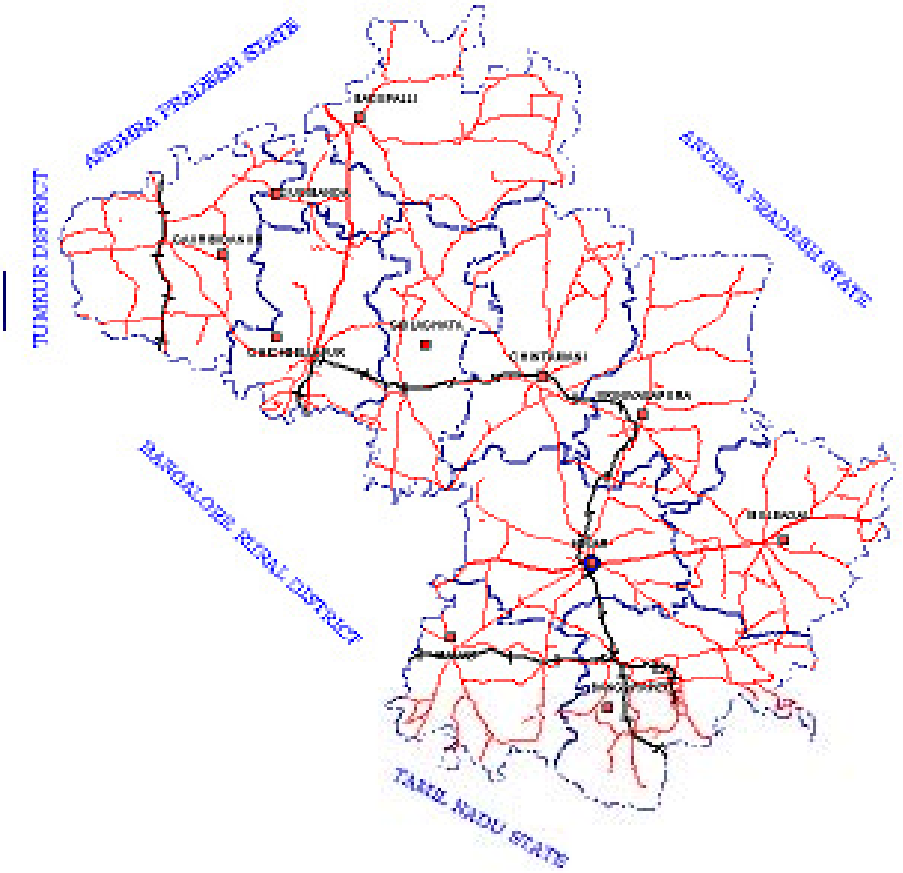
जल वर्ष 2007 Water Year 2007

स्वच्छ सुरक्षित जल – सुन्दर खुशहाल कल

CONSERVE WATER - SAVE LIFE

GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES
CENTRAL GROUND WATER BOARD

GROUND WATER INFORMATION BOOKLET
KOLAR DISTRICT, KARNATAKA



SOUTH WESTERN REGION
BANGALORE
NOVEMBER 2009

FOREWORD

Ground water contributes to about eighty percent of the drinking water requirements in the rural areas, fifty percent of the urban water requirements and more than fifty percent of the irrigation requirements of the nation. Central Ground Water Board has decided to bring out district level ground water information booklets highlighting the ground water scenario, its resource potential, quality aspects, recharge – discharge relationship, etc., for all the districts of the country. As part of this, Central Ground Water Board, South Western Region, Bangalore, is preparing such booklets for all the 27 districts of Karnataka state, of which six of the districts fall under farmers' distress category.

The **Kolar** District Ground Water Information Booklet has been prepared based on the information available and data collected from various state and central government organisations by several hydro-scientists of Central Ground Water Board with utmost care and dedication. This booklet has been prepared by **Shri K.Kumaresan, Assistant Hydrogeologist**, under the guidance of Dr.K.Md. Najeeb, Superintending Hydrogeologist, Central Ground Water Board, South Western Region, Bangalore. The figures were prepared by S/Sri. H.P.Jayaprakash, Scientist-C and K.Rajarajan, Assistant Hydrogeologist. The efforts of Report processing section in finalising and bringing out the report in this format are commendable.

I take this opportunity to congratulate them for the diligent and careful compilation and observation in the form of this booklet, which will certainly serve as a guiding document for further work and help the planners, administrators, hydrogeologists and engineers to plan the water resources management in a better way in the district.

sd/-
(T.M.HUNSE)
Regional Director

KOLAR DISTRICT AT A GLANCE

SL NO	ITEM	STATISTICS
I	**GENERAL INFORMATION**	
	i) Geographical Area	8223 Sq. Km
	ii) Administrative Divisions (March 07)	2, Kolar and Chickballpur
	No. Of Taluks :	11
	No of Panchayats/villages	305 /3325
	iii) Population (as on 2001 census)	25.36 lakhs Density 306 persons/sq.km
	iv) Average annual Rainfall	743 mm
2	**GEOMORPHOLOGY**	
	Major physiographic units	2
	Major Drainages	3
3	**LAND USE**	
	a) Forest Area (sq.km)	703
	b) Net Area Sown (sq.km)	3604
4	**MAJOR SOIL TYPES**	1. Red Loamy 2. Red Sandy 3. Mixed Red
5	**AREA UNDER PRINCIPAL CROPS (as on31.3.06)in ha.** Ragi Paddy Maize Oil seeds Pulses Fruits Vegetables	 1093 73 249 577 351 503 306
6	**IRRIGATION BY DIFFERENT SOURCES (ha)**	
	Dug wells	478
	Bore wells	92327
	Tanks	00
	Canals	00
	Other Sources	0.0
	Lift Irrigation	00
	Net Area Irrigated	91805

	No .of Ground Water structures Domestic BW Piped water supply	 7636 806
7	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.2007)**	
	Dug wells	113, Abandoned- 57
	Piezometers	31, 13 fitted with DWLR
10	**PREDOMINANT GEOLOGICAL FORMATIONS**	Peninsular Gneissic complex (Granites, Gneisses and Kolar schist(Horn blende schist and Amphibolite schist)
11	**HYDROGEOLOGY**	
	Major water bearing formations	Weathered and fractured Granite Gneisses and schists,
	Premonsoon Depth to water level (2006)	0.89 to 14.31 mbgl (NHS OB Dugwells) 1.21 to 49.52 mbgl (pz)
	Postmonsoon Depth to water level (2006)	0.13 to 14.21 mbgl NHS OB Dugwells 0.30 to 48.98 mbgl (pz)
	Long term water level trend (1997-2006) in m per year	62% falling trend -0.002 m to 3.477 m 38 % show rising decadel trend ranging from 0.006 m to 2.62 m
12	**GROUND WATER EXPLORATION BY CGWB AS ON MARCH 2007**	
	EW (Depth Range /Discharge range) 56	Depth –30 –500.43 mts Discharge –0.5 to 24.7lps
	OW(Depth Range /Discharge range) 29	Depth 30- 256.70 mts Discharge –0.5- 11.7 lps
	PZ(Depth Range /Discharge range) 6	Depth 24.51 to 131.07 mts Discharge –2.1 to 0.5 lps
	SH (Depth Range /Discharge range)	Nil
	Total	91
	Transmissitivity (m^2/day)	0.6 to 106
13	**GROUND WATER QUALITY**	
	Presence of chemical constituents more than permissible limits	Fluoride,
	Type of water	Potable in general

14	**DYNAMIC GROUND WATER RESOURCES (2004) IN HAM**	
	Annual replenishable ground water resource	59063
	Net annual ground draft	115323
	Projected demand for Domestic and Industrial use up to 2025	6316
	Stage of ground water Development (%)	195 %
15	**MASS AWARENWSS PROGRAMME ORGANISED**	
	Date	14.9.06-
	Place	Bangarpet
	No. of people participated	300
	WATER MANAGEMENT TRAINING PROGRAMMES ORGANISED	12.9.06 &13.9.06- Kolar No of participants-40
16	**EFFORTS OF ARTIFICIAL RECHARGE AND RAINWATER HEAVESTING**	Centrally sponsored sechems in Gauribidinur and Mulbagl taluks Demonstrative artificial recharge projects
17	**GROUND WATER CONTROL AND REGULATION** No of OE Blocks No of Critical blocks	NOT NOTIFIED 10 1
18	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	
		Water level depletion 80 % of the stations indicate phreatic zone dried up. Highest borewells in the state resulted in withdrawal of static reserve and ground water mining. And yield dwindling in 10 taluks over exploited with overall 195 % ground water develop-ment. High concentration of fluoride in Bagepally taluk.

KOLAR DISTRICT

1.0 INTRODUCTION :

Kolar district is the eastern gateway to Karnataka .It is famous for erstwhile Kolar Goldmines .It is land locked district and hard rock terrain of Karnataka in the maiden (plain) region and covers an area of 8223 sq.km. The district lies almost in the central part of peninsular India, which has immense bearing on its geoclimatic conditions. This district experiences tropical climate throughout the year, Kolar district owes its prosperity and development to the existence of ancient tanks. There are 3298 tanks which are highest number in the state. The main occupation of people is agriculture. In the absence of surface water irrigation system ground water is the main source of irrigation. The district has highest number bore wells in the state

1.1 Location:

Kolar district lies between North latitude 12˚ 46' to 13˚ 58' and East Longitude 77˚ 21' to 78˚ 35'. It is bounded by Bangalore and Tumkur districts on the west, Ananthpur district of Andhra Pradesh on the north, Chittoor district on the east and on the south by North Arcot and Dharmapuri districts of Tamil Nadu. The district is famous for gold exploitation at Kolar Gold Fields. Administratively the district is divided into 11 taluks, 53 hoblies, 305 gram-panchayats and 3325 villages. The population as per the 2001census is 2523406 and the density of population is 306 per sq.km.

1.2: Administrative setup & Approachability:

Total geographical area of the district is 8223 sq.km .The district is divided into 11 taluks coming under two subdivisions. The kolar subdivision consists of Kolar, Bangarpet , Malur, Mulbagal , Srinivaspur and Chintamani and Siddalghatta and Chickballapur division consist of Chickballpur, Bagepalley, Gauribidinur and Gudi banda taliuks. The district is well connected by highways and rail. The NH-4 from Chennai to Bombay passes through this district via Mulbagal and Kolar towns. The NH-7 which connects from Bangalore to Hyderabad passes through western part of district via Chickballapur and Bagepalley towns. The south central railway connecting Bangalore to Hyderabad passes through the district in the western side and southern railway from Bangalore to Chennai through the southern side of the district via Bangarpet and Malur towns.The administrative setup is shown in **Fig -1**

1.3 Demographic features:

The total population in the district is around 25.36 lakhs (as per 2001 census)with poplation density of 306 persons/sq. km. The rural population constitute 19.1lakhs and urban population constitutes 6.2 lakhs .The schedule cast population constitute 6.6 lakhs and the scheduled tribe population constitutes 2.05 lakhs . The sex ratio in the district is 972 females for every 1000 males.

Fig-1

ADMINISTRATIVE SET-UP
KOLAR DISTRICT
KARNATKA

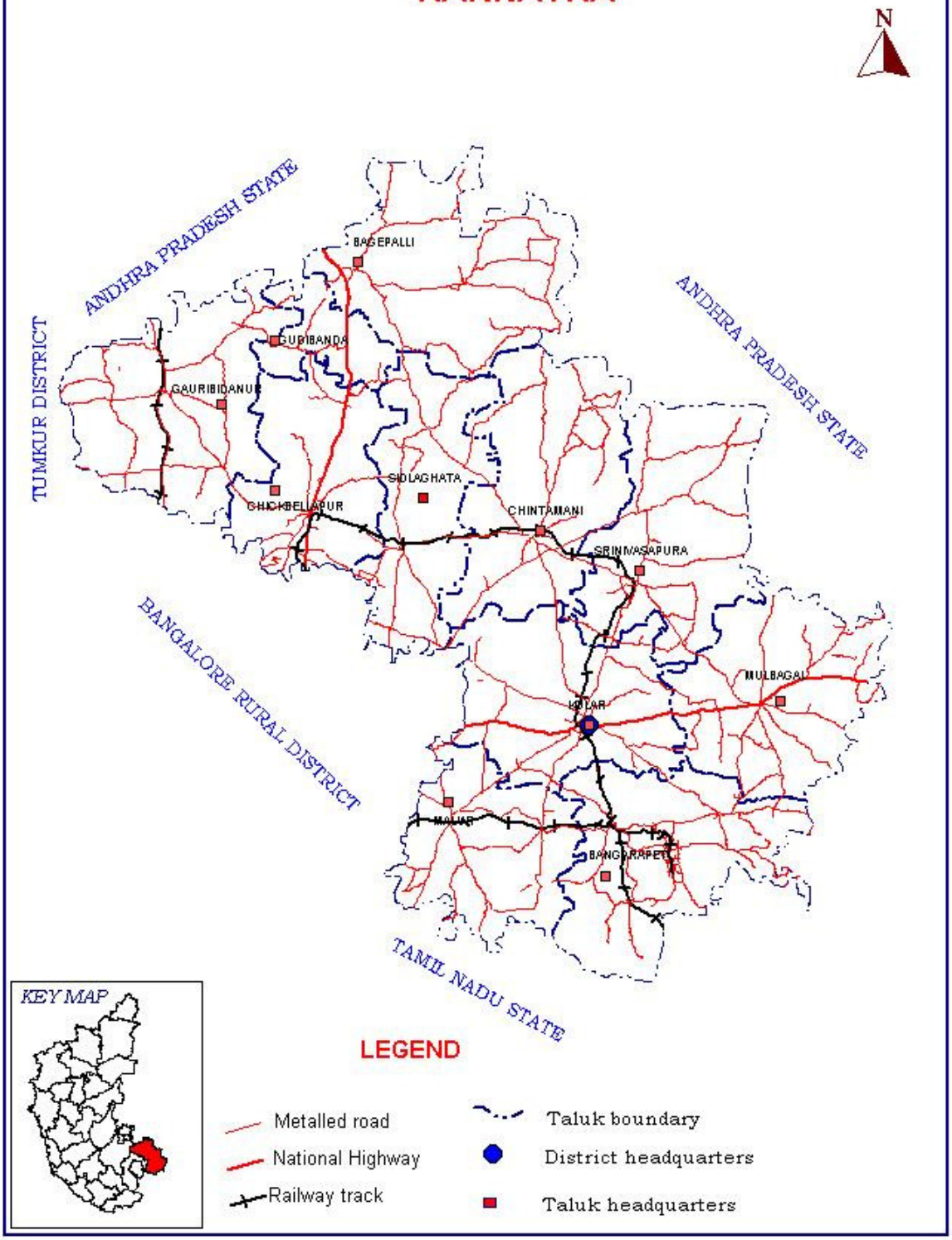
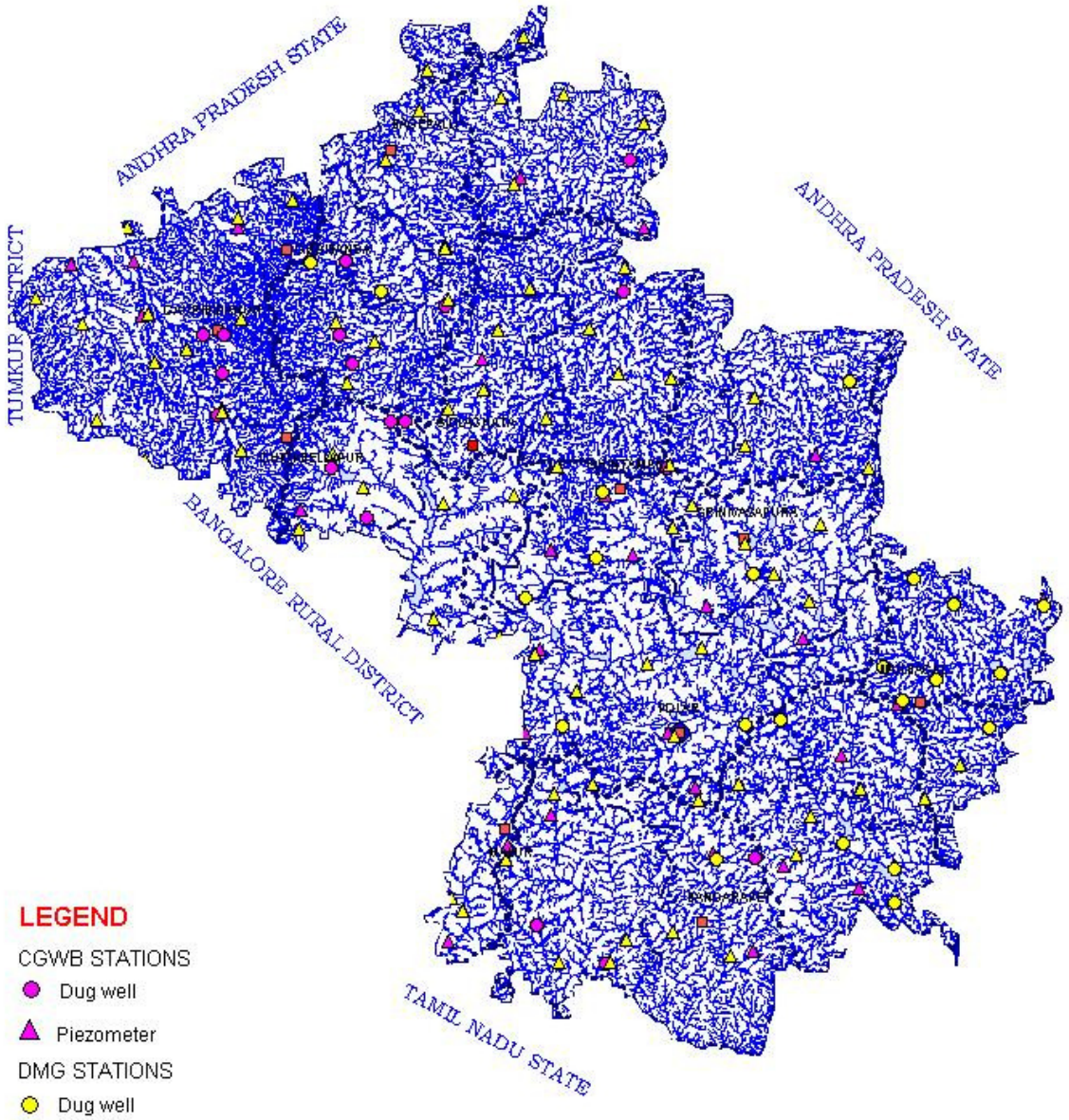


Fig-2

DRAINAGE & HYDROGRAPH MONITORING STATIONS
KOLAR DISTRICT, KARNATAKA



1.4 Basin and Drainage:

There are no perennial rivers in Kolar district .The district is drained by three river basins namely Palar, North Pennar(North pinakani), and South Pennar (South Pinakani). All these rivers and their tributaries are small and carry water only during rainy season. North Pennar drains 47%, Palar drains 32% and South Pennar drains 21% of the total area of the Kolar district

Palar originates at Ambajidurga hillocks in Chintamani taluk and flows NW-SE direction .The drainage is highly dendritic in nature The pennar river originates in Doddapallapura taluk of Bangalore district and flows towards north covering parts of Sidlaghatta, Gowribidinur, Bagepalley and Gudibanda taluks, river Papagni enters in Sidlaghatta taluk and flows towards NE covering parts of Chintamani, Bagepalley, Sidlaghatta, and Srinivaspur taluks. North pinakani originates from nandihills in Chickballpur taluk and flows in Chickballapur and Gowribidanur taluks for about 55 kms and enters Anathapura district in Andra.Pradesh state. South pinakani originates from Nandi hills and flows in Chickballapur and Sidlaghatta taluks for about 110 kms and enters Tamilnadu state. Apart from these river Arkavathi a tributary of Cauvery also originates in Nandi hills and flows only 2.8 kms in the district and enters Bangalore district . The drainage map of the district is given in **Fig -2**

1.5 Land use pattern

9% of the total area of the district is covered by forest and 66% by cultivable land. 16% of the area is uncultivated (02-03). Area sown in the district forms 34% of the total area of the district.

1.6 Agriculture and Irrigation practices :

The predominant crops grown are finger millet, groundnut and pulses. Finger millet occupies about 45% of the total cultivated area. The important irrigated crops are paddy, mulberry, sugarcane, potato and other vegetables. The important commercial fruit crops grown are mango and grapes. The area irrigated by wells constitutes 99% of the total irrigated area. Dug well irrigation practice is largely replaced by bore-well irrigation. Irrigation is being practiced both in the valley as well as in upland areas.

1.7 Studies carried out by CGWB :

Systematic and Reapprisal hydrogeological surveys were carried out in Kolar district during different field season programmes from 1984 to 2006. phase-I of Exploratory drilling was carried out during 1996-1998 of maximum depth of 300.69 mts and phase- II of deep exploratoty drilling commenced during 2004 of 500 mts rig capacity for the first time in hard rock terrain and exploratory drilling was completed in Mulbagal, Bangarpet, Kolar taluks and it is ongoing in Malur and remaning taluks.

2.0 RAINFALL AND CLIMATE:

Kolar district falls in the Eastern dry agro climatic Zone. It experiences a semi-arid climate, characterized by typical monsoon tropical weather with hot summers and mild winters. The year is normally divided into four seasons. They are; a) dry season during Jan-Feb, b) Premonsoon season during Mar-May, c) Southwest Monsoon season during Jun-Sep and d) Post or Northeast monsoon season during Oct-Dec.

Based on rainfall data pertaining to There are 11 rain gauge stations in each of the 11 taluks. Data from these stations for the period from 1971 to 2000 is analysed. Normal annual rainfall ranges from around 650mm at Gudibanda in the north to around 800mm at Mulbagal in the east averaging 740mm in the district. There is a general south to north decreasing trend in annual rainfall.

The southwest monsoon contributes around 55 percent of the annual rainfall. The other monsoon (NE) yields around 30 percent. The balance of around 15 percent results from the premonsoon. September and October are the wettest months with over 100mm monthly rainfall. Thunderstorms are common during the month of May. The post monsoon season often gets copious rains due to passing depressions.

On annual basis the variability coefficient are less than 30 percent indicating consistent rainfall. On seasonal basis dry season rainfall is most inconsistent where as the monsoon rainfall is least inconsistent. On a monthly basis the inconsistencies are more pronounced indicated by high coefficients of variability. The lowest annual rainfall recorded in the district is around 300mm while the highest is over 1300mm.

There is one meteorological observatory at KGF, which has long term records. The one at Kolar is of recent origin. Normally April and May are hottest months with temperatures as high as 40° C. They are generally lowest during December being as low as 10°C. Potential evapotranspiration is around 1550mm annually ranging from 170mm in Apr-May period to less than 100mm during Nov–Dec period.

Being a semi arid area the district is drought prone. In the recent years, 2002 and 2003 are deficient in rainfall. On an average year 2004 is a normal year and 2005 is a rainfall excess year amounting to nearly 50 percent excess over the normal.

Seasonal and annual rainfall distrct; normals and actuals in mm and % departures, Kolar district.

	Mar-May				Jun-Sep				Oct-Dec				Annual			
YEAR	Nor	Act	Dep	Class	Nor	Act	Dep	Class	Nor	Act	Dep	Class	Nor	Act	Dep	Class
2001	135	139	3	N	389	463	19	N	222	311	40	E	745	900	21	E
2002	135	156	15	N	389	223	-43	D	220	105	-52	D	744	484	-35	D
2003	135	26	-81	D	389	374	-4	N	214	187	-12	N	738	587	-20	D
2004	135	220	63	E	389	399	3	N	214	140	-35	D	738	759	3	N
2005	135	95	-30	D	388	566	46	E	219	444	103	E	742	1105	49	E
2006					389	315	-19	N	222	174	-21	D	611	489	-20	D

3.0 GEOMORPHOLOGY AND SOILS:

The topography of the district is undulating to plain. The central and eastern parts of the district forming the valley of Palar Basin, are well cultivated. The norhtern part of the district forms a depression forming the valley of the North Pinakini River towards Gauribidanur. The general elevation varies from 249 to 911 m above mean sea level

The soils of Kolar district occur on different landforms such as hills, ridges, pediments, plains and valleys. The types of soils distributed range from red loamy soil to red sandy soil and lateritic soil. Soil distribution map is given in figure below. Of the total area, about 73% is suitable for agriculture and horticulture; about 3% for forestry, pasture and the remaining area is suitable for quarrying, mining and as habitat for wildlife.

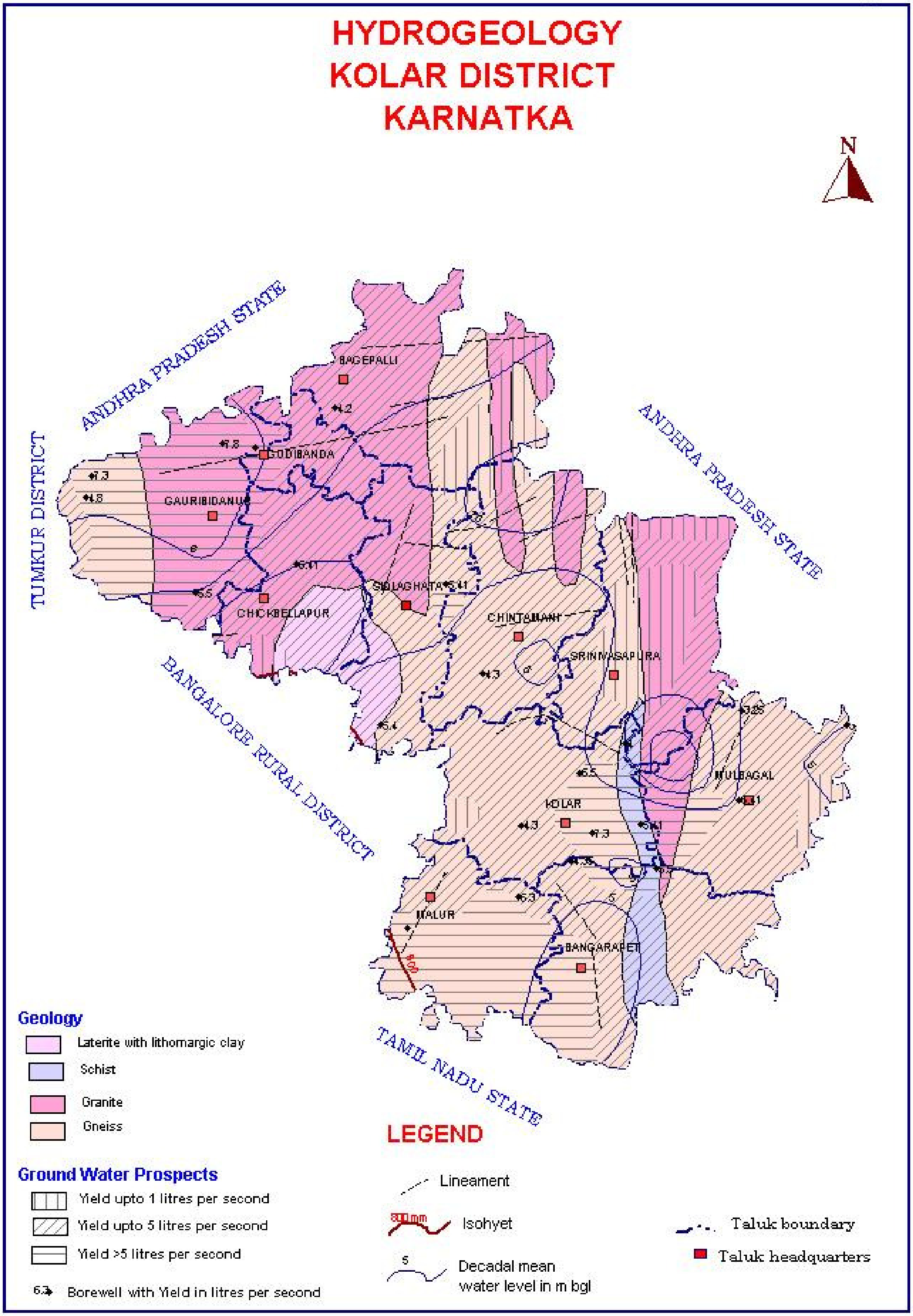
4.0 GROUND WATER SCENARIO:

4.1 Hydrogeology :

Granites, gneisses, schists, laterites and alluvium underlie the district. Basic dykes intrude the above formations at places. Granites and gneisses occupy major portion of the district. Schists are mostly confined to two places - around Kolar Gold Fields and in the northwestern part of Gauribidanur taluk. Laterites occupy small portions in Kolar, Srinivaspura and Sidlaghatta taluks. Alluvium is confined to river courses. Fractures or lineaments occupy well-defined structural valleys and majority of them trend NE-SW.

The occurrence and movement of ground water is controlled by weathered zone and fractures and fissures that exist in hard rocks. In the district, ground water occurs in phreatic and semi-confined to confined conditions. It also occurs in alluvium under water table conditions. The weathered thickness varies from 6 to 18 m in the majority of the area, except in parts of Sidlaghatta and Chikballapura taluks where it ranges from 40 to 60 m. The depth of water level in piezometer generally ranges from 12 to 49 mbgl. The ground water levels are essentially controlled by physiographic features and rainfall distribution. The appreciable change in ground water levels was noticed close to over exploitaiton

Fig-3


HYDROGEOLOGY
KOLAR DISTRICT
KARNATKA
N
ANDHRA PRADESH STATE
TUMKUR DISTRICT
ANDHRA PRADESH STATE
BANGALORE RURAL DISTRICT
TAMIL NADU STATE
BAGEPALLI
GUDIBANDA
GAURIBIDANUR
CHICKBELLAPUR
SIDLAGHATA
CHINTAMANI
SRINIVASAPURA
MULBAGAL
KOLAR
MALUR
BANGARAPET
Geology
Laterite with lithomargic clay
Schist
Granite
Gneiss
Ground Water Prospects
Yield upto 1 litres per second
Yield upto 5 litres per second
Yield >5 litres per second
Borewell with Yield in litres per second
LEGEND
Lineament
Isohyet
Decadal mean water level in m bgl
Taluk boundary
Taluk headquarters

areas, where local troughs are observed.The hydrogeology map of the Kolar district is given in **Fig - 3**

Mode of ground water extraction is through borewells. Among the abstraction structures, borewells are predominant. The yield of borewells in hard rock varies generally from 15 to 200 m^3/day. The depth of irrigation borewells range in depth from 100to 300 mbgl and the yield of borewells ranges from 0.5 to 20 m^3/hour.

Semi-confined to confined aquifer is formed due to fractures in hard formations. This aquifer system is developed by bore wells ranging in depth up to 300m. Its yield ranges up to 1200m^3/day, and specific yield ranges from 2 to 173 lpm/m.

Premonsoon water Level (2006)

Out of 113 NHS wells (averge depth 5-20 mts) , 78 % wells have been dried up. As per the data available for 24 stations of phreatic aquifer i.e shallow zone for May 2006 premonsoon depth to water level varies from 0.89 mts (Avani, Mulbagal taluk) to 14.31 mts (Bestrahalli, Srinivaspur taluk) .A generalised water level map of premonnsoon is given as **Fig- 4** . In general, major part of the district comes under 10-20 m range except in Mulbagal taluk where less than 5 m is also recorded . Northern part of Chintamani and Chickbakkpur deeper water levels are noticed. The water level recorded in Piezometer stations which represent semi confined aquifer, depth to water levels range even up to 49.52 m.

Post monsoon Depth to water level (2006):

Post monsoon Depth to water level in NHS dug wells ranges from 0.13 mts (Avani, Mulbagal taluk) to 14.51 mts (Bestrahalli, Srinivaspur taluk **) .** A generalized water level map of postmonsoon is given as **Fig - 5**. In general major part of the district comes under 5-10 m range and parts of Chickballapur and Srinivaspur show more than 10-20 m range

Seasonal Fluctuation (2006)

The seasonal fluctuation for the 2006 was available for 20% of the stations . Out of which 75% of the wells have shown seasonal rise of water level ranging 0.10 m to 3.64 m with an average of 1.45 m and 25 % of stations show decline of water level ranging 0.14 m to 1.30 m with average of 0.67 m .

For the available 50% of the piezometer stations 42 % stations show seasonal rise of water level ranging 0.77 m to 7.91 m and 58 % stations show declining trend of water level ranging 0.07 to 9.8 m.

Long term water level trend (1997-2006)

Out of 113 observations wells 35 wells have become dry due to decline of water levels. Of the data available for remaining 78 stations, 62% have falling decadal trend ranging from 0.002 m to 3.47 m and 38 % show rising decadel trend ranging from 0.006 m to 2.62 m.

Fig- 4

DEPTH TO WATER LEVEL PRE-MONSOON (MAY-2006)
KOLAR DISTRICT, KARNATAKA

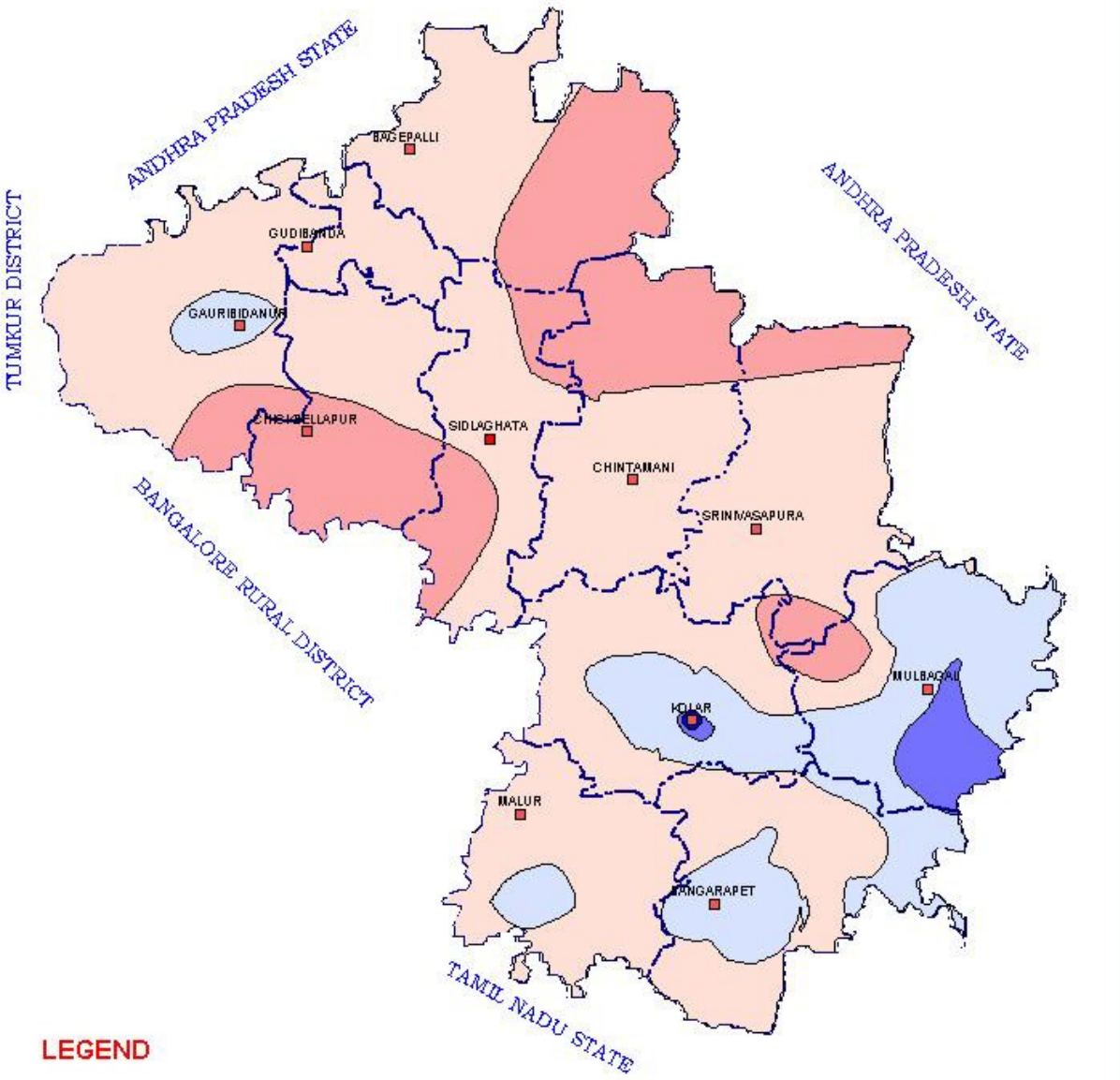
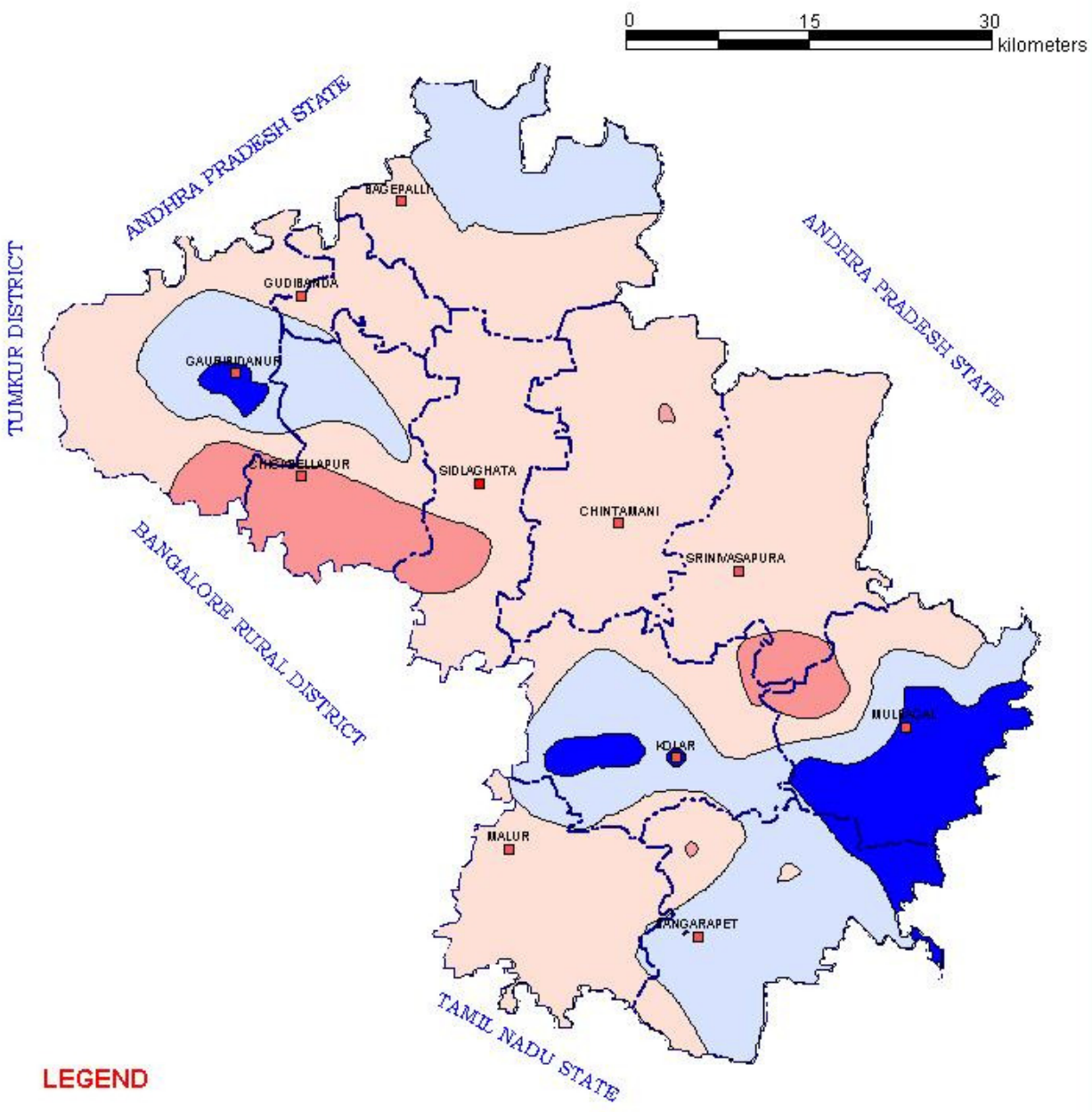


Fig- 5

DEPTH TO WATER LEVEL POST-MONSOON (NOVEMBER-2006) KOLAR DISTRICT, KARNATAKA



Aquifer parameters/well parameters of unconfined aquifer:

Specific capacity of dugwells ranges from 0.22 to 1.69 m3/min/m with unit area sp.capacity ranging from 0.357 to 47 l/m/m/m2.

Aquifer parameters of confined aquifers :

Borewells drilled by CGWB under exploration programme have given a discharge ranging from 0.3 to 10 lps. The maximum depth drilled is 500.00 mbgl. Depth to water level and depth vary from 2 to 39 mbgl. and 30 to 500 mbgl. respectively. Transmissivity ranges from 1 to 102 m^2/day. Frequent fracture depth ranges encountered are 38 to 48, 58 to 62, 108 to 120 and 148 to 151, 200, 360-370 m . which indicate the presence of deep seated fractures.

The average annual unit draft of bore-wells for the district is 1.1 Ha.m. As per well census 2000-01 data the well density for the different taluks ranges from 5 (Bagepalli) to 10 wells/sq.km. (Kolar). The average well density for the district works out to be 8 wells/sq.km.

4.2 Ground water Resources:

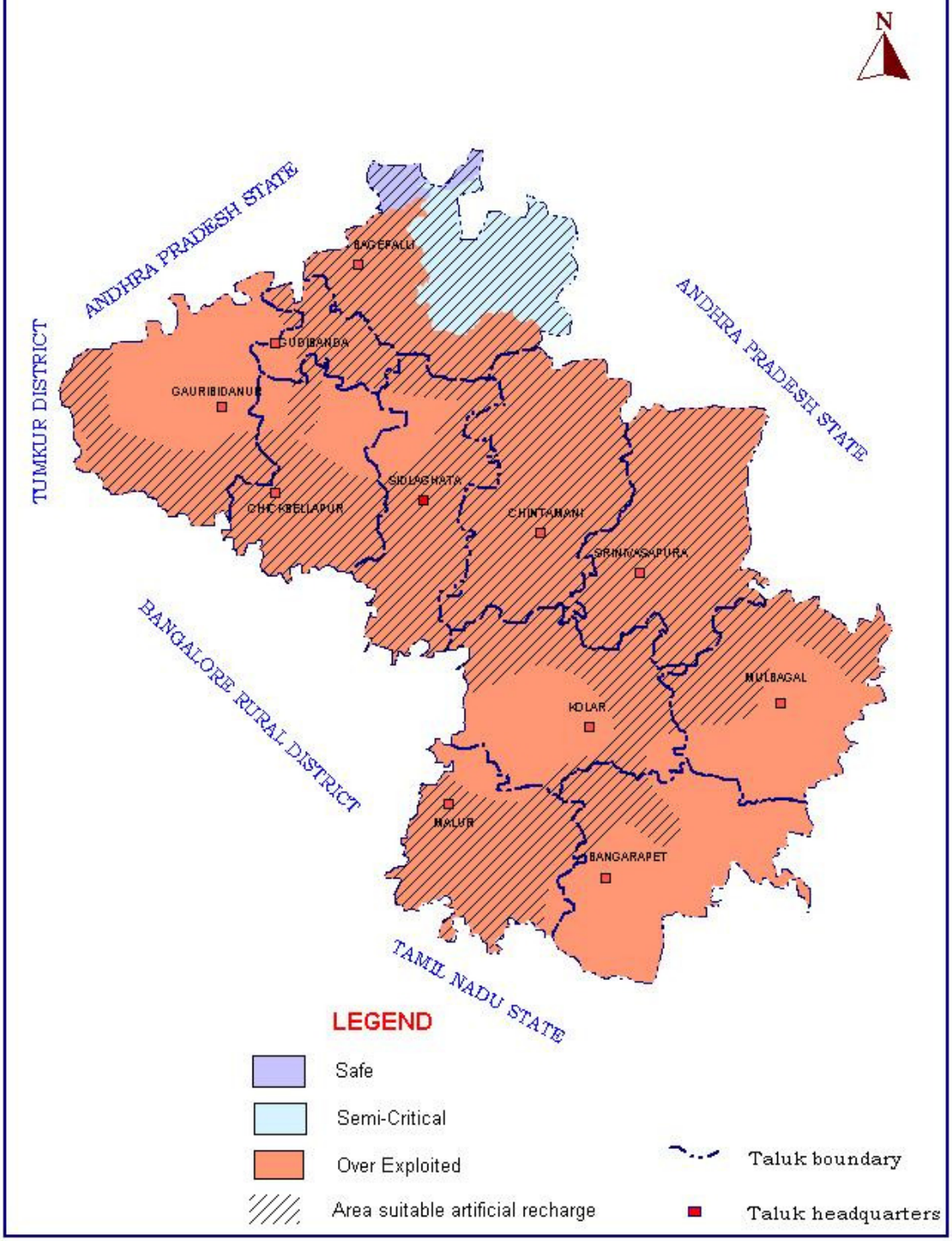
Taluk-wise ground water resources, drafts, balance resources available and the category as on March 2004 are given table –1.

Sl No	Taluk	Net Annual Ground water Availability (HAM)	Existing Ground water Draft for all uses (HAM)	Net Ground water Availability for future Irrigation Development (HAM)	Catagorisation based on Stage of Ground water Development (% area)			
					Safe	Semi-critical	Critical	Over Exploited
1	Bagepalli	5747	7021	1001	8	47	-	45
2	Bangarpet	9845	21924	0	-	-	-	100
3	Chikballapur	5960	13203	0	-	-	-	100
4	Chintamani	4568	8558	0	-	-	-	100
5	Gauri-bidanur	5126	11050	0	-	-	-	100
6	Gudibanda	1238	2382	0	-	-	-	100
7	Kolar	4606	6748	0	-	-	-	100
8	Malur	4913	11667	0	-	-	-	100
9	Mulbagal	7048	14032	0	-	-	-	100
10	Sidlaghatta	5785	13198	0	-	-	-	100
11	Srinivaspur	4227	5541	0	-	-	-	100
	Total	**59063**	**115323**	**1001**				

The net annual ground water availability of the district is 59063 Ham ,draftfor all uses is 115323 ham and available resources for future irrigation development is 1001 ham . Out of 11 taluks 10 are over exploited and in Bagepally taluk about 60% of the area is safe. Average stage of development is -

Fig-6

STATUS OF GROUNDWATER UTILISATION
KOLAR DISTRICT



195 %. There is over draft of 56,260 ham annually in the district . Taluk wise resources and categorization are given in table and **Fig- 6.**

4.3 Ground Water Quality:

In general, the ground water is of acceptable quality for irrigation and domestic use. The pH value of ground water ranges from 7 to 8.67 indicating that the water is alkaline in nature. In major part of the district the specific conductance values are within 2000 us/cm at 25° C. Fluoride concentration of more than 1.5 mg/l. is reported from Bagepalli taluk. However, some of the exploratory borewells also have recorded fluoride concentration of 2mg/l and above. Nitrate concentration of more than 100 ppm is reported from parts of Mulbagal, Bangarpet and Malur taluks. A ground water quality map is presented as **Fig-7.**

4.4 Status of groundwater development :

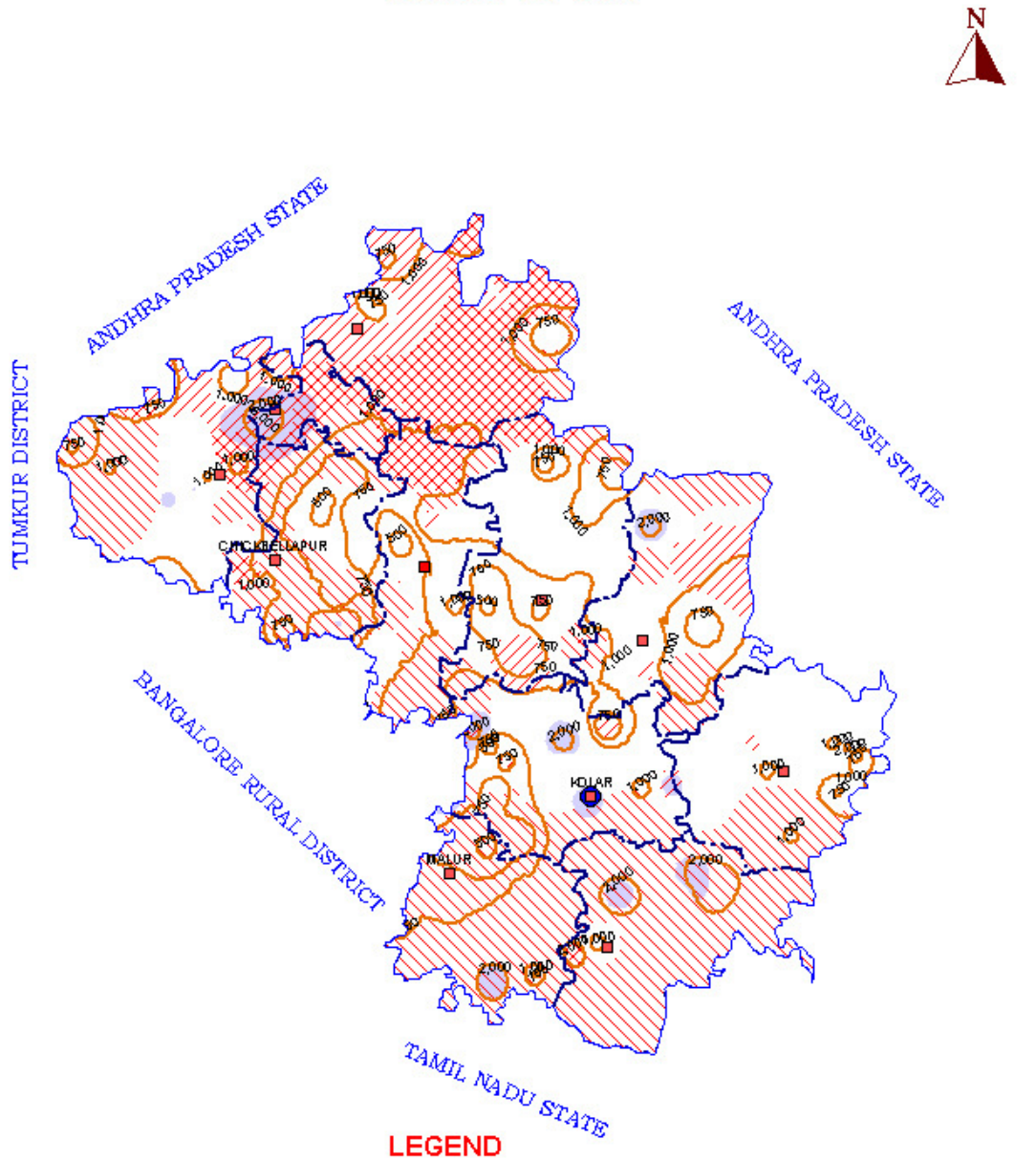
Wells are the major source of irrigation in the district. There are 11196 dug wells and 56684 bore wells in the district as per 3rd MI census. 791dug wells and 1822 bore wells have gone dry in the district due to lowering of water level. Talukwise breakup of the wells is given in table 2.

Table 2: Distribution of wells according to status as per MI Census 2000-01

Sl No	Taluk	Wells in Use		Wells dried up	
		Dug Wells	Shallow BW	Dug Wells	BW
1	Bagepally	1423	3358	49	51
2	Bangarpet	1974	5262	188	144
3	Chickballapur	1692	4348	122	152
4	Chintamani	25	7216	0	354
5	Gauribidanur	1530	6111	98	431
6	Gudibanda	298	1455	9	151
7	Kolar	231	7906	81	128
8	Malur	477	5594	163	231
9	Mulbagal	3071	3781	14	45
10	Siddlaghatta	183	4423	48	28
11	Srinivaspur	292	5230	19	107
Total		**11196**	**54684**	**791**	**1822**

Fig-7

GROUND WATER QUALITY
KOLAR DISTRICT
KARNATAKA



LEGEND

- Fluoride concentration >1.5 Mg/L
- Nitrate concentration > 45 Mg/L
- Electrical conductivity (Micro mhos/cm) — 1000
- Chloride concentration 250-1000 Mg/L
- Taluk boundary
- District headquarters
- Taluk headquarters

Chemical Data source: Central Ground Water Board and Department of Mines and Geology

5.0 GROUND WATER MANAGEMENT STRATEGY :

5.1 Ground Water Development

Ground water is developed both for the domestic and irrigation purposes. Almost the entire domestic water requirement for 25 lakh population and the live stock is met by ground water. As per MI census 2001, they are accounting for about 86% of the total wells in Karnataka. Well irrigation constitutes about 94% of total irrigation. 10405 tube wells and 52868 borewells in use in the district. As on 2002-03 there are altogether 806 piped water supply and 2414 mini water supply schemes in Kolar district which are wholly dependent on ground water. Even though Kolar district stands first in having the maximum number of irrigation tanks (4488 tanks) in Karnataka, their dependability for irrigation again depends upon rainfall conditions. Hence, ground water has a special significance for the all-round development of this water-starved district and plays a vital role in the development of this drought-prone area.

As per the ground water resource estimation, all taluks, except Bagepalli come under the over-exploited category as shown in **Fig-6.** There is no resource for further development in these taluks.

5.2 Water conversation and Artificial Recharge :

CGWB has carried out experimental artificial recharge studies under Central Sector Scheme in Gauribidanur and Mulbagal taluks during 1994-95 to 1998-99. Under this, desilting of two percolation tanks (at Erapothenahalli in Gauridibanur taluk and Manchiganahalli in Mulbagal taluk), watershed treatment in two areas (Basavapura, Gauribidanur taluk, and Bovibikkanahalli, Mulbagal taluk), gravity recharge experiments in two wellfields at Belchikkanahalli and Hussainpura, Gauribidanur taluk, and roof-top rain harvesting structure and point recharge studies at five locations in Hosur (2 Nos.) Baktharahalli & Sonaganahalli in Gauribidanur and Manchiganahalli in Mulbagal taluk were experimented. The above studies have shown favourable results in building up storage in the area to the tune of 3 to 7 m. and resulted in an improvement in the productivity of irrigation borewells

6.0 GROUND WATER ISSUES AND PROBLEMS:

Ground water plays an important role in the economy of the farmers of the Kolar district. This district is popularly known as land of Silk and Milk. Agriculture was mainly dependent on irrigation facility by numerable widely distributed tanks during earlier days. Due to drought situations farmers are now mainly depending upon borewells for their agriculture needs. There are about 122910 bore wells in the district, which reflects on the dependency of farmers on ground water

Taluk-wise ground water resources, drafts, balance resources available and the category as on March 2004 are given in table-3. The figure indicates a limited scope for further exploitation of ground water in parts of Bagepalli taluk only. All the other taluks are over exploited. On an average over

draft of 56,363 ham per year is occurring in the district which results in continuous lowering of water table.

Even though Kolar district stands first in having the maximum number of irrigation tanks (4488 tanks) in Karnataka, their dependability for irrigation again depends upon rainfall conditions. Hence, ground water has a special significance for the all-round development of this water-starved district and plays a vital role in the development of this drought-prone area.

Fluoride concentration of more than 1.5 mg/l. is reported from Bagepalli taluk. However, some of the exploratory borewells also have recorded fluoride concentration of 2mg/l. and above. Nitrate concentration of more than 100 ppm is reported from parts of Mulbagal, Bangarpet and Malur taluks.

7.0 AWARENESS TRAINING ACTIVITY:

7.1 Mass awareness and Water Management Training programmes :

Central Ground Water Board, SWR, Bangalore organized " Mass awareness programme on use and conservation of Ground Water" on 14.9.06 at Bangarpet, Kolar district, Karanataka, as apart of national level programme. The programme was well attended by administrators, local farmers. Display of slogans in local language (Kannada) highlighting to the attributes to ground water were arranged apart from technical maps/ (Reports) charts etc., pertaining to the area. The programme was attended by about 300 persons.

Water Management Training programme on artificial recharge techniques was conducted between 12/09/06 and on 13/09/2006 at Kolar and participated by around 40 trainees from various state government departments, NGOs and progressive farmers of the district.

7.2 Participation in Exhibition , mela , fair etc :

An exhibition stall was arranged by CGWB on participating in Bharat Nirman campaign organized by Press Information Bureau at Mulbagal town .The stall exhibited various aspects of ground water management, rainwater harvesting and artificial recharge to Ground water with help of models, posters, charts and documentaries. Film shows were also organized during the five days exhibition. CGWB officers delievered lectures and participated in workshops arranged by PIB in connection with Rajiv Gandhi Drinking water scheme and Rain water harvesting and artificial recharge to ground water at Mulbagal town .

8.0. Areas notified by CGWA/SGWA – Nil

9.0 . Recommendations :

Considering the prevailing scenario of the groundwater resources and development the following recommendations are made for the optimum drawl with sustainable development of resources in the area.

1. Construction of check dams and sub surface dykes at appropriate places across the nallahs and streams in the water table depleting areas, over exploited, critical areas of the district and the areas where water quality problem exists may be taken on priority basis.
2. Considering the fresh water scarcity in the district, a comprehensive programme should be formulated to harvest the rain water through roof top, check dams, surface tanks, bunds and subsurface dykes to use the resources directly from the structures, which in turn to arrest the sub surface flows and augment the groundwater resources.
3. The ground water worthy areas such as topographic lows, valley portions low fluctuations zones should be developed with an adequate soil conservation measures to prevent the soil erosions during rainy seasons.
4. Constant monitoring of ground water quality should be carried out in the fluoride-contaminated areas to prevent further deterioration and related problems. The determination of trace elements and organic compound be done to help in categorizing the quality of water.
5. A detailed geophysical study with the help of the state of the art technology should be conducted to demarcate the extent of potential aquifers and its geometry, especially in central plain region.
6. Except part of Bagepally taluk all other areas come under over exploited categories. In these taluks Ground water legislation should be implemented to avoid further adverse effects of ground water system of the area
7. In semi-urban areas like Kolar town and other taluk Head quarters a lot of roof area is available for rooftop rain water harvesting. So in these semi-urban areas rooftop rainwater harvesting practices may be encouraged. This will help in reducing the load on urban water supply systems.