



REPORT OF EXPERT COMMITTEE ON

SVAMITVA SCHEME



Ministry of Panchayati Raj
Government of India





**REPORT OF EXPERT COMMITTEE
ON
SVAMITVA SCHEME**

2022



गिरिराज सिंह
GIRIRAJ SINGH



सत्यमेव जयते



आज़ादी का
अमृत महोत्सव

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Message

SVAMITVA Scheme is playing a pivotal role in the development of rural areas by providing Record of Rights to the property owners in Abadi land. The scheme outcomes are providing multi-fold benefits to a larger section of stakeholders by providing a bankable record of rights that can be used to avail bank credit, creation of high-resolution maps to facilitate better rural planning, reformed land governance, streamlining of property taxes at gram panchayats, and establishment of GIS infrastructure to be utilized by various departments and agencies.

Through the Expert Committee Report on SVAMITVA Scheme, Ministry and the various domain experts have put an effort to distil-out the best practices observed over the course of implementation of the scheme in various States and Union Territories, improve cross-linkages between departments for better decision-making, and provide a definitive roadmap for realizing the outcomes of the scheme in a holistic and transparent way.

I urge the States and UTs to adopt the recommendations of the Report to streamline the implementation and spur gains for the individuals at the grassroots as well as for the broader State level.

(GIRIRAJ SINGH)

कपिल मोरेश्वर पाटील
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MINISTRY OF PANCHAYATI RAJ
GOVERNMENT OF INDIA



MESSAGE

Through the advent of SVAMITVA Scheme, a vast trove of opportunities has been unlocked in the field of land administration, rural and spatial planning, land monetization, survey infrastructure creation, and own-source of revenue generation for gram panchayats, among others. It is of utmost importance that the States and UTs seize the opportunity accorded and make the best use of the outcomes of the SVAMITVA Scheme.

The work done by the Expert Committee on SVAMITVA Scheme has invaluable inputs from domain experts in the field of land governance, spatial planning, banking, land survey, and GIS. The deliberations of the experts have been distilled in the report and its recommendations provide a nudge to the Stakeholders towards gaining the best from the scheme outcomes towards improving the rural abadi land governance systems, using SVAMITVA data for streamlining property tax management in Gram Panchayats for own-sources of revenue, improving the bankability of the record of rights created so that rural property owners can avail loans. It also serves as a guiding compass for stakeholders in utilizing the CORS network being setup in the country and its high-precision positioning services for developmental work, preparing better gram panchayat development plans through high-resolution maps obtained through drone survey and exploring public-private partnership for data exchange to develop various applications on top of SVAMITVA data.

The collaborative spirit showcased by States, UTs and Stakeholders in implementing SVAMITVA Scheme is a testimony of the shared goal that we all are working towards. I hope the recommendations of the Report of Expert Committee on SVAMITVA Scheme are adopted by States and UTs in order to make rural India "Atmanirbhar" in the coming years.


(Kapil Moreshwar Patil)

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MESSAGE

Rural India has gained immensely through the implementation of the SVAMITVA Scheme. Through the collective efforts of the State Revenue Department, State Panchayati Raj Department, and Survey of India, multiple objectives are being met viz. preparation of Record of Rights for Abadi area in villages, creation of digitized maps of Abadi area, creation of survey infrastructure and geospatial datasets for better village level planning.

The Report of the Expert Committee on the SVAMITVA Scheme provides a ready-reckoner of steps that States may take in order to realize the scheme's objectives. Over the course of multiple meetings, various domain experts have deliberated over the aspects of land governance, bankability of property cards, systems for streamlining property taxes, creation of survey infrastructure and GIS datasets, and Rural Planning and put together actionable recommendations that must be adopted by States and UTs.

Through the report, it is envisaged to create systems that promote transparency in the implementation of the scheme, promote the adoption of record of rights as a tool for mortgaging Abadi land, build cross-linkages between departments for informed decision-making related to property tax assessment and collection, promote greater use of SVAMITVA data-sets by government and private agencies in-line with new geospatial guidelines, adoption of RADPFI guidelines and village-level data for accurate planning, and infuse capacity at State, Block and District level to impart GIS skills and knowledge, among others.

I acknowledge the rigor of the recommendations put together by the domain experts and appreciate the efforts made by them in giving shape to the report.

It is through the adoption of the recommendations that a wider net can be cast by the States and UTs for realizing the benefits of the scheme.

(Sunil Kumar)

B. K. Agarwal, IAS (Retd.)
Chair
Expert Committee on SVAMITVA scheme
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Message

The Land Administration System in India was established about 150 years back by the British mainly for the collection of land revenue from agricultural lands. As land revenue was not levied on lands in inhabited areas of a village, maps and ownership records of such lands were also not prepared by them. Villagers were left to themselves to resolve disputes regarding lands in inhabited areas.

The Ministry of Panchayati Raj has taken a laudable initiative to change this situation by launching the SVAMITVA scheme. Under this scheme, maps and the record of rights of the inhabited area of the villages are being created for the first time throughout the country using the latest drone technology.

This Expert Committee was constituted on 16th February 2022 drawing subject matter experts from various related domains. Due to the prevalence of COVID-19, physical meetings were avoided and most of the deliberations were held through virtual meetings. The Expert Committee has mainly focussed on the objectives of this scheme, their achievement till now and future strategies to achieve them.

I am thankful to the expert committee members for their immense contribution to this report. I am also thankful to the Sh. Sunil Kumar, Secretary, Ministry of Panchayati Raj for his constant support to the Committee. Sh. Alok Prem Nagar, Joint Secretary and his team of officers including Ms Karnika Kaushik and Sh. Abhas Vyas, have provided valuable support to the Committee in putting together this report.

I hope that this report will help the Ministry of Panchayati Raj and state governments to realize the objectives of this scheme.

(B. K. Agarwal)

EXPERT COMMITTEE MEMBERS

S.no	Member	Role	Thematic Area
<i>i.</i>	Sh. B.K Agarwal Chief Secretary (Retd) Himachal Pradesh	Chairperson	Subject matter Expert from Land governance (legal & Administrative)
<i>ii.</i>	Sh. A P Nagar Joint Secretary (SVAMITVA), Ministry of Panchayati Raj	Convener	
<i>iii.</i>	Sh. Mahesh Goel Chief General Manager, REHBU State Bank of India	Member	Subject matter Expert from Financial & Banking
<i>iv.</i>	Dr. N. Sridharan Director, School of Planning and Architecture, Bhopal	Member	Subject matter Expert from Planning
<i>v.</i>	Sh. Smit Shah President Drone Federation of India	Member	Subject matter Expert from Drone industry
<i>vi.</i>	Lt General Girish Kumar, VSM, (Retd)	Member	Subject matter Expert from Technology interventions – Survey methodology
<i>vii.</i>	Sh. Rajiv Chawla ACS(Retd.), Govt. of Karnataka Sh. S Chockalingam Director General, (YASHADA)	Member	Subject matter Expert from Digital Land Records
<i>viii.</i>	a. Sh. Uday Kumar, DDG, NIC b. Sh. Sanjay Kumar, CEO, Geospatial world	Member	Subject matter Expert in GIS
<i>ix.</i>	Sh. Pankaj Mishra Deputy Surveyor General, Survey of India	Member	Representative from Survey of India - Expert in Training & Capacity Building
<i>x.</i>	Ms. Uma Mahadevan Principal Secretary (PR) Karnataka	Member	Subject matter expert for determination and streamlining of Property Tax under Scheme
<i>xi.</i>	Sh. Avinash Misra NITI Aayog	Member	Representative of NITI Aayog
<i>xii.</i>	Two State Government officials	Member	Sh Balasaheb Kale, Dy Director, Land Records Sh Bhasham Lal Verma, Dy Commissioner, Board of Revenue, Uttar Pradesh

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ABBREVIATIONS

CORS	Continuous Operation Reference Station
DCR	Development Control Regulation
DEM	Digital Elevation Model
FDC	Field Data Collector
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GP	Gram Panchayat
IOI	Incidence of Indebtedness
MoPR	Ministry of Panchayati Raj
NBSSLUP	National Bureau of Soil Survey & Land Use Planning
NDMA	National Disaster Management Authority
NSS	National Sample Survey
PRIs	Panchayati Raj Institutes
QA/QC	Quality Assurance / Quality Check
RADPFI	Rural Area Development Plan Formulation and Implementation
RBI	Reserve Bank of India
RCMS	Revenue Case Management Systems
RTK	Real-Time Kinematic
SAARA	Smart Application for Revenue Administration
SDG	Sustainable Development Goals
SFC	State Finance Commission
SoI	Survey of India
UAV	Unmanned Aerial Vehicles
ULPIN	Unique Land Parcel Identification Number
VPS	Village Planning Scheme

DEFINITIONS

Abadi areas	The Abadi area includes inhabitant land, inhabited areas contiguous to Abadi, and wadis/basties in rural areas
Property Card	The Property Card is a certificate issued by a competent authority under the land law provisions confirming ownership of a property in favour of a person. Property Card will generally contain the details such as name of the person who owns the property, the mode of acquiring property, area of the property, location with spatial data. In India, Property Cards have only presumptive value.
Rovers	A rover is a small GPS receiver with data-collecting and transmitting capability. Their ability to perform measurements offers unprecedented advantages for quickly and inexpensively measuring features on a land with near-survey accuracy in minutes.

EXECUTIVE SUMMARY

This work aims to provide planners and administrators with the means to realize the fullest potential of the SVAMITVA Scheme. This is only the first step in the journey that must be traversed for empowering people and rural local bodies, establishing systems that reduce transaction costs for accessing property documents, enabling the use of an accurate survey infrastructure by agencies and entrepreneurs to increase transparency and finally, to trigger the insertion of spatial planning in rural landscapes leading to villages becoming convenient habitats.

Starting with the scheme particulars, the **first chapter** provides the role expectations from all partners, estimated cost, progress, and the context for the report. In essence, it provides basic details.

Chapter two explains the implications of survey infrastructure that is being set up through a network of Continuously Operating Referencing Stations (CORS). What it means for the way the land is currently measured by government agencies, how detailed project reports are prepared for large-scale infrastructure projects, and the granularity and accuracy of weather forecasts are some of the questions that can be answered in this chapter. There are definitive pointers for those deciding to take early steps on the path of progress.

The **third chapter** pertains to the recording of the rights of people in states that are mapping Abadi areas for the first time. It also provides a peek into what the States with the legacy record for Abadis can do with the SVAMITVA Scheme through cross-learning. Some states and UTs have extended their property record systems for agricultural land over Abadis, some have made separate laws just for Abadi areas. Yet others have continues to provide people with ownership rights over land parcels in the Abadi area under Panchayat law using geo-referenced SVAMITVA maps. One state is looking to have a whole new act for land titling covering all land categories. The idea is to provide everyone with the best options that lead to the creation and easy access of Abadi record in a way that aids scheme implementation and empower all manner of people.

In **chapter four**, we take a close and hard look at what banks would want the property cards to be in order to give people loans. While the active engagement of the State with banks at the State and then at the district level is something that must be done in any case. The chapter content goes a long way in specifying the characteristics of a good, bankable property card format.

This scheme began because Maharashtra wanted to update property registers for its rural local bodies, the Panchayats. **Chapter five** looks at the other states that also have a system of property tax accruing to Panchayats. More importantly, it can guide the states in which such a system does not exist. With 5 cm accuracy, geo-referenced data in respect of properties in villages, Tax assessment (based on willingness to pay) becomes very easy. If the states take the next step towards empowering their Panchayats and legislature, we would have the biggest measure in this direction since the 73rd amendment.

The **last two chapters** are dedicated to spatial planning in rural areas and to how the geo-referenced information created can make life easier for the citizens. There is no reason that villages must continue being shoddy, smelly, and inconvenient places that one wants to get out of. Using information created under SVAMTIVA Scheme, we can change the discourse around rural India.

Chapter-1

OVERVIEW OF SVAMITVA SCHEME

1.1. Introduction

SVAMITVA scheme was launched by the Hon'ble Prime Minister on National Panchayati Raj Day, 24th April 2020 with a resolve to enable the economic progress of Rural India by providing a "Record of Rights" to every rural household owner in a rural inhabited area. The scheme covers multifarious aspects viz. facilitating monetization of properties and enabling bank loans; reducing property-related disputes; comprehensive village-level planning.

"Record of Rights" to the household owners in rural inhabited areas under the SVAMITVA Scheme are provided through the use latest Drone Technology and Continuously Operating Reference Station (CORS) technology for capturing images. The high resolution and accurate image base maps have facilitated the creation of the most durable record of property holdings in these areas. Such accurate image base maps provide a clear demarcation of land holdings in a very short frame of time compared to on-ground physical measurement and mapping of the land parcels. Further, these maps are free from measurement errors to a very large extent, which is not the case with physical on-ground measurements. Such maps provide a visual aid to the landowners as well as to the officials for identifying and resolving any property dispute and are also an invaluable tool for local-level planning.



The Scheme is implemented in a phased manner. Based on the successful implementation and outcome of the pilot phase, the scheme was rolled out for implementation across all States/UTs on 24th April 2021. So far, 31 States and UTs have signed MoU with the Survey of India for the implementation of the SVAMITVA Scheme in their States/UT.

1.2. Objectives

The scheme aims to achieve the following objectives

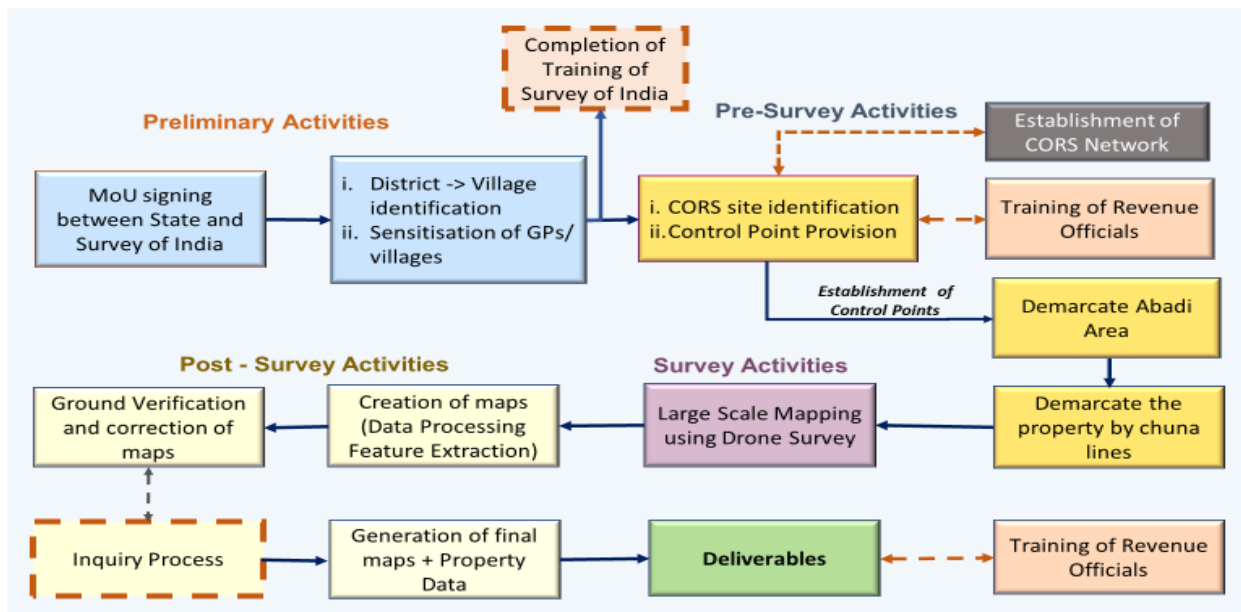
- i. Creation of accurate land records for rural planning and reducing property-related disputes.
- ii. To bring financial stability to the citizens in rural India by enabling them to use their property as a financial asset for taking loans and other financial benefits.
- iii. Determination of property tax, which would accrue to the GPs directly in States where it is devolved or else, add to the State exchequer
- iv. Creation of survey infrastructure and GIS maps that can be leveraged by any department for their use.
- v. To support the preparation of a better-quality Gram Panchayat Development Plan (GPDP) by making use of GIS maps

1.3. SVAMITVA Implementation Process

SVAMITVA scheme, is a collaborative effort of the Ministry of Panchayati Raj, State Panchayati Raj Departments, State Revenue Departments, and Survey of India, and aims to provide an integrated property validation solution for rural India, engaging the latest Drone Surveying technology, for demarcating the inhabitant (Abadi) land in rural areas.



The brief/broad-level implementation process flow of the scheme is illustrated below:

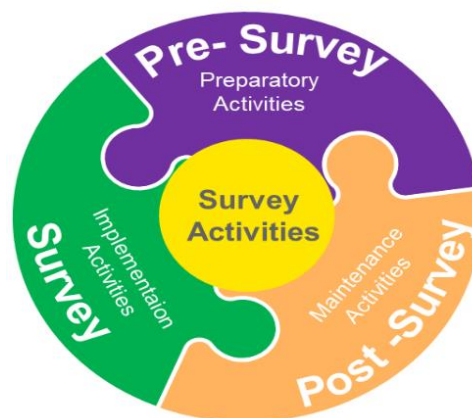


The activities are broadly divided into Pre-Survey, Survey, and Post Survey activities.

Pre-survey activities include the signing of an MOU between the state and Survey of India, IEC activities by Panchayat for sensitization of rural population, identification of sites for the establishment of CORS, and notification of villages for the survey, and demarcation of boundaries of Abadi and parcels using chuna lines. Also, the survey of India provides training to Revenue officials on survey processes like KML creation, chunna marking, maps verification, etc.

Survey activities include the establishment of Ground Control Points for Drone-based surveys to capture aerial images. Images are then processed by Sol for the creation of property maps and high-resolution Spatial data.

Post-Survey activities include ground verification of maps and ownership data collection by the State Revenue Department and Gram Panchayat. Inquiry/Objection Process for Ownership adjudication with the help of gram sabha, land owners, and review the existing documents and resolve any objections received from property owners. Thereafter, the printing and distribution of property cards to village household owners are done by State. Sol shall also provide training and



Capacity building of Revenue Department Government Officials for regular updation and usage of maps.

The scheme framework detailing the administrative and technical guidelines of the Scheme is published/ released and is available on the Scheme dashboard ([HTTP://svamitva.nic.in](http://svamitva.nic.in))

1.4. Role of different Stakeholders

A brief overview of the Role and responsibilities of different Stakeholders is illustrated below. Details can be seen in the Scheme Framework/Guidelines

1. Ministry of Panchayati Raj

The Ministry of Panchayati raj is the nodal department for the implementation of the Scheme. It manages Funding and monitoring of the scheme at the Central level.

2. Survey of India

Survey of India is responsible for drone-based surveys and the generation of high-resolution 1:500 scale images, Spatial/GIS data, and DEM. Sol is also responsible for the establishment of Continuous Operating Reference Stations (CORS) under the Scheme. For outsourcing any activity under the project, Sol will be responsible for the preparation of RFPs/Bids, Processing of bids, Award of work, Supervision, Quality check, and Work execution as per the contract agreement as well as the norms laid down by Government of India. Sol shall be responsible for survey planning, execution, and monitoring of survey activities and shall adhere to the norms as laid by the Government of India

3. State Revenue Department/ Nodal

The state will carry out the appropriate amendment to the Land Revenue Code and/or any other administrative document to grant the format of the Property Card due authority and validity. The State Revenue Department needs to check the extent of activities that can be undertaken to conduct Drone surveys for the demarcation of rural inhabited areas in the State Revenue Act. The department issues appropriate notifications/notices, facilitates field survey activities, ground verification and validation of Land Parcel maps, adjudication of final results- re-verifies the ownership and resolves any post-survey

objections received from property owners, finalization of revenue maps and subsequent actions, etc.

4. State Panchayati Raj Department

- i. Organising the Gram Sabha to intimate the schedule of the survey and post-survey validation of maps
- ii. Providing support to sensitize the villagers about the project work and its intended benefits leveraging RGSA funds for IEC etc.
- iii. Preparing and updating the Property (Tax) Register through GPs

5. Gram Panchayats

- i. Generate Awareness among the residents of the village about the survey
- ii. Digitize existing GP property (Tax) Registers, wherever applicable, and make them available to Sol and Enquiry Officer for preparing interim maps/Records.
- iii. Coordination of ground-level activities for conducting the survey
- iv. Update property tax and asset register of GP, wherever applicable
- v. Help in the resolution of the post-survey objections received from property owners. These may be related to correction in owner name, property boundaries, joint holding, etc. For unresolved objections/disputes, the final decision shall rest with the State Authorities/ Judicial System.
- vi. Make use of the created maps for GPDP formulation.

6. NIC

- i. Enhance the Ministry's Spatial Planning Application "Gram Manchitra" by leveraging digital spatial data/maps created
- ii. Support in State in development of State system for SVAMITVA Property Cards generation and reporting & Monitoring of Scheme

7. State Department of Land Records

Facilitate seamless integration of Bhu-Naksha with SVAMITVA maps.

1.5. Scheme Funding

The scheme has been approved for a financial outlay of Rs. 566.23 crores for five years from 2020-25 (i.e. from 01.04.2020 till 31.03.2025).

Scheme component-wise funding

SL. No.	Scheme Components	Brief Description	Total Cost (in Rs.)
1	Establishment of the CORS Network <i>(Funds Recipient – Survey of India)</i>	The CORS Network supports establishing Ground Control Points, which is an important activity for accurate Geo-referencing, ground-truthing, and demarcation of lands	Rs. 136.08 crores
2	Large Scale Mapping (LSM) using Drone <i>(Funds Recipient – Survey of India)</i>	Large Scale Mapping using Drone in Rural inhabited areas covering all villages across the Country. Rural inhabited (Abadi) area would be mapped by Survey of India in collaboration with the state Revenue Department to generate revenue maps to confer ownership property rights. Based on these maps or data, property cards would be issued to the rural household owners.	Rs. 346.03 crores
3	IEC Activities <i>(Funds Recipient – State Government)</i>	Awareness program to sensitize the rural population about the surveying methodology and its benefits	Rs. 29.38 crores
4	State Project Management Unit (SPMU) <i>(Funds Recipient – State Government)</i>	Program Management Unit at State	Rs. 11 crores

5	National Project Management Unit (NPMU) <i>(Funds Recipient – NIC/NICSI)</i>	Programme Management Unit at Ministry	12.23 crores
6	Enhancement of Applications <i>(Funds Recipient – NIC/NICSI)</i>	<ul style="list-style-type: none"> • Spatial Planning Application “Gram Manchitra “-Leveraging digital spatial data/maps created under drone survey for the creation of spatial analytical tools to support the preparation of GPDP • Development and maintenance of online monitoring and reporting Dashboard of the Scheme • Central Infrastructure - Hardware & Software 	Rs 28 crores
7	Documentation Support /Workshops and Exposure Visits <i>(Funds Recipient – State/ any Government agency)</i>	Organization of National/ Regional level workshops and exposure visits	Rs 3.5 crores

Year-wise expenditure in scheme

Component	2020-21	2021-22	2022-23	Total
CORS	554,235,115	611,179,340	0	1,165,414,455
LSM	194,922,240	703,724,160	531,480,000	1,430,126,400
IEC	22,337,645	17,831,500	0	40,169,145
SPMU	2,405,000	5,265,000	0	7,670,000
Enhancement of Spatial Planning Application “Gram Manchitra” & Monline Monitoring System	15,000,000	1,940,987	1,100,000	18,040,987
Central Infrastructure - Hardware & Software	0	50,000,000	20,000,000	70,000,000
NPMU	7,600,000	10,000,000	10,000,000	27,600,000
Total	796,500,000	1,399,940,987	562,580,000	2,759,020,987

1.6. SVAMITVA Scheme Progress

31 states and UTs have signed MoU with Survey of India for implementation of the SVAMITVA Scheme in their States/UT.

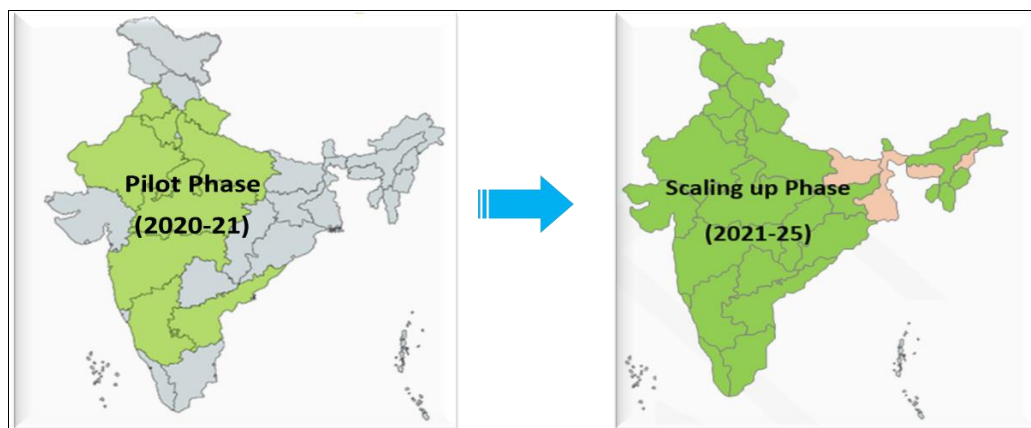


Figure 1. SVAMITVA Scheme coverage of States – Pilot phase and scaling up phase

As of 17th October 2022, drone flying has been completed in 1.87 lakh villages across 31 States/UTs. Drone flying is saturated in State of Haryana, Uttarakhand, Goa and Union territories of Lakshadweep, Andaman & Nicobar Island, Puducherry, Daman and Diu & Dadra & Nagar Haveli.

As of 17th October 2022, property cards have been prepared in approx. 58,774 villages of nearly 91 Lakh property owners.

1.7. Mechanism for review of Framework/ Guidelines

- i. Draft Framework/ Guidelines were shared with States, concerned Departments/Ministries, and Stakeholders for comments and suggestions
- ii. After incorporation of all suggestions, approval from competent authority was sought
- iii. Once approved, a final guidelines/Report was published
- iv. Any subsequent amendments to Guidelines can be done with the approval of the Hon'ble Minister, Panchayati Raj.

1.8. Mid-Term Assessment of the impact of the Scheme

The mid-term evaluation study of the **Pilot Phase of the SVAMITVA Scheme** (FY 2020-2021) was done by a team of experts from the National Institute of Public Finance and Policy (NIFP) consisting of the following:

- i. Dr. K P Krishnan (formerly senior IAS officer, and currently IEPF Chair in Regulatory Economics at the National Council for Applied Economic Research and Chairperson of Property Rights Research Consortium (PRRC) Steering Committee)
- ii. Dr. Ila Patnaik, Professor at NIFP
- iii. Sh. Devendra Damle, Research Fellow at NIFP

The Study has been done in pilot phase States where the scheme is being implemented for a better understanding of processes, procedures, coordination methodology, and innovative steps undertaken by these States during the successful implementation of the scheme despite the Covid-19 Pandemic and other odds coming in the way. These are shared with other States for suitably incorporating into State-specific systems to the extent possible. Also, suitable incorporation of the suggestions from the study in the Framework of the Scheme. Next, the Mid-term Evaluation of the Scheme is scheduled for March 2023

1.9. Constitution of Expert Committee under SVAMITVA Scheme

An Expert Committee is constituted under SVAMITVA Scheme vide OM dated 16 Feb 2022, drawing subject matter experts and practitioners from multiple domains/fields to chart out the thematic impact areas under SVAMITVA Scheme, best practices observed, and provide recommendations for future course of action in the realization of SVAMITVA Scheme objectives.

1. Objectives of the Expert Committee

In the thematic areas

- i. Examine the existing Scheme implementation landscape in India
- ii. To study and suggest best and novel practices that are to be adopted
- iii. Analyse global best practices and potential use cases that can strengthen Scheme implementation
- iv. Formulate a roadmap/way-forward towards greater delivery of Scheme objectives to the common man
- v. Submit the report as per the timeline
- vi. Any other related issues

2. Composition of Committee

S.no	Member	Role	Thematic Area
i.	Sh. B.K Agarwal Chief Secretary (Retd) Himachal Pradesh	Chairperson	Land governance (legal & Administrative)
ii.	Sh. A P Nagar Joint Secretary (SVAMITVA), Ministry of Panchayati Raj	Convener	
iii.	Sh. Mahesh Goel Chief General Manager, REHBU State Bank of India	Member	Financial & Banking
iv.	Dr. N. Sridharan Director, School of Planning and Architecture, Bhopal	Member	Rural Planning
v.	Sh. Smit Shah President Drone Federation of India	Member	Subject matter Expert from Drone industry
vi.	Lt General Girish Kumar, VSM, (Retd)	Member	Technology interventions – Survey methodology
vii.	Sh. Rajiv Chawla ACS(Retd.), Govt. of Karnataka Sh. S Chockalingam Director General, (YASHADA)	Member	Digital Land Records
viii.	c. Sh. Uday Kumar, DDG, NIC d. Sh. Sanjay Kumar, CEO, Geospatial world	Member	GIS
ix.	Sh. Pankaj Mishra Deputy Surveyor General, Survey of India	Member	Training & Capacity Building
x.	Ms. Uma Mahadevan Principal Secretary (PR) Karnataka	Member	Property Tax under the Scheme
xi.	Sh. Avinash Misra NITI Aayog	Member	Representative of NITI Aayog
xii.	Two State Government officials	Member	Sh Balasaheb Kale, Dy Director, Land Records, Maharashtra Sh Bisham Lal Verma, Dy Commissioner, Board of Revenue, Uttar Pradesh

3. Methodology

Each Subject matter expert member is allocated a thematic area as per his/her expertise. He/ She has undertaken a detailed study and analysis of Scheme aspects related to his/her particular/domain areas. The study includes best practices, experience, and learnings from similar areas. Individual area-wise draft studies and recommendations were discussed and finalized during Expert Committee meetings. There were various domain-specific meetings held with States, and experts regarding prevailing conditions/ status, need assessment, system available, challenges faced, and best practices.

The committee examined all these findings and recommendations holistically and conclude the final study report. The Ministry of Panchayati Raj is responsible for the overall compilation of the final report and providing necessary support to the subject matter experts as required.

Details for various meetings held for the finalization of the report

Meeting date	Agenda	Participants
21-Feb-22	Expert committee meeting with all members	Sh. B K Agarwal, Chair Expert Committee Sh. A. P Nagar, Joint Secretary, MoPR Lt Gen Girish Kumar (retd.), Chairman, Handholding and Monitoring Committee on SVAMITVA Ms. Uma Mahadevan, Pr Secretary, PR, Karnataka Sh Pankaj Mishra, DSG-Tech, Sol Sh Mahesh Goel, CGM, SBI Sh Uday Kumar, DDG, NIC Sh Vishnu Chandra, DDG, NIC Sh Sanjay Kumar, CEO, Geospatial world Dr. N Sridharan, Director, SPA, Bhopal Sh Smit Shah, President, DFI Sh Bhisham Lal Verma, Dy Commissioner, BoR, UP
25-Feb-22	Expert Committee meeting on Financial and	Sh. B K Agarwal, Chair Expert Committee

Meeting date	Agenda	Participants
	Economic growth	Sh. A. P Nagar, Joint Secretary, MoPR Lt Gen Girish Kumar (retd.), Chairman, Handholding and Monitoring Committee on SVAMITVA Sh Shriman Shukla, Commissioner-LR, Madhya Pradesh Sh Sunil Jha, OSD, BoR, UP Sh B Kale, Director, Survey and settlement, Maharashtra Sh Mahesh Goel, CGM, SBI
4-March-22	Expert Committee meeting on the GIS system	Sh. B K Agarwal, Chair Expert Committee Sh. A. P Nagar, Joint Secretary, MoPR Sh Uday Kumar, DDG, NIC Sh Vishnu Chandra, DDG, NIC Smt Leena Patel, Asst Director-IT, NIC, Gujarat Sh Ajay Trivedi, US, Land Records, Jharkhand Representative, Chhattisgarh
8-March-22	Expert Committee meeting on property tax	Sh. B K Agarwal, Chair Expert Committee Sh. A. P Nagar, Joint Secretary, MoPR Sh Ajit Kumar, Addl Director, PR, Kerala Representatives of Panchayati Raj from Maharashtra, Madhya Pradesh, Tamil Nadu,
8-March-22	Expert Committee meeting on Rural Planning	Sh. B K Agarwal, Chair Expert Committee Sh. A. P Nagar, Joint Secretary, MoPR Dr. N Sridharan, Director, SPA Bhopal Sh Amit Gorecha, Asst Prof. CEPT Dr. Uttam Roy, Asst prof., IIT Roorkee Sh R Srinivas, TCP, MoHUA Sh Ajay Katuri, NDMA
29-April-22	Expert Committee Meeting with all members to review the chapters	Sh. B K Agarwal, Chair Expert Committee Sh. A. P Nagar, Joint Secretary, MoPR Lt Gen Girish Kumar (retd.), Chairman, Handholding and Monitoring Committee on SVAMITVA

Meeting date	Agenda	Participants
		<p>Sh Pankaj Mishra, DSG-Tech, Sol</p> <p>Sh Mahesh Goel, CGM, SBI</p> <p>Sh Sanjay Kumar, CEO, Geospatial world</p> <p>Sh Uday Kumar, DDG, NIC</p> <p>Smt. Aparna Soni, Asst. Professor, SPA Bhopal</p>
17-May-22	Expert Committee Meeting with all members to review the chapters	<p>Sh. B K Agarwal, Chair Expert Committee</p> <p>Sh. A. P Nagar, Joint Secretary, MoPR</p> <p>Lt Gen Girish Kumar, VSM (retd.), Chairman, Handholding and Monitoring Committee on SVAMITVA</p> <p>Sh S Chockalingam, DG, YASHADA</p> <p>Dr. N Sridharan, Director, SPA Bhopal</p> <p>Sh Mahesh Goel, CGM, SBI</p> <p>Sh Udaya Kumar, DDG, NIC</p>
11- July-22	Expert Committee meeting regarding finalization of Index and introduction chapter of Report	<p>Sh. B K Agarwal, Chair Expert Committee</p> <p>Sh. A. P Nagar, Joint Secretary, MoPR</p> <p>MoPR-SVAMITVA team</p>
15-July-22	<p>Expert Committee to review the chapter on</p> <ol style="list-style-type: none"> 1. Creation of survey infrastructure and spatial data 2. Use of geospatial infrastructure and data of SVAMITVA scheme by other agencies 	<p>Sh. B K Agarwal, Chair Expert Committee</p> <p>Sh Alok Prem Nagar, Joint Secretary, MoPR</p> <p>Sh Pardeep Singh, DSG-Tech, Survey of India</p> <p>Sh Upkar Pathak, SS, SGO</p> <p>MoPR-SVAMITVA team</p>
21-July-22	Expert Committee to review the chapter on use of Abadi land as a financial asset	<p>Sh. B K Agarwal, Chair Expert Committee</p> <p>Sh Mahesh Goel, CGM, SBI</p> <p>Sh Rajesh Keshri, DGM, SBI</p> <p>MoPR-SVAMITVA team</p>

Meeting date	Agenda	Participants
22-July-22	Expert Committee to review the chapter on Property Tax	Sh. B K Agarwal, Chair Expert Committee Ms Uma Mahadevan, Principal Secretary, Panchayati Raj, Karnataka Sh Anjaniappa K B, Director, Panchayati Raj, Karnataka Sh Ajith Kumar, Addl. Director, Panchayati Raj, Kerala Ms K Sridevi, State Project Coordinator, Panchayati Raj, Andhra Pradesh Sh Devesh Mishra, Dy Director, Panchayati Raj, Madhya Pradesh Sh Nimish Patel, Dy DDO, Panchayati Raj, Gujarat Ms Deepali Jape, Section Officer, Gram Vikas, Maharashtra MoPR-SVAMITVA team
5-Aug-22	Expert Committee review on Rural Planning	Sh. B K Agarwal, Chair Expert Committee Sh. N. Sridharan, Member Expert Committee Sh. Uday Kumar, DDG, NIC-GIS MoPR-SVAMITVA team
17-Oct-22	Expert Committee meeting regarding finalization of the Report	Sh. B K Agarwal, Chair Expert Committee Sh. A P Nagar, Joint Secretary, MoPR Sh. Avinash Mishra, Advisor, NITI Aayog Sh. S Chockalingam, DG, YASHADA Lt Gen Girish Kumar, VSM (retd.), Chairman, Handholding and Monitoring Committee on SVAMITVA Sh Mahesh Goel, CGM, SBI Sh Uday Kumar, DDG, NIC Sh Rajesh Keshri, DGM, SBI Sh N K Sudhanshu, Commissioner, Survey & Settlement, Maharashtra Sh Bisham Lal Verma, Dy Commissioner, Board of Revenue, Uttar Pradesh

Chapter- 2

CREATION OF SURVEY INFRASTRUCTURE AND SPATIAL DATA

The Abadi area in most of the states is not surveyed and there are no record-of-rights for the properties in the Abadi area. Under the SVAMITVA scheme, the Abadi area in villages is being mapped by the Survey of India in collaboration with the state governments to generate maps on the 1:500 scale. Based on these maps, record-of-rights is prepared and property cards are issued to the owners in the Abadi area.

2.1. Process for Survey and Creation of Maps

Drones are programmed to fly and capture image at a pre-determined time interval. The drone photographs are overlapped to create a seamless image compiled of the mosaic of images. After post-processing the images, feature extraction is a big challenge as it is manually done on the system and involves human interface. The quality of work depends on the person who extracts the required information for generating the spatial data. The image itself is not spatial data since the required spatial data has to be extracted and validated on the ground is a must to generate spatial data of a property. Spatial data is only a part of the information in Property card and many other vital information required for a property card has to come from other sources.

Broad steps are illustrated below:

- i. **Acquisition of Images**
 - a. To acquire accurate high-resolution images having better than 5 cm GSD and ± 12.5 cm or better planimetric accuracy, RTK (Real Time Kinematic) /PPK (Post Processed Kinematic) enabled Professional Survey-Grade Drones are used by the Survey of India.
 - b. Necessary Permissions or Clearances for drone flying are obtained from DGCA, MHA, etc. Guidelines regarding Registration, Remote Pilot Training, and Safety guidelines for unmanned aircraft systems are being followed during the implementation of large-scale drone survey mapping carried out under SVAMITVA.

- c. Demarcation of the Abadi area of the village by issuing notices to the adjacent landholders is done by the state government officials.
- d. Ground marking of individual parcels/properties in the area to be surveyed using white limestone powder or any other appropriate method is to be done by the state government officials.
- e. Mission planning for drone flying is done by the Survey of India, using available maps or satellite data based on boundary coordinates provided by State officials.
- f. To facilitate the geo-tagging of drone images and checking of the final data, ground control points (GCPs) are established in the vicinity of the area to be surveyed. These GCPs are established either using CORS (in static mode) in the states where the CORS network is operational or using DGPS pair.
- g. The data captured using drones is processed in the Survey of India labs using drone data processing software on dedicated High-end Computer Systems for the generation of ORI(Ortho Rectified Imagery) and DEM(Digital Elevation Model). The Survey of India is also exploring cloud-based data processing solutions for this step.

ii. Feature Extraction and Base Map Generation:

- a. All the topographical features agreed upon in the MoU with the state government would be extracted by the Survey of India including property boundaries marked or visible in the ORI.
- b. Attribute information and other secondary information in the GIS database is incorporated in consultation with the state government.
- c. The numbering of properties within the Abadi area is done as per the numbering system provided by the State Revenue Department and a Land parcel Map on a 1:500 scale is generated.

d. Issues faced during digitization/ Feature Extraction

- Misinterpretation of boundaries while doing feature extraction on the drone image. Drone image is an overview of a property from a height above the property. After an image is captured it has to undergo processing and later the boundary of a property has to be extracted

from the image manually. The quality of extraction of boundary depends on the interpretation of the person involved in the process. When an image is captured, if tree camouflage is there and the building corners below the trees it cannot be seen in the image and the boundary of such properties below the trees are the interpretation points of the person who extracts the property boundary.

- In addition many times the property boundaries are not clearly visible from the top and if there are buildings having common boundaries, the separating points of the properties are again the interpretation of the operator.
- When there is vacant land around the building it is difficult to determine the plot boundary from the image.
- If there are many vacant properties, boundaries between them is also very difficult to interpret on the image unless there is clear boundary stone which are visible on the image.
- Many ground features are hard to recognize on the image and some ground features are covered by the roof of the building and hence and not visible on the image. Hence there is always possibility for misinterpretation of boundaries while extraction of information from drone image.

iii. Ground-truthing and validation of Land Parcel maps are done by the state government.

- a. Ground marking of parcels/properties has to be done even before the flying commences. When markings are done, care should be taken that all such markings are captured in the image and based on these markings if the boundaries of the property is extracted errors can be minimized. As mentioned above, if there are tree coverage and buildings below the tree are not seen then markings also are not seen in the image. In such cases a hard copy print has to be carried to the field and physical measurement has to be taken and recorded on the hard copy of the image from the visible points.

- b. The other solution is to generate a map of the property from drone image with measurements for all vertices of the property, print it to the convenient scale and visit the property to verify physically using tape / ETS to ascertain the correctness of the measurements of the property on ground compared to the map generated using drone image. To get the best results all possible measurements of all properties have to be measured.
- iv. **Enquiry Process for Ownership adjudication:** The process is initiated, where survey officials verify ownership of the land parcels, with the help of gram sabha, land owners, and review the existing documents. Mapping is one part of the activity of generating property card. The major activity is deciding ownership of the property by collecting information about who owns the property and how ownership is acquired. For this purpose required documents are to be collected from the person who claims ownership. The ownership could be by purchase, inheritance, gift, grant or could be only based on very long period of possession. After collecting information from the owner the data needs to be examined for deciding the ownership – this process is called Title Enquiry.

Broad level process followed:

- a. Title enquiry process involves collection of ownership documents from the building owners in the first step. However, just based on the documents given by the owners the title cannot be decided. Genuineness of the documents have to be examined. Establishing the link between the documents has also to be done. This process involves comparing the documents with the department / authority which has issued the documents. In addition if there are differences in names, area or dimensions recorded in the documents given by the owner to that of the information available in the department, a further detailed examination has to be done to find out the cause for the differences. Hence Title enquiry is a very big detailed and complicated process.
- b. Title enquiry process is a complicated task in SVAMITVA as it proposes to generate Property Cards for the village settlements. Citizens are living in these abadi areas from very long time. Properties within abadi areas are generally having houses and less open places. These properties generally

gets transferred through inheritance from one generation to the next and the siblings continue to live in the same house and whenever necessary renovation is undertaken. Sale transaction of properties within abadi Area is very less and most of these properties will not have any ownership documents unlike city area or houses constructed outside abadi Area. For example, as in Karnataka, the only reference found in official document is entry in tax registers of the village panchayat. Hence, the Gram Panchayat shall update the property tax and asset register of GP, wherever applicable.

- v. Post validation and verification, creation of final LPM (Land Parcel Maps), village maps /digital GIS maps and GIS database.
- vi. Creation of Property Cards by State Government
The Property Cards are generated after following the prescribed process of Law. It is a process of measuring and mapping of the properties, collecting and scrutinizing the ownership documents received from the citizens / departments, and determining the owners of the properties through the process of title enquiry. Drone output is only an image of a property as seen from above which is used as one of the input while preparing the property card. Drone image is only a tool which helps in preparing required spatial data and hence drone output by itself cannot be considered as spatial component of the Property Card.
- vii. Final deliverables (Final maps and GIS database) are handed over to the Ministry of Panchayati Raj and the State government.
- viii. Training, Capacity building for hand holding to the officials of state governments is facilitated by the Survey of India to make the process more efficient.

2.2. Internal Resources of Survey of India

1. Establishment of CORS network:

Preparation and maintenance of the National Spatial Reference Frame (NSRF) is the mandate of the Survey of India for establishing the CORS network in India. NSRF comprises of Horizontal Spatial Reference Frame (HSRF) and Vertical Spatial Reference Frame (VSRF). HSRF in India was relayed by Ground Control Point Library. In 2019, the Survey of India undertook the modernization of HSRF by establishing PAN-India CORS Network.

2. Drone flying:

As of October 2022, the Survey of India is having more than 250 operational drones. In addition to that, the Survey of India has hired drones as a service. Presently nine firms have been empanelled to provide drones as a service for the generation of orthorectified images (ORI). The core service given by these firms is to provide ORI images of the quality required under the Scheme. These ORI images are checked by the Survey of India to ensure quality compliance.

3. Supervision the quality of work:

The Survey of India has experienced manpower to monitor the outputs generated in the SVAMITVA scheme including ORI and GIS vector data. The Survey of India has an in-house training facility in National Institute for Geo-Informatics Science And Technology, Hyderabad. In addition to in-house strength, several GIS supervisors have been hired who work under Survey of India section officers to ascertain the output and quality of work.

4. Processing of data for producing draft maps and final maps after ground verification:

The Survey of India has more than 200 high-end computer systems for processing Drone Imagery and more than 1200 workstations for feature extraction and preparation of final GIS data and maps after ground verification. With the advent of new draft geospatial policy, Sol now have an unlimited data processing and feature extraction capacity through hiring of services from the market.

2.3. Process and procedures for hiring manpower and equipment from the private agencies

1. In the initial phase of the SVAMITVA Scheme, the Survey of India deployed drones owned by it only. With the advancement of the SVAMITVA scheme, Survey of India decided to outsource some of its workload to the industry. A drone service tender was floated by the GIS Technology Cell of the Surveyor General's office on 02/07/2020, and after the tendering process, the contract was awarded on 30.10.2020. Under this contract, the vendor was required to fly the drone over an area and deliver the raw data, which was then processed by the Survey of India to generate orthorectified imagery for further activities.

2. After the pan-India launch of the SVAMITVA scheme, a huge workload was generated for data processing activities. To speed up the work, it was decided to get the raw data processed by the vendor only. To implement this model a bid was floated by Punjab GDC, Chandigarh on 29.09.21 and the tender was concluded on 17.11.21.
3. When the requirement for drones increased manifold, it was decided that to avoid the multiple tending process, some experienced and technically qualified service providers be empanelled, and teams can be deployed as per requirement without any cap on the number of teams in the contract. Since the empanelment was not possible on GeM, tendering was processed on CPP Portal on 15.09.22. After a rigorous process of capacity evaluation and cost evaluation, 09 firms were empanelled by the Survey of India for hiring drones Services up to the generation of ORI.
4. Survey of India has augmented its capacity by hiring digitisers, Drone as a Service, pilots, co-pilots, etc. from the private sector.
5. Survey of India has relaxed a few eligibility criteria and financial conditions in their tenders for promoting participation from Start-up companies:
 - i. A bidder except for DPIIT registered/recognized Start-Ups should have 1-2 years experience in carrying out Professional Survey grade RPAS/Drone based large-scale mapping projects.
 - ii. The average annual financial turnover of a bidder during the last three years, ending on 31st March 2020, should be at least Rs. 2 million or more as per the annual report /audited balance sheet and profit & loss account of the relevant period, duly authenticated by a Chartered Accountant/Cost Accountant in India or equivalent in relevant countries.
 - iii. For Manufacturers recognized as Startups by DIPP the condition of average annual financial turnover is condoned.
6. The Manpower hired by various offices of the Survey of India is monitored by experienced Survey of India officers, who are deputed as camp officers for field work and section officers for office work. The hired manpower is trained by the Survey of

India personnel for the execution of the work. As per the requirement, there is also a provision of training of manpower in the NIGST, Hyderabad.

7. Quality Assurance/Quality Check of data captured by outsourced agency:

Survey of India has a team of experienced personnel who check the delivered data by the outsourced agency for errors, both qualitatively and quantitatively. Payment to the service provider is released only after acceptance of the quality of data.

2.4. Software and Applications

1. Survey of India

- i. Survey of India has an Enterprise Level Agreement with M/s ESRI, under which it has been using ArcMap and ArcGIS Pro for digitization and feature extraction activities and preparation of the final GIS attribute database of villages. To process drone imageries, the Survey of India has procured more than 200 Licences of Pix4D and AGI-Meta shape software.
- ii. The GIS data is being generated in shapefile format, which is supportive and compatible with various proprietary, open-source, and GIS software used in DILRMP. Data is provided to the state government in such a format that it is interoperable with their database.
- iii. The Survey of India is in the process of supplying and handover the final GIS data along with ORI, vector, and DEM elevation data of covered villages under implementation across various states to the Ministry of Panchayati Raj for integration in its spatial planning Application ‘Gram Manchitra’.

2.5. Ownership, Hosting of Data and Disaster Recovery

The following datasets are generated under SVAMITVA Scheme:

S No	Data Generated
1	Ortho-Rectified Image (ORI) of better than ± 5 cm GSD
2	GIS database* prepared on 1:500 scale on UTM projection and WGS-84 datum
3	DEM/DSM of better than ± 20 cm accuracy
4	Record-of-Rights and Property Card data.
5	Hard copy maps on a 1:500 scale for a village on good quality 90 GSM paper along with pdf copy

- i. ORI/ **GIS** layers created under Scheme shall be owned by Survey of India and is responsible for maintaining the data.
- ii. GIS Data containing property details would be owned by State Government as it has the authority to mutate the record-of-rights and update the maps. Hence, State will be the owner/host of this data, and others will have a right to view it.
- iii. State government shall be responsible to future update of property parcels using Rovers etc., after a time interval as per State policy and there must be mechanism for cross sharing of data with other user departments through API enabled service.
- iv. Survey of India shall share all GIS/Spatial data generated under Scheme with Ministry of Panchayati Raj and State Government as per Scheme Framework and their respective MoUs with State.

2.6. Maintenance of Continuous Operating Reference Stations (CORS)

1. Continuously Operating Reference Station or CORS is a network of reference stations that provide a virtual base station that allows access to long-range high accurate Network Real-Time Kinematic (RTK) corrections. It Supports establishing Ground Control Points (GCP) for aerial surveys, ground truthing, demarcation of lands, etc. This geospatial Infrastructure will facilitate location information of +/- 5 centimetres (cm) level accuracy in real-time across the country.
2. Preparation and maintenance of the National Spatial reference frame is a mandate of the Survey of India. The CORS network established under the scheme is an essential part of it, hence the Survey of India would maintain the CORS network.
3. The Govt agencies can register themselves on the CORS portal of the Survey of India i.e. *cors.surveyofindia.gov.in*.
4. The Standard operating procedure for using the CORS is available on the Survey of India website and on the CORS portal itself. To provide further assistance, few instructional videos have also been uploaded on the CORS portal.
5. The Services of the CORS network are available for private users at fair and transparent pricing.

2.7. Use of CORS and Data/Maps by other departments

1. The CORS network supports the establishment of Ground Control Points, which is an important activity for accurate geo-referencing, ground truthing, and demarcation of lands.
2. Once the CORS network is established, it can be used by any state agency or department viz. Revenue Department, Gram Panchayat (GP), Public Works Department, Rural Development Department, Agriculture, Drainage & Canal, Education, Electricity, Water, Health, etc. for the survey and implementation and use of GIS-based applications.
3. It plays a major role in achieving centimeter accuracy positioning in many applications, like cadastral mapping, land information management, large-scale mapping, fleet management, etc., and facilitates any survey-related activities like road construction, Irrigation works, infrastructure works, etc.
4. CORS network established also covers the border areas of other neighbouring states resulting in accurate Geo-referencing in these areas.

2.8. Application of CORS in Various Sectors

1. **Disaster Management and Emergency Response:** CORS network positioning services can be used for various applications of disaster management and emergency response – Floods, Earthquakes, landslides, tsunamis, etc.. It can be used to monitor the positions and movements of natural and man-made structures such as glaciers, landslides, dams, bridges, buildings, towers, offshore oil rigs, etc. Warning Systems can be put in place with the help of the CORS network. In regions where earthquakes are likely to occur, along major fault lines, and in areas of volcanic activity, networks of suitably positioned GPS reference stations are often used to monitor movements of the Earth's crust.
2. **Transport Sector:** CORS can be used for route alignment, geofencing of routes, and planning for road infrastructure. It shall bring in efficiency and tracking of vehicles, especially government transport.
3. **Power Sector:** CORS may be used for efficient planning of power infrastructure and monitoring.

4. **Irrigation:** CORS shall be used for planning efficient irrigation and drainage systems.
5. **Agriculture:** When used for the precise positioning of farm machinery, CORS Network can be used to improve crop yields. CORS can be utilized in planning and managing seed sowing more precisely to create less waste and reduce costs. Improving and increasing the cost-effectiveness of crop management strategies including fertilizer inputs, irrigation management, and pesticide application will bring Precision Agriculture and will improve farmers' financial and social conditions.
6. **Construction & Planning:** CORS Network can be used for machine control on construction sites. This creates efficiencies by increasing the accuracy of the work, cutting fuel use, and reducing operator error. CORS can help in urban planning, urban construction, and many other requirements.
7. **Surveying:** CORS Network is used for land monitoring, building, and setting out, among other types of surveying.
8. **Accurate asset management:** Companies in the energy and infrastructure sector use CORS Network to map their buried services like pumps, electricity precisely. This saves time in relocation and enables repairs to be carried out quickly and efficiently.
9. **Land use changes:** CORS Network can serve as a tool for monitoring land use changes and detecting unauthorized development.
10. **Machine Guidance:** On large construction sites and in opencast mines, work can be carried out faster, with higher accuracy, and using less material when machines are equipped with automatic guidance and height-control systems. Bulldozers, graders, scrapers, drilling machines, etc. can be positioned and steered to centimetre accuracy with RTK.
11. **Data collection:** RTK and DGPS measurement techniques are widely used for updating the database, surveying new features, and re-surveying existing features to improve the accuracy of the data. The GIS database shows the location of property boundaries, infrastructure, and assets such as water pipes, hydrants, power lines, gas pipes, telephone lines, etc.
12. **Meteorology:** The delay in the GPS signals as they pass through the atmosphere provides valuable information for meteorologists. The data is used to assist in

weather forecasting and studying climatic change. For such applications, it is usually required to connect a meteorological sensor to the GPS receiver at the reference station. The meteorological sensor delivers temperature, humidity, and pressure data, which are recorded together with GPS data.

2.9. Maps Data Handling & Usage Policy and Interventions

1. SVAMITVA data compliance with various guidelines and Policies: -
 - i. **National Geospatial Guidelines**- SVAMITVA data involves the creation of spatial layers with attribute datasets. SVAMITVA workflow has a process of feature extraction of ground layers from the drone Imagery that contains location information of each layer point along with attribute data. A drone survey creates an ortho rectified Image (geo-referenced) that has location-linked latitude and longitude data in CSV format. It shall fulfil the vision of *Atmanirbhar Bharat* as mentioned under the guidelines.
 - ii. Handling & use of all datasets generated by outsourced agencies under the scheme. An appropriate Non-Disclosure Agreement (NDA) in addition to contractual obligations is to be ensured considering the authorized use of their on-premise IT infrastructure or Cloud Services within the scope permitted under the “New Geospatial Guidelines” issued by DST, Government of India.

2.10. Future Updating of Record

- i. **Need for future Updates**
 - a. **Creation of Property Records in respect of new extensions** - Always the village / city boundary keeps getting expanded and new properties keep getting added. As and when new properties are created there should be a mechanism to add such properties on a regular basis. Mapping of properties as and when created, is a challenge, because all the properties do not get created at the same time, in which case it would be a continuous process and may not be much of a challenge. Hence a proper mechanism has to be adopted to add new properties as when they are created and particularly when new extensions all around the village / city keep mushrooming.

- b. **Changes in property records needs to be continuously updated** - Due to new constructions and change in land use in the village / city where already property cards are created and maintained. New buildings will be constructed by demolishing old structures. Residential properties get converted into commercial usage. Many a times new projects are taken up by acquiring and amalgamating properties. There are possibilities of vertical growth of properties – apartments are constructed. Such changes in usage of land, and recording of such information in property card needs a proper mechanism to be in place.
- c. **Mutation of property records in case of sale / partition etc** - this is another activity which has to be taken care of for the information to be always continuously updated. This process may involve changes in the spatial data as well as ownership or it may involve only changes in ownership (without any change in spatial data).

ii. Process may be adopted

- a. State governments would be responsible for conducting future updates of records. The frequency of updating would be decided by state governments.
- b. Whenever new layouts are formed before approval of layout a proper survey needs to be undertaken using a mobile device setup integrated with Rover1 for accurate positioning as it is easy, quick and less time consuming. If co-ordinates are captured for each property including common property like roads, parks and such civic amenities including assigning unique numbers, the same can be easily consumed to generate property cards with spatial data without flying drones every time.
- c. Future map data or attribute data updating or collection should be done by the state officials as part of their functional duties only. The regular updating of the datasets can only be ensured in this fashion.
- d. The Survey of India would provide training to the state government officials (master trainer) on the operations and use of various applications and

¹ A rover is a small GPS receiver with data-collecting and transmitting capability. Their ability to perform measurements offers unprecedented advantages for quickly and inexpensively measuring features on a land with near-survey accuracy in minutes.

technologies for the updating of map data. The state government departments will have to build in-house capacity to handle the project.

2.11. Training & Capacity Building Needs for various Stakeholders

1. Training and capacity building of various stakeholders at various working levels is very critical for the successful implementation of the scheme and achievement of short-term and long-term objectives. Training activities should broadly cover the skill up-gradation of the state officials at basic, supervisory and executive levels for the specific roles and responsibilities covering Surveying methodology, Revenue Processes, Drone Survey technology, CORS technology, Scheme specific operational tasks, GIS data generation, digital data handling, future updating of datasets, future uses of GIS data, etc.
2. Training of the manpower resources for the ground-level activities is the most critical aspect, considering the large number of resources required for the execution of the activities. Skill-based training for job roles like Drone Pilots, GNSS surveyors, Drone Data Processors, Feature Extraction Operators, QA/QC surveyors/supervisors, ground data collection surveyors/supervisors, Map Verifier, Revenue surveyors, etc.
3. Presently, ground-level revenue survey staff engaged for execution comes from varying backgrounds and constitutes a challenging mix for skill up-gradation, particularly in new technology areas. These officials stand differently to grasp the new skills as they are from diverse backgrounds in terms of education level, surveying skill level, age bracket, professional experience, communication skills, language known, etc. Hence it is very important from the state government's perspective to earmark suitable resources for professional training considering these factors.
4. The training can be imparted effectively through various training facilities available for skill up-gradation at Central, State, and private entities. It would be very important to devise short-term custom training modules in addition to existing available training modules to train the resources for a specific job role. Any professional training module has to be a mix of academic understanding, technical knowledge, and practical exercises considering the target role and level of focus as learning objectives. For example, while training a village surveyor for the GNSS Surveyor role, he/she needs to be given exposure to Drone technology and its application in

Land Surveying to have clarity about the present assignment and develop an understanding for achieving the long-term objectives to use this know-how to update and maintain the currency of the records.

2.12. Approach for Handling Training Needs

1. Professional Training Institutes like NIGST (Survey of India), State Revenue Training Institutes, Drone Pilot Training Institutes, and other GIS training institutes are to be involved to address these training requirements.
2. Training of **State officials (Master Trainer)** can be imparted at the Survey of India training institute i.e. NIGST, Hyderabad. NIGST, Hyderabad has been conducting specifically designed short-term course modules covering Drone & CORS technology, and its usage with practical exercises. The following short-term (one-week) course modules will serve the purpose:
 - i. Field Data Verification Using Field Data Collector (FDC) With Web-Services of Area of Interest (FDC and Rover)
 - ii. Drone Photogrammetry
 - iii. 2D Feature Extraction
 - iv. Network RTK, CORS, Testing of CORS Network
3. Training modules need to be developed for all job roles like Drone pilots, GNSS surveyors, Drone Data processors, Feature Extraction operators/supervisors, QA/QC surveyors/supervisors, Ground data collection surveyors/supervisors, Map verifiers, Revenue surveyors, etc. There are certain job roles like Drone Pilots, GNSS surveyors, Drone Data processors, Feature Extraction, etc, which are more critical for execution agencies i.e. Survey of India, and private companies engaged through outsourcing of services. However, at the State Govt level, a broader understanding of these job roles would be sufficient with more focus on ground data collection, data validation, attribute collection, Use of NRTK services, etc.
4. A training module will be prepared with a focus on training objectives considering the trainee's background, course duration, No of contact hours for lectures, lab or field Exercises, pre-requisites (if any), course contents, practical exercises details, etc. A standard training module covers all topics and is available for training with an

Institute. On the other hand, a custom training module will cover topics and content specifically suiting the scheme-specific job role requirement.

Standard Training modules as given in point 2 (i),(ii),(iii),(iv) above have been prepared at NIGST, Hyderabad covers the following job roles of SVAMITVA scheme execution (see **Annexure-I** more details):

- GNSS Surveyor (including NRTK Survey),
 - Drone Data Processor,
 - Feature Extraction operator/supervisor,
 - QA/QC Surveyor/supervisor,
 - Ground data collection surveyor/supervisor,
 - Map Verifier
5. A training plan for a year is to be worked out based on state government training requirements for standard modules or custom modules. Standard training modules (1 week to 2-3 weeks) meeting the specific job role requirements with NIGST or other institutes can be opted directly as per their calendar schedule, whereas custom modules (2-3 days to 5-6 days) developed for a specific purpose can be scheduled by the institute on special request from the state governments. (See **Annexure-II** for details about the custom module)
6. **Best Practice showcased by Maharashtra in Training and Capacity Building:** Maharashtra Land Records department has taken the opportunity accorded by SVAMITVA Scheme to enhance GIS capability of its staff. State has created dedicated GIS cell and Project Monitoring Unit (PMU) at its headquarter with the following manpower: A senior technical director from NIC, 3 consultant from major consulting firms in the field of IT and GIS, 5-6 senior and junior programmers in IT and GIS, 2 desk officer of the rank of Dy SLR, Digitizer and data entry operator for support. In order to train the manpower (nearly 7000) in GIS, Maharashtra has collaborated with College of Engineering, Pune and NIT, Nagpur residential training. State has also collaborated with NIGST, Hyderabad for more detailed training in surveying and GIS and two batches have been successfully trained at the institute. Training is continuously being given to new recruits and mid-career training to senior staff on Rovers, CORS and GIS at Land Records Training

Academy, Aurangabad. State also organizes training at district level for surveyors in GIS and related subjects. Details are included at Annexure III.

2.13. Challenges faced and Mitigation approach adopted

Major Challenges faced by different Stakeholders are illustrated below:

1. Survey of India

- i. States are sharing the extent of the Abadi area with the Survey of India team through excel or in KML files. However, unawareness or lack of training on preparing KML files of drone flying villages in a few states leads to delays in drone flying operations.
- ii. Inefficient coordination between the State government and the Survey of India. Many a time the villages are notified for drone survey but chuna-marking is not done by the village-level officers.
- iii. Improper chuna marking of villages in some cases results in repetitive drone flying over the same area leading to inefficient utilization of drones and increased drone flight time.
- iv. Low ortho-rectification and map production infrastructure.
- v. Difficult terrain and connectivity issues in hilly regions of Uttarakhand, Himachal Pradesh, Jammu & Kashmir, and Ladakh.
- vi. The progress was assumed to be 5 villages per day by a drone team. However, in a few states, cluster village planning is not adopted, and hence fewer villages are being provided which impact the schedule.
- vii. Resource crunch: Delay in shifting of drones from one location to another for optimal utilization of resources, High turn-around time in the deployment of available drones on the ground.
- viii. Data integrity: Need for oversight by Survey of India on outsourced agency to prevent data manipulation/tampering.

2. States

- i. Shortage of manpower for ground verification and drone survey.
- ii. Siloed approach of departments towards data sharing to facilitate ground verification.

- iii. Unavailability of MIS for managing and monitoring the progress of the scheme.
- iv. Sometimes due to local disturbances and misinformation spread by the non-social elements, vendors have faced difficulty in establishing the CORS station.

3. Ministry of Panchayati Raj

- i. Challenges related to missed timeline and milestone targets.

Mitigation Approach Adopted

- i. The Ministry of Panchayati Raj conducts weekly progress reviews with the States and the Survey of India to review the progress of implementation of the SVAMITVA Scheme, address the concerns, and support the resolution of issues.
- ii. Milestone-based implementation approach.
- iii. Orientation training on Scheme provided to States.
- iv. Pilot Phase states demonstrated best Practices/ tools created for SVAMITVA Scheme to other states/ UTs for adoption and streamlining the processes.
- v. The Survey of India provided online training on the SARTHI application for automation of the ground verification process.
- vi. As per the scheme framework, a four-level Monitoring framework was put in place at the Central, State, District, and Panchayat levels for monitoring the progress of the scheme.
- vii. Central SVAMITVA Scheme dashboard developed (svamitva.nic.in) to review and monitor Key performance indicators.
- viii. Regular interaction with Survey of India to assess the drone requirements for various states and plan the pipeline of drone deployment and augmentation of necessary infrastructure viz. data processing labs, GIS digitizers, drone pilots, etc.

2.14. Recommendation

- 1. At present the Ministry of Panchayati Raj provides funds to the Survey of India for the creation of survey infrastructure and spatial data of Abadi areas in states. The Survey of India enters into an MOU with the state enlisting responsibilities of the Survey of India and the state for the completion of this work. The officials of the Survey of India conduct various activities in coordination with the state and district

officials. It has been observed officials of the Survey of India face many obstacles like delayed notification of villages to be surveyed, lack of advance publicity, non-compliance of cluster-based drone-flying, delayed information of ownership data etc. These factors delay the completion of survey work. There is a need for village-wise close monitoring of the whole process by the National Steering Committee and the State Steering Committee. The National Programme Management Unit and State Programme Management Units should be adequately strengthened for this purpose.

2. Completion of survey of a village involves many processes like selection of villages, establishment of CORS network, dissemination of information on the schedule of survey to the public, marking of properties on ground, procurement of drones, obtaining requisite permissions for drone-flying, capturing images, processing of captured images, ground validation, verification of ownership data, hearing of objections etc. Some of these processes are to be completed by the Survey of India and some other by the state government. Any delay in any process affects the quality and timely delivery of the end product. Therefore, it is essential to monitor timely completion of each of the processes involved in this work. This can be done only through a comprehensive work-flow based IT Platform. This IT Platform should be developed by the Ministry of Panchayati Raj. Each of the agencies involved in the process should feed authentic data on this IT Platform using its user ID and password. This software should generate appropriate MIS reports for the supervisory agencies for taking corrective actions whenever required.
3. The data being created under the SVAMITVA scheme is very valuable data which is being created for the first time. The record-of-rights prepared on the basis of this data has legal implications on the rights of the people in Abadi area. This data is also likely to be used by many other government departments and private agencies. It is very important to protect this data from unauthorized changes and manipulations. There is a need to categorize this data on the basis of its sensitivity. Security features for each category of data should be introduced as its sensitivity classification. The Ministry of Panchayati Raj, in consultations with all the stakeholders, should frame appropriate protocols and guidelines to ensure the security of this data. These guidelines should be aligned with the National

Information Security Policy and Guidelines of the Ministry of Home Affairs and any other such policy of the Government of India.

4. Along with the security of data, the privacy of the personal data of the people is equally important. In consultation with all the stakeholders, a policy for allowing this data available to other agencies and put in the public domain should be formulated. This policy should take into account the existing privacy laws and policies of the Government of India and state governments.
5. To maintain the integrity of data for all times to come, it is very important to establish ownership of data created under the SVAMITVA scheme. It should be clearly understood that ownership is different from user rights. While many departments may be allowed to use this data, ownership should preferably be with a single agency. The owner of the data should, for all the time, be responsible for the security and integrity of this data. It should also be responsible for making this data available to other agencies and ensuring compliance with security and privacy policies by the user agency. As per the guidelines of the SVAMITVA scheme the Ministry of Panchayati Raj, the Survey of India and state governments are joint owners of the data created under the SVAMITVA scheme. This policy should be reviewed in consultation with all the stakeholders. The department which is made owner should have the technical capability, long-term stake and availability of funds to maintain and update this data.
6. Under the SVAMITVA scheme, two kinds of data are created. One is the geospatial data and the other is the record-of-rights. The revenue departments of states have the mandate of preparing and maintain the record-of-rights under the provisions of the law. They are using geospatial data for the preparation of record-of-rights for the first time but may not have the capability to maintain and update this geospatial data which has many uses other than record-of-rights. Therefore, the responsibility of handling geospatial data on a long-term basis should be given to the revenue department only if it has the capability to do so. Other departments in the state which are already handling geospatial data should also be considered for this role.
7. The huge investment being made in the survey infrastructure and creation of geospatial data will remain underutilized if this data is not updated with

appropriate periodicity. While there are legal provisions for updating record-of-rights, there is no policy or guideline for updating geospatial data created under the SVAMITVA scheme. The Ministry of Panchayati Raj should frame appropriate guidelines for this purpose.

Annexure- I: SVAMITVA Standard Module Training

Module Name: FIELD DATA VERIFICATION USING FIELD DATA COLLECTOR WITH WEB-SERVICES					
Module Code: T-FDC					
Sl. No.	Sub Module Name	Contact Hours			Non-Contact Hours
		Theory	Field	Lab	Assignment
1.3.1	FIELD DATA VERIFICATION(T-FDC-1) Overview of Basic Workflows using android/windows based Field Data Collector (FDC)	4	0	0	0
1.3.2	FIELD EXERCISES(T-FDC-2) Planning & Preparation for creating and loading web services on FDC, Field data Acquisition, Synchronization with data on the Server	0	36	0	0
	Sub Total	4	36	0	0
	TOTAL			40	

Course Name: DRONE PHOTOGRAMMETRY					
Course Code: DS-R					
Sl. No	Course contents	Contact Hours			Non-contact Hours
		Theory	Field	Lab	Assignment

<p>1 INTRODUCTION TO DRONE PHOTOGRAMMETRY</p> <p>History of drone mapping; Type and classes of drones. An overview of mapping by drone.</p> <p>MISSION PLANNING</p> <p>Preparing for a flight; Ground Control Points; Image overlaps; Precautionary measures, Pre-flight Tests, An overview of Mission Planning software; The flight planning process.</p> <p>DATA DOWNLOADING & DRONE IMAGE PROCESSING:</p> <p>An overview of image processing software e.g. Pix4D, Agisoft, Imagine UAV; Image refinement; Computer hardware requirements; Principles of Drone photogrammetry: Calibration of the non-metric camera, self-calibrating bundle adjustment, the basic workflow for drone data processing alignment of imagery, sparse cloud generation, dense cloud generation, DSM/DTM generation, aerial distortions, ortho rectification process, ortho-mosaic, structures from motion 3D reconstruction from multiple overlapping images, error and accuracy assessments.,</p> <p>DRONE POLICY IN INDIA AND DGCA GUIDELINES:-</p> <p>Up-to-date drafts & regulations</p> <p>MISSION PLANNING</p> <p>Mission Planning and Uploading Mission</p> <p>DATA DOWNLOADING & GEO-TAGGING:-</p> <p>Geotagging of drone photos using Qbase and BlueFireMapAssist</p> <p>BASIC WORKFLOW (PIX4D)</p> <p>AT, Point Cloud, DEM, Ortho, 3D-textured Model Generation (Pix4D)</p> <p>BASIC WORKFLOW (AgiSoftMetashape)</p> <p>AT, Point Cloud, DEM, Ortho, 3D-textured Model Generation (AgiSoftMetashape)</p>	8	0	32	0
<p>Sub Total</p>	8	0	32	0
<p>TOTAL</p>	40			

Course Name: 2D DIGITISATION					
Course Code: DM-FE-R					
Sl. No.	Course contents	Contact Hours			Non-Contact Hours
		Theory	Field	Lab	Assignment
1	<p>Basic Workflow of 2d Digitization and Digital Mapping: Geo-referencing of base raster layer, Preparing for Data editing, Data editing, Symbolization, QA/QC.</p> <p>Raster Data: Raster Data Structure and encoding, TIN, DEM, Various formats, and interoperability.</p> <p>Data Presentation: Classification of various types of symbols, SOI symbols, and Style- sheets.</p> <p>Topology: Topological relationships: Connectivity, Contiguity, Containment, Topological Rules, Design of rule-based Topology for SOI SDMS, Topological workflow, and tasks.</p> <p>Data Reviewer: Introduction to Data Reviewer, Types of auto-checks in Data Reviewer.</p>	8	0	16	16
	DTDB – Basics of MicroStation: ADVANCE TOOLS OF GIS: Acquaintance to basic and advanced Editing Tools, 2D Feature Extraction using appropriate Feature classes and symbology with attribute entry and annotation placement.				
	DATA REVIEWER: Software Interface and acquaintance with Reviewer Tools, Starting/configuring /managing a Reviewer session, configuring automated quality control checks, Schedule the checks to run automatically as a Windows scheduled task.				
	Sub Total	8	0	16	16
	TOTAL	40			

Annexure- II: SVAMITVA Basic Module Training

SVAMITVA: Module-1 (2D FEATURE EXTRACTION)		
1	Course Duration	10 Working Days (80 hours)
2	Course Level	BASIC (Entry-Level Course)
3	Eligibility	State Land Surveyor
4	Job Roles	Feature Extraction operator/supervisor, Data QA/QC, GIS operator, GIS Supervisor

Sl.No.	Topics	Lectures (Hours)	Practicals (Hours)
1	Introduction: Drone Survey Technology	02	--
2	Overview of Datum & Projections	02	--
3	GIS & its Components	02	--
4	Data Formats	02	--
5	Introduction to SDMS or Data Model	02	--
6	Data Validation / Topology	02	--
PRACTICAL EXERCISES			
7	Creation of GDB, Feature Dataset, and Feature Class defining a projection for Vector / Raster data layer	--	6
8	Creation of Domains- usage of Domains, Attribute entry (including external sources).	--	6
9	Geo-referencing using GCP/GRID	--	6
10	Importing Data from KML/CSV/Others	--	6
10	Feature Extraction (Point, Line, Area), Attribute entry	--	22
11	Data Validation - Topology	--	4
12	Different types of analysis such as SQL, Proximity, Overlay, et.	--	18
Total		12 Hours	68 Hours

Annexure- III: Training and Capacity Building Initiatives by Maharashtra

Capacity building and skill enhancement under SVAMITVA

Experience of Maharashtra

1) **Introduction:** Under the SVAMITVA scheme, started in 2020 in six states initially and later extended to all the states of the country, digital records of property is being created for areas within the village site. In most of the states the village site areas have not been surveyed and hence do not have any record of right. Apart from creation ownership records (RoR), accurately georeferenced maps for the individual parcel as well as map of common properties and utilities are also being created. These digital records are going to be useful for the purpose of easy transaction, development and land use planning. Provision of civic amenities by the Local/regional planning bodies, proactive permissions of change of land use can be granted using the digital maps available online.

Intended use of these maps and digital records require adequate skills with the user departments. In the current process of creation of maps the following departments are involved in most of the states with little variation.

- a. Revenue Department - Patwari, Talathi, Karmchari, Circle Officer, Tahsildar, SDM etc
- b. Land Records Department – Surveyor, Ameen, Taluka Inspector of land Records, District Superintendent of Land Records etc
- c. Rural Development Department – Gramsevak, Rojgar sevak, Extension officers, Block Development Officers etc.

These functionaries have been working till now on textual records and paper maps. In most of the states, the Record of Rights (RoR) has been either fully digitized or is in the process of getting fully digitized and hence revenue/land record staff is reasonably aware about handling the digital RoRs. However, very few states have digitized their cadastral maps fully and most of them are now taking up the projects to digitize the cadastral maps and georeference them accurately under DILRMP. The staff in the Revenue department and Land Records department need basic skills to handle maps and digital records well. In very near future, these functionaries will require skills to alter these digital records as and when the situation changes on the ground. They will also require skill to use maps and digital records for granting various permissions relating to land.

Hence there is a need to plan for upgrading the digital skill specially GIS related skills of the staff engaged in land related records.

2) **Uses of the maps and records being created under SVAMITVA :** as mentioned above, the use of digital records and maps relating to land is going to grow exponentially. Some of the possible uses that digital records being created under SVAMITVA can be put to are as below

- a) *Use by other departments:* Uploading the correctly Georeferenced map of land parcel created under SVAMITVA on GIS portal so that it is available for the citizen and other departments for use.
- b) *Change in boundaries due to transactions:* As the subdivisions happen of a land parcel due to succession or sale purchase, the digital map and its boundaries need to be changed as per the mutation in the textual records.

- c) *Village level development planning*: The digitized and georeferenced map of the village site including all the utilities and open spaces and roads will be required to plan, estimate and execute infrastructure and developmental projects.
- d) *Land use Planning/Regional planning*: The georeferenced village and lowest parcel maps will be used for long term regional land use planning of an area including various reservations like industry, school etc. and the plans can be put in the public domain for reference.
- e) *Land acquisition for National/State level Infrastructure*: The georeferenced maps will be used for planning the land acquisition for major infrastructure projects like highways, railways, metro etc.
- f) *Disaster Management*: The maps, especially 3D cloud points will be used for planning for disaster management like floods, landslides etc.
- g) *Valuation of land*: the georeferenced maps will be used for valuation of the land for the purpose of stamp duty at the time of registration etc.
- h) *Agricultural extension and planning*: the georeferenced maps will be used for the real time planning of the support, extension, marketing to farmers and also for help in case of natural calamities (this is applicable where the mapping is being done for the entire village including the agricultural land) .
- i) *Building permissions by the Local bodies*: the georeferenced accurate maps will be used by the Local bodies to approve/sanction building plans.

3) Basic Skills needed for creation, updating and use of digital records created under SVAMITVA.

- a) Formats of the Digital Cadastral Maps
- b) Digitization of Map from a paper map and its quality check
- c) Basics of Geographical Information System (GIS)
- d) Coordinate System
- e) Geo-referencing of maps
- f) Collection of location data in the form of Latitude and Longitude from the field using GPS based equipment
- g) Upload of digital maps on web based GIS systems
- h) Use of basic edit tools available in common GIS software
- i) Basics of drone and acquisition of data using drone
- j) Checking the quality of Ortho Rectified Image

Some of the above mentioned skills may not be required for those who are not involved in creation and alteration of records but are working only in planning and use of georeferenced cadastral maps.

4) Enhanced skills needed for the staff of Land records department to enable transition from paper maps to global co-ordinate based GIS maps

Apart from the basic skills mentioned under point no 3, the staff involved in creation, updation and maintenance of the cadastral records in the department of survey need the following skills.

- a) Introduction to Photogrammetry
- b) Introduction to Projection systems
- c) Focussed use of popular GIS software like ArcMap, QGIS etc to analyse the spatial data
- d) Topographical errors and corrections

e) Basics of Geo database

5) **Training to the ground level staff of Land Records department in Maharashtra.**

With the felt need of GIS skill enhancement of the staff of Land Records department of Maharashtra a planning for the capacity building and change management was done. This involved the following components

- a) *Creation of a dedicated GIS under the Project Monitoring Unit (PMU) at the Headquarter.* To enable in house research in GIS and guide the entire department towards greater use of information technology including GIS, a PMU has been established with following manpower:
- i) A Senior Technical Director from NIC as its head
 - ii) 3 Consultants from major consulting firms in the field of IT and GIS
 - iii) 5-6 Senior and Junior Programmers in IT and GIS
 - iv) 2 Desk officers of the rank of Dy SLR
 - v) Digitizers and Data Entry Operators for support

The PMU in the Headquarter has the following verticals

- IT Cell : IT vertical has computer programmers and Project Managers to develop and monitor the software being developed for the department including database handling. It also helps the department in training efforts at the ground level.
- GIS Cell : GIS vertical takes care of all the GIS activities like development of software, its testing, development of SOPs and training modules for the department.
- Technology Cell : This vertical takes care of survey equipment including CORS and ROVERs and Drone related procurement, maintenance and training for the department. Currently, GIS and Technology Cells are functioning jointly.

b) *Tie up with Engineering Colleges in Maharashtra for training of Surveyors:* As the manpower to be trained in GIS is huge in numbers (roughly 7000), there is a need to scale up the training efforts. To scale up the number of staff to be trained quickly, We worked with two famous engineering colleges in the state. They are College of Engineering, Pune (CoEP) and Visvesvaraya National Institute of Technology, Nagpur (VNIT). After discussion on the training need of the ground staff (mostly surveyors), with CoEP and VNIT, a basic syllabus for 6 days residential training at the engineering college was drawn. After feedback from the first batch of the training, the desired changes were made in the syllabus and the approach. The details of the syllabus and pedagogy is given in Annexure I. Training of Surveyors and officers in premier Engineering colleges gives a sense of achievement to them and it also inspires them to learn further.

c) *Tie up with the NIGST, Survey of India, Hyderabad:* For the senior staff and officers, a more detailed training in surveying and GIS has been designed in consultation with the National Institute of Geo-informatics Science and Technology (NIGST), Hyderabad. Two batches have done their training at NIGST and based on their feedback, further changes in the syllabus has been done. Training for the remaining batches is planned in the months from July to November. The syllabus for the training at NIGST is as shown in **Annexure II**.

- d) *Skilling the faculty at Land Records Training Academy, Aurangabad:* Land Records Training Academy (LTRA) is located in Aurangabad and is responsible for conducting induction training for new recruits and mid career training for senior staff and officers. The trainings mentioned above were given also to the Faculty of the LTRA. A 6 days training on ROVERs, CORS and GIS has been designed and training is being continuously given to the staff and officers.
- e) *Training and Hands on at the district level:* As skilling in GIS and related subjects requires constant updation and hands on in the field, training by the trained staff is organized at the district level especially for the surveyors. A test for testing basic competency in user of ROVERs and GIS has also been designed for the surveyors.

The details of the trainings conducted till now is given in the **Annexure III**. Some glimpses of the training is given in the **Annexure IV**

6) Way forward

- a) *Strengthening the GIS Cell:* The GIS cell of the Land Records Department needs to be made capable and skilled for it to be able to give services to other departments using GIS services like Urban Local bodies, Rural Development Department, Regional Planning Authorities, Agriculture department. The process of hiring more manpower and giving more resources to it in the form of hardware and latest software is under progress.
- b) *Strengthening the LTRA:* The training Academy is being modernized by making most of the training process online through good videos, implementation of Learning Management System and providing a modern GIS lab. This will enable the Academy to cater to not only Land Records Department but also other departments for GIS related training.
- c) *Improving the promotional avenues for GIS trained:* The entry level qualification in the Land Records department is ITI surveying/diploma /degree in civil engineering. We are in the process of changing the recruitment rules for the surveyors to FastTrack the promotions based on selection of surveyors who are trained in GIS and who pass the qualifying tests at every level of promotion. The proposal is being made accordingly

Annexure I A

Syllabus for 6 days training in Basics of GIS
College of Engineering, Pune (CoEP)

Day	Practical	Theory
<p>Day 1</p> <p>1Hr Theory + 4 Hrs. Practical + 45 Min Soft Skill session + 15 Min Quiz</p> <p>(Additional 1 Hr Practice Session)</p>	<p>AutoCAD Practical</p> <ul style="list-style-type: none"> • Introduction of various AutoCAD software and extensions. • AutoCAD Screen Components and Interface • Shortcut keys in AutoCAD • Assigning co-ordinates in AutoCAD • Creating a New Workspace, Saving. • Creating layers, Sheet Sets, • Adding a Subset. • Digitization of Map in AutoCAD. • Conversion of AutoCAD File to .Shp Files, .Shp to CAD using Cad Map & Online converters • Soft skill Session: Group Discussion & Experience Sharing • Quiz 	<ul style="list-style-type: none"> • Basics of AutoCAD Theory • Components of Map • Concepts of Layers • Types of Data Management tools • Introduction of Co-ordinates, Introduction of Raster & vector data • Concept of Attributes • Limitation of CAD
<p>Day 2</p> <p>1Hr Theory + 5Hrs. Practical + 1 Hr Practice Session</p> <p>(Additional 1 Hr Practice Session)</p>	<p>Drone Practical</p> <ul style="list-style-type: none"> • Drone flying & Processing Practical <p>GIS Practical</p> <ul style="list-style-type: none"> • Geo-referencing of Top sheets, Satellite Imagery, Village map using GPC • Creation of shape file, GDB, PGDB, Symbology, Map Digitization & Attribute Creation, of. • Measurement, Techniques of Importing, exporting Land Survey Data on GIS • Soft skill Session: Team building & Management 	<ul style="list-style-type: none"> • Introduction to Arc GIS • Components of GIS • Hardware and software requirements for GIS • Coordinate systems, Projection systems in GIS – UTM, Conic, cylindrical, planner etc., calculation of UTM zone, • Concept of Pixels, Resolution Distortion etc
<p>Day 3</p> <p>1Hr Theory + 4 Hrs. Practical + 45 Min Soft Skill session + 15 Min Quiz</p> <p>(Additional 1 Hr Practice Session)</p>	<p>DGPS Practical, GIS Practical</p> <ul style="list-style-type: none"> • Land surveying using DGPS rover by establishing connection with CORS, Establishing GCP. • Using DGPS Identification of points on ground using co-ordinates. • Data collection of latitude, Longitude & elevation. • Hands on experience for hand held GPS, DGPS etc • Import & Export GNSS Survey Files in GIS for post processing. • Soft skill Session: Importance of Public Communication. 	<ul style="list-style-type: none"> • Introduction of SVAMITVA Scheme & components. • History & Development of GNSS, GPS, Working mechanism of GNSS devices, Drones etc. • Concept of RTK and PPK in • Types of GNSS

<p>Day 4</p> <p>1Hr Theory + 4 Hrs. Practical + 45 Min Soft Skill session + 15 Min Quiz</p> <p>(Additional 1 Hr Practice Session)</p>	<ul style="list-style-type: none"> • Quiz GIS Practical • Introduction to Google earth • Linking Spatial to Non spatial data base • Preparing choropleth Maps based on attached data, • Representing Attribute data on GIS Maps • Symbology and Labelling, • Exporting Maps from GIS, • Soft skill Session: Importance of Leadership • Quiz 	<ul style="list-style-type: none"> • Data structure and formats • Vector and Raster Data Structures • Data input in GIS • Linkage in spatial and non-spatial data
<p>Day 5</p> <p>1Hr Theory + 4 Hrs. Practical + 45 Min Soft Skill session + 15 Min Quiz</p> <p>(Additional 1 Hr Practice Session)</p>	<ul style="list-style-type: none"> GIS Practical • Creating Contours, Hill shade and Slope Maps from DEM • Geo-processing Tools • Spatial Data Query, • Soft skill Session: Stress Management • Quiz 	<ul style="list-style-type: none"> • Spatial Data Entry into GIS • Spatial Information Security & Sharing. • Conversion of Shape files to other file formats. • Limitations of GIS & Upcoming advancements in field of GIS
<ul style="list-style-type: none"> • Day 6 Practical at Survey of India to understand the complete flow of SWAMITVA project from data collection, processing, digitisation, correction and final output stage. 		

Annexure I B

Syllabus for 6 days training in Basics of GIS

Visvesvaraya National Institute of Technology, Nagpur (VNIT)

Short Term Training Program “Basic course in Geographical Information System” at VNIT Nagpur (18th to 22nd July 2022) Batch VI
VENUE: Smart Classroom, Department of Civil Engineering

Date and Day	Session I 9:30-11:00 (Smart Class Room)	Session II 11:15 – 13:00 (Smart Class Room)	Session III 14.00- 16.00 (Comp. Room)	Session IV 16.15- 18.00 (Smart Class Room)
18.7.22 Monday	Registration of Participants Inaugural Session (At smart Classroom) at 10 am	Generating Digital concept of Surveying (Theory) YBK Projection Systems and datum (Theory) YBK	Introduction to GPS /DGPS / CORS for Location based data generation (Theory + Practical) SP	Using CORS for Location based data generation (Practical) SP/DL/TJ
19.7.22 Tuesday	Using CORS for Location based data generation (Practical) DL/TJ/MMS	Using CORS for Location based data generation (Practical) DL/TJ	Introduction to Remote sensing and its components, Georeferencing of images (Theory + Practical) YBK	Georeferencing of Spatial Data (Practical) YBK/DL/TJ/ANP
20.7.22 Wednesday	Georeferencing of Maps (Using Department data) YBK/DL/TJ	Introduction to Google earth and generation of kml files (Th + Pract.) DL/TJ/ANP Lunch at 12.30-1.30	Drone Technology session SDVE Techno Solutions (Session starts at 1.30)	Drone Technology session SDVE Techno Solutions
21.7.22 Thursday	QUIZ 1 (15 Min.) Structure and management in GIS including overlay Analysis and Contour using Interpolation (Theory) YBK	Maps Digitization /Vector data generation from Georeferenced Department Data (Practical) YBK/DL/TJ	Introduction to AUTOCAD, Data and functions within AUTOCAD including Commands (Th. + Practical) MMS /AHP	Team Work and Managing stress for efficient working YMD
22.7.22 Friday	QUIZ 2 (15 Min.) Importing of Auto CAD files and Creation of GIS maps, exporting maps, conversion of shape files, import of csv files, etc. (Practical) DL/TJ	Working with Survey Data (Department) creation of attribute table (Practical) DL/TJ/ANP	Creation of Final GIS maps from Department Data including overlay analysis (Practical) YBK/DL/TJ	Communication Skills MB Feedback & Valedictory session

Note: Inaugural Function will be held on 18.7.22 at 10.00 a.m.

YBK: Dr. Yashwant B Katpatal, Professor and Head, Department of Civil Engineering, VNIT, Nagpur; AHP: Dr Amit Padade; YMD: Dr. Yogesh M Deshpande, Professor, Department of Humanities and Social sciences, VNIT, Nagpur; MB: Dr. Maithili Barahate, Asst Prof. Dept of Humanities, VNIT; SP: Dr. Sarang Paranjape; DL: Digambar Londhe (Res. Scholar); MMS: Mukesh MS (Res. Scholar); TJ: Tulshidas Jibhakate (Res. Scholar); ANP: Anooona NP (Res. Scholar); PG: Athira, Vaishnavi, Jaideep, Rashmi, Amruta.

Annexure II

Syllabus of 10 days Survey and GIS training for senior staff

National Institute of Geo-Informatics Science and Technology (NIGST), Hyderabad

Date	09.00 Hrs - 11.00 Hrs	11.15 Hrs – 13.00 Hrs	13.30 Hrs – 15.30 Hrs	15.45 Hrs – 17.30 Hrs
20.06.2022 (Monday)	Introduction to Survey: GTS, etc. History (GVK)	Basic Concepts of Surveying and mapping – (L) (PSK)	Demonstration & Observation on GPS instrument – (C) (RVVS /HS/SU)	
21.06.2022 (Tuesday)	Control Survey (horizontal) –(T) (NBS)	Control Survey (Vertical) –(T) (PY)	GPS Observation and data Downloading/ Processing – (C) (RVVS/ HS/SU)	
22.06.2022 (Wednesday)	GNSS Surveying techniques (rapid static/DGPS/RTK) – (T) (KVR)	Concepts and applications of Total Station Survey – (T) (YKR)	Levelling inside NIGST Campus – (C) (RVVS/ HS/SU)	
23.06.2022 (Thursday)	Theory of Error (Accuracy, Precision and Error) (T) (KVR)	Concepts and applications of Total Station Survey – (T) (YKR)	Levelling inside NIGST Campus and data Downloading/ Processing –(C) (RVVS/ HS/SU)	
24.06.2022 (Friday)	Demonstration and Control Survey by Total Station – (C) (RVVS/ HS/SU)		Detail Survey by Total Station – (C) (HS/SU /RVVS)	
27.06.2022 (Monday)	Detail survey by total station Data down loading and Processing –(C) (RVVS/ HS/SU)		Applications of Total Station-(C) (RVVS/HS/SU)	
✓ 28.06.2022 (Tuesday)	Basics of Photogrammetry (T) (RKD)	Complete work flow for mapping using UAV (T) (PRKP)	UAV Flight planning & Data processing- (P) (PRKP/RK/Ch.A))	
✓ 29.06.2022 (Wednesday)	Drone Flying and Data Acquisition- (P) (PRKP/RK)		Drone Data downloading Processing using AGI soft Meta shape s/w(PRKP/RK/Ch.A)	
30.06.2022 (Thursday)	Concept of Datum, Map Projection& Co-ordinate system –(T) (KVR)	Basics of GIS and Digital Mapping – (T) (YC)	Geo Referencing of satellite/Drone imagery using ArcGIS/QGIS –(P) (AR/KG/FA)	
01.07.2022 (Friday)	QA/QC of digital data –(T) (BCS)	Basic of Digitization using ArcGIS/QGIS – (P) (AR/KG/FA)	Valedictory function	

T: Theory Class, C: Campus Exercise, P: Practical's in Lab

Annexure III

Basic GIS Trainings conducted by various institutions

TOTAL NO. OF PARTICIPANTS OFFICERS AND EMPLOYEES TRAINED LIST INCOURSE GIS/SURVEYING/CORS				
SR.NO.	Course Name	Total Officers Trained	Total Employees Trained	Total
1	Basic Course in GIS by COEP Pune	45	101	146
2	Basic Course in GIS by VNIT Nagpur	74	140	214
3	Basic Course in GIS by GeotecAurangabad	6	24	30
	TOTAL	125	265	390
4	GIS Training by SOI NIGST Hyderabad	20	NA	
5	Surveying Training by SOI NIGSTHydrabad	20	NA	
	TOTAL	40	NA	40
6	CORS Training by LRTA Aurangabad	36	322	358
7	CORS Training At SLR office Levels	54	501	555
		90	823	913
	Total Trained Manpower			1343

Chapter- 3

CREATION OF LAND RECORDS OF THE ABADI AREA OF VILLAGES

3.1. Introduction

1. In most states, uncultivable areas like hilly terrains, forests, and homestead areas (called Abadi, Gaothan, Natham Purambok, Lal Dora land, etc.) have not been surveyed perhaps, Abadi lands were considered unproductive, and wasteland earlier and therefore not surveyed earlier. With increasing urbanization, the value of Abadi land is growing and there is a need for a detailed survey of these lands also. However, there was no concerted effort to survey Abadi lands as it was for agricultural lands mainly because of the lack of the driving force of land revenue collection. This is even though surveys are always revenue neutral, that is, the cost of the survey is always collected from landholders in due course. Possible reasons for not taking up this survey may be frontloading of the heavy cost of the survey, the survey being time-consuming, the drudgery of conducting a field-to-field survey, or a simple question of priorities.
2. However, there are some exceptions. In parts of Odisha, Abadi lands were surveyed along with the survey of agricultural land. Tamil Nadu Survey and Boundaries Act, 1923 provides for the survey of government land (defined as any land not forming part of an 'Estate'). Tamil Nadu completed the 'Natham' (Abadi) Survey in the 1980s and 1990s. Maharashtra had a law regarding the 'City Survey' since the 1860s. In fact, in 1867, it was pronounced that 'it is as much the duty of Government to survey cities and village sites as to survey agricultural lands.' However, as a matter of policy, the village site (gaothan) survey is taken up only when the population of the village is more than two thousand. A few existing examples of the legal framework can be seen to understand the need. Chapter VIII (Sections 121 to 131) of the Maharashtra Land Revenue Code, 1966 together with The Maharashtra Land Revenue (Village, Town and City Survey) Rules, 1969 provide for the survey of 'lands within the sites of villages, towns and cities, charging of survey fee, Grant of Sanad to every holder of land, etc. village site means Gaothan (Abadi), Gujarat also has a similar framework.

3. In the Northeastern Region, the land tenure system in the hill area, inhabited mostly by the tribal people, is markedly different from the system found in the plain area. As in most other parts of the country, in the plains of the Northeastern Region, individual rights over land holding are transferable and buying and selling of such rights are ordinarily unrestricted. However, in the hill area, individual rights over land are yet to take the form of full property rights in the sense that the transfer of these rights is subject to many restrictions. Non-transferability of holding rights renders land unsuitable as collateral to secure institutional credit to landholders. Land used to be communally held and the rights to land used to be distributed to families according to customary norms by the village council or the village chief as the case may be and as such, the land revenue is not collected. The absence of land revenue did not necessitate cadastral survey and settlement of land ownership. In those parts of the hills of the Northeastern Region where individual holdings of land have emerged, transfer of the holding is possible, and it takes place frequently but within the tribal population only. Similarly in Jharkhand, Chota Nagpur Tenancy Act and Santhal Parganas Tenancy Act prohibits sale of tribal land outside of the community
4. Most of the States that have been accorded special provisions under Article 371 are in the Northeast and the special status aims to preserve their tribal culture. Articles 371A through 371H were incorporated subsequently which aim at different provisions. In the case of Nagaland Article 371A, Parliament cannot legislate on matters of Naga religion or social practices, Naga customary law and procedure, and ownership and transfer of land without the concurrence of the state Assembly. Article 371-G that deals with special provisions with respect to Mizoram has similar nature.
5. Subsequently, Article 371C, special provisions with respect to the State of Manipur, defines that the President may provide for the constitution of a committee of elected members from the Hill areas in the Assembly, and entrust “special responsibility” to the Governor to ensure its proper functioning. In this article, the expression ‘Hill Areas’ means such areas as the President may, by order, declare to be Hill Areas.

3.2. Changes in Law for Survey of Abadi Land

For the successful implementation of the SVAMITVA scheme, amendments in the State Acts and Rules providing for the survey of Abadi lands and the issue of property cards are very crucial steps. In this regard, the Ministry of Panchayati Raj has written letters to

states to make necessary changes in their acts and rules. Many states and UTs have provisioned for implementation of the SVAMITVA scheme and preparation of property cards in their relevant laws. The States and UTs have laid down different principles and procedures for deciding on ownership of Abadi lands. A detailed note on Acts/Rules amended by the States/UTs for the implementation of the SVAMITVA Scheme is in Annexure IV.

State/UT	Notification of amendment/ New Act	Period for claims and Objection	Procedure for mutations
Andaman and Nicobar Islands	Andaman and Nicobar Islands Land Revenue and Land Reforms Regulation 1966 and Andaman and the Nicobar Islands Land Revenue and Land Reforms Rules 1968	7 days	The mutation of land is being made under the provisions of sections 84 and 85 read with rule 135, the sub-divisions are being allowed under the provisions of sections 51 & 65 read with rule 48 in rural areas. Mutation can also happen online by visiting – (http://db.and.nic.in/ROR/view1/formf.aspx).
Chhattisgarh	Chhattisgarh Land Revenue Code, 1959	15 days	State is in process to finalise the procedure in cognizance to SVAMITVA Scheme implementation
Daman and Diu, Dadra and Nagar Haveli	Goa, Daman and Diu Land Revenue Rules, 1969 and Dadra Nagar Haveli Land Revenue Administration Regulation, 1971	15 days	UT has an online system for storage and updation of property cards through Avanika Portal (http://dnh.nlrm.in/avanika/) and (https://dd.nlrm.in/urban1/).
Gujarat	Gujarat Land Revenue Code, 1879	60 days	The state has an online system for storage and updation of property cards through AnyRoR Portal (https://anyror.gujarat.gov.in/).
Haryana	Haryana Land Records Manual Amendment 2022, Section:7A (The Records of Rights-Abadi Deh) notified	30 days	State is in process to finalise the procedure in cognizance to SVAMITVA Scheme implementation

State/UT	Notification of amendment/ New Act	Period for claims and Objection	Procedure for mutations
	vide Haryana Government Gazette		
Himachal Pradesh	Himachal Pradesh Abadi Deh (Record of Right) Act 2021	30 days	State has provisioned for mutation/transfer of land/jamabandi through 'Form-E' that is to be filled in manually by the Patwari.
Jammu and Kashmir	S.O No. 34 notified Jammu and Kashmir Abadideh Survey and Record Operations Regulations, 2022	21 days	UT has integrated its land records with the NGDRS portal for Registration and auto start of mutation proceedings by Sub Registrar under Registration Act 1908 (https://ngdrs.jk.gov.in).
Karnataka	Karnataka Land Revenue Act 1964 and Karnataka land Revenue Rules 1966	15 days	Mojini (bhoomojini.karnataka.gov.in) & UPOR are online portals dealing with the spatial data creation and updation as and when transactions as per the transfer of property act are initiated for part of recognized survey number.
Ladakh	clause (d) of Sub-Section (2) of section 21 of the Jammu and Kashmir Land Revenue Act, Samvat 1996 (XII of 1996)	15 days	UT is in process to finalise the procedure in cognizance to SVAMITVA Scheme implementation
Madhya Pradesh	Madhya Pradesh Land Revenue Code,1959 (Amended 2018)	15 days	The state has an online system for storage and updation of property cards through the State MP Bhulekh portal (https://mpbhulekh.gov.in/Login.do)
Maharashtra	Maharashtra Land Revenue Code 1966 –chapter, clause 121 to 131	10 days	The survey officer not below the rank of a District Inspector of Land Records shall be responsible for the up-to-date maintenance of record of rights and register of mutations in all surveyed cities, town and villages within his jurisdiction. Manual procedure is followed for mutation and a register of mutation is

State/UT	Notification of amendment/ New Act	Period for claims and Objection	Procedure for mutations
			maintained in Form VII as laid down in Maharashtra Land Revenue Record of Rights and Registers (Preparation and Maintenance) Rules 1971, Amended 1983.
Punjab	Punjab Abadi Deh (Record of Rights) Act, 2021	90 days	The state has an online system for the storage and updating of property cards (https://abadirecords.punjab.gov.in).
Uttar Pradesh	Uttar Pradesh Land Revenue Code, 2006	15 days	Entry/update/generation of Gharauni and dashboard for monitoring is available on portal https://svamitva.up.gov.in
Uttarakhand	Uttarakhand U P Land Revenue Act 1901	10 days	The state has an online system for the storage and updating of property cards through the Uttarakhand Bhulekh portal (https://bhulekh.uk.gov.in/public/homePage_login.jsp).

3.3. Identified gaps in the law and procedure in different states

1. In India, land ownership is established through a registered sale deed (a record of the property transaction between the buyer and seller) where no prior survey has been conducted and no record-of-right exists or in the case of vertical ownerships like flats. Other documents used to establish ownership include the record of rights (document with details of the property), property tax receipts, and survey documents. Land records consist of various types of information (property maps, sale deeds) and are maintained across different departments at the district or village level. These departments work in silos, and the data across departments is not updated properly and frequently. Hence, discrepancies are often noted in land records. In the past, surveys to update land records have not been undertaken or completed, and maps have not been used to establish actual property boundaries on the ground. Therefore, in several records, the property documents do not match the position on the ground.
2. If the land records are not frequently updated, then it may also affect future property transactions. It becomes difficult and cumbersome to access land records when data

is spread across departments and has not been updated. A person has to go back several years of documents, including manual records, to find any ownership claims on a piece of property. Such a process is inefficient and causes time delays.

3.4. Best Practices in States and UTs

Some states and UTs have adopted very good practices for the creation of record-of-rights of Abadi lands and to provide various related services to the villagers. These practices are given below which can be considered for adoption by other states also.

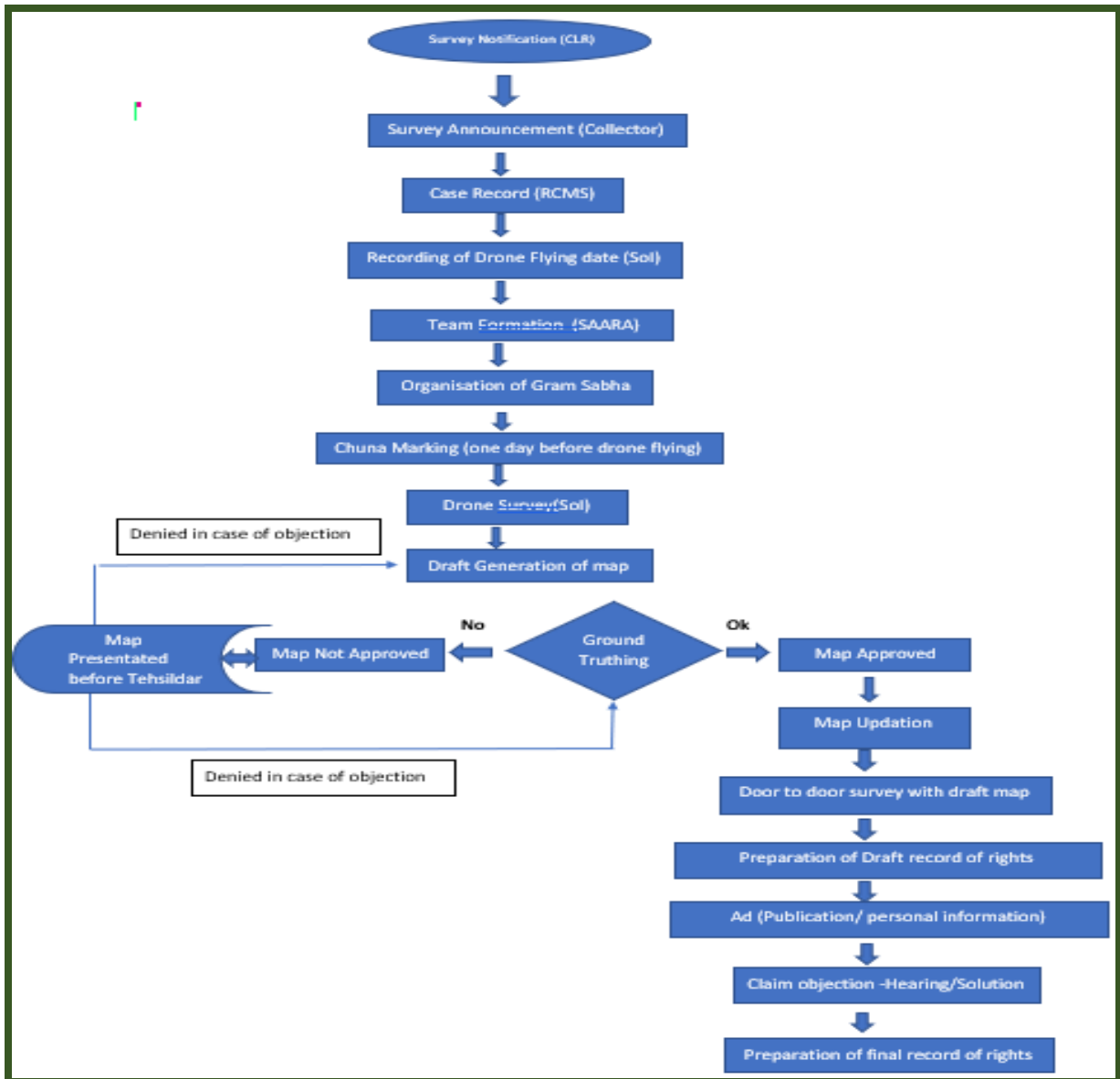
1. Chhattisgarh

The record-of-rights of Abadi lands in Chhattisgarh has all the provisions prescribed under the SVAMITVA scheme like registration, encumbrance, geo-tagging, co-ownership, Aadhaar Number, Mobile Number of the owner, Unique Property Number, QR Code, map of land parcel and chauhaddi. It is integrated with the record-of-rights of the agricultural land and has a system for storage as well as updating of changes.

2. Madhya Pradesh

State has implemented end-to-end process automation in the state in respect of land surveys. Drone Survey case is registered on the Revenue Case Management System (RCMS) platform for villages; Survey of India upon completing the drone survey in a village uploads the digitized map on the SAARA portal; Patwari of the village performs the ground truthing through a mobile application of SAARA wherein digitized maps are downloaded and ground truthing done. Through the use of RCMS, the process of Revenue Courts has become completely transparent. Monitoring has become easier for the higher officials so that the cases are disposed of at the earliest. The general public can apply for objection on the property from their home, can see the status of prevailing cases through the portal, and after the order is issued, can also download a copy of the order through the portal. The finalized Adhikar-Abhilekh or Record of Rights is published on the MP-Bhulekh portal for downloading. Any subsequent change/transfer of ownership is registered through the MP-Bhulekh portal. The state has also introduced the concept of Cyber Tehsils under the MP Land Revenue Code 2018 through RCMS, wherein the process of transfer of ownership or division is automated. Registration of case under transfer or division of property, issue of a public notice, Report on diversion of land by Patwari, Resolution of disputes by Tehsildar through RCMS and notice for hearing of dispute is provided through RCMS,

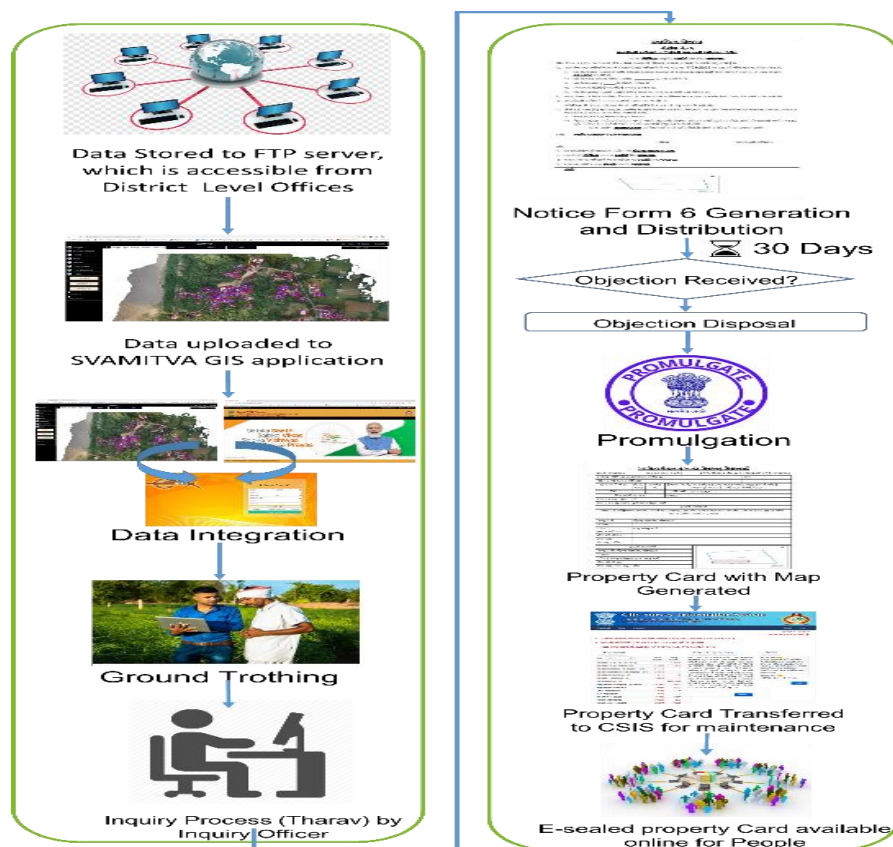
Passing of order conveying decision for diversion of land, final integration of Land Record on MP Bhulekh Portal.Madhya Pradesh has also integrated the social profile of property owners through the SAMAGRA database. The social profile is populated at the time of ground verification on SAARA mobile application. This has helped the state in maintaining an integrated database of beneficiaries of various schemes.



State has provisioned for extending the abadi areas under Section 243 of Madhya Pradesh Land Revenue Code, 1959 (Amended 2018). District Collectors can thereby include such inhabited areas under Abadi.

3. Gujarat

The Panchayat department of Gujarat is using the Gram Suvudha portal for the maintenance of the Local Tax Register (*Akarni Patrak*) online. It contains details of House No., Property Occupant Name, Locality, Address, etc. This Tax register data is fetched in the SVAMITVA portal, and it is used to auto-fill the forms of the Inquiry Process, eliminating the huge task of data entry. Specifically, for field survey activities, one GIS based web application is developed, with easy-to-use GIS editing tools. Using the GIS application, surveyors can carry maps in digital form and easily edit / update the maps on field itself. It eliminates the dependency on Survey of India for GIS map editing. Mapping of property on the map with details from the tax register is also done on the field itself using the GIS application. Once field survey is completed, whole data is passed to SVAMITVA portal for further inquiry process. The inquiry process is completed on the portal for inviting final claims and objections through Notice-6. Upon completion of the inquiry process, the promulgation of records is completed, and property cards are generated along with individual property maps. Data from newly made property cards are transferred to the City Survey Information System (CSIS), where regular maintenance of city survey records is done.



4. Maharashtra

State has developed Maha-SVAMITVA Information System for automating end-to-end processes. The purpose of the Maha-SVAMITVA Information System-MSIS (web portal) is to share all spatial and non-spatial data among the stakeholders as well as make all necessary communication among them. The MSIS will cover all activities of the SVAMITVA Scheme. The website is accessible to the state Panchayat Raj department, State Revenue Department, State Land Record Department, and Survey of India. The State Land Record Department is the Nodal agency that mainly deals with the conservation, maintenance, and updation of land record documents' spatial as well as non-spatial data. All communications, data sharing as well as monitoring is done through the web portal.

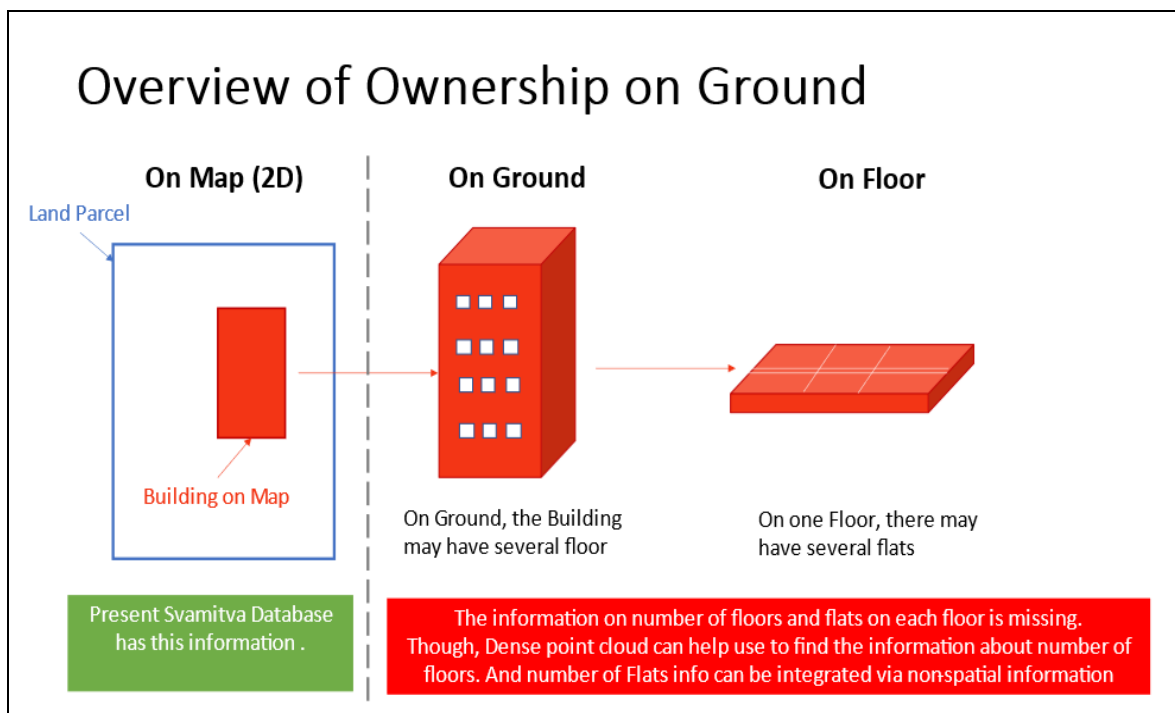
Activities performed by various stakeholders involved in MahaSvमितva implementation:

Sr. No.	Stake Holder	Activities undertaken by Stakeholders in MahaSvमितva
1.	Maintenance Surveyor (MS)	Basic Information of the Village
2.	Team Leader (TL)	Preparatory work of Drone flying in the village
3.	Shirstedaar	Namuna 8 data (property register with Panchayati Raj deptt.), Notice A, monitoring the work of MS and TL
4.	Enquiry Officer	Notice A, Enquiry register, Notice B, final map, etc.
5.	Dy Superintendent Land Records	Appointment of team leader, monitoring all activities of above stakeholders
6.	District Superintendent Land Records	Appointment of Enquiry officer within the district and monitoring all activities of the above stakeholders
7.	Dy Director Land Records	Appointment of Enquiry officer within the division and monitoring all activities of the above stakeholders
8.	Survey of India	Uploading schedule, geotiff, area statement, sanad, etc
9.	Dy Director Land Records, City	Monitoring all activities of the above stakeholders and MSIS improvement

	Survey, Nodal Officer, Desk Officer	
10.	Settlement Commissioner and Director Land Records	Monitoring all activities of the above stakeholders

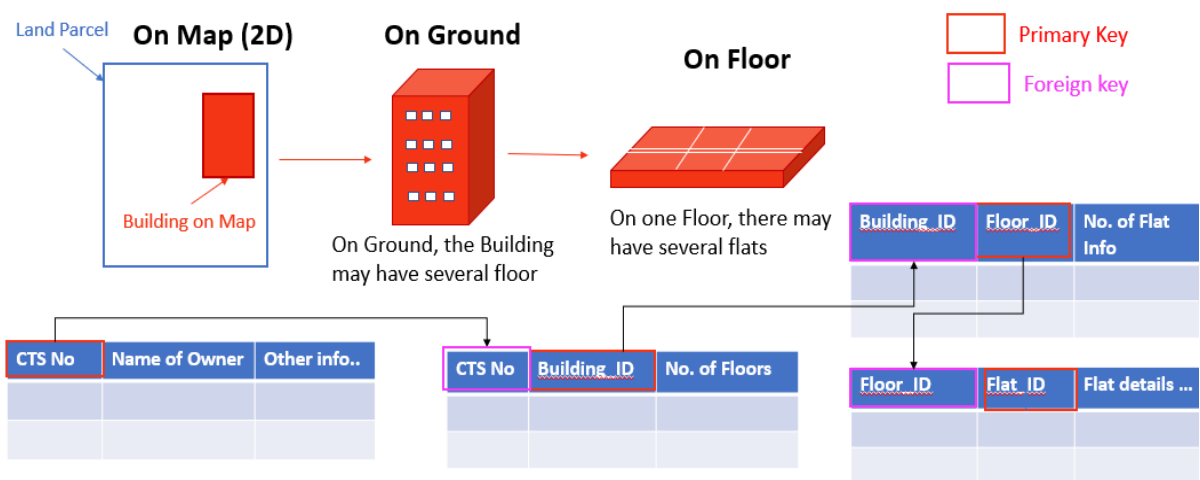
5. Creation of Floor-wise Property cards in Abadi areas for multi-storeyed building

SVAMITVA data can be used to generate property cards for multi-storeyed building as well. The Spatial datasets prepared under SVAMITVA scheme can be used to extended its applicability by integration of additional non-spatial information containing floor information and flat information by introducing relational database. The height and number of floors information can be collected from the Dense point cloud from SVAMITVA drone processing data. However, for better accuracy and rendering of the 3D image of vertical properties inside the Gaothan (Village Site), drone has to be flown in cross pattern (cross flying) to capture more 3D points.



Further, the tabular data containing Flat ownership information, of different owners per floor per flat, which is received from state government can be organised in a predefined relationship wherein data is stored in one or more tables of column and rows and thereafter making logical connection between these different tables by using primary and foreign key concept. By using above logic the property card for different flat owners can be generated.

Overview of integration of floor wise Ownership in SVAMITVA



For the states to provide property cards in multi-storeyed buildings, necessary provisions may be made in State Acts and vertical property rules may be drafted for providing property cards. A supplementary property card (supplementary and linked to existing property card) can be issued containing details of the building (vertical property) and record the ownership of individual dwelling units within the building. The ownership details can be noted after inquiry as per the process laid out under State Acts. The details of the building to be noted in the supplementary property card will be as approved by the concerned planning authority.

3.5. Recommendations

There are recommendations that States and UTs may adopt to further streamline the implementation process. These recommendations will help the States and UTs to successfully saturate the scheme in time bound manner.

1. The provision regarding the presumption of truth in the state laws is the most important concept which gives legal sanctity to the record-of-rights. The record-of-rights of the Abadi area should also have the presumption of truth attached to it. States must ensure that appropriate legal provisions for this purpose are inserted in the law enacted for making record-of-rights and issuing property cards in the Abadi area.
2. Some states require the enactment of a new law or amendment in the existing law to create a provision for making record-of-rights of the Abadi area. In these states, the legal validity of property cards issued before the enactment of such a law can be questioned. Therefore, states must ensure that property cards are issued only after the supporting law is in place.
3. The most important objective of the SVAMITVA scheme is the creation of record-of-rights for the Abadi areas of the villages. Therefore, after the completion of the survey by the Survey of India, record-of-rights should be completed at the earliest in a time-bound manner.
4. Preparation of computerized land records in the villages is part of the Digital India Land Records Modernization Programme (DILRMP) of the Department of Land Resources, Ministry of Rural Development, Government of India. Therefore, funds for the preparation of record-of-rights in Abadi areas surveyed under the SVAMITVA scheme should be provided under the DILRMP. The Ministry of Panchayati Raj may coordinate with the Department of Land Resources to ensure that all villages surveyed under the SVAMITVA scheme are included in the work plan of DILRMP on priority.
5. State should develop appropriate systems to ensure that Abadi data can be freely used by different departments like Panchayati Raj, Taxation, Survey department, town planning department, banks, etc. Department-wise login should be created for the use of such data. Different departments may utilize the data as per their requirements, but the database should be updated regularly by the revenue departments when changes are made to the original database.

Annexure- IV: States/UT Legal Process**1. Andaman and Nicobar Islands**

The Land records of Andaman and Nicobar Islands is governed by the Andaman and Nicobar Islands Land Revenue and Land Reforms Regulation 1966 and Andaman and Nicobar Islands Land Revenue and Land Reforms Rule 1968. The survey of Land is being made under the provisions of sections 48,49 and various sections of chapters VIII and XVI of the regulation and rules framed thereunder.

The Andaman and Nicobar Administration has made necessary amendments to rules 130 and 132 of the Andaman and Nicobar Islands Land Revenue and Land Reforms rules 1968 for conducting surveys using drone/ improvised technology and issuance of record of rights respectively. The necessary provisions are already available in the Andaman and Nicobar Islands Land Revenue and Land Reforms rules 1968 for conducting surveys and obtaining claims and objections.

The property card (Record of Right in Form 'F') was issued under the SVAMITVA Scheme along with the corresponding map, and QR code capturing village name, survey numbers, total area, and name of the tenants. The Administration has an online system for storage and updation of property cards through the web portal <http://db.and.nic.in/propertycard/>

Amendments in rule 132 for including a mobile number in the property card are under process. The Unique Land Parcel Identification Number (ULPIN) was adopted for the four villages of South Andaman District on a pilot basis and the remaining villages will be adopted accordingly.

The updation of records are being made while mutation/ sub-division, allotment of land and set apart of land for various purposes in the software developed by NIC namely DweepBhoomi and has an online system (<http://db.and.nic.in/ROR/view1/formf.aspx>).

The mutation of land is being made under the provisions of sections 84 and 85 read with rule 135, the sub-divisions are being allowed under the provisions of sections 51 & 65 read with rule 48 in rural areas and sections 68 & 69 read with rule 74 in the urban areas, the allotment of land is being made under the provisions of section 146 and set apart of land are being made under the provision of 198 of Andaman and Nicobar Islands Land

Revenue and Land Reforms Regulation 1966 and Andaman and Nicobar Islands Land Revenue and Land Reforms Rules 1968.

2. Chhattisgarh

The State of Chhattisgarh has amended the Chhattisgarh Land Revenue Code, 1959, and notified it on 04.05.2022. As per the CGLRC, 1959; "Abadi" means the area reserved from time to time in a village in a non-urban area for the residence of the inhabitants thereof or purposes ancillary thereto, and any other local equivalent of this expression such as "village Site" or "gaonthan" shall also be construed accordingly.

The record-of-rights for the State of Chhattisgarh is issued under the CGLRC, 1959. After the drone survey and verification of the map, the ror will be finalized. The state has an objection period of 15 days. The provisions of appeal, revision, and review are mentioned in the CGLRC, 1959. The record-of-rights of Chhattisgarh has all the provisions by MOPR like Registration, Encumbrance, Geo-Tagging, Co-Ownership, Aadhar Number, Recorded of the owner Mobile Number of the owner, Unique Property Number, QR Code, Map of Land parcel and chauhaddi. It is integrated with the Agri Records and has a system for storage as well as updation.

3. Daman and Diu, Dadra and Nagar Haveli

UT has made provision for surveys of the Abadi area and record of rights under the Goa, Daman, and Diu Land Revenue Rules, 1969 and Dadra Nagar Haveli Land Revenue Administration Regulation, 1971, and laid down the process of conducting surveys, including objection period of 15 days. The Record of Rights exists in the rural Abadi area and the format for RoR by UT captures Encumbrances on the property, co-ownership for husband and wife, mobile number of the owner, and Unique property Parcel Number/serial number. The UT has also made provision for the registration of RoR for availing of loans. However, the Abadi land records are not integrated with agricultural land records. UT has an online system for storage and updation of property cards through Avanika Portal (<http://dnh.nlrmv.in/avanika/>) and (<https://dd.nlrmv.in/urban1/>).

4. Gujarat

The state has made provision for a survey of the Abadi area and record of rights under the Gujarat Land Revenue Code, 1879, and laid down the process of conducting an inquiry process (Haqchoksi) to prepare property cards including survey, notice for document collection, the

decision for property rights and promulgation. The property card issued under SVAMITVA Scheme captures Encumbrances on the property, geo-tagging, Unique property numbers, and QR codes linked with State Revenue Portal. The State is planning to include co-ownership, the Aadhar number of the owner on property cards, and also the mobile number of the property card holder.

For the record promulgation process under the SVAMITVA scheme, the promulgation power is vested to DILR (class-II) by Department dated: 22/04/2022, earlier it was with Superintendent Land Records (SLR- Class-I).

For the speedy completion of the inquiry process under the SVAMITVA scheme the inquiry power is vested to Senior Surveyor (Class-III) by Department date: 25/01/2022, earlier it was with DILR(Class-II).

Non-testamentary transactions involving non-agricultural properties are recorded by mutation entries. The Abadi land records are not integrated with Agricultural land records and there is an online system for storage and updation of property cards through AnyRoR Portal (<https://anyror.gujarat.gov.in/>).

5. Haryana

The state of Haryana is implementing SVAMITVA under the aegis of the Revenue Department. To streamline the Records of Rights for the village habitation areas and to preserve them like that of the Revenue Estate Records of Rights, Haryana has effected an amendment to the legal framework followed by the Revenue Department through the Haryana Land Records Manual Amendment 2022, Section:7A (The Records of Rights- Abadi Deh) notified vide Haryana Government Gazette Extraordinary Published on Friday, April 1, 2022. Under this amendment Section, 7A has been introduced in the Manual which starts as under-

“The procedure prescribed under the provisions of Act, 1887 shall be applicable for preparing the records-of-rights on the land falling within the Lal Dora of a village i.e. the inhabited site of the village.” (The Gazette notification is appended for reference).

The property card format is finalized by the state provisions for capturing not just the details of the owner and the area of the property but also a visual map of the property,

giving its dimensions and details of neighboring properties, so that disputes are minimized. The Revenue department has also provisioned for voluntary Registration of these property cards at the Sub Registrar's office as per provisions of the Indian Registration Act. For these registrations, a nominal stamp duty of Rs 100/- is charged from the owners. Along with the property cards and registries of properties, detailed records of rights are being prepared for each village habitation. These records are on the same lines as the Records of Rights of Revenue Estate.

The georeferenced maps generated by the Survey of India give coordinates of each property within village habitation. These are published at the village level by including the details of owners of each property and also assigning unique property numbers to each property. Haryana Panchayati Raj Act 1994, Section 26, provides for claims and objections in these maps. Should any property owner not agree with the map published, he/she may raise their claim/objection within 30 days of publication of the village habitation map. Gram Sabhas are held to discuss these claims and objections and resolve them amicably.

Once the village habitation map is approved by the Gram Sabha concerned, property cards are issued to owners of each property giving all details of the property. The Government of India has mandated that every citizen must have a unique identification number i.e. Aadhaar. Therefore, each property ID number has been linked with the unique identity number of the owners. Simultaneously, each property ID is linked with Haryana's special family identification number called Parivar Pehchan Numbers (PPN). The PPN is a gateway to establish kinship and inheritance lineages to every property, thereby reducing future disputes, whenever the original owner expires.

As it is mandatory for every property card and Record of Right to be linked with a unique identification number associated with the owners, therefore Haryana has adopted the process of linking Parivar Pehchan Numbers (PPN) with each property holder. The PPN is generated by an online system linked to the Aadhaar number of the property owner. There is also a provision to write the Aadhaar number of the owners in the title certificate being issued to the owners. However, since Aadhaar numbers can not be stored electronically, therefore all electronic and online records of rights of properties within

village habitation shall not contain aadhaar numbers; instead, electronic records shall include linked with Parivar Pehchan Numbers.

At present Haryana is also in the process of integrating the records of village habitations with the records of revenue estates. Very soon these two records shall be integrated, and the records of village habitation will thenceforth be updated as and when transactions or changes in ownership take place like that of agricultural lands of revenue estates.

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Para 7A.1- Applicability of Punjab Land Revenue Act, 1887.

The procedure prescribed under the provisions of Act, 1887 shall be applicable for preparing the records-of-rights on the land falling within the Lal Dora of a village i.e. the inhabited site of village. The State Government is well within its power for imposing any cess in the village, on account of market or fair etc. The preparation of records-of-rights shall only be for the villages beyond the limits of municipality or a notified area.

Para 7A.2- Record-of-rights and documents included therein

The record-of-right for an estate shall include the following documents, namely:

- (a) statement showing, so far as may be practicable:-
 - (i) the persons who are land-owners, tenants or assignees of land within Abadi Deh in the estate or who are entitled to receive any of the rents, profits and to occupy land therein;
 - (ii) the nature and extent of the interests of those persons and the conditions and liabilities attaching thereto;
 - (iii) the rent, rates, cesses or other payments due from and to each of those persons and to the Government.
- (b) a map of the estate;and
- (c) such other documents as the Financial Commissioner may, with the previous sanction of the State Government prescribe.

6. Himachal Pradesh

The 'RoR for the State of Himachal Pradesh is issued under the 'Himachal Pradesh Abadi Deh (Record of Right) Act 2021. The 'RoR' of Himachal Pradesh has Provisions like Encumbrances as well as Geo-tagging information which can help in exactly locating the property parcel in the village. The Act also provisions for updating and partitioning the Maps and records linked to the maps. Further, a web-based application for Property Cards issuance/updating is being developed by the State NIC. The RoR also has a provision for providing the land parcel/property with a unique property number or Unique-ID and there is also a provision of a QR code on the Property Card, which when scanned can give detailed information about the property and its owner. However, at present, the 'RoR' are not registered, and the co-ownership is also not indicated in it. Also, the RoR neither links the Aadhar Card number as well as the phone number of the property owners nor they are integrated with the agri-land records. The State has an objection period of 30 days, during which a grievance can be raised before RoRs get finalized.

7. Jammu and Kashmir

The government of Jammu and Kashmir vide S.O No. 34 dated 25.01.2022 notified Jammu and Kashmir Abadideh Survey and Record Operations Regulations, 2022 for implementation of the SVAMITVA scheme in the Union Territory. Government of Jammu and Kashmir vide S.O 175 dated 13.04.2022 declares that the area of habitation in the Abadideh villages of respective Tehsils in the districts of the UT will be subject to the Survey and Record Operations in accordance with the Jammu and Kashmir Abadideh Survey and Records Operations Regulations, 2022.

Property card is the legally valid certificate of ownership of property issued in Abadideh areas. A Property Card is a valid Instrument for the grant of financial assistance by Financial Institutions. Financial Institution to endorse a copy of the entry made in Property Card to the jurisdictional Revenue Officer and SRO. Financial Institutions to make entry against the property on the security of which the financial assistance has been granted and the entry shall have the effect of creating a charge in favor of the Financial Institution and the said property cannot be alienated until the clearance of liability of Financial Institution.

The Property Card format finalized by the UT provisions for registration of ownership details at the Sub Registrar Office and details of any encumbrances, if recorded against the property owner. Geo-referenced map generated provides latitude and longitude coordinates which are also reflected on the property card. If there are objections by the beneficiaries on the property details, then these can be filed within 15 days of the notification. Information on co-ownership is also recorded by the department. Property Card also has features like Unique Plot Code, QR Code, ULPIN, Sketch of the plot, Area of the plot, and Encumbrances, besides the details of the landowner(s) and his/her share(s) and Mobile number as well for better Authenticity.

UT has integrated its land records with the NGDRS portal for Registration and the auto start of mutation proceedings by Sub Registrar under the Registration Act 1908 (<https://ngdrs.jk.gov.in>). At Present, Jammu and Kashmir have not integrated their Abadi records with Agri records but the UT is in process of integrating the records. The Abadideh Map 2 shall be considered as final Abadideh Map-3 if the map is finalized with the consent of all the concerned property owners.

8. Karnataka

The 'RoR for the State of Karnataka is issued under the 'Karnataka Land Revenue Act 1964 and Karnataka Land Revenue Rules 1966'. ROR creation and maintenance by the revenue department happens under Karnataka Land Revenue Act 1964 Sec 127,128,129. Creation of boundaries and Maintenance of agricultural lands by Survey dept Karnataka Land Revenue Act 1964 sec 140, rules 46-56.

The creation and updating of RoR and boundaries of properties in a village site and urban properties are prepared and maintained by the survey department as per chapters IX, XII & XIII following Karnataka Land Revenue Rules 1966 Rules 83 to 92. In Villages, every cluster of 10 or more houses is considered a habitat, and RoRs are created and maintained.

The 'RoR' format for both the rural properties(Form 16A) and habitats (Form 13A) has been modified as per the Government notification number RD 106 SSC 2020 Dated: 21-04-2022. The RoR has both spatial and non-spatial information. The spatial information in the RoR has the real-time image of the property captured during the survey as an underlying layer.

The RoR has provision to include the ULPIN of the property corners whereby all the properties are geo-tagged. Each PR card has both a QR code and 2D Barcode printed and is digitally signed by the competent authority. The entire data is stored at the state data center. The State has an online portal 'Bhoomi' which deals in delivering various 'RoR' Services. Bhoomi RoR has provisions like Encumbrances, Co-Ownership of properties, Aadhar Numbers as well as mobile number integration, unique property numbers, QR codes, and a system for storage as well as updating of records.

Kaveri is the online platform for the registration of properties under the transfer of property act. Kaveri online portal enables the free downloading of encumbrance certificates. Mojini & UPOR are online portals dealing with the spatial data creation and updation as and when transactions as per the transfer of property act are initiated for part of the recognized survey number.

All the online portals Bhoomi, Mojini & UPOR, and Kaveri are virtually integrated. During the creation of RoR in Svamitva, the Draft PR card served has an objection period of 15 days during which the grievances can be raised before the finalization of property cards.

9. Ladakh

In exercise of the powers conferred by clause (d) of Sub-Section (2) of section 21 of the Jammu and Kashmir Land Revenue Act, Samvat 1996 (XII of 1996), the SVAMITVA scheme can be implemented in the Union Territory of Ladakh. There is a provision in the property card or Record of Rights (RoR) to record details of encumbrances if any against the property. UT of Ladakh has a notice period of 15 days for objections raised by the property owners. Geo-referenced map generated provides latitude and longitude coordinates which are also reflected on the property card. Currently, Co-ownership details and Aadhar Numbers are not recorded by the UT of Ladakh, but the Mobile Number of the beneficiary is duly available. QR codes may help in displaying the information of the property online by scanning the code but as of now UT has not made available QR codes on the RoR and there is no system for the storage of information online. The UT of Ladakh is one of the few States/UTs to integrate Abadi records with Agriculture records.

10. Madhya Pradesh

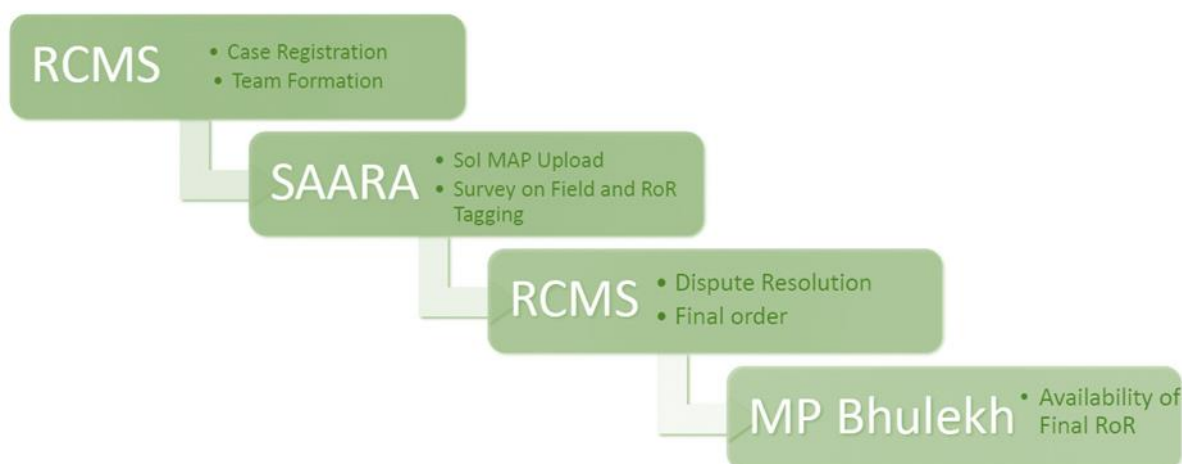
The state has made provision for a survey of the Abadi area and record of rights under the Madhya Pradesh Land Revenue Code, 1959 (Amended 2018) and laid down the process of conducting a survey, including an objection period of 15 days. Madhya Pradesh also has provided power to District Collector to extend the Abadi area/Lal Dora to include hamlets lying on the outer periphery of the Lal Dora under the purview of the Survey. MP has published Bhu-Abhilekh and Bhu-Survekshan Rules 2020 wherein the following survey procedure is highlighted.

Rules	Description
Rule 10	Notification by the commissioner of land records
Rule 14	District survey to initiate land survey operations with the proclamation
Rule 16	Preparation of draft ROR
Rule 17	Publication of draft RoR for inviting claims/objections

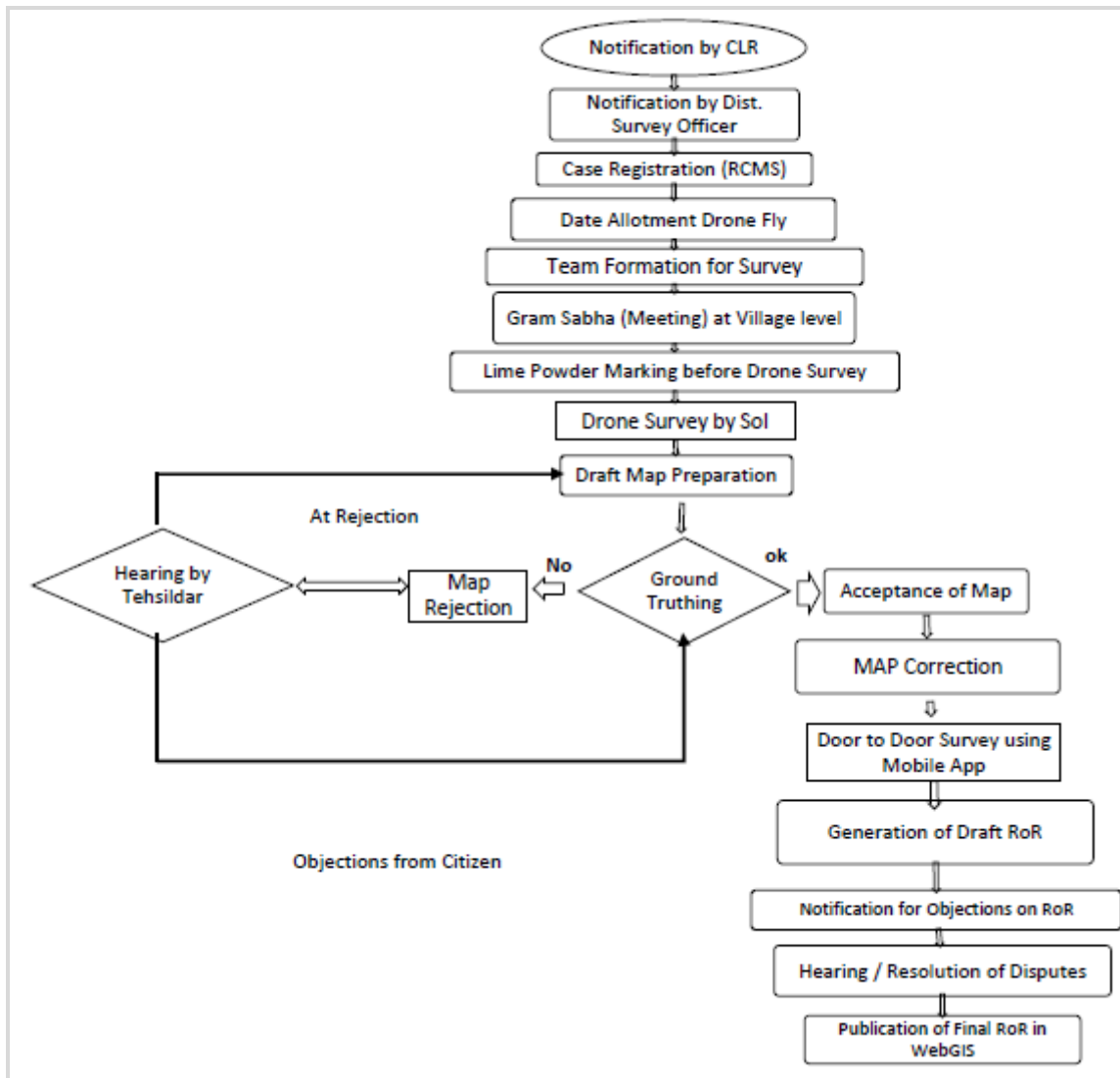
Rules	Description
Rule 20	Preparation of final RoR, publication of final RoR on Bhulekh portal
Rule 26	Survey proceedings to be completed within the time limit (08 months)
Rule 27	The extension of the deadline by Commissioner Land Record, if the survey proceedings are not completed within the time limit
Rule 28	Completion of survey proceedings by notification of Commissioner Land Records

The property card issued under SVAMITVA Scheme captures Mobile Number, Aadhar Number, Unique Property Number (ULPIN), and a QR Code linked with the State Revenue portal. The state has also made provisions for the Registration of property, Indicating encumbrances, Geo-tagging, and co-ownership on property card. The Abadi land records are integrated with Agricultural land records and the state has an online system for storage and updation of property cards through the State [MP Bhulekh portal \(https://mpbhulekh.gov.in/Login.do\)](https://mpbhulekh.gov.in/Login.do) and RCMS portal [\(http://rcms.mp.gov.in/citizen/\)](http://rcms.mp.gov.in/citizen/).

Execution of Abadi Survey with various online Applications



Abadi survey Flowchart as per Rules



11. Maharashtra

State has provisioned for Abadi survey in villages and property cards under Maharashtra Land Revenue Code 1966. Coverage of the survey includes villages with more than 15 households. State has provisioned for Registration, and encumbrances on property cards through <https://igrmaharashtra.gov.in> and <https://mahabhumi.gov.in/mahabhumulink/eCourt/eCourt> portals. State also has system for storage and updation of property cards through ESDS cloud. State does not have geo tagging, unique property number, aadhar number, mobile number, QR code, and is also not integrated with agricultural records. State is in process of including ULPIN number for Abadi property parcels.

12. Punjab

The State of Punjab has enacted a new Act namely the Punjab Abadi Deh (Record of Rights) Act, 2021 for the implementation of the SVAMITVA scheme. The record of rights can be created as per provisions provided in the Punjab Abadi Deh (Record of Rights) Act, 2021. Sections 5 and 6 of the Punjab Abadi Deh (Record of Rights) Act, 2021 deal with the identification of Abadi deh areas, survey using a drone, mapping, and preparation of standing records of rights in the survey units. The standing record of rights and their making is discussed under Chapter 4, Section 7-11 of the abovesaid Act.

There is a provision to raise objections by the owners within 90 days provided under section 11(1) of the Act. The objections, if any, filed under section 11 of the act shall be filed before the Assistant Recording and Resolution officer in “Form-C” provided in the Punjab Abadi Deh (Record of Rights) Rules, 2021. In case, there is no objection to the entries recorded under rule 9, Assistant Recording and Resolution officer shall incorporate them in the Record of Rights of survey units in “Form D” provided in abovesaid Rules. The resolution of disputes is being made under the provision of Rule 10. The provision of transfer and consignments of standing records of right is made under Rule 12. The mutation of acquisition of rights in survey unit by inheritance, succession, purchase, mortgage, or otherwise is being made in “Form E” as provided under Rule 13.

There is a system of Storage and updation of records which will promote the use of technology as changes can be automatically recorded on the server and remove manual intervention in updating the records (<https://abadirecords.punjab.gov.in>). The provision is provided in the portal to generate the property cards to be issued under SVAMITVA along with the corresponding map, survey unit number, unit type, total area, and name of the tenants, based on the data provided by the Survey Officer. Mobile numbers are also being recorded for better authenticity.

13. Uttar Pradesh

The state has made provision for a survey of the Abadi area and record of rights under the Uttar Pradesh Land Revenue Code, 2006, and laid down the process of conducting a survey, including an objection period of 15 days. The property card issued under

SVAMITVA Scheme captures Aadhar Number, Mobile Number, Unique Property Number, Document No, and a QR Code.

Presently State has not made provision for Registration, indicating encumbrances. Geo-tagging and co-ownership on property cards are also maintained in the Database of property cards. At present, there is no provision for integration of Property Card(Gharauni) with Land Record data. Entry/update/generation of Gharauni and dashboard for monitoring is available on portal <https://svamitva.up.gov.in>

The state has laid down the specific process for implementation through various “Forms” as below:

Form Number	Description
Form 01	Notification of Abadi Survey
Form 02	Information by district collector/district record officer
Form 03	Public notice regarding the meeting of gram sabha
Form 04	List of errors and corrections required in Map1
Form 05	List of preliminary Abadi survey of Plot owners
Form 06(1)	List of errors found during field survey and corrections
Form 06(2)	List of disputes and required corrections in field survey
Form 07	List of Preliminary Aabadi Plots/Owners for publication.
Form 08	Notice for preliminary publication of Aabadi Survey
Form 09	Objections and Disposal of disputes
Form 10	Record of Habitation Gharauni / Property Card

14. Uttarakhand

The state has made provision for a survey of the Abadi area and record of rights under Uttarakhand U P Land Revenue Act 1901 and laid down the process of conducting a survey, including an objection period of 10 days. The property card issued under SVAMITVA Scheme captures Mobile Number, Unique Property Number, Encumbrances (remarks), and a QR Code linked with the State Revenue portal. The state has not made

provisions for Registration, Geo-tagging, capturing aadhar numbers, and co-ownership on property card. The Abadi land records are not integrated with Agricultural land records but the state has an online system for storage and updation of property cards through the Uttarakhand Bhulekh portal (https://bhulekh.uk.gov.in/public/homePage_login.jsp)

Chapter- 4

USE OF ABADI PROPERTY AS FINANCIAL ASSET FOR LOANS AND OTHER FINANCIAL BENEFITS

4.1. Property Ownership and Records in Abadi Areas

In the Abadi area, people have rights over land or houses that are mostly inherited from their forefathers. These rights are defined by the possession and long use of land by an owner. In some cases, rights are also acquired by the purchase of land or a grant given by the government. In the case of agricultural land, the rights of people are recorded by the government authorities in the record-of-rights which provides good evidence of the ownership of a person over land and can be relied upon by the banks while disbursing loans. In contrast, no record-of-rights is made in the Abadi area in most of the states. Therefore, while people own land and houses in the Abadi area, there is no authentic document where these rights are recorded. In the absence of such records, banks do not provide loans on the security of the Abadi land. In the SVAMITVA Scheme, it is envisaged to provide a “Record-of-Rights” for the Abadi land to facilitate availing of loans on the security of such lands.

4.2. Existing Norms of Banks for Loans in Villages

1. Mortgage of Land as Security of Loan

There are mainly three methods through which loans are given by banks on the security of a property:

- i. **Registered Mortgage:** Generally, when loans of high amounts are to be sanctioned by banks a registered mortgage is created, wherein under the Transfer of Property Act, a mortgage deed is registered by the borrower and the bank. This gives the bank the authority to recover any outstanding amount from the property in case of default. In this case, stamp duty and the registration fee are payable as per prevailing laws of the state. A registered mortgage is required to be created when a title deed is not available as in the case of ancestral property or it is lost or destroyed.

- ii. **Equitable Mortgage:** An Equitable Mortgage is created by deposit of the title deed of the property with the bank as per provisions of the Transfer of Property Act. When ownership is acquired by purchase, a title deed is available which can be deposited with the bank to create an equitable mortgage. Incidentally, the requirement of an equitable mortgage is mentioned in RBI Circular No. RBI No /2004-05 /151: UBD. No. BPD. 15 /12.05.01 /2004-05 dated 01.09.2004. (Point No. 7 in Annexure of Report of the Committee on Frauds on Housing Finance). After the closure of the loan, cancellation of the mortgage is done at the Registrar's office wherever required and the same is noted on the EM register and the property documents are released to the borrower. This kind of mortgage does not need any registration as per provisions of the Transfer of Property Act. Consequently, no stamp duty or registration fee is payable. In some states, a memorandum of deposit of title deed is required to be registered for which nominal stamp duty is levied. In urban areas, Due to simplicity of procedure and exemption from stamp duty and registration fee, a mortgage by deposit of title deed is preferred when title deeds are available. However, in the case of rural land where land is mostly inherited, an equitable mortgage may be difficult to create since a title deed is not available.
- iii. **Creation of Charge:** Some states have provided in law that a charge on the property can be created in place of a registered or equitable mortgage. Generally, it is applicable in the case of Agricultural land. In this procedure, at the request of the bank, an entry is made into record-of-rights mentioning the details of charge on the land by the concerned revenue officer. After the repayment of the loan, this entry is removed from the record-of-rights on receiving intimation from the bank. As the present system of mortgage of land involves cumbersome procedures and is costly and time-consuming banks prefer the facility of creation of charge instead of a mortgage to enhance the credit flow to Agriculture. In some states like Madhya Pradesh, Andhra Pradesh, Tripura, Gujarat, Karnataka, and Telangana, banks have been provided access to the revenue records through which charges can be created online. This is the simplest procedure for creating security for a loan. However, this procedure can be adopted only for the land for which record-of-rights is available.

2. Procedure for Valuation of Land

As per RBI circular No. RBI No.2006-2007/224: DBOD.BP.BC No. 50 / 21.04.018/ 2006-07 dated 04.01.2007, valuation of property should be done by professionally qualified independent valuers. However, banks generally use the guidance value notified by the state government to assess the value of the land offered as security. The guidance value (also called government value or minimum value) is determined by the state government at periodic intervals to ensure that the sale/ purchase price of land, is not undervalued affecting the collection of stamp duty. The guidance value forms the base of the valuation done by the empanelled valuers of banks. An independent assessment is also done by the officer of the lending bank.

3. Recovery Process in case of default

Normally bank has to approach a civil court for recovery of dues through the sale of property mortgaged to the bank under the provisions of the Transfer of Property Act. Only a civil court has the power to order the sale of mortgaged property except in certain special cases covered under some special laws. In the event of non-payment of bank dues of more than Rs. 20 lakhs by the borrower, the bank can approach the Debt Recovery Tribunal (DRT) under the Recovery of Debt Due to Banks and Financial Institutions Act, 1993. SARFAESI Act, 2002 confers power on banks and financial institutions, recovery of their outstanding dues by selling the mortgaged property without the intervention of the court. However, provisions of this Act are not applicable if the mortgaged property is agricultural land. Banks also use the forum of Lok Adalat for recovery of loans with outstanding less than Rs.10 lakh as per RBI Circular No. LEG.BC.114/09.06.002/2000-01 dt 02.05.2001.

4.3. Best Practices in States

1. Madhya Pradesh

Madhya Pradesh has made provisions in section 108 of the MP Land Revenue Code for property cards in Abadi areas. These cards are recognized by banks for providing loans on the security of Abadi land. Both residential and agricultural lands can be mortgaged to raise a loan. Madhya Pradesh has also provided an online charge creation facility since July 2019. The charge on Abadi land is created along the same lines as done on Agricultural land in Madhya Pradesh. Nearly 7000 bank branches are on board to provide

loans on the security of Abadi lands. Any charge created on the land by banks can be viewed at <https://mpbhulekh.gov.in/mpbhulekh.do> .

2. Maharashtra

Maharashtra has made provision in section 149 of the Maharashtra Land Revenue Code, 1966 for the issue of property cards, providing loans on property cards and noting of charges. Form 7/12 is used for providing loans in the Abadi areas. The Registration Department of Maharashtra prepares ready reckoner of rural properties for valuation purposes, based on which stamp duty is decided.

3. Andhra Pradesh

In Andhra Pradesh, banks have the facility for online creation of the charge on the land records. NIC has developed a Loan Charge Creation module. Banks have been given user credentials for the creation of charges. In this module, there is a provision to view land records i.e. Adangal and ROR-IB, and also to enter the loan details in the survey number in the “Webland”- online portal.

4. Tripura

In Tripura, the state government has given access to banks for noting online lien/charge in land records of the Home Loan borrowers under PMAY-G (small ticket home loan to MNREGA beneficiaries on relaxed terms and conditions- Rs. 70.000/- plus Rs. 1.20 lacs as government grant).

4.4. Action by Ministry of Panchayati Raj towards Recognition of Property Cards by Banks

1. Consultation with the Banks

The Ministry of Panchayati Raj through a DO Letter 19011/(35)/1/2019-e-Panchayat dated 17th June 2020 to the Department of Financial Services took up the matter of recognition of Property Card or Title Deed issued by the state government in respect of newly surveyed Abadi lands under the SVAMITVA scheme by the banks for giving loans to the villagers. This letter mentioned Property Cards issued by the Government of Maharashtra and Property Cards and title deeds being issued by the Government of Haryana. The Department of Financial Services was requested to get documents being

issued by the governments of Maharashtra and Haryana examined by bank authorities and convey their feedback to the Ministry of Panchayati Raj. Correspondence by DFS placed at **Annexure V**.

In response to this communication, the Department of Financial Services through a letter dated 25th September 2020 informed the following feedback of the public sector banks on this issue:

- i. An enactment empowering /authorizing the issue of a property card as a title deed to secure loans based on entries made in the property card may be passed by the legislature to ensure the legal validity of the transfer of title.
- ii. The proposed record of the Gharauni register (record-of-rights of Abadi land being created under the SVAMITVA scheme) may be aligned with the land revenue records (Khatauni) created under local land laws of the state concerned so that the two land records are not inconsistent with each other.
- iii. The Gharauni register may provide for noting of charge/mortgage/attachment over the land when such charge/mortgage/attachment is either created by the landowner/court/authority in favour of any person/bank/lending institution.
- iv. Provision may be made for stamp duty and registration of title deed (title deed being issued by Haryana) so that duplicate/fake title deeds are not procured for availing multiple lending by concealment.
- v. The Ministry of Panchayati Raj may take up this matter with the Department of Land Resources and the Department of Legal Affairs to examine the legal issues raised by banks in respect of the recognition of the Property Card/ Title Deed issued under the SVAMITVA Scheme.

2. Guidelines in the Framework

The Framework for implementation of the SVAMITVA Scheme (2021-25) contains the following guidelines for the states to ensure the recognition and legal sanctity of property cards.

- i. For people to secure loans based on Property Card, the State may take measures to ensure the legal validity of the transfer of Property. Engagement with Banks right from the start so that the property card is recognized by them for loan purposes may be a good strategy.
- ii. The Property Cards owner's records may provide for noting of charge/ mortgage/ attachment over the land when such charge/ mortgage/ attachment is either

created by the landowner/ court/ authority in favour of any person/ bank/ lending institution.

- iii. Provision may be made for stamp duty and registration of Property Cards so that duplicate/fake Property Card are not used for availing multiple lending by fraud. The official record for the registration of plots may be created at the district level.
- iv. The property may be rendered transferable, including for Patta awardees - registration authorities may allow the creation of a registered mortgage/ sale of such land.
- v. Procedures may be defined to determine mutation of property with due legal consultation- the mutation on the occasion of voluntary (transfer, sale, gift, mortgage) or involuntary (Succession) be clearly defined.
- vi. To increase accessibility, the spatial record of property may be created and geotagged with the Property Cards. This data could be utilised for the identification of parts or areas of the property, which would further enable the prevention of fraud.
- vii. The record of Property Cards owners under the SVAMITVA Scheme may be aligned with land revenue records.

4.5. Recommendations

For the banks to provide loans against the security of the Abadi property, a record of ownership in the Abadi area must be created which should be similar to the record-of-rights of the agricultural land in the village. For accepting Abadi property as security, banks have three basic requirements. First, the property card should provide unambiguous evidence of ownership of the borrower. Second, state laws should provide for the creation of a mortgage or charge on that property. Third, in case of default, banks should be able to recover the outstanding loan by selling the mortgaged property. States have to ensure that these three basic requirements are fulfilled in respect of the Abadi land. To achieve the objective of enabling the use of Abadi property as a financial asset by the rural people following specific actions are recommended to be taken by the governments and the banks.

1. Banks readily accept agricultural land as security against loans because ownership of agricultural land is recorded in the record-of-rights which as per law

is presumed to be true until proven otherwise. The provision regarding the presumption of truth in the state laws is the most important concept which gives legal sanctity to the record-of-rights. The record-of-rights of the Abadi area should also have the presumption of truth attached to it. States must ensure that appropriate legal provisions for this purpose are inserted in the law enacted for making record-of-rights and issuing property cards in the Abadi area.

2. Property cards issued under the SVAMITVA scheme must have a QR code or any other such unique identifier which may enable the bank to verify the authenticity of the property card and the latest status of the property instantly. This will reduce the time taken in the usual verification of property documents through revenue officials.
3. A bank can accept the property as security only when it is identifiable on the ground. Therefore, every plot in the Abadi land must be numbered and boundaries should be clearly defined.
4. Banks need some basis to assess the value of the property offered as security. In the case of agricultural land, the guidance value notified by the state government is used for this purpose. State governments should notify guidance value for the Abadi area also and update it periodically.
5. It is required to be well understood by all the stakeholders involved in the implementation of the SVAMITVA scheme that it is not the process of granting ownership rights in the Abadi land to the people. The ownership rights on the Abadi property already exist with the people as per the law of inheritance, possession and prevailing conventions. However, in most of the states, maps of the Abadi area are not available and rights are not recorded in record-of-rights as is the case for agricultural lands. A property card issued under the SVAMITVA scheme and supporting record-of-rights provide evidence of the rights of an individual which can be relied upon by the bank. A property card cannot be called a title document as it does not transfer any title to the land. Therefore, a property card by itself alone cannot be used as a title document to create an equitable mortgage on the property.
6. As title deeds do not exist in the case of a majority of rural land, an equitable mortgage cannot be created by the bank to secure a loan. A registered mortgage

involves the extra burden of stamp duty on the borrower. Creation of charge by making an entry in the record-of-rights is the most appropriate method for disbursing a loan against Abadi property. Therefore, appropriate legal provisions for the creation of charge on Abadi property by making an entry in the record-of-rights must be made by all the state governments. Banks should be given access to record-of-rights for creating charges as has been done by some states.


7. The state should ensure that there is no restriction in the law on selling the Abadi property in case of default of the loan, as is done in the case of the agricultural land. However, due process of law will have to be followed by the banks in this regard.
8. Normally, in case of default, a bank has to take the order of a competent court or tribunal for the sale of the mortgaged property. Under the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act (SARFAESI Act), 2002, banks and other financial institutions have been given the power to sell a mortgaged property without the intervention of the court. Provisions of this Act, however, do not apply to any security created on agricultural land. To avoid later disputes in this regard the Government of India should clarify whether the SARFAESI Act 2002 will apply on Abadi land or not so that banks and borrowers know in advance the procedure of recovery in case of default.
9. Under the SARFAESI Act 2002, the Central Registry of Securitization Asset Reconstruction and Security Interest of India (CERSAI) was created to restrain fraudulent activity in lending transactions. As per the directives of the Central Government and the Reserve Bank of India, the lender of a loan shall register all the information concerning a security interest that has been created on any asset or property, with CERSAI through their portal. Such registration is required to be completed within a period not exceeding 30 days from the date of creation of security interest. This provision is also not applicable on agricultural land as per provisions of the SARFAESI Act 2002. It should be clarified by the Central Government and the RBI, whether mortgages created on the Abadi lands will be required to be registered with the CERSAI.
10. As loans against the security of Abadi properties will be a new feature for the banks, there may be some hesitation on the part of some bank officials. Disbursal

of the loan will be greatly facilitated if comprehensive instructions are issued by the Reserve Bank of India in this regard. The Ministry of Panchayati Raj may take appropriate steps to get such instructions issued by the RBI. State Level Bankers Committees must be advised to monitor the progress of disbursal of loans against the security of Abadi property regularly.

Annexure- V: DFS Correspondences

1. Letter to DFS from MOPR dated 17th June 2020

Sunil Kumar, IAS
Secretary



सत्यमेव जयते

भारत सरकार
पंचायती राज मंत्रालय
डॉ. राजेन्द्र प्रसाद रोड, कृषि भवन,
नई दिल्ली-110001
Government of India
Ministry of Panchayati Raj
Dr. Rajendra Prasad Road, Krishi Bhawan,
New Delhi-110001
June 17, 2020

2244

D.O.No. N-19011(35)/1/2019-e-Panchayat

Dear *Debasish,*

As you may be aware, the Prime Minister has launched a new Central Sector Scheme 'SVAMITVA' on 24th April 2020, the National Panchayati Raj Day.

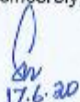
2. Under this scheme, demarcation of inhabited (Abadi) land in rural areas would be done by the surveying drone-technology with the collaborative efforts of the Ministry of Panchayati Raj, State Panchayati Raj Department, State Revenue Departments and Survey of India. The scheme would enable establishing the 'record-of-rights' in the revenue / property registers and issuance of 'property cards' to the property owners. This would facilitate unlocking value of rural residential assets and enable owners to access credit and other financial services. Further, this would also pave the way for clear determination of property tax.
3. The Scheme covers the drone survey of about 1.01 lakh villages in the States of Maharashtra, Karnataka, Haryana, Uttar Pradesh, Uttarakhand and Madhya Pradesh in the pilot phase (FY 2020-2021) and eventually, will cover all 6.62 lakh villages across the country (FY 2020-2024). Upon successful completion of this drone based survey, the State Revenue department / Panchayati Raj department (as the case may be in specific State) would prepare and distribute 'records of rights' or 'title deeds' of housing property to the villagers. The Scheme would generate crores of rural property cards.
4. Issuance of property card to the villagers for their immovable residential property is expected to pave the way to use their property as a financial asset for taking loans and other financial benefits from banks, as is the case in towns and cities. This exercise is already completed successfully in a few villages of Maharashtra and Haryana and property cards have been issued to the villagers viz. for Sonari village by Government of Maharashtra and Sirsi village of Karnal district by Government of Haryana. A sample 'title deed' document issued by Government of Haryana is enclosed for reference.
5. Since one major objective of the scheme is to 'unlock' value of household property in rural areas, it is important that scheduled Commercial Banks recognize the Property Card /Title Deed papers that will be issued by the State Authorities to property owners for accessing bank loans by the villagers.
6. In the light of the above, you are requested to have the sample Title Deed issued by Government of Haryana examined by Bank Authorities and their feedback communicated to this Ministry at the earliest. A positive response and communication to all Bank Branches in this regard will help unleash latent energy to uplift and transform rural economy, villages and society.

With best wishes,

Encl: As above.

Shri Debasish Panda,
Secretary (FS),
Department of Financial Services, Ministry of Finance, Govt. of India,
3rd Floor, Jeevan Deep Building, Sansad Marg, New Delhi-110001.

Yours sincerely,



(Sunil Kumar)

2. Letter from DFS to MOPR regarding recognition of property cards

1

120607/2021/1006

F.no. 7/63/2020 - BOA-I
 Government of India
 Ministry of Finance
 Department of Financial Services

3rd floor, Jeevan Deep Building,
 Parliament Street, New Delhi - 110 001
 Dated 23rd September 2020

Office Memorandum

Subject: Recognition of Property Card/title-deed papers issued by State authorities to property owners for accessing bank loans

Please refer to Secretary, Ministry of Panchayati Raj's D.O. no. N-19011(35)/1/2019-e-Panchayat, dated 17.6.2020, and Joint Secretary, Ministry of Panchayati Raj's D.O. no. N-19011(35)/1/2019-e-Panchayat, dated 14.8.2020, on the above subject, requesting for examination by bank authorities of the proposed property card/title-deed papers, so that the same are recognised by banks for purposes of bank loans.

2. Issuance of legally valid title-deed papers lies in the domain of State Governments. As per the D.O. letter dated 17.6.2020, the proposed property card/title-deed papers are meant to establish the record of rights, which pertain to land records, which are a State subject by virtue of 'land' being a State List entry under the Seventh Schedule to the constitution. Within the Central Government, the subject of 'land records' is allocated to the Department of Land Resources.

3. Insofar as use of title-deeds for purposes of loans is concerned, the same is provided for in section 58(f) of the Transfer of Property Act, 1882, as per which deposit of immovable property title-deed creates equitable mortgage as security interest legally enforceable in a court of law for backing up a loan. No definition of 'title-deed' is provided under the Act. Lending being a commercial activity, acceptance of a document as title-deed by way of security is a matter of satisfaction of the bank concerned regarding whether the mortgagor has absolute, clear and marketable title to the property, for which each bank undertakes due diligence through its empanelled advocates. In this regard, feedback was taken from Public Sector Banks, who have broadly suggested as follows:

- (a). An enactment empowering / authorising to issue Property Card as a title-deed to secure loans on the basis of entries made in the Property Card may be passed by the legislature for legal validity of transfer of title can be effected only under a law.
- (b). The proposed record of Gharauni register may be aligned with the land revenue records (khatauni) created under local land law legislation of the State concerned so that two land records are not inconsistent with each other.
- (c). The Gharauni Register may provide for noting of charge/mortgage/attachment over the land when such charge/mortgage/attachment is either created by the land-owner/court/authority in favour of any person/bank/lending institution.

120607/2021/1006

(d). Provision may be made for stamp duty and registration of title-deed so that duplicate / fake title-deeds are not procured for availing of multiple lending by concealment.

4. Against the above background, Ministry of Panchayati Raj is requested to take up the matter with the Department of Land Resources and Department of Legal Affairs to examine the legal issues raised by PSBs for recognition of Property Card/Title Deed issued by Gram panchayat for the purpose of creating equitable mortgage, and thereafter, take appropriate action thereon.

Encl: as above



(A. K. Ghosh)

Under Secretary to the Government of India

Tel: 011-23748755

Email: boa1-dfs@nic.in

Secretary
Ministry of Panchayati Raj
Krishi Bhawan, New Delhi – 110 001

Copy to:

Secretary, Department of Land Resources, Nirman Bhawan, New Delhi – 110 001 with a request take necessary amendments according to suggestions of the Public Sector Banks, if required and furnish to Ministry of Panchayati Raj.

Chapter- 5

MANAGEMENT OF PROPERTY TAX COLLECTION IN RURAL AREAS

5.1. Introduction

The taxation power of the Panchayats essentially flows from Article 243 (H), which reads that:

The Legislature of a State may, by law—

- i. Authorize a Panchayat to levy, collect and appropriate such taxes, duties, tolls, and fees in accordance with such procedure and subject to such limits;
- ii. Assign to a Panchayat such taxes, duties, tolls, and fees levied and collected by the State Government for such purposes and subject to such conditions and limits;
- iii. Provide for making such grants-in-aid to the Panchayats from the Consolidated Fund of the State; and
- iv. Provide for the constitution of such Funds for crediting all money received, respectively, by or on behalf of the Panchayats and also, for the withdrawal of such money therefrom, as may be specified in the law.

Property tax is the most important tax collected by the panchayats because it is a visible tax that finances services and infrastructure development. It is imposed on land and buildings within the limits of the panchayat that are not subject to agricultural assessment. The different States have varying provisions under which property tax can be collected. In most states like Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Sikkim, and Tamil Nadu property tax can be collected at the Gram Panchayat level. In the states of Andhra Pradesh and Chhattisgarh, Block Panchayat can also collect Property Tax. In Uttarakhand and Uttar Pradesh, only District Panchayats can collect Property Tax. There exists a considerable gap between the assessment and realization of property tax by Gram Panchayats. There is an urgent need to address the systemic issues to streamline the management of property tax collection in Rural areas.

5.2. Importance of Property Tax as Own Source of Revenue in Panchayats

1. Resources from higher-level governments often involve conditionalities. Local governments spend such funds mostly as their agents. If the local government has sufficient revenues from its own sources, it can spend funds on items that they consider to be important for its population. According to the Economic Survey of 2018, the own revenues of gram panchayats accounted for only 5 per cent of their total revenues while 95 per cent of their revenues came from devolutions by the state and central governments. Thus, there is a potential to increase the Own Sources of Revenue collection by panchayats and some of it could come from the streamlined collection of property taxes.
2. The Fifteenth Finance Commission estimated the house tax potential for rural and urban areas separately for all States using the unit level data from NSSO Seventy-Sixth Round on Drinking water, Sanitation, Hygiene, and Housing Conditions' conducted in July-December 2018 (DWSHH 2018). It is estimated that the collection of house taxes in rural areas relative to their potential in select five states viz Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Uttar Pradesh averaged about 20%. The overall potential for house tax collections derived at the 2019 prices is Rs. 42,160 crores for rural areas. Thus, panchayats have a large potential of increasing their own source revenue by improving the collection of property tax.

5.3. Problems with the Collection of Property Tax

1. Even though many states have empowered Gram Panchayats for the collection of property tax few bottlenecks like the lack of updated and accurate property registers with Panchayats depicting size, area, and the number of properties still exist which prevent the realization of the full potential of tax collection.
2. Records of non-agricultural properties are maintained by rural local bodies for tax collection. The gap created due to the non-availability of ownership records for non-agricultural lands has been generally filled by these tax documents maintained by local bodies.

3. Another problem faced by rural local bodies is the high cost of accurate valuation and difficulty in enforcement of tax collection. If the tax base is not estimated properly, coverage would be low which results in lower revenue collections. Enforcement problems play a major role in the under-collection of property taxes. There is a need for public information campaigns, combined with establishing credibility that the tax revenues will be used judiciously, to encourage voluntary compliance.

5.4. Present State of Property Tax Collection in States

States have adopted various methods for the assessment and collection of property tax which are based on self-declaration, annual rental value, capital value, etc. Some States have also integrated property registers with property tax collection systems which enables ownership details, and property details to be captured seamlessly. Some states have digitized the tax collection system which has resulted in considerable efficiency in tax collection. Property Tax assessment and collection systems of a few States are illustrated below.

1. Madhya Pradesh

The state has developed an online portal for the collection of property tax called Svakardhan Pravadhan Pranali which is also integrated with the Samagra database. About 7.79 lakh households have registered on the property tax portal. An amount of Rs. 11.05 crore property tax has been collected. Panchayat Darpan Portal is an online register of properties that are already registered manually. This helps in assessing the demand for property tax. As of now, only the area of a property is reflected in the property register. The state is in process of making a provision in the law that the sale and purchase of properties registered on the Panchayat Darpan portal will only be registered by the sub-registrar. In Madhya Pradesh, property tax imposition & collection is provisioned under Section 77A of Panchayat Raj Avam Gram Swaraj Adhiniyam, 1993. Three-tier of PRIs impose and collect tax according to provisions/rules as per the panchayat act. For making the tax assessment and collection process transparent, analytical, and publically available; Panchayat & Rural Development Department has developed an online mechanism called “Svakaradhan Pravandhan Pranali” on the departmental portal “Panchayat Darpan” from FY 2020-21. 7.79 lakh households have registered on the property tax portal. INR 11.05 Cr property tax has been collected.

Process Flow of System

- i. At first, PRI registers each family as per SAMAGRA ID² and maintains an online register of families
- ii. Register property details of the family
- iii. Impose tax/fees according to the Panchayat act for property tax and water/sanitation/other tax if avail by the family on a monthly/yearly basis
- iv. Update the tax collection information

2. Kerala

Kerala has prepared Sanchaya software through Information Kerala Mission. Panchayat Department only collects Property tax on buildings. Tax on vacant land is collected by the Revenue Department. All the buildings are onboarded on the software, demand notice is issued digitally, demand collection can be accessed daily, and payment can be made through UPI as well. Property tax collection is 100% paperless. Recovery has been improved by better demand planning and better monitoring. In the Financial Year 90% of property tax demand of Rs. 750 crores was collected using this system.

3. Andhra Pradesh

The capital value method is used for property tax assessment wherein 12.5p to 100p is collected based on capital value. The registered value of the property in the Abadi area is used for assessing capital value. The existing property registers have been digitized and house tax collection will be digitized through the Digital Panchayat web application. Assessment of the property tax is done manually by the Panchayat Secretary after which notices are issued manually. Software is used for providing layout permissions, building permissions, and issues of NoC. The state has an annual demand of Rs. 459 crores for property tax.

² Samagra Social Security Mission (SSSM), a common household database with account details and other parameters, was developed by Madhya Pradesh to facilitate integrated monitoring and management of all major government-to-people (G2P) cash transfers in the state

4. Maharashtra

Devolution of property tax to Gram Panchayats has been done vide section 124 of the Maharashtra Village Panchayat Act, 1959. Property Tax for buildings and open land is calculated differently and the rate of tax is determined using the capital value method. Namuna 8 and Namuna 9 forms are used for the assessment of property tax.

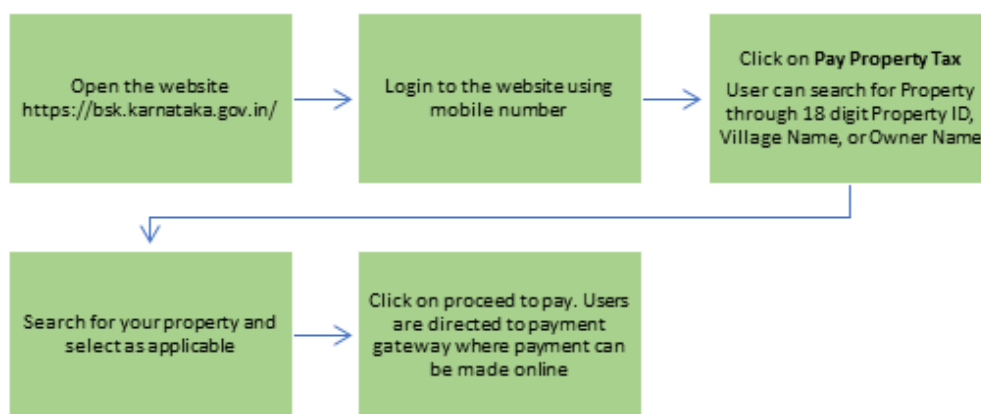
5. Karnataka

The State collects property tax based on the market value (Capital Value Method) of the properties through the online portal 'Panchatantra' which is integrated with the online property register called "e-SWATHU". e-SWATHU is an initiative of the Department of Rural Development and Panchayat Raj, (RDPR) Government of Karnataka that was initiated in 2013. The objective was to create a digitized database of ownership records for rural non-agricultural properties which can be used for transacting properties and also assist Gram Panchayats in tax collection. e-SWATHU is a property record management system meant for maintaining and managing ownership records. Panchatantra is DCB (Demand, Collection, and Balance) of property tax and also a double-entry accounting system.

e-SWATHU and Panchatantra are electronically integrated for data exchange through APIs. e-SWATHU is being implemented in an incremental approach and property records are being created based on the demand from the citizen. e-SWATHU issues Form-9 (Tax assessment register) for regular properties which have been created following the law of the land. Form-11 (Tax demand collection and balance register) Form-11B (Irregular properties tax assessment register) is issued to irregular properties created before the cut-off date (before 14-06-2013). All the properties within the Abadi area (Gramathana) are given Form-9, based on the confirmation from the survey department. Agricultural properties which have been converted for non-agricultural purposes and whose layout has been approved by Local planning authorities are also given Form-9. The electronic integration between e-SWATHU and Panchatantra helps to synchronize the tax details among both systems. Data captured as part of e-SWATHU helps Panchatantra to arrive at the correct demand. The electronic integration between e-SWATHU and KAVERI (Registration system) has ensured that only properties

identified in e-SWATHU as eligible for the transaction are allowed to be transacted in the registration system.

On e-SWATHU, an average user charge for obtaining property documents is Rs.50.00. Until now, a total of 55 lakh Form 9/11A and 11 lakh Form 11B copies have been issued to the public which helps in the financial sustenance of the project. In Karnataka, the Property register is integrated with the property tax collection system. This allows for the automatic computation of property tax due on a property. A simple workflow is illustrated below:



Process of property tax payment online through Bapuji Seva Kendra

6. Gujarat

State levies 50p to 1.50 rs as property tax based on the registered value of the property (for newly constructed properties) and for inherited properties, a notional value is decided by gram panchayats through a resolution. Out of 14,572 GPs, till now 14,100 GPs have moved to an online register called the Gram Suvidha portal. Property tax collection has been made digital through the Gram Suvidha portal.

5.5. Use of SVAMITVA Scheme for improving the management of property tax collection

An efficient and effective property tax collection system requires identification and valuation of all the properties, tax liability assessment based on spatial and non-spatial data, tax billing and collection, tax enforcement, taxpayer services, and dispute resolution. Data and maps created under the SVAMITVA scheme can be very easily and effectively utilized to create an efficient property tax management system.

1. Digitization of Property Register

The initial step in property tax assessment and realization is to collate and update the property register once the taxable properties are identified. Under the SVAMITVA Scheme survey of the property in the Abadi Areas is being conducted with the help of advanced drone technology. The properties are identified and marked with a unique number. By using appropriate software data created under the SVAMITVA scheme can be used to create a digitized property register. This register will contain maps, features and ownership details of all the properties in the village. The property register can be linked to the record-of-rights so that in case of any mutation in the record-of-rights property register is automatically updated.

2. Assessment of Property Tax

The SVAMITVA data contains all the attributes required for the assessment of tax on property like the dimensions, type of construction, road width, ownership, use of property, etc. Based on these attributes property tax on all the properties in the village can be assessed very quickly. It is also possible to assess the tax automatically through the appropriate software. This will reduce subjectivity in the assessment of tax resulting in less of grievances and more tax collection.

3. Creation of Demand and collection

After the assessment of the tax, demand notices can also be sent automatically through SMS, E-mail, or by post. The collection of tax also improves if people are given the easy option of paying the tax digitally without visiting any office for this purpose. Once the property register is digitized, a system for the collection of tax digitally can also be created easily.

5.6. Recommendations

The following recommendations are made for improving the management of property tax collection in rural areas.

1. Improvement in the management of the property tax collection system is one of the objectives of the SVAMITVA scheme. Therefore, the Ministry of Panchayati

Raj should proactively guide, monitor and fund the projects for improvements in the property tax collection system using the SVAMITVA scheme data.

2. Some states have made commendable progress in establishing electronic systems for making property registers and collecting property tax. However, most of these systems have been designed before the SVAMITVA scheme. The SVAMITVA scheme has opened an opportunity to design better property tax management systems utilizing maps and data created under the scheme. These states should upgrade their property tax management system with the integration of the SVAMITVA scheme data.
3. While monitoring the progress of the SVAMITVA scheme, improvement in the Property tax management system should also be monitored regularly by the Ministry of Panchayati Raj.
4. At present, a major proportion of funds under the SVAMITVA scheme is being spent on the creation of maps and record-of-rights. This is justified in the initial years of the implementation of the scheme. However, with the progress of the scheme, attention has also to be given to the development of systems for improving governance using data created under the SVAMITVA scheme. Therefore, under the SVAMITVA scheme, the Ministry of Panchayati Raj should fund the computerization of property tax management systems in the states. This will expedite the computerization of the property tax management system and leave an indelible effect on the financial position of the panchayats.
5. The Ministry of Panchayati Raj should consider making generic software for a property tax management system based on the SVAMITVA scheme data. This software should be made with the help of the NIC or any other competent agency. This software may have the following essential features:
 - i. It should be a generic software with provision for customization by the states as per their specific requirements.
 - ii. Property registers should be created by importing required data from the SVAMITVA scheme databases directly.

- iii. The ownership details and dimensions of the properties should be linked to the record-of-rights. After every mutation in the record-of-rights property register should automatically be updated.
- iv. Assessment of tax should be automatic based on the attributes of a property and principles of the assessment notified by the competent authority.
- v. Demand notices should be issued automatically and delivered through SMS, E-mails, WhatsApp, post, etc.
- vi. There should be a facility for filing a dispute online and resolution of the dispute should be made in a time-bound manner.
- vii. People should have the facility to pay taxes online.
- viii. Various NOCs related to property tax collection systems should be issued online.

Chapter- 6

RURAL PLANNING

6.1. Need for Rural Planning

1. The spatial expansion of many Gram Panchayats (villages) in India, necessitates the preparation of a land use plan for an orderly development through a Master Plan and to provide adequate infrastructure. Rural development has been experiencing a see-saw change in terms of emerging peri-urban expansion, Census Towns (which are still expanded villages), and some of the villages require basic infrastructure provision with adequate land for their development. Though some of these were addressed earlier, there was no framework for proper land use planning. Ministry of Panchayati Raj (MoPR), has introduced Rural Area Development Formulation and Plan (RADPFI) Guidelines in January 2022, and SVAMITVA for land titling through drone survey in the Abadi/habitat area of the villages in April 2020. The Gram Panchayat Development Plan (GPDP) that came up earlier for sectoral budgeting, was constrained by a lack of spatial/land use planning component.

2. Together, the Rural Area Development Plan Formulation and Implementation (RADPFI) – Guidelines which focus overall on village land use planning (that is land management in terms of land allocated for Residential, Commercial, Industrial, Infrastructure, agriculture, water bodies, conserving areas, etc.) and the SVAMITVA program addresses the issue of habitable area/Abadi area within a village, and how to come out with land monetization through land titling. RADPFI Guidelines and SVAMITVA combined can provide a future vision for any village in the preparation of GPDP for the next five years. While the RADPFI will guide in the preparation of a Master Plan for a Village, SVAMITVA can enable Spatial Budgeting by unlocking the land use made available through Drone surveys and feature extraction. These two are the arms of Village planning which can help in guiding the GPDP preparation and implementation of various infrastructure and land development schemes. RADPFI guides the land-use plan for the future with a vision, land management, and later land-use regulation for orderly development. SVAMITVA is an important tool that provides the inputs in terms of land titling: its size, ownership pattern, micro land use like what kind of building is in place, and detailed dimensions of the plot/building like height, length, and width of the plot as well as its area, etc. SVAMITVA linked to titling deed also provides an opportunity for land monetization, which is an important tool for land use planning and management under RADPFI. Therefore, there is a need for a scientific and orderly disposition of land use resources, not only for the Abadi area (provided by SVAMITVA) but overall spatial planning under RADPFI, which would in turn foster socio-economic

development, and contribute to the quality of life of the people residing in those areas. Thus, the need for Rural Area Planning arises with the help of the SVAMITVA Scheme.

6.2. Present Scenario of Rural Planning

1. The implementation of PMGSY, Health Mission, WASH, and other missions along with technology leap in rural areas, have brought in the transformation of rural areas in India. In addition, the socioeconomic transformation, especially the aspirational vision that rural India is seeing today gets transmitted in terms of demand for housing, socioeconomic infrastructure, and other amenities within a village. This vision needs to be addressed in a faster way with the help of land use planning for the overall village area, especially Abadi areas which are the habitable areas of the villages and are growing with pace.
2. In an effort of strengthening planning and implementation at the grass-root level, Gram Panchayat has mandated the preparation of the Gram Panchayat Development Plan (GPDP) for economic development and social justice at the village level. These plans are prepared on annual basis after exhaustive stakeholder consultations at various levels. Along with the plan preparation of Gram Panchayats, these are integrated into Block Panchayat Development Plans (BPDP) and District Panchayat Development Plans (DPDP) respectively. **The GPDP covers 29 subjects defined in XIth Schedule namely:**

LIST OF 29 SECTORS			
1.	Agriculture.	2.	Poverty alleviation program.
3.	Land Improvement.	4.	Education.
5.	Minor Irrigation.	6.	Vocational education
7.	Animal Husbandry.	8.	Adult and non-formal education
9.	Fisheries.	10.	Libraries.
11.	Social Forestry.	12.	Cultural activities.
13.	Minor Forest Produce.	14.	Markets and fairs.
15.	Small-scale industries.	16.	Health and sanitation.
17.	Khadi, village, and cottage industries	18.	Family welfare.
19.	Rural Housing	20.	Women and child development.
21.	Drinking Water	22.	Social welfare.

LIST OF 29 SECTORS			
23.	Fuel and fodder	24.	The welfare of the weaker sections.
25.	Roads	26.	Public distribution system.
27.	Rural Electrification	28.	Maintenance of community assets
29.	Non-conventional energy		

3. It covers various components in the above 29 sectors, for which development is to be planned either for addition or augmentation in the annual budget of the year. Thus, the funds from various schemes can be utilized in a better-planned way. From the fifteenth finance commission’s allocated amount for Rural Local bodies, 40% of the recommended grants will be untied grants and the remaining 60% as tied grants. The 40% of untied grants can also be used for the development of the above 29 sectors, while from the 60% tied grant of total finance commission funds - 30% are distributed to sanitation & maintenance of the O.D.F status and 30% for drinking water, rainwater harvesting as well as water recycling.

Indicative list of Scheme, whose funds can be utilized for GPDP implementation:

- XV (Fifteen) FC Grants (Tied-Untied)
- National Health Mission (Rural) - NHM
- Mahatama Gandhi National Rural Employment Guarantee Act – MGNREGA
- Pradhan Mantri Awas Yojana- Grameen – PMAY-G
- National Rural Livelihood Mission – NRLM
- Deen Dayal Upadhyaya Grameen Kaushalya Yojana – DDUGKY
- Pradhan Mantri Gram Sadak Yojana – PMGSY
- National Rurban Mission - NRuM
- Integrated Child Development Services- ICDS
- Samagra Shiksha Abhiyan
- Mid-Day Meal Scheme
- Swachh Bharat Mission – Grameen
- Jal Jeevan Mission - JJM

- Pradhan Mantri Krishi Sinchayee Yojana – PMKSY
- Rashtriya Krishi Vikas Yojana – RKVY
- Soil Health Card - SHC
- Fasal Bima Yojana - PMFBY
- Pradhan Mantri Pradhan Mantri Ujjwala Yojana – PMUY
- Integrated Power Dev Scheme - IPDS
- Deen Dayal Upadhaya Gramin Jyoti Yojana- DDUGJY
- National Ayush Mission
- State specific Schemes

In Panchayats development plans are prepared annually along with the Panchayats, at Blocks and Districts levels too, they have termed Block Panchayat Development Plans (BPDP) and District Panchayat Development Plans (DPDP).

4. GPDP converges development plans for many sectors within a Panchayat, still it is short of spatial vision. Unlike the Master Plan in an urban area, spatial planning was not introduced in India before 2016. Hon. Prime Minister launched the Shyama Prasad Mukherjee Rurban Mission (SPMRM) in 2016, with a vision to 'Develop cluster of Panchayats that preserve and nurture the essence of rural community life, with the provision of services which are equivalent to urban areas. The cluster approach was initiated for a group of panchayats addressing the above aspect, RADPFI guidelines were prepared in 2016, which were revised in 2021, have focussed spatial planning at the Gram Panchayat level, and links to SVAMITVA as well as GPDP.
5. The RURBAN Mission envisaged developing 14 components covering RADPFI Guidelines addressed the village spatial planning and integrates it with a scientific approach to land use, disaster preparedness, climate change, and various sectors for the entire village/panchayat. This spatial plan is linked to GPDP already in vogue at the Gram Panchayat level. It is also being suggested to bring in the necessary amendments under Schedule 11 of the CAA 73rd ACT to strengthen land use planning. As an example, the Ministry of Panchayati Raj during the process of preparation of the 34 villages' spatial plans, came across several aspects which should be incorporated in the first version of RADPFI guidelines released in 2016. Many challenges came out from these villages in terms of the issue of developing Abadi/habitat areas, how to

provide a vision for the village, and infrastructure like housing, water, sewer, drainage, conservation areas, energy proficiency, etc for the future. All these aspects are incorporated in the Revised RADPFI Guidelines-2021, which will help in the preparation of a spatial plan for the rural areas.

6. Although agricultural land titling already existed, the Abadi/Habitat areas were not titled due to many constraints. SVAMITVA Scheme has brought in a paradigm shift by addressing this Abadi/Habitat area in villages, where the land is measured through drone surveys and titling is assigned. A new beginning has been made by Hon. Prime Minister to bring in the technology to use the land titling which can also monetize land development in the long run.
7. Ministry of Panchayati has developed a Spatial Planning Application “Gram Manchitra”. It has added objectivity to the planning process by acquiring relevant data and performing planning at the panchayat level with the use of geographic data for sustainable development. It enables the user to take a decision based on geographical data. Rich SVAMITVA data would be integrated with the application for supporting in Panchayat development plan.

6.3. Learning from Pilot Rural Spatial Planning conducted in 34 Panchayats

1. Ministry of Panchayati Raj has conducted pilot Spatial Planning for 34 Gram Panchayats and selected GPs in proximity to transport corridors like National Highways or State Highways. The study was conducted in collaboration with 17 planning and architecture institutes of National repute, including SPAs, CEPT, IITs, NITs, etc., spread across 14 States of Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal.
2. The comprehensive reports have analyzed various parameters of the selected 34 Panchayats the importance of their strategic location, their demography as well as their demographic trends, economic base, socioeconomic structure, social and physical infrastructure status, coverage of ongoing government schemes, zoning, land usage, development control regulations/norms, disasters happened in past, unhealthy/unsustainable practices followed in the panchayats, presence of heritage, etc. Surveys were conducted to get an in-depth understanding of the Panchayats. Analysis with the help of Mapping of various forms of data

was done. Issues and challenges were identified in the Panchayats. The concluding remarks were followed by proposals in the form of zoning, land use distribution, infrastructure (social and physical), sustainable development solutions, disaster mitigating solutions, etc.

3. One of the issues, which was common in all 34 studies was: The Lack of land-use data for the Abadi areas. Abadi areas are accounted for the majority of the residential population of the villages. Several functions are already going in the Abadi areas, which support the residential function like commercial activities, small-scale industrial activities, recreational activities, tourism activities, institutional activities, etc, The details of the land use within the Abadi areas were not available at the time of conducting the study. Exhaustive door-to-door surveys were conducted and few institutes conducted drone surveys themselves. Now, under SVAMITVA Scheme, with the availability of the Abadi area data, better analysis and better planning of various land use functions in the Abadi Area of the villages can be easily carried out.

6.4. Revised RADPFI Guidelines

1. Ministry of Panchayati Raj (MoPR) launched the revised Rural Area Development Plan Formulation and Implementation (RADPFI) Guidelines on 20th Jan 2022, which contains a set of norms and standards for categorizing the village, providing infrastructure (social & physical) facilities, land use, amenities, etc., at the village level and its integration with GPDP. The basic idea is that RADPFI Guidelines can help in setting up a vision for the village as a whole in terms of land use planning for the next five to ten years along with its facilitations and regulations, SVAMITVA is expected to provide two dimensions to support spatial planning with the help of RADPFI Guidelines: -
 - i. Provision of basic Maps for the Abadi/Habitat area, through detailed drone survey and land titling; and,
 - ii. Linkages to GPDP for better preparation and monitoring of the land management system as suggested in the RADPFI guidelines. As GPDP is expected to bring in Spatial Budgeting – fiscal and spatial dimensions can be integrated with the village for better and planned infrastructure provision – especially public infrastructure, and resource mobilization through land monetization (mainly through SVAMITVA).
2. The RADPFI guidelines lay the foundation for inducing a spatial approach to Gram Panchayat Development Plans. The guidelines emphasize the categorization of villages according to the agro-climatic regions, metropolitan area villages, peri-urban villages, coastal villages, etc., in

the preparation of the Rural Master Plan, and a scientific approach to decision-making regarding land use plan for various categories of villages is suggested. The Guidelines also promote the use of modern technology for Spatial Data inputs for land use planning, which are dynamic using satellite imageries, rather than static data which hardly captures the rapid land use transformation that happens in peri-urban villages and census towns. It has also incorporated the Bureau of Indian Standards guidelines on Disaster and Resilience, and suggestions laid down by the National Institute of Disaster Management guidelines.

3. These Guidelines certainly provide direction to the process of development in various sectors such as physical and social infrastructure, connectivity as well as anticipated economic activities and aid towards a workable solution for conversion of agricultural to the non-agricultural purpose for planned development, only up to certain limits while preserving the food security which is mainly dependent on the rural areas.
4. The Guidelines can be downloaded from the Ministry of Panchayati Raj website (<https://panchayat.gov.in/>)

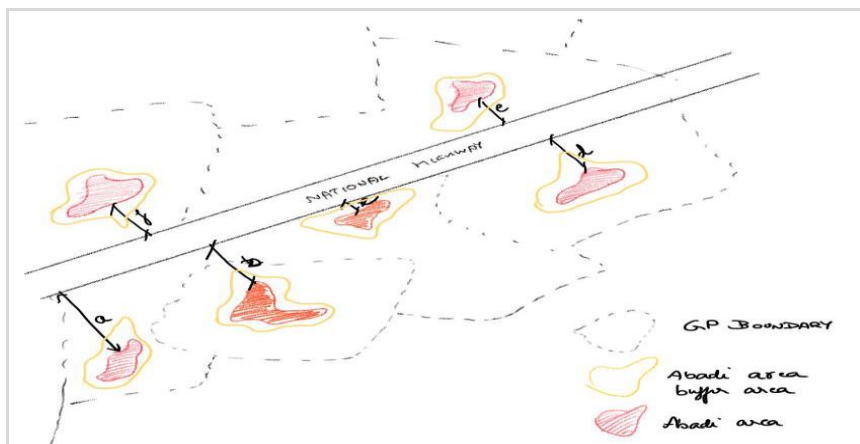
6.5. Use of SVAMITVA Scheme for improving village planning

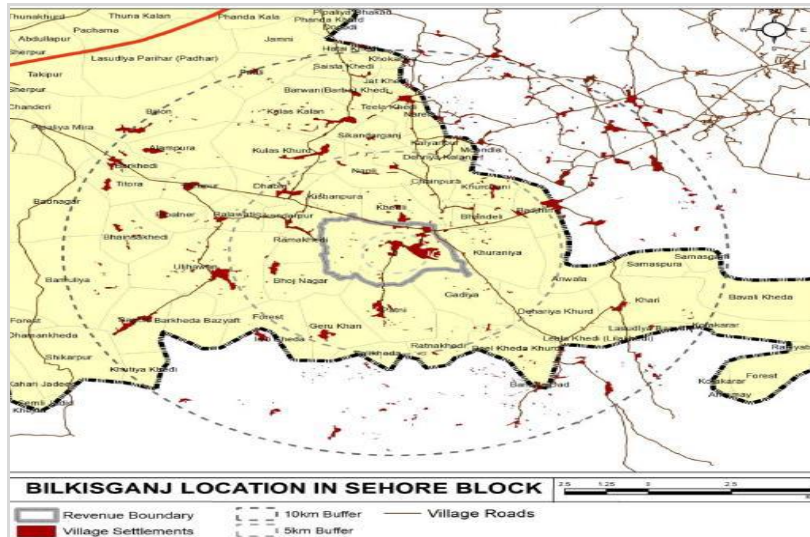
1. SVAMITVA survey public land parcels data can be utilized for the development of various infrastructures, such as Educational institutions, parks, playgrounds, warehouses, water bodies, solar energy harvesting areas, water harvesting areas, etc. The database produced under SVAMITVA Scheme is providing high-resolution maps to the scale of 1:500 and Digital Elevation Model (DEM) data for Abadi areas, which can be used further for spatial planning purposes, implementation of various schemes, and realizing the accurate amount of property tax which can help in improving the own source of revenue for the panchayats.
2. Further, SVAMITVA Scheme, highlights the public/private land, typology of land within the habitat area along with land parcel size and their distribution. The growing population within high-density areas and the unorganized settlement in villages attract a lot of disaster-prone challenges as well. SVAMITVA through Drone survey provides important data such as water bodies, building heights, expansion, drainage basin, etc combining physical features of the Abadi/Habitat areas which can be used for understanding as well as predicting the magnitude of the disasters and can be used for finding interventions for mitigating those disasters.

3. Some of SVAMITVA’s usage and implications can be as under:

i. Classification of Rural Areas

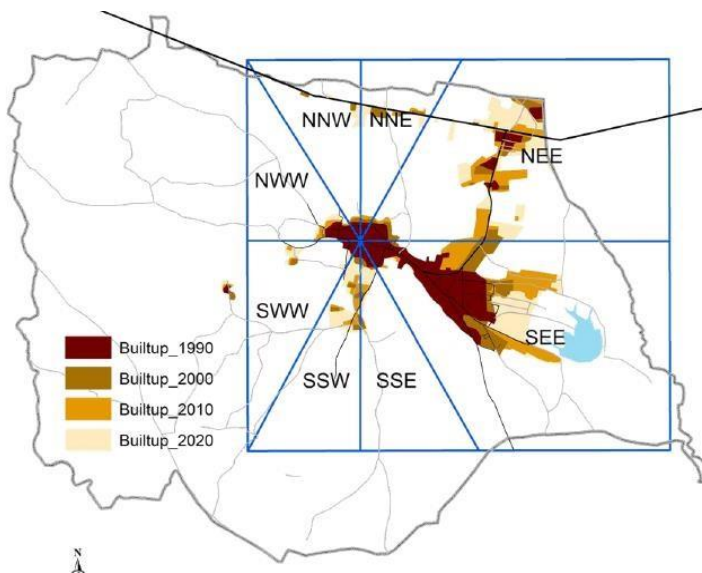
For better planning of the rural areas, it is important to contextualize the rural areas and classify them accordingly as per the size of the area and its location. RADPFI classified the typology as per the agro-climatic conditions, location of the village around National/State Highways, Hill Areas, etc. This has to be linked to the size of the Abadi/Habitat Area as per the SVAMITVA data, which will reveal the typology of the Abadi/Habitat area. This is required for land use planning and also to bring out a vision for the village, and how best the resources can be optimized. There may be many externalities and influences which may result in the expansion or spread of the Abadi areas of the villages, e.g., if some industrial area comes up which connects the Abadi areas with any road, with time there are chances that Abadi/habitat area may start growing towards that area along the road or new hamlets may appear on that road which may eventually merge with the existing Abadi/habitat area with time. SVAMITVA Scheme data can help in identifying the same. Thus, classification of the village can be done accordingly, and for it, RADPFI guidelines can be referred to.





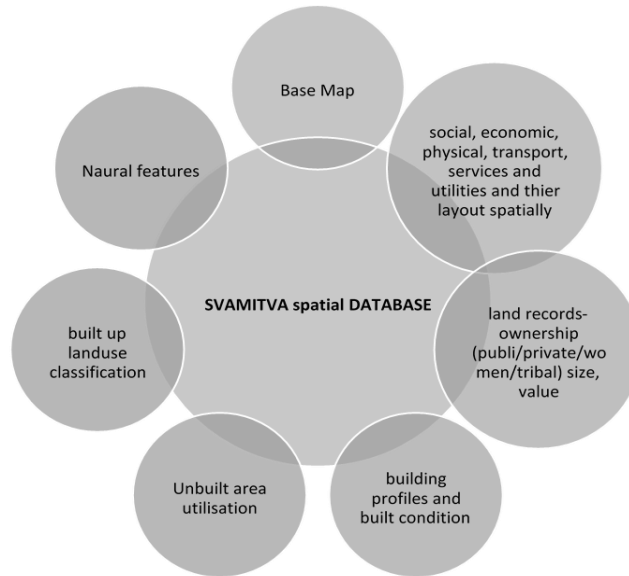
ii. Planning Boundary Delineation:

Abadi area and buffer area delineation can be done with the help of SVAMITVA data. It can be useful in the delineation of the Master Plan, project area boundaries may it be village level, panchayat level, or cluster level. The data can be useful in the assessment of the morphology and growth direction of the built-up area. This will help the land use planning under the RADPFI guidelines and come out with a vision for the village for the next five, ten, and twenty years.



iii. Plan Formulation and Preparation

SVAMITVA data is useful in several stages of plan preparation. It is a validated source of accurate information that provides multiple layers of information for plan preparation as illustrated in the diagram below.



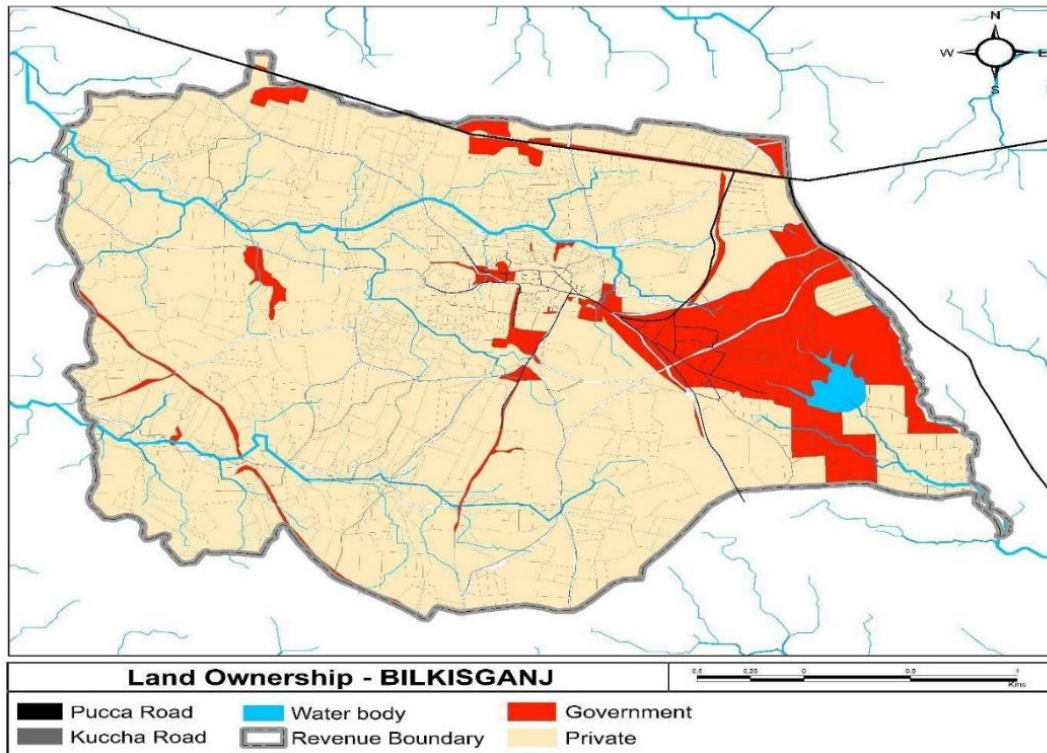
iv. Existing Situation Analysis:

a. Land & Plot Size Data

SVAMITVA database provides details of Land Typology, Land Ownership, and Land Parcel Area Details. This may help assess the total public land area available for developmental activities to be proposed preferably in the public land. This can also further include an assessment of the land that may be put to economic use or needs to be conserved for environmental reasons. Detailed land-use plans can be prepared which can enhance the base maps at various levels.



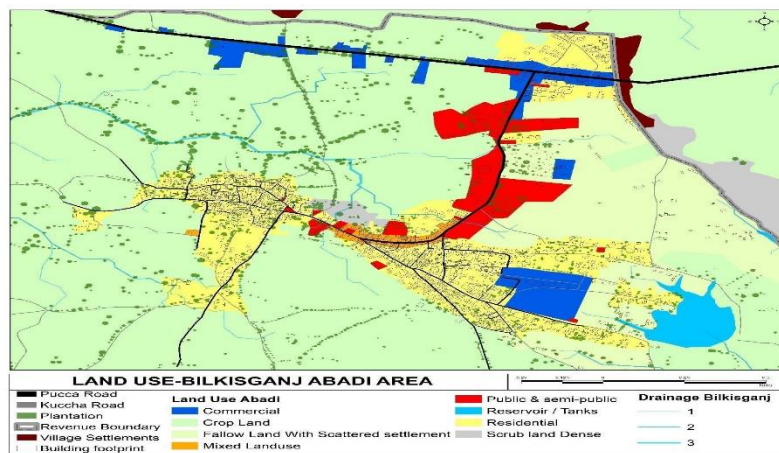
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b. Existing land-use analysis

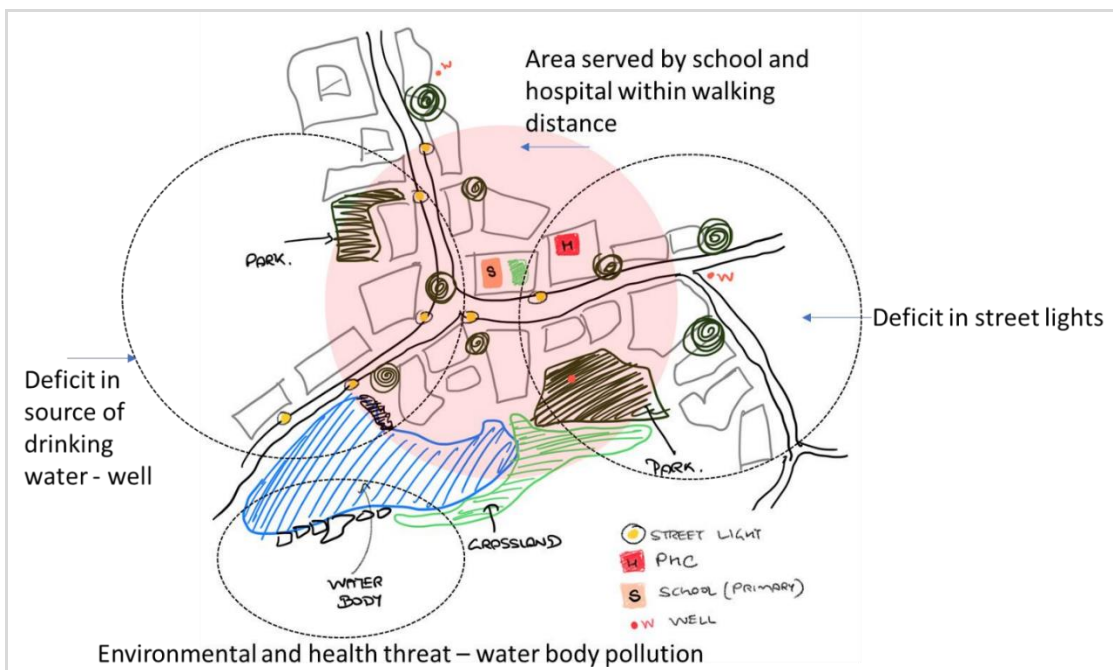
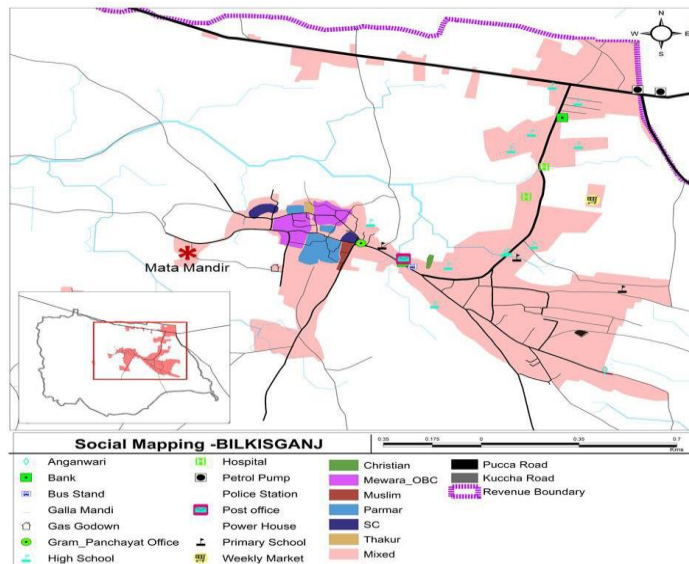
SVAMITVA Data can be used to produce an existing land-use plan, where land-use categories like residential, commercial, industrial, educational, health, services, utilities, recreational, transportation, communication, and a special area in the Abadi area of the village, can be mapped on the base map of the villages and panchayats. The Abadi part of the base map can be updated and detailed from the SVAMITVA database. The land-use classification on the base map can follow the color coding, in in-line and as suggested in the revised RADPFI Guidelines or can be as per the color codes used by the State standards for preparing the Master Plans.



Source:https://panchayat.gov.in/documents/20126/0/BILKISGANJ_Madhya+Pradesh.pdf/b00cc5ba-3f74-259ecbd6-31e740270a15?t=1610691838167

c. Existing Situation Analysis- Infrastructure Gap Identification –

With the help of the SVAMITVA Scheme and the data from it, in form of Feature Extracted Maps and DEM Data, the social and physical infrastructure gaps and potential areas of intervention for the planning area may be established. It thus, can help in making an inventory and spatially mapping the services and utilities to identify the service deficit pockets.



d. Sustainable disaster resilient growth and SDGs

With the data collected by the SVAMITVA Scheme, the attributes linked to the condition of the housing stock can be added during the ground truthing. With this, an inventory of Houses based on their conditions (Pucca House, Semi-Pucca, and

Kutch) can be recorded and analyzed. Kutch houses are more prone to disaster, thus while preparing rural spatial plans, this can be addressed by providing suitable intervention.

Similarly, during SVAMITVA Survey many un-inhabited settlements were recorded in many States. These un-inhabited settlements can be analyzed and an approach along with induced growth factors for re-densified or green field development can be initiated in those villages.

For making the rural area resilient and future-ready, the data sets of the National Disaster Management Authority (NDMA), National Bureau of Soil Survey & Land Use Planning (NBSSLUP), etc., can be converged for better planning and providing disaster resilient growth to the rural settlements.

Development of spatial layer with census data (population data) concerning gram panchayats. The potential risks can be concerning certain hazard like earthquakes and landslides in the specific region. The flash floods have increased their frequency at the places situated near the river. SVAMITVA Scheme data can be used to identify those vulnerable villages and populations which can be affected by that disaster. Vulnerability Atlas of India was published by BMTPC under the Ministry of Housing and Urban Affairs from time to time. NIC with help of NIDM and BMTPC has converted this publication into a web-based GIS application for Vulnerability assessment at a 1:2M scale. This can be incorporated for visualization at the district level. Similarly, Landslide maps can be consumed as a service from NRSC prepared atlas, along with other navigation spatial datasets such as roads/highways can help in analyzing the situation. A flood zonation map at a finer scale available with NRSC can also be incorporated for visualization at Block and Gram Panchayat level. This could help us predict the amount of loss, buildings, and populations that could be affected during riverine flooding activity.

SVAMITVA database can provide valuable spatial information instrumental in the following thematic mapping exercises:

- Hazard mapping
- Spatial mapping of vulnerability

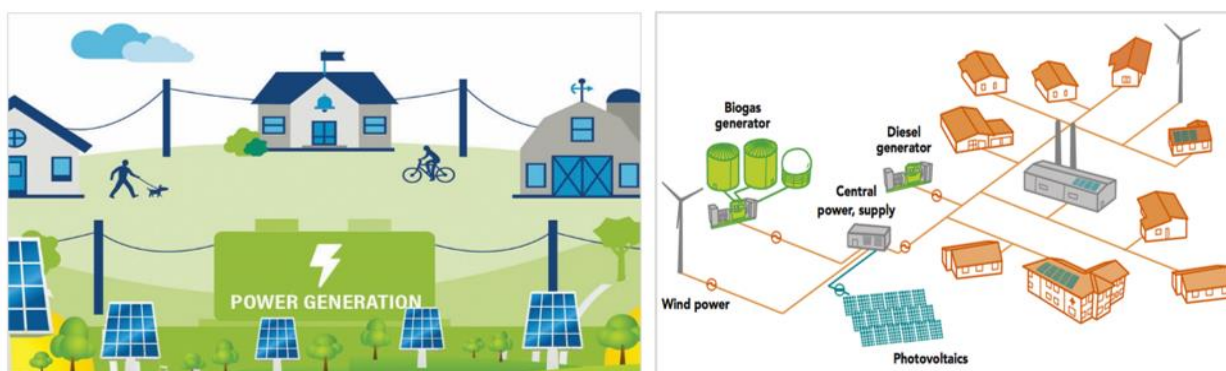
- Emergency response resource mapping

For achieving Sustainable Development Goals (SDGs), the role of rural India is paramount. Village natural resources like land, water bodies, and forest areas need conservation as well as better resource management efforts will ensure sustainable rural development. River edges and lakes/pond edges are invaluable parts of rural culture. SVAMITVA database can provide information on the threats and vulnerabilities these resources may have been subjected to.

v. SVAMITVA Data & Renewable Energy

Building self-sustainable villages/gram Panchayats is a primary requirement to address the energy requirements. The energy requirement could be effectively analyzed based on the SVAMITVA data that is being captured under the scheme. The build-up area or the open areas data from the SVAMITVA Scheme along with the solar/wing/tidal energy potential of the Area would help in the selection of villages that can be prioritized and selected for setting up of Solar PV micro-grids, solar water heaters, wing energy generating units, at the community level, identification of homes using cooking facility types – providing LPG connection to every household or help in setting up community biogas plants, etc.

This would majorly increase the employment generation of skilled youths, and help in building self-reliant villages to cater to the energy requirements through renewable sources.



vi. SVAMITVA Data and Social Development

Analysis tool for classification of houses in the Abadi areas based on social category i.e., SC/ST/OBC/General, and their condition enables identification of houses under PMAY-G based on their eligibility. This dataset along with the micro-enterprise being run by them

can be used for financial aid which will lead to the social development of the gram panchayats. This data can be captured primarily by the States under SVAMITVA Scheme and used for Social Development. The Panchayats should keep the data sets updated so that records are maintained.

6.6. Development approach based on RADPFI Guidelines utilising SVAMITVA data

SVAMITVA Scheme along with RADPFI Guidelines can be used for adopting the development approach as discussed below:

i. Rural Area Improvement (Retrofitting):

Retrofitting is the introduction of planning in an existing built-up area to achieve developmental objectives, along with other objectives, to make the existing area more efficient and livable. It is important to provide infrastructure in areas where the population density and building density are high. This provision requires a detailed and accurate map, which is possible through SVAMITVA. With the help of SVAMITVA Scheme data, analysis of the existing infrastructure and their service levels can be assessed easily and gaps can be identified. The GIS Maps and layout of the existing infrastructure prepared under the SVAMITVA Scheme and the analysis of DEM obtained under the SVAMITVA Scheme can help in scientifically analyzing and deciding the layout of the augmented infrastructure.

ii. Rural Area Renewal (Redevelopment):

Redevelopment affects a replacement of the existing built-up environment and enables the co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Thus, with the help of SVAMITVA Scheme Data, the densities in the parts of the Abadi areas can be analyzed and areas, where redevelopment is to be taken up, can be identified and further redevelopment plans can be prepared and implemented.

iii. Village Planning Scheme (VPS)

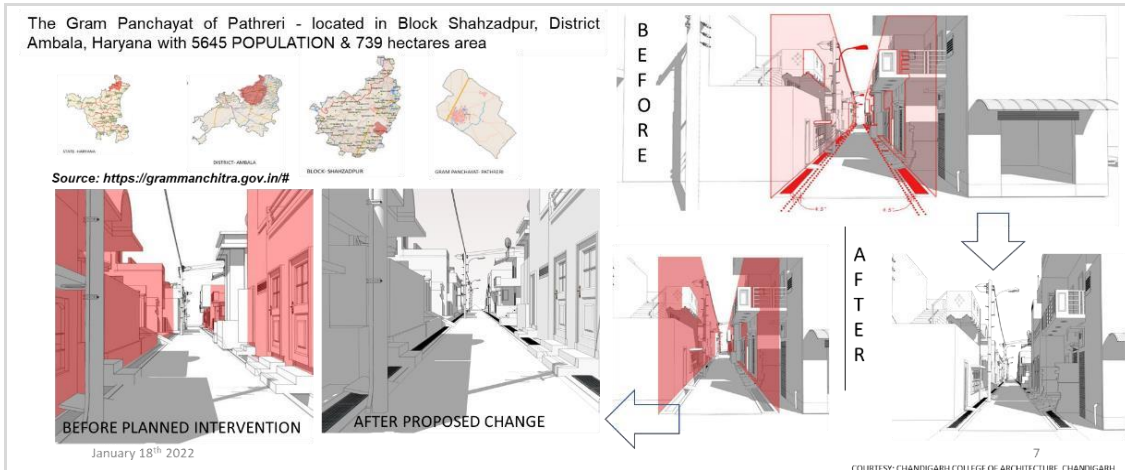
Rural land parcels in India are highly fragmented and irregular in shape. Like the Town Planning Scheme, the Village Planning Scheme envisages efficient land pooling exercise with the consent of the property owners. With contiguous land pooled from various owners of the land, a better and more efficient plan is prepared for the owners. This plan incorporates Development Control Regulations (DCR) for planned development and the owner of the properties at the end receives better-planned areas with plots attached to the roads with a uniform width, along with all the infrastructure and services. The planning also incorporates proper zoning, thus making the VPS

efficient, if implemented. An integral element of VPS is plot reconstitution. The irregular plot boundaries as obtained with the help of SVMITVA can be redesigned to accommodate the existing properties and also make space and efficiently utilize remaining land parcels for value-generating land uses.



iv. Land Management

The SVAMITVA Scheme data can spatially assess the deviations in the Building by-laws and development control regulations, which are required for rural areas to mitigate rural informality and safeguard land speculation. SVAMITVA Scheme data also empowers the Gram Panchayats for monitoring the land management within their village area through GIS tools. Usually, in many states, a village which is falling within the State level Directorate of Town and Country Planning, plan approvals, and constructions are sanctioned only by them, which delays the development process. Also, no revenue from plan approvals and sanctions is shared by them with the Gram Panchayats. Once GIS provision is linked to SVAMITVA, a digital process may outline norms for the various features of commercial buildings, industrial buildings, institutional and community buildings specifying allowable ground coverage, Floor Area Ratio (FAR), height, and setbacks, and parking norms. SVAMITVA database allows a deep study of the plot sizes and the amount of regularization required to ensure that the specified norms and standards may be achieved while preparing and implementing the rural plans.



Source: Chandigarh College of Architecture, Chandigarh

6.7. Recommendations

This chapter highlights the utilization of the SVAMITVA database for the preparation and implementation of rural spatial planning with the help of the RADPFI guidelines and its usage in enhancing the annual planning process carried through the GPDP.

1. SVAMITVA Data along with the RADPFI guidelines should be used for better planning purposes and setting up medium/long-term development vision for the Panchayats. This data should be used for the preparation of annual GPDP, BPDP, and GPDP. This data should also be used for Village Planning Schemes (VPS).
2. To institutionalize the process of using the SVAMITVA scheme data, the RADPFI and GPDP guidelines should include the process of using the SVAMITVA scheme data in the preparation of these plans.
3. With the advent of new technologies, SVAMITVA Scheme data can be used for disaster preparedness and mitigation also. The Ministry of Panchayati Raj may issue appropriate guidelines for this purpose.
4. The Ministry of Panchayati Raj may consider developing a generic software which may facilitate the use of the SVAMITVA scheme data in preparation of spatial development plans and gram panchayat development plans. States can further customize this software as per local requirements.

Chapter- 7

Use of geospatial infrastructure and data of SVAMITVA Scheme by other agencies

7.1. Need of Geo-spatial infrastructure

1. Automated systems, such as land title systems and digital cadastral or property maps, are being seen increasingly as an integral part of developing a state's or nation's Sustainable Development Index and demonstrate the potential for land administration and cadastral systems evolution driven by advances in technology. The world is transitioning from data-centric to knowledge-centric systems. Data is not the end-point, and the true value of data lies in its use to derive knowledge and meet needs. Most of the world's greatest challenges are time and place related, which in turn form the essence of geospatial and location data. Thus, geospatial knowledge is crucial for solving the world's greatest challenges, and it is important to place geospatial knowledge at the heart of tomorrow's sustainable digital society. Existing national spatial infrastructures need to evolve on the same grounds. An integrated and geo-enabled land administration and management system can act as an enabler for the evolution of national geospatial infrastructures
2. The evolving challenges associated with the dynamic and ever-expanding landscape of land administration necessitates a cognitive approach in the workflow, through the integration of frontier technology including IoT, AI, ML, 5G, etc. with geospatial data and technology thereby enabling an automated, collaborative, and participatory land administration system. The cognitive approach which places geospatial at the heart of the land administration workflow will enable effective decision-making by making real-time geospatial knowledge accessible to stakeholders across the workflow.
3. Further, for effective and efficient land management and village planning, there is also a need for **collaborative architecture**, involving government, industry experts, and the public.
 - i. **From Govt side:** Fundamental data, Integrated policy
 - ii. **From the Industry side:** innovation, technology integration, geo+4IR, applications, analytics, and modeling

- iii. **From the User side:** Data integration, enhancing knowledge services
- iv. Enrich the data ecosystem
- v. Enhance its value proposition by offering knowledge services
- vi. Integrate data for national good
- vii. Provide collaboration and partnership amongst the stakeholders

This will also support the implementation of the SVAMITVA scheme and bring together the stakeholders (government, industry, research, academia, etc.) from the geospatial, digital, and user industries to evolve strategies and action plans to make fit-for-purpose geospatial data and knowledge accessible on demand for use cases across sectors. It will thus enable a better understanding of the needs and demands of the land administration sector through extensive engagement and interaction with stakeholders.

7.2. Enriched Geo-Spatial data and Infrastructure generated under SVAMITVA Scheme

1. The Survey of Villages and Mapping with Improved Technology in Village Areas (SVAMITVA) Scheme aims to provide an integrated property validation solution for rural India. The objective of the project is to develop maps to aid in panchayat-level planning, direct benefit transfers, accurate land records for property rights, etc. As part of the scheme, a survey infrastructure and GIS map will be created which can be leveraged by any other department for their use.
2. Large Scale Mapping is carried out across India and high-Resolution data maps of 5 cm spatial resolution are created under SVAMITVA to generate accurate maps for the rural Abadi area to confer ownership property rights. High-quality Survey Grade Drones used in survey activities enable the generation of maps on a scale of 1:500 with ortho-rectified images of 5 cm horizontal accuracy and Vertical Accuracy of 0.2 m for surveyed areas.
3. Drone images, large scale & high-resolution Villages maps can serve for feature extraction of all visible features such as buildings, roads, land parcels, water tanks, open plots, etc. for preparation of base map layers in Gram Manchitra Application.

4. Drone survey also captures the height component of the ground features as a part of



raw data and generates the DEM (Digital Elevation Models) of 20 cm vertical accuracy for the surveyed Abadi villages. DEMs are used to determine terrain attributes such as elevation at any point, slope, and aspect. DEMs can be used in infrastructural

management, hydrology & flow-direction studies, and land-use planning. They are widely used for contouring Topographic maps.

Some other applications where DEM data shall be utilized are as follows :

- Modeling water flow or mass movements (e.g., landslides)
- Creating physical models (such as raised-relief maps)
- Rectifying aerial photography or satellite imagery
- Reducing (terrain correction) gravity measurements (e.g., gravimetry, physical geodesy)
- Analyzing terrain in physical geography and geomorphology

DEM Profile created can demarcate the relative heights of all village features & could help in the creation of high informative 3D Maps at the village level for all panchayats across India.

5. The data presently available is mostly in form of sketches. The data generated under SVAMITVA is on Nation Spatial Reference Frame. This promotes the use of NSRF for other maps generated by other agencies. Having the same reference frame will make the data suitable to be integrated and seamless.

7.3. Role of GIS in Rural development plan

1. The Panchayat development plan is prepared through a participatory process involving all the Stakeholders matching people’s needs and priorities with available resources. A sample Gram Panchayat development plan is placed in **Annexure VI** for reference
2. Use of Spatial planning adds objectivity to the planning process by acquiring relevant data and performing planning at the panchayat level with the use of geographic data for sustainable development. It enables the user to take a decision based on geographical data.
3. GIS technology plays an important role in the preparation of a rural development plan by reflecting location-based attribute information of features at ground level. These datasets or feature extraction from High-Resolution Ortho rectified Imageries encapsulated from Drone surveys would be integrated with Spatial application and robust planning at gram panchayat could be achieved.

4. Spatial Planning GIS tool- Gram Manchitra

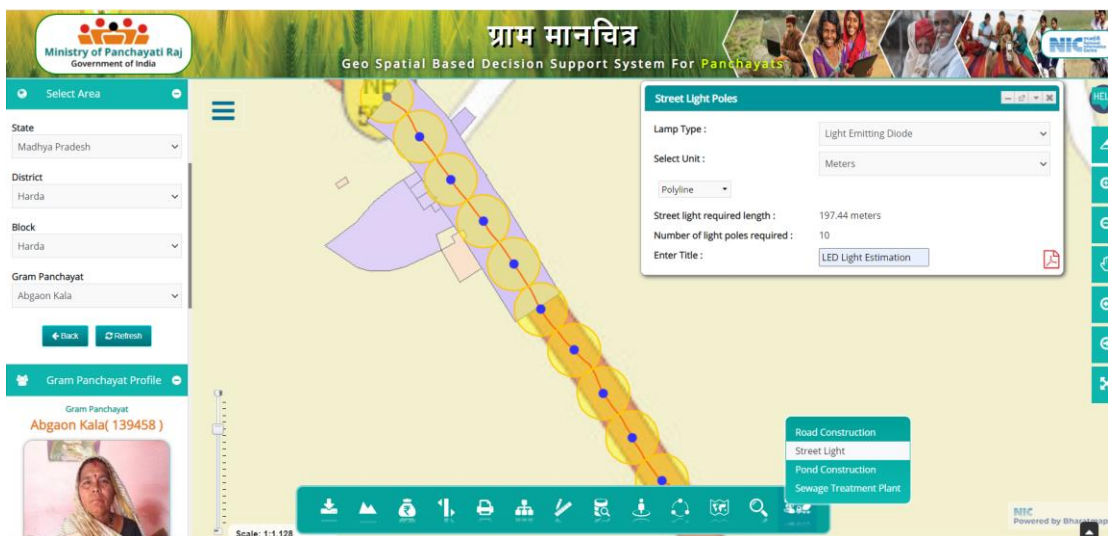
Gram Manchitra is a spatial application of the Ministry of Panchayati Raj. The application facilitates the creation of various planning scenarios for facility planning and management, integrated with the priority and needs of the people, ensuring basic facilities, avenues for livelihood, and productive use of resources It has added objectivity to the planning process by acquiring relevant data and performing planning at panchayat



level with the use of geographic data for sustainable development. It enables the user to take a decision based on geographical data.

Key features of the Application

- It is a Unified Geo-Spatial Platform for all Gram Panchayats providing a decision support system for Panchayat Development Plan
- Supports bringing better accountability and transparency to the process of preparing GPDP through the Geographic information system (GIS) platform
- Linking relevant data along with geographic data to ascertain objectivity in the planning process
- Spatial analysis tools provisioned for the identification of suitable sites for the creation of new amenities/ development work like schools, Anganwadi center, etc.
- “Real-time“ tracking of progress of work undertaken under different schemes. Work status is displayed in different colors along with geotagged photos of assets on the map
- Gram Panchayat profile with details like details of Sarpanch, Functionaries, Panchayat office address, demographic data, etc. available
- Socio-Economic Caste Census (SECC) report, Mission Antyodaya (MA) data, and MA gap analysis for the Gram panchayat available
- Integrated with spatial and relevant data of different Central Ministries
- Analysis tool –
 - Street Light -This application is aimed to address the requirement of planning for streetlight laying for any village in gram panchayat.



- Road Construction -This tool helps the administrators/planners/decision makers to calculate the cost of the construction of any road based on its length, width, thickness, and type.



- Drainage Construction: This tool is developed to help the user to calculate the cost of a proposed drainage network.



Further, the Gram Mahchitra application would integrate the 1:500 scale maps prepared under the SVAMITVA scheme, which will improve manifold the ability of the Panchayats to plan interventions accurately.

5. Bhuvan Panchayat Application

Bhuvan Panchayat Portal is developed and hosted by NRSC (ISRO) under the project named 'Space-based Information Support for Decentralized Planning (SIS-DP)1. The web portal integrates geospatial layers derived from space-based inputs in a web-GIS

framework with interactive modules like Area Profile Report Generation, Asset Mapping, Activity Planning, and Implementation-Monitoring for facilitating effective developmental planning in the light of the Village Developmental Plan.

The following are the database available on Bhuvan Panchayat Portal:

- **Satellite imagery:** An ortho-corrected high-resolution satellite imagery database (fused product of Cartosat-1 and LISS-IV imagery) is generated for the entire country to act as a base layer for further mapping.
- **Thematic data:** Overlaid on the base layer, various thematic layers (such as land cover, drainage, transportation, and slope layers) are prepared at 1:10,000 scale for the entire country.
- **Legacy data:** Soil information layer, groundwater potential, forest boundary, watershed boundary, wasteland information, and slope class layer
- **Cadastral data:** Prepared at 1:4000 scale for five priority States
- **Administrative boundaries:** Village, Panchayat, Intermediate Panchayat, District, State, Parliamentary, and Assembly Constituency
- **Asset Data:** A continuously growing national inventory of geo-tagged community assets along with their photographs and related attributes is available on the Portal for its utilization in developmental planning. The inventory is crowd-sourced for citizens/PRIs/facilitators to map assets through Bhuvan Panchayat Asset Mapping Mobile App.
- **Non-spatial data:** In addition to the geospatial layers, the project database comprises village amenities, and demographic and climatic data integrated with the spatial database.

The following are the points worth mentioning in terms of the database.

- **Periodicity of the satellite data:** There is a provision to update the satellite data every two years to facilitate regular monitoring of progress as per village.
- **Accessibility of the datasets:** All the datasets are available in the public domain and viewing them on Portal does not require any registration

6. SVAMITVA Data and NRSC Datasets

The below datasets could be integrated with the Gram Manchitra application , so that robust planning at gram panchayat could be achieved

- i. 'Satellite Image Maps' for the entire country as a base for decentralized planning (High resolution, color, Ortho-rectified, merged satellite data products)
- ii. Thematic & base layers on a 1:10000 scale using 'Satellite Image Maps', slope classes maps, and Cadastral maps vectorization & geo-referencing
- iii. Databank comprising of 'Satellite Image Maps', thematic and base maps, slope class maps; and organize census data, climate data, cadastral maps, stakeholder's data, and available legacy thematic & base data on GIS platform

7.4. Utilisation of SVAMITVA Geo-Spatial data by other departments

The following sectors & departments at the Panchayat level can assimilate the mentioned GIS datasets. The GIS maps generated under Scheme can further be used to create customized maps/vector layers for applications by various departments:

- i. **Water Department-** Once water lines get traced on base-map, flow direction GIS maps can be generated & new water lines/water valves to be laid can be planned.
- ii. **Road Department** - It shall provide a solution to extend the road infrastructure of new roads, route planning, and shortest path of existing roads through network analysis.
- iii. **Sewerage Department** - Once sewer lines get traced on base-map, flow direction GIS maps can be generated & new sewer lines/sewer valves to be laid can be planned
- iv. **Sanitation Department** – The application contains the spatial information of containers. Pick-up vehicles route & new locations for setting up bin locations can also be planned using proximity analysis tools, buffering, etc.
- v. **Solid Waste Department** –Visualizing existing public & private toilets of a village, the application will help in decision making of setting up a new public toilet for the department through distance analysis.
- vi. **Health Department** – Existing mapping of health centers will provide a way of improving health services by identifying a suitable location for a new health clinic.
- vii. **Electricity Department** - Electricity distribution network maps & customer connectivity maps can be generated along the LED street light maps.

- viii. **Education Department** - Applications include school facilities planning activities encompassing room capacities, technology infrastructure, emergency preparedness, and campus safety.
- ix. **TP Department** - Town Planning department makes use of the Gram Manchitra application for better visibility over new TP Schemes in villages through tracking of existing mapped features like open plots, roads, etc.
- x. **DP Department** – Visualization of existing village infrastructure is key for the planning of the Development Plan of Villages. It shall ensure to providing the gap in current services by including the same in new development plan maps for villages.

7.5. Proposed protocols for sharing such data with other agencies including the private sector

Cloud-based sharing of data with Government and Private Agencies is proposed. Survey of India and other Stakeholders can consider the suggested approach and generate a detailed standard operating procedure for data sharing

- i. The SVAMITVA **GIS database/** maps/ DEM created shall be stored using Cloud technology so that it shall be utilized well by various government & non-government agencies on a requirement basis in the future. This will also ensure a new source of revenue for the government.
- ii. Survey of India shall host the data on Cloud and share data with the Ministry of Panchayati Raj and States as per respective MoU. This will reduce the infrastructure required by MoPR/ States to host data at respective data centers.
- iii. Survey of India may share the map data with private agencies on a payment basis to initiate the mode of revenue for the government. This would encourage a revenue system for government entities.
- iv. The available data should be shared with consumers through the integration of APIs.

7.6. Recommendations

- 1. In order to disseminate GIS data created under the SVAMITVA scheme as per National Geospatial Guidelines 2021, Standard Operating Procedure (SoP) must be put in place by the Ministry of Panchayati Raj, State Government and Survey of India for utilization by other departments, and agencies.

2. Workshops and meetings with other departments may be organized by the Survey of India and States to ensure to optimum use of data for developmental purposes.
3. Common data schema shall be set for all base map layers to bring uniformity in single-layer data at the national level. A common Schema format to be followed is in **Annexure VII**.
4. Data should be made available to other government departments at all levels. This would help them to maximize the use of available geospatial data & develop solutions to solving unresolved issues in various sectors.
5. The data available with the private sector agencies in various spatial formats such as shp, gdb, etc. should be identified and systems should be established for two way exchange of data.
6. With the expansion of the geospatial market, Industries are expected to use geospatial data to make more applications on the ground in near future. Therefore, data should be made available to such agencies.
7. There should be some Public Private Partnership model for the maintenance and updating of the developed data under the Scheme.
8. Survey of India/ State Government should develop a procedure for sharing data, and CORS services with a private agency, considering pricing, payment, and delivery workflow.

Annexure VI – Sample GPDP

The Gram Panchayat Development Plan of the Gram Panchayat can be seen on the eGramSwaraj application of the Ministry of Panchayati Raj (URL: <https://egramswaraj.gov.in/>)

Navigate the Page

eGramSwaraj Application

Analytical dashboard > Planning & Reporting > Approved GPDP > No. of GPs with published GPDP 022-2023 > West Bengal(State) > Darjeeling (District)> Naxalbari(Block Panchayat)> Naxalbari(Gram Panchayat)>Approved Action Plan 2022-2023> Priority wise action details

The screenshot shows the eGramSwaraj dashboard with the following components:

- Header:** eGramSwaraj logo and tagline "Simplified Work Based Accounting Application for Panchayati Raj".
- Navigation Menu:** Finances and Accounting, Geo-tagging of Assets, Progress Reporting, Gram Panchayat Profiling, Action Plan Creation, Activity Output.
- Dashboard Widgets:**
 - Analytical Dashboard:** A red box highlights this widget.
 - Panchayat Profile:** 263225 GPs (97.77% Profile Created).
 - Elected Representatives (Active):** 1225962 ERs.
 - Planning & Reporting:** A red box highlights this widget, containing:
 - 378 ZPs (55.75% Approved ZP Plan (2022-23))
 - 5066 BPs (75.34% Approved BP Plan (2022-23))
 - 254548 GPs (94.55% Approved GPDP (2022-23))
 - 73744 GPs (27.39% Physical Progress Ongoing)
 - 233400 GPs (86.69% Geo-tagging initiated)
 - Year Book Closed (2021-2022):** 85.82%.

GOVERNMENT OF INDIA | MINISTRY OF PANCHAYATI RAJ

eGramSwaraj
Simplified Work Based Accounting Application for Panchayati Raj

No. of GPs with published GPDP 2022-2023

Print | Export to Excel

23.	21	ODISHA	6798	6640
24.	34	PUDUCHERRY	108	0
25.	3	PUNJAB	13241	13220
26.	8	RAJASTHAN	11289	11306
27.	11	SIKKIM	185	177
28.	33	TAMIL NADU	12525	12489
29.	36	TELANGANA	12769	12769
30.	38	THE DADRA AND NAGAR HAVELI AND DAMAN AND DIU	38	38
31.	16	TRIPURA	1178	1176
32.	5	UTTARAKHAND	7791	7783
33.	9	UTTAR PRADESH	58190	56961
34.	19	WEST BENGAL	3339	3173
Total			269031	254550

Reported Generated through eGramSwaraj (http://egramswaraj.gov.in) on Tue, Aug 23, 2022 23:44:09 PM.

Close

eGramSwaraj
Simplified Work Based Accounting Application for Panchayati Raj

No. of GPs with published GPDP 2022-2023

Back

State Name : WEST BENGAL

Print Export to Excel

S.No.	Local Body Code	District Panchayat & Equivalent	Total No. of GP	No. of GPs with published GPDP
1.	263	24 PARAGANAS NORTH	199	199
2.	264	24 PARAGANAS SOUTH	310	308
3.	263853	ALIPURDUAR	64	64
4.	265	BANKURA	190	187
5.	267	BIRBHUM	167	167
6.	268	COOCHBEHAR	128	128
7.	269	DARJEELING	22	22
8.	270	DINAJPUR DAKSHIN	64	64
9.	271	DINAJPUR UTTAR	98	98
10.	260940	Gorkhaland Territorial Administration	112	0
11.	272	HOOGHLY	207	163
12.	273	HOWRAH	157	157
13.	274	JALPAIGURI	80	80

Close

GOVERNMENT OF INDIA | MINISTRY OF PANCHAYATI RAJ

eGramSwaraj
Simplified Work Based Accounting Application for Panchayati Raj

No. of GPs with published GPDP 2022-2023

Back

State Name : WEST BENGAL District Panchayat & Equivalent : DARJEELING

Print Export to Excel

S.No.	Local Body Code	Block Panchayat & Equivalent	Total No. of GP	No. of GPs with published GPDP
1.	3230	KHARIBARI	4	4
2.	3231	MATIGARA	5	5
3.	3232	NAXAL BARI	6	6
4.	3233	PHANSIDEWA	7	7
Total			22	22

Reported Generated through eGramSwaraj (<http://egramswaraj.gov.in>) on Tue, Aug 23, 2022 23:44:09 PM.

Close

eGramSwaraj
Simplified Work Based Accounting Application for Panchayati Raj

No. of GPs with published GPDP 2022-2023

Back

State Name : WEST BENGAL District Panchayat & Equivalent : DARJEELING Block Panchayat & Equivalent : NAXAL BARI

Print Export to Excel

S.No.	Local Body Code	Gram Panchayat & Equivalent	GP with published GPDP
1.	109159	GOSSAIPUR	Yes
2.	109160	HATIGHISA	Yes
3.	109161	LOWER BAGDOGRA	Yes
4.	109162	MANIRAM	Yes
5.	109163	NAKSHALBARI	Yes
6.	109164	UPPER BAGDOGRA	Yes

Reported Generated through eGramSwaraj (<http://egramswaraj.gov.in>) on Tue, Aug 23, 2022 23:44:09 PM.

Close

EXPERT COMMITTEE REPORT



eGramSwaraj

Simplified Work Based Accounting Application for Panchayati Raj

Approved Action Plan Report 2022-2023

Export to PDF

Plan Year	State	District Panchayat & Equivalent	Block Panchayat & Equivalent	Village Panchayat & Equivalent
2022-2023	WEST BENGAL	DARJEELING	NAXAL BARI	NAKSHALBARI

SECTION 1 :Plan Summary +

SECTION 2 : Sectoral View +

SECTION 3 : Scheme View +

SECTION 4: Priority Wise Activity Details +

<http://egramswaraj.gov.in>

Report Generated on 23/08/2022 11:48:23 PM and data is entered and managed by State Panchayati Raj Departments and Panchayats

Close

Plan Year	State	District Panchayat & Equivalent	Block Panchayat & Equivalent	Village Panchayat & Equivalent
2022-2023	WEST BENGAL	DARJEELING	NAXAL BARI	NAKSHALBARI

SECTION 1 :Plan Summary +

SECTION 2 : Sectoral View +

SECTION 3 : Scheme View +

SECTION 4: Priority Wise Activity Details -

S.No.	Activity Code	Activity Name	Activity Description	Activity For	Sector	Mgnrega Activity category	Location of Asset	Estimated Cost	Total Duration	Scheme Name	General Fund	SC Fund	ST Fund
1	57046425	CC drain with slab from Kalimandir to Iskon Mandir at West Babupara	CC drain with slab from Kalimandir to Iskon Mandir at West Babupara sansad	Gen	Sanitation	N/A	Geni (CT)	500000	MAR 2023-2024	XV Finance Commission	500000	0	0
2	57046704	CC drain from Ashram to Kanai Ghosh house at Middle Kotia Sansad	CC Drain from Ashram To Kanai Ghosh House at Middle Kotia sansad	Gen	Sanitation	N/A	Bhimram (CT)	500000	MAR 2023-2024	XV Finance Commission	500000	0	0
3	57046991	CC drain from Palash Sutradhar House towards Doli Biswas House at South Kotia	CC Drain from Palash Sutradhar House towards Doli Biswas House at South Kotia	Gen	Sanitation	N/A	Bhimram (CT)	400000	MAR 2023-2024	XV Finance Commission	400000	0	0

Annexure VII – Common Schema

SVAMITVA SCHEME

Spatial Dataset Schema |

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1 OBJECTIVE

- Ability to navigate to desired gram panchayat for planning purpose
- To identify the property with a unique property id
- To identify the basic amenities available at gram panchayat
- To identify the transportation facility available at gram panchayat
- Ability to find the open areas of gram panchayat, which can be used for betterment of Gram Panchayat

2 SPATIAL LAYERS

2.1 Raster Layer

2.1.1 Ortho Rectified Drone Imagery

1:500 scale of complete village area surveyed including inhabited area/abadi area

2.1.2 Digital Elevation Model

DEM of ≤ 20 cm vertical accuracy for the village habited area.

2.1.3 Mosaic map of Village

2.2 Vector Layers

2.2.1 Polygon

#	Spatial Layer Name
1	Property Parcel Boundary of Owner
2	Transport - Road Network
3	Water Bodies
4	Boundary
5	Government, Public Property

2.2.2 Line

#	Spatial Layer Name
1	Road Network
2	Railway Line
3	Bridge
4	Sewage

2.2.3 Point

#	Spatial Layer Name
1	Landmarks
2	Buildings
3	Wells
4	Assets

2.2.4 Elevation Model (Primary Dem)

3 SPATIAL LAYERS DETAILS

All the codes mentioned in the spatial layers refers to LGD Codes.

3.1 Polygon

3.1.1 Property Parcel Boundary Map of Owner

Simple feature class				Geometry	Polygon
Parcel Boundary Map				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
Shape Area	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Owner_Name	String	Yes			
Father_Name	String	Yes			
Property_Type	String	Yes	1		
Property_ID	String	Yes			
Property_Card_ID	String	Yes			
Lot_Area	Double	Yes			
BuiltUp_Area	Double	Yes			
Open_Area	Double	Yes			
Roof_Type	String	Yes			
Ownership_Type	String	Yes			
No_Floors	Integer	Yes			
IFlease	bool	Yes			
Remarks	String	Yes			

Subtypes of Parcel Boundary Map				
Subtype field	Property_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Residential			

Subtypes of Parcel Boundary Map				
Subtype field	Property_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
2	commercial			

3.1.2 Transport

Simple feature class			Geometry	Polygon	
Transport			Contains M values	No	
			Contains Z values	Yes	
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
Shape Area	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Road_Type	Integer	Yes	1		
Road_Width	Double	Yes			
Feature_Code	String	Yes			
Remarks	String	Yes			

Subtypes of Transport				
Subtype field	Road_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	National Highway			
2	State Highway			
3	District Highway			
4	Gram Panchayat Road			

Subtypes of Transport				
Subtype field	Road_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
5	Metalled Road			
6	Un-metalled Road			
7	Kucha Road			
8	Foot Path			

3.1.3 Waterbody

Simple feature class			Geometry	Polygon	
Waterbody			Contains M values	No	
			Contains Z values	Yes	
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
Shape Area	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Waterbody_Type	Integer	Yes	1		
Feature_Code	String	Yes			
Remarks	String	Yes			

Subtypes of Waterbody				
Subtype field	Waterbody_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	River			
2	Stream			
3	Nala			
4	Lake			
5	Pond			
6	Tank			
7	Canal			

Subtypes of Waterbody				
Subtype field	Waterbody_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
8	Drain			

3.1.4 Boundary

Simple feature class			Geometry	Polygon	
Boundary			Contains M values	No	
			Contains Z values	Yes	
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
Shape Area	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Abadi_Bdry_Name	String	Yes			
Feature_Code	String	Yes			
Remarks	String	Yes			

3.1.5 Government Public Property Parcel Boundary

Simple feature class			Geometry	Polygon	
Parcel Boundary Map			Contains M values	No	
			Contains Z values	Yes	
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
Shape Area	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Property_Type	String	Yes	2		
Property_ID	String	Yes			

Simple feature class				Geometry	Polygon
Parcel Boundary Map				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
Property_Card_ID	String	Yes			
Lot_Area	Double	Yes			
BuiltUp_Area	Double	Yes			
Open_Area	Double	Yes			
Roof_Type	String	Yes			
No_Floors	Integer	Yes			
IFlease	bool	Yes			
Remarks	String	Yes			

Subtypes of Parcel Boundary Map				
Subtype field	Property_Type		List of defined default values and domains for subtypes in this class	
Default subtype	2			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Office			
2	Institutional			
3	GP Office			
4	Post Office			
5	Bank			
6	Shed			
7	Architectural Building			
8	School			
9	CSC			
10	Health Service			
11	Park			
12	Playground			
13	Aganwadi			
14	Stadium			
15	Religious			
16	Government plot			
17	Vacant land			
18	Community Hall			

3.2 Polyline

3.2.1 Road Network

Simple feature class				Geometry	Polygon
Transport Road				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Road_Type	Integer	Yes	1		
Feature_Code	String	Yes			
Remarks	String	Yes			

Subtypes of Transport Road				
Subtype field	Road_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	National Highway			
2	State Highway			
3	District Highway			
4	Gram Panchayat Road			
5	Metalled Road			
6	Un-metalled Road			
7	Kucha Road			
8	Foot Path			

3.2.2 Railway Line

Simple feature class				Geometry	Polygon
Transport Railway				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
State Code	Integer	Yes			
District Code	Integer	Yes			
Block Code	Integer	Yes			
Tehsil Code	Integer	Yes			
Village Code	Integer	Yes			
Rail Type	Integer	Yes	1		
Feature Code	String	Yes			
Remarks	String	Yes			

Subtypes of Transport Railway				
Subtype field	Rail Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Single Gauge			
2	Double Gauge			
3	Meter Gauge			

3.2.1 Bridge Line

Simple feature class				Geometry	Polygon
Transport Railway				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
State Code	Integer	Yes			
District Code	Integer	Yes			
Block Code	Integer	Yes			
Tehsil Code	Integer	Yes			
Village Code	Integer	Yes			
Bridge Type	Integer	Yes	1		
Feature Code	String	Yes			

Simple feature class				Geometry	Polygon
Transport Railway			Contains M values		No
			Contains Z values		Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
Remarks	String	Yes			

Subtypes of Transport Railway					
Subtype field	<u>Bridge_Type</u>		List of defined default values and domains for subtypes in this class		
Default subtype	1				
Subtype Code	Subtype Description	Field names	Default value	Domain	
1	Over Bridge				
2	Under Pass				
3	Foot over Bridge				

1.1 Sewage Line

Simple feature class				Geometry	Polygon
Transport Railway			Contains M values		No
			Contains Z values		Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
Shape Length	Double	Yes			
<u>State_Code</u>	Integer	Yes			
<u>District_Code</u>	Integer	Yes			
<u>Block_Code</u>	Integer	Yes			
<u>Tehsil_Code</u>	Integer	Yes			
<u>Village_Code</u>	Integer	Yes			
<u>Sewage_Type</u>	Integer	Yes	1		
<u>Feature_Code</u>	String	Yes			
Remarks	String	Yes			

Subtypes of Transport Railway					
Subtype field	<u>Sewage_Type</u>		List of defined default values and domains for subtypes in this class		
Default subtype	1				
Subtype Code	Subtype Description	Field names	Default value	Domain	
1	Open				

Subtypes of Transport Railway				
Subtype field	Sewage_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
2	Closed			

3.3 Point

3.3.1 Landmark

Simple feature class				Geometry	Point
Landmark				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Feature_Type	String	Yes	1		
Feature_Descr	String	Yes	1		
Feature_Code	String	Yes			
Remarks	String	Yes			

Subtypes of Landmark				
Subtype field	Feature_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Landmarks			
2	Religious Places			
3	Electric			

Subtypes of Landmark				
Subtype field	Feature_Descr		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain

Subtypes of Landmark				
Subtype field	Feature Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Temple			
2	Mosque			
3	Church			
4	Gurudwara			
5	Pylon			
6	HT			
7	DT			
8	LT			
9	LampPost			

3.3.2 Wells

Simple feature class				Geometry	Point
Well			Contains M values		No
			Contains Z values		Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
State Code	Integer	Yes			
District Code	Integer	Yes			
Block Code	Integer	Yes			
Tehsil Code	Integer	Yes			
Village Code	Integer	Yes			
Feature Type	String	Yes	1		
Feature Code	String	Yes			
Well Depth	Double	Yes			
Remarks	String	Yes			

Subtypes of Wells				
Subtype field	Feature Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Open Well			
2	Closed Well			
3	Tube Well			
4	Hand Pump			

3.3.3 Assets

Simple feature class				Geometry	Point
Assets				Contains M values	No
				Contains Z values	Yes
Fieldname	Data type	Allow nulls	Default value	Domain	Precision
OBJECTID	Object ID				
Shape	Geometry	Yes			
State_Code	Integer	Yes			
District_Code	Integer	Yes			
Block_Code	Integer	Yes			
Tehsil_Code	Integer	Yes			
Village_Code	Integer	Yes			
Feature_Type	String	Yes	1		
Feature_Code	String	Yes			
Remarks	String	Yes			

Subtypes of Assets				
Subtype field	Feature_Type		List of defined default values and domains for subtypes in this class	
Default subtype	1			
Subtype Code	Subtype Description	Field names	Default value	Domain
1	Overhead Tank			
2	Tank			
3	Tap			
4	Toilet			
5	Petrol Pump			

4 Other Attributes

Other attributes may be added as per states/UTs requirement

5 Other Attribute Sub-Types

The list provided under sub-types for each feature class (Polygon/Polyline/Point) is indicative list only. Other sub-types may be added as per the requirement.





MINISTRY OF PANCHAYATI RAJ
GOVERNMENT OF INDIA



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