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

JAMAKHANDI TALUK, BAGALAKOTE DISTRICT, KARNATAKA

दक्षिण पश्चिमी क्षेत्र, बैंगलोर

South Western Region, Bengaluru

AQUIFER INFORMATION AND MANAGEMENT SYSTEM

CENTRAL GROUND WATER BOARD

REPORT ON AQUIFER MANAGEMENT PLAN
JAMAKHANDI TALUK, BAGALAKOTE DISTRICT, KARNATATA STATE

Table 1:

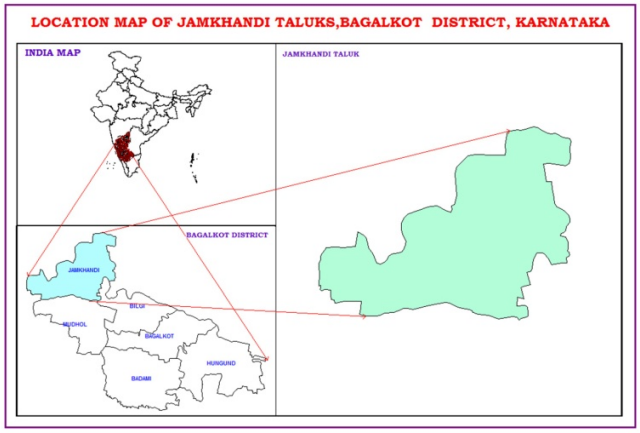
General Information	
District:	Bagalakote
Taluk:	Jamakhandi
Geographical Area:	1133 sq.km
Panchyaths/ Villages	The taluk have 38 Grama Panchyaths, (http://panchamitra.kar.nic.in/) 71 villages (https://www.census2011.co.in/)
Principal Aquifer System:	Deccan Traps
Basin/Sub basin :	Basin: Krishna Sub-basin: Krishna Upper Sub-Basin (Source: 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:	343 mm (2018) (Source: KSNDMC)
Taluk's Coordinate extents:	Longitude: East 74° 59' 13.58" – 75° 29' 42.71" Latitude: North 16° 24' 19.64" – 16° 46' 56.97"
Town's Coordinates:	75° 17' 27.72" E - 16° 30' 21.29" N

Table2:

Aquifer Disposition	
Aquifer Disposition:	Two aquifer systems have been mapped viz. • Aquifer I: Weathered aquifer down to the depth of 42 m bgl (Basalt) • Aquifer II: Fractured aquifer down to the depth of 200 m bgl (Basalt) (Source: Outsourcing exploration drilling data)
Status of GW exploration:	In-house: Up to 1990 • Exploratory Wells : 4 EW & 1 OW • Depth range: 40 to 92 m bgl, Weathering: 5 to 14 m bgl, Yield: <1 to 3.76 lps) (Ref.: In-house exploration database collected) Outsourcing through WAPCOS: 2018 • Exploratory Wells : 9 EW • Depth range: 200 m bgl, Weathering: 5.5 to 42 m bgl, Yield: <1 to 6.71 lps)
Aquifer Characteristics:	• Exploratory Wells: Depth range: Upto 200 m bgl, Weathering: 5 to 42 m bgl, yield: < 1 to 6.71 lps, most of the potential fractures notice beyond the depth of 90 m bgl. • Average depth to water level: Dug wells: 12.50 m bgl (May 2016); 5,68 m bgl (Nov 2016), Pz: 31.00 m bgl (May 2016); 26.07 m bgl (Nov 2016)
GW Quality:	• Phreatic Aquifer (Aquifer – I): EC: 330 - 8100 (µS/cm at 25°C), F: 0.09 – 1.16 mg/l and NO_3: 0 – 183 mg/l • Fractured Aquifer (Aquifer – II)): EC: 305 - 7863 (µS/cm at 25°C), F: 0.10 – 1.60 mg/l and NO_3: 0 – 171 mg/l
Aquifer Potential:	• 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 <1 to 6.71 lps)
CGWB GW Monitoring status:	• WL ranges from 4.26 to 22.02 m bgl during pre-monsoon 2016; 2.14 to 17.10 during post-monsoon 2016), Pz: upto 26.07 m bgl during Nov 2016.
GW Management Issues	• Shallow water levels • Quality problems • Soil salinity in canal command areas • Water logging due to rise in water levels in parts of the taluk
GW Resources:	• Net Annual Ground Water Availability: 15961 ham • Existing Gross Ground Water Draft: Irrigation – 10491 ham, Domestic & Industrial Uses – 1063 ham, Total: 11554 ham (Source: GEC 2017)
GW Stage of Development (%)	• Stage of Ground Water Development: 72 % • Category: Semi-critical (Source: GEC 2017)
Existing and Future Water Demand:	• Irrigation development: 4686 ham • Domestic & Industrial Use (for next 25 years): 1224 ham (Source: GEC 2017)
GW Management Plans	• Area feasible for artificial recharge: 760 sq.km • Water economy irrigation practices like drip and sprinkler irrigation methods should be popularized. • In canal command areas, conjunctive use approach can be adopted.

	• In the areas of deeper ground water levels, various water conservation measures like percolation tanks, check dams, may be constructed to augment the ground water resources. • Point recharge structures would help in recharge deeper fractures. • Participatory approach in groundwater management in essitial. • Conservation and augmentation can be achieved by adopting water efficient irrigation practices, suitable cropping pattern, and also constructing appropriate artificial recharge structures. • Rainwater harvesting would help a remedy in areas where there is groundwater quality problem due to high EC and Nitrate. • Withdrawing of more groundwater through dug well and shallow borewell and transferring it to upland areas would solve the water scarcity and reduces the water logging problem in the command area.
AR & Conservation Possibilities	• Depicted in Plates/Tabular formats
Optional	-

PLATE – 1


LOCATION MAP OF JAMKHANDI TALUKS,BAGALKOT DISTRICT, KARNATAKA
INDIA MAP
JAMKHANDI TALUK
BAGALKOT DISTRICT
JAMKHANDI
BILGI
MUDHOL
BAGALKOT
BADAMI
HUNGUND

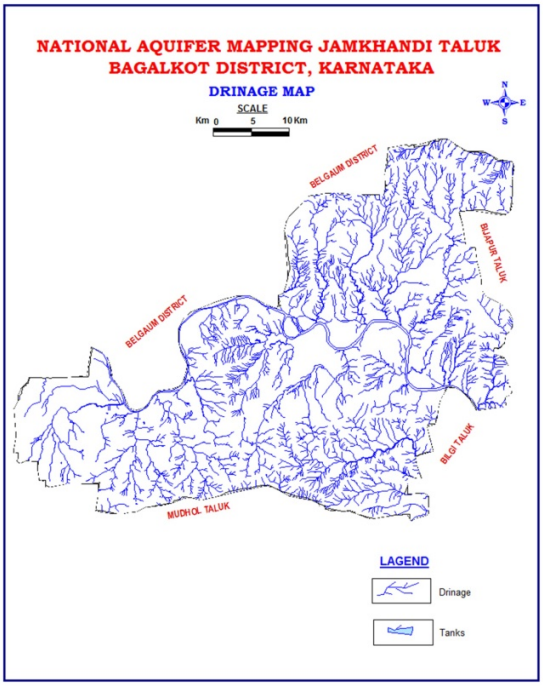

NATIONAL AQUIFER MAPPING JAMKHANDI TALUK
BAGALKOT DISTRICT, KARNATAKA
DRINAGE MAP
SCALE
Km 0 5 10 Km
N
W E
S
BELGAUM DISTRICT
BILAPUR TALUK
BELGAUM DISTRICT
BILGI TALUK
MUDHOL TALUK
LAGEND
Drinage
Tanks

PLATE – 2

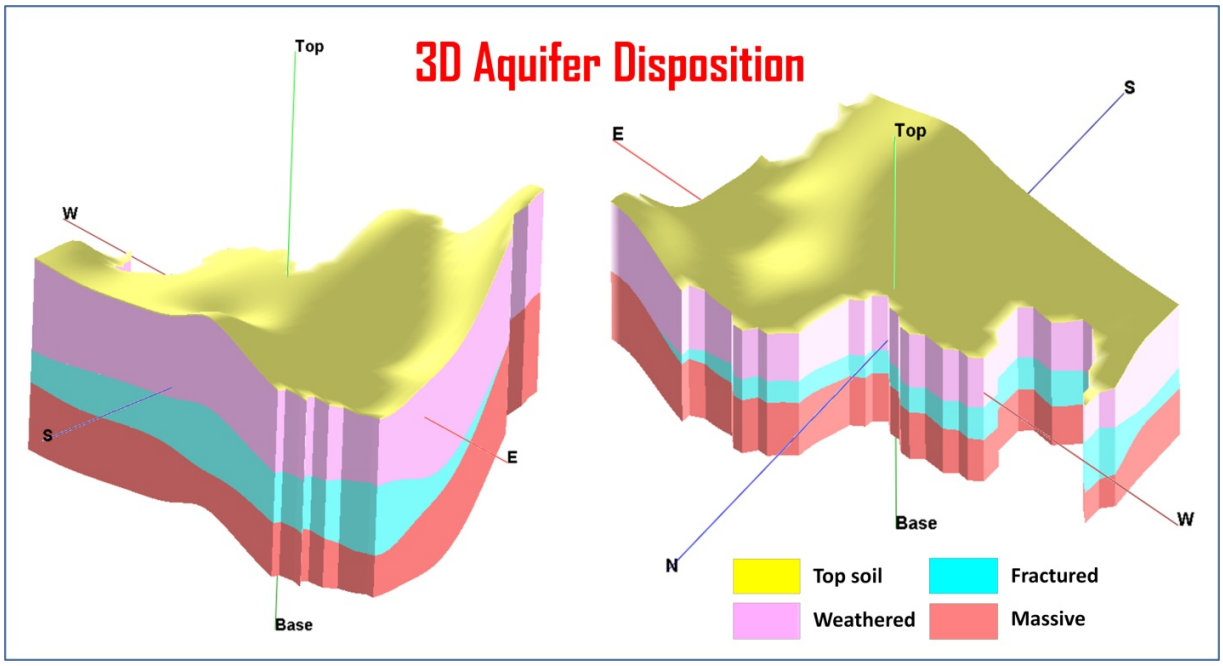

3D Aquifer Disposition
Top
W
S
E
Base
E
Top
S
W
Base
N
Top soil
Fractured
Weathered
Massive

PLATE – 3

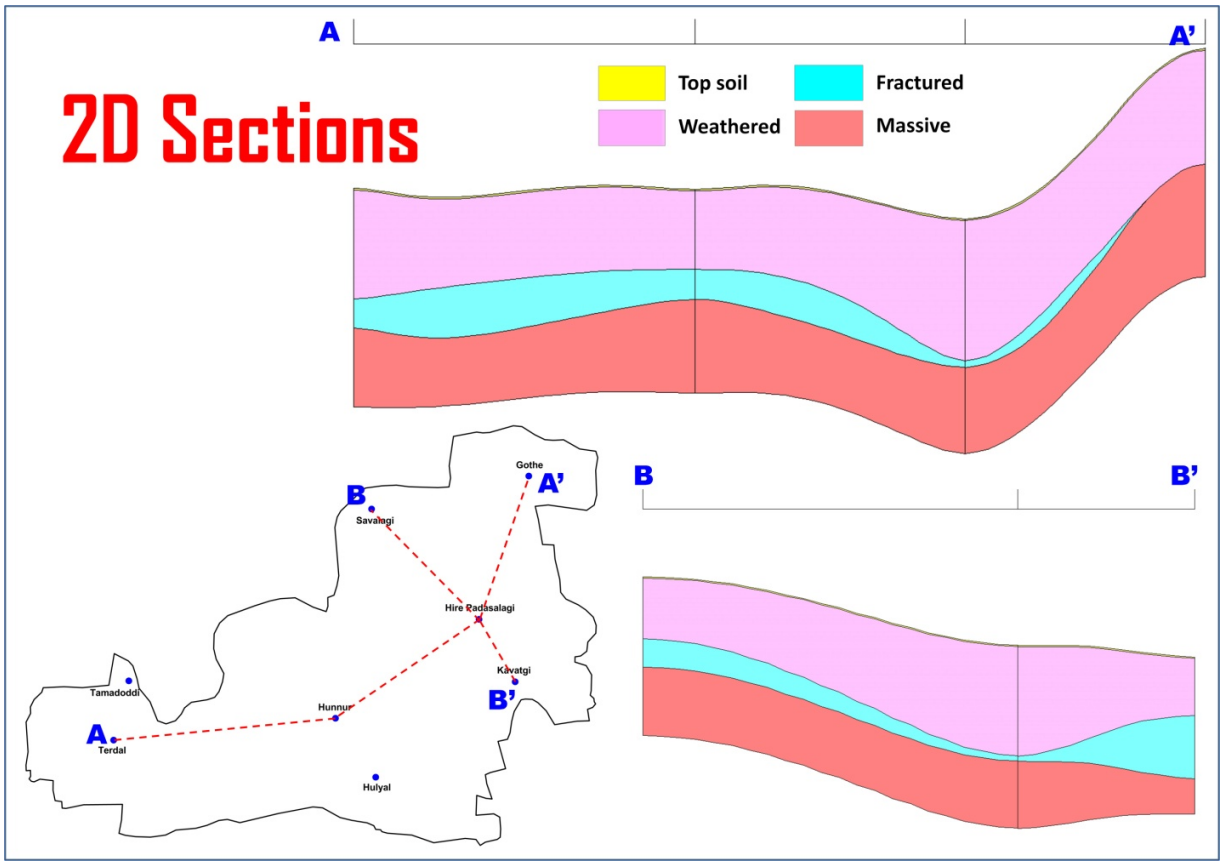

A
A'
2D Sections
Top soil
Fractured
Weathered
Massive
Gothe
A'
B
Savalgi
Hire Radasalagi
Kavatgi
B'
Tamadoddi
Hunnur
A
Terdal
Hulyal
B
B'

PLATE – 4

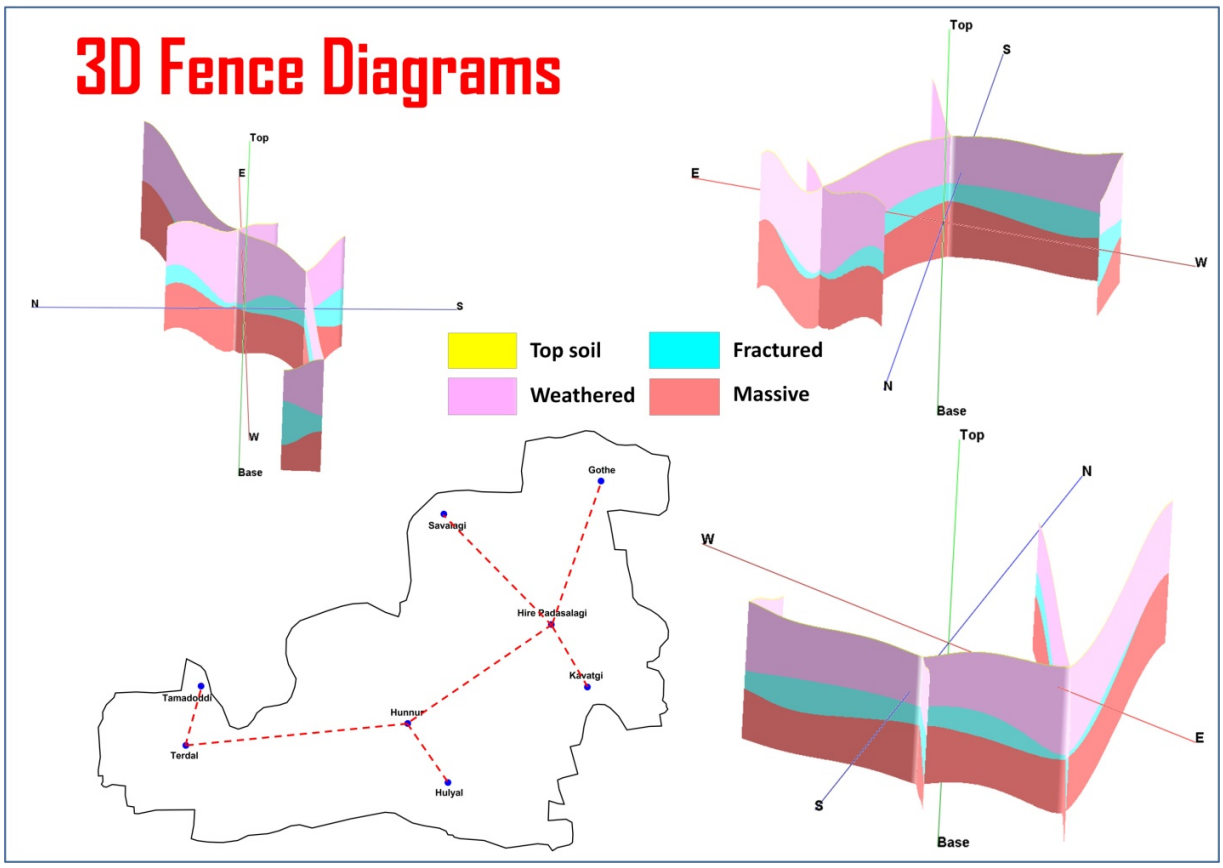

3D Fence Diagrams
Top
E
N
S
W
Base
Top soil
Fractured
Weathered
Massive
Top
S
E
W
N
Base
Gothe
Savalagi
Hire Padasalagi
Kavatgi
Tamadoddi
Hunnur
Terdal
Hulyal
Top
N
W
E
S
Base

PLATE – 5

ISSUES:

Rainfall details of Jamakhandi taluk, Bagalakote district

Seasonal & Annual Normal Rainfall for the period 2001-2010 Bagalkote District, Karnataka				
Station	Pre-Monsoon	SW Monsoon	NE Monsoon	Annual
	Rainfall (mm)			
Jamkhandi	74	309	119	502

Monthwise Actual Rainfall 2018

Taluk	jan	feb	mar	april	may	P M	june	july	august	Sept	SWM	oct	nov	dec	N E M	ANNUAL
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
JAMKHANDI	0	0	0	36	50	86	9	76	71	87	243	14	0	0	14	343

- Ground water is the sole source.
- Experiences a semi-arid type climate characterized by hot summer and low rainfall.
- Low Rainfall 343 mm (2018) mm/year.
- Deep borewells were drilled upto 200 m bgl with deep seated fractures.
- Deep fractured aquifers are not annually getting recharged.
- Poor sustainability.

PLATE – 6

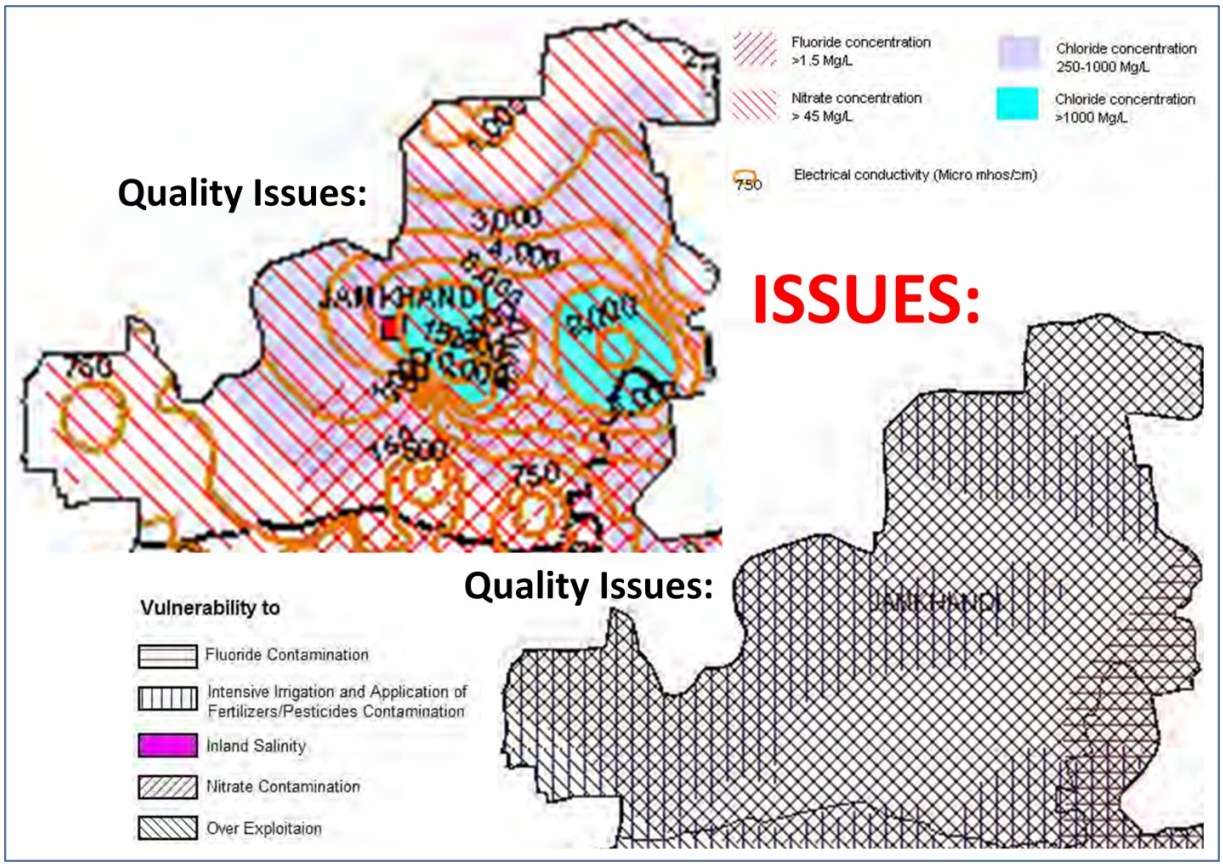

Quality Issues:
Fluoride concentration >1.5 Mg/L
Nitrate concentration > 45 Mg/L
Chloride concentration 250-1000 Mg/L
Chloride concentration >1000 Mg/L
750
Electrical conductivity (Micro mhos/cm)
ISSUES:
Quality Issues:
Vulnerability to
Fluoride Contamination
Intensive Irrigation and Application of Fertilizers/Pesticides Contamination
Inland Salinity
Nitrate Contamination
Over Exploitaion

PLATE – 7

MANAGEMENT PLANS:

- Area feasible for artificial recharge: 760 sq.km
- Water economy irrigation practices like drip and sprinkler irrigation methods should be popularized.
- In canal command areas, conjunctive use approach can be adopted.
- In the areas of deeper ground water levels, various water conservation measures like percolation tanks, check dams, may be constructed to augment the ground water resources.
- Point recharge structures would help in recharge deeper fractures.
- Participatory approach in groundwater management in essential.
- Conservation and augmentation can be achieved by adopting water efficient irrigation practices, suitable cropping pattern, and also constructing appropriate artificial recharge structures.
- Rainwater harvesting would help a remedy in areas where there is groundwater quality problem due to high EC and Nitrate.
- Withdrawing of more groundwater through dug well and shallow borewell and transferring it to upland areas would solve the water scarcity and reduces the water logging problem in the command area.

PLATE – 8

MANAGEMENT PLANS:

ASSESSMENT OF DYNAMIC GROUND WATER RESOURCES OF KARNATAKA STATE - AMINISTRATIVE UNIT WISE RESOURCE (2016-2017)

District	Taluk	NET ANNUAL GROUND WATER AVAILABILITY	EXISTING GROSS GROUND WATER DRAFT FOR IRRIGATION	EXISTING GROSS GROUND WATER DRAFT FOR DOMESTIC AND INDUSTRIAL WATER SUPPLY	EXISTING GROSS GROUND WATER DRAFT FOR ALL USES	ALLOCATION FOR DOMESTIC AND INDUSTRIAL USE FOR NEXT 25 YEARS	NET GROUND WATER AVAILABILITY FOR FUTURE IRRIGATION DEVELOPMENT	EXISTING STAGE OF GROUND WATER DEVELOPMENT	CATEGORY
		HAM	HAM	HAM	HAM	HAM	HAM	%	
Bagalkote	Jamkhandi	15961	10491	1063	11554	1224	4686	72	SEMICRITICAL

Details of Proposed Recharge Structures, Cost estimates and likely Recharge benefits for Taluk of Karnataka

District	Taluk	Number of Recharge Structures Completed by various agency			Number of Proposed Recharge Structures				Cost of Recharge Structures (Rs. In Lakhs)			
		CD/MACD/VD	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)
BAGALKOTE	JAMKHANDI	203	0	295	1	44	57	0	25.99	877.14	568.94	0.00

District	Taluk	Availability of Surface non commited 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)
BAGALKOTE	JAMKHANDI	48.730	7.310	24.365	12.183	4.873	48.730	1472.075	36.548	0.044