Draft Report

केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

भारत सरकार

Central Ground Water Board

Ministry of Water Resources, River Development and Ganga Rejuvenation

Government of India

Report on

AQUIFER MAPPING AND MANAGEMENT PLAN

Bangarpet Taluk, Kolar District, Karnataka

दक्षिण पश्चिमी क्षेत्र, बैंगलोर

South Western Region,Bengaluru

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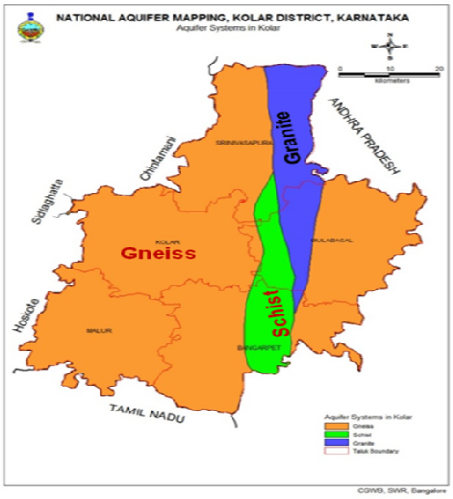
No. Naquim-Taluk -01/2016-17

GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES,
RIVER DEVLOPMENT AND GANGA REJUVANATION
CENTRAL GROUND WATER BOARD

BANGARPET TALUK AQUIFER MAPS AND MANAGEMENT PLANS, KOLAR DISTRICT, KARNATAKA



By

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CENTRAL GROUND WATER BOARD
SOUTH WESTERN REGION
BANGALORE
DECEMBER 2016

BANGARPET TALUK AQUIFER MAPS AND MANAGEMENT PLANS,

KOLAR DISTRICT, KARNATAKA

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BANGARPET TALUK AQUIFER MAPS AND MANAGEMENT PLANS,

KOLAR DISTRICT, KARNATAKA

1. SALIENT INFORMATION

1.1 Name of the taluk- BANGARPET

District – Kolar

State- Karnataka. (Administrative map is given in Fig 1).

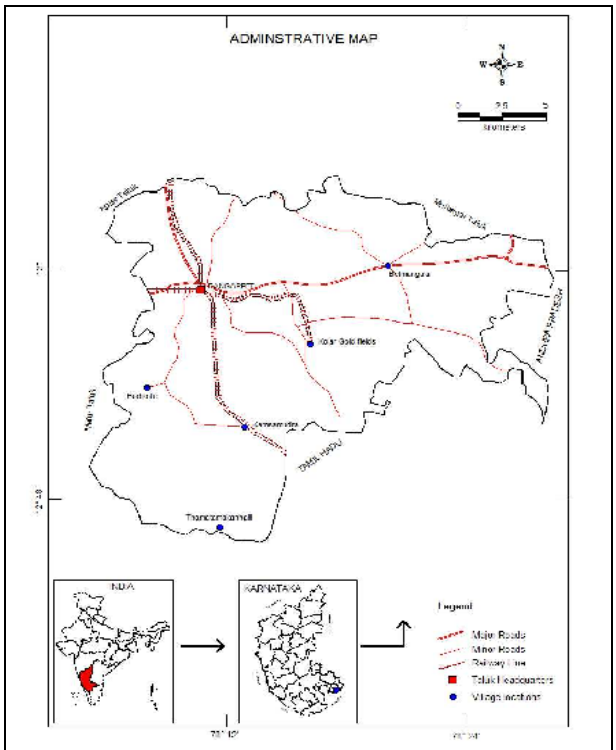


Fig 1. Administrative map of Bangarpet taluk

1.2 Area – 848 sq. kms. (12° 45′ 30′′, 13° 04′ 55′′ N : and 78° 05′ 15′′, 78° 28′ 20′′ E);

Toposheets: 57K/4, 57 K/8, 57 L/1: 57 L/5 (1:50,000)

1.3 Population: Census 2011

Taluk/District	Rural	Urban	Total	Decadal Growth rate	Density of population/sq. km.
Bangarpet taluk	235566	220504	456070	8.22%	538
Kolar district	1056953	483278	1540231	11.39%	388

For 2025- population projected is 52485 (annually 0.822*14yrs*456070)=508555

1.4 Normal Rainfall: (1981-2010) in mm

Taluk	Annual Normal RF	Normal monsoon RF	Normal non-monsoon RF
Bangarpet	739.7	291	448.7

1.5 Agriculture and Irrigation: area in Ha

Principal crops	Net sown area	Gross sown area	Cropping intensity	Area under irrigation		No. of abstraction structures	
				Surface water	Ground water	Dug wells	Bore wells
Ragi, pulses, vegetables, fruits, Mulbarry, oil seeds	33365 (45%)	35216	1.06	367 (7.35%)	4621 (92.65%)	5658	17823

(Source: Kolar district at a Glance 2011-12)

Land use map of Bangarpet taluk is given in figure 2.

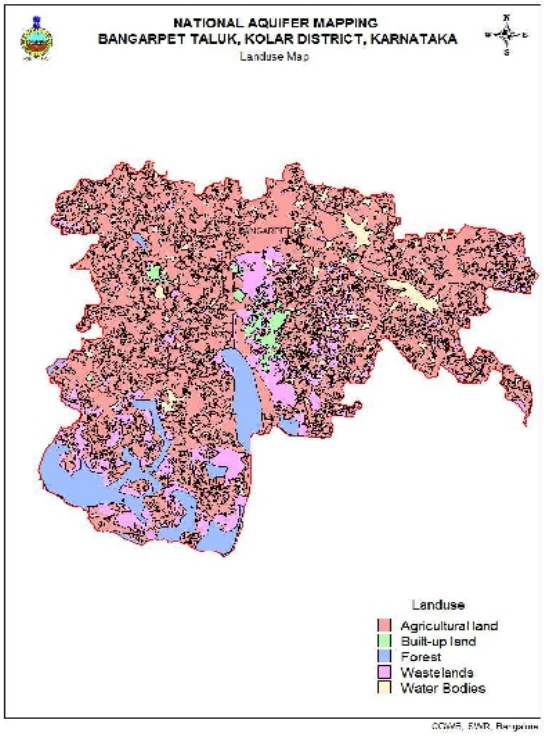


Fig 2. Land use map, Bangarpet taluk

1.6 Ground water resource availability and extraction

(Aquiferwise upto 200 m depth)

Total GW Resources (2009), (Ha m)

Taluk	Annual replenishable GW resources	Fresh In-storage GW resources		Total availability of fresh GW resources
		Phreatic	Fractured (Down to 200m)	Dynamic + phreatic in-storage + fractured
Bangarpet	4724	10281	2379	17384

Extraction:

Taluk	Net annual GW availability	Total draft for all uses	Stage of GW development, %	Category
Bangarpet	4780	9528	199	OE

1.7 Existing and future water demands

- No scope for further Irrigation from GW
- Domestic (Industrial sector) demand: 292.05 MCM (From GWRE-2011)

1.8 Water level behavior

Depth to water level

Aquifer-I

- *Pre-monsoon: 1.62 – 12.65 mbgl*
- *Post-monsoon: 0.5 – 12.07 mbgl*
- *Fluctuation: 0.22 – 9.15 m*

Aquifer-II

- *Pre-monsoon: 10.93 – 117.06 mbgl*
- *Post-monsoon: 3.3 – 96.52 mbgl*
- *Fluctuation: 7.63 – 52.41 m*

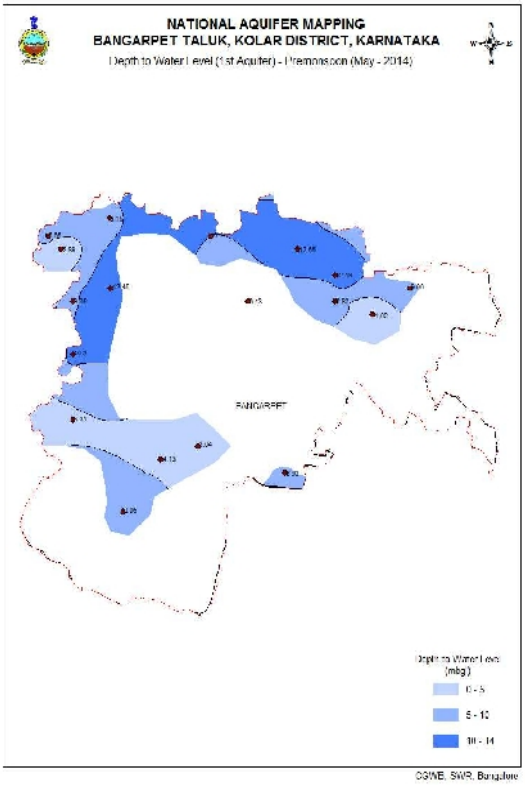


Fig 3A. Pre-monsoon Depth to water level, Aq-I

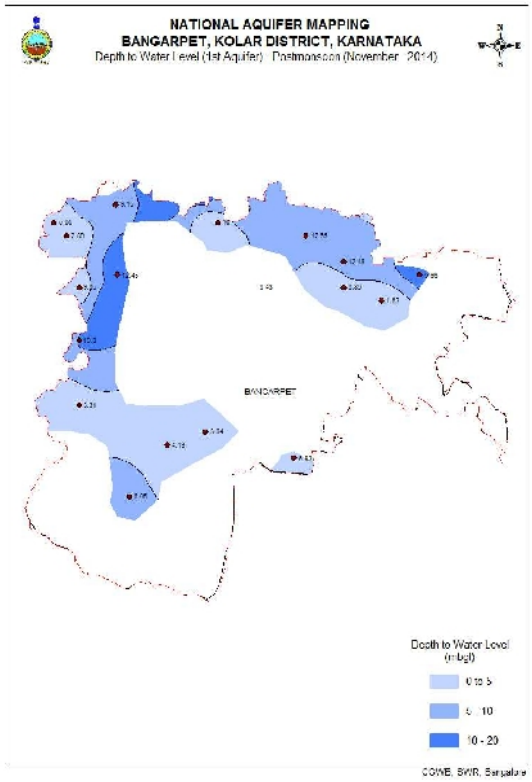


Fig 3B. Post-monsoon Depth to water level, Aq-I

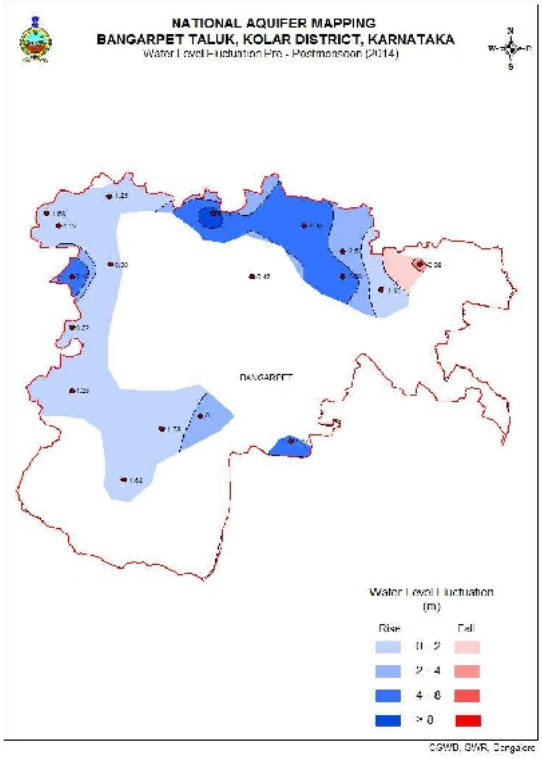


Fig 4. Water Level Fluctuation map, Aq-I

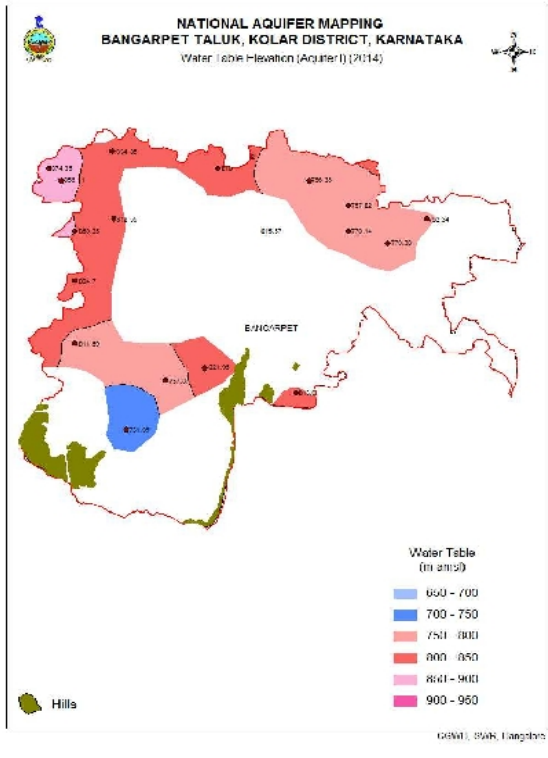


Fig 5. Water Table Elevation map, Aq-I

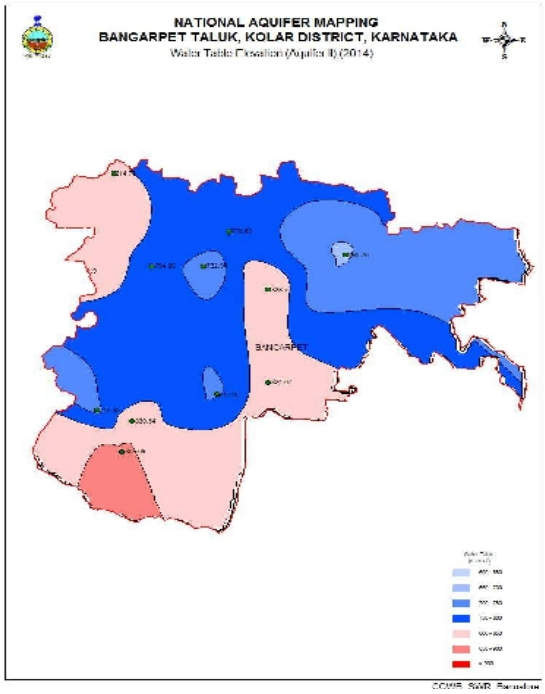


Fig 6. Water Table elevation map, Aq-II

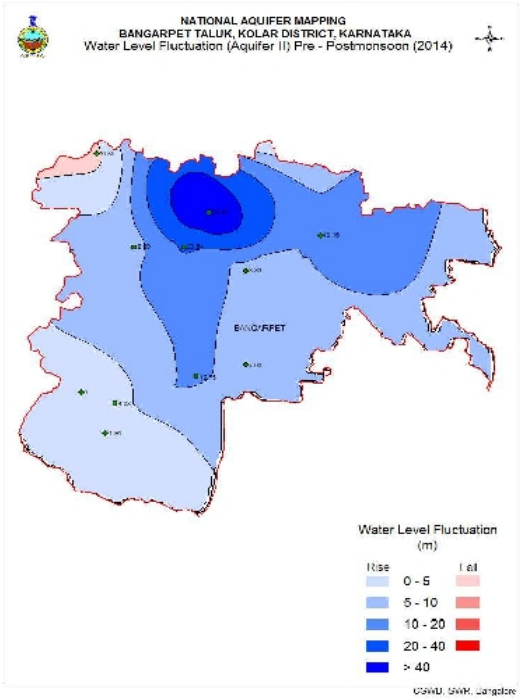


Fig 7. Water level Fluctuation map, Aq-II

2. AQUIFER DISPOSITION

In the area, there are mainly two types of aquifer syatems:

i. **Aquifer-I (Phreatic aquifer) comprising** Weathered Gneiss / Granite / Schist

Average thickness of weathered zone is 30 mbgl and is shown in figure 9.

ii. **Aquifer-II, (Fractured, multi-aquifer system) comprising** Fractured Gneiss / Granite / Schist. Geology map of the taluk is given in figure 8.

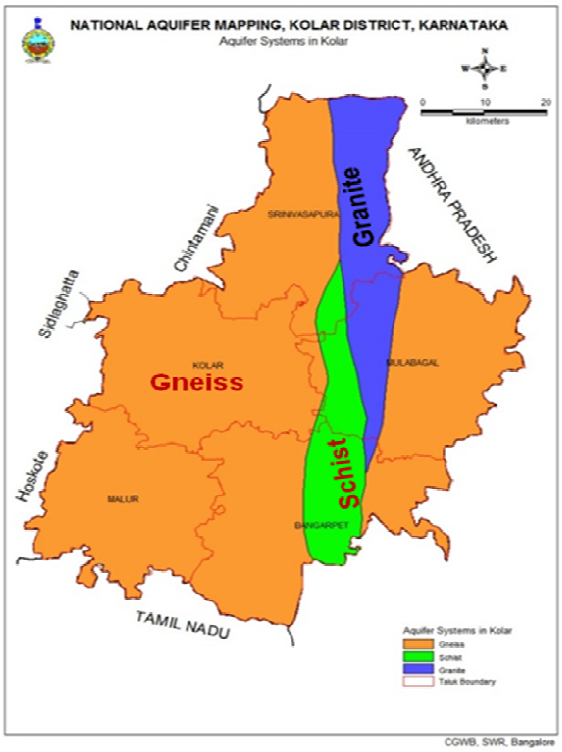


Fig 8. Geology map, Bangarpet taluk

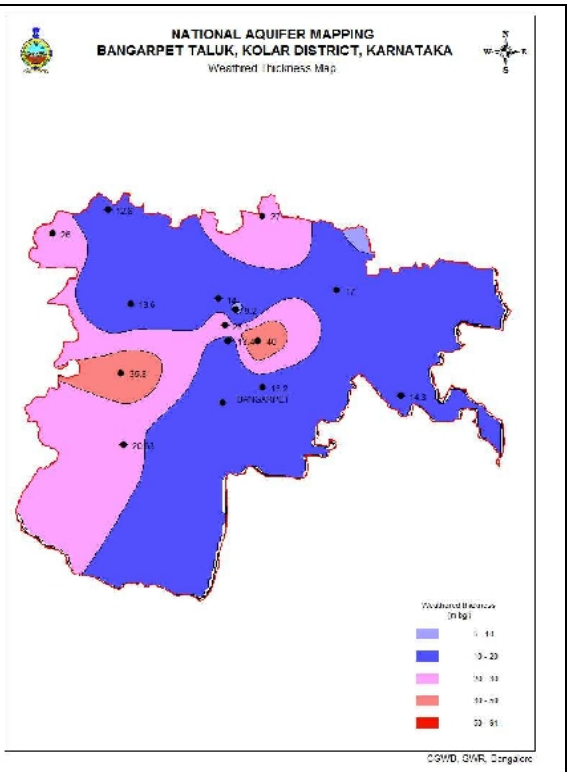


Fig 9. Weathered thickness map, Bangarpet taluk

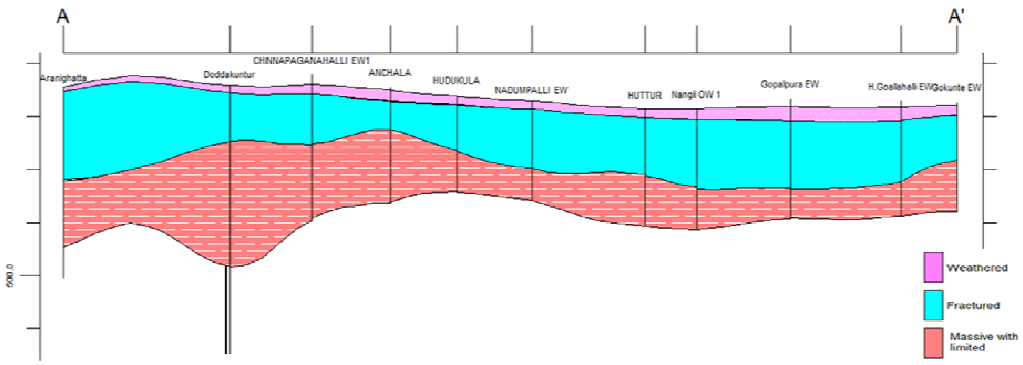
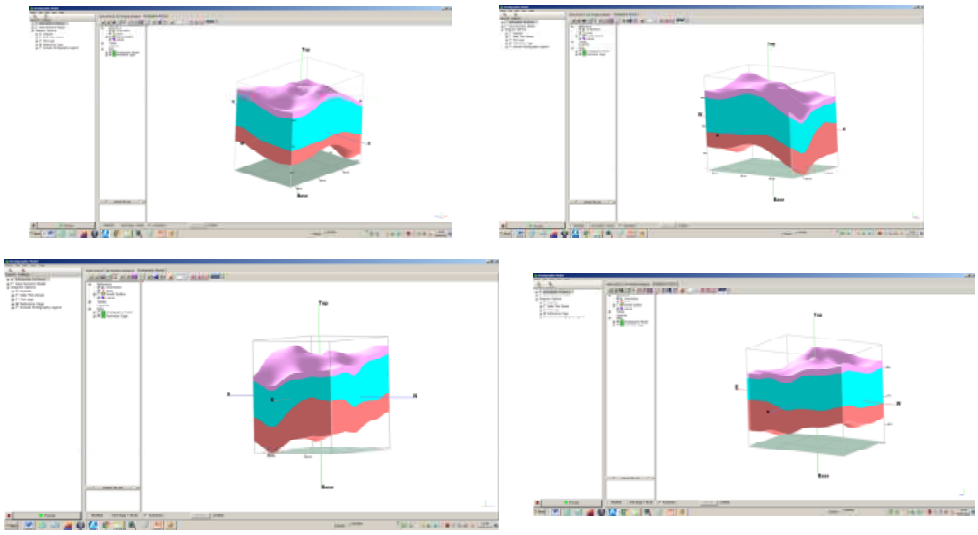


Fig 10. Cross section along NE-SW, Bangarpet taluk

Bagarpet Taluk



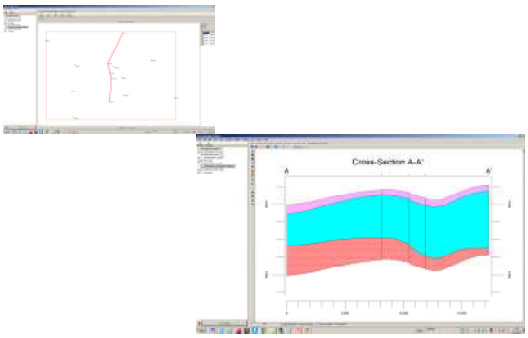
Aquifer legend

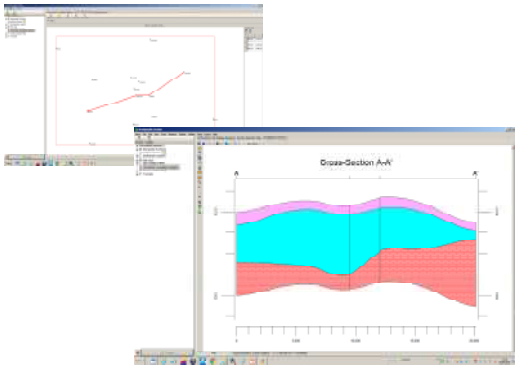
Weathered

Fractured

Massive with limited fractures

Fig 11. Aquifer disposition, Bangarpet taluk (Rockworks output)





Cross section along N-S	Cross section along E-W

Fig 12. Cross sections along different directions, Bangarpet taluk

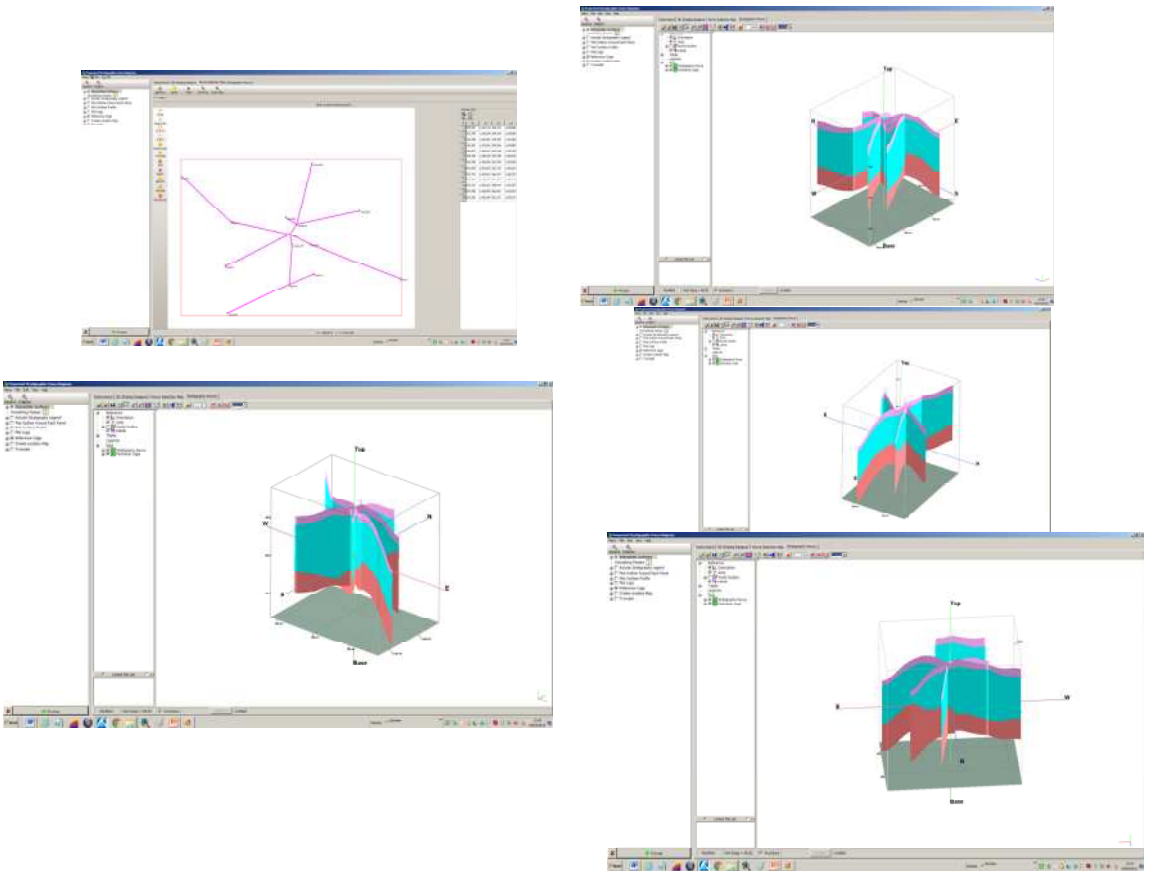


Fig 13. Fence diagram along different sections, Bangarpet taluk

3. GROUND WATER RESOURCE, EXTRACTION, CONTAMINATION AND OTHER ISSUES

3.1 Ground water resource

Dynamic GW Resource (2011) (Ha m).

Taluk	Net annual GW availability	Total draft for all uses	Stage of GW development, %	Category
Bangarpet	4780	9528	199	OE

Total GW Resources (2009) (Ha m).

Taluk	Annual replenishable GW resources	Fresh In-storage GW resources		Total availability of fresh GW resources
		Phreatic	Fractured	Dynamic + phreatic in-storage + fractured
Bangarpet	**4724**	**10281**	**2379**	**17384**

3.2 Ground water quality

Groundwater is generally good and potable.

- EC is generally within permissible limit except a few isolated areas.
- Nitrate and fluoride are the two quality parameters causing health hazards in the area.
- Nitrate is anthropogenic.
- Fluoride is geogenic.

Quality maps

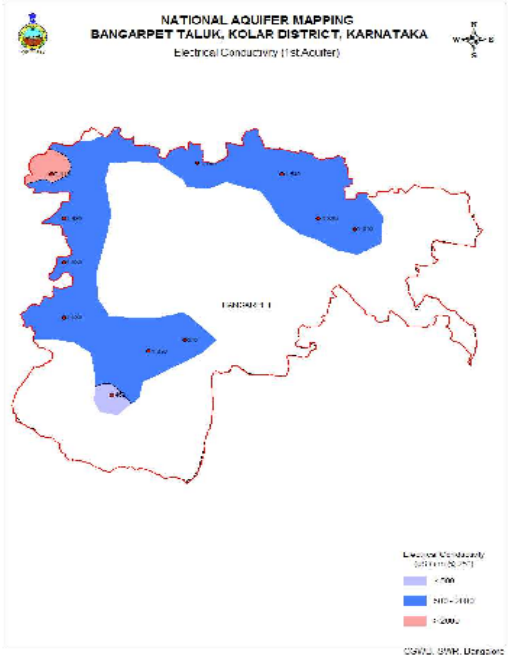


Fig 12A. EC distribution in Aq-I

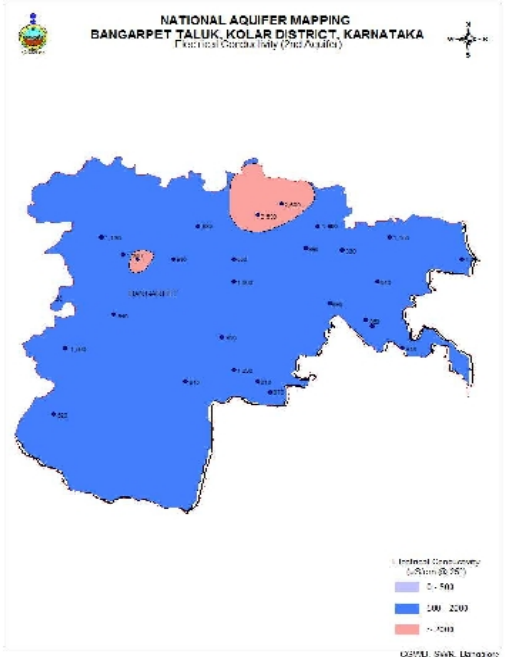


Fig 12B. EC distribution in Aq-II

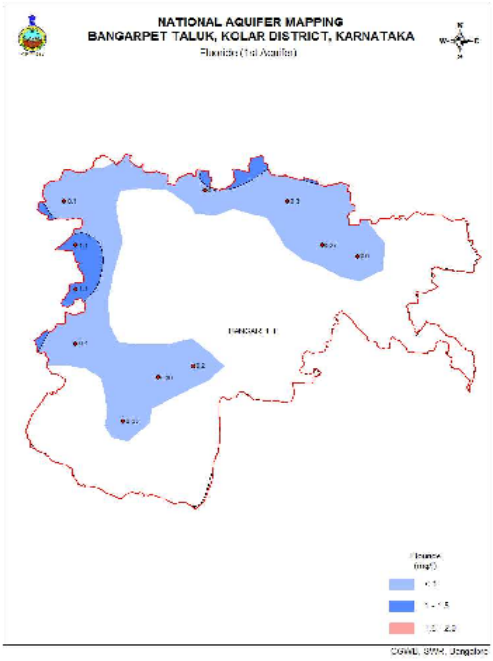


Fig 13A. Fluoride distribution in Aq-I

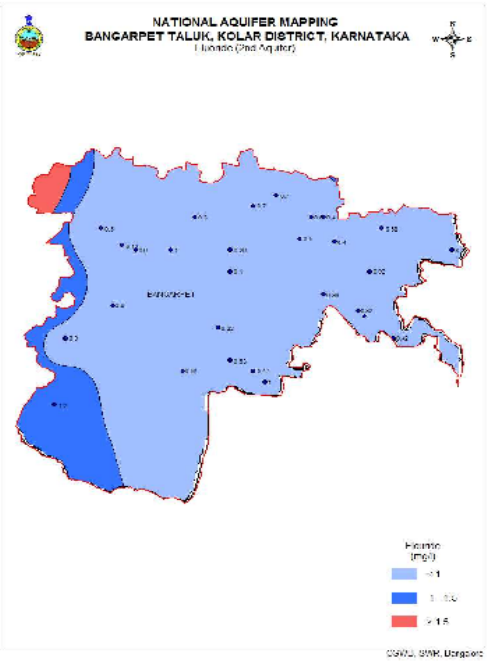


Fig 13B. Fluoride distribution in Aq-II

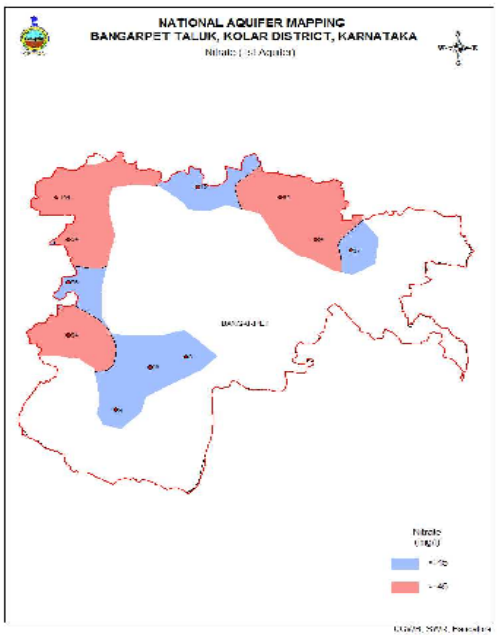


Fig 14A. Nitrate distribution in Aq-I

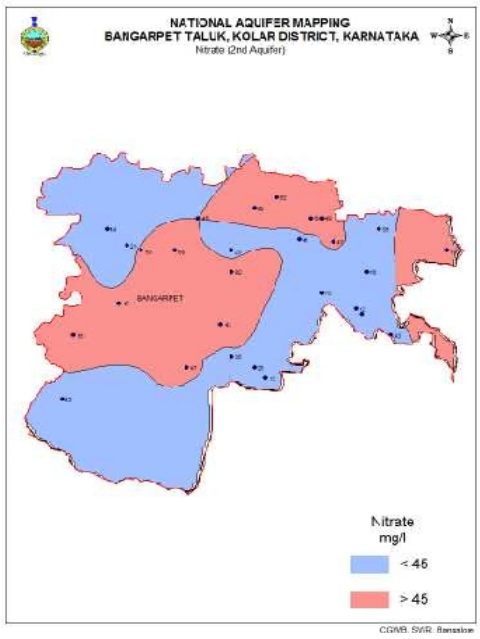


Fig 14B. Nitrate distribution in Aq-II

3.3. Poor Sustainability

- Groundwater is the sole source.
- Rainfall is the only source of recharge.
- Deep bore wells of more than 800-900 ft with deep seated fractures are not sustainable under OE condition.
- The deep fractured aquifers are not annually getting recharged and hence, due to prevailing heavy over- draft condition, fractured aquifers are not sustainable.

4. GROUND WATER RESOURCE ENHANCEMENT

4.1 Aquiferwise space available for recharge and proposed interventions.

Quantity of water available through non-committed surface runoff

Artificial Recharge Structures Proposed	Bangarpet Taluk
Non committed monsoon runoff available (Ham)	1380
Number of Check Dams	85
Number of Percolation Tanks	6
Number of Point Recharge structures	9
Tentative total cost of the project (Rs. in lakhs)	302.4
Excepted recharge (MCM)	7.81
Expected rise in water level (m)	0.5
Cost Benefit Ratio (Rupees/ cu.m. of water harvested)	3.9

4.2 Improvement in GW availability due to Recharge

Taluk	GW availability	Stage of GW dev %	Expected Additional Recharge from non committed monsoon runoff	Expected Increase in GW Availability	Expected Stage of GW Development after recharge (%)
Bangarpet	4780	199	1380	6160	155

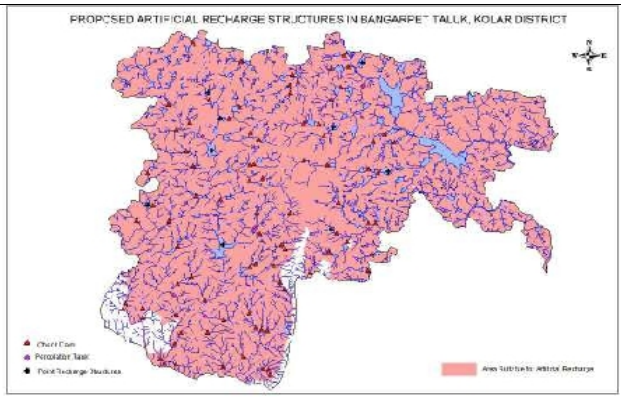


Fig 15. Locations of AR structures proposed, Bangarpet taluk

4.3 Other interventions proposed, if any.-nil

5. DEMAND SIDE INTERVENTIONS

5.1 Advanced irrigation practices

- Efficient irrigation practices like Drip irrigation & sprinkler are already adopted by the farmers in about 70% of the irrigated area.
- Irrigation draft is 9236 ham
- If, the remaining 30% is adopted for water use efficient irrigation techniques, savings in water is 30% of irrigation draft.

Fig 16. Efficient Water Use irrigation techniques in practice

5.2 Change in cropping pattern:

- Not necessary as due to water scarcity, heavy duty crops are not grown in the taluk.

5.3 Alternate water sources:

- Inter-basin transfer from west-flowing river Yettinahole project

  (Talukwise quantity to be assessed)

- Transporting tertiary treated water from Bangalore city and filling MI tanks for groundwater recharge, (Talukwise quantity to be assessed)

5.4 Regulation and Control:

Bangarpet taluk has been notified for groundwater development by Karnataka Ground Water Authority

5.5 Other interventions proposed, if any, - Nil