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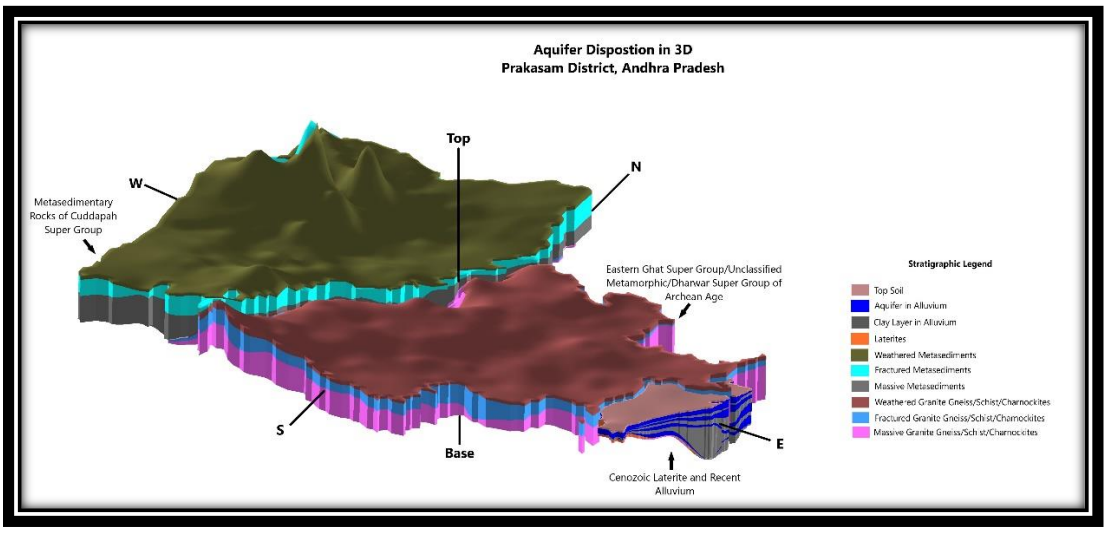
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION
CENTRAL GROUND WATER BOARD

REPORT ON

AQUIFER MAPPING FOR SUSTAINABLE MANAGEMENT OF GROUND WATER RESOURCES IN PRAKASAM DISTRICT, ANDHRA PRADESH



CENTRAL GROUND WATER BOARD
AP SUO, VISAKHAPATNAM
MARCH, 2023

REPORT ON
AQUIFER MAPPING FOR SUSTAINABLE MANAGEMENT OF GROUND WATER RESOURCES IN PRAKASAM DISTRICT, ANDHRA PRADESH (AAP-2022-23)

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AT A GLANCE

S.No.	Item		Particulars
1	Districts	:	Prakasam
2	Mandals	:	38
3	Revenue villages	:	857
4	Geographical area	:	14323 Km^2
5	Population (2011 Census)	:	23 lakhs (80.5% Rural and 19.5 % urban)
6	Locations	:	North Latitude 14°57´- 16°17´ East Longitude 78°43´- 80°25´
7	Rainfall (Normal)	:	618-1220 mm (avg: 841 mm) (SW-50%, NE 40% & Winter season 10%)
8	Geomorphology	:	Pediplain (48%), Structural hill (18%), Pediments (9%) , structural valley (6%) etc.
9	Major Rivers	:	Gundlakamma, Musi and Paleru and its tributaries.
9.1	Watersheds	:	100
10	Forests	:	~31% (4420 Km^2)
11	Soils	:	Red loamy soils (51%) and Black cotton soils (41%).
12	Land Utilization (Ha)	:	Net area sown: 387730 (27%);Barren & uncultivable land: 136338 (10%); Land put to non-agricultural use: 138205 (10%); cultivable waste land: 50000 (3%); Others: 54061 (4%).

13	The Gross cropped area (Ha)	:	Total cropped area: 393863; Net area sown:387730 & Area sown more than once:6133.
14	Irrigation	:	**Major:** Polola Subbaiah Veligonda with ayacut 180708 ha and Kandula obula Reddy Gundlakamma Reservoir project 56073ha. **Medium:** Mopadu project (5147 ha) and Paleru Bitragunta Project (2961 ha) Total gross cropped area is 111485 ha; Tube wells/dug wells (73514 ha), Canal (31132 ha). **MI Tanks:** 790 with registered ayacut 87659 ha and actual irrigated area 4486 ha (4%)
15	Water conservation/Recharge practices	:	PT:3828 and CD's:3918
16	Geology	:	Shales (32%), Schist (30%), Quartzite (19%), Granite Gneisse (7%), Alluvium (5%), Granite (94%), and Charnockite (2%).
17	Exploratory Drilling	:	63 no's well of depth ranges 20-100 m, 53 no's (>100-150 m), 63 no's (150-200 m)
18	Number of ground water structures	:	-
19	Ground water yield (lps)	:	Granitic gneisses, granite and charnockite: yield <1.0 to 18.5 lps. Shales, slate, limestone, phyllite and quartzite: yield < 1.0 to 11.7 lps. Alluvium: yield <1.0 to 2.4 lps.
20	Water Levels	:	196 Wells
20.1	Depth to water Table elevations (m amsl)	:	Pre-monsoon:0.8-422 and Post-monsoon: 1.82-435
20.2	Depth to water levels (m bgl)	:	Pre-monsoon:1.18-63.45 (avg:12.55) Post-monsoon:0.75-68.13 (avg:10.83)
20.3	Water Level Fluctuations (May vs. November 2022)	:	-3.62 to 24.68 m (average rise of 3.83m and fall 1.04 m)

20.4	Long term water level trends (2012-22)	:	**Pre-monsoon:** Falling :48 wells (0.01-3.3 m/yrs and avg.0.80 m/yrs) Rising: 43 wells (0.01-4.61 m/yrs and avg.0.95 m/yrs) **Post-monsoon:** Falling:34 wells (0.01-2.51 m/yrs and avg. 0.55 m/yrs), Rising: 51 wells (0.04-5.36 m/yrs and avg. 1.16 m/yrs)	
21	Geophysical data	:	76 no's (VES)	
22	Hydrochemistry	:	272 nos ground water samples.	
22.1	Electrical Conductivity (µ Siemens/cm)	:	300-8800 (avg: 1789)	
22.2	Fluoride	:	0.08-6.03 mg/L	
22.3	Nitrate	:	0.1-598 mg/L;	
22.4	Ground water suitability for drinking	:	EC: 11780 sq.km (65 %) EC: 750 to 2250 µ Siemens/cm & 1602 sq. kms (11 %) > 2250 to 3000 µ Siemens/cm. Fluoride: 188 nos. sample (69%)<1.5 mg/L & 84 nos. sample (31%) >1.5mg/L. Nitrate: 168 nos. (62%)<45 mg/L & 104 nos. sample (38%) >45mg/L.	
23	Conceptualization		**Weathered zone**	**Fractured zone**
23.1	Aquifer Characterization	:	Aq-I	Aq-II
	• Charnockite	:	12-23	15-71
	• Grainite Gneiss	:	6-15	20-86
	• Granite	:	6-16	21-114
	• Khondalite	:	14-16	35-38
	• Schist	:	5-24	12-108
	• Quartzite	:	5-23	35-171
	• Shale	:	4-24	29-182
	• Alluvium	:	5 Aquifer system up to 200 m	

23.2	Ground water yield (lps)	:		
	• Charnockite	:	0.7-5.63	
	• Grainite Gneiss	:	0.66-2.26	
	• Granite	:	0.15-4.63	
	• Khondalite	:	1.50-2.27	
	• Schist	:	0.13-14.26	
	• Quartzite	:	0.30-17.92	
	• Shale	:	0.04-9.18	
	• Alluvium	:	1.04-3.38	
	Transmissivity (m^2/day) and Storativity	:	Alluvium: 20-100 m^2/day Shale/Quartzite: <1.0-889 m^2/day Granite gneiss/Granite/Schist:<1.0-168 m^2/day	
	Specific Yield	:		
24	**Ground water Resources (MCM)**	:	2020	2022
24.1	Net dynamic groundwater availability	:	913	952
24.2	Gross GW Draft	:	353	308
24.3	Provision for Domestic Use (2025)	:	67	49
24.4	Stage of Ground water development (%)	:	46	35
24.5	Net GW Availability for future use	:	587	671
24.6	Safe mandal (nos.)		30	33
24.7	Semi-critical (nos.)		4	3
24.8	Critical (nos.)		0	1
24.9	Over-exploited (nos.)		4	1
25	Major Ground Water Issues Identified	:	Ground water exploitation:1 Mandal is categorized as over-exploitation, 1 mandal is critical and 3 are semi-critical.	

			Ground water irrigation contributes 73514 (66%) of total irrigated area. Deep water levels (>20-40 m) in 32 % and 15 % of area in pre and post-monsoon seasons respectively. Very deep water level (>40 m) in 211 and 162 sq.kms area in pre and post-monsoon seasons respectively. Low yields < 1 lps in 2845 sq.kms (20%) area. In, 84 nos. sample (31%) F >1.5mg/L is fluorosis endemic (geogenic) and 104 nos. sample (38%) NO3 >45mg/L. Anthropogenic contamination due to nitrate is common. EC is >2250 µ Siemens/cm covering around 2490 sq.kms (17%) of the district.
26	Management Strategies	:	• A total 552 nos. artificial recharge structures (ARS) (340 Percolation Tank/Percolation Tank with recharge shaft and 212 Check Dam/Gully plug/Check Dam with recharge shaft) to be taken up in the district. • After completely implementing AR structures in the district, a total 12.18 MCM of water expected to be recharge. • Existing ARS like percolation tanks and check dams can be de-silted involving people's participation. • The sprinkler and drip irrigation system with suitable cropping pattern is recommended in 1433 sq. kms of central part (yield <1 lps) and 1028 sq.kms (deeper water level >20 m) area of the district. • In 798 sq.km (WL<5m) area is recommended to follow the anti-water logging measures for conjunctive use of surface and ground water in the coastal mandals of the district. • Desiltation and cascading of existing MI tanks and filling up MI tanks with surface water

			schemes. This can result in increased ayacut, sustainability of bore wells and decrease the ground water irrigation. • 1.5 million populations in 29 Mandals of fluoride and drought affected areas in Prakasam, Nellore and Kadapa district will be provided safe drinking water and 180708 ha area will be irrigated from Krishna river surplus water under ongoing Poola Subbaiah Veligonda Project. • Roof top rain water harvesting in Government buildings (new and existing) as per the existing post monsoon depth to water levels, provisions of AP WALTA. • Participatory groundwater management (PGWM) approach are recommended. • In urban and rural area, the sewerage line should be constructed to arrest leaching of nitrate.

ABBREVATION:

2D	:	2 Dimensional
3D	:	3 Dimensional
ARS	:	Artificial Recharge Structures
Avg	:	Average
BW	:	Bore Well
CD	:	Check dam
CGWB	:	Central ground water board
Cr	:	Crore
DTW	:	Depth to water
DW	:	Dug well
EC	:	Electrical conductivity
EL	:	East Longitude
F	:	Fluoride
FP	:	Farm Pond
GEC	:	Ground Water Estimation committee
GW	:	Ground Water
Ha	:	Hector
Ha.m	:	Hector meter
ID	:	Irrigated dry
IMD	:	Indian Meteorological Department
Km2	:	square kilometre
LPS	:	Litres per second
M	:	meter
M^3	:	Cubic meter
max	:	Maximum
m bgl	:	Mitres below ground level
MCM	:	Million cubic meter
Mg/L	:	Milligram per litre
MI	:	Micro irrigation
min	:	Minimum
MPT	:	Mini percolation tank
NL	:	North Latitude
NO_3	:	Nitrate
OE	:	Over Exploited
PGWM	:	Participatory ground water management
PT	:	Percolation tank
SGWD	:	State Ground Water Department
S	:	Storativity
T	:	Transmissivity

EXECUTIVE SUMMARY

The Prakasam district lies in tropical region between north latitude of 14° 57’ and 16° 17’ and east longitudes of 78° 43’ and 80° 25’ with an aerial extent of 14,323 km^2. The district headquarters is located at Ongole town. The district is divided into three revenue divisions viz., Ongole, Kanigiri and Markapuram. Further these revenue divisions are divided into 38 revenue mandals. There are as many as 857 villages (including forest villages) exist in the district. Out of 857 villages, 769 villages are inhabited while the balance is 88 uninhabited villages. As per the 2011 census the population of the district is ~ 23 lakhs and density of population of the district is 160 persons per sq. km.

The district is physiographically comprises structural hills in the west and Pediplain with scattered hills in the northern, southern central and eastern parts. The major rivers that drains the district are Gundlakamma, Musi and Paleru besides small rivers like Thammileru, Sagileru and Gudisileru and streams like Ogeru vagu, Nallavagu and Vedimangala vagu. The Gundlakamma river originate at an altitude of about 823 m near Gundla Brahmeswaram of Nallamala forest and runs in a NE direction touches Mundlamur, Maddipadu and Ongole mandals and falls into Bay of Bengal near Devarampadu of Ongole mandal. The river Musi rises near Dokkalasala in the Veligondas and Paleru rises in the Veligondas and after flowing through the district, joins Bay of Bengal. The drainage exhibits sub-dendritic to dendritic and drainage density is worked out to be 0.4 to 0.6 km/sq.km.

The normal annual rainfall of the district is 841 mm varies between 618 mm (Racherla) to 1220 mm (Singarayakonda) of which SW monsoon 50 % and north-east monsoon contributes 40 %. The agriculture activity in the district is deplorable owing to gambling of monsoons and unreliable rainfall and much dependence on tanks and wells for irrigation.

The area is underlain mainly by shale, quartzite, schist, khondalite, granite gneiss, granite, charnockite, laterite and alluvium. Geomorphologically, the district can be broadly divided into 4 distinct units viz.; pediplains, structural hills, pediment and alluvial plains. Total cropped area is ~27%, area sown more than once is ~0.4%, forest occupies ~31%, barren and uncultivable land is 10%, land put to non-agricultural uses is 10% etc. of the total geographical area. During Khariff season, main crops grown are Paddy, Cotton and Chillies etc. During Rabi season, main crops grown are Paddy, maize, oil seeds etc. The Red loamy soils (51%), black cotton soils (41%) and sandy loams (6%) etc. are the predominant soils in the district.

The ongoing major irrigation projects are Poola Subbaiah Veligonda Project and Kandula Obula Reddy Gundlakamma Reservoir Project with total 180708 ha and 56073 ha ayacut respectively. The ongoing medium irrigation projects are Mopadu project constructed near Lakshmi Narasapuram village in Pamur mandal with register ayacut of 5007 ha. The Cumbum tank providing irrigation facilities to an ayacut of 2733 ha and Paleru Bitragunta Project with 1166 ha Prakasam district. Besides these, a total of 790 Minor Irrigation Tanks having a registered ayacut of 85278 hectares. There are3828 percolation tanks/ mini percolation tanks, 3918 check dams/ check walls are created under MGNREGS and IWMP scheme.

CGWB drilled 142 no's bore wells. (81 EW, 19 OW and 42 piezometer) Out of these, 47 wells were drilled in Archean granite gneiss, schist, granite and charnockite area, 90 wells were drilled in Cuddapah formation of shale, phyllite, slate and quartzite area and 5 wells in Gondwana sandstones and alluvial formation. Data analysed from CGWB wells indicates, 7 no's well of depth ranges 20-100 m, 50 no's (>100-150 m), 85 no's (150-200 m) depth. The potential zones were encountered between 30 and 100 m depth. In Archean granite gneiss, schist, granite and charnockites, fracture occur in range of 12 to 125 m bgl depth and yield ranges from <1.0 to 16.15 lps. The transmissivity varies from 0.53 to 168 m2/day. In Cuddapah formation, fracture encountered between 17 to 198 m bgl depth and yield of wells varies from <1.0 to 18.55 lps. The yield of wells ranges from <1.0 lps to 18.5 lps The transmissivity varies from 0.13 to 193 m2/day and storativity ranges from 0.000001 to 0.058. The fresh water aquifers in alluvium occurs between 10 and 20 m bgl and yield of the exploratory wells in varies from 1.0 to 3.0 lps and the specific capacity varies from 40 to 100 lpm/m dd, whereas the transmissivity varies from 20 to 100 m^2/day.

Water levels are monitored through 149 Piezometer (CGWB: 74 & SGWD: 75) during pre and post-monsoon season of 2022. The DTWL varies from varies from 1.18 to 63.45 meter below ground level (m bgl) (average: 12.55 m bgl) and 0.75 to 68.13 m bgl (average: 10.83 m bgl) during pre-monsoon and post-monsoon seasons respectively. During pre-monsoon season, 10 to 20 m covering 32 % of the area, followed by 20 to 40 m bgl (32 %), 5.0 to 10 m bgl (28 %), < 5.0 m bgl (7 %) and >40 m bgl (1%). During post-monsoon season, 5.0 to 10 m covering 37 % of the area, followed by 10 to 20 m bgl (34 %), 20 to 40 m bgl (15 %), < 5.0 m bgl (13 %) and >40 m bgl (1%). Water level fluctuation (Nov'2022 Vs. May'2022) data indicates that fluctuation vary from -3.62 to 24.68 m with average fall of -1.04 m and rise of 3.83 m. Long-term water level trends during pre-monsoon, 43 wells shows rising trend ranging 0.01 to 4.61

m/yrs (Avg: 0.95 m/yrs) and 48 wells shows falling trends ranging 0.01 to 3.39 m/yrs (Avg: 0.80 m/yrs). During post-monsoon season, 51 wells shows raising trend ranging 0.04 to 5.36 m/yrs (Avg: 1.16 m/yrs) and 34 wells shows falling trends ranging 0.01 to 2.51 m/yrs (Avg:0.55 m/yrs).

Ground water is mildly alkaline to alkaline in nature with pH in the range of 7.26 to 8.02 (Avg: 7.77). Electrical conductivity varies from 300 to 8800 (Avg: 1789) µ Siemens/cm. In majority of area 11780 sq.km (65 %) EC is within 750 to 2250 µ Siemens/cm; in 1602 sq. kms (11 %) area, it is 2250 to 3000 µ Siemens/cm; in 887 sq. kms (6 %) where EC is > 3000 µ/Siemens/cm. The Concentration of NO3 ranges from 0.1-598 mg/l with an average 71.13 mg/l. Nitrate concentration < 45 mg/l is observed in 168 (62 %) sample out of 272 sample and above permissible limit of >45 mg/l is observed 104 (38%) samples. The concentration of Fluoride ranges from 0.08-6.03 mg/l with an average of 1.27 mg/l. In 188 samples (69%), F concentration is observed less than the permissible limits (<1.5 mg/l) and in 84 (31%) samples F is more than the permissible range (>1.5 mg/l)

Based on 218 hydrogeological data points, aquifers from the area can be conceptualized in to 2 nos' namely, 1) weathered zone (2.0 to 46.5 m) and 2) fractured zone (10 to 198 m). Weathered zone in the range of 10 to 15 m in most part of area covering ~51 % of area, 15 to 20 m weathering thickness occurs in ~16 % of the area and shallow (<10 m) occurs in ~32 % of the area. The fractures in the range of 30 to 90 m depth are more predominant (70 % of the area), 90 to 120 m fractures occur in 16 % area; < 30 m and 120 to 150 m fractures occur in 7 % and 6 % of area respectively. Deep fractures (> 150 m) occur in isolated parts of Ardhaveedu, Bestavaripeta, Giddaluru, Racharla, Komarolu, Markapur, Tarlupadu mandals. The yield of fracture zone is varying from <1.0 to 18.5 lps. Around ~67 % of area, the yield varies from 1.0 to 3.0 lps followed by < 1.0 lps in ~20 % of area; 3 to 5 lps occurs in ~11 % of area and 5 to 10 lps occurs in ~2 % of the study area.

Net dynamic replenishable ground water availability as on 2022 is 671 MCM, gross ground water draft is 308 MCM, provision for drinking and industrial use for the year 2025 is 49 MCM. The stage of ground water development varies from 2% (ongole) to 128% (Peda Araveedu) (avg. 35 %).

Out of the total irrigated area of 1,11,485 ha, GW contributes 73,514 ha (66 %) due to lack of assured surface water irrigation in the district. 5 mandals viz., Pedaraveedu, Racherla, Pullala Cheruvu, Markapur and Giddalur comprising an area of ~ 2556 sq. km (~18 %) area is

categorized as water stress mandals. Deep water levels (20-40 m bgl) and (>40 m bgl) are observed during pre and post-monsoon season in 5132 sq. kms (33%) and 2492 sq. kms (16%) of the area respectively. Out of 91 wells analysed, 48 wells (53 %) shows fall in water levels (0.01 to 3.39 m) and 34 well (37 %) shows fall in water levels (0.01 to 2.51 m) during pre and post-monsoon seasons. The falling trend <1.0 m/yrs is observed in 5742 sq.kms (37%) and 3963 sq.kms (26%) and of the area during pre and post-monsoon respectively. The falling trend 1-2 m/yrs is observed in 1910 sq.km (12%) and 549 sq.km (4%); >2 m/yrs in 50 and 7 sq.km of the area during pre and post-monsoon respectively. Low yield (<1 lps) occurs in ~2845 sq.kms (20 %) of area of the district. The high fluoride concentration (>1.5 mg/L) found in 84 (31%) samples and high nitrate (> 45 mg/L) in 104 (38%) samples of the study area. EC is >2250 µ Siemens/cm covering around 2490 sq.kms (17%) in parts of Singarayakonda, Zarugulilli, Kondapi, Pamur, P C Palle, Mundlamuru, Maddipadu, Kurichedu, Konakanimitla Naguluppalapadu, Tripuranthakam mandals.

High Dependence on ground water for irrigation (66 % of irrigation) coupled with less rainfall, lack of assured surface water irrigation has led to a fall in water level and desaturation of weathered zone particularly in north western and central part of district. A total 3957 MCM unsaturated volume and 247 MCM surplus run off is available in the district. Although District Water Management Agency (DWMA), Rural Development Department, Govt. of Andhra Pradesh had constructed 3918 Check dams and 3828 Percolation in the district. The existing storage created through this construction of CDS (137 MCM) and PTS (54 MCM). In addition, a total 552 nos artificial recharge structures (ARS) (340 Percolation Tank/Percolation Tank with recharge shaft and 212 Check Dam/Gully plug/Check Dam with recharge shaft) are recommended in the district. After implementing AR structures in the district, a total 12.18 MCM of water expected to be recharge and total estimated expenditure for artificial recharge structures is 72.2 crore. Further, it is recommended existing check dams and percolation tanks ARS can be de-silted involving people's participation through the MGNREGS. In addition, the existing 790 Minor Irrigation Tanks can be taken up for desiltation and cascading of tanks. This can result in increase in Ayacut/Irrigation area, sustain the bore well yields and decrease the ground water irrigation. Around 2845 sq.kms with low yield (<1.0 lps) and deeper water levels of more than (>20 m) 1433 sq. kms of central parts and 1028 sq.kms in northwestern part area is recommended for Micro-irrigation. Roof top rainwater harvesting in Government buildings (new and existing), proper waste water management, participatory groundwater management (PGWM), Subsidy/incentives on cost involved in sharing of groundwater, lining

of sewerage to arrest leaching of nitrate and effective implementation of the existing 'Water, Land and Trees Act' of 2002 (WALTA-2002) are other recommended measures in the district.

NUMBER OF DATA POINTS USED FOR PREPARATION OF VARIOUS MAPS/FIGS- PRAKASAM DISTRICT, ANDHRA PRADESH STATE

S. No.	Data	Aquifer	Total Data Points	Source	
				CGWB	SGWD
1	Panel Diagram (3-D)	4 no	218	Expl:142 VES:76	
2	Hydrogeological Sections	5 no	218	Expl:142 VES:76	
3	Fence/panel Diagrams	1 no	218	Expl:142 VES:76	
4	Depth of weathering	1 no	218	Expl:142 VES:76	
5	Depth of fracturing	1 no	218	Expl:142 VES:76	
6	Groundwater Yield	Combine	142	Expl:142	
7	Transmissivity (m^2/day)	Combine	122	Expl:122	
8	Depth to Water Level Maps (2020)	Combine	95	20	75
9	Water Level Fluctuation	Combine	149	74	75
10	Long term water level trends	Combine	85	13	72
11	Water quality	Combine	272	272	

1. INTRODUCTION

Aquifer mapping is a process wherein a combination of geologic, geophysical, hydrologic and chemical analyses is applied to characterize the quantity, quality and sustainability of ground water in aquifers. In recent past, there has been a paradigm shift from "**groundwater development**" to "**groundwater management**". As large parts of India particularly hard rock have become water stressed due to rapid growth in demand for water due to population growth, irrigation, urbanization and changing life style. Therefore, in order to have an accurate and comprehensive micro-level picture of groundwater in India, aquifer mapping in different hydrogeological settings at the appropriate scale is devised and implemented, to enable robust groundwater management plans. This will help in achieving drinking water security, improved irrigation facility and sustainability in water resources development in large parts of rural and many parts of urban India. The aquifer mapping program is important for planning suitable adaptation strategies for sustainable development and management of ground water resources of the country. As a part of NAQUIM in Andhra Pradesh, the Prakasam district has been selected and completed during AAP 2022-2023.

Hard rock (Granites/Gneisses) lack primary porosity, and groundwater occurrence is limited to secondary porosity developed by weathering and fracturing. Weathered zone is the potential recharge zone for deeper fractures and excessive withdrawal from this zone leads to drying up in places and reducing the sustainability of structures. Besides these quantitative aspects, groundwater quality also represents a major challenge which is threatened by both geogenic and anthropogenic pollution. In some places, the aquifers have high level of geogenic contaminants, such as fluoride, rendering them unsuitable for drinking purpose. High utilization of fertilizers for agricultural productions and improper development of sewage system in rural/urban areas lead to point source pollution viz., nitrate and chloride.

1.1 Objectives: In view of the above challenges, an integrated hydrogeological study was taken up to develop a reliable and comprehensive aquifer map and to suggest suitable groundwater management plan on 1: 50,000 scale.

1.2 Scope of study: The main scope of study is summarised below.

1. Compilation of existing data (exploration, geophysical, groundwater level and groundwater quality with geo-referencing information and identification of principal aquifer units.

2. Periodic long term monitoring of ground water regime (for water levels and water quality) for creation of time series data base and ground water resource estimation.
3. Quantification of groundwater availability and assessing its quality.
4. To delineate aquifer in 3-D along with their characterization on 1:50, 000 scale.
5. Capacity building in all aspects of ground water development and management through information, education and communication (IEC) activities, information dissemination, education, awareness and training.
6. Enhancement of coordination with concerned central/state govt. organizations and academic/research institutions for sustainable ground water management.

1.3 Area details: The Prakasam district, Andhra Pradesh having geographical area of 14,323 km^2, lies between north latitude 14°57′ to 16°17′ and east longitude 78°43′ to 80°25′(**Fig.1.1**). The total forest area in the district accounts for 4,420 km^2 forming 30.86% of the total Geographical area. Administratively the district is governed by three Revenue divisions viz., Ongole, Kanigiri and Markapur and 38 revenue mandals. There are 857 villages (including forest villages) with a population of ~23 lakhs (2011 census) (urban: 19.5 %, rural: 80.5 %). The density of population is 160 persons/ km^2 whereas it is 304 per Sq.km. for the State.

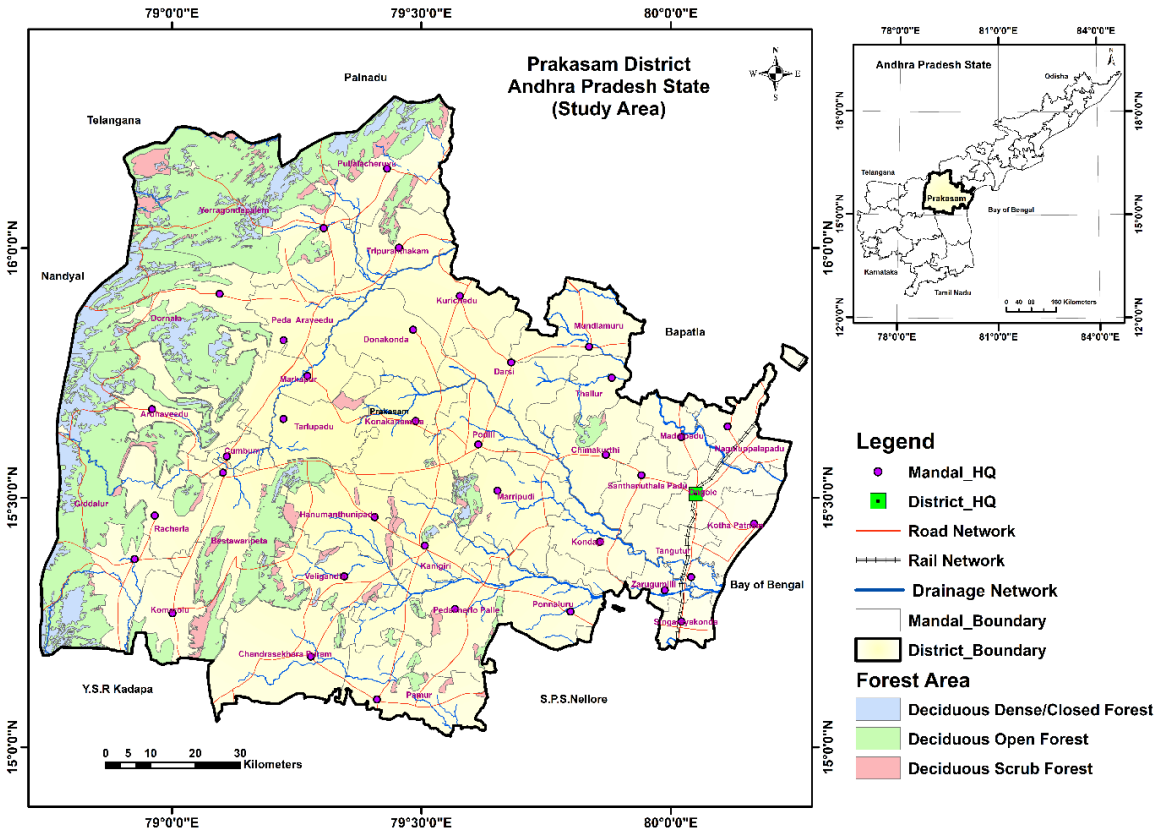


Fig.1.1: Location map of Prakasam district.

	Area (Sq.km)
Total Area	14,323
Forest Area	4,420
Mappable Area	9,903

1.4 Climate and Rainfall: The climate of the study area is characterised by hot summer and generally dry weather except during S-W monsoon season. The normal maximum and minimum temperatures recorded in the district are 40.2° C and 20.3° C respectively. The Maximum temperature is usually recorded in the months April, May and June.

The average normal annual rainfall of the study area is 841 mm (Indian Meteorological Department). This varies between 618 mm (Racherla) to 1220 mm (Singarayakonda) (Fig. 1.2). The South west monsoon contributes ~50 %, North east monsoon contributes ~40%, and remaining by winter season. **(Fig.1.2.)**

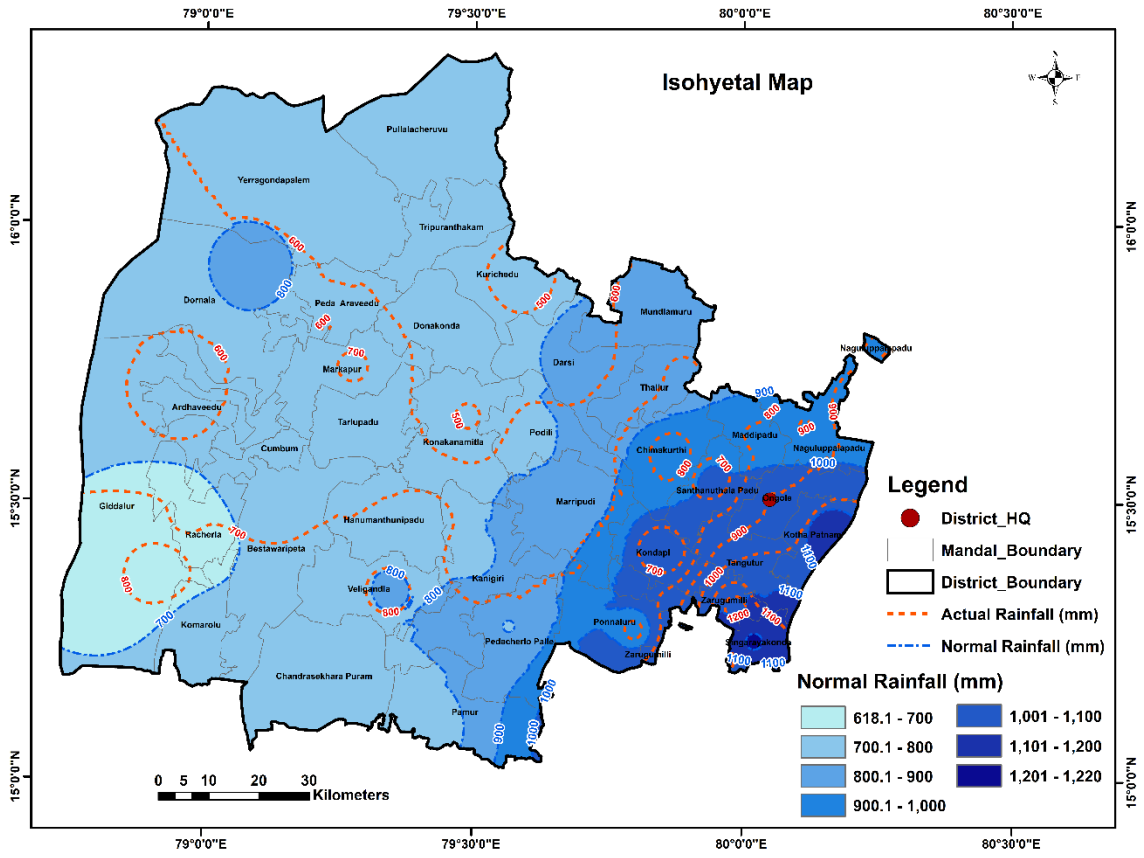


Fig.1.2: Isohyetal map of Prakasam district.

1.5 Geomorphological Set up: Structural hills, valleys, Pedi plains and pediments are the major geographic units in the study area. The details and percentage of geomorphological features of the area is given in the table and depicted in **Fig.1.3.**

Geomorphology	Area (Sq.kms)	%
Pediplain	6943	48
Structural hill	2577	18
Pediment	1294	9
Structural valley	809	6
Dissected plateau	402	3
Channel fill	372	3
Dome structural	288	2
Flood plain	279	2
Denudational hill	278	2
Piedmont zone	276	2
Coastal plain	266	2
Others	539	4
Total	14323	100

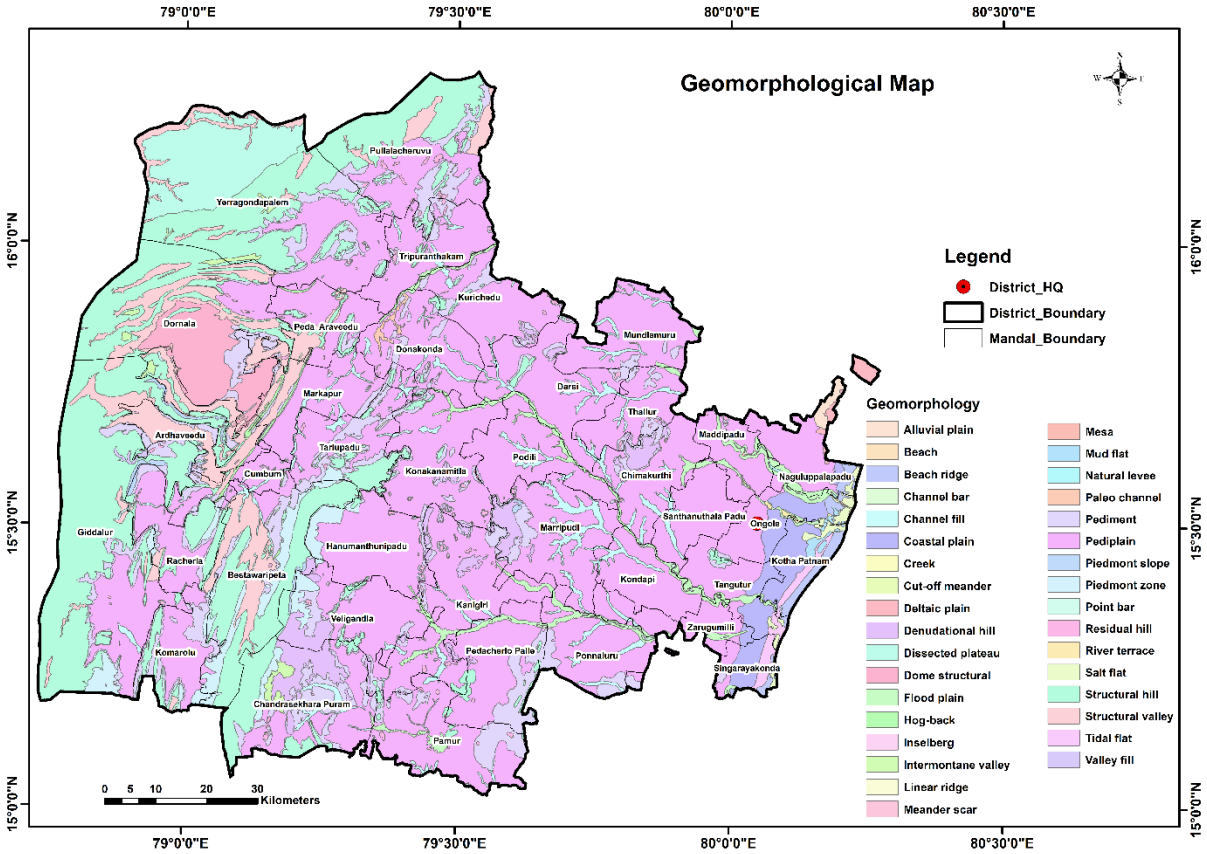


Fig.1.3: Geomorphology of Prakasam district.

1.6 Drainage and Structures: The Gundlakamma, Musi and Paleru River are the major rivers flowing in the district and they further split into smaller arms before it debouches into the Bay of Bengal. Besides small rivers like Thammileru, Sagileru and Gudisileru and streams like

Ogeru vagu, Nallavagu and Vedimangala vagu. The general drainage pattern is dendritic to sub-dendritic. The drainage density varies from less than 0.4 km/sq.km in poorly drained alluvial areas which covers the entire southern parts of the district to 0.6 km/sq.km in the Northern parts occupied by crystalline rocks. The Map depicting river, drainage and water bodies is presented in **Fig.1.4.**

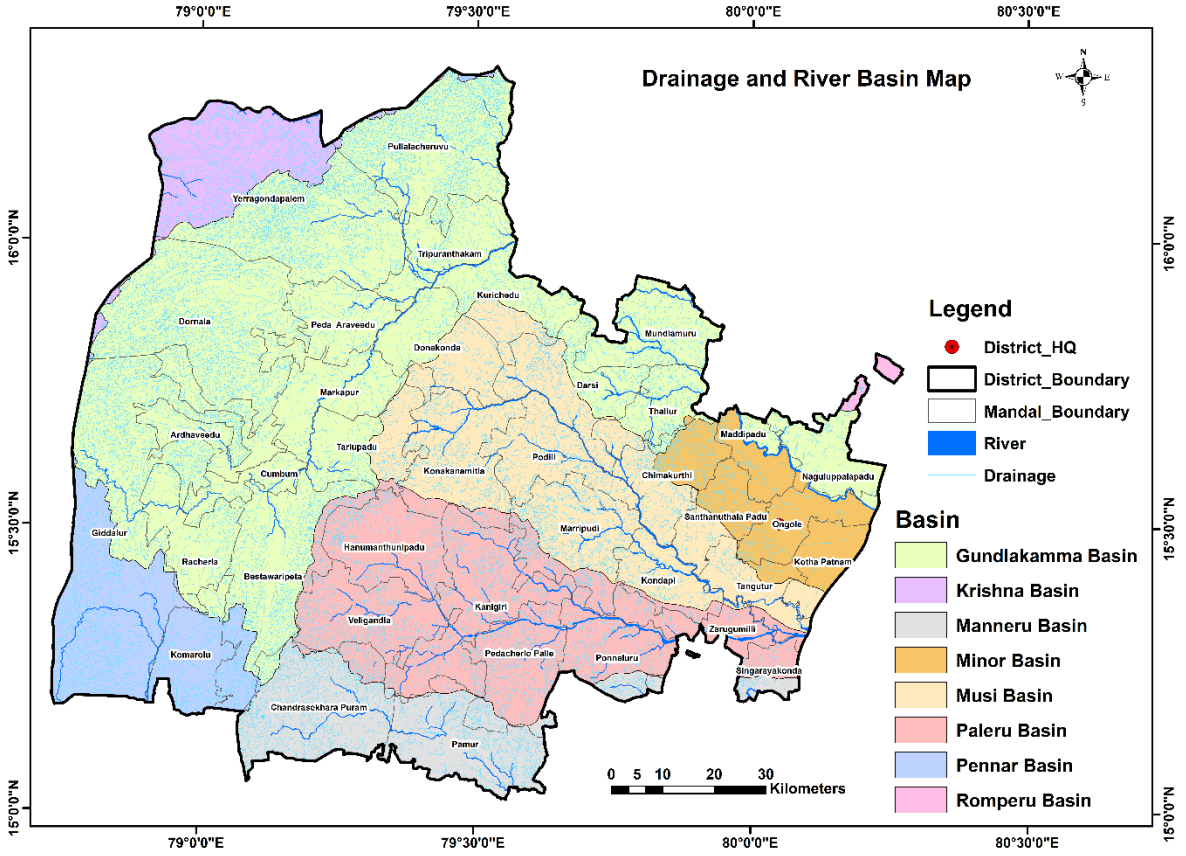


Fig.1.4: Drainage and Basin map of Prakasam.

1.7 Land Use and Land Cover: Out of total geographical area of 1432300 ha, Forest occupies 442073 ha (~31%), Barren and uncultivable land is 136338 ha (10%), land put to non-agricultural uses is 138205 ha (10%), current fallow is 109662 ha (8%), Cultivable waste is 50000 ha (3%) etc. Land use and land cover map of the district is depicted in Fig. 1.5 and graphical presentation is depicted in Fig-1.5a, 1.5b.

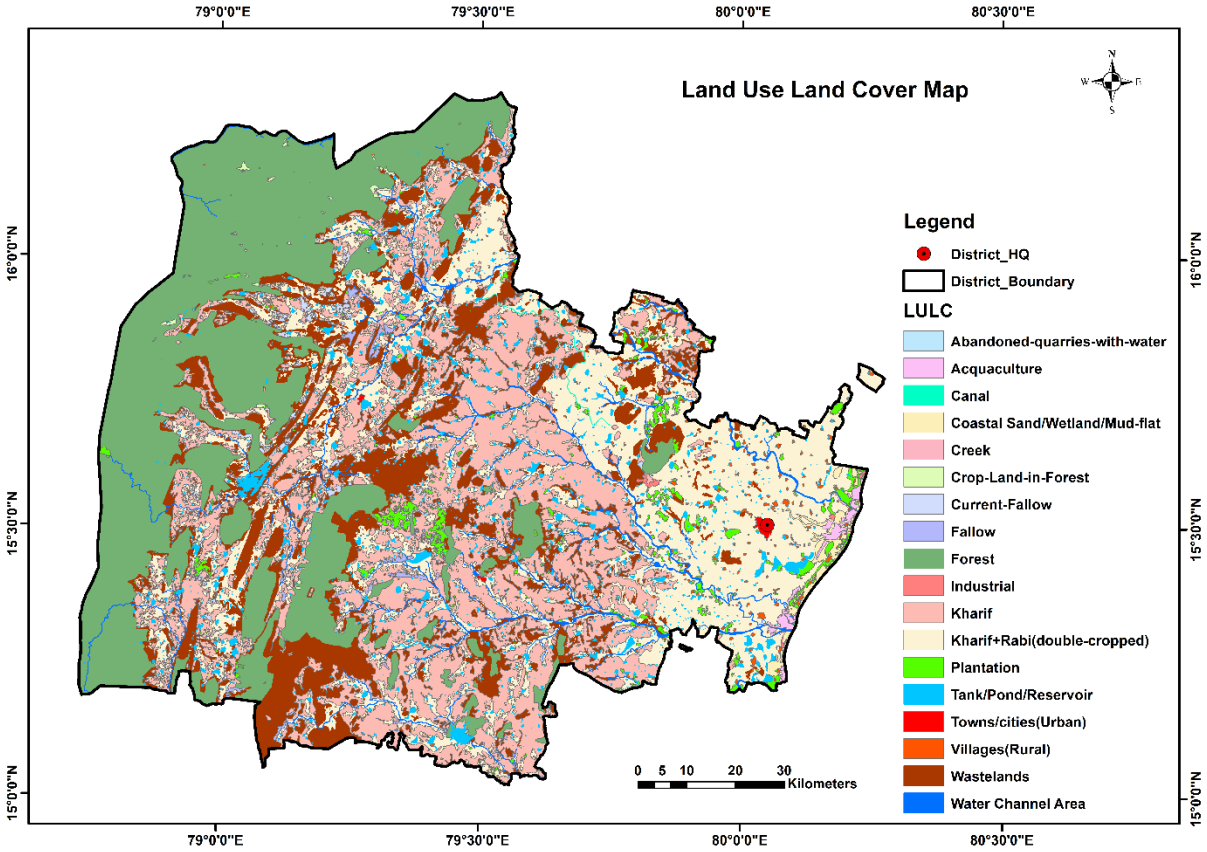
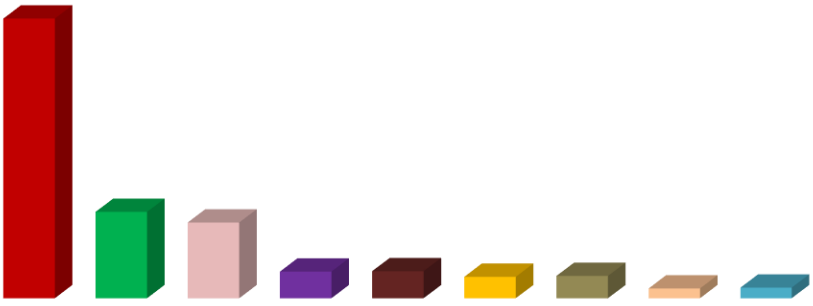


Fig.1.5: Land use and land cover of Prakasam district

Source: Chief Planning Officer, Ongole



	Total geographical area	Forests	Net Area Sown	Barren & uncultivable land	Land put to non-agricultureal uses	Current fallows	Other fallow lands	Cultivable waste	Others
% of Area	100	31	27	10	10	8	8	3	4
Area (Hectare)	1432349	442073	387730	136338	138205	109662	114280	50000	54061

Fig.1.5a: Land Use of Prakasam District

1.8 Cropping Pattern: Total cropped area is 393863 ha (~27%), area sown more than once is 6133 ha (~0.4%), During Khariff season, main crops grown are Paddy, Cotton and Chillies etc. During Rabi season, main crops grown are Paddy, maize, oil seeds etc. The other crops are turmeric, jowar etc. In the district there are 262344 marginal farmers (<1 hectare of land), 128584 small farmers (1-2 hectare), 66638 semi-medium (2-4 hectare), 18776 medium (4-10 hectare) and 1327 large farmers (>10 hectare). (Source: Chief planning Officer, Ongole)

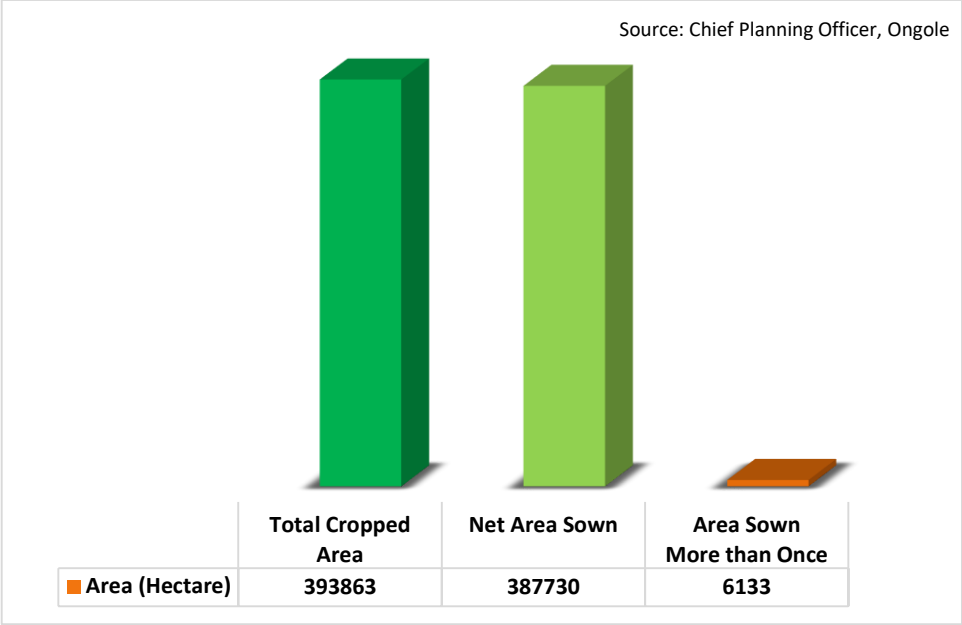


Fig.1.5b: Cropped area

1.9 Soils: The Red loamy soils (51%), black cotton soils (41%) and sandy loams (6%) are the predominant soils in the district. The black cotton soils are prevalent in Ongole division whereas red loams soils and Sandy loams are predominant in Markapur division and coastal parts of the district respectively. The **Fig.1.6** shows the distribution of soils in the district.

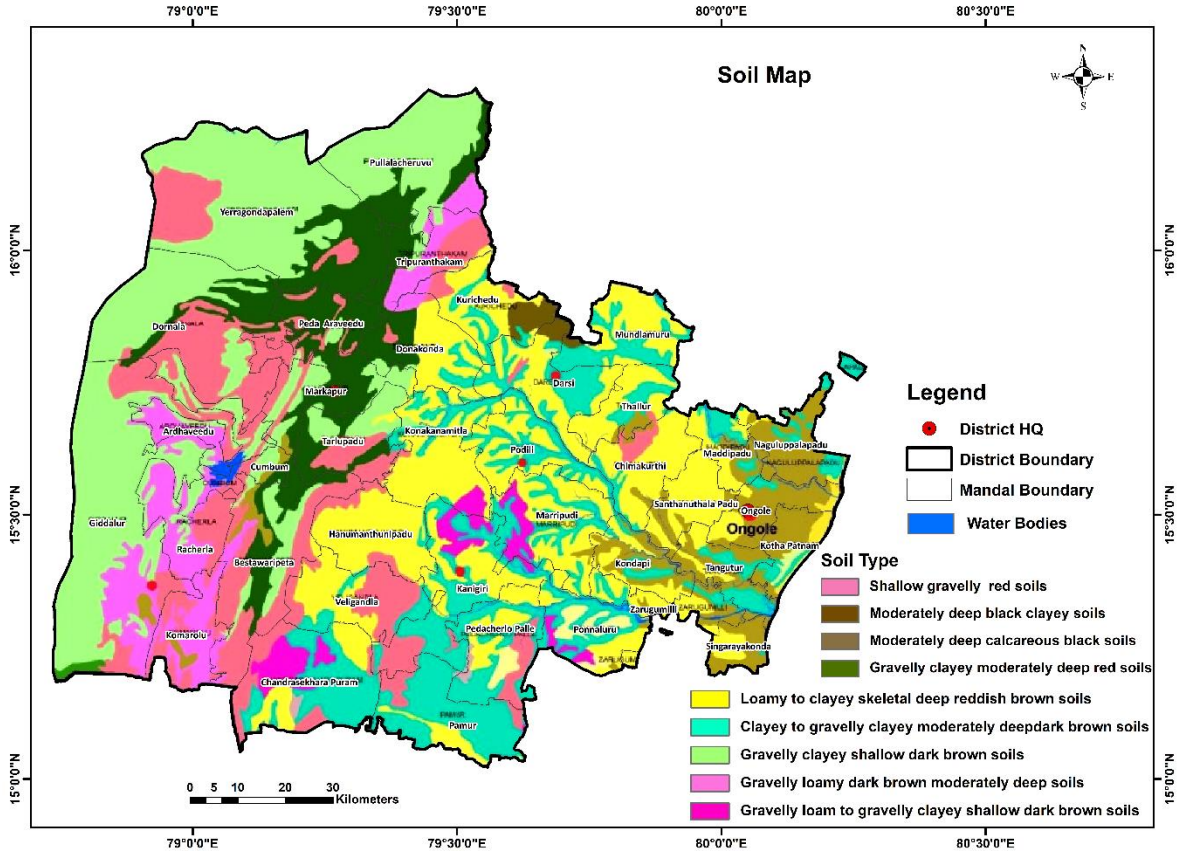


Fig.1.6: Soil map of Prakasam district (Source: District survey report-2021)

1.10 Irrigation:

The district is mainly irrigated by ground water. Out of total gross irrigated area of 111485 ha, ~ 73514 ha (~66%) is irrigating through tube wells/dug wells. The 31132 ha (28%) is irrigated through canal and 4483 ha (4%) through tanks. The remaining 2356 ha (2 %) irrigated through lift irrigation and other sources. (**Fig. 1.7a).** In the district, there are 790 Minor Irrigation Tanks having a registered ayacut of 85278 ha and actual irrigated area is 4364 ha. **(Fig.1.7b)** (Source: Chief Planning officer, Ongole). The medium irrigation projects in the district are Mopadu project constructed near Lakshmi Narasapuram village in Pamur mandal with register ayacut of 5007 ha in Prakasam and SPSR Nellore districts. The Cumbum tank providing irrigation facilities to an ayacut of 2733 ha in 19 villages of Cumbum and Bestavaripeta mandals of Prakasam district. The Paleru Bitragunta Project with 1166 hectares ayacut under 9 system tanks in 9 villages of Singarayakonda and Zarugumalli mandals.

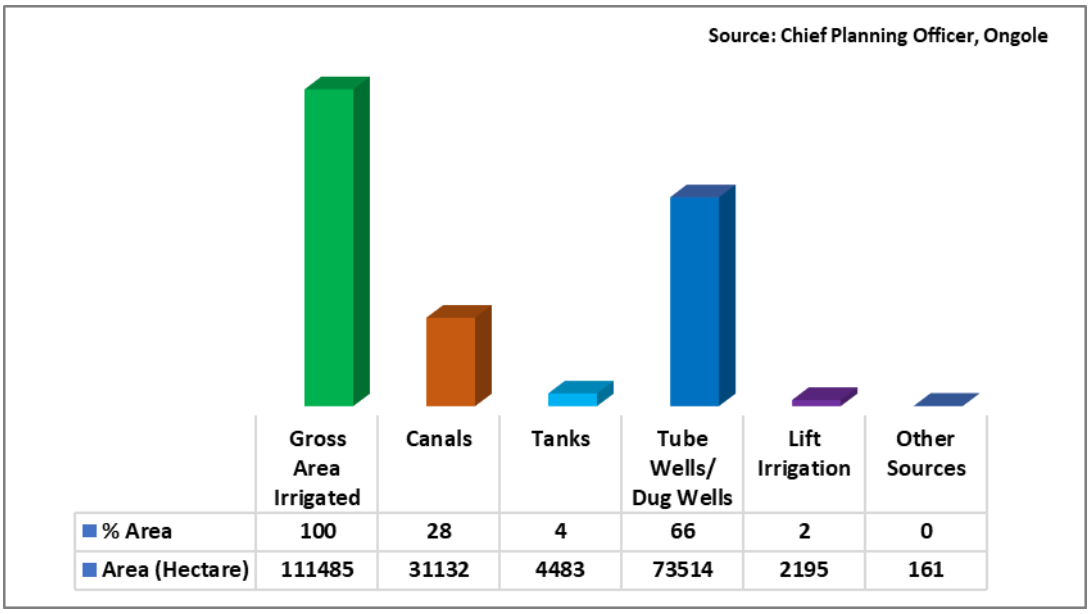


Fig. 1.7a: Area irrigated under different sources.

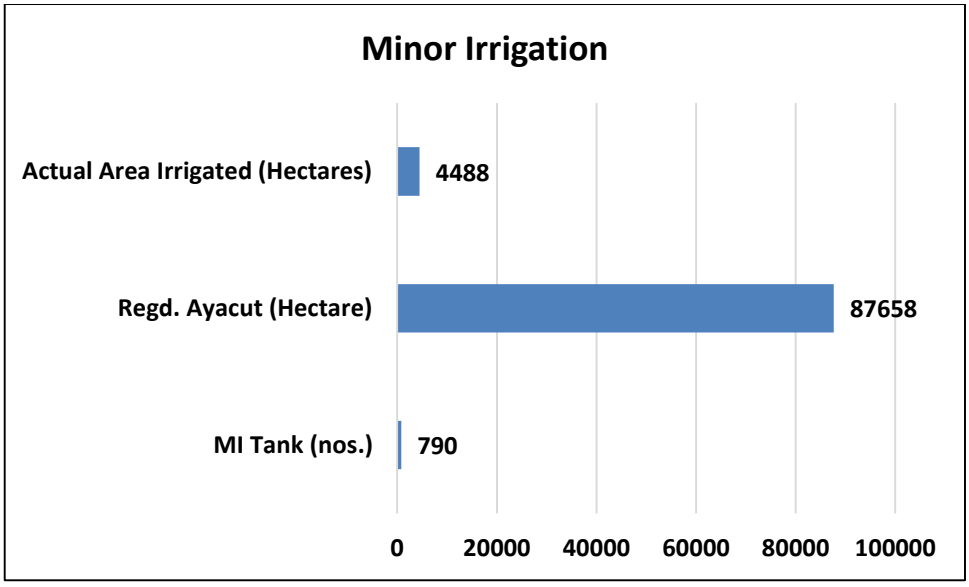


Fig.1.7b: Area Irrigated under Minor Irrigation.

Ongoing/Contemplated Irrigation Projects:

The Poola Subbaiah Veligonda Project is ongoing irrigation project in Markapuram divison. Upon completion, it can provide irrigational facilities to 4,59,000 acres (180708 ha) and drinking water to 1.5 million populations in 29 Mandals of fluoride and drought affected areas in Prakasam, Nellore and Kadapa district by diverting 43.5 TMC (1232 MCM) of floodwater of Krishna River from foreshore of Srisailam Reservoir near Kollamvagu and proposed to store

in Nallamalasagar Reservoir. The water for the project is drawn through two 18.8 km long tunnels across Nallamala hills.

Kandula Obula Reddy Gundlakamma Reservoir Project is another ongoing major irrigation project is formed across Gundlakamma river in Maddipadu mandal of Prakasam district. Through utilization of 12.845 TMC water to provide irrigation facilities to 62,368 acres (24554 ha) in Khariff and 80,060 acres (31519 ha) in Rabi seasons in 6 mandals of Prakasam district. Besides providing water facility to 2.56 lakh population in 43 villages enroute canals and Ongole town. The YSR Korsipadu Lift Irrigation Scheme is proposed on Gundlakamma reservoir by lifting water from the left side foreshore of Gundlakamma reservoir to irrigate of 20000 acres in Naguluppalapadu mandal of Prakasam district and Korisapadu of Bapatla district. **(Fig.1.7).**

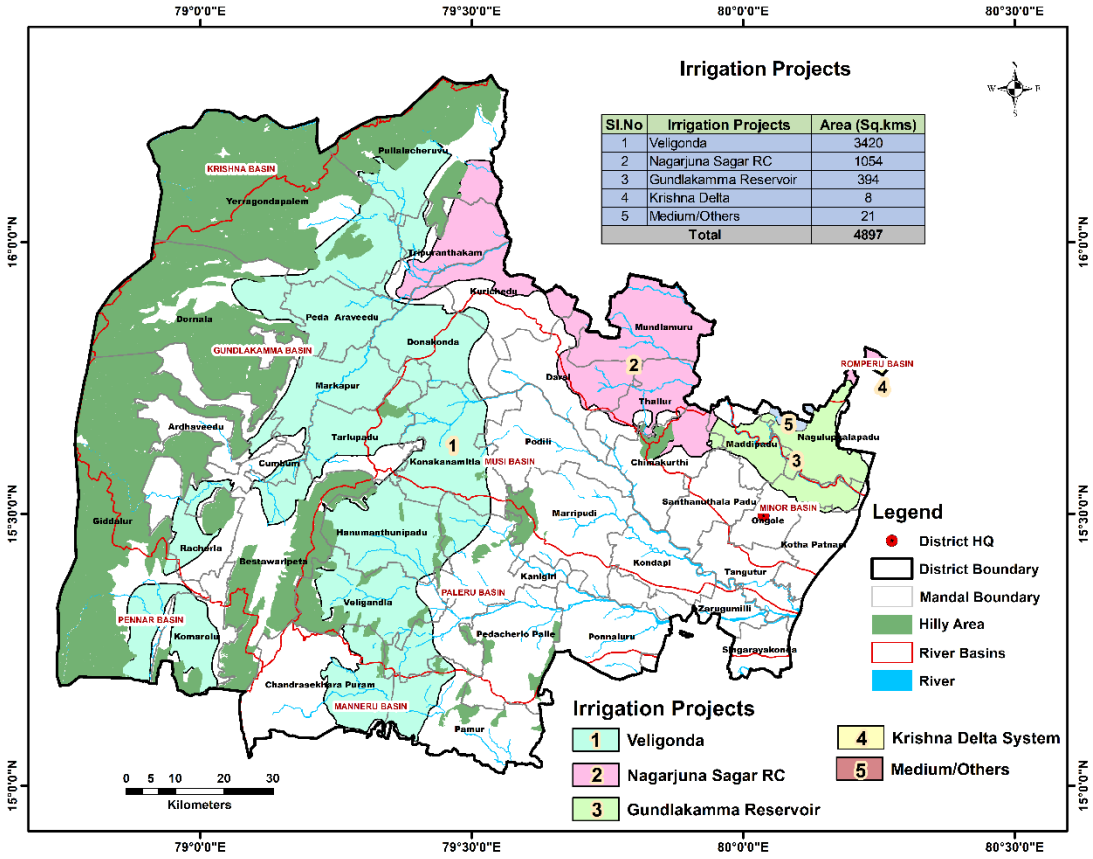


Fig. 1.7: Major and Medium Irrigation Projects, Prakasam District (Source: WRD)

1.11 Prevailing water conservation/Recharge practices: In the district, 3828 percolation tanks/ mini percolation tanks, 3918 check dams/ check walls and other artificial recharge and water conservation structures (WCS) are created under IWMP and MGNREGS. The graphical presentation of structures is provided in **fig.1.8.**

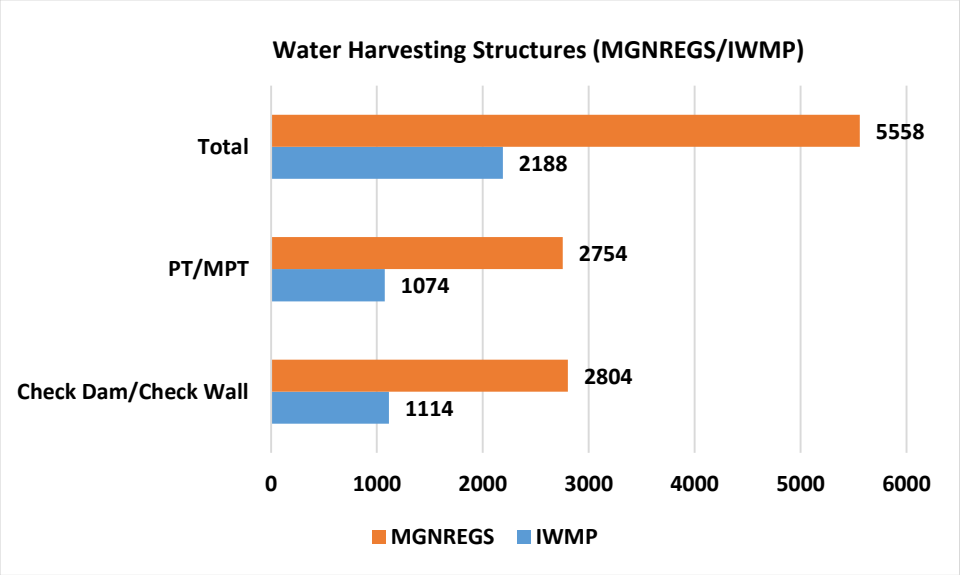


Fig. 1.8: Water harvesting structures under MGNREGS/IWMP.

1.11 Geology: The district comprises rock units of the Khondalite and Charnockite Group of Eastern Ghats Super Group and Unclassified Metamorphics and Dharwar Super Group of Archaean age, Younger Igneous Intrusives, Cuddapah Super Group and Kurnool Group of Proterozoic age, Upper Gondwana sequence of Upper Cretaceous age, Cenozoic laterite and Recent Alluvium. The details and percentage of geology of the area is given in the table and depicted in **Fig.1.9.**

Lithology	Area (Sq. kms)	Percentage (%)
Shale	4565	32
Schist	4295	30
Quartzite	2660	19
Granite Gneiss	992	7
Alluvium	787	5
Granite	604	4
Charnockite	300	2

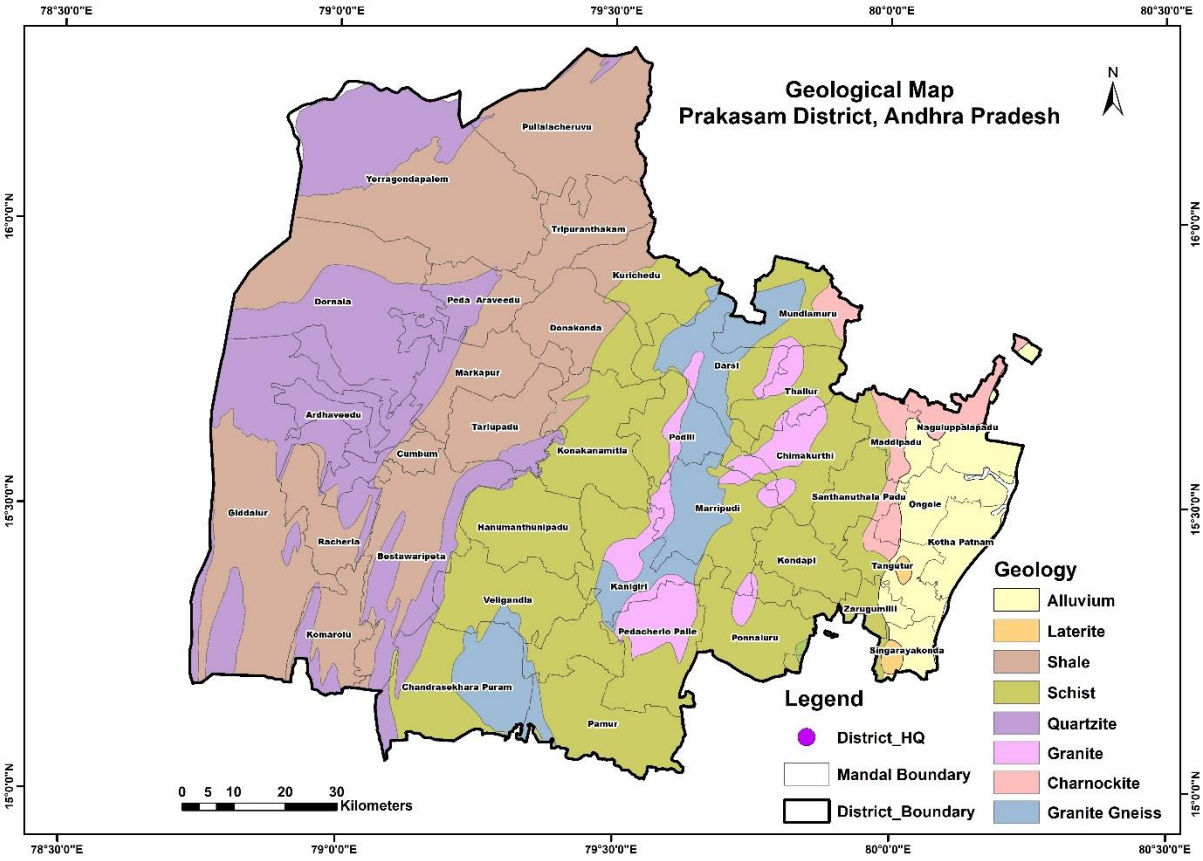


Fig.1.9: Geology of Prakasam district.

2. DATA COLLECTION AND GENERATION

Collection and compilation of data for aquifer mapping studies is carried out in conformity with Expenditure Finance Committee (EFC) document of XII plan of CGWB encompassing various data generation activities (Table-2.1).

Table-2.1: Brief activities showing data compilation and generations.

S. No.	Activity	Sub-activity	Task
1	Compilation of existing data/ Identification of Principal Aquifer Units and Data Gap	Compilation of Existing data on groundwater	Preparation of base map and various thematic layers, compilation of information on Hydrology, Geology, Geophysics, Hydrogeology, Geochemical etc. Creation of data base of Exploration Wells, delineation of Principal aquifers (vertical and lateral) and compilation of Aquifer wise water level and draft data etc.
		Identification of Data Gap	Data gap in thematic layers, sub-surface information and aquifer parameters, information on hydrology, geology, geophysics, hydrogeology, geochemical, in aquifer delineation (vertical and lateral) and gap in aquifer wise water level and draft data etc.
2.	Generation of Data	Generation of geological layers (1:50,000)	Preparation of sub-surface geology, geomorphologic analysis, analysis of land use pattern.
		Surface and sub-surface geo-electrical and gravity data generation	Vertical Electrical Sounding (VES), bore-hole logging, 2-D imaging etc.
		Hydrological Parameters on groundwater recharge	Soil infiltration studies, rainfall data analysis, canal flow and recharge structures.
		Preparation of Hydrogeological map (1:50, 000 scale)	Water level monitoring, exploratory drilling, pumping tests, preparation of sub-surface hydrogeological sections.
		Generation of additional water quality parameters	Analysis of groundwater for general parameters including fluoride.
3.	Aquifer Map Preparation (1:50,000 scale)	Analysis of data and preparation of GIS layers and preparation of aquifer maps	Integration of Hydrogeological, Geophysical, Geological and Hydro-chemical data.
4.	Aquifer Management Plan	Preparation of aquifer management plan	Information on aquifer through training to administrators, NGO's, progressive farmers and stakeholders etc. and putting in public domain.

The aquifer mapping and management plan of Prakasam district is broadly carried out in following steps:

Data gap analysis: The identification of data gap was done after the detailed analysis, examination, synthesis and interpretation from available sources. This process incorporated the conversion of analog data in the form of digital data that could be processed readily on GIS platform. Based on data gap, the key wells established in uncovered NAQUIM area particularly in eastern part of Prakasam district, A.P.

Data compilation: The data from previous NAQUIM studies in western part (5851 sq.km) and Central pats (4095 sq.km) of the district, basic data reports of exploratory wells/observation wells/ piezometers drilled by CGWB, details of wells drilled by State Departments, district brochures of CGWB are compiled and integrated for aquifer mapping.

2.1. Hydrogeological Studies

Hydrogeology is concerned primarily with mode of occurrence, distribution, movement and chemistry of ground water occurring in the subsurface in relation to the geological environment. The occurrence and movement of water in the subsurface is broadly governed by geological frameworks i.e., nature of rock formations including their porosity (primary and secondary) and permeability. The principal aquifer in the area is Archean unclassified metamorphic/ Eastern Ghats/ Dharwar Super Group of rocks occurs in central part and comprising granites gneisses, charnockites, khondalites, migmatites, quartzites and intrusives, etc. The metasedimentary formation of Cuddapah Super Group of Proterozoic age of shale, slate, phyllite, quartzite, etc. and found in Western parts of district. The Cenozoic Laterite and recent alluvium formation which are occurs in Eastern part of the district. The occurrence and movement of ground water in these rocks is controlled by the degree of interconnection of secondary pores/voids developed by fracturing and weathering of hard and crystalline formation and presence of sand and clay layers in alluvium formation. The location of the exploratory wells and other hydrogeological data points is given in **Fig. 2.1.** Based on **429** hydrogeological data points, hydrogeological map is prepared. **(Fig.2.2)**

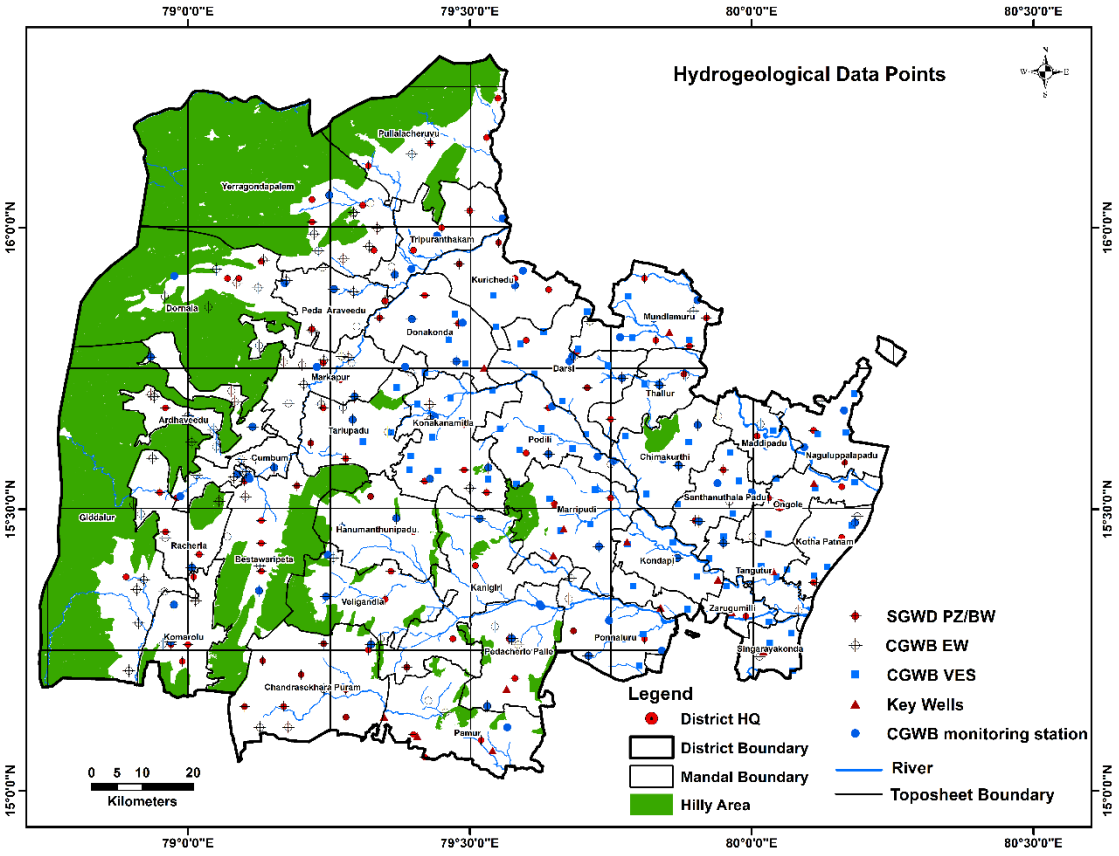


Fig. 2.1: Hydrogeological data availability.

2.1.1. Exploratory Drilling: As on 31/03/2022, Central Ground Water Board has drilled 142 no's bore wells (81 EW, 19 OW and 42 piezometer) in Prakasam district. Out of these, 47 wells were drilled in Archean granite gneiss, schist, granite and charnockite area, 90 wells were drilled in Cuddapah formation of shale, phyllite, slate and quartzite area and 5 wells in Gondwana sandstones and alluvial formation. Data analysed from CGWB wells indicates, 7 no's well of depth ranges 20-100 m, 50 no's (>100-150 m), 85 no's (150-200 m) depth. The potential zones were encountered between 30 and 100 m depth.

In Archean granite gneiss, schist, granite and charnockites, fracture occur in range of 12 to 125 m bgl depth and deepest fracture encountered at depth of 121.8 m bgl in Peddacharlo Palle mandal. The yield ranges from <1.0 to 16.15 lps and highest discharge (16.15 lps) found in Pallamalli, Chimakurty mandal. The transmissivity varies from 0.53 to 168 m2/day.

In Cuddapah formation, Fracture encountered between 17 to 198 m bgl depth and yield of wells varies from <1.0 to 18.55 lps. The deepest fracture was encountered at 198 m. bgl at Guduru Moravai Palle, Komarolu mandal and highest discharge 18.5 lps was found at Yerrabalem, Cumbum mandal of Prakasam district. The yield of wells ranges from a

minimum of <1.0 lps to a maximum of 18.5 lps (in Yerrabalem, Cumbum mandal). The transmissivity varies from 0.13 to 193 m2/day and storativity ranges from 0.000001 to 0.058. The bore well yields are highest in Cuddapah shales than in Archaean and Dharwar formations.

The fresh water aquifers in alluvium occurs between 10 and 20 m bgl. The general yield of the exploratory wells in varies from 1.0 to 3.0 lps and the specific capacity varies from 40 to 100 lpm/m dd, whereas the transmissivity varies from 20 to 100 m2/day. The formation wise drilled wells are given in **Fig. 2.2a.**

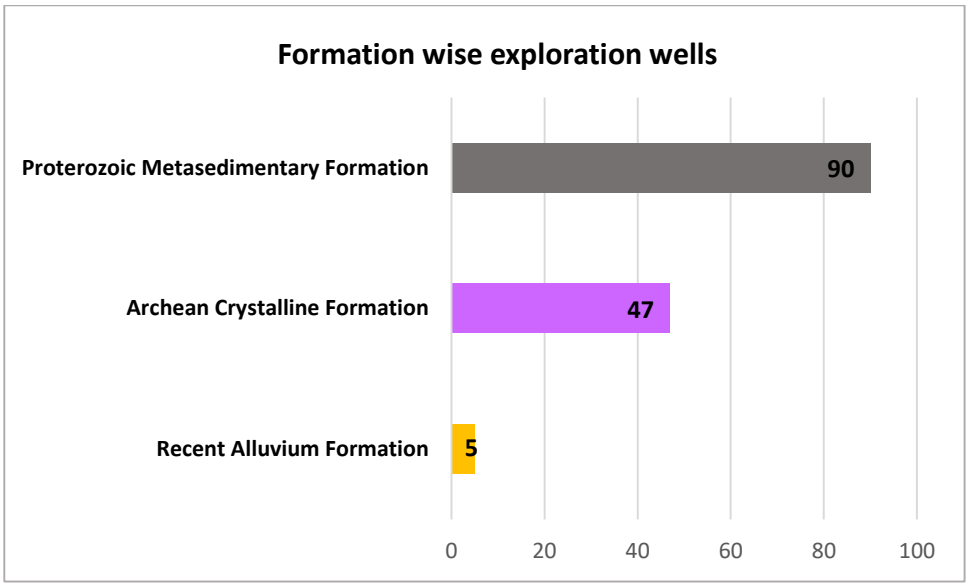


Fig. 2.2a. Formation wise exploration wells.

2.1.2. Ground water Yield: Ground water yield varies from <1.0 to 18.5 lps. Over all, in ~67 % of study area, the yield occurs from 1.0 to 3.0 lps followed by < 1.0 lps in ~20 % of area. Ground Water yield from 3 to 5 lps occurs in ~11 % of area and 5 to 10 lps occurs in ~2 % of the study area. The yield of wells varies from <1.0 to 16.15 lps in granitic gneisses, granite and charnockites area. In shales, slate, limestone, phyllite and quartzite the yield varies from < 1.0 to 18.55 lps and in alluvium it varies from < 1.0 to 2.4 lps. The high yielding wells of 5 to 10 lps occurs in some parts of Ardhaveedu, Chimakurty, Dornala, Komarolu and Racharla mandal of the district. (**Fig.2.3)**

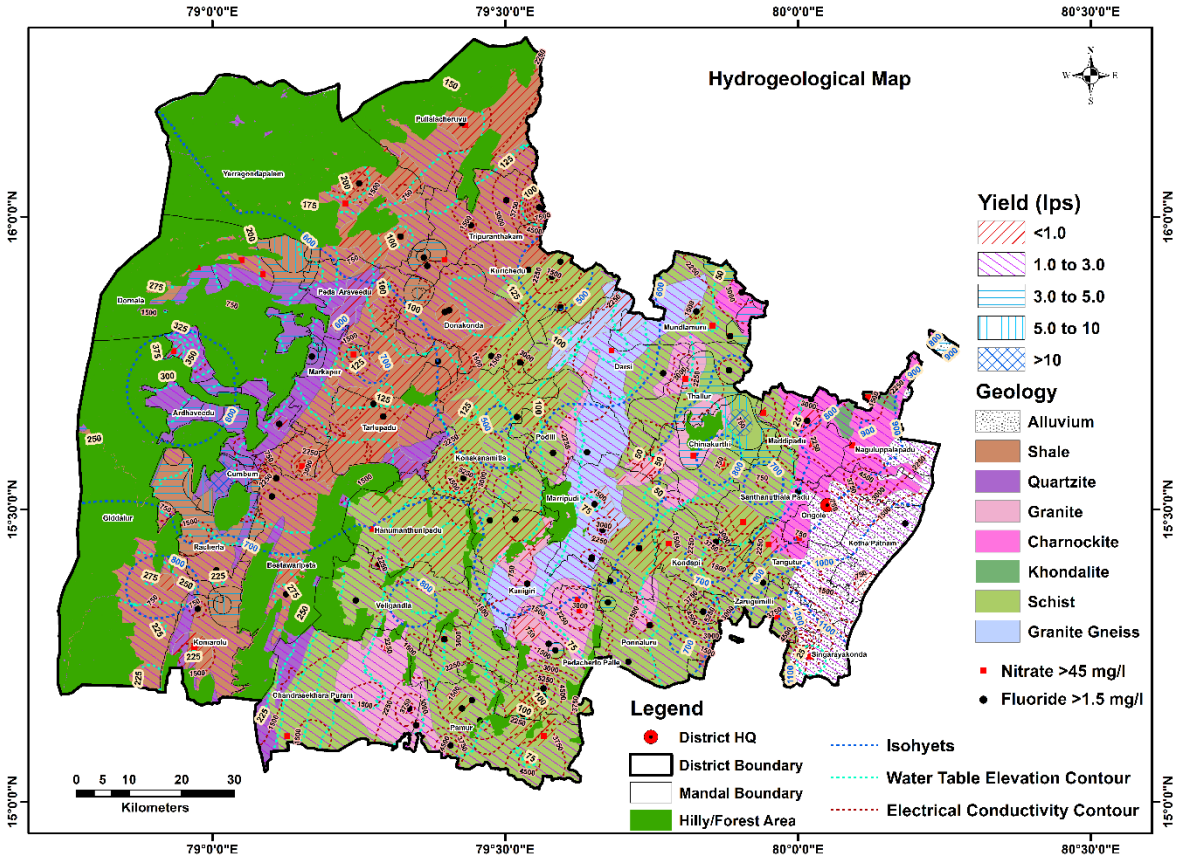


Fig.2.2: Hydrogeological map of Prakasam district.

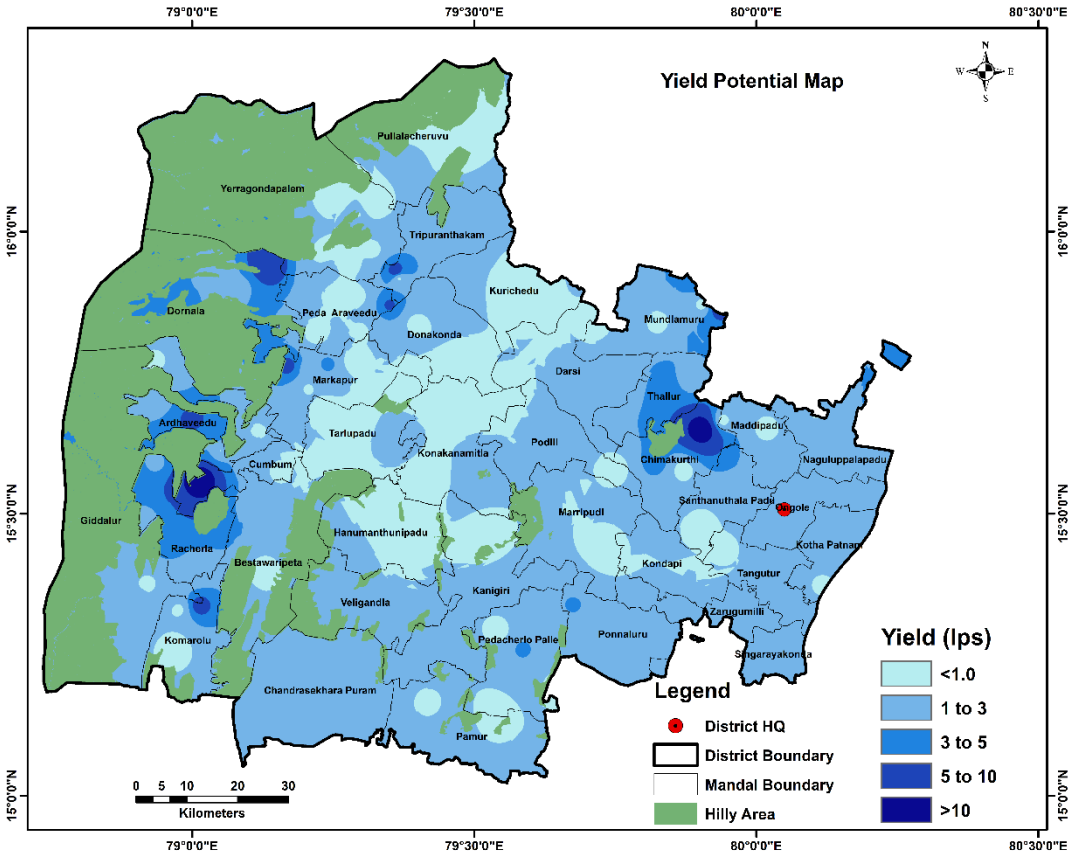


Fig.2.3: Ground water yield potential map of Prakasam district.

2.2 Water Levels: Ground water levels from 196 piezometers/DWs (CGWB: 123 and SGWD: 73) were monitored for pre-monsoon and post-monsoon season (2012 to 2022).

2.2.1 Water Table Elevations: During pre and post-monsoon season (May and November), the water-table elevation ranges from 0.8 to 422 and 1.82 to 435 meter above mean sea level (m amsl) respectively and The ground water flow in western part of the district is mainly towards North-East direction, whereas the flow is towards South-East direction in central and eastern parts of the district. **(Fig.2.4)**

2.2.2 Depth to Water Levels (DTWL): The average DTWL of 10 years (2012 to 2022) for pre-monsoon and post-monsoon were analysed, the avg. DTWL varies from 1.18 to 63.45 meter below ground level (m bgl) (average: 12.55 m bgl) and 0.75 to 68.13 m bgl (average: 10.83 m bgl) during pre-monsoon and post-monsoon seasons respectively.

Pre-monsoon season: Majority of the water levels during this season are in the range of 10 to 20 m covering 32 % of the area, followed by 20 to 40 m bgl (32 %), 5.0 to 10 m bgl (28 %), < 5.0 m bgl (7 %) and >40 m bgl (1%). The water level > 40 m bgl occupy in parts of Markapur, Yerragondapalem and Pullalacheruvu mandals and 20 to 40 m bgl water level found in parts of Pedaraveedu, Markapur, Yerragondapalem, Tarlupadu, Giddaluru, Bestavaripeta, Racherla, Komarolu and Dornala mandals. (**Fig.2.5**)

Post-monsoon season: Majority of the water levels during this season are in the range of 5.0 to 10 m covering 37 % of the area, followed by 10 to 20 m bgl (34 %), 20 to 40 m bgl (15 %), < 5.0 m bgl (13 %) and >40 m bgl (1%). The water level > 40 m bgl occupy in parts of Yerragondapalem and Pedaraveedu mandals and 20 to 40 m bgl water level found in parts of Pedaaraveedu, Markapur, Yerragondapalem, Tarlupadu, Giddaluru, Bestavaripeta, Komarolu, Donakonda and Dornala mandals. The shallow water level < 5.0 m bgl occupy in parts of Ongole, Santhanuthalapadu, Kothapatnam, Maddipadu, Tangutur, Zarugumilli, Singarayakonda, Kurichedu mandals. (**Fig.2.6**)

2.2.3 Water Level Fluctuations (May vs. November): The water level fluctuations vary from -3.62 to 24.68 m with average fall of -1.04 m and rise of 3.83 m. Fall in water level ranges -0.02 to -3.62 m and rise in water levels from 0.08 to 24.68 m. (**Fig.2.7**). Rise in water level range of 0.0 to 2.0 m covers majority of the area with 38 % followed by 5.0 to 10 m rise in 28% of the area, 2.0 to 5.0 m rise (25 %) and >10 m rise (12 %). The fall of water levels -0.02 to -3.62 m is observed only in 1% of area.

2.2.4 Long term water level trends: Trend analysis for the last 10 years (2012-2022) is studied from 91 hydrograph stations of CGWB and SGWD for pre-monsoon and post-monsoon season respectively. It is observed that during pre-monsoon season 43 wells shows rising trend ranging 0.01 to 4.61 m/yrs (Avg: 0.95 m/yrs) and 48 wells shows falling trends ranging 0.01 to 3.39 m/yrs (Avg: 0.80 m/yrs). During post-monsoon season 51 wells shows raising trend ranging 0.04 to 5.36 m/yrs (Avg: 1.16 m/yrs) and 34 wells shows falling trends ranging 0.01 to 2.51 m/yrs (Avg:0.55 m/yrs). The magnitude of trend values indicates that significant change is occurred in parts of Pedaraveedu, Tarlupadu, Pullalacheruvu, Dornala, Donakonda, Markapur, Giddalur and Yerragondapalem mandals. The Long-term water level trends of Pre-monsoon and Post-monsoon map is shown in **Fig.2.8 & Fig.2.9** respectively. The percentage of rise and fall area during pre and post-monsoon are shown in **Fig.2.10.**

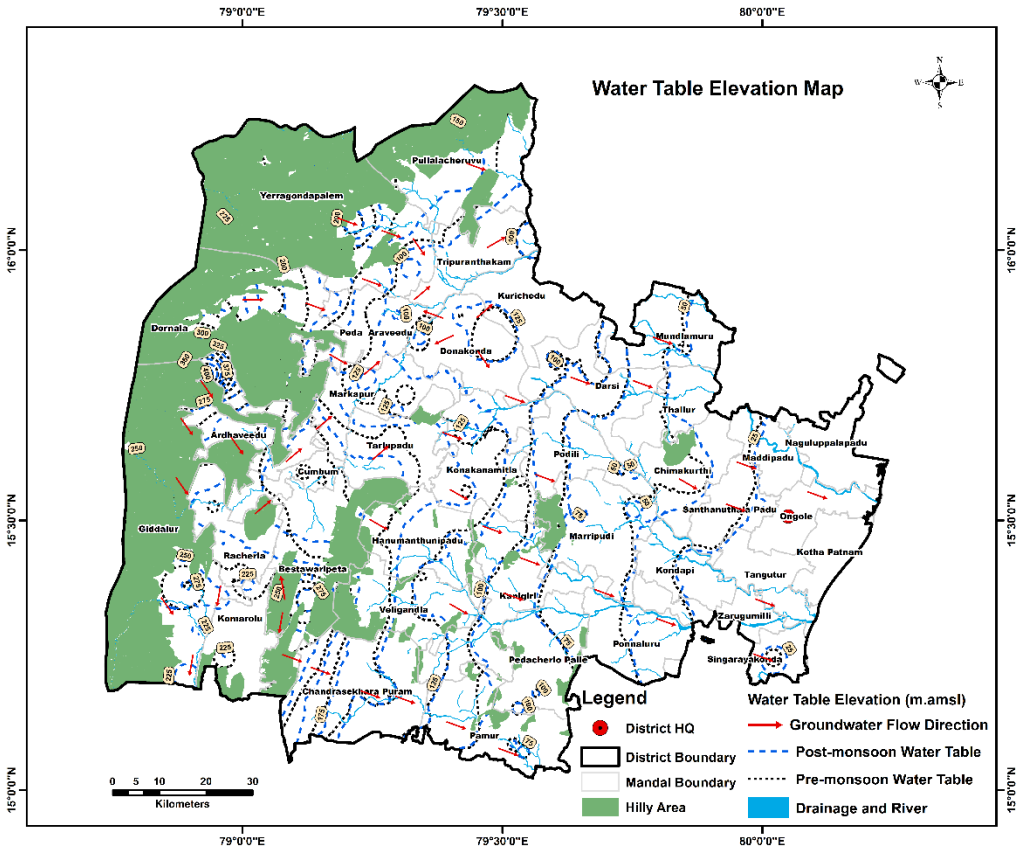


Fig.2.4: Water table elevation map (m amsl) during pre and post-monsoon

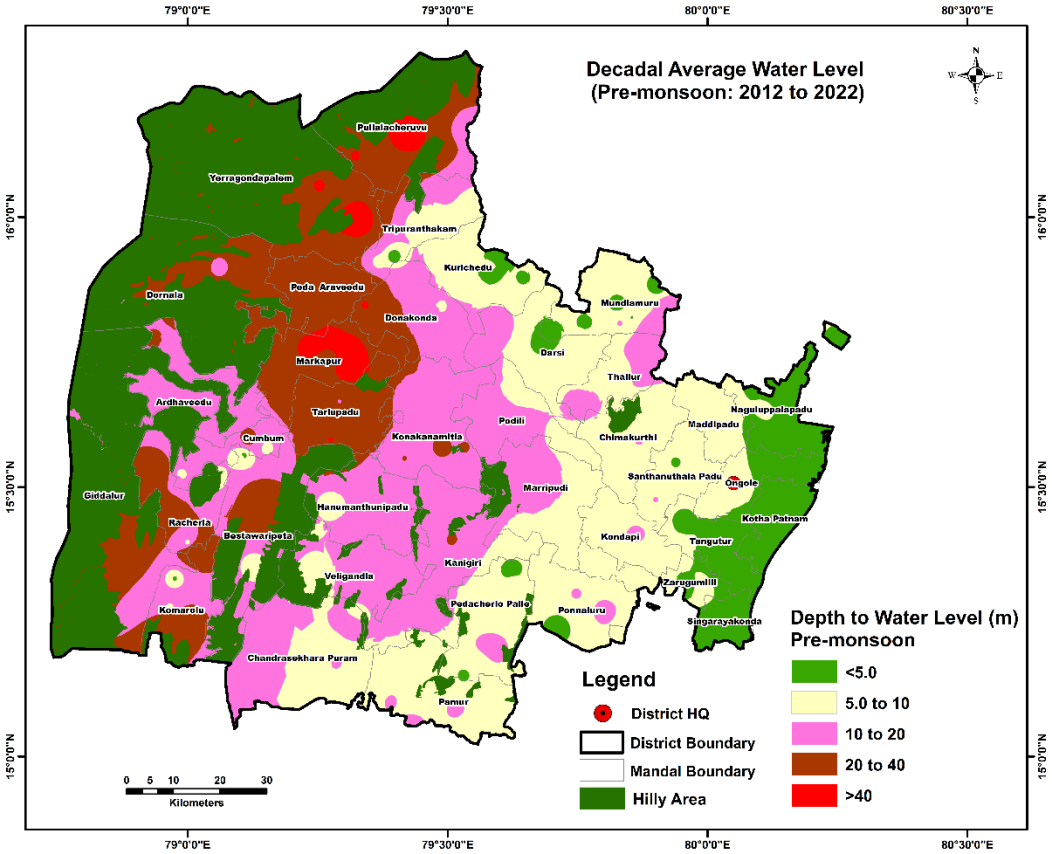


Fig.2.5: Depth to water levels Pre-monsoon (Average).

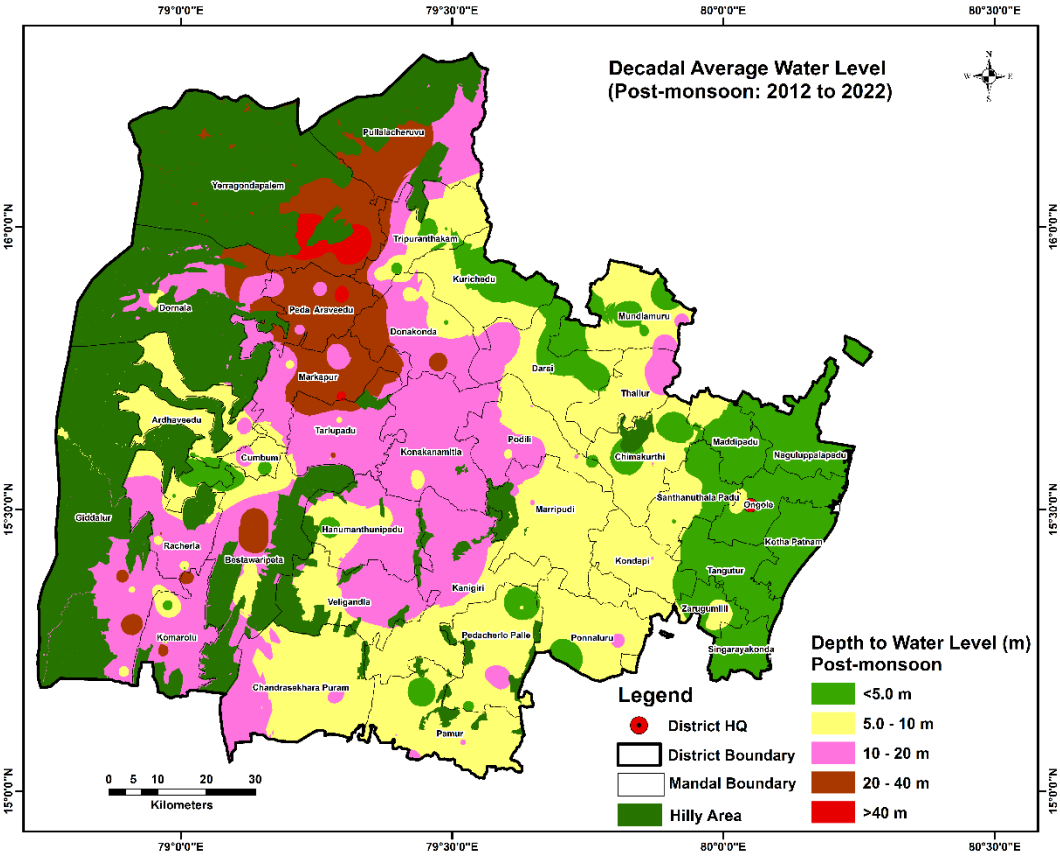


Fig.2.6: Depth to water levels Post-monsoon (Average).

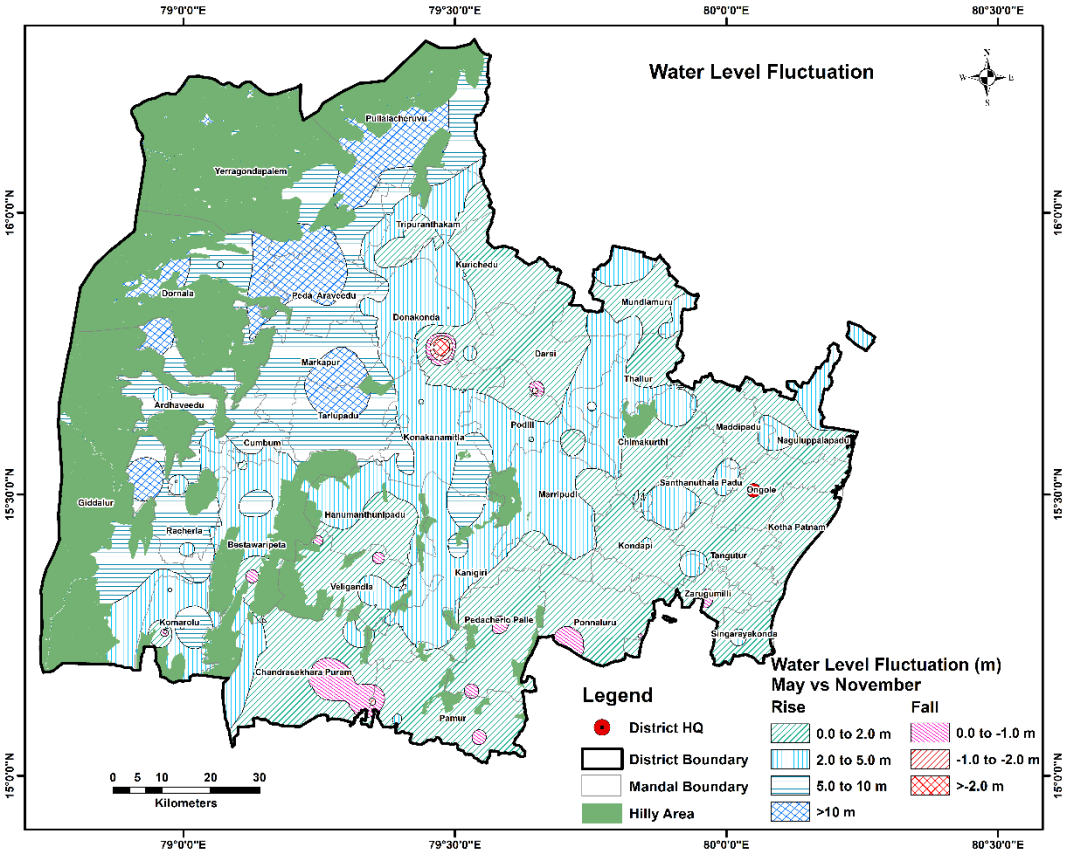


Fig.2.7: Water Level Fluctuations (m) (Nov. with respect to May).

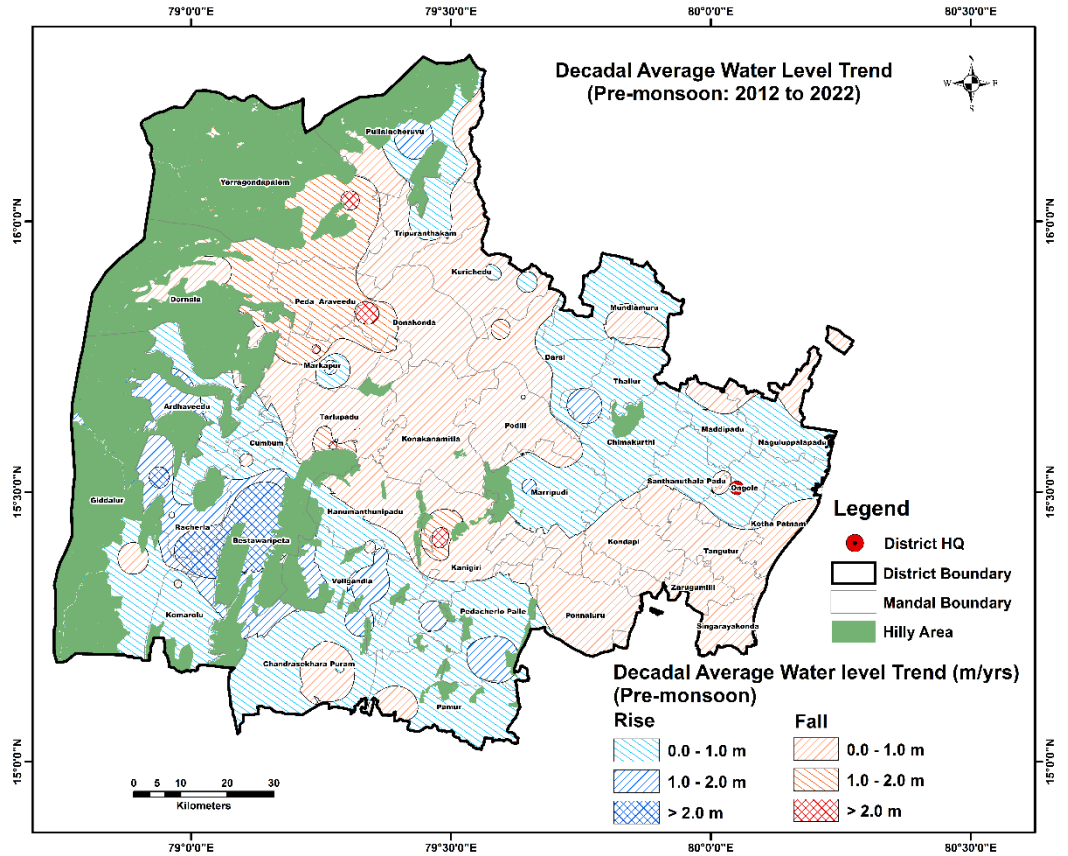


Fig. 2.8: Long-term water level trends of Pre-monsoon (2012-2022).

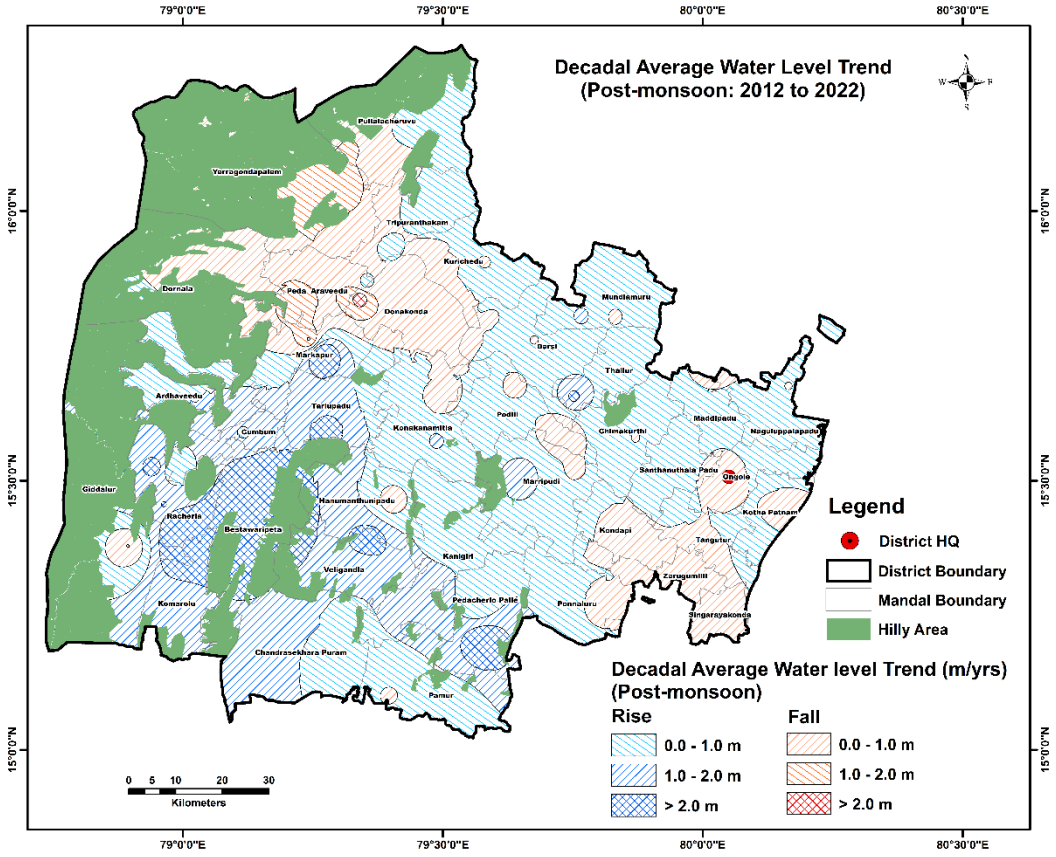
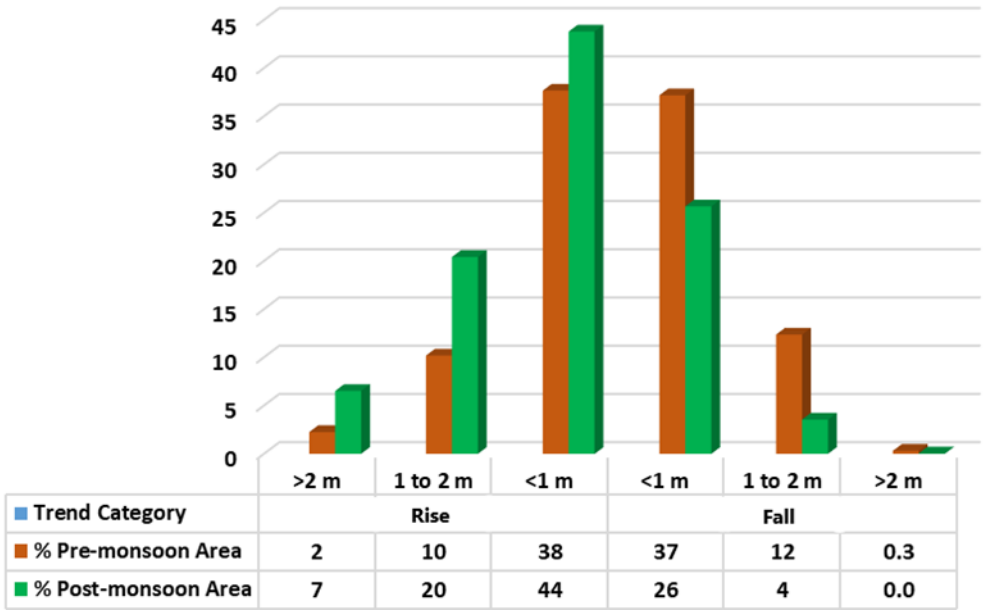


Fig. 2.9: Long-term water level trends of Post-monsoon (2012-2022).



Trend Category	Rise			Fall		
	>2 m	1 to 2 m	<1 m	<1 m	1 to 2 m	>2 m
% Pre-monsoon Area	2	10	38	37	12	0.3
% Post-monsoon Area	7	20	44	26	4	0.0

Fig.2.10: Percentage of rise and fall area during pre and post-monsoon trend.

2.2. Hydro chemical Studies: For groundwater quality analysis 156 EW, 91 NHS monitoring well and 45 key wells data are being used for spatial and temporal variation of ground water quality.

Ground Water from the area is mildly alkaline to alkaline in nature with pH in the range of 7.26 to 8.02 (Avg: 7.77). Electrical conductivity varies from 300 to 8800 (Avg: 1789) µ Siemens/cm**.** In majority of area 11780 sq.km (65 %) EC is within 750 to 2250 µ Siemens/cm; in 1602 sq. kms (11 %) area, it is 2250 to 3000 µ Siemens/cm; in 887 sq. kms (6 %) where EC is > 3000 µ/Siemens/cm **(Fig.2.11 & Fig.2.11a).** The Concentration of NO3 ranges from 0.1-598 mg/l with an average 71.13 mg/l. Nitrate concentration < 45 mg/l is observed in 168 (62 %) sample out of 272 sample and above permissible limit of >45 mg/l is observed 104 (38%) samples **(Fig.2.12).** The concentration of Fluoride ranges from 0.08-6.03 mg/l with an average of 1.27 mg/l. In 188 samples (69%), F concentration is observed less than the permissible limits (<1.5 mg/l) and in 84 (31%) samples F is more than the permissible range (>1.5 mg/l) **(Fig.2.13 & Fig.2.13a)**

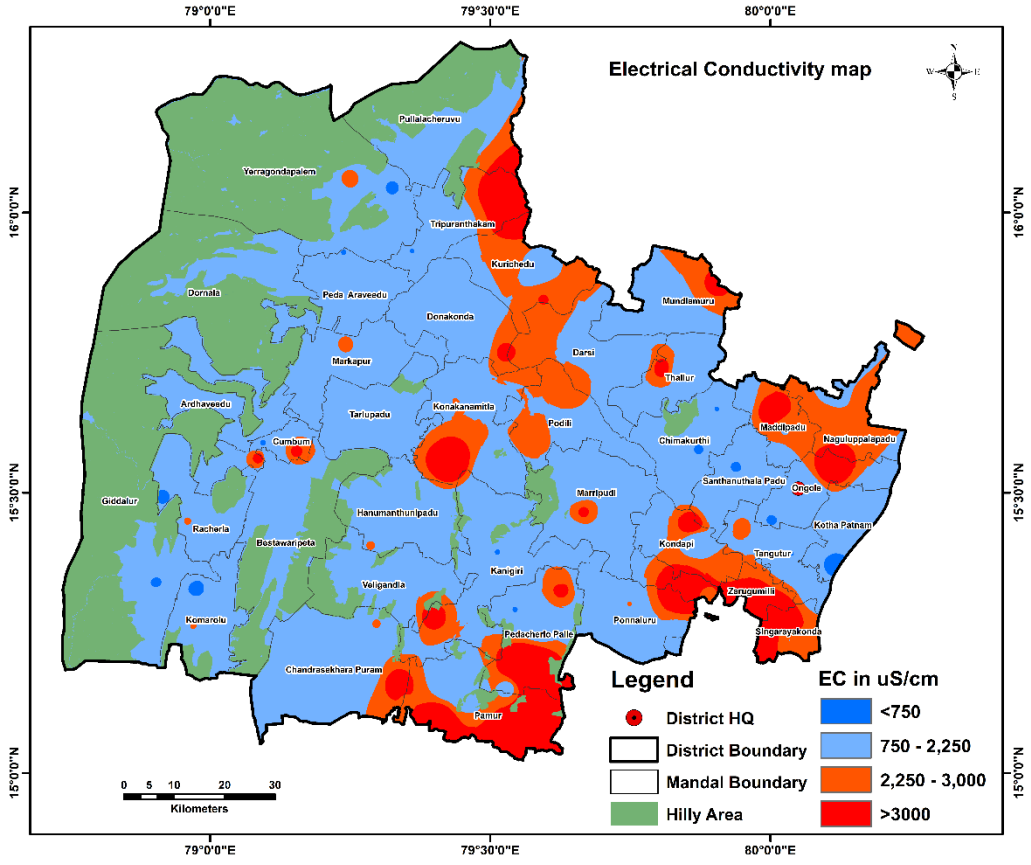


Fig.2.11.: Distribution of Electrical conductivity.

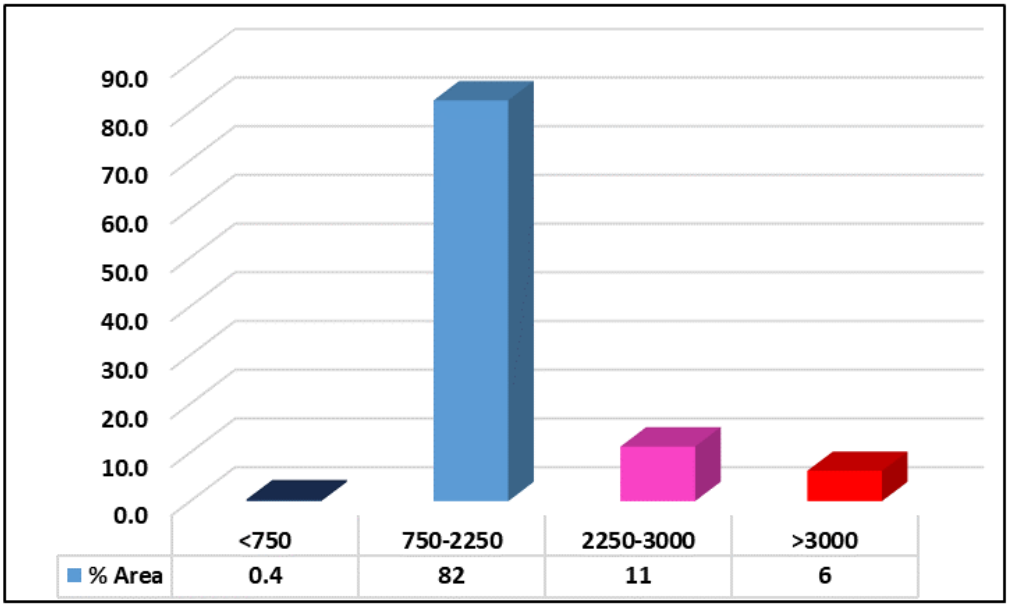


Fig.2.11a.: Percentage of area (EC).

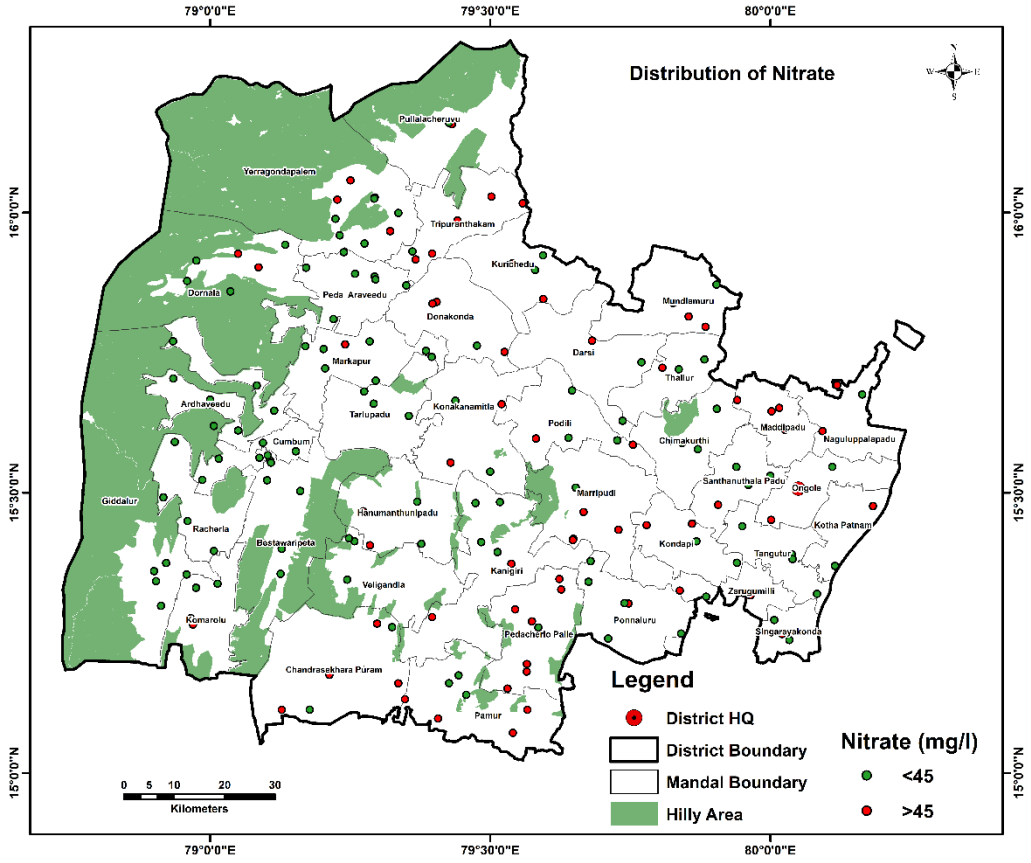


Fig.2.12: Distribution of Nitrate.

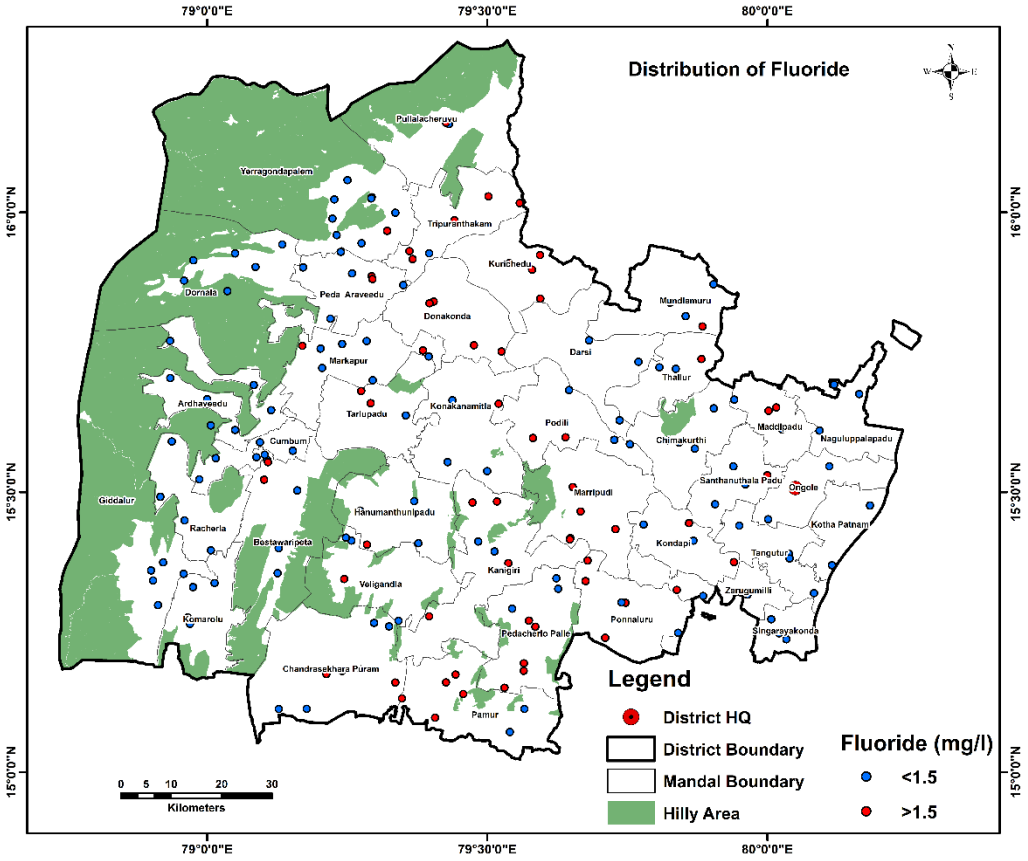


Fig.2.13: Distribution of Fluoride.

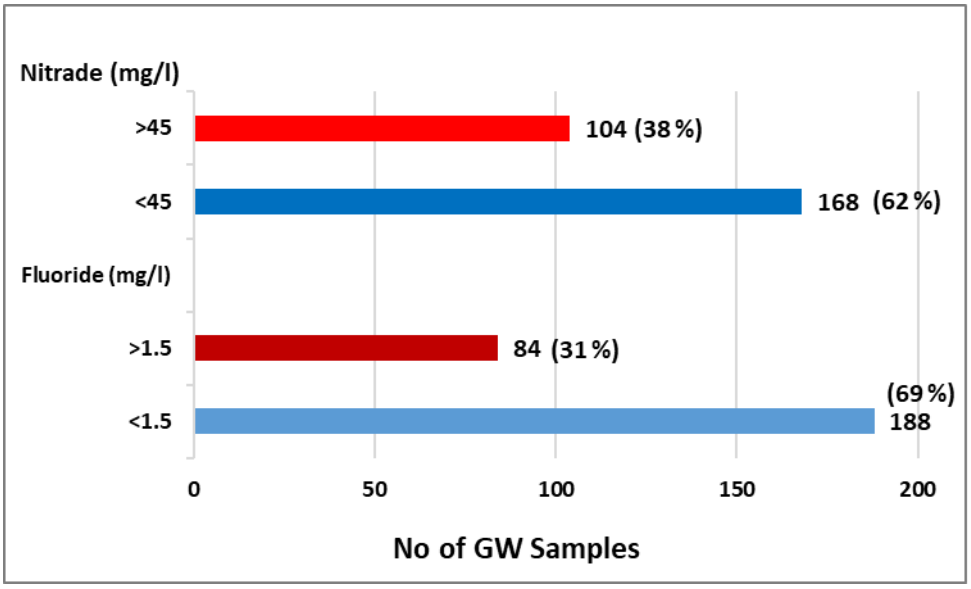


Fig.2.13a.: Percentage of Nitrate and Fluoride samples above and below permissible limit.

3. DATA INTERPRETATION, INTEGRATION AND AQUIFER MAPPING

Conceptualization of 3-D hydrogeological model was carried out by interpreting and integrating representative 218 data points (exploration and VES) for preparation of 3-D map, panel diagram and hydrogeological sections. The data is calibrated for elevations with Shuttle Radar Topography Mission (SRTM) data. The lithological information was generated by using the Rock Works-16 software and generated 3-D map for Prakasam district (**Fig.3.1, Fig.3.2, Fig.3.3 & Fig.3.4.)** and hydrogeological sections. **(Fig.3.5.)**

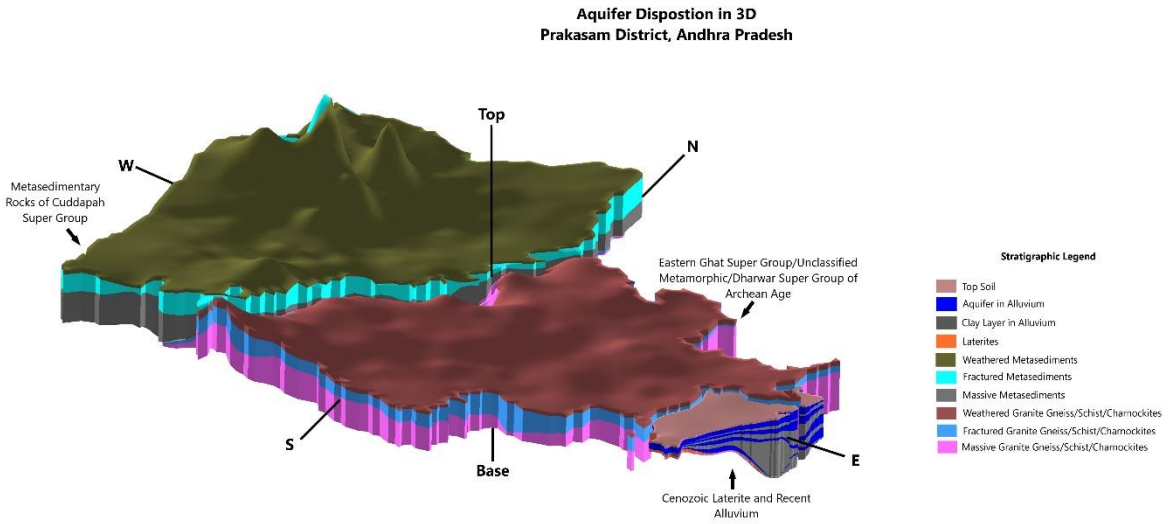


Fig.3.1: Aquifer disposition in 3D, Prakasam district, Andhra Pradesh.

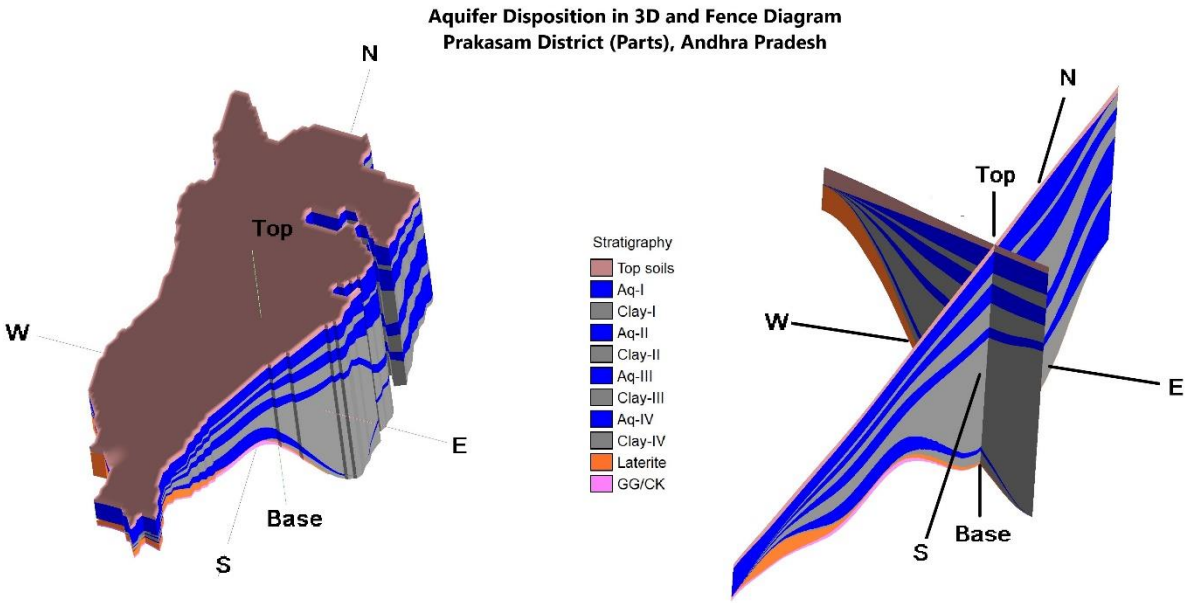


Fig.3.2: Alluvium Aquifer disposition in 3D and Fence Diagram.

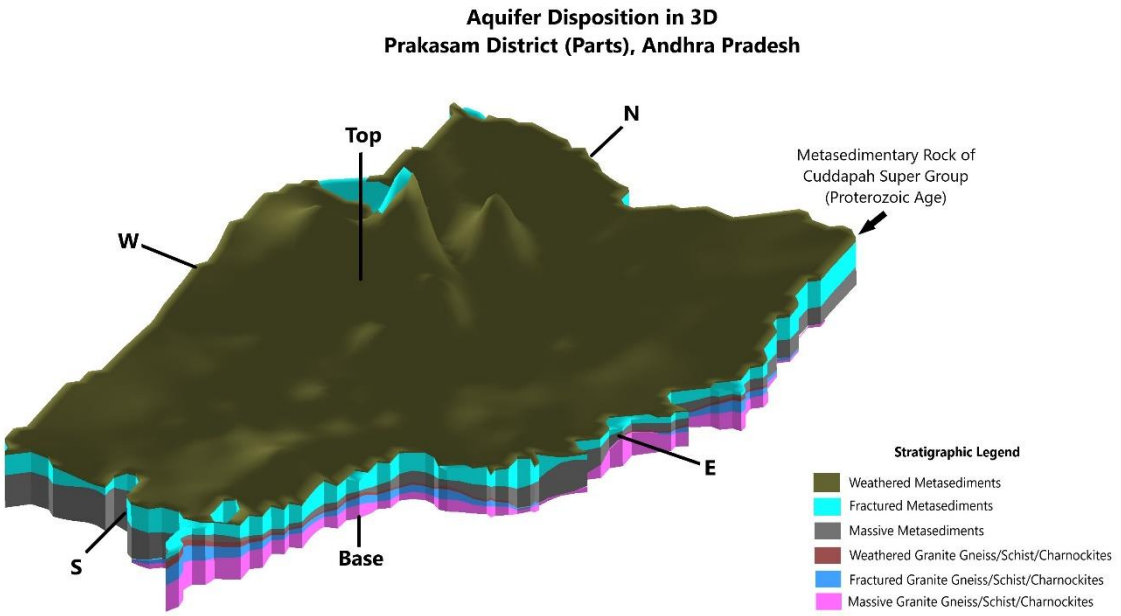


Fig.3.3: 3D Aquifer disposition in Metasedimentary rock, Prakasam district (Parts), Andhra Pradesh.

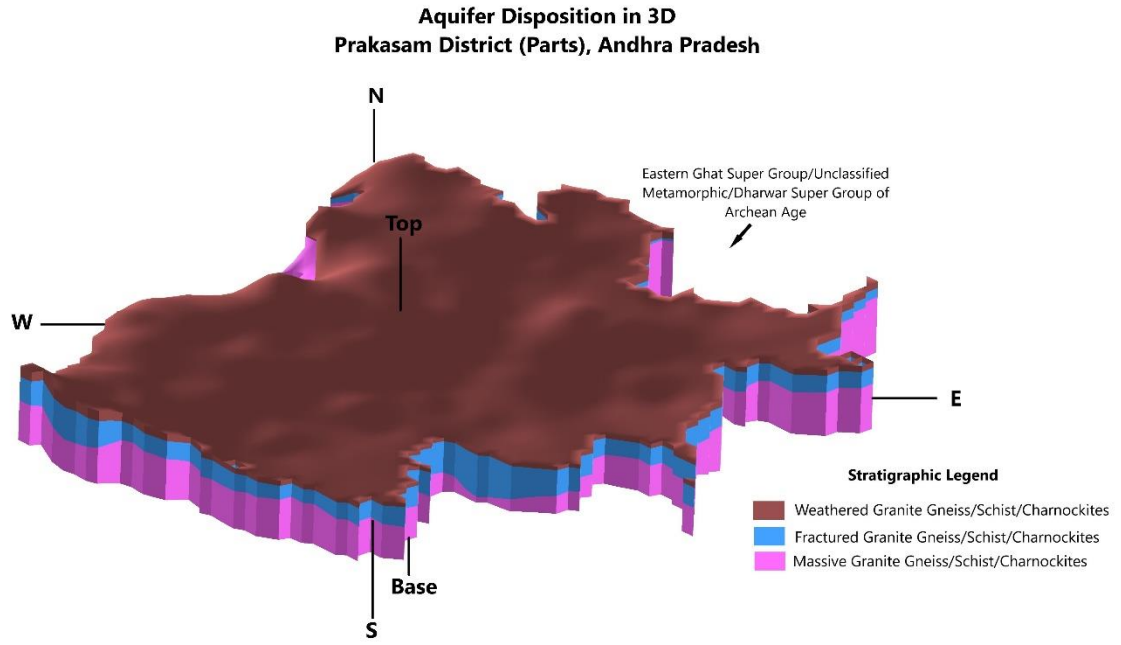


Fig.3.4: 3D Aquifer disposition in Easthern Ghat, Dharwar Super Group and Unclassified Metamorphics of Prakasam district (Parts), Andhra Pradesh.

3.1 Conceptualization of aquifer system in 3D:

Aquifers were characterized in terms of potential and quality based on integrated hydrogeological data and various thematic maps. Weathered zone is considered up to the

maximum depth of weathering and first fracture encountered (below weathered depth) generally down to ~21 m depth and the fractured zone (fractured granite) is considered up to the depth of deepest fracture below weathered zone (~21 to 200 m).

3.2 Hydrogeological Sections:

Hydrogeological sections are prepared in E-W, N-S, NW-SE, SW-NE and SW'-NE' direction. (**Fig.3.5a-e**).

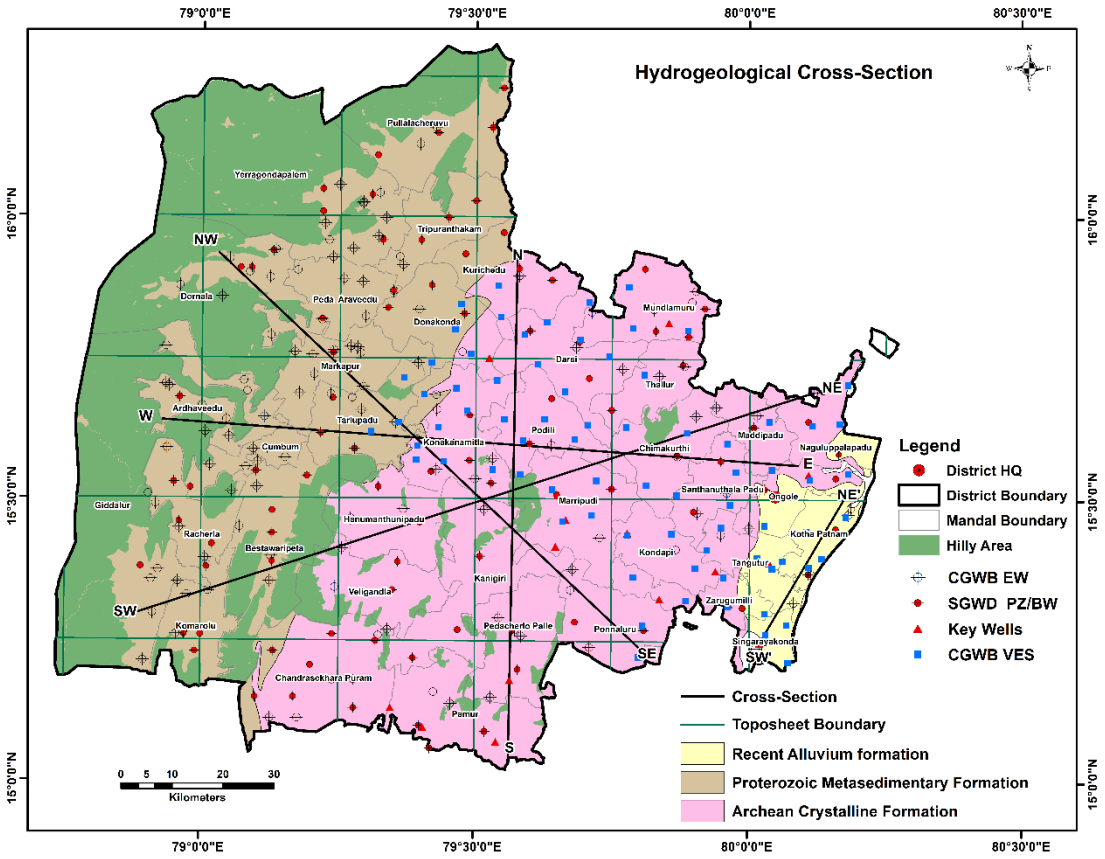


Fig.3.5: Map showing orientation of hydrogeological sections

3.2.1 Hydrogeological Cross Section (E-W): The section drawn along the E-W direction in central part of district covering distance of ~122 km **(Fig.3.5a)**. It depicts metasediments are occurs in western part and granite gneiss, schist is occurring in eastern part of the section. The weathered part followed by massive Eastern Ghat/ Dharwar Super Group of rock is found at Chinnarikatla and Katurivaripalem. The deepest fracture in metasediments are seen at Bollupalli, C. Donakonda and Laxmakka Palle and in granitic gneiss at Sivarampuram, Chinakada area.

3.2.2 Hydrogeological Cross Section (N-S): The section drawn along the N-S direction from Kurichedu to Kotlapalle of the district covering distance of ~78 km **(Fig.3.5b)**. It depicts weathered and fractured metasediments occur only at Choutapalle. The shallow fractures are found in Eastern Ghat/ Dharwar Super Group followed by massive rocks at Kurichedu, Thimmareddypalle, Sitarampuram and Kotlapalle.

3.2.3 Hydrogeological Cross Section (NW-SE): The section drawn along the NW-SE direction of the district covering distance of ~108 km from Valaparla to Venkupalem **(Fig.3.5c).** The metasediments are found in NW part and granite gneiss, schist and charnockite are occurs in SE part. The deepest fracture is found in metasediments at Peddaraveedu, Kandivanipalle and Laxmakka Palle and in Eastern Ghat/ Dharwar Super Group of rock at G Mekapadu.

3.2.4 Hydrogeological Cross Section (SW-NE): The section drawn along the SW-NE direction of district covering distance of ~140 km **(Fig.3.5d)**. It depicts metasediments are occurs only at south western parts and Eastern Ghat/ Dharwar Super Group of rock is occurring in entire section. The deepest fracture found at Pachala Venkatapuram in medisedimentary rock and good potential fracture zone with high discharge are found at Pallamalli and R L Puram in Eastern Ghat/ Dharwar Super Group of rock.

3.2.5 Hydrogeological Cross Section (SW'-NE'): The section drawn along the SW'-NE' direction in eastern part of the district covering distance of ~32 km (**Fig.3.5e**). It depicts that, area has multi-layer (4 nos.) aquifer system in alluvium parts the district. The thickness of alluvium increases towards coast and basement is Cenozoic laterite and Archean granite gneiss/schist or charnockite.

Fig:3.5a.

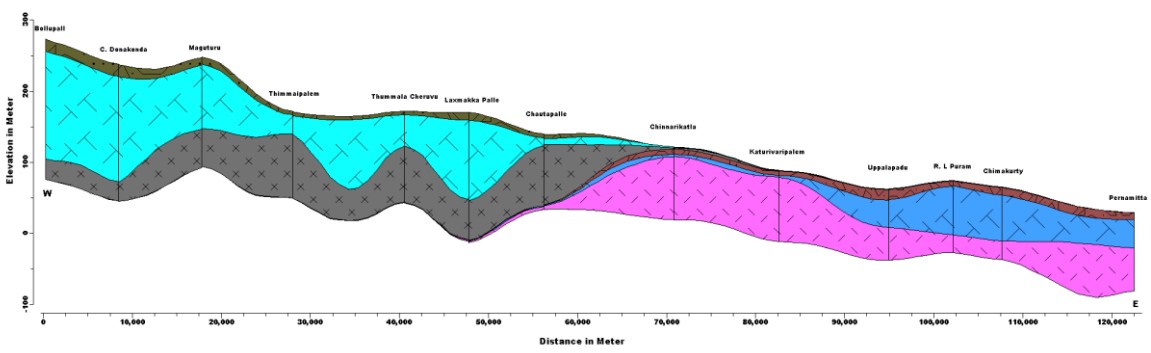


Fig:3.5b.

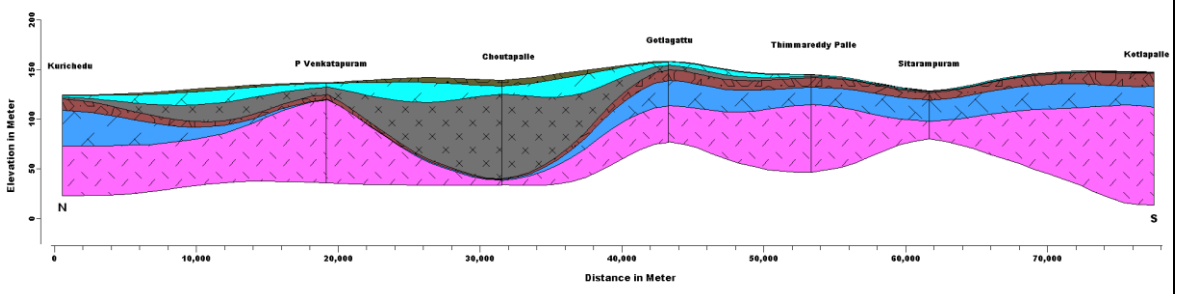


Fig:3.5c.

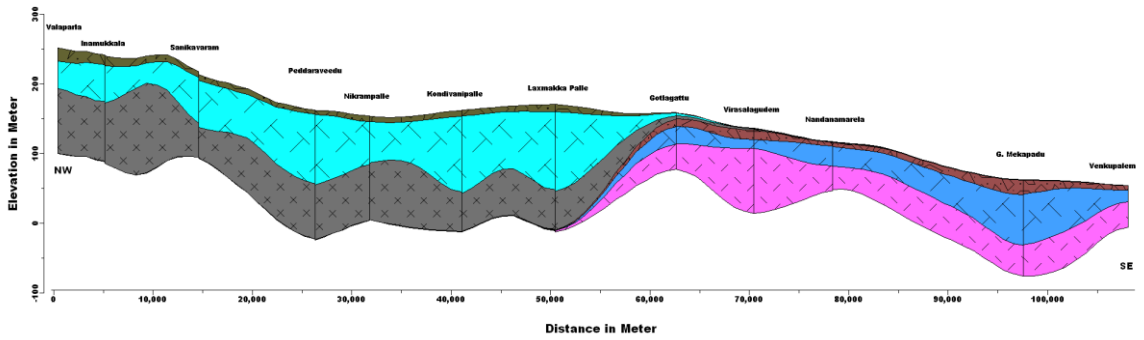


Fig:3.5d.

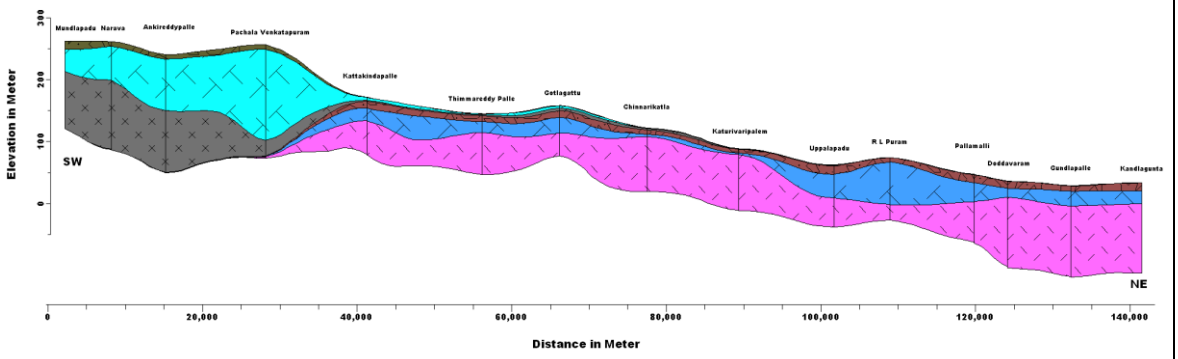
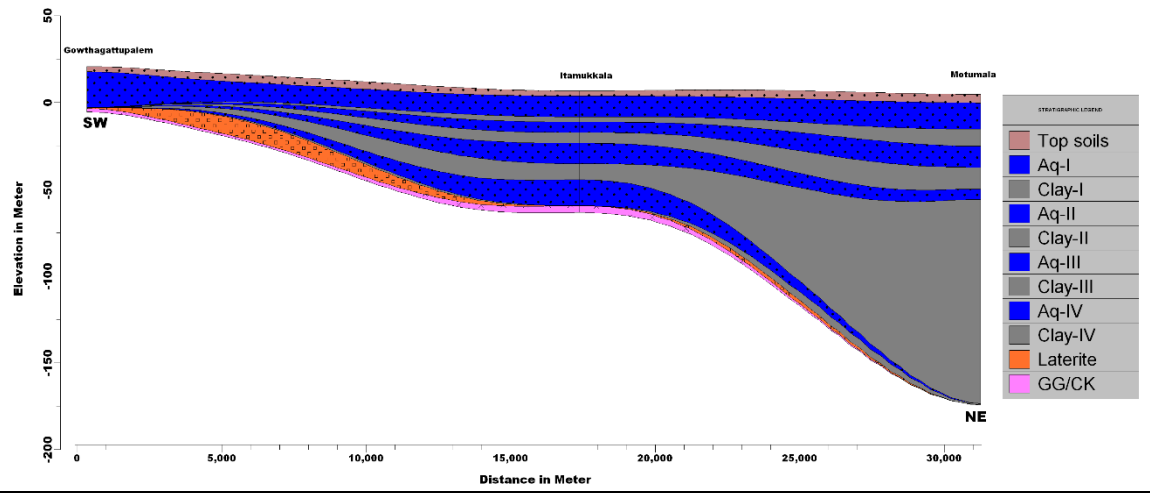


Fig:3.5e.



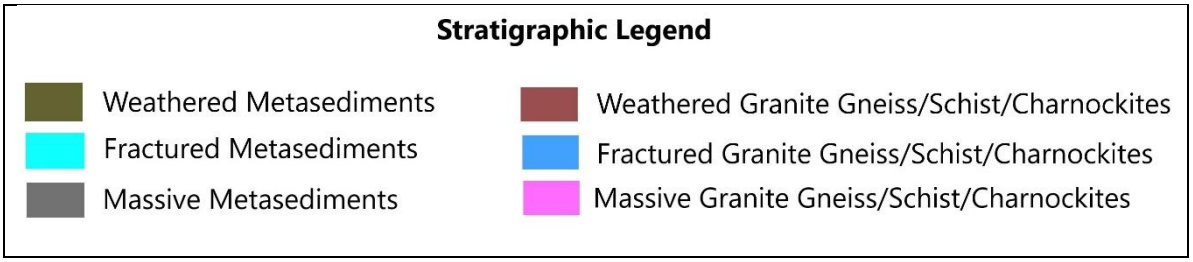


Fig.3.5a-e: Hydrogeological Cross Section in different directions in Prakasam district.

3.3 Aquifer Characterization:

3.3.1 Weathered zone: The Thickness of weathered zone varies from 2.0 m to 46.5 m (avg. ~12 m). The Weathered zone varies from 2.0 to 29.5 m bgl in khondalites, charnockites, gneisses of Archaean age and schists of Dharwar Super Group and 3.0 to 46.5 m bgl in shales, limestones, quartzites of Cuddapah Super Group. The spatial distribution of weathering thickness is shown in **Fig.3.6 & Fig.3.6a**. Thickness of weathering < 10 m occurs in ~32 % of the area, 10 to 15 m occurs in ~51 % of area, 15 to 20 m occur in 16 % of area. High thickness of weathering (>20 m) occurs in isolated parts of Ardhaveedu, Dornala, Ponnaluru, Racherla, Giddaluru, C S Puram mandals.

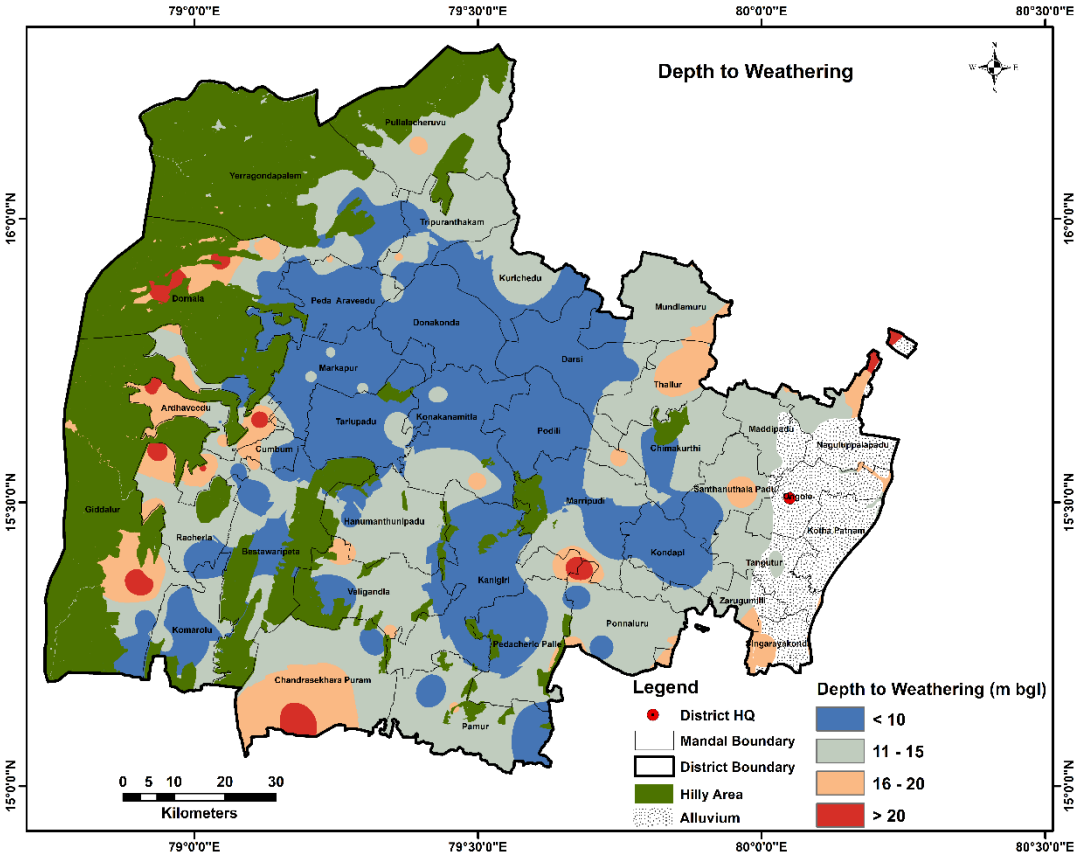


Fig.3.6: Depth to weathered zone, Prakasam district.

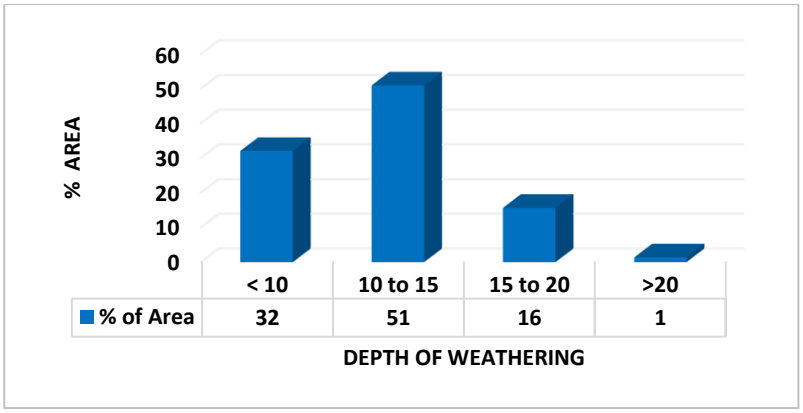


Fig.3.6a.: Depth wise distribution of weathering, Prakasam District.

3.3.2. Fractured zone: The depth of fracturing varies from 10-198 m and deepest fracture encountered in exploratory drilling is 198 m at Guduru Moravai Palle, Komarolu mandal and 197.5 m at C Donakonda, Ardhaveedu mandal. The yield of the deepest fracture encountered at komarolu mandal is 3.7 lps and at Ardhaveedu mandal is 6.7 lps. All the exploratory wells drilled so far are less than 200 m except one exploration well drilled in alluvium formation (300 m) at Motumala, Kothapatnam mandal. The yield varying from <1.0 to 18.5 lps (Yerrabalem, Cumbum mandal – Hard rock aquifer). From the data, it is inferred that fractures in the range of 30 to 90 m depth are more predominant (70 % of the area), 90 to 120 m fractures occur in 16 % area; < 30 m and 120 to 150 m fractures occur in 7 % and 6 % of area respectively. Deep fractures (> 150 m) occur in isolated parts of Ardhaveedu, Bestavaripeta, Giddaluru, Racharla, Komarolu, Markapur, Tarlupadu (**Fig.3.7**). The Depth wise distribution of fractures is shown in **Fig.3.7a**.

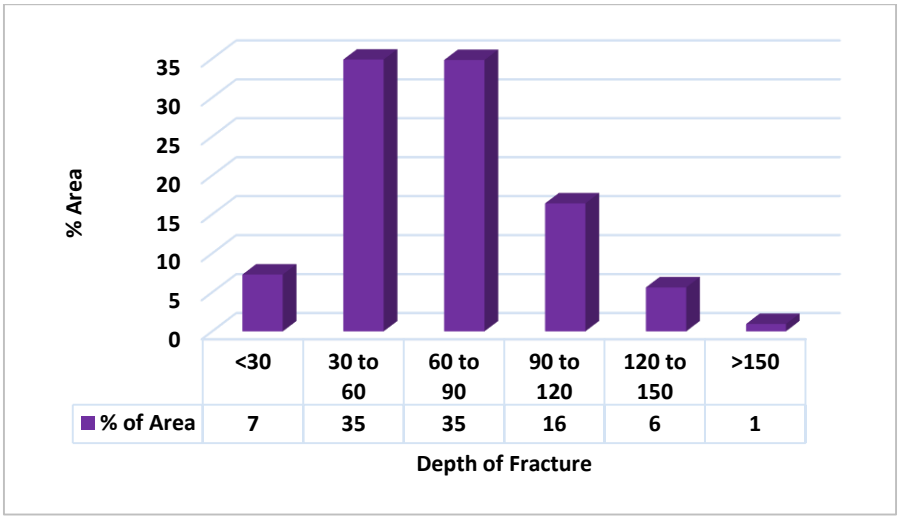


Fig.3.7a.: Depth wise distribution of fractures, Prakasam District

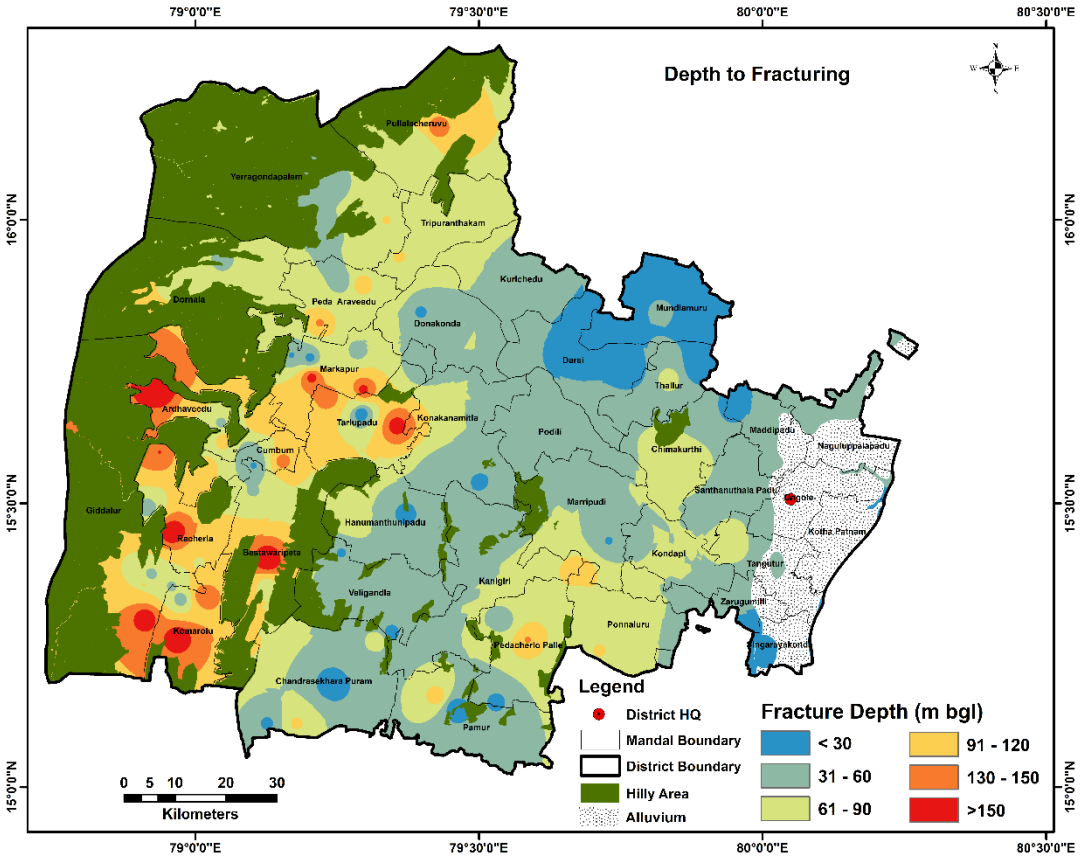


Fig.3.7: Depth of Fractured zone, Prakasam District.

4.0 GROUND WATER RESOURCES (2022)

In hard rocks, for practical purpose it is very difficult to compute zone wise (aquifer wise) ground water resources, because the weathered zone and fractured zone are inter-connected with fractures/joints and fractured zone gets recharged through weathered zone. Therefore, it is very difficult to demarcate the boundary between two aquifers; hence the resources are estimated considering entire area as a single aquifer system. Village wise dynamic and in-storage ground water resources are computed as per the guidelines laid down in GEC methodology. The mandal wise Dynamic Ground Water Resources of the Prakasam District, Andhra Pradesh (2022) are given in **Table-4.1 and Annexure-III & IV**

As per 2022 Ground Water Resource Assessment report, the net annual groundwater availability is 671 MCM, gross ground water draft for all uses 308 MCM, provision for domestic utilisation for the year 2025 is 49 MCM. Stage of ground water development varies from 4.5 % in Ongole to 128 % in Peda Araveedu mandal (avg: 35%). Based on the present stage of ground water development (out of 38 mandals) 3 mandals falls in semi critical category, 1 in critical category, 1 in over-exploited category and 33 in safe category. (**Table-4.2) & (Fig.4.1)**

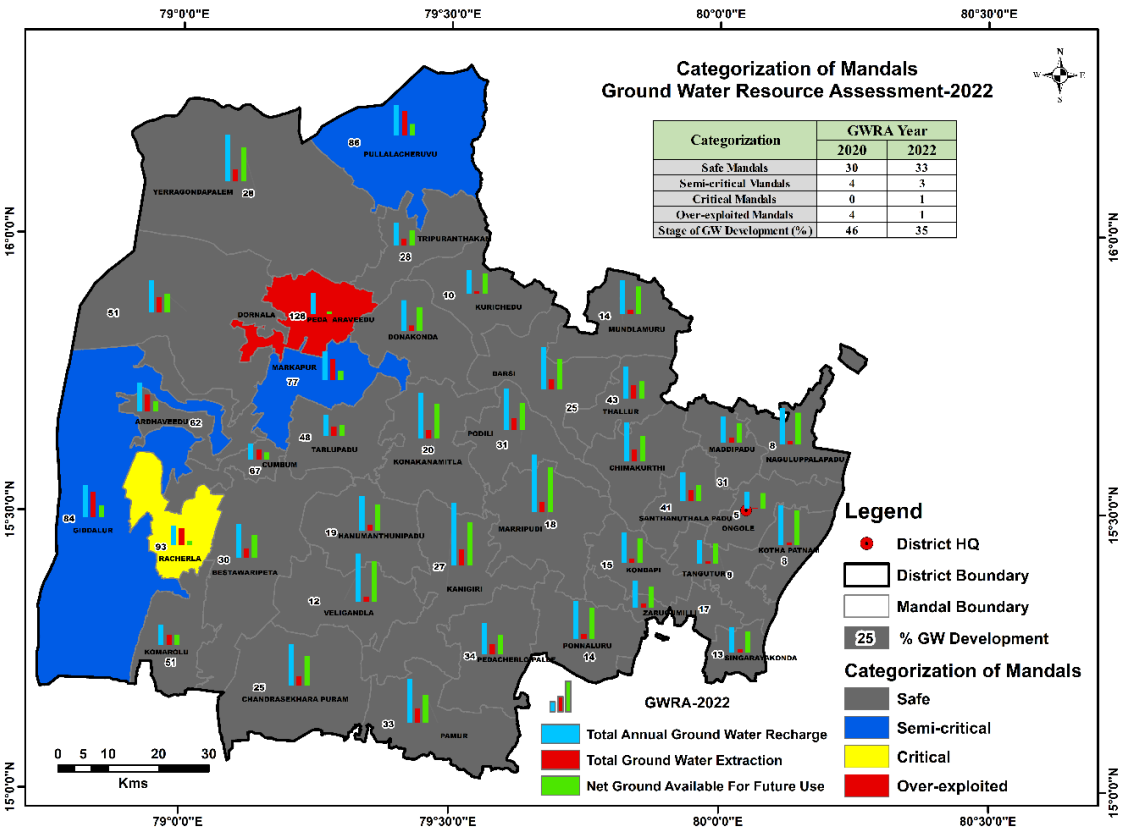


Fig.4.1: Categorization of Mandals (GWRA-2022), Prakasam district.

Table-4.1: Computed Dynamic ground water resources, Prakasam district.

Ground Water Resource Assessment		
Year	**2020**	**2022**
Total Area (Sq.km)	14321	14321
Recharge worthy Area (Sq.km)	11437	11381
Resource	**MCM**	**MCM**
Recharge from Rainfall (Monsoon)	490	674
Recharge from Other Sources (Monsoon)	118	192
Recharge from Rainfall (Non-monsoon)	186	11
Recharge from Other Sources (Non-monsoon)	167	125
Total Annual Ground Water Recharge	961	1002
Total Natural Discharges	48	50
Annual Extractable Ground Water Resource	913	952
Irrigation Use	338	259
Industrial Use	2	5
Domestic Use	13	44
Total Extraction	353	308
Annual GW Allocation for for Domestic Use as on 2025	67	49
Net Ground Water Availability for future use	587	671
Stage of Ground Water Extraction (%)	46	35
Categorization (OE/Critical/Semicritical/Safe)	Safe	Safe

Table-4.2: Categorization of Mandal, Prakasam district.

Categorization	GWRA Year	
	2020	**2022**
Safe Mandals	**30**	**33**
Semi-critical Mandals	**4**	**3**
Critical Mandals	**0**	**1**
Over-exploited Mandals	**4**	**1**
Stage of GW Development (%)	**46**	**35**

5. GROUND WATER RELATED ISSUES and REASONS FOR ISSUES

5.1 Issues and Reasons

Over-exploitation

Out of the total irrigated area of 1,11,485 ha, GW contributes 73,514 ha (66 %) due to lack of assured surface water irrigation in the district. This has resulted in desaturation of Aquifer-1 in many locations. Ground water is being extracted from deeper aquifers further compounding the problem. 5 mandals comprising an area of ~ 2556 sq. km (~18 %) area is categorized as overexploited (Pedaraveedu), critical (Racherla) and semi-critical (Pullala Cheruvu, Markapur and Giddalur) as per Ground Water Resource Assessment 2022 where ground water balance for future irrigation is zero or negative.

Deep water levels

Deep water levels (20-40 m bgl) and (>40 m bgl) are observed during pre and post-monsoon season in 5132 sq. kms (33%) and 2492 sq. kms (16%) of the area respectively. The analysis of long term water level data indicates out of 91 wells analysed, 48 wells (53 %) shows fall in water levels (0.01 to 3.39 m) and 34 well (37 %) shows fall in water levels (0.01 to 2.51 m) during pre and post-monsoon seasons. The falling trend <1.0 m/yrs is observed in 5742 sq.kms (37%) and 3963 sq.kms (26%) and of the area during pre and post-monsoon respectively. The falling trend 1-2 m/yrs is observed in 1910 sq.km (12%) and 549 sq.km (4%); >2 m/yrs in 50 and 7 sq.km of the area during pre and post-monsoon respectively.

Low Groundwater Yield

Low yield (<1 lps) occurs in ~2845 sq.kms (20 %) of area of the district. The hard rock aquifers lack primary porosity and ground water yield depeneds on secondary posoity developed due to weathering or fracturing. Poor interconnection and discrete nature of fractures and less recharge aquifers of hard rocks are low in yield.

Pollution (Geogenic and Anthropogenic)

In 12 mandals (Mundlamuru, Zarugumilli, Darsi marripudi, Kurichedu, Konakanamitla, P C Palle, H M Padu, Donakonda, Kanigiri, Kondepi and Tripurathakam), fluoride concentrations is more than permissible limits (>3.0 to 6.03 mg/L). The high fluoride concentration (>1.5 mg/L) found in 84 (31%) samples of analysed samples in the study area. Higher concentration of fluoride in ground water is attributed due to source rock, rock water interaction where acid-soluble fluoride bearing minerals (fluorite, fluoroapatite) gets dissolved under alkaline conditions and higher residence time of ground water in deeper aquifer.

High nitrate (> 45 mg/L) due to anthropogenic activities is observed in about 104 (38%) samples. This is due to unscientific sewage disposal of treated and untreated effluents in urban

and rural areas. Use of NPK fertilizers. EC is >2250 µ Siemens/cm covering around 2490 sq.kms (17%) in parts of Singarayakonda, Zarugulilli, Kondapi, Pamur, P C Palle, Mundlamuru, Maddipadu, Kurichedu, Konakanimitla Naguluppalapadu, Tripuranthakam mandals. The ground water related issues of the district is shown in **Fig.5.1.**

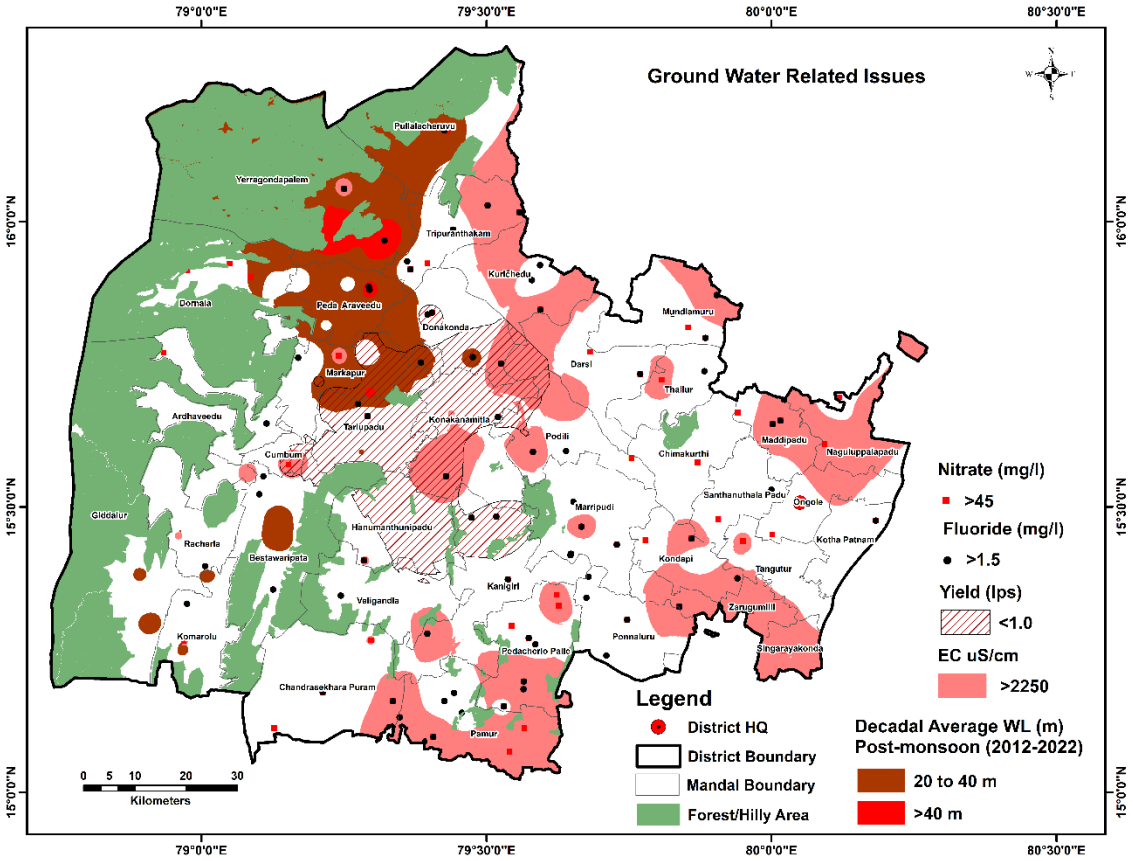


Fig.5.1: Ground water related issues, Prakasam district.

6. MANAGEMENT STRATEGIES

High Dependence on ground water for irrigation (66 % of irrigation) coupled with less rainfall, lack of assured surface water irrigation has led to a fall in water level and desaturation of weathered zone particularly in northwestern and central part of district. Besides, the high Nitrate concentrations (> 45mg/L) in groundwater due to sewage contamination and higher concentration of Fluoride (>1.5mg/L) due to geogenic reasons. The occurrence of fractures in fractured zone are very limited in extent, as the compression in the rock reduces the opening of fractures at depth and most fractures occur within 90 m depth (70%).

6.1 Management plan

The uneven distribution of groundwater availability and its utilization indicates that a single management strategy cannot be adopted and requires integrated hydrogeological aspects along with socio-economic conditions to develop appropriate management strategy.

6.1.1 Supply and Demand side management

The supply side management include artificial recharge of available surplus runoff through construction of check dams and percolation tanks in rural areas and roof top and open space rainwater harvesting in urban areas. More over repair renovation & restoration of existing tanks will also help in ground water recharge.

The unsaturated volume and availability of surplus run off is calculated in the district. Out of 3957 MCM of unsaturated volume, only 247 MCM surplus runoff available (20% of runoff) in the district. The District Water Management Agency (DWMA), Rural Development Department, Govt. of Andhra Pradesh had constructed 3918 Check dams (2804 in MNREGS and 1114 in IWMP) and 3828 Percolation Tanks (2754 PTs in MNREGS and 1074 in IWMP) in the district. (Source-https://emms.ap.gov.in/nregs_ap/Reports/#). The existing storage created through this construction of CDS (137 MCM) and PTS (54 MCM). In addition, a total 552 nos artificial recharge structures (ARS) (340 Percolation Tank/Percolation Tank with recharge shaft and 212 Check Dam/Gully plug/Check Dam with recharge shaft) are recommended in the district and their locations are pin pointed on map based on data gap analysis **(Fig:6.1 & Annexure-I)**. After completely implementing AR structures in the district, a total 12.18 MCM of water expected to be recharge and total estimated expenditure for artificial recharge structures is 72.2 crore. **(Table-6.1). Further, it is recommended e**xisting check dams and percolation tanks ARS can be de-silted involving people's participation

through the Mahatma Gandhi National Rural Employment Guarantee Scheme. This will also help in sustainable management of ground water resources. The existing CDs/PTs are constructed by DWMA and IWMA are shown in **Fig.6.2**. In addition, the existing 790 Minor Irrigation Tanks can be taken up for desiltation and cascading of tanks. This can result in increase in Ayacut/Irrigation area, sustain the bore well yields and decrease the ground water irrigation.

Micro Irrigation is recommended in the district. As a priority, area (2845 sq.kms) with low yield (<1.0 lps) deeper water levels of more than >20 m (1433 sq. kms of central parts and 1028 sq.kms in northwestern part) can be prioritized **(Fig.6.3).**

Upon completion of PS Veligonda Project, additional ground water recharge will take place due to infiltration form tank storage, canal seepage and return irrigation. The groundwater stress may further decrease, and groundwater resources will increase due to the improved irrigation facilities.

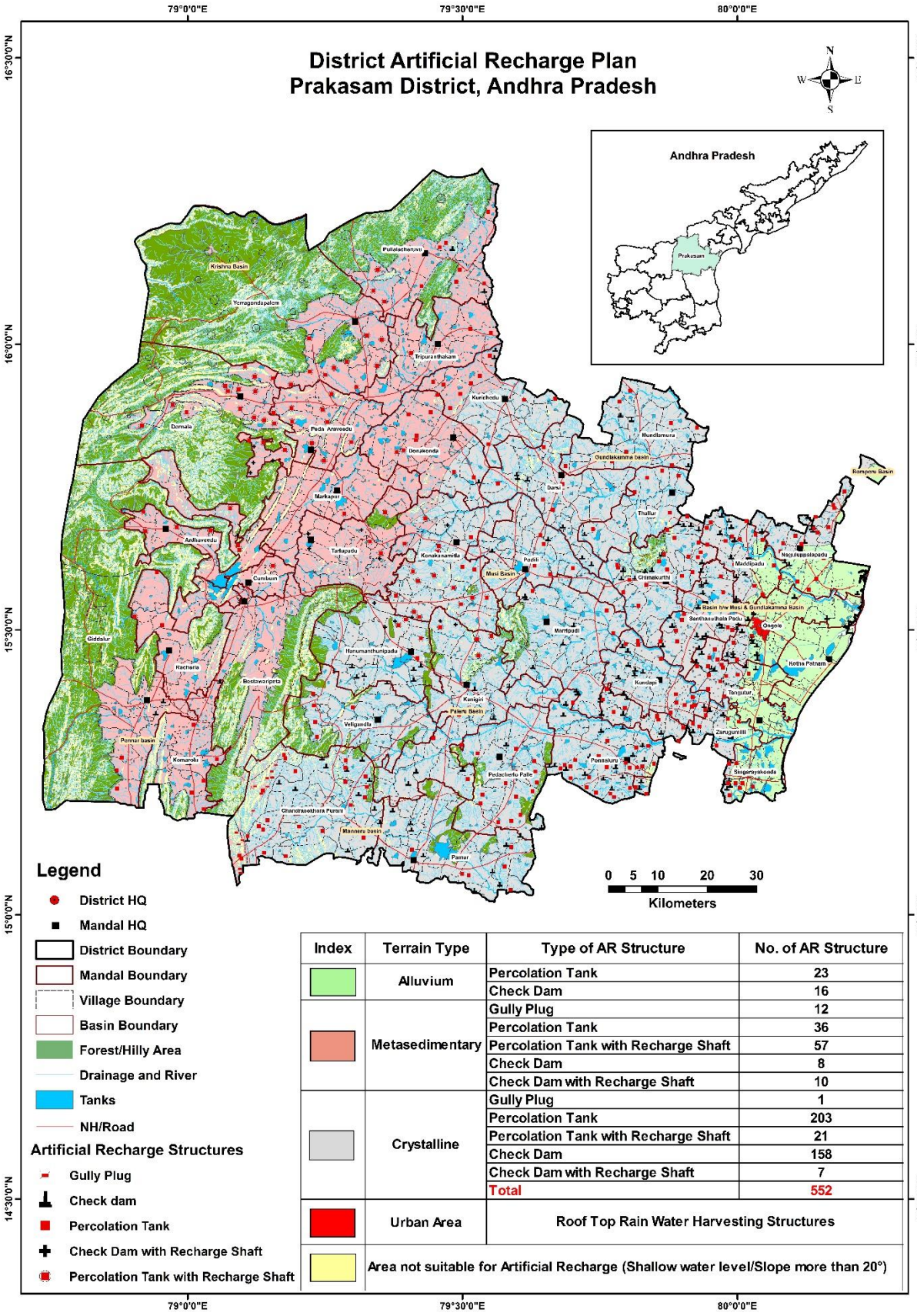
Roof top rainwater harvesting in Government buildings (new and existing), proper waste water management, participatory groundwater management (PGWM), Subsidy/incentives on cost involved in sharing of groundwater, lining of sewerage to arrest leaching of nitrate and effective implementation of the existing 'Water, Land and Trees Act' of 2002 (WALTA-2002) are other recommended measures in the district.

Table-6.1: District recharge potential, existing AR structures, recommended AR structures and other details are given bellow-

Total geographical area (sq.kms)	14230
Recharge worthy area (sq.kms)	11381
Unsaturated volume (MCM)	197841
Recharge potential (MCM)	3957
Runoff available (MCM)	1234
Surplus runoff available for recharge (20% of runoff) (MCM)	247
Volume considered for recharge (50% of Surplus runoff) (MCM)	123
Existing AR Structures	7746
Feasible AR Structures	2859
Recommended and pinpointed ARS on map (Based on Gap)	552

Table-6.2: Formation wise Hydrogeological details of the district-

Sl.No.	HG Attributes/Geology	Unit	Archean Crytalline Rock				Proterozoic Metasedimentary Rock			Recent	Total
			CK	GN	GR	KH	QZ	SC	SH	AL	
1	Area	Sq.kms	480	715	875	44	2879	4652	3988	597	14230
2	No of Mandals	Nos.	6	6	13	1	11	22	16	6	38
3	No of Villages	Nos.	45	73	72	3	55	336	258	42	884
4	Average Thickness of Weathering	(m)	14	9	11	15	12	11	11	-	11
5	Average Depth of Occurrence of Fractures	(m)	35	44	55	37	90	51	87	-	62
6	Average Depth to WL (Decadal) -Pre Monsoon	(m)	5.74	9.20	9.38	3.95	22.90	10.28	23.54	4.19	14.23
7	Average Depth to WL (Decadal) - Post Monsoon	(m)	4.03	7.69	7.84	2.88	14.93	8.34	17.33	3.17	10.80
8	Average of Discharge	(lps)	1.99	1.31	1.67	1.95	3.13	1.49	1.79	1.65	1.71
9	Unsaturated Volume	(MCM)	1147	3290	5330	46	74633	53396	58967	1033	197841
10	Recharge Potential	(MCM)	23	66	107	1	1493	1068	1179	21	3957
11	Feasible AR Structures	Nos.	198	179	204	18	233	1209	583	323	2859
12	Existing AR Structres	Nos.	138	564	675	1	370	3256	2563	176	7746
13	Recommended AR Structures	Nos.	390				123			39	552
14	No of Existing MI tanks	Nos.	323	165	118	25	145	1022	716	412	2926
	Existing ARS based on Shape Village		110	512	644	7	342	3309	2642	164	7730



Index	Terrain Type	Type of AR Structure	No. of AR Structure
	Alluvium	Percolation Tank	23
		Check Dam	16
	Metasedimentary	Gully Plug	12
		Percolation Tank	36
		Percolation Tank with Recharge Shaft	57
		Check Dam	8
		Check Dam with Recharge Shaft	10
	Crystalline	Gully Plug	1
		Percolation Tank	203
		Percolation Tank with Recharge Shaft	21
		Check Dam	158
		Check Dam with Recharge Shaft	7
		Total	552
	Urban Area	Roof Top Rain Water Harvesting Structures	
	Area not suitable for Artificial Recharge (Shallow water level/Slope more than 20°)		

Fig.6.1: Pin pointed locations of recommended Artificial Recharge Structures of Prakasam district.

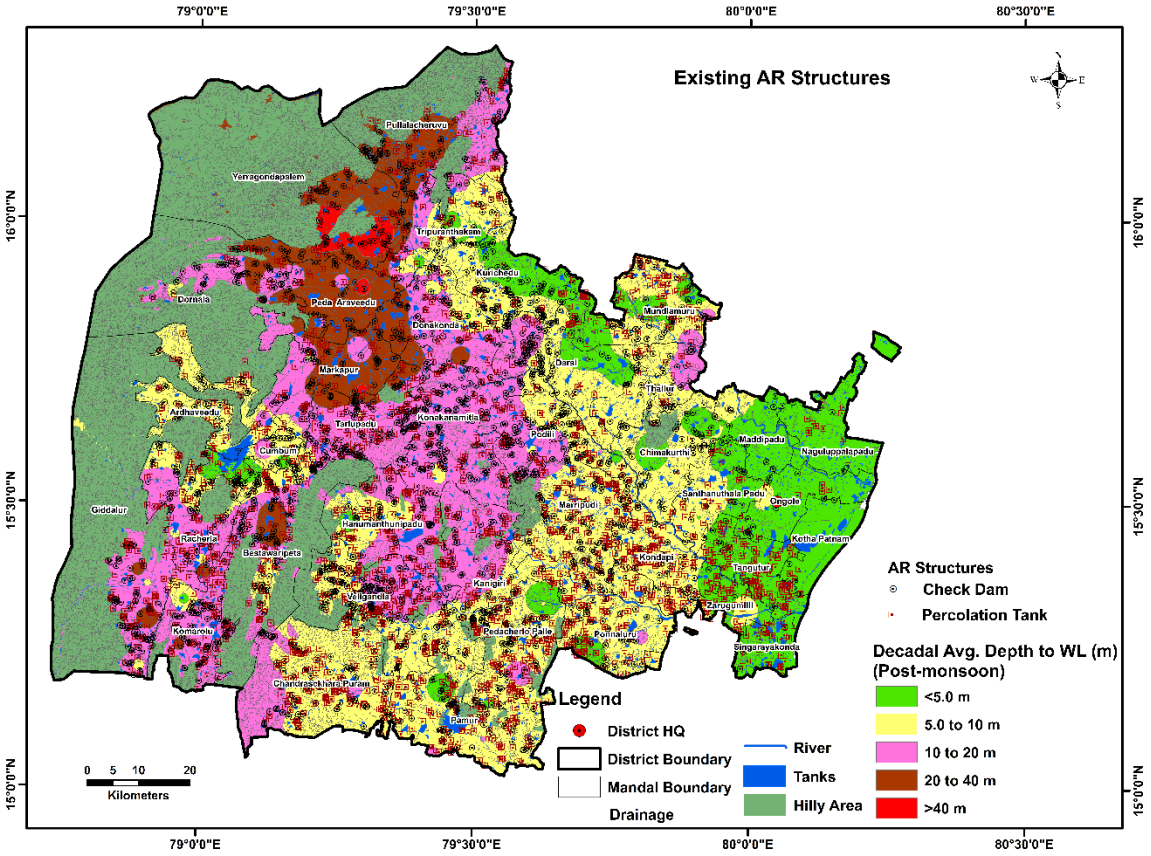


Fig.6.2: Existing Artificial Recharge Structures, Prakasam district.

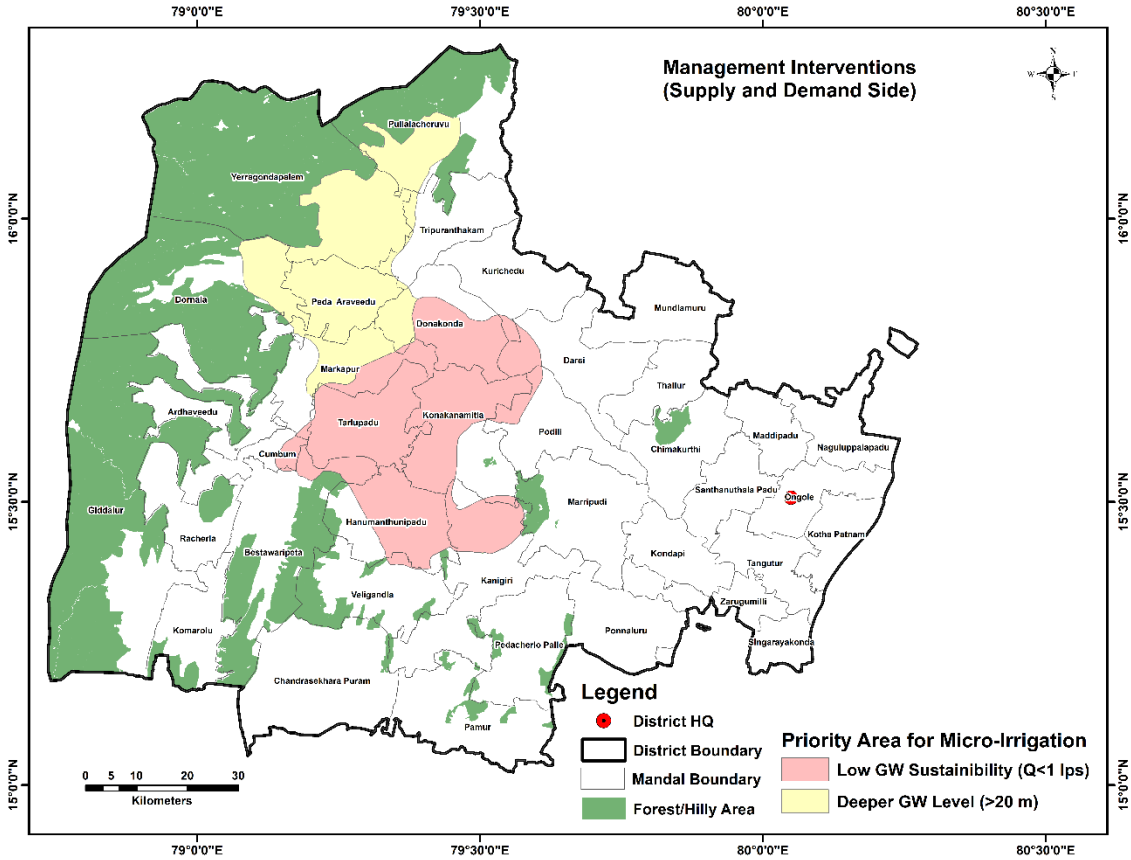


Fig.6.3: Priority area for Micro-Irrigation, Prakasam district.

Acknowledgment

The author thanks to Sri. J Siddhardha Kumar, Regional Director, CGWB, Hyderabad and Sri Ravi Kumar Gumma, Scientist- 'D' & OIC, CGWB for their encouragement, guidance and support. The author sincere gratitude towards Sri. L. N. Damodara, Scientist- 'C', Dr. D Anantha Rao, AHG and Miss. Nilima Patra, AHG for their valuable help in preparation of various maps and model generation. The author acknowledges State Ground Water Department, Govt. of Andhra Pradesh for making available of field data. Author also thanks the Executive Engineer and his drilling crew of CGWB for carrying out the exploration activity.

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ANNEXURE-I

Pin pointed locations of recommended AR Structures of Prakasam district

S.No.	District	Mandal	Village	Lat	Long	Aquifer	Type of recommended AR structure
1	PRAKASAM	ARDHAVEEDU	Ardhaveedu	15.6802	78.9797	SH	Percolation Tank with Recharge Shaft
2	PRAKASAM	ARDHAVEEDU	Ayyavari Palle	15.6737	79.0414	SH	Percolation Tank with Recharge Shaft
3	PRAKASAM	ARDHAVEEDU	Bollu Palle	15.7064	78.9197	SH	Percolation Tank with Recharge Shaft
4	PRAKASAM	ARDHAVEEDU	Donakonda	15.6527	78.9981	SH	Percolation Tank with Recharge Shaft
5	PRAKASAM	ARDHAVEEDU	Kakarla	15.6482	79.0917	SH	Percolation Tank with Recharge Shaft
6	PRAKASAM	ARDHAVEEDU	Kakarla	15.6401	79.0943	SH	Percolation Tank with Recharge Shaft
7	PRAKASAM	ARDHAVEEDU	Magutur	15.7132	79.0773	SH	Percolation Tank with Recharge Shaft
8	PRAKASAM	ARDHAVEEDU	Papineni Palle	15.6725	78.9229	SH	Percolation Tank with Recharge Shaft
9	PRAKASAM	ARDHAVEEDU	Potti Basavai Palle	15.6651	79.0903	SH	Check Dam with Recharge Shaft
10	PRAKASAM	CHANDRASEKHARA PURAM	Anikalla Palle	15.1494	79.281	BG	Percolation Tank
11	PRAKASAM	CHANDRASEKHARA PURAM	Bontha Vari Palle	15.1661	79.145	BG	Percolation Tank
12	PRAKASAM	CHANDRASEKHARA PURAM	Boyamadugula	15.2518	79.1959	BG	Percolation Tank
13	PRAKASAM	CHANDRASEKHARA PURAM	Chandra Sekhara Puram	15.1927	79.2966	BG	Percolation Tank
14	PRAKASAM	CHANDRASEKHARA PURAM	Chennapanayuni Palle	15.1552	79.1292	BG	Percolation Tank
15	PRAKASAM	CHANDRASEKHARA PURAM	Chennapanayuni Palle	15.1494	79.1373	BG	Percolation Tank
16	PRAKASAM	CHANDRASEKHARA PURAM	Darsi Thimmakka Palle	15.2713	79.2442	BG	Check dam
17	PRAKASAM	CHANDRASEKHARA PURAM	Darsi Thimmakka Palle	15.2576	79.2517	BG	Check dam
18	PRAKASAM	CHANDRASEKHARA PURAM	Darsi Thimmakka Palle	15.2294	79.166	BG	Check dam
19	PRAKASAM	CHANDRASEKHARA PURAM	Darsi Thimmakka Palle	15.2181	79.1956	BG	Check dam
20	PRAKASAM	CHANDRASEKHARA PURAM	Guntachennam Palle	15.1469	79.2452	BG	Percolation Tank
21	PRAKASAM	CHANDRASEKHARA PURAM	Kambham Padu	15.1444	79.3077	BG	Check dam
22	PRAKASAM	CHANDRASEKHARA PURAM	Kambham Padu	15.1355	79.3196	BG	Percolation Tank
23	PRAKASAM	CHANDRASEKHARA PURAM	Komatigunta	15.1833	79.3397	BG	Check dam
24	PRAKASAM	CHANDRASEKHARA PURAM	Kotha Palle	15.1029	79.1779	BG	Percolation Tank
25	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.1237	79.0925	SH	Gully Plug
26	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.1445	79.0887	SH	Gully Plug
27	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.1309	79.0996	SH	Gully Plug
28	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.0807	79.095	SH	Gully Plug

29	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.0733	79.0963	SH	Gully Plug
30	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.0987	79.098	SH	Percolation Tank
31	PRAKASAM	CHANDRASEKHARA PURAM	Malameedi Palle	15.104	79.094	SH	Percolation Tank
32	PRAKASAM	CHANDRASEKHARA PURAM	Medanulu Vengana Palle	15.1549	79.2028	BG	Percolation Tank
33	PRAKASAM	CHANDRASEKHARA PURAM	Mundlapadu	15.2335	79.287	BG	Percolation Tank
34	PRAKASAM	CHANDRASEKHARA PURAM	Musunoor	15.2088	79.3109	BG	Check dam
35	PRAKASAM	CHANDRASEKHARA PURAM	Musunoor	15.2246	79.3262	BG	Percolation Tank
36	PRAKASAM	CHANDRASEKHARA PURAM	Musunoor	15.2066	79.3225	BG	Percolation Tank
37	PRAKASAM	CHANDRASEKHARA PURAM	Nagulavaram	15.1597	79.3496	BG	Check dam
38	PRAKASAM	CHANDRASEKHARA PURAM	Pedagogulapalle	15.2517	79.2897	BG	Check dam
39	PRAKASAM	CHANDRASEKHARA PURAM	Pedagogulapalle	15.2336	79.3306	BG	Check dam
40	PRAKASAM	CHANDRASEKHARA PURAM	Pedagogulapalle	15.2699	79.3175	BG	Check dam
41	PRAKASAM	CHANDRASEKHARA PURAM	Pedagogulapalle	15.2429	79.3236	BG	Percolation Tank
42	PRAKASAM	CHANDRASEKHARA PURAM	Pedagogulapalle	15.2584	79.2871	BG	Percolation Tank
43	PRAKASAM	CHANDRASEKHARA PURAM	Pedaraju Palem	15.1098	79.2908	BG	Check dam
44	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2412	79.1538	BG	Gully Plug
45	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2628	79.1601	SH	Gully Plug
46	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2396	79.1445	SH	Gully Plug
47	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2519	79.1534	SH	Gully Plug
48	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2249	79.1451	SH	Gully Plug
49	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2252	79.1223	SH	Gully Plug
50	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.1826	79.1189	SH	Gully Plug
51	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2127	79.1341	SH	Gully Plug
52	PRAKASAM	CHANDRASEKHARA PURAM	Talaneelamala	15.2184	79.1365	SH	Percolation Tank
53	PRAKASAM	CHANDRASEKHARA PURAM	Thungodu	15.2808	79.1751	BG	Percolation Tank
54	PRAKASAM	CHANDRASEKHARA PURAM	Thungodu	15.2746	79.1776	BG	Percolation Tank
55	PRAKASAM	CHANDRASEKHARA PURAM	Vatla Bayulu	15.1291	79.1082	BG	Check dam
56	PRAKASAM	CHANDRASEKHARA PURAM	Vatla Bayulu	15.1382	79.1091	BG	Percolation Tank
57	PRAKASAM	CHANDRASEKHARA PURAM	Vatla Bayulu	15.1089	79.1388	BG	Percolation Tank
58	PRAKASAM	CHANDRASEKHARA PURAM	Viranchi Puram	15.2711	79.2875	BG	Percolation Tank
59	PRAKASAM	CHIMAKURTHI	Budavada	15.5871	79.7889	BG	Check dam
60	PRAKASAM	CHIMAKURTHI	Budavada	15.6019	79.7922	BG	Check dam
61	PRAKASAM	CHIMAKURTHI	Budavada	15.5875	79.8034	BG	Percolation Tank
62	PRAKASAM	CHIMAKURTHI	Chandrapadu	15.6162	79.9358	BG	Check dam

63	PRAKASAM	CHIMAKURTHI	Chandrapadu	15.6357	79.9338	BG	Percolation Tank
64	PRAKASAM	CHIMAKURTHI	Chandrapadu	15.6274	79.9282	BG	Percolation Tank
65	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.6019	79.8445	BG	Check dam
66	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.6292	79.8629	BG	Check dam
67	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.5999	79.8323	BG	Check dam
68	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.6199	79.8579	BG	Percolation Tank
69	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.597	79.8776	BG	Percolation Tank
70	PRAKASAM	CHIMAKURTHI	Chimakurthi	15.6059	79.8726	BG	Percolation Tank
71	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6808	79.9156	BG	Check dam
72	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6803	79.9022	BG	Check dam
73	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6736	79.9299	BG	Check dam
74	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6839	79.8931	BG	Check dam
75	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6983	79.9093	BG	Percolation Tank
76	PRAKASAM	CHIMAKURTHI	Ilapavuluru	15.6751	79.8727	BG	Percolation Tank
77	PRAKASAM	CHIMAKURTHI	Manchikalapadu	15.5944	79.8996	BG	Percolation Tank
78	PRAKASAM	CHIMAKURTHI	Mylavaram	15.5656	79.7924	BG	Percolation Tank
79	PRAKASAM	CHIMAKURTHI	Nekunambadu	15.6531	79.9293	BG	Percolation Tank
80	PRAKASAM	CHIMAKURTHI	Nippatlapadu	15.6088	79.783	BG	Percolation Tank
81	PRAKASAM	CHIMAKURTHI	Nippatlapadu	15.6143	79.7813	BG	Percolation Tank
82	PRAKASAM	CHIMAKURTHI	Padamatinaidupalem	15.6328	79.8666	BG	Percolation Tank
83	PRAKASAM	CHIMAKURTHI	Palla Malli	15.6609	79.8855	BG	Percolation Tank
84	PRAKASAM	CHIMAKURTHI	Palla Malli	15.628	79.911	BG	Percolation Tank
85	PRAKASAM	CHIMAKURTHI	Pulikonda	15.5423	79.8203	BG	Percolation Tank
86	PRAKASAM	CHIMAKURTHI	Rajupalem - Laxmipuram	15.5885	79.8134	BG	Check dam
87	PRAKASAM	CHIMAKURTHI	Rajupalem - Laxmipuram	15.5788	79.8342	BG	Percolation Tank
88	PRAKASAM	CHIMAKURTHI	Yerragudipadu	15.6008	79.9184	BG	Percolation Tank
89	PRAKASAM	CUMBUM	Lanja Kota	15.6121	79.1549	SH	Percolation Tank with Recharge Shaft
90	PRAKASAM	DARSI	Bukka Puram	15.756	79.5648	BG	Percolation Tank
91	PRAKASAM	DARSI	China Uyyalawada	15.6124	79.7344	BG	Check dam
92	PRAKASAM	DARSI	Darsi	15.7553	79.6819	BG	Percolation Tank
93	PRAKASAM	DARSI	Jammigumpala @ K.S.Palem	15.7695	79.5986	BG	Check dam
94	PRAKASAM	DARSI	Jammigumpala @ K.S.Palem	15.7604	79.6179	BG	Check dam

95	PRAKASAM	DARSI	Jammigumpala @ K.S.Palem	15.7643	79.5995	BG	Check dam
96	PRAKASAM	DARSI	Kothapalle	15.6779	79.6825	BG	Check dam
97	PRAKASAM	DARSI	Pedauyyalawada	15.6238	79.7178	BG	Check dam
98	PRAKASAM	DARSI	Rajam Palle	15.7107	79.6648	BG	Percolation Tank
99	PRAKASAM	DARSI	Ramachandra Puram	15.7278	79.6467	BG	Percolation Tank
100	PRAKASAM	DARSI	Thanam Chinthala	15.8201	79.6479	BG	Percolation Tank
101	PRAKASAM	DONAKONDA	Aravallipadu	15.7567	79.5292	BG	Check dam
102	PRAKASAM	DONAKONDA	Bhumanapalle	15.8324	79.4152	SH	Percolation Tank
103	PRAKASAM	DONAKONDA	Chandavaram	15.911	79.4544	SH	Percolation Tank
104	PRAKASAM	DONAKONDA	Gudipadu	15.7673	79.5208	BG	Percolation Tank
105	PRAKASAM	DONAKONDA	Lakshmi Narayana Puram	15.7761	79.4845	BG	Percolation Tank
106	PRAKASAM	DONAKONDA	Mallam Peta	15.8112	79.3803	SH	Percolation Tank with Recharge Shaft
107	PRAKASAM	DONAKONDA	Manginapudi	15.8146	79.3927	SH	Percolation Tank with Recharge Shaft
108	PRAKASAM	DONAKONDA	Pole Palle	15.8812	79.4424	SH	Percolation Tank
109	PRAKASAM	DONAKONDA	Rudra Samudram	15.8399	79.4167	SH	Percolation Tank
110	PRAKASAM	DONAKONDA	Rudra Samudram	15.8771	79.402	SH	Percolation Tank
111	PRAKASAM	DORNALA	Ayinamukkala	15.8872	79.0956	SH	Percolation Tank with Recharge Shaft
112	PRAKASAM	DORNALA	Chilaka Cherla Gudem	15.8806	78.998	SH	Percolation Tank with Recharge Shaft
113	PRAKASAM	DORNALA	China Dornala	15.8716	79.1209	SH	Percolation Tank with Recharge Shaft
114	PRAKASAM	DORNALA	Dornala	15.9211	79.093	SH	Percolation Tank with Recharge Shaft
115	PRAKASAM	DORNALA	Dornala	15.9172	79.1228	SH	Percolation Tank with Recharge Shaft
116	PRAKASAM	DORNALA	Kata Kani Palle	15.8669	79.1393	SH	Percolation Tank with Recharge Shaft
117	PRAKASAM	DORNALA	Kata Kani Palle	15.8615	79.1571	SH	Percolation Tank with Recharge Shaft
118	PRAKASAM	DORNALA	Nallaguntla	15.8573	78.9165	SH	Percolation Tank with Recharge Shaft
119	PRAKASAM	DORNALA	Peda Bommala Puram	15.9605	79.1042	SH	Percolation Tank with Recharge Shaft
120	PRAKASAM	DORNALA	Peda Bommala Puram	15.9433	79.1223	SH	Percolation Tank with Recharge Shaft
121	PRAKASAM	DORNALA	Peda Bommala Puram	15.9404	79.1547	SH	Percolation Tank with Recharge Shaft
122	PRAKASAM	DORNALA	Yadavalli	15.9266	79.0683	SH	Percolation Tank with Recharge Shaft
123	PRAKASAM	DORNALA	Yadavalli	15.9179	79.0728	SH	Percolation Tank with Recharge Shaft
124	PRAKASAM	DORNALA	Yeguva Cherlo Palle	15.8938	78.9724	SH	Percolation Tank with Recharge Shaft
125	PRAKASAM	GIDDALUR	Gadikota	15.2538	78.8709	SH	Percolation Tank
126	PRAKASAM	GIDDALUR	Giddaluru	15.3723	78.9554	SH	Check dam
127	PRAKASAM	GIDDALUR	Narava	15.3505	78.9418	SH	Check dam

128	PRAKASAM	GIDDALUR	Sanjeevarao Peta	15.276	78.8798	SH	Percolation Tank
129	PRAKASAM	GIDDALUR	Uyyala Wada	15.2216	78.8712	SH	Percolation Tank
130	PRAKASAM	HANUMANTHUNIPADU	Chinagolla Palle	15.4563	79.3417	BG	Check dam
131	PRAKASAM	HANUMANTHUNIPADU	Dasalla Palle	15.4177	79.3211	BG	Check dam
132	PRAKASAM	HANUMANTHUNIPADU	Hanumanthunipadu	15.4501	79.4181	BG	Percolation Tank
133	PRAKASAM	HANUMANTHUNIPADU	Hazee Puram	15.4344	79.4241	BG	Check dam
134	PRAKASAM	HANUMANTHUNIPADU	Hazee Puram	15.4281	79.411	BG	Check dam
135	PRAKASAM	HANUMANTHUNIPADU	Kondareddi Palle	15.4851	79.4245	BG	Percolation Tank with Recharge Shaft
136	PRAKASAM	HANUMANTHUNIPADU	Masaya Peta	15.4097	79.4107	BG	Check dam
137	PRAKASAM	HANUMANTHUNIPADU	Mohammada Puram	15.5466	79.3395	BG	Check Dam with Recharge Shaft
138	PRAKASAM	HANUMANTHUNIPADU	Muppala Padu	15.4333	79.2988	BG	Check dam
139	PRAKASAM	HANUMANTHUNIPADU	Muppala Padu	15.4151	79.3074	BG	Check dam
140	PRAKASAM	HANUMANTHUNIPADU	Thimmareddi Palle	15.5151	79.3769	BG	Check Dam with Recharge Shaft
141	PRAKASAM	HANUMANTHUNIPADU	Thimmareddi Palle	15.5047	79.359	BG	Check Dam with Recharge Shaft
142	PRAKASAM	HANUMANTHUNIPADU	Thimmareddi Palle	15.5179	79.3967	BG	Percolation Tank with Recharge Shaft
143	PRAKASAM	HANUMANTHUNIPADU	Thimmareddi Palle	15.5083	79.3836	BG	Percolation Tank with Recharge Shaft
144	PRAKASAM	KANIGIRI	Ayyanapalem	15.3428	79.5566	BG	Check dam
145	PRAKASAM	KANIGIRI	Baduguleru	15.5156	79.4598	BG	Check Dam with Recharge Shaft
146	PRAKASAM	KANIGIRI	Baduguleru	15.5088	79.4876	BG	Check Dam with Recharge Shaft
147	PRAKASAM	KANIGIRI	Baduguleru	15.5047	79.4593	BG	Percolation Tank with Recharge Shaft
148	PRAKASAM	KANIGIRI	Balli Palle	15.2385	79.5097	BG	Percolation Tank
149	PRAKASAM	KANIGIRI	Chirla Dinne	15.2488	79.4155	BG	Check dam
150	PRAKASAM	KANIGIRI	Dirisavancha	15.455	79.5289	BG	Percolation Tank with Recharge Shaft
151	PRAKASAM	KANIGIRI	Guravajipeta	15.2274	79.4014	BG	Check dam
152	PRAKASAM	KANIGIRI	Polavaram	15.3507	79.4935	BG	Percolation Tank
153	PRAKASAM	KANIGIRI	Sankavaram	15.3932	79.522	BG	Check dam
154	PRAKASAM	KANIGIRI	Takkellapadu	15.3102	79.447	BG	Percolation Tank
155	PRAKASAM	KANIGIRI	Vijaya Gopala Puram	15.2978	79.4979	BG	Percolation Tank
156	PRAKASAM	KANIGIRI	Viswanadha Puram	15.2522	79.5	BG	Check dam
157	PRAKASAM	KANIGIRI	Yadavalli	15.4891	79.5527	BG	Percolation Tank with Recharge Shaft
158	PRAKASAM	KANIGIRI	Yadavalli	15.4834	79.5265	BG	Percolation Tank with Recharge Shaft
159	PRAKASAM	KOMAROLU	Allinagaram	15.1856	79.0287	SH	Percolation Tank
160	PRAKASAM	KOMAROLU	Chinthala Palle	15.2729	79.053	SH	Percolation Tank
161	PRAKASAM	KOMAROLU	Nallaguntla	15.3334	79.0106	SH	Percolation Tank

162	PRAKASAM	KOMAROLU	Reddicherla	15.2353	79.0286	SH	Percolation Tank
163	PRAKASAM	KOMAROLU	Reddicherla	15.2146	79.0072	SH	Percolation Tank
164	PRAKASAM	KOMAROLU	Taticherla	15.4063	79.0586	SH	Check dam
165	PRAKASAM	KONAKANAMITLA	Batchalakurapadu	15.5735	79.4835	BG	Percolation Tank with Recharge Shaft
166	PRAKASAM	KONAKANAMITLA	Budamkayala Padu	15.5854	79.4192	BG	Percolation Tank with Recharge Shaft
167	PRAKASAM	KONAKANAMITLA	Burada Palem	15.6831	79.4725	BG	Check Dam with Recharge Shaft
168	PRAKASAM	KONAKANAMITLA	Chinarikatla	15.5565	79.5441	BG	Percolation Tank with Recharge Shaft
169	PRAKASAM	KONAKANAMITLA	Chinarikatla	15.5561	79.5176	BG	Percolation Tank with Recharge Shaft
170	PRAKASAM	KONAKANAMITLA	Garladinne	15.6511	79.3949	SH	Percolation Tank with Recharge Shaft
171	PRAKASAM	KONAKANAMITLA	Gotlagattu	15.5215	79.4085	BG	Check Dam with Recharge Shaft
172	PRAKASAM	KONAKANAMITLA	Gotlagattu	15.5312	79.4116	BG	Percolation Tank with Recharge Shaft
173	PRAKASAM	KONAKANAMITLA	Gotlagattu	15.5227	79.4213	BG	Percolation Tank with Recharge Shaft
174	PRAKASAM	KONAKANAMITLA	Irasalagundam	15.545	79.4969	BG	Percolation Tank with Recharge Shaft
175	PRAKASAM	KONAKANAMITLA	Katragunta	15.6019	79.4097	BG	Percolation Tank with Recharge Shaft
176	PRAKASAM	KONAKANAMITLA	Katragunta	15.5949	79.4486	BG	Percolation Tank with Recharge Shaft
177	PRAKASAM	KONAKANAMITLA	Nagaraju Gunta	15.662	79.5158	BG	Percolation Tank
178	PRAKASAM	KONAKANAMITLA	Regumani Palle	15.6953	79.4321	BG	Percolation Tank with Recharge Shaft
179	PRAKASAM	KONAKANAMITLA	Salanuthala	15.5602	79.3791	BG	Percolation Tank with Recharge Shaft
180	PRAKASAM	KONAKANAMITLA	Siddavaram	15.606	79.5218	BG	Percolation Tank
181	PRAKASAM	KONAKANAMITLA	Siddavaram	15.6102	79.5	BG	Percolation Tank
182	PRAKASAM	KONAKANAMITLA	Thuvva Padu	15.637	79.4542	BG	Percolation Tank with Recharge Shaft
183	PRAKASAM	KONAKANAMITLA	Thuvva Padu	15.6307	79.4327	BG	Percolation Tank with Recharge Shaft
184	PRAKASAM	KONAKANAMITLA	Vedurralla Padu	15.647	79.4565	BG	Percolation Tank with Recharge Shaft
185	PRAKASAM	KONDAPI	Anakarlapudi	15.4494	79.8609	BG	Percolation Tank
186	PRAKASAM	KONDAPI	C G Anantha Bhotla Vari Khandrika	15.4362	79.8012	BG	Check dam
187	PRAKASAM	KONDAPI	C G Chamarthivarikhandrika	15.4269	79.8143	BG	Check dam
188	PRAKASAM	KONDAPI	China Venkana Palem	15.3677	79.9222	BG	Percolation Tank
189	PRAKASAM	KONDAPI	China Venkana Palem	15.3654	79.9175	BG	Percolation Tank
190	PRAKASAM	KONDAPI	Chinakandla Gunta	15.4241	79.8281	BG	Check dam
191	PRAKASAM	KONDAPI	Chinakandla Gunta	15.4187	79.813	BG	Check dam
192	PRAKASAM	KONDAPI	Chodavaram	15.3727	79.889	BG	Percolation Tank
193	PRAKASAM	KONDAPI	Chodavaram	15.3544	79.8783	BG	Percolation Tank

194	PRAKASAM	KONDAPI	Gurrappadia	15.4606	79.8008	BG	Check dam
195	PRAKASAM	KONDAPI	Gurrappadia	15.4682	79.791	BG	Check dam
196	PRAKASAM	KONDAPI	K.Uppalapadu	15.3633	79.9392	BG	Check dam
197	PRAKASAM	KONDAPI	K.Uppalapadu	15.3499	79.9426	BG	Percolation Tank
198	PRAKASAM	KONDAPI	K.Uppalapadu	15.3594	79.9415	BG	Percolation Tank
199	PRAKASAM	KONDAPI	Mugachintala	15.4809	79.8193	BG	Percolation Tank
200	PRAKASAM	KONDAPI	Mugachintala	15.4752	79.797	BG	Percolation Tank
201	PRAKASAM	KONDAPI	Muppavaram	15.3872	79.8884	BG	Percolation Tank
202	PRAKASAM	KONDAPI	Nennurupadu	15.4736	79.8202	BG	Percolation Tank
203	PRAKASAM	KONDAPI	Petlurumocharlavari Khandrika	15.4142	79.7833	BG	Check dam
204	PRAKASAM	KONDAPI	Vennuru	15.3821	79.9187	BG	Percolation Tank
205	PRAKASAM	KONDAPI	Vennuru	15.3682	79.9043	BG	Percolation Tank
206	PRAKASAM	KURICHEDU	Avulamanda	15.9442	79.5313	SH	Percolation Tank
207	PRAKASAM	KURICHEDU	Avulamanda	15.9317	79.5153	SH	Percolation Tank
208	PRAKASAM	KURICHEDU	Bayya Varam	15.9042	79.6688	BG	Percolation Tank
209	PRAKASAM	KURICHEDU	Jagannadhapuram	15.9343	79.4465	SH	Percolation Tank
210	PRAKASAM	KURICHEDU	Kallur	15.9296	79.4657	SH	Percolation Tank
211	PRAKASAM	KURICHEDU	Mallaya Palem	15.9028	79.6121	BG	Percolation Tank
212	PRAKASAM	KURICHEDU	Mustla Gangavaram	15.9871	79.5597	SH	Check dam
213	PRAKASAM	KURICHEDU	Mustla Gangavaram	15.9741	79.5578	SH	Check dam
214	PRAKASAM	KURICHEDU	Mustla Gangavaram	15.9798	79.5498	SH	Percolation Tank
215	PRAKASAM	KURICHEDU	West Gangavaram	15.8251	79.5472	BG	Percolation Tank
216	PRAKASAM	KURICHEDU	West Naidupalem	15.8878	79.478	SH	Percolation Tank
217	PRAKASAM	KURICHEDU	West Naidupalem	15.9132	79.4957	SH	Percolation Tank
218	PRAKASAM	MADDIPADU	Annangi	15.655	79.9948	BG	Check dam
219	PRAKASAM	MADDIPADU	Annangi	15.6776	79.9889	BG	Check dam
220	PRAKASAM	MADDIPADU	Annangi	15.6885	79.9846	BG	Check dam
221	PRAKASAM	MADDIPADU	Annangi	15.6904	80.0165	BG	Percolation Tank
222	PRAKASAM	MADDIPADU	Annangi	15.6637	79.9905	BG	Percolation Tank
223	PRAKASAM	MADDIPADU	Doddavaram	15.6665	79.9684	BG	Check dam
224	PRAKASAM	MADDIPADU	Doddavaram	15.6784	79.9447	BG	Percolation Tank
225	PRAKASAM	MADDIPADU	Doddavaram	15.6496	79.9453	BG	Percolation Tank
226	PRAKASAM	MADDIPADU	Doddavarappadu	15.5768	80.0312	BG	Percolation Tank

227	PRAKASAM	MADDIPADU	Edugundlapadu	15.5621	80.046	AL	Percolation Tank
228	PRAKASAM	MADDIPADU	Gadiyapudi	15.6973	79.9716	BG	Check dam
229	PRAKASAM	MADDIPADU	Garlapadu	15.6957	79.9442	BG	Check dam
230	PRAKASAM	MADDIPADU	Garlapadu	15.6882	79.9518	BG	Percolation Tank
231	PRAKASAM	MADDIPADU	Gundla Palle	15.6583	80.0048	BG	Percolation Tank
232	PRAKASAM	MADDIPADU	Inamanamellur	15.6169	80.0864	AL	Check dam
233	PRAKASAM	MADDIPADU	Inamanamellur	15.5917	80.0777	AL	Percolation Tank
234	PRAKASAM	MADDIPADU	Inamanamellur	15.6125	80.0667	AL	Percolation Tank
235	PRAKASAM	MADDIPADU	Keerthi Padu	15.6668	80.0331	BG	Percolation Tank
236	PRAKASAM	MADDIPADU	Kolachanakota	15.6242	79.9888	BG	Check dam
237	PRAKASAM	MADDIPADU	Mallavaram	15.6557	79.9788	BG	Percolation Tank
238	PRAKASAM	MADDIPADU	Nelatur	15.6145	79.9948	BG	Percolation Tank
239	PRAKASAM	MADDIPADU	Peda Kotha Palle	15.5954	80.0138	BG	Check dam
240	PRAKASAM	MADDIPADU	Peda Kotha Palle	15.553	79.9978	BG	Check dam
241	PRAKASAM	MADDIPADU	Rachavari Palem	15.6579	80.0455	AL	Percolation Tank
242	PRAKASAM	MARKAPUR	Goguladinne	15.7031	79.285	SH	Percolation Tank with Recharge Shaft
243	PRAKASAM	MARRIPUDI	Chilamkuru	15.4943	79.7741	BG	Percolation Tank
244	PRAKASAM	MARRIPUDI	Chimata	15.5054	79.7025	BG	Check dam
245	PRAKASAM	MARRIPUDI	Ganjipalem	15.473	79.6828	BG	Check dam
246	PRAKASAM	MARRIPUDI	Garla Peta	15.3988	79.5849	BG	Check dam
247	PRAKASAM	MARRIPUDI	Gundla Samudram	15.5525	79.6154	BG	Check dam
248	PRAKASAM	MARRIPUDI	Kakarla	15.534	79.762	BG	Percolation Tank
249	PRAKASAM	MARRIPUDI	Raju Palem	15.5563	79.6135	BG	Check dam
250	PRAKASAM	MARRIPUDI	Raju Palem	15.5678	79.6273	BG	Percolation Tank
251	PRAKASAM	MARRIPUDI	Ramachandrapuram	15.4319	79.6281	BG	Check dam
252	PRAKASAM	MUNDLAMURU	Avisanavaripalem	15.7851	79.9108	BG	Check dam
253	PRAKASAM	MUNDLAMURU	Brundavanam	15.7866	79.6873	BG	Percolation Tank
254	PRAKASAM	MUNDLAMURU	Edara	15.9188	79.8049	BG	Percolation Tank
255	PRAKASAM	MUNDLAMURU	Khambham Padu (East)	15.8543	79.9267	BG	Percolation Tank
256	PRAKASAM	MUNDLAMURU	Kommavaram	15.8993	79.786	BG	Percolation Tank
257	PRAKASAM	MUNDLAMURU	Marella	15.8621	79.8793	BG	Percolation Tank
258	PRAKASAM	MUNDLAMURU	Mundlamuru	15.7997	79.8334	BG	Percolation Tank
259	PRAKASAM	MUNDLAMURU	Nadimpallivari Khandrika	15.812	79.798	BG	Percolation Tank
260	PRAKASAM	MUNDLAMURU	Nuzella Palle	15.8287	79.9146	BG	Check dam

261	PRAKASAM	MUNDLAMURU	Pedavullagallu	15.7947	79.7718	BG	Percolation Tank
262	PRAKASAM	MUNDLAMURU	Polavaram	15.7885	79.8812	BG	Percolation Tank
263	PRAKASAM	MUNDLAMURU	Umamaheswarapuram	15.8646	79.8073	BG	Check dam
264	PRAKASAM	MUNDLAMURU	Vemulabanda	15.8723	79.7873	BG	Check dam
265	PRAKASAM	NAGULUPPALAPADU	Ammana Brolu	15.5889	80.1434	AL	Percolation Tank
266	PRAKASAM	NAGULUPPALAPADU	Ammana Brolu	15.5706	80.1298	AL	Percolation Tank
267	PRAKASAM	NAGULUPPALAPADU	Chadalawada	15.6256	80.0942	AL	Check dam
268	PRAKASAM	NAGULUPPALAPADU	Chadalawada	15.6123	80.0942	AL	Check dam
269	PRAKASAM	NAGULUPPALAPADU	Chadalawada	15.6276	80.1069	AL	Check dam
270	PRAKASAM	NAGULUPPALAPADU	Chadalawada	15.6288	80.1007	AL	Percolation Tank
271	PRAKASAM	NAGULUPPALAPADU	Cheervanuppala Padu	15.5843	80.1095	AL	Percolation Tank
272	PRAKASAM	NAGULUPPALAPADU	Edumudi	15.7185	80.1747	BG	Percolation Tank
273	PRAKASAM	NAGULUPPALAPADU	Kandlagunta	15.6953	80.1289	BG	Check dam
274	PRAKASAM	NAGULUPPALAPADU	Kandlagunta	15.6981	80.1425	BG	Percolation Tank
275	PRAKASAM	NAGULUPPALAPADU	Kanuparthi	15.5612	80.2184	AL	Check dam
276	PRAKASAM	NAGULUPPALAPADU	Kothakota	15.6705	80.0448	BG	Check dam
277	PRAKASAM	NAGULUPPALAPADU	Maddirala Muppalla	15.7424	80.1954	BG	Percolation Tank
278	PRAKASAM	NAGULUPPALAPADU	Mattigunta	15.7133	80.1763	BG	Percolation Tank
279	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.675	80.1348	BG	Check dam
280	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6819	80.1364	BG	Check dam
281	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6517	80.1228	BG	Check dam
282	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6709	80.1377	BG	Check dam
283	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6506	80.1169	BG	Percolation Tank
284	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6703	80.1459	BG	Percolation Tank
285	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6779	80.1393	BG	Percolation Tank
286	PRAKASAM	NAGULUPPALAPADU	Naguluppala Padu	15.6326	80.1303	AL	Percolation Tank
287	PRAKASAM	NAGULUPPALAPADU	Nidamanur	15.6814	80.074	BG	Check dam
288	PRAKASAM	NAGULUPPALAPADU	Nidamanur	15.6513	80.0833	BG	Percolation Tank
289	PRAKASAM	NAGULUPPALAPADU	Nidamanur	15.6371	80.0785	BG	Percolation Tank
290	PRAKASAM	NAGULUPPALAPADU	Pothavaram	15.6643	80.1056	BG	Percolation Tank
291	PRAKASAM	NAGULUPPALAPADU	Raparla	15.6251	80.157	AL	Percolation Tank
292	PRAKASAM	NAGULUPPALAPADU	Uppugundur	15.6797	80.1655	BG	Percolation Tank
293	PRAKASAM	ONGOLE	Chejerla	15.5185	80.1631	AL	Check dam
294	PRAKASAM	ONGOLE	Cheruvu Kommu Palem	15.476	80.0279	AL	Check dam

295	PRAKASAM	ONGOLE	Cheruvu Kommu Palem	15.4696	80.0353	AL	Check dam
296	PRAKASAM	ONGOLE	Karavadi	15.5551	80.1041	AL	Check dam
297	PRAKASAM	ONGOLE	Kothamamidipalem (Rural)	15.495	80.0085	BG	Check dam
298	PRAKASAM	ONGOLE	Kothamamidipalem (Rural)	15.4888	80.0261	AL	Percolation Tank
299	PRAKASAM	ONGOLE	Mukthinutala Padu (Rural)	15.5429	80.0629	AL	Percolation Tank
300	PRAKASAM	ONGOLE	Pelluru (Rural)	15.4548	80.0356	AL	Check dam
301	PRAKASAM	ONGOLE	Pelluru (Rural)	15.4464	80.0367	AL	Check dam
302	PRAKASAM	ONGOLE	Sarvereddy Palem	15.4534	79.9817	BG	Check dam
303	PRAKASAM	ONGOLE	Sarvereddy Palem	15.4772	79.9931	BG	Percolation Tank
304	PRAKASAM	ONGOLE	Vengamukka Palem	15.4809	80.026	AL	Check dam
305	PRAKASAM	ONGOLE	Yerajerla	15.4566	79.9922	BG	Check dam
306	PRAKASAM	ONGOLE	Yerajerla	15.4509	79.9926	BG	Check dam
307	PRAKASAM	ONGOLE	Yerajerla	15.448	79.9996	BG	Percolation Tank
308	PRAKASAM	PAMUR	Ayyannakota	15.1363	79.6051	BG	Check dam
309	PRAKASAM	PAMUR	Ayyannakota	15.12	79.5798	BG	Check dam
310	PRAKASAM	PAMUR	Botla Gudur	15.0736	79.5546	BG	Check dam
311	PRAKASAM	PAMUR	Botla Gudur	15.0721	79.4991	BG	Percolation Tank
312	PRAKASAM	PAMUR	Botla Gudur	15.0689	79.5113	BG	Percolation Tank
313	PRAKASAM	PAMUR	Dadireddi Pallle	15.1583	79.4055	BG	Check dam
314	PRAKASAM	PAMUR	Gummalampadu	15.1463	79.4069	BG	Check dam
315	PRAKASAM	PAMUR	Karrollapadu	15.0404	79.5212	BG	Check dam
316	PRAKASAM	PAMUR	Kattakinda Palli	15.1805	79.3727	BG	Check dam
317	PRAKASAM	PAMUR	Malakondapuram	15.1188	79.5887	BG	Percolation Tank
318	PRAKASAM	PAMUR	Pamur	15.1016	79.4284	BG	Check dam
319	PRAKASAM	PAMUR	Pamur	15.1145	79.408	BG	Percolation Tank
320	PRAKASAM	PAMUR	Renimadugu	15.0439	79.5877	BG	Percolation Tank
321	PRAKASAM	PAMUR	Siddavaram	15.0506	79.5681	BG	Check dam
322	PRAKASAM	PAMUR	Siddavaram	15.0846	79.5769	BG	Percolation Tank
323	PRAKASAM	PEDA ARAVEEDU	Badveedu	15.8645	79.1898	SH	Percolation Tank with Recharge Shaft
324	PRAKASAM	PEDA ARAVEEDU	Boyada Gumpula	15.8853	79.2456	SH	Percolation Tank with Recharge Shaft
325	PRAKASAM	PEDA ARAVEEDU	Chatla Mitta	15.9125	79.2618	SH	Percolation Tank with Recharge Shaft
326	PRAKASAM	PEDA ARAVEEDU	Devarajugattu	15.7962	79.2478	SH	Percolation Tank with Recharge Shaft

327	PRAKASAM	PEDA ARAVEEDU	Kalanuthala	15.8213	79.1202	SH	Check Dam with Recharge Shaft
328	PRAKASAM	PEDA ARAVEEDU	Kalanuthala	15.7747	79.114	SH	Check Dam with Recharge Shaft
329	PRAKASAM	PEDA ARAVEEDU	Kalanuthala	15.7923	79.1191	SH	Check Dam with Recharge Shaft
330	PRAKASAM	PEDA ARAVEEDU	Kalanuthala	15.8314	79.1116	SH	Percolation Tank with Recharge Shaft
331	PRAKASAM	PEDA ARAVEEDU	Kalanuthala	15.8279	79.1374	SH	Percolation Tank with Recharge Shaft
332	PRAKASAM	PEDA ARAVEEDU	Peda Araveedu	15.8269	79.2257	SH	Percolation Tank with Recharge Shaft
333	PRAKASAM	PEDA ARAVEEDU	Pragallapadu	15.8639	79.254	SH	Percolation Tank with Recharge Shaft
334	PRAKASAM	PEDA ARAVEEDU	Sanikavaram	15.8878	79.1887	SH	Percolation Tank with Recharge Shaft
335	PRAKASAM	PEDA ARAVEEDU	Sanikavaram	15.8801	79.1564	SH	Percolation Tank with Recharge Shaft
336	PRAKASAM	PEDA ARAVEEDU	Sunkesula	15.7964	79.1548	SH	Check Dam with Recharge Shaft
337	PRAKASAM	PEDA ARAVEEDU	Sunkesula	15.8154	79.1766	SH	Percolation Tank with Recharge Shaft
338	PRAKASAM	PEDA ARAVEEDU	Thangirala Palle	15.8287	79.2976	SH	Percolation Tank with Recharge Shaft
339	PRAKASAM	PEDACHERLO PALLE	Chinavari Madugu	15.247	79.5919	BG	Check dam
340	PRAKASAM	PEDACHERLO PALLE	Chinavari Madugu	15.2514	79.596	BG	Percolation Tank
341	PRAKASAM	PEDACHERLO PALLE	Chinthagum Palle	15.211	79.5364	BG	Percolation Tank
342	PRAKASAM	PEDACHERLO PALLE	Chinthagum Palle	15.1952	79.5329	BG	Percolation Tank
343	PRAKASAM	PEDACHERLO PALLE	Lakshmakka Palle	15.1509	79.6435	BG	Check dam
344	PRAKASAM	PEDACHERLO PALLE	Marella	15.2914	79.5971	BG	Percolation Tank
345	PRAKASAM	PEDACHERLO PALLE	Murugammi	15.2325	79.6356	BG	Percolation Tank
346	PRAKASAM	PEDACHERLO PALLE	Murugammi	15.2516	79.6324	BG	Percolation Tank
347	PRAKASAM	PEDACHERLO PALLE	Neredu Palle	15.2702	79.6306	BG	Percolation Tank
348	PRAKASAM	PEDACHERLO PALLE	Peda Irla Padu	15.1649	79.5889	BG	Percolation Tank
349	PRAKASAM	PEDACHERLO PALLE	Peda Irla Padu	15.1624	79.565	BG	Percolation Tank
350	PRAKASAM	PEDACHERLO PALLE	Peda Irla Padu	15.1751	79.6054	BG	Percolation Tank
351	PRAKASAM	PEDACHERLO PALLE	Peda Irla Padu	15.217	79.6273	BG	Percolation Tank
352	PRAKASAM	PEDACHERLO PALLE	Peda Irla Padu	15.207	79.5976	BG	Percolation Tank
353	PRAKASAM	PEDACHERLO PALLE	Rama Govinda Puram	15.296	79.5795	BG	Check dam
354	PRAKASAM	PEDACHERLO PALLE	Talakondapadu	15.2834	79.5273	BG	Percolation Tank
355	PRAKASAM	PEDACHERLO PALLE	Vepagum Palle	15.2389	79.5642	BG	Check dam
356	PRAKASAM	PEDACHERLO PALLE	Vepagum Palle	15.2307	79.5784	BG	Percolation Tank
357	PRAKASAM	PODILI	Chintagum Palle	15.6077	79.7008	BG	Percolation Tank
358	PRAKASAM	PODILI	Dondleru	15.6355	79.554	BG	Check dam
359	PRAKASAM	PODILI	Kunchepalle	15.666	79.6419	BG	Percolation Tank
360	PRAKASAM	PODILI	Mallavaram	15.6558	79.6556	BG	Check dam

361	PRAKASAM	PODILI	Mallavaram	15.6501	79.6479	BG	Percolation Tank
362	PRAKASAM	PODILI	Podili	15.5971	79.6598	BG	Percolation Tank
363	PRAKASAM	PODILI	Podili	15.6123	79.6311	BG	Percolation Tank
364	PRAKASAM	PONNALURU	Cherukuru	15.2758	79.7316	BG	Check dam
365	PRAKASAM	PONNALURU	Cherukuru	15.2587	79.658	BG	Check dam
366	PRAKASAM	PONNALURU	Cherukuru	15.2598	79.6675	BG	Check dam
367	PRAKASAM	PONNALURU	Cherukuru	15.2595	79.7623	BG	Percolation Tank
368	PRAKASAM	PONNALURU	Cherukuru	15.2786	79.7481	BG	Percolation Tank
369	PRAKASAM	PONNALURU	Cherukuru	15.2717	79.7054	BG	Percolation Tank
370	PRAKASAM	PONNALURU	Cherukuru	15.2608	79.6967	BG	Percolation Tank
371	PRAKASAM	PONNALURU	Cherukuru	15.2568	79.6786	BG	Percolation Tank
372	PRAKASAM	PONNALURU	Cherukuru	15.2627	79.6861	BG	Percolation Tank
373	PRAKASAM	PONNALURU	Chouta Palem	15.2362	79.7563	BG	Check dam
374	PRAKASAM	PONNALURU	Chouta Palem	15.2146	79.7425	BG	Percolation Tank
375	PRAKASAM	PONNALURU	Ippagunta	15.2397	79.7913	BG	Check dam
376	PRAKASAM	PONNALURU	Ippagunta	15.2187	79.772	BG	Check dam
377	PRAKASAM	PONNALURU	Ippagunta	15.2127	79.7691	BG	Percolation Tank
378	PRAKASAM	PONNALURU	Ippagunta	15.2067	79.7757	BG	Percolation Tank
379	PRAKASAM	PONNALURU	Kotapadu	15.3483	79.6834	BG	Check dam
380	PRAKASAM	PONNALURU	Lingam Gunta	15.2236	79.7261	BG	Percolation Tank
381	PRAKASAM	PONNALURU	Lingam Gunta	15.2417	79.7302	BG	Percolation Tank
382	PRAKASAM	PONNALURU	Malepadu	15.2446	79.7227	BG	Check dam
383	PRAKASAM	PONNALURU	Malepadu	15.2533	79.688	BG	Check dam
384	PRAKASAM	PONNALURU	Malepadu	15.2399	79.6969	BG	Percolation Tank
385	PRAKASAM	PONNALURU	Mekapadu (Z)	15.3677	79.6879	BG	Check dam
386	PRAKASAM	PONNALURU	Mekapadu (Z)	15.3856	79.7092	BG	Check dam
387	PRAKASAM	PONNALURU	Mekapadu (Z)	15.3906	79.7074	BG	Check dam
388	PRAKASAM	PONNALURU	Mekapadu (Z)	15.3727	79.7008	BG	Percolation Tank
389	PRAKASAM	PONNALURU	Pachavabala Gopalapuram	15.3197	79.7521	BG	Check dam
390	PRAKASAM	PONNALURU	Ponnaluru	15.2223	79.8046	BG	Percolation Tank
391	PRAKASAM	PONNALURU	Ponnaluru Gudavari Khandrika	15.2781	79.81	BG	Check dam
392	PRAKASAM	PONNALURU	Ponnaluru Gudavari Khandrika	15.2565	79.7784	BG	Check dam

393	PRAKASAM	PONNALURU	Ponnaluru Gudavari Khandrika	15.2583	79.8044	BG	Percolation Tank
394	PRAKASAM	PONNALURU	Ponnaluru Gudavari Khandrika	15.2669	79.7971	BG	Percolation Tank
395	PRAKASAM	PONNALURU	Ponnaluru Gudavari Khandrika	15.2936	79.8159	BG	Percolation Tank
396	PRAKASAM	PONNALURU	Ravula Kollu	15.3259	79.7913	BG	Check dam
397	PRAKASAM	PONNALURU	Ravula Kollu	15.3056	79.7636	BG	Percolation Tank
398	PRAKASAM	PONNALURU	Singara Botla Palem	15.2651	79.8486	LT	Percolation Tank
399	PRAKASAM	PONNALURU	Vellaturu	15.2695	79.8308	BG	Check dam
400	PRAKASAM	PONNALURU	Vellaturu	15.2588	79.8177	BG	Percolation Tank
401	PRAKASAM	PONNALURU	Vellaturu	15.2609	79.8272	BG	Percolation Tank
402	PRAKASAM	PONNALURU	Vempadu	15.295	79.8274	BG	Check dam
403	PRAKASAM	PONNALURU	Vempadu	15.2963	79.8384	BG	Percolation Tank
404	PRAKASAM	PULLALACHERUVU	Ayyagari Palle	16.0904	79.5396	SH	Check dam
405	PRAKASAM	PULLALACHERUVU	Chowtapa Charla	16.0692	79.5397	SH	Check dam
406	PRAKASAM	PULLALACHERUVU	Chowtapalle	16.164	79.4816	SH	Check dam
407	PRAKASAM	PULLALACHERUVU	Chowtapalle	16.1694	79.4587	SH	Percolation Tank
408	PRAKASAM	PULLALACHERUVU	Chowtapalle	16.1771	79.4698	SH	Percolation Tank
409	PRAKASAM	PULLALACHERUVU	Isukatripuravaram	16.1299	79.4951	SH	Percolation Tank
410	PRAKASAM	PULLALACHERUVU	Isukatripuravaram	16.109	79.4889	SH	Percolation Tank
411	PRAKASAM	PULLALACHERUVU	Kavala Kuntla	16.1014	79.4256	SH	Percolation Tank
412	PRAKASAM	PULLALACHERUVU	Komarolu	16.0933	79.3378	SH	Percolation Tank with Recharge Shaft
413	PRAKASAM	PULLALACHERUVU	Komarolu	16.0743	79.3575	SH	Percolation Tank with Recharge Shaft
414	PRAKASAM	PULLALACHERUVU	Mane Palle	16.1062	79.5394	SH	Percolation Tank
415	PRAKASAM	PULLALACHERUVU	Marrivemula	16.2313	79.5467	SH	Percolation Tank
416	PRAKASAM	PULLALACHERUVU	Pullalacheruvu	16.1673	79.4262	SH	Percolation Tank
417	PRAKASAM	PULLALACHERUVU	Racha Konda	16.1649	79.3913	SH	Percolation Tank
418	PRAKASAM	PULLALACHERUVU	Yendra Palle	16.1303	79.3457	SH	Percolation Tank with Recharge Shaft
419	PRAKASAM	RACHERLA	Akaveedu	15.6006	78.944	SH	Percolation Tank
420	PRAKASAM	RACHERLA	Chinnagani Palle	15.5233	78.9033	SH	Percolation Tank with Recharge Shaft
421	PRAKASAM	RACHERLA	Chollaveedu	15.5081	78.9535	SH	Percolation Tank
422	PRAKASAM	SANTHANUTHALA PADU	Bhatla Machavaram	15.4702	79.8641	BG	Check dam
423	PRAKASAM	SANTHANUTHALA PADU	Bhatla Machavaram	15.4794	79.8905	BG	Percolation Tank

424	PRAKASAM	SANTHANUTHALA PADU	Bhatla Machavaram	15.4984	79.8882	BG	Percolation Tank
425	PRAKASAM	SANTHANUTHALA PADU	Bhatla Machavaram	15.4797	79.8601	BG	Percolation Tank
426	PRAKASAM	SANTHANUTHALA PADU	Chilakapadu	15.4831	79.9363	BG	Check dam
427	PRAKASAM	SANTHANUTHALA PADU	Endluru	15.5658	79.9744	BG	Percolation Tank
428	PRAKASAM	SANTHANUTHALA PADU	Gangavaram	15.5133	79.9667	BG	Check dam
429	PRAKASAM	SANTHANUTHALA PADU	Gangavaram	15.4881	79.9427	BG	Check dam
430	PRAKASAM	SANTHANUTHALA PADU	Gangavaram	15.5373	79.9287	BG	Check dam
431	PRAKASAM	SANTHANUTHALA PADU	Gummalam Padu	15.5282	79.9034	BG	Percolation Tank
432	PRAKASAM	SANTHANUTHALA PADU	Gummalam Padu	15.5174	79.8994	BG	Percolation Tank
433	PRAKASAM	SANTHANUTHALA PADU	Konagani Vari Palem	15.6007	79.934	BG	Check dam
434	PRAKASAM	SANTHANUTHALA PADU	Lakshmi Puram	15.503	79.9715	BG	Check dam
435	PRAKASAM	SANTHANUTHALA PADU	Lakshmi Puram	15.5074	79.967	BG	Check dam
436	PRAKASAM	SANTHANUTHALA PADU	Lakshmi Puram	15.5	79.9985	BG	Check dam
437	PRAKASAM	SANTHANUTHALA PADU	Lakshmi Puram	15.5	79.991	BG	Percolation Tank
438	PRAKASAM	SANTHANUTHALA PADU	Lakshmi Puram	15.5046	79.983	BG	Percolation Tank
439	PRAKASAM	SANTHANUTHALA PADU	Matti Padu	15.5783	79.9345	BG	Check dam
440	PRAKASAM	SANTHANUTHALA PADU	Matti Padu	15.5743	79.9348	BG	Check dam
441	PRAKASAM	SANTHANUTHALA PADU	Matti Padu	15.5808	79.9433	BG	Check dam
442	PRAKASAM	SANTHANUTHALA PADU	Matti Padu	15.5627	79.9372	BG	Check dam
443	PRAKASAM	SANTHANUTHALA PADU	Mynampadu	15.4875	79.9263	BG	Check dam
444	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5479	79.9972	BG	Check dam
445	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5086	80.0015	BG	Check dam
446	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5163	80.0193	AL	Check dam
447	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.527	80.0298	AL	Check dam
448	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5241	79.9857	BG	Percolation Tank
449	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5362	79.9775	BG	Percolation Tank
450	PRAKASAM	SANTHANUTHALA PADU	Padamati Thakkella Padu	15.5429	80.0098	BG	Percolation Tank
451	PRAKASAM	SANTHANUTHALA PADU	Pidathalagudi Padu	15.5935	79.9704	BG	Percolation Tank
452	PRAKASAM	SANTHANUTHALA PADU	Rudravaram	15.5909	79.9979	BG	Check dam
453	PRAKASAM	SANTHANUTHALA PADU	Yenikapadu	15.5203	79.8758	BG	Check dam
454	PRAKASAM	SANTHANUTHALA PADU	Yenikapadu	15.5044	79.8815	BG	Check dam
455	PRAKASAM	SINGARAYAKONDA	Kanumalla	15.2665	79.9877	BG	Check dam
456	PRAKASAM	SINGARAYAKONDA	Kanumalla	15.265	79.9845	BG	Percolation Tank
457	PRAKASAM	SINGARAYAKONDA	Kanumalla	15.2658	79.998	LT	Percolation Tank

458	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.219	79.9812	BG	Check dam
459	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.2277	79.9768	BG	Check dam
460	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.2339	79.9848	BG	Check dam
461	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.224	79.9865	LT	Check dam
462	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.2307	79.9835	BG	Percolation Tank
463	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.2099	79.9856	BG	Percolation Tank
464	PRAKASAM	SINGARAYAKONDA	Sanampudi	15.2309	79.9966	LT	Percolation Tank
465	PRAKASAM	SINGARAYAKONDA	Singarayakonda	15.231	80.0095	LT	Percolation Tank
466	PRAKASAM	SINGARAYAKONDA	Singarayakonda	15.223	80.0045	LT	Percolation Tank
467	PRAKASAM	SINGARAYAKONDA	Singarayakonda	15.2253	80.0281	AL	Percolation Tank
468	PRAKASAM	TANGUTUR	Kandulur	15.433	80.0147	BG	Check dam
469	PRAKASAM	TANGUTUR	Kandulur	15.4214	80.0007	BG	Percolation Tank
470	PRAKASAM	TANGUTUR	Kandulur	15.4189	79.9794	BG	Percolation Tank
471	PRAKASAM	TANGUTUR	Karumanchi	15.383	79.9761	BG	Percolation Tank
472	PRAKASAM	TANGUTUR	Karumanchi	15.3956	80.0071	AL	Percolation Tank
473	PRAKASAM	TANGUTUR	Konijedu	15.4308	79.953	BG	Check dam
474	PRAKASAM	TANGUTUR	Konijedu	15.4416	79.9252	BG	Check dam
475	PRAKASAM	TANGUTUR	Konijedu	15.4651	79.9303	BG	Check dam
476	PRAKASAM	TANGUTUR	Konijedu	15.4566	79.935	BG	Check dam
477	PRAKASAM	TANGUTUR	Konijedu	15.4481	79.9637	BG	Percolation Tank
478	PRAKASAM	TANGUTUR	Konijedu	15.4518	79.9491	BG	Percolation Tank
479	PRAKASAM	TANGUTUR	Konijedu	15.4652	79.9591	BG	Percolation Tank
480	PRAKASAM	TANGUTUR	Konijedu	15.4364	79.9469	BG	Percolation Tank
481	PRAKASAM	TANGUTUR	M.Nidamalur	15.3957	79.9469	BG	Percolation Tank
482	PRAKASAM	TANGUTUR	M.Nidamalur	15.4097	79.9694	BG	Percolation Tank
483	PRAKASAM	TANGUTUR	Marlapadu	15.4273	79.9583	BG	Check dam
484	PRAKASAM	TANGUTUR	Marlapadu	15.4339	79.9738	BG	Percolation Tank
485	PRAKASAM	TANGUTUR	Marlapadu	15.4391	79.9712	BG	Percolation Tank
486	PRAKASAM	TANGUTUR	Ponduru	15.4361	79.9268	BG	Percolation Tank
487	PRAKASAM	TANGUTUR	Ponduru	15.4209	79.948	BG	Percolation Tank
488	PRAKASAM	TANGUTUR	Valluru	15.4299	80.0336	AL	Check dam
489	PRAKASAM	TANGUTUR	Valluru	15.4228	80.0208	AL	Percolation Tank
490	PRAKASAM	TARLUPADU	Ganugapenta	15.7055	79.3594	SH	Percolation Tank with Recharge Shaft
491	PRAKASAM	TARLUPADU	Kethagudipi	15.6746	79.3158	SH	Check Dam with Recharge Shaft

492	PRAKASAM	TARLUPADU	Lakshmakka Palle	15.6245	79.3492	SH	Check Dam with Recharge Shaft
493	PRAKASAM	TARLUPADU	Lakshmakka Palle	15.634	79.3514	SH	Percolation Tank with Recharge Shaft
494	PRAKASAM	TARLUPADU	Obaya Palle	15.6546	79.3314	SH	Percolation Tank with Recharge Shaft
495	PRAKASAM	TARLUPADU	Tarlupadu	15.6422	79.2207	SH	Check Dam with Recharge Shaft
496	PRAKASAM	TARLUPADU	Tellapadu	15.6679	79.2197	SH	Check Dam with Recharge Shaft
497	PRAKASAM	TARLUPADU	Thummala Cheruvu	15.6769	79.2794	SH	Check Dam with Recharge Shaft
498	PRAKASAM	THALLUR	Boddikura Padu	15.6652	79.7218	BG	Check dam
499	PRAKASAM	THALLUR	Dosakayalapadu	15.7414	79.8132	BG	Percolation Tank
500	PRAKASAM	THALLUR	Malkapuram	15.7698	79.8928	BG	Percolation Tank
501	PRAKASAM	THALLUR	Mannepalle	15.7663	79.8361	BG	Percolation Tank
502	PRAKASAM	THALLUR	Sankaranarayanapuram	15.6763	79.7373	BG	Percolation Tank
503	PRAKASAM	THALLUR	Sivarampuram	15.7051	79.8769	BG	Percolation Tank
504	PRAKASAM	THALLUR	Vithalapuram	15.7787	79.8633	BG	Percolation Tank
505	PRAKASAM	TRIPURANTHAKAM	Lella Palle	15.9848	79.4069	SH	Percolation Tank with Recharge Shaft
506	PRAKASAM	TRIPURANTHAKAM	Medapi	16.0265	79.514	SH	Percolation Tank
507	PRAKASAM	TRIPURANTHAKAM	Medapi	16.0194	79.5516	SH	Percolation Tank
508	PRAKASAM	VELIGANDLA	Gandla Seetharam Puram	15.3638	79.3001	BG	Percolation Tank
509	PRAKASAM	VELIGANDLA	Kankanam Padu Agraharam	15.4046	79.3626	BG	Check dam
510	PRAKASAM	VELIGANDLA	Panduva Nagula Varam	15.388	79.2286	BG	Percolation Tank
511	PRAKASAM	VELIGANDLA	Pulikuntla Ralla Palle	15.3379	79.2319	BG	Percolation Tank
512	PRAKASAM	VELIGANDLA	Pulikuntla Ralla Palle	15.3672	79.2298	BG	Percolation Tank
513	PRAKASAM	VELIGANDLA	Vedulla Cheruvu	15.3121	79.2351	BG	Percolation Tank
514	PRAKASAM	YERRAGONDAPALEM	Ammani Gudi Padu	15.9462	79.25	SH	Percolation Tank with Recharge Shaft
515	PRAKASAM	YERRAGONDAPALEM	Ammani Gudi Padu	15.9585	79.2659	SH	Percolation Tank with Recharge Shaft
516	PRAKASAM	YERRAGONDAPALEM	Boyala Palle (S.H.O)	15.9695	79.2894	SH	Percolation Tank with Recharge Shaft
517	PRAKASAM	YERRAGONDAPALEM	Gollavidipi	16.008	79.3529	SH	Percolation Tank with Recharge Shaft
518	PRAKASAM	YERRAGONDAPALEM	Gollavidipi	16.0154	79.3261	SH	Percolation Tank with Recharge Shaft
519	PRAKASAM	YERRAGONDAPALEM	Gurije Palle	15.9622	79.3441	SH	Percolation Tank with Recharge Shaft
520	PRAKASAM	YERRAGONDAPALEM	Gurije Palle	15.9252	79.307	SH	Percolation Tank with Recharge Shaft
521	PRAKASAM	YERRAGONDAPALEM	Gurrapusala	15.9295	79.1879	SH	Percolation Tank with Recharge Shaft
522	PRAKASAM	YERRAGONDAPALEM	Gurrapusala	15.9521	79.2224	SH	Percolation Tank with Recharge Shaft
523	PRAKASAM	YERRAGONDAPALEM	Kolukula	16.0098	79.221	SH	Percolation Tank with Recharge Shaft
524	PRAKASAM	ZARUGUMILLI	Chirrikura Padu	15.3196	79.9191	BG	Check dam

525	PRAKASAM	ZARUGUMILLI	Chirrikura Padu	15.3357	79.9193	BG	Percolation Tank
526	PRAKASAM	ZARUGUMILLI	Chirrikura Padu	15.3306	79.9312	BG	Percolation Tank
527	PRAKASAM	ZARUGUMILLI	Nandanavanam	15.2969	79.9622	BG	Percolation Tank
528	PRAKASAM	ZARUGUMILLI	Narasimhanayani Khandrika	15.3776	79.7995	BG	Check dam
529	PRAKASAM	ZARUGUMILLI	Narasimhanayani Khandrika	15.3885	79.7694	BG	Check dam
530	PRAKASAM	ZARUGUMILLI	Narasimhanayani Khandrika	15.3852	79.7935	BG	Check dam
531	PRAKASAM	ZARUGUMILLI	Narasimhanayani Khandrika	15.396	79.7624	BG	Percolation Tank
532	PRAKASAM	ZARUGUMILLI	Narasimhanayani Khandrika	15.363	79.7953	BG	Percolation Tank
533	PRAKASAM	ZARUGUMILLI	Narasingolu	15.3283	79.9018	BG	Percolation Tank
534	PRAKASAM	ZARUGUMILLI	Narasingolu	15.305	79.8934	BG	Percolation Tank
535	PRAKASAM	ZARUGUMILLI	P.G. Khandrika	15.3491	79.9741	BG	Check dam
536	PRAKASAM	ZARUGUMILLI	Paidi Padu	15.3487	79.8537	BG	Percolation Tank
537	PRAKASAM	ZARUGUMILLI	Paidi Padu	15.3424	79.8564	BG	Percolation Tank
538	PRAKASAM	ZARUGUMILLI	Patcheva	15.35	79.753	BG	Check dam
539	PRAKASAM	ZARUGUMILLI	Patcheva	15.3499	79.792	BG	Check dam
540	PRAKASAM	ZARUGUMILLI	Patcheva	15.3556	79.7751	BG	Percolation Tank
541	PRAKASAM	ZARUGUMILLI	Ramachandrapuram	15.3171	79.8614	BG	Check dam
542	PRAKASAM	ZARUGUMILLI	Thumadu	15.3567	79.9496	BG	Check dam
543	PRAKASAM	ZARUGUMILLI	Vardhineni Palem	15.3784	79.7517	BG	Check dam
544	PRAKASAM	ZARUGUMILLI	Vardhineni Palem	15.373	79.7509	BG	Check dam
545	PRAKASAM	ZARUGUMILLI	Vardhineni Palem	15.3778	79.7553	BG	Percolation Tank
546	PRAKASAM	ZARUGUMILLI	Vavileti Padu	15.3389	80.0026	AL	Percolation Tank
547	PRAKASAM	ZARUGUMILLI	Yeduluru Padu	15.2201	79.8216	BG	Check dam
548	PRAKASAM	ZARUGUMILLI	Yeduluru Padu	15.2313	79.8251	BG	Check dam
549	PRAKASAM	ZARUGUMILLI	Yeduluru Padu	15.2237	79.8148	BG	Percolation Tank
550	PRAKASAM	ZARUGUMILLI	Yeduluru Padu	15.2127	79.8344	BG	Percolation Tank
551	PRAKASAM	ZARUGUMILLI	Zarugumilli	15.3246	79.9936	AL	Percolation Tank
552	PRAKASAM	ZARUGUMILLI	Zarugumilli	15.3436	79.983	AL	Percolation Tank

ANNEXURE-II

Exploratory Well details of deep wells (>100m.) in Prakasam district

Sr. No.	Location/Village	Mandal	Well Type	Total Depth (m)	Weathering Depth (m)	Geology	Deepest Fracture Depth (m)	Yield (lps)	Year
1	2	3	4	5	6	7	8	9	10
1	A.Kottapalli	C S Puram	EW	150	23.6	Schist	93.5	1.79	2005
2	Akiveedu	Racharla	EW	200	22	Schist	150.5	6.10	2018-21
3	Akiveedu	Racharla	OW	200	27	Schist	75.5	2.45	2018-21
4	Akkapalli	Santhanuthalapadu	EW	150	18.1	Shale	42		2005
5	Amanagudipadu	Yerragondapalem	EW	200	11.5	Schist	69.5	0.03	2018-21
6	Ankireddypalle	Racherla	EW	200	5.5	Schist	87.5	1.18	2018-21
7	Bestavaripeta	Bestavaripeta	PZ	100	10.5	Shale	0	0.00	2018-19
8	Bogulu	Ardhaveedu	EW	200	5.5	Schist	42.5	1.80	2018-21
9	Bollupalli	Ardhaveedu	EW	200	17.4	Schist	179.5	2.40	2018-21
10	Bollupalli	Ardhaveedu	OW	200	23.4	Schist	175.5	2.10	2018-21
11	Botla Palem	Darsi	PZ	100	9.3	Charnockite	16.5	0.95	2020-21
12	Boyalapalle	Yeragondapalem	PZ	100	6	Shale	71.3	0.45	2018-19
13	C.Donakonda	Ardhaveedu	EW	200	18.7	Schist	197.5	6.73	2018-21
14	C.Donakonda	Ardhaveedu	OW	200	18.7	Schist	91.5	2.55	2018-21
15	C.S.Puram	C S Puram	OW	150	16.3	Granite		0.00	2005
16	Chenchureddypalem	Pamuru	EW	150	15.5	Schist		0.24	2005
17	Chettireddypalle	Giddaluru	EW	200	29.5	Schist	90.5	1.18	2018-21
18	Chilkapadu	Santhanuthalapadu	PZ	100	5.5	Syenite	56	0.02	2019-20
19	Chimakurti	Chimakurti	PZ	100	11.7	Syenite	80	0.02	2019-20

20	Chinna Cumubum	Cumbum	EW	200	5.5	Schist			2018-21
21	Chinnarikatla	Konakanamitla	PZ	100	6	Schist			2020-21
22	Chintakunta	Markapur	EW	200	11.5	Schist	163.5	0.75	2018-21
23	Chintala Agraharam	Dornala	EW	116.5		Shale		0.97	2005
24	Chintalapalem	Cumbum	EW	150	17.4	Schist		2.00	2005
25	Chitlamitta	Pedaaraveedu	EW	200	5.5	Schist	40.59	0.08	2018-21
26	Choutapalli	Konakanamitla	PZ	100	6	Shale			2020-21
27	Darsi	Darsi	PZ	20	6.1	Granite gneiss	19	1.20	2009
28	Dhupadu	Tripurantakam	PZ	100	6.5	Shale	66.3	0.80	2018-19
29	Doddavaram	Chimakurty	EW	150	11.2	Charnockite	18.5	0.25	2005
30	East Gangavaram	Talluru	PZ	100	18	Charnockite	74.45	2.43	2020-21
31	G.Mekapadu	Kanigiri	EW	150	27.5	Gneiss	111	0.59	2005
32	Gajjela konda	Markapur	PZ	100	6	Shale	32.5	0.40	2018-2019
33	Giddaluru	Giddaluru	EW	150	18.1	Shale	50	0.40	2005
34	Gottipadia	Dornala	EW	100	6	Shale		0.73	2005
35	Gottipatipalli	Veligandla	EW	150	18.6	Schist	28	0.00	2005
36	Guduru Moravai Palle	Komarolu	EW	200	12.17	Phyllites	198	3.70	2018-21
37	Guduru Moravai Palle	Komarolu	OW	200	14.46	Phyllites	145	6.70	2018-21
38	Gundamcherla	Peddaraveedu	EW	200	5.5	Schist			2018-21
39	Gundlapalli	Maddipadu	EW	150		Charnokite	32	0.44	2005
40	Guntu Palle	P C Palli	PZ	100		Schist	25.65	0.43	2020-21
41	Gurrapusala	Yerragondapalem	EW	200	8.5	Schist	39.5	0.43	2018-21
42	Hasnabad (Dornala)	Pedda Dornala	EW	200	8.2	Schist			2018-21
43	Idupur	Markapur	EW	200	5.5	Schist	43.5	0.17	2018-21
44	Inamukkala	Dornala	EW	150	13.75	Shale		0.97	2005
45	J.P.Cheruvu	Racherla	EW	150	18.8	Shale	48	2.50	2005
46	Juvvigunta	Maripudi	PZ	100	5.5	Granite gneiss and schist	28.7	0.01	2019-20

47	Kakarla	Ardhaveedu	EW	200	24.4	Schist	116.5	0.65	2018-21
48	Kambhampadu	Peddaraveedu	EW	180	11.5	Schist	72.5	5.60	2018-21
49	Kambhampadu	Peddaraveedu	OW	200	11.5	Schist	72.5	4.42	2018-21
50	Kandlagunta	Naguluppalapadu	EW	150	14.7	Gneiss	33	1.80	2005
51	Katurivaripalem	Podili	PZ	100	5.5	Schist			2020-21
52	Kenujedu	Tangutur	PZ	100	14.5	Charnockite/Schist	86.65	0.43	2020-21
53	Kolabhimunipadu	Markapur	EW	200	5.5	Schist	180.5	2.50	2018-21
54	Kolabhimunipadu	Markapur	OW	200	5.5	Schist	17.5	0.15	2018-21
55	Kolukula	Yerragondapalem	EW	200	11.5	Schist	51.5		2018-21
56	Komati kunta	Markapur	PZ	100	3.3	Shale	0	0.00	2018-19
57	Kommunuru	Giddaluru	EW	200	8.5	Schist	174.5	4.20	2018-21
58	Kommunuru	Giddaluru	OW	200	8.5	Schist	81.5	1.18	2018-21
59	Kondepi	Kondepi	PZ	100	5.5	Syenite	0	0.00	2019-20
60	Kondivanipalle	Markapur	EW	200	11.5	Schist	163.5	0.75	2018-21
61	Kotlapalli	C S Puram	EW	150	17.41	Migmatite	17	0.00	2005
62	Kumbum	Cumbum	EW	150	18.6	Quartzite		0.98	2005
63	Kurichedu	Kurichedu	PZ	100	12	Quartz mica schist	50	0.01	2019-20
64	Laxmakka Palli	Tarlupadu	EW	200	12.5	Phyllites	147	1.80	2018-21
65	Laxmakka Palli	Tarlupadu	OW	200	12.18	Phyllites	166	3.30	2018-21
66	Maguturu	Ardhaveedu	EW	150	9.15	Quartizite	110	1.21	2005
67	Maguturu	Ardhaveedu	EW	200	2.85	Schist			2018-21
68	Malapatipalle	Markapur	EW	156.6	5.5	Schist			2018-21
69	Malepadu	Ponnaluru	PZ	100	5.5	Biotite schist and gneiss	95	0.00	2019-20
70	Marela	Mundlamuru	PZ	100	11.5	Charnockite	5	0.08	2020-21
71	Marrikuntapalli	Peddacherlapalli	EW	150	5.7	Gneiss	50.8	0.59	2005
72	Mocherla	Gudulur	EW	150	26.6	Schist	55	1.00	2005
73	Mohiddmpuram	Ardhaveedu	EW	150	16.1	Shale	106	0.98	2005
74	Mokshagundam	Bestavaripeta	EW	200	11.5	Schist			2018-21

75	Motimala	Kothapatnam	EW	174		Sandstone	17.5	0.00	2000
76	Motumala	Kothapatnam	EW	300	NA	Alluvium	36	0.00	2018-21
77	Mundlapadu	Giddaluru	PZ	100	8.5	Shale	0	0.00	2018-2019
78	Nadigadda	Yerragondapalem	EW	128.24	17	Shale	100	2.10	2005
79	Nandanavanam	Hanumanthinapadu	PZ	100	9.5	Quartz mica schist and quartzite	77.5	0.00	2018-19
80	Nandenamarela	Kanigiri	PZ	100	3.5	Slate and mica schist	37.85	0.01	2019-2020
81	Narasayapalem	Yerragondapalem	EW	200	5.5	Schist	92.5	1.18	2018-21
82	Narava	Giddaluru	EW	200	5.5	Schist	54.5	4.20	2018-21
83	Narava	Giddaluru	OW	200	13.5	Schist	57.5	2.45	2018-21
84	Nikrampalli	Markapur	EW	150	11.35	Shale	85	0.59	2005
85	Nimmamaheswarapuram	Kanigiri	EW	150	5.5	Gneiss	85	3.34	2005
86	P C Palli	P C Palli	PZ	100	2	Gabbro			2020-21
87	P Gogulapalle	C S Puram	PZ	100	5.5	Quartz mica schist and granite gneiss	77.5	0.00	2019-2020
88	P Rallapalle	Veligandla	PZ	100	6.5	Quartz mica schist and quartzite	34.8	0.00	2018-19
89	P Venkatapuram	Donakonda	PZ	100	5.5	Schist			2020-21
90	P.Gollavidipi			150	14.5	Shale		0.44	2005
91	Pachala Venkatapuram	Bestawaripeta	EW	200	6.3	Phyllites	186	0.21	2018-21
92	Pajerla	Gudulur	EW	150	46.5	Shale	43	0.44	2005
93	Pallamalli	Chimakurti	PZ	100	13.4	Granite Gneiss	47	9.86	2020-21
94	Palukurala Tanda			200	6.1	Granite gneiss	28	0.44	2009
95	Peda Obineni Palle	Bestawaripeta	EW	157.14	12.58	Phyllites	145	5.40	2018-21
96	Peda Obineni Palle	Bestawaripeta	ow	200	12.51	Phyllites	147	1.74	2018-21
97	Pedaaraveedu	Pedaaraveedu	EW	200	5.5	Schist	124.2	0.08	2018-21
98	Pedakandukur	Ardhaveedu	EW	150	9.9	Shale		0.37	2005

99	Peddabommalapurma	Dornala	EW	122	17.5	Schist	75.5	10.00	2018-21
100	Peddabommalapurma	Dornala	OW	200	16.6	Schist	97.5	4.42	2018-21
101	Peddacherlapalli	Peddacherlapalli	EW	150	10.5	Pegmatite	121.8	3.34	2005
102	Pullala Cheruvu	Pullala Cheruvu		100	11.65	Shale	0	0.00	2019-20
103	Pullalacheruvu Tanda	Pamuru	EW	150	8	Shale	105.4	0.75	2005
104	Pullaripalem	Pullaripalem	EW	110	NA	Alluvium	75	0.00	2018-21
105	Punugodu	Pullala Cheruvu	EW	150	11.2	Gabbro	132	0.22	2005
106	R L Puram	Chimakurty	PZ	100	5	Granite	80.5	2.43	2020-21
107	Racherla	Racherla	EW	145.5	18.18	Phyllites	140	11.70	2018-21
108	Racherla	Racherla	ow	200	12.18	Phyllites	185	4.30	2018-21
109	Rajupalem	Komarolu	PZ	100	3.9	Shale	45	0.40	2018-19
110	Ramavari Palli	Komarolu	EW	200	12.16	Phyllites			2018-21
111	Ravipadu	Cumbum	EW	200	5.5	Schist	131.2	0.22	2018-21
112	Sanikavaram	Pedda Aravedu	PZ	100	6	Shale	89.7		2018-19
113	Shetticherla	Bestavaripeta	EW	150	6.9	Shale	58	2.00	2005
114	Singara Palle	Bestavaripeta	PZ	100	11.5	Shale and quartzite	77.5	0.00	2018-19
115	Sitanagalavaram	Tarlupadu	EW	150	3.75	Shale	142	0.22	2005
116	Sompalli	Pedaaraveedu	EW	150		Shale	110	0.44	2005
117	Sunkerivarapalem			184	14.5	Granite gneiss	16.2	0.00	2008
118	Surepalli	Tarlupadu	EW	150	4.5	Shale	89	0.97	2005
119	Suryavaripalli (Bedusupalle)	Komarolu	EW	200	6.1	Phyllites	174	0.01	2018-21
120	Talluru	Talluru	EW	136	17.5	Gneiss		0.32	2005
121	Thimmaipalem	Markapur	PZ	100	3.1	Shale	0	0.00	2018-2019
122	Thimmareddypalle	H M Padu	PZ	100	10.1	Shale	25		2020-21
123	Thokapalle	Pedda Aravedu	PZ	100	5.3	Shale	65.5	0.77	2018-19
124	Thummala Cheruvu	Tarlupadu	PZ	100	2.9	Shale	2.5	0.40	2018-19
125	Umamaheswarapuram	Mundlamuru	PZ	100	12.5	Granite Gneiss	31.75	0.43	2020-21

126	Uppalapadu	Podili	PZ	100	16	Granite Gneiss	53.1	0.08	2020-21
127	Uyyalavada	Giddaluru	PZ	100	5.5	Shale	0	0.00	2018-19
128	V.Bayalu	C S Puram	EW	150	18.3	Chlorite	26	1.00	2005
129	Valaparla	Dornala	EW	150	22.2	Granite	51	1.20	2005
130	Veerabhadrapuram	Yeragodapalem	PZ	100	12.6	Shale	40.9	0.45	2018-19
131	Velagalapaya	Ardhaveedu	EW	200	12.85	Schist	133.5	0.43	2018-21
132	Venkatareddypalli	Yerragondapalem	EW	150	16	Shale	61	1.20	2005
133	Virasalagudem	Konakanamitla	EW	136.6	17.4	Schist	27	2.50	2005
134	Y.Cherlopalle	Dornala	EW	200	28.4	Schist	85.5	4.50	2018-21
135	Y.Cherlopalle	Dornala	OW	200	23	Schist	87.5	2.25	2018-21
136	Y.Palem	Yerragondapalem	EW	135.9		Shale	109.2	0.18	2005
137	Yerrabalem	Cumbum	EW	133.4	5	Schist	80.5	7.00	2018-21
138	Yerrabalem	Cumbum	OW	116	20.5	Schist	110.5	18.55	2018-21
139	Yerragondapalem	Yerragondapalem	EW	200	5.5	Schist	44.5	2.50	2018-21
140	Yerragondapalem	Yerragondapalem	OW	200	5.5	Schist	63.5	0.22	2018-21
141	Yerrajarla	Tangutur	EW	150	11.8	Gneiss	33	2.10	2005

ANNEXURE-III

Mandal wise area, rainfall recharge and recharge due to different sources (GWRA-2022)

S.No.	Mandal	Total area of assesment unit (Ha)	Recharge worthy area (Ha)	Recharge from Rainfall-MON	Recharge from Other Sources-MON	Recharge from Rainfall-NM	Recharge from Other Sources-NM	Total Annual Ground Water (Ham) Recharge
1	ARDHAVEEDU	56519	29919	1459	560	0	311	2330
2	BESTAVARIPETA	43439	27833	1039	1104	20	561	2724
3	CHADRASEKARAPURAM	53274	32918	2458	512	7	348	3325
4	CHIMAKURTHI	28163	24863	1941	717	24	407	3090
5	CUMBUM	17269	16439	687	291	17	256	1251
6	DARSI	37265	36230	1823	834	73	603	3333
7	DONAKONDA	39068	36480	1579	593	23	278	2473
8	DORNALA	95032	41258	1769	503	6	297	2576
9	GIDDALURU	86342	48682	1562	545	0	438	2545
10	HANUMANTHUNIPADU	34618	32472	1891	479	42	337	2749
11	KANIGIRI	51333	49205	3715	637	122	508	4982
12	KOMAROLU	39426	22926	823	507	0	303	1633
13	KONAKANAMITLA	48820	45715	2762	445	105	340	3652
14	KONDAPI	21230	21230	1817	357	3	272	2449
15	KOTHAPATNAM	16475	16475	2733	162	29	240	3165
16	KURICHEDU	29428	26444	1040	486	43	316	1885
17	MADDIPADU	16839	16839	1507	175	0	373	2054
18	MARKAPUR	34759	27253	1020	882	17	379	2298
19	MARRIPUDI	40221	37976	2871	1108	109	529	4618
20	MUNDLAMURU	33442	33292	1998	378	46	301	2723
21	NAGULUPPALAPADU	25298	25298	2561	166	26	140	2894
22	ONGOLE	20187	19314	1160	121	4	74	1358
23	PAMUR	41800	40201	2642	521	0	334	3497
24	PEDAARAVEEDU	37907	24987	991	365	16	323	1694
25	PEDACHERLOPALLE	35478	32183	1742	404	81	299	2526
26	PODILI	29885	29315	2052	773	62	463	3350
27	PONNALURU	29023	29023	2286	474	0	278	3038
28	PULLALACHERUVU	64565	45103	1484	588	57	320	2449
29	RACHERLA	32024	23174	730	530	0	312	1572
30	SANTHANUTHLAPADU	21211	21211	1375	483	20	391	2270
31	SINGARAYAKONDA	11091	11091	1954	72	0	35	2061
32	TANGUTUR	20429	20299	1706	113	0	61	1880
33	TARLAPADU	34794	24739	1034	330	16	272	1652
34	THALLUR	20977	20697	1404	695	23	424	2546

35	TRIPURANTHAKAM	26389	25389	951	528	3	316	1798
36	VELIGANDLA	31712	31182	2176	1019	34	643	3872
37	YERRAGONDAPALEM	107942	72088	2749	600	75	345	3770
38	ZARUGUMILLI	18447	18447	1916	120	0	113	2149
Total		**1432121**	**1138190**	**67408**	**19178**	**1105**	**12539**	**100230**

ANNEXURE-IV

Mandal wise GW Extraction and Ground Water categorization (GWRA-2022)

S.No.	Mandal	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Irrigation Use (Ham)	Industrial Use (Ham)	Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)	Categorization (OE/Critical/Semicritical/Safe)
1	ARDHAVEEDU	117	2214	1272	0	96	1367	105	837	62	safe
2	BESTAVARIPETA	136	2587	699	0	87	786	95	1831	30	safe
3	CHADRASEKARAPURAM	166	3159	675	0	108	783	119	2364	25	safe
4	CHIMAKURTHI	155	2935	511	233	155	898	170	2022	31	safe
5	CUMBUM	63	1188	686	0	111	796	122	561	67	safe
6	DARSI	167	3167	614	0	179	793	198	2394	25	safe
7	DONAKONDA	124	2349	333	0	116	448	127	1889	19	safe
8	DORNALA	129	2447	1138	0	102	1241	113	1484	51	safe
9	GIDDALURU	127	2418	1906	0	125	2031	137	904	84	semi_critical
10	HANUMANTHUNIPADU	137	2612	418	0	82	501	90	2103	19	safe
11	KANIGIRI	249	4733	1013	0	245	1258	270	3451	27	safe
12	KOMAROLU	82	1551	707	0	92	799	101	788	51	safe
13	KONAKANAMITLA	183	3469	560	0	131	691	144	2766	20	safe
14	KONDAPI	123	2327	238	0	114	352	125	1964	15	safe
15	KOTHAPATNAM	158	3007	155	8	81	245	94	2754	8	safe
16	KURICHEDU	94	1790	92	0	93	185	102	1596	10	safe
17	MADDIPADU	103	1951	229	66	100	395	114	1547	20	safe
18	MARKAPUR	115	2183	1554	0	138	1692	151	764	77	semi_critical
19	MARRIPUDI	231	4387	701	22	79	803	87	3576	18	safe

20	MUNDLAMURU	136	2587	242	3	113	358	124	2218	14	safe
21	NAGULUPPALAPADU	145	2749	81	0	151	232	184	2502	8	safe
22	ONGOLE	68	1290	56	0	3	59	58	1231	5	safe
23	PAMUR	175	3322	943	0	167	1110	184	2195	33	safe
24	PEDAARAVEEDU	85	1609	1956	0	112	2068	123	205	128	over_exploited
25	PEDACHERLOPALLE	126	2399	719	0	98	817	108	1573	34	safe
26	PODILI	167	3182	837	0	137	974	151	2194	31	safe
27	PONNALURU	152	2886	286	0	114	400	126	2475	14	safe
28	PULLALACHERUVU	122	2327	1864	0	135	1999	149	929	86	semi_critical
29	RACHERLA	79	1493	1315	0	70	1385	77	363	93	critical
30	SANTHANUTHLAPADU	114	2156	662	112	103	877	129	1265	41	safe
31	SINGARAYAKONDA	103	1958	66	33	161	261	178	1682	13	safe
32	TANGUTUR	94	1786	5	33	120	158	158	1616	9	safe
33	TARLAPADU	83	1570	672	0	80	752	88	837	48	safe
34	THALLUR	127	2419	952	0	96	1048	106	1361	43	safe
35	TRIPURANTHAKAM	90	1708	356	0	129	485	142	1210	28	safe
36	VELIGANDLA	194	3678	353	0	71	424	79	3247	12	safe
37	YERRAGONDAPALEM	189	3581	837	0	168	1005	185	2744	28	safe
38	ZARUGUMILLI	107	2042	235	0	115	351	127	1680	17	safe
Total		**5012**	**95218**	**25936**	**509**	**4377**	**30823**	**4941**	**67121**		