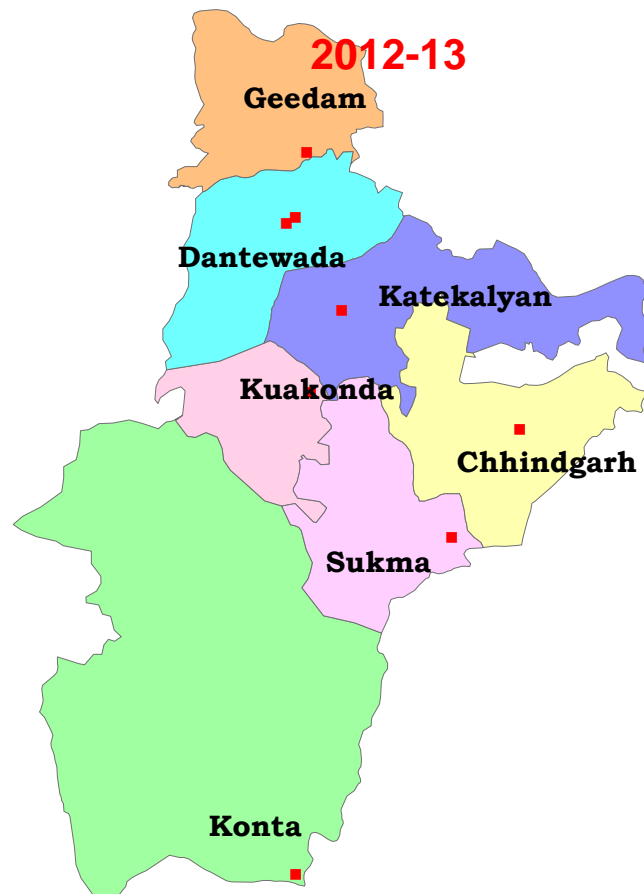




**GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES
CENTRAL GROUND WATER BOARD**

**GROUND WATER BROCHURE OF DANTEWADA
DISTRICT, CHHATTISGARH**



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GROUND WATER BROCHURE OF DANTEWADA DISTRICT

DISTRICT AT A GLANCE

I. General Information:

- | | |
|------------------------------------|--|
| 1. Location | :Long (East): 80°54'58" to 81°58'03"
: Lat (North): 17°47'24" to 19°17'48" |
| 2. Geographical area | : 9046.29 sq.km. |
| 3. Community Development blocks | :7 no.s |
| 4. Villages | :608 no.s |
| 5. Population | : 532791 (As per Census 2011) |
| 6. Average annual rainfall(2004) | :1254.4 mm |
| 7. Major physiographic unit | :Bastar plateau |
| 8. River Basins and major drainage | : Godavari Basin
:Major rivers and streams
Indravati,Sabri,Dantewadaetc |
| 8. Forest area | :5032.98 sq.km (Nearly 56% of
geographical area) |

II. Major Soils

- | | |
|-------------|--------------------------------------|
| 1. Alfisols | :Red sandy soils
:Red loamy soils |
|-------------|--------------------------------------|

III. Principal crops (2010)

- | | |
|--------------|------------------------|
| Crop seasons | :Two (Kharif and Rabi) |
| 1. Rice | :743 ha |
| 2. Maze | :124 ha |
| 3. Wheat | :50 ha |

IV. Irrigation (2010)

- | | |
|-------------------------|--------------------|
| 1. Net sown area | :198416 ha |
| 2. Gross irrigated area | : 1239 ha |
| a) By dug wells | :59 no.s (13 ha) |
| b) By tube wells | :141 no.s (275 ha) |
| c) By tanks/ponds | :12 no.s (6 ha) |
| d) By canals | :18 no.s (793 ha) |
| e) By other sources | :152 ha |

V. Geology

: Bastar Gneisses& Bengpal Group,Sabri group and Pakhal group (Granite gneiss, Quartzite & Calc-Silicate rocks metasediments Sandstone,Shale and limestone)

VI. Hydrogeology

Water bearing formations

:Major formations are porous , fractured & weathered Sandstones, Granite gneisses, etc.

VII. Ground water monitoring (by CGWB)

1. No. of monitoring stations :08 no.s
 - a) Dug wells :06no.s
 - b) Piezometers :02 no.s

2. Water levels

- a) Pre-monsoon water level depth (2007) :2.5to 16.0 mbgl
- b) Post-monsoon water level depth(2007) :0.94 to 6.94 mbgl
- c) Water level fluctuation :0.07 to 5.11 m
- d) Water level trend (1997-2006) :On average water level trend is neither decline nor fall

VIII. Ground water exploration (by CGWB)

1. Total no. of wells drilled :01 no.s
 - a) Exploratory wells :01 no.s
 - b) Observation wells :0 no.s
 - c) Piezometers :13 no.s
2. Depth range : 60 to 100 mbgl
3. Discharge : 0.5 to 6 lps
4. Transmissivity :-
5. Storativity :-

IX. Ground water quality

: Suitable for all purposes

X. Ground water resources

1. Annual available resources : 51157.86 ham
2. Ground water draft : 3379.05 ham
3. Stage of ground water development : 6.61 %

XI. Awareness and Training activity

: Neither Mass awareness nor training programme have been organized in the district

XII. Artificial recharge and rain water harvesting

1. Projects by CGWB : Nil
2. Projects under technical guidance : Nil

XIII. Ground water control and regulation

: Nil (No critical/ notified/ Overexploited area)

XIV. Major ground water problems and issues : Nil

Ground Water Brochure of Dantewada district, Chhattisgarh

By

Rajeev kumar Tripathy, AHg

1. General

The Dantewada district covers an area of 9046.29 sq.km. It consists of 608 no. of villages. For administrative convenience these villages are grouped into 7 no. of community development blocks. Dantewada is the districts headquarter. Nearly 56 % of the total geographical area of the district is covered by forest. **Fig 1** shows the location of the area along with drainage, block headquarters, Network Hydrograph Stations and location of exploratory wells established and drilled by Central Ground Water Board in the district respectively.

The district comes Godavari basin and the major tributaries of the Godavari river in the district are Indrawati, Berudi, Chint, Talperu, Sabari etc. The drainage pattern in the district is dendritic to sub-angular and the overall drainage density is high in the granitic terrain in comparison to protorozoic sedimentary formations, least drainage density is observed in the area covered with alluvium (along rivers Indravati and Sabri).

The annual rainfall varies from 1250 to 1670 mm in the district. Presented in **Fig 5**, higher magnitude of rainfall recorded in Geedam and Dantewada blocks where as low rainfall was recorded in the Konta block of the district; the normal annual for the district is 1450 mm. The annual temperature varies from 10°C in winter to 40°C in summer. The relative humidity varies from 85% in rainy season to 35-45% during winter.

Physiographically the district forms the part of Bastar plateau. The area is characterized by a highly undulating topography with hills and valleys. The area exhibits mainly structural hill , valley and pediment/pediplain along with some area of structural plains and some flood plains in the southern part. The plateaus and ridges in the area are of 600 m amsl. The maximum elevation observed for hilly areas is 1025 m amsl (Bailadila hill, near Akash nagar) and is at the south central part of the district. The lowest elevation is 50 m amsl (Konta village) and is on the south-eastern part of the district.

The soils in the district are having wide variations, and are mostly insitu in nature. Most of the area is covered by Red sandy Alfisols. It occurs over the Bastar Gneisses and Bengal group. The red loamy Alfisols is present as patches in northern and eastern part.

2. Geology and Hydrogeology

The oldest basement crystalline rocks and gneisses belonging to the Bengal group cover about 17 % area (1560 sq.kms) of the district mostly in the central part of the district. The rock formations are mostly hard and compact Pink and Grey granites, Charnokites and gneisses associated rocks, often intruded by dykes and pegmatite veins. However Schist,.Weathered mantle is the main aquifer.Generally the weathered zone is immediately followed by a fracture. In granite and gneisses the yield of well depends upon structure,

Fig 1 Administrative map of Dantewada District

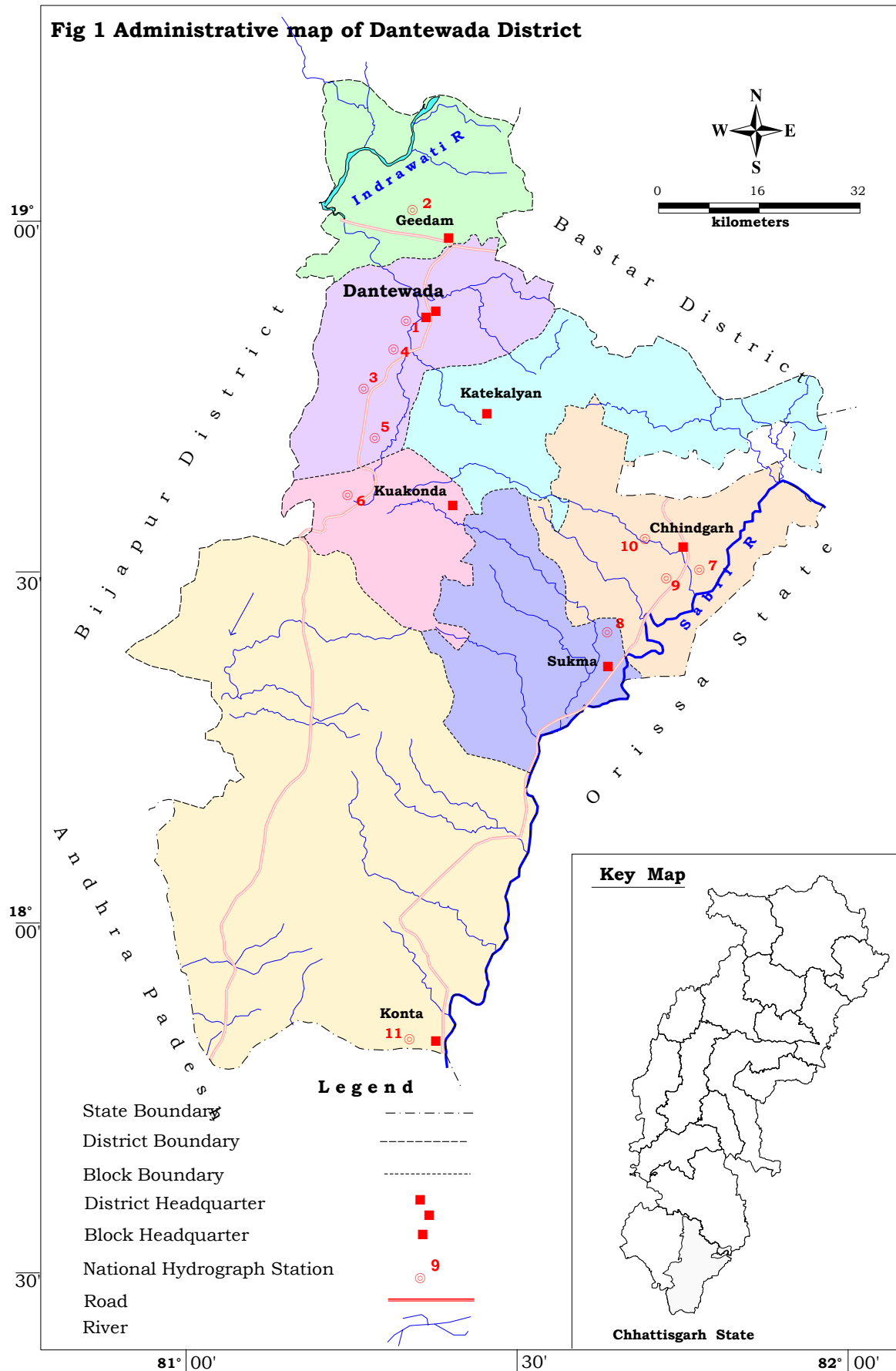


Fig 2 Premonsoon (May 2012) Depth to Water Level in Dantewada District

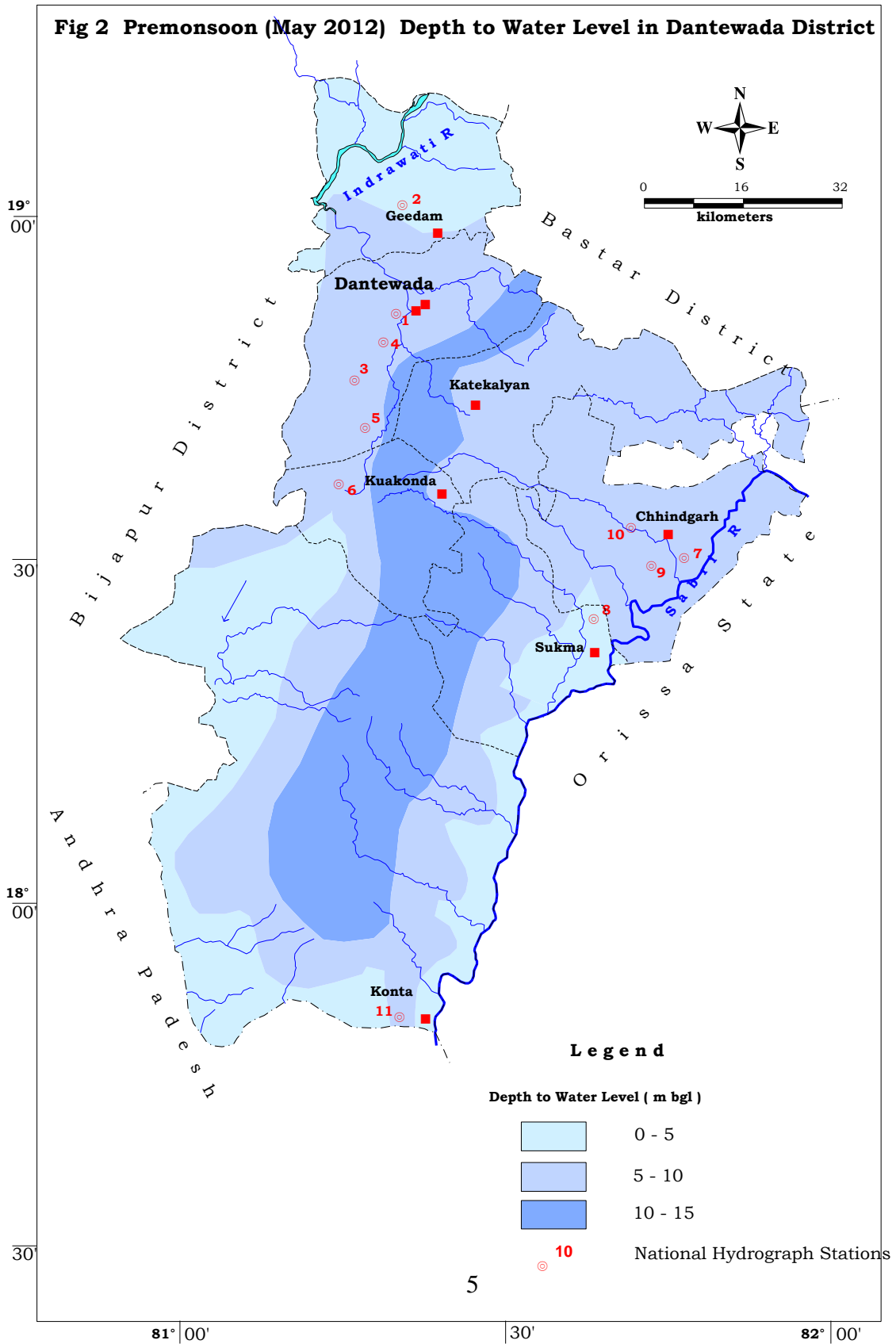
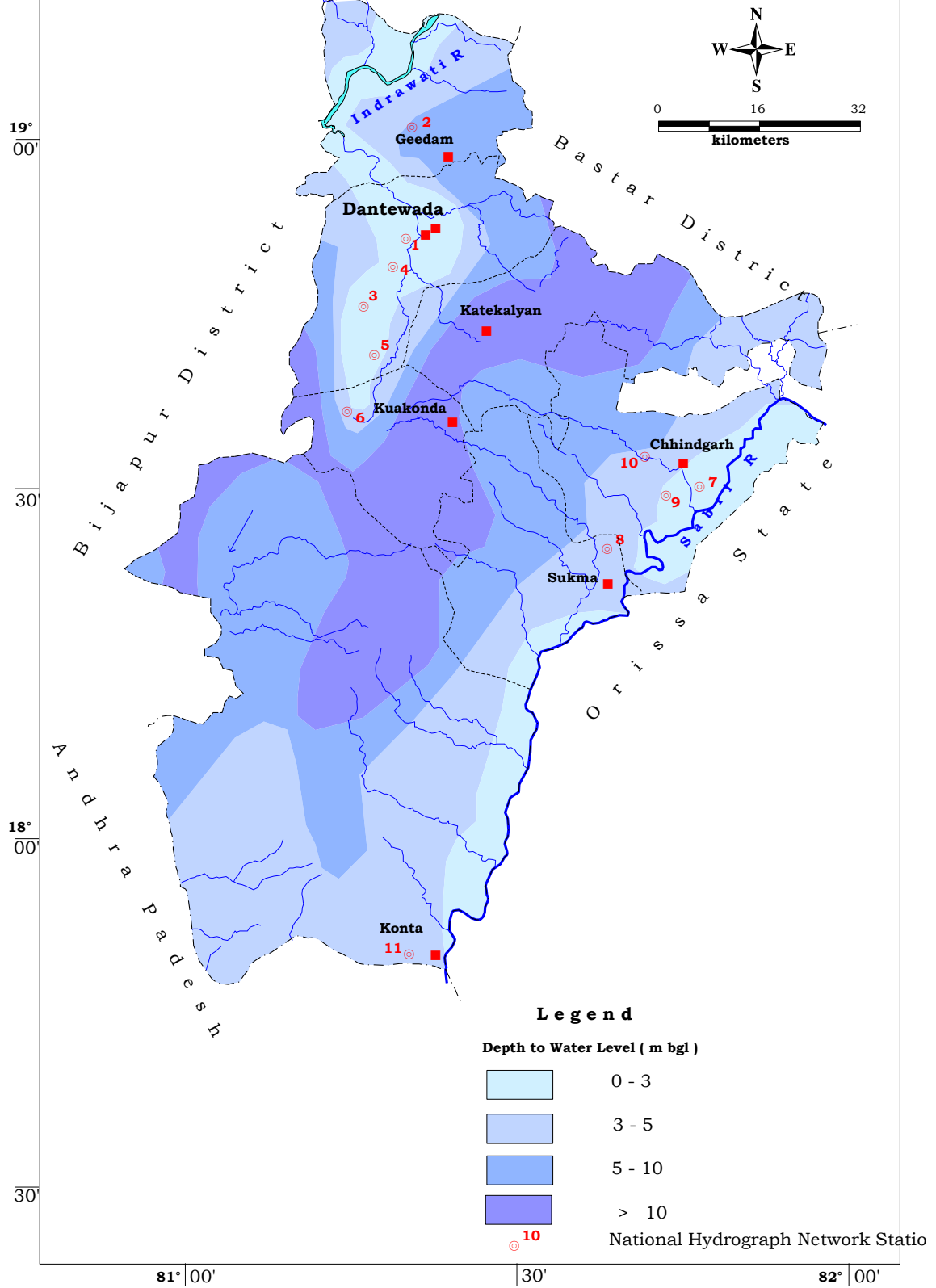


Fig 3 Postmonsoon (Nov 2012) Depth to Water Level in Dantewada District



lithology and landform. Of these, structure controlled by lineament plays a major role in controlling the yield. Felsic rocks (Pink granite) have more fractures compared to mafic and mafelsic rocks.

The rocks of Lower Proterozoic Dongargarh Super Group, comprising mainly of fine to medium grained Potash rich Dongargarh Granite and its equivalents are distributed in northern and central parts of the district. The area comes under plateau and hilly region. General elevation of the area is between 550 and 750m. amsl Effect of weathering through joints down to 40 metres can be very well observed during drilling in this formation. Intrusives of pegmatite /quartz vein can be often seen in this granite. The weathered thickness in granites ranges between 16 and 40 mbgl. Weathered granite followed by a fracture at bottom is the only aquifer which possesses good quantity of water. In general the shallow fractured zone lies within 80 m. depth. The yield of this zone varies from 3 to 5 lps and specific capacity varies between 23 and 37 lpm/mdd.

Rocks Sabari group covers in the part of Sukma and Kanta blocks of the district covering an area of about 674 sq.kms. Deposition in this basin is simultaneous to the deposition of Chhattisgarh basin, which exhibit arenites, argillites and carbonate rock sequence over the basement crystallines.

Apart from these the recent alluvium and Pliocene Laterites occur in isolated patches along Sabri and Indravati rivers, deposits are mainly consist of clays and sand thickness varies from 10 to 30 meters, alluvium formation formed potential aquifer in Sukma and Kanta blocks, yield of the formation varies from 1 to 8 lps.

The ground water in these formations occurs under water table conditions in the weathered mantle of the crystalline formation and weathered part of sedimentary formation (Sabari group) and under confined to semi-confined conditions in the fractured part of the crystalline, metamorphic rock and cavernous zones in limestone of the Sabari formation. Weathered mantle down to the depth of the hard and massive rocks mainly provides space for ground water movement and storage. The thickness of the weathered part in the area generally varies between 10 to 25 m. This province is found least potential with respect to ground water yield and development. Generally bore wells in the area yield 1- 3 lps and dug wells are having yield between 0.25 to 2.3 lps.

In all there are 8 no. of observation wells (i.e. National Hydrograph Network Stations); out of which 6 no.s are dug wells and 2 no.s are piezometers were established in the district to monitor the water levels four times a year and water quality once a year.

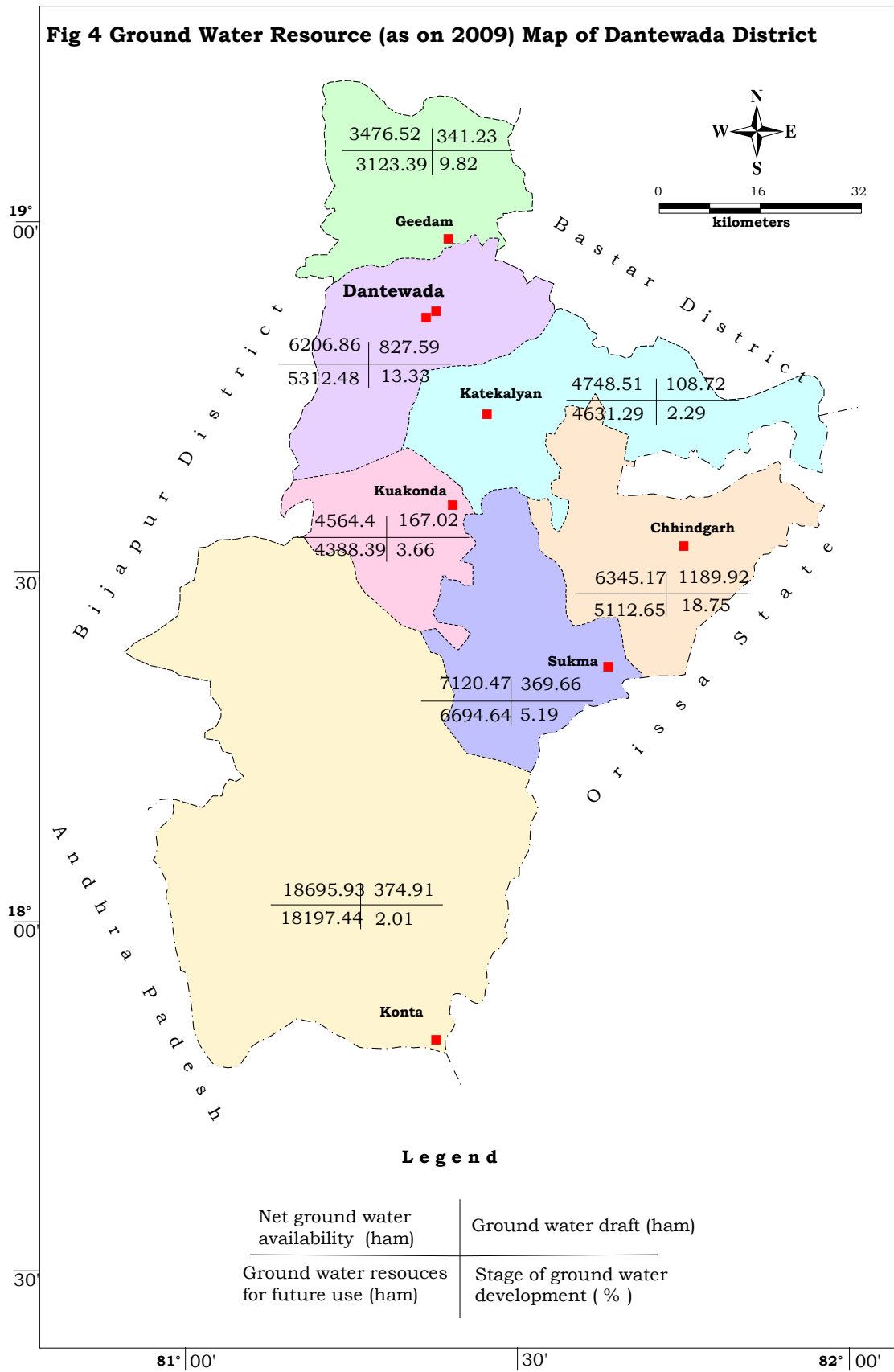
The pre-monsoon ground water level in the district (**Fig 2**) varies from 2.5 to 12.0 mbgl with an average around 4 to 9 mbgl and the post-monsoon water level (**Fig 3**) varies from 0.94 to 6.94 mbgl with an average around 3 to 6 mbgl. The water level fluctuation varies from 0.07 to 5.11m with an average around 2 to 4 m The water level trend (for 10 years) for pre-monsoon and post-monsoon period on an average indicates no significant change (rise or fall).

3. Ground water resource

The ground water resources for Dantewada district has been estimated based on the GEC'1997 methodology and were projected to the year 2009. The estimates indicate that the annual replenishable ground water resource for the district is 53850.38 ham . The net annual ground water availability is 51157.86 mcm. The gross annual draft has been estimated as 3379.05 ham and out of which, the draft for irrigation is 2336.96 ham and for domestic purpose is 1042.09 ham. Ground water resources for Dantewada district is given below and presented in fig 4

Dynamic ground water resources (as on 2009) for Dantewada district								
Assessment Unit / District	Command / Non Command	Net Ground Water Availability in Ham	Existing Gross Ground Water Draft for Irrigation in Ham	Existing Gross Ground Water Draft for Domestic & Industrial Water Supply in Ham	Existing Gross Ground Water Draft for All Uses in Ham	Allocation For Domestic & Industrial Water Supply in Ham	Net Ground Water Availability for Future Irrigation Development in Ham	Stage of Ground Water Development in %
Chhindgarh	Command	36.27	22.50	0.45	22.95	0.55	13.22	63.28
	Non Command	6082.62	308.75	174.01	482.76	212.72	5561.15	7.94
	Block Total	6118.89	331.25	174.46	505.71	213.27	5574.37	8.26
Dantewara	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	6084.49	735.89	206.29	942.18	293.95	5054.65	15.48
	Block Total	6084.49	735.89	206.29	942.18	293.95	5054.65	15.48
Geedam	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	3472.00	261.00	176.26	437.26	189.69	3021.31	12.59
	Block Total	3472.00	261.00	176.26	437.26	189.69	3021.31	12.59
Katekalyan	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	4645.23	70.00	94.36	164.36	102.53	4472.70	3.54
	Block Total	4645.23	70.00	94.36	164.36	102.53	4472.70	3.54
Konta	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	17677.94	133.50	230.99	364.49	322.61	17221.83	2.06
	Block Total	17677.94	133.50	230.99	364.49	322.61	17221.83	2.06
Kuakonda	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	5104.74	121.00	142.43	263.43	154.48	4829.26	5.16
	Block Total	5104.74	121.00	142.43	263.43	154.48	4829.26	5.16
Sukma	Command	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non Command	7015.49	323.76	142.02	465.78	191.80	6499.93	6.64
	Block Total	7015.49	323.76	142.02	465.78	191.80	6499.93	6.64
District Total		50118.78	1976.39	1166.81	3143.20	1468.33	46674.06	6.27

Fig 4 Ground Water Resource (as on 2009) Map of Dantewada District



4. Ground water development

The ground water development in the district is being done by dug wells and bore wells. The dug well depth varies from 6 to 17 m and the diameter varies from 1 to 4 m. The bore wells drilled in the area are 60 to 75m deep with diameter of 100 to 150 mm. Diesel or electric operated pumps of 1 to 5 HP or traditional teda is used to lift the water from dug wells for irrigation purposes. The electric pump or rope and bucket are used to lift the water for domestic purpose. Submersible electrical pumps of 3 to 5 HP are used for irrigation purpose in case of bore wells in the area. The bore wells in the area can irrigate an area of 1 to 2.5 ha for paddy.

Ground water is the main source of drinking in the district covering 608 no. of villages. In all 141 no. of bore wells and 59 no. of dug wells exist in the district (2010). Together they irrigate around 288 ha. The contribution of ground water for irrigation comes to nearly 23 % in the district. The use of ground water in non-command area is maximum.

The stage of ground water development estimated for the district is very low i.e. 6.61 % Konta block is having the lowest stage of development i.e. 2.01% while Dantewada block is having the highest stage of development i.e. 13.33 %. The districts as well as all the blocks fall within the Safe category. The block wise stage of ground water development in the district is depicted in Fig 4. The yield potential and the recommended suitable abstraction structures for the area are shown in Fig 6.

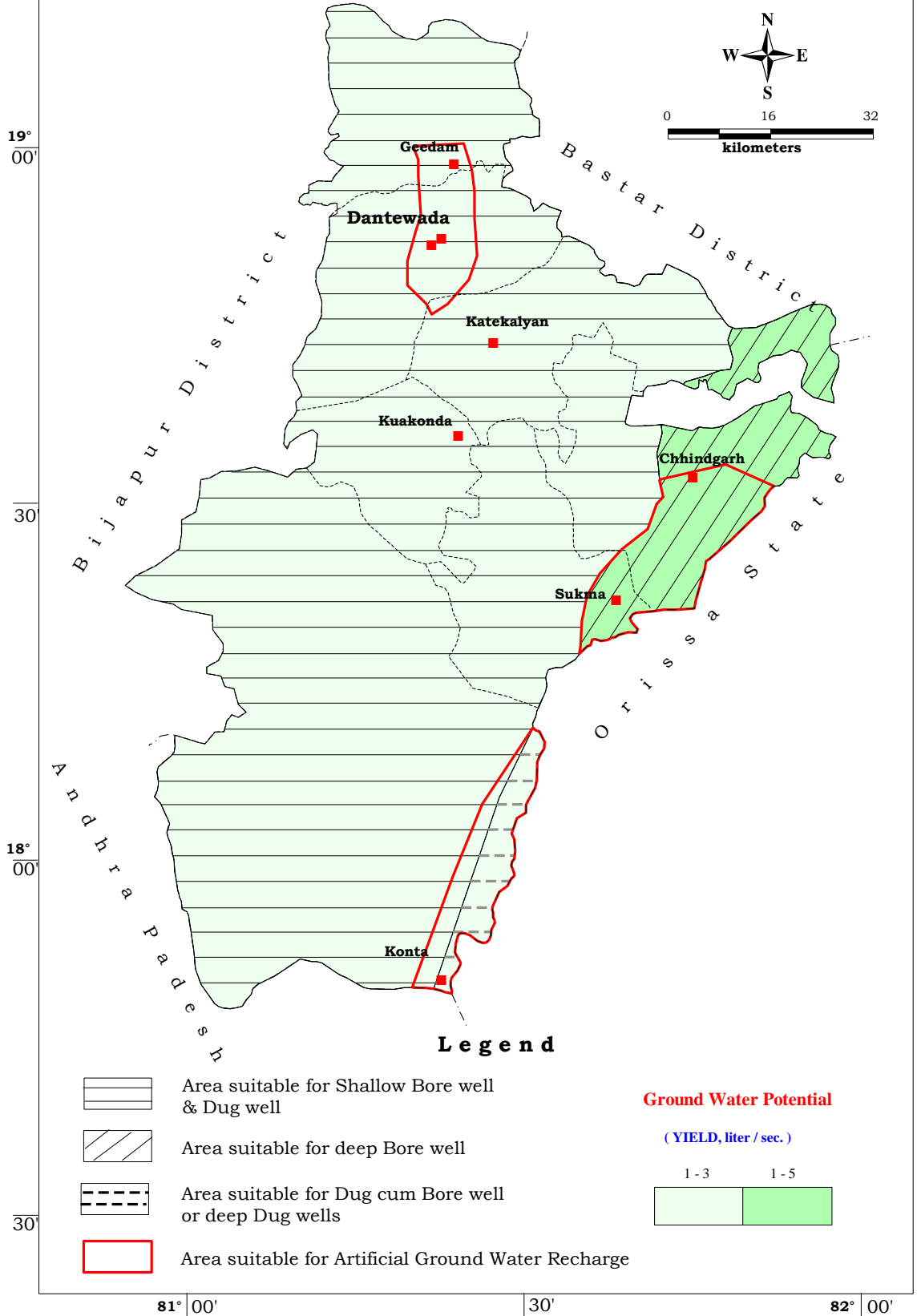
5. Ground water quality

The water samples collected from NHNS during the month of May'2012 (Pre-monsoon) were analysed to determine the quality of ground water in the district. The analysis shows that the concentrations of the major ions are within limit as per BIS Standards and the ground water in the district is suitable for all purposes. The EC values ranges between 65 to 1500 micro siemens/cm at 25°C (Fig 5) and the pH values ranges between 7.7 to 8.2. The overall composition of ground water indicates that it is moderately alkaline and predominantly CaHCO₃ type (calcium bicarbonate). Higher concentration fluoride recorded in Bhopalpatanam (> 1.5 pp) and concentration of nitrate more than permissible limit are recorded at Dornapal area.

6. Ground water management strategy

There exists a wide scope for ground water development in the district. The available ground water resources for the district are of order of 51157.86 ham and the ground water draft is 3379.05 ham. The stage of ground water development is only 6.61 %. It is estimated that with the available ground water resources a total of 9334 no.s of bore wells and 23337 no.s of dug wells can be constructed in the district. By adapting suitable developmental strategies, the less developed blocks can be further developed by way of increased irrigation.

Fig 6 Ground Water Development Potential & Artificial Recharge Prospects in Dantewada District



7.
Water

conservation and Artificial Recharge

The normal annual rainfall for the district is 1450 mm. There exist a huge surplus non-committed run off in the district. Rain water harvesting and artificial recharge structures at suitable locations in Sukma ,Dantewada and Konta blocks can be constructed to improve the storage capacity of the surface and subsurface reservoirs. Areas recommended for artificial recharge are marked on Fig 6.

8. Awareness and Training activity –Nil

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Fig. - 5

Hydrogeological Map of Dantewada District

