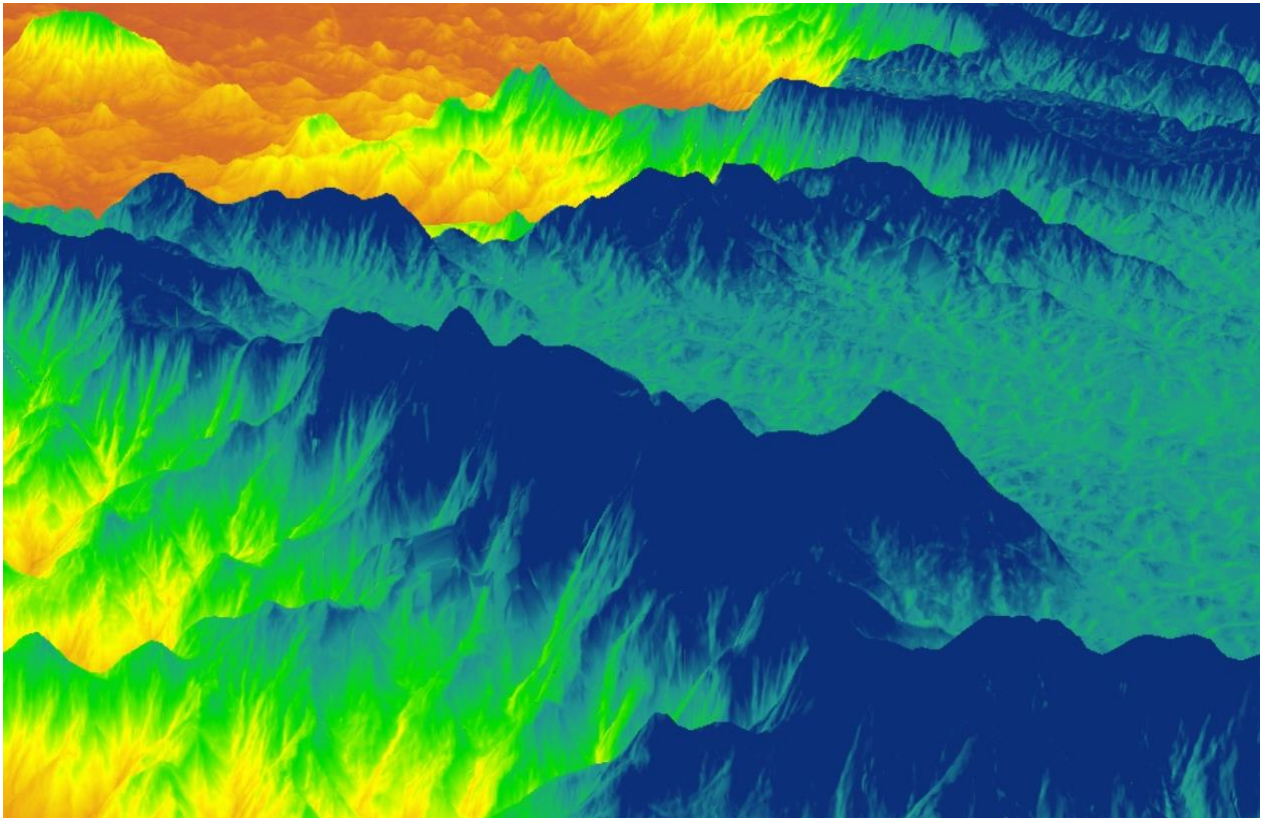


# **Karnataka GIS Mission**

## **Report**

**(April-2016 to March-2019)**



**Karnataka State Remote Sensing Applications Centre,  
Department of Personnel and Administrative Reforms  
(e-Governance), Government of Karnataka**

**June, 2019**

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# **1. Introduction and Background of Karnataka GIS Mission**

## **1.1 Background**

The Karnataka State Remote Sensing Applications Centre (KSRSAC) has, over the past 25 years, developed expertise in survey and usage of satellite/aerial images and has built up a GIS database of resources, which has been of immense value and importance to various line departments for their development purposes. The Karnataka Jnana Ayoga has observed that if the data/images available in KSRSAC are augmented and enhanced to cover the whole state with detailed granularity and also integrated with socio-economic data, then it can substantially improve scientific decision making, planning and development – thereby improving efficiency and performance of governance in the state.

## **1.2 Introduction**

The concept of Karnataka GIS (K-GIS) and its Vision document were brought out by Karnataka Jnana Aayoga (KJA) in collaboration with KSRSAC. The Vision for a State GIS and for assessing GIS needs of GoK departments was initiated through a broad consultation process. The consultation process culminated in GO. No. ITD.14 ADM dated 02.06-2015 establishing K-GIS and giving the responsibility of implementing it to KSRSAC. K-GIS is envisioned to be a major support to high-quality governance by embedding GIS in its different aspects such as

- planning and implementation at national/state/local levels;
- bringing GIS support in decision-making;
- enable a sound process of monitoring development and identifying “gaps in development”

Making GIS data available at all levels helps in bringing accountability and responsibility in governance.

Preliminary definition of K-GIS brought out by KJA together with KSRSAC envisaged development of the K-GIS elements in two phases.

- Phase-1 of K-GIS to be completed within a time frame of approximately one year from commissioning involved development of portal having 53 GIS layers available with KSRSAC, incorporation of geo-referenced assets data of 5 GoK departments, integration of their MIS data and development of Decision Support Applications for these departments.
- The second phase of the K-GIS mission involves preparation of a new Spatial Framework for the state of Karnataka, transfer of all available GIS layers to the new framework, geo-referencing of departmental assets of 20 departments, their MIS data linking, updation of remote sensing based GIS layers at granularity level corresponding to 1:10000 scale and applications for these departments.

K-GIS also involves setting up of state-of-art infrastructure to support the development and hosting of all K-GIS portal elements and services for the GoK Departments, Citizens and Enterprises.

### **1.3 Objectives**

Objectives of K-GIS are enumerated below:

- To establish the state needs for a robust information and GIS based decision support systems and also focus to ensure continued availability of GIS ready data assets and applications for decision support, in a way easily accessible across the departments, citizens, private enterprises, institutions etc.
- All the GIS data available in various departments need to be brought under one single seamless framework.
- To help the departmental users with GIS data and advanced tools for GIS analysis through simpler web and mobile interfaces system with an executive dashboard and other business workflows.
- To enable the policy makers, departments and public to make effective decision making process for planning and implementation of various developmental activities.

## 1.4 Expected Benefits

The expected benefits from K-GIS include:

- i. A common state-wide authoritative GIS – a platform of constantly updated, standardized and seamless GIS data of 250+ layers, latest satellite images and geo-linked departmental data sets that would be used by one and all.
- ii. GIS Applications as Decision Support modules of governance for all departments, as per their needs, and also for citizen GIS services.
- iii. Reduction in duplication of efforts, redundancy of GIS data and removal of usage of inconsistent GIS data and un-reliable decisions.
- iv. Enhancement of efficiency in governance, decision-making, planning and development actions.
- v. Ready availability and accessibility of a collection of standardized, inter-operable, seamless and regularly maintained GIS datasets for the whole state.
- vi. Impetus to private sector participation in GIS activities by offering efficient GIS Applications as an all-inclusive support to State governance and development activities.
- vii. Positioning of Karnataka in a leading role to nation-wide GIS and enabling the Government of Karnataka to play a larger role in this critical technology arena in the country.
- viii. Citizens will have access to State wide maps/ images /geospatial information, enabling a “Crowd – sourced” interactive process of citizen involvement in providing feedback/inputs/data as a virtual geographical ingest.

## 1.5 Components of K-GIS

The Components of K-GIS are grouped under 6 major categories.

- i. **K-GIS Data**, a seamless, state-wide GIS-Ready dataset of map/image data layers that are standardized, updated and configured to meet the GIS data and application needs of government, citizens and enterprises.

- ii. **K-GIS Portal**, a single gateway access to K-GIS Asset and K-GIS DSS Applications - with specialized Metadata service, GIS Applications service, data ingests service, data sharing service, publishing service etc.
- iii. **K-GIS DSS Applications**, a suite of GIS applications for decision and work processes of different departments; GIS applications for public services and citizens and also hosting/publishing enterprise GIS solutions.
- iv. **K-GIS Infrastructure**, a state-of-art common state-level computing and networking infrastructure for hosting/serving the K-GIS Asset and K-GIS Applications.
- v. **K-GIS Capacity Building**, a sustained effort for training and orientation of users/professionals from government and enterprise in GIS and for positioning an integrated programme of education and research in GIS.
- vi. **K-GIS Standards, Protocol, Policies and Management Practices**, through a constant policy-definition and review that promotes GIS usage in the state and creates an environment for success of GIS activity in the state.

## **1.6 Period of the Mission**

Karnataka GIS is a Mission to be completed in a period of 3 years from the date of start i.e. 01.04.2016 to 31.03.2019.

## **2. Implementation of K-GIS Mission**

The GoK formed an Empowered Committee, headed by the Chief Secretary, GoK and vested with overall coordination and guidance for the execution of the K-GIS mission and a Technical Committee for guidance in detailing the technical definition of the elements of the K-GIS mission. The Executive Committee of the KRSRAC is vested with monitoring and guiding the execution of the mission and is the administrative and financial overseeing body for the K-GIS mission.

The implementation of K-GIS commenced from April 2016 after obtaining guidance from Empowered Committee which held its 1st meeting on 15<sup>th</sup> March, 2016.

The K-GIS Technical committee, in seven meetings provided valuable inputs in defining the contents and technical specifications of the elements of K-GIS.

The details of departmental meetings and follow up meetings organized during the execution of K-GIS mission are given in **Annexure-1**.

The execution of K-GIS is organized under following activities:

- Geospatial Data sets
  - Spatial Framework for Karnataka
- Portal
- Decision Support Applications
- Infrastructure
- Capacity Building
- Standards Protocol, Policy and Management Practices

Report of these activities and achievements made are given in the following sections and the list of activities is given in **Annexure-2**.

### **2.1 Geospatial Data sets**

Based on the directives of the K-GIS Empowered Committee, the GoK departments were categorized into three groups for defining the GIS needs. The groups are:

- i. Departments which deal with public assets and their management like Education, Health, Woman and Child, etc.,
- ii. Departments which deal with dynamic natural resources like Agriculture, Horticulture, Forest, etc. and
- iii. Departments which deal with urban, and infrastructure like Urban, Industries, Public Works, etc.

Sectoral Committees were formed taking the members of the Empowered Committee to define the needs for the three groups. Meetings of the Sectoral Committees under the chairmanship of Additional Chief Secretary & Development Commissioner, Additional Chief Secretary-Urban and Principal Secretary/Additional Chief Secretary, IT/BT and S&T were held. Guidelines provided by the three committees were followed in defining the geospatial data sets for K-GIS.

### **2.1.1 Organization of GIS Layers**

The layers of data were organized into 16 major categories, as given below:

- i. Boundary
- ii. Infrastructure
- iii. Hydrology
- iv. Urban and Settlement
- v. Industrial Content
- vi. Forest Environment & Ecology
- vii. Geological
- viii. Land Information
- ix. Land Ownership Information
- x. Soil Information
- xi. Public Assets/ Amenities
- xii. Point of Interest
- xiii. Graticules
- xiv. Images
- xv. Terrain Information
- xvi. Weather Information

In addition, mapping of assets belonging to the departments of GoK and additional geospatial data sets required to fulfill the requirements of defined Decision Support Systems was carried out.



Organization of the K-GIS Database Version 1 comprising the data available with KSRSAC and few GoK departments was completed. The version 1 included 105 layers of boundary, thematic and dept. asset data etc organized as per K-GIS standards. Metadata defining the source, year, scale and other parameters data were created for each GIS layers. More than 2 lakh dept. assets were geo-tagged as planned for version 1.

Generation and organization of the K-GIS Database Version 2 was completed. In addition to the Version-1 database, more than 18 lakh dept. assets were geo-tagged. A unique coding system based on administrative hierarchy was conceptualised and assigned to each asset. The version 2 has more than 245 layers of GIS data comprising dept. jurisdiction boundary, dept. specific data and asset data. In total more than 400 layers data were organized under K-GIS as against the 240 layers visualized. All these data layers were transformed on to the new spatial framework. Additionally, new base map and land use layers were generated using 50 cm resolution satellite data.

The list of geospatial data layers completed under K-GIS is given in **Annexure-3**.

### **2.1.2 Spatial Framework for Karnataka**

As part of Spatial Framework, the coordinates of 21 Primary Control Points (PCP) and 131 Secondary Control Points (SCP) were obtained from Survey of India (SoI) and used as reference for extension of control network activities, essential for geo-referencing the K-GIS data layers.

The points and details collected from SoI were physically verified on ground for their correctness / availability on ground and whether their markings are intact. The extension of ground control for Spatial Framework involved parallel activities involving processing of (0.5 m) high resolution satellite imagery and separately processing of CartoSAT 2.5 m resolution stereo data.

**Phase 1** Establishment of distributed set of Terrain Reference Points (TRPs) for the entire state for generating DEM & Ortho-base of Cartosat data.

**Phase 2** Establishment of TRPs for the entire state for generating high resolution ortho-base image.

DGPS survey of 222 and 3200 TRPs was carried out using the existing PCP and SCP obtained from SoI. Additionally the survey has been done for 100 no's extended SCPs. Generation of Digital Surface Model (DSM) and seamless 2.5m Cartosat ortho product has been completed for entire state.

In addition, 2m ortho image is generated for entire state. This was used for improving the positional accuracy of cadastral data.

The automated DSM generated from Cartosat stereo satellite data was smoothed and edited appropriately for generation of ortho image of 0.5m worldview satellite data. The seamless colour balanced ortho mosaic tile of 0.5m resolution was generated for the entire state.

Digital Elevation Model (DEM) which was generated through automated process was edited manually to accurately generate contours and represent the terrain for use in hydrologic models.

A Virtual flythrough of the state with 2.5m stereo satellite data and for Bangalore 0.5 m stereo satellite was created. Many stereo videos were created for places of importance like Important Dams, Bangalore – important places, archeological or religious places of importance in Karnataka, industrial area location, Western Ghats terrain visualization etc.

## **2.2 Portal**

K-GIS Portal developed by the KRSAC was launched by the Hon'ble Minister for IT, BT and Tourism in the Bengaluru ITE.BIZ 2016, on 30th November, 2016 and made accessible to all the GoK depts. It provided tools / functionality like metadata explore, general map viewer, attribute and spatial query and general thematic view. The portal was continuously updated by inclusion of the GIS layers generated time to time and additional applications and functionalities based on the feedback obtained from the user departments.

In addition to generic applications for visualization of geospatial data, a number of departmental applications / queries are available in the portal for the depts. of Education, Health, Agriculture, Animal Husbandry, Forest, KUIDFC, Election Commission, Revenue, Disaster Management etc. Mobile applications developed

for a number of departments (Horticulture, Agriculture, RDPR, Emergency Services, Food and Civil Supplies, Water Resources, Fisheries, Sericulture, Election Commission, SSLR, Health dept., etc) are hosted in the portal for download and use. A common mobile application for search and query of various assets / facilities, Govt offices, its jurisdiction boundaries along with admin, constituency and planning boundaries is available for citizen use with flexible and easy to use, navigation.

K-GIS remains fully integrated with the complete workflow of KIADB, Soil Health Mission, SEIAA, Crop Survey for e-Governance / SSLR department. K-GIS has so far developed 36 mobile applications and 72 Web applications for departmental decision support and are in use by the departments.

### **2.3 Decision Support Applications**

The DSS requirement documents were prepared and finalized by depts. of Primary and Secondary Education, Health and Family Welfare, KSPCB, BWSSB, Water Resource and KIADB. DSS Applications were developed for Department of Health and Education and KSPCB, BWSSB, Agriculture, IDD, KIADB, KUIDFC, Fisheries, AHVS and WRD. Demonstration and usage training for the DSS applications were given to the concerned departments.

Some of the key applications developed are given below

- Karnataka State Election Information System was developed which had mobile and web views of the application with various statistics, constituency details and GIS visualization.
- KSAPS dashboard for analyzing HIV Patients in the state is included for Health Department.
- Karnataka at a Glance application for Planning and Statistics department for data entry, reports and monitoring data for various departments.
- Application for generation of certificate of availability of assets in K-GIS – as per the GO issued by GoK.
- Crop survey dashboard has been developed to view and report crop data collected. This application includes a module for analysis and validation of data collected.

- KSPCB application with NOC module to access/approve/permit establishment of a new Industry for a given location.
- Dashboards for Infrastructure Development Department for viewing assets and project monitoring
- Dashboards for Telecom Department for viewing assets.
- Application for Environment and Ecology Department with a module for State Environment Impact Assessment Authority to view Departmental assets along with other Modules for Search and Querying.

## Mobile Applications

The list of mobile applications developed for GoK Dept. is given in table-1.

**Table – 1 List of Mobile Applications**

Department	Application
Agriculture	Crop Survey
Agriculture	Soil health
AHVS	AHVS- assets geotagging
AHVS	Fodder plot identification
DULT	DULT
Education	Geotagging Anganawadi buildings
Education	Geotagging ITI college buildings
Education	Library - geotagging app
Election Commission	Chunavana
FCS	Geotagging rationshops building
FCS	K-FCS mobile app
Fisheries	G-FISH
Forest	KAPY- Mobile app
Health	Child Malnutrition Data Collector
Health	KSAPS assets geotagging
Health	Nearby emergency services
Health	Polio Data Collector App
Home	Home - Crime geotagging
Infrastructure	IDD Data collector
IT	Connect Karnataka mobile app
KSPCB	KSPCB geotagging assets
RDPR	RDPR assets geotagging
SEIAA	SEIAA - Data collector app
Sericulture	Sericulture assets geotagging
SSLR	Dishaank
Stamps & Registration	Maulya

Department	Application
State Election Commission	Data collector app for polling Booth- KPSIS
Transport	KSRTC- geotagging
Urban	BWSSB (RR number collection) - mobile app
Urban	Property Connect(NIC)
Water Resource	Borewell Water depth Monitoring- Antharjala
Water Resource	Water resource-Asset geotagging (Neeravari Aasthi)
Water Resource	Water resource-Reservoir Water level capturing
KUIDFC/KMDS	Jalasiri
DWCD	Women and child- Geotagging Assets
KSNDMC	Disaster- geotagging app

## Web Applications

Web applications are classified in to 2 categories based on the purpose they serve in K-GIS. The **Web applications** are capable of supporting departments in their decision-making with respect to GIS. The **Dashboards** provide summary of various assets captured or mapped. The list of Web applications and Dashboards is given in table – 2.

**Table – 2 List of Web applications and Dashboards**

Department	Application
Agriculture	Agriculture DSS
Agriculture	Crop Dashboard
Agriculture	Soil Moisture
Agriculture	Soil Nutrient
Agriculture	Crop Suitability
Agriculture	Land Suitability
Agriculture	NDVI Visualization
Agriculture	Horti-Drought Monitoring
Agriculture	Tank-Report Generation
Agriculture	Agriculture Dashboard
Agriculture	Crop Area Estimation
Agriculture	Tank Information
Agriculture	Waterspread Area Analysis
Agriculture	Rainfall Distribution
AHVS	AHVS-Hospital Information Query Analysis
AHVS	Animal Husbandry-Fodder Plot
AHVS	Animal Husbandry-Assets & Beneficiaries
BWSSB	BWSSB Attribute data editing
Education	Education DSS

<b>Department</b>	<b>Application</b>
Education	ITI college dashboard
Education	Higher Education Dashboard
E-Governance	Crop insurance
Election Commission	Election Polling Station collector monitoring Dashboard
FCS	K-FCS Dashboard
Fisheries	Fisheries
GWD	Aquifer-Report Generation
GWD	Groundwater Fluctuation
Health	Polio and Routine Immunization Monitoring Dashboard
Health	Polio and Routine Immunization Monitoring Dashboard- Citizen Module
Health	KSAPS Dashboard
Health	Road safety
Health	Health GIS Portal
Health	Malnutrition Child Tracking dashboard
Health	NVBDCP Data entry application for Malaria
Health	Biomedical Waste Management Data Entry
Home	Police Portal
Horticulture	Horticulture Dashboard
IDD	IDD Portal
ITBT&ST	Connected Karnataka monitoring Dashboard
KFD	Krishi Aranya Prostahana Yojana (KAPY)
KIADB	KIADB
KSPCB	Environment Clearance
KSPCB	NOC for red Category Industry
KSPCB	Air quality Monitoring data entry form
KSPCB	Mobile application for data collection (KSPCB)
KSPCB	Dashboard for monitoring KSPCB assets
KSPCB	Water Quality Data entry form
KRSRAC	3D visualization
KRSRAC	Satellite Images Searching
KUIDFC	KUIDFC
RDPR	RDPR asset dashboard
Sericulture	Sericulture Dashboard
Sericulture	Sericulture Editing dashboard data
SSLR	Cadastral Analysis
WRD	WRD Basin Information
WRD	Reservoir Water Level Monitoring
WRD	Water Resources
WRD	Water Resources-Nigam & CADA Assets

## **2.4 Infrastructure**

Eight high-end servers and 100 TB storage device were procured to establish development and staging environment. ESRI ArcGIS server licenses were pooled from 3 departments of GoK and upgraded to the latest version along with existing 2 licenses of KRSRAC.

Oracle Database server software was procured through open tendering process. Organized Open source software like PostgreSQL and SQL was used along with COTS software for database management. Image processing software was upgraded to support spatial framework establishment.

Dedicated network from data center to K-GIS development center and K-SWAN network were established. The virtualization of servers and restructuring of complete development infrastructure was carried out for effective data management and application development, testing and staging environment.

## **2.5 Capacity Building**

Training was given to K-GIS staff on Database, GIS server, image processing, python scripting, image interpretation, DEM editing related subjects and other by engaging experts from the industry. About 150 staff week training is conducted.

The dept. officers of GoK were trained in batches on use of portal and applications and on Remote Sensing and GIS technology. In total, training was offered for 450 staff weeks.

Also participated in the workshop / conference like FOSS 4G, IGF, ITBiz, BTS and others organized by various agencies.

The details of training program / workshop / conference conducted or attended are given in tables 3 to 5.

**Table – 3: Training to GoK Departments**

<b>Sl No</b>	<b>Training</b>	<b>Month/Year</b>	<b>Days</b>	<b>Department</b>
01	Training on RDPR asset data collector mobile application	Aug-2016	02	RDPR Department, GoK
02	RS & GIS for Integrated Water Resource Management	Jan-2017	05	Water Resource Department & Neeravari Nigams, GoK
03	Training on Sericulture asset data collector mobile application	Feb-2017	02	Department of Sericulture, GoK
04	K-GIS Portal Demonstration	March-2017	01	K-GIS Nodal Officers of GoK
05	Training on Soil Sample collection mobile application	April-2017	02	Department of Agriculture, GoK
06	K-GIS Portal demonstration	May-2017	01	K-GIS Nodal Officers of GoK
07	Training on Soil Sample collection mobile application(New version)	May-2017	01	Agricultural officers of GoK
08	Training on GIS Based Property Mapping	June-2017	02	Urban Property Tax, GoK
09	Training on Sericulture asset data collector mobile application (Remaining districts)	July-2017	01	Department of Sericulture, GoK
10	K-GIS Portal Demonstration	July-2017	01	Secretariat Level Nodal Officers Workshop
11	Applications of RS & GIS for Horticulture Sciences	Aug-2017	03	University of Horticulture Science, Bagalkote
12	Fundamentals of RS, GIS & GPS	Aug-2017	02	Krishi Vignana Kendra, Belagavi
13	KSPCB Mobile app Training	Aug-2017	01	Officers of KSPCB, GoK
14	Water Resource Mobile app	Aug-2017	01	Officers of Water Resource Dept. GoK
15	RS & GIS for Horticulture Sciences	Aug-2017	03	Faculties of Horticulture University, Bagalkote
16	Space awareness Program	Oct-2017	01	Students of different schools
17	Soil Health Mobile application	Oct-2017	01	Officer of Agriculture department, GoK



<b>Sl No</b>	<b>Training</b>	<b>Month/Year</b>	<b>Days</b>	<b>Department</b>
18	Water Resource Mobile app	Nov-2017	01	Officers of Water Resource Dept. GoK
19	SIS-DP	Nov-2017	01	RDPR department, GoK
20	K-GIS Portal demonstration	Nov-2017	01	K-GIS Nodal Officers of GoK
21	Neeravari Aasti Mobile application Training	Dec-2017		Officers of Water Resource Dept. GoK
22	KSPCB Mobile app Training	Dec-2017	01	Officers of KSPCB, GoK
23	SIS-DP	Dec-2017	01	RDPR department, GoK
24	Spatial Technology	Apr-2018	02	Officers of KIADB
25	GWD Mobile application	Apr-2018	01	Officers of Ground water department
26	WRD Mobile application	May-2018	01	Officers of WRD
27	Spatial Technology	Jun-2018	01	Officers of KIADB Higher officers
28	GWD Mobile application	Jun-2018	01	Officers of Ground water department
29	Spatial Technology	Jul-2018	01	Probationary State Forest Service (S.F.S) officers from Forest training institute Coimbatore
30	Spatial Technology	Jul-2018	01	International Delegates from NRDI ,GoI, Hyderabad
31	Usage of K-GIS and GIS	Jul-2018	01	KIADB department higher officers
32	Usage of K-GIS and GIS	Aug-2018	01	Education Department Officers
33	Urban Property Mapping mobile application	Aug-2018	01	KUIDFC department officers
34	Usage of K-GIS and GIS	Sep-2018	03	AHVS department officers
35	Usage of K-GIS and GIS	Sep-2018	03	Agriculture department officers
36	Usage of K-GIS and GIS	Oct-2018	01	Higher Education department officers

<b>Sl No</b>	<b>Training</b>	<b>Month/Year</b>	<b>Days</b>	<b>Department</b>
37	Usage of K-GIS and GIS	Oct-2018	03	Home department officers
38	Usage of K-GIS and GIS	Nov-2018	01	Urban Development Department
39	Usage of K-GIS and GIS	Nov-2018	01	EMPRI
40	Usage of K-GIS and GIS	Dec-2018	05	Planning and Statistics department
41	Usage of K-GIS and GIS	Jan-2019	01	Training on geo-tagging of departmental assets to WRD officers at WALMI Dharwad completed
42	Usage of K-GIS and GIS	Feb-2019	01	Forest Department
43	Usage of K-GIS and GIS	Feb-2019	01	Department of Libraries
44	Property Information System	March-2019	01	KUIDFC

**Table – 4: Training to K-GIS Staff**

<b>Sl No</b>	<b>Training</b>	<b>Month/Year</b>	<b>Days</b>	<b>Approach / Description</b>
01	RDPR Mobile application	Aug-2016	01	Class room / Utilization of mobile application for data collection
02	ArcGIS portal to development team	Sep-2016	01	Class room / Training on ArcGIS collector app
03	Oracle DB	Oct-Dec/2016	90	Class room / Training on Oracle SQL and PLSQL
04	Sericulture Mobile application	Jan-2017	01	Class room / Utilization of mobile application for data collection
05	Agriculture Mobile application	Apr-2017	01	Class room / Utilization of mobile application for data collection
06	ERDAS Training	Apr-2017	01	Class room / Stereo data processing
07	Visual Image Interpretation	May-2017	02	Class room / Training on Image interpretation, enhancement and analysis
08	GIS	June-2017	03	Class room/ Training on GIS data, manipulation, analysis
09	Coding Standards	June-2017	01	Class room/ Training on software coding standards
10	IMAD Training	July-2017	56	Online/ Integrated Management of Application development
11	Drone Training/Demonstration	July-2017	1	Field/Class room
12	Trimble Training	July-3017	1	Field/Class room
13	Configuration Management & Release management	Aug-2017	01	Class room/ Training on configuration and release management
14	Team Management	Aug-2017	02	Class room/Soft skills

<b>Sl No</b>	<b>Training</b>	<b>Month/Year</b>	<b>Days</b>	<b>Approach / Description</b>
15	Digital Photogrammetry	Sep-2017	01	Class room/Training on ERDAS software
16	Data Publishing	Sep-2017	02	Class room/Training on ESRI server
17	GPS data processing	Sep-2017	04	Class room/Training on GPS data processing software
18	Stereo data processing	Sep-2017	05	Class room/Training on LPS
19	Python for GIS	Dec-2017	05	Class room/Training on Python software
20	Personality Development	Dec-2017	01	Class room/soft skill
21	IIS administration	Dec-2017	02	Class room/Training on IIS server
22	Microsoft Visual Studio TFS	Jan-2018	06	Class room/Training on TFS
23	Election web application portal	Apr-2018	06	Class room/Training
24	DEM updation training	May-2018	20	Class room/Training
25	Spatial Technology	Jun-2018	22	Student project/ internship is in progress
26	IT Hardware (SAN Storage)	Jul-2018	05	Class room/Training
27	Spatial Technology	Jul-2018	22	Student project/ internship is in progress
28	Base Map Preparation	Jul-2018	01	Class room/Training
29	Oracle Training	Aug-2018	01	Class room/Training
30	Arc GIS server training	Sep-2018	05	Class room/Training
31	LULC map preparation	Oct-2018	01	Class room/Training
32	ESRI Training	Nov-2018	05	Class room/Training
33	KGIS portal training (New app)	Jan-2019	01	Class room/Training
34	KGIS portal training (New app)	Mar-2019	01	Class room/Training

**Table 5: Conference/Workshop conducted/participated by KRSAC/K-GIS**

<b>Sl No</b>	<b>Conference / Workshop</b>	<b>Month-Year</b>	<b>Days</b>	<b>Description</b>
01	ITE .BIZ 2016 Conference / workshop	Nov-2016	3	Officers of GoK and Industry representative
02	Geospatial World Forum Conference	Feb-2017	3	Participated and presented papers
03	Free and Open Source (FOSS 4G) conference / workshop	Feb-2017	2	Participated and presented papers
04	GIS Workshop for Planning and Governance, Ahmedabad	June-2017	1	Organized by NITI Aayoga
05	Workshop on GIS for Governance for Senior officers of Delhi Govt.	June-2017	2	Delivered Presentation / Lecture. Organized by NISG
06	RS & GIS application in Forestry	Sep-2017	3	Organized by Krushi Vishwavidyalaya, Dharwad
07	Bengaluru Tech Summit 2017 Conference	Nov-2017	3	Officers of GoK and Industry representative. Got the best award
08	Geospatial World Forum Conference	Jan-2018	3	Participated and presented papers
09	Bengaluru Tech Summit 2018	Nov-2018	3	Participation through organizing 1. Deep tech session for officers of GoK, academia and industry representatives. 2. Session on geospatial innovations 3. Session on Drone Technologies and Applications 4. Exhibition 5. Geospatial Hackathon; and Two manuals were released by <b>Sri. K. J. George, Hon'ble Minister for IT, BT and Science and Technology</b>
10	Geospatial World Forum Conference	March-April-2019		Director, KRSAC Participated and delivered a talk in GWF, held in Amsterdam, Netherlands

### **2.5.1 Promotional and Outreach activities**

1. As per the directions of Empowered Committee, K-GIS team continuously published release of new mobile and web application, job posting, training calendar and photographs in all the social media viz., Twitter, LinkedIn, Facebook, Instagram
2. The monthly updated status of K-GIS layers and application were circulated through automated email to all the departments.
3. The K-GIS monthly E-News Letter is circulated on success stories of implementation of K-GIS to the GoK departments.
4. The videos related to different technical activities of KRSAC/K-GIS on spatial technology were continuously posted in YouTube channel.

### **2.5.2 Awards and Recognition**

1. ITE .BIZ 2016 Conference / workshop – Award for best Stall
2. Bengaluru Tech Summit 2017 Conference – Award for best session and Stall
3. Geospatial World Forum Conference – Award for best Stall
4. ESRI India Award for “Achievement in GIS” at ESRI India User Conference 2018, Hyderabad.

## **2.6 Standards and Policies**

The Karnataka GIS embodies a new information regime, which requires geospatial based communications within and across the concerned entities viz. Govt. departments, local bodies, statutory bodies as well as private enterprises and citizens in the state. This requires that the geospatial data sets should be prepared in a standardized form, the communication protocols should be standardized and necessary policy guidelines be issued as Govt. orders. This should be accompanied by appropriate capacity building exercises in the departments and public outreach initiatives.

In accordance with requirements of standardized geospatial based communications in the state, the following actions have been taken:

1. The content of geospatial data prepared for the K-GIS mission is standardized as per International standards. A possibility for adding

additional layers with guidelines for their documentation is part of standardization. The content standards are documented in **Karnataka GIS Standards Volume-I Part-1** (document number KRSRAC/K-GIS/Standards/01/July-2016, Dated: July 2016).

2. City GIS is a noncontiguous part of K-GIS and requires definitions with higher granularity. A group of experts from GoK urban departments and KRSRAC prepared the geospatial data content and standards for City GIS under K-GIS, which is documented in **Karnataka GIS City GIS – Contents & Standards** (document number KRSRAC/K-GIS//City GIS/Contents & Standards, Dated: May 2017). These standards are followed in organizing data for the urban applications.
3. The metadata is standardized and separately documented to facilitate data discovery and to facilitate faster search. The geospatial data contents, Metadata standards are documented in **Karnataka GIS Standards Volume-I Part-1** (document number KRSRAC/K-GIS/Standards/01/July-2016, Dated: July 2016).
4. The database design has undergone detailed discussions and is documented in **Karnataka GIS Standards Volume-I Part-2 Database Design** (document number KRSRAC/K-GIS/STANDARDS/01/March-2017, Dated: March 2017).
5. The data exchange protocols between GoK departments and K-GIS for access of available GIS and MIS data have been defined and documented in **Karnataka GIS Standards Volume-II Data Exchange Protocol** (document number KRSRAC/K-GIS/STANDARDS/03/ April -2017, Dated: April 2017).
6. The details of Spatial framework, developed for state of Karnataka under K-GIS are documented in **Karnataka GIS Spatial Framework** (document number KRSRAC/K-GIS/DATA CONTENT/01/JULY-2016, Dated: July 2017).

This framework provides geometric foundation for overlaying all geospatial data of the state for use in decision making. The details of the Spatial Framework for Karnataka has been thoroughly reviewed by an expert group with participation from SOI, ISRO, SSLR and urban departments of GoK apart from KRSRAC. The expert group endorses the specifications of the spatial framework.

7. The K-GIS portal architecture is documented in **Karnataka GIS Portal Architecture** (document number KRSRAC/K-GIS/Portal Architecture/ 01/ August-2017, Dated August 2017).
8. Software development and testing processes for K-GIS have been documented in **Karnataka GIS Testing & Evaluation Report** (document number KRSRAC/K-GIS/Testing & Evaluation Report/01/June-2017, Dated: June 28, 2017).

The portal architecture forms the foundation while standardized software development process is followed at K-GIS development lab at KRSRAC.

9. In order to represent all geospatial data of the state in K-GIS, the departments have been mandated to share their GIS data with K-GIS platform vide **GO No ITD 187 ADM 2016, Date 09.08.2016** mandating all departments to follow the standards in all geospatial activities.
10. The departments have been mandated to geo-tag their assets and issue of certificate of completion from K-GIS vide **GO no. ITD 236 ADM 2017, Dated 04.11.2017**.
11. A circular on mandatory geo-tagging of assets of GoK departments under K-GIS programme was issued on 25.11.2017 mandating the depts. to share the data of assets under creation with photograph to K-GIS along with progress status as per K-GIS standards, and issue of an automated certificate to the effect that the data of assets have been integrated into the K-GIS database and portal.
12. A circular on mandatory use of K-GIS Application was issued on 16.03.2018 mandating the depts. to share the MIS / attributes data and validating the data regularly.
13. The draft geospatial data sharing policy of K-GIS and the draft Geospatial policy of Karnataka are circulated to GoK Departments for their feedback. The same was followed by meeting with ACS/Principal Secretary/Secretary of GoK Dept. by KRSRAC.



### 3. K-GIS Budget and Schedule

The estimated cost and expenditure made in the three years from April-2016 to March, 2019 are given in table 6.

**Table – 6 Estimated cost and expenditure made in K-GIS project**

<b>Sl. No</b>	<b>Description</b>	<b>Total Estimated Cost in INR (Crores)</b>	<b>Expenditure 2016-2017 in INR (Crores)</b>	<b>Expenditure 2017-2018 in INR (Crores)</b>	<b>Expenditure 2018-2019 in INR (Crores)</b>
1	Control Network / Control Point Library	2.58	0.00	0.08	0.00
2	Spatial framework - Image Framework	13.46	4.86	1.26	0.00
3	Version 1 of K-GIS Database	0.09	0.00	0.00	0.00
4	Version 2 of K-GIS Database	36.00	0.00	0.00	7.98
5	K-GIS Portal	0.00	0.00	0.00	0.00
6	DSS Application	9.00	0.00	0.00	0.00
7	Capacity Building	5.75	0.33	0.10	0.03
8	Infrastructure	9.50	0.00	6.22	0.65
9	General - Salary, Operational, travel & other promotional Expenditure	19.80	3.94	6.77	6.34
	<b>Total</b>	<b>96.18</b>	<b>9.13</b>	<b>14.43</b>	<b>15.00</b>
<b>Grand Total Expenditure</b>					<b>38.56</b>

#### **4. Deputation of GIS Expert to Govt. Departments**

As per the decision taken in the 3<sup>rd</sup> meeting of K-GIS Empowered Committee twenty senior GIS experts were identified from the pool of K-GIS resources; they were trained and deputed to 20 major departments. They were instructed to perform the following activities:

- Meeting the Principal Secretary / officers to apprise the purpose of deputation.
- Continuous interaction with department nodal officer for data/asset collection
- Update department asset details
- Gather application requirements/modifications
- Gather/ involve in business requirement and new application requirement
- Training the department officers on use of K-GIS

## **5. KRSAC Participation in Bengaluru Tech Summit-2018**

Department of IT, BT S&T, in its 21st edition, the tech outreach event of the Department, 'Bengaluru Tech Summit 2018' was held from 29<sup>th</sup> November to 1<sup>st</sup> December 2018 at the Palace Grounds, Bengaluru with this year's theme being 'Innovation & Impact'. The Karnataka State Remote Sensing Applications Centre (KRSAC) was one of the organizers of the Summit.

### **KRSAC had conducted following events in the summit:**

1. An exclusive hackathon on geospatial technologies and applications in association with HackerEarth.
2. Workshop on K-GIS as a Deep Tech Session exclusively for officers of GoK Departments
3. GIS Session: Geospatial Innovations in the Times of Disruptive Changes
4. Technical Session : Drone Technologies and Applications
5. Drone Manual release during the function of BTS-2018
6. K-GIS Manual release during the valedictory function of BTS-2018
7. KRSAC Stall to showcase the products and applications developed for various GoK Departments.

## **6. Summary**

This document deals with background, definition and work completed in the execution of Karnataka GIS mission- a flagship program of the Govt. of Karnataka.

Karnataka Jnana Aayoga (KJA) carried out the overall conceptualization of the project. The K-GIS empowered committee provided overall guidelines for its implementation. The definition and specifications of technical elements were prepared by KRSAC under the guidance of K-GIS Technical Committee.

The execution of K-GIS was completed in a period of 3 years from April, 2016 to March, 2019. The significant achievements made in the project are given below.

- 1) Preparation of Geospatial Data sets,
- 2) Development of highly precise Spatial Framework for Karnataka,
- 3) Development of K-GIS Portal,
- 4) Definition and development of Decision Support Applications for departments of GoK,
- 5) Establishment of Hardware and software Infrastructure to create a conducive development environment,
- 6) Capacity Building at KRSAC and GoK departments to develop and use the K-GIS and
- 7) Development and documentation of Standards and Best Practices are under execution as per the plan to ensure the success of the mission.

Further, the K-GIS shall continue to work on the emerging needs of GoK departments and others related to the state of Karnataka.

## Annexure-1: Interaction meetings held with GoK Departments

Dept. Name	ACS / Principal Secretary / Secretary	Commissioner/ Director/CEO/ Nodal Officers / Technical Officers	Total
Water Resources		6	6
Agriculture	3	18	21
Animal Husbandry		13	13
APMC		1	1
Archaeology and Museum		4	4
AYUSH		3	3
BESCOM		4	4
BMRCL		1	1
BWSSB		6	6
Central Lab, KSPCB		3	3
Chief Election Commission		10	10
Commerce and Industries	1	12	13
Co-operation		1	1
DMA	1	7	8
Education Department		5	5
Election Commission	2	5	7
Energy	2	4	6
ESIC		1	1
Excise		2	2
Fire		4	4
Fisheries	1	18	19
Food, Civil Supplies & Consumer Welfare	4	5	9
Forest		14	14
Forest Working Plan	6	4	10
Groundwater Directorate (GWD)		4	4
Health & Family Welfare	8	30	38
Health and Family Welfare		6	6
Health and Family welfare		2	2
Health and Family welfare (Immunization)		3	3
Health and Family welfare (Nutrition)		4	4
Higher Education	1	7	8
Home		11	11
Horticulture	5	16	21
IDD	4	6	10
Information Dept.	1		1
Infrastructure Development	4	6	10
KaMPA		1	1
Karnataka Bio diversity Board		2	2
Karnataka Ecotourism Board		1	1

<b>Dept. Name</b>	<b>ACS / Principal Secretary / Secretary</b>	<b>Commissioner/ Director/CEO/ Nodal Officers / Technical Officers</b>	<b>Total</b>
Karnataka Forest Department (KAPY)		1	1
Karnataka Industrial Area Development Board	1	8	9
Karnataka Lake Conservation Development Authority (KLCDA)		2	2
Karnataka Rural Road Development Agency (KRRDA)		4	4
Karnataka State Natural Disaster Monitoring Center (KSNDMC)		5	5
Karnataka State Pollution Control Board (KSPCB)	1	10	11
KFD	4	11	15
KFDC		3	3
KFSIC		1	1
KIADB		3	3
KMDS	1	4	5
KPCL		1	1
KPTCL		3	3
KRRDA		1	1
KSPCB		3	3
KSPCB, Laboratory		2	2
KUIDFC	1	16	17
Labour		2	2
M- Gov.	2	1	3
Mangalore City Corporation		1	1
Medical Education	4		4
Medicinal Plant Authority		1	1
Mines and Geology		6	6
MRC		3	3
NVBDP		1	1
Pre University		1	1
Primary & Secondary Education	4	12	16
Prison		1	1
Railway Police		1	1
Revenue - DM	1		1
Rural Development & Panchayath Raj - (RDPR)		7	7
Rural Development & Panchayath Raj - Department	1	1	2
Rural Development & Panchayath Raj (PRED)		2	2
SEIAA	1		1
Sericulture	1	5	6
SSLR		6	6
State Board of Aquaf		2	2

<b>Dept. Name</b>	<b>ACS / Principal Secretary / Secretary</b>	<b>Commissioner/ Director/CEO/ Nodal Officers / Technical Officers</b>	<b>Total</b>
State Election Commission	2	4	6
Tanks		1	1
Telecom		1	1
Tourism		3	3
Transport	1		1
Transport - BMTC		9	9
Transport (KSRTC)		9	9
Urban	5	19	24
Urban - BDA		4	4
Water Resource	5	22	27
Water Resource - ACIWRM		1	1
Water Resource - CNNL		1	1
Water Resource, (Hydrology Section, WRDO)		1	1
Water Resources	1		1
Water Resources, (Hydrology Section, WRDO)		4	4
Water Resources, (Hydrology Section, WRDO)		2	2
Woman and Child Development	1	11	12
Women & Child Welfare Development	1	2	3
WRD		3	3
Youth Empowerment and Sports		6	6
<b>Grand Total</b>	<b>79</b>	<b>483</b>	<b>565</b>

## Annexure-2: List of Activities

Sl. No	Description	Units	Total Target in Units	Target Till 2017-18	Achieved till 2017-18	Target for 2018-19	Achieved in 2018-19	Remarks
1	<b>Control Network / Control Point Library</b>							
	Primary Control Point	no's	21	21	21			Completed
	Secondary Control Points	no's	131	131	131			
	Secondary Control Points (without monuments)	no's	200	100	100			
	Terrestrial Reference Points	no's	3,000	3,200	3,200			
2	<b>Spatial framework - Image Framework</b>							
	DEM generation - 10m grid refined	Scenes	-	-	-	8127	8127	Completed
	Ortho mosaic Generation 2.5m resolution	Scenes	900	900	900	-		Completed
	Ortho mosaic Generation 0.5m resolution	Scenes	9,000	7,000	2000	2,000	2,000	Completed
3	<b>Version 1 (existing data ) - K-GIS Database</b>							
	Organize existing database as per K-GIS Standards	no of layers	83	83	83			Completed
	Creation of departmental assets	no of layers	22	22	22			Completed
	Metadata Generation	no of layers	105	105	105			Completed
	No of Assets	no of assets	200,000	200,000	200,000			Completed
4	<b>Version 2 (New) of K-GIS Database</b>							
	No of Assets for various department (in- house)	no of assets	450,000	450,000	420,000		18,00,000	



Sl. No	Description	Units	Total Target in Units	Target Till 2017-18	Achieved till 2017-18	Target for 2018-19	Achieved in 2018-19	Remarks
	No of Layers of assets from various Dept (in-house)	no of layers	135	115	200	20	376	
	Transform existing GIS Database on to the new framework (in-house)	no of layers	300			300	300	Completed
	New Base Map Layers using HR Satellite data for rural areas	no of sqkm	180000			180,000	180,000	Completed
	New Base Map Layers using HR Satellite data for urban areas including Landuse	no of Sqkm	12000			12,000	12,000	Completed
	New Cadastral Layer - reorganization on HR satellite data	no of villages	30,000		200	29,800	29,800	Completed
	Landuse map on new framework	no of layers	1			1	1	80% completed
5	<b>K-GIS Portal</b>							
	Portal Functionalities - development (in-house)	No of staff months	300		Complete			
	Availability of No of Layers of assets from various depts. in portal	no of layers	240		300		379	
6	<b>DSS Application</b>	no of applications	15	6	95% Achieved	9	9	The application development is an continuous & evolving process. Dept's refine / define requirements after development &
	Dept. 1 - Health & Family Welfare				100%			
	Dept. 2 - P&S Education				100%			
	Dept. 3 - BWSSB				95%			
	Dept. 4 - KSPCB				100%			
	Dept. 5 - Water Resource				100%			

Sl. No	Description	Units	Total Target in Units	Target Till 2017-18	Achieved till 2017-18	Target for 2018-19	Achieved in 2018-19	Remarks	
	Dept. 6 – KIADB / KUIDFC				100% / 95%			demonstration	
	Dept. 7 – AHVS				100%				
	Dept. 8 - Agriculture & Allied				100%				
	Dept. 9 - Forest				100%				
	Dept. 10 – Urban Property Tax				100%				
	Dept. 11 – Higher Education				100%				
	Dept. 12 – Women & Child				100%				
	Dept. 13 – Backward Class				100%				
	Dept. 14 – Energy – Generation / Transmission								
	Dept. 15 – Transport				85%				
	Citizen Applications	no of application	5	3	3	3	3		Completed
	Data collection / data entry / dashboard / visualization applications	no of application	50	40	26	10	33		
	Additional Applications developed			Departments : Planning & Statistics, Election Commission					
7	<b>Capacity Building</b>								
	Departmental Staff	staff weeks	10,000	6000	4272	4,000	1550		
	Internal team - on various new technologies / tools	staff weeks	1,000	400	414	400	350		

<b>Sl. No</b>	<b>Description</b>	<b>Units</b>	<b>Total Target in Units</b>	<b>Target Till 2017-18</b>	<b>Achieved till 2017-18</b>	<b>Target for 2018-19</b>	<b>Achieved in 2018-19</b>	<b>Remarks</b>
8	<b>Infrastructure</b>							
	Development Environment - Hardware	no of servers	8	8	8	4	4	
	Development Environment - Software	No of SW	10	10	7			Reporting & Analytics Software to be procured
	Hosting Environment @ SDC - HW & SW		16	6	8	10	10	

### Annexure-3: List of GIS layers organized under K-GIS

Department Name	Layer Name	Count
Administrative Boundaries (Census)	Village	30519
Administrative Boundaries (Census)	Gram Panchayat	6376
Administrative Boundaries (Census)	Hobli	925
Administrative Boundaries (Census)	Taluk	204
Administrative Boundaries (Census)	District	49
Administrative Boundaries (Census)	State	12
Administrative Boundaries (Hybrid)	Village	32651
Administrative Boundaries (Hybrid)	Hobli	1068
Administrative Boundaries (Hybrid)	Taluk	243
Administrative Boundaries (Hybrid)	District	54
Administrative Boundaries (Hybrid)	State	14
Bangalore Water Supply and Sewerage Board	Consumers	532025
Bangalore Water Supply and Sewerage Board	Manholes	259033
Bangalore Water Supply and Sewerage Board	Sewer lines	104640
Bangalore Water Supply and Sewerage Board	water lines	80526
Bangalore Water Supply and Sewerage Board	Valves	37547
Bangalore Water Supply and Sewerage Board	Borewell	6895
Bangalore Water Supply and Sewerage Board	Ground Level Reservoir	114
Bangalore Water Supply and Sewerage Board	Service Station	109
Bangalore Water Supply and Sewerage Board	Kiosks	74
Bangalore Water Supply and Sewerage Board	Subdivision	32
Bangalore Water Supply and Sewerage Board	Pumpstation	30
Bangalore Water Supply and Sewerage Board	STP	19
Bangalore Water Supply and Sewerage Board	Division	13
BMTC	Bus Stand	9649
Chief Election Commission (DPAR)	Polling Station Location (Auxillary 406)	57102
Commerce & Industries (C & I)	Industrial Area	161
Commerce & Industries (C & I)	Kiadb Land Bank	15
Department Of Fire Service & Emergency Services-Status	Fire station	217
Department Of Fire Service & Emergency Services-Status	District Fire Office	55
Department Of Fire Service & Emergency Services-Status	Regional Fire Office	17
Department Of Fire Service & Emergency Services-Status	Fire Squard	7
Department Of Fire Service & Emergency	Chief Fire Office	6

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Services-Status		
Department Of Fire Service & Emergency Services-Status	Commandant Office	1
Department Of Fire Service & Emergency Services-Status	Fire Head Office	1
Department Of Fire Service & Emergency Services-Status	Fire Services Control Room	1
Department Of Fire Service & Emergency Services-Status	Fire services Training Centre	1
Department Of Sainik Welfare & Resettlement	ZillaSainikOffices	13
Department Of Sainik Welfare & Resettlement	Rest House	10
Department Of Sainik Welfare & Resettlement	Free Military Hostel	5
Department Of Sainik Welfare & Resettlement	Directorate Offices	3
Department Of Sainik Welfare & Resettlement	War Victims Quarters	3
Department Of Sainik Welfare & Resettlement	Military Canteen Stores	2
Department Of Sainik Welfare & Resettlement	Civic Amenity Sites	1
Department Of Sainik Welfare & Resettlement	Soldiers Community Hall	1
Department Of Sainik Welfare & Resettlement	War Victims Sites	1
Department of Archaeology	Monuments	600
Department of Archaeology	Heritage Site	152
Department of Archaeology	Art Gallery	63
Department of Archaeology	Museum	16
Department of Archaeology	Deputy Director Office	4
Department of Archaeology	Commissioner Office	1
Department of Archaeology	Director Office	1
Department of Finance-Bank	Bank	10541
Department of Health and Family Welfare	Sub Centers	9333
Department of Health and Family Welfare	Hot Spots Hospitals (Hospital-Level)	6024
Department of Health and Family Welfare	Scanning Centers	3934
Department of Health and Family Welfare	Private Hospitals(KPME)	3700
Department of Health and Family Welfare	Primary Health Centre	2472
Department of Health and Family Welfare	Under Construction Hospitals	1037
Department of Health and Family Welfare	Arogya Kavacha 108 Ambulance	701
Department of Health and Family Welfare	Detroit Medical Center	665
Department of Health and Family Welfare	State Ambulance	639
Department of Health and Family Welfare	Health Wellness Center	571
Department of Health and Family Welfare	Health Wellness Centre	473
Department of Health and Family Welfare	Community Health Centre	204
Department of Health and Family Welfare	Tuberculosis Unit (TB)	200
Department of Health and Family Welfare	Nagu Magu Ambulance	196
Department of Health and Family Welfare	Tertiary Health Centre	179

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Department of Health and Family Welfare	Taluk Hospital	146
Department of Health and Family Welfare	Special Newborn Care Unit	45
Department of Health and Family Welfare	District Hospital	42
Department of Health and Family Welfare	Cartridge-Based Nucleic Acid Amplification Test (CBNAAT) Site	32
Department of Health and Family Welfare	Nutrition Rehabilitation Centers (NRC)	32
Department of Health and Family Welfare	District Tuberculosis Center	31
Department of Health and Family Welfare	State Institute of Health & Family Welfare	25
Department of Health and Family Welfare	Surveillance Unit	21
Department of Health and Family Welfare	District Training Centre	20
Department of Health and Family Welfare	Auxiliary Nurse Midwife Training Centre	19
Department of Health and Family Welfare	District Public Health Laboratories	14
Department of Health and Family Welfare	Trauma centers	10
Department of Health and Family Welfare	Referral Labs	8
Department of Health and Family Welfare	Drug Resistant TB Center(DRTBC)	7
Department of Health and Family Welfare	GNMTC	5
Department of Health and Family Welfare	Health & Family Welfare Training Centre	4
Department of Health and Family Welfare	LHVTC	4
Department of Health and Family Welfare	Implantable Loop Recorder Centre (IRL)	3
Department of Health and Family Welfare	Apex Labs	1
Department of Medical Education	Nursing School	404
Department of Medical Education	Paramedical colleges	337
Department of Medical Education	Nursing College	228
Department of Medical Education	Medical College	56
Department of Medical Education	Dental College	45
Department of Medical Education	Specialty Hospital	7
Department of Revenue	Nadakacheri	721
Department of Revenue	Taluk Office	175
Department of Revenue	Revenue Office	30
Department of Tourism	Tourism Hotel	909
Department of Tourism	Tourism Site	362
Department of Tourism	Mayura Hotel	21
Department of Tourism	Tourism Office	20
Department of Tourism	JLRT Camp	14
Department of Tourism	JLRT Resort	8
Department of Tourism	Tourism information centre	7
Department of Tourism	Tourism Head Office	1
Dept. of Police	Police Stations	856
Dept. of Police	Police Staff Quarters	708
Dept. of Police	Police Parade Ground	246
Dept. of Police	Police Circle Office	206
Dept. of Police	Police Out Post Office	182
Dept. of Police	Police Land	181
Dept. of Police	Sub Divisional Police Officer(SDPO)	112

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Dept. of Police	Traffic Police Stations	94
Dept. of Police	Police Guest House	93
Dept. of Police	Police Check Post	41
Dept. of Police	Division Intelligence Office	36
Dept. of Police	District Level Rural Office(SP_DOP)	26
Dept. of Police	District Armed Reserve(DAR) Office	25
Dept. of Police	Railway Police Station	17
Dept. of Police	Police Forest Cell	14
Dept. of Police	Coastal Security Police station (CSP)	10
Dept. of Police	District Level Urban Offices(DCP)	9
Dept. of Police	Police Training Centre	8
Dept. of Police	City Armed Reserve Office	7
Dept. of Police	Cyber Crime Police Stations	6
Dept. of Police	Forensic Science Laboratories (FSL)Office	6
Dept. of Police	Railway Circle Office	6
Dept. of Police	Commissioner Office	5
Dept. of Police	Karnataka State Reserve Police(KSRP)Office	5
Dept. of Police	State Level ADGP Office	5
Dept. of Police	Traffic Sub Divisions office	5
Dept. of Police	City Crime Branch (CCB) Office	4
Dept. of Police	Deputy Inspector General of Police (DIGP)	3
Dept. of Police	District Level Traffic Office DCP / ACP	3
Dept. of Police	Railway Sub Divisions Office	3
Dept. of Police	Inspector General Of Police(IGP) Office	2
Dept. of Police	State level DGP Office	2
Dept. of Police	Chief Office	1
Dept. of Police	Karnataka State Industrial Security Force(KSISF) Office	1
Dept. of Police	Police Wireless Head Office	1
Dept. of Police	Police Wireless Technical Support	1
Dept. of Police	State Intelligence Office	1
Dept. Of Excise	Inspector Office	220
Dept. Of Excise	Deputy Superintendent Office	60
Dept. Of Excise	Deputy Commissioner Office	35
Dept. Of Excise	Department Land	31
Dept. Of Excise	Microbreweries	28
Dept. Of Excise	IML Manufacturing Distillery	26
Dept. Of Excise	Primary Distillery	26
Dept. Of Excise	Fruit Wineries	9
Dept. Of Excise	Joint Commissioner Office	8
Dept. Of Excise	Breweries	7

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Dept. Of Excise	Composite Distillery	7
Dept. Of Excise	Fortified And Fruit Wineries	7
Dept. Of Excise	Sub-Inspector Office	5
Dept. Of Excise	Fortified Wineries	4
Dept. Of Excise	Superintendent Office	2
Dept. Of Excise	Commissioner Office	1
Dept. Of Excise- Jurisdiction Boundary	Excise Range Boundary	219
Dept. Of Excise- Jurisdiction Boundary	Excise Subdivision Boundary	81
Dept. Of Excise- Jurisdiction Boundary	Excise Division Boundary	55
Dept. Of Excise- Jurisdiction Boundary	Excise Zone Boundary	20
Dept.Of Police- Jurisdiction Boundary	PS Boundary	825
Dept.Of Police- Jurisdiction Boundary	PS Circle Boundary	371
Dept.Of Police- Jurisdiction Boundary	PS Subdivision Boundary	188
Dept.Of Police- Jurisdiction Boundary	PS Division Boundary	71
Dept.Of Police- Jurisdiction Boundary	PS Election Crime Boundary	35
Dept.Of Police- Jurisdiction Boundary	PS District Boundary	31
Dept.Of Police- Jurisdiction Boundary	PS City Commissionerate Boundary	26
Dept.Of Police- Jurisdiction Boundary	Railway PS Boundary	24
Directorate of Ayush	Govt Ayurveda Dispensary	563
Directorate of Ayush	Govt Ayurveda Hospital	117
Directorate of Ayush	Ayurveda College	61
Directorate of Ayush	Govt Unani Dispensary	50
Directorate of Ayush	Govt Homoeopathy Dispensary	43
Directorate of Ayush	Govt Unani Hospital	18
Directorate of Ayush	Govt Homoeopathy Hospital	16
Directorate of Ayush	Homeopathy College	11
Directorate of Ayush	Govt Nature Cure And Yoga Hospital	6
Directorate of Ayush	Ayush Boards	4
Directorate of Ayush	Nature Cure And Yoga College	4
Directorate of Ayush	Unani College	4
Directorate of Ayush	Govt Nature Cure And Dispensary	3
Directorate of Ayush	Govt Nature Cure And Hospital	2
Directorate of Ayush	Govt Nature Cure And Yoga Dispensary	1
Directorate of Backward Classes	BC Hostel	2209
Directorate of Backward Classes	BC Residential School	505
Directorate of Backward Classes	BC Land	329
Directorate of Cooperative Audit, in Karnataka	Cooperative Audit Office	5
Directorate of Employment & Training	Employment Exchanges	40
Directorate of Employment & Training	Industrial Training Institutes (ITI)	31
Directorate of Employment and Training	Employment Exchange	34
Directorate of Employment and Training	University Employment Information and Guidance Bureau	6
Directorate of Employment and Training	Employment Exchange	1



Department Name	Layer Name	Count
	Officer	
Directorate of Mass Education	Mass Education Office	30
Election constituency Boundaries	Polling Booth Boundary	56696
Election constituency Boundaries	Taluk Panchayath Boundary	4149
Election constituency Boundaries	Zilla Panchayath Boundary	1361
Election constituency Boundaries	Assembly Constituency	249
Election constituency Boundaries	Assembly Constituency	224
Election constituency Boundaries	Parliament Constituency	43
Environment Management and Policy Research Institute	Training Centers	109
Food, Civil Supplies & Consumer Affairs Department	Ration Shops	16927
Graticules - Lat/Long	Grid3minGraticuls	6867
Graticules - Lat/Long	Grid7min30sceGraticuls	1172
Graticules - Lat/Long	Grid15minGraticuls	318
Health Immunization	Polio Immunization Centers	31671
Higher Education	Other College	1947
Higher Education	State Government College	411
Higher Education	Polytechnic Institute	321
Higher Education	Engineering College	231
Higher Education	University	54
Higher Education	Junior Technical School	6
Infrastructure Development Department	Railway Stations	414
Infrastructure Development Department	IDD PPP Projects	21
Infrastructure Development Department	Rob / RUB	11
Infrastructure Development Department	Land Acquisition for New Line	7
Infrastructure Development Department	Land Acquisition for Airport	6
Infrastructure Development Department	Railway New Line	3
Infrastructure Development Department	Gauge Conversion	1
IT BT	GP Wise Wi-Fi Location	500
Karnataka Biodiversity Board	Biodiversity Mgmt Committee at GP level	7710
Karnataka Biodiversity Board	Biodiversity hotspots	2
Karnataka Eco Tourism Board	Eco Trails	22
Karnataka Forest Department	Encroachment Cases	53520
Karnataka Forest Department	Forest Density	38239
Karnataka Forest Department	Forest Type	25802
Karnataka Forest Department	Wetland	12190
Karnataka Forest Department	Forest Boundary	5508
Karnataka Forest Department	Lakes of KFD	4497
Karnataka Forest Department	Forest Beat	2902
Karnataka Forest Department	Forest Section	1074
Karnataka Forest Department	Forest Range	336
Karnataka Forest Department	Forest Nursery	226
Karnataka Forest Department	Forest Guest House	121
Karnataka Forest Department	Forest Watch Tower	97
Karnataka Forest Department	Range Forest Office	97
Karnataka Forest Department	Forest Division	96
Karnataka Forest Department	Protected Area	87
Karnataka Forest Department	Forest Check Post	71
Karnataka Forest Department	Ecosensitive Zones	62
Karnataka Forest Department	Forest Circle	26

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Karnataka Forest Department	Deputy Conservator Of Forest Office	21
Karnataka Forest Department	Forest Timber Depot	20
Karnataka Forest Department	Forest Wireless Tower	7
Karnataka Forest Department	Assistant Conservator Of Forest Office	5
Karnataka Forest Department	Forest Watchers Camp	4
Karnataka Forest Department	Conservator Of Forest Office	2
Karnataka Lake Conservation Development Authority	Lakes (In Tank Information System)	475
Karnataka Prisons Department	District Prison	19
Karnataka Prisons Department	Talk Sub Jail	18
Karnataka Prisons Department	Central Prison	10
Karnataka Prisons Department	Head Office	2
Karnataka Prisons Department	Special Sub Jail	2
Karnataka State AIDS Prevention Society	FICTC(Facility Integrated Counseling and Testing Center)	1919
Karnataka State AIDS Prevention Society	SAICTC(Standalone Integrated Counseling and Testing Center)	387
Karnataka State AIDS Prevention Society	Blood Banks	202
Karnataka State AIDS Prevention Society	ART Link Plus Centers (Antiretroviral Therapy Link Plus Centers)	102
Karnataka State AIDS Prevention Society	ART Plus Centers (Antiretroviral Therapy Plus Centers)	84
Karnataka State AIDS Prevention Society	Targeted Intervention Sites	81
Karnataka State AIDS Prevention Society	ART Centers (Antiretroviral Therapy)	64
Karnataka State AIDS Prevention Society	STI / RTI Clinics (Sexually Transmitted Infections/ Reproductive Tract Infections (Suraksha Clinics)	53
Karnataka State AIDS Prevention Society	State Reference Laboratory	10
Karnataka State AIDS Prevention Society	National Reference Laboratory	1
Karnataka State Forest Industries Corporation Limited	Office locations	9
Karnataka State Medicinal Plant Authority	Medicinal Plant area	13
Karnataka State Natural Disaster Monitoring Center	Telemetric Rain Gauge Station	5929
Karnataka State Natural Disaster Monitoring Center	Telemetric Weather Station	740
Karnataka State Pollution Control Board	Water Quality Monitoring Station	264
Karnataka State Pollution Control Board	KSPCB tanks	188
Karnataka State Pollution Control Board	Continuous Emission Monitoring Industry	185
Karnataka State Pollution Control Board	E-waste Recyclers center	88
Karnataka State Pollution Control Board	Plastic Container Recycle center	56
Karnataka State Pollution Control Board	KSPCB Jurisdiction boundary	55

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Karnataka State Pollution Control Board	Air Quality Monitoring Station	41
Karnataka State Pollution Control Board	Regional Office	39
Karnataka State Pollution Control Board	Bio Medical Waste Treatment Facility	28
Karnataka State Pollution Control Board	E-waste Producer center	19
Karnataka State Pollution Control Board	Sewage Treatment Plant	15
Karnataka State Pollution Control Board	Battery Dealer	13
Karnataka State Pollution Control Board	Common Effluent Treatment Plant	13
Karnataka State Pollution Control Board	E-waste Collection center	13
Karnataka State Pollution Control Board	Hazardous Waste Incineration	13
Karnataka State Pollution Control Board	Noise Monitoring Station	10
Karnataka State Pollution Control Board	Carry Bag Recycler Unit	9
Karnataka State Pollution Control Board	Zonal Office	9
Karnataka State Pollution Control Board	Central Environment Laboratory	1
Karnataka State Pollution Control Board	Head Office	1
Karnataka State, Drugs Control Department	Licensed Medical Shops	32962
Karnataka State, Drugs Control Department	Blood Storage Centers	196
Karnataka State, Drugs Control Department	Generic Medical Shop	194
Karnataka State, Drugs Control Department	Drug Testing Laboratory	3
Prosecution Department	Asst. Public Prosecutor Office	183
Prosecution Department	Senior Asst Public Prosecutor And Jr Law Office	82
Prosecution Department	Public Prosecutor Office	70
Prosecution Department	Head And Division Office	10
Public Instructions	Primary & Secondary Schools	72574
Public Instructions	Pre-University College	4756
Rural Development and Panchayath Raj Department	Water Supply	78978
Rural Development and Panchayath Raj Department	Building	40783
Rural Development and Panchayath Raj Department	Road	25696
Rural Development and Panchayath Raj Department	Sanitation	9467
Rural Development and Panchayath Raj Department	Bridge	4276
Rural Development and Panchayath Raj Department	Energy	2547
Rural Development and Panchayath Raj Department	OpenSpace	2405
Rural Development and Panchayath Raj Department	Irrigation	1377
Rural Development and Panchayath Raj Department	Plantation	646

<b>Department Name</b>	<b>Layer Name</b>	<b>Count</b>
Sericulture Department	Commercial building	997
Sericulture Department	Office building	730
Sericulture Department	Residential Building	470
Sericulture Department	Training Center	149
Sericulture Department	Cold storage	13
State Environment Impact Assessment Authority	Mining	682
State Environment Impact Assessment Authority	Construction	614
State Environment Impact Assessment Authority	Industry	150
Watershed Boundaries	Watershed - Microwatershed	34552
Watershed Boundaries	Watershed - Miniwatershed	7677
Watershed Boundaries	Watershed - Subwatershed	3805
Watershed Boundaries	Watershed - Watershed	498
Watershed Boundaries	Watershed - Subcatchment	84
Watershed Boundaries	Watershed - Catchment	32
Watershed Boundaries	Watershed - Basin	21
Watershed Boundaries	Watershed - Region	15
Women & Child Development	Anganawadi	64310
<b>Total</b>	<b>379</b>	<b>1895057</b>