



केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण

विभाग, जल शक्ति मंत्रालय

भारत सरकार

Central Ground Water Board

Department of Water Resources, River
Development and Ganga Rejuvenation,

Ministry of Jal Shakti

Government of India

AQUIFER MAPPING AND MANAGEMENT OF GROUND WATER RESOURCES

**KUSHTAGI TALUK, KOPPAL DISTRICT,
KARNATAKA**

दक्षिण पश्चिमी क्षेत्र, बैंगलोर

South Western Region, Bengaluru



AQUIFER INFORMATION AND MANAGEMENT SYSTEM

CENTRAL GROUND WATER BOARD

REPORT ON AQUIFER MANAGEMENT PLAN KUSHTAGI TALUK, KOPPAL DISTRICT, KARNATATA STATE

Table 1:

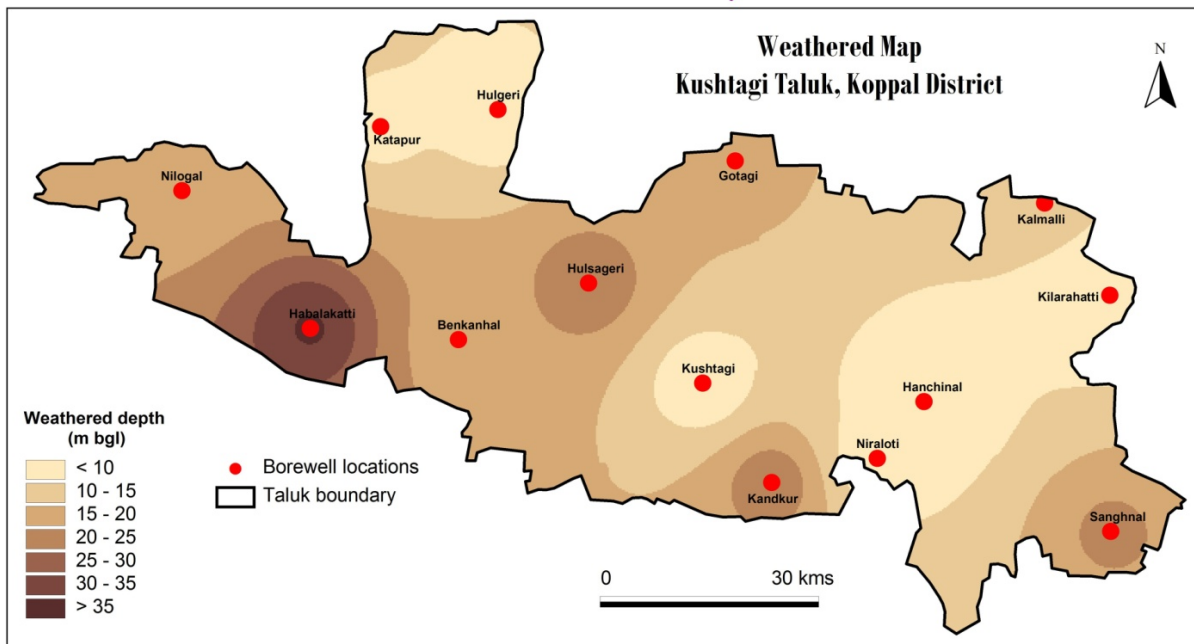
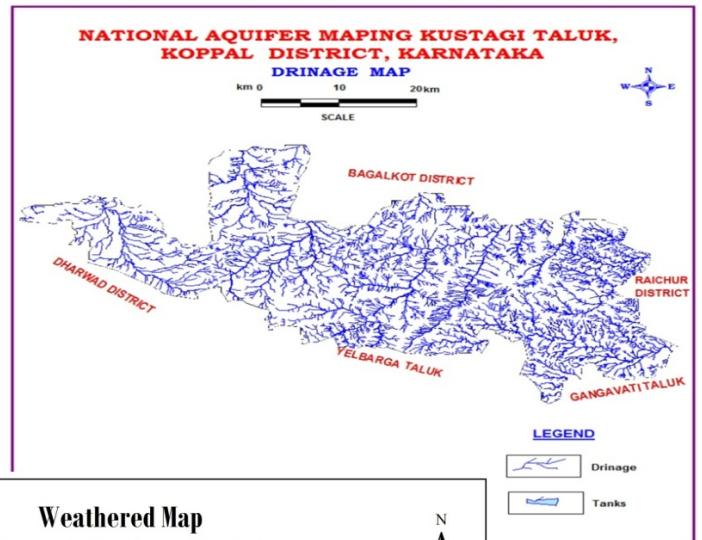
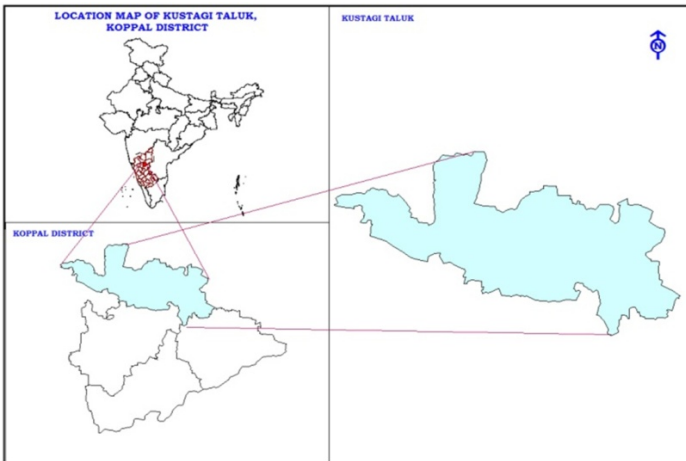
General Information	
District:	Koppal
Taluk:	Kushtagi
Geographical Area:	1359 sq.km
Hoblies/Panchyaths/ Villages	The taluk have 4 Hoblies 36 Panchyaths, (http://panchamitra.kar.nic.in/) 165 villages (https://www.census2011.co.in/)
Principal Aquifer System:	Banded Gneissic Complex (90%), Basalt (7%) and Limestone (3%)
Basin/Sub basin :	Basin: Krishna Sub-basin: Krishna Upper Sub-Basin & Tungabhadra Lower Sub-Basin (INDIA-WRIS)
Major Aquifer System:	Two aquifer systems have been mapped viz. (i) Aquifer I: Phreatic i.e. weathered (ii) Aquifer II: Fractured
Normal Annual Rainfall:	562 mm (District GW Brochure)
Taluk's Coordinate extents:	Longitude: East 75° 45' 53.47" – 76° 29' 13.33" Latitude: North 15° 37' 46.21" – 16° 01' 40.58"
Town's Coordinates:	76° 11' 28.64" E - 15° 45' 15.53" N

Table2:

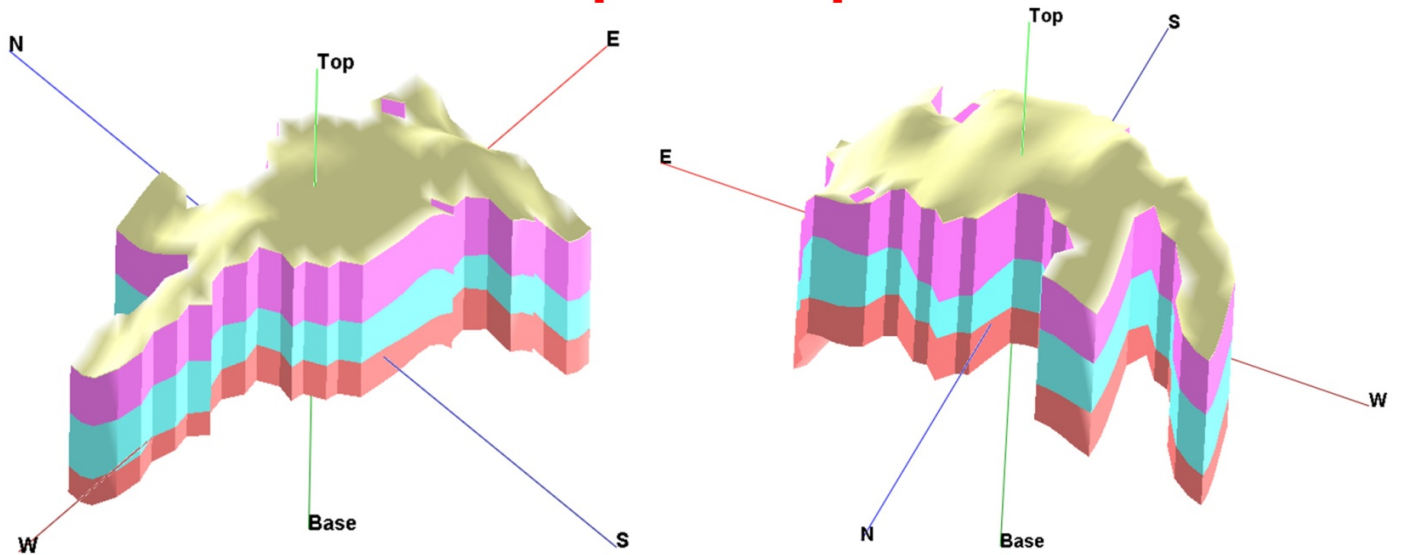
Aquifer Disposition	
Aquifer Disposition:	<p>Two aquifer systems have been mapped viz.</p> <ul style="list-style-type: none"> • Aquifer I: Weathered aquifer down to the depth of till 36 m bgl (Granitic gneiss) • Aquifer II: Fractured aquifer down to the depth of 147 m bgl (Granitic gneiss) (Source: WAPCOS Outsourcing drilling data)
Status of GW exploration:	<p>In-house: Upto 1998</p> <ul style="list-style-type: none"> • Exploratory Wells : 4 EW & 5 OW • Depth range: 31 to 80 m bgl, Weathering: 1 to 6 m bgl, Yield: <1 to 4lps) (Ref.: Inhouse exploration database collected from TS cell) <p>Outsourcing through WAPCOS: 2018</p> <ul style="list-style-type: none"> • Exploratory Wells : 14 EW • Depth range: 200 m bgl, Weathering: 5 to 36 m bgl, Yield: <1 lps)
Aquifer Characteristics:	<ul style="list-style-type: none"> • Exploratory Wells: Depth range: 31 to 200 m bgl, Weathering: 1 to 36 m bgl, Yield: < 1 to 5.25 lps (including Observation Wells), 65% of potential fractures between the depth of 120 to 200 m bgl. • Average depth to water level: Dugwells: 3.86 m bgl (May 2016); 6.12 m bgl (Nov 2016), Pz: 8.80 m bgl (May 2016); 8.92 m bgl (Nov 2016) (NHS database) • Trasmmissivity – 0.2 (m²/day)
GW Quality:	<ul style="list-style-type: none"> • Phreatic Aquifer (Aquifer – I): EC: 820 - 1850 (µS/cm at 25°C), F: 0.55 – 1.35 mg/l and NO3: 49 – 56 mg/l • Fractured Aquifers(Aquifer II): EC:750 - 800 (µS/cm at 25°C), F: 0.89 – 3.2 mg/l and NO3: 49 – 60 mg/l
Aquifer Potential:	<ul style="list-style-type: none"> • Aquifer I: Phreatic i.e. weathered is dry in several parts of the district but restricted to limited patches. • Aquifer II: Fractured (yield ranges between negligible to 1 lps)
CGWB GW Monitoring status:	<ul style="list-style-type: none"> • WL ranges from 2.10 to 8.85 m bgl during pre-monsoon 2016; 3.6 to 8.85 during post-monsoon 2016), Pz: 8.80 m bgl during May 2016; 8.92 m bgl during Nov 2016.
GW Management Issues	<ul style="list-style-type: none"> • Water levels are shallow • Water quality issues
GW Resources:	<ul style="list-style-type: none"> • Net Annual Ground Water Availability: 11724 ham • Existing Gross Ground Water Draft: Irrigation – 6159 ham, Domestic & Industrial Uses – 513 ham, Total: 6672 ham • (Source: GEC 2017)
GW Stage of Development (%)	<ul style="list-style-type: none"> • Stage of Ground Water Development:57 % • Category: Safe (Source: GEC 2017)
Existing and Future Water Demand:	<ul style="list-style-type: none"> • Irrigation development: 5038 ham • Domestic & Industrial Use (for next 25 years): 594 ham(Source: GEC 2017)
GW Management Plans	<ul style="list-style-type: none"> • In the safe areas there is scope for ground water development: more than 5000 borewells area feasible in Kushtagi taluk with an annual draft of 1.1ham/well. • In areas of inferior water quality, attempts can be made to locate suitable sites for bore well construction, adjacent to canal/distributaries, so that wherever bad quality water is encountered it can be mixed with good quality canal water and supplied for irrigation. • This may help to supply more water at the tail end of the canal command area. Micro level ground water studies may be initiated for effective management of

	the ground water resource.
AR & Conservation Possibilities	<ul style="list-style-type: none">• Depicted in Plates/Tabular formats
Optional	<ul style="list-style-type: none">• -

PLATE – 1



3D Aquifer Disposition



Type of Aquifer	Formation	Thickness (m bgl)	Fracture (m bgl)	Yield rage (lps)	Sustainability of wells
Aquifer - I Pheratic/ Weathered	Granitic Gneisses and Schists	0 - 36	Dry in most parts of the district	-	-
Aquifer - II Fractured	Granitic Gneisses and Schists	Upto the depth of 200 m bgl	43 - 185 m	< 1 - 5.23	1 - 5 hrs

PLATE – 3

3D Fence Diagrams

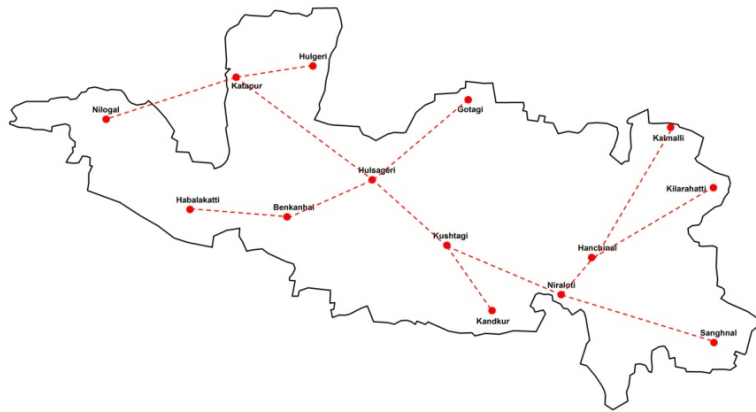
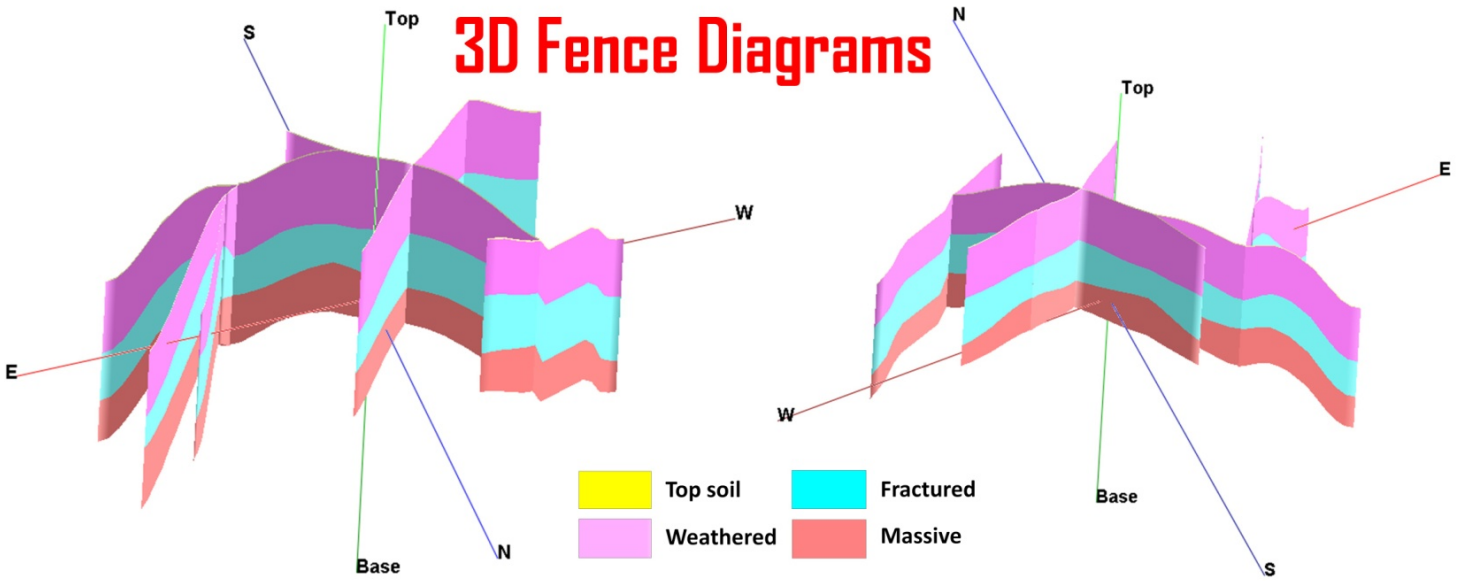
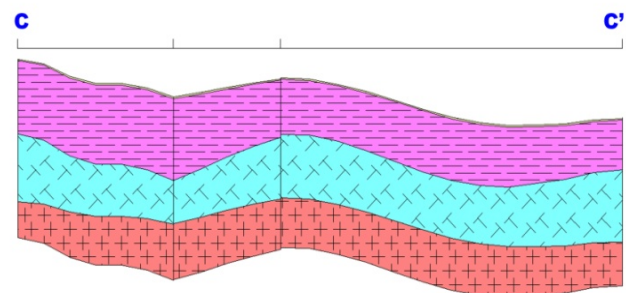
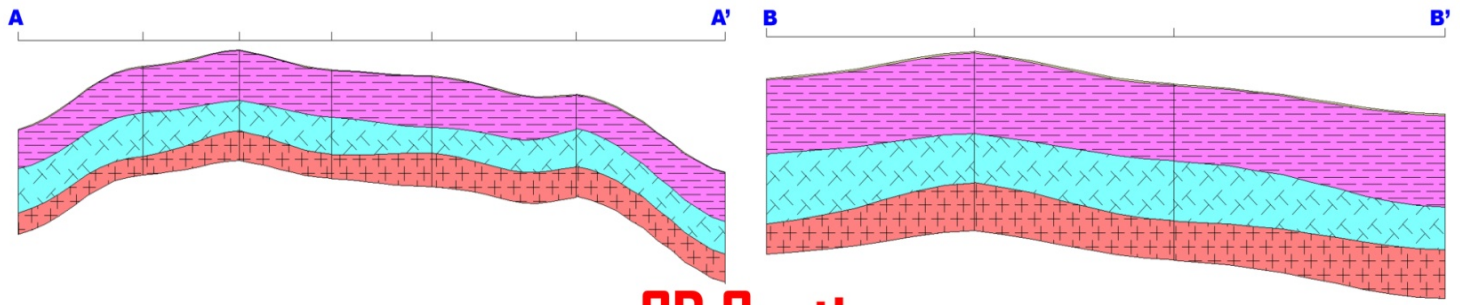


PLATE – 4



2D Sections

- Top soil
- Weathered
- Fractured
- Massive

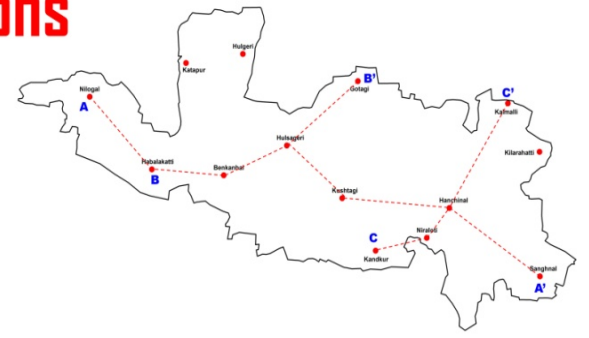


PLATE – 5

ISSUES:

- **Ground water is the sole source.**
- **Experiences a semi-arid type climate characterized by hot summer and low rainfall.**
- **Low Rainfall 562 mm/year.**
- **Deep borewells of more than 200 m bgl with deep seated fractures.**
- **Deep fractured aquifers are not annually getting recharged.**
- **Poor sustainability.**
- **Groundwater Quality Issues.**

PLATE – 6

ISSUES:

Taluk-wise long-term average rainfall data (mm)

Taluk	Total Number of working stations	Normal rainfall (1941-1990)	Actual average rainfall(m.m) (2009)	Actual average rainfall(days) (2009)
KUSHTAGI	6	562	913	46

Source: web, koppalnic.in

Land utilization in Kushtagi taluk (in hectares)

Taluk	geographical area	Forest	Non agricultural	Barren	Cultivable waste	Net Area sown	Permanent Pasture
Kushtagi	135779	4110	7626	2361	811	02424	3898

Source: www.koppal nic.in

Net Irrigated Area (ha) in Kushtagi taluk (in hectares)

Taluk	canals	Tanks	Wells	Borewells	Lift irrigation	Other source	Total
Kushtagi	0	150	0	8326	0	0	8476

Source: CGWB, District GW Brochure, 2012

MANAGEMENT PLANS:

- The district comes under northern dry zone and the climatological factors are very much suitable for growing the horticulture crops.
- The farmers of the district are very much interested in adopting hi-tech horticulture such as green house cultivation of vegetables, growing flowers under controlled conditions, keeping high standards of export in mind.
- Water management practices, specially drip Irrigation and sprinkler Irrigation are important features of the taluk. Wherever shallow water levels are noticed, it may be transferred to upland areas. So that it would solve the water scarcity in many villages.

PLATE – 8

**MASTER PLAN FOR ARTIFICIAL RECHARGE TO GROUND WATER:
KUSHTAGI TALUK, KOPPAL DISTRICT**

Taluk	Area Feasible for AR (Sq.Km)	Number of Recharge Structures Completed by various agency			Number of Proposed Recharge Structures				Cost of Recharge Structures (Rs. In Lakhs)			
		CD/MACD/D	PT	PRS	Sub surface dyke	Pecolation tank	Check dam	Filter Beds	Sub surface dyke (@Rs 20 lakhs)	Pecolation tank (@Rs 20 lakhs)	Check dam(@Rs 10 lakhs)	Filter Beds(@Rs 1.5 lakhs)
KUSHTAGI	1366	1021	0	627	6	194	130	0	115.09	3884.36	1299.21	0.00

Taluk	Availability of Surface non committed monsoon runoff (MCM)	Recharge Capacity of each structure (MCM)				Total Recharge capacity (MCM)	Total Cost in Lakhs	Expected benefit of artificial recharge & RWH	
		Sub surface dyke	Pecolation tank	Check dam	Filter Beds			Vol. of water likely to be recharged (MCM)	Additional Irrigation Potential (Lakh Hectares)
KUSHTAGI	215.798	32.370	107.899	53.949	21.580	215.798	5298.657	161.848	0.195