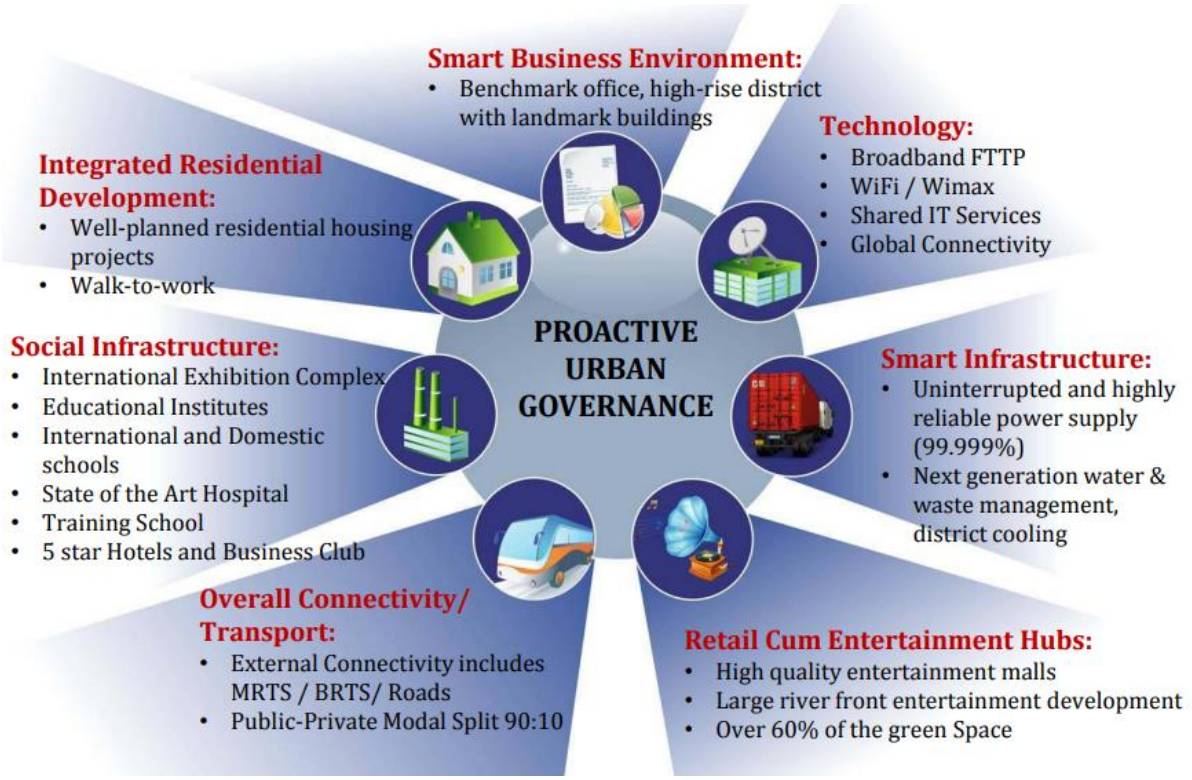
The **Gujarat International Finance Tec-City** (GIFT City) is India's first greenfield smart city and global financial hub. Planned as a **high-density, vertical mixed-use zone**, GIFT integrates:

- **Special Economic Zones (SEZs)**
- **Commercial complexes, residential towers, civic plazas**
- **Smart infrastructure** such as district cooling, underground utility corridors, and sensor-based systems This project showcases the potential of **advanced planning, vertical zoning, and technology-driven governance** in shaping future-ready cities.

GIFT City in Gandhinagar, Gujarat, is India's first IFSC and a smart, high-density, mixed-use development that combines finance, technology, and urban living to curb urban sprawl and create a self-sustaining hub.

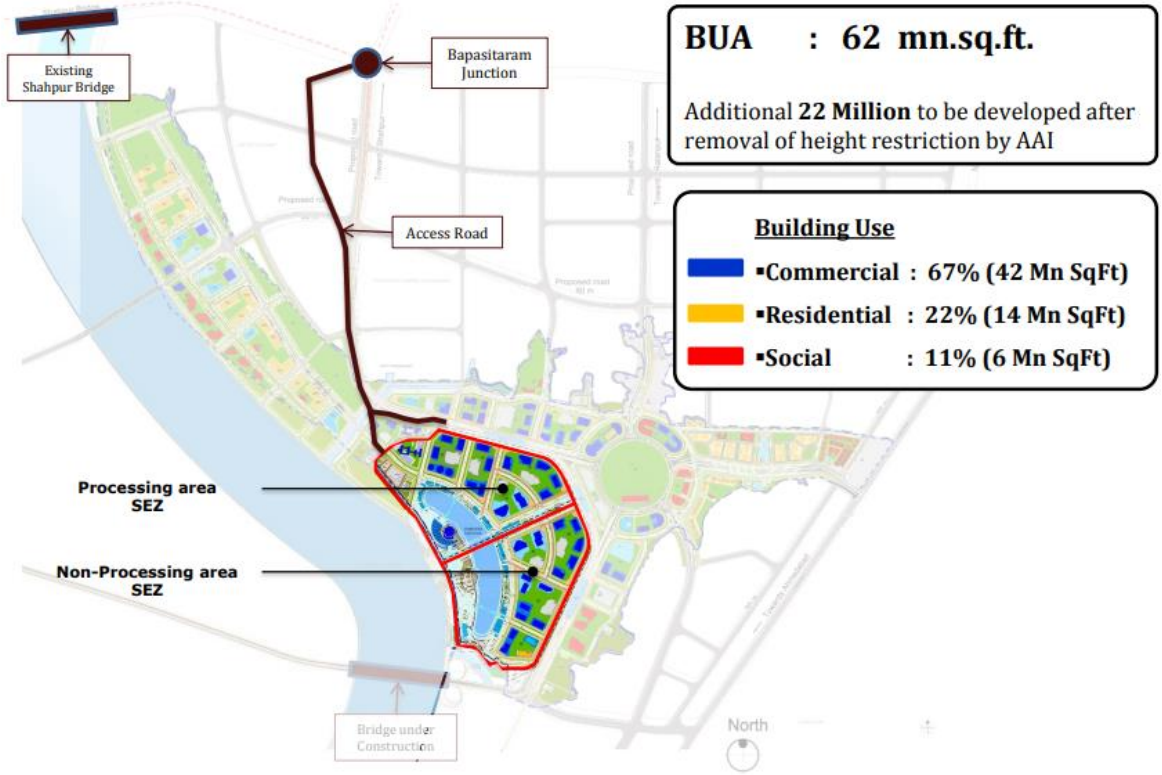
Strategic Location - India / Gujarat

GIFT an Integrated Urban Development



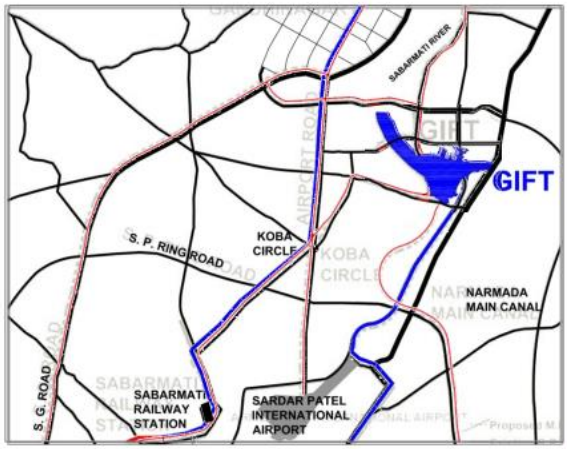
Govt *Vice President, GIFT*

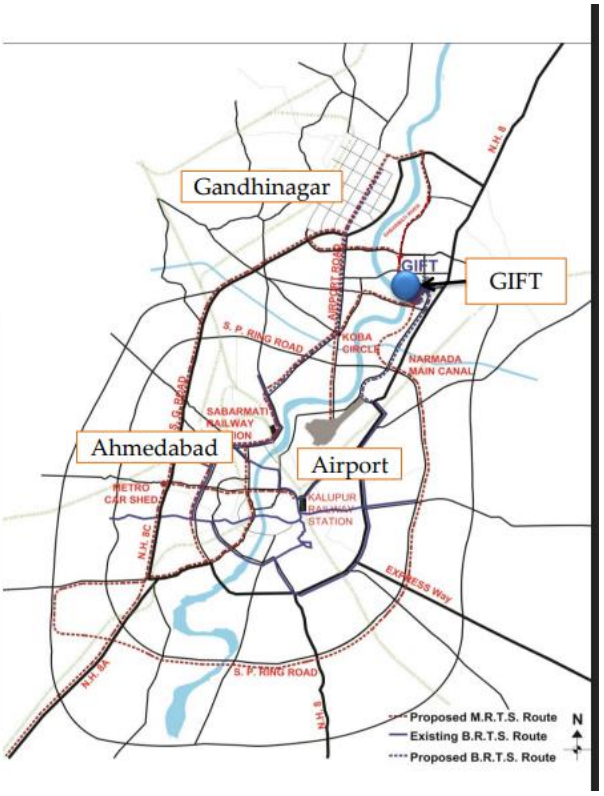
GIFT: Master Plan



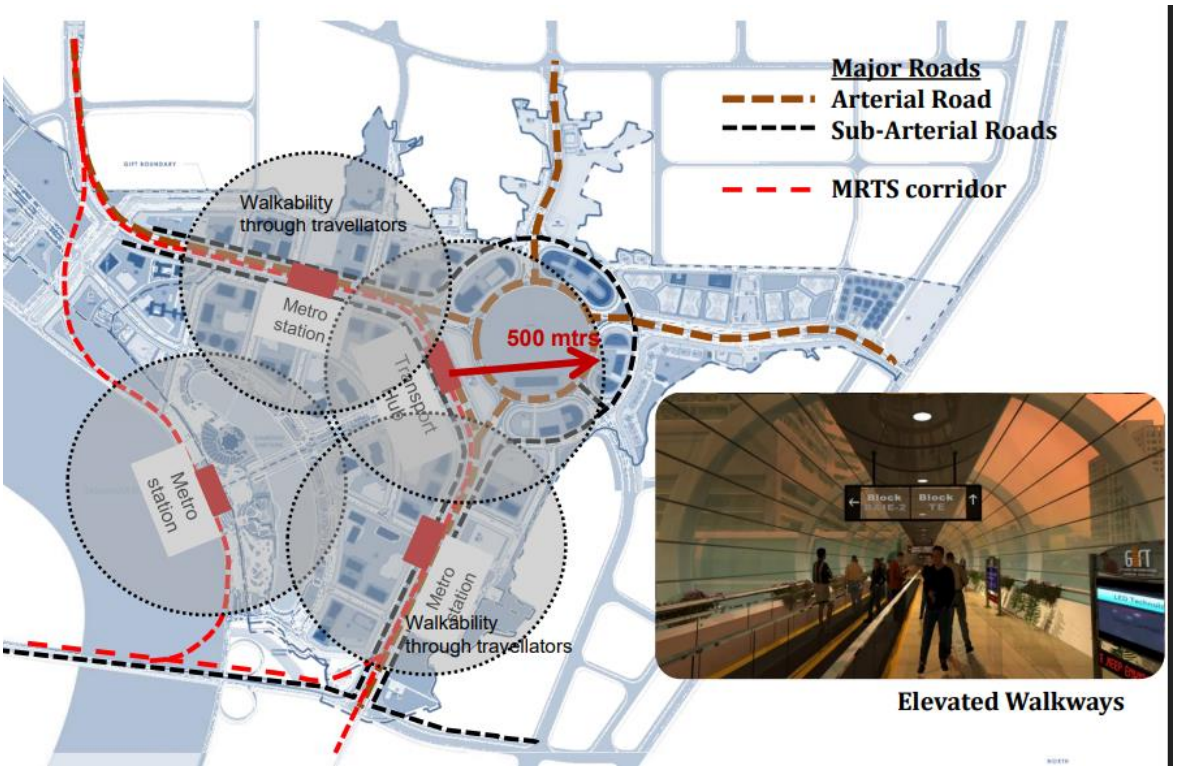
External Transportation

- Grid of six Arterial Roads (Connecting to various areas of Ahmedabad and Gandhinagar)
- Metro Rail Transport System (MRTS) to GIFT
- Bus Rapid Transit System (BRTS) to GIFT

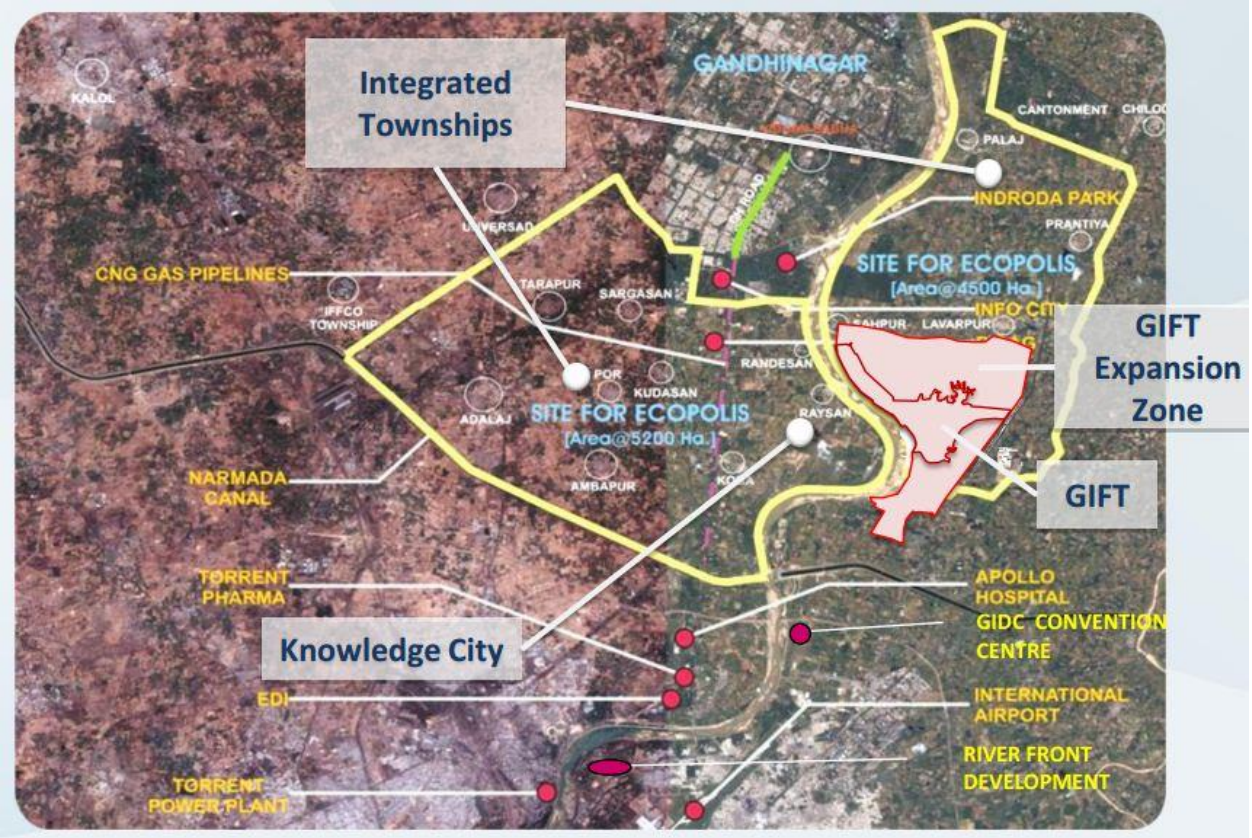




GIFT- A Transit Oriented Development Major Internal Transport Corridor



GIFT: Implementation Plan (Phase wise)



Key Features of the City

- **Integrated Mixed-Use Development:** Combines SEZ, IT parks, residences, schools, hospitals, and retail; home to global banks and corporations.
- **Smart Infrastructure & Sustainability:** Features waste and water recycling, district cooling, smart grids, and LEED-certified green buildings.
- **Efficient Transport & Connectivity:** Linked by metro, highways, and airport; promotes walkability and smart mobility.
- **Work-Live-Play Model:** Offers luxury homes, business spaces, and ample recreation, fostering a high-quality urban lifestyle.

Problem: Urban Sprawl in Gujarat

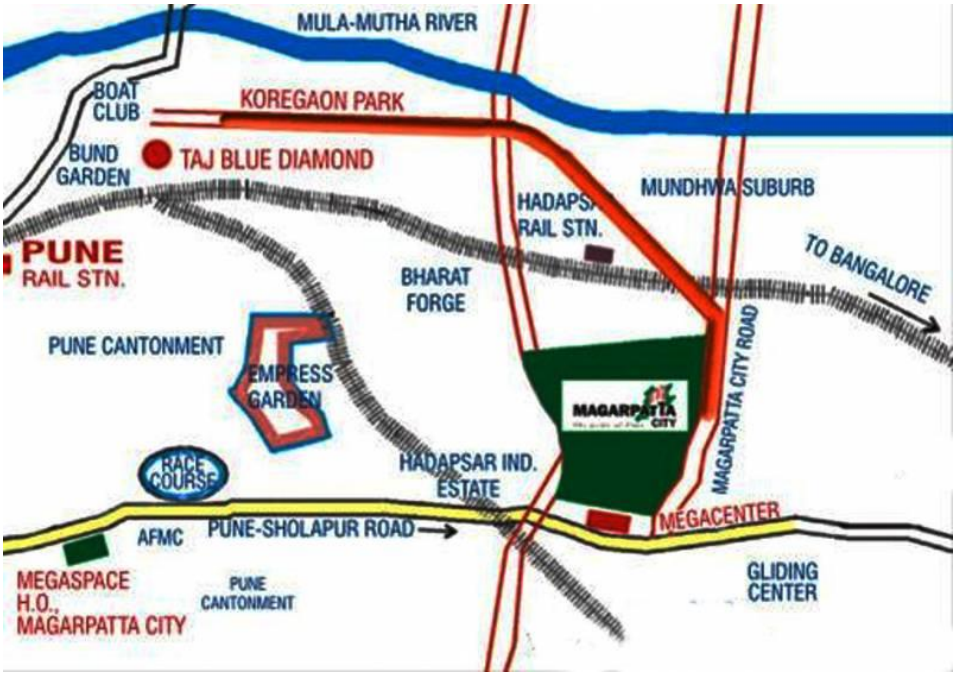
- Dispersed growth in Ahmedabad-Gandhinagar causes congestion and land inefficiency.
- India lacked a global financial hub, pushing firms offshore.
- Unplanned commercial sprawl increases commute times and pollution.

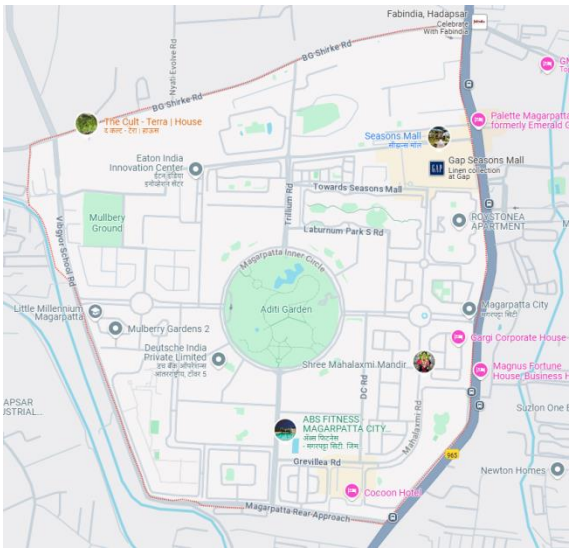
Magarpatta City, Pune Case study

Magarpatta City, located in Pune, Maharashtra, is a pioneering mixed-use, self-sustained township developed as a response to urban sprawl and unplanned growth. Built on 430 acres of farmland, it integrates residential, commercial, educational, and recreational spaces within a single urban environment. dense urban areas, reduce suburban sprawl, and improve quality of life.

Source: Kritika Shukla (2025), Primary Survey

Connectivity Map





Source: Kritika Shukla (2025), Primary Survey

Problem: Urban Sprawl in Pune

- **Rapid expansion of Pune's suburbs** due to the booming **IT and manufacturing industries**, leading to **unplanned growth** and increased **traffic congestion**.
- **Loss of agricultural land** due to disorganized urbanization, threatening the livelihoods of local farmers.
- **Overcrowding in central Pune**, forcing residents to relocate to far-off suburbs, increasing commute times.

ZONNING

PLANNING

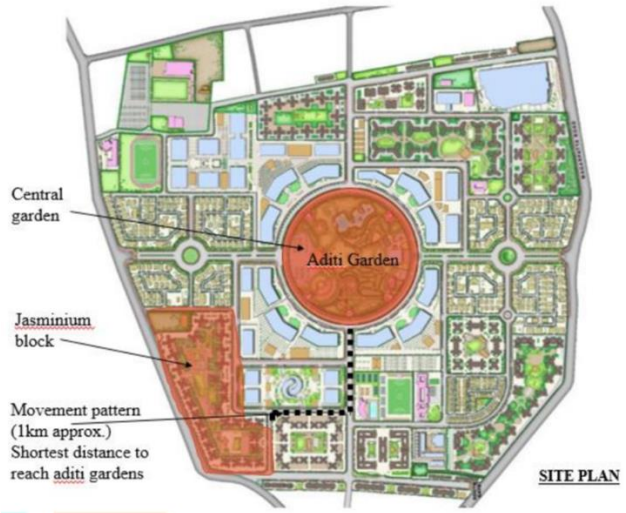


Figure 4: site plan

Impact on Urban Sprawl

- Reduced Traffic & Pollution: Local employment and services minimize long-distance travel.
- Sustainable Urban Development: A model of eco-friendly, planned urbanization.
- Empowered Local Farmers: Instead of selling land to developers, farmers became
- stakeholders in the township's success.
- Balanced Growth of Pune: Prevented excessive urban expansion by creating a self-sufficient township.

Key Features of the City

1.Mixed-Use Development:

- IT parks, residential apartments, schools, hospitals, shopping complexes, and recreational facilities in one integrated township.

2. Sustainability & Green Initiatives:

- **30% of the area** is allocated to **green spaces**, reducing the urban heat island effect.
- **Solar energy, rainwater harvesting, and waste management** initiatives promote eco-friendly urban living.

3. Walk-to-Work Concept:

- Employment hubs within the township reduce **travel time and traffic congestion**.

Solution: Magarpatta City - A Planned Mixed-Use Township

The landowners (farmers) formed the Magarpatta Township Development and Construction Company (MTDCC) and collaborated to develop the land into a planned urban township instead of selling it to private developers.

Impact on Urban Sprawl

- Reduced Traffic & Pollution: Local employment and services minimize long-distance travel.
- Sustainable Urban Development: A model of eco-friendly, planned urbanization.
- Empowered Local Farmers: Instead of selling land to developers, farmers became
- stakeholders in the township's success.
- Balanced Growth of Pune: Prevented excessive urban expansion by creating a self-sufficient township.

The pearl District, Portland, Oregon

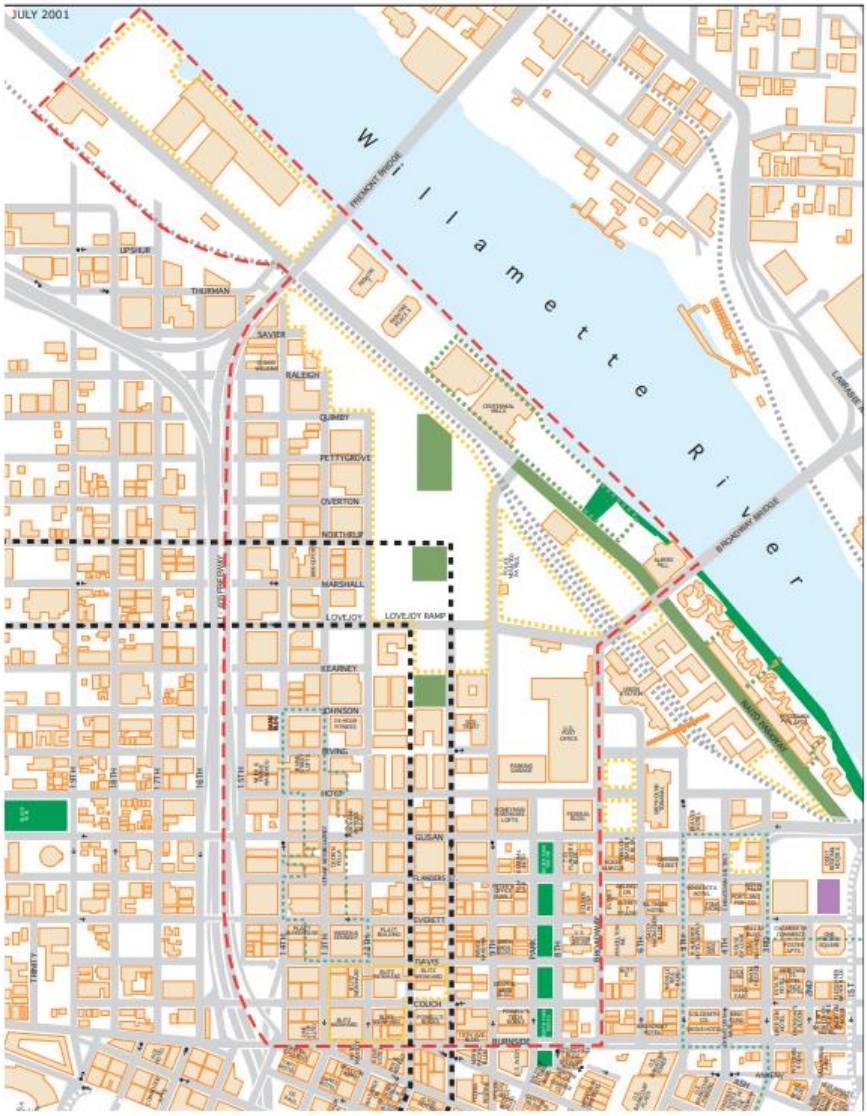
Introduction

Urban sprawl leads to traffic congestion and green space loss, while mixed-use development (MXD) fosters sustainable, walkable communities. Portland's Pearl District, once underused warehouses and rail yards in the 1980s, has been transformed through public-private efforts into a vibrant hub for living, working, and tourism.

BEFORE REDEVELOPMENT THE PEARL DISTRICT

BEFORE REDEVELOPMENT THE PEARL DISTRICT

Pearl district development plan study area



Objective 1: Recognize the character of historic/architectural resources.

Objective 2: Create and promote high design standards.

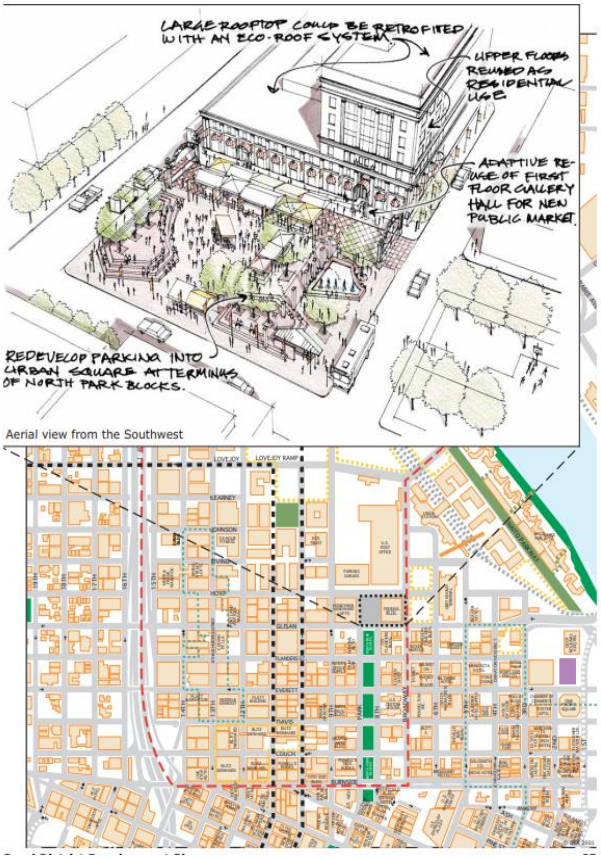
Objective 3: Ensure that new development supports and reinforces public infrastructure investments and are integrated into and enhance the vitality of the Pearl District.

- Early tourism expansion driven by cultural and natural attractions.
- Focus on Bangkok, Phuket, Chiang Mai, and Pattaya as primary tourist hubs.
- Growth in mass tourism, leading to commercialization of destinations.

Shift to Integrated Tourism Management

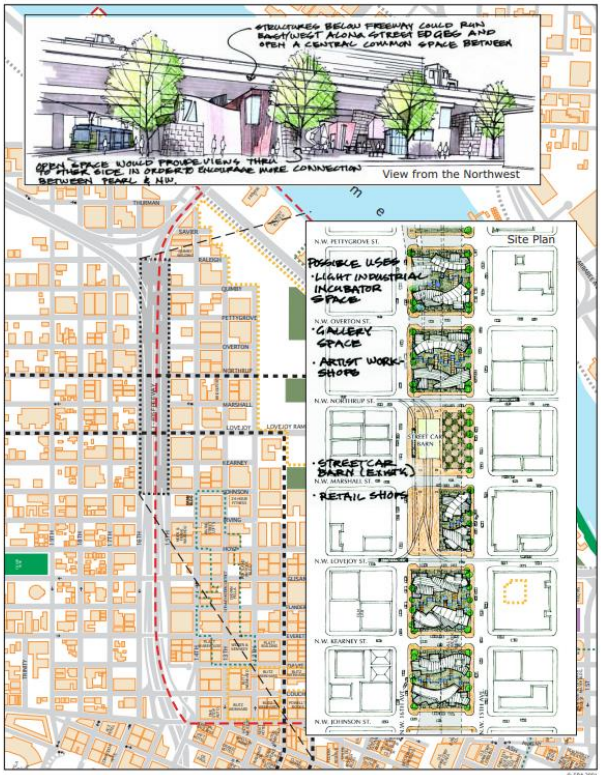
- Emergence of the **Sufficiency Economy Philosophy (SEP)** in tourism policies.

1 BROADWAY MIXED-USE REDEVELOPMENT



Map - THE PEARL DISTRICT, PORTLAND, OREGON

CONCEPTUAL PLAN
I-405 FREEWAY BLOCKS REDEVELOPMENT



Challenges related to urban sprawl:

- **Traffic:** Increased development causes congestion and commuting issues.
- **Loss of Green Spaces :** Growth reduces parks and natural areas.
- **Housing Costs:** Rising prices limit affordable options.
- **Gentrification:** Revitalization displaces residents and small businesses.
- **Infrastructure:** Development strains transit, utilities, and services.

Key Features of the Pearl District's Mixed-Use Development

1. Compact, Walkable Design

- **High-density housing**: A mix of apartments, condominiums, and townhomes reduces the need for suburban expansion.
- **Pedestrian-friendly streets**: Wide sidewalks, crosswalks, and bike lanes encourage alternative transportation.

2. Integration of Residential, Commercial, and Recreational Spaces

- **Live-work spaces**: Apartments above retail and office spaces reduce commuting needs.
- **Public parks and green spaces**: Tanner Springs Park and Jamison Square enhance quality of life.

3. Sustainable Transportation

- **Access to public transit**: Streetcars and buses connect the district to the rest of Portland.
- **Bicycle infrastructure**: Dedicated bike lanes and bike-sharing programs promote eco-friendly travel.

Impact on Urban Sprawl and Sustainability

1. Reduces Dependency on Cars

Encourages public transit, biking, and walking, leading to lower emissions.

2. Efficient Land Use

Maximizes space by integrating multiple functions within the same development Prevents

3. Suburban Expansion

By accommodating population growth within the city, it reduces the need for outward development.

4. Enhances Economic Growth

Mixed-use zoning attracts businesses, increasing job opportunities and property values.

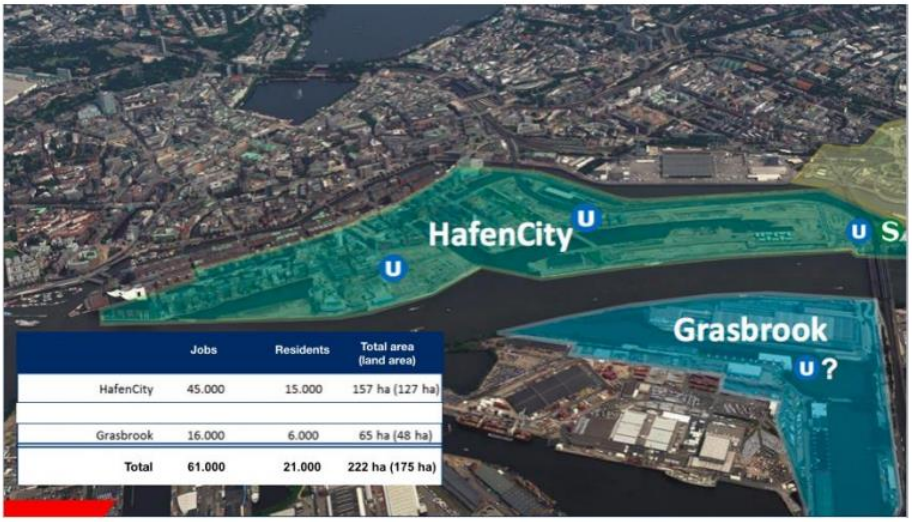
HAFEN CITY, HAMBURG , GERMANY

Introduction

Urban sprawl leads to congestion and green loss, while mixed-use development creates walkable, sustainable areas—evident in Portland's Pearl District transformation.

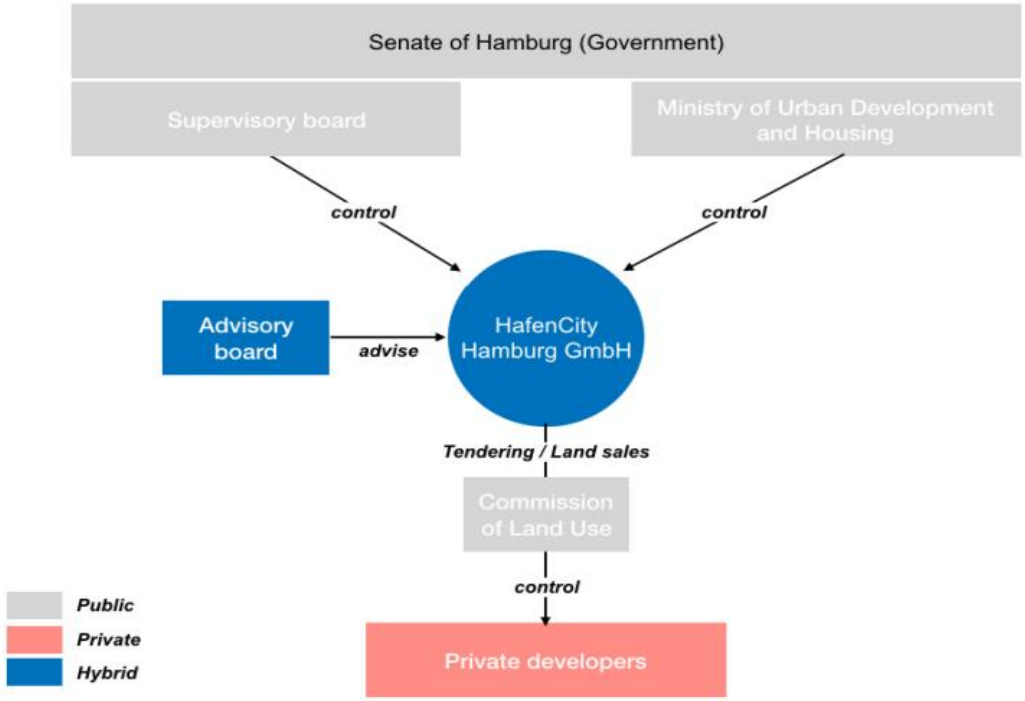
Adapted from HafenCity Hamburg GmbH (2019).

Areas under development: HafenCity and Grasbrook



Adapted from HafenCity Hamburg GmbH (2019).

Governance structures HafenCity Hamburg



Before Redevelopment

Adapted from HafenCity (2019)

Map 4.4 Thailand PASSANGE TRAFFIC

Challenges related to urban sprawl:

Affordability: Rising prices push out low-income residents.

Infrastructure: Congestion and poor public transport.

Environment: Flood and climate risks.

Disparities: Exclusive high-end development.

Economy: Reliance on tourism and investment.

After Redevelopment

Adapted from HafenCity (2019)

Diversified residential concepts and mixed uses

Urban Sprawl Solutions :

Mixed-Use: Vertical growth, space-efficient.

Smart Infra: Eco-friendly systems and transit.

Urban Living: Quality lifestyle, less sprawl.

Redevelopment: Saves greenfields, limits expansion.

High urban density : efficient land use

Adapted from HafenCity (2019)

1. Reduces Dependency on Cars

Encourages public transit, biking, and walking, leading to lower emissions.

2. Efficient Land Use

Maximizes space by integrating multiple functions within the same development **Prevents**

3. Suburban Expansion

By accommodating population growth within the city, it reduces the need for outward development.

4. Enhances Economic Growth

Mixed-use zoning attracts businesses, increasing job opportunities and property values.

Best Practices for Future Developments

City State of Hamburg	Private / Public Sector HafenCity Hamburg GmbH (Quango)	Private Sector
a) State Commission approvals: - development plans - land sales **b) Prepares and grants:** - development plans - urban design (guidelines) - building permits **c) Finances and builds,** partly as public-private joint venture: - schools - university - concert hall - science centre - subway	**a) - Acts as land owner** of special asset "city and port" - Finances its activities from land sales - Acts as master developer **b) Activities** - development planning - plans and builds infrastructure (streets, bridges, quay walls) - public spaces (promenades, parks) - acquires investors, property sales - organizes communication, marketing	**a) Private and institutional developers and investors** - development of individual sites (exception Überseequartier: central retail area, 16 buildings)

Comparative analysis of integrated tourism management plans of Jaipur, Ujjain, Thailand, and Sri Lanka:

Comparative Analysis

Parameter	GIFT City (India)	Magarpatta City (India)	Pearl District (USA)	HafenCity (Germany)	Key Takeaway / Recommendation
Urban Sprawl Context	Emerging core to prevent peripheral spread	Response to Pune's uncontrolled sprawl	Reclaimed inner-city vibrancy	Prevents suburban push through reuse of inner land	**Use inner-city revitalization or new compact urban cores to mitigate sprawl**
Land Use Strategy	Smart zoning with functional segregation	Integrated land use: work, live, learn	Infill with diverse uses	Mixed-use waterfront expansion	**Blend diverse functions in compact areas to optimize land and reduce sprawl**
Transit Integration	Metro, NMT networks (planned)	Walk-to-work model within township	Excellent pedestrian and streetcar network	Multi-modal public transit	**Prioritize TOD and walkability in all MXD to reduce car-dependency and encourage compactness**
Density Model	High-rise vertical core	Mid-rise cluster-based model	Mid-density adaptive reuse	Medium-high-rise with public zones	**Customize density to local context—vertical in dense metros, mid-rise in suburban zones**
Governance / Model	Centralized planning with PPP	Community-led cooperative model	Public-private revitalization model	City-led structured planning	**Choose context-appropriate governance: PPPs, co-ops, or city-led based on scale and legacy**
Impact on Urban Sprawl	Curbing greenfield sprawl	Contained urban expansion	Attracts back inner-city residents	Avoids peripheral expansion	**MXD is highly effective when tied to existing networks or planned compact urban centers**
Public Spaces / Placemaking	Parks, waterfront, civic zones	Green boulevards, community gathering places	Active streetscapes, cultural identity	Promenades, museums, open plazas	**Prioritize placemaking to build identity, social bonds, and urban livability**
Key Strength	Visionary smart city design	Self-sustained urban ecosystem	Vibrant, artsy, livable reuse of old areas	Urban regeneration through sustainability	**Combine vision, inclusion, and infrastructure for successful MXD that combats sprawl**

Source: Kritika shukla (2025), Primary Survey

Recommendations for Mixed-use development as a solution to urban sprawl:

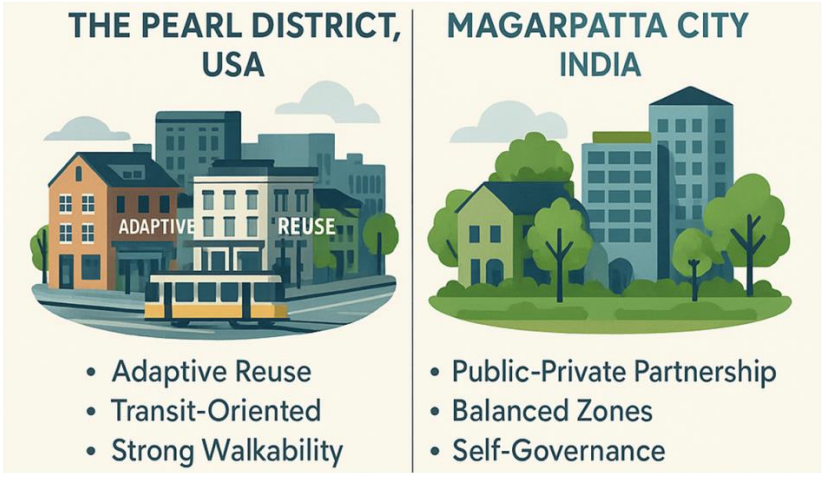
- **Update Zoning Laws –** Allow mixed-use zoning in master plans to integrate housing, commerce, and services.
- **Compact Development –** Promote higher density along transport corridors and within city limits to curb sprawl.
- **Transit-Oriented Design –** Align mixed-use projects with public transport and support walkability and cycling.
- **Public Spaces & Amenities –** Include parks, schools, healthcare, and recreation within mixed-use zones.
- **Community Participation –** Involve locals in planning and monitor outcomes through clear urban indicators.

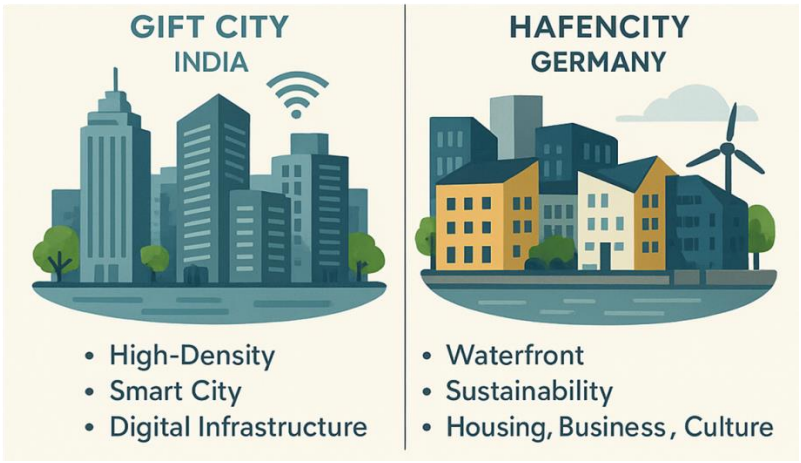
Govt policy support to tourism

- **NUPF 2018** – Promotes compact, mixed-use cities to reduce sprawl.
- **Smart Cities Mission** – Encourages mixed-use zoning and walkable areas.

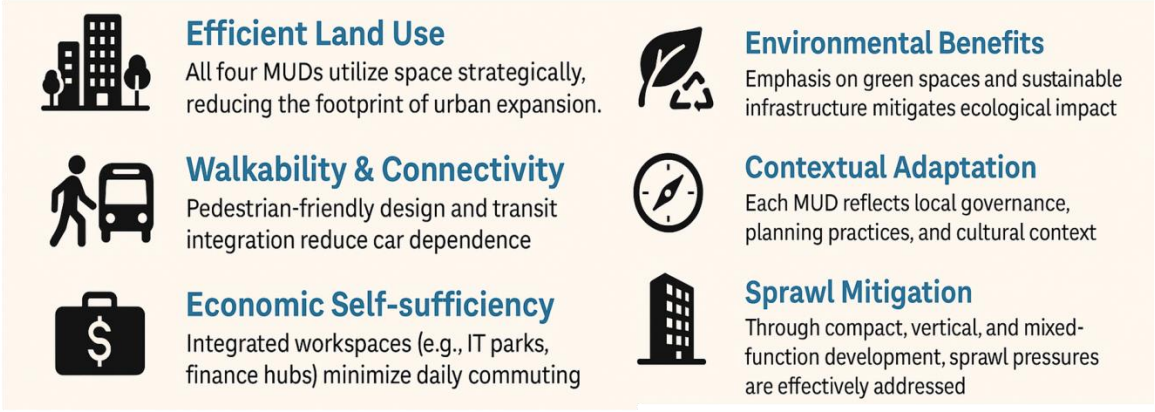
- **AMRUT** – Supports integrated land use & infrastructure for compact growth.
- **Model Building Bye-Laws 2016** – Allows flexible land use and FAR incentives.
- **TOD Policy** – Promotes high-density, mixed-use near mass transit hubs.

Summary of findings:





Key Takeaways from Comparative Analysis



Source: Kritika Shukla (2025), Primary Survey

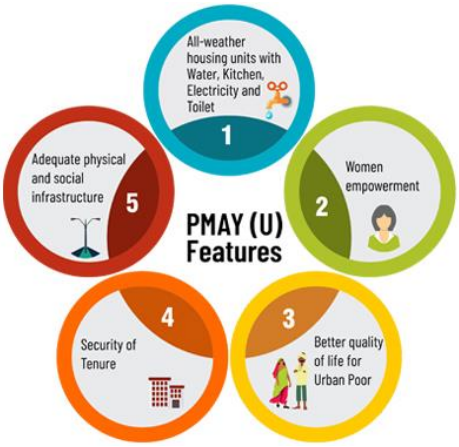
Key Government schemes

Smart Cities Mission

Promotes mixed-use, walkable neighborhoods through Area-Based Development.

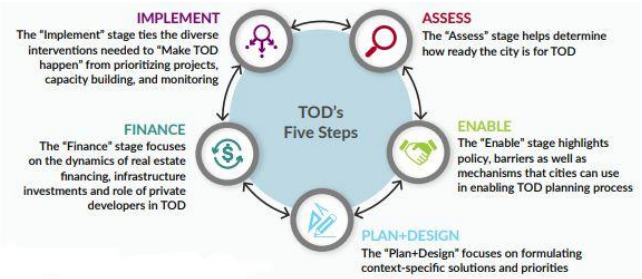
PMAY–U (Pradhan Mantri Awas Yojana – Urban)

Encourages inclusive housing within mixed-use areas.



Transit-Oriented Development (TOD) Policy

Supports high-density, mixed-use zones near public transport corridors.



Source: www.digitalindia.gov.in

Conclusion:

The case study of the Kalyanpur–Mandhana corridor in Kanpur reveals a critical need for sustainable urban development to counter the rapid, unplanned peripheral growth driven by population pressure, institutional expansion, and increased real estate demand. The current urban form in this corridor shows clear signs of **urban sprawl**—low-density development, fragmented land use, increasing reliance on private vehicles, and strain on infrastructure.

Through detailed spatial analysis, stakeholder consultation, and planning review, this study establishes that **Mixed-use Development (MXD)** is not only viable but essential for reversing these unsustainable trends. Mixed-use development fosters **compact urban form**, encourages **land-use integration**, promotes **walkability**, and enhances the **live-work-play environment** within a neighborhood.

Key Findings from the Case Study:

1. **Strategic Location Advantage**
   The corridor benefits from its proximity to IIT-Kanpur, other educational hubs, and its location along NH-91, making it a suitable candidate for high-density, transit-supported MXD zones.
2. **Urban Sprawl Patterns**
   The analysis shows dispersed settlements, low Floor Area Ratios (FAR), and single-use zoning, resulting in high commuting times, increased vehicle ownership, and ecological pressure.
3. **Opportunity for Urban Consolidation**
   By promoting vertical and horizontal mixed-use development, vacant and underutilized lands along the corridor can be transformed into vibrant urban centers with access to essential services within 15–20 minutes of walking.
4. **Policy and Governance Support**
   Existing schemes like the **Smart Cities Mission, AMRUT, RERA, and PMAY-Urban** provide a supportive policy landscape. However, their alignment with local

Development Plans, zoning by-laws, and land pooling mechanisms needs improvement for practical implementation.

5. **Community Livability and Sustainability**
   MXD supports **affordable housing**, **local employment generation**, **social inclusivity**, and **environmental sustainability** through reduced emissions, green building norms, and better urban design.

Overall Conclusion:

The study concludes that **Mixed-use Development is a strategic planning tool** to restructure and revitalize the Kalyanpur–Mandhana urban corridor. It directly addresses the negative impacts of urban sprawl by enabling:

- **Efficient land utilization**,
- **Reduced dependency on private transport**,
- **Better integration of infrastructure and land use**, and
- **Improved socio-economic outcomes** for local communities.

However, for its success, the following are crucial:

- Institutional coordination between KDA, Kanpur Municipal Corporation, and development agencies,
- Flexible zoning regulations that encourage vertical mixing of uses,
- Financial models for landowners and developers under PPP frameworks,
- Community engagement and awareness.

This case study not only proposes a localized solution for Kanpur's urban edge but also provides a **replicable model** for Indian cities facing similar growth challenges. It emphasizes the importance of **planning-led urban transformation**, aligned with **sustainability, inclusivity, and resilience goals** for future urban India.

Chapter- 05
ISSUES & POTENTIALS

GIFT City (Gujarat International Finance Tec-City), India

Key Issues:

1. **Slow occupancy and demand** uptake due to niche financial focus.
2. **Limited housing diversity**—focus on high-end users.
3. **Lack of organic urban fabric**, being a Greenfield project.
4. Regulatory and taxation hurdles delayed early growth.

Potential Opportunities:

1. India's first operational **Smart City and IFSC** (International Financial Services Centre).
2. Planned integration of **high-density, mixed-use zones**.
3. **Greenfield development** with world-class infrastructure (district cooling, underground utility tunnel).
4. Attracts **global financial institutions**, boosts employment and investment.
5. **Transit-oriented** development with metro and BRT connectivity.

Magarpatta City (Pune, India)

Key Issues:

1. **Homogeneous demographic**, limited affordable housing.
2. **Private ownership model**—replication limited by governance.
3. Infrastructure stress due to **rising population**.
4. Dependency on **private governance** reduces democratic accountability.

Potential Opportunities:

1. **Farmer-led development**; successful example of land pooling.

2. Integrated township with **residential, commercial, institutional, and recreational** spaces.
3. **Sustainable planning**: solar panels, green cover, walkability.
4. **Live-work-play** model reduces commute times and traffic congestion.

Pearl District (Portland, USA)

Key Issues:

1. **Gentrification** pushed out lower-income residents.
2. High cost of living and rising real estate prices.
3. Traffic congestion at peak hours due to **density**.
4. Limited scalability in Indian contexts due to socio-economic differences.

Potential Opportunities:

1. uccessful **brownfield redevelopment** (former rail yards).
2. Strong focus on **public transport (streetcar)** and **walkability**.
3. Blend of **affordable and high-end housing**.
4. **Art and culture-driven** urban regeneration (galleries, events).

HafenCity (Hamburg, Germany)

Key Issues:

1. **High project costs** and long implementation timelines.
2. Risk of **elitist development**—affordability concerns remain.

3. **Flood management and climate adaptation** require high investment.

4. Mixed success in achieving social diversity.

Potential Opportunities:

- Europe's largest **inner-city urban redevelopment** project.
- Smart integration of **waterfront, commercial, residential, and cultural uses**.
- Focus on **climate resilience** and **sustainability**.
- Emphasis on **public spaces**, waterfront access, and **inclusionary housing**.

3. Integrated Tourism Model: Coordination between government, private sector, and NGOs is a working success.

4. Cultural Depth: Heritage tourism combined with local experiences offers authentic travel.

5. Digital and Green Tourism: Big data, AI, and eco-certifications are

increasingly being adopted.

Chapter- 06
RECOMENDATIONS

Vision & Mission to Promote Mixed-use Urban Growth and Curb Sprawl

VISION

Vision

A vibrant, inclusive, and sustainable urban corridor that thrives on smart growth and integrated living.

MISSION

Mission

To transform Kalyanpur–Mandhana into a dynamic mixed-use zone by blending residential, commercial, and institutional spaces with efficient infrastructure and smart urban planning.

Integrated Policy Framework to Promote Mixed-use Urban Growth and Curb Sprawl

Integrate Mixed-Use in Master Planning Framework

Goal

- Institutionalize MXD at the planning stage to guide urban growth

Policy Action

- Amend master plans to mandate MXD along growth axes and transport routes- Introduce MXD overlays/zones in peri-urban areas

Transit-Oriented Mixed-Use Zoning (TOD-MXD)

Goal

- Create walkable, high-density zones around public transit

Policy Action

- Designate TOD zones within 500–800m of metro/BRT- Promote vertical development with mixed-use functions- Ensure 50% land use mix in TOD zones

Affordable & Inclusive Housing Mandate

Goal

- Prevent gentrification and promote social equity

Policy Action

- Reserve 15–20% units in MXD for affordable/student housing- Offer FAR bonuses, tax rebates, fast-track approvals

Land Readjustment & PPP

Goal

- Mobilize land and private capital efficiently

Policy Action

- Implement land pooling/readjustment schemes- Promote PPP models with risk-sharing for MXD

Affordable & Inclusive Housing Mandate

Goal

- Prevent gentrification and promote social equity

Policy Action

- Reserve 15–20% units in MXD for affordable/student housing- Offer FAR bonuses, tax rebates, fast-track approvals

Land Readjustment & PPP

Goal

- Mobilize land and private capital efficiently

Policy Action

- Implement land pooling/readjustment schemes- Promote PPP models with risk-sharing for MXD

Source: Kritika Shukla (2025), Primary Survey

Institution Framework Role & Responsibility

Institution	Role	Responsibility
Kanpur Development Authority (KDA)	Planning Lead	Define MXD zones, approve plans
Kanpur Municipal Corporation (KMC)	Local Governance	Provide services, enforce bylaws
UP Housing & Development Board	Housing Provision	Deliver affordable housing
Metro/BRT Authority	Transit Integration	Create TOD zones, link with MXD
Town & Country Planning Dept (TCPD)	Policy & Zoning Reform	Approve plans, reform zoning
Private Developers / PPP Cells	Development Partner	Invest, build, follow norms
Academic Institutions (e.g., IITK)	Technical Support	Research, innovate, evaluate pilots

Implementation Proposals

Expected Outcomes

Policy Component	Expected Outcomes
Integrate Mixed-Use in Master Planning	Planned urban growth, Reduced sprawl, Efficient land-use & transport integration
Transit-Oriented Mixed-Use Zoning (TOD-MXD)	Higher public transport use, Walkable dense neighborhoods, Reduced traffic & emissions
Affordable & Inclusive Housing Mandate	Inclusive communities, Affordable housing, Reduced gentrification
Mixed-Use Demonstration Zones	Proof-of-concept projects, Replicable models, Smart green infrastructure

Source: Kritika Shukla (2025), Primary Survey

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Chapter- 07
ANNEXURE

Questionnaire: Mixed-Use Development as a Solution to Urban Sprawl

Section A: Respondent Information

1. **Name (Optional): _____**

2. **Age Group:**

☐ <18 ☐ 18–30 ☐ 31–45 ☐ 46–60 ☐ 60+

3. **Occupation: _____**

4. **Location/City: _____**

Section B: Awareness and Perception of Urban Sprawl

1. **Are you aware of the concept of urban sprawl?**

☐ Yes ☐ No

2. **Which of the following do you think are impacts of urban sprawl? (Select all that apply)**

☐ Traffic congestion

☐ Increased travel time

☐ Environmental degradation

☐ Lack of green/open spaces

☐ Unplanned real estate growth

☐ Loss of farmland and forests

3. **Have you observed urban sprawl in your area or city?**

☐ Yes ☐ No ☐ Not Sure

Section C: Knowledge of Mixed-Use Development (MXD)

1. **Are you familiar with the concept of Mixed-Use Development?**

☐ Yes ☐ No

2. **How would you define a Mixed-Use Development?**

What do you think MXD projects should ideally include? (Select all that apply)

☐ Residential spaces

☐ Commercial areas (shops/offices)

☐ Public transit access

☐ Recreational spaces (parks/theatres)

☐ Health & education facilities

☐ Affordable housing

Section D: MXD as a Solution to Urban Sprawl

1. **Do you believe Mixed-Use Development can help reduce urban sprawl?**

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

2. **In your opinion, what are the main benefits of MXD in controlling sprawl? (Select up to 3)**

☐ Reduced traffic/travel distance

☐ Compact, walkable neighborhoods

☐ Better land use efficiency

☐ Promotes community interaction

☐ Lower environmental impact

☐ Increased job opportunities

3. What could be challenges in implementing MXD? (Select all that apply)

☐ **High initial investment**

☐ **Land acquisition issues**

☐ **Government policy limitations**

☐ **Public resistance**

☐ **Maintenance/management issues**

4. Do you think government should promote MXD through policies and incentives?

☐ **Yes** ☐ **No** ☐ **Not Sure**

5. What kind of areas in your city would be best suited for Mixed-Use Development?

☐ **City outskirts**

☐ **Old city/core areas**

☐ **Industrial zones**

☐ **Transit corridors**

☐ **New townships**

Section E: Final Comments

Any suggestions for better planning to tackle urban sprawl through MXD?

Thesis Sheets