Edition-1
2025

DIGITAL DATA REGISTER

CHANDIGARH

SURVEY OF INDIA

CONTENTS

LIST OF ABBREVIATIONS

OSM	-	Open Series Map
DSM	-	Defence Series Map
ABDB	-	Administrative Boundary Data Base
DEM	-	Digital Elevation Model
NHP	-	National Hydrology Project
NMCG	-	National Mission For Clean Ganga
CMPDI	-	Central Mine Planning and Design Institute
ICZM	-	Integrated Coastal Zone Management
NUIS	-	National Urban Information System
SVAMITVA	-	Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas
UTM	-	Universal Transverse Mercator
WGS84	-	World Geodetic System 1984
LCC	-	Lambert Conformal Conic
Res.	-	Resolution
.tiff	-	Geo-Referenced Tagged Image File Format
.gdb	-	Geo Data Base
.pdf	-	Portable Document Format
.dgn	-	Design File
.shp	-	Shape File

CHANDIGARH –ABOUT THE STATE/UT

Chandigarh is a city and union territory in northwestern India, serving as the shared capital of the states of Punjab and Haryana. Situated near the foothills of the Shivalik range of Himalayas, it borders Haryana to the east and Punjab in the remaining directions. It is located 260 km northwest of New Delhi and 229 km southeast of Amritsar and 104 km southwest of Shimla.

Chandigarh is one of the earliest planned cities in post-independence India and is internationally known for its architecture and urban design. Chandigarh has grown greatly since its initial construction and has also driven the development of Mohali and Panchkula; the tri-city metropolitan area has a combined population of over 1,611,770. The city has one of the highest per capita incomes in the country.

Chandigarh has a humid subtropical climate characterized by a seasonal rhythm: very hot summers, mild winters, unreliable rainfall, and great temperature variation . The average annual rainfall is 1,038.4 millimeter's or 40.88 inches. The city also receives occasional winter rains from the Western Disturbance originating over the Mediterranean Sea.

Fig 1: Rock Garden, Chandigarh

Sukhna Lake, a 3 km^2 artificial rain-fed lake, was created in 1958 by damming the Sukhna Choe, a seasonal stream coming down from the Hills. Chandigarh has a belt of parks running from sectors. It is known for its green belts and other special tourist parks.

The Rock Garden, is located near the Sukhna Lake and has numerous sculptures made by using a variety of different discarded waste materials. The Zakir Hussain Rose Garden (which is also Asia's largest rose garden) contains nearly 825 varieties of roses in it and more than 32,500 varieties of other medicinal

plants and trees. Other gardens include the Garden of Fragrance , Garden of Palms , Butterfly Park, Valley of Animals, the Japanese Garden which is designed in traditional Japanese style and known for its peaceful atmosphere, the Terraced Garden , Shanti Kunj Garden, the Botanical garden and the Bougainvillea Garden. There is also the Government Museum and Art Gallery, Chandigarh .

DESCRIPTION OF DATA

1. TOPOGRAPHICAL MAPS

Topographical Maps are detailed, large-scale maps prepared by the Survey of India that accurately depict the natural and man-made features of the land. These maps serve as a fundamental reference for planning, administration, and developmental activities in India.

They provide precise information on terrain, elevations, drainage, vegetation, settlements, transport networks, administrative boundaries, and land use patterns. Using contour lines and symbols, these maps help visualize the shape and features of the ground.

Topographical maps are used for:

i. Infrastructure Planning: Supports planning and alignment of roads, railways, canals, pipelines, and power lines.

ii. Urban and Rural Development: Aids in town planning, settlement expansion, and selection of suitable sites for public/private infrastructure.

iii. Water Resource Management: Facilitates watershed analysis, irrigation planning, and identification of drainage and flood-prone areas.

iv. Natural Resource Assessment: Enables mapping vegetation, soil, and land use for sustainable resource management.

v. Land Records Correlation: Helps link cadastral maps and revenue records with actual ground features.

vi. Boundary Verification: Used for proper identification and confirmation of administrative boundaries at various levels.

vii. Enables identification of forest area.

viii. Environmental and Ecological Studies: Useful in assessing terrain, slopes, and ecological sensitivity for conservation planning.

ix. Disaster Management: Assists in flood, drought, and landslide analysis, and in post-disaster damage assessment.

x. Defence and Security Applications: Provides essential terrain information for defence planning, border management, and surveillance.

xi. Tourism and Recreation Planning: Helps identify trekking routes, viewpoints, and eco-tourism sites.

xii. Educational and Research Purposes: Used as inputs in geographical, geological, and environmental studies.

xiii. Legal purposes: An authentic and accurate spatial framework to support legal and judicial requirements.

xiv. GIS Applications: Serves as a reliable base layer for any geospatial analysis.

These are accurate and authorized maps which provide a base layer for integrating and validating all spatial data, supporting accurate decision-making and efficient land administration.

Survey of India provides Topographical Maps at 1:250,000 scale, 1:50,000 scale and 1:25,000 scale.

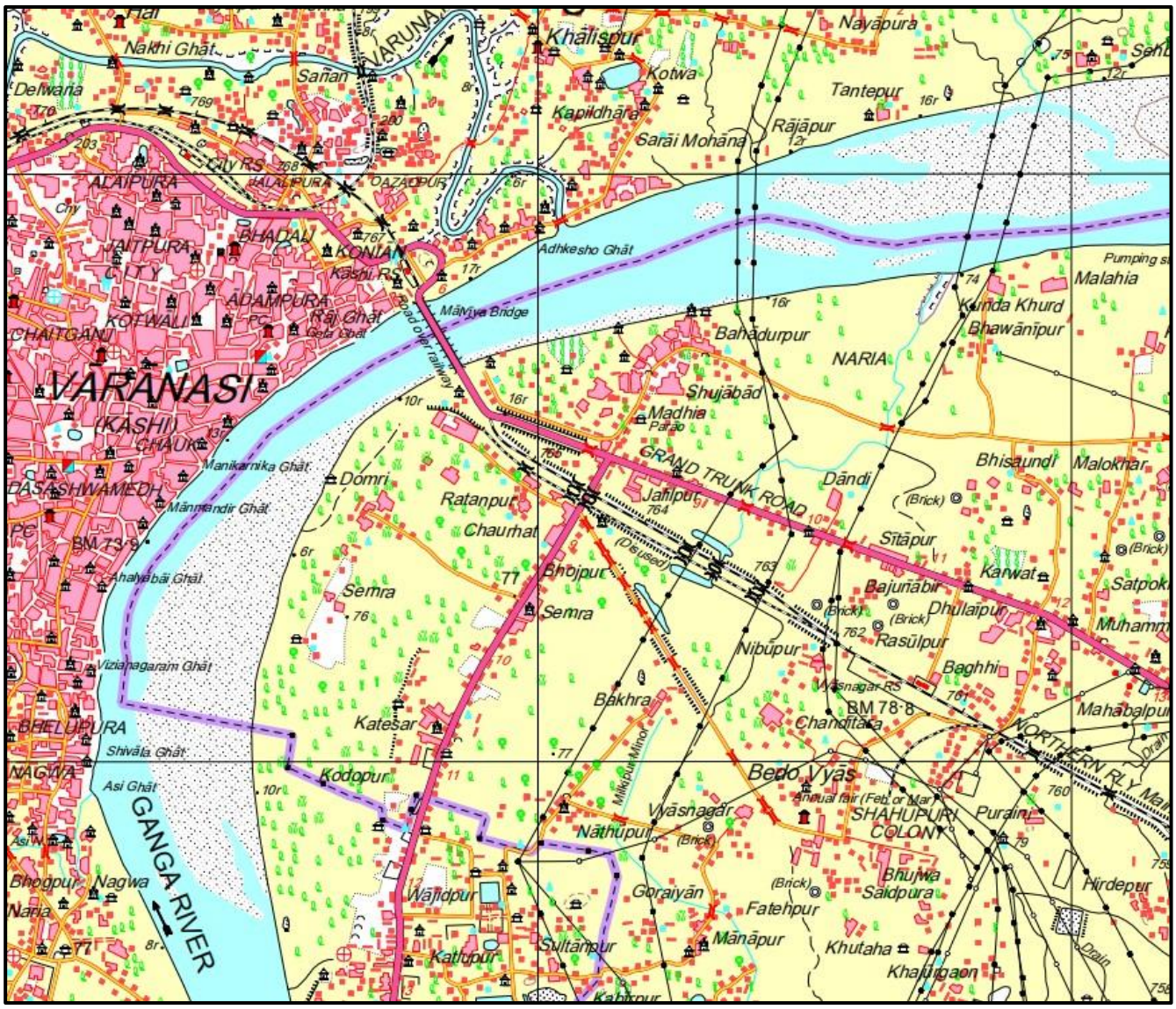


Fig 2: Topographical Map

2. ADMINISTRATIVE BOUNDARIES

Administrative boundaries represent officially demarcated divisions of governance & jurisdiction and are mapped and maintained by the Survey of India (SOI). These boundaries provide the foundational spatial framework for all administrative functions.

SOI maintains and updates boundary data at multiple hierarchical levels, ranging from International Boundaries, State Boundaries, Union Territory Boundaries, District Boundaries, Sub-District (Tehsil/Taluk) Boundaries, Village Boundaries and some Urban Area Boundaries.

Administrative boundary data of SOI is currently used in numerous ways, such as:

i. Land and Revenue Record Management – verifying jurisdictional accuracy for land parcels and revenue collection.

ii. Development Planning – identifying areas for infrastructure, welfare schemes, and resource allocation.

iii. Disaster Management – coordinating relief efforts based on clearly demarcated jurisdictions.

iv. E-Governance and GIS Integration – linking spatial boundaries with demographic, economic, and land use data for better decision-making.

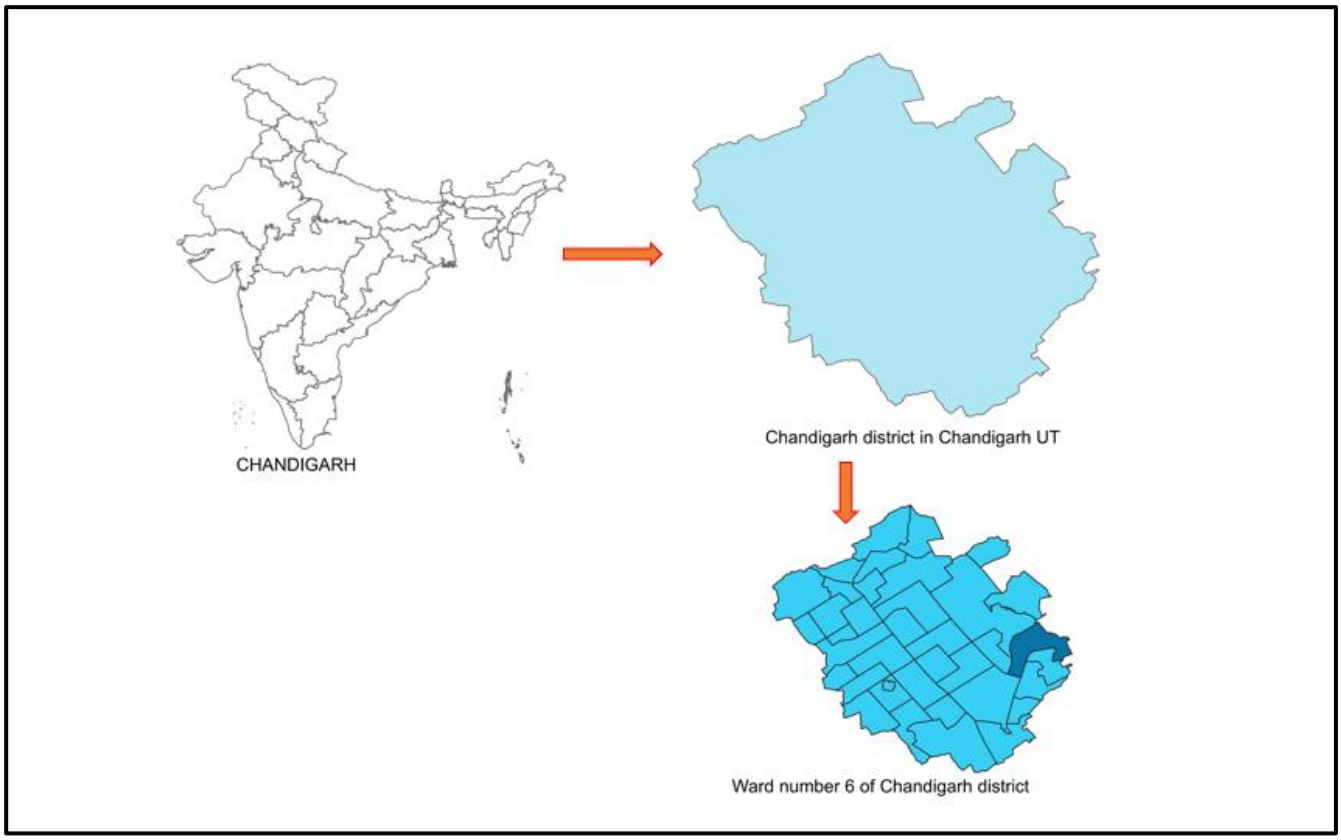


Fig 3: Administrative Boundaries: From International boundary to Village boundary

3. DIGITAL ELEVATION MODEL (DEM)

The Digital Elevation Model (DEM) is a digital representation of the Earth's surface showing the elevation (height) of surface features. Survey of India (SOI) has prepared DEMs by digitizing and processing contour data from 1:50,000 scale topographical maps, ensuring consistent accuracy across the country.

A DEM depicts the natural terrain in three dimensions. It forms the foundation for terrain analysis, watershed delineation, infrastructure planning, and disaster management.

The DEM provided by SOI is highly used for:

1. Land Use and Development Planning – identifying suitable areas for roads, buildings, and public utilities based on terrain conditions.
2. Drainage and Irrigation Management – analysing slope and flow direction to design efficient water distribution systems.
3. Flood Risk and Disaster Management – mapping flood-prone or low-lying areas to support preparedness and mitigation efforts.
4. Infrastructure Projects – assisting in route alignment for roads, canals, and pipelines.

The SOI's DEM (10m resolution) thus serves as a foundational spatial dataset that enables accurate and authorized terrain-based decision-making for various administrative, developmental, and legal applications.

4. SOI PROJECTS

I.NATIONAL HYDROLOGY PROJECT (NHP)

Survey of India is one of the Central Implementation Agencies in the National Hydrology Project (NHP) of Government of India which is intended for setting up of a system for timely and reliable water resources data acquisition, storage, collation and management. The Ministry of Jal Shakti, Department of Water Resources, River Rejuvenation and Ganga Rejuvenation (DoWR, RD&GR) is the Nodal Ministry for implementation of the project.

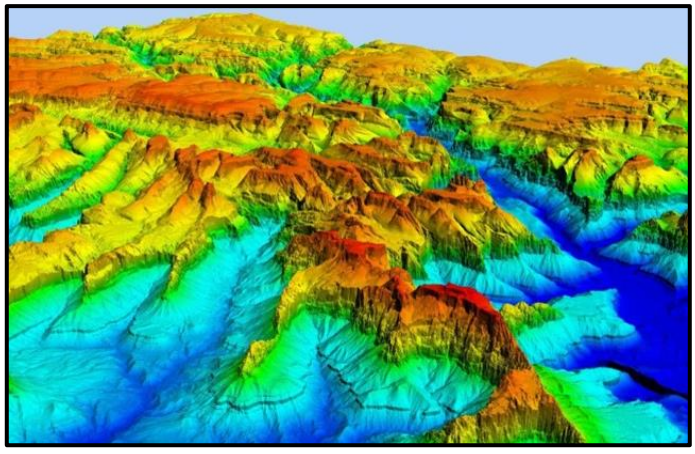


Fig 4: Digital Elevation Model

The data generated under NHP provide tools/systems for informed decision making through Decision Support Systems (DSS) for water resources assessment, flood management, reservoir operations, drought management, etc. NHP also seeks to build capacity of the State and Central sector organizations in water resources management using Information Systems and adoption of State-of-the-art technologies like Remote Sensing.

Survey of India was entrusted with the responsibility to generate, prepare and provide various types of Geo-spatial datasets i.e. mapping and preparing the Digital Elevation Model (DEM) of 0.5m & 3-5 m

for River Basin areas (plain), up to 5 km on both the sides of river and GIS ready data of SOI Topo sheets on 1: 25 K scale.

II.NATIONAL MISSION FOR CLEAN GANGA (NMCG)

This project is an integrated conservation mission, approved as flagship program by the Union Government in June 2014 accomplish the twin objectives of effective abatement of pollution, conservation and rejuvenation of the national river Ganga.

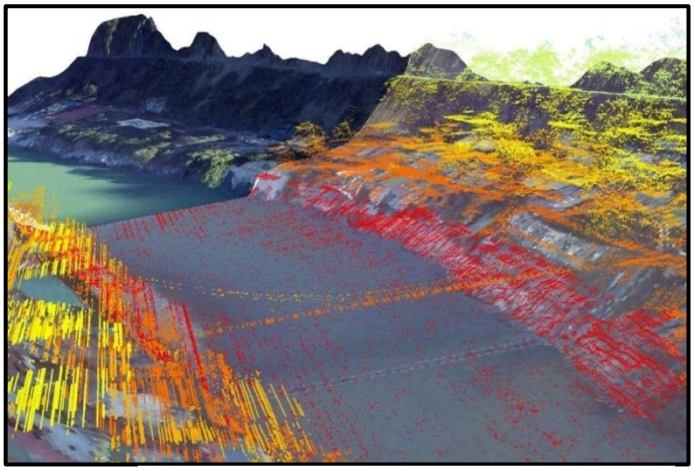


Fig 5: LiDAR Point Cloud Data

Objective of the Project was to generate High Resolution DEM and GIS ready database for the part of River Ganga with latest technology. The mapping of mainstream of river Ganga in five major states namely Uttarakhand, Uttar Pradesh, Jharkhand, Bihar and West Bengal covering major towns and cities along the river Ganga and its tributaries in these states with an area of Two lakh fifty thousand square km. To provide a major support to Ganga River Basin Management by embedding GIS in different aspects of - planning and implementation at national/state/local levels; bringing GIS support in decision-making; enable a sound process of monitoring development and identifying critical hotspots. To make GIS data available at all levels and groups associated in this process – that helps bringing accountability and responsibility in policy decisions.

Survey of India was tasked to generate High-Resolution Digital Elevation Model (DEM) of 0.5 meter resolution and GIS based data for the part of River Ganga covering up to 10 km extent on both sides of the river using latest technology.

III.CENTRAL MINE PLANNING AND DESIGN INSTITUTE (CMPDI)

Survey of India generated up-to-date digital topographical maps of 27 Major Indian Coal fields. Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra & Goa, Meghalaya & Arunachal Pradesh, Orissa and W.B & Sikkim GD's Major Indian Coal fields covering an area of 30,488 sq.km. for Central Mine Planning & Design Institute (CMPDI), a subsidiary of Coal India Limited using aerial photographs and adequate ground checks. To generate the Topographical maps of the major coalfields on 1:5000 scale with 2 meter contour interval in Plains (in case of hilly terrain contour interval may be 3-5 meter as practical) in GIS digital format based on Digital Photogrammetric Techniques using high resolution aerial photographs and adequate ground verification. Survey of India also imparted training on data processing and interpretation to scientists of CMPDI at the initial stage on preparation of Topographical maps based on aerial photographs using digital photogrammetric technique.

IV. INTEGRATED COASTAL ZONE MANAGEMENT (ICZM)

To ensure effective protection of shorelines, coastal infrastructure, livelihoods and lives through improved coastal management a Coastal Management Program undertaken by Ministry of Environment & Forest (MoEF) and entrusted the work of supplying a requisite coastal data and vulnerability mapping, (involving hazard line demarcation of coastal areas) to Survey of India through its Integrated Coastal Zone Management (ICZM) Project.

The objective of the project was to delineate, map and benchmark the coastal hazard line all along the mainland coast of India under World Bank Assisted "Integrated Coastal Zone Management" (ICZM) project, where SURVEY OF INDIA had to generate a 0.5 meter elevation contour map on 1:10,000 scale as base map to delineate the Hazard Line for the entire mainland coast of India up to the maximum width of 7 km from shore line on the landward side.

V. NATIONAL URBAN INFORMATION SYSTEM (NUIS)

Survey of India has undertaken the task of mapping of 152 towns on 1:2000 scales for core area and 1:10,000 scale for the peripheral areas under National Urban Information Scheme (NUIS), of Ministry of Urban Development.

1:10,000 Scale Survey: Satellite Imagery of 152 towns had been received, and scanning was done for 151 towns for thematic mapping. Thematic mapping of 132 towns has been completed, and final product of 100 towns has been sent to State Nodal Agency.

1:2,000 Scale Surveys: Aerial Photography of 133 towns received and scanned. Control points of 126 towns have been completed. 2D feature extraction of 94 towns has been completed. Ground survey of 4 towns using total station had been completed. Data pertaining to 89 towns has been sent to State Nodal Agency.

VI. SURVEY OF VILLAGES ABADI AND MAPPING WITH IMPROVISED TECHNOLOGY IN VILLAGE AREAS (SVAMITVA)

Survey of Villages Abadi & Mapping with Improvised Technology in Village Areas (SVAMITVA) Scheme is a Central Sector scheme launched by Hon'ble Prime Minister of India on National Panchayat Day i.e. 24th April 2020. The Ministry of Panchayati Raj (MoPR) is the Nodal Ministry for implementation of the scheme. In the States, the Revenue Department / Land Records Department will be the Nodal Department and shall carry out the scheme with support of State Panchayati Raj Department. Survey of India is the technology partner for implementation.

The scheme aims to provide **'record of rights'** to village household owners possessing houses in inhabited rural areas using Drone Surveying technology. Ortho Rectified Image (ORI) & Digital Elevation Models are generated in Lab from images captured by drone.

The scheme provides an integrated property validation solution for rural India. The demarcation of rural abadi areas would be done using Drone Surveying technology. This would provide the 'record of rights' to village household owners possessing houses in inhabited rural areas in villages which, in turn, would

enable them to use their property as a financial asset for taking loans and other financial benefits from Bank. **Ortho Rectified Image (ORI) of 5 cm resolution** are generated from images captured by drone.

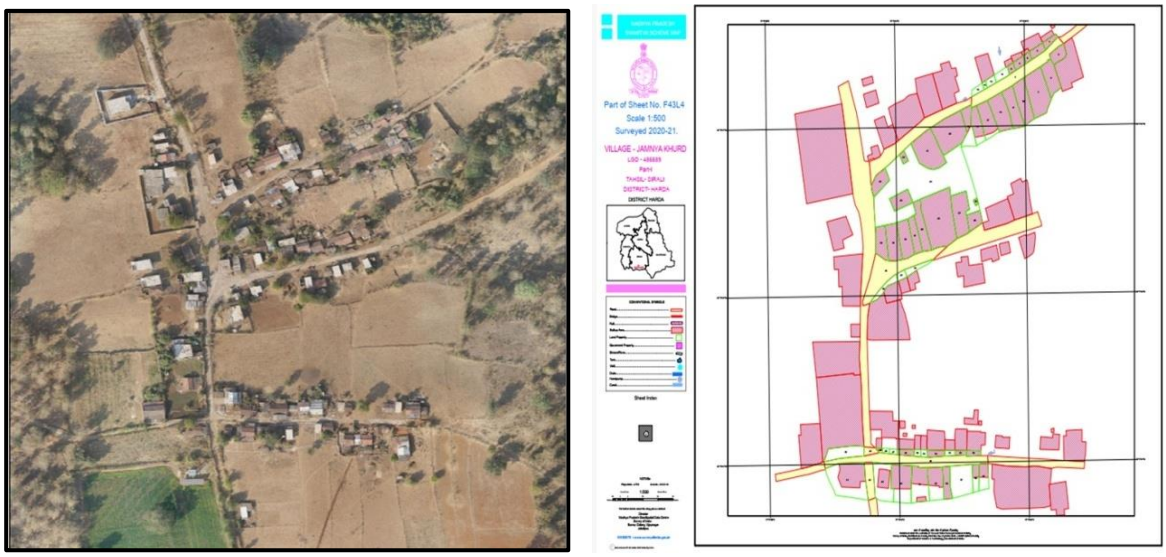


Fig 6: Ortho Rectified Image and feature extraction of abadi area

VII.LARGE SCALE MAPPING (LSM)

Survey of India in collaboration with the State Government authorities is executing large scale mapping projects using Professional Survey Grade Unmanned Aerial Vehicle/ Drone, for generation of high-resolution Ortho-rectified imagery, digital elevation model & GIS enabled data. Currently LSM is being carried out in states/UTs of Haryana, Karnataka, Andhra Pradesh and Andaman & Nicobar Island. Ortho Rectified Image (ORI) of 5 cm resolution are generated from images captured by drone.

Fig 7: Ortho Rectified Image and feature extraction

VIII. NATIONAL GEOSPATIAL KNOWLEDGE – BASED LAND SURVEY OF URBAN HABITATIONS (NAKSHA):

The **Department of Land Resources (DoLR)** has launched a pilot program titled **"NAKSHA"** — *National Geospatial Knowledge' based land Survey of urban Habitations* — for the creation of accurate and up-to-date **land records in urban areas**. Survey of India, as the technical partner, will carry out high-resolution mapping using manned and unmanned systems. The project aims to modernize urban land records through advanced aerial survey technologies. The launch marks a significant step toward accurate, up-to-date urban land records and better urban governing.

Key Features of the NAKSHA Programme:

Technologies Used:

i. Nadir Camera for generation of ORI and DEM and creation of 2D dataset
ii. Multi-angle Camera (1 nadir + 4 oblique) and data acquisition for generation of ORI, DEM, 3D reality Model and creation of 3D GIS dataset.
iii. Multi-angle Camera with LiDAR Sensor for generation of ORI, DEM, 3D reality Model and creation of 3D GIS dataset.
iv. Coverage: Pilot to be implemented in 128 cities across India. The project is in progress.
v. Deliverables: ORI (5 cm resolution) and DEM (50 cm resolution).

IX. ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION 2.0 (AMRUT 2.0):

A Memorandum of Understanding (MoU) was signed between the Survey of India (SoI) and the Ministry of Housing and Urban Affairs (MoHUA) for the execution of drone-based surveys under the AMRUT 2.0 GIS Sub-Scheme.

The objective of this collaboration is to generate large-scale urban geospatial data using professional survey-grade Drones/UAVs for small and medium towns with populations ranging from 50,000 to 99,000. This initiative supports evidence-based urban planning and contributes to the creation of smart, resilient, and sustainable towns in India.

Key Highlights:

- Technology Used: High-precision survey-grade drones/UAVs
- Deliverables: ORI (5 cm resolution) and DEM (50 cm resolution)
- Purpose: Creation of detailed urban geospatial datasets for planning, infrastructure development, and governance

5. OTHER MAPS

I.STATE/UT MAPS

The geographical map of a state depicts the state boundary, district boundaries, and sub-divisional boundaries, Major cities, towns, rivers, lakes, important monuments along with important transport routes like national and state highways and railways, important rivers, lakes for spatial reference. Second edition (English & Hindi) of State/UT map of Haryana state & Chandigarh UT was published in 2021 on 1:5,00,000 scale.

II.OTHER GEOGRAPHICAL MAPS

These are small-scale maps covering larger area and published with themes for specific purposes. Various geographical maps available in vector format (Shape file) & PDF format are as follows:

i. Railway Map of India - Scale 1:3.5M**:** This dataset provides comprehensive information about India's railway network. It includes data showing railway lines, stations, and important junctions across the country.

ii. Political Map of India - Scale 1:4M**:** This dataset offers detailed information on India's political boundaries. It includes maps that delineate state and union territory borders, major cities, and administrative divisions.

iii. Road Map of India - Scale 1:2.5M**:** This dataset features an extensive road network of India. It includes data highlighting national and state highways, important routes, and major cities.

iv. India & Adjacent Countries - Scale 1:2.5M**:** This dataset includes detailed maps of India and its neighboring countries. It provides information on the road networks, major cities, and international borders.

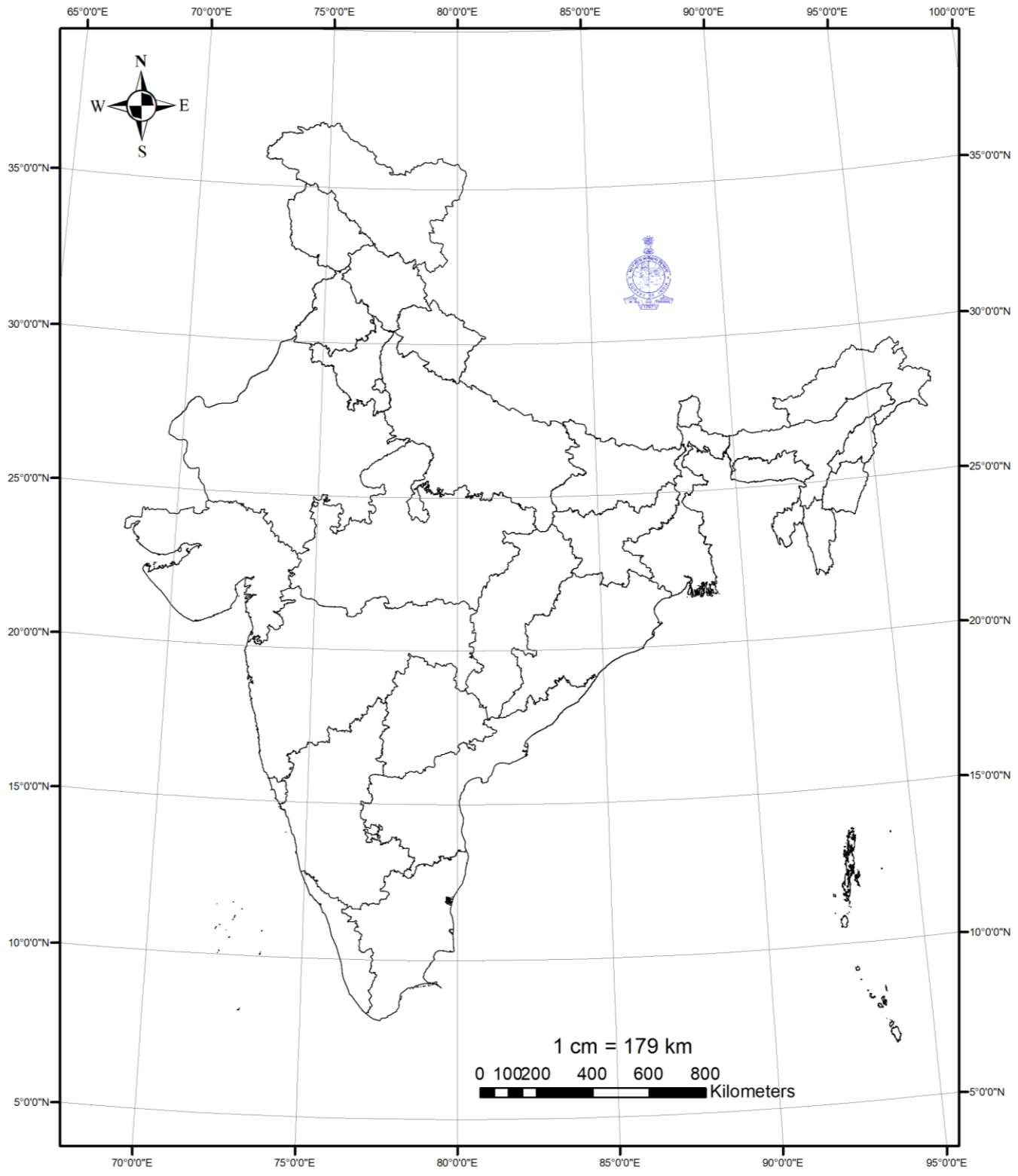
v. Physical Map of India - Scale 1:4.5M**:** This dataset showcases India's physical geography. It includes maps displaying topographical features such as mountains, rivers, plains, and plateaus.

vi. World Map - Scale 1:20M**:** This dataset provides a global perspective with detailed world maps. It includes information on continents, countries, and major geographical features.

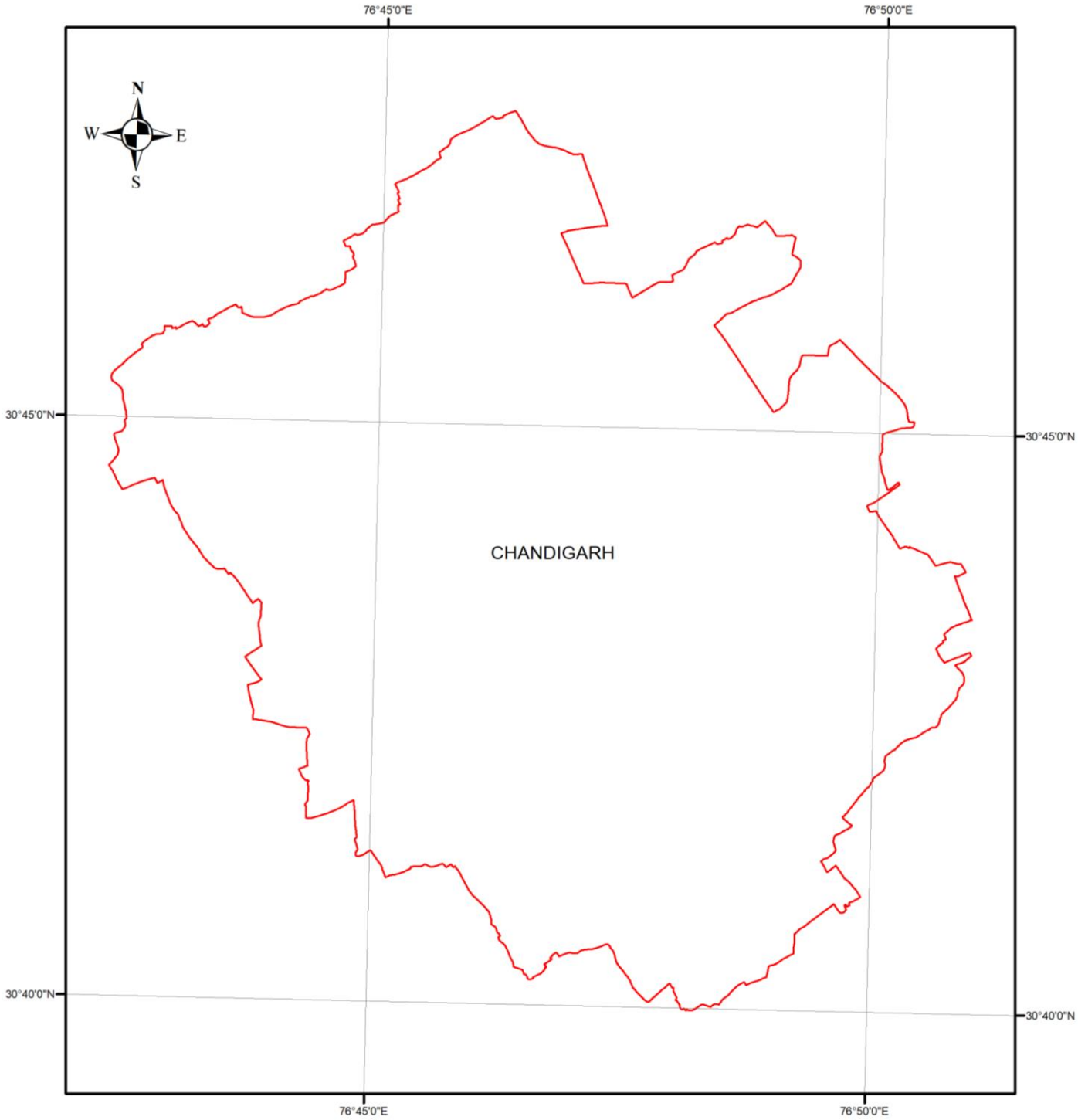
Note: All area measurements presented in this document are derived from digital data (shape files) projected using the Lambert Conformal Conic (LCC) projection based on the World Geodetic System 1984 (WGS 84) datum.

Digital Data Register

UT:- Chandigarh

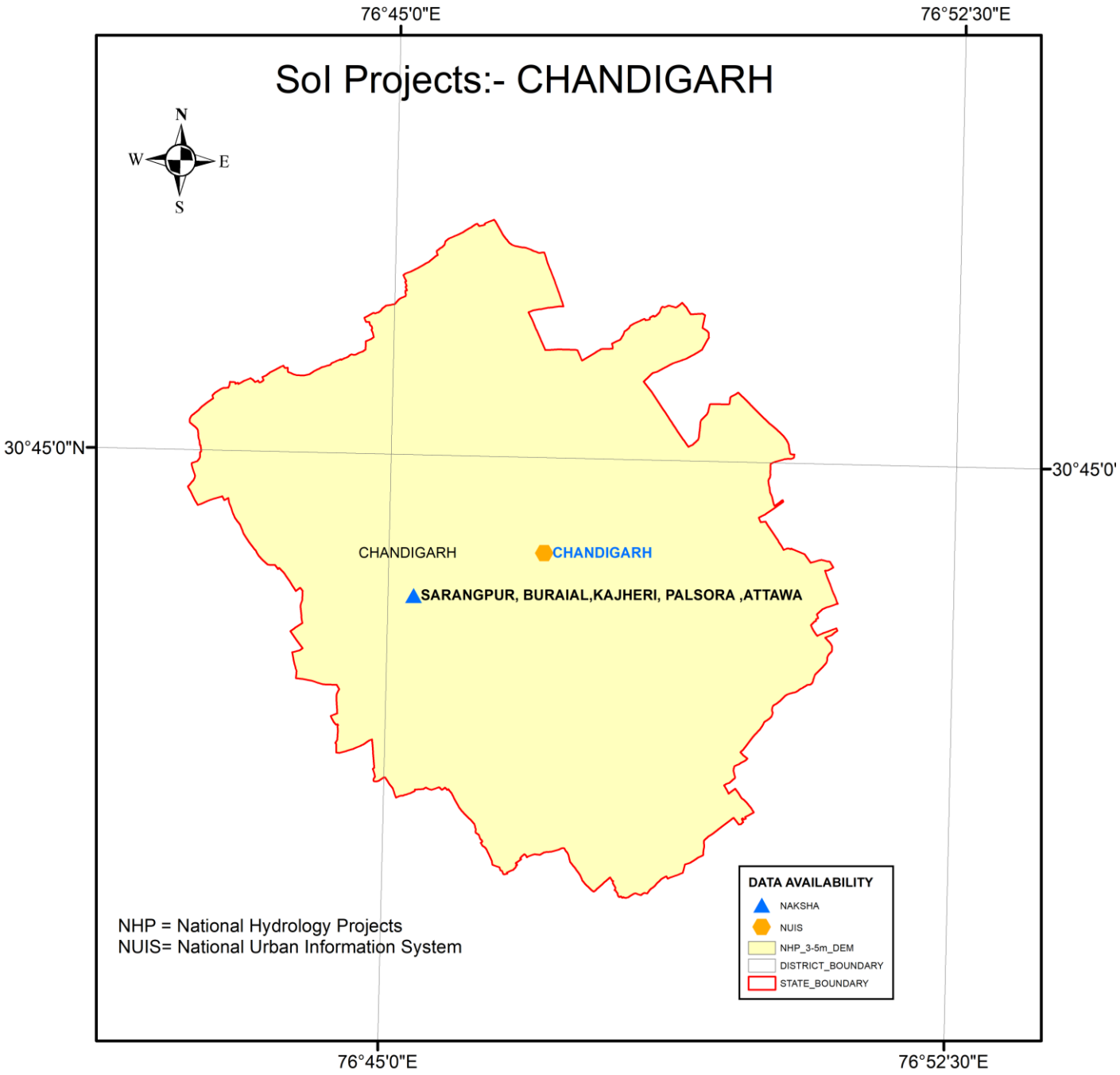


UT- CHANDIGARH

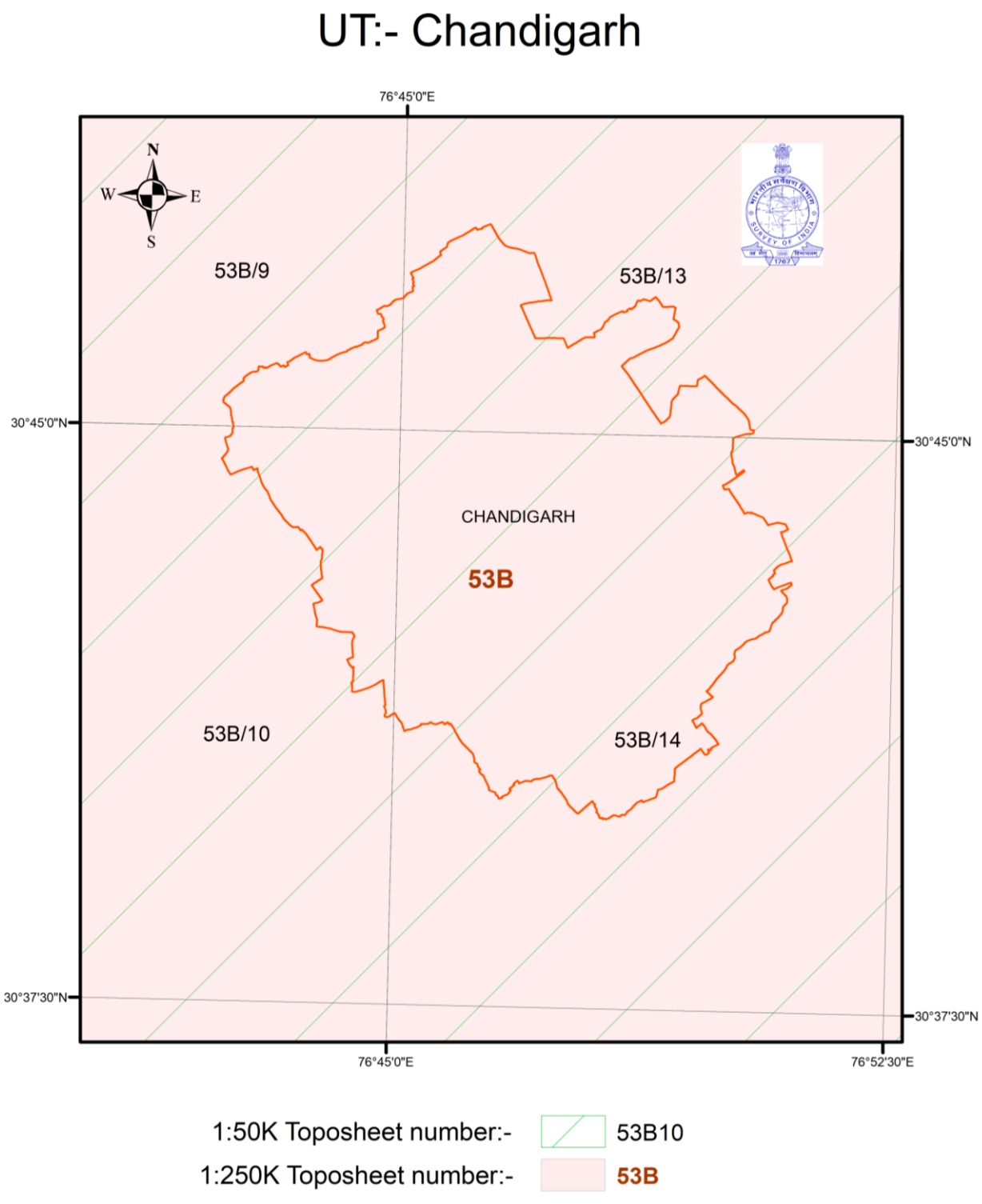


UT - CHANDIGARH Area- 111.86 sq. km											
Sl. No	Project Name	Projection & Datum	Vintage	Area(In Sq km)/No. of Towns or villages	Raster			Vector			Remarks
					ORI (Res.)	DEM (Res.)	Data Format	Scale	Contour Interval	Data Format	
1	OSM	UTM/ WGS84	2003-2009	111.86	-	-	.tiff, .pdf	1:50K	10/20m	.gdb, .shp, .dgn	
2	ABDB	LCC/ WGS84	2024-2025	111.86	-	-	-	1:50K	-	.shp	
3	DEM	UTM/ WGS84	2003-2009	111.86	-	10 m	.tiff	-	-	-	
4	NHP (3-5m DEM)	UTM/ WGS84	2017-2021	111.86	80 cm	10 m	.tiff	1:25K	5/10 m	.gdb	
5	NHP (0.5m DEM)	UTM/ WGS84	2017-2021	-	-	-	-	-	-	-	
6	NMCG	UTM/ WGS84	2017-2021	-	-	-	-	-	-	-	
7	CMPDI	UTM/ WGS84	2012-2019	-	-	-	-	-	-	-	
8	ICZM	UTM/ WGS84	2011-2012	-	-	-	-	-	-	-	
9	NUIS	UTM/ WGS84	2008-2011	1	15cm	2m	.tiff, .img	1:2 K	2m	.dgn, .gdb	CHANDIGARH
10	SVAMITVA	UTM/ WGS84	2021-2025	-	-	-	-	-	-	-	
11	LSM	UTM/ WGS84	2019-2024	-	-	-	-	-	-	-	
12	Naksha	UTM/ WGS84	Ongoing	1	5 cm	50 cm	.tiff	1:500	-	.gdb	SARANGPUR, BURAIAL, KAJHERI, PALSORA, ATTAWA
13	AMRUT	UTM/ WGS84	Ongoing	-	-	-	-	-	-	-	

SOI PROJECTS IN CHANDIGARH UT



TOPOGRAPHICAL MAPS OF CHANDIGARH UT



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