

Karnataka NRDMS program

Initiated : 1992-93

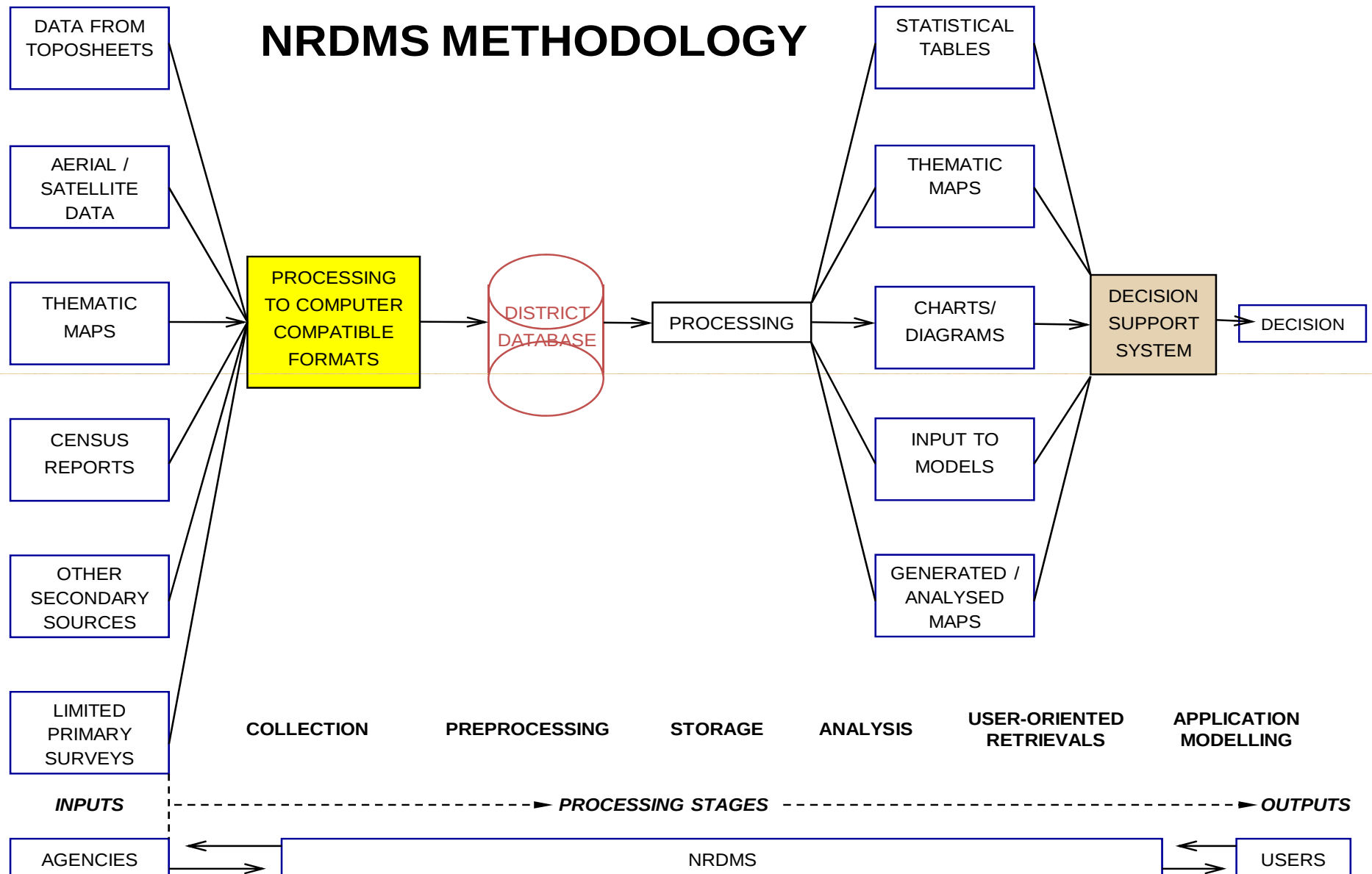
Funding : DST - GOI and GOK.

Principal Investigator: **H. Hemanth Kumar**

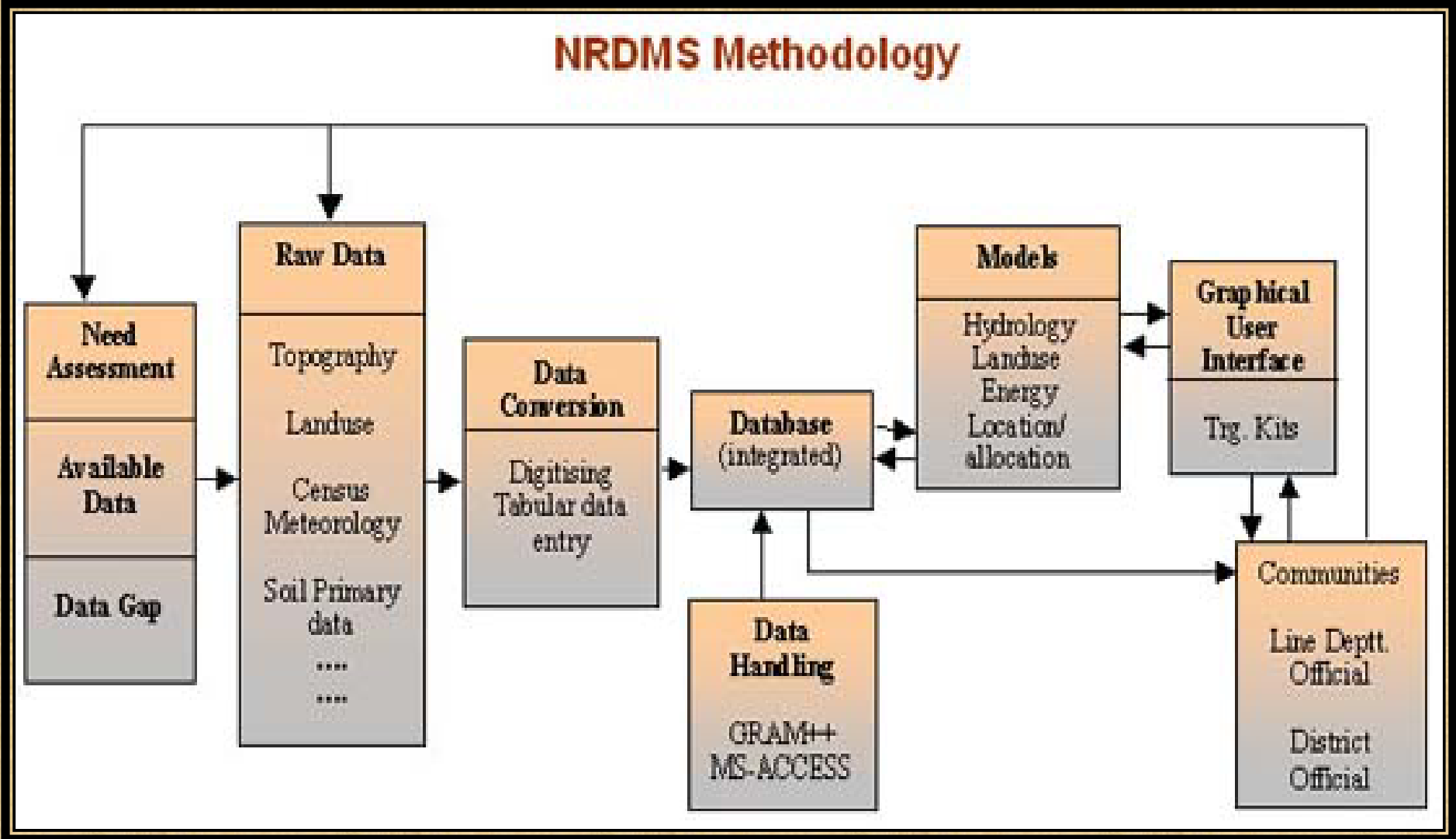
Objectives:

- To support 'Decentralized (Local level) Planning' process (value added information) using geospatial technologies.
- Development of integrated digital database for generating
 1. Resource profiles
 2. Query-based information
 3. Static and dynamic outputs based on Spatial Decision Support System (SDSS).
- To create awareness among end-users about the utility of GIS technologies by conducting regular training programs and workshops.
- Documentation and dissemination.

NRDMS METHODOLOGY



NRDMS (1992 – 1998)



Database:

Creation of seamless database

1. Spatial Database

- All Boundary & Thematic Maps on 1:50000
- Standard Symbols as per SOI/NRSA
- Standard Color Code as per SOI/NRSA

2. Non Spatial Database

- Common Database Structure
- Standard Field Names
- Common Reporting Format.

Taluk Level Data

Administrative/electoral Boundaries

- Gram Panchayath Boundary
- Hobli Boundary
- Taluk Panchayath Boundary
- Zilla Panchayath Boundary
- Village Boundary etc

Headquarters

- Gram Panchayath Headquarters
- Hobli Headquarters
- Taluk Panchayath Headquarters
- Settlements etc

State Level Data

- Agro-Climatic Zones
- Taluk/District Boundary
- District Head Quarters
- Division Boundary
- Division Head Quarters
- Geology
- Meteorological Station
- Parliamentary Constituencies
- Legislative Assembly Constituencies
- Rail network
- Reservoir
- Rain gauge Station
- River
- Drainage
- Basin Boundary
- Catchment Boundary
- Sub catchment Boundary
- Subdivision Boundary
- Sub watershed Boundary
- Tanks
- National Highway
- State Highway
- Major district road
- Other District Roads
- Village roads
- Airport etc.,

Non spatial Database (linked to village maps)

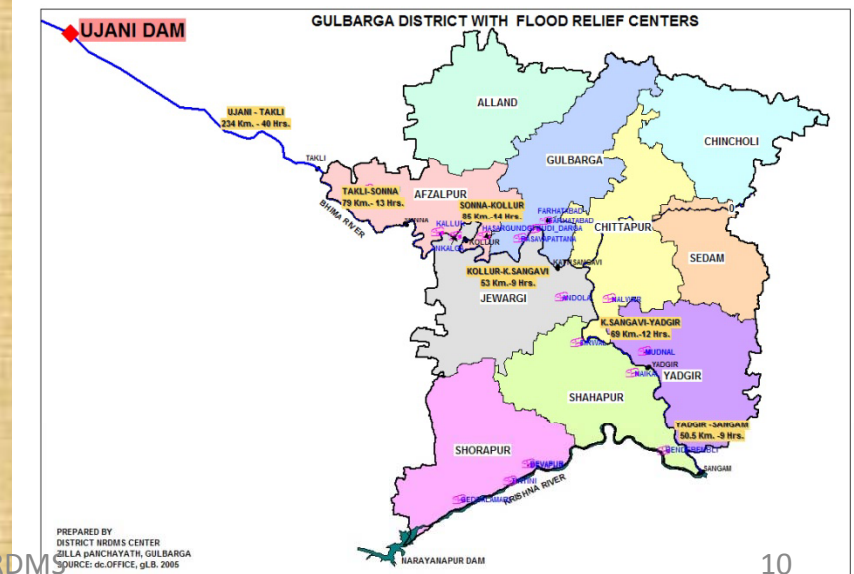
- 2001 Census Data (part I and part II)
- Line department data
- Data linked to thematic layers

Strengths – Karnataka NRDMS

- NRDMS centres in all the districts.
- Exhaustive database.
- Multi-spatial and multi attribute based analysed information to line departments using databases.
- Availability of skilled man power.
- Geo spatial data - Ideal tool for decision making
- Good rapport with State Government/PRI's.

Typical applications

- Election information system
- Rural Health facilities-Location/allocation, jurisdiction
- Education facilities & information on infrastructure in schools
- Rural water supply and water quality
- Resource mapping of Gram Panchayaths
- Information on Rural road Network
- Mapping of HIV affected blocks
- Prioritization of watersheds



Health Facilities

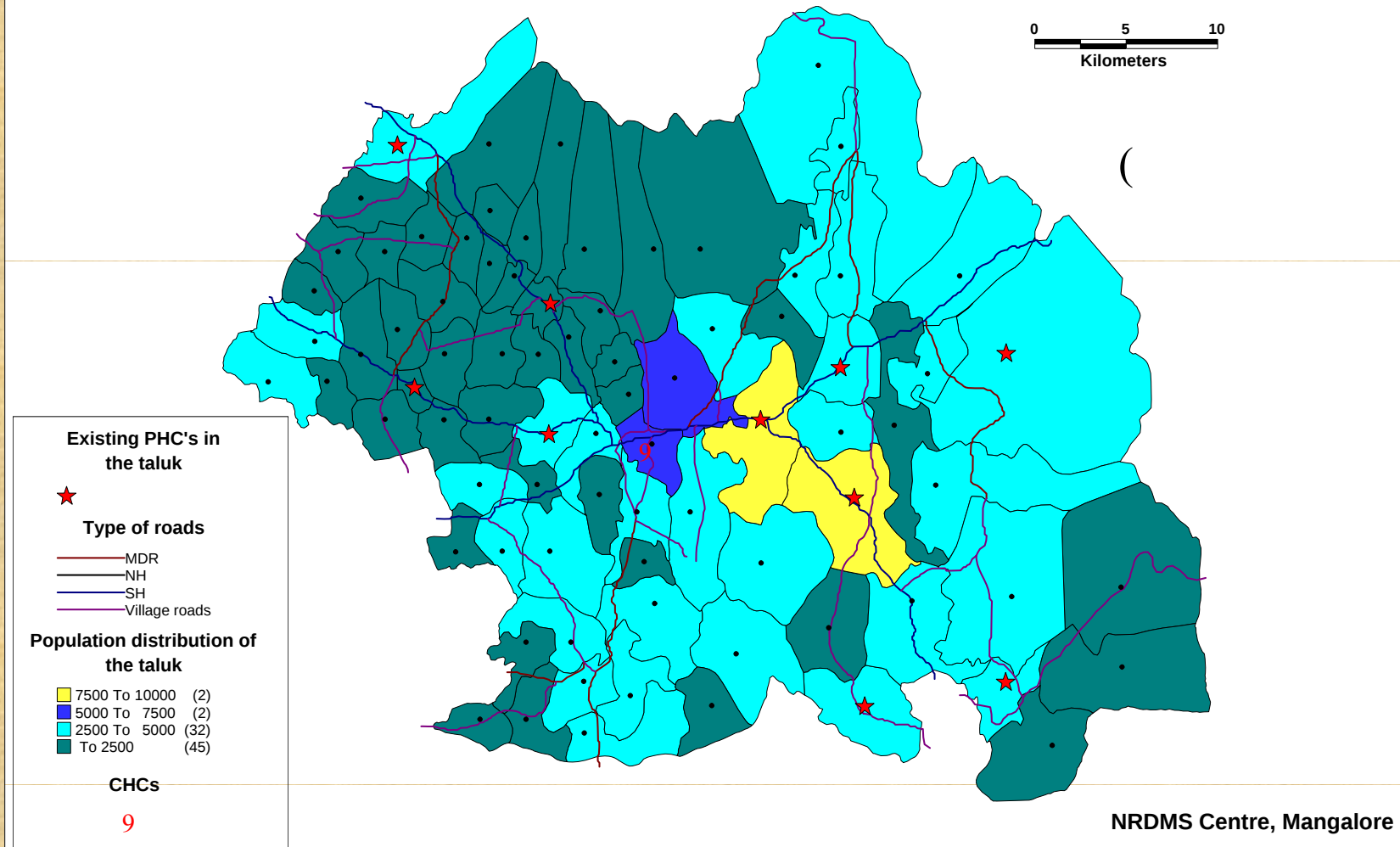
A case study - Dakshina Kannada district

- **Locate new / upgrade existing health facilities.**
- **Medical facilities considered :
PHC / PHU, Subcentres and CHCs.**
- **Government norms: development of DSS.**
- **Additional norms also employed.**

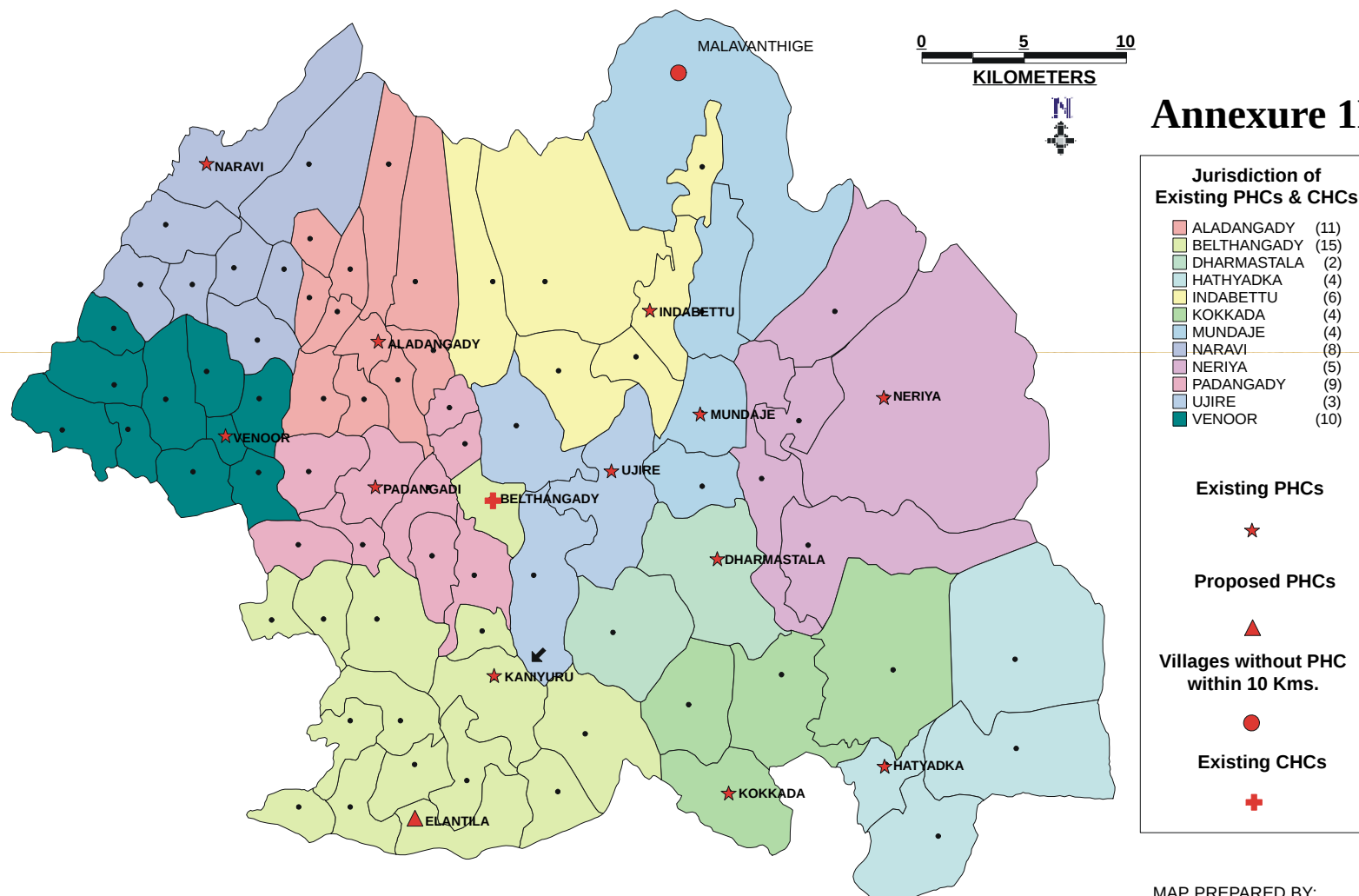
Guidelines for developing DSS

Population in plain area	Population in hilly / tribal area	Type of health centre	Minimum distance between two centers
5000	3000	Sub centre	
30,000	20,000	PHC	8 Km.
200,000	100,000	CHC	

Existing PHCs and CHCs in Belthangady Taluk



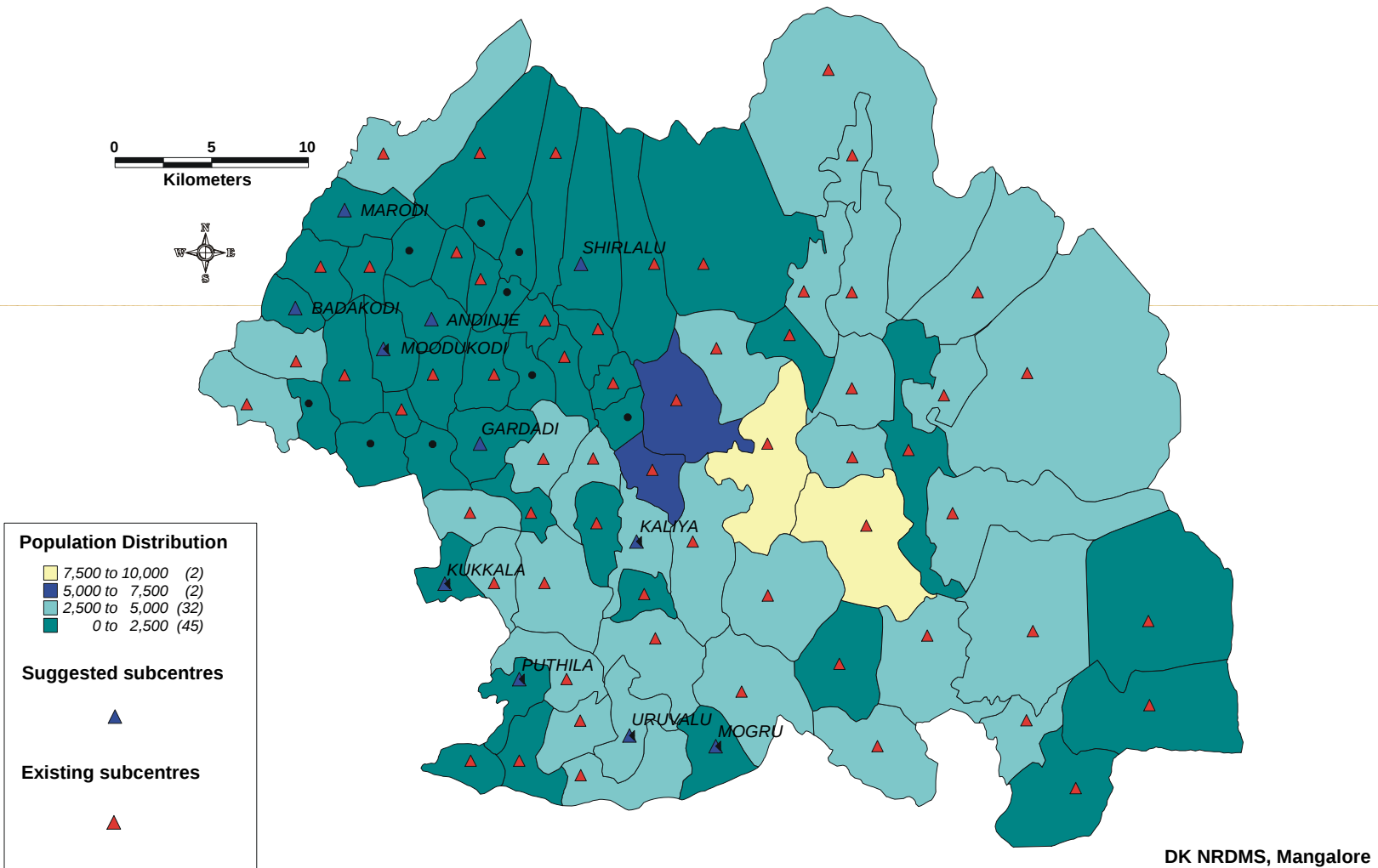
EXISTING AND PROPOSED HEALTH FACILITIES (PHC & CHC) IN BELTHANGADY TALUK WITH JURISDICTION OF EXISTING PHCS AND CHCS



NOTE: ✎ SHOWS PHC KANIYURU WHICH IS SANCTIONED BUT NOT STARTED.
HENCE NO SEPERATE JURISDICTION IS GIVEN FOR THE SAME

MAP PREPARED BY:
DK NRDMS
MANGALORE

Existing and proposed subcentres in Belthangadi taluk



Abstract of health facilities (existing and proposed)

Taluk	Existing sub centres*	Proposed sub centres	Existing PHCs	Proposed PHCs	Existing CHCs	Proposed CHCs
Bantwal	95 (27)	7	16	-	2	1. Vittal
Belthangady	73 (18)	11	12	1. Elantila	1	1. Neriya 2. Hathyadka 3. Kokkada 4. Venoor 5. Naravi 6. Indabettu (any one)
Mangalore	138 (33)	6	22	-	1 + govt. hospital	1. Bajpe 2. Muttur 3. Moodbidri 4. Nellikaru (any two)
Puttur	77 (35)	1	11	1. Aituru	1 govt. hospital	1. Nelyadi 2. Kolthige (any one)
Sullia	62 (14)	-	5	1. Aletti 2. Kalmadka	1	-
Dakshina Kannada	445 (127)	25	66	4	5 + 2	5

DRINKING WATER SUPPLY IN THE RURAL HABITATION (DWIS)

The DWIS is an application of GIS , that provides a scientific handling and maintenance of the available drinking water resources

develop a customized , menu based front end tool to generate thematic maps showing the status of drinking water facilities in each village and the priority areas.

Data Required :

Digitized taluk maps with village boundaries and village locations . The Norms database .Database for the taluks regarding drinking water facilities with the structure shown in the next

Drinking Water Information System - [Norms specified by MoRD]

File Customize Analyze Map Options Window Administrator Help

Norms specified by Ministry of Rural Development

	Population in Malnad area	Population in Plain area	No of HandPumps	No of BoreWells
▶	50 - 100	100 - 200	1	1
	101 - 250	201 - 400	2	2
	251 - 350	401 - 500	3	3
	351 - 800	501 - 1000	0	0
	> 800	> 1000	0	0

◀ [] ▶

Row Operations

Column Operations

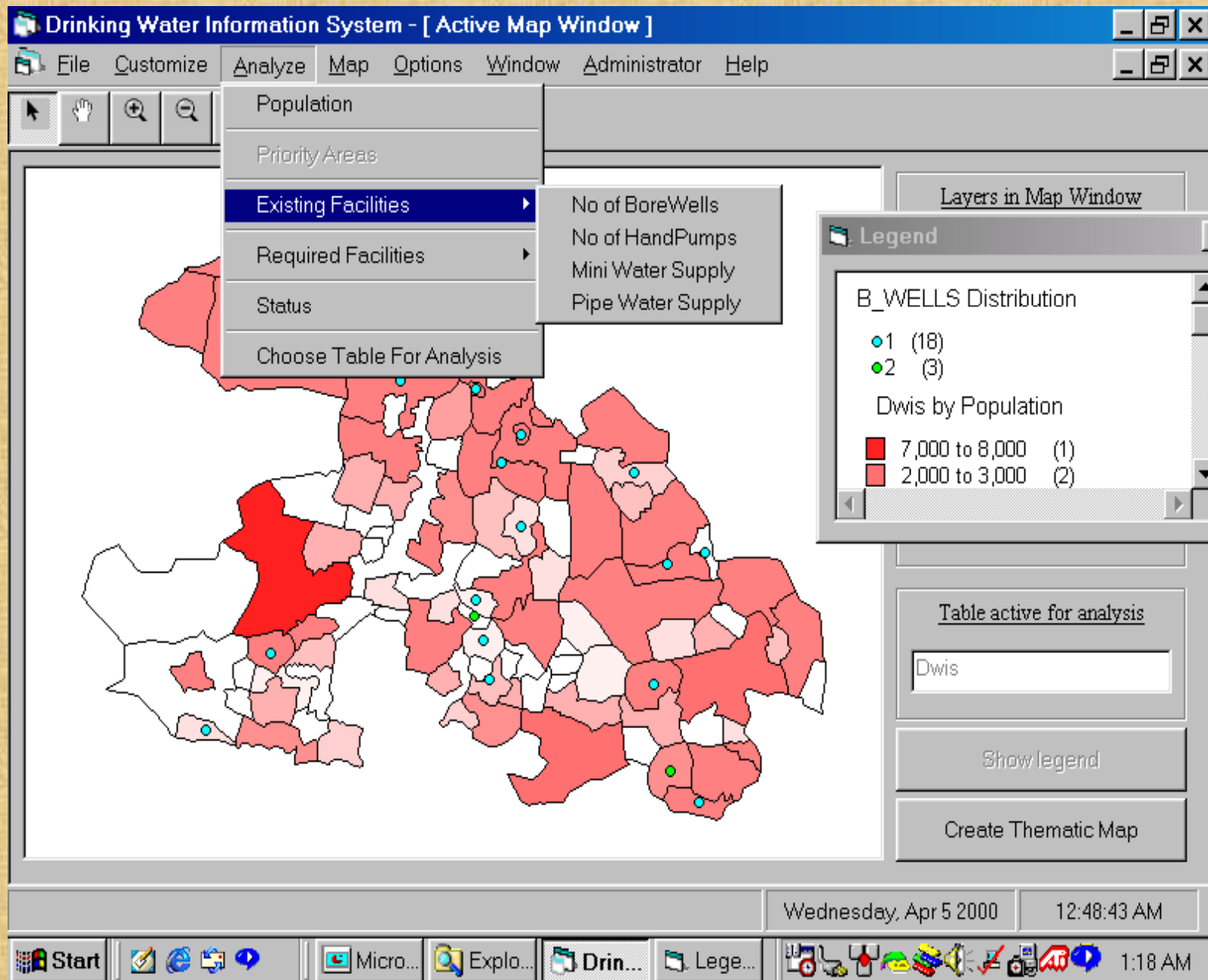
Close

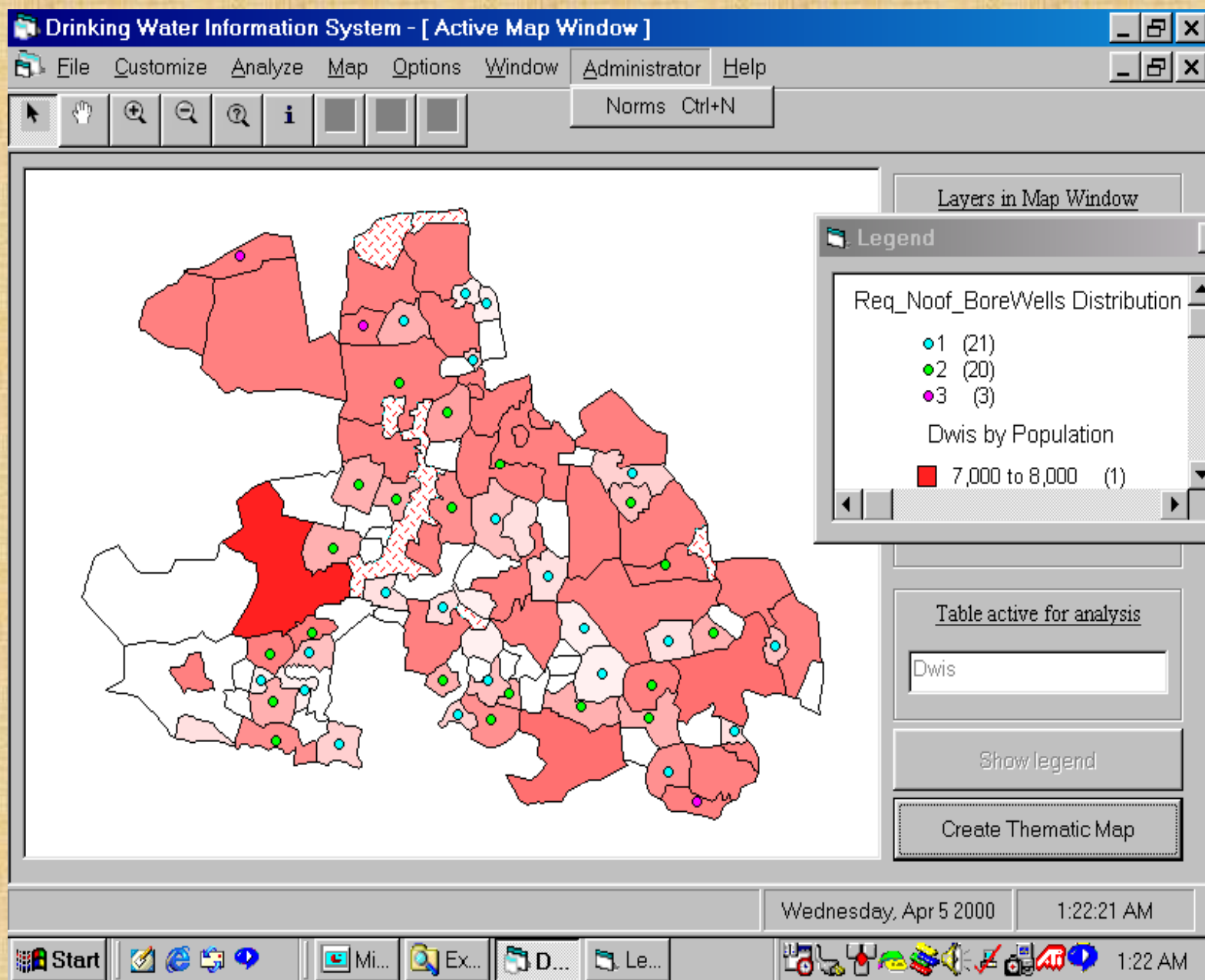
Wednesday, Apr 5 2000 1:05:59 AM

Start

 Microsoft ...
 Exploring ...
 Drinkin...

 1:05 AM





Landuse management

Accurate and timely information about land use and land cover (LULC) and its changes in urban/rural areas are crucial for urban/rural land management decision-making, ecosystem monitoring and urban planning. Also, monitoring and representation of urban sprawl and its effects on the LULC patterns is an essential part of resource planning and management.

A combination of Remote Sensing (RS) and Geographical Information System (GIS) techniques, is an effective tool that enhances land-use monitoring, planning, and management of resources and infrastructure.

Watershed

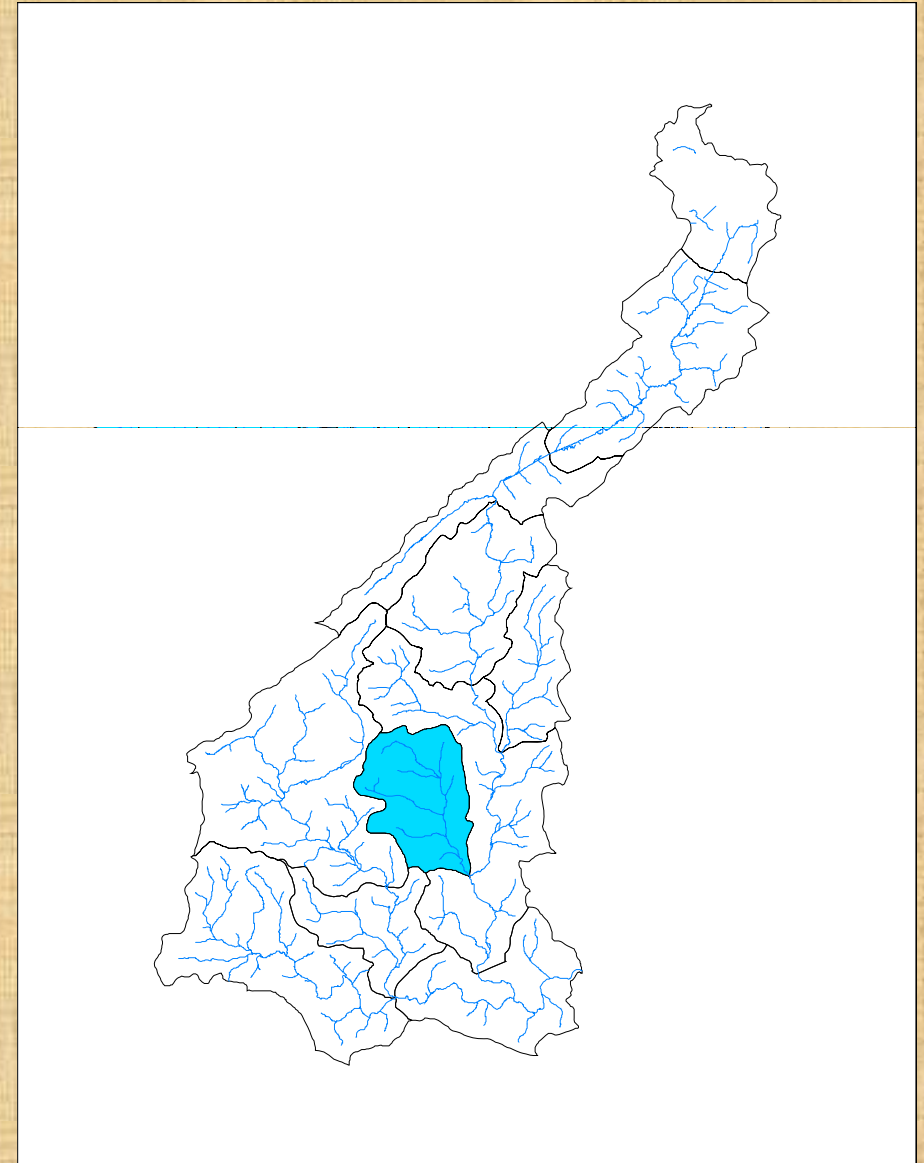
Basin

Sub-basin

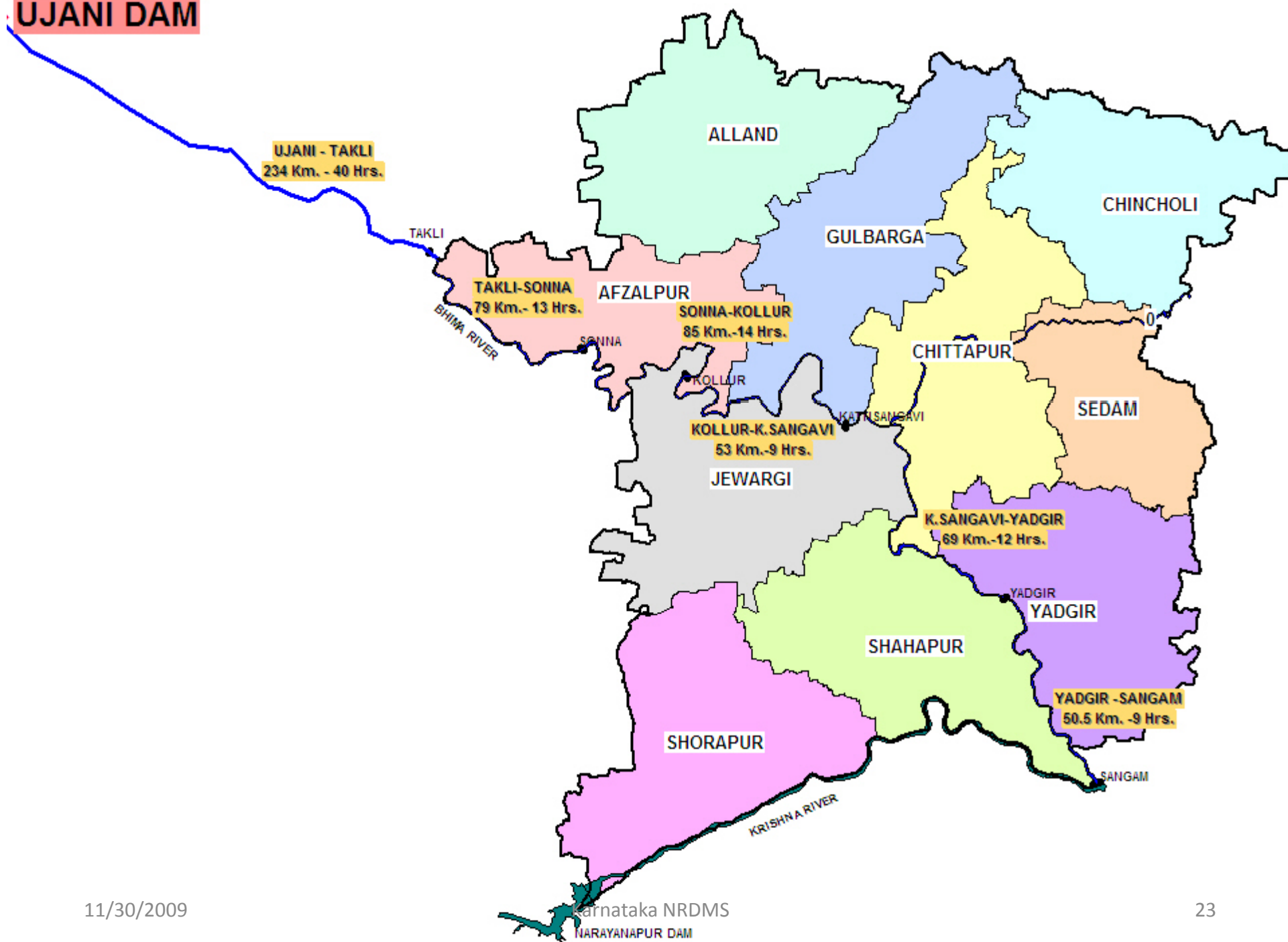
Watershed

Sub-watershed

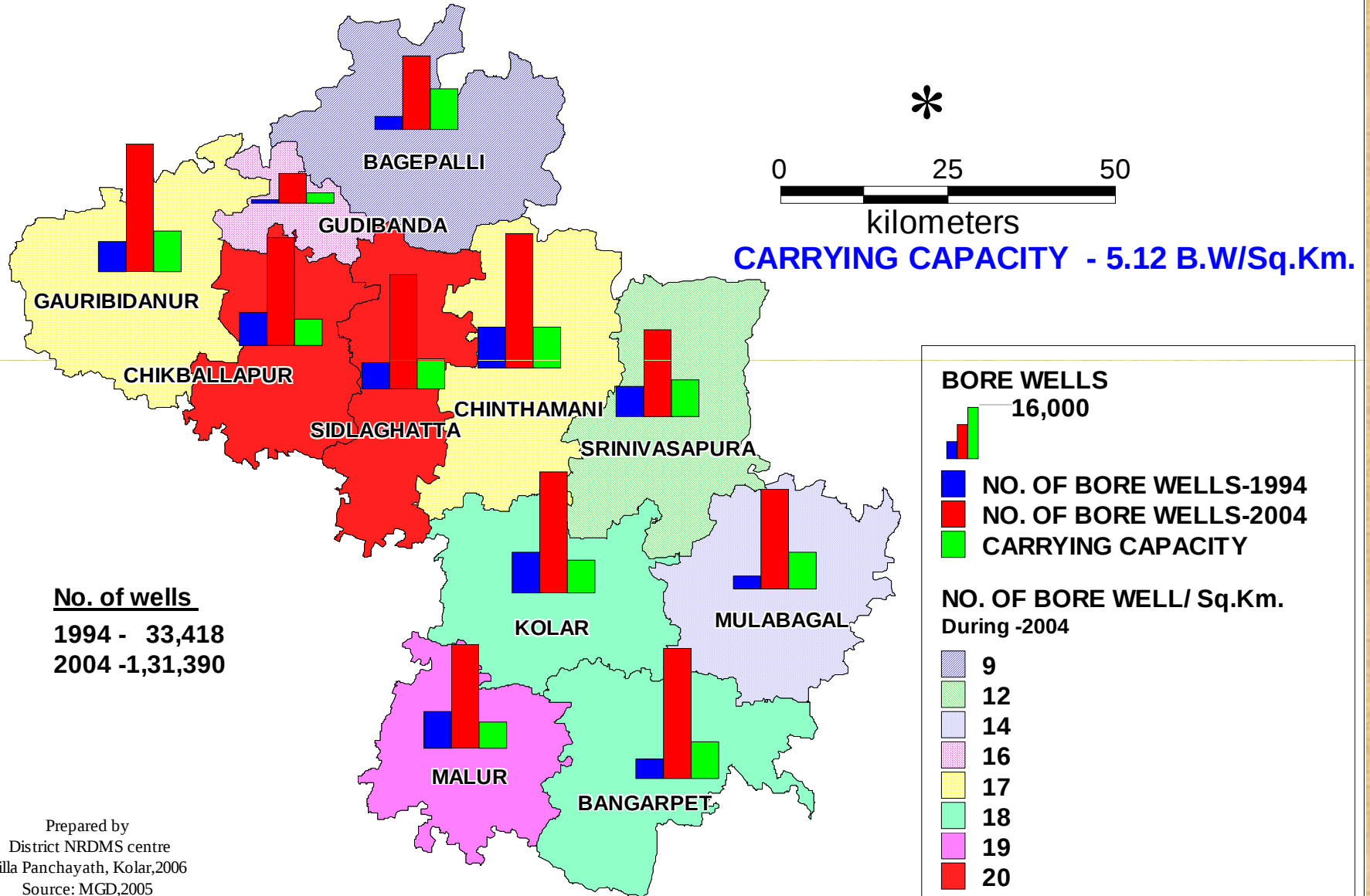
Watershed Management
Areas, are on the basin or
sub-basin scale.

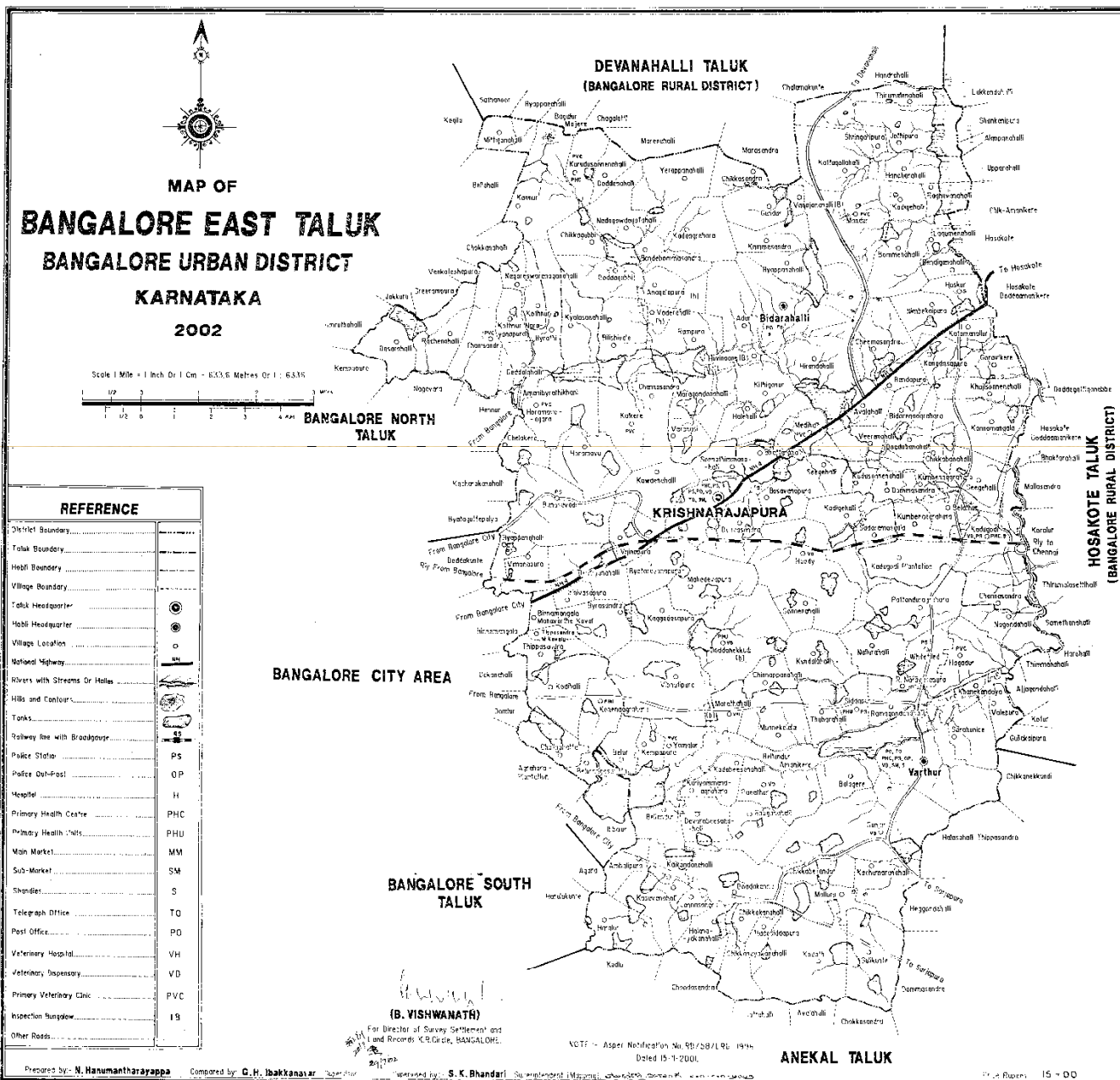


UJANI DAM



BORE WELLSDENSITY & CARRYING CAPACITY OF KOLAR DISTRICT

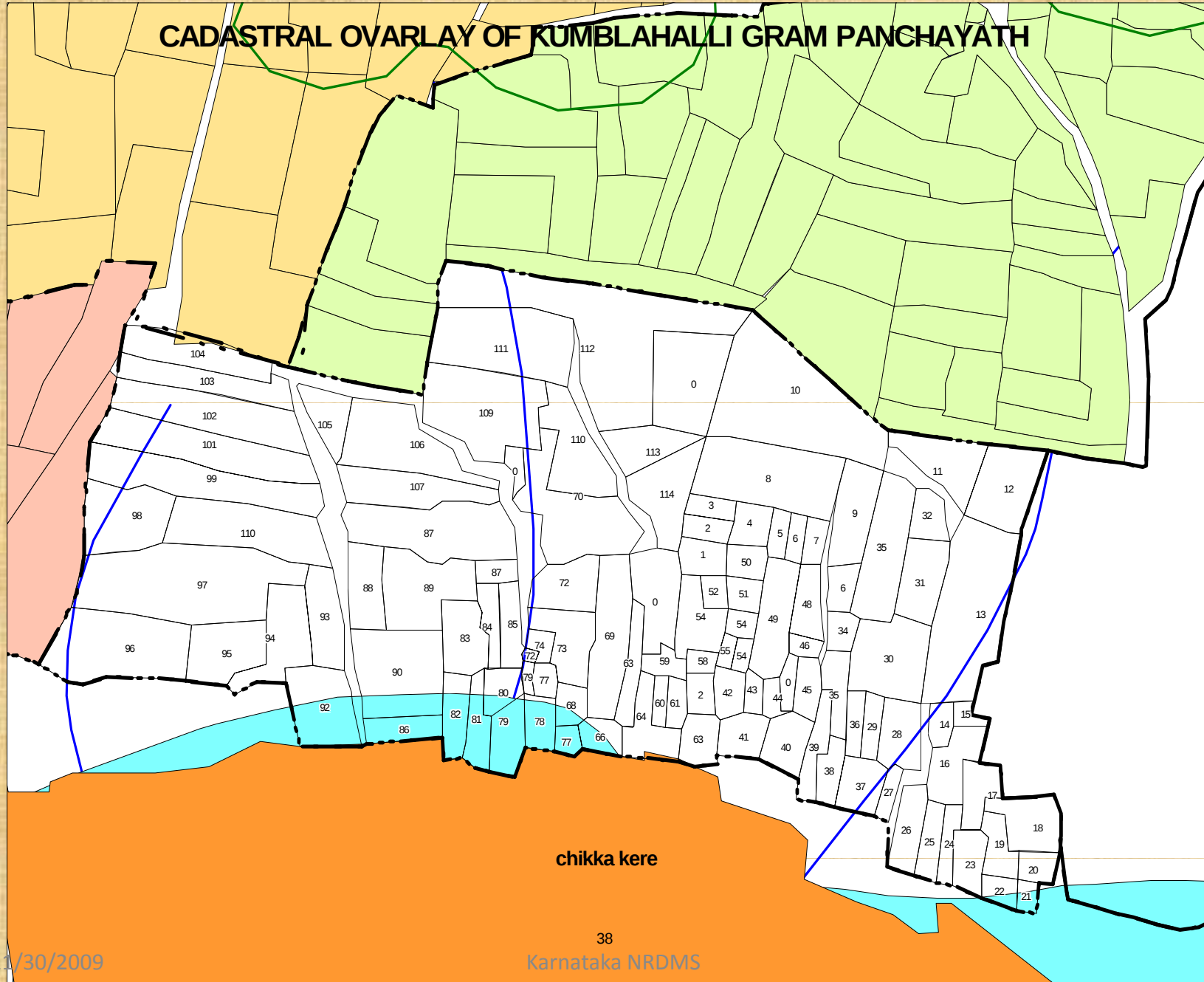




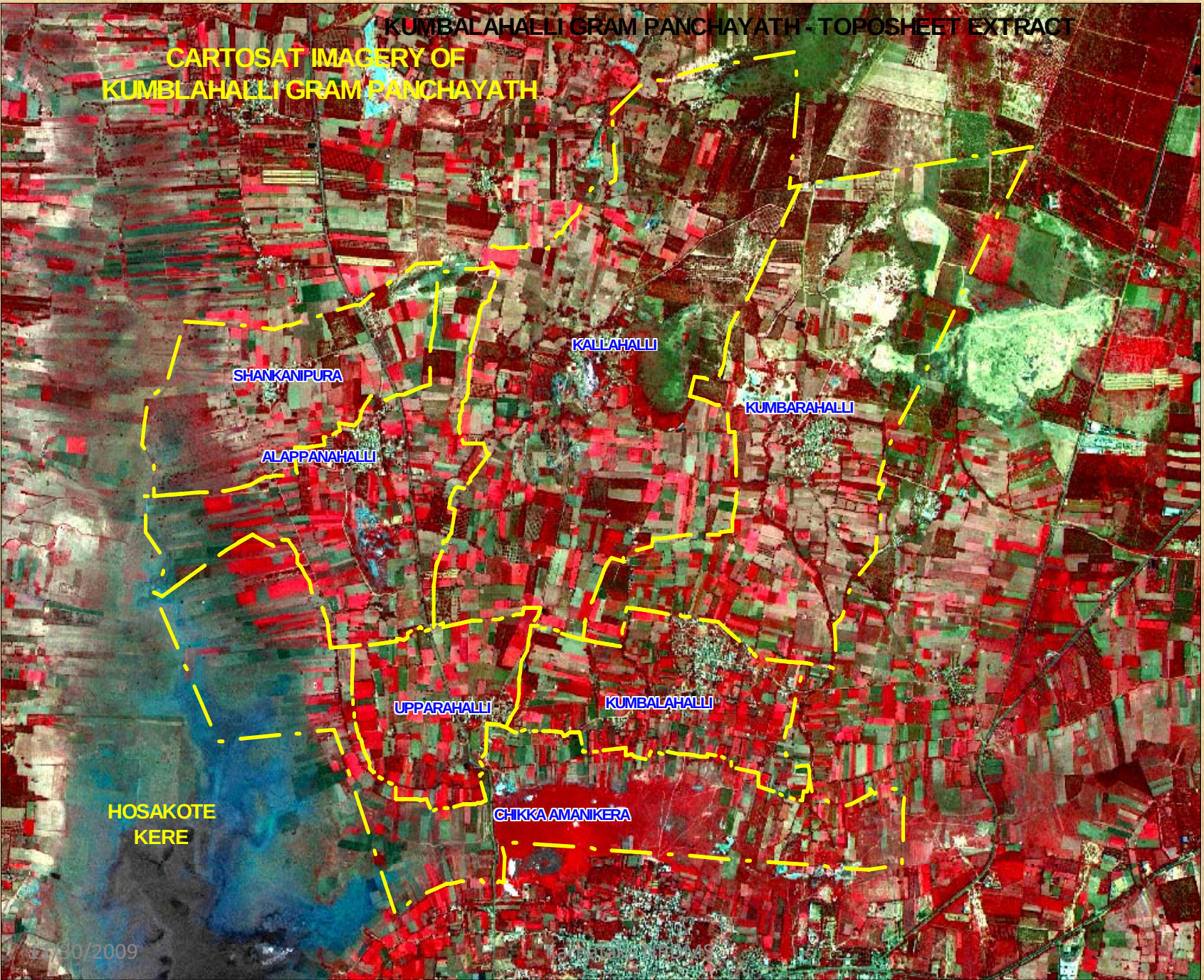
11/30/2009

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CADASTRAL OVARLAY OF KUMBLAHALLI GRAM PANCHAYATH



KUMBALAHALLI GRAM PANCHAYATH - TOPOSHEET EXTRACT
CARTOSAT IMAGERY OF KUMBLAHALLI GRAM PANCHAYATH



The image is a false-color aerial photograph (Cartosat imagery) of the Kumbalahalli Gram Panchayath area. The landscape is dominated by a patchwork of agricultural fields, with red and green being the most prominent colors. A large, irregularly shaped lake, labeled 'HOSAKOTE KERE', is located in the lower-left quadrant. Several small, distinct areas are outlined with yellow dashed lines, likely representing individual villages or hamlets within the panchayath. These areas are labeled with blue text: 'SHANKANIPURA' (top left), 'KALLAHALLI' (top center), 'KUMBARAHALLI' (top right), 'ALAPPANAHALLI' (middle left), 'UPPARAHALLI' (bottom left), 'KUMBALAHALLI' (bottom center), and 'CHIKKA AMANIKERA' (bottom center, below Upparahalli). The overall terrain appears to be relatively flat, with some variations in vegetation and land use patterns.

SHANKANIPURA

KALLAHALLI

KUMBARAHALLI

ALAPPANAHALLI

UPPARAHALLI

KUMBALAHALLI

CHIKKA AMANIKERA

HOSAKOTE KERE

07/30/2009



11/30/2009

Karnataka NRDMS

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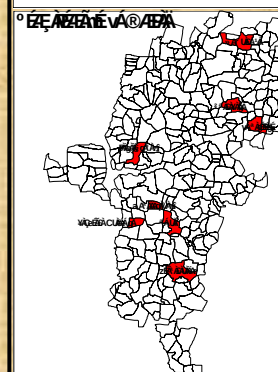
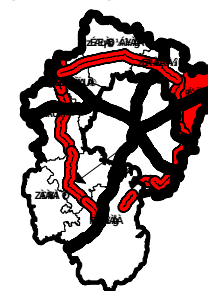
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ಸುವರ್ಣ ಗ್ರಾಮೋದಯ ಯೋಜನೆ - ಕರ್ನಾಟಕ ಸರ್ಕಾರ - ೨೦೦೮

ಹೊಸಾಳ - ಕಚ್ಚೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ಕಾರ್ಯಾಲಯ, ಉಡುಪಿ ಜಿಲ್ಲೆ

ಗ್ರಾಮ : ಹೊಸಾಳ - ಕಚ್ಚೂರು

ತಾಲೂಕು : ಉಡುಪಿ

ಜಿಲ್ಲೆ : ಉಡುಪಿ

ಉಪಗ್ರಹ ಪ್ರತಿಕ್ರಮಿ ಹಾಗೂ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳ ನಕ್ಷೆ



ಉಡುಪಿ ಜಿಲ್ಲೆ



LEGEND

- OPENWELL
- ✕ HEALTH CENTER
- PUBLIC/PRIVATE/INSTITUTION/OFFICE
- OVERHEAD TANK
- HANDPUMPS
- BSNL OFFICE
- OVERHEAD TANK+ PUMP HOUSE
- POST OFFICE
- METALLED ROADS
- DRAINAGE
- EARTHEN ROADS



ಸೌಜನ್ಯ / ಕೃಪೆ: ಗೂಗಲ್ ಆರ್ಕ್

ತಯಾರಿಸಿದವರು:
ಎನ್.ಆರ್.ಡಿ.ಎಮ್.ಎಸ್. ವಿಭಾಗ
ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ಮಂಡಳಿ
ಭಾರತೀಯ ವಿಜ್ಞಾನ ಸಂಸ್ಥೆ ಆವರಣ
ಬೆಂಗಳೂರು - ೫೬೦ ೦೧೨

Karnataka State Spatial Data Infrastructure (KSSDI) Project

DEVELOPMENT OF KARNATAKA STATE SPATIAL DATA INFRASTRUCTURE (KSSDI) PROJECT

Objectives:

- To develop a web based Geo Portal to acquire, process, store, distribute and improve the utilization of geo spatial data
- Data clearing house which would be a gateway of spatial data being generated by various agencies in the State.

Concept of SDI:

Spatial Data Infrastructure (SDI) is the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data.

KSSDI Portal

Spatial Data Infrastructure (SDI)

Data will not reside on central server but will be distributed and shared amongst the nodes (partners) that comprise the portal

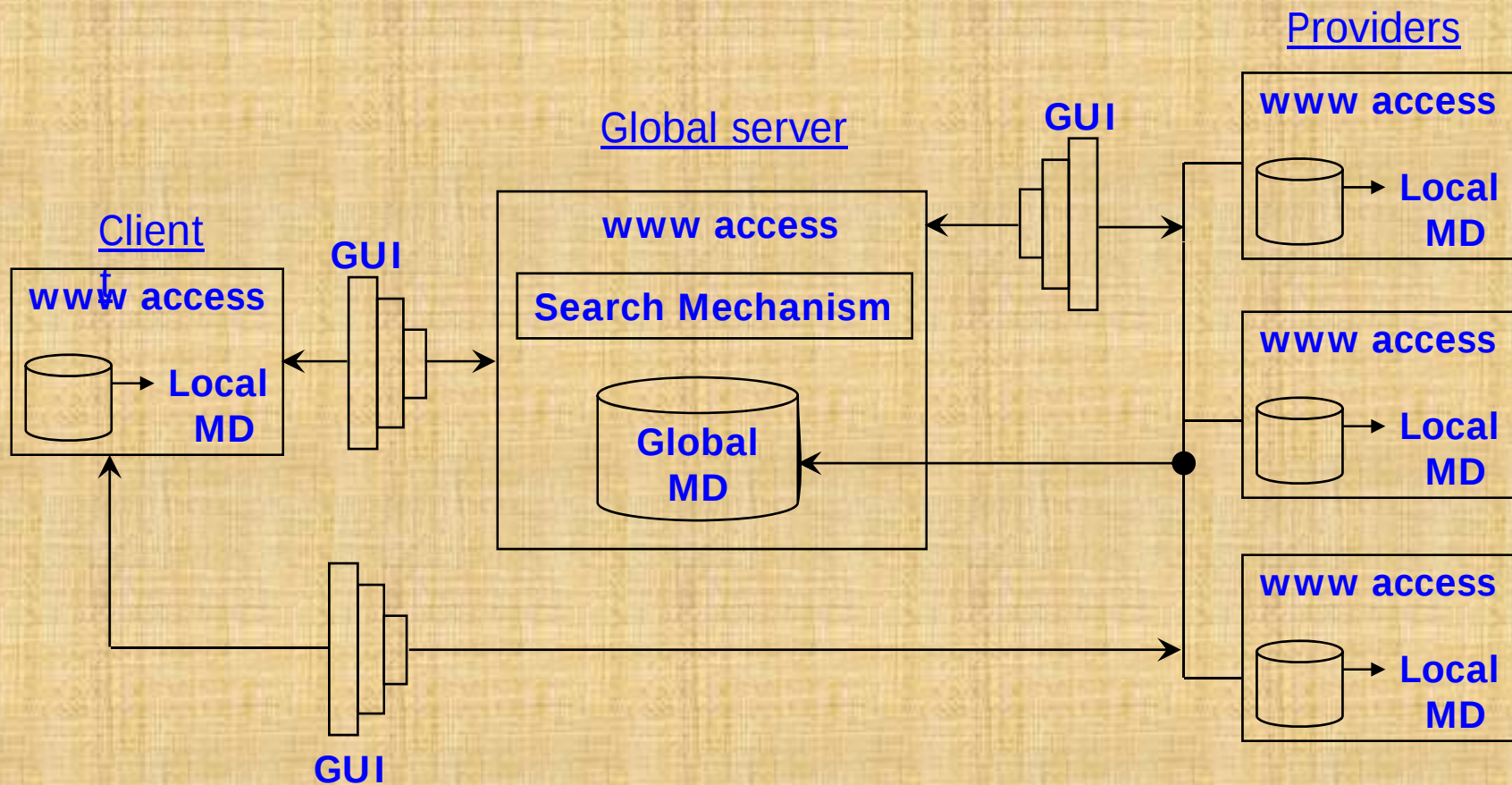
Geo-portal

A Geo-portal is a web site that provides a view into a universe of spatial content and activity through a variety of links to other sites, communication and collaboration tools, and special features geared towards the community served by the Geo-portal. As an open Web resource, a geo-portal should connect through open interfaces to data and services with similar interfaces.

Clearinghouse

A clearinghouse is a decentralized system of servers located on the Internet that contain field-level descriptions of available digital spatial data. This descriptive information, known as metadata, are collected in a standard format to facilitate query and consistent presentation across multiple participating sites.

How does a clearinghouse work ?



Open Geospatial Consortium, Inc (OGC) – The Organisation

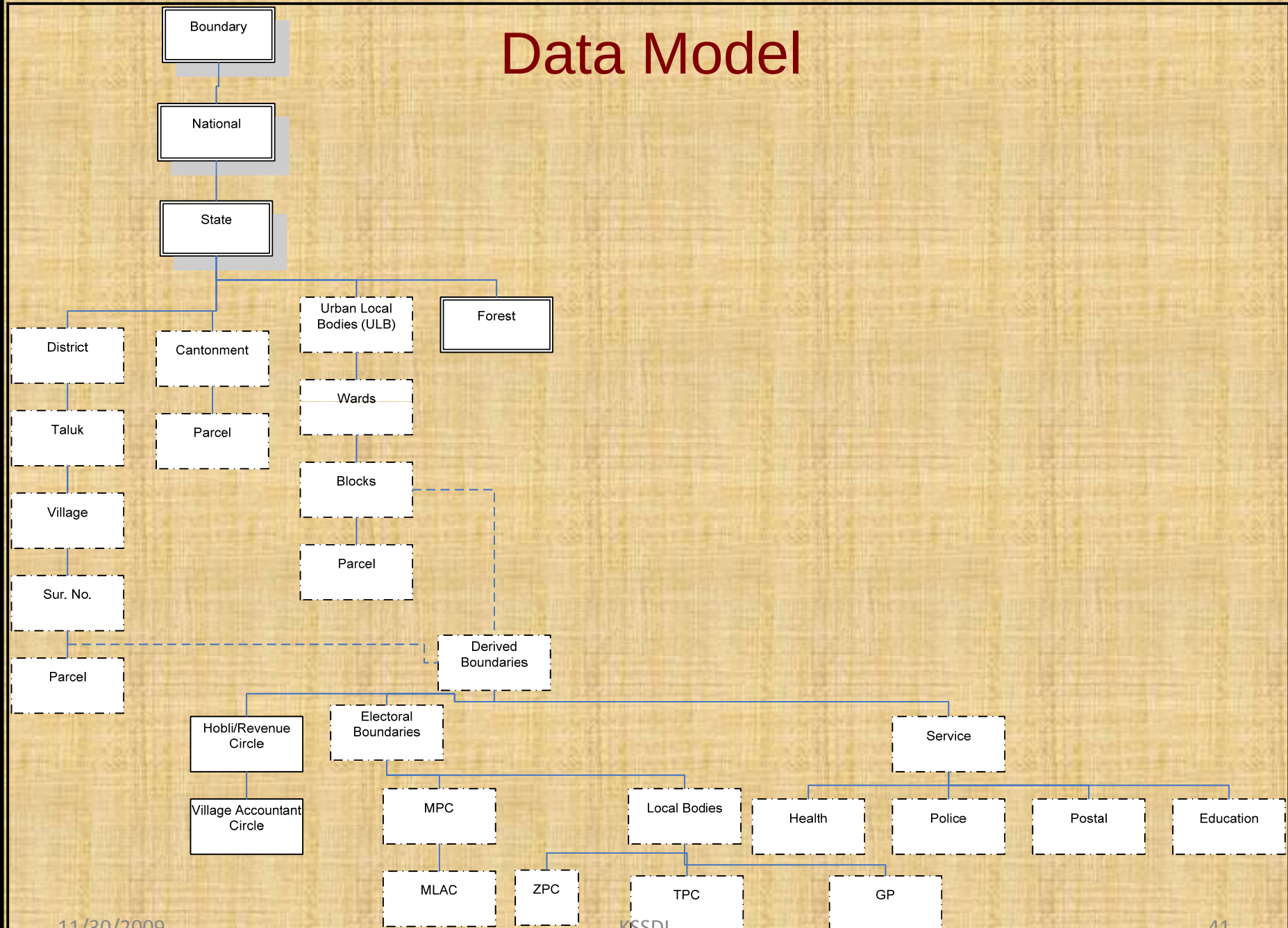
OGC is an international industry **consortium** of **315 companies, government agencies and universities** participating in a consensus process to **develop** publicly available **interface specifications**.

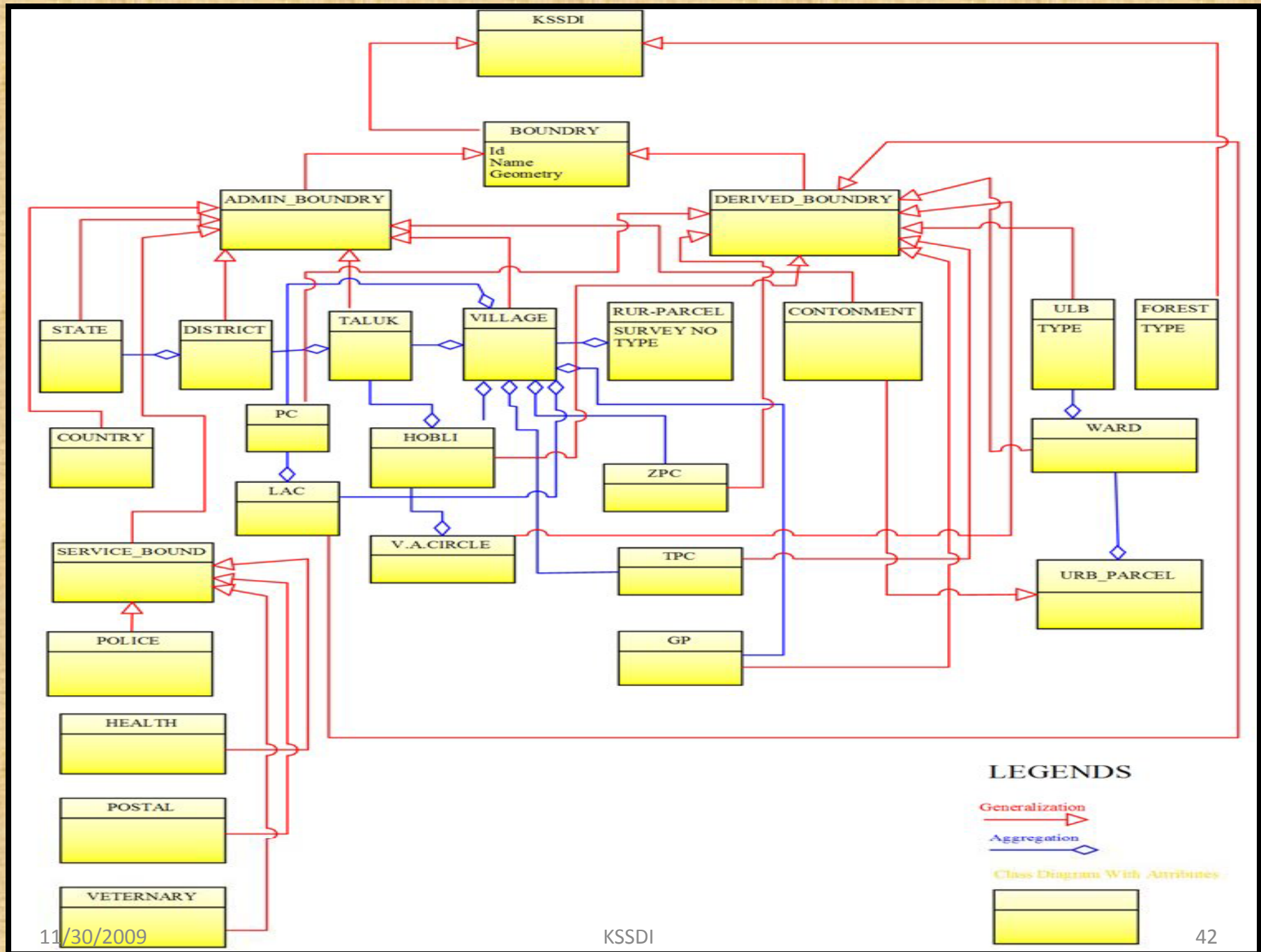
A world in which everyone benefits from **geographic information** and services made **available** across any **network, application, or platform**.

Development of KSSDI Portal

- Inventory of databases
- Functional requirements of website/portal
- Notification of Expression of Interest (EOI)
- Pre-bid meeting with Industry/agencies
- Preparation of Request for proposal (RFP)
 - 1. Technical bid (scope of work)
 - 2. Financial bid (hardware/software/networking/development etc.)
- Invitation to bidders – RFP
- Evaluation of technical bids
- Short listing of bidders
- Evaluation of financial bids
- Identification of bidder for implementation
- Technical committee for monitoring project implementation
- Stakeholders meeting – formulate policies/standards

Data Model





Components of State Geo-portal

Hardware

(Servers, networking etc.)

Software

(OGC compliant software product)
WMS,WFS,WCS,CSW,WRS

Centralised database

NAR, Data Model, RWO,
Metadata, Data Migration

Portal development

(Interface, applications,
development etc.)

Back end Infrastructure
(LAN,UPS and air-conditioning)

Stages of Portal development

- ✓ Requirement analysis
- ✓ Real world object catalogue
- ✓ Conceptual Data Model
- ✓ Centralized database
- ✓ Publishing metadata
- ✓ Creation of Geo-portal
- ✓ Customization of software for creation of Geo-portal
 - Security system to handle data, identity & network
 - Testing of the Geo-portal/ database/ services
 - User acceptance testing
 - Final deployment of the complete system
 - Training (planned during October to December 2009 for PRI's)
 - System maintenance for three years

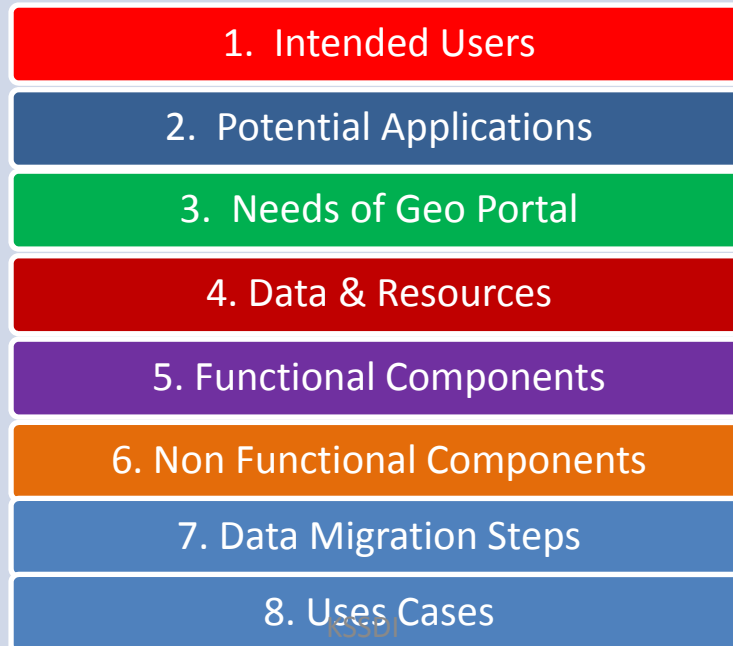
Deliverables

- Detailed SRS
- Design documents
- Source code with annotations wherever applicable
- Unit level test script
- Test cases for UAT and test report
- User manual
- Software executables with all the related library files

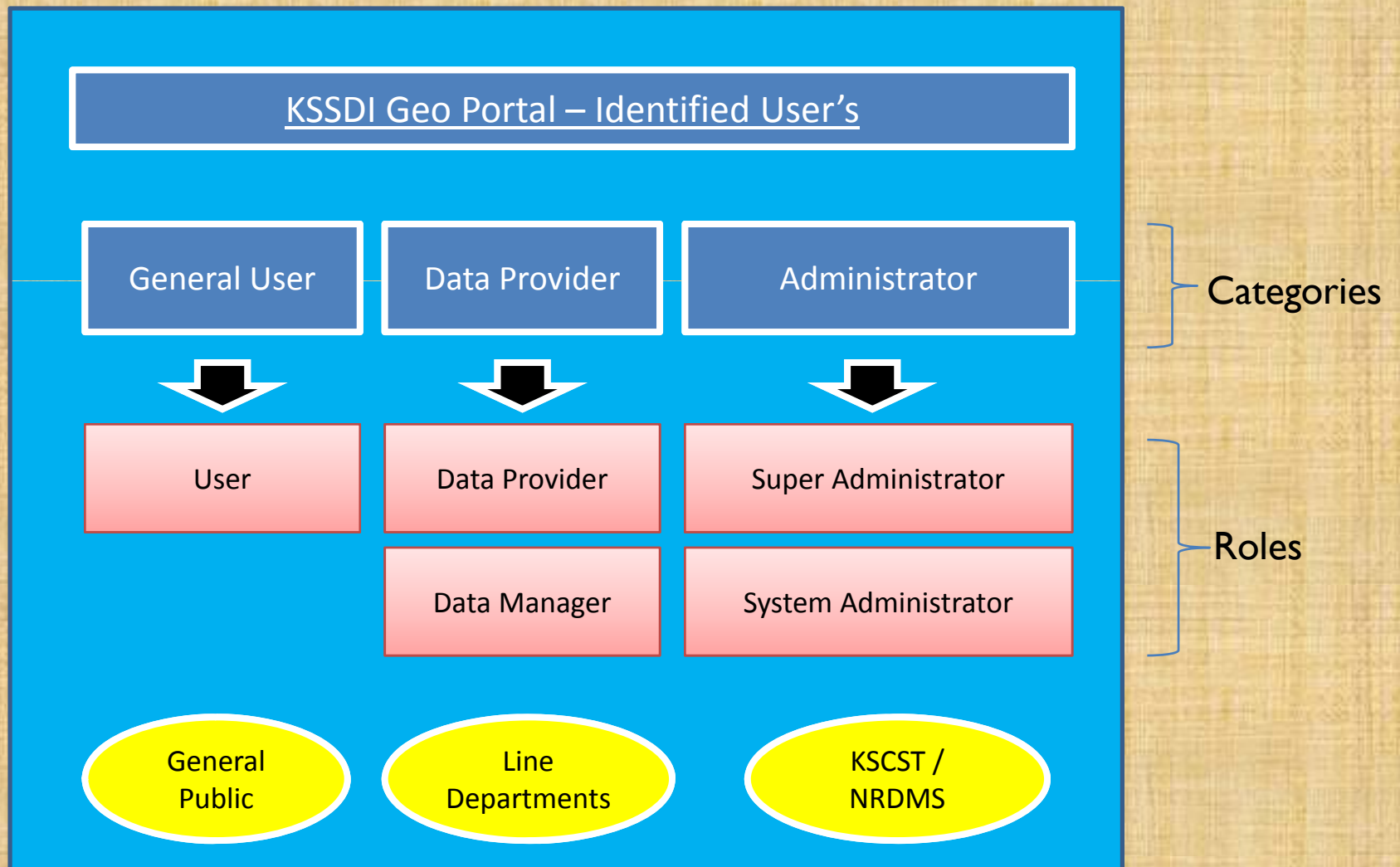
Need Assessment Approach

- Identifying the Intended Users of the Geo Portal
- Identification of the Data Requirements (Geo Portal & Applications)
- Identification of the Functional Requirements (Geo Portal & Applications)
- Preparation of the Need Assessment Report (User + Data Requirements + Functional)
- Review of Need Assessment Report and Acceptance

Approach



Intended Users



Potential Applications

Selective List

Department	Application	Predefined Queries
Education	Opening of new Primary School within 1.5 km	Select Village that does not contain Primary Sch. within distance ≤ 1.5 km
Health	Identification of High Risk Areas	Select Districts prone to Malaria high risk areas
Watershed	Constituency wise watershed 1000 ha	Select Constituency within a district that has watershed area = 1000ha
Irrigation	Minor irrigation tank taluk wise	Select Taluk with MI tank
PRE	Village with fluoride distribution	Select OBW at village level with Flouride
Animal Husbandry	Village with veterinary facility	Select villages with Veterinary facility
Taluk Panchayath	Village with population greater than 600	Select villages with population > 600

Potential Applications

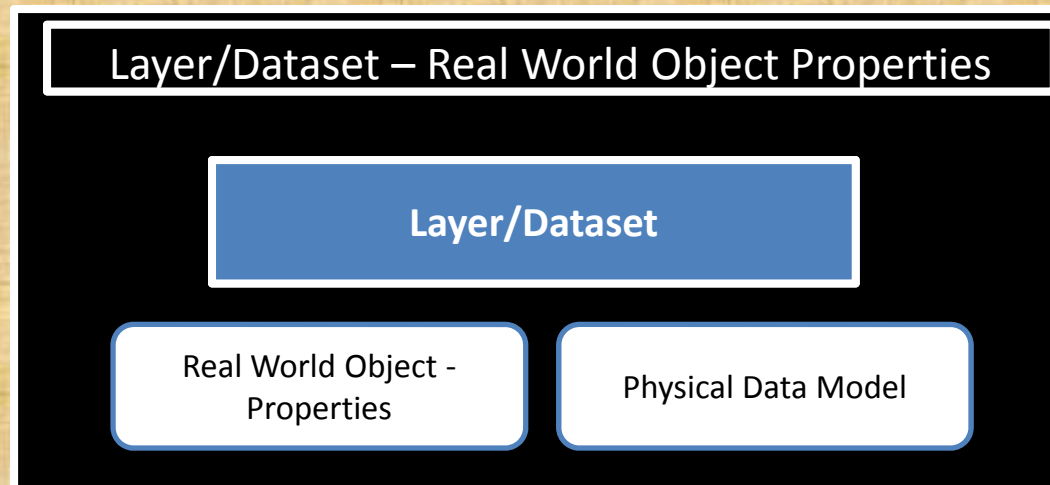
Selective List ...

Departments	Applications	Predefined Queries
Agriculture	Water shed area 2500 Ha Water shed area 500 Ha	Select watershed with area = 2500 Ha Select watershed with area = 500 ha
Forest	Village settlements inside R.F. & S.F. Boundaries	Village settlements inside R.F. & S.F. Boundaries
Zilla Panchayath Office	SC/ST percentage distribution taluk wise	Select Taluk wise SC/ST percentage Distribution
Health & Family Welfare	Village with Primary health centre	Select villages with PHC facility available
Fishery	Extent of water spread area of tanks	Select Tank within Taluk group by tank area in Ha
Horticulture		
District Adult Education	Village with adult education	Select Villages with Adult Education facility available

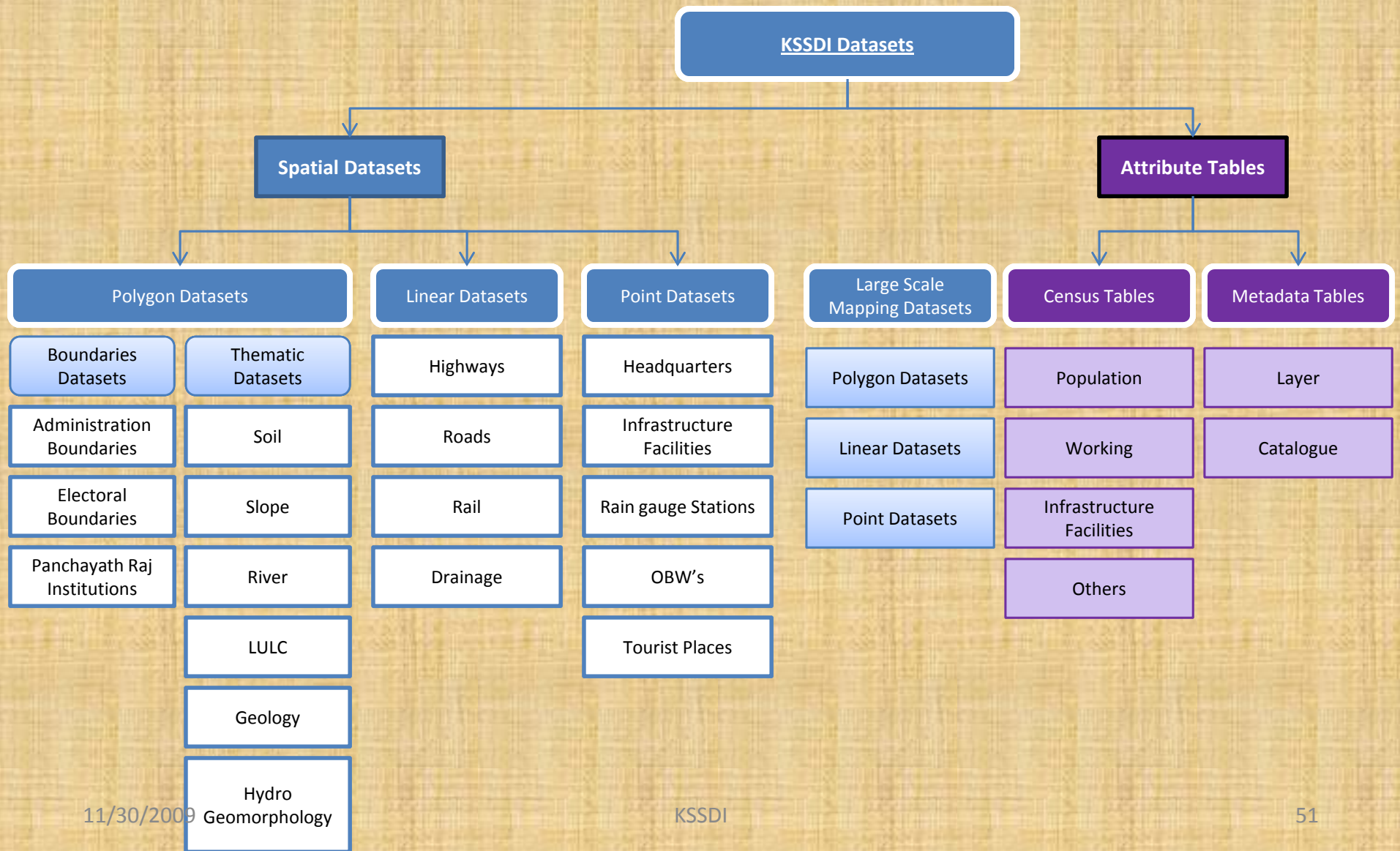
Real World ObjectCatalogue

KSSDI Real World Object Catalogue Comprises

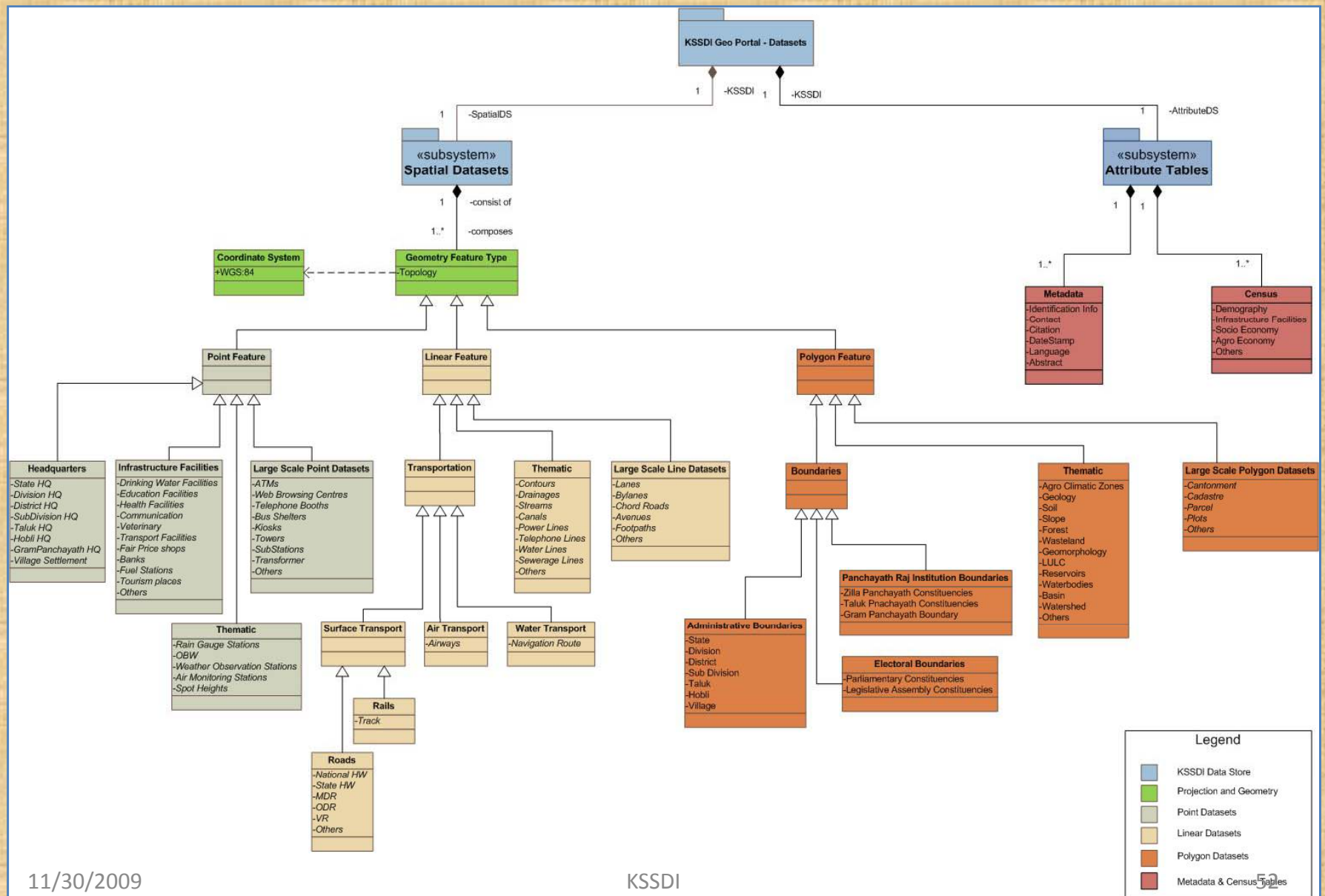
- **Hierarchy and Classification of Datasets:**
- **Real World Objects:** Based on the hierarchy, the datasets are identified as the real world objects. Each dataset is categorized as a real world object defining its type, category, scale, definition, source and finally its attributes are designed for the future use.



Hierarchy & Classification



Data Model Hierarchy



KSSDI System Infrastructure Setup

- Hardware Components**

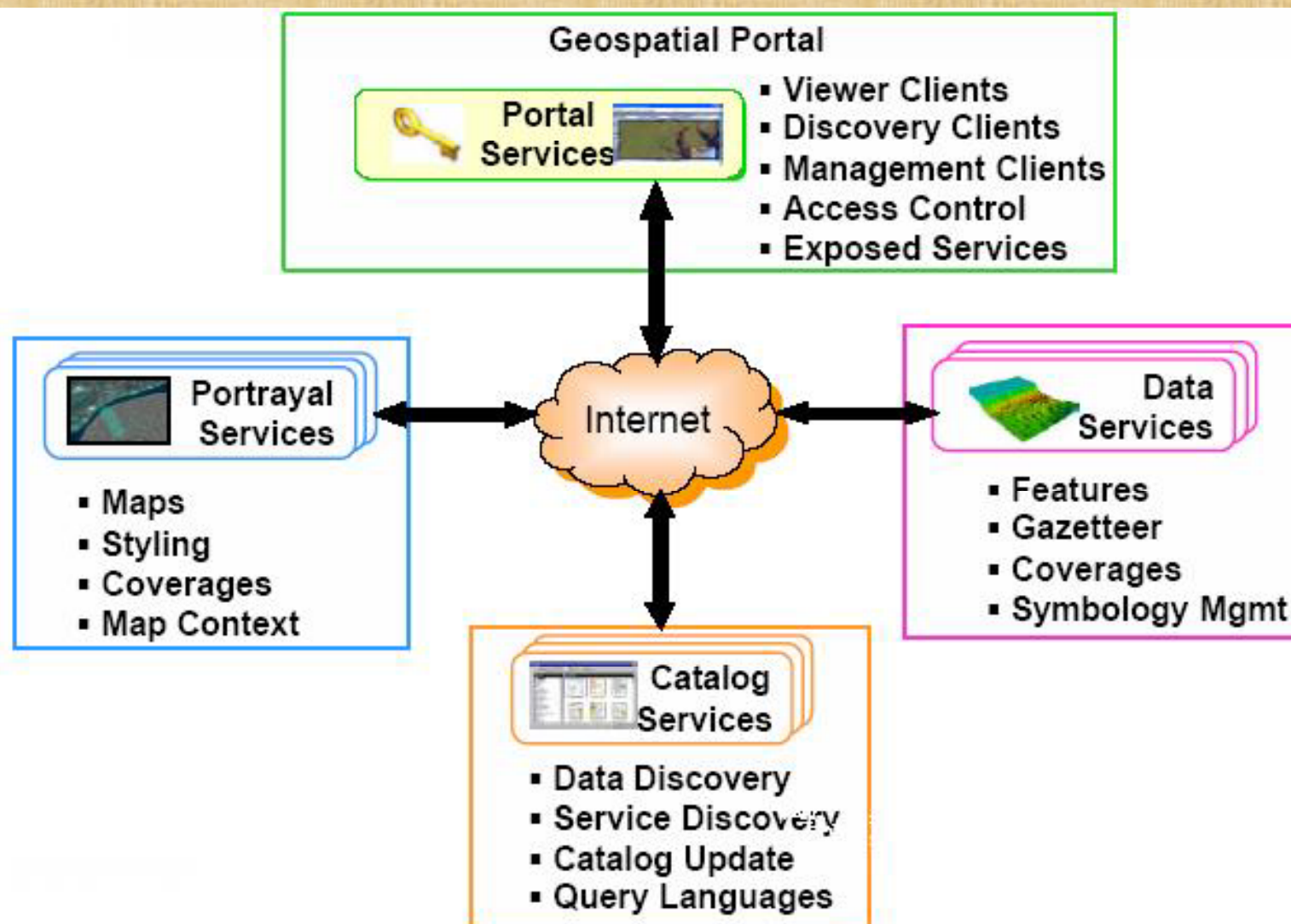
S No.	Component	Make	Quantity
1	Blade Servers Chassis	IBM eServer Bladeserver H	1
2	Application & Database servers	IBM Blade server HS21	2
3	Web, Security and Backup Servers	IBM Blade server HS21	3
4	SAS Storage	DS3200 storage solution	1
5	Backup Device -Tape Library	TS3100 tape library	1
6	Rack and its accessories	IBM Netbay S2 42U	1
7	Internet Firewall	CISCO ASA 5520	1
8	Application and Database Zone Firewall	CISCO ASA 5550	1
9	Internet Router	CISCO 3845	1
10	Application and Database Zone Gigabit switch	CISCO 4948 – 10 GE	2
11	DMZ switch	Catalyst 2960 G	1
12	UPS	30 KVA APC Smart UPS – VT with 2 hours backup	1

System Infrastructure Setup

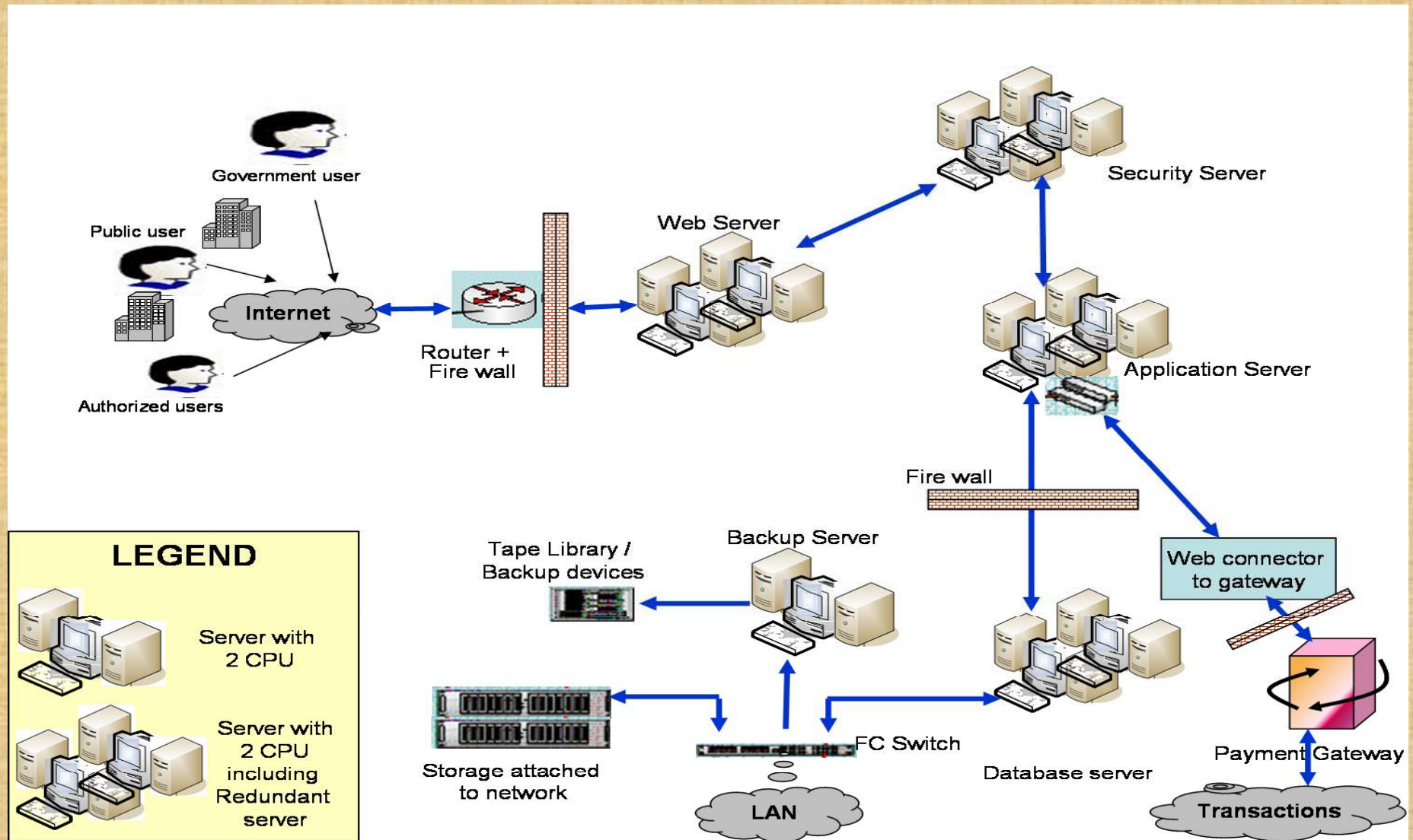
- **Software Components**

S No.	Component	Make	Quantity
1	Backup Software	IBM Tivoli Storage manager	1
2	SNMP	CISCO Works LAN Management solution Software	1
3	RDBMS	ORACLE 11 g – Enterprise Edition with Spatial Option	2
4	OGC Software	REDSPIDER / Apollo Suite Software including Apollo server, Image manager – catalogue and Application solution kit – deployment license	1
5	Operating System	Microsoft Windows 2003 / 2008 server standard edition	5

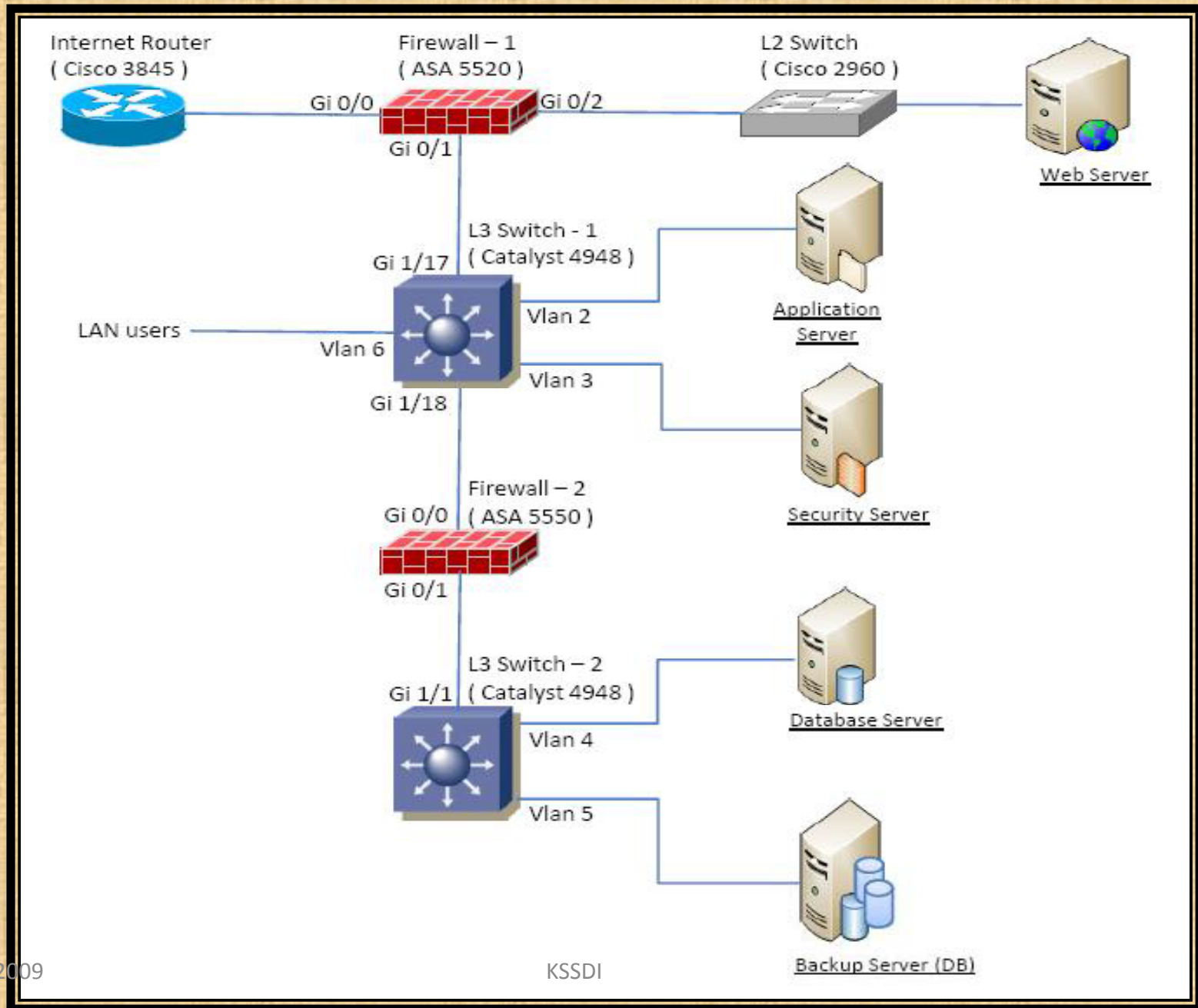
OGC Services



KSSDI Architecture



Network Diagram



KSSDI - Data Center



11/30/2009



Firewall

Switches

Tape Drives

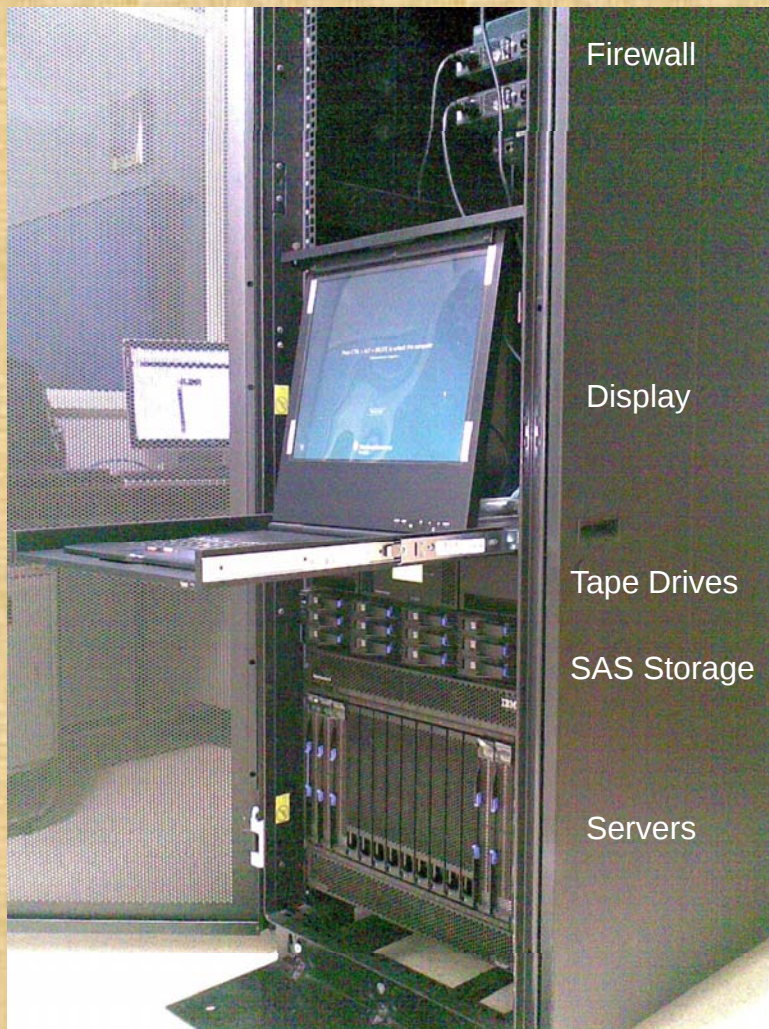
SAS Storage

Servers

KSSDI

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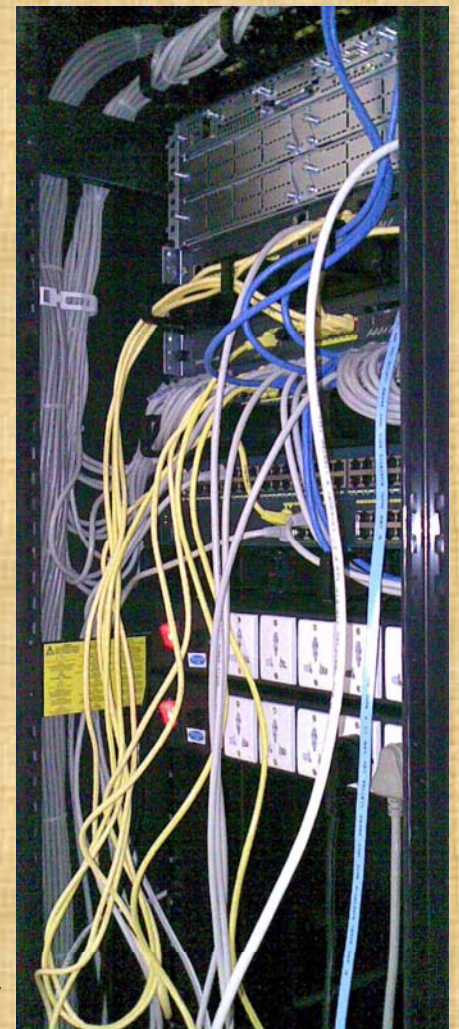
KSSDI – Data Center



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KSSDI



Backend
Network
Connectivity

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Thank You