केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण

विभाग, जल शक्ति मंत्रालय

भारत सरकार

Central Ground Water Board

Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti

Government of India

AQUIFER MAPPING AND MANAGEMENT OF GROUND WATER RESOURCES

YSR KADAPA DISTRICT, ANDHRA PRADESH

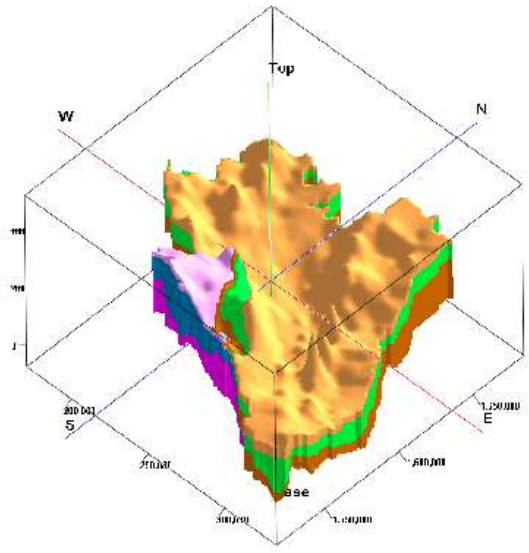
दक्षिणी क्षेत्र, हैदराबाद

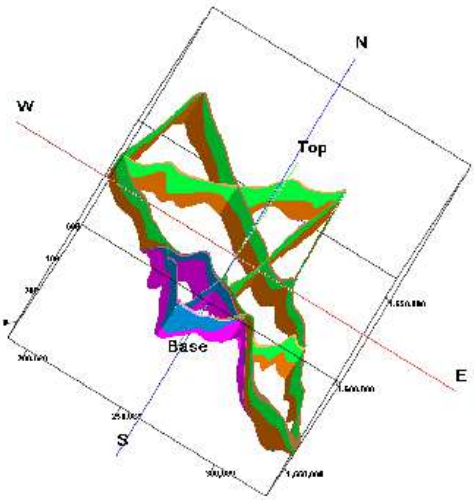
Southern Region, Hyderabad

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन नदी विकास एवम् गंगा संरक्षण विभाग
केंद्रीय भूमि जल बोर्ड

GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RD & GR
CENTRAL GROUND WATER BOARD

REPORT ON
AQUIFER MAPPING FOR SUSTAINABLE MANAGEMENT OF GROUND WATER RESOURCES IN YSR KADAPA DISTRICT, ANDHRA PRADESH





CENTRAL GROUND WATER BOARD
SOUTHERN REGION
HYDERABAD
NOVEMBER-2019

REPORT ON
AQUIFER MAPPING FOR SUSTAINABLE MANAGEMENT OF GROUND WATER RESOURCES IN HARD ROCK AREAS OF YSR KADAPA DISTRICT, ANDHRA PRADESH

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REPORT ON
AQUIFER MAPPING FOR SUSTAINABLE MANAGEMENT OF GROUND WATER RESOURCES IN YSR KADAPA DISTRICT, ANDHRA PRADESH

AT A GLANCE

S.No.	Item		Particulars
1	Districts	:	YSR Kadapa
2	Revenue Mandals (No.)	:	51
3	Villages	:	983 Nos
4	Geographical area	:	15359 km^2
5	Mappable area	:	15359 km^2
5	Population (2011 Census)	:	28.82 lakh
6	Density of population (2011 Census)	:	188 persons/km^2.
7	Location	:	North latitude 13°43´-15°14´ East longitude 77°55-79°29"
8	Rainfall (Normal)	:	~502-927 mm (avg: 700 mm) (SW: 56 % & NE: 36 %)
9	Geomorphology	:	Pediplain (40 %), Structural hills (35%), Pediments (8%), Flood plains (6%).
10	Major Rivers	:	Pennar & its tributaries
11	Land Utilization (Ha) (2018-19)	:	Double cropped area occupies ~19% of the total geographical area, Forest: ~33%, barren and uncultivable 14 % and land put to non-agricultural use is 12%. of the area .
12	Soils	:	Sandy loams soils (53 %) and Clayey soils (47%)
13	Cropping Pattern (2017-18) (Gross cropped Area:304048Ha)	:	Cotton-19%, Paddy -24 % (Khariff), 13% (Rabi), Pulses -9 % (Khariff), 55% (Rabi), Millets 21% (Rabi).
14	Irrigation	:	**Major project:** Kurnool-Kadapa canal (Registered ayacut:92001 acres, Tunghabhadra Project High level canal (Registered ayacut:75000acres), Pulivendula Branch Canal (Registered ayacut:55239 acres). Telugu Ganga Project (1,86,832 acres) GNSS (1,55,000 acres) **Medium Projects**: Lower and Upper sagileru Project (ayacut: 19303 acres), Pincha project (ayacut: 3776 acres), Buggavagu (ayacut: 9700 acres), Annamayya Project (ayacut: 22500 acres).
15	Prevailing Water	:	PT: 901 and CD: 4716

	Conservation/Recharge Practices		Micro irrigation: 169940 Ha.
16	Geology	:	Shales: 51 %, Quartzite: 23%, Limestone: 10%, Granites :15%.
17	Hydrogeological data points	:	381 hydrogeological data points (Exploration CGWB: 192), VES: 158 (CGWB), 31 well inventory.
19	Ground water yield (lps)	:	0.1 to 6 lps (Avg:1 lps) <0.1 to 6 lps (avg: 1.2 lps) in Granites and <0.1 to 10 lps (avg: 1.5 lps) in Metasediments. Low yield (<1 lps):54 % of area, Moderate yield (1-3 lps):28% of area and high yield (>3 lps): 18% of area. Deepest Fracture : 196.5 m at Eguvakopparajupalle in Rajampet mandal
20	Water Levels (Avg of 10 yrs) Depth to water levels (m bgl)	: :	179 wells (CGWB:39, SGWD:140) Water table elevations during pre-monsoon season vary from 75.45-547 m amsl and during post-monsoon season vary from 50.8-533.2 m amsl. Pre-monsoon season: 4 to 47.2 m bgl (average: 14.41 m bgl) and majority are in the range of 10- 20 m bgl (49 % area) followed by 20-40 mbgl (28% area). Deep water levels (> 40 mbgl) occupy 0.3% of area. Post-monsoon: 1.4 to 33.34 m bgl (average: 10.4) and majority are in the range of 10-20 m bgl (44% area) followed by 5-10 mbgl (31 % area) , shallow water levels < 5 mbgl (14 % area) and Deep water levels (20-40 m.bgl) occupy 11% of area.
21	Water Level Fluctuations (May vs. November)	:	-8 to 29.83 m.bgl. Average rise of 4.1 m.
22	Long term water level trends (2009-18) (64 wells)	:	**Pre-monsoon:** Falling trends: 40 wells (0 m/yr to -3.3 m/yr) Rising trends: 18 wells shows 0 to 3.7 m/yr. **Post-monsoon:** Falling trends: 39 wells (0 m/yr to -3.8 m/yr) Rising trends: 25 wells shows 0 to 3.6 m/yr.
23	Geophysical data (down to 200 m)	:	158 VES Weathered granite/Gneiss <100Ω m, Semi-weathered granite/Gneiss 60-350 Ω m, Fractured granite/Gneiss >350 Ω m. and < 150 ohm (Ω) m for the weathered Metasediments, 50-300 Ω m for underlying fractured Metasediments and > 300 Ω m for massive Metasediments.
24	Hydrochemistry	:	Total 503 data Pre-monsoon (CGWB:27 nos, SGWD:122 and RWS:86) Post-monsoon (SGWD:189 and RWS:79)
25	Electrical Conductivity (µ Siemens/cm)	:	Pre-monsoon: 88-8300 µ Siemens/cm (avg:1306) in 81 % of the area EC is within 1500 µ Siemens/cm. Post-monsoon: 268- 7150 µ Siemens/cm (avg:1457) in 70 % of

			the area EC is within 1500 µ Siemens/cm.	
25.1	Fluoride mg/l	:	Pre-monsoon: 0.02- 3.2 mg/L, 15% of samples are unfit for human consumptions. Post-monsoon: 0.1- 4.63 mg/L, 8 % of area are unfit for human consumptions.	
25.2	Conceptualization		Weathered zone (~25 m), Fractured zone (25-196 m)	
26	Aquifer Characterization	:	Weathered zone (~25 m). 10-20 m weathering occurs in 66% followed by < 10 m in 21% of area and deep weathering occurs in 13 % of area.	Fractured zone(25-196m.) Majority of fractures ~78% occurs within 100 m depth.
27	Aquifer wise Ground water yield	:	<0.1 to 1 lps. Avg:0.8 lps.	<0.1 to 6 lps. Avg: 0.75 lps. In Granites and <0.1 to 7 lps. Avg: 1 lps in Metasediments.
27.1	Transmissivity (m^2/day)	:	1- 14 m^2/day in Granites, upto 53 m^2/day in metasediments.	1- 910 m^2/day, in majority of wells it is < 30 m^2/day.
27.2	Specific Yield	:	< 1 to 2 %	-
27.3	Storativity	:	-	0.00001 to 0.0001
28	Ground water Resources (2017) MCM	:		
28.1	Net Dynamic groundwater availability	:	1162.87 MCM	
28.2	Gross GW Draft	:	798.62 MCM	
28.3	Provision for Domestic &Industrial (2025)	:	61.10 MCM	
28.4	Average Stage of Ground water development (%)		69%	
28.5	Net GW Availability for future irrigation	:	378.4 MCM	
28.6	In storage GW Resources	:	434 MCM	
28.7	Categorization of mandals		Mandal wise it varies from 7 % to 165% (OE:09, C:4, SC: 16 and Safe:22)	
29	Major Ground Water Issues Identified	:	• 9 mandals are categorized as over-exploited. • Ground water Pollution High fluoride concentration (>1.5 mg/L) occur in 15% of the samples High concentration of EC (> 3000 micro-seimens/cm) in 5 % of the area. • Deep water levels (> 20 m bgl) are observed during pre and post-monsoon season in 30 % and 45% of area. • Declining water levels: Out of 64 wells analyzed, 40 wells shown falling trend in pre-monsoon and 39 during post-monsoon season.	

			• Low Sustainability: Low yield (<1 lps) occurs in ~53 % of area and reduction in yield over a period of time. • Change in land use from agricultural land to residential purposes.
30	Management Strategies	:	**Supply side measures** **Ongoing Projects** **Repair, Renovation and Restoration of existing tanks:** ~10.75 MCM of silt is removed from 1651 tanks contributing to ~ 2.5 MCM to groundwater and with this additional ~416 ha land can be brought under irrigated dry (ID) crops under tank ayacut. **To be taken up (Artificial Recharge Structure)** **Priority-1:Over-exploited villages: 148(~2631 km^2)** • 68 ARS (CD with recharge shafts: 24 and PT:44) • Cost Rs ~9.5Crores **Priority-2:Other remaining villages:860 (~12771 km^2)** • 788 ARS (CD with recharge shafts:344 and PT:444) • Cost Rs ~107.8 Crores. **Water Conservation measures (WCM) Farm Ponds** • The size of form ponds can be 10 x 10 x 3 m. Total 17940 farm ponds are recommended (20 in each village in 897 villages) with total cost of **44.85** crores. • **Demand side measure** **Ongoing work:** In the area till date a total ~169940 ha area is brought under micro-irrigation saving ~339 MCM of groundwater. • **Proposed micro Irrigation:** ~47850 ha of additional land that can be brought under micro-irrigation **Cost: 339** crores. With this ~95 MCM of ground water can be conserved over the traditional irrigation practices. **Other Recommendations** • Declaration of Minimum Support Price in advance (before start of season) and improved facilities at procurement centres. • As a mandatory measure, every groundwater user should recharge rainwater through artificial recharge structures in proportionate to the extraction on OE blocks. • Capacity building in power supply regulation (4 hour each in morning and evening) will increase the sustainability of wells • A participatory groundwater management (PGWM)

			approach in sharing of groundwater and monitoring resources on a constant basis along with effective implementation of the existing 'Water, Land and Trees Act' of 2002 (WALTA-2002). • Laser levelling of irrigated land. • Subsidy/incentives on cost involved in sharing of groundwater may be given to the concerned farmers. In urban and rural areas the sewerage line should be constructed to arrest leaching of nitrate
31	Expected Results and Out come	:	With the above interventions costing Rs **501** crores, the likely benefit would be net saving of **122** MCM of ground water or net reduction of 7% in stage of groundwater,i.e., from 69 % to 62 % One time cost will be ~4 paisa/litre (Rs 40 /m^3 of ground water).

ABBREVATIONS

2D	:	2 Dimensional
3D	:	3 Dimensional
ARS	:	Artificial Recharge Structures
Avg	:	Average
BDL	:	Below Detection Level
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	:	Hectare
Ha.m	:	Hectare meter
ID	:	Irrigated dry
IMD	:	India Meteorological Department
Km^2	:	square kilometre
LPS	:	Litres per second
M	:	meter
M^3	:	Cubic meter
m bgl	:	Metres below ground level
MCM	:	Million cubic meter

Mg/l	:	Milligram per litre
MI	:	Micro irrigation
Min	:	Minimum
max	:	Maximum
MPT	:	Mini percolation tank
MSP	:	Minimum Support price
NL	:	North Latitude
NO_3	:	Nitrate
OE	:	Over Exploited
PGWM	:	Participatory ground water management
PT	:	Percolation tank
SGWD	:	State Ground Water Department
S	:	Storativity
Sy	:	Specific Yield
T	:	Transmissivity
WCM	:	Water conservation measures

EXECUTIVE SUMMARY

YSR Kadapa district covering an area of 15,379 km^2, receives an average annual normal rainfall of 700 mm of which SW monsoon 56 % and north-east monsoon contributes 36 %. During the year 2019, the district received 678 mm, 3% less of normal rainfall.

Administratively, the area is governed by 51 revenue mandals with 983 villages. The population of the district is ~ 28.82 lakhs (2011 census) with average density of 188 persons/km^2.

The area is underlain by Shales (51%), Quartzites (23%), limestone (10%) and Granites(15%). Pediplain is the major geomorphic feature (40% of area), followed by structural hills (35%), pediments (8%),flood plain (6%), Denudational hills, Structural valleys and channel fill, etc. Most of the area is drained by river Pennar and its tributaries and are divided into 79 watersheds. The gross cropped area during 2018-19 is 304078 ha. Forest occupies 33% of the total geographical area, waste lands and current fallow land occupies 14% of area. Main crops grown are Paddy (Khariff : 24%, Rabi: 13%), Cotton (19%), Pulses (Khariff :9%, Rabi: 55%), Fruits (Khariff:46%) and Millets (Rabi :21%).The soils are loamy soils (53%) and clayey soils (47%).

The major irrigation projects completed in Kadapa district are Kurnool-kadapa canal, Tunghabhadra Project High level canal and Pulivendula Branch Canal. The medium irrigation projects completed in the district are Lower and Upper sagileru Project, Pincha project , Buggavagu Project with 9,700 acre ayacut and Annamayya Project. During the year 2018-19, 19471 ha area was irrigated from surface water and 139940 Ha irrigated by Ground water. Ground water contributes 87 % of irrigation and surface water 13%. In the district there are total of 1776 minor irrigation tank and 76,706 irrigation wells exist.

Exploratory results of CGWB (192 no.) wells are analysed of which 171 wells are drilled in metasediment area and 21 wells in Granitic area. These comprise 16 wells of shallow depth (30 m), 23 nos (30-60 m), 63 nos (60-100 m), 22 nos (100-150 m), 68 nos (150-200 m)

depth**.** There are 82,359 agricultural wells (Irrigation: 76706 wells (DW: 17836 and BW:58870) and domestic: 5653 wells (BW: 5443 and DW: 210).

Ground water yield varies from <0.1 to 6 lps in Granite/Gneisses and <0.1 to 10 lps in metasediments. Majority of fractures occur within 100 m depth and deepest fracture is encountered at 196.5 m.bgl at Eguvakopparajpalle, Rajampeta mandal. Water levels are monitored through 179 Piezometer (CGWB:39 and SGWD: 140) wells during pre and post-monsoon seasons of 10 years (2010 to 2019). The average DTWL varies from 4 to 47.2 m bgl (average: 14.41) and 1.4 to 33.34 m bgl (average: 10.43) during pre and post-monsoon season respectively. During pre-monsoon season 10-20 m water level range is more predominant (49% of area) followed by 20-40 m (28 % of area), and > 40 m.bgl (0.3% of area). During post-monsoon season 10-20 m water level is more predominant (44 % of area), followed by 5-10 m (31% of area) and < 5 m (14% of area). Water level fluctuation (May Vs Nov) data indicate that 89% of the wells show rise in water level while 11% of wells show fall in water level. The water level fluctuations vary from -8 to 29.83 m with average rise of 4.1 m. The Long-term water level trend analysis for 10 years (2009-2018) is analysed and it is observed that during pre-monsoon season 40 wells shows falling trend (0 m/yr to -3.3 m/yr) and 18 wells shows rising trend (0 to 3.7 m/yr). During post-monsoon season 39 wells show falling trend (0 m/yr to -3.8 m/yr) and 25 wells shows rising trends (0 to 3.6 m/yr).

Geophysical data from 158 VES data (CGWB) reveals resistivity < 100 Ohm (Ω) m for the weathered granite (1-30 m) , 60-350 Ω m for underlying fractured granite and > 350 Ω m for massive granite. Resistivity < 150 ohm (Ω) m for the weathered Meta-sediments (1-20 m), 50-300 Ω m for underlying fractured Meta-sediments (70-100m) and > 300 Ω m for massive Metasediments.

Total 503 ground water samples (Pre-monsoon:235 and Post-monsoon:268) were analysed for knowing the suitability of ground water for drinking purposes. In 81% and 70% of the areas EC is in the range of < 1500 µ Siemens/cm during pre and post-monsoon seasons respectively. During pre-monsoon season, nitrate concentration in 2% of samples is beyond permissible limits of BIS (45 mg/l) and F concentration varies from 0.02 to 3.2 mg/l and found 85% of the samples within permissible limits of BIS (< 1.5 mg/l). During post-monsoon season, Nitrate concentration in all samples is within the permissible limits of 45 mg/L. The F concentration varies from 0.1 to 4.63 mg/l and in 8% of samples is beyond maximum permissible limit of BIS.

Based on 381 hydrogeological data points, aquifers from the area can be conceptualized in to 2 no.s namely 1) weathered zone (~25 m) and 2) fractured zone (25- 196 m). Weathered zone has gone dry in most of the area due to over-exploitation during pre-monsoon season. Weathered zone in the range of < 10 m occurs in 21 % of area, 10-20 m in 66 % of area, and deep weathering (> 20 m) in 13 % of area. Ground water yield of this zone varies from <0.1 to 1 lps (avg: 0.8 lps) in granites and from 0.01 to 4 lps (avg: 1.0 lps) in metasediments. Transmissivity varies from 1 to 14 m^2/day in Granites and upto 53 m^2/day in weathered metasediment aquifer. Fracturing zone varies from 25 to 196 (deepest fracture at Eguvakopparajpalle, Rajampeta mandal mandal). In 78% of the area fractures occur within < 100 m depth. It is observed that 100-150 m fractures occur in 18% while > 150 m fractures occur in 4% of area. Ground water yield varies from 0.01 to 6 lps (avg: 0.75 lps) and meta sediments vary from 0.01 to 7 lps (avg: 1 lps) . . The transmissivity varies from 1-910 m^2/day.

Net dynamic replenishable ground water availability as on 2017 is 1162 MCM, gross ground water draft is 798 MCM, provision for drinking and industrial use for the year 2025 is 61 MCM and net available balance for future irrigation use is 378.4 MCM. The stage of ground water development is 69 %. The in-storage ground water resource estimated for YSR Kadapa is 434 MCM.

Major issues identified are over-exploitation (9 mandals) , high fluoride concentration (>1.5 mg/L) occur in 15% & 8% of the samples during pre and post monsoon seasons , high concentration of EC (> 3000 micro-seimens/cm) in 3% & 5% of the area during pre and post monsoon seasons, deep water levels (> 20 m bgl) in 30% and 45% of the area during pre and post monsoon seasons and low yield in 53 % of the area. Other issues identified are water marketing, change in cropping pattern etc.

The management strategies mainly include both supply side and demand side. The supply side measure includes ongoing work under state Govt. sponsored NEERU-CHETTU programme where ~10.75 MCM of silt has been removed from existing 1651 tanks. This will contribute ~2.5 MCM of ground water by recharge, with this additional ~416 ha land can be brought under irrigated dry (ID) crops in tank ayacut. Construction of 68 ARS with ~9.5 crores in **priority-1** area (over-exploited 148 villages) and constructions of 788 ARS with ~107.8 crores in **priority-2** area (860 villages) are recommended as supply side measures.

Under Water conservation measures, constructions of 17940 nos of farm ponds are proposed with a cost of 44.85 crores in all villages.

Demand side measure includes bringing ~47850 ha of additional land (@50 ha/village in 957 villages) under micro-irrigation with total cost of **339** crores. With this 95 MCM of ground water will be saved in both seasons by utilizing same units.

A total number of 169940 no's drip and sprinklers are sanctioned which has irrigated ~169940 ha of land saving ~255 MCM of groundwater from the district considering 30% of net savings as compared to traditional practice of flood irrigation.

Other measure includes a participatory groundwater management (PGWM) approach in sharing of groundwater and monitoring resources on a constant basis along with effective implementation of the existing 'Water, Land and Trees Act' of 2002 (WALTA-2002). Subsidy/incentives on cost involved in sharing of groundwater may be given to the concerned farmers. In urban and rural areas the sewerage line should be constructed to arrest leaching of nitrate.

With the above interventions costing Rs 501 crores, the likely benefit would be the net saving of 122.1 MCM of ground water. This will bring down the stage of ground water development by 7 % (from 69 % to 62 %).

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

S. No.	Data	Aquifer	Total Data Points	Source		
				CGWB	SGWD	Well Inventory
1	Hydrogeological maps & Panel Diagram (3-D)	Combine	381	Expl:192 VES:158	-	31
2	Depth to Water Level Maps	Combine	179	39	140	-
3	Water Level Fluctuation	Combine	179	39	140	-
4	Long term water level trends	Combine	64	28	36	0
5	Water quality Pre-monsoon Post-monsoon	Combine	503 Pre:235 Post:268	22 0	SGWD:122 RWS : 86 SGWD:189 RWS : 79	0 0

1. INTRODUCTION

Aquifer mapping is a multideciplinary and a holistic scientific approach wherein a combination of geologic, geophysical, hydrologic and chemical analysis 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 rocks 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 to meet climate change also. Thus the crux of National Aquifer Mapping (NAQUIM) is not merely mapping, but reaching the goal-that of ground water management through community participation.

Hard rocks (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 purposes. 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 summerised 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 YSR Kadapa district having geographical area of 15,359 km^2, lies between north latitude 13°43′-15°14′ and east longitude 77°55′-79°29′ located in the south-east of Andhra Pradesh. The District is bounded on north by Kurnool District, on the south by Chittoor District, on the west by Anantapur District. It is part of the River Pennar basin (**Fig.1.1**).Administratively the district is governed by 51 revenue mandals with 791 Panchayats and 983 villages and 4954 habitations with a population of ~28.82 lakhs (2011 census). The density of population in the district is 188 per Sq.km.

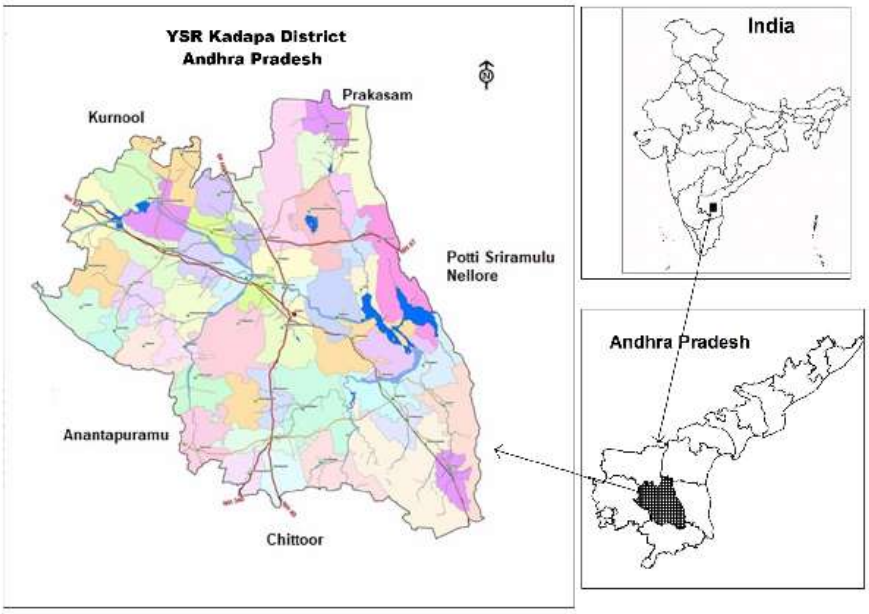


Fig.1.1: Location map of YSR Kadapa district.

1.4 Climate and Rainfall: The climate of the district is characterised by tropical wet and dry climate, characterized by year round high temperatures. Kadapa gets rainfall from both the South west monsoon as well as the North East Monsoon. June to October is usually the monsoon period. The normal mean daily minimum and maximum temperature of 34°C and 40°C during May and 25°C and 35°C during December. Normal annual rainfall varies between 502 mm (Vemula) to 927 mm (Kodur) with average of 710 mm (**Fig. 1.2**). ~ SW monsoon contributes 56% and 36% is contributed by retreating monsoon (NE) season and rest by winter and summer rainfall. Rainfall increses from west to east. As per the IMD rainfall data, during the year 2019, it received average rainfall of 678 mm (3% less of normal rainfall).

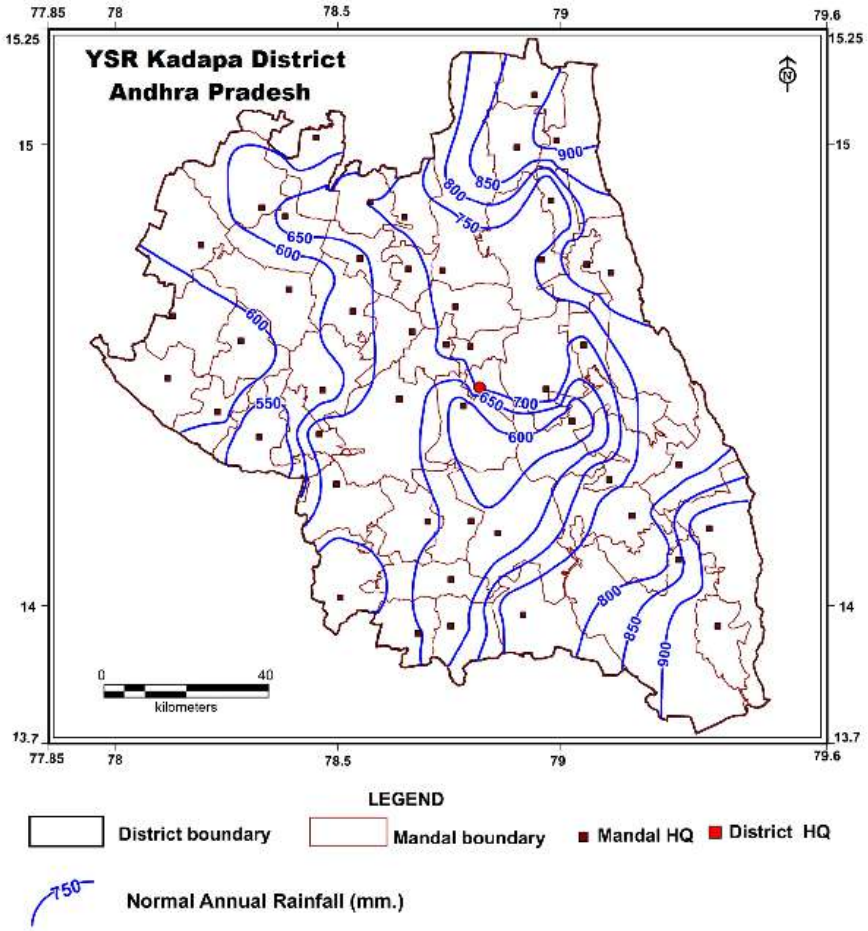


Fig.1.2: Isohyetal map of YSR Kadapa district.

1.5 Geomorphological Set up:

The district exibits rolling topography with high and deep fronted hill ranges, valleys and plains. High hill ranges with intervening valleys are generally found in the eastern part of the district. Northern part of the district is occupied by thickly forested medium hill ranges.

Southern part of the district is occupied by plateau. The major slope of the district is towards east but in the southern part it slopes towards north, in the northern part towards south and in the western part towards southeast.

Pediplain is the major landform covering about 6109 km^2 (40%) area. The other landforms observed are Structural hills (35%), Pediments (8%), flood plain (06%), Denudational hills, Structural valleys, channel fill, etc. (**Fig.1.3**).

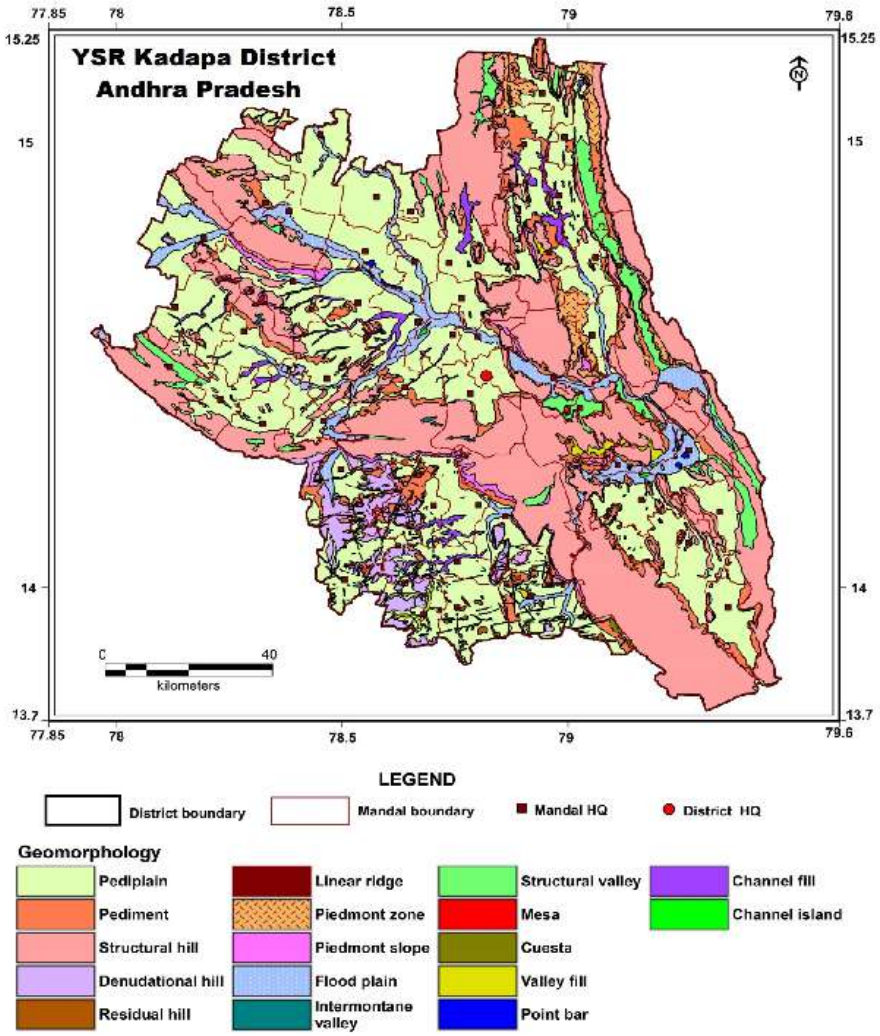


Fig.1.3: Geomorphology map of YSR Kadapa district.

1.6 Drainage and Structures: Pennar river is major stream flowing in NW-SE direction. The major tributaries of this river are Chitravathi, Cheyyair, Kundair and Sagileru.The southern granitic terrain is drained by Mandavi river, a tributary of Cheyyeru. The drainage pattern is dendritic to sub-dendritic and parallel.The drainage is also regularly parallel to sub parallel demonstrating basic control.The Cuddapah basin is a major synformal structure with minor antiforms and synforms.

Many lineaments trend NE-SW and are sub-parallel to the trends of geological formations, other lineaments run either in a ENE-WSW or E-W direction. Map depicting drainage, water bodies, lineaments and watershed boundaries is presented in Fig.1.4.

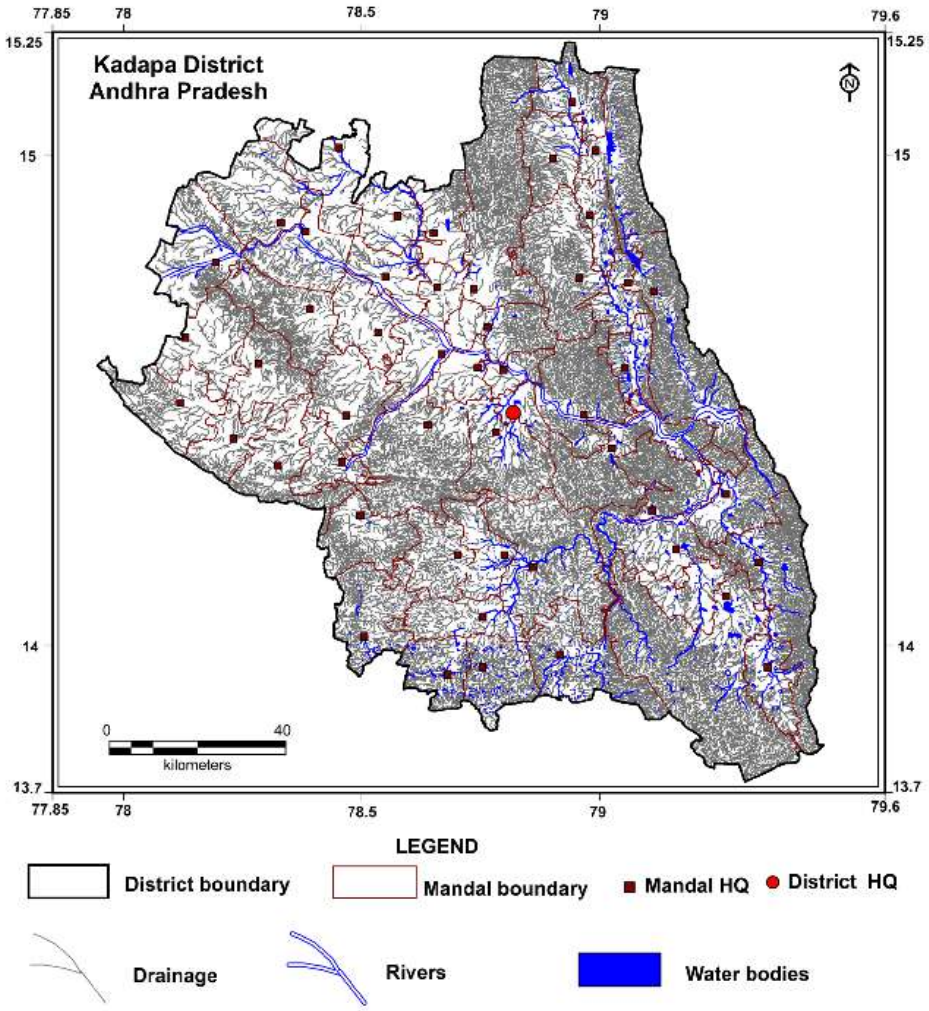


Fig.1.4: Drainage map

1.7 Land use and cropping pattern (2018-19): In the area, Forest occupies ~33% of the total geographical area, Barren and uncultivable land 14%, land put to non-agricultural use is 12%. Nearly 6.1 lakh hectares are under cultivation, 19 % (2.9 lakh hectares) area is under double cropping. (**Fig.1.5**).

Net area Sown 304078 ha, Area sown more than once 24543 ha, Total cropped area is 279535 ha. Main crops grown are Paddy 30717 ha (24%) followed by Cotton 24449 ha (19%) , Pulses 11382 ha (9%) and Fruits in 58588 ha (46%) during khariff and Pulses 103256 ha (55%), Millets 39319 ha (21%) and Paddy 24262 ha (13%) during rabi season

respectively.Vegetables are grown in 7411 ha(6%) during Khariff and 8166 ha (4%) during rabi. Season wise cropping pattern is given in **Fig.1.6a** and **Fig.1.6b.**

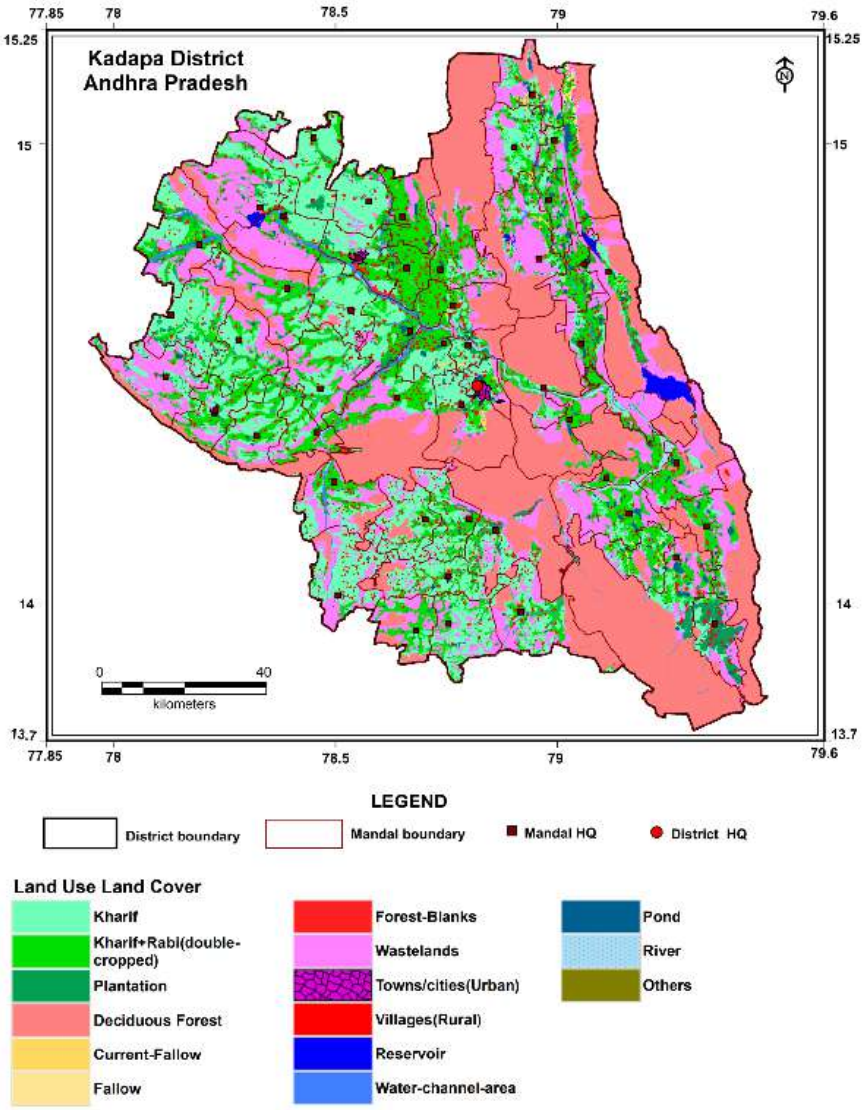


Fig.1.5: Land use and land cover of YSR Kadapa district.

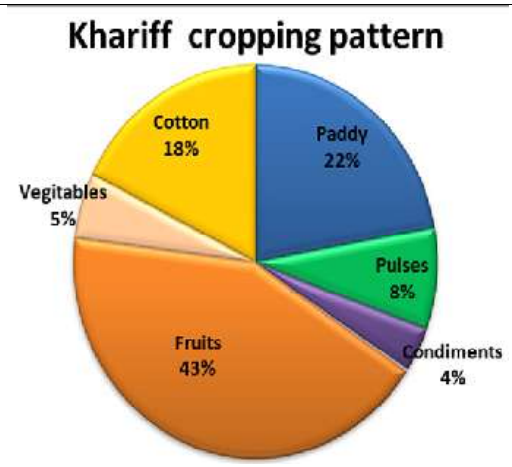


Fig.1.6a:Cropping pattern in Khariff

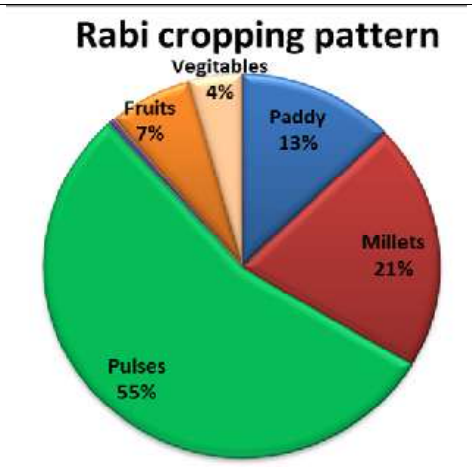


Fig.1.6b:Cropping pattern in Rabi

1.8 Soils: The area is mainly occupied by Loamy soils (53%) (Red and sandy soils, which are shallow with low water holding capacity), clayey soils (47%) (Deep, well drained, gravelly clay with low avaialable water content (AWC)). Red loamy soils are predominant in eastern and southern parts of the district, Clayey soils are mostly seen in northern and small areas in southern part of the district and clayey to loamy mixed soils are mostly observed in central parts of the district.(**Fig.1.8**).

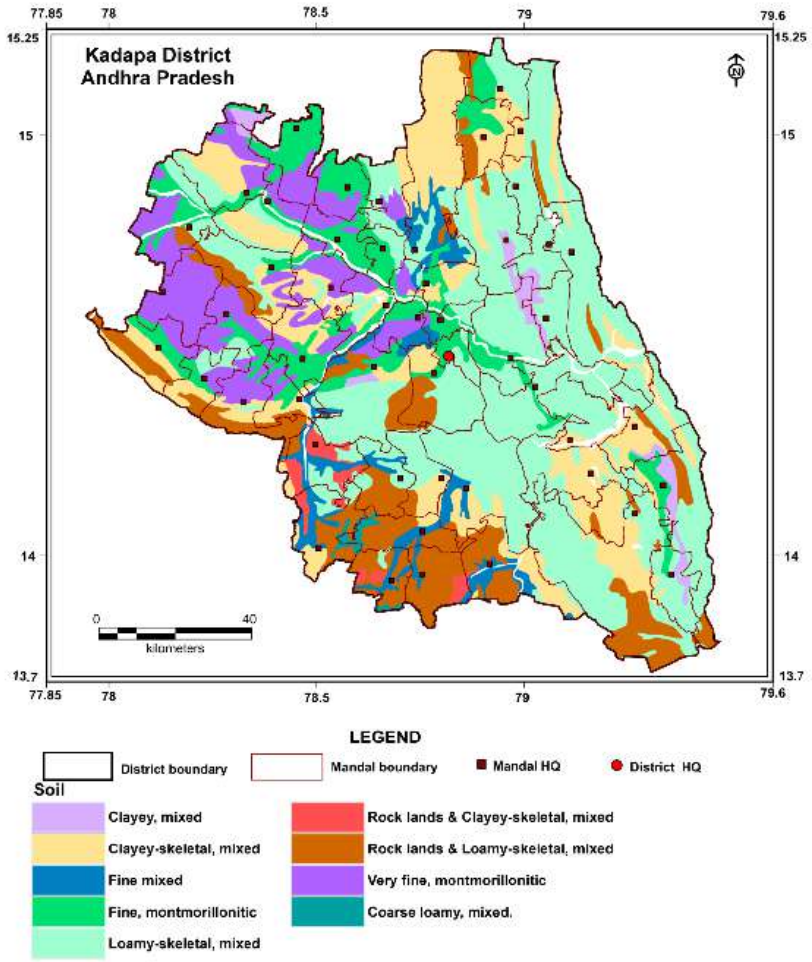


Fig.1.7: Soil map of YSR Kadapa district.

1.9 Irrigation:

Pennar is the major river flowing through the district, the other rivers traversing through the area, Chitravati, Cheyyair, Papaghni and Kundair are tributaries of Pennar river.

Major Irrigation Project

The major irrigation projects completed in YSR Kadapa district are Kurnool-Kadapa canal (KC canal) with 92,001 acres ayacut, Tunghabhadra Project High level canal with

75,000 acres ayacut and Pulivendula Branch Canal with 55,239 acre ayacut. The total ayacut of completed irrigation projects is 2,22,239 acres. The ongoing major irrigation projects are Telugu Ganga Project with 1,86,832 acres ayacut, Chitravathi Balancing Reservoir right canal with 60,000 acres ayacut, Galeru Nagari Sujala Sravanthi (GNSS) Project with 1,55,000 acres ayacut, Ananta Venkata Reddy Hundri Niva Sujala Sravanthi Scheme with 37,500 acres ayacut and Poola Subbaiah Veligonda Project with 27,200 acres ayacut. The total ongoing major irrigation project is 4,66.532 acres ayacut.

Medium Irrigation Project

The medium irrigation projects completed in the district are Lower and Upper sagileru Project with 19,303 acres ayacut, Pincha project with 3,776 acre ayacut, Buggavagu Project with 9,700 acre ayacut and Annamayya Project with 22,500 acre ayacut. The total medium irrigation projects completed in the district with 55,280 acres ayacut. The ongoing medium irrigation project at veligallu project is with 24,000 acre ayacut.

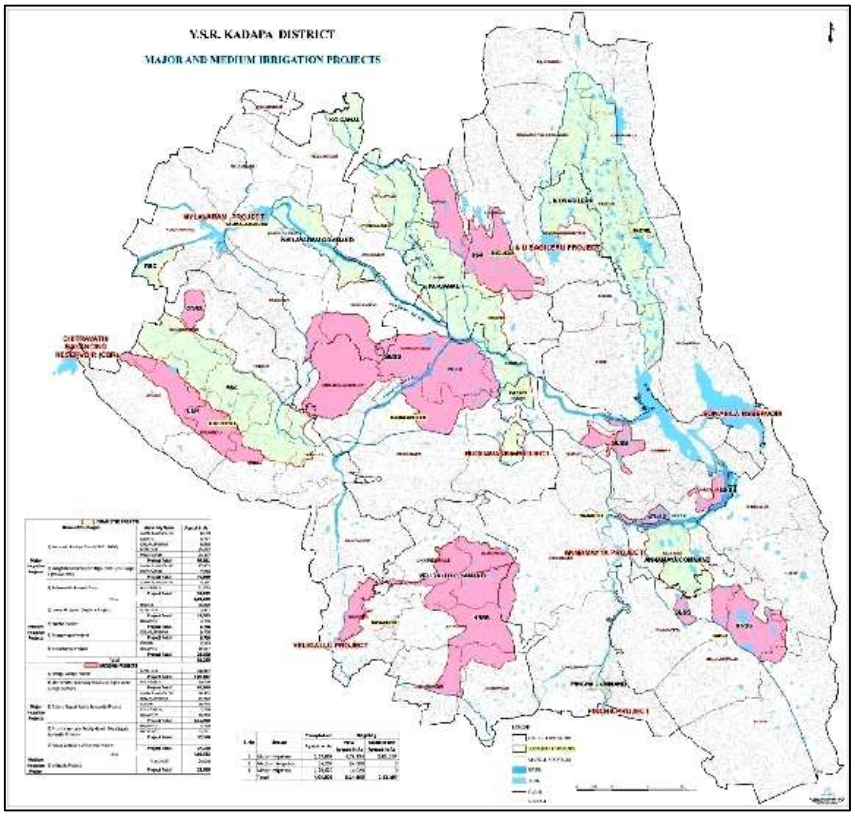


Fig. 1.8: Major and Medium Irrigation Projects of YSR Kadapa District

A total of 1776 minor irrigation tanks exist in the district with an ayacut of 99,240 acres. In the district there are 76,706 irrigation wells (17,836 dugwells and 58870 borewells).

During the year 2018-19 19471 Ha area was irrigated from surface water and 139940 Ha irrigated by Ground water. Ground water contributes 87% of irrigation and surface water 13%.

Status of Groundwater development

The dug wells are generally circular or rectangular in shape and generally down to 10 m depth. The shallow bore wells for hand pumps are generally down to 60 m. Deep bore wells with 162 mm diameter were drilled down to 300 m in non-command areas and down to 100 m in command areas. The dug wells are fitted with centrifugal pumps of 5 to 7.5 HP whereas the shallow bore wells where water levels are shallow are fitted with hand pumps for drinking and domestic purposes. The irrigation bore wells are fitted with submersible pumps ranging from 5 to 20 HP. Most of the open wells are in Atloor, Chapadu, B.Matam, Kalasapadu, Thandur and Simhadripuram mandals. Most of the irrigation is through ground water in the district. Around 86% of the total irrigation is through ground water of which 81% is through bore wells and filter points and 5% through dug wells.

1.10 Prevailing Water Conservation/Recharge Practices: In the district there are ~6569 water conservation structures. 901 percolation tanks exist of which 503 are in good condition, 4716 Check dams exist of which 1799 are in good condition, 748 mini Percoloation tanks exist of which 467 are in good condition and 204 check walls exist of which 74 are in good condition.

1.11 Geology: The area is underlain by various rock types that belong to Late Archaean or Early Proterozoic era which are succeeded by rocks of Dharwarian Age and both are traversed by dolerite dykes. The older rocks are overlain by rocks of Cuddapah Super group and Kurnool Group belonging to Middle and Upper Proterozoic Age. The Archaeans comprise the Peninsular Gneissic Complex, represented by granite, granodiorite, granite-gneiss and migmatite. The metasediment rocks of Cuddapah and Kurnool Group include mostly shales, quartzites, limestones, dolomites. (**Fig1.10**).

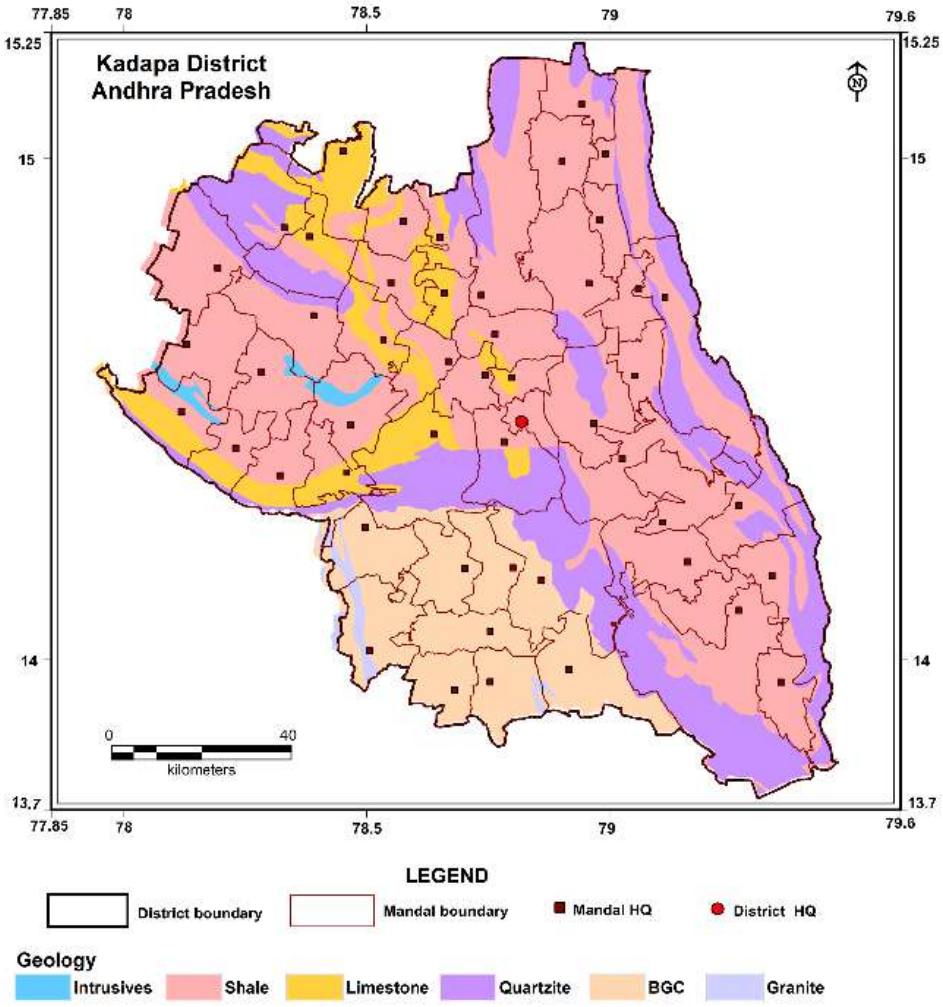


Fig.1.9: Geology map of YSR Kadapa district.

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.

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 granites gneisses, Shales, Limestone and Quartzites and 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. Based on 381 hydrogeological data points (**Fig.2.1)** hydrogeological map is prepared.

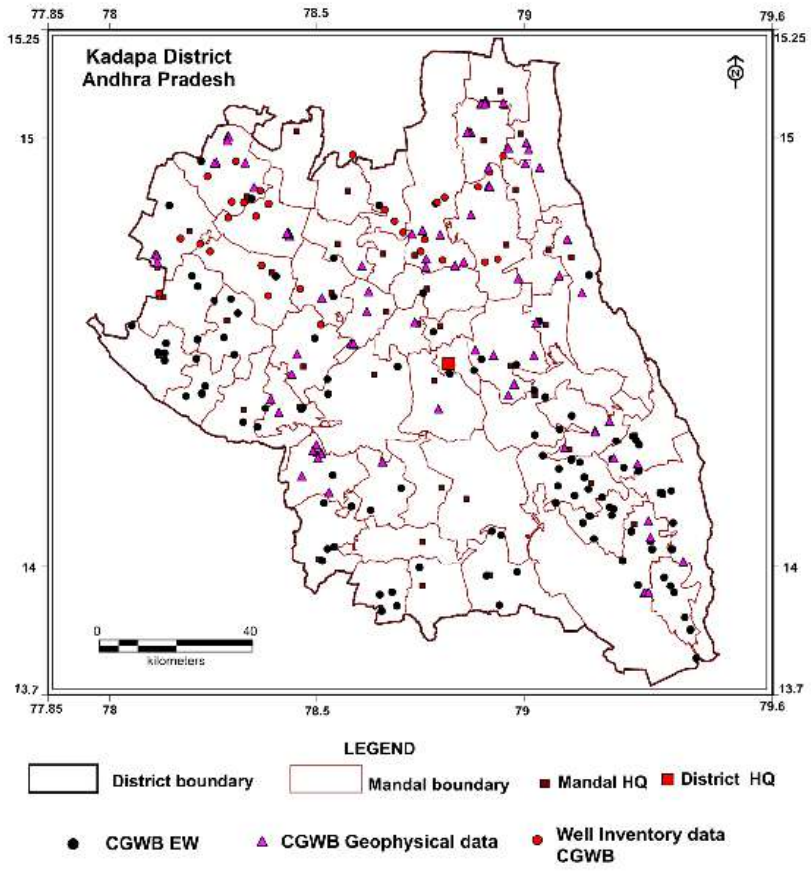


Fig. 2.1: Hydrogeological data availability.

2.1.1 Ground water occurrences and movement: Ground water occurs under unconfined and semi-confined/confined conditions and flows downward from the weathered zone into the fracture zone. The main aquifers constitute the weathered zone at the top, followed by a discrete anisotropic fractured/fissured zone at the bottom, generally extending down to 200 m depth. The storage in granite rocks is primarily confined to the weathered zone and its

overexploitation, mainly for irrigation purpose, has resulted in desaturation of weathered zone at many places.The thickness of weathered zone generally extends upto 10m. in most of the granitic area.Ground water in fractured zone is developed through construction of shallow/deep bore wells.Ground water in metasediments occurs under water table conditions in weathered portion of the formation and the thickness of weathered portion is around 10 m.bgl. Ground water in fractured zone is developed through construction of deep bore wells down to a depth of 300 m.bgl.

At present, extraction is mainly through boreholes of 60-100 m depth, with yield between <0.2 and 7 litres/second (lps). ~ 87 % of fractures occur within 100 m depth and deepest fracture is encountered in Meta sediments (shales) at the depth of 276 m (Muddanur mandal) and in Granites at the depth of 191 m depth (Chinamandyam mandal). The hydrogeological map of the area is presented in **Fig. 2.2a** and **Fig 2.2b**.

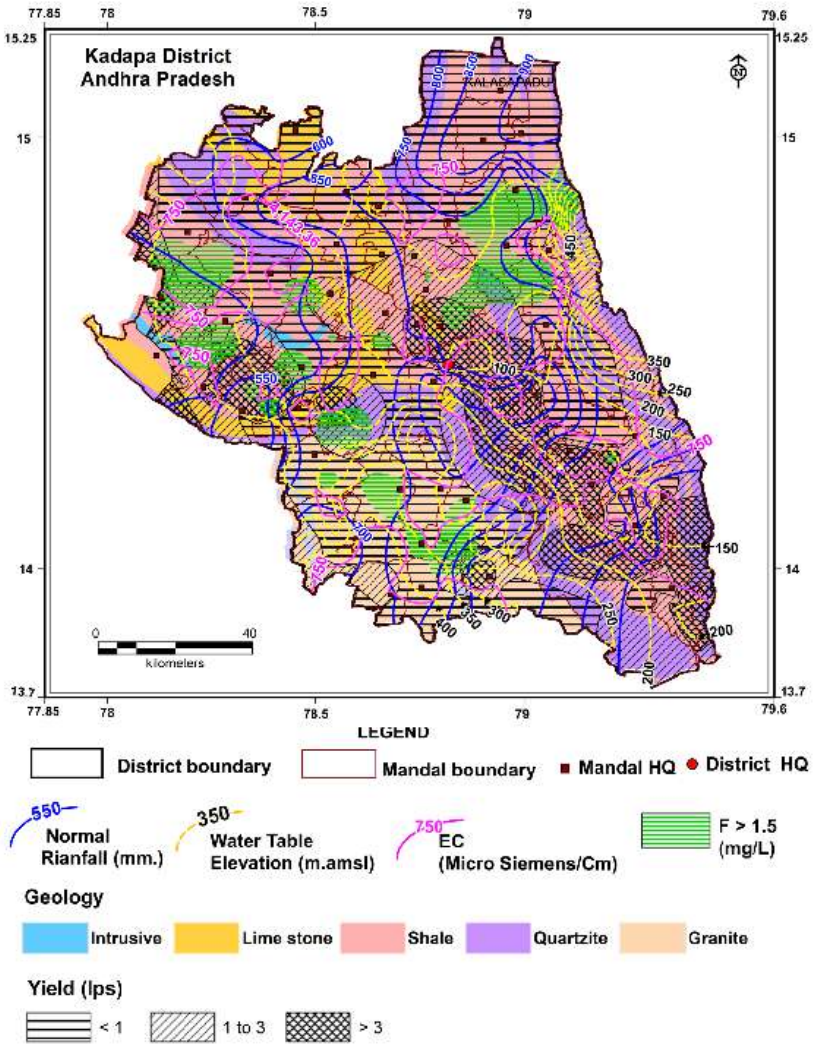


Fig.2.2a: Hydrogeological map of YSR Kadapa district.

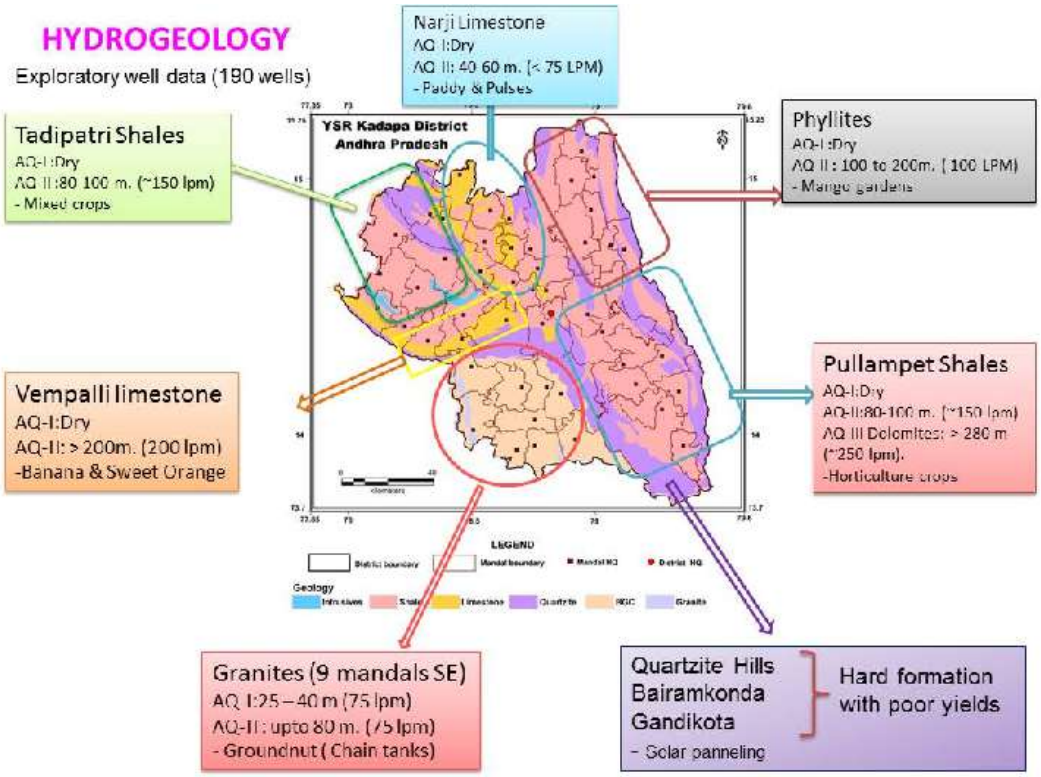


Fig.2.2b: Hydrogeological map of YSR Kadapa district.

2.1.2 Exploratory Drilling: As on 31/03/2019, CGWB drilled 192 bore wells (exploratory, observation and piezometers), 171 wells were drilled in metasediment area and 21 wells were drilled in granitic area. Data analysed from CGWB wells indicates, 16 well of shallow depth (30 m), 23 nos (30-60 m), 63 nos (60-100 m) 22 nos (100-150 m) 68 nos (150-200 m) depth**.** Deepest fracture was encountered at 196.5 m.bgl at Eguvakopparajpalle, Rajampeta mandal. 43 high yielding exploratory wells were handed over to Rural water supply operations in the district as on date. Exploration details of deep wells (200 m.) given in Annexure-III.

In the district, there are 82,359 existing wells (Irrigation: 76706 wells (DW: 17836 and BW:58870) and domestic: 5653 wells (BW: 5443 and DW: 210).

2.1.3 Ground water Yield: Ground water yield of granitic aquifers varies varies from <0.1 to 6 lps (avg: < 1 lps) and metasediment aquifers varies from <0.1 to 10 lps (avg: 1.5 lps). Wells located in the command area have higher yield (1-3 lps) and sustain for more hours of pumping as compared to non-command area where yields are relatively low with sustainability for 2-3 hrs (**Fig.2.2).**

2.2 Water Levels : Ground water levels from 179 piezometers (CGWB:39 and SGWD: 140 were monitored for pre-monsoon and post-monsoon season.

2.2.1 Water Table Elevations: During pre and post-monsoon season (May and November), the water-table elevation ranges from 75.45-547 and 50.8-533.2 meter above mean sea level (m amsl) respectively and general ground flow is towards Pennar river i.e towards SW in the northern parts of the district and towards N, NE from southern part of the district. (**Fig.2.3**).

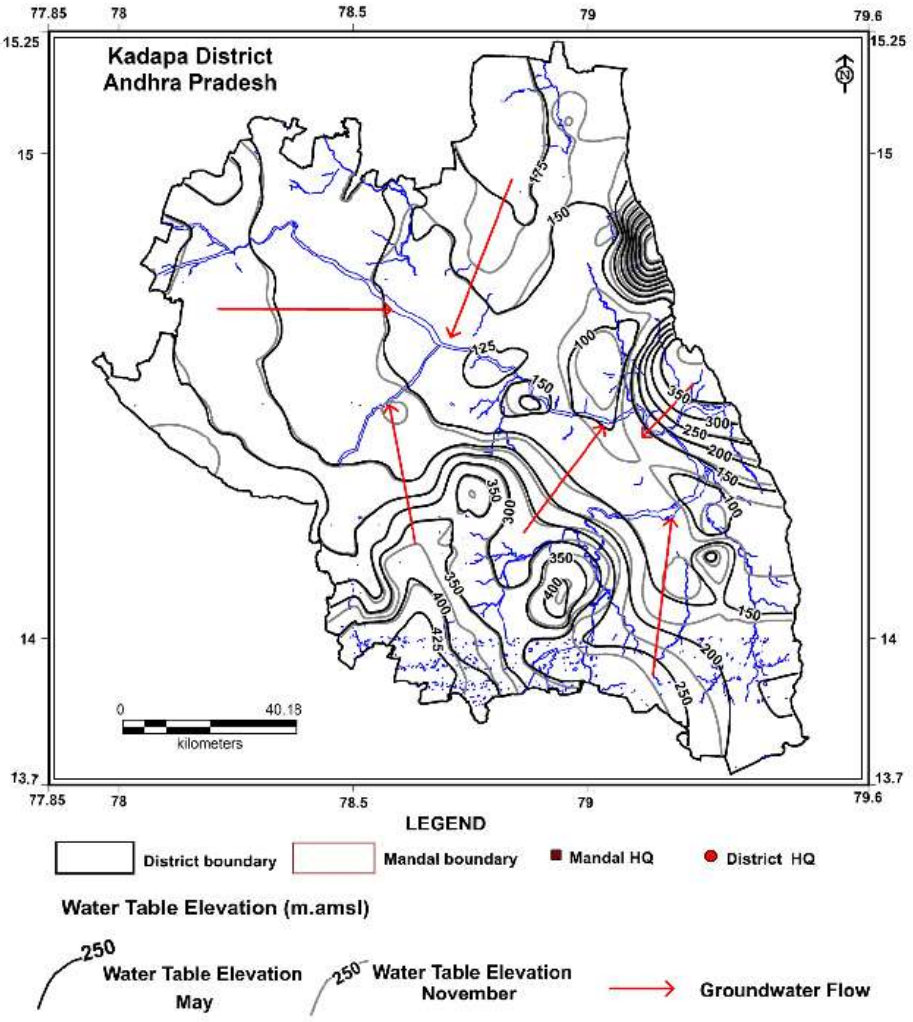


Fig.2.3: Water table elevations (m amsl) during pre and post-monsoon seasons.

2.2.2 Depth to Water Levels (DTWL): The average DTWL of 10 years (2010 to 2019) for pre-monsoon and post-monsoon were analysed, The avg. DTWL varies from 4 to 47.22 meter below ground level (m bgl) (average: 14.41 m bgl) and 1.4 – 33.34 m bgl (average: 10.43 m bgl) during pre and post-monsoon seasons respectively.

Pre-monsoon season: Majority of the water levels during this season are in the range of 10-20 m covering 49% of the area, followed by 20 -40 m bgl (28%) and 5- 10 m bgl (22%). Deep water levels > 40 m.bgl occupy about 1% of the area falling in parts of Thandur and Simhadripuram mandals (**Fig.2.4**). Shallow water levels < 5 m.bgl occupy 1% of the area in small parts of Veeraballe,Ramapuram and Khajipet mandals.

Post-monsoon season: Majority of the water levels during this season are in the range of 10-20 m covering 44% of the area, followed by 5-10 m bgl (31%). Deep water levels in the range of 20-40 m bgl occupy about 11% of the area falling mostly in parts of Chakrayapet, Pullampeta, Chitvel, Penagalur, Rajampet, Obuluvaripalle, Pendlimarri, Vemula, Vempalle Kondapuram and Chinthakommadinne mandals (**Fig.2.5**). Shallow water level < 5 m.bgl occupy 14% of the area in small parts of Lingala, Veeraballe, S.Mydukur, Khajipet, Ramapuram, Obulavaripalle, T Sundupalle, Galiveedu, Nandalur, Lakkireddipalle and Mylavarm mandals.

2.2.3 Water Level Fluctuations (May vs. November): The water level fluctuations vary from -8 to 29.83 m with average rise of 4.1 m (**Fig.2.6**). 89% (50 nos) of the wells show rise in water level and 11% (6 nos) of wells show fall in water level. Fall in water level is recorded only in 4% of the area whereas rise in water levels is observed throughout the distict covering 96% of area. Rise in water level range of 2 to 5 m covers majority of the area with 35% followed by 5 to 10 m, 0 to 2 m and 10 to 20 m in 28%, 22% and 10% of the areas respectively. Rise of water levels > 20 m. is observed only in 1% of area in parts of Thondur and Simhadripuram mandals.

2.2.4 Long term water level trends: Trend analysis for the last 10 years (2009-2018) is studied from 64 hydrograph stations of CGWB and SGWD. It is observed that during pre-monsoon season 40 wells shows falling trend (0-1:27, 1-2 m: 7 and >2 m:6wells) (max fall: 3.3 m/yr) and 18 wells shows rising trend (0-1:13, 1-2:2, > 2:3) (max rise: 3.7 m/yr). During post-monsoon season 39 wells show falling trend (0-1m.:28, 1-2 m: 4 and >2 m: 7 wells) (maximum fall: 3.8 m/Yr) and 25 wells shows rising trends (0-1m.:21, 1-2 m: 1 and >2 m: 3 wells) (max rise: 3.6 m/yr). The graphical representation of fall and rise is shown in **Fig 2.7** and spatial distribution map is shown in **Fig 2.8**.

2.3 Geophysical Studies

A total of 158 VES data is interpreted, which reveals resistivity < 100 ohm (Ω) m for the weathered granite (1-30 m), 60-350 Ω m for underlying fractured granite with maximum thickness of 84 m and > 350 Ω m for massive granite. Resistivity < 150 ohm (Ω) m for the weathered Meta-sediments (1-20 m), 50-300 Ω m for underlying fractured Meta-sediments (70-100m) and > 300 Ω m for massive Meta-sediments.

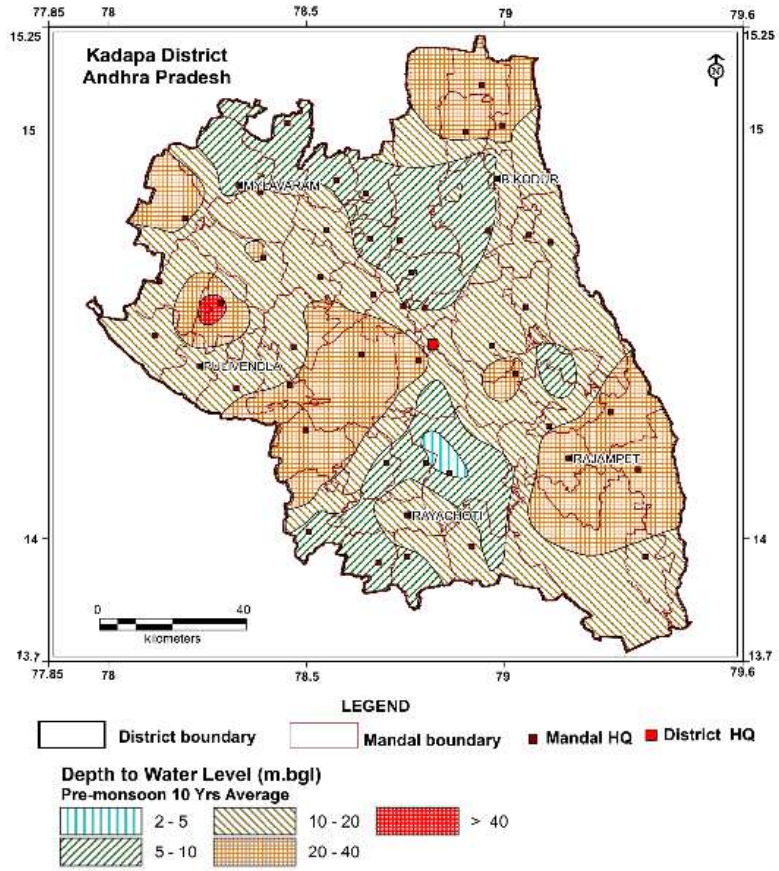


Fig.2.4: Depth to water levels Pre-monsoon (Average).

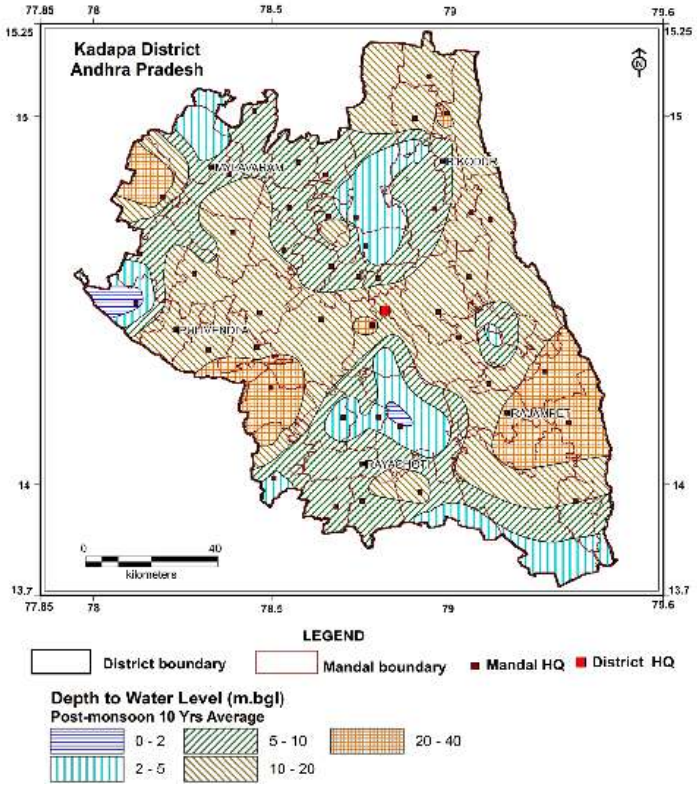


Fig.2.5: Depth to water levels Post-monsoon (Average).

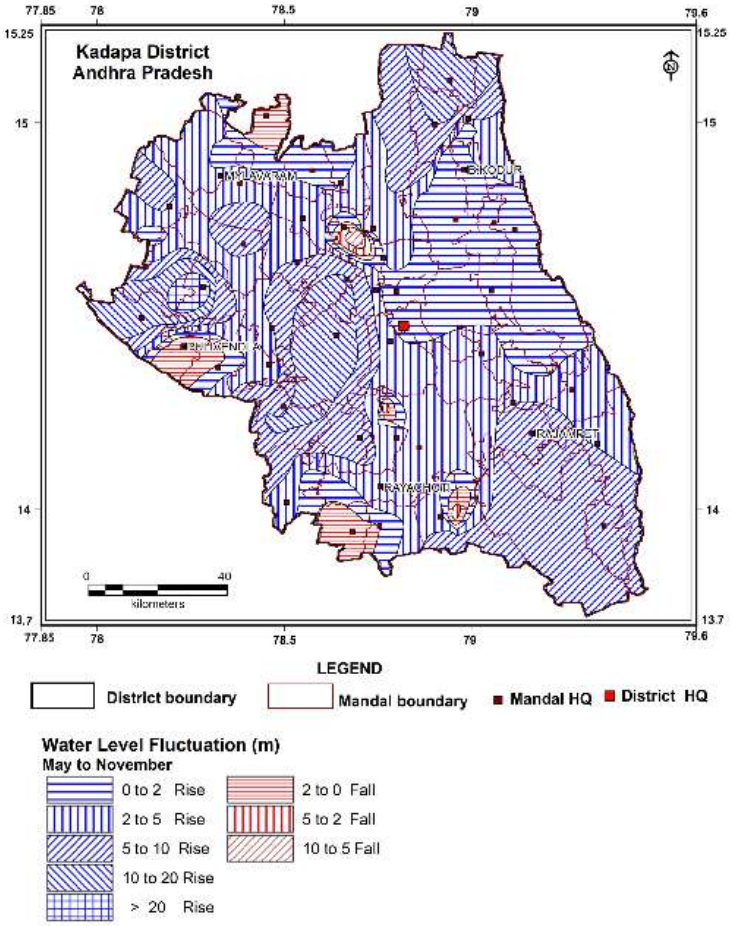


Fig.2.6: Water Level Fluctuations (m) (Nov with respect to May).

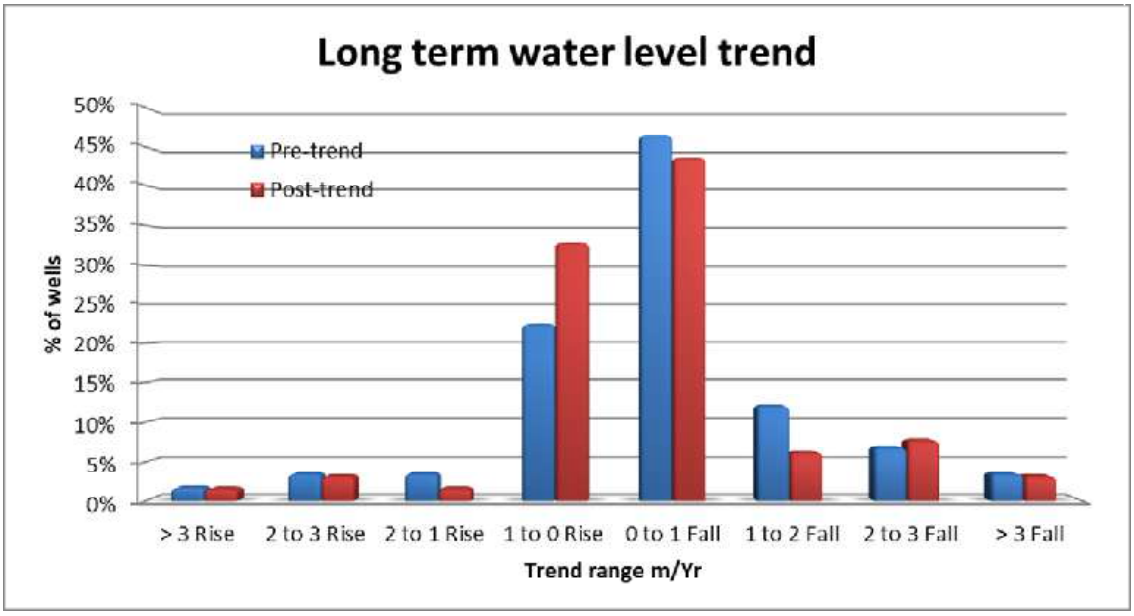


Fig. 2.7: Graphical representation of water level trends (2009-2018).

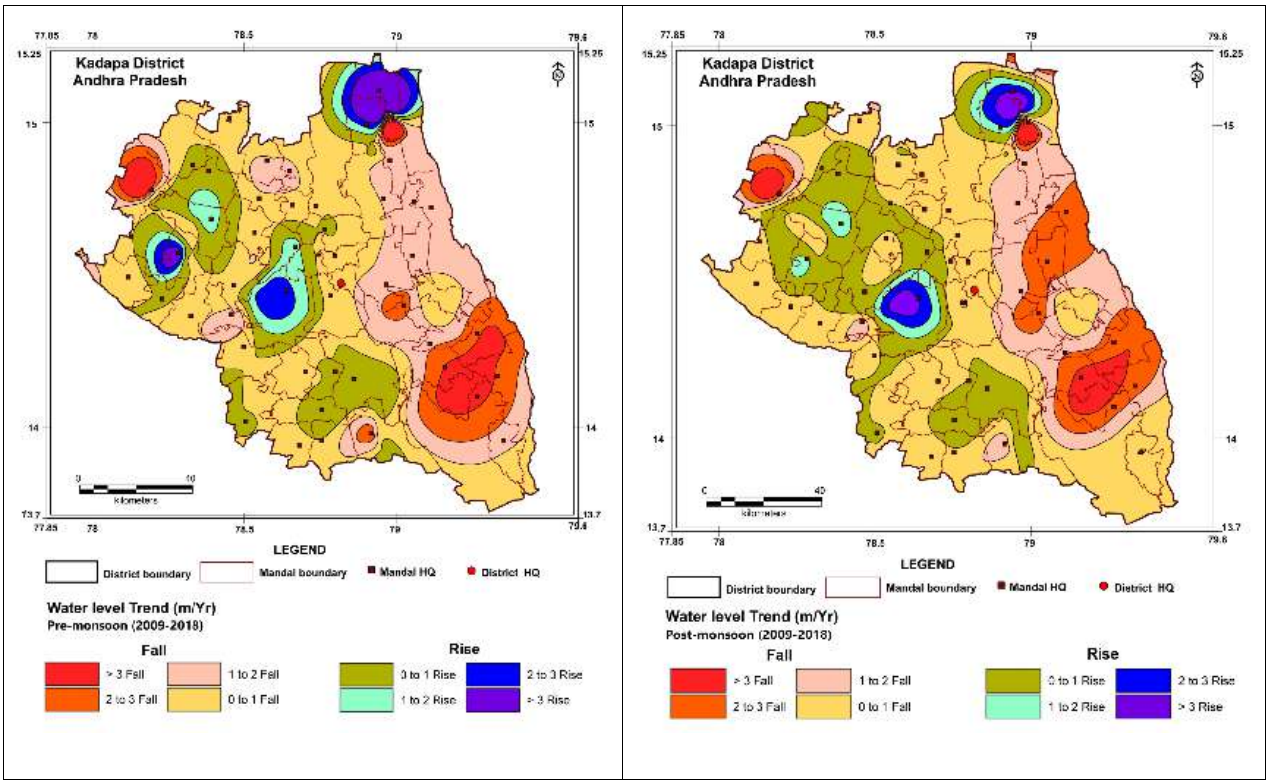


Fig. 2.8: Long-term water level trends (2009-2018).

2.4 Hydro chemical Studies

To understand chemical nature of groundwater, 503 water sample data is utilized from ground water monitoring wells of CGWB, SGWD and RWS wells (Pre-monsoon:235 and post-monsoon:268) (mostly tapping combined aquifers Aq-1 and aq-2) during the pre-monsoon season of 2017and post-monsoon season of 2017. Parameters namely pH, EC (in µS/cm at 25° C), TH, Ca, Mg, Na, K, CO_3, HCO_3, Cl, SO_4, NO_3 and F were analyzed.

2.4.1 Pre-monsoon : (Total 235 samples were analyzed (CGWB: 27, SGWD:122 and RWS:86):

Groundwater from the area is mildly alkaline to alkaline in nature with pH in the range of 6.94-8.03(Avg:7.50). Electrical conductivity varies from 88-8300 (avg: 1306) µ Siemens/cm**.** In 81 % of area EC is within 1500 µ Siemens/cm, in 16% area, it is 1500-3000 µ Siemens/cm and in 3 % area, it is > 3000 µ Siemens/cm (**Fig.2.9).**Nitate concentration in 2% of samples is beyond permissible limits of 45 mg/L (**Fig.2.10**). Fluoride concentration varies from 0.02-3.2 mg/L (**Fig 2.11**) and 85 % of samples are within permissible limits of BIS and rest is beyond permissible limit of 1.5 mg/L. High fluoride concentration is observed mostly in Kondapuram, SimhadripuramMuddanur,Brahmamgarimatam, Bedvel, Porumamilla,Rayachoti, Veerballe, lakkireddypalle, Pendlimarri mandal and in small areas in western parts of the district.

2.4.2 Post-monsoon : (Total 268 samples were analyzed (SGWD:189 and RWS:79):

Groundwater from the area is mildly alkaline to alkaline in nature with pH in the range of 6.91-7.97 (Avg: 7.46). Electrical conductivity varies from 268-7150 (avg: 1457) µ Siemens/cm**.** In 70 % of area EC is within 1500 µ Siemens/cm, in 25% of area EC is 1500 to 3000 µ Siemens/cm and in 5% area it is > 3000 µ Siemens/cm. falling mostly in central and northern parts of the district.(**Fig.2.12).** Nitrate concentration in all samples is within the permissible limits of 45 mg/L (**Fig.2.13**). Fluoride concentration varies from 0.1-4.63 mg/L (**Fig 2.14**) and 92 % of samples are within permissible limit of BIS and rest is beyond permissible limit of 1.5 mg/L.

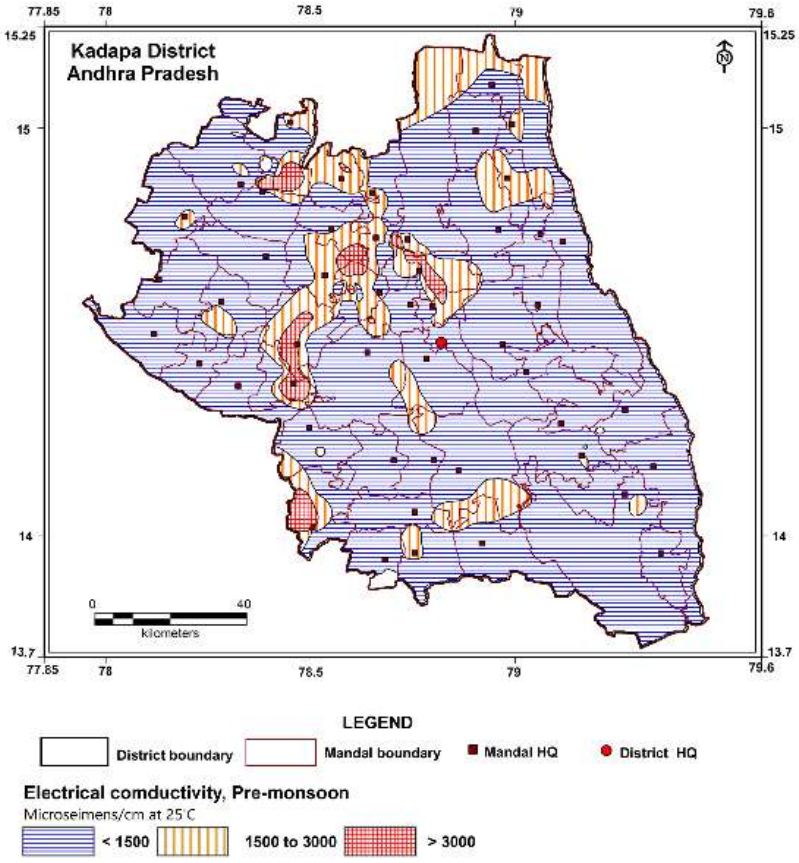


Fig.2.9: Distribution of Electrical conductivity (Pre-monsoon).

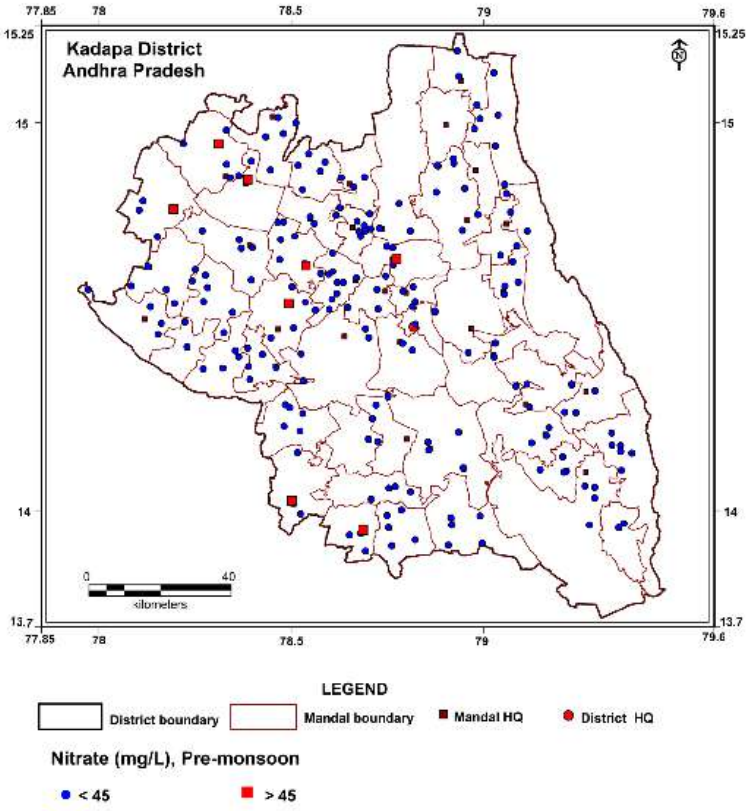


Fig.2.10: Distribution of Nitrate (Pre-monsoon).

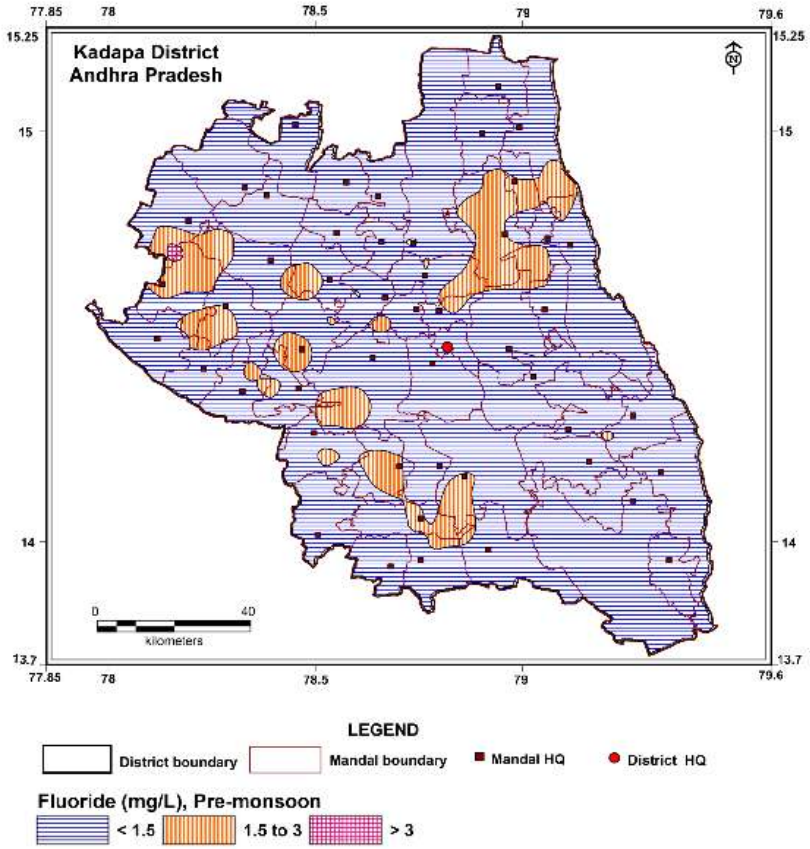


Fig.2.11: Distribution of Fluoride (Pre-monsoon).

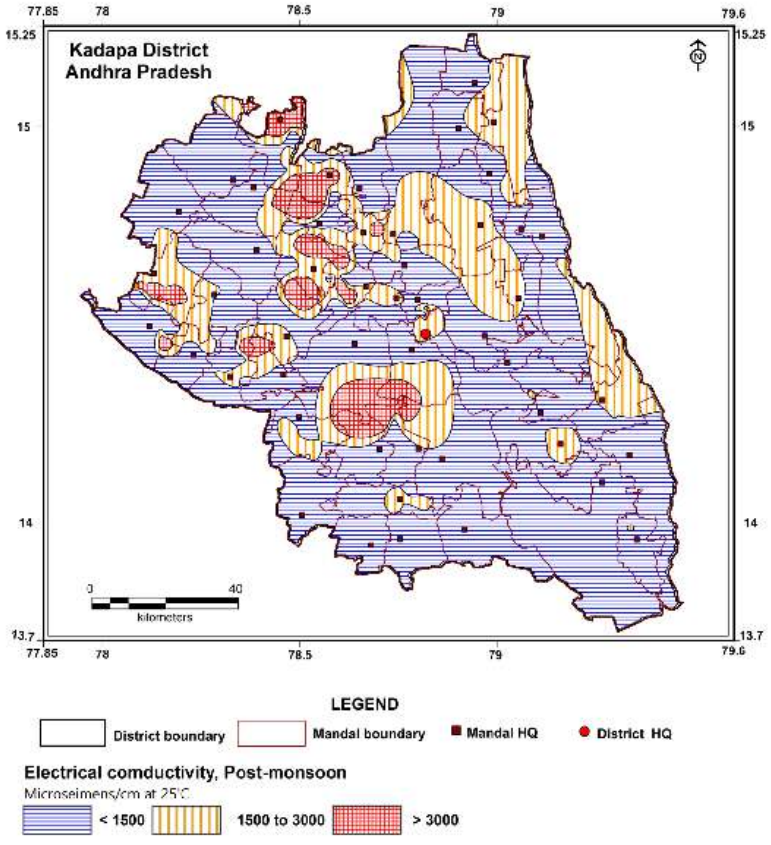


Fig.2.12: Distribution of Electrical conductivity (Post-monsoon).

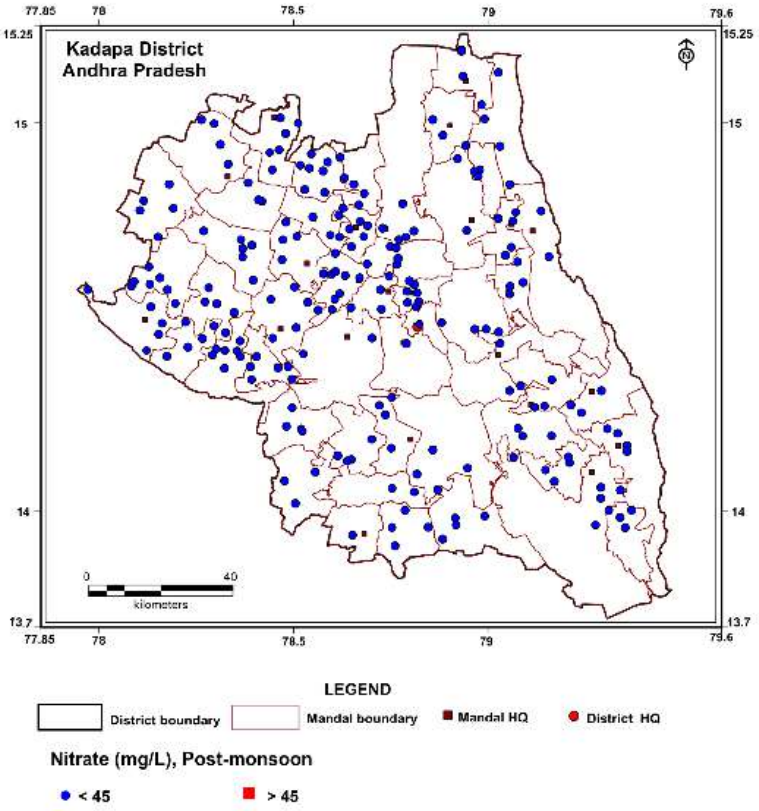


Fig.2.13: Distribution of Nitrate (Post-monsoon).

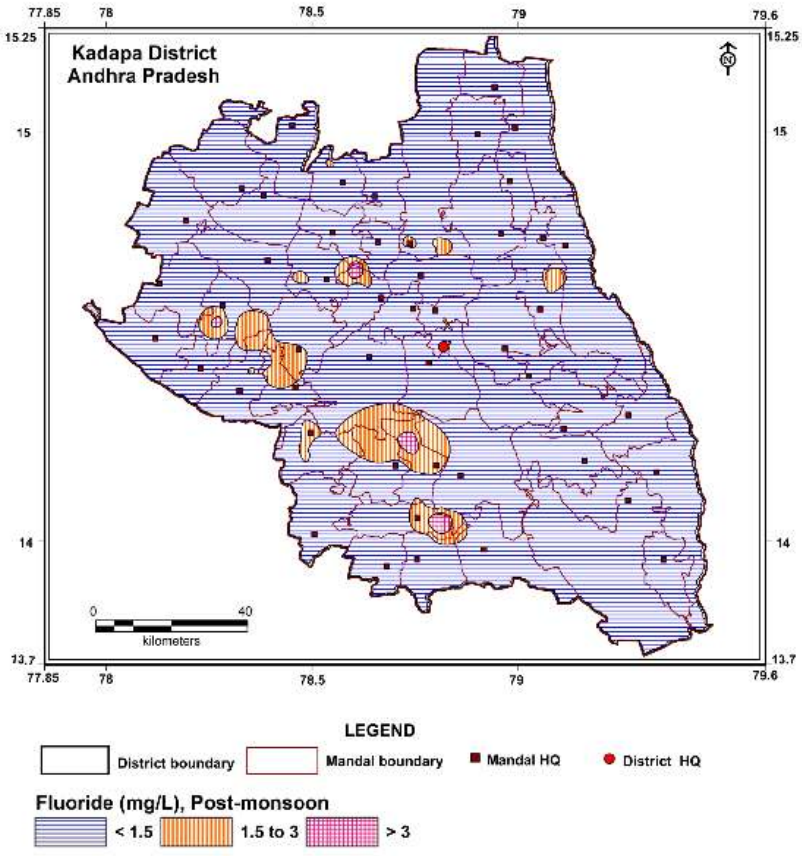


Fig.2.14: Distribution of Fluoride (Post-monsoon).

3. DATA INTERPRETATION, INTEGRATION AND AQUIFER MAPPING

Conceptualization of 3-D hydrogeological model was carried out by interpreting and integrating representative 381 data points (both hydrogeological and geophysical down to 200 m) for preparation of 3D map, panel diagram and hydrogeological sections. The data (**Fig.2.1**) is calibrated for elevations with Shuttle Radar Topography Mission (SRTM) data. The lithological information was generated by using the RockWorks-16 software and generated 3-D map for Kadapa district (**Fig.3.1)** and hydrogeological sections.

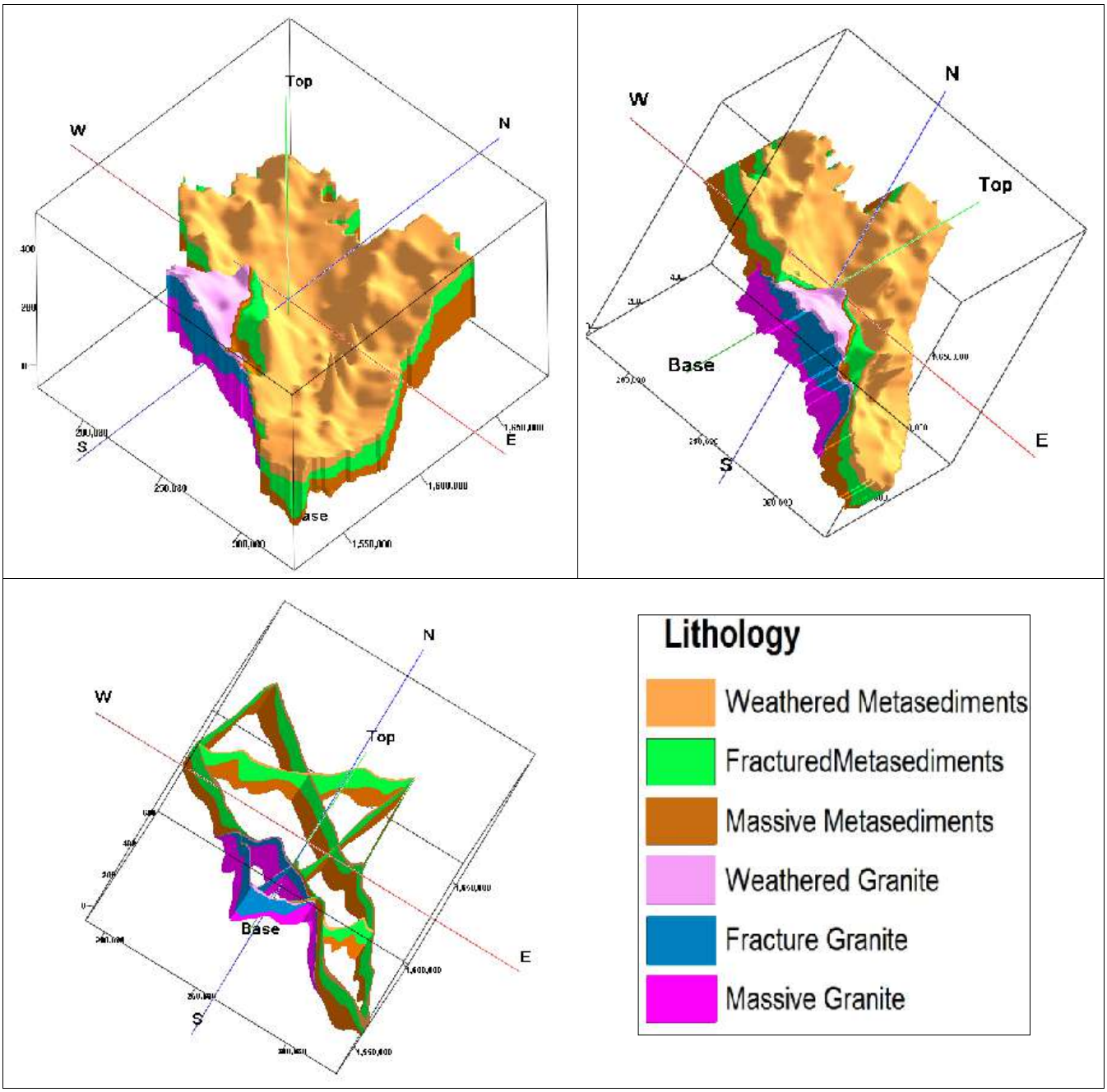


Fig.-3.1:3D Model for study area.

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 ~25 m depth and the fractured zone (fractured granite) is considered up to the depth of deepest fracture below weathered zone (~25-196 m).

3.2 Hydrogeological Sections

Hydrogeological sections are prepared in NW-SE, SW-NE and W-E directions (**Fig. 3.2**).

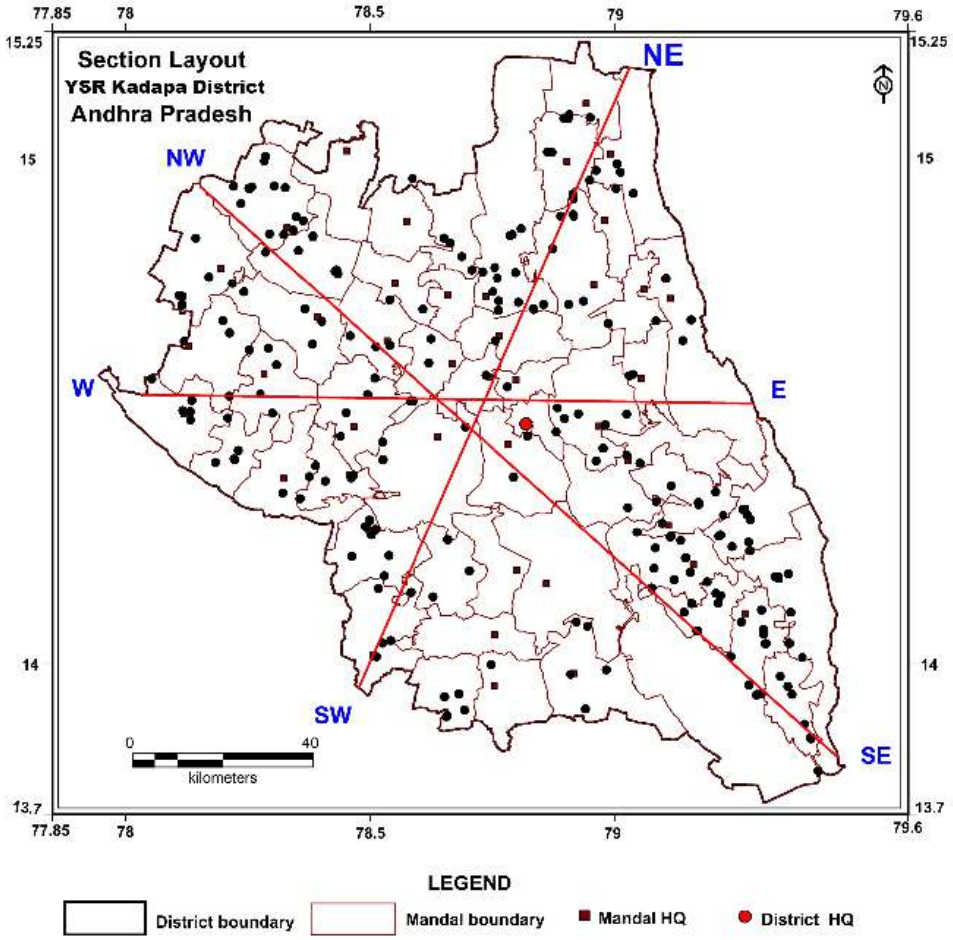


Fig.-3.2: Map showing orientation of hydro geological Sections

3.2.1 South-West and North-East Section: The section drawn along the SW-NE direction covering distance of ~140 kms (**Fig.3.3a**). It depicts thick fractured zone overlaid by thin weathering zone in granites extending upto ~45 Km from SW. Thick fractured zone in metasediments is seen in ceantral part of the section averlaid by thick weathering zone.

3.2.2 North-West and South-East Section: The section drawn along the NW-SE parts covering distance of ~175 kms (**Fig.3.3b**). It depicts thick weathered zone in the central and south-eastern parts and thick fracture zones in the central part with thin fractured zone on both sides.

3.2.3 West-East Section: The section drawn horizontally along the West-East direction covering distance of ~100 kms (**Fig.3.3c**).It depicts thick weathered zone in central part. Thick fractured zone in seen western and east-central part and thin fracture zones in the central and eastern part.

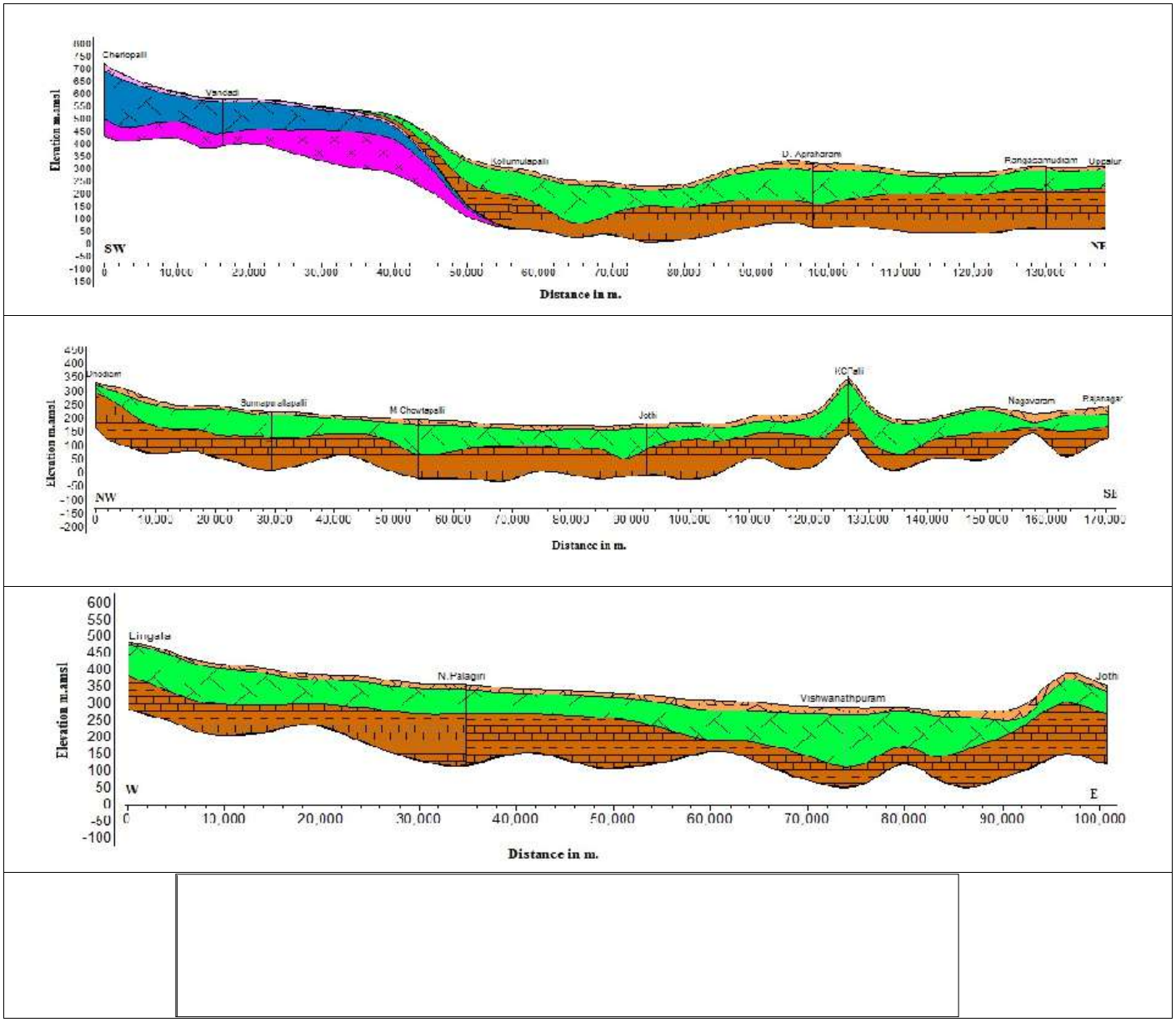


Fig.3.3 (a-c): Hydrogeological profile in different directions in YSR Kadapa district.

3.3 Aquifer Characterization

3.3.1 Weathered zone: The Weathered zone (~25 m) consisting of upper saprolite (~13 m) and lower sap rock (13-25m.) varies from meagre to 17 m.bgl in granitic formation and meagre to 62 m. in metasediments. It has gone dry in considerable part due to over-exploitation. Spatial distribution of weathering depth zone map is given in **Fig.3.4**. Thickness of weathered zone is in the range of 10-20 m in most part of area covering ~66 % of area, shallow weathering (< 10 m) occurs in 21 % of the area and deep weathering (> 20 m) occurs in rest of the area (**Fig.3.5**). Shallow weathering mostly seen in granitic areas along the SW boundary of the district.

Ground water yield from weathered granite/gneiss aquifer varies from <0.1 to 1 lps (avg: 0.8 lps) in granites and from 0.01 to 4 lps (avg: 1.0 lps) in metasediments. The transmissivity varies from 1-14 m^2/day in granites and upto 53 m^2/day in weathered metasediment aquifer.

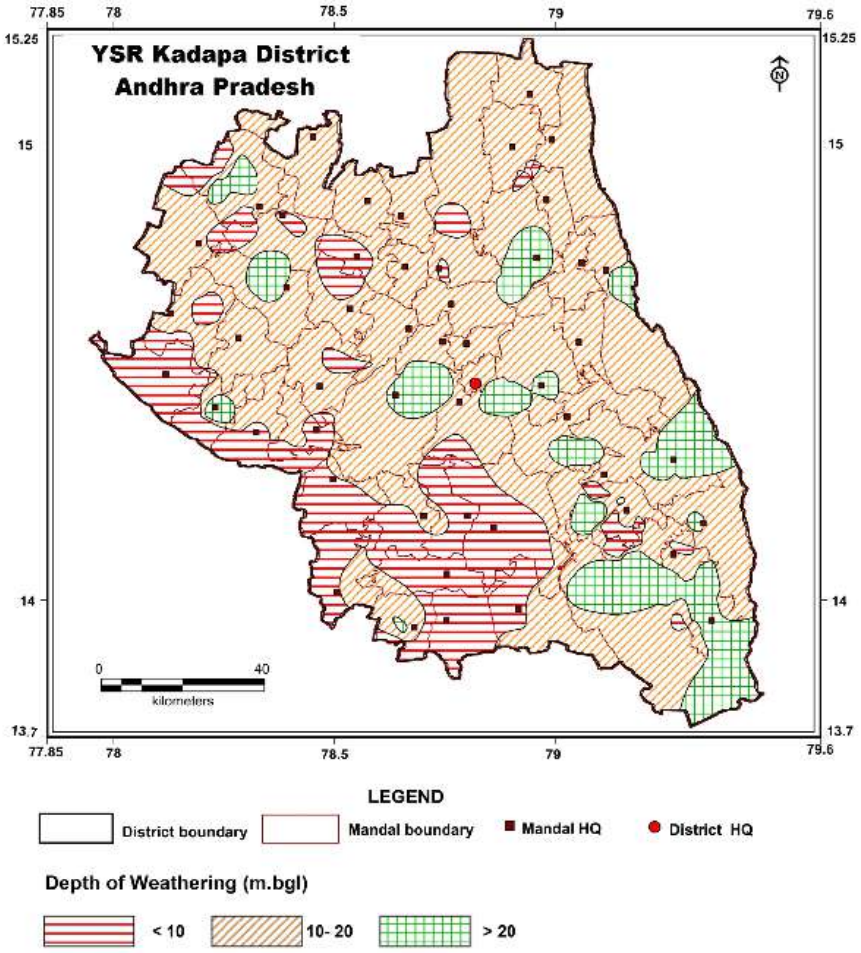


Fig.3.4: Depth to Weathered zone, YSR Kadapa district.

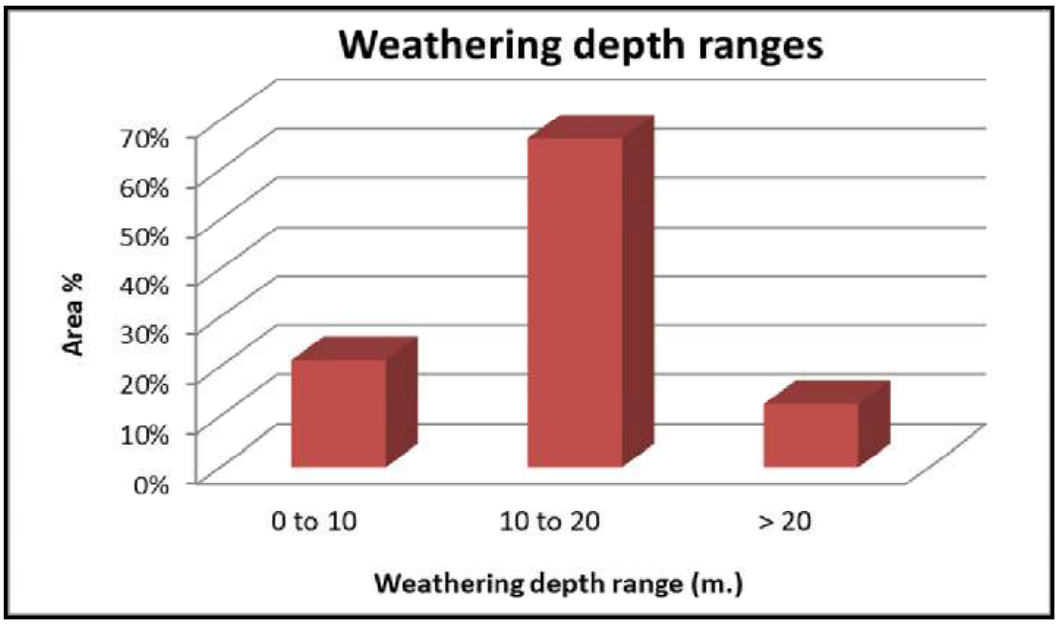


Fig.3.5: Depth wise weathered zone distribution

3.3.2 Fractured zone: Ground water is extracted mainly through bore wells of 30 to 250 m depth from fractured zone (~25 to 196 m). Based on CGWB data, it is inferred that fractures in the range of < 100 m depth are more predominant (78 % of the area), 100-150 fractures occur in 18 % and > 150 m. fractures occur in 4 % of area respectively and deep fractures in the range of > 150m. occur in Duvvur, Muddanur, Mylavaram. Rajampet, T.Sundupalle and Sambepalle mandals (**Fig.3.6**). Analysis of occurence of fractures (599 nos from 358 wells) reveal that majority of fractures (~87 %) occur within 100 m depth (**Fig. 3.7**).

Groundwater yield of fractured granite/gneiss varies from 0.01 to 6 lps (avg: 0.75 lps) and meta sediments vary from 0.01 to 7 lps (avg: 1 lps) . Wells located in the command area have higher yield (1-3 lps) and sustains for more hours of pumping as compared to non-command area where yields are relatively low and sustains for 2-3 hrs. The transmissivity varies from 1-910 m^2/day. Stotativity of the fracture zone varies from 0.0001 to 0.00001.

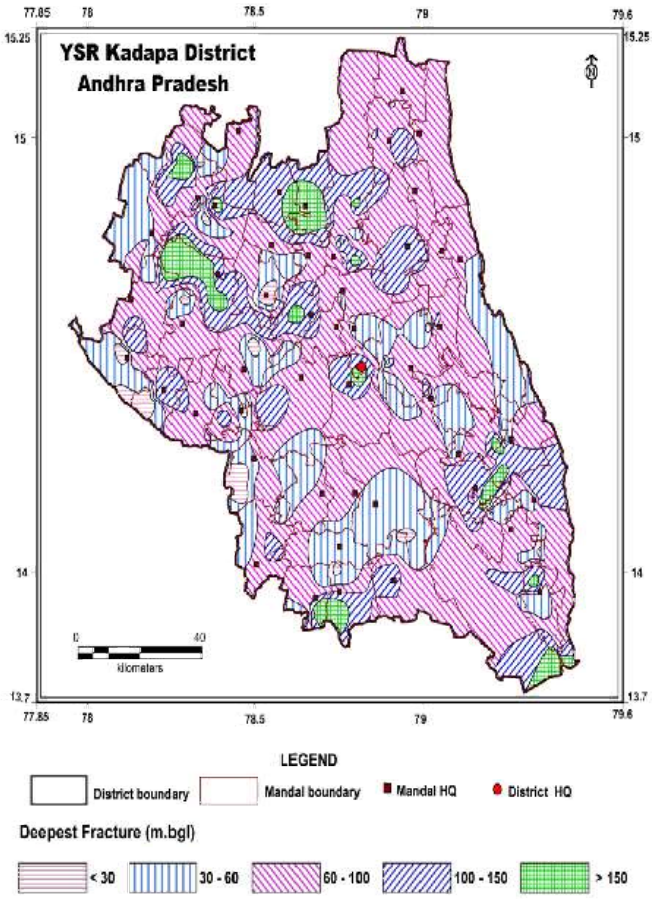


Fig.-3.6: Depth of Fractured zone , YSR Kadapa district

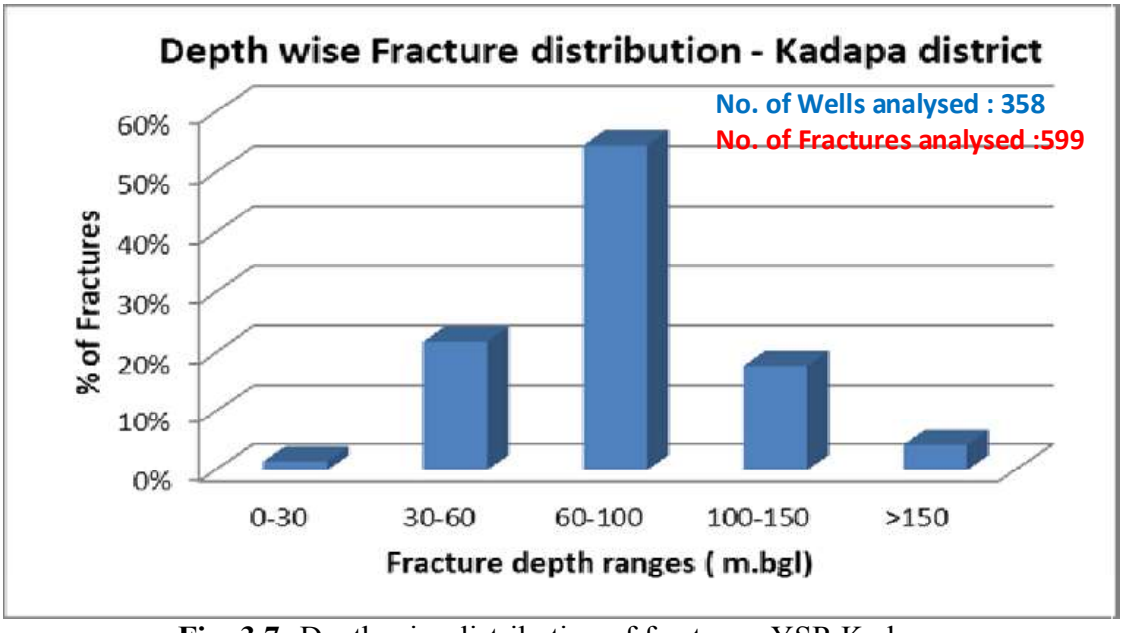


Fig.-3.7: Depth wise distribution of fractures, YSR Kadapa

4. GROUND WATER RESOURCES (2017)

In hard rocks, for practical purpose it is very difficult to compute zone wise (aquifer wise) ground water resources, because the weathered zone (WZ) and fractured zone (FZ) 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.

While computing the in-storage resources, the general depth of deepest fractures in the area, pre-monsoon water levels and 2% of granular zone (depth below pre-monsoon water level and down to deepest fracture depth in the village) is considered. Summarized command/ non-command area and mandal wise resources are given in ***Table-4.1***.

As per 2017 GEC report, the net dynamic replenishable groundwater availability is 1162 MCM, gross ground water draft for all uses 798 MCM, provision for drinking and industrial use for the year 2025 is 61 MCM and net annual ground water potential available for future use is 378.4 MCM.Stage of ground water extraction in the district is 69%. 09 mandals (Chinnamandyam, Kamalapuram, Kodur,Lingala, Obulavaripalle, Pullampeta, Sambapalle, Vempalle, Vemula) falls in over-exploited category, 04 mandals (Penagaluru, Porumamilla, Rajampet, Simhadripuram) in critical category, 16 mandals fall in semi critical category and remaining 22 mandals fall in safe category. Mandal wise stage of ground water development varies from 7 % (S.Mydukur mandal) to 165 % (Lingala mandal) with average of 74%. Based on 2017 resources, mandal categorization map is given in **Fig. 4.1.**

The instorage was calculated for saturated zone to the depth of depest fracture encountered. The total instorage groundwater resources estimated for Kadapa district is 434 MCM.

Table-4.1: Computed Dynamic, In-storage ground water resources, YSR Kadapa district.

Resources As per GEC 2017	**MCM**
Dynamic (Net GWR Availability)	**1162.87**
• Monsoon recharge from rainfall	933.11
• Monsoon recharge from other sources	158.69
• Non-Monsoon recharge from rainfall	20.48
• Non-monsoon recharge from other sources	111.77
Gross GW Draft	**798.62**
• Irrigation	748.88
• Domestic and Industrial use	49.75
Provision for Drinking and Industrial use for the year 2025	61.10
Net GW availability for future use	378.4
Stage of GW development (%)	69%
In-storage GW Resources (down to the maximum depth of fractures)	434

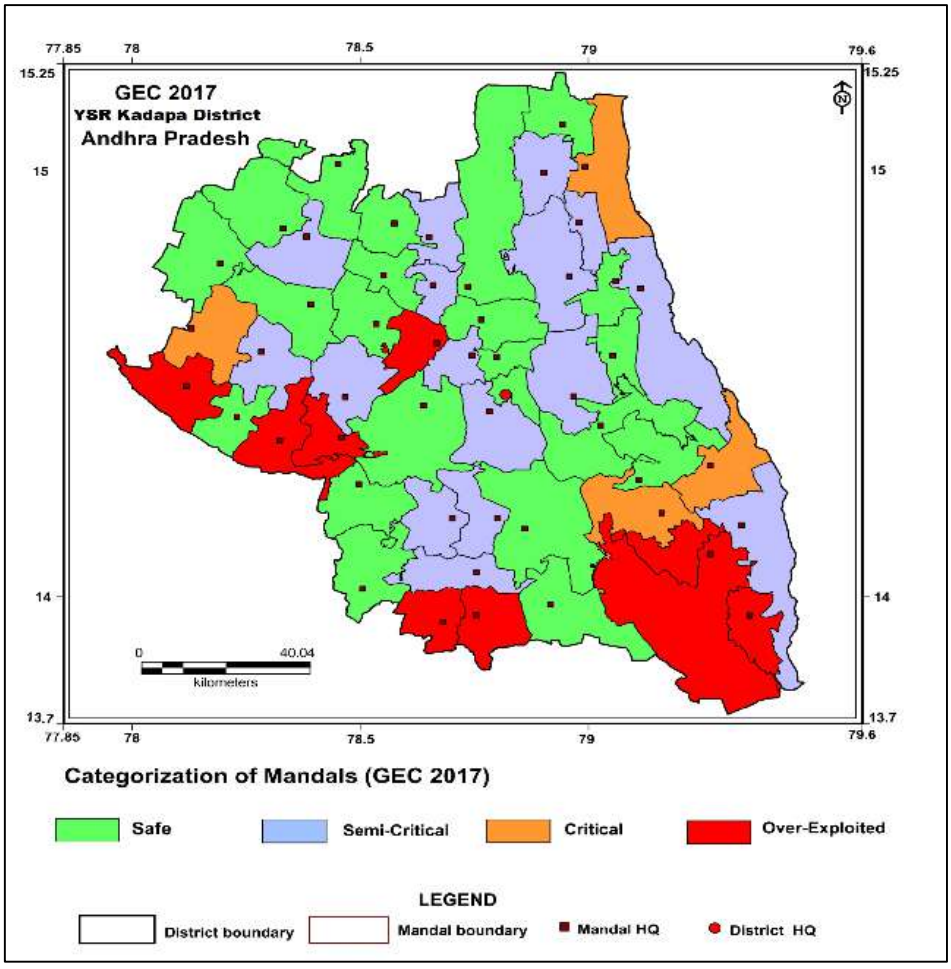


Fig.4.1: Categorization of mandals (GEC 2017).

5. GROUND WATER RELATED ISSUES AND REASONS FOR ISSUES

5.1 Issues

Over-exploitation

1. 9 mandals are categorized as over-exploited as per 2017 GEC estimations, where ground water balance for future irrigation is zero or negative.

Deep water levels

2. Deep water levels (> 20 m bgl) are observed during pre as well as post-monsoon season in 30 % and 45% of the area respectively.

3. Out of 64 wells analysed, 40 wells during pre-monsoon 39 wells during post-monsoon shown falling trend in the last 10 years (@-0.02 to -3.3 m/yr and -0.04 to -3.8 m/yr) respectively.

Sustainability

4. Low yield (<1 lps) occurs in ~53 % of area covering entire district. The yield from bore wells have reduced over a period of time and some bore wells which used to yield sufficient quantity of water have gone dry due to low rainfall.

Pollution (Geogenic and Anthropogenic)

5. Few mandals are fluorosis endemic where fluoride (geogenic) as high as 3.2 mg/L during pre-monsoon and 4.63 mg/L during post-monsoon season is found in groundwater. The high fluoride concentration (>1.5 mg/L) occur in 15% and 8 % of the samples during pre-monsoon and post-monsoon seasons respectively.

6. The high concentration of EC (> 3000 micro-seimens/cm) in 3 % and 5 % of the area is observed during pre-monsoon and post-monsoon seasons respectively (mostly in canal command area).

5.2 Reasons for Issues

Over-exploitation and Deep water levels

1. Over-extraction, low rainfall and limited artificial measures etc.

Sustainability

2. Absence of primary porosity, negligible development of secondary porosity, low rainfall, desaturation of weathered zone and urbanization.

Geo-genic pollution (Fluoride)

3. Higher concentration of fluoride in ground water is attributed due to source rock, rock water interaction where acid-soluble fluoride bearing minerals (fluorite, fluoro-apatite) gets dissolved under alkaline conditions.

4. Higher residence time of ground water in deeper aquifer

6. MANAGEMENT STRATEGIES

High dependence on groundwater coupled with absence of augmentation measures has led to a steady fall in water levels and desaturation of weathered zone in some parts, raising questions on sustainability of existing groundwater structures, food and drinking water security. 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 the majority of fractures occur within 100 m depth (75%) (**Fig.3.7**). Higher NO_3^- concentrations (> 45 mg/L) in weathered zone is due to sewage contamination and higher concentration of F^- (>1.5 mg/L) in weathered zone and fractured zone is due to local geology (granite/gneiss rock), high weathering, longer residence time and alkaline nature of groundwater.

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.

In the district 111567 MCM of unstaturated volume (below the depth of 5 m) is avaialable during post-monsoon season, having 2231 MCM of recharge potential (2%). This can be utilized for implementing management strategy.

The study suggests notable measures for sustainable groundwater managem ent, which involves a combination of various measures given below.

1. Supply side measures
2. Demand side measures
3. Regulatory measures
4. Institutional measures

6.1.1 Supply side measures:

Ongoing Projects

6.1.1.1 Repair, Renovation and Restoration of existing tanks (Competed):

De-silting of 10.75 MCM of silt from existing 1651 (minor irrigation tanks and Percolation tanks) tanks are completed under state Govt. sponsored NEERU-CHETTU programme and created additional surface storage. This will contribute ~ 2.5 MCM to groundwater

(considering 25 % of recharge) and with this additional ~416 ha land can be brought under irrigated dry (ID) crops in tank ayacut.

6.1.1.2 Artificial Recharge structures:

To be taken up

Construction of 856 artificial recharge structures (ARS) 68 priority-1 (over-exploited) and 788: priority-2 areas) are suggested by following standard methodology.

While formulating the village wise groundwater management plan, the unsaturated volume of aquifer is estimated by multiplying the area with specific yield and unsaturated thickness (post-monsoon water levels below 5 m). Initially village wise dynamic groundwater resources of 2017 are considered (**Fig.4.1**). Potential surface run off is estimated by following standard procedures. On conservative side 20% run off yield is considered as non-committed yield for recommending artificial recharge structures, in intermittent areas 50% of yield is considered and remaining 50% is recommended for implementing water conservation measures in recharge areas through MGNREGS.

The pre-monsoon groundwater quality is considered for categorising contaminated area (F >1.5 mg/l & EC >3000 μ S/cm). Nitrate is not considered here because it is point source pollution and localized. Based on above criteria, the area is prioritized into **Priority-1(over-exploited)** which needs immediate intervention and **Priority-2**. Based on hydrogeological characteristics, the area is further sub-divided into following 8 categories (**Table-6.1**).

Table-6.1: Hydrogeological characteristics of area.

Category	Hydrogeologic characterizations
1	High EC with additional scope for artificial recharge.
2	High EC with no additional scope for artificial recharge.
3	High F with additional scope for artificial recharge.
4	High F with no additional scope for artificial recharge.
5	High EC and F with additional scope for artificial recharge.
6	High EC and F with no additional scope for artificial recharge.
7	Groundwater quality within permissible limits for drinking and irrigation with scope for artificial recharge.
8	Groundwater quality within permissible limits for drinking and irrigation with no scope for artificial recharge.

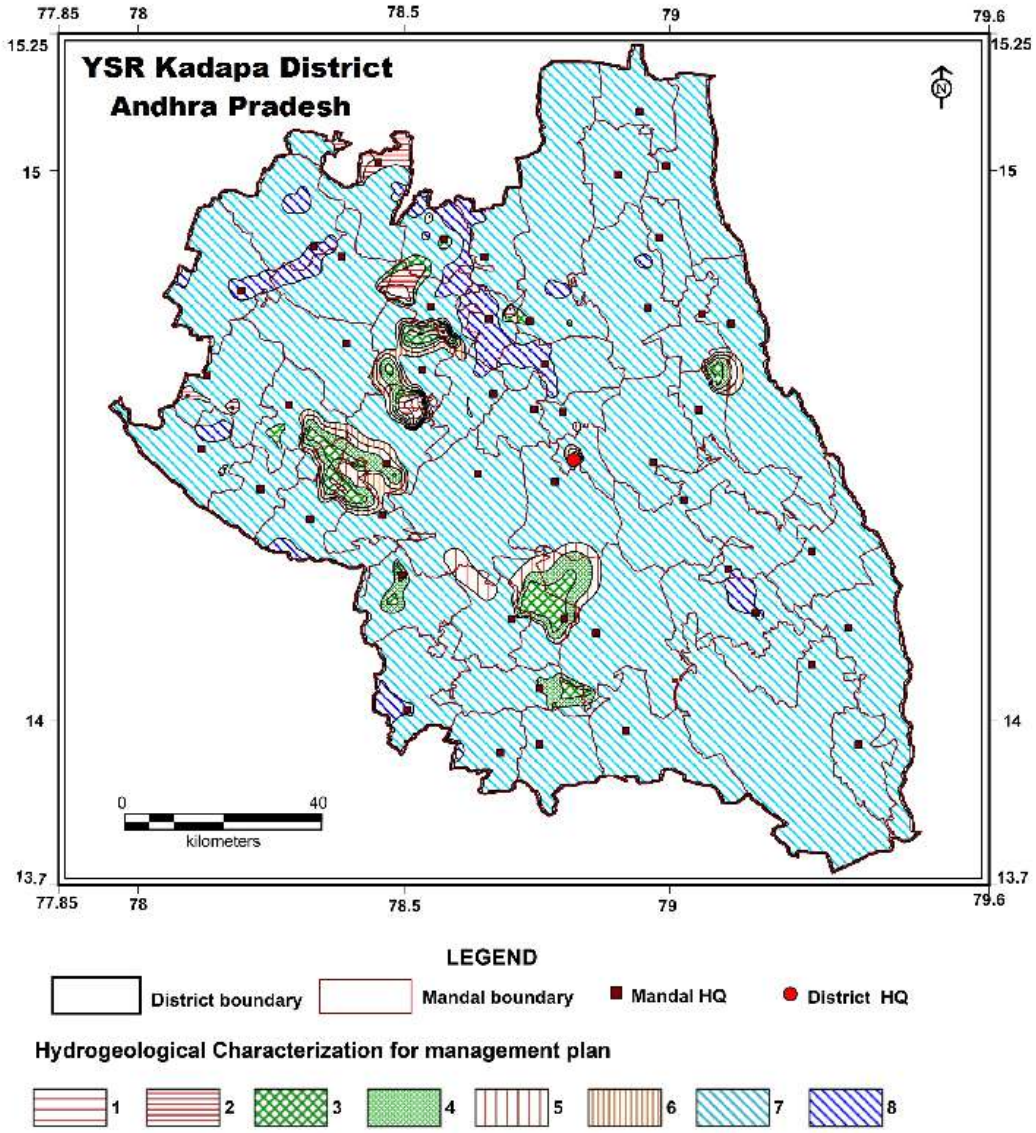


Fig.6.1: Hydrogeological characterization for management plan.

Priority-1 (Area where groundwater development > 100 %)

Area consisting of 148 villages covering ~2631 Km^2 (**Fig.6.1**) is considered as Priority-1 where 358 MCM recharge potential and 11 MCM utilizable yield is avaialable and immediate intervention is required because, here, the stage of groundwater development is > 100%. For sustainable development and management of the groundwater resources the following recommendations are made and summarised in **Annexure-1**.

- 845 artificial recharge structures (666 CD's and 179 mini PT's (good and minor repair structures)) exist in the area.

- In addition to the existing structures, 68 artificial recharge structures (24 CD's with shafts and 44 mini PT's with shafts) with a total cost of **9.5** crores (@ 12 Lakh/CD and 15 Lakh/PT) can be taken up.

- After effective utilization of this yield, there will be 1.5 MCM of ground water recharge with new structures.

- All existing artificial recharge structures are to be desilted and maintained properly.

- Roof top rainwater harvesting structures should be made mandatory to all Government buildings (new and existing).

Priority-2 (A**rea where groundwater development <100 %)**

Area consisting of 860 villages with ~ 12771 Km2 rechargable areas (**Fig.6.1**) is considered as Priority-2, where 1873 MCM recharge potential and 78 MCM utilizable yield is avaialable. The area is again further divided into 8 categories based on hydrogeological characteristics as mentioned above (**Table-6.1)**. For sustainable development and management of groundwater resources, the recommendations are made and summarised in **Annexure-II**.

- 2564 artificial recharge structures (1763 CD's and 801 mini PT's (good and minor repair structures)) exist in the area.

- In addition to the existing structures, 788 Artificial recharge structures (ARS) (344 CD's with shafts and 444 mini PT's with shafts) can be taken up with a cost estimate of **107.8** crores.

- After effective utilization of this yield, there will be 18 MCM of ground water recharge with new structures.

- All existing artificial recharge structures are to be desilted and maintained properly.

- Roof top rainwater harvesting structures should be made mandatory to all Government buildings.

6.1.1.3 Other supply side measures:

- Existing ARS like percolation tanks and check dams categorized under major repair by the state Govt. need to be repaired.

- Existing ARS like percolation tanks and check dams and dried dug wells can be de-silted involving people's participation through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) (NREGA 2005). This will also help in sustainable management of groundwater resources.

6.1.1.4 Water Conservation Measures (WCM) (Farm Ponds):

The farm ponds are the ideal water conservation structures, which are constructed in the low lying areas of the farm. The size of form ponds can be 10 x 10 x 3 m. In the district total 6779 farm ponds exist in 202 villages and additional 17940 farm ponds are recommended (20 in each village in 897 villages) with total cost of **44.85** crores.

6.1.2 Demand side measures: In order to manage the available resources more effectively the following measures are recommended.

6.1.2.1 Ongoing Work

- In the district till date a total number of 169940 no's drip and sprinklers are sanctioned which has irrigated ~169940 ha of land saving ~255 MCM of groundwater from the district considering 30% of net savings as compared to traditional practice of flood irrigation.

6.1.2.2 Proposed Work

- ~47,850 ha of additional land that can be brought under micro-irrigation (@50 ha/village in 957 villages) costing about 339 crores (considering 1 unit/ha @0.6 lakh/ha). With this 95 MCM of ground water can be conserved over the traditional irrigation practices (considering 0.004 MCM/ha for ID crops against 0.006 MCM/ha).

- Change in cropping pattern from water intensive paddy to irrigated dry crops like pulses and oil seeds are recommended, particularly in water stress/Over-exploited/Critical areas. If necessary some regulatory rules may be framed and implemented.

- To avoid the interference of cone of depression between the productive wells, intermittent pumping of bore wells is recommended through regulatory mechanism.

- Power supply should be regulated by giving power in 4 hour spells two times a day in the morning and evening by the concerned department so that pumping of the bore well is carried out in phased manner to allow recuperations of the aquifer and increase sustainability of the bore wells.

- As a mandatory measure, every groundwater user should recharge rainwater through artificial recharge structures in proportionate to the extraction.

6.1.3 Other measures

- A participatory groundwater management (PGWM) approach in sharing of groundwater and monitoring resources on a constant basis along with effective implementation of the existing 'Water, Land and Trees Act' of 2002 (WALTA-2002) are the other measures suggested. Subsidy/incentives on cost involved in sharing of groundwater may be given to the concerned farmers.

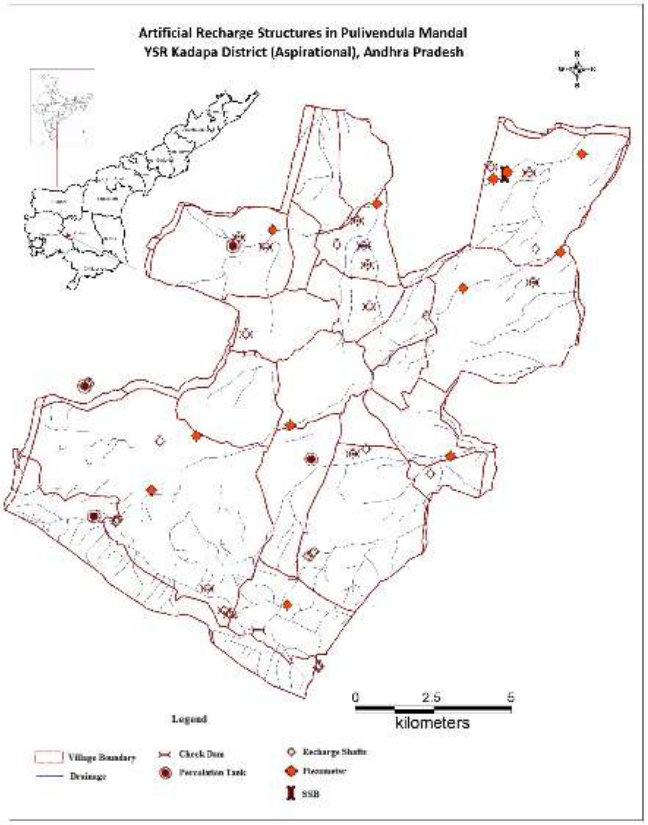
- In urban and rural areas the sewerage line should be constructed to arrest leaching of nitrate.

6.2 Expected Results and Out come

With the above interventions costing Rs 510 crores, the likely benefit would be the net saving of 122.1 MCM of ground water. This will bring down the stage of ground water development by 07 % (from 69 % to 62 %). The other benefits will be more distribution of income among farmers. The onetime cost will be ~4 paisa/litre (Rs 40 /m^3 of ground water).

7.0 Aquifer Rejuvenation Project, Pulivendula, YSR Kadapa District

Salient findings	
Study area	Pulivendula Mandal, YSR Kadapa district, Andhra Pradesh
Area of investigation	163 sq.km.
Annual Rainfall	620 mm
Drainage	Sub dendritic, rectangular to sub rectangular
Geology	Quartzites, shales, limestones (meta sediments), basic intrusive
Problem	Vagaries of monsoon, poor groundwater potential, low natural recharge rate and resource depletion due to expansion of agricultural activities leading to aquifer stress
New Recharge structures implemented	
1) Percolation tanks	4
2) Check dams	16
3) Recharge shafts with wells	36
4) Subsurface barrier	1
5) Piezometers	12
Impact evaluation for 2019	
1) Rainfall recorded (June to Dec in 2019)	522 mm
2) Source of recharge	Rainfall, Canal, Return flow
3) Average water level rise in PZ wells	5.7 m
4) Recharge estimation based on Thiessen polygon method	36.8 MCM
5) Recharge estimation based on sector method (Catchment; middle and tail end areas)	36.8 MCM
6) Natural recharge estimated	12.5 MCM
7) Estimated Artificial recharge component through structures	24.6 MCM
8) Cost of structures	Rs. 5 crores
9) Cost: Benefit ratio	Approx. Rs 2.00 /cubic meter
Findings: • The overall impact in the watershed due to new artificial recharge structures implemented is 2 times the natural recharge quantum, i.e. 24.6 MCM, in spite of deficit rainfall of about 15%. • The cost of water resource created is about Rs. 2 / cubic meter	



Artificial Recharge Structure locations, Pulivendula Mandal.

Latest Photograph (19.09.2020), Motunuthalapalli Village, Pulivendula, YSR kadapa District, AP

Completed CD and RS wells in Pulivendula AR project

Completed PT, CD and RS wells in Pulivendula AR project

Completed CD, RS, SSB, AWLR locations in Pulivendula AR project

Aerial view of a CD site

Proposed supply side interventions in Priority-I *Annexure-I*

Mandal	Village	Existing CD	Existing PT	Proposed CDs	Proposed PTs	Cost of CD @12 lakh	Cost of PT @15 lakh
Chinnamandem	Bonamala	13	3	0	0	0	0
Chinnamandem	Chinnamandem	13	3	0	0	0	0
Chinnamandem	Devagudipalle	14	7	0	0	0	0
Chinnamandem	Diguvagottiveedu	18	7	0	0	0	0
Chinnamandem	Forest	0	0	1	0	12	0
Chinnamandem	Forest	0	0	1	1	12	15
Chinnamandem	Forest	0	0	1	1	12	15
Chinnamandem	Kalibanda	5	13	0	0	0	0
Chinnamandem	Mallur	8	4	0	0	0	0
Chinnamandem	Paramatikona	26	31	0	0	0	0
Chinnamandem	Tsakibanda	15	10	0	0	0	0
Chinnamandem	Vandadi	8	7	0	0	0	0
Kamalapuram	Apparaopalle	0	0	1	1	12	15
Kamalapuram	Chinnachepalle	6	0	0	1	0	15
Kamalapuram	Jambapuram	7	0	0	0	0	0
Kamalapuram	Kamalapuram (Pt)	2	0	0	1	0	15
Kamalapuram	Kokatam	0	0	1	1	12	15
Kamalapuram	Letapalle	2	0	0	0	0	0
Kamalapuram	Nallingayapalle	3	2	0	0	0	0
Kamalapuram	Pandillapalle	1	0	0	0	0	0
Kamalapuram	Peddacheppalle	1	0	0	1	0	15
Kamalapuram	Podadurthi	5	4	0	0	0	0
Kamalapuram	Sambatur	0	0	1	1	12	15
Kamalapuram	T.Sadipirala	8	0	0	1	0	15
Kamalapuram	Yellareddipalle	5	3	0	0	0	0
Kamalapuram	Yerragudipadu	2	0	0	1	0	15
Kodur	Anantharajupeta	7	1	0	0	0	0
Kodur	Chiyyavaram	10	0	0	1	0	15
Kodur	K.Buduguntapalle	13	1	0	0	0	0
Kodur	Kodur	2	0	0	2	0	30
Kodur	Obanapalle	4	2	0	0	0	0
Kodur	Raghavarajupuram	2	0	0	0	0	0
Kodur	Setti Gunta	0	1	0	0	0	0
Kodur	Upparapalle	4	0	0	1	0	15
Kodur	Vellelavari Khandrika	5	0	0	0	0	0
Lingala	Ambakapalle	4	0	0	0	0	0
Lingala	Bonala	6	0	0	0	0	0
Lingala	Chinnakudala	7	0	0	0	0	0
Lingala	Dondlavagu	5	0	0	1	0	15
Lingala	Gunakanepalle	4	0	0	0	0	0

Lingala	Ippatla	8	0	0	0	0	0
Lingala	Kamasamudram	7	0	0	0	0	0
Lingala	Kommanuthala	8	0	0	0	0	0
Lingala	Lingala	5	0	0	0	0	0
Lingala	Lopatnuthala	5	0	0	0	0	0
Lingala	Murarichintala	10	0	0	0	0	0
Lingala	Parnapalli	3	1	0	0	0	0
Lingala	Peddakudala	6	0	0	0	0	0
Lingala	Velidandla	12	0	0	0	0	0
Obulavaripalle	Bommavaram	2	0	0	1	0	15
Obulavaripalle	Botimeedapalle	1	0	0	0	0	0
Obulavaripalle	Chinnaorampadu	7	2	0	0	0	0
Obulavaripalle	Forest	0	0	9	9	108	135
Obulavaripalle	Gadela	5	1	0	0	0	0
Obulavaripalle	Gobburuvaripalle	7	0	0	0	0	0
Obulavaripalle	Govindampalle	8	0	0	0	0	0
Obulavaripalle	Korlakunta	5	0	0	1	0	15
Obulavaripalle	Mukkavaripalle	1	0	0	0	0	0
Obulavaripalle	Peddarampadu	5	8	0	0	0	0
Obulavaripalle	Rallacheruvupalle	0	2	0	0	0	0
Obulavaripalle	Yerraguntakota	7	3	0	0	0	0
Pullampeta	Anantaiahgaripalle	0	1	1	0	12	0
Pullampeta	Ananthasamudram	1	0	0	1	0	15
Pullampeta	Dalavaipalle	2	0	0	0	0	0
Pullampeta	Dandlopalle	3	0	0	1	0	15
Pullampeta	Forest	0	0	6	5	72	75
Pullampeta	Garalamadugu	3	0	0	0	0	0
Pullampeta	Kommanavaripalle	5	2	0	0	0	0
Pullampeta	Pullampeta	1	0	0	0	0	0
Pullampeta	Ramasamudram	1	0	0	0	0	0
Pullampeta	Rangampalle	6	0	0	0	0	0
Pullampeta	Reddipalle	3	1	0	0	0	0
Pullampeta	Thippayapalle	2	0	0	1	0	15
Pullampeta	Vathalur	0	0	1	1	12	15
Sambepalle	Devapatla	19	3	0	0	0	0
Sambepalle	Dudyala	8	3	0	0	0	0
Sambepalle	Gunnikuntla	8	0	0	0	0	0
Sambepalle	Guriginjakunta	21	2	0	0	0	0
Sambepalle	Guttapalle	5	1	0	0	0	0
Sambepalle	Motakatla	6	5	0	0	0	0
Sambepalle	Narayanareddipalle	14	0	0	1	0	15
Sambepalle	Routhukunta	3	2	0	0	0	0
Sambepalle	Sambepalle	4	1	0	0	0	0
Sambepalle	Settipalle	15	12	0	0	0	0
Vempalle	Alavala Padu	9	1	0	0	0	0

Vempalle	Alireddipalle	1	1	0	0	0	0
Vempalle	Kathaluru	16	2	0	0	0	0
Vempalle	Muthukuru	1	0	0	1	0	15
Vempalle	Naguru	1	0	0	1	0	15
Vempalle	Pamalur	8	6	0	0	0	0
Vempalle	Ramireddi Palle	3	0	0	0	0	0
Vempalle	T.Velamvaripalle	18	3	0	0	0	0
Vempalle	Tallapalle	29	5	0	0	0	0
Vempalle	Vempalle	11	0	0	2	0	30
Vemula	Chagaleru	9	5	0	0	0	0
Vemula	Chintalajutur	7	0	0	0	0	0
Vemula	Forest	0	0	1	1	12	15
Vemula	Gollalagudur	7	1	0	0	0	0
Vemula	Gondipalle	6	0	0	0	0	0
Vemula	Meedipentla	8	0	0	1	0	15
Vemula	Nallacheruvupalle	3	0	0	1	0	15
Vemula	Peddajutur	8	1	0	0	0	0
Vemula	V.Kothapalle	10	4	0	0	0	0
Vemula	Velpula	21	0	0	1	0	15
Vemula	Vemula	13	1	0	0	0	0
	Total	**666**	**179**	**24**	**44**	**288**	**660**

Proposed supply side interventions in Priority-II *Annexure-II*

Mandal	Village	Existing CD	Existing PT	Proposed CDs	Proposed PTs	Cost of CD @12 lakh	Cost of PT @15 lakh
Atlur	Atlur	1	0	0	1	0	15
Atlur	Kamalakuru	2	3	0	0	0	0
Atlur	Kamasamudram	1	1	0	0	0	0
Atlur	Kondur	4	0	0	0	0	0
Atlur	Madapur	9	2	0	0	0	0
Atlur	Muthukur	2	0	0	0	0	0
Atlur	Thamballagondi	3	1	0	0	0	0
B Kodur	Akkemgundla	0	0	1	1	12	15
B Kodur	Itigullapadu	0	0	4	3	48	45
B Kodur	Khatragandla	0	0	5	4	60	60
B Kodur	Koduru	6	4	0	0	0	0
B Kodur	Mekavaripalle	2	2	0	0	0	0
B Kodur	Munnelli	4	0	0	2	0	30
B Kodur	Papanapalle	1	0	0	0	0	0
B Kodur	Peddullapalle	3	0	0	0	0	0
B Kodur	Prabhalaveedu	1	0	0	1	0	15
B Kodur	Savisettipalle	0	0	4	4	48	60
Badvel	Anantharajupuram	2	0	0	1	0	15
Badvel	Badvel (Pt)	0	0	1	1	12	15
Badvel	Chennampalle	0	0	1	1	12	15
Badvel	Chintalacheruvu	5	1	0	0	0	0
Badvel	Ethirajupalle	0	0	1	1	12	15
Badvel	Forest	0	0	3	2	36	30
Badvel	Gopalapuram	0	0	1	1	12	15
Badvel	Gunthapalle	0	0	1	1	12	15
Badvel	Imadapuram	0	0	1	0	12	0
Badvel	Konasamudram	0	1	0	0	0	0
Badvel	Kongalaveedu	4	1	0	0	0	0
Badvel	Puttayapalle	0	1	1	0	12	0
Badvel	Rajupalem	0	0	1	1	12	15
Badvel	Thippanapalle	4	0	0	1	0	15
Badvel	Tiruvengalapuram	4	0	0	0	0	0
Badvel	Vanampula	1	1	0	0	0	0
Badvel	Veerapalle	5	0	0	1	0	15
Brahmamgarimattam	Diguva Nelatur	17	4	0	0	0	0
Brahmamgarimattam	Dirasavancha	21	1	0	0	0	0
Brahmamgarimattam	Eguvanelatur	0	0	1	1	12	15
Brahmamgarimattam	Godlaveedu	10	1	0	0	0	0
Brahmamgarimattam	Mallepalle	11	0	0	0	0	0
Brahmamgarimattam	Mudumala	1	1	0	0	0	0
Brahmamgarimattam	Palugurallapalle(Partiv	2	0	0	0	0	0
Brahmamgarimattam	Papireddipalle	0	0	1	0	12	0
Brahmamgarimattam	Pulugurallapalle	0	0	2	2	24	30
Brahmamgarimattam	Rekalakunta	4	1	0	0	0	0
Brahmamgarimattam	Somireddipalle	3	3	0	0	0	0
Brahmamgarimattam	T.Soudaravaripalle	7	0	0	1	0	15
Chakrayapet	Addalamarri	1	0	3	3	36	45
Chakrayapet	Chakrayapet	6	0	0	1	0	15
Chakrayapet	Chilekampalle	7	0	0	1	0	15

Chakrayapet	Errabommanapalle	5	1	0	0	0	0
Chakrayapet	Forest	0	0	2	2	24	30
Chakrayapet	Gandikovvur	2	4	0	0	0	0
Chakrayapet	Kallurupalli	6	0	0	1	0	15
Chakrayapet	Kateneniyerragudi	11	5	0	0	0	0
Chakrayapet	Kumarakalva	5	1	0	0	0	0
Chakrayapet	Kuppam	5	12	0	0	0	0
Chakrayapet	Mahadevapalle	5	5	0	0	0	0
Chakrayapet	Marellamadaka	1	3	0	0	0	0
Chakrayapet	Nersupalle	7	0	0	1	0	15
Chakrayapet	Rajupalle	4	19	0	0	0	0
Chakrayapet	Surabhi	28	9	0	0	0	0
Chapad	Alladupalle	0	0	1	1	12	15
Chapad	Ananthapuram	0	0	2	1	24	15
Chapad	Bhadripalle	0	0	1	1	12	15
Chapad	Chiyyapadu	2	0	0	1	0	15
Chapad	Kutchupapa	1	0	0	0	0	0
Chapad	Madur	0	0	2	2	24	30
Chapad	Pallavolu	2	0	0	1	0	15
Chapad	Vedurur	2	0	0	1	0	15
Chennur	Chinamachupalle	0	0	1	1	12	15
Chennur	Gurrampadu	1	0	0	0	0	0
Chennur	Kanuparthi	0	0	3	3	36	45
Chennur	Upparapalle	1	0	0	1	0	15
Chintha Kommadinne	Chinnakampalle	0	0	2	2	24	30
Chintha Kommadinne	Chintakommadinne	1	0	2	2	24	30
Chintha Kommadinne	Ippapenta	4	0	0	3	0	45
Chintha Kommadinne	Kammavaripalle	0	2	0	0	0	0
Chintha Kommadinne	Kolumulapalle	4	0	0	1	0	15
Chintha Kommadinne	Kopparthi	6	3	0	0	0	0
Chintha Kommadinne	Mamillapalle	0	0	3	3	36	45
Chintha Kommadinne	Papasahebpet	1	3	0	0	0	0
Chintha Kommadinne	Thadigotla	0	0	1	0	12	0
Chitvel	Cherlopalle	3	3	0	0	0	0
Chitvel	Chitvel	0	0	1	1	12	15
Chitvel	Devamachupalle	2	8	0	0	0	0
Chitvel	Forest	0	0	1	1	12	15
Chitvel	Forest	0	0	8	7	96	105
Chitvel	Forest	0	0	10	9	120	135
Chitvel	K.V.R.R. Puram	2	0	0	0	0	0
Chitvel	Kampasamudram	3	1	0	0	0	0
Chitvel	Kampasamudram	3	1	0	0	0	0
Chitvel	Maharajapuram	4	0	0	1	0	15
Chitvel	Malemarpuram	14	0	0	3	0	45
Chitvel	Mallemadugu	0	0	2	2	24	30
Chitvel	Mylapalle	2	1	0	0	0	0
Chitvel	Nagaripadu	0	0	2	2	24	30
Chitvel	Nagavaram	3	0	0	1	0	15
Chitvel	Nethivaripalle	3	1	0	0	0	0
Chitvel	Rajukunta	3	0	0	0	0	0
Chitvel	Thimmayapalem	2	1	0	0	0	0
Chitvel	Thumma Konda	1	1	0	0	0	0
Cuddapah	Chinnachowk	0	0	2	1	24	15
Cuddapah	Cuddapah (M)	0	0	2	2	24	30
Cuddapah	Pathacuddapah	0	0	1	1	12	15

Cuddapah	Putlampalli	0	0	1	1	12	15
Duvvur	Chinna Singanapalle	2	0	0	0	0	0
Duvvur	Chintakunta	1	0	0	0	0	0
Duvvur	Dasaripalle	0	0	4	3	48	45
Duvvur	Duvvur	0	0	2	2	24	30
Duvvur	Gudipadu	0	0	1	1	12	15
Duvvur	Idamadaka	1	0	0	1	0	15
Duvvur	Jillela	2	0	0	1	0	15
Duvvur	Kanagudur	0	0	1	1	12	15
Duvvur	Machanapalle	0	0	1	1	12	15
Duvvur	Madirepalle	3	0	0	1	0	15
Duvvur	Neelapuram	6	0	0	1	0	15
Duvvur	Nelaturu	0	0	1	1	12	15
Duvvur	Sallabasayapalle	1	0	0	0	0	0
Galiveedu	Araveedu	1	5	0	0	0	0
Galiveedu	Eguvagottiveedu	3	16	0	0	0	0
Galiveedu	Galiveedu	0	12	0	0	0	0
Galiveedu	Garugupalli	7	0	0	1	0	15
Galiveedu	Gopanapalle	0	0	1	1	12	15
Galiveedu	Gundlacheruvu	5	2	0	0	0	0
Galiveedu	Korlakunta	3	13	0	0	0	0
Galiveedu	Nooliveedu	10	7	0	0	0	0
Galiveedu	Pandikunta	3	12	0	0	0	0
Galiveedu	Pulikunta	2	0	0	2	0	30
Galiveedu	Pyarampalle	19	0	0	1	0	15
Galiveedu	Talamudipi	1	7	0	0	0	0
Galiveedu	Thumukunta	12	13	0	0	0	0
Galiveedu	Veligallu	5	1	0	0	0	0
Gopavaram	Boddecherla	0	0	1	1	12	15
Gopavaram	Brahmanapalle	7	1	0	0	0	0
Gopavaram	Forest	0	0	2	2	24	30
Gopavaram	Forest	0	0	3	3	36	45
Gopavaram	Forest	0	0	3	3	36	45
Gopavaram	Forest	0	0	5	4	60	60
Gopavaram	Forest	0	0	5	5	60	75
Gopavaram	Forest	0	0	9	8	108	120
Gopavaram	Gopavaram	12	5	0	0	0	0
Gopavaram	Kalvapalle	1	0	0	1	0	15
Gopavaram	Lakkavaripalle	0	0	1	1	12	15
Gopavaram	Madakalavaripalle	0	0	1	1	12	15
Gopavaram	Northramapuram	0	0	1	1	12	15
Gopavaram	Obulam	0	0	1	1	12	15
Gopavaram	Ramapuram	0	0	1	1	12	15
Gopavaram	South Ramapuram	7	1	0	0	0	0
Jammalamadugu	Ambavaram	11	1	0	0	0	0
Jammalamadugu	Danavulapadu	0	0	1	1	12	15
Jammalamadugu	Devagudi	0	0	1	1	12	15
Jammalamadugu	Dharmapuram	0	0	1	1	12	15
Jammalamadugu	Gandikota	4	0	0	3	0	45

Jammalamadugu	Goriganur	0	0	1	1	12	15
Jammalamadugu	Gudemcheruvu	5	0	0	0	0	0
Jammalamadugu	Jammalamadugu	0	0	2	2	24	30
Jammalamadugu	Kothaguntapalle	0	0	1	1	12	15
Jammalamadugu	Peddandlur	7	0	0	1	0	15
Jammalamadugu	Ponnathota	2	0	0	1	0	15
Jammalamadugu	Poorvabommepalle	6	1	0	1	0	15
Jammalamadugu	Poorvapusugumanchipalle	2	0	0	1	0	15
Jammalamadugu	Salevariuppalapadu	3	0	0	2	0	30
Jammalamadugu	Sirigepalle	0	0	1	1	12	15
Jammalamadugu	Sunnapurallapalle	3	1	0	0	0	0
Jammalamadugu	Thugutlapalle	0	0	1	1	12	15
Jammalamadugu	Vemaguntapalle	0	0	1	1	12	15
Kalasapadu	Balayapalle	0	0	1	1	12	15
Kalasapadu	Chennupalle	6	0	0	0	0	0
Kalasapadu	Eguva Thamballapalle	9	1	0	0	0	0
Kalasapadu	Forest	0	0	1	1	12	15
Kalasapadu	Forest	0	0	4	4	48	60
Kalasapadu	Gangayapalle	0	0	1	1	12	15
Kalasapadu	Kalasapadu	2	0	0	1	0	15
Kalasapadu	Kondapeta	0	0	1	1	12	15
Kalasapadu	Kothakota	0	0	2	2	24	30
Kalasapadu	Mahanandi Palle	6	0	0	0	0	0
Kalasapadu	Moolapalle	0	0	1	1	12	15
Kalasapadu	Narasapuram	0	0	1	1	12	15
Kalasapadu	Nayunipalle	0	0	1	1	12	15
Kalasapadu	Pendlimarri	4	4	0	0	0	0
Kalasapadu	Pullareddypalle	5	0	0	0	0	0
Kalasapadu	Rajupalem	5	7	0	0	0	0
Kalasapadu	Sankavaram	3	0	1	4	12	60
Kalasapadu	Tellapadu	3	0	0	1	0	15
Kalasapadu	Uppalur	0	0	1	1	12	15
Kalasapadu	Varigunta	0	0	1	1	12	15
Khajipet	Bhumayapalle	1	0	0	0	0	0
Khajipet	Chemullapalle	1	0	0	0	0	0
Khajipet	Chennamukkapalle	0	0	1	1	12	15
Khajipet	Dumpalagattu	2	0	0	0	0	0
Khajipet	Eturu	0	0	1	1	12	15
Khajipet	Khajipet Sunkesula	1	0	0	0	0	0
Khajipet	Miduthur	0	0	1	1	12	15
Khajipet	Nagasanipalle	18	1	0	0	0	0
Khajipet	Pathur	3	0	0	0	0	0
Khajipet	Pullur	1	1	0	0	0	0
Khajipet	Thavvaripalle	1	0	0	0	0	0
Khajipet	Thripuravaram	0	0	1	1	12	15

Khajipet	Thudumuladinne	1	0	0	1	0	15
Kondapuram	Anatapuram	0	0	1	1	12	15
Kondapuram	Bedaduru	4	0	0	1	0	15
Kondapuram	Bukkapatnam	0	0	1	1	12	15
Kondapuram	Burujupalli	5	0	0	0	0	0
Kondapuram	Chamaluru	3	4	0	0	0	0
Kondapuram	Eturu	0	0	1	1	12	15
Kondapuram	Gandlur	0	0	1	1	12	15
Kondapuram	K.Bommepalli	0	0	1	1	12	15
Kondapuram	K.Sugumanchipalle	2	0	0	1	0	15
Kondapuram	Koduru	0	0	2	2	24	30
Kondapuram	Konavaripalli	0	0	1	0	12	0
Kondapuram	Kondapuram	2	0	0	0	0	0
Kondapuram	Koppolu	0	0	1	1	12	15
Kondapuram	Lavanuru	1	0	0	1	0	15
Kondapuram	Neknampeta	0	0	1	0	12	0
Kondapuram	Obannapeta	0	0	1	1	12	15
Kondapuram	Pottipadu	5	0	0	1	0	15
Kondapuram	Regadipally	1	0	0	0	0	0
Kondapuram	S.Timmapuram	3	0	0	0	0	0
Kondapuram	Sankepalli	1	0	0	0	0	0
Kondapuram	Sivapuram	0	0	1	0	12	0
Kondapuram	Thallaproddatur	2	0	0	1	0	15
Kondapuram	Venkaiah Kalva	10	0	0	1	0	15
Kondapuram	Yenamalachintala	4	1	0	0	0	0
Lakkireddipalle	Ananthapuram	5	2	0	0	0	0
Lakkireddipalle	Brahmanayerragudi	5	0	0	3	0	45
Lakkireddipalle	Dappepalle	0	12	2	0	24	0
Lakkireddipalle	Forest	0	0	1	1	12	15
Lakkireddipalle	Kakulavaram	3	2	0	0	0	0
Lakkireddipalle	Kurnoothala	8	1	0	1	0	15
Lakkireddipalle	Lakkireddipalle	2	2	0	0	0	0
Lakkireddipalle	Maddirevula	5	7	0	0	0	0
Lakkireddipalle	Pandillapalle	0	2	1	0	12	0
Muddanur	Aravetipalle	0	0	1	1	12	15
Muddanur	Bondalakunta	4	6	0	0	0	0
Muddanur	Chinnadudyala	4	2	0	0	0	0
Muddanur	Chintakunta	5	0	0	1	0	15
Muddanur	Denepalle	2	5	0	0	0	0
Muddanur	K.Thimmapuram	4	0	0	0	0	0
Muddanur	Kolavali	8	0	0	1	0	15
Muddanur	Korrapadu	1	5	0	0	0	0
Muddanur	Kosinepalle	0	0	1	1	12	15
Muddanur	Mangapatnam	3	10	0	0	0	0
Muddanur	Muddanur	4	4	0	0	0	0

Muddanur	Nallaballe	3	1	0	0	0	0
Muddanur	Obulapuram	2	9	0	0	0	0
Muddanur	Penikalapadu	1	3	0	0	0	0
Muddanur	Rajulaguravaiahpalle	6	3	0	0	0	0
Muddanur	Uppalur	9	2	0	0	0	0
Muddanur	Velpucherla	5	2	0	0	0	0
Muddanur	Yamavaram	4	0	0	1	0	15
Mylavaram	Bestavemula	10	1	0	0	0	0
Mylavaram	Chinna Komerla	3	0	0	0	0	0
Mylavaram	Dhodium	10	0	0	3	0	45
Mylavaram	Dommara Nandyala	0	0	1	1	12	15
Mylavaram	Kallutla	2	0	0	0	0	0
Mylavaram	Khaderabad	0	0	1	1	12	15
Mylavaram	Lingapuram	5	0	0	0	0	0
Mylavaram	Malameedi Kambala Dinne	6	0	0	2	0	30
Mylavaram	Murapandi	6	0	0	1	0	15
Mylavaram	Mylavaram	3	1	0	0	0	0
Mylavaram	Nawabpet	2	0	0	0	0	0
Mylavaram	Nelanuthala	0	0	1	1	12	15
Mylavaram	Ponnam Palle	0	0	1	1	12	15
Mylavaram	Ramachandraya Palle	6	0	0	1	0	15
Mylavaram	Talamanchi Patnam	1	0	0	0	0	0
Mylavaram	Thorri Vemula	2	0	0	0	0	0
Mylavaram	Vaddirala	8	0	0	0	0	0
Mylavaram	Veparala [Pt]	0	0	1	1	12	15
Nandalur	Adepur	2	2	0	0	0	0
Nandalur	Chintalakunta	0	0	1	1	12	15
Nandalur	Forest	0	0	1	1	12	15
Nandalur	Forest	0	0	5	4	60	60
Nandalur	Lebaka	2	0	0	1	0	15
Nandalur	Nallathimmayapalle	0	1	0	0	0	0
Nandalur	Nandalur	2	0	0	0	0	0
Nandalur	Patur	2	0	0	0	0	0
Nandalur	Pothapi	1	0	0	1	0	15
Nandalur	Tangutur Vengamambapura	0	1	0	0	0	0
Nandalur	Tanguturu	2	2	0	0	0	0
Peddamudium	Bheemagundam	1	0	0	0	0	0
Peddamudium	Chinamudium	0	0	1	1	12	15
Peddamudium	Chinnapasupula	5	0	0	0	0	0
Peddamudium	Diguva Kalvatala	9	0	0	0	0	0
Peddamudium	Gundlakunta	1	0	0	1	0	15
Peddamudium	J.Kottalapalli	2	0	0	0	0	0
Peddamudium	Jangalapalli	0	1	1	0	12	0
Peddamudium	Kondasunkesula	6	0	0	0	0	0

Peddamudium	Medidinne	1	0	0	0	0	0
Peddamudium	N.Kottalapalli	0	0	1	1	12	15
Peddamudium	Nemalladinne	0	0	1	1	12	15
Peddamudium	Palur	7	0	0	1	0	15
Peddamudium	Pedda Pasupalle	4	0	0	3	0	45
Peddamudium	Peddamudium	1	0	0	1	0	15
Peddamudium	Suddapalli	0	0	1	1	12	15
Peddamudium	Ulavapalli	0	0	1	1	12	15
Penagaluru	Forest	0	0	1	1	12	15
Penagaluru	Itimarpuram	7	0	0	2	0	30
Penagaluru	Kondur	8	1	0	2	0	30
Penagaluru	Nallapureddipalle	0	4	1	0	12	0
Penagaluru	Narasingarajupuram	0	1	0	0	0	0
Penagaluru	Obili	0	1	0	0	0	0
Penagaluru	Peddayapalle	0	0	2	2	24	30
Penagaluru	Penagalur	0	2	0	0	0	0
Penagaluru	Pondalur	6	0	0	1	0	15
Penagaluru	Singareddipalle	0	1	0	0	0	0
Penagaluru	Velagacherla	0	0	1	1	12	15
Pendlimarri	Chabali	0	0	1	0	12	0
Pendlimarri	Cheemalapenta	5	0	0	2	0	30
Pendlimarri	Forest	0	0	9	8	108	120
Pendlimarri	Ganganapalle	9	2	0	3	0	45
Pendlimarri	Gondi Palle	9	3	0	0	0	0
Pendlimarri	Konduru	5	9	0	0	0	0
Pendlimarri	Machanur	11	3	0	0	0	0
Pendlimarri	Moillakalava	1	0	0	0	0	0
Pendlimarri	Nandimandalam	3	0	0	3	0	45
Pendlimarri	Peddadasari Palle	0	0	3	3	36	45
Pendlimarri	Pendlimarri	7	3	0	0	0	0
Pendlimarri	Sangatipalle	2	0	0	0	0	0
Pendlimarri	Thippireddipalle	0	0	1	1	12	15
Pendlimarri	Tummalur	1	3	0	0	0	0
Pendlimarri	Vellatur	8	0	0	0	0	0
Porumamilla	Akkalreddipalle	5	0	0	1	0	15
Porumamilla	Challagirigella	8	4	0	0	0	0
Porumamilla	Cherlopalle	0	0	2	2	24	30
Porumamilla	Chinayerasala	2	2	0	0	0	0
Porumamilla	Dammanapalle	2	0	0	1	0	15
Porumamilla	Forest	0	0	7	6	84	90
Porumamilla	Ganugapenta	6	8	0	0	0	0
Porumamilla	Kavalakuntla	2	3	0	0	0	0
Porumamilla	Korrapatupalle	1	1	0	0	0	0
Porumamilla	Musalreddipalle	5	1	0	0	0	0
Porumamilla	Porumamilla	0	2	1	0	12	0

Porumamilla	Pulliveedu	4	2	0	0	0	0
Porumamilla	Ranga Samudram	6	1	0	1	0	15
Porumamilla	Sancharala	5	0	0	1	0	15
Porumamilla	Siddavaram	3	2	0	0	0	0
Porumamilla	Venkataramapuram	1	2	0	0	0	0
Porumamilla	Yellapalle	0	0	1	1	12	15
Proddutur	Bollavaram In(Mun.Area)	0	0	1	1	12	15
Proddutur	Chowdur	1	0	0	1	0	15
Proddutur	Gopavaram	2	0	0	0	0	0
Proddutur	Kallur	2	0	0	1	0	15
Proddutur	Kamanur	4	0	0	1	0	15
Proddutur	Kothapalle	0	0	1	1	12	15
Proddutur	Modameedipalle (R)	0	0	1	1	12	15
Proddutur	Peddasettipalle	0	0	2	1	24	15
Proddutur	Proddatur (M)	0	0	1	1	12	15
Proddutur	Rameswaram (R)	0	0	1	1	12	15
Proddutur	Thallamapuram	1	0	0	1	0	15
Pulivendla	Atchavalle	2	6	0	0	0	0
Pulivendla	Erraballe	0	0	2	1	24	15
Pulivendla	K.Velamavanipalle	0	0	1	1	12	15
Pulivendla	Konampalle	1	0	0	0	0	0
Pulivendla	Korrapadu	0	0	1	0	12	0
Pulivendla	Ragimanupalle	1	0	0	0	0	0
Pulivendla	Ulimella	0	0	1	1	12	15
Pulivendula	Forest	0	0	1	1	12	15
Rajampet	Akepadu	8	8	0	0	0	0
Rajampet	Bahirajapalle	0	0	1	1	12	15
Rajampet	Brahmanapalle	5	0	0	0	0	0
Rajampet	Forest	0	0	1	1	12	15
Rajampet	Forest	0	0	1	1	12	15
Rajampet	Gundlur	3	2	0	0	0	0
Rajampet	Kitchamambapuram	0	0	1	1	12	15
Rajampet	Kothapalle	0	2	0	0	0	0
Rajampet	Madanagopalapuram	2	0	0	0	0	0
Rajampet	Mandapalle	2	3	0	0	0	0
Rajampet	Mannur	0	0	1	1	12	15
Rajampet	Mittameedapalle	3	2	0	0	0	0
Rajampet	Poli	3	2	0	0	0	0
Rajampet	Pulapathuru	11	5	0	0	0	0
Rajampet	Rollabuduguntapalle	3	0	0	1	0	15
Rajampet	Rollamadugu	0	14	1	0	12	0
Rajampet	Seshamambapuram	1	1	0	0	0	0
Rajampet	Sitarampuram	2	7	0	0	0	0
Rajampet	Tallapaka	2	3	0	0	0	0
Rajampet	Utukur	2	2	0	0	0	0

Raju Palem	Arakatavemula	1	0	1	2	12	30
Raju Palem	Chinna Settipalle	1	0	0	1	0	15
Raju Palem	Eruvapalem	1	0	0	0	0	0
Raju Palem	Gadegudur	0	0	1	1	12	15
Raju Palem	Gopayapalle	0	0	1	1	12	15
Raju Palem	Korrapadu	0	0	2	2	24	30
Raju Palem	Kulur	0	0	1	1	12	15
Raju Palem	Paidala	3	0	0	1	0	15
Raju Palem	Parlapadu	1	0	0	1	0	15
Raju Palem	Pottipadu	0	0	1	1	12	15
Raju Palem	Tangatur	0	0	2	2	24	30
Raju Palem	Velavali	0	0	2	2	24	30
Raju Palem	Vellala	0	0	2	2	24	30
Ramapuram	Bandlapalle	19	8	0	0	0	0
Ramapuram	Chitlur	12	6	0	0	0	0
Ramapuram	Gopagudipalle	4	1	0	0	0	0
Ramapuram	Hasanapuram	9	8	0	0	0	0
Ramapuram	Kalpanayunicheruvu	4	9	0	0	0	0
Ramapuram	Nallaguttapalle	13	2	0	0	0	0
Ramapuram	Neelakantharaopeta	17	6	0	0	0	0
Ramapuram	Rachapalle	2	0	0	0	0	0
Ramapuram	Saraswathipalle	14	1	0	0	0	0
Ramapuram	Suddamalla	11	7	0	0	0	0
Rayachoti	Abbavaram	3	1	0	0	0	0
Rayachoti	Chennamukkapalle	14	0	0	0	0	0
Rayachoti	Forest	0	0	2	1	24	15
Rayachoti	Gorlamudiveedu	8	13	0	0	0	0
Rayachoti	Katimayakunta	13	11	0	0	0	0
Rayachoti	Madhavaram	1	0	0	1	0	15
Rayachoti	Masapet	0	0	1	1	12	15
Rayachoti	Pemmadapalle	4	1	0	0	0	0
Rayachoti	Rayachoti	0	0	1	1	12	15
Rayachoti	Sibyala	29	7	0	0	0	0
Rayachoti	Yandapalle	17	5	0	0	0	0
S Mydukur	Audireddipalle	14	1	0	0	0	0
S Mydukur	Forest	0	0	23	22	276	330
S Mydukur	Ganjikunta	1	0	0	0	0	0
S Mydukur	Mittamanipalle	20	2	0	0	0	0
S Mydukur	Nandyalampeta	2	0	0	0	0	0
S Mydukur	Onipenta	11	0	0	0	0	0
S Mydukur	Thippireddipalle	6	0	0	0	0	0
Sidhout	Forest	0	0	2	2	24	30
Sidhout	Forest	0	0	24	23	288	345
Sidhout	Jangalapalle	3	0	0	0	0	0
Sidhout	Jyothi	3	0	0	0	0	0

Sidhout	Kadapayapalle	0	3	0	0	0	0
Sidhout	Machupalle	1	9	0	0	0	0
Sidhout	Mulapalle	4	0	0	0	0	0
Sidhout	Nekanapuram	4	6	0	0	0	0
Sidhout	Peddapalle	9	3	0	0	0	0
Sidhout	S.Rajampeta	1	0	0	0	0	0
Sidhout	Shakarajupalle	6	3	0	0	0	0
Sidhout	Sidhout @ Siddavattam	4	0	0	0	0	0
Sidhout	Tokkolu	2	1	0	0	0	0
Sidhout	Vontithatipalle	4	0	0	0	0	0
Simhadripuram	Ankalammagudur	2	3	0	0	0	0
Simhadripuram	Balapanur	9	3	0	0	0	0
Simhadripuram	Bidinamcherla	7	0	0	0	0	0
Simhadripuram	Chavvaripalle	0	1	0	0	0	0
Simhadripuram	Duddekunta	5	0	0	1	0	15
Simhadripuram	Gurjala	10	2	0	0	0	0
Simhadripuram	Himakuntla	5	1	0	0	0	0
Simhadripuram	Kasanur	4	0	0	2	0	30
Simhadripuram	Lomada	6	3	0	0	0	0
Simhadripuram	Maddulapaya	0	0	1	1	12	15
Simhadripuram	Nandyalampalle	0	3	0	0	0	0
Simhadripuram	Nidivelagala	0	0	1	1	12	15
Simhadripuram	Pydipalem	0	1	2	1	24	15
Simhadripuram	Ravulakolanu	5	1	0	0	0	0
Simhadripuram	Simhadripuram	5	3	0	0	0	0
Simhadripuram	Sunkesula	2	0	0	1	0	15
Simhadripuram	Thelike	12	8	0	0	0	0
T Sundupalle	Bhagampalle	1	4	0	0	0	0
T Sundupalle	Forest	0	0	8	7	96	105
T Sundupalle	Gundlapalle	0	9	0	0	0	0
T Sundupalle	Madithadu	8	15	0	0	0	0
T Sundupalle	Mudampadu	9	1	0	0	0	0
T Sundupalle	Peddinenikalva	13	8	0	0	0	0
T Sundupalle	Polimerapalle	7	0	0	2	0	30
T Sundupalle	Rayavaram	12	1	0	1	0	15
T Sundupalle	Reddivaripalle	2	0	0	0	0	0
T Sundupalle	T.Sundupalle	30	17	0	0	0	0
T Sundupalle	Thimmasamudram	7	3	0	0	0	0
T Sundupalle	Yerramanenipalem	25	31	0	0	0	0
Thandur	Agadur	3	3	0	0	0	0
Thandur	Bhadrampalle	2	0	0	1	0	15
Thandur	Buchupalle	1	0	0	1	0	15
Thandur	Gotur	2	4	0	0	0	0
Thandur	Gundlamadugu	9	1	0	0	0	0
Thandur	Inagalur	1	0	0	1	0	15

Thandur	Madur	2	2	0	0	0	0
Thandur	Mallela	21	59	0	0	0	0
Thandur	Palur	0	1	1	0	12	0
Thandur	Santhakovvur	9	15	0	0	0	0
Thandur	Thelluru	4	0	0	1	0	15
Thandur	Thondur	1	5	0	0	0	0
Thandur	Udavagandla	5	0	0	1	0	15
Vallur	Ambavaram	1	0	0	1	0	15
Vallur	Gotur	3	1	0	0	0	0
Vallur	Jangampalle	0	0	1	1	12	15
Vallur	Koppolu	5	0	0	1	0	15
Vallur	Kotluru	10	0	0	1	0	15
Vallur	Lebaka	0	0	1	1	12	15
Vallur	Paidikalva	9	0	0	1	0	15
Vallur	Peddaputha	3	0	0	0	0	0
Vallur	Tappetla	0	0	1	1	12	15
Vallur	Thollaganganapalle	2	0	0	1	0	15
Vallur	Vallur	4	0	0	1	0	15
Veeraballe	Forest	0	0	1	1	12	15
Veeraballe	Forest	0	0	7	6	84	90
Veeraballe	Gadikota	3	0	0	0	0	0
Veeraballe	Matli	5	5	0	0	0	0
Veeraballe	Odiveedu	6	2	0	0	0	0
Veeraballe	Peddiveedu	3	1	0	0	0	0
Veeraballe	Sanipaya	3	1	0	0	0	0
Veeraballe	Somavaram	4	0	0	0	0	0
Veeraballe	Veeraballe	8	24	0	0	0	0
Veeraballe	Vongimalla	9	0	0	0	0	0
Veerapunayunipalle	Alidena	6	0	0	1	0	15
Veerapunayunipalle	Animela	2	0	0	2	0	30
Veerapunayunipalle	Gonumakulapalle	5	0	0	0	0	0
Veerapunayunipalle	Indukur	12	0	0	1	0	15
Veerapunayunipalle	Kommaddi	10	4	0	0	0	0
Veerapunayunipalle	Lingala	0	0	1	1	12	15
Veerapunayunipalle	Moillacheruvu	1	0	0	1	0	15
Veerapunayunipalle	Northpalagiri	3	0	0	2	0	30
Veerapunayunipalle	Payasampalle	10	0	0	0	0	0
Veerapunayunipalle	Southpalagiri	5	0	0	1	0	15
Veerapunayunipalle	U.Rajupalem	0	0	1	1	12	15
Veerapunayunipalle	Urutur	1	0	1	2	12	30
Veerapunayunipalle	Veldurthi	15	3	0	0	0	0
Vontimitta	Chintarajupalle	13	0	0	0	0	0
Vontimitta	Forest	0	0	2	1	24	15
Vontimitta	Forest	0	0	3	2	36	30
Vontimitta	Gangaperuru	4	0	0	0	0	0

Vontimitta	Gollapalle	9	0	0	0	0	0
Vontimitta	Konarajupalle	3	0	0	0	0	0
Vontimitta	Mantapampalle	7	0	0	0	0	0
Vontimitta	Pennaperuru	1	0	0	0	0	0
Vontimitta	Rachagudipalle	14	1	0	0	0	0
Vontimitta	Vontimetta	2	0	0	0	0	0
Yerraguntla	Chilamkur	12	0	0	2	0	30
Yerraguntla	Chinnadandluru	0	0	2	1	24	15
Yerraguntla	Hanumanagutti	4	0	0	1	0	15
Yerraguntla	Illuru	2	0	0	0	0	0
Yerraguntla	Kalamalla	6	0	0	2	0	30
Yerraguntla	Koduru	0	0	1	1	12	15
Yerraguntla	Malepadu	5	0	0	1	0	15
Yerraguntla	Nidizivve	2	0	0	1	0	15
Yerraguntla	Peddanapadu	4	0	0	1	0	15
Yerraguntla	Potladurthi	2	0	0	1	0	15
Yerraguntla	T.Sunkesala	0	0	1	1	12	15
Yerraguntla	Thippaluru	6	0	0	0	0	0
Yerraguntla	Valasapalle	4	0	0	1	0	15
Yerraguntla	Yerraguntla	0	0	1	1	12	15
	Total	**1763**	**801**	**344**	**444**	**4128**	**6660**

Exploratory well details of deep wells (200m.) in YSR Kadapa district *Annexure-III*

S.no	Site	Mandal	Well type	Total depth	Weathered depth(m.bgl)	Deepest fracture (m.bgl)	Yield (lps)	Geology	Year
1	Kislampalle	Obulavaripalle	OW	200	8	36.5	2.11	Shales	1990-98
2	Peramvaripalle	Penagalur	EW	208	17.5	187.3	0.592	Shales	1990-98
3	Penagalur	Penagalur	EW	200	20.8	133.3	2.9	Shale	1990-98
4	Balapanur	Pulivendula	EW	200	11.5	85	1.76	Shales	1990-98
5	Kanumakuidakottalu	Pulivendula	EW	200	49.42	129	1.76	Shales	1990-98
6	Pulivendula	Pulivendula	EW	200	25.4	89	0.8	Shales	1990-98
7	Pulivendula	Pulivendula	EW	200	6.5	176	6.3	Shales	1990-98
8	Pulivendula	Pulivendula	OW	200	8.5	173	3.4	Shales	1990-98
9	Bramhanapalle	Rajampeta	EW	200	2.1	134	0	Shales	1990-98
10	Mannur	Rajampeta	EW	200	11.85	137.2	6.2	Shales	1990-98
11	Simhadripuram	Simhadripuram	EW	200	12.2	23	0.8	Shales	1990-98
12	Mallela	Tondur	EW	200	11.7	62	0.77	shale	1990-98
13	Kumbagiri	Atlur	EW Aq-II	200	11.5	102.6	0.78	shale	18-19
14	Besthapalli	Chinna mandem	EW OF AQ-II	200	5.5	105.3	0.07	Granite & Dolerite	18-19
15	Kayalwandlapalli	Chinna mandem	EW OF AQ-II	200	8.7	192	0.07	Granite	18-19
16	Kesshapuram	Chinna mandem	EW OF AQ-II	200	5.5	19.9	0.78	Granite	18-19
17	Padamaiona	Chinna mandem	EW OF AQ-II	200	15	59	0.01	Granite	18-19
18	Nakkalavandlapalli	Gaaliveedu	EW OF AQ-II	200	10	62.6	1.19	Granite & Dolerite	18-19
19	Vishwanathpuram	Kadapa	EW Aq-II	200	17.5	165.6	0.78	shale	18-19

20	Gangarajupuram	Kodur	EW Aq-2	200	35.5	163.6	0.78	Shale/Limestone	18-19
21	Lakkireddypalli	Lakkireddypalli	EW OF AQ-II	200	10.5	69	0.01	Granite	18-19
22	Somalavandlapalli	Lakkireddypalli	EW OF AQ-II	200	5.5	68	0	Granite	18-19
23	Kothachoparavaripalli	Nandalur	EW Aq-II	200	23.5	74.1	4.25	Shale	18-19
24	Kothachoparavaripalli	Nandalur	OW Aq-II	200	20	137.1	2.43	Shale	18-19
25	Pulapatru	Nandalur	EW Aq-II	200	11.5	86.3	6.71	shale/carbonaceous shale	18-19
26	Waddipalli	Sambepalli	EW OF AQ-II	200	11.5	111.4	0.04	Granite	18-19
27	OW Of Aq-II At Machupally	Sidhout	OW Aq-II	200	17.5	178.8	6.71	Shale	18-19
28	Gundlapalli	T Sundupalli	EW OF AQ-II	200	11.15	62.1	0.02	Granite	18-19
29	Rayavaram	T Sundupalli	EW OF AQ-II	200	17.7	18.7	Meager	Granite	18-19
30	Appayagaripalli	T.Sundupalli	EW OF AQ-II	200	7.5	8.5	Meager	Granite	18-19
31	Nandalur	Tangutur	EW OF AQ-II	200	39.49	184	0.21	shale	18-19
32	Chintarajupalle	Vontimitta	OW AQ-II	200	19.35	58.9	6.71	shale/sandstone	18-19
33	Gangaperuru	Vontmitta	OW Aq-II	200	11.5	81.2	8.2	shale	18-19
34	Mallampet	Vontmitta	EW Aq-II	200	29.5	53.8	0.07	shale	18-19
35	M.Rachepalli	Chitvel	EW-II of AQ-II	200	25.6	166.2	0.58	Shale	17-18
36	Kokaladoddi	Kodur	EW of AQ-II	200	31	175.3	2.43	Shale	17-18
37	Erraguntlakota	Oblavaripalli	EW of AQ-II	200	8.5	139.7	0.58	Shale	17-18
38	Pullampet	Pullampet	EW	200	11	66	0.08	Shale/Limestone	17-18

39	Gundlur	Rajampet	OW 2	200.05	29.3	159.95	11.72	Shale/Limestone	17-18
40	Kadapa	Rajampet	EW	200	16	141	11.72	Shale/Limestone	17-18
41	Bonala	Lingala	EW	200	6.1	125.5	0.76	Dolomite	2018
42	Lingala	Lingala	EW	200	2.3	3.3	0.077	Dolomite	2018
43	Nandimandalam	Pendlimarri	EW	200	12.16	171.3	1.5	Dolomite	2018
44	Nandimandalam	Pendlimarri	OW	200	12.77	179.3	3.3	Dolomite	2018
45	Jangamreddypalle	Simhadripuram	EW	200	12.19	44.2	0.21	Dolomite	2018
46	Sunkesula	Simhadripuram	EW	200	6.08	191.5	2.1	Shale & Dolomite	2018
47	Narapareddigaripalli	Pulivendula	EW	200	18	19	Meager	Shales	2019
48	Ullimela	Pulivendula	EW	200	24	193	0.0135	Shales	2019
49	Bhoomigaripalli	Vemula	EW	200	17.38	120	0.7823	shale	2019
50	V.Kottapalli	Vemula	EW	200	24.5	188	1.186	shale	2019

Proposed supply side interventions in Priority-I *Annexure-I*

Mandal	Village	Existing CD	Existing PT	Proposed CDs	Proposed PTs	Cost of CD @12 lakh	Cost of PT @15 lakh
Chinnamandem	Bonamala	13	3	0	0	0	0
Chinnamandem	Chinnamandem	13	3	0	0	0	0
Chinnamandem	Devagudipalle	14	7	0	0	0	0
Chinnamandem	Diguvagottiveedu	18	7	0	0	0	0
Chinnamandem	Forest	0	0	1	0	12	0
Chinnamandem	Forest	0	0	1	1	12	15
Chinnamandem	Forest	0	0	1	1	12	15
Chinnamandem	Kalibanda	5	13	0	0	0	0
Chinnamandem	Mallur	8	4	0	0	0	0
Chinnamandem	Paramatikona	26	31	0	0	0	0
Chinnamandem	Tsakibanda	15	10	0	0	0	0
Chinnamandem	Vandadi	8	7	0	0	0	0
Kamalapuram	Apparaopalle	0	0	1	1	12	15
Kamalapuram	Chinnachepalle	6	0	0	1	0	15
Kamalapuram	Jambapuram	7	0	0	0	0	0
Kamalapuram	Kamalapuram (Pt)	2	0	0	1	0	15
Kamalapuram	Kokatam	0	0	1	1	12	15
Kamalapuram	Letapalle	2	0	0	0	0	0
Kamalapuram	Nallingayapalle	3	2	0	0	0	0
Kamalapuram	Pandillapalle	1	0	0	0	0	0
Kamalapuram	Peddacheppalle	1	0	0	1	0	15
Kamalapuram	Podadurthi	5	4	0	0	0	0
Kamalapuram	Sambatur	0	0	1	1	12	15
Kamalapuram	T.Sadipirala	8	0	0	1	0	15
Kamalapuram	Yellareddipalle	5	3	0	0	0	0
Kamalapuram	Yerragudipadu	2	0	0	1	0	15
Kodur	Anantharajupeta	7	1	0	0	0	0
Kodur	Chiyyavaram	10	0	0	1	0	15
Kodur	K.Buduguntapalle	13	1	0	0	0	0
Kodur	Kodur	2	0	0	2	0	30
Kodur	Obanapalle	4	2	0	0	0	0
Kodur	Raghavarajupuram	2	0	0	0	0	0
Kodur	Setti Gunta	0	1	0	0	0	0
Kodur	Upparapalle	4	0	0	1	0	15
Kodur	Vellelavari Khandrika	5	0	0	0	0	0
Lingala	Ambakapalle	4	0	0	0	0	0
Lingala	Bonala	6	0	0	0	0	0
Lingala	Chinnakudala	7	0	0	0	0	0
Lingala	Dondlavagu	5	0	0	1	0	15
Lingala	Gunakanepalle	4	0	0	0	0	0

Lingala	Ippatla	8	0	0	0	0	0
Lingala	Kamasamudram	7	0	0	0	0	0
Lingala	Kommanuthala	8	0	0	0	0	0
Lingala	Lingala	5	0	0	0	0	0
Lingala	Lopatnuthala	5	0	0	0	0	0
Lingala	Murarichintala	10	0	0	0	0	0
Lingala	Parnapalli	3	1	0	0	0	0
Lingala	Peddakudala	6	0	0	0	0	0
Lingala	Velidandla	12	0	0	0	0	0
Obulavaripalle	Bommavaram	2	0	0	1	0	15
Obulavaripalle	Botimeedapalle	1	0	0	0	0	0
Obulavaripalle	Chinnaorampadu	7	2	0	0	0	0
Obulavaripalle	Forest	0	0	9	9	108	135
Obulavaripalle	Gadela	5	1	0	0	0	0
Obulavaripalle	Gobburuvaripalle	7	0	0	0	0	0
Obulavaripalle	Govindampalle	8	0	0	0	0	0
Obulavaripalle	Korlakunta	5	0	0	1	0	15
Obulavaripalle	Mukkavaripalle	1	0	0	0	0	0
Obulavaripalle	Peddarampadu	5	8	0	0	0	0
Obulavaripalle	Rallacheruvupalle	0	2	0	0	0	0
Obulavaripalle	Yerraguntakota	7	3	0	0	0	0
Pullampeta	Anantaiahgaripalle	0	1	1	0	12	0
Pullampeta	Ananthasamudram	1	0	0	1	0	15
Pullampeta	Dalavaipalle	2	0	0	0	0	0
Pullampeta	Dandlopalle	3	0	0	1	0	15
Pullampeta	Forest	0	0	6	5	72	75
Pullampeta	Garalamadugu	3	0	0	0	0	0
Pullampeta	Kommanavaripalle	5	2	0	0	0	0
Pullampeta	Pullampeta	1	0	0	0	0	0
Pullampeta	Ramasamudram	1	0	0	0	0	0
Pullampeta	Rangampalle	6	0	0	0	0	0
Pullampeta	Reddipalle	3	1	0	0	0	0
Pullampeta	Thippayapalle	2	0	0	1	0	15
Pullampeta	Vathalur	0	0	1	1	12	15
Sambepalle	Devapatla	19	3	0	0	0	0
Sambepalle	Dudyala	8	3	0	0	0	0
Sambepalle	Gunnikuntla	8	0	0	0	0	0
Sambepalle	Guriginjakunta	21	2	0	0	0	0
Sambepalle	Guttapalle	5	1	0	0	0	0
Sambepalle	Motakatla	6	5	0	0	0	0
Sambepalle	Narayanareddipalle	14	0	0	1	0	15
Sambepalle	Routhukunta	3	2	0	0	0	0
Sambepalle	Sambepalle	4	1	0	0	0	0
Sambepalle	Settipalle	15	12	0	0	0	0
Vempalle	Alavala Padu	9	1	0	0	0	0

Vempalle	Alireddipalle	1	1	0	0	0	0
Vempalle	Kathaluru	16	2	0	0	0	0
Vempalle	Muthukuru	1	0	0	1	0	15
Vempalle	Naguru	1	0	0	1	0	15
Vempalle	Pamalur	8	6	0	0	0	0
Vempalle	Ramireddi Palle	3	0	0	0	0	0
Vempalle	T.Velamvaripalle	18	3	0	0	0	0
Vempalle	Tallapalle	29	5	0	0	0	0
Vempalle	Vempalle	11	0	0	2	0	30
Vemula	Chagaleru	9	5	0	0	0	0
Vemula	Chintalajutur	7	0	0	0	0	0
Vemula	Forest	0	0	1	1	12	15
Vemula	Gollalagudur	7	1	0	0	0	0
Vemula	Gondipalle	6	0	0	0	0	0
Vemula	Meedipentla	8	0	0	1	0	15
Vemula	Nallacheruvupalle	3	0	0	1	0	15
Vemula	Peddajutur	8	1	0	0	0	0
Vemula	V.Kothapalle	10	4	0	0	0	0
Vemula	Velpula	21	0	0	1	0	15
Vemula	Vemula	13	1	0	0	0	0
	Total	**666**	**179**	**24**	**44**	**288**	**660**

Proposed supply side interventions in Priority-II *Annexure-II*

Mandal	Village	Existing CD	Existing PT	Proposed CDs	Proposed PTs	Cost of CD @12 lakh	Cost of PT @15 lakh
Atlur	Atlur	1	0	0	1	0	15
Atlur	Kamalakuru	2	3	0	0	0	0
Atlur	Kamasamudram	1	1	0	0	0	0
Atlur	Kondur	4	0	0	0	0	0
Atlur	Madapur	9	2	0	0	0	0
Atlur	Muthukur	2	0	0	0	0	0
Atlur	Thamballagondi	3	1	0	0	0	0
B Kodur	Akkemgundla	0	0	1	1	12	15
B Kodur	Itigullapadu	0	0	4	3	48	45
B Kodur	Khatragandla	0	0	5	4	60	60
B Kodur	Koduru	6	4	0	0	0	0
B Kodur	Mekavaripalle	2	2	0	0	0	0
B Kodur	Munnelli	4	0	0	2	0	30
B Kodur	Papanapalle	1	0	0	0	0	0
B Kodur	Peddullapalle	3	0	0	0	0	0
B Kodur	Prabhalaveedu	1	0	0	1	0	15
B Kodur	Savisettipalle	0	0	4	4	48	60
Badvel	Anantharajupuram	2	0	0	1	0	15
Badvel	Badvel (Pt)	0	0	1	1	12	15
Badvel	Chennampalle	0	0	1	1	12	15
Badvel	Chintalacheruvu	5	1	0	0	0	0
Badvel	Ethirajupalle	0	0	1	1	12	15
Badvel	Forest	0	0	3	2	36	30
Badvel	Gopalapuram	0	0	1	1	12	15
Badvel	Gunthapalle	0	0	1	1	12	15
Badvel	Imadapuram	0	0	1	0	12	0
Badvel	Konasamudram	0	1	0	0	0	0
Badvel	Kongalaveedu	4	1	0	0	0	0
Badvel	Puttayapalle	0	1	1	0	12	0
Badvel	Rajupalem	0	0	1	1	12	15
Badvel	Thippanapalle	4	0	0	1	0	15
Badvel	Tiruvengalapuram	4	0	0	0	0	0
Badvel	Vanampula	1	1	0	0	0	0
Badvel	Veerapalle	5	0	0	1	0	15
Brahmamgarimattam	Diguva Nelatur	17	4	0	0	0	0
Brahmamgarimattam	Dirasavancha	21	1	0	0	0	0
Brahmamgarimattam	Eguvanelatur	0	0	1	1	12	15
Brahmamgarimattam	Godlaveedu	10	1	0	0	0	0
Brahmamgarimattam	Mallepalle	11	0	0	0	0	0
Brahmamgarimattam	Mudumala	1	1	0	0	0	0
Brahmamgarimattam	Palugurallapalle(Partiv	2	0	0	0	0	0
Brahmamgarimattam	Papireddipalle	0	0	1	0	12	0
Brahmamgarimattam	Pulugurallapalle	0	0	2	2	24	30
Brahmamgarimattam	Rekalakunta	4	1	0	0	0	0
Brahmamgarimattam	Somireddipalle	3	3	0	0	0	0
Brahmamgarimattam	T.Soudaravaripalle	7	0	0	1	0	15
Chakrayapet	Addalamarri	1	0	3	3	36	45
Chakrayapet	Chakrayapet	6	0	0	1	0	15
Chakrayapet	Chilekampalle	7	0	0	1	0	15

Chakrayapet	Errabommanapalle	5	1	0	0	0	0
Chakrayapet	Forest	0	0	2	2	24	30
Chakrayapet	Gandikovvur	2	4	0	0	0	0
Chakrayapet	Kallurupalli	6	0	0	1	0	15
Chakrayapet	Kateneniyerragudi	11	5	0	0	0	0
Chakrayapet	Kumarakalva	5	1	0	0	0	0
Chakrayapet	Kuppam	5	12	0	0	0	0
Chakrayapet	Mahadevapalle	5	5	0	0	0	0
Chakrayapet	Marellamadaka	1	3	0	0	0	0
Chakrayapet	Nersupalle	7	0	0	1	0	15
Chakrayapet	Rajupalle	4	19	0	0	0	0
Chakrayapet	Surabhi	28	9	0	0	0	0
Chapad	Alladupalle	0	0	1	1	12	15
Chapad	Ananthapuram	0	0	2	1	24	15
Chapad	Bhadripalle	0	0	1	1	12	15
Chapad	Chiyyapadu	2	0	0	1	0	15
Chapad	Kutchupapa	1	0	0	0	0	0
Chapad	Madur	0	0	2	2	24	30
Chapad	Pallavolu	2	0	0	1	0	15
Chapad	Vedurur	2	0	0	1	0	15
Chennur	Chinamachupalle	0	0	1	1	12	15
Chennur	Gurrampadu	1	0	0	0	0	0
Chennur	Kanuparthi	0	0	3	3	36	45
Chennur	Upparapalle	1	0	0	1	0	15
Chintha Kommadinne	Chinnakampalle	0	0	2	2	24	30
Chintha Kommadinne	Chintakommadinne	1	0	2	2	24	30
Chintha Kommadinne	Ippapenta	4	0	0	3	0	45
Chintha Kommadinne	Kammavaripalle	0	2	0	0	0	0
Chintha Kommadinne	Kolumulapalle	4	0	0	1	0	15
Chintha Kommadinne	Kopparthi	6	3	0	0	0	0
Chintha Kommadinne	Mamillapalle	0	0	3	3	36	45
Chintha Kommadinne	Papasahebpet	1	3	0	0	0	0
Chintha Kommadinne	Thadigotla	0	0	1	0	12	0
Chitvel	Cherlopalle	3	3	0	0	0	0
Chitvel	Chitvel	0	0	1	1	12	15
Chitvel	Devamachupalle	2	8	0	0	0	0
Chitvel	Forest	0	0	1	1	12	15
Chitvel	Forest	0	0	8	7	96	105
Chitvel	Forest	0	0	10	9	120	135
Chitvel	K.V.R.R. Puram	2	0	0	0	0	0
Chitvel	Kampasamudram	3	1	0	0	0	0
Chitvel	Kampasamudram	3	1	0	0	0	0
Chitvel	Maharajapuram	4	0	0	1	0	15
Chitvel	Malemarpuram	14	0	0	3	0	45
Chitvel	Mallemadugu	0	0	2	2	24	30
Chitvel	Mylapalle	2	1	0	0	0	0
Chitvel	Nagaripadu	0	0	2	2	24	30
Chitvel	Nagavaram	3	0	0	1	0	15
Chitvel	Nethivaripalle	3	1	0	0	0	0
Chitvel	Rajukunta	3	0	0	0	0	0
Chitvel	Thimmayapalem	2	1	0	0	0	0
Chitvel	Thumma Konda	1	1	0	0	0	0
Cuddapah	Chinnachowk	0	0	2	1	24	15
Cuddapah	Cuddapah (M)	0	0	2	2	24	30

Cuddapah	Pathacuddapah	0	0	1	1	12	15
Cuddapah	Putlampalli	0	0	1	1	12	15
Duvvur	Chinna Singanapalle	2	0	0	0	0	0
Duvvur	Chintakunta	1	0	0	0	0	0
Duvvur	Dasaripalle	0	0	4	3	48	45
Duvvur	Duvvur	0	0	2	2	24	30
Duvvur	Gudipadu	0	0	1	1	12	15
Duvvur	Idamadaka	1	0	0	1	0	15
Duvvur	Jillela	2	0	0	1	0	15
Duvvur	Kanagudur	0	0	1	1	12	15
Duvvur	Machanapalle	0	0	1	1	12	15
Duvvur	Madirepalle	3	0	0	1	0	15
Duvvur	Neelapuram	6	0	0	1	0	15
Duvvur	Nelaturu	0	0	1	1	12	15
Duvvur	Sallabasayapalle	1	0	0	0	0	0
Galiveedu	Araveedu	1	5	0	0	0	0
Galiveedu	Eguvagottiveedu	3	16	0	0	0	0
Galiveedu	Galiveedu	0	12	0	0	0	0
Galiveedu	Garugupalli	7	0	0	1	0	15
Galiveedu	Gopanapalle	0	0	1	1	12	15
Galiveedu	Gundlacheruvu	5	2	0	0	0	0
Galiveedu	Korlakunta	3	13	0	0	0	0
Galiveedu	Nooliveedu	10	7	0	0	0	0
Galiveedu	Pandikunta	3	12	0	0	0	0
Galiveedu	Pulikunta	2	0	0	2	0	30
Galiveedu	Pyarampalle	19	0	0	1	0	15
Galiveedu	Talamudipi	1	7	0	0	0	0
Galiveedu	Thumukunta	12	13	0	0	0	0
Galiveedu	Veligallu	5	1	0	0	0	0
Gopavaram	Boddecherla	0	0	1	1	12	15
Gopavaram	Brahmanapalle	7	1	0	0	0	0
Gopavaram	Forest	0	0	2	2	24	30
Gopavaram	Forest	0	0	3	3	36	45
Gopavaram	Forest	0	0	3	3	36	45
Gopavaram	Forest	0	0	5	4	60	60
Gopavaram	Forest	0	0	5	5	60	75
Gopavaram	Forest	0	0	9	8	108	120
Gopavaram	Gopavaram	12	5	0	0	0	0
Gopavaram	Kalvapalle	1	0	0	1	0	15
Gopavaram	Lakkavaripalle	0	0	1	1	12	15
Gopavaram	Madakalavaripalle	0	0	1	1	12	15
Gopavaram	Northramapuram	0	0	1	1	12	15
Gopavaram	Obulam	0	0	1	1	12	15
Gopavaram	Ramapuram	0	0	1	1	12	15
Gopavaram	South Ramapuram	7	1	0	0	0	0
Jammalamadugu	Ambavaram	11	1	0	0	0	0
Jammalamadugu	Danavulapadu	0	0	1	1	12	15
Jammalamadugu	Devagudi	0	0	1	1	12	15
Jammalamadugu	Dharmapuram	0	0	1	1	12	15

Jammalamadugu	Gandikota	4	0	0	3	0	45
Jammalamadugu	Goriganur	0	0	1	1	12	15
Jammalamadugu	Gudemcheruvu	5	0	0	0	0	0
Jammalamadugu	Jammalamadugu	0	0	2	2	24	30
Jammalamadugu	Kothaguntapalle	0	0	1	1	12	15
Jammalamadugu	Peddandlur	7	0	0	1	0	15
Jammalamadugu	Ponnathota	2	0	0	1	0	15
Jammalamadugu	Poorvabommepalle	6	1	0	1	0	15
Jammalamadugu	Poorvapusugumanchipalle	2	0	0	1	0	15
Jammalamadugu	Salevariuppalapadu	3	0	0	2	0	30
Jammalamadugu	Sirigepalle	0	0	1	1	12	15
Jammalamadugu	Sunnapurallapalle	3	1	0	0	0	0
Jammalamadugu	Thugutlapalle	0	0	1	1	12	15
Jammalamadugu	Vemaguntapalle	0	0	1	1	12	15
Kalasapadu	Balayapalle	0	0	1	1	12	15
Kalasapadu	Chennupalle	6	0	0	0	0	0
Kalasapadu	Eguva Thamballapalle	9	1	0	0	0	0
Kalasapadu	Forest	0	0	1	1	12	15
Kalasapadu	Forest	0	0	4	4	48	60
Kalasapadu	Gangayapalle	0	0	1	1	12	15
Kalasapadu	Kalasapadu	2	0	0	1	0	15
Kalasapadu	Kondapeta	0	0	1	1	12	15
Kalasapadu	Kothakota	0	0	2	2	24	30
Kalasapadu	Mahanandi Palle	6	0	0	0	0	0
Kalasapadu	Moolapalle	0	0	1	1	12	15
Kalasapadu	Narasapuram	0	0	1	1	12	15
Kalasapadu	Nayunipalle	0	0	1	1	12	15
Kalasapadu	Pendlimarri	4	4	0	0	0	0
Kalasapadu	Pullareddypalle	5	0	0	0	0	0
Kalasapadu	Rajupalem	5	7	0	0	0	0
Kalasapadu	Sankavaram	3	0	1	4	12	60
Kalasapadu	Tellapadu	3	0	0	1	0	15
Kalasapadu	Uppalur	0	0	1	1	12	15
Kalasapadu	Varigunta	0	0	1	1	12	15
Khajipet	Bhumayapalle	1	0	0	0	0	0
Khajipet	Chemullapalle	1	0	0	0	0	0
Khajipet	Chennamukkapalle	0	0	1	1	12	15
Khajipet	Dumpalagattu	2	0	0	0	0	0
Khajipet	Eturu	0	0	1	1	12	15
Khajipet	Khajipet Sunkesula	1	0	0	0	0	0
Khajipet	Miduthur	0	0	1	1	12	15
Khajipet	Nagasanipalle	18	1	0	0	0	0
Khajipet	Pathur	3	0	0	0	0	0
Khajipet	Pullur	1	1	0	0	0	0
Khajipet	Thavvaripalle	1	0	0	0	0	0

Khajipet	Thripuravaram	0	0	1	1	12	15
Khajipet	Thudumuladinne	1	0	0	1	0	15
Kondapuram	Anatapuram	0	0	1	1	12	15
Kondapuram	Bedaduru	4	0	0	1	0	15
Kondapuram	Bukkapatnam	0	0	1	1	12	15
Kondapuram	Burujupalli	5	0	0	0	0	0
Kondapuram	Chamaluru	3	4	0	0	0	0
Kondapuram	Eturu	0	0	1	1	12	15
Kondapuram	Gandlur	0	0	1	1	12	15
Kondapuram	K.Bommepalli	0	0	1	1	12	15
Kondapuram	K.Sugumanchipalle	2	0	0	1	0	15
Kondapuram	Koduru	0	0	2	2	24	30
Kondapuram	Konavaripalli	0	0	1	0	12	0
Kondapuram	Kondapuram	2	0	0	0	0	0
Kondapuram	Koppolu	0	0	1	1	12	15
Kondapuram	Lavanuru	1	0	0	1	0	15
Kondapuram	Neknampeta	0	0	1	0	12	0
Kondapuram	Obannapeta	0	0	1	1	12	15
Kondapuram	Pottipadu	5	0	0	1	0	15
Kondapuram	Regadipally	1	0	0	0	0	0
Kondapuram	S.Timmapuram	3	0	0	0	0	0
Kondapuram	Sankepalli	1	0	0	0	0	0
Kondapuram	Sivapuram	0	0	1	0	12	0
Kondapuram	Thallaproddatur	2	0	0	1	0	15
Kondapuram	Venkaiah Kalva	10	0	0	1	0	15
Kondapuram	Yenamalachintala	4	1	0	0	0	0
Lakkireddipalle	Ananthapuram	5	2	0	0	0	0
Lakkireddipalle	Brahmanayerragudi	5	0	0	3	0	45
Lakkireddipalle	Dappepalle	0	12	2	0	24	0
Lakkireddipalle	Forest	0	0	1	1	12	15
Lakkireddipalle	Kakulavaram	3	2	0	0	0	0
Lakkireddipalle	Kurnoothala	8	1	0	1	0	15
Lakkireddipalle	Lakkireddipalle	2	2	0	0	0	0
Lakkireddipalle	Maddirevula	5	7	0	0	0	0
Lakkireddipalle	Pandillapalle	0	2	1	0	12	0
Muddanur	Aravetipalle	0	0	1	1	12	15
Muddanur	Bondalakunta	4	6	0	0	0	0
Muddanur	Chinnadudyala	4	2	0	0	0	0
Muddanur	Chintakunta	5	0	0	1	0	15
Muddanur	Denepalle	2	5	0	0	0	0
Muddanur	K.Thimmapuram	4	0	0	0	0	0
Muddanur	Kolavali	8	0	0	1	0	15
Muddanur	Korrapadu	1	5	0	0	0	0
Muddanur	Kosinepalle	0	0	1	1	12	15
Muddanur	Mangapatnam	3	10	0	0	0	0

Muddanur	Muddanur	4	4	0	0	0	0
Muddanur	Nallaballe	3	1	0	0	0	0
Muddanur	Obulapuram	2	9	0	0	0	0
Muddanur	Penikalapadu	1	3	0	0	0	0
Muddanur	Rajulaguravaiahpalle	6	3	0	0	0	0
Muddanur	Uppalur	9	2	0	0	0	0
Muddanur	Velpucherla	5	2	0	0	0	0
Muddanur	Yamavaram	4	0	0	1	0	15
Mylavaram	Bestavemula	10	1	0	0	0	0
Mylavaram	Chinna Komerla	3	0	0	0	0	0
Mylavaram	Dhodium	10	0	0	3	0	45
Mylavaram	Dommara Nandyala	0	0	1	1	12	15
Mylavaram	Kallutla	2	0	0	0	0	0
Mylavaram	Khaderabad	0	0	1	1	12	15
Mylavaram	Lingapuram	5	0	0	0	0	0
Mylavaram	Malameedi Kambala Dinne	6	0	0	2	0	30
Mylavaram	Murapandi	6	0	0	1	0	15
Mylavaram	Mylavaram	3	1	0	0	0	0
Mylavaram	Nawabpet	2	0	0	0	0	0
Mylavaram	Nelanuthala	0	0	1	1	12	15
Mylavaram	Ponnam Palle	0	0	1	1	12	15
Mylavaram	Ramachandraya Palle	6	0	0	1	0	15
Mylavaram	Talamanchi Patnam	1	0	0	0	0	0
Mylavaram	Thorri Vemula	2	0	0	0	0	0
Mylavaram	Vaddirala	8	0	0	0	0	0
Mylavaram	Veparala [Pt]	0	0	1	1	12	15
Nandalur	Adepur	2	2	0	0	0	0
Nandalur	Chintalakunta	0	0	1	1	12	15
Nandalur	Forest	0	0	1	1	12	15
Nandalur	Forest	0	0	5	4	60	60
Nandalur	Lebaka	2	0	0	1	0	15
Nandalur	Nallathimmayapalle	0	1	0	0	0	0
Nandalur	Nandalur	2	0	0	0	0	0
Nandalur	Patur	2	0	0	0	0	0
Nandalur	Pothapi	1	0	0	1	0	15
Nandalur	Tangutur Vengamambapura	0	1	0	0	0	0
Nandalur	Tanguturu	2	2	0	0	0	0
Peddamudium	Bheemagundam	1	0	0	0	0	0
Peddamudium	Chinamudium	0	0	1	1	12	15
Peddamudium	Chinnapasupula	5	0	0	0	0	0
Peddamudium	Diguva Kalvatala	9	0	0	0	0	0
Peddamudium	Gundlakunta	1	0	0	1	0	15
Peddamudium	J.Kottalapalli	2	0	0	0	0	0

Peddamudium	Jangalapalli	0	1	1	0	12	0
Peddamudium	Kondasunkesula	6	0	0	0	0	0
Peddamudium	Medidinne	1	0	0	0	0	0
Peddamudium	N.Kottalapalli	0	0	1	1	12	15
Peddamudium	Nemalladinne	0	0	1	1	12	15
Peddamudium	Palur	7	0	0	1	0	15
Peddamudium	Pedda Pasupalle	4	0	0	3	0	45
Peddamudium	Peddamudium	1	0	0	1	0	15
Peddamudium	Suddapalli	0	0	1	1	12	15
Peddamudium	Ulavapalli	0	0	1	1	12	15
Penagaluru	Forest	0	0	1	1	12	15
Penagaluru	Itimarpuram	7	0	0	2	0	30
Penagaluru	Kondur	8	1	0	2	0	30
Penagaluru	Nallapureddipalle	0	4	1	0	12	0
Penagaluru	Narasingarajupuram	0	1	0	0	0	0
Penagaluru	Obili	0	1	0	0	0	0
Penagaluru	Peddayapalle	0	0	2	2	24	30
Penagaluru	Penagalur	0	2	0	0	0	0
Penagaluru	Pondalur	6	0	0	1	0	15
Penagaluru	Singareddipalle	0	1	0	0	0	0
Penagaluru	Velagacherla	0	0	1	1	12	15
Pendlimarri	Chabali	0	0	1	0	12	0
Pendlimarri	Cheemalapenta	5	0	0	2	0	30
Pendlimarri	Forest	0	0	9	8	108	120
Pendlimarri	Ganganapalle	9	2	0	3	0	45
Pendlimarri	Gondi Palle	9	3	0	0	0	0
Pendlimarri	Konduru	5	9	0	0	0	0
Pendlimarri	Machanur	11	3	0	0	0	0
Pendlimarri	Moillakalava	1	0	0	0	0	0
Pendlimarri	Nandimandalam	3	0	0	3	0	45
Pendlimarri	Peddadasari Palle	0	0	3	3	36	45
Pendlimarri	Pendlimarri	7	3	0	0	0	0
Pendlimarri	Sangatipalle	2	0	0	0	0	0
Pendlimarri	Thippireddipalle	0	0	1	1	12	15
Pendlimarri	Tummalur	1	3	0	0	0	0
Pendlimarri	Vellatur	8	0	0	0	0	0
Porumamilla	Akkalreddipalle	5	0	0	1	0	15
Porumamilla	Challagirigella	8	4	0	0	0	0
Porumamilla	Cherlopalle	0	0	2	2	24	30
Porumamilla	Chinayerasala	2	2	0	0	0	0
Porumamilla	Dammanapalle	2	0	0	1	0	15
Porumamilla	Forest	0	0	7	6	84	90
Porumamilla	Ganugapenta	6	8	0	0	0	0
Porumamilla	Kavalakuntla	2	3	0	0	0	0
Porumamilla	Korrapatupalle	1	1	0	0	0	0

Porumamilla	Musalreddipalle	5	1	0	0	0	0
Porumamilla	Porumamilla	0	2	1	0	12	0
Porumamilla	Pulliveedu	4	2	0	0	0	0
Porumamilla	Ranga Samudram	6	1	0	1	0	15
Porumamilla	Sancharala	5	0	0	1	0	15
Porumamilla	Siddavaram	3	2	0	0	0	0
Porumamilla	Venkataramapuram	1	2	0	0	0	0
Porumamilla	Yellapalle	0	0	1	1	12	15
Proddutur	Bollavaram In(Mun.Area)	0	0	1	1	12	15
Proddutur	Chowdur	1	0	0	1	0	15
Proddutur	Gopavaram	2	0	0	0	0	0
Proddutur	Kallur	2	0	0	1	0	15
Proddutur	Kamanur	4	0	0	1	0	15
Proddutur	Kothapalle	0	0	1	1	12	15
Proddutur	Modameedipalle (R)	0	0	1	1	12	15
Proddutur	Peddasettipalle	0	0	2	1	24	15
Proddutur	Proddatur (M)	0	0	1	1	12	15
Proddutur	Rameswaram (R)	0	0	1	1	12	15
Proddutur	Thallamapuram	1	0	0	1	0	15
Pulivendla	Atchavalle	2	6	0	0	0	0
Pulivendla	Erraballe	0	0	2	1	24	15
Pulivendla	K.Velamavanipalle	0	0	1	1	12	15
Pulivendla	Konampalle	1	0	0	0	0	0
Pulivendla	Korrapadu	0	0	1	0	12	0
Pulivendla	Ragimanupalle	1	0	0	0	0	0
Pulivendla	Ulimella	0	0	1	1	12	15
Pulivendula	Forest	0	0	1	1	12	15
Rajampet	Akepadu	8	8	0	0	0	0
Rajampet	Bahirajapalle	0	0	1	1	12	15
Rajampet	Brahmanapalle	5	0	0	0	0	0
Rajampet	Forest	0	0	1	1	12	15
Rajampet	Forest	0	0	1	1	12	15
Rajampet	Gundlur	3	2	0	0	0	0
Rajampet	Kitchamambapuram	0	0	1	1	12	15
Rajampet	Kothapalle	0	2	0	0	0	0
Rajampet	Madanagopalapuram	2	0	0	0	0	0
Rajampet	Mandapalle	2	3	0	0	0	0
Rajampet	Mannur	0	0	1	1	12	15
Rajampet	Mittameedapalle	3	2	0	0	0	0
Rajampet	Poli	3	2	0	0	0	0
Rajampet	Pulapathuru	11	5	0	0	0	0
Rajampet	Rollabuduguntapalle	3	0	0	1	0	15
Rajampet	Rollamadugu	0	14	1	0	12	0
Rajampet	Seshamambapuram	1	1	0	0	0	0
Rajampet	Sitarampuram	2	7	0	0	0	0

Rajampet	Tallapaka	2	3	0	0	0	0
Rajampet	Utukur	2	2	0	0	0	0
Raju Palem	Arakatavemula	1	0	1	2	12	30
Raju Palem	Chinna Settipalle	1	0	0	1	0	15
Raju Palem	Eruvapalem	1	0	0	0	0	0
Raju Palem	Gadegudur	0	0	1	1	12	15
Raju Palem	Gopayapalle	0	0	1	1	12	15
Raju Palem	Korrapadu	0	0	2	2	24	30
Raju Palem	Kulur	0	0	1	1	12	15
Raju Palem	Paidala	3	0	0	1	0	15
Raju Palem	Parlapadu	1	0	0	1	0	15
Raju Palem	Pottipadu	0	0	1	1	12	15
Raju Palem	Tangatur	0	0	2	2	24	30
Raju Palem	Velavali	0	0	2	2	24	30
Raju Palem	Vellala	0	0	2	2	24	30
Ramapuram	Bandlapalle	19	8	0	0	0	0
Ramapuram	Chitlur	12	6	0	0	0	0
Ramapuram	Gopagudipalle	4	1	0	0	0	0
Ramapuram	Hasanapuram	9	8	0	0	0	0
Ramapuram	Kalpanayunicheruvu	4	9	0	0	0	0
Ramapuram	Nallaguttapalle	13	2	0	0	0	0
Ramapuram	Neelakantharaopeta	17	6	0	0	0	0
Ramapuram	Rachapalle	2	0	0	0	0	0
Ramapuram	Saraswathipalle	14	1	0	0	0	0
Ramapuram	Suddamalla	11	7	0	0	0	0
Rayachoti	Abbavaram	3	1	0	0	0	0
Rayachoti	Chennamukkapalle	14	0	0	0	0	0
Rayachoti	Forest	0	0	2	1	24	15
Rayachoti	Gorlamudiveedu	8	13	0	0	0	0
Rayachoti	Katimayakunta	13	11	0	0	0	0
Rayachoti	Madhavaram	1	0	0	1	0	15
Rayachoti	Masapet	0	0	1	1	12	15
Rayachoti	Pemmadapalle	4	1	0	0	0	0
Rayachoti	Rayachoti	0	0	1	1	12	15
Rayachoti	Sibyala	29	7	0	0	0	0
Rayachoti	Yandapalle	17	5	0	0	0	0
S Mydukur	Audireddipalle	14	1	0	0	0	0
S Mydukur	Forest	0	0	23	22	276	330
S Mydukur	Ganjikunta	1	0	0	0	0	0
S Mydukur	Mittamanipalle	20	2	0	0	0	0
S Mydukur	Nandyalampeta	2	0	0	0	0	0
S Mydukur	Onipenta	11	0	0	0	0	0
S Mydukur	Thippireddipalle	6	0	0	0	0	0
Sidhout	Forest	0	0	2	2	24	30
Sidhout	Forest	0	0	24	23	288	345

Sidhout	Jangalapalle	3	0	0	0	0	0
Sidhout	Jyothi	3	0	0	0	0	0
Sidhout	Kadapayapalle	0	3	0	0	0	0
Sidhout	Machupalle	1	9	0	0	0	0
Sidhout	Mulapalle	4	0	0	0	0	0
Sidhout	Nekanapuram	4	6	0	0	0	0
Sidhout	Peddapalle	9	3	0	0	0	0
Sidhout	S.Rajampeta	1	0	0	0	0	0
Sidhout	Shakarajupalle	6	3	0	0	0	0
Sidhout	Sidhout @ Siddavattam	4	0	0	0	0	0
Sidhout	Tokkolu	2	1	0	0	0	0
Sidhout	Vontithatipalle	4	0	0	0	0	0
Simhadripuram	Ankalammagudur	2	3	0	0	0	0
Simhadripuram	Balapanur	9	3	0	0	0	0
Simhadripuram	Bidinamcherla	7	0	0	0	0	0
Simhadripuram	Chavvaripalle	0	1	0	0	0	0
Simhadripuram	Duddekunta	5	0	0	1	0	15
Simhadripuram	Gurjala	10	2	0	0	0	0
Simhadripuram	Himakuntla	5	1	0	0	0	0
Simhadripuram	Kasanur	4	0	0	2	0	30
Simhadripuram	Lomada	6	3	0	0	0	0
Simhadripuram	Maddulapaya	0	0	1	1	12	15
Simhadripuram	Nandyalampalle	0	3	0	0	0	0
Simhadripuram	Nidivelagala	0	0	1	1	12	15
Simhadripuram	Pydipalem	0	1	2	1	24	15
Simhadripuram	Ravulakolanu	5	1	0	0	0	0
Simhadripuram	Simhadripuram	5	3	0	0	0	0
Simhadripuram	Sunkesula	2	0	0	1	0	15
Simhadripuram	Thelike	12	8	0	0	0	0
T Sundupalle	Bhagampalle	1	4	0	0	0	0
T Sundupalle	Forest	0	0	8	7	96	105
T Sundupalle	Gundlapalle	0	9	0	0	0	0
T Sundupalle	Madithadu	8	15	0	0	0	0
T Sundupalle	Mudampadu	9	1	0	0	0	0
T Sundupalle	Peddinenikalva	13	8	0	0	0	0
T Sundupalle	Polimerapalle	7	0	0	2	0	30
T Sundupalle	Rayavaram	12	1	0	1	0	15
T Sundupalle	Reddivaripalle	2	0	0	0	0	0
T Sundupalle	T.Sundupalle	30	17	0	0	0	0
T Sundupalle	Thimmasamudram	7	3	0	0	0	0
T Sundupalle	Yerramanenipalem	25	31	0	0	0	0
Thandur	Agadur	3	3	0	0	0	0
Thandur	Bhadrampalle	2	0	0	1	0	15
Thandur	Buchupalle	1	0	0	1	0	15
Thandur	Gotur	2	4	0	0	0	0

Thandur	Gundlamadugu	9	1	0	0	0	0
Thandur	Inagalur	1	0	0	1	0	15
Thandur	Madur	2	2	0	0	0	0
Thandur	Mallela	21	59	0	0	0	0
Thandur	Palur	0	1	1	0	12	0
Thandur	Santhakovvur	9	15	0	0	0	0
Thandur	Thelluru	4	0	0	1	0	15
Thandur	Thondur	1	5	0	0	0	0
Thandur	Udavagandla	5	0	0	1	0	15
Vallur	Ambavaram	1	0	0	1	0	15
Vallur	Gotur	3	1	0	0	0	0
Vallur	Jangampalle	0	0	1	1	12	15
Vallur	Koppolu	5	0	0	1	0	15
Vallur	Kotluru	10	0	0	1	0	15
Vallur	Lebaka	0	0	1	1	12	15
Vallur	Paidikalva	9	0	0	1	0	15
Vallur	Peddaputha	3	0	0	0	0	0
Vallur	Tappetla	0	0	1	1	12	15
Vallur	Thollaganganapalle	2	0	0	1	0	15
Vallur	Vallur	4	0	0	1	0	15
Veeraballe	Forest	0	0	1	1	12	15
Veeraballe	Forest	0	0	7	6	84	90
Veeraballe	Gadikota	3	0	0	0	0	0
Veeraballe	Matli	5	5	0	0	0	0
Veeraballe	Odiveedu	6	2	0	0	0	0
Veeraballe	Peddiveedu	3	1	0	0	0	0
Veeraballe	Sanipaya	3	1	0	0	0	0
Veeraballe	Somavaram	4	0	0	0	0	0
Veeraballe	Veeraballe	8	24	0	0	0	0
Veeraballe	Vongimalla	9	0	0	0	0	0
Veerapunayunipalle	Alidena	6	0	0	1	0	15
Veerapunayunipalle	Animela	2	0	0	2	0	30
Veerapunayunipalle	Gonumakulapalle	5	0	0	0	0	0
Veerapunayunipalle	Indukur	12	0	0	1	0	15
Veerapunayunipalle	Kommaddi	10	4	0	0	0	0
Veerapunayunipalle	Lingala	0	0	1	1	12	15
Veerapunayunipalle	Moillacheruvu	1	0	0	1	0	15
Veerapunayunipalle	Northpalagiri	3	0	0	2	0	30
Veerapunayunipalle	Payasampalle	10	0	0	0	0	0
Veerapunayunipalle	Southpalagiri	5	0	0	1	0	15
Veerapunayunipalle	U.Rajupalem	0	0	1	1	12	15
Veerapunayunipalle	Urutur	1	0	1	2	12	30
Veerapunayunipalle	Veldurthi	15	3	0	0	0	0
Vontimitta	Chintarajupalle	13	0	0	0	0	0
Vontimitta	Forest	0	0	2	1	24	15

Vontimitta	Forest	0	0	3	2	36	30
Vontimitta	Gangaperuru	4	0	0	0	0	0
Vontimitta	Gollapalle	9	0	0	0	0	0
Vontimitta	Konarajupalle	3	0	0	0	0	0
Vontimitta	Mantapampalle	7	0	0	0	0	0
Vontimitta	Pennaperuru	1	0	0	0	0	0
Vontimitta	Rachagudipalle	14	1	0	0	0	0
Vontimitta	Vontimetta	2	0	0	0	0	0
Yerraguntla	Chilamkur	12	0	0	2	0	30
Yerraguntla	Chinnadandluru	0	0	2	1	24	15
Yerraguntla	Hanumanagutti	4	0	0	1	0	15
Yerraguntla	Illuru	2	0	0	0	0	0
Yerraguntla	Kalamalla	6	0	0	2	0	30
Yerraguntla	Koduru	0	0	1	1	12	15
Yerraguntla	Malepadu	5	0	0	1	0	15
Yerraguntla	Nidizivve	2	0	0	1	0	15
Yerraguntla	Peddanapadu	4	0	0	1	0	15
Yerraguntla	Potladurthi	2	0	0	1	0	15
Yerraguntla	T.Sunkesala	0	0	1	1	12	15
Yerraguntla	Thippaluru	6	0	0	0	0	0
Yerraguntla	Valasapalle	4	0	0	1	0	15
Yerraguntla	Yerraguntla	0	0	1	1	12	15
	Total	**1763**	**801**	**344**	**444**	**4128**	**6660**