



भूमि संसाधन विभाग
DEPARTMENT OF
LAND RESOURCES

National Workshop on Survey/Re-Survey under Digital India Land Records Modernization Programme (DILRMP)

Organised by DoLR, MoRD, GoI.

Place: Guntur, Andra Pradesh.

15th – 16th May, 2025

Rajender Kumar Kataria I.A.S
Principal Secretary
Revenue Department
Government of Karnataka.

Agenda

1. Progress of Survey/Re-Survey in Karnataka.
2. Modern Survey technologies.
3. Field level Challenges.
4. Best practices.
5. Survey/Re-Survey experience by Karnataka.

Note of Gratitude for all support

GoK submits its **Gratitude to the DoLR, GoI**, for their support by empowering the State to get access to the Advance Technologies by establishing CORS Network & making available Drone & Aerial methodologies and also to procure Rovers to carry out Survey / Resurvey.

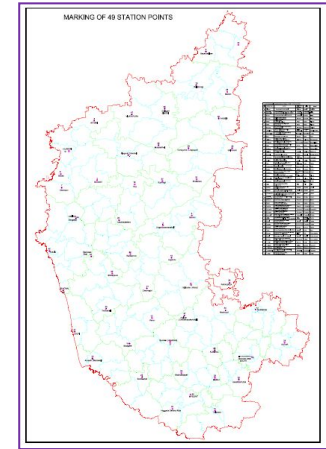
- GoI has approved **5 Districts** Survey/Resurvey in 2012-13.
- GoI has approved **11 Districts on 22-12-2023**.
- Totally **16 Districts has been** Approved.
- Rs 19539.45 Lakhs has been sanctioned.
- **Rs 4,178.00 Lakhs** amount released.

DILRMP (Survey/Resurvey) Sanctioned and released amount- (Rs in Lakhs)

Component	Proposal sent on 26-10-2023 for all 31 Districts in Lakhs	Total Amount Sanctioned till 2023 in Lakhs	Total Funds Released in Lakhs	Total Expenditure made in Lakhs
Survey / Resurvey	51,623.31	19,539.45	4,178.00	2,840.02

Use of Technology in Karnataka

1. Establishment of 49 CORs across the state
2. Use of Drone Technology
3. Use of Rovers for ground truthing and other survey works.
4. Use of QGIS for Digitization work
5. Inhouse Software developed by BMC for generation of RTC
6. GIS integration – Transforming Geo-spatial data to digital platform



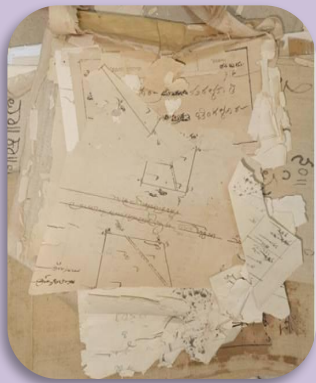
ವಿವರಣೆ: ಭೂಮಿ, ಸ್ಥಳೀಯ, ಸರ್ಕಾರಿ ಮತ್ತು ಸಾರ್ವಜನಿಕ ಸ್ಥಳಗಳಲ್ಲಿ					
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“Transforming Land Governance”

- Resurvey in Karnataka Under DILRMP

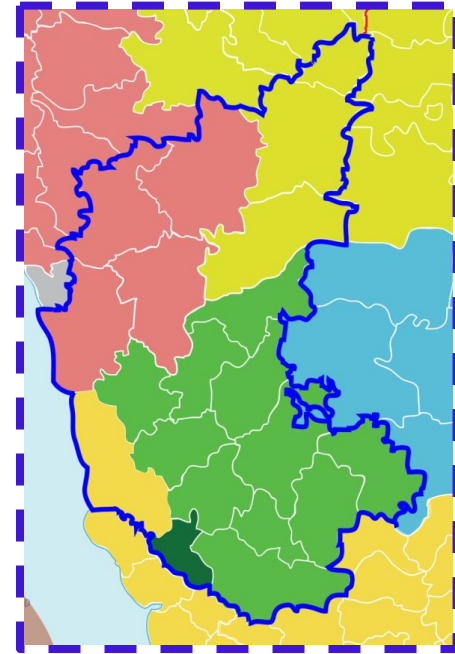
Using Modern Technology



Transformation from Manual to Digital Mode in all aspects from field work to preparation of records.

Historic context- Initial Surveys in State

The present geographical area of Karnataka is a unified form of different provinces, which took place in 1956. Different provinces are mentioned below and Survey methodology adopted is different in each province.



- ✓ **Mysore**
- ✓ **Madras presidency**
- ✓ **Coorg**
- ✓ **Bombay Presidency**
- ✓ **Nizam area**

Region	Original survey	Revision survey
OLD MYSORE AREA	1863-1899	1900-1917
BOMBAY KARNATAKA	1840-1863	1906-1921
MADRAS AREA	1863-1904	1923-1935
HYDERABAD KARNATAKA	1875-1888	1906-1916
COORG	1806-1816	--

Survey/Resurvey -Introduction- Legal provisions

Legal Provisions – Karnataka Land Revenue Act, 1964

- **Section 106** empowers the State to introduce Revenue Survey : “ The State Government may direct the survey of any land in any part of the State for settlement of land revenue and preservation of land rights. Such a survey shall be called a Revenue Survey.”
- **Section 115 of KLR Act 1964 says** ; a settlement shall remain in force for a period of 30 years.....
- Special amendment made to **enable Drone-based Resurvey**. Notified on RD 106 SSC 2020 Dated: 21-04-2022.

Requirement of Survey & Re-Survey

Survey is required because :

1. To maintain the existing Survey records in the event of transactions, bifurcation of land parcels, acquisition, conversions, court orders etc.,
2. Survey is required to measure the areas which were un-surveyed during the time of previous survey.

Re-Survey is required because :

Re-Survey is necessary to measure large areas boundaries of which are disturbed over a period of time (Ex : Rivers, Forest areas, urbanized areas) and particularly where settlement requires modification (Section 114 A of KLR Act 1964) .

Results of early Resurvey efforts in State

i) Initial Resurvey Attempts (Conventional Method)

- In 2003: Resurvey started in Mandya District 35 villages completed
- In 2008–09: Resurvey initiated in Belgaum District 30 villages completed

Challenges Faced :

- Limited Human Resource, Time-consuming, manual process.

ii) Shift to Outsourcing Model - engaging Private vendors

Pilot taken up in 2 villages of 14 districts- 25 villages completed (2012-13).

iii) Outcome : Pilot did not meet expectations. Slow implementation → Method was discontinued. With all these only 90 villages completed in decade together period.

iv) Need for Change : Modern technology is the only viable solution for fast, reliable, large-scale resurvey.

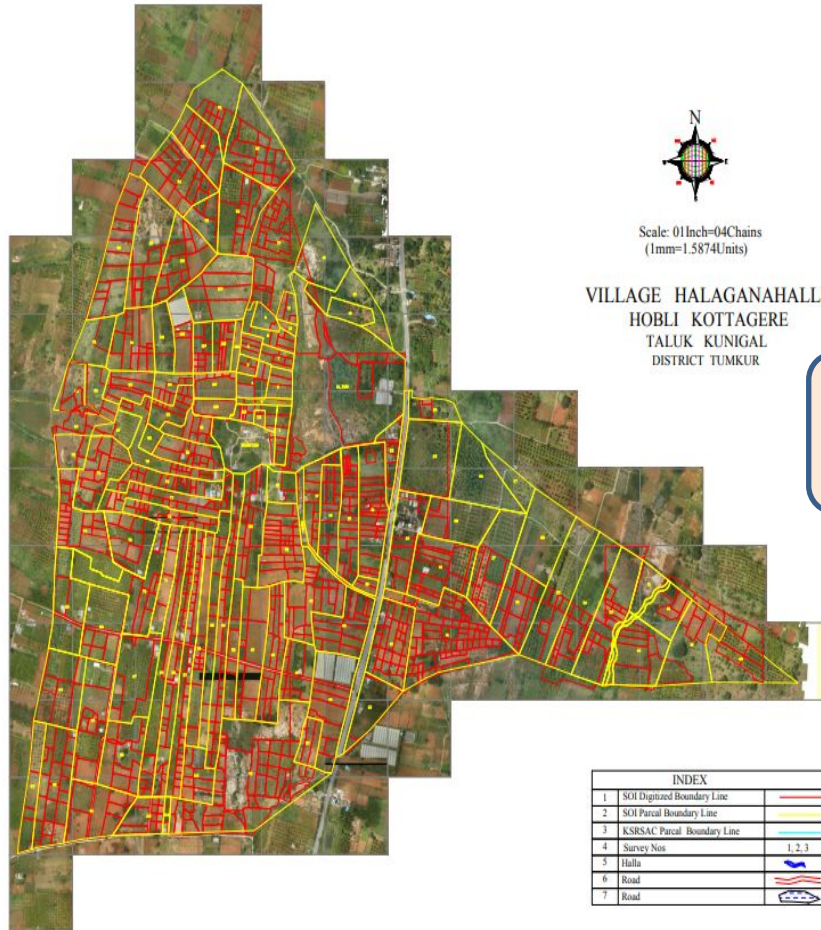
Introduction of Drone/UAV Based Survey

Phase 1 - MoU with Survey of India on 28-02-2019 (05 Districts)

Phase 2 - Drone-As-A-Service (DAAS) Model (26 Dists. - apprx 1.4 Lakh Sq.Kms.)
16 districts awarded on 04-02-2022 , to 04 pvt. agencies. Drone flying currently in progress.

- Under the LSMK initiative, the high-accuracy spatial data generated through drone flying is not just an end in itself. This data is used for implementation of 03 major projects.
- These are done separately for :
 - For Rural-Aabadhi Areas – SVAMITVA Scheme.
 - For Rural-Agricultural Areas – Re-Survey.
 - For Urban Areas –UPOR (Now NAKSHA).

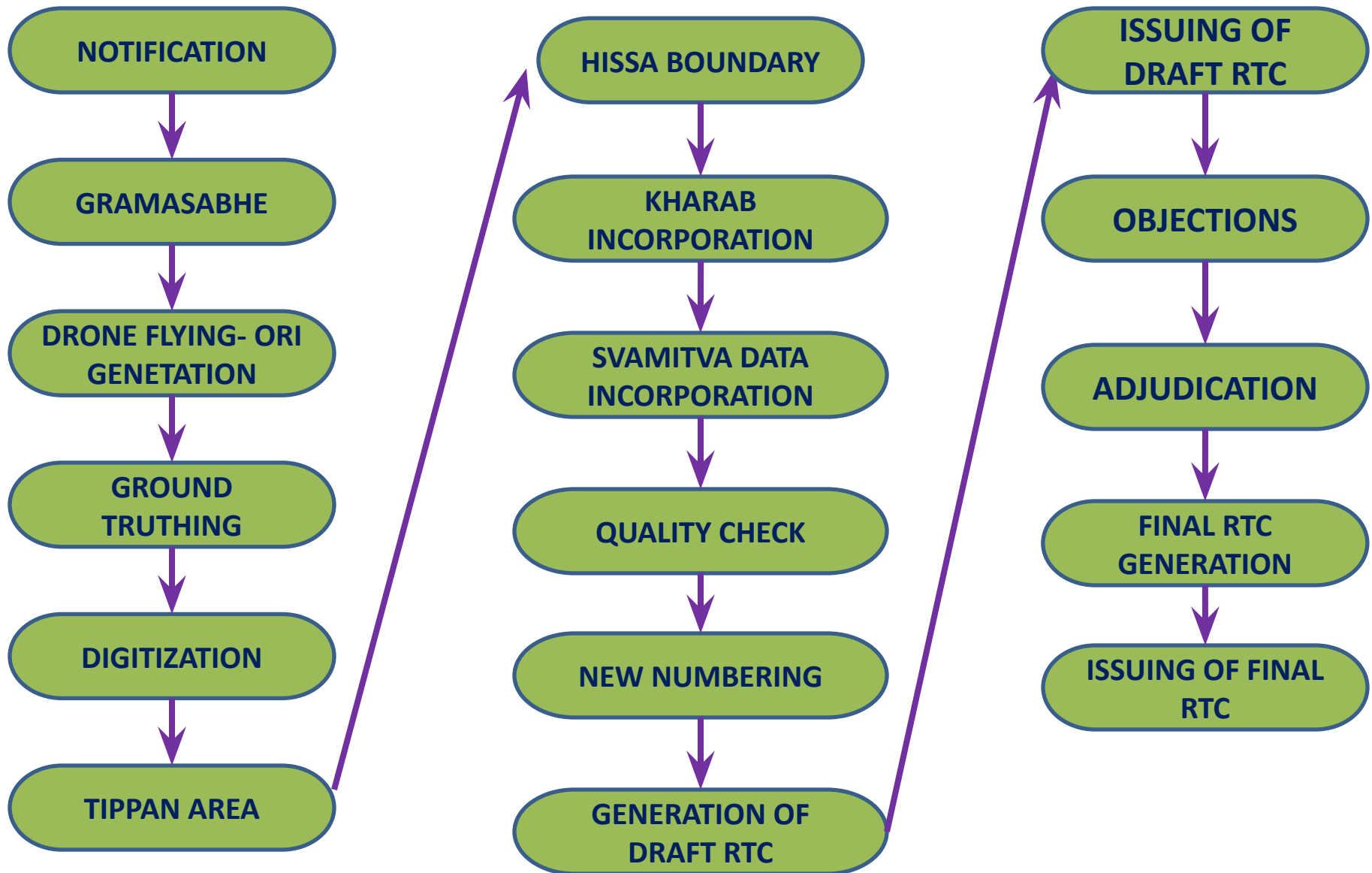
Existing RoR

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Resurvey RoR with Cadastral Map

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STAGES OF RESURVEY



Stages involved in Drone Resurvey process:

- Notification
- GramSabha
- Drone flying & Image capturing
- Generation of ORIs
- Quality Check
- Checked Data to park in Geo Server
- Data access to field offices

Stages involved in Drone Resurvey process.. Contd..

- Ground Truthing by Field staff
- Map Book Preparation
- Ground Truthing using Rovers
- Collection of Non spatial data as per field
- Digitization of the parcels on web.
- Collection of Various data eg: Details of Grant, Acquisition, Alienation etc.
- Preparation of Comparative statement of existing and re-surveyed area.

Stages involved in Drone Resurvey process.. Contd..

- Generation of Draft RTC (RoR)
- Call for Objections.
- Enquiry process.
- Final RTC (RoR) generation.
- Issuing of Final RoRs
- RoR contains both spatial & non-spatial information. (Spatial information contains image of the parcel along with neighborhood. Non-Spatial information contains details such as owners name, nature of land etc.).

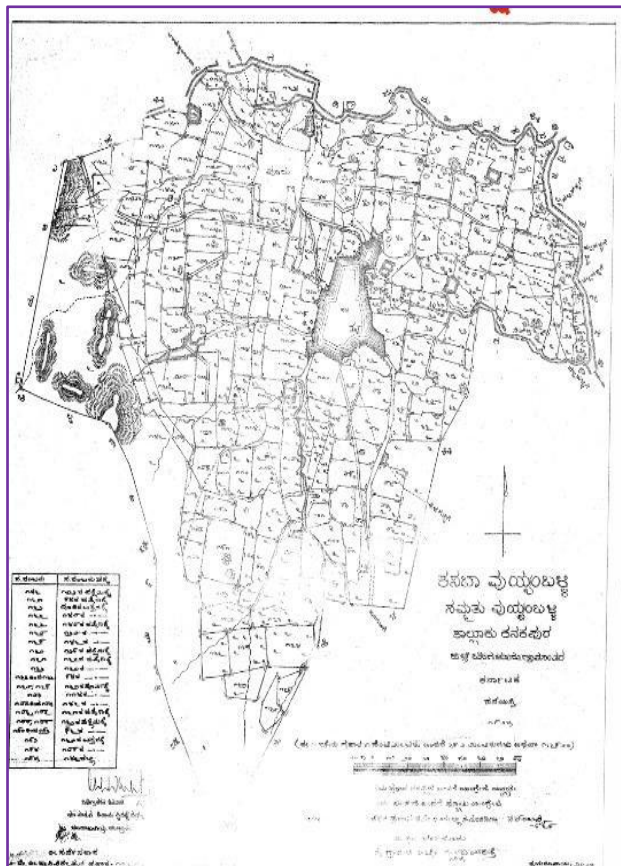
Benefits of Drone/Aerial survey in Cadastral Surveying

- Revolutionized.
- Speedy.
- Accurate.
- Transparent.
- Cost-effective.
- Unbiased Results.
- Access to Inaccessible Terrain

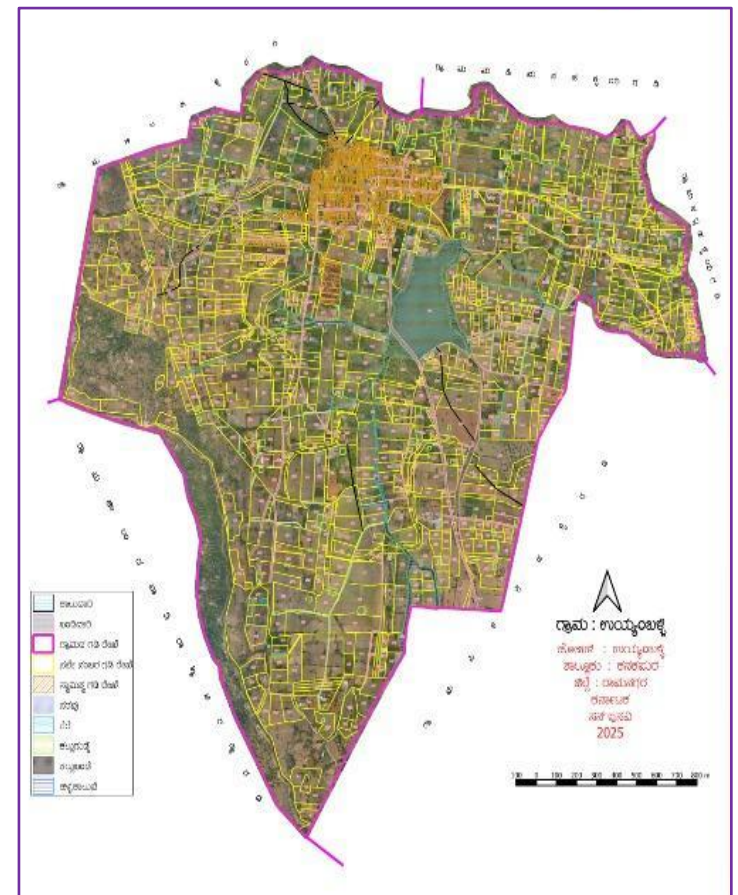
Improvised Mapping



Manual Map



Drone Survey Digital Map

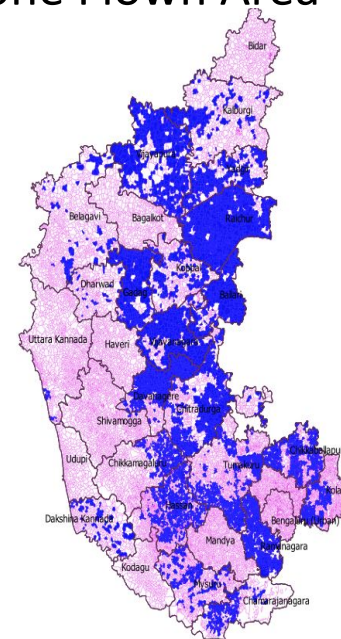


Present Progress of Survey/Re-Survey in Karnataka

Drone Flown Area

State Statistics

- Area of State : 1,91,791 Sq.kms.
- Dists. in State : 31
- Villages in State : 30,715.
- Area awarded : 1,43,484 Sq.kms.
- Dists. in awarded : 21 (16 Dists. under DILRMP + 5 State funding)
- Total Area flown : 1,17,187 Sq. Kms.
- Total Villages drone flown : 19,880
- Pilot Re-Survey : Ramanagar District, (Kanakapura Taluk, Uyyamballi hobli, 35 Villages. In 33 villages 23,083 draft RTC have been issued.



Progress of Re-Survey (DLRMP Portal)

S.No.	State/ UT	Total Districts	Total Tehsils	Total Villages	Total Rural Revenue Area (Sq.Km.)	Area Sanctioned for Survey / Resurvey (Sq.Km.)	Drone flying		No. of Villages				Area of Villages Where Survey Sanctioned but Not Started
							No. of Villages	Area of Villages (Sq.Km.)	Map 1 is generated	Draft map published & objections invited	Final Promulgation done	Survey Sanctioned but Not Started	
16	KARNATAKA	31	240	30,715	186983.21	101822.04	14,628	110011.84	123	123	90	6,015	25988.91

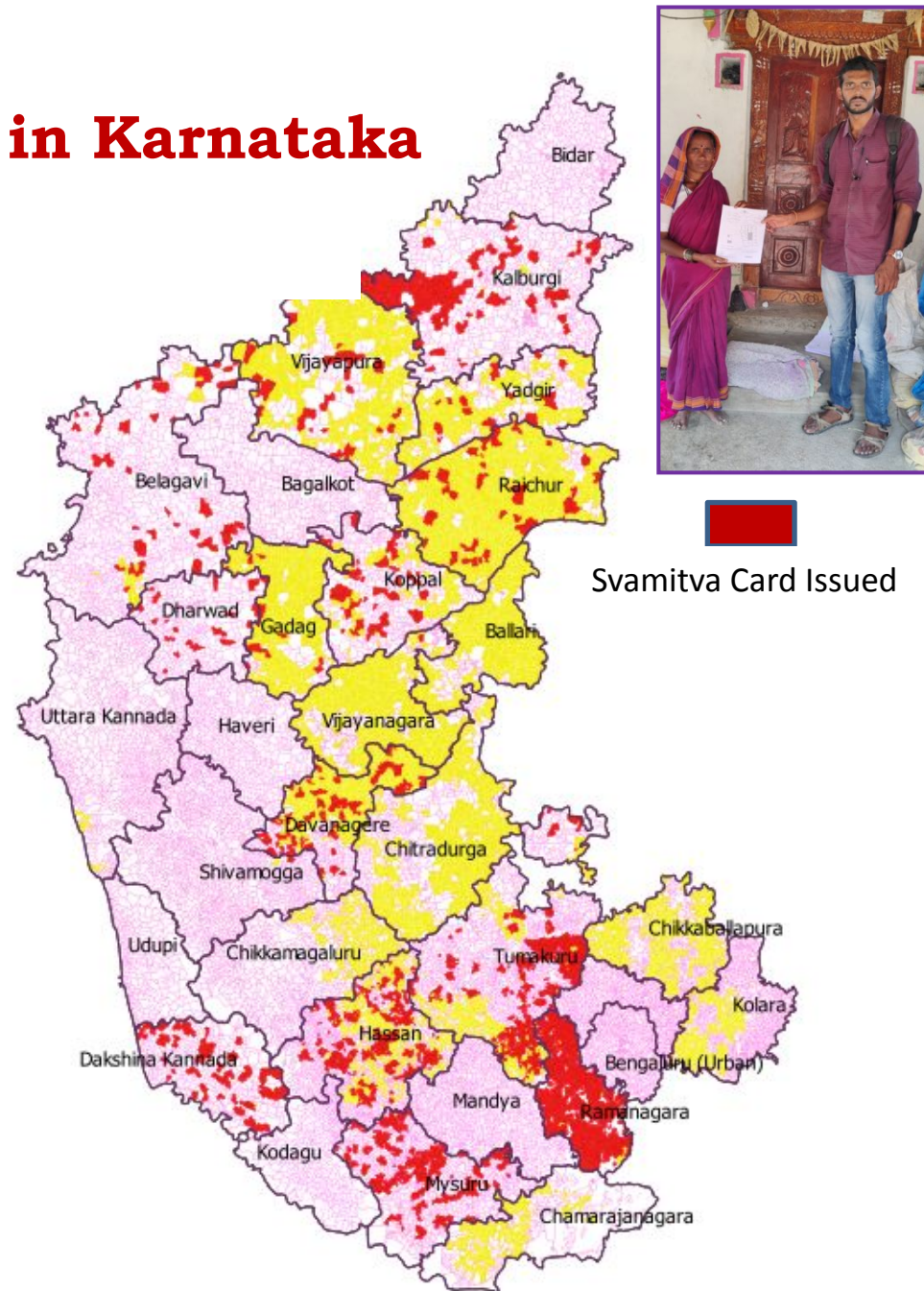
MAP Showing SVAMITVA in Karnataka

Under implementation across the state (16 District flying by Pvt agencies+ 15 district by Sol)

3,956 Villages 10.17 Lakh

Draft SVAMITVA Property Cards issued.

2,583 villages 3.28 Lakh Final SVAMITVA Property cards issued.



NAtional geospatial **K**nowledge-based land **S**urvey of urban **HA**bitations



Creating Land Records In Urban Areas

NAKSHA Programme under Survey/Re-Survey of DILRMP

- NAKSHA Program in Karnataka is being carried-out on the lines of existing **UPOR**.
- Rectitude, Objective, Scope of SoP, Stake Holders & their Roles and Responsibilities are very much similar to the concept of UPOR.
- Presently NAKSHA is being carried out as per the guidelines of DoLR.

Workflow - NAKSHA

MAP 1

By Sol

- ORI Generation & feature extraction- MAP 1
- Defines boundary for Aerial Survey
- Establish GCPs and control points
- Acquisition of high-resolution Imagery
- ORI, DEM & 3D reality model
- Methodology **a**: 2D Nadir camera for 2D GIS
- Methodology **b**: 05 angle oblique camera without LiDAR
- Methodology **c**: Oblique camera with LiDAR
- Challenging areas with high canopy, complex terrain, etc. – ETS/DGPS/CORS
- 2D/3D Feature Extraction
- Property boundary markers, compound wall, fence, etc.

MAP 2

By States/UTs

Field survey with the help of Map 1

- Survey with GNSS
- Scanning & digitization of existing records & Maps
- Integration of Record of Rights (RoR) including property tax data and other details in the attributes of the map/vector generated out of ORI
- Land parcels demarcated using GNSS (MAP 2)

MAP 3

By States/UTs

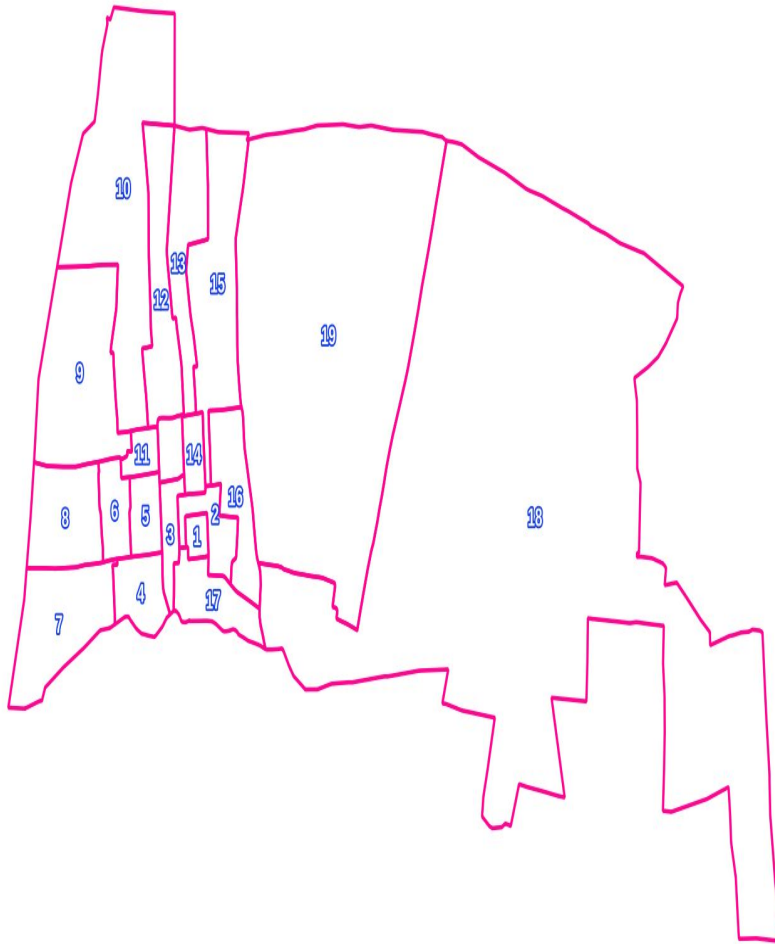
- Dispute & grievances invitation & redressed
- Data correction & processing
- Claim finalization
 - Disposal of objections received related to the ownership, share, area, boundary & shape of land parcel
- PUBLICATION OF FINAL LAND RECORDS (MAP 3)

Cities/Towns selected under NAKSHA

Sl No	District	Type	Town/City	Technology and Vendor selected	Area (Sq Km)	Population
1	Shivamogga	TP	Ananvatti	3D by Pioneer	35.158	23,334
2	Bagalkote	CMC	Bagalkote	3D by Pioneer	70.465	1,53,935
3	Bidar	CMC	Basavakalyana	2D by Arvee	26.359	91,990
4	Mysore	TP	Bogadi	3D by Pioneer	30.243	27,715
5	Belagavi	TP	Boragaon	2D by Arvee	38.199	21,125
6	Chikkamagaluru	CMC	Chikkamagaluru	3D by Pioneer	31.361	1,25,000
7	Belagavi	CMC	Gokak	2D by Arvee	21.014	1,04,398
8	Kolar	CMC	Kolar	2D by Inhouse	18.095	1,59,785
9	Koppal	TP	Bhagyanagara	2D by Inhouse	7.758	25,054
10	Bellary	CMC	Siraguppa	2D by Inhouse	29.874	64,617
					308.526	7,96,953

One ULB case study under NAKSHA

ULB outer boundary along with ward boundary



Rover points on the ORI along with the points attributes



One ULB case study under NAKSHA

Bhagyanagara ULB Output after Ground truthing and Digitization



Legend

- Outerproperty_layer
- Builtup_layer
- Sewer_layer
- Drainage_layer
- Electricconnectivity_layer
- Road_layer
- Ward_Boundary

0 50 100 m

Progress as on 13-5-2025 in 3 ULBs under NAKSHA

ULB Name	TOTAL PROPERTIES	TOTAL AREA IN Sq Km	SURVEY COMPLETED IN TERMS OF AREA AND PROPERTIES		PROGRESS
			AREA(Sq Km)	PROPERTIES	
KOLAR	34,237	18.1	1.79	6,944	20% towards properties, 10% against area
SIRAGUPPA	24,390	30	3.66	9,925	41% towards properties, 12% against area
BHAGYANAGAR	18,513	7.758	2.74	10,862	59% towards properties, 35% against area
TOTAL	77,140	55.86	8.19	27,731	

Survey/Resurvey -vs- NAKSHA

Aspect	Survey/Resurvey	NAKSHA (Urban Land Survey)
Focus Area	Generally refers to Survey of agricultural land parcels and rural habitat area.	Measurement of Land parcels in Urban Local bodies.(cities, towns, wards).
Objective	Measurement and fixing the boundaries of land parcels, updating Survey records pertaining to RoR	Measurement and fixing the boundaries of urban properties and generating Property cards with all details.
Technology Used	1) ETS, DGPS 2) Hybrid methods 3) Satellite Imagery.	Only through Aerial Survey with 1) Nadir Camera 2) Oblique Camera (Nadir + 4 angle cameras) 3) LiDAR + Oblique Camera & GIS tools.

Survey/Resurvey vs NAKSHA under DILRMP: Key Differences....Contd.....

Aspect	Survey/Resurvey	NAKSHA (Urban Survey)
Stakeholder Involvement	Village-level /Taluk level Revenue/Survey officers.	Urban Local Bodies (ULBs), BBMP (in Karnataka), town planning Department.
Output	Updated Rural land ownership records (RoR), cadastral maps.	Geo-referenced property maps with ownership and usage details for urban area.
Public Participation	Through Gram sabhas and local hearings.	Through urban public notifications.
General benefits	Safeguarding Government lands, Resolving land disputes, Resolving issues related to Agriculture subsidies, Land grants, tenancy rights etc.	Property tax, Urban planning, infrastructure development, Transparent & resolving ownership records etc.

Resurvey as a Solution

- ❖ Karnataka is proceeding with digital land governance.
- ❖ Re-Survey with Drone/Aerial in GIS platform is found to be a good solution.

THANK YOU