भूमि संसाधन विभाग
DEPARTMENT OF LAND RESOURCES
MINISTRY OF **RURAL DEVELOPMENT**
GOVERNMENT OF INDIA

NAKSHA

NAtional geospatial Knowledge-based land Survey of urban HAbitations
· · · · · · · · शहरी भूमि की सही पहचान · · · · · · · ·

A City Survey Program

INTRODUCTION

The Department of Land Resources (DoLR) has initiated the NAKSHA (NAtional geospatial Knowledge-based land Survey of urban HAbitations) program under the Digital India Land Records Modernization Programme (DILRMP) to revolutionize urban land records creation and management.

The NAKSHA program aims to create a comprehensive and accurate geospatial database for urban land records. By integrating aerial and field surveys with advanced GIS technology, the program enhances effieciency in land governance, streamlines property ownership records, and facilitates urban planning. Accurate geospatial data ensures improved decision-making, efficient land use planning and smoothen and certain property transactions.

HON'BLE FINANCE MINISTER SMT. NIRMALA SITHARAMAN, IN THE UNION BUDGET

In 2024-2025 on July 23, 2024, announced "Urban Land related actions – Land records in urban areas will be digitized with GIS mapping. An IT based system for property record administration, updating, and tax administration will be established. These will also facilitate improving the financial position of urban local bodies."

In 2025-26 on February 1, 2025, announced the "launch of the National Geospatial Mission. This initiative aims to develop foundational geospatial infrastructure and data, leveraging the PM Gati Shakti framework to Modernize Land Records, enhance urban planning, and improve the design of infrastructure projects."

(Source: www.indiabudget.gov.in – budget speech 2024-2025 - page no. 18, para 100; budget speech 2025-2026 - page 14, point 83)

NAKSHA – A City Survey Program

One Year

PILOT PROGRAMME

26 States and 3 UTs

152 Cities

4142.63 SQ. KM

Area less than 35 sq. km. and population less than 2 lakhs

Pilot Cost

Rs. 194 CRORES

Scaling Up

PHASE 1 – 1000 ULBS

Based on the outcomes and learnings, followed up in all the 4912 ULBs in the country

Rationale for NAKSHA

- **LACK OF PROPER URBAN LAND RECORD MAINTENANCE**

  Most urban areas, except in a few states like Tamil Nadu, Maharashtra, Gujarat and Goa, have outdated or unstructured land records, causing inefficiencies in governance and taxation

- **RAPID URBANIZATION & EXPANSION**

  Both horizontal and vertical growth in urban and peri-urban areas demand a robust and updated land record system.

- **HIGH LAND VALUE & KEY ASSET FOR CITIZENS**

  With land being the most valuable asset for many, precise and transparent records are crucial for security and financial stability.

- **OWNERSHIP DISPUTES AND LENGTHY LEGAL BATTLES**

  Missing or unclear urban land records cause disputes, prolonged court cases, and ownership uncertainties.

- **OBSTACLE TO PLANNED INFRASTRUCTURE DEVELOPMENT**

  Unclear land titles hinder urban planning, delaying key infrastructure projects, increasing costs.

- **DIFFICULTIES IN PROPERTY TRANSACTIONS & CREDIT ACCESS**

  Poor land documentation complicates property deals and limits citizens' ability to secure loans.

- **LACK OF TRANSPARENCY, ACCESSIBILITY, AND ACCURACY**

  Weak urban land record systems enable fraud, corruption and tax evasion, reducing public trust.

NAKSHA aims to create and modernize urban land records, ensuring transparency, efficiency, effectiveness and economic growth.

Key Players of NAKSHA
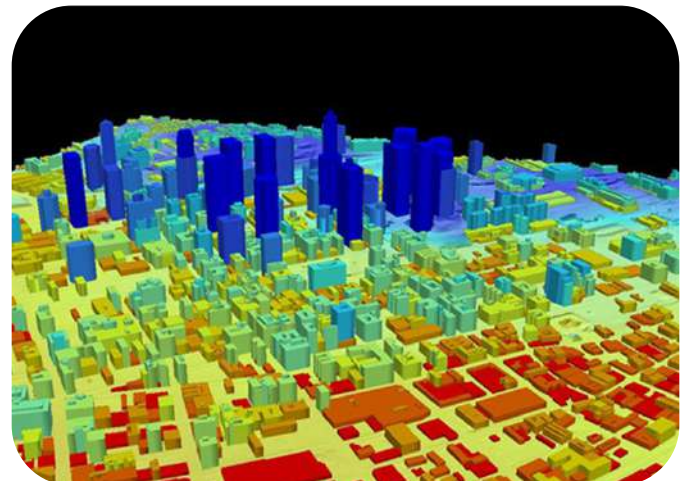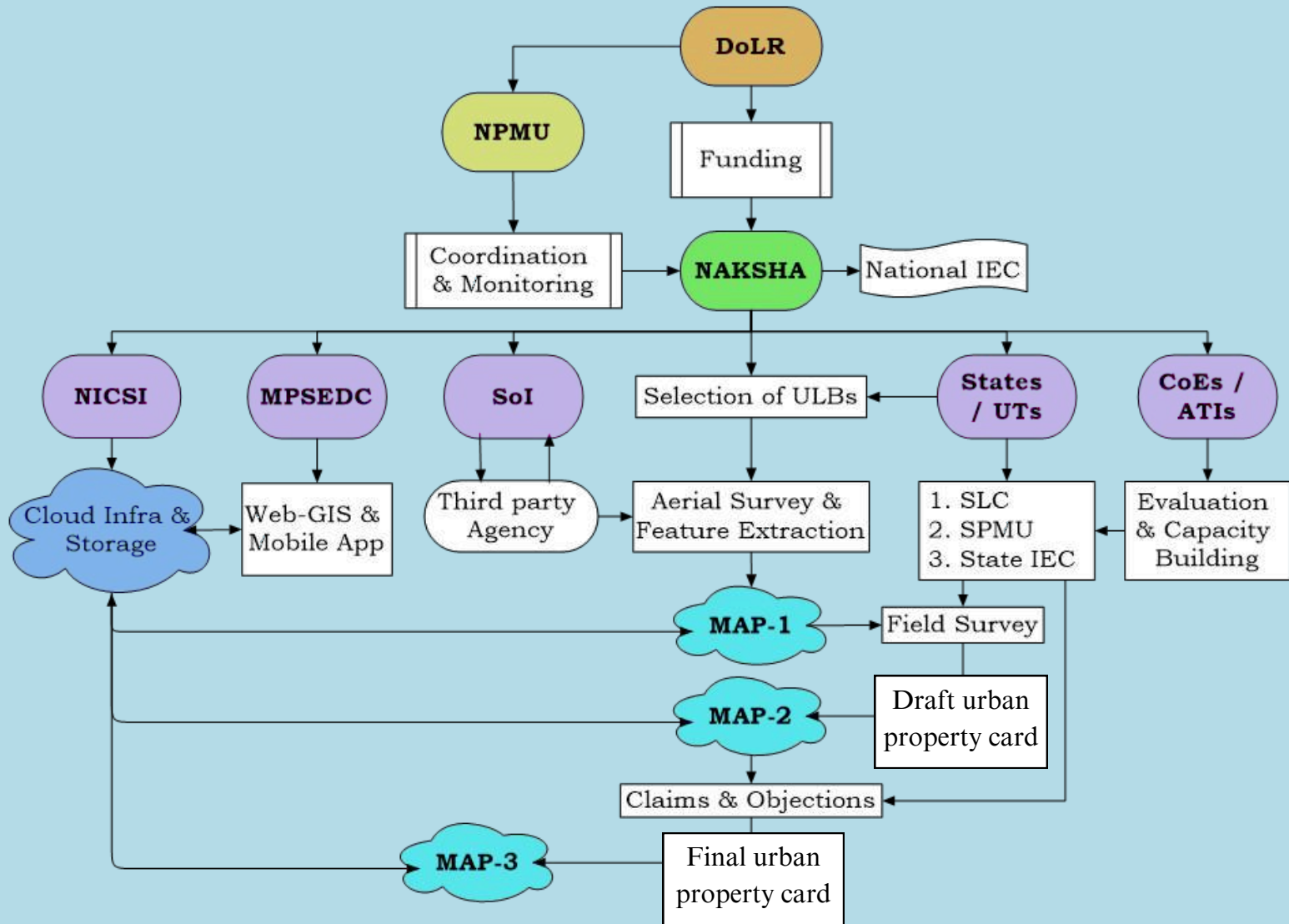
Key Players of NAKSHA

DEPARTMENT OF LAND RESOURCES (DOLR)

- Setting up NPMU (National Project Management Units)
- Selection of cities
- Standard Operating Procedures (SOP) and guidance
- GIS Platforms and storage
- National level IEC capacity building and its monitoring & documentation

STATES AND UNION TERRITORIES

- Supporting SOI in getting clearance for Aerial survey
- Setting up SPMU (State Project Management Units)
- State level IEC and capacity building & documentation
- Procurement of Survey Equipment (e.g. GNSS Rover)
- Field survey and ground truthing
- Integration of Land Records and other details

SURVEY OF INDIA (SOI)

- Technology Partner
- Aerial Survey
- Geospatial Services
- Fixing boundaries of AOI
- Collecting GCPs and Fixing flight plans
- Feature Extraction
- Quality Assurance & Quality Check

M.P. STATE ELECTRONICS DEVELOPMENT CORPORATION LTD. (MPSEDC)

- Enterprise Software Development
- Dovetailing as per State requirement
- Training and support on WebGIS

NATIONAL INFORMATICS CENTRE (NIC/ NICSI)

- Cloud Space and Storage
- Database Management
- Data Security Audit
- Data Recovery.

CENTRE OF EXCELLENCE (COES)/ ADIMINISTRATIVE TRAINING INSTITUTE (ATI)

- Evaluation Study on land governance
- Documentation of Best Practices
- Technical Assistance in survey/re-survey
- Hands-on training to States /UTs
- Review acts related to urban and rural land records and titling etc.

Aerial Survey Methodologies Under NAKSHA

2D NADIR CAMERA

- Captures vertical images with high resolution, ensuring precise topographic data and detailed mapping of the terrain.
- Uses image overlap between consecutive shots to ensure seamless stitching and consistent coverage of varying urban landscapes.
- Optimized for variable camera height and focal length, providing flexibility to capture clear, detailed images across different urban settings, supporting both large-scale and finer-level mapping.

2D Nadir

OBLIQUE ANGLE CAMERA (5 CAMERAS)

- Uses five cameras arranged in a multi-angle configuration (typically 45° to 60°) to capture images from four oblique angles (front-left, front-right, back-left, and back-right) and a vertical angle for comprehensive views of urban structures.
- Captures detailed 3D models of buildings, urban features, and complex infrastructures with high precision, ideal for high-density cities with vertical growth, such as apartment complexes.
- Provides a comprehensive view from multiple perspectives, enabling accurate modeling of urban landscapes and complex structures.

Oblique

Aerial Survey Methodologies Under NAKSHA

OBLIQUE ANGLE CAMERA & LIDAR SENSOR

- Combines LiDAR technology with oblique imaging to provide enhanced 3D mapping capabilities, capturing both the surface and elevated features of the terrain and structures.
- The LiDAR sensor emits laser pulses to measure distances, creating a detailed point cloud that generates bare-earth models and accurately captures both visible and non-visible features, such as underground structures or dense vegetation.
- Ideal for mountainous regions, dense urban areas, and environments with thick vegetation where traditional imagery may not provide clear details, offering high accuracy and improved planning capabilities.

LiDAR Sensor   Combined Camera and Sensor System

MAP – 1 Process

1. Area of interest
2. Flight Plan
3. Fly and capture
4. Process data
5. True Ortho-Rectified Image (ORI) and feature extracted data

MAP – 2 Process

1. Field Survey
2. Integration of ROR/ Property Tax, Registration Deeds, etc
3. 2D/ 3D Model
4. Publish land ownership details

MAP – 3 Process

1. Claims and Objectives
2. Grievance redressal
3. Final Land Ownership
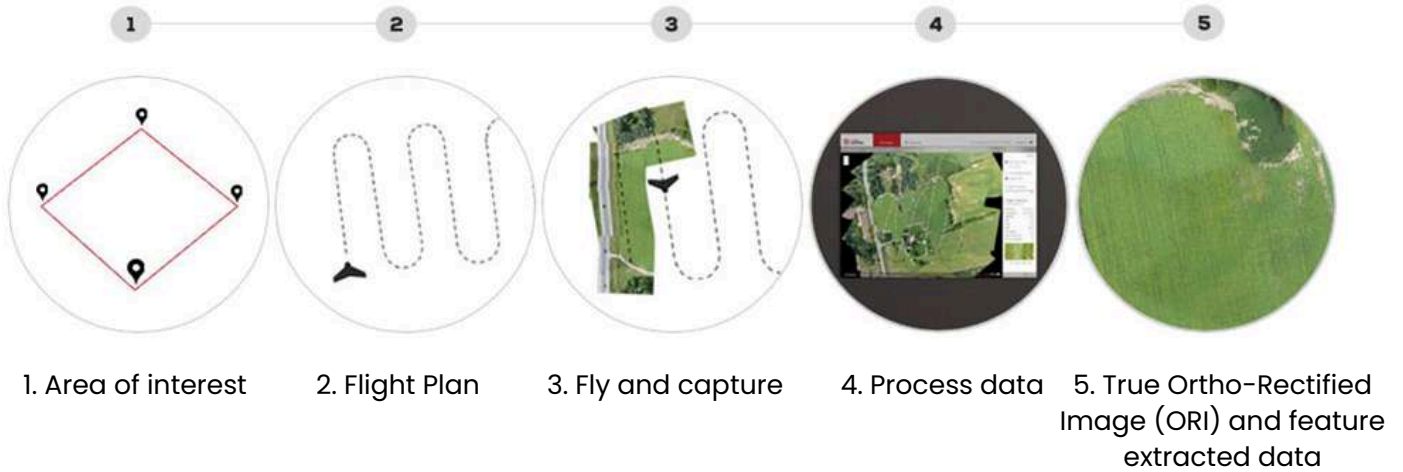
End-to-End Integration of Aerial Survey + Field Survey

Infrastructure

Modern Survey Technology

RTK Rover

R-ETS

Drone/ Airborne Sensor

IT Solution for Surveyor

Field Mapping Software

GIS Server

QA/QC Software

Map Server

IT Solution For Department

THE INTEGRATED SURVEY SOLUTION

A SINGLE WINDOW FOR AUTHORITY AND CITIZEN

NAKSHA – Pilot Locations

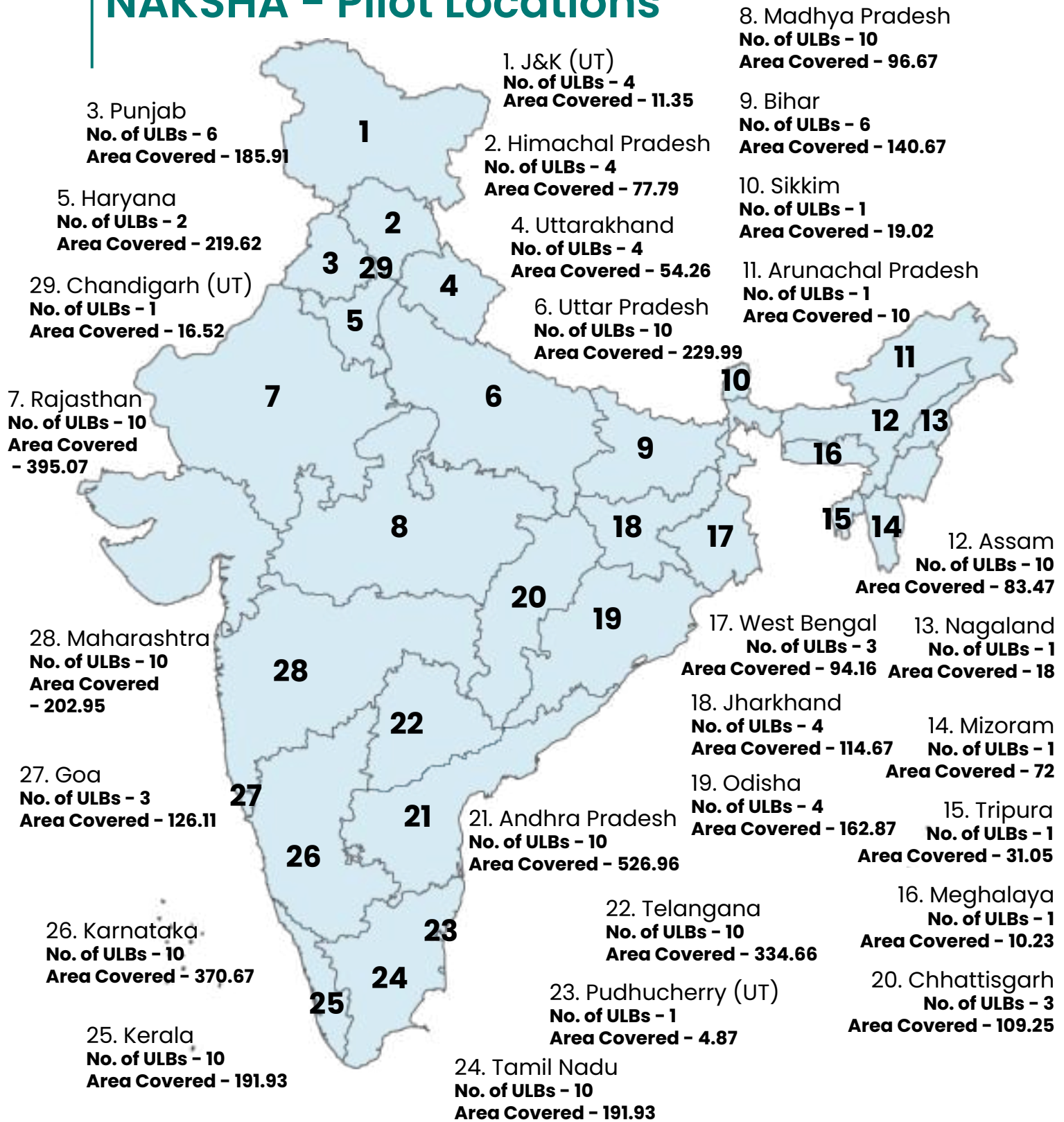
1. J&K (UT)
No. of ULBs – 4
Area Covered – 11.35

2. Himachal Pradesh
No. of ULBs – 4
Area Covered – 77.79

3. Punjab
No. of ULBs – 6
Area Covered – 185.91

4. Uttarakhand
No. of ULBs – 4
Area Covered – 54.26

5. Haryana
No. of ULBs – 2
Area Covered – 219.62

6. Uttar Pradesh
No. of ULBs – 10
Area Covered – 229.99

7. Rajasthan
No. of ULBs – 10
Area Covered – 395.07

8. Madhya Pradesh
No. of ULBs – 10
Area Covered – 96.67

9. Bihar
No. of ULBs – 6
Area Covered – 140.67

10. Sikkim
No. of ULBs – 1
Area Covered – 19.02

11. Arunachal Pradesh
No. of ULBs – 1
Area Covered – 10

12. Assam
No. of ULBs – 10
Area Covered – 83.47

13. Nagaland
No. of ULBs – 1
Area Covered – 18

14. Mizoram
No. of ULBs – 1
Area Covered – 72

15. Tripura
No. of ULBs – 1
Area Covered – 31.05

16. Meghalaya
No. of ULBs – 1
Area Covered – 10.23

17. West Bengal
No. of ULBs – 3
Area Covered – 94.16

18. Jharkhand
No. of ULBs – 4
Area Covered – 114.67

19. Odisha
No. of ULBs – 4
Area Covered – 162.87

20. Chhattisgarh
No. of ULBs – 3
Area Covered – 109.25

21. Andhra Pradesh
No. of ULBs – 10
Area Covered – 526.96

22. Telangana
No. of ULBs – 10
Area Covered – 334.66

23. Pudhucherry (UT)
No. of ULBs – 1
Area Covered – 4.87

24. Tamil Nadu
No. of ULBs – 10
Area Covered – 191.93

25. Kerala
No. of ULBs – 10
Area Covered – 191.93

26. Karnataka
No. of ULBs – 10
Area Covered – 370.67

27. Goa
No. of ULBs – 3
Area Covered – 126.11

28. Maharashtra
No. of ULBs – 10
Area Covered – 202.95

29. Chandigarh (UT)
No. of ULBs – 1
Area Covered – 16.52

152 Urban Local Bodies (ULBs)	4142.63 sq. km. being covered	Note: Area Covered is mentioned in Square Kilometers (sq.km.)

Source: https://mapservice.gov.in

Outcomes of NAKSHA

Comprehensive Digital Urban Land Records

- Urban land records will be fully digitized and GIS-mapped, ensuring structured, accessible, and transparent data.
- Can be used for disaster management, environmental planning, and smart city development.

Reduction in Land Disputes & Legal Clarity: Ease of Living

- Clear and updated ownership records will minimize disputes, speed up legal processes, and enhance property rights.
- Can assist in court cases, legal documentation, and historical land data analysis.

Faster & More Efficient Urban Planning

- Accurate land data will enable better zoning, infrastructure development, and city expansion with minimal delays.
- Assist in transport planning, housing projects, and sustainable urban growth.
- Helps in efficient disaster management planning.

Improved Property Tax Collection & Financial Strength of ULBs

- A centralized, digital tax administration system will enhance urban local bodies' (ULBs) revenue collection, reducing tax evasion.
- Can support real estate valuation, municipal finance planning, and public service enhancements.

Simplified Property Transactions & Credit Access

- Verified land records will make buying, selling, and leasing faster, secure, and fraud-free, while enabling easier loan approvals.
- Useful for banking, mortgage approvals, and land-based investments.

More Outcomes of NAKSHA

Enhanced Transparency & Governance

- A real-time, accessible digital system will curb corruption, prevent fraud, and improve public trust in urban land management.
- Can support e-Governance initiatives, digital service delivery, and policy-making.

Boost to Real Estate & Infrastructure Investments: Ease of business

- Investors and developers will have clear legal frameworks, reducing risks and accelerating urban growth and economic development.
- Helps in foreign investments, private sector participation, and smart city projects.

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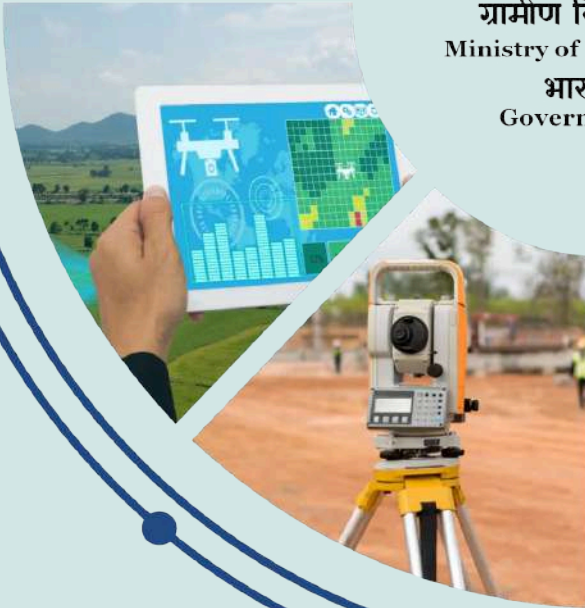
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