NATURAL RESOURCES DATA MANAGEMENT SYSTEM (NRDMS)

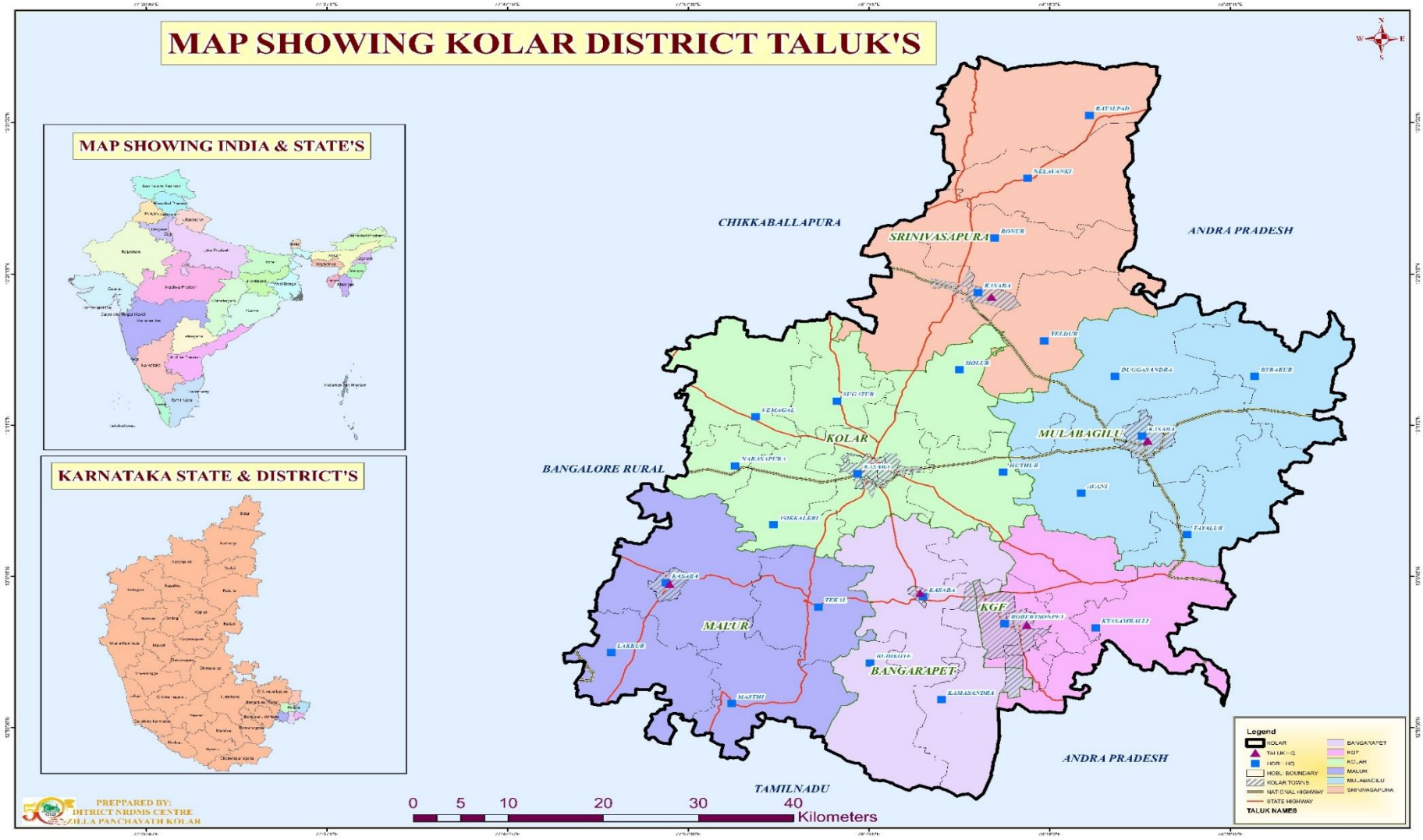
MONTHLY ACTIVITY REPORT
August – November 2025

Submitted by

District NRDMS Centre
Zilla Panchayat, Kolar

Submitted to

Karnataka State Council for Science and Technology (KSCST)
Indian Institute of Science Campus,
Bengaluru – 560012


MAP SHOWING KOLAR DISTRICT TALUK'S
MAP SHOWING INDIA & STATE'S
KARNATAKA STATE & DISTRICT'S
CHIKKABALLAPURA
ANDRA PRADESH
BANGALORE RURAL
TAMILNADU
SRINIVASAPURA
KOLAR
MULABAGILU
MALUR
KGF
BANGARAPET
RAYALPAD
NELAVANKI
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3. NRDMS Background:

The Karnataka Natural Resources Data Management System (NRDMS) program, initiated in 1992 by the Council with support from DST, Government of India and Government of Karnataka, aims to strengthen decentralized planning through the use of spatial data and geospatial technologies. Recognizing the limitations of macro-level resource assessment, NRDMS introduced micro-level spatial planning supported by digital databases on natural resources, socio-economic and agro-economic parameters. Through a network of District NRDMS Centers, the program integrates multi-sectoral data to provide analyzed, location-specific information and decision-support tools to planners, administrators, and local governance bodies, facilitating informed and integrated development planning.

Background of Kolar District (Elaborated)

Kolar is a prominent district located in the south-eastern part of **Karnataka**, India. It holds a unique place in Indian history and geography due to its rich natural resources, cultural heritage, and strategic location. The district is famously known as the **"Land of Gold"** because of the **Kolar Gold Fields (KGF)**, which were once among the **deepest, oldest, and most productive gold mines** in the world. These mines were operational for more than a century under British colonial rule and later managed by the Indian government before being closed due to declining production and rising operational costs.

The legacy of gold mining has deeply influenced the region's identity, economy, and settlement patterns. KGF also attracted workers and engineers from across India and abroad, creating a unique multi-cultural environment in the area.

Apart from its mining legacy, Kolar has a **rich historical and cultural background**. It was once part of ancient kingdoms such as the **Ganga dynasty**, the **Cholas**, the **Hoysalas**, and the **Vijayanagara Empire**, all of which left their imprint in the form of temples, inscriptions, and traditional art. The district is dotted with historical temples, such as the **Kolaramma Temple** and **Someshwara Temple**, which reflect its architectural heritage.

Kolar is part of the **Bengaluru Division** and is situated in a region that is important for its **connectivity and proximity to other southern states**. The district **shares its borders with Andhra Pradesh to the east and Tamil Nadu to the south**, making it a **tri-junction of**

cultural exchange, trade, and migration. This strategic location enhances its importance in regional development and cultural diversity.

In the present day, although the gold mines are no longer operational, Kolar continues to thrive through **agriculture**, **silk production**, and **horticulture**. It is particularly known for the cultivation of **tomatoes, mangoes, and flowers**, making it one of the leading horticultural districts in Karnataka.

Thus, Kolar district represents a blend of **historical richness, geographical significance, and cultural diversity**, rooted in its golden past and growing through modern development.

Description of Kolar District:

Kolar is a district in the **south-eastern part of Karnataka**, India. It is known for its historical significance, especially due to the **Kolar Gold Fields (KGF)**, once famous for gold mining. The district is also recognized for its **agriculture**, **silk production**, and **horticulture**, particularly tomatoes and mangoes. Kolar has a mix of rural and semi-urban areas and plays a key role in Karnataka's economy and history.

Location:

- **State**: Karnataka
- **Region**: Southern Karnataka (Bengaluru Division)
- **Geographical Coordinates**: Between **12°46′ N to 13°58′ N latitude** and **77°21′ E to 78°35′ E longitude**
- **Elevation**: Around **850–950 meters** above sea level

Neighbouring Districts and States:

Direction	Neighbouring Region
North	**:Chikkaballapur District** (Karnataka)
West	**:Bengaluru Rural District** (Karnataka)
East	**:Chittoor District** (Andhra Pradesh)
South	**:Krishnagiri District** (Tamil Nadu)

Direction Neighbouring Region

Southeast :Vellore District (Tamil Nadu)

Topography of Kolar District

Kolar district, located in the southeastern part of **Karnataka**, has a **diverse topography** but is primarily characterized by **undulating plains**, **rocky hills**, and **scattered plateaus**. It is **not a coastal region** and lies in the **interior part** of South India.

1. Terrain and Landforms

- The district features a mix of **gently sloping plains** and **rugged terrain**.
- The **elevation** ranges between **850 to 950 meters above sea level**, giving it a **moderate altitude**.
- The land is mostly **dry and semi-arid**, suited for **dryland agriculture**.
- **Rocky outcrops** and **granite hills** are common across the landscape.

2. Hills and Plateaus

- Kolar has several **isolated hills** and **hill ranges**, mainly composed of **granite and gneiss rocks**.
- Notable hill areas include:
    - **Antara Gange Hills** near Kolar – known for caves, springs, and religious significance.
    - **Shathashrunga Hills** – located near Mulbagal.
- These hills are **not part of the Western or Eastern Ghats** but are local hill formations.
- The terrain transitions into the **Deccan Plateau**, making Kolar a part of the **Southern Plateau region**.

3. Rivers and Water Bodies

- **Kolar is not a coastal district** and does **not** have access to the sea.
- It has **no major perennial rivers**, but several small rivers **originate here**.
- Major rivers:
    - **Palar River** – originates in Kolar and flows into Tamil Nadu.

    - **South Pennar (Dakshina Pinakini)** – also flows through the district.
- Due to lack of consistent surface water, the region depends on **tanks (lakes)** and **groundwater**.
    - Examples: **Bethamangala Lake**, **Kolaramma Tank**, **Narsapura Tank**.

4. Soil and Agriculture

- Dominated by **red sandy loam** and **red clay soils**, which are **well-drained** but low in fertility.
- The terrain and soil support crops like **ragi**, **groundnut**, **pulses**, and **horticultural crops** like **mangoes**, **tomatoes**, and **flowers**.

Summary

- **Region**: Interior plateau (not coastal)
- **Terrain**: Undulating plains with rocky hills and plateaus
- **Hills**: Local granite hills (e.g., Antara Gange)
- **Rivers**: Palar, South Pennar (seasonal and rain-fed)
- **Elevation**: 850–950 meters
- **Soil**: Red soils, suitable for dryland farming
- **Climate**: Semi-arid

Climate of Kolar District

Kolar district experiences a **semi-arid to dry tropical climate**, typical of the interior regions of South India. The climate is generally **hot and dry**, with **moderate rainfall** and **distinct seasonal variations**.

1. Temperature

- **Summer (March to May)**:
    - Hot and dry
    - Average temperatures: **28°C to 35°C**
    - Occasionally crosses **38°C** during peak summer
- **Monsoon (June to September)**:

    - Slight drop in temperature
    - Humid during rainy days
- **Winter (November to February)**:
    - Mild and pleasant
    - Average temperatures: **15°C to 28°C**
    - Night temperatures can drop below **12°C** in some areas

2. Rainfall

Kolar receives **moderate rainfall**, mostly from the **Southwest Monsoon**.

- **Average annual rainfall**: **750 to 900 mm**
- Rainfall is **uneven and irregular**, often leading to **water scarcity**.
- Some rain also occurs during the **Northeast Monsoon** (October–November).

3. Humidity and Winds

- **Humidity** is generally low except during the monsoon season.
- **Winds** are dry and strong in summer, contributing to evaporation and soil dryness.

4. Climate Challenges

- The district is prone to **droughts** due to irregular rainfall.
- **Groundwater depletion** is a major issue because of overuse and limited recharge.
- Agriculture heavily depends on **rainwater and tank irrigation**.

Season	Months	Temperature Range	Rainfall
Summer	March to May	28°C – 35°C	Very low
Monsoon	June to September	25°C – 30°C	Moderate (SW Monsoon)
Post-Monsoon	October to November	22°C – 28°C	Some (NE Monsoon)
Winter	November to February	15°C – 28°C	Very low

Natural Resources of Kolar District

1. 🌳 Forests and Their Locations

Kolar has **limited forest cover**, mainly consisting of **dry deciduous** and **scrub-type forests**. These forests are found on hill slopes and in less cultivated areas.

Common Trees: Neem, Honge, Tamarind, Acacia, Eucalyptus

Forest Area	Location	Type
Antara Gange Hills	Near Kolar town	Dry deciduous, rocky forests
Shathashrunga Hills	Near Mulbagal	Scrub forests, scattered trees
Devarabetta Forest Range	Near Malur and Bangarpet	Thorny shrubs and small trees
Kaiwara Hills (partly)	Bordering Chikkaballapur	Rocky and dry forest cover

2. ⛏ Minerals and Their Locations

Kolar is historically rich in **minerals**, especially **gold** and **granite**.

Mineral	Location in Kolar District	Details
Gold	**Kolar Gold Fields (KGF)** – near Bangarpet	Deepest and oldest gold mine (closed now)
Granite	Mulbagal, Malur, KGF area, and Kolar Taluk	Used in construction, monuments
Quartz	Found near Bangarpet and KGF	Industrial use
Feldspar & Mica	Scattered across Mulbagal & Malur	Limited extraction

3. 💧 Water Bodies and Their Locations

Kolar lacks perennial rivers and relies on **seasonal rivers** and **man-made tanks** (lakes) for water storage and irrigation.

Rivers (mostly seasonal):

River	Origin / Flow Through
Palar River	Originates near Nandi Hills, flows through Kolar Taluk
South Pennar	Flows through southern parts of Malur and Bangarpet
Markandeya River	Near KGF region and joins Palar later

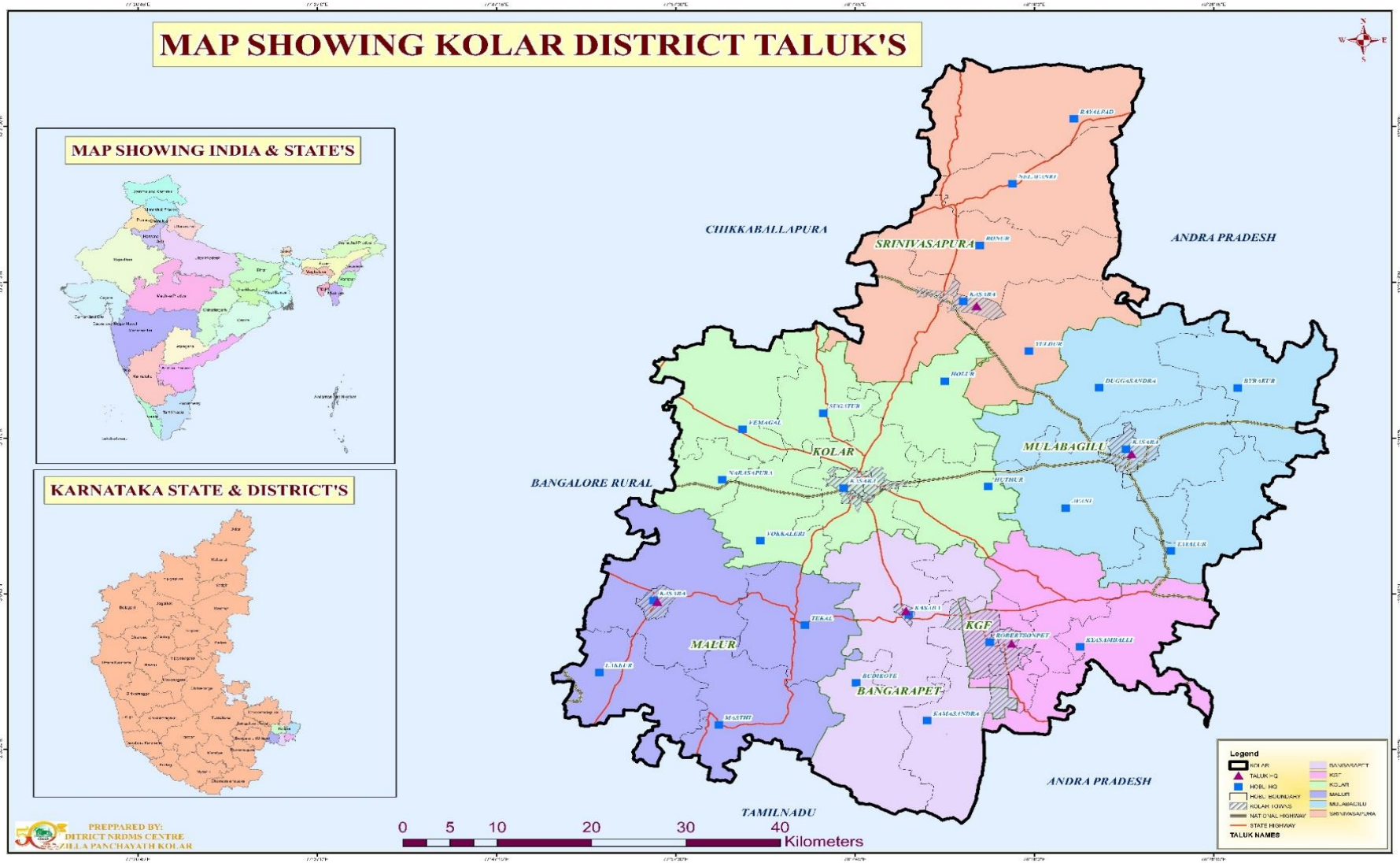
Major Tanks and Lakes:

Water Body	Location
Bethamangala Lake	Near Bangarpet
Kolaramma Tank	Near Kolar Town
Narsapura Tank	Near Malur
Doddur Tank	Near Mulbagal

4. Soil Types and Their Distribution

Soil Type	Location in Kolar District	Features
Red Sandy Loam	Widespread – Mulbagal, Kolar, Malur Taluks	Well-drained, suitable for millets
Red Clay Soil	Valleys and semi-irrigated areas	Moisture-retentive, good for ragi, pulses
Lateritic Soil	Hilly areas – Antara Gange, Bangarpet Hills	Less fertile, needs treatment
Black Soil	Patches near Malur and Mulbagal	Suitable for cotton and oilseeds

Natural Resource	Type / Name	Location
Forests	Dry deciduous, scrub forests	Antara Gange, Shathashrunga Hills, Malur
Gold	Kolar Gold Fields (KGF)	Near Bangarpet
Granite	Granite quarries	Mulbagal, Malur, KGF
Rivers	Palar, South Pennar	Kolar, Bangarpet, Malur
Lakes/Tanks	Bethamangala, Kolaramma Tank	Bangarpet, Kolar
Red Soils	Red sandy and clay loam	Across district, especially Kolar & Malur
Black Soil	Fertile black soil patches	Parts of Mulbagal and Malur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DISTRICT NRDMS CENTRE
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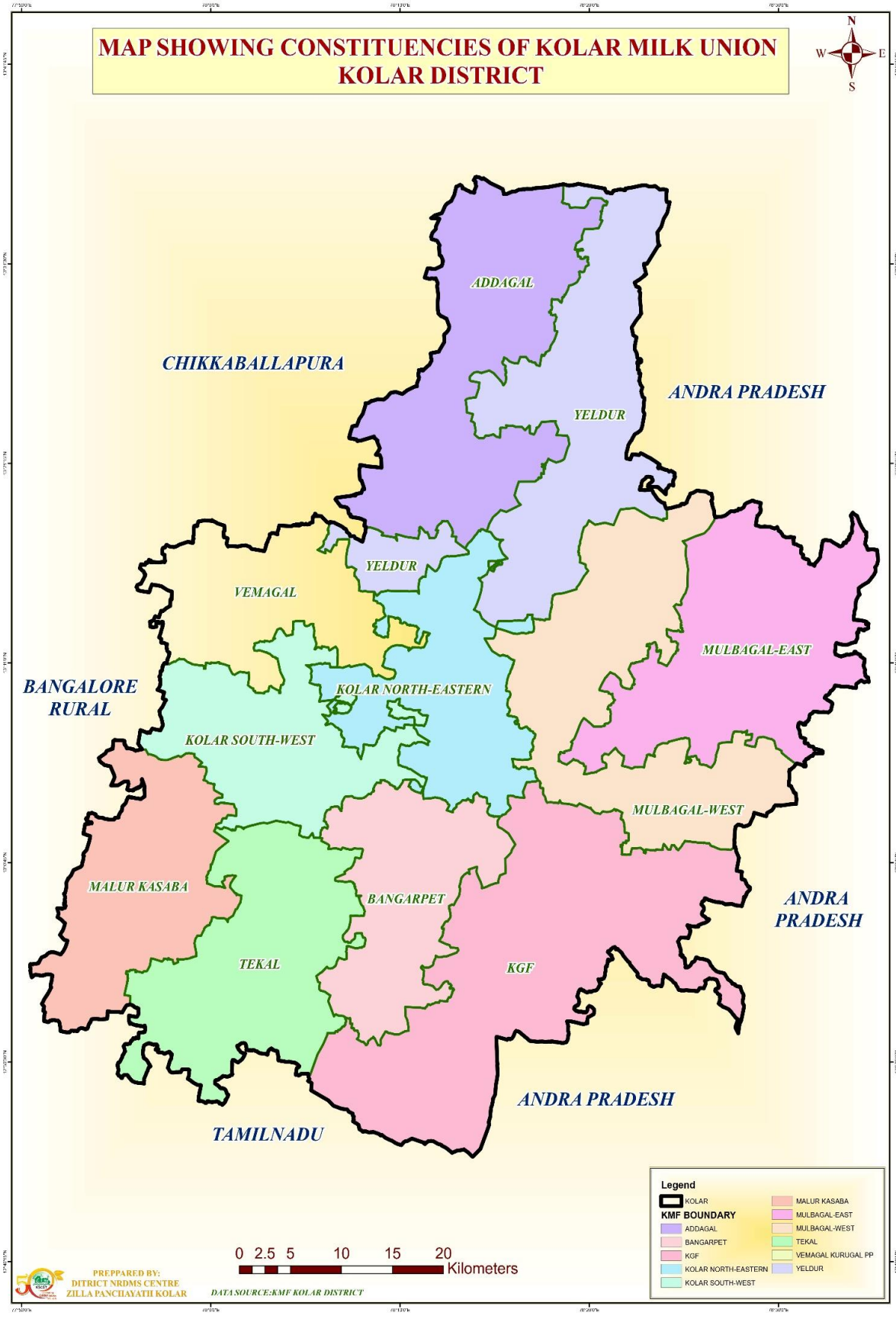
MAP SHOWING CONSTITUENCIES OF KOLAR MILK UNION
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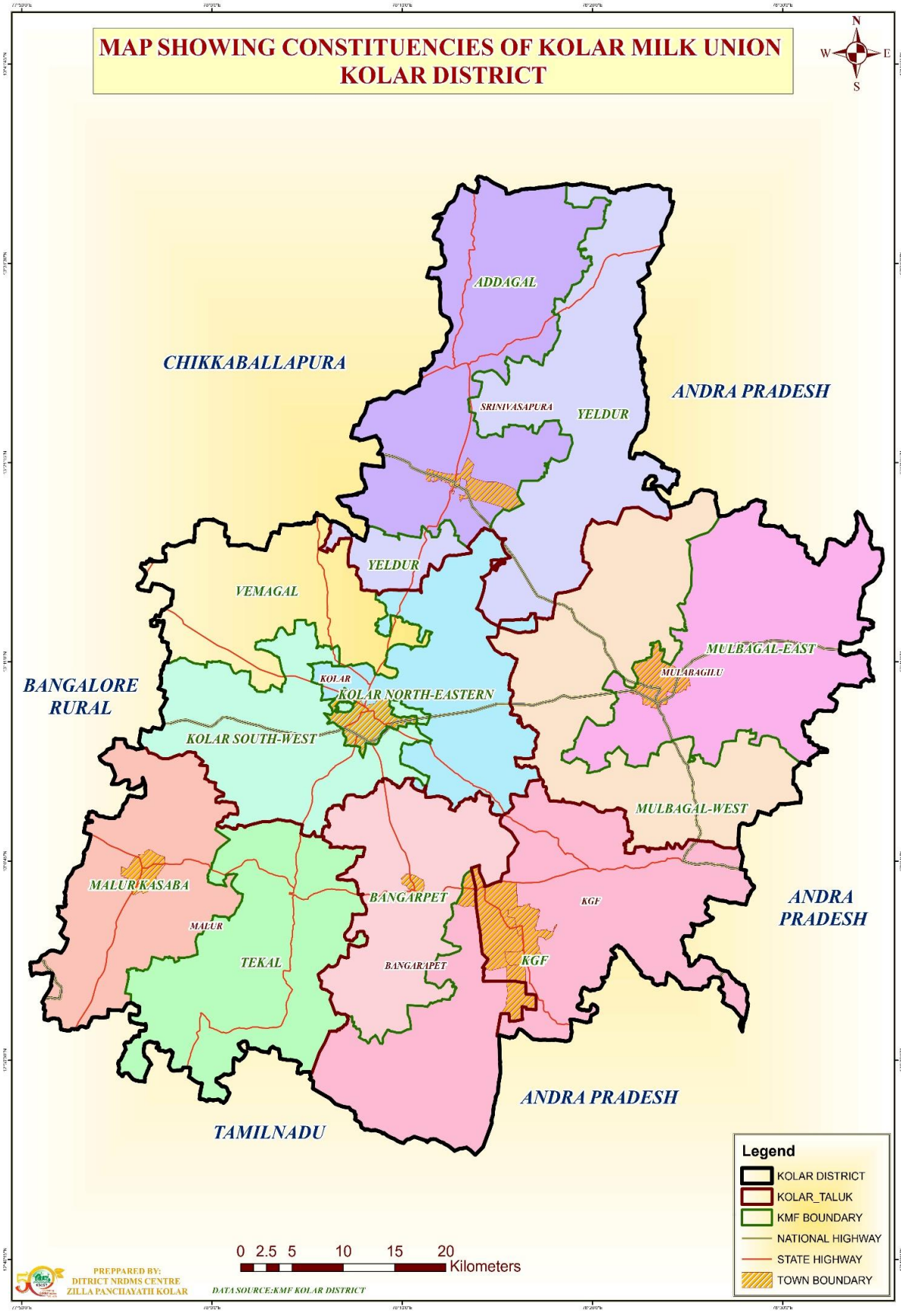
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DITRICT NRDMS CENTRE
ZILLA PANCHAYATH KOLAR
DATA SOURCE:KMF KOLAR DISTRICT

1. Background of the Study

Kolar Milk Union (KMF–Kolar District) plays a vital role in the cooperative dairy development of Kolar district. For effective planning, management, monitoring, and administration of milk procurement activities, accurate spatial delineation of Milk Union constituency boundaries is essential. Traditionally, constituency boundaries were maintained in manual records, which posed challenges in updating, visualization, and spatial analysis.

With advancements in **Remote Sensing and Geographic Information System (GIS)** technologies, it has become possible to prepare accurate, digital, and scalable maps of administrative and functional boundaries. The present study focuses on the preparation of **Kolar Milk Union constituency boundary maps** using GIS techniques to support planning, decision-making, and efficient management of dairy cooperative activities in Kolar district.

2. Objectives of the Study

The main objectives of the study are:

1. To prepare accurate digital maps of Kolar Milk Union constituency boundaries using GIS.
2. To delineate Milk Union constituencies taluk-wise within Kolar district.
3. To create a spatial database for Milk Union planning and management.
4. To support effective monitoring, administration, and development activities of Kolar Milk Union.
5. To facilitate easy visualization and spatial analysis of Milk Union constituencies.

3. Study Area: Kolar District

Kolar district is located in the southeastern part of Karnataka state. The district shares its boundaries with **Chikkaballapura district to the north, Bangalore Rural district to the west, Tamil Nadu to the south, and Andhra Pradesh to the east**.

Kolar district comprises **six taluks**, and within these taluks, **eleven Kolar Milk Union constituencies** are organized for efficient milk procurement and cooperative management.

Taluk-wise Milk Union Constituencies

- **Kolar Taluk (3 constituencies):**
    1. Kolar South West
    2. Kolar North Eastern
    3. Vemgal
- **Mulbagal Taluk (2 constituencies):**
    1. Mulbagal East
    2. Mulbagal West
- **Srinivasapur Taluk (2 constituencies):**
    1. Addagal
    2. Yeldur
- **Malur Taluk (2 constituencies):**
    1. Malur Kasaba
    2. Tekal
- **Bangarpet Taluk (1 constituency):**
    - Bangarpet
- **KGF Taluk (1 constituency):**
    - KGF (including some parts of Bangarpet Taluk)

4. Research Methodology

The preparation of Kolar Milk Union constituency boundary maps involved the following steps:

4.1 Data Collection

- Administrative boundary data of Kolar district and taluks were collected from authenticated government sources.
- Milk Union constituency boundary details were obtained from Kolar Milk Union records.
- Satellite imagery and base maps were used for reference and validation.

4.2 Data Preparation

- Taluk and district boundaries were digitized using GIS software.
- Constituency boundaries were delineated based on official records and verified spatially.
- Attribute data such as constituency name and taluk name were linked to spatial features.

4.3 GIS Analysis and Mapping

- Digitized boundaries were edited, validated, and topologically corrected.
- Constituency-wise thematic maps were generated with distinct colors.
- Map elements such as legend, scale bar, north arrow, and annotations were added for clarity.

4.4 Map Output

- Final maps were prepared in standardized layout formats suitable for printing and digital use.
- The Kolar Milk Union constituency boundary map clearly depicts all 11 constituencies within the district.

5. Importance of Kolar Milk Union Constituency Boundary Maps

The preparation of Milk Union constituency boundary maps is important for:

- Accurate spatial representation of Milk Union operational areas.
- Improved administrative control and planning.
- Clear demarcation of milk procurement zones.
- Avoidance of jurisdictional overlap among constituencies.
- Integration with other spatial datasets for advanced analysis.

6. Uses and Impacts of Kolar Milk Union Constituency Boundary Maps

6.1 Uses

- Planning milk procurement routes and collection centers.
- Monitoring milk production and cooperative performance.

- Supporting infrastructure development such as chilling centers.
- Assisting in disaster management and emergency planning.
- Facilitating data-driven decision-making for Milk Union authorities.

6.2 Impacts

- Enhanced efficiency in Milk Union operations.
- Improved transparency and coordination among constituencies.
- Reduced operational conflicts and ambiguities.
- Long-term support for sustainable dairy development in the district.

7. Analysis

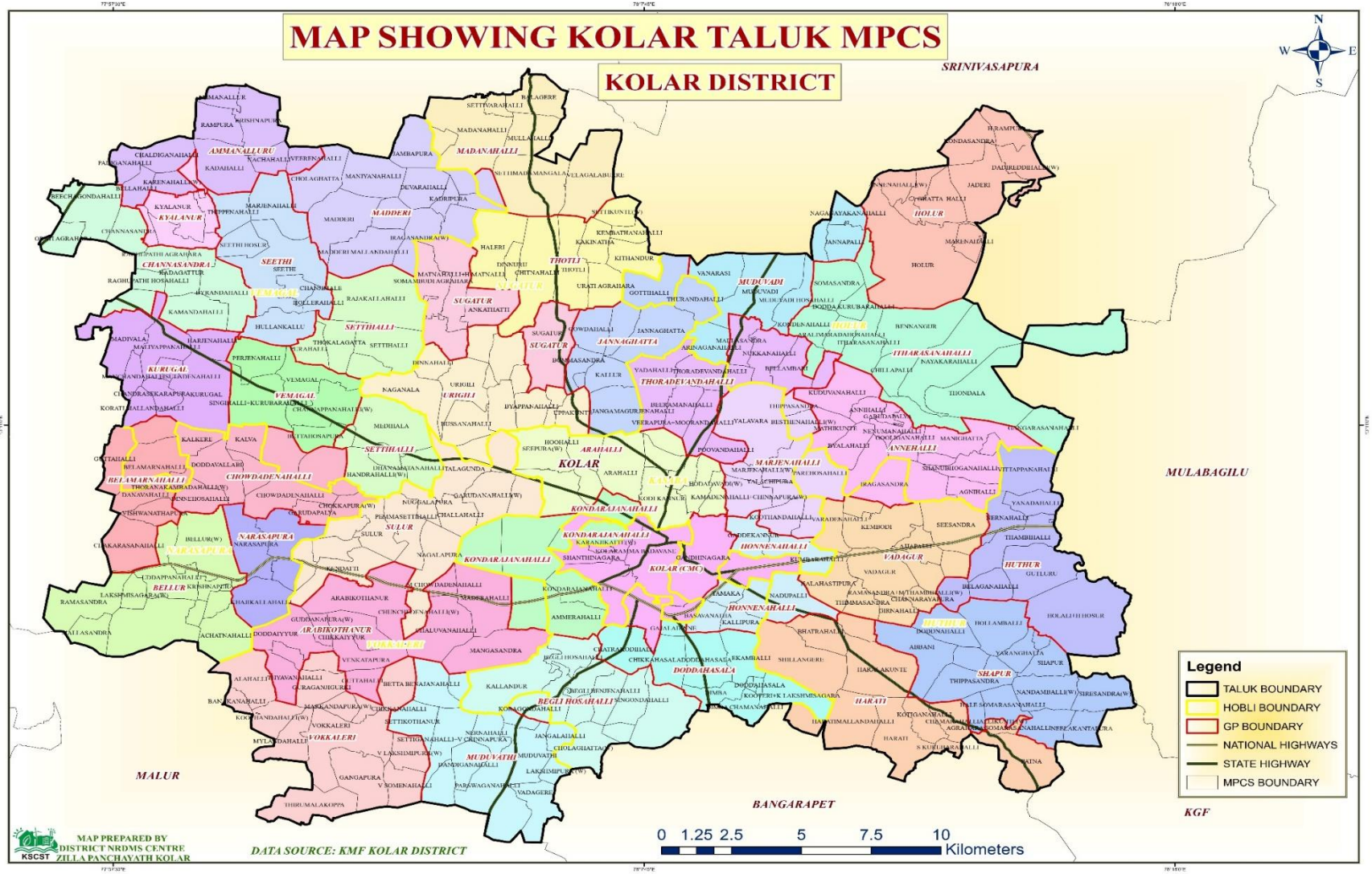
The GIS-based mapping of Kolar Milk Union constituencies reveals a well-distributed organizational structure aligned with taluk boundaries. Kolar Taluk, having the highest number of constituencies, reflects its significant dairy activity. Constituencies like KGF and Bangarpet show inter-taluk coverage, highlighting the need for spatial tools to manage complex administrative arrangements effectively.

The use of GIS ensures high positional accuracy, easy updating, and better visualization compared to traditional mapping methods.

8. Summary and Conclusion

The study successfully demonstrates the application of **Remote Sensing and GIS technologies** in preparing accurate and reliable **Kolar Milk Union constituency boundary maps**. The digital maps provide a strong spatial foundation for planning, administration, and management of dairy cooperative activities in Kolar district.

The prepared maps serve as an essential decision-support tool for Kolar Milk Union and can be further enhanced by integrating milk production data, infrastructure details, and socio-economic information. Overall, the GIS-based approach significantly contributes to efficient governance and sustainable development of the dairy sector in Kolar district.


MAP SHOWING KOLAR TALUK MPCS
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DISTRICT NRDMS CENTRE
ZILLA PANCHAYATH KOLAR
KSCST
DATA SOURCE: KMF KOLAR DISTRICT

2. Objectives of the Study

The specific objectives of the study are:

1. To prepare accurate digital boundary maps of Milk Producers' Cooperative Societies (MPCS) in Kolar district using GIS.
2. To spatially delineate MPCS boundaries within Kolar Taluk.
3. To develop a comprehensive geospatial database for MPCS administration.
4. To support effective planning and management of milk procurement activities.
5. To enhance visualization and accessibility of MPCS jurisdictional information.

3. Study Area: Kolar District

Kolar district is located in the southeastern part of Karnataka state. It is bounded by **Chikkaballapura district to the north, Bangalore Rural district to the west, Tamil Nadu to the south, and Andhra Pradesh to the east**. The district comprises six taluks, namely **Kolar, Mulbagal, Srinivasapur, Malur, Bangarpet, and KGF**.

The present study primarily focuses on **Kolar Taluk**, which has a dense network of MPCSs due to its high dairy activity. The study area includes rural and peri-urban villages, road networks, hobli boundaries, and administrative units relevant to MPCS operations.

4. Research Methodology

The preparation of Kolar MPCS boundary maps was carried out through the following systematic steps:

4.1 Data Collection

- Administrative boundaries of district, taluk, hobli, and villages were collected from official government sources.
- MPCS boundary details and attribute information were obtained from Kolar Milk Union (KMF – Kolar District).
- Satellite imagery and base maps were used as reference layers for spatial verification.

4.2 Data Processing and Digitization

- Taluk, hobli, and village boundaries were digitized using standard GIS software.
- MPCS boundaries were delineated based on official records and field-verified inputs.
- Attribute data such as MPCS name, village coverage, and administrative linkage were attached to spatial layers.

4.3 GIS Analysis and Map Preparation

- Topological checks were performed to eliminate overlaps and gaps between MPCS boundaries.
- MPCS boundaries were symbolized using distinct colors for clear differentiation.
- Cartographic elements such as legend, scale bar, north arrow, road networks, and administrative boundaries were incorporated.

4.4 Map Output and Validation

- Final MPCS boundary maps were generated in both digital and print-ready formats.
- Maps were cross-validated with Kolar Milk Union officials to ensure accuracy and reliability.

5. Importance of Milk Producers' Cooperative Society (MPCS) Maps

The MPCS boundary maps are important for:

- Clear demarcation of MPCS operational jurisdictions.
- Strengthening administrative efficiency and cooperative governance.
- Avoiding duplication and conflict in milk procurement areas.
- Supporting transparency and accountability in cooperative management.
- Integration with other spatial datasets for advanced planning.

6. Uses and Impacts of Milk Producers' Cooperative Society (MPCS) Maps

6.1 Uses

- Planning and optimization of milk collection routes.
- Identification of underserved or overlapping MPCS areas.
- Location planning for milk collection centers and chilling units.
- Monitoring MPCS performance at village and hobli levels.
- Supporting disaster management and emergency response in rural areas.

6.2 Impacts

- Improved operational efficiency of MPCSs.
- Enhanced coordination between MPCSs and Milk Union authorities.
- Data-driven decision-making for dairy development programs.
- Long-term sustainability and growth of cooperative dairy institutions.

7. Analysis

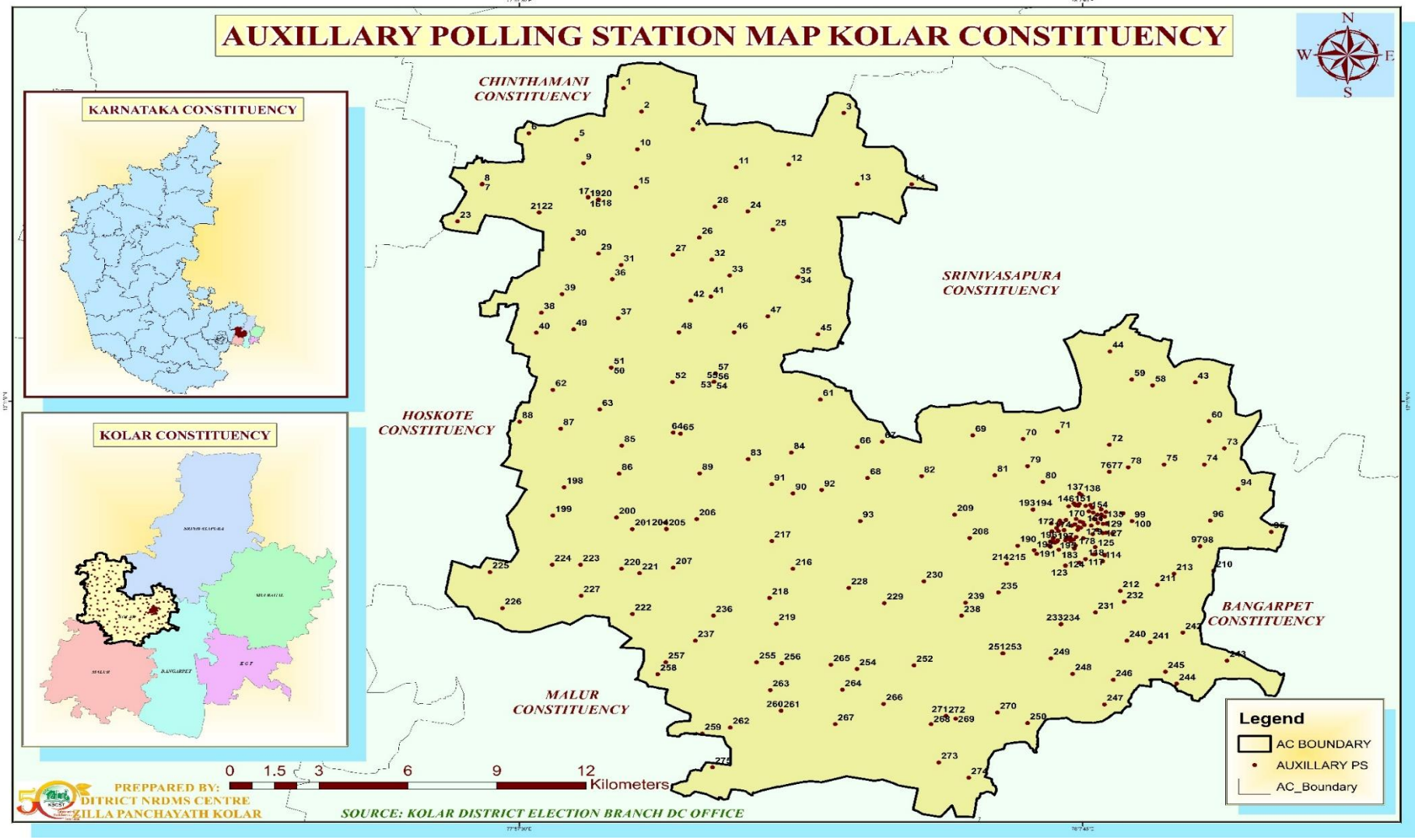
The GIS-based MPCS boundary mapping reveals a dense and well-organized cooperative network in Kolar Taluk. The spatial distribution of MPCSs aligns closely with village and hobli boundaries, ensuring efficient coverage and accessibility for milk producers. Integration of road networks and administrative layers enhances operational planning and logistical efficiency.

The use of GIS technology significantly improves the accuracy, update capability, and analytical potential of MPCS boundary information compared to conventional mapping methods.

8. Summary and Conclusion

The study demonstrates the effective application of **Remote Sensing and GIS technologies** in the preparation of **Milk Producers' Cooperative Society boundary maps** for Kolar district. The digital MPCS maps provide a robust spatial framework for planning, administration, and monitoring of dairy cooperative activities.

The prepared maps serve as a valuable decision-support tool for Kolar Milk Union and associated stakeholders. Future enhancements may include integration of milk production statistics, farmer demographics, and infrastructure data to further strengthen cooperative planning and sustainable dairy development in the region.


AUXILLARY POLLING STATION MAP KOLAR CONSTITUENCY
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DITRICT NRDMS CENTRE
ZILLA PANCHAYATH KOLAR
SOURCE: KOLAR DISTRICT ELECTION BRANCH DC OFFICE

1. Background Study

Elections form the backbone of a democratic system, and their effective conduct depends heavily on accurate planning, spatial organization, and accessibility of polling infrastructure. Polling stations are designated locations where electors cast their votes, while **auxiliary polling stations** are additional temporary stations established to reduce voter congestion, improve accessibility, and accommodate population growth or special geographic conditions.

Traditionally, polling station planning relied on paper maps and manual records, which often resulted in inaccuracies, difficulties in updates, and limited spatial analysis. With advancements in **Remote Sensing (RS)** and **Geographic Information Systems (GIS)**, election management has become more precise, transparent, and efficient. GIS enables spatial visualization, database integration, and analytical modeling, while remote sensing provides up-to-date base maps and land-use information.

In this context, the preparation of **Kolar Constituency Polling Station and Auxiliary Polling Station Maps** using RS and GIS techniques supports informed decision-making by election authorities and ensures free, fair, and accessible elections.

2. Objectives

The main objectives of the study are:

1. To prepare accurate and georeferenced maps of polling stations and auxiliary polling stations for Kolar Constituency.
2. To integrate spatial and attribute data related to election infrastructure using GIS.
3. To analyze the spatial distribution and accessibility of polling and auxiliary polling stations.
4. To support election planning, management, and monitoring through thematic mapping.
5. To demonstrate the application of remote sensing and GIS in electoral administration.

3. Study Area: Kolar Constituency

Kolar Constituency is located in the southeastern part of Karnataka State, India. It is bounded by **Chintamani Constituency** to the north, **Srinivaspura Constituency** to the east, **Bangarpet**

Constituency to the southeast, **Malur Constituency** to the south, and **Hoskote Constituency** to the west.

The constituency consists of urban, semi-urban, and rural regions with varied terrain, settlement patterns, and population densities. Such diversity necessitates careful planning of polling stations to ensure voter convenience and equitable access. The study area map includes Assembly Constituency (AC) boundaries, polling station locations, auxiliary polling station locations, and surrounding administrative units.

4. Research Methodology

The methodology adopted for preparing polling station and auxiliary polling station maps involved the following steps:

4.1 Data Collection

- Satellite imagery and base maps obtained from remote sensing sources.
- Administrative boundary data (State, District, Assembly Constituency).
- Polling station and auxiliary polling station details from the District Election Branch.
- Ancillary data such as road networks and settlement locations.

4.2 Data Processing

- Digitization of constituency and polling station boundaries.
- Georeferencing of satellite imagery to standard coordinate systems.
- Creation of attribute databases containing polling station numbers, names, and types.

4.3 GIS Analysis

- Spatial plotting of polling stations and auxiliary polling stations.
- Density and distribution analysis to identify clustering and coverage gaps.
- Overlay analysis with road networks and settlements to assess accessibility.

4.4 Map Preparation

- Thematic map design with standardized symbols and legends.
- Inclusion of scale, north arrow, and administrative references.
- Final cartographic layout suitable for official and operational use.

5. Importance of Kolar Constituency Polling Station and Auxiliary Polling Station Maps

The prepared maps are important because they:

- Provide a clear spatial representation of election infrastructure.
- Help ensure equitable distribution of polling stations.
- Assist election officials in logistical planning and deployment.
- Improve transparency and accountability in election management.
- Enable quick identification of underserved or high-density voter areas.

6. Uses and Impacts of the Maps

6.1 Uses

- Election planning and booth allocation.
- Voter awareness and information dissemination.
- Route planning for election personnel and security forces.
- Emergency response and contingency planning.
- Post-election analysis and record maintenance.

6.2 Impacts

- Reduced voter travel distance and waiting time.
- Enhanced voter participation and inclusivity.
- Improved efficiency in election administration.
- Better coordination among election-related departments.
- Long-term digital database creation for future elections.

7. Analysis of Kolar Constituency Polling Station and Auxiliary Polling Station Maps

The spatial analysis reveals that polling stations are distributed across the constituency in alignment with population density and settlement patterns. Auxiliary polling stations are strategically placed in high-density or geographically constrained areas to reduce voter congestion. Urban regions show higher concentration of polling stations, while rural areas demonstrate wider spatial spread but adequate coverage.

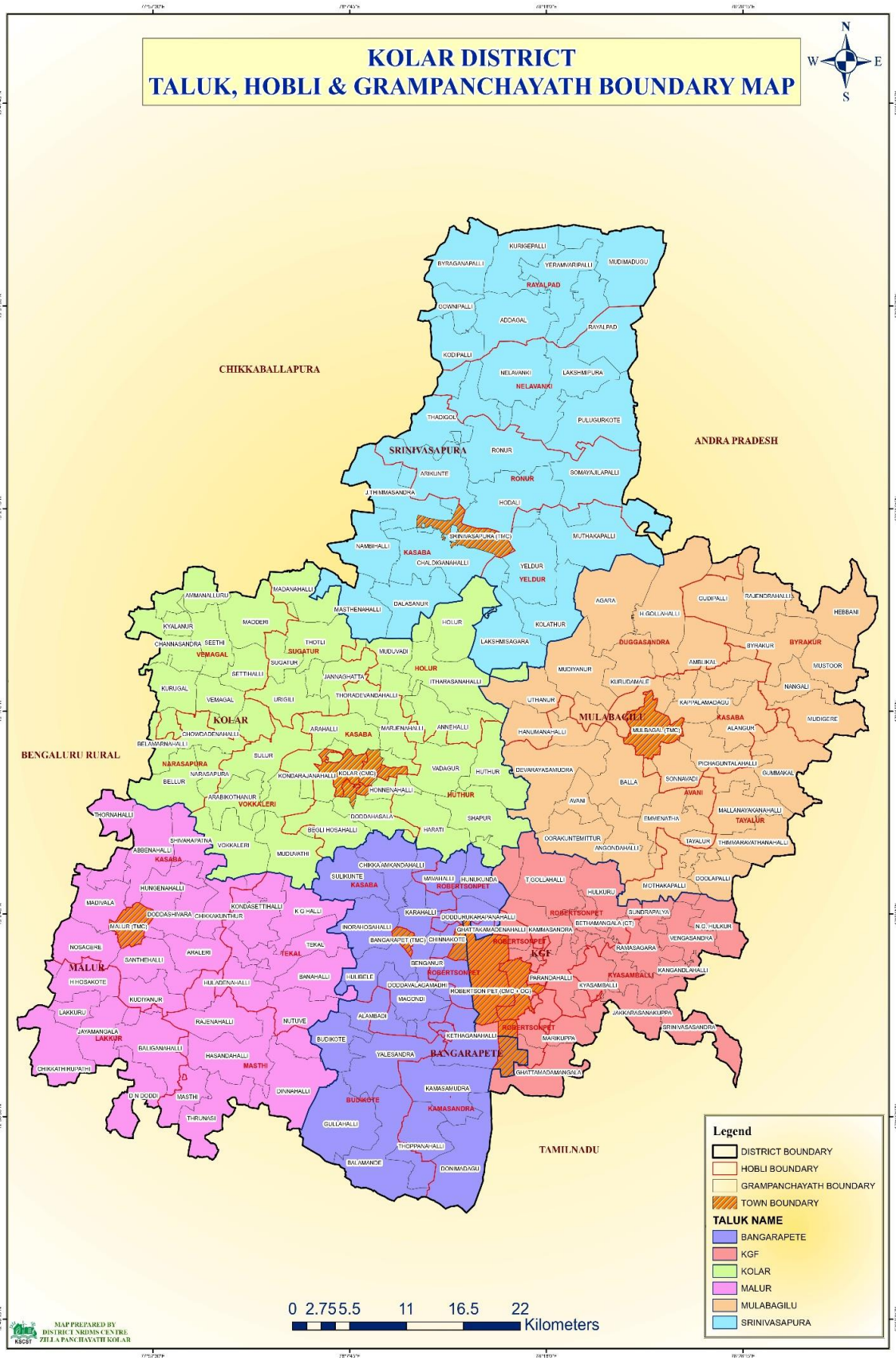
GIS-based visualization allows easy identification of boundary limits, neighboring constituencies, and administrative overlaps. The integration of attribute data enhances decision-making by linking spatial location with operational information.

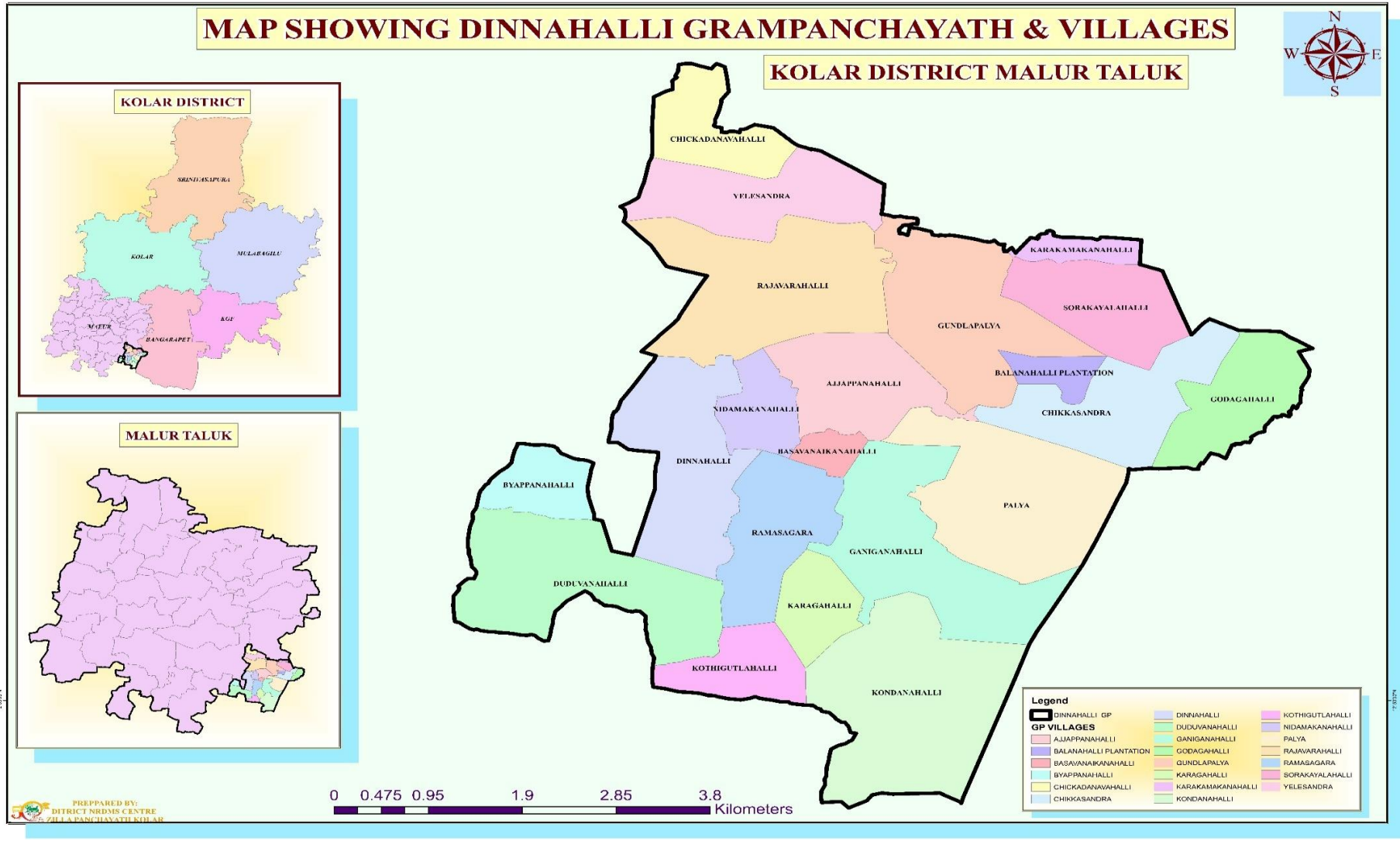
8. Summary and Conclusion

The preparation of Kolar Constituency Polling Station and Auxiliary Polling Station Maps using remote sensing and GIS applications demonstrates the effectiveness of geospatial technologies in electoral management. The study successfully achieved accurate mapping, efficient spatial analysis, and meaningful visualization of election infrastructure.

These maps serve as a vital decision-support tool for election authorities, ensuring accessibility, transparency, and efficiency in the electoral process. The approach can be replicated for other constituencies to strengthen democratic governance through technology-driven election planning.

Prepared Using:
Remote Sensing and GIS Techniques
Source: District Election Branch, Kolar


KOLAR DISTRICT
TALUK, HOBLI & GRAMPANCHAYATH BOUNDARY MAP
N
W
E
S
CHIKKABALLAPURA
ANDRA PRADESH
BENGALURU RURAL
TAMILNADU
SRINIVASAPURA
RONUR
ARIKUNTE
SOMAYAJILAPALLI
PULUGURKOTE
THADIGOL
KODIPALLI
NELAVANKI
LAKSHMIPURA
RAYALPAD
OOMMPALLI
ADDAGAL
BYRAGANAPALLI
KURIGEPALLI
YERAMVARIPALLI
MUDIMADUGU
J.THIMMASANDRA
HODALI
SHRINIVASAPURA (TMC)
MUTHAKAPALLI
NAMBIHALLI
KASABA
CHALIKSANAHALLI
YELDUR
MADANAHALLI
AMMANALLURU
MASTHENAHALLI
DALASANUR
HOLUR
KOLATHUR
LAKSHMISAGARA
KYALANUR
MADDERI
CHANNASANDRA
SEETHI
VEMAGAL
THOTLI
SUGATUR
MUDUVADI
SETTIHALLI
JANNAGHATTA
ITHARASANAHALLI
KURUGAL
VEMAGAL
URIGILI
THORADEVANDAHALLI
KOLAR
ARAHALLI
MARJENAHALLI
ANNEHALLI
CHOWDADENAHALLI
BELAMARNAHALLI
NARASAPURA
SULUR
KONDARAJANAHALLI
KOLAR (CMC)
VADAGUR
HUTHUR
HONNENAHALLI
ARABIKOTHANUR
VOKKALERI
THORNAHALLI
DODDAHASALA
SHAPUR
BEGLI HOSAHALLI
HARATI
SHIVANAPATNA
ABBENAHALLI
MUDUVATHI
SULIKUNTE
CHIKKAMKANDAHALLI
MAVAHALLI
HUNIKUNDA
ROBERTSONPET
HUNGENAHALLI
MADIVALA
DODDASHIVARA
CHIKKAKUNTHUR
KONDASETTIHALLI
K.G.HALLI
MALUR (TMC)
NOSAGERE
SANTHEHALLI
ARALERI
TEKAL
MALUR
H.HOSAKOTE
KUDIYANUR
LAKKURU
JAYAMANGALA
LAKKUR
BALIGANAHALLI
CHIKKATHIRUPATHI
HULIDENAHALLI
BANAHALLI
HULIBELE
RAJENAHALLI
NUTUVE
HASANDAHALLI
MASTHI
D.N.DODDI
DINNAHALLI
THIRUNASI
KARAHALLI
DODDUKUKARAPANAHALLI
INORAHOSAHALLI
BANGARAPET (TMC)
CHINNAKOTE
GHATTAKAMADENAHALLI
KAMMASANDRA
BENGANUR
DODDAVALAGAMADHI
MAGONDI
ALAMBADI
BUDIKOTE
YALESANDRA
BANGARAPETE
KETHAGANAHALLI
GHATTAMADAMANGALA
KAMASAMUDRA
KAMASANDRA
GULLAHALLI
THOPPANAHALLI
BALAMANDE
DONIMADAGU
T.GOLLAHALLI
HULKURU
MOTHAKAPALLI
DOOLAPALLI
SUNDRAPALYA
BETHAMANGALA (CT)
N.G.HULKUR
VENGASANDRA
RAMASAGARA
KGF
PRANDAHALLI
KYASAMBALLI
KANGANDLAHALLI
JAKKARASANAKUPPA
SRINIVASASANDRA
MARIKUPPA
MULBAGAL (TMC)
MULABAGILU
DUGGASANDRA
AGARA
H.GOLLAHALLI
GUDIPALLI
RAJENDRAHALLI
HEBBANI
BYRAKUR
MUSTOOR
NANGALI
MUDIGERE
ALANGUR
KANNALAMADAGU
UTHANUR
KURUDAMALE
MUDIYANUR
AMBLIKAL
HANUMANAHALLI
DEVARAYASAMUDRA
BALLA
SONNAVADI
AVANI
PICHAGUNTALAHALLI
GUMMAKAL
MALLANAYAKANAHALLI
TAYALUR
EMMENATHA
THIMMAMAVATHANAHALLI
DORAKUNTEMITTUR
ANGONDAHALLI
0 2.755.5 11 16.5 22
Kilometers
MAP PREPARED BY
DISTRICT NRDMS CENTRE
ZILLA PANCHAYATH KOLAR
KSCST
Legend
DISTRICT BOUNDARY
HOBLI BOUNDARY
GRAMPANCHAYATH BOUNDARY
TOWN BOUNDARY
TALUK NAME
BANGARAPETE
KGF
KOLAR
MALUR
MULABAGILU
SRINIVASAPURA


MAP SHOWING DINNAHALLI GRAMPANCHAYATH & VILLAGES
KOLAR DISTRICT MALUR TALUK
KOLAR DISTRICT
SRINIVASAPURA
KOLAR
MULABAGILU
MALUR
BANGARAPET
KGF
MALUR TALUK
CHICKADANAVAHALLI
YELESANDRA
RAJAVARAHALLI
KARAKAMAKANAHALLI
SORAKAYALAHALLI
GUNDLAPALYA
BALANAHALLI PLANTATION
AJJAPPANAHALLI
NIDAMAKANAHALLI
CHIKKASANDRA
GODAGAHALLI
DINNAHALLI
BASAVANAIKANAHALLI
BYAPPANAHALLI
PALYA
RAMASAGARA
GANIGANAHALLI
DUDUVANAHALLI
KARAGAHALLI
KOTHIGUTLAHALLI
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Legend
DINNAHALLI GP
GP VILLAGES
AJJAPPANAHALLI
BALANAHALLI PLANTATION
BASAVANAIKANAHALLI
BYAPPANAHALLI
CHICKADANAVAHALLI
CHIKKASANDRA
DINNAHALLI
DUDUVANAHALLI
GANIGANAHALLI
GODAGAHALLI
GUNDLAPALYA
KARAGAHALLI
KARAKAMAKANAHALLI
KONDANAHALLI
KOTHIGUTLAHALLI
NIDAMAKANAHALLI
PALYA
RAJAVARAHALLI
RAMASAGARA
SORAKAYALAHALLI
YELESANDRA
0 0.475 0.95 1.9 2.85 3.8
Kilometers
PREPPARED BY:
DITRICT NRDMS CENTRE
ZILLA PANCHAYATH KOLAR

1. Introduction

Local self-governance plays a crucial role in rural development and democratic administration in India. The **Grama Panchayat** system is the foundation of grassroots democracy, responsible for governance, development planning, and delivery of public services at the village level. Accurate spatial information is essential for effective administration, planning, and conduct of **Grama Panchayat elections**.

The preparation of **Kolar District Grama Panchayat maps** using **Remote Sensing (RS)** and **Geographic Information Systems (GIS)** provides an advanced, accurate, and efficient approach to visualize administrative boundaries, village extents, and jurisdictional limits. These maps support transparent governance, election planning, and informed decision-making.

2. Background of the Study

Traditionally, Grama Panchayat boundary maps were maintained in paper format, often outdated and inconsistent with ground realities. Rapid population growth, administrative reorganization, and infrastructure development have increased the need for updated and precise spatial data.

Remote sensing technology provides recent satellite imagery, while GIS enables integration, analysis, and visualization of spatial and non-spatial data. The application of geospatial technology in preparing Grama Panchayat maps helps overcome limitations of manual mapping, ensuring accuracy, consistency, and easy updates.

This study focuses on the preparation of **Kolar District Grama Panchayat maps** using RS and GIS to support administrative functions and electoral processes.

3. Objectives

The main objectives of this study are:

1. To prepare accurate and georeferenced Grama Panchayat maps for Kolar District.
2. To delineate district, taluk, village, and Grama Panchayat boundaries using GIS.
3. To create a digital spatial database for administrative and electoral use.

4. To support effective planning and conduct of Grama Panchayat elections.
5. To demonstrate the role of geospatial technology in local governance.

4. Study Area: Kolar District

Kolar District is located in the southeastern part of **Karnataka State, India**. It is bordered by Andhra Pradesh to the east and north and by other Karnataka districts to the west and south. The district comprises multiple **taluks**, numerous villages, and several Grama Panchayats.

The terrain includes plains and undulating landscapes with agricultural dominance. Due to the rural settlement pattern and administrative diversity, precise Grama Panchayat mapping is essential for governance, service delivery, and election management.

5. Research Methodology

The preparation of Kolar District Grama Panchayat maps followed a systematic GIS-based methodology:

5.1 Data Collection

- High-resolution satellite imagery from remote sensing sources.
- Administrative boundary data (State, District, Taluk, Village).
- Grama Panchayat boundary records from district and rural development departments.
- Census and election-related attribute data.

5.2 Data Processing

- Georeferencing of satellite imagery to standard coordinate systems.
- Digitization of district, taluk, village, and Grama Panchayat boundaries.
- Creation of attribute tables containing Panchayat names, codes, and demographic details.

5.3 GIS Analysis

- Spatial validation of boundaries through overlay analysis.

- Identification of boundary overlaps and gaps.
- Area and population-based analysis of Grama Panchayats.

5.4 Map Generation

- Preparation of thematic maps showing Grama Panchayat distribution.
- Cartographic design including legends, scale, and north direction.
- Generation of digital and print-ready maps for administrative use.

6. Importance of Kolar District Grama Panchayat Maps for Administration and Elections

6.1 Administrative Importance

- Clear demarcation of jurisdictional boundaries.
- Improved planning and monitoring of rural development schemes.
- Efficient resource allocation and service delivery.
- Reduction of administrative disputes related to boundaries.

6.2 Importance in Grama Panchayat Elections

- Accurate delimitation of electoral constituencies.
- Proper allocation of polling stations and booths.
- Transparent voter list preparation.
- Effective deployment of election personnel and security forces.

7. Impacts of Grama Panchayat Mapping

- Improved governance and accountability at the grassroots level.
- Enhanced transparency in electoral processes.
- Better coordination among government departments.
- Reduced errors and disputes during elections.
- Long-term creation of a reliable digital spatial database.

8. Analysis of Kolar District Grama Panchayat Maps

The GIS-based analysis shows that Grama Panchayats are spatially distributed according to settlement patterns, population density, and administrative requirements. Larger Panchayats are observed in sparsely populated rural areas, while smaller Panchayats exist in densely populated regions.

Overlay analysis with village boundaries ensures accurate jurisdictional coverage. The digital format allows easy updates and analysis, making the maps dynamic and adaptable for future administrative and electoral needs.

9. Uses of Kolar District Grama Panchayat Maps

- Grama Panchayat election planning and management.
- Rural infrastructure development planning.
- Disaster management and emergency response.
- Monitoring government schemes and welfare programs.
- Public information and transparency initiatives.

10. Role of Geospatial Technology in Grama Panchayat Elections

Geospatial technology significantly enhances the efficiency and transparency of Grama Panchayat elections by:

- Accurately defining electoral boundaries.
- Identifying optimal polling station locations.
- Analyzing voter distribution and accessibility.
- Supporting route planning for election logistics.
- Enabling real-time monitoring and post-election analysis.

GIS-based election mapping ensures fair representation, reduces administrative errors, and strengthens democratic participation at the village level.

11. Summary and Conclusion

The preparation of **Kolar District Grama Panchayat maps** using remote sensing and GIS applications provides a robust foundation for effective local governance and election management. The integration of spatial and attribute data enhances accuracy, transparency, and efficiency in administrative and electoral processes.

Geospatial technology proves to be an indispensable tool for modern Grama Panchayat administration, enabling data-driven decision-making and strengthening grassroots democracy. The methodology and outcomes of this study can be replicated across other districts to improve governance and electoral integrity.

3. Training Programmes Attended (August 2025-November 2025)

The NRDMS team participated in various trainings aimed at capacity building and the application of geospatial tools:

1. Attended a one-day **"Shallow Aquifer Management (SAM 2.0) Inception Workshop"** at the Kolar City Municipal Council.
2. Attended the **"Thematic Programme on District Disaster Management Plan"** training held at the Administrative Training Institute, Mysore.
3. Attended Workshop on mathematics for high-school teachers conducted by Karnataka jnana vignana samithi.
4. Attended Yukthadhara online training

Improvements in NRDMS Activities – Kolar District

The NRDMS (Natural Resources Data Management System) Centre in Kolar has significantly enhanced its role in district-level planning and governance through the expanded application of **geospatial technologies**.

1. Strengthening Geospatial Integration in Line Departments

- Geospatial tools are now being actively used by **line departments** such as KOMUL, Revenue department election branch, police department, Health department, Agriculture, Horticulture, Social Forestry, and Panchayat Raj Engineering.
- This has improved **decision-making, infrastructure planning, and resource management**.

NRDMS-Committed Map Deliverables Kolar District

1. Introduction

The **Natural Resources Data Management System (NRDMS)** initiative for **Kolar District** aims to support evidence-based planning, governance, and emergency response through the development and dissemination of **thematic GIS-based maps**. Under this commitment, spatial datasets and decision-support maps have been prepared and delivered to multiple line departments to enhance operational efficiency, inter-departmental coordination, and public service delivery.

This report summarizes the **maps delivered, maps proposed, and future mapping requirements** for various departments in Kolar District.

2. Maps Delivered to Police Department

2.1 Administrative and Jurisdictional Maps

- District, Taluk, Hobli, and Village boundary maps
- Existing Police Station jurisdiction maps
- Beat-wise and ward-wise police coverage maps (urban areas)

2.2 New Proposal Map – Narasapura Police Station

- **Proposed Narasapura Police Station boundary map**
- Overlay of:
    - Population density

    - Industrial areas (Narasapura Industrial Area)
    - Crime-prone zones
    - Road and transport network
- Rationale:
    - Improved law enforcement coverage
    - Faster response time in industrial and high-growth areas
    - Support for administrative approval and infrastructure planning

3. Maps Delivered to Health Department

3.1 Health Risk Assessment (HRA) Sites Map

HRA sites were mapped and **segregated based on risk categories** for effective monitoring and intervention.

HRA Classification:

- **M1** – Very Low Risk
- **M2** – Low Risk
- **M3** – Moderate Risk
- **M4** – High Risk
- **M5** – Very High Risk
- **M6** – Critical Risk

Map Features:

- Village-wise and ward-wise HRA site distribution
- Color-coded risk categorization (M1–M6)
- Overlay with:
    - Population density
    - Water sources
    - Industrial and waste disposal zones

Utility:

- Prioritization of health interventions
- Disease surveillance and prevention planning
- Resource allocation for high-risk areas

3.2 Health Facilities Location Maps for Polio MSP (Micro Support Plan)

Mapped Health Infrastructure:

- **DH** – District Hospitals
- **TH** – Taluk Hospitals
- **CHC** – Community Health Centres
- **PHC** – Primary Health Centres
- **SC** – Sub-Centres

Map Applications:

- Polio drops campaign planning
- Booth and mobile vaccination route planning
- Identification of underserved and remote habitations
- Monitoring vaccine coverage and logistics

4. Maps Delivered / Required for Other Departments

4.1 Revenue Department

- Land use / land cover (LULC) maps
- Village cadastral overlays
- Flood-prone and drought-vulnerable area maps

4.2 Rural Development & Panchayat Raj (RDPR)

- Gram Panchayat-wise infrastructure maps
- Drinking water source maps
- Sanitation and solid waste management maps

4.3 Urban Local Bodies (ULBs)

- Ward boundary maps
- Property and utility mapping
- Road, drainage, and streetlight inventory maps

4.4 Education Department

- School location maps (Government / Aided / Private)
- Catchment area mapping
- Student density analysis

4.5 Disaster Management Authority

- Hazard zonation maps (flood, drought, fire-prone areas)
- Emergency shelter and evacuation route maps
- Vulnerable population mapping

5. Election-Related Maps (Future and Ongoing Requirements)

5.1 Electoral Maps

- Assembly Constituency (AC) boundaries
- Polling Booth locations
- Voter density and demographic maps
- Sensitive and critical polling station maps

5.2 Election Planning Support

- Route maps for EVM/VVPAT movement
- Law and order deployment maps
- Accessibility maps for elderly and disabled voters

6. Conclusion

The NRDMS mapping initiative for Kolar District has significantly strengthened **data-driven governance** by providing accurate, standardized, and department-specific GIS maps. These deliverables support:

- Improved service delivery
- Efficient resource allocation
- Better planning and emergency response
- Enhanced transparency and inter-departmental coordination

Future efforts will focus on **regular data updates**, **integration with real-time systems**, and **capacity building of departmental staff** to maximize the utility of NRDMS outputs.

List of Maps Prepared

1. District Map
2. **Komul Constituency maps distrct and Taluk-wise**
3. **District-MPCS and and Taluk-wise**
4. **District-Auxillary polling station and Constituency wise**
5. **District-Grampanchayth**,
6. **Taluk-grampanchayth**
7. **Grampanchayath Maps**
8. **Kolar District Base Map**.