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

INDI TALUK, VIJAYAPURA DISTRICT, KARNATAKA

दक्षिण पश्चिमी क्षेत्र, बैंगलोर

South Western Region, Bengaluru

AQUIFER INFORMATION AND MANAGEMENT SYSTEM

CENTRAL GROUND WATER BOARD

REPORT ON AQUIFER MANAGEMENT PLAN
INDI TALUK, VIJAYAPURA DISTRICT, KARNATATA STATE

Table 1:

General Information	
District:	Vijayapura
Taluk:	Indi
Geographical Area:	2240 sq.km.
Hobli/Panchyaths/ Villages	The taluk have 2 Hoblis (www.landrecords.karnataka.gov.in)(bhoomi) 51GramaPanchyaths, (http://panchamitra.kar.nic.in/) 129 villages (https://www.census2011.co.in/)
Principal Aquifer System:	Deccan Traps (Source: Geology of Karnataka)
Basin/Sub basin :	Basin: Krishna Sub-basin: (i) Bhima Upper Sub-basin (ii) Bhima Lower 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:	369 mm (2018) (Source:KSNDMC)
Taluk's Coordinate extents:	Longitude: East 75° 35' 51.58" – 76° 12' 03.71" Latitude: North 16° 55' 38.99" – 17° 29' 39.19"
Town's Coordinates:	75° 57' 14.95" E - 17° 10' 31.72" N

Table2:

Aquifer Disposition			
Aquifer Disposition:	Two aquifer systems have been mapped viz. • Aquifer I: Weathered aquifer down to the depth of 28 m bgl • Aquifer II: Fractured aquifer down to the depth of 200 m bgl (Source: Outsourcing exploration drilling data)		
Status of GW exploration:	*Particulars*	*In-house (up to 1990)*	*Outsourcing though WAPCOS*
	• *No. of wells (EW&OW):*	8 EW, 1 OW	19 EW
	• *Depth range (m bgl):*	80 to 90	Up to 200
	• *Weathering (m bgl):*	2.7 to 18	4 to 28
	• *Yield (lps):*	0.4 to 6.9 lps	0.01 to 2.44 lps
Aquifer Characteristics:	*Particulars*	*Exploratory wells*	
	• *Depth range (mbgl)*	80 to 200	
	• *Weathering range (mbgl)*	2.7 to 28	
	• *Yield range (lps)*	0.4 to 2.44	
	• *Fracture encounterance (mbgl)*	Most of the fractures encountered between the depth ranges of 50 to 174 mbgl.	
	Particulars	*Dug wells*	*Piezometers*
	• *Avg. depth to water levels*	9.52 mbgl (May 2016) 6.97 mbgl (Nov 2016)	11.79 mbgl (May 2016) 6.96 mbgl (Nov 2016)
GW Quality:	*Particulars*	*Phreatic Aquifer (Aquifer-I)*	*Fractured Aquifer (Aquifer-II)*
	EC (µS/cm at 25°C),	750 – 10,100	710 – 9,570
	*F(*mg/l)	0.24 – 1.22	0.50 – 1.30
	NO_3(mg/l)	10 – 1,097	20 – 1,050
Aquifer Potential:	• Aquifer I: Phreatic i.e. weathered is dry in several parts but restricted to limited patches. • Aquifer II: Fractured (yield ranges between 0.4 to 2.44 lps)		
CGWB GW Monitoring status:	*Particulars*	*Dug wells*	*Piezometers*
	• *Water level range:*	6.35 – 16.50 mbgl (May 2016)	4.65 – 16.54 mbgl (May 2016)
		1.69 – 14.19 mbgl (Nov 2016)	2.50 – 14.70 mbgl (Nov 2016)
GW Management Issues	• Shallow water levels wherever it is existing • Groundwater quality problems: High EC, High Nitrate • Soil salinity problems • Water logging due to rise in water levels in parts of the taluk		
GW Resources:	• Net Annual Ground Water Availability: 10926 ham • Existing Gross Ground Water Draft:		

	(i) Irrigation – 9160 ham, (ii) Domestic & Industrial Uses – 810 ham, (iii) Total: 9970 ham (Source: GEC 2017)
GW Stage of Development (%)	• Stage of Ground Water Development: 91 % • Category: Critical (Source: GEC 2017)
Existing and Future Water Demand:	• Irrigation development: 2446 ham • Domestic & Industrial use (for next 25 years): 1026 ham (Source: GEC 2017)
GW Management Plans	• Area feasible for artificial recharge: 2225 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

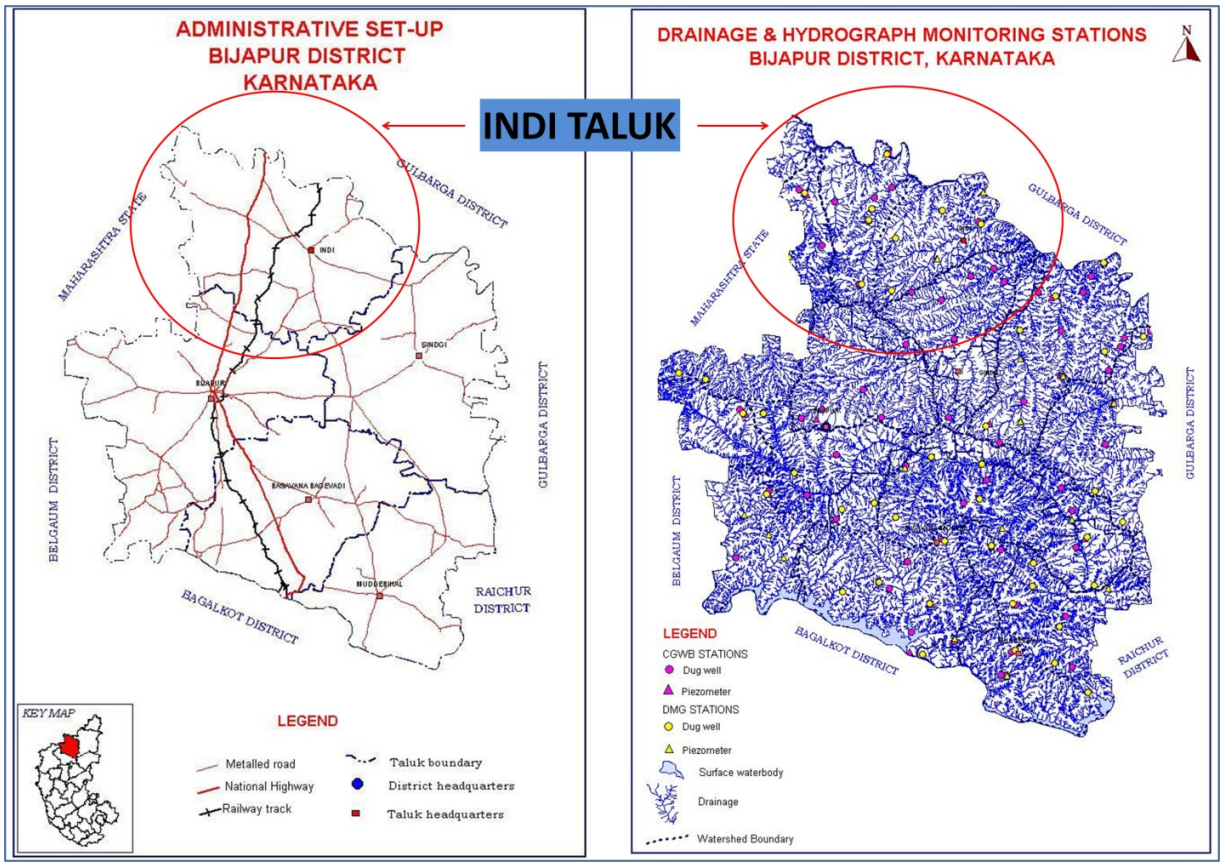
ADMINISTRATIVE SET-UP
BIJAPUR DISTRICT
KARNATAKA
INDI TALUK
MAHARASHTRA STATE
GULBARGA DISTRICT
INDI
SINDGI
BIJAPUR
BASAVANA BAGEWADI
MUDDEBIHAL
BELGAUM DISTRICT
GULBARGA DISTRICT
BAGALKOT DISTRICT
RAICHUR DISTRICT
KEY MAP
LEGEND
Metalled road
National Highway
Railway track
Taluk boundary
District headquarters
Taluk headquarters
DRAINAGE & HYDROGRAPH MONITORING STATIONS
BIJAPUR DISTRICT, KARNATAKA
N
LEGEND
CGWB STATIONS
Dug well
Piezometer
DMG STATIONS
Dug well
Piezometer
Surface waterbody
Drainage
Watershed Boundary

PLATE – 2

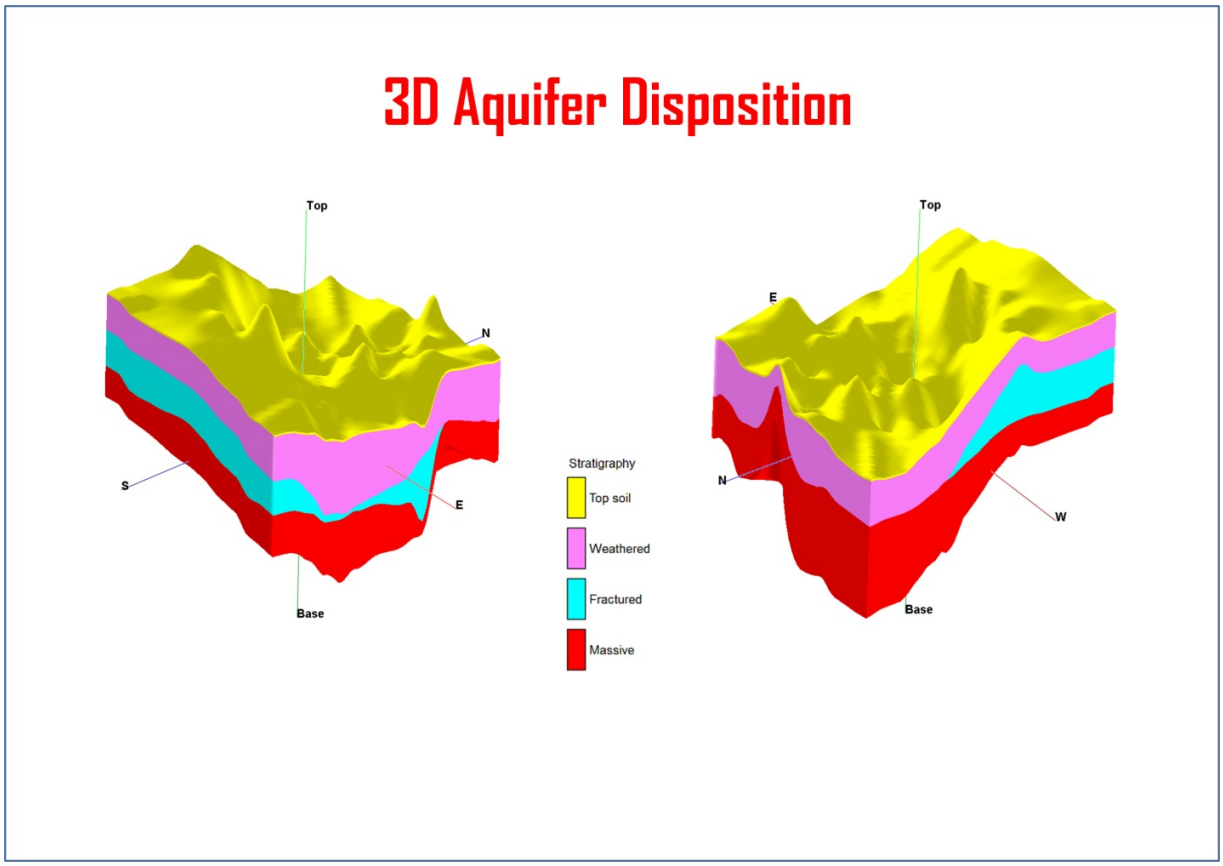
3D Aquifer Disposition
Top
N
S
E
Base
Stratigraphy
Top soil
Weathered
Fractured
Massive
Top
E
N
W
Base

PLATE – 3

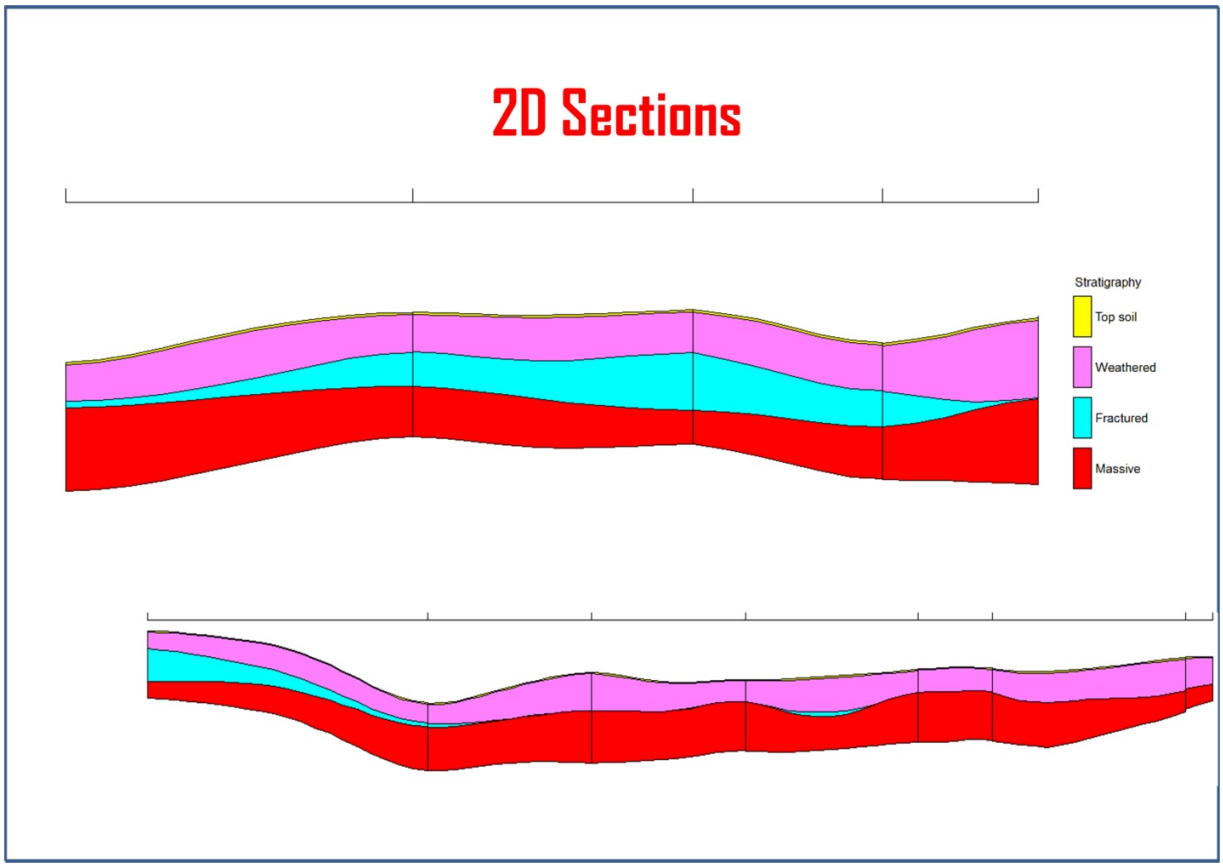
2D Sections
Stratigraphy
Top soil
Weathered
Fractured
Massive

PLATE – 4

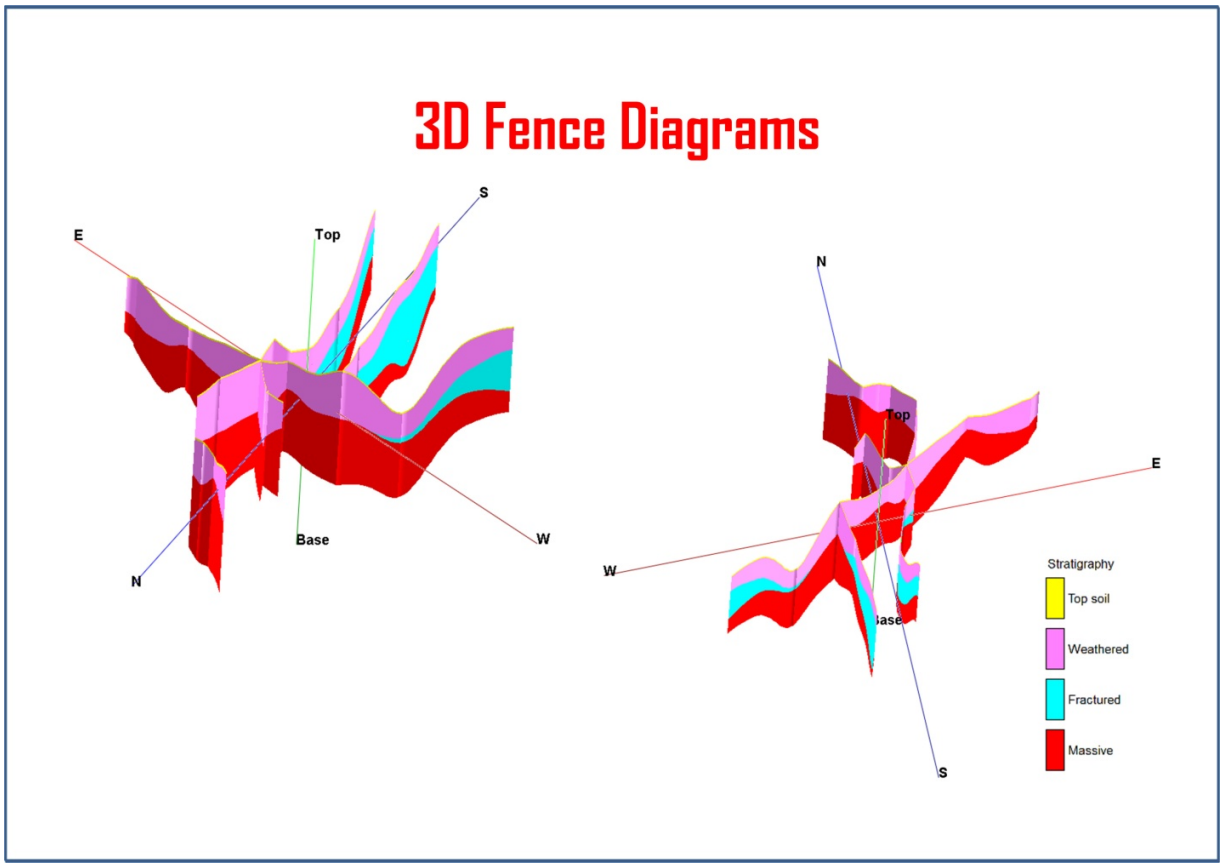
3D Fence Diagrams
S
E
Top
W
Base
N
N
Top
E
W
S
Stratigraphy
Top soil
Weathered
Fractured
Massive

PLATE – 5

-:ISSUES:-

Normal rainfall data of Indi taluk, Vijayapura district

Taluk	No. of Rain gauge stations	Normal rainfall (mm) 1901-70	Actual rainfall (mm) 2006	Rainy days
Indi	7	595	505.4	37.6

Land utilization in Indi taluk, Vijayapura district

Taluk	Area (sq.km)	Forest	Land not available for cultivation	Un-cultivable land	Fallow land	Net area sown		
						Net Sown	Sown > once	Total
Indi	2224.92	-	141.55	24.93	610.87	1447.57	244.14	1691.71

Area irrigated by different sources in Indi taluk, Vijayapura district

Taluk	Canals	Tanks	Dug wells	Bore wells	Lift irrigation	Other source	Total
Indi	5,657	-	14,700	3,118	-	6,280	29,755

- **Ground water is the sole source.**
- **Experiences a semi-arid type climate characterized by hot summer and low rainfall. Low Rainfall 369 mm/year (2018) .**
- **Deep borewells were drilled upto 200 m bgl with deep seated fractures.**
- **Deep fractured aquifers are not annually getting recharged.**

PLATE – 6

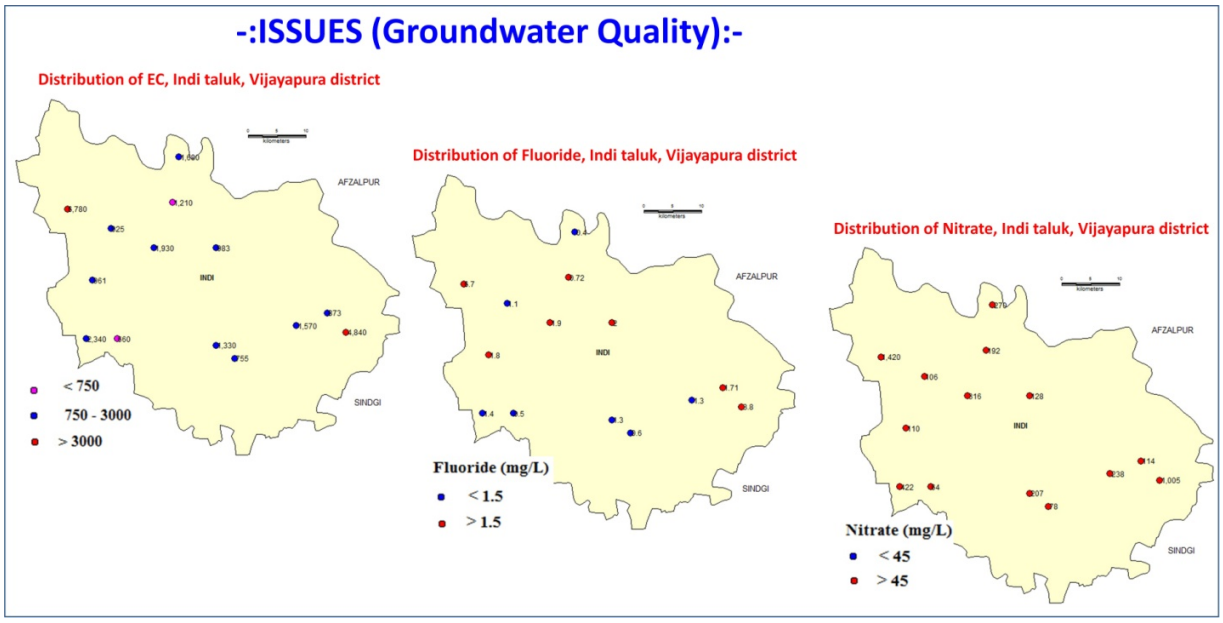
-:ISSUES (Groundwater Quality):-
Distribution of EC, Indi taluk, Vijayapura district
AFZALPUR
INDI
SINDGI
< 750
750 - 3000
> 3000
Distribution of Fluoride, Indi taluk, Vijayapura district
AFZALPUR
INDI
SINDGI
Fluoride (mg/L)
< 1.5
> 1.5
Distribution of Nitrate, Indi taluk, Vijayapura district
AFZALPUR
INDI
SINDGI
Nitrate (mg/L)
< 45
> 45

PLATE – 7

-:MANAGEMENT PLANS:-

- Area feasible for artificial recharge: 2225 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	%	
Bijapur	Indi	10926	9160	810	9971	1026	2446	91	CRITICAL

District	Taluk	Area Feasible for AR (Sq.Km)	Number of Recharge Structures			Number of Proposed Recharge Structures				Cost of Recharge Structures (Rs. In Lakhs)				Availability of Surface non commited monsoon runoff (MCM)
			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)	
BIJAPUR	INDI	2225	840	0	240	6	217	448	0	128.79	4346.55	4478.66	0.00	241.475

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

District	Taluk	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)
BIJAPUR	INDI	36.221	120.737	60.369	24.147	241.475	8953.989	181.106	0.218