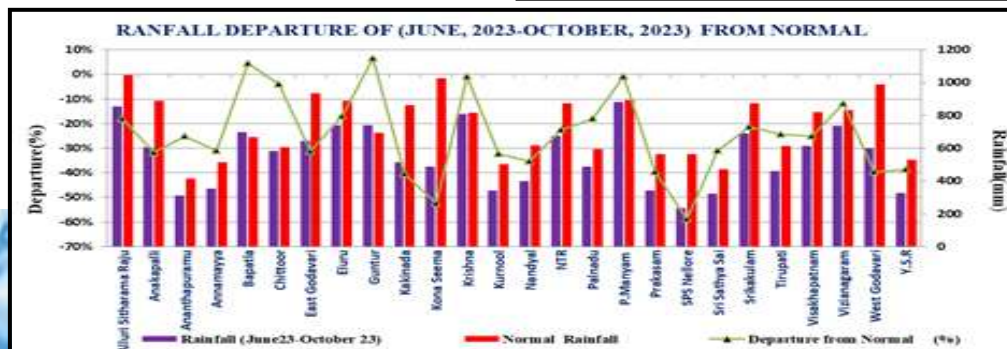
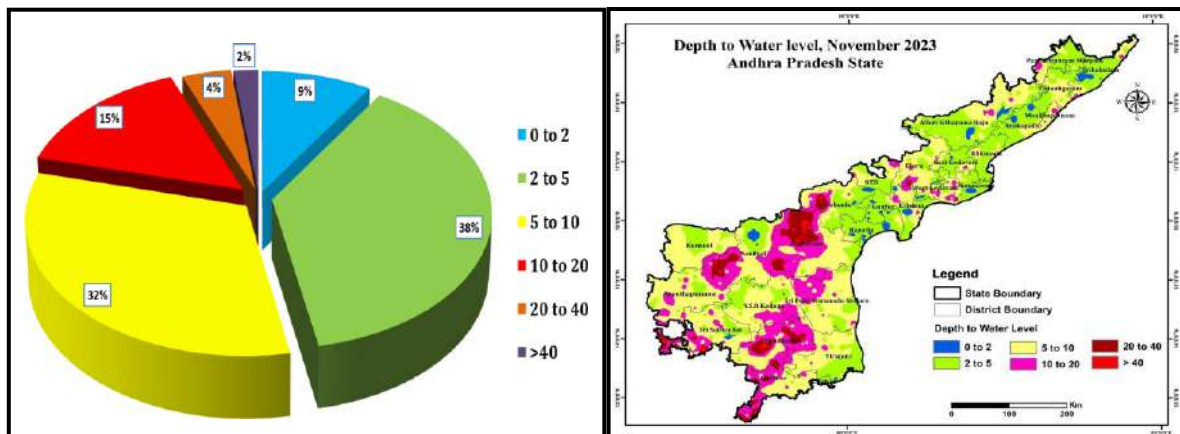


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Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Board

GROUND WATER YEAR BOOK 2023-24 ANDHRA PRADESH



**Southern Region
Hyderabad
September, 2024**



**Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Board**

**GROUND WATER YEAR BOOK
2023-24
ANDHRA PRADESH**

Authors

**Ms. Monika, Scientist-C (Hg)
Ms. Resma S. Pillai, Scientist-C (Hg)
Sh. P. Kiran Kumar, Scientist-C (HM)
Sh. Perika Yadaiah, Scientist-C (Hg)**

Supervisory Officer

Ms. Rani V.R, Scientist-D (Hg)

Over all Guidance by

Sh.G.Krishnamurthy, Regional Director



जी. कृष्णामूर्ति
G. Krishnamurthy
क्षेत्रीय निदेशक
Regional Director



भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसदन, नदी विकास और गंगा संरक्षण विभाग
Dept. of Water Resources,
River Development & Ganga Rejuvenation
केंद्रीय भूमि जल बोर्ड / Central Ground Water Board
दक्षिणी क्षेत्र / Southern Region
जी.एस.आई. पोस्ट, बंडलगुड़ा / GSI Post, Bandlaguda
हैदराबाद / Hyderabad-500068

FOREWORD

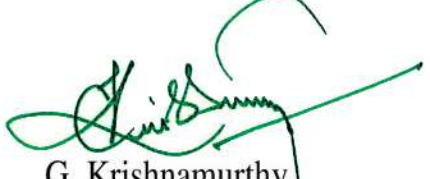
The historical groundwater level monitoring data is useful in understanding changes in groundwater regime in time and space and for preparation of sustainable development plan for the state. Central Ground Water Board has been monitoring groundwater regime since 1969. As on 31-3-2024, a total no. of 1473 operational ground water monitoring wells (GWMS) (DW: 676, Pz: 797) are in operation. These stations are being monitored four times a year viz. May, August, November and January to study the seasonal and long term changes.

The groundwater level monitoring carried out by Central Ground Water Board, Southern Region, Hyderabad during 2023-24 is compiled in the form of Ground Water Year Book. It outlines the ground water level behavior in the current year with reference to the corresponding periods of previous year and also with last decadal mean.

The sincere efforts made by Ms. Monika, Sc-C; Ms. Resma S. Pillai, Sc-C, Sh. P. Kiran Kumar, Sc-C, Sh. Perika Yadaiah, Sc-C in preparation of the report under the supervision of Ms. Rani V.R., Sc-D are commendable.

It is hoped that the Ground Water Year Book will be quite useful as baseline information for planners, administrators and researchers involved in groundwater development and management in the state of Andhra Pradesh

Hyderabad
Dated: 18.10.2024


G. Krishnamurthy
(Regional Director)

GROUND WATER YEAR BOOK- 2023-24

ANDHRA PRADESH STATE

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EXECUTIVE SUMMARY

Andhra Pradesh, a state encompassing a geographical area of 1.63 lakh sq.km, is administratively divided into 26 districts. The State's total population amounts to 4.96 crores, marked by a decade-long growth rate of 9.2%. Its location is situated between North Latitude 12° 37' and 19° 09', and East Longitude 76° 45' and 84° 47'. The primary drainage of the region comes from rivers such as Godavari, Krishna, Pennar, Vamsadhara, Nagavalli, and Gundlakamma. The state's terrain is predominantly characterized by a gneissic complex, supplemented by structural fill from sedimentary formations and basin-fill of meta-sedimentary formations and meta-sediments. In the year 2022, the state witnessed varying levels of rainfall, ranging from 713 mm in Kurnool to 1450 mm in Prakasam, resulting in an overall annual average rainfall of 1089 mm.

As a component of the National Ground Water Monitoring Programme, the Central Ground Water Board (CGWB) conducts monitoring of the ground water conditions on a quarterly basis: in January, pre-monsoon May, post-monsoon August, and November. Additionally, a yearly assessment of ground water quality is performed in May. The Ground Water Year Book is compiled by amalgamating data from both CGWB and the State Ground Water Department, Government of Andhra Pradesh. As of November 30, 2023, the Southern Region of the Central Ground Water Board supervises 676 dug wells and 797 piezometers. This comprehensive effort aims to portray the variations in the state's ground water conditions across different seasons.

In the pre-monsoon of 2023, around 85% of the state's territory displayed a depth to water level within 10 meters below the ground level. Similarly, during the post-monsoon season of the same year, only 81% of the state's area exhibited a depth to water level within 10 meters below ground level. During pre-monsoon, deeper water levels were particularly noted in sections of Prakasam, Nandyal, Annamaya, Chittoor, Anantapur, Sri Satya Sai district, and Eluru district. Likewise, during the post-monsoon season, deeper water levels were observed in Prakasam, Annamaya, Chittoor, and Nandyal districts.

Annual water level fluctuation of pre-monsoon has shown a rise in water levels for 51% of the area. During post-monsoon about 96% area of the state experienced fall in annual water level fluctuation because The monsoon in 2023 witnessed significant fluctuations in rainfall pattern across the state. The evident decline in annual ground water level decline during November 2023 in Andhra Pradesh can be attributed to a substantial -36% deficit rainfall when comparing 2023 to 2022. This drastic reduction in rainfall has far-reaching implications, leading to a further depletion of groundwater resources. Rainfall distribution varied with some part of coastal Andhra Pradesh received good rainfall during July 2023 while Rayalseema region experienced comparatively weaker rainfall.

90% of the area experienced rise of water level in decadal mean water level fluctuation of 2012-2021 with respect to May, 2023, whereas only 33% of the area experienced rise in decadal mean water level of 2013-2022 with respect to November, 2023.

The pre-monsoon water level trend map reveals that a decline in water level ranging from 0 to over 2 meters per year is evident across 42% of the area, while an increase in water level ranging from 0 to 2 meters per year is observed in 50% of the state's area. During the month of May, 357 locations display a decreasing trend, while 370 locations exhibit a rising trend in water levels. In the post-monsoon water level trend map, a decrease in water level ranging from 0 to over 2 meters per year is noted in 41% of the area, while an increase in water level ranging from 0 to over 4 meters per year is observed in 56% of the state's area. Across this period, 341 locations indicate a decline in trend, while 408 locations showcase an upward trend in water levels.

A total of 15 hydrographs have been generated. Among these, 5 wells exhibit an ascending trend in groundwater levels during both seasons, while another 8 wells display a declining trend in both the pre-monsoon and post-monsoon periods. The remaining wells demonstrate a mixed trend, with fluctuations that vary across the seasons.

Officers/Officials engaged in NHS Monitoring for the year 2023-24 in Andhra Pradesh

Sl.No.	Name	Designation
1	D. Mohanta	Scientist-D (Hydrogeology)
2	L.N. Damodara	Scientist-C (Hydrogeology)
3	Mrs. Monika	Scientist-C (Hydrogeology)
4	Md. Sarif Khan	Scientist-C (Hydrogeology)
5	Dr. S.S. Vittala	Scientist-C (Hydrogeology)
6	Dr. D. Anantha Rao	Asst. Hydrogeologist
7	Nilima Patra	Asst. Hydrogeologist
8	D.N. Ranganatha,	Chief Draughtsman
9	Shekar Singh Dhruw	Officer Surveyor
10	P. Srinivasa Rao	Chief Draughtsman
11	B. Sarath	Chief Draughtsman

GROUNDWATER YEAR BOOK (2023-24) ANDHRA PRADESH

1.INTRODUCTION

Central Groundwater Board has taken up the task of groundwater management, development, augmentation, protection and regime monitoring both in terms of quality and quantity in the state. In order to arrive at proper parametric indices of evaluation and judicious development of groundwater resources, the Board is monitoring a National Network of Hydrograph Stations (NHS) on long term basis since 1969 through a network of wells (Dug wells and Piezometers) for studying its long term behaviour due to influence of rainfall and groundwater development. A historical database on the groundwater levels and water quality has been developed over a period of time since the year 1969.

The monitoring mainly comprises measurement of water levels and temperature, four times in a year viz., in the months of May (pre-monsoon), August (mid-monsoon), November (post-monsoon), January and collection of water samples during May for chemical analysis. As on 31-03-2023, there were 1334 operational Groundwater Monitoring Wells (GWMS) (633 dug wells and 701 piezometers). During the year 2023, 17 Groundwater monitoring wells were abandoned and 156 groundwater monitoring wells were established. As on March, 2024, the status of monitoring stations is 1473 wells, out of which, 676 are Dug wells and 797 are Piezometers.

The dug wells tapping unconfined aquifers are mostly confined to village limits, which are used for domestic purpose. Some of these are community wells and the rest belong to private individuals. The piezometers tapping unconfined and confined aquifers constructed under various projects and exploration programs by the department are monitored manually four times a year. The location of network of monitoring wells is presented in the **Fig.1.1**.

Table: 1.1: Status of monitoring wells in Andhra Pradesh during the year 2023

Monitoring Period	No. of well Established	No. of wells Abandoned	Total no.of wells
May, 2023	130	0	1464
August, 2023	0	0	1464
November, 2023	0	12	1452
January, 2024	26	5	1473
Total no. of monitoring wells as on 31st March, 2024 :			1473

1.1 Location and Extent

Andhra Pradesh State is the 7th largest state in India covering geographical area of 1,63,000 Km². It lies between NL 12° 37' and 19° 09' and EL 76° 45' and 84° 47'. The State is bordered on the east by Bay of Bengal (~970 km), south by Tamil Nadu and Karnataka, west by Karnataka and Telangana and north by Telangana, Chattisgarh and Odisha states.

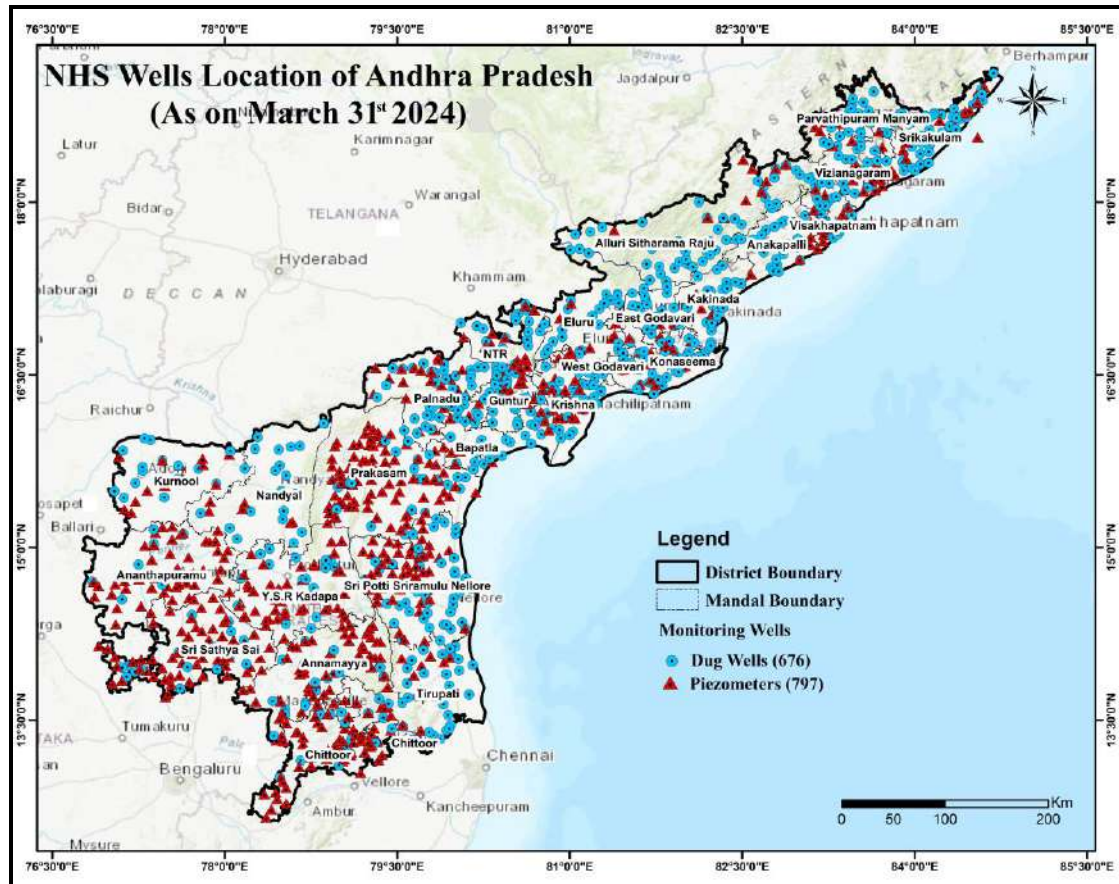


Fig.1.1: Location of GWMS in Andhra Pradesh State (as on 31st March, 2024)

Administratively, the state is divided into 26 districts and governed by 667 revenue mandals with 28123 revenue villages. Total population of the state (2011 census) is ~8.45 Crores (with male-female ratio of 993) of which 66.64% lives in rural area and 33.36% in urban area. The average density of population is 308 persons/km². The overall growth in total population during decade is ~9.2 % (2001 to 2011 census) (DES, Govt of Andhra Pradesh, 2015). The present groundwater year book (2023-24) depicts the groundwater level scenario in the State and describes the behaviour of water levels during the period. The piezometric data of Groundwater Department, Govt of Andhra Pradesh, is also integrated in order to have realistic water level scenario.

2. PHYSIOGRAPHY, DRAINAGE AND SOIL

2.1 Physiography

Physiographically, Andhra Pradesh State can be divided into three distinct zones, viz., Coastal plains, Eastern Ghats and Western pediplains. The first two zones stretch from north-east to south-west in a narrow strip while 3rd zone occupy rest of the area. The elevation ranges from 0 to > 600 m above mean sea level (a.msl) (Fig.2.1).

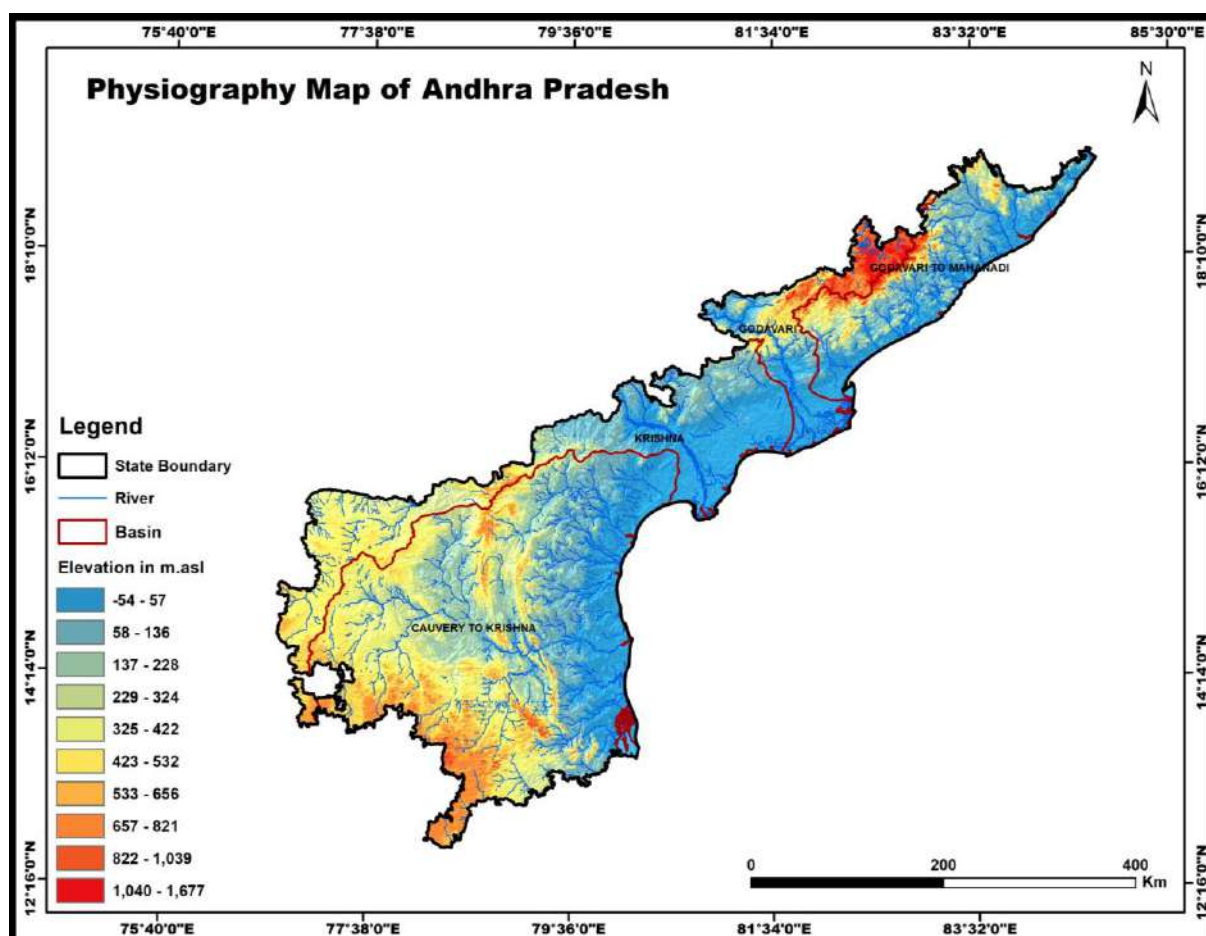


Fig.2.1: Physiography map of Andhra Pradesh (after APSRAC-2014)

2.1.1 Coastal Plains

The coastal plains stretch from Kalingapatnam (Srikakulam district) in north to Pulicat (Nellore district) in south along a narrow strip, which broadens in the middle along Godavari-Krishna deltas (up to 80 km²). The altitude of coastal plains ranges from sea level at the coast to 150-200 m amsl on the west. The area has rich agricultural land owing to two deltas.

2.1.2 Eastern Ghats

The Eastern Ghats follow the Coastal Plains stretching closely from one end to other end except in area between the Godavari and Krishna rivers. The hill ranges trend in NE - SW direction in the north and in N-S direction in the south and attain an elevation of 600 to 1200 m amsl. The Nallamala, Erramala, Seshachalam, Velikonda and Palakonda hills falling in Rayalaseema region, cover southern section of Ghats.

2.1.3 Western Pediplains

A major part of State covering parts of Rayalaseema region (Kurnool, Nandyal, Anantapur and Sri Sathya Sai district), fall in this category. The pediplains show rolling topography with flat to undulating tracts. This plateau in the interior of the State extends largely between elevations of 150 to 600 m amsl except at places where the elevation ranges from 600 to 900 m amsl.

2.2 Drainage

Godavari and Krishna rivers and their tributaries drain the northern and central part and Pennar river drains in southern part of state before joining Bay of Bengal (**Fig. 2.2**). There are 3 major basins and 11 medium river basins in the state. The major river basins are Godavari, Krishna and Pennar and medium basins are Vamsadhara, Nagavali, Sarada, Yeleru, Gundlakamma, Paleru (A), Manneru, Uppateru, Swarnamukhi, Palar and minor drainages between Musi and Gundlakamma river. The drainage pattern is generally dendritic with wide valleys in western peniplain. The drainage in Eastern Ghat is coarse and dendritic with steep and narrow valleys. Youthful streams and valleys mark the eastern coastal tract intersected by innumerable feeder and distributary canal system. The mature river courses of Godavari, Krishna and Pennar meanders through the vast areas and are covered by deltas as well as coastal plains. The deltas of rivers are very extensive and characterized by considerable thickness of alluvial material.

Most of the smaller streams feed innumerable tanks. River Penna flows across the southern part of the state with its tributaries Chitravati, Papaghni, Kundu, Sagileru and Cheyyeru and drains major part of Rayalaseema region and Nellore district of coastal region. The drainage basins are characterized by undulating topography comprising a series of ridges and valleys intersperse by hill ranges. Vamsadhara and Nagavalli rivers with their distributaries drain the northeastern part of the state in Srikakulam district. Visakhapatnam

district is mostly drained by local rivulets like Sarada. River Yeleru drains most of the East Godavari district while Yerrakalava, Tammileru drain West Godavari district. Nellore district is drained by Pennar, Swarnamukhi and Araniar rivers.

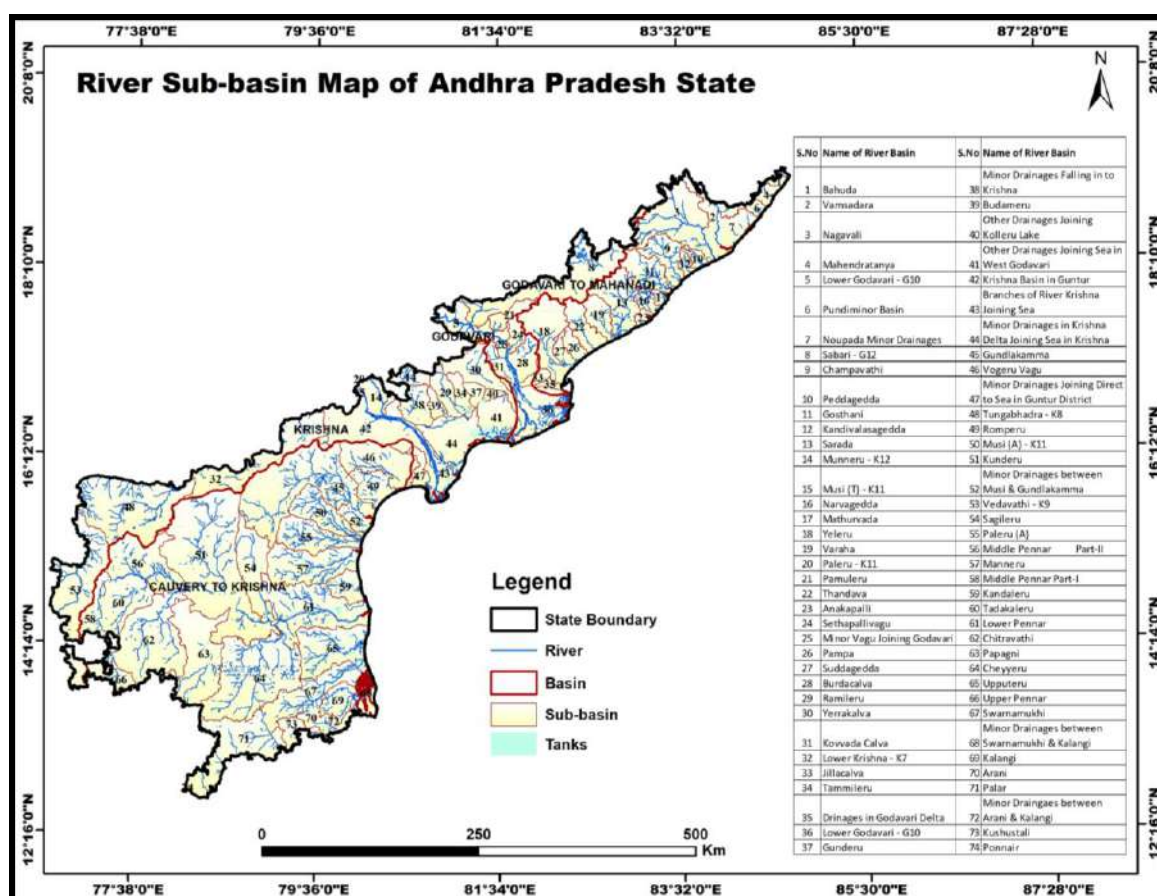


Fig.2.2: Drainage and River sub-basin map of Andhra Pradesh State

2.3 Soils

The State has a wide variety of soils viz., Red soil, Laterite, Black Cotton soil, Deltaic Alluvium soil, Coastal soil and Saline soil. Red clayey soils occur predominantly in Srikakulam, Visakhapatnam, East Godavari and West Godavari districts in coastal region. Black cotton soil commonly occurs in Krishna, Bapatla and Guntur districts. Red earths with loamy sub-soil and red sandy loamy soil occur in Prakasam, Palnadu and Nellore districts and Laterite soils in Nellore, Tirupati and Prakasam districts. Black cotton soil occurs in part of Kadapa, Kurnool, Nandyal, Sri Sathya Sai and Ananthpuramu district and Red loamy soils occur in parts of Chittoor, Annamayya and Kadapa districts. Red earths are predominant in Ananthpuramu and Sri Sathya Sai district. Soil map of Andhra Pradesh is given in **Fig. 2.3**.

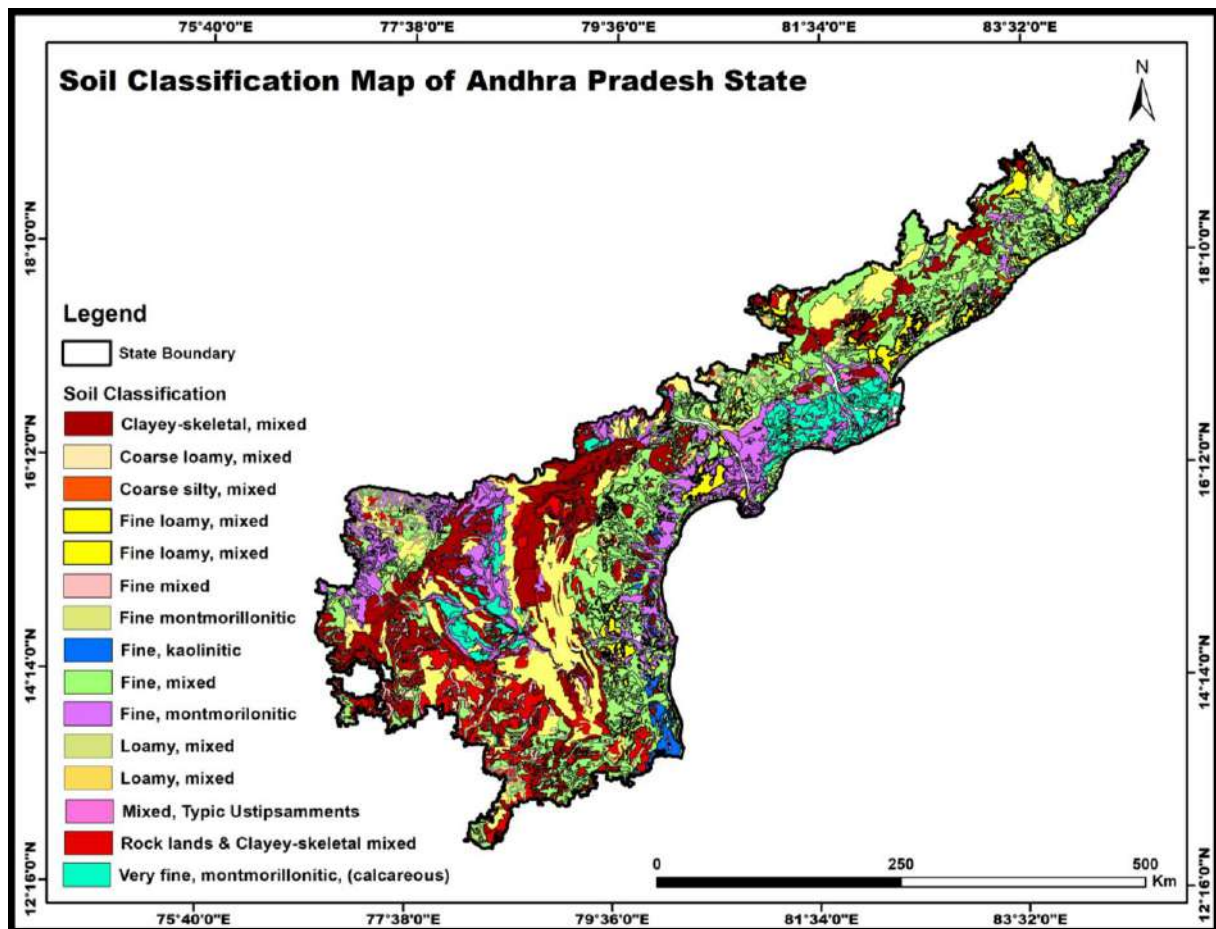


Fig.2.3: Soil Classification Map of Andhra Pradesh

3. HYDROMETEOROLOGY

3.1 Climate

The climate of the state is tropical in nature and is influenced by the topographical variations and maritime influence. The Eastern Ghats in Visakhapatnam and its neighborhood play a significant role, which acts as a barrier to easterly winds in association with depression from Bay of Bengal during the southwestern monsoon. The Agro-climatic classification (Agricultural Department) of the state is given below.

Region	Classification
Rayalaseema	Scarce rainfall zone
	Southern Zone
Coastal Andhra Pradesh	Krishna-Godavari Zone
	North Coastal zone
	South Coastal Zone
	High Altitude
	Tribal Zone
	Scarce rainfall zone

3.2 Rainfall Analysis 2023

District wise monthly, seasonal, annual and normal rainfall and departure from normal is given in the **Table-3.1**. The district wise departure from normal is depicted in **Fig. 3.1**. The salient features of rainfall analysis are given below.

- The normal annual rainfall of the state is 976 mm and isohyetal map for annual normal rainfall is presented in **Fig. 3.2**. Season-wise normal rainfall is 575 mm, 285.4 mm, 15.90 mm and 99.6 mm in southwest monsoon (June-Sept), northeast monsoon (Oct-Dec), winter (Jan-Feb) and summer (March-May) respectively, contributing 59% of annual in southwest monsoon, 29% of annual rainfall in northeast monsoon and 12% in non-monsoon season.
- Annual normal rainfall ranges from 512.5 mm in Ananthpuramu district to 1295 mm in Konaseema district.
- The mean annual rainfall in the year 2023 of the state is 962.7 mm. Season-wise rainfall is 549 mm, 234.3 mm, 1.2 mm and 178.2 mm in southwest monsoon (June-Sept),

northeast-monsoon (Oct-Dec), winter (Jan-Feb) and summer (March-May) respectively, contributing 57% of annual in southwest monsoon, 24% of annual rainfall in northeast monsoon and 19% in non-monsoon season. The annual (2023) rainfall ranges from 468.9 mm in Ananthapuramu district (-9% below normal) to 1354.62 mm (29 % above normal) in Krishna district.

- Annual rainfall was -1 % below the normal in 2023 in the state.

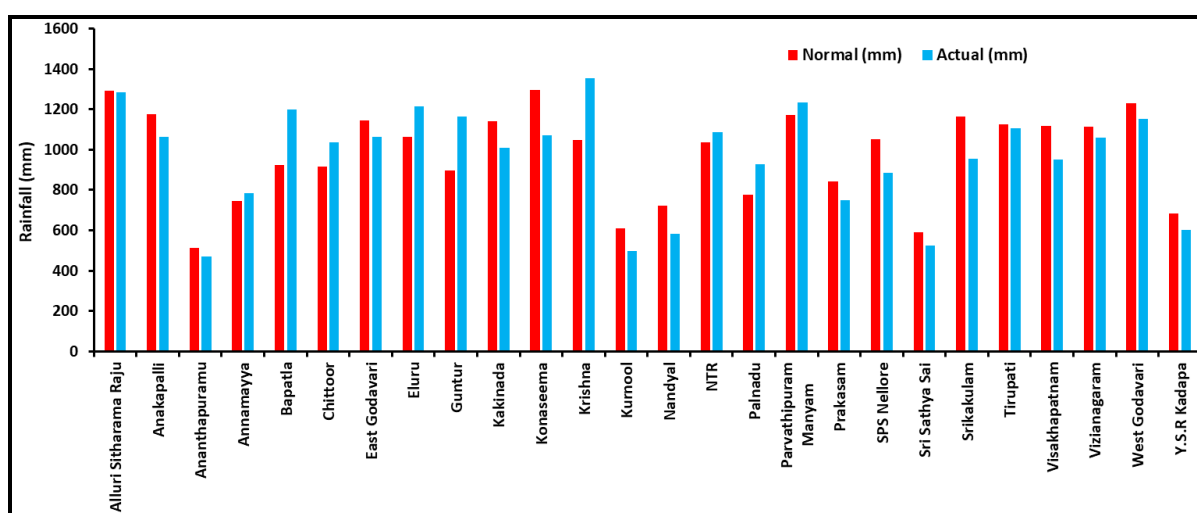


Fig.3.1: District wise Annual actual and Normal (2023) rainfall

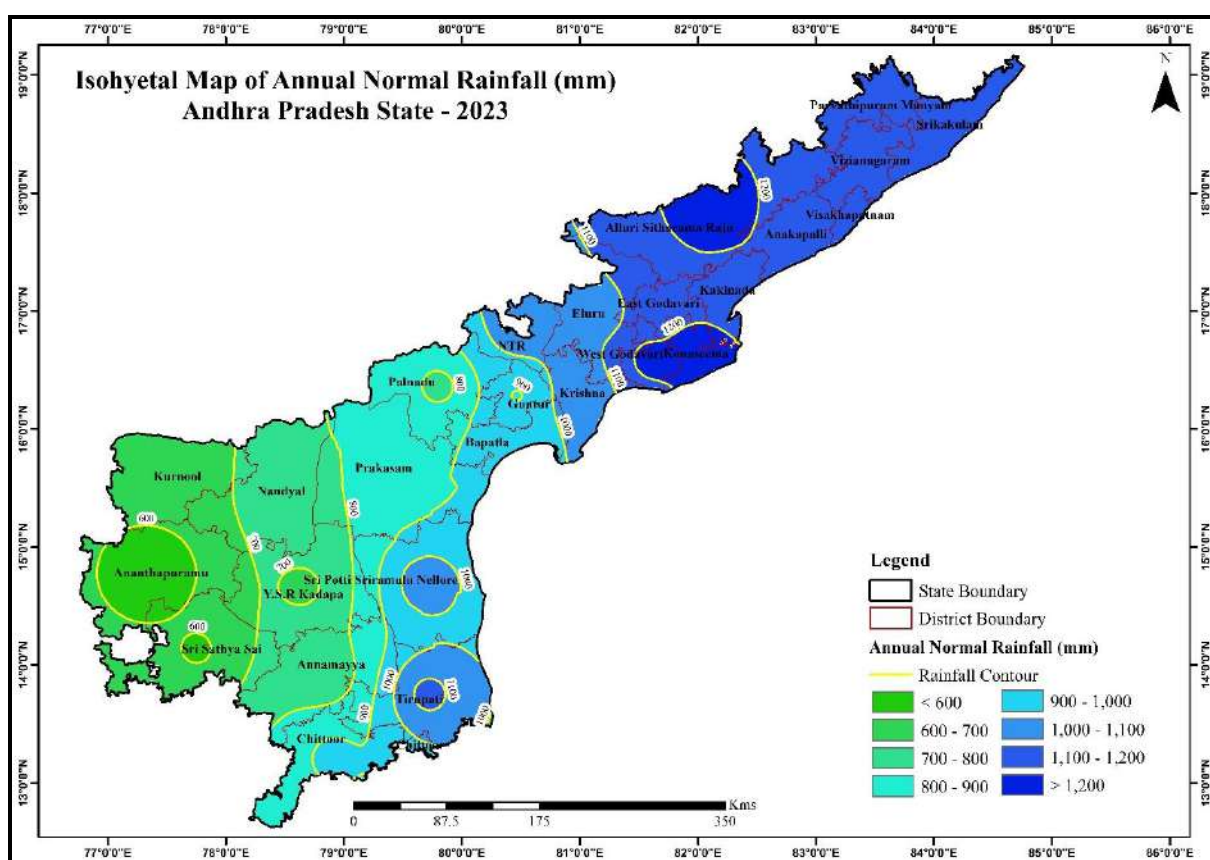


Fig.3.2: Isohyetal map of Annual Normal rainfall (2023), Andhra Pradesh.

Table-3.1: Monthly Actual and Normal (2023) rainfall (mm) in Andhra Pradesh

ISTRICK	Jan		Feb		Mar		Apr		May		Jun		Jul	
	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)
Alluri Sitharama Raju	7.6	0.2	10.2	0.0	19.1	81.7	42.9	57.5	107.6	90.0	162.4	101.2	295.1	352.4
Anakapalli	9.6	0.2	13.8	0.0	20.6	105.3	27.3	21.3	116.3	83.8	123.2	56.4	175.9	240.2
Ananthapuramu	1.8	0.0	0.8	0.0	2.1	14.2	12.1	42.3	36.7	72.2	61.1	52.3	63.9	79.6
Annamayya	5.6	0.7	3.2	0.0	6.8	58.4	14.1	31.3	46.0	55.0	75.1	42.9	90.5	65.1
Bapatla	11.3	1.6	7.0	0.0	6.0	62.1	10.2	40.1	63.7	82.8	71.0	95.8	118.5	239.6
Chittoor	4.9	0.3	2.8	0.0	9.4	51.7	19.5	27.0	67.2	122.9	81.0	93.4	103.5	75.7
East Godavari	9.6	1.2	7.5	0.0	15.2	39.3	18.4	57.3	85.6	62.2	117.0	64.9	247.1	298.0
Eluru	9.8	0.1	6.8	0.0	14.6	76.7	19.9	68.1	63.5	53.2	112.3	96.9	242.5	353.8
Guntur	8.0	0.7	9.5	0.0	9.9	40.5	12.4	38.7	62.2	74.8	97.2	114.1	164.4	311.7
Kakinada	9.5	8.0	11.9	0.0	12.5	81.3	17.6	47.6	118.0	100.5	112.8	74.3	198.0	221.3
Konaseema	9.7	4.2	10.5	0.0	12.0	78.3	13.0	90.8	74.8	70.9	111.4	89.6	241.0	181.1
Krishna	7.1	2.0	10.1	0.0	11.4	80.5	13.1	90.1	57.0	87.1	91.6	106.7	196.1	351.3
Kurnool	3.2	0.0	1.5	0.0	5.9	6.4	15.5	67.6	40.2	46.5	77.6	61.0	89.5	142.5
Nandyal	2.3	0.0	2.3	0.0	5.6	25.8	18.2	80.0	36.9	34.6	76.8	49.7	141.2	122.4
NTR	10.1	0.1	4.2	0.0	9.0	62.3	14.5	64.5	60.3	45.4	109.4	87.6	233.8	356.0
Palnadu	8.4	0.6	9.0	0.0	8.9	54.2	12.1	47.6	52.7	58.1	80.9	80.1	131.0	158.3
ParvathipuramManyam	9.1	1.1	17.0	0.0	30.6	93.6	36.1	94.1	117.1	100.2	140.7	93.6	208.5	321.8
Prakasam	11.4	0.5	4.3	0.0	10.7	27.4	12.6	62.9	51.3	53.3	57.9	49.3	87.8	97.3
SPS Nellore	12.5	1.0	5.5	0.0	5.0	51.4	9.3	36.3	54.5	40.8	51.9	25.5	81.6	73.1
Sri Sathya Sai	1.5	0.0	1.9	0.0	4.4	22.3	13.5	36.5	42.5	67.0	66.6	65.5	70.9	51.5
Srikakulam	6.1	1.9	19.5	0.3	19.7	87.0	29.8	34.8	100.4	82.9	134.9	66.6	184.4	304.2
Tirupati	16.0	1.2	6.3	0.0	5.0	63.5	12.7	24.3	55.0	56.9	72.8	57.3	103.2	64.2
Visakhapatnam	12.2	1.9	13.0	0.0	16.9	79.3	23.6	12.8	88.4	73.3	110.9	33.8	139.0	310.5
Vizianagaram	9.2	2.2	16.4	0.1	17.7	72.3	28.4	35.1	111.6	91.4	123.5	52.1	170.8	324.4
West Godavari	9.8	1.6	8.7	0.0	14.3	55.0	16.5	58.5	72.7	57.4	110.6	114.0	246.3	197.3
Y.S.R Kadapa	1.7	0.0	0.9	0.0	2.5	49.3	11.7	50.0	36.5	33.0	68.2	35.8	98.5	78.7
State Mean	8.0	1.2	7.9	0.0	11.4	58.4	18.3	50.6	69.9	69.1	96.1	71.6	158.6	206.6

DISTRICT	August		September		October		November		December		Annual		
	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Normal (mm)	Actual (mm)	Departure
Alluri Sitharama Raju	252.51	136.79	184.96	251.4	157.78	19.03	47.47	26.56	2.92	167.12	1290.58	1283.96	-1%
Anakapalli	179.47	78.01	203.29	217.69	214.05	26.13	87.33	19.93	4.57	213.07	1175.44	1061.94	-10%
Ananthapuramu	83.85	25.04	110.92	145.48	100.89	8.32	28.64	23.38	9.81	6.12	512.46	468.88	-9%
Annamayya	99.78	53.63	114.68	178.01	139.18	20.62	109.21	106.95	39.71	171.02	743.67	783.58	5%
Bapatla	157.23	133.68	157.83	218.04	171.92	34.43	122.63	89.95	28.02	199.82	925.33	1197.96	29%
Chittoor	121.19	116.99	153.14	252.29	156.63	51.42	141.21	117.09	54.44	129.08	914.8	1037.85	13%
East Godavari	238.57	118.22	173.24	154.91	169.08	10.56	56.82	29.67	6.73	228.61	1144.78	1064.84	-7%
Eluru	239.34	121.99	171.06	163.14	134.36	19.51	42.04	35.32	7.64	224.79	1063.85	1213.54	14%
Guntur	165.36	138.29	146.09	201.58	128.8	25.9	77.03	50.78	15.89	168.11	896.65	1165.17	30%
Kakinada	179.85	65	179.49	138.77	201.3	14.35	92.14	39.75	7.1	216.78	1140.16	1007.61	-12%
Konaseema	229.74	49.71	196.83	151.59	254.41	21.3	122.7	62.03	18.97	272.87	1295.02	1072.56	-17%
Krishna	194.36	131.57	163.42	203.39	182.82	46.41	97.34	58.58	23.44	197.06	1047.68	1354.62	29%
Kurnool	114.88	31.61	116.04	103.93	110.4	1.35	28.38	31.45	8.04	3.89	611.09	496.12	-19%
Nandyal	152.29	49.32	133.99	172.82	117.98	5.84	26.95	24.45	6.99	18.89	721.42	583.89	-19%
NTR	240	65.5	162.38	181.43	142.92	19.29	41.74	45.54	6.92	160.26	1035.14	1087.85	5%
Palnadu	139.75	67.31	134.48	210.32	118.21	22.34	67.91	64.21	12.05	163.27	775.29	926.26	19%
ParvathipuramManyam	209	197.7	206.11	248.02	137.39	24.13	54.75	11.68	4.21	49.56	1170.56	1235.4	6%
Prakasam	92.01	42.17	128.5	155.46	205.07	11.38	136.17	122.82	43.45	125.8	841.13	748.45	-11%
SPS Nellore	83.2	41.42	103.89	90.34	249.3	15.5	295.46	235.91	98.45	273.34	1050.55	884.62	-16%
Sri Sathya Sai	93.4	19.2	125.63	183.19	120.11	6.62	40.6	47.29	10.04	26.03	590.9	525.07	-11%
Srikakulam	181.94	126.28	195.2	186.57	192.31	8	99.24	16.03	2.78	40.38	1166.26	955.03	-18%
Tirupati	114.03	109.23	124.23	211.06	203.48	34.95	288.94	196.86	122.71	286.83	1124.44	1106.37	-2%
Visakhapatnam	180.6	119.3	162.25	141.6	234.88	14.31	129.1	18.07	7	146.94	1117.75	951.78	-15%
Vizianagaram	187.94	160.53	184.71	190.89	178.7	9.88	79.21	11.02	4.13	109	1112.36	1059.01	-5%
West Godavari	250.23	81.62	186.91	200.84	203.04	27.98	93.65	65.15	16.25	294.75	1228.9	1154.02	-6%
Y.S.R Kadapa	119.96	46.27	118.38	161.86	130.43	10 5.91	76.92	58.8	18.62	83.82	684.25	603.46	-12%
State Mean	165.4	89.5	155.3	181.3	167.5	19.4	95.5	61.9	22.3	153	976.2	962.7	-1%

3.2.1 May, 2023

The rainfall data collected and compiled from weekly and monthly weather reports of India Meteorological Department and used to analyze the rainfall for the period June, 2022 - May, 2023. **Table-3.2** gives the district wise rainfall data for the period June, 2022 - May, 2023, June, 2021-May, 2022, normal of June -May and the departure of June, 2022 - May, 2023 rainfall from 2022 & normal. The departure values are used to prepare the graphs and presented in **Fig-3.3 to Fig.3.4**.

Table-3.2: Salient features of rainfall and its variability in Andhra Pradesh state, May 2023.

S NO	District	Rainfall (June22-May 2023)	Rainfall (June 21-May 22)	Normal Rainfall	Departur e from 2022 (%)	Departure from normal (%)	Remark
1	Alluri Sitharama Raju	1258	1312	1291	-4%	-3%	Normal
2	Anakapalli	1279	1309	1175	-2%	9%	Normal
3	Ananthapuramu	887	956	513	-7%	73%	Large Excess
4	Annamayya	1033	1264	744	-18%	39%	Excess
5	Bapatla	1080	1168	925	-8%	17%	Normal
6	Chittoor	1149	1468	915	-22%	26%	Excess
7	East Godavari	1400	1175	1145	19%	22%	Excess
8	Eluru	948	1232	1064	-23%	-11%	Normal
9	Guntur	987	1184	896	-17%	10%	Normal
10	Kakinada	1281	1190	1140	8%	12%	Normal
11	Kona Seema	1195	1219	1295	-2%	-8%	Normal
12	Krishna	1080	1206	1048	-10%	3%	Normal
13	Kurnool	732	825	615	-11%	19%	Normal
14	Nandyal	831	930	721	-11%	15%	Normal
15	NTR	901	1188	1025	-24%	-12%	Normal
16	Palnadu	954	1196	775	-20%	23%	Excess
17	P.Manyam	1507	1358	1171	11%	29%	Excess
18	Prakasam	1030	1077	841	-4%	22%	Excess
19	SPS Nellore	1115	1423	1053	-22%	6%	Normal
20	Sri Sathya Sai	904	1023	591	-12%	53%	Excess
21	Srikakulam	1221	1449	1166	-16%	5%	Normal
22	Tirupati	1068	1407	1124	-24%	-5%	Normal
23	Visakhapatnam	1271	1320	1106	-4%	15%	Normal
24	Vizianagaram	1398	1343	1112	4%	26%	Excess
25	West Godavari	1032	1249	1229	-17%	-16%	Normal
26	Y.S.R Kadapa	1027	1217	684	-16%	50%	Excess
	State Mean	1099	1219	976	-10%	13%	Normal

Source: India Meteorological Department, GOI. Legend: Large Excess (+60% or more), Excess (+20% to +59%), Normal (-19% to +19%), Deficient (-20% to -59%), Large Deficient (-60% to -99%) departure from normal.

3.2.1.1 Rainfall departure of June, 2022 to May, 2023 from Normal rainfall of same period:

During the period June, 2022 to May, 2023, the state has received 13% more rainfall than normal. **Fig.3.3** gives departure of June, 2022 to May, 2023 rainfall from normal of the same period and **Fig. 3.4** represents the spatial distribution of deviation of rainfall from normal across the State. It ranges from -16% in West Godavari district to 73 % in Ananthapuramu district.

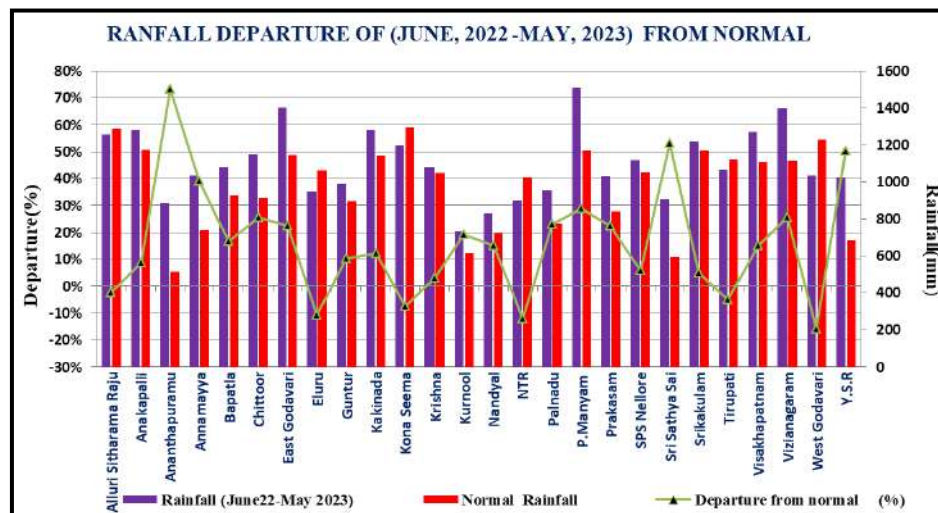


Fig.3.3: Rainfall Departure of June, 2022 to May, 2023 from Normal of same period

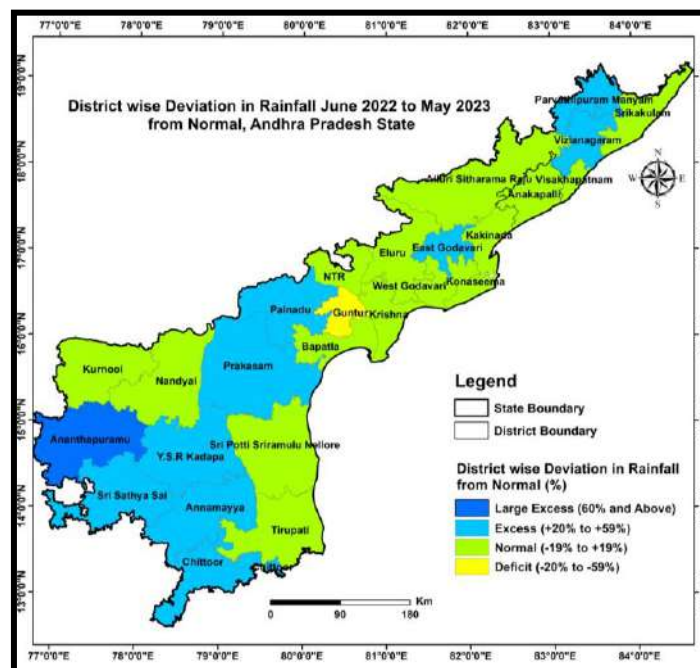


Fig. 3.4: Rainfall Departure of June, 2022 to May, 2023 from Normal of same period

3.2.1.2 Rainfall departure of June 2022 to May 2023 from June 2021 to May 2022:

The state has received 1099 mm rainfall during the period June 2022 to May 2023, which is 10% less than the rainfall (1219 mm) received during June 2021 to May 2023. **Fig.3.5** gives departure of June 2022 to May 2023 rainfall from June 2021 to May 2022 rainfall. The departure percentage ranges from -35% in Kurnool district to 43% in Srikakulam district. **Fig. 3.6** represents the spatial distribution of deviation

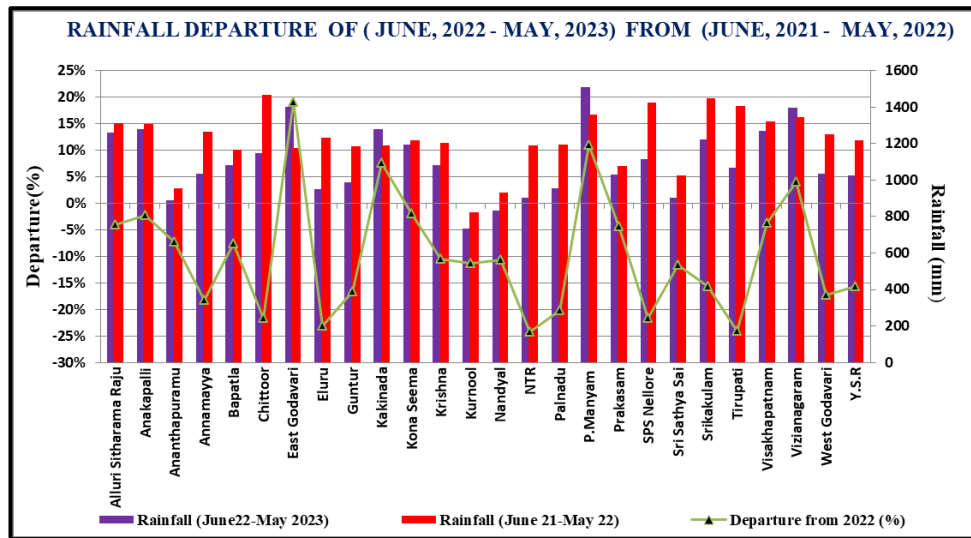


Fig.3.5: Rainfall Departure of June 2022 to May 2023 from June 2021 to May 2022

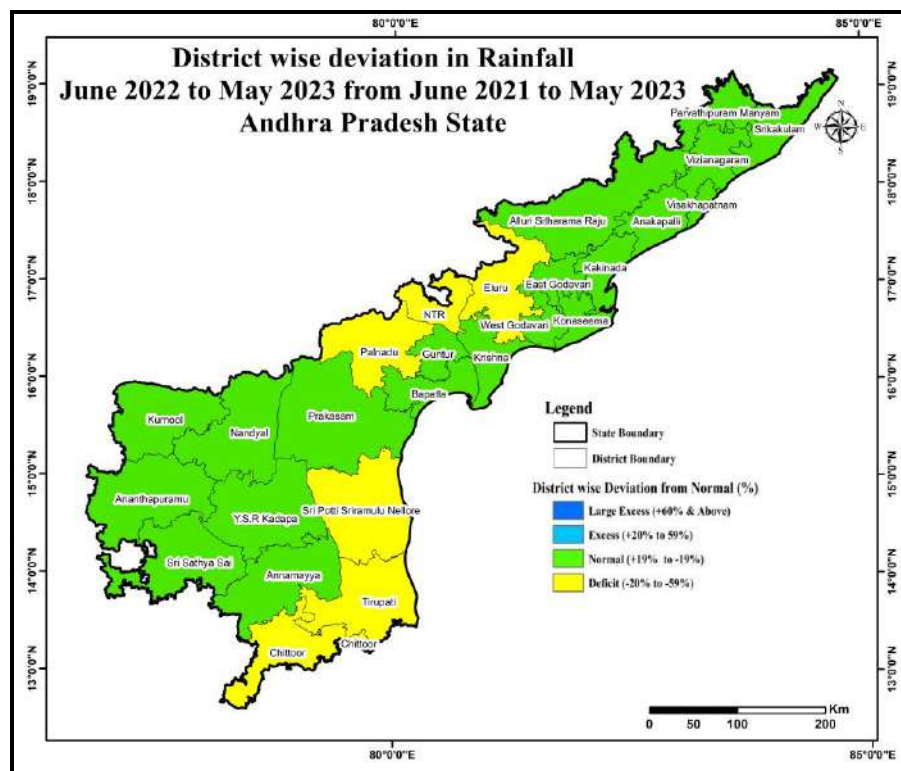


Fig.3.6: Rainfall Departure of June 2022 to May 2023 from June 2021 to May 2022

3.2.2 August, 2023

The rainfall data collected and compiled from weekly and monthly weather reports of India Meteorological Department has been used to analyze the rainfall for the period June 2023 - August 2023. **Table-3.3** gives the district wise rainfall data for the period June 2023- August 2023 and June 2022- August 2022 normal for the same period and the departure from normal and previous year (2022).

Table-3.3: Salient Features of Rainfall and its Variability in Andhra Pradesh State, August 2023.

Sl. no	Districts	Rainfall (June-August 2023)	Rainfall (June-August 2022)	Normal Rainfall (mm)	Departure from 2022 (%)	Departure from normal (%)	Remark
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	A.Sitharama Raju	805	566	880	42%	-9%	Normal
2	Anakapalli	548	556	431	-1%	27%	Excess
3	Ananthapuramu	374	415	272	-10%	38%	Excess
4	Annamayya	404	427	331	-5%	22%	Excess
5	Bapatla	559	436	437	28%	28%	Excess
6	Chittoor	486	396	386	23%	26%	Excess
7	East Godavari	672	521	729	29%	-8%	Normal
8	Eluru	730	339	747	115%	-2%	Normal
9	Guntur	579	416	529	39%	9%	Normal
10	Kakinada	653	599	625	9%	4%	Normal
11	Konaseema	781	492	719	59%	9%	Normal
12	Krishna	619	377	605	64%	2%	Normal
13	Kurnool	352	316	370	11%	-5%	Normal
14	Nandyal	392	320	462	23%	-15%	Normal
15	NTR	600	410	697	46%	-14%	Normal
16	Palnadu	427	452	449	-5%	-5%	Normal
17	ParvathipuramMany	676	696	706	-3%	-4%	Normal
18	Prakasam	272	509	306	-47%	-11%	Normal
19	SPS Nellore	301	329	271	-9%	11%	Normal
20	Sri Sathya Sai	497	425	287	17%	73%	L.
21	Srikakulam	531	422	644	26%	-18%	Normal
22	Tirupati	317	376	360	-16%	-12%	Normal
23	Visakhapatnam	376	600	555	-37%	-32%	Deficit
24	Vizianagaram	569	731	624	-22%	-9%	Normal
25	West Godavari	686	402	733	71%	-6%	Normal
26	Y.S.R Kadapa	305	491	355	-38%	-14%	Normal
	State Mean	519	462	520	12%	-0.1%	Normal
Source: India Meteorological Department, GO. Legend: Large Excess (+60% or more), Excess (+20% to +59%), Normal (-19% to +19%), Deficient (-20% to -59%), Large Deficient (-60% to -99%) departure from normal							

3.2.2.1 Rainfall Departure of June 2023 to August 2023 from Normal

During the period June 2023 to August 2023, the state has received 519 mm of rainfall. **Fig.3.7 & 3.8** gives the district wise departure of June 2023 to August 2023 rainfall from normal rainfall of the same period. It ranges from -32 % in Visakhapatnam to 73 % in Sri Sathya Sai district. Out of 26 districts, 1 district received large excess rainfall (+60% or more), 5 districts received excess rainfall (+20% to +59% above normal), 19 districts received normal rainfall (-19% to +19%) and 1 district received deficient rainfall (-20% to -59% below normal) during the period (**Table 3.3**).

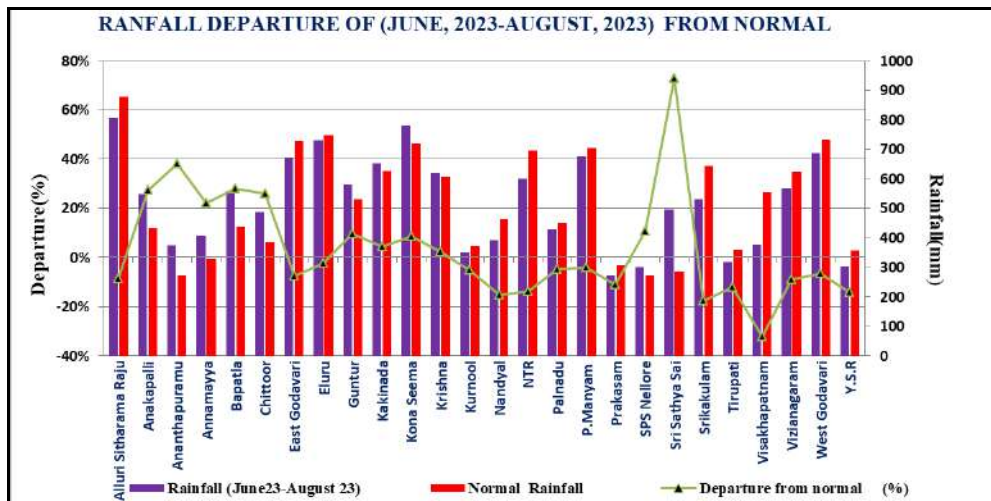


Fig.3.7: Rainfall Departure of June to August 2023 from Normal of same Period.

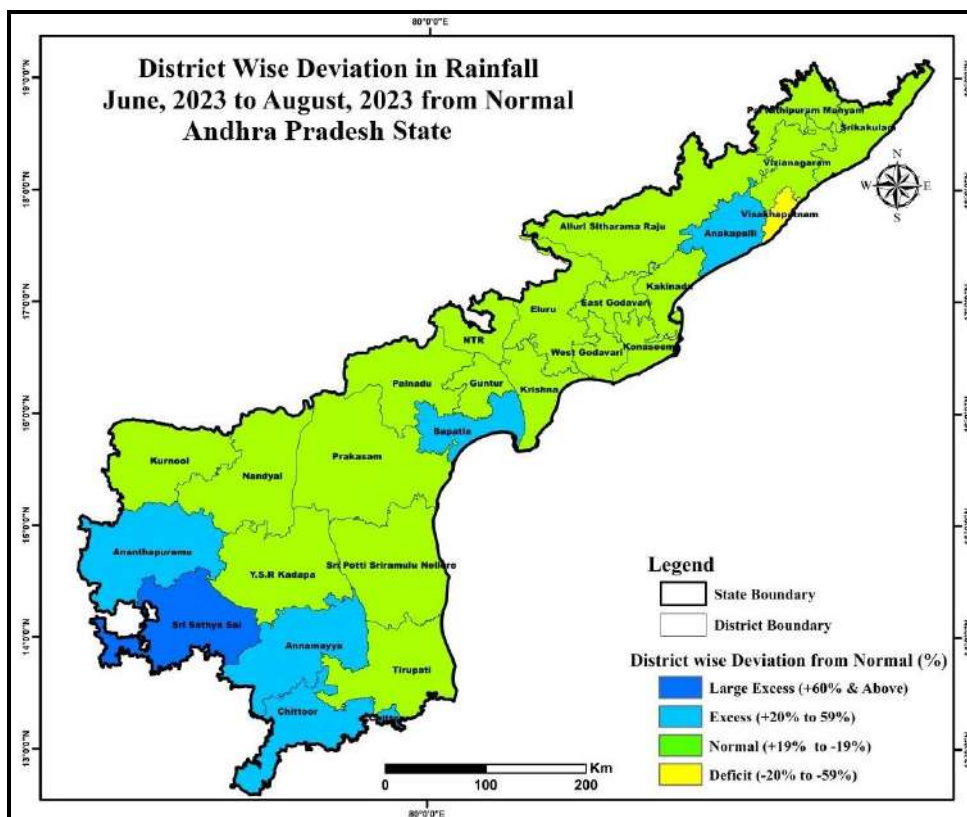


Fig.3.8: Rainfall deviation June 2023 - August 2023 from Normal of same period

3.2.2.2 Rainfall Departure of June – August 2023 from 2022.

The State received 519 mm rainfall during the period June - August 2023, which is 12% more than the rainfall received (462 mm) during the same period in 2022 (**Table 3.3**). **Fig.3.9 & 3.10** gives district wise departure of June-August 2023 rainfall from rainfall received during same period in 2022. The departure in percentage ranges from -47% in Prakasam district to 115% in Eluru district.

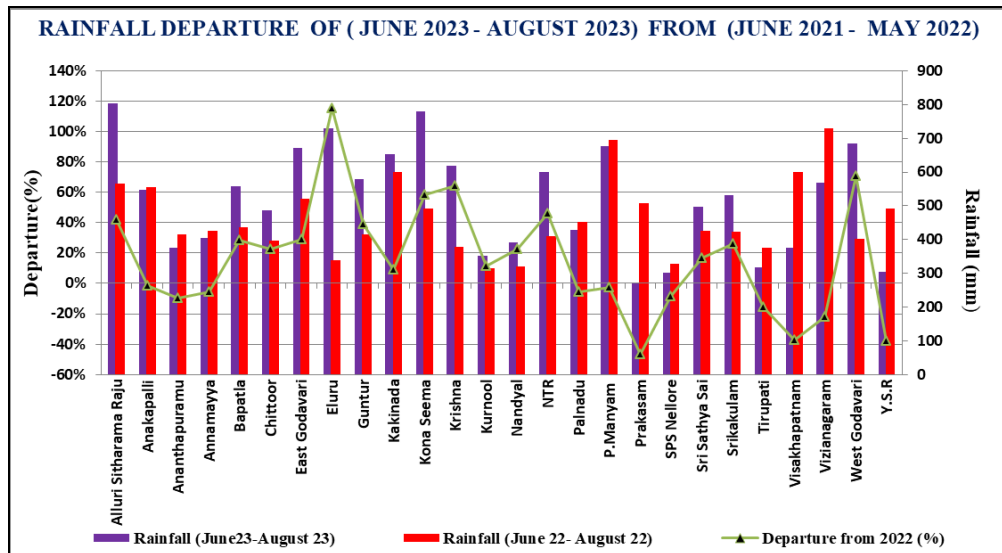


Fig.3.9: Rainfall Departure of June 2023 - August 2023 from June 2022- August 2022

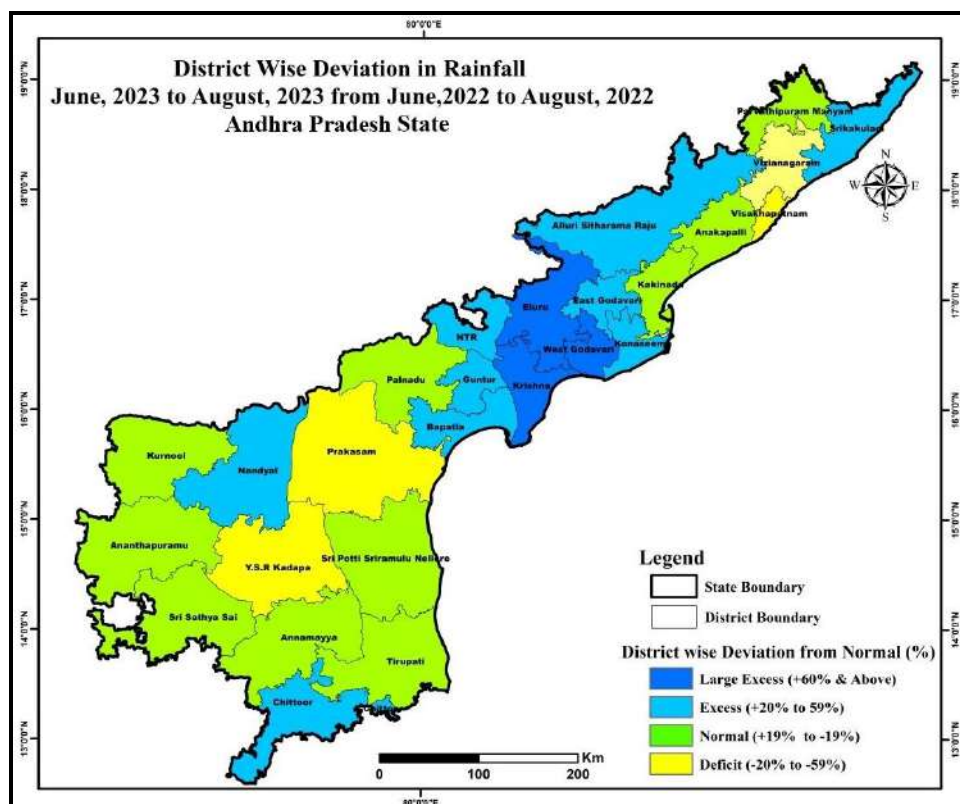


Fig.3.10: Rainfall deviation from June 2023 –August 2023 from June 2023 – August 2023

3.2.4 November, 2023

The rainfall data collected and compiled from weekly and monthly weather reports from India Meteorological Department were used to analyze the rainfall for the period June 2023 - October 2023.

Table.3.4 gives the district-wise rainfall data for the period June - October 2022 & 2023, normal and the departure of June - October 2023 rainfall with other periods. The departure values are used to prepare the graphs and presented in **Fig.3.11 to Fig.3.14**.

Table-3.4: Salient Features of Rainfall and its Variability in Andhra Pradesh State, Nov 23.

SNo	District	Rainfall (June23- October23)	Rainfall (June22- October22)	Normal Rainfall	Departure from 2022(%)	Departure from Normal (%)	Status
1	Alluri Sitharama Raju	856	1149	1044	-26%	-18%	Normal
2	Anakapalli	607	932	888	-35%	-32%	Deficient
3	Ananthapuramu	311	644	415	-52%	-25%	Deficient
4	Annamayya	354	596	513	-41%	-31%	Deficient
5	Bapatla	698	872	668	-20%	4%	Normal
6	Chittoor	582	693	606	-16%	-4%	Normal
7	East Godavari	643	1144	936	-44%	-31%	Deficient
8	Eluru	738	1250	888	-41%	-17%	Normal
9	Guntur	738	798	693	-7%	6%	Normal
10	Kakinada	513	1117	863	-54%	-41%	Deficient
11	Kona Seema	488	1181	1025	-59%	-52%	Deficient
12	Krishna	809	995	816	-19%	-1%	Normal
13	Kurnool	340	616	502	-45%	-32%	Deficient
14	Nandyal	399	625	617	-36%	-35%	Deficient
15	NTR	676	889	874	-24%	-23%	Deficient
16	Palnadu	488	702	594	-31%	-18%	Normal
17	P.Manyam	882	1168	891	-24%	-1%	Normal
18	Prakasam	341	539	564	-37%	-40%	Deficient
19	SPS Nellore	233	497	565	-53%	-59%	Deficient
20	Sri Sathya Sai	325	717	471	-55%	-31%	Deficient
21	Srikakulam	689	1067	875	-35%	-21%	Deficient
22	Tirupati	462	598	612	-23%	-24%	Deficient
23	Visakhapatnam	615	925	821	-33%	-25%	Deficient
24	Vizianagaram	735	1073	833	-31%	-12%	Normal
25	West Godavari	597	1183	988	-50%	-40%	Deficient
26	Y.S.R	326	558	531	-42%	-39%	Deficient
	State Mean	556	866	734	-36%	-24%	Deficient

Source: India Meteorological Department, GO. Legend: Large Excess (+60% or more), Excess (+20% to +59%), Normal (-19% to +19%), Deficient (-20% to -59%), Large Deficient (-60% to -99%) departure from normal

3.2.3.1 Rainfall Departure of June 2023 to October 2023 from Normal

During the period June 2023 to October 2023, the state has received 556 mm of rainfall. **Fig. 3.11 & 3.12** gives the district wise departure of June 2023 to October 2023, rainfall from normal rainfall of the same period. It ranges from -40% in Visakhapatnam to 6% in Guntur district. Out of 26 districts, only 9 districts received normal rainfall (-19% to +19%) and remaining 17 districts received deficient rainfall (-20% to -59% below normal) during the period (**Table 3.4**). The break in monsoon as El Nino conditions over the Pacific Ocean and fewer low-pressure systems formed over the State were reasons for the deficient rainfall.

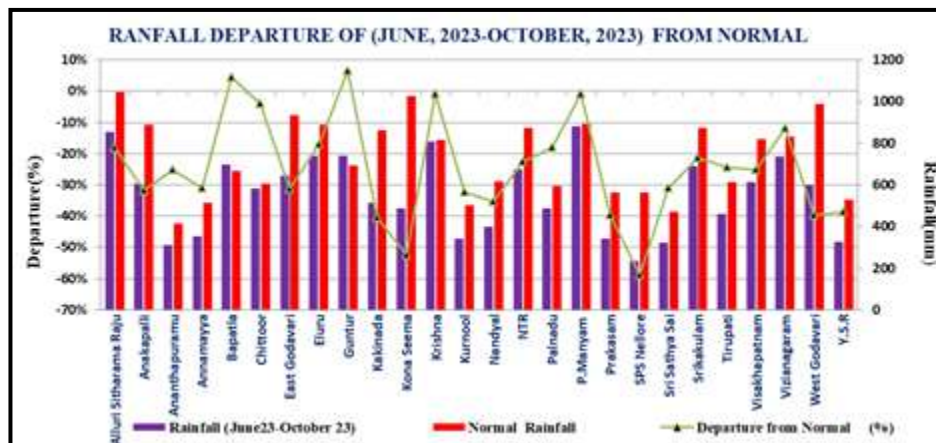


Fig.3.11: Rainfall Departure of June 2023 to October 2023 from Normal of same Period

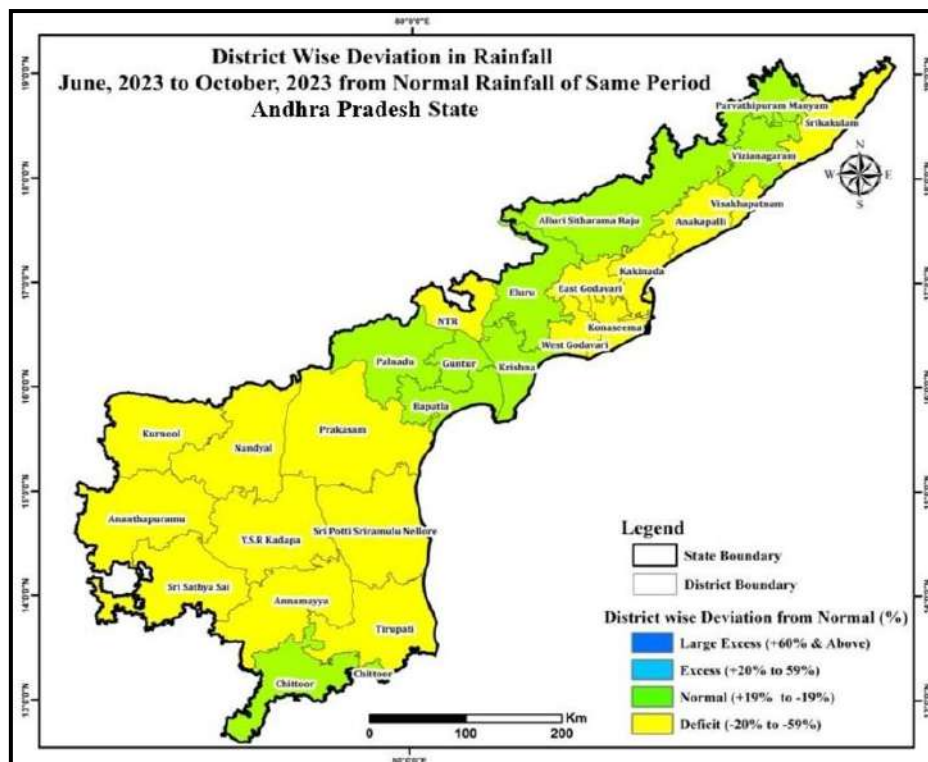


Fig.3.12: Rainfall deviation June 2023 – October 2023 from Normal

3.2.3.2. Rainfall Departure of June 2023 to October 2023 from 2022

The State received 519 mm rainfall during the period June- October 2023, which is 12% more than the rainfall received (462 mm) during the same period in 2022 (Table 3.4). Fig. 3.13 & 3.14 gives district wise departure of June-November 2023 rainfall from rainfall received during sameperiod in 2022. The departure in percentage ranges from -47% in Prakasam district to 115% in Eluru district.

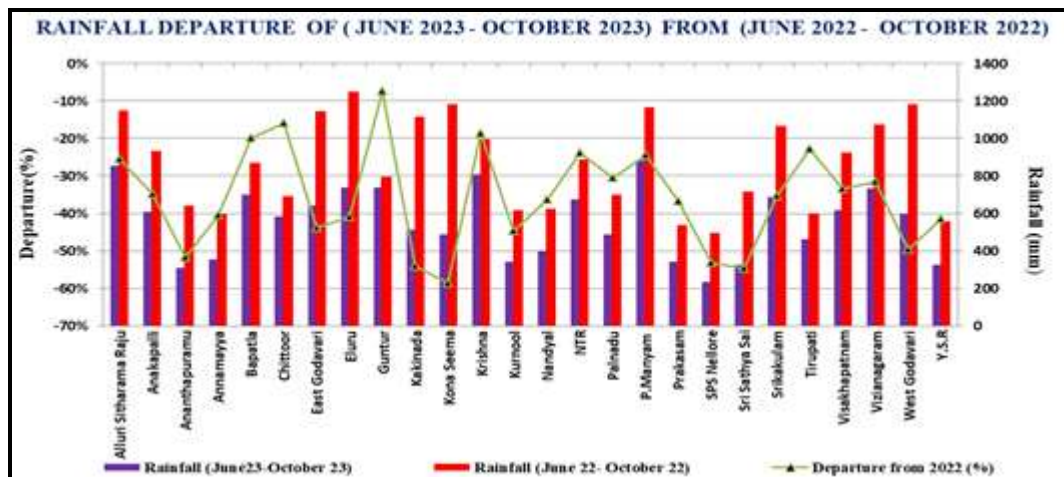


Fig.3.13: Rainfall Departure of June 2023–October 2023 from June 2022–October 2022

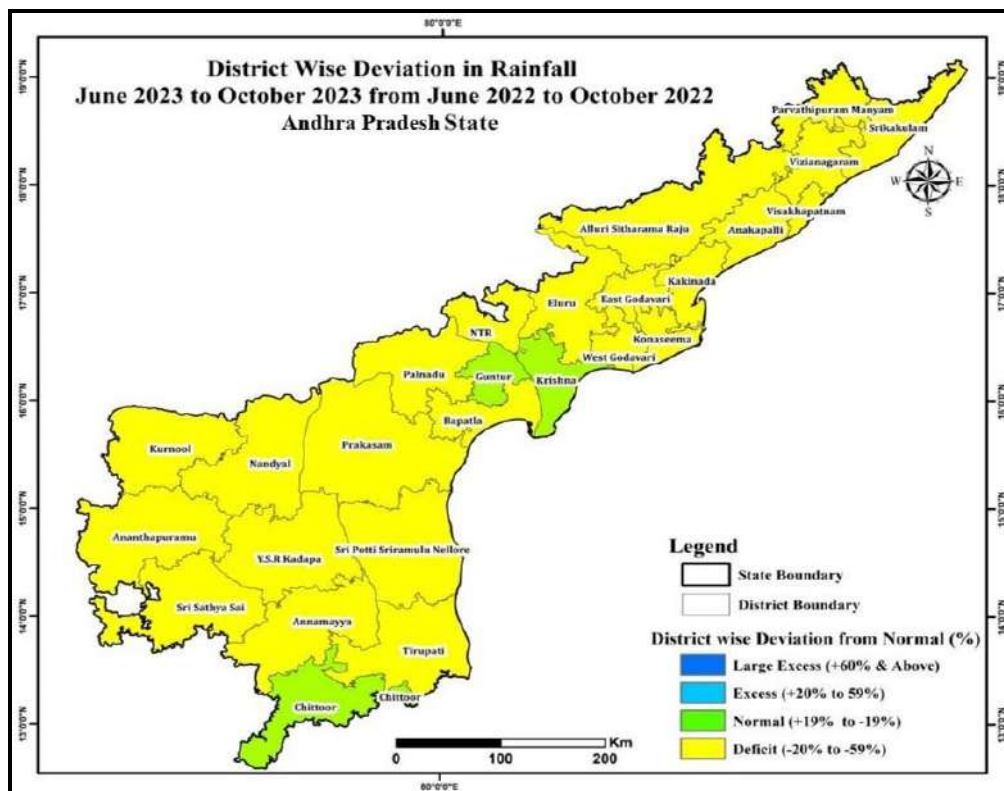


Fig.3.14: Rainfall deviation from June 2023 – October 2023 from June 2022 – October 2022

3.2.4 January, 2024

The rainfall data collected and compiled from weekly and monthly weather reports from Andhra Pradesh Water Resources Information & Management System were used to analyze the rainfall for the period June 2023 - Dec 2023. **Table-3.5** gives the district-wise rainfall data for the period June-December 2022 & 2023, normal and the departure of June-December 2022 rainfall with other periods.

Table.3.5: Salient Features of Rainfall and its variability in Andhra Pradesh January 2024

S.No.	District	Rainfall (June 2023 to December 2023 Actual)	Rainfall (June 2022 to December 2022)	Normal	Deviation from 2022 (%)	Deviation from Normal (%)	Status
1	Alluri Sitharama Raju	1054.52	1167.23	1103.13	-10%	-4	Normal
2	Anakapalli	851.42	972.83	987.84	-12%	-14	Normal
3	Ananthapuramu	340.27	717.86	459.03	-53%	-26	Deficit
4	Annamayya	638.21	826.48	668.1	-23%	-4	Normal
5	Bapatla	1011.35	970.5	827.18	4%	22	Excess
6	Chittoor	836.03	948.69	811.02	-12%	3	Normal
7	East Godavari	904.85	1188.26	1008.51	-24%	-10	Normal
8	Eluru	1015.44	1278.14	949.21	-21%	7	Normal
9	Guntur	1010.49	871.36	794.72	16%	27	Excess
10	Kakinada	770.2	1166.09	970.67	-34%	-21	Deficient
11	Konaseema	828.26	1259.68	1175.03	-34%	-30	Deficient
12	Krishna	1095.04	1059.01	949.05	3%	15	Normal
13	Kurnool	375.69	648.48	544.82	-42%	-31	Deficient
14	Nandyal	443.46	680.25	656.16	-35%	-32	Deficient
15	NTR	915.63	924.67	937.13	-1%	-2	Normal
16	Palnadu	765.83	774.78	684.25	-1%	12	Normal
17	ParvathipuramManyam	946.52	1178.84	960.65	-20%	-1	Normal
18	Prakasam	604.29	718.09	750.93	-16%	-20	Deficient
19	SPS Nellore	755.1	938.87	963.76	-20%	-22	Deficient
20	Sri Sathya Sai	399.26	807.13	527.21	-51%	-24	Deficient
21	Srikakulam	748.08	1076.22	990.77	-30%	-25	Deficient
22	Tirupati	960.51	1079.26	1029.39	-11%	-7	Normal
23	Visakhapatnam	784.52	980.62	963.71	-20%	-19	Normal
24	Vizianagaram	857.78	1093.23	929.02	-22%	-8	Normal
25	West Godavari	981.61	1243.53	1106.92	-21%	-11	Normal
26	Y.S.R Kadapa	471.11	695.3	630.97	-32%	-25	Deficient
	State Mean	783.29	971.75	860.74	-19%	-10%	Normal
Source: India Meteorological Department, GO. Legend: Large Excess (+60% or more), Excess (+20% to +59%), Normal (-19% to +19%), Deficient (-20% to -59%), Large Deficient (-60% to -99%) departure from normal							

3.2.4.1 Rainfall Departure of June – December 2023 from 2022.

The State received 783 mm rainfall during the period June - December 2023, which is -19 % less than the rainfall received (860.74 mm) during the same period in 2022 (Table 3.5). Fig. 3.15 & 3.16 gives district wise departure of June - December 2023 rainfall from rainfall received during same period in 2022. The departure in percentage ranges from -53% in Ananthapuramu district to 16% in Guntur district.

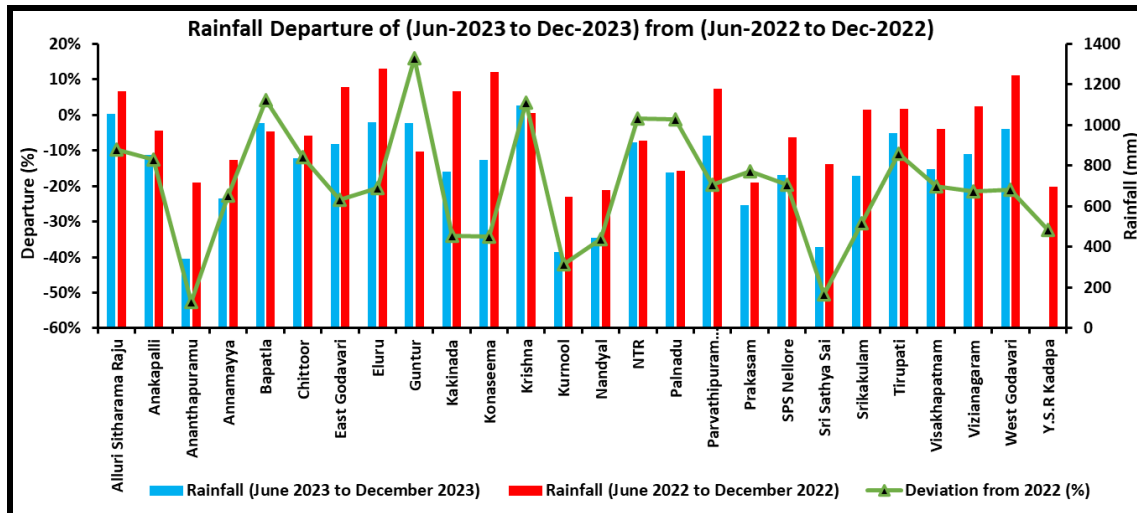


Fig. 3.15: Rainfall Departure of June 2023–December 2023 from June 2022–December 2022

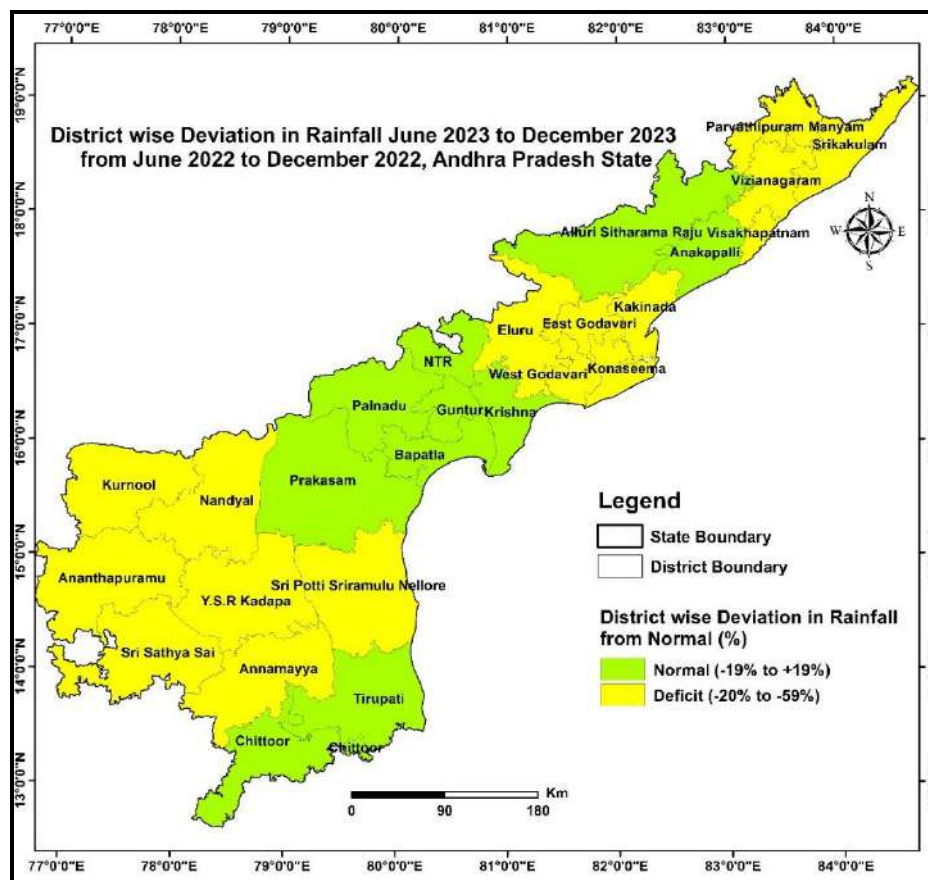


Fig. 3.16: Rainfall deviation from June 2023 – December 2023 from June 2022 – December 2022

3.2.4.2 Rainfall Departure of June 2023 to December 2023 from Normal

During the period June 2023 to December 2023, the state has received 783 mm of rainfall. Fig.3.17 & 3.18 gives the district wise departure of June 2023 to December 2023 rainfall from normal rainfall of the same period. It ranges from -32 % in Nandyal to 27 % in Guntur district. Out of 26 districts, 2 districts received excess rainfall (+20% to +59% above normal), 14 districts received normal rainfall (-19% to +19%) and 10 district received deficient rainfall (-20% to -59% below normal) during the period (Table 3.5).

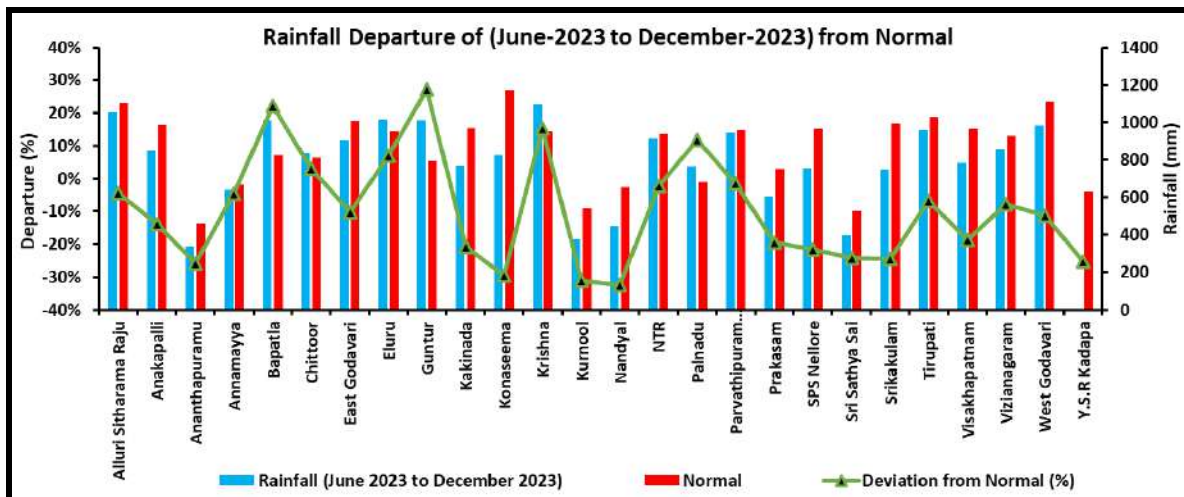


Fig. 3.17: Rainfall Departure of June 2023–December 2023 from Normal 2022

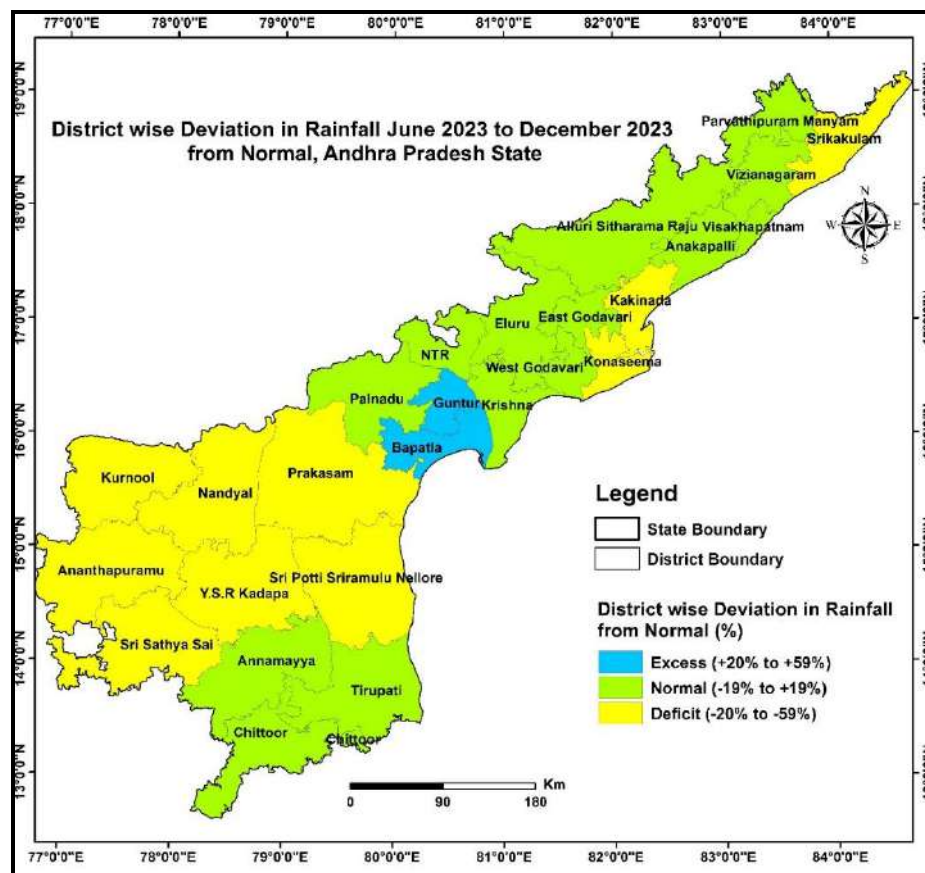


Fig. 3.18: Rainfall deviation from June 2023–December 2023 from Normal

4. GEOLOGY

A wide variety of geological formations occur in Andhra Pradesh State, ranging from the oldest Archaean crystalline formations to recent alluvium. The geological set up and hydrogeological map is presented in the **Fig.4.1** and **4.2** respectively. A major part of the area is underlain by gneissic complex with a structural fill of sedimentary formations and basin fill of metasedimentary formations. The gneissic complex is overlain by basaltic lava flows in the northwestern part and is intruded by several younger rocks namely granites, dolerites, pegmatites and quartzite etc.

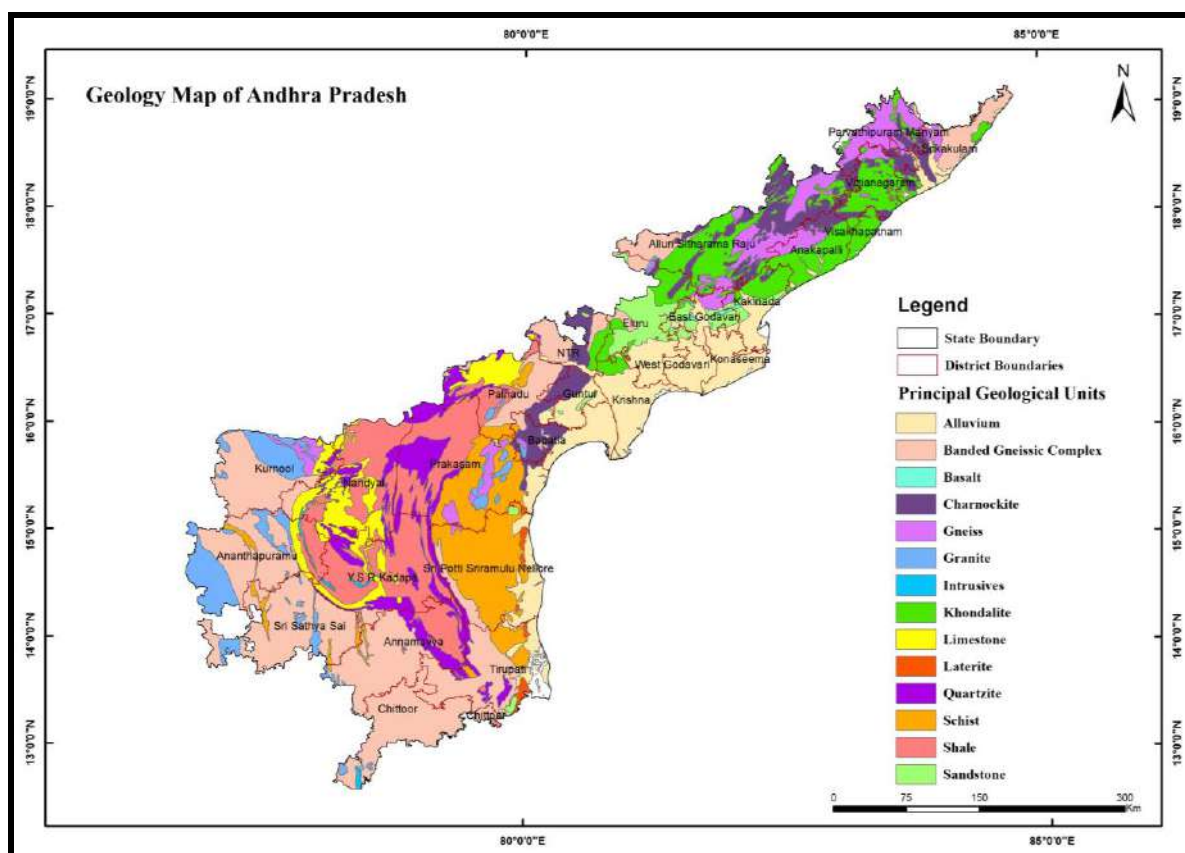


Fig.4.1: Geology Map of Andhra Pradesh

4.1 Archaeans and Lower Pre-Cambrians

Peninsular gneisses of Archaean age are dominant rock types in Rayalaseema region of the State. Dharwars, comprising amphibolites, gneisses, schists, and quartzites occur as narrow isolated bands within granites in Chittoor, Sri Sathya Sai, Annamaya, Tirupati, Ananthapuramu, Kurnool, Nandyal, Kadapa, Nellore, Palnadu and Prakasam districts. The Charnockites and Khondalites occur in an extensive belt in Srikakulam, Parvathipuram Manyam, Anakapalli, Alluri Sitharama Raju, Vizianagaram, and Visakhapatnam districts

and in upland areas of East Godavari and West Godavari districts. The Charnockite bands also occur as narrow patches adjoining Coastal alluvium in Krishna, Bapatla, Guntur, Palnadu and Prakasam districts.

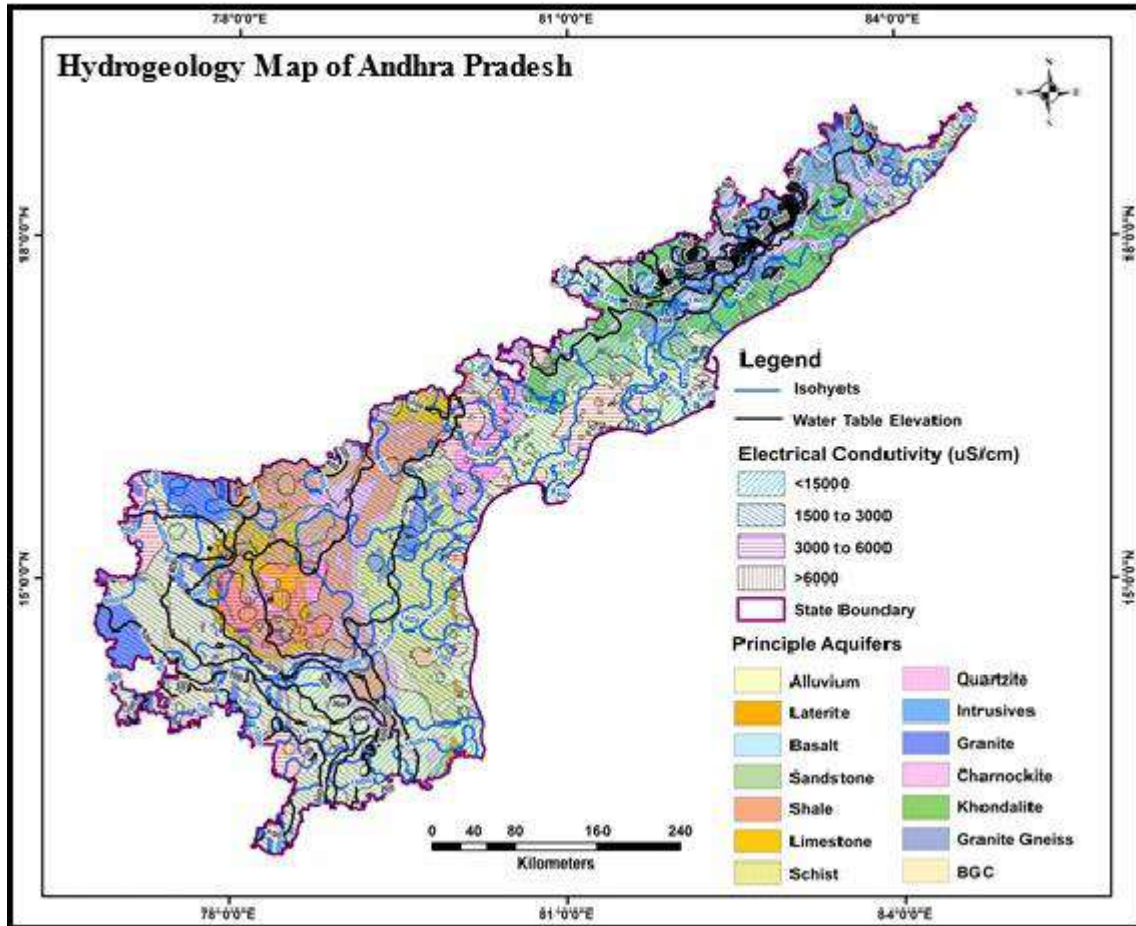


Fig.4.2: Hydrogeology map of Andhra Pradesh State.

4.2 Upper Pre-Cambrian to Early Pre-Cambrian

The group includes Kadapas and Kurnools comprising shales, limestones, dolomites, sandstones and conglomerates. The crescent shaped Kadapa Super Group covering ~42,100 Km² occur in parts of Krishna, Eluru, Nandyal, Kurnool, Prakasam, Palnadu, Guntur, Nellore, Tirupati, YSR Kadapa, Chittoor, Annamayya, Sri Sathya Sai and Ananthpuramu districts. Kurnools occur in Kundair valley and Palnad tract. Gondwanas also occur as disconnected outcrops along the coast from Tuni in East Godavari district to Satyavedu in Chittoor district.

4.3 Deccan Traps (Basalt) and Associated Rocks

Deccan traps, the horizontally disposed lava flows are confined to minor outcrops near Rajahmundry on either banks of the river Godavari. The thickness of individual flow varies between few meters to as much as 30 m. Inter-trappean beds comprising limestones, cherts and sandstones occur between trap flows near Rajahmundry. Infra-trappean beds, comprising deposits of limestones and sandstones, underlie the trap flows. These are exposed in an area covering a stretch of 6 km from Pangidi in West Godavari district to Kateru in East Godavari district.

4.4 Tertiary Formations (Miocene-Pliocene)

The formation of this group is locally known as Rajahmundry formation. It constitutes mainly Sandstones occurring from Eluru to Rajahmundry as isolated out crops dipping gently towards the coast. Sandstones of equivalent age occur along the southern coast in Chittoor, Tirupati, Prakasam and Nellore districts. They are highly potential from groundwater point of view.

4.5 Quaternary Formations

Alluvium, beach sands, Laterite soils etc. belong to this group. Beds of clay, sand, gravel and boulders stretch along the coast except near Visakhapatnam and Anakapalli. This distribution is not only confined to deltas but also extends deep inland in narrow patches along river courses of Godavari, Krishna, Pennar and Vamsadhara. The alluvial deposits attain a thickness of more than 600 m in East and West Godavari districts sloping towards the coast. In Srikakulam and Visakhapatnam districts, the thickness varies up to 20 m.

5.. GROUNDWATER RESOURCES (2023)

The dynamic groundwater resource potential of the state has been estimated as per the methodology given by the Groundwater Estimation Committee 2015 (GEC 2015).

As per the latest estimates (March, 2023), the net groundwater availability in the state is 52.89 BCM out of which the total draft for all uses (Domestic, Industrial and Irrigation) is 14.95 BCM. Net groundwater available for future use is 38.17 BCM. The stage of extraction is 32.61%. Out of 667 mandals, over-exploited (OE) mandals are 10, critical mandals are 03, semi-critical mandals are 18 and safe mandals are 597 and 39 mandals are categorized as saline. Comparatively high groundwater extraction is observed in Sri Sathya Sai (56.24%) districts. Groundwater extraction is lowest in Alluri Sitharama Raju (2.49%). More mandals from Rayalaseema regions falls under OE, Critical and Semi Critical category than Coastal region mandals. The categorization of mandals is depicted in Fig.5.1.

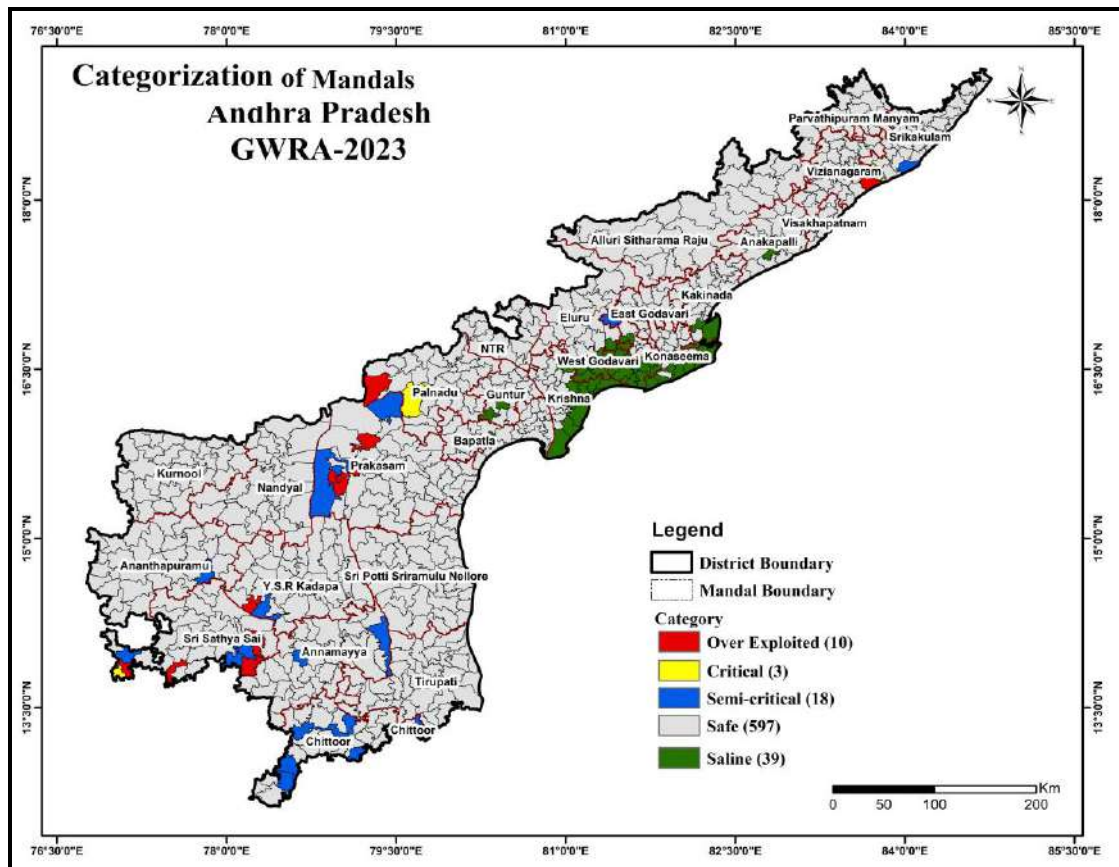


Fig.5.1: Categorization of Mandals (GWRA-2023), Andhra Pradesh

6. GROUNDWATER REGIME MONITORING

Groundwater level monitoring is a scientific surveillance system to establish the periodic and long-term changes in groundwater regime. The water level data over a period of time provides information on changes in groundwater levels with progressive groundwater development by natural and artificial recharge/surface water irrigation system.

Monitoring of a network of groundwater monitoring wells provides periodical information on groundwater regime scenario with a fair degree of accuracy in different hydrogeological environments in the area.

From the groundwater occurrence point of view, State litho units are grouped into following 3 groups.

- i) Consolidated Formations
- ii) Semi-consolidated Formations
- iii) Unconsolidated Formations

6.1 Consolidated formations: Crystalline rocks of Archaean age, metasedimentary rocks of Kadapa and Kurnools are included in these formations occupying ~83% of the area. These rocks generally lack primary porosity and secondary porosity is developed due to weathering, fracturing, development of solution cavities. In these rocks, depth of weathering varies from 5 to 10 m bgl (occasionally up to 20 m) and majority of fractures occur within 100 m depth. In these rocks dug wells/ dug cum bore wells and bore wells are the most prevalent abstraction structures. Groundwater yield from these rocks varies from 0.1 lps to 3 lps.

In Khondalite formations, depth of weathering varies from 10-40 mbgl with yields of 0.5-2 lps. Consolidated meta-sedimentary formations (Kadapa and Kurnool rocks and equivalents) have undergone great deal of compaction, metamorphism, thereby reducing primary porosity. Occurrence of groundwater in these formations is restricted to structural features like folds, faults, lineaments, fractures, fissures, solution cavities and channels. Depth of weathering in these formation ranges from 5-10 m bgl and yield varies from 0.01-19 lps (general 1-5 lps). Relatively Kurnool group of rocks are more potential than Kadapas (general yield 5-10 lps).

6.2 Semi-consolidated formations: Semi-consolidated formations are represented by rocks belonging to Gondwana formations (sandstones) and Rajahmundry sandstones. The yield of these formations ranges from 10-70 lps.

6.3 Unconsolidated formations: Unconsolidated formations are represented by coastal alluvium, deltaic alluvium and inland river alluvium. Groundwater occurs under water table and confined conditions. Water quality in deeper aquifers is of poor quality. In deltaic areas of Godavari, Krishna and Pennar, yield varies from 0.7-30 lps. In Godavari delta, groundwater quality is of potable nature in paleo channels.

6.4 Monitoring Methodology

Groundwater regime is monitored through a network of dug wells and piezometers known as Groundwater Monitoring Station (GWMS). The dug wells, which are owned by government, non-government agencies and individual users, are tapped in the shallow aquifer system. Piezometers (basically bore wells /tube wells) are constructed exclusively for groundwater regime monitoring under Hydrology Projected. Some of the exploratory wells/ observatory wells drilled under exploratory drilling programme of Central Groundwater Board are converted to piezometers for regular monitoring.

The network of Groundwater Monitoring Station (GWMS) are monitored 4 times a year by Central Groundwater Board during the following periods.

Period	Date
May (Pre-monsoon)	20 th to 30 th of the month
August (Mid-monsoon)	20 th to 30 th of the month
November (Post-monsoon)	1 st to 10 th of the month
January	1 st to 10 th of the month

6.4.1 Participatory Groundwater Monitoring

Weekly water level measurements are initiated in phases involving local people as observers under participatory groundwater monitoring programme, to observe micro-level changes in groundwater regime. Participatory observers from the local area are identified and are engaged since May, 2005 and as on 31st March, 2024, 105 no's of GWMS are monitored through participatory approach (**Table-6.1**).

6.4.2 Chemical Quality Monitoring

The chemical quality of groundwater is monitored (dug wells/Piezometers) once in the month of May (pre-monsoon season) to observe the effect of geogenic as well as

anthropogenic contamination of groundwater in different hydrogeological environments over a period of time.

6.5 Maintenance of Database on Groundwater Monitoring Wells

The database on water levels and chemical quality is maintained since 1969 in various database softwares developed by CGWB such as GWDES and GEMS. The database is maintained in Oracle using GEMS (Groundwater Estimation and Management System) software, which is adopted by all groundwater agencies in the country. Currently, the department switches to online water level and quality database, WIMS (Water Information and Management System).

6.6 Distribution of Groundwater Monitoring Wells

The distribution and density of monitoring wells in the State; distribution in river basins, aquifer systems and canal command areas are summarized in the following session.

6.6.1 District-Wise Distribution of Groundwater Monitoring Wells`

Total 1473 GWMS are monitored in the state (DW: 676 (46%) and Pz: 797 (54%) and density varies from 361 Km²/well (Nandyal) to 31 Km²/well in (Vishakhapatnam) district (**Table-6.1**).

6.6.2 Aquifer-Wise Distribution of Groundwater Monitoring Wells

Out of 1473 GWMS, 1066 wells are located in hard rocks, 226 wells in soft rocks. District wise and aquifer wise distribution of GWMS is given in **Table-6.2**. About 27 % of GWMS are located in Banded Gneissic complex, followed by Alluvium formations (19 %), followed by Khondalite rocks (9 %).

Table-6.1: District wise Distribution of GWMS, Andhra Pradesh State (As on March, 2023).

S.No.	District	Area	No of GWMS			No of Participatory observers	Density of Network stations (sq. km. per well)		
		(Km2)	DW	Pz	Total	Nos	Dug wells	Piezo meters	Combined stations
1	Allurisitaramaraju	12665	44	13	57	1	288	974	222
2	Anakapalli	4024	24	4	28	1	168	1006	144
3	Ananthapuramu	10185	8	58	66	6	1273	176	154

4	Annamayya	9043	19	64	83	6	476	141	109
5	Bapatla	3897	24	12	36	1	162	325	108
6	Chittoor	6736	15	70	85	7	449	96	79
7	East Godavari	2615	21	4	25	3	125	654	105
8	Eluru	6699	34	21	55	4	197	319	122
9	Guntur	2413	23	18	41	2	105	134	59
10	Kakinada	3247	23	7	30	3	141	464	108
11	Konaseema	2442	30	12	42	1	81	204	58
12	Krishna	3818	29	56	85	3	132	68	45
13	Kurnool	7882	17	15	32	9	464	525	246
14	Nandyal	9735	22	5	27	8	443	1947	361
15	NTR	3289	20	19	39	3	164	173	84
16	Palnadu	7281	46	28	74	8	158	260	98
17	Parvathipuram Manyam	3627	22	6	28	0	165	605	130
18	Prakasam	14230	24	98	122	4	593	145	117
19	Sirkalulam	4464	51	29	80	4	88	154	56
20	SPS Nellore	10403	45	66	111	6	231	158	94
21	Sri Sathya Sai	8946	17	74	91	10	526	121	98
22	Tirupati	8449	34	16	50	7	249	528	169
23	Visakhapatnam	992	16	16	32	1	62	62	31
24	Vizianagaram	3871	31	14	45	1	125	277	86
25	West Godavari	2140	22	14	36	1	97	153	59
26	YSR Kadapa	10106	15	58	73	5	674	174	138
	Total	160205	676	797	1473	105	237	201	109

Table 6.2: Aquifer Wise Distribution of Groundwater Monitoring Well

District	Alluvium		BGC		Basalt		Charnockite		Gneiss		Granite		Khondalite		Limestone		Laterite		Quartzite		Schist		Shale		Sandstone		Total
	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	DW	PZ	
Alluri Sita Rama Raju			3	1			13	4	18	8			10														57
Anakapalli	1						2		8				13	4													28
Ananthapuramu			5	31							3	12				3						3		9			66
Annamayya			17	37																	2	2	25				83
Bapatla	17	7		1			6	1				3							1								36
Chittoor			15	69								1															85
East Godavari	21	2																								2	25
Eluru	16	13			3				4				3												8	8	55
Guntur	12	12	1						1				2	3											7	3	41
Kakinada	9	3					12	4																	2		30
Konaseema	15	7					3						9												3	5	42
Krishna	28	51		1				1					1	3													85
Kurnool			7	6					1	3	7	5			1	1			1								32
Nandyal			1	1											7	3			3				11	1			27
NTR	1	3	12	8			5	5					2	2		1											39
Palnadu	2		20	4			6	3			1	2			9	10			1	1	5	6	2	2			74
Parvathipuram Manyam							6		15	5			1	1													28
Prakasam	2	1					2	3	5	3	3	7								18	4	22	7	44	1		122
Sirkalulam	10	2	4	5													5				31	22			1		80
SPS Nellore			35	55							10	11															111
Sri Sathya Sai	2	5	5	16			3	11	3	21			2	19			1	2							1		91
Tirupati	3		17	13													4				10	3					50
Visakhapatnam													16	16													32
Vizianagaram							9		4	2			16	12					2								45
West Godavari	21	14							1																		36
YSR Kadapa				3											3	9			1	3			11	43			73
Total	166	120	142	251	3	0	67	32	60	42	24	41	75	60	20	27	10	2	9	22	50	58	33	124	23	18	1473

7. ANALYSIS OF WATER LEVELS

The groundwater levels observed over a period of time provide valuable information on behaviour of the groundwater regime, which is constantly subjected to changes due to recharge and discharge phenomena. A balance between these two factors results in the decline or rise in the groundwater storage. When the recharge exceeds discharge there will be a rise in the groundwater storage and vice versa. The decline in water level may be due to increase in draft (for different purposes) or decrease in precipitation (less recharge to ground water). On the other hand a rise in water level may be due to an increase in rainfall and/or due to changes in irrigation practices. The dug wells tapping the phreatic aquifer mostly limited to a depth of 20 m. The depth of piezometers which are tapping both the phreatic and deeper aquifers varies from 20 to 100 m. Hence the water level recorded in the piezometers may not be the same as that of dug wells for a particular period though both the structures are in the same place. In this report the water level data collected from un-confined aquifers (shallow depth) as well as confined/semi-confined aquifers is presented. The data from GWMS for the year 2023 was analyzed and for every set of measurements, write up and maps were prepared and are presented here under various paragraphs.

The purpose of water level data analysis is

- i) Four measurements of depth to water level give an overall idea regarding the groundwater level in the state during the year of measurement.
- ii) The fluctuation in comparison to the same month in the previous year gives an idea about the change in the groundwater level for a particular period with respect to that of the level during the same month in the previous year. This gives an idea about the change in the amount of draft and rainfall between the two years.
- iii) The water level fluctuation during the pre-monsoon period in comparison to last year gives an idea about the seasonal fluctuation, which ultimately reflects the change in dynamic groundwater resources.
- iv) The water level fluctuation during a particular month of measurement with reference to the decadal mean for the same months gives an idea of the behaviour of the groundwater level on long-term basis.

7.1 Depth to Water Levels (Unconfined & Confined/Semi-confined)

7.1.1 Depth to Water Levels (May, 2023)

The depth to water level of 1323 wells is used for the analysis. Distribution of wells in different depth ranges is depicted in pie diagram **Fig.7.1**. District wise minimum and maximum of water level ranges are given in bar diagram **Fig.7.2** and depth to water level map is given in **Fig.7.3**. Analysis of depth to water level data of 1323 wells (**Annexure - V**) shows water levels vary between 0.04 m bgl (Sri Sathya Sai district) to 65.93 m bgl (Prakasam district). Water level of less than 2 m bgl is recorded in 6 % of wells, between 2 to 5 m bgl in 37% of wells, between 5 to 10 m bgl in 37% of wells, between 10 to 20 m bgl in 14 % of wells, between 20-40 m bgl in 5% of wells and water level more than 40 m bgl is observed in 1 % of wells.

Depth to water level map of May, 2023 (**Fig.7.3**) shows that shallow water level of less than 2 m bgl is noticed as isolated patches in parts of Ananthapuramu, Eluru, Konaseema, Krishna, Palnadu, SPS Nellore, Sri Sathya Sai and West Godavari districts covering an area of 1.3 % of the state. Water level of 2 to 5 m bgl is observed throughout the state mainly in Sri Sathya Sai, Guntur, SPS Nellore, Palnadu, Srikakulam, Anakapalli, Annamayya, Alluri Sitharama Raju, Tirupati, Kurnool, Bapthla, and Konaseema districts covering an area of 39% of the state. 45% area of the state is covered by depth to water level of 5 to 10 m bgl with significant area in Sri Sathya Sai, Prakasam, SPS Nellore, Alluri Sitharama Raju, Chittoor, Vizianagaram and YSR Kadapa districts. Water level of 10 to 20 m bgl is covered in 12% of the area and mainly observed in Annamayya, Prakasam, Eluru, Chittoor, SPS Nellore and Srikakulam districts. Deeper water levels of more than 20 m covers 4% area of the state.

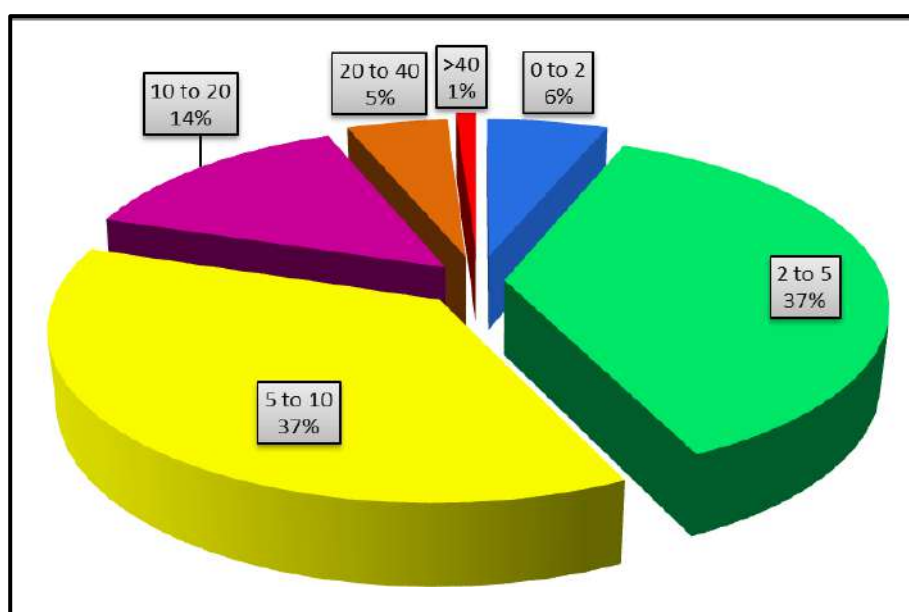


Fig.7.1: Percentage of wells in different depth ranges of groundwater level, May, 2023

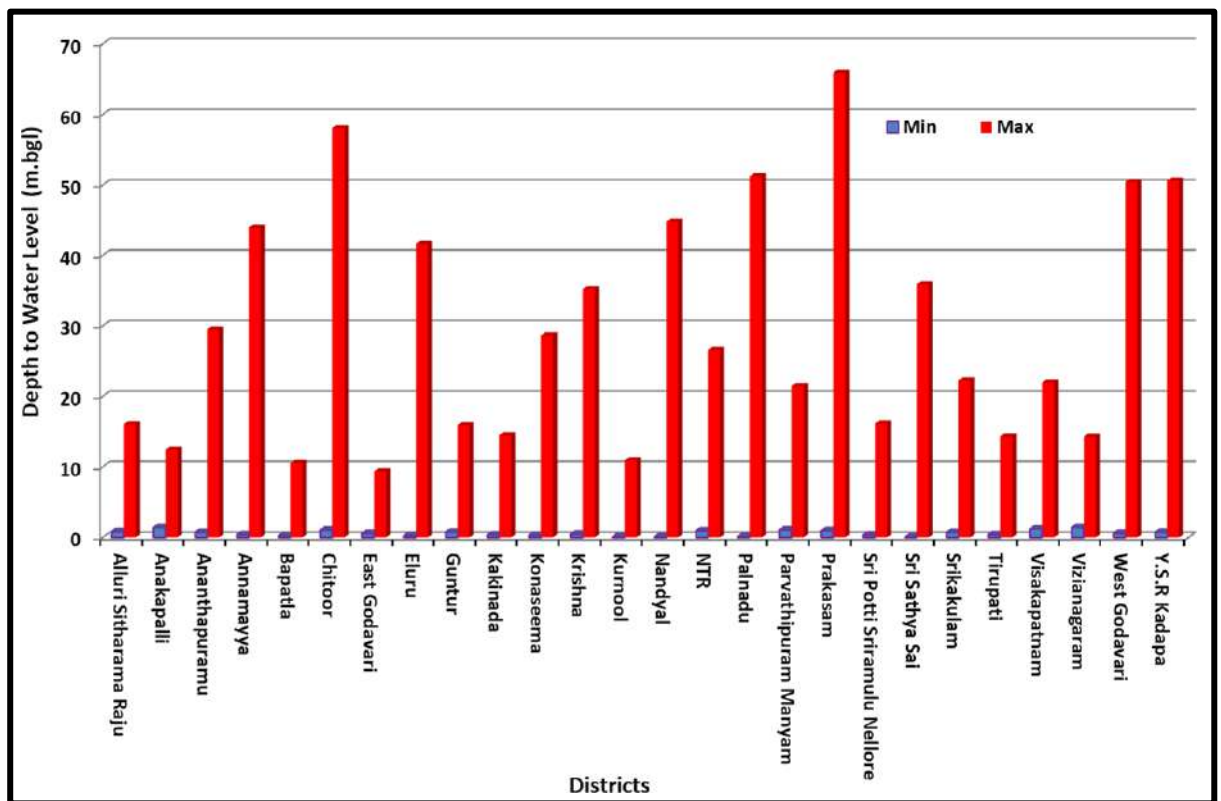


Fig. 7.2: District wise minimum and maximum of water levels: May, 2023

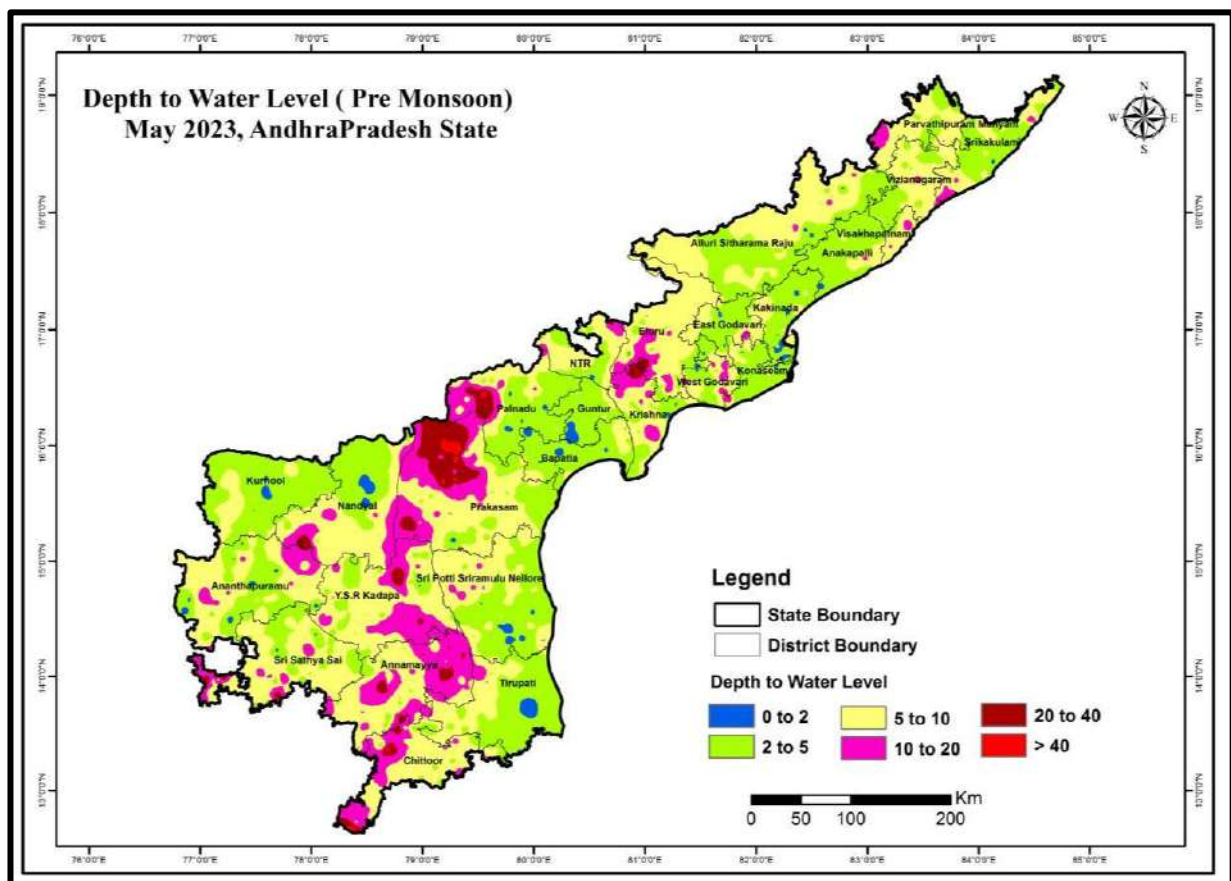


Fig-7.3: Depth to water level of May, 2023 in Andhra Pradesh

7.1.2 Depth to Water Levels (August, 2023)

Out of 1464 wells, depth to water level of 1340 wells is used for the analysis. Distribution of wells in different depth to water level ranges is depicted in pie diagram **Fig.7.4**. District wise minimum and maximum of water level ranges are given in bar diagram **Fig.7.5** and depth to water level map is given in **Fig.7.6**. Analysis of depth to water level data of 1340 wells (**Annexure - VI**) shows water levels vary between groundwater level (Guntur district) to 61.4 m bgl (Chittoor district). Water level of less than 2 m bgl is recorded in 18 % of wells, between 2 to 5 m bgl in 32% of wells, between 5 to 10 m bgl in 27 % of wells, between 10 to 20 m bgl in 16 % of wells, between 20-40 m bgl in 5% of wells and water level more than 40 m bgl is registered in 2% of wells.

Depth to water level map of August, 2023 shows that shallow water level of less than 2 m bgl occur as isolated patches in parts of Srikakulam, Alluri Sita Rama Raju, West Godavari, East Godavari, Bapatla, Guntur, Konaseema, Krishna and Nandyal districts covering an area of 4 % of the State. Water level of 2 to 5 m bgl is observed throughout the State mainly in northern districts of Andhra Pradesh covering an area of 39 % of the State. 35% area of the state is covered by depth to water level of 5 to 10 m bgl with significant area in RayalaSeema region significantly in Chittoor, Sri Sathya Sai, YSR Kadapa , SPS Nellore, Ananthapuramu, Prakasam and Palnadu districts. Water level of 10 to 20 m bgl is covered in 17% of the area and mainly observed in Krishna, Chittoor, Annamayya, Ananthapuramu, Prakasam, SPS Nellore and YSR Kadapa districts. Deeper water levels of more than 20 m covers 5% area of the state.

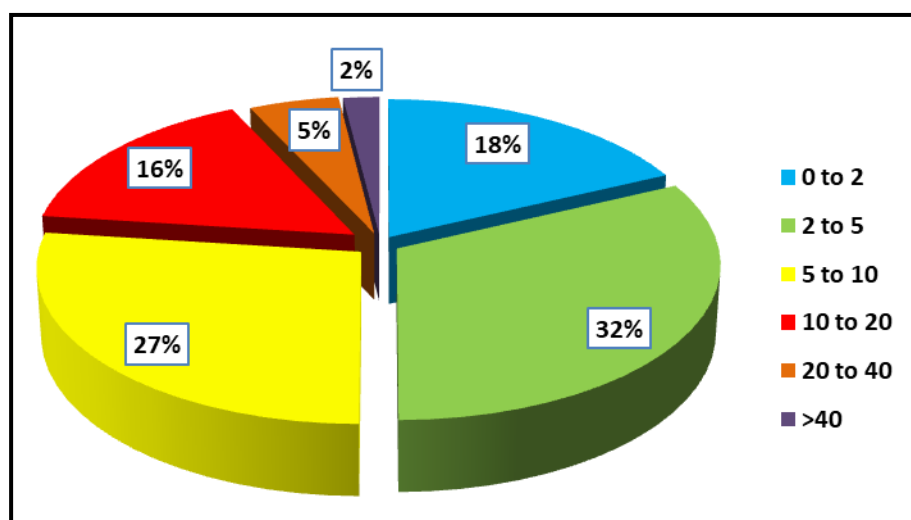


Fig.7.4: Percentage of wells in different depth ranges of groundwater level August, 2023

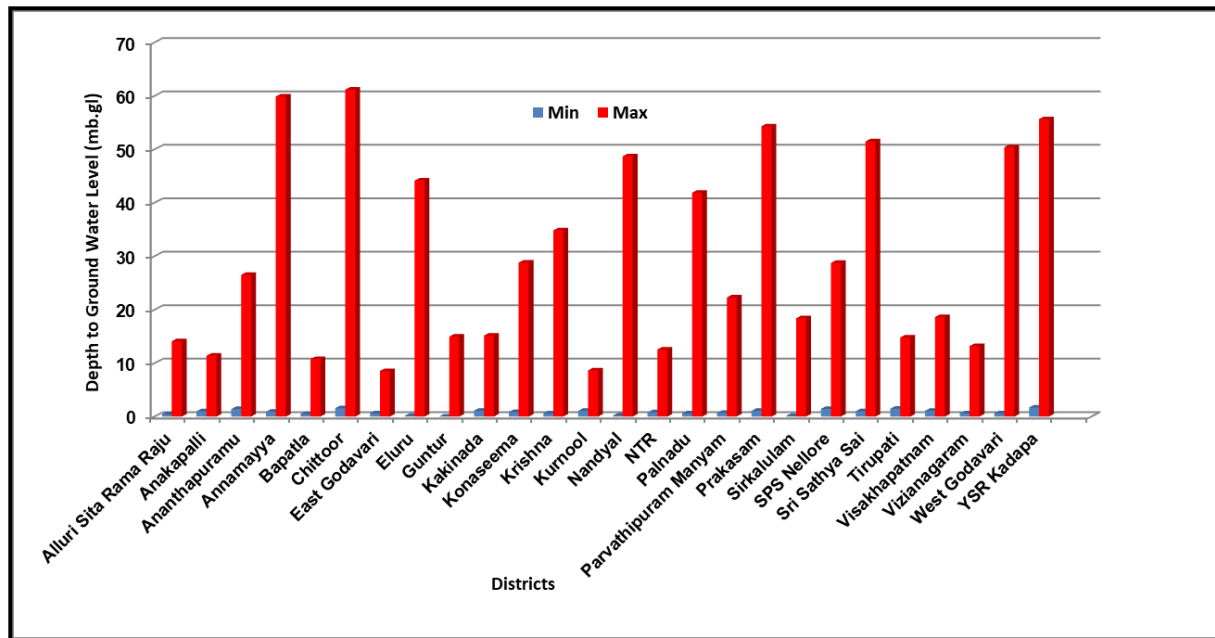


Fig. 7.5: District wise minimum and maximum of depth to water levels during August, 2023.

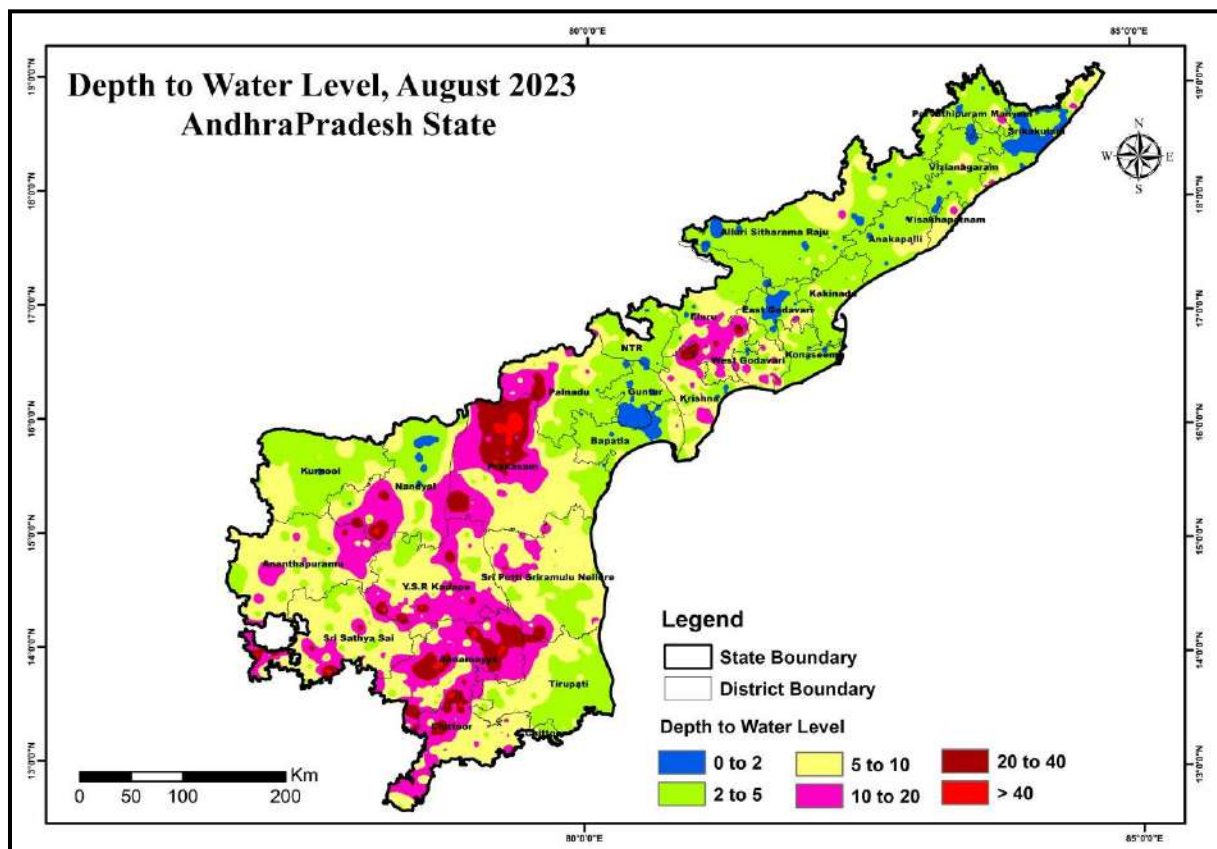


Fig.7.6: Depth to water level during August, 2023.

7.1.3 Depth to Water Levels (November, 2023)

The depth to water level of 1328 wells is used for the analysis. Distribution of wells in different depth ranges is depicted in pie diagram **Fig.7.7**. District wise minimum and maximum of water level ranges are given in bar diagram **Fig.7.8** and depth to water level map is given in **Fig.7.9**. Analysis of depth to water level data of 1328 wells (**Annexure - VII**) shows water levels vary between 0.3 m bgl (Tiruati district) to 68 m bgl (Sri Sathya Sai district). Water level of less than 2 m bgl is recorded in 9 % of wells, between 2 to 5 m bgl in 38% of wells, between 5 to 10 m bgl in 32% of wells, between 10 to 20 m bgl in 15 % of wells, between 20-40 m bgl in 4% of wells and water level more than 40 m bgl is observed in 2 % of wells.

Depth to water level map of November, 2023 shows that shallow water level of less than 2 m bgl as isolated patches in parts of Bapatla, Guntur Srikakulam, Nandyal, West Godavari, Palnadu, Alluri Sitharam Raju, Vizianagaram, Anakapalli, Konaseema, East Godavari, Sri Sathya Sai and Eluru districts covering only an area of 2% of the State. Water level of 2 to 5 m bgl is observed mainly in coastal districts of Andhra Pradesh and also YSR Kadapa, Tirupati, Kurnool, Annamayya, Ananthapuramu, Alluri Sitharam Raju, Parvathipuram Manayam, Palnadu, NTR, Sri Satya Sai districts covering an area of 34% of the State. 45% area of the State is covered by depth to water level of 5 to 10 m bgl is observed throughout the state with significant area in Prakasam, Sri Sathya Sai, SPS Nellore, Chittoor, Ananthapuramu, YSR Kadapa, Tirupati, Srikakulam, Krishna, Alluri Sitharam Raju and Palnadu districts. Water level of 10 to 20 m bgl is covered in 16% of the State area and mainly observed in SPS Nellore, Prakasam, Annamayya, Chittoor, Krishna, Sri Sathya Sai, Ananthapuramu, YSR Kadapa, Eluru and Alluri Sitharam Raju districts. Deeper water levels of more than 20 m cover 3 % area of the State covering mainly Prakasam, Annamayya, Chittoor, West Godavari, Sri Sathya Sai, Eluru and Nandyal districts.

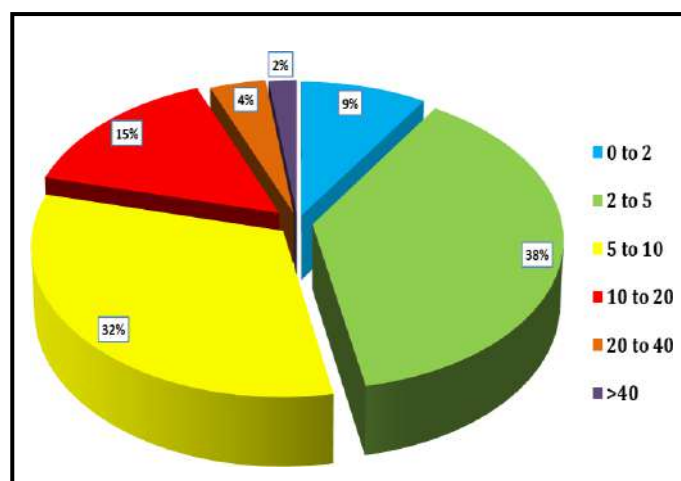


Fig.7.7: Percentage of wells in different depth ranges of groundwater level November 2023

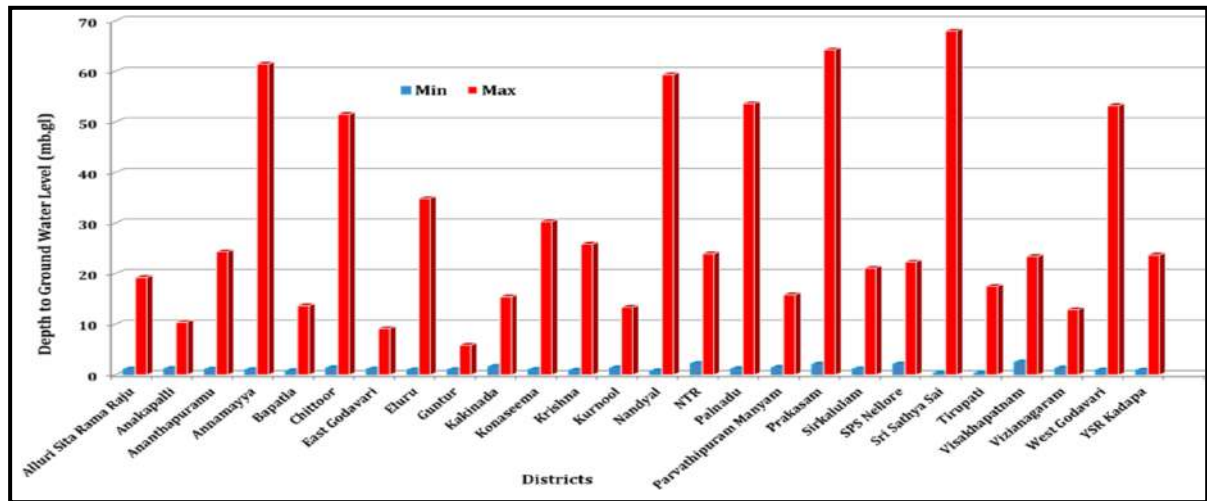


Fig.7.8: District wise minimum and maximum of water levels during November 2023

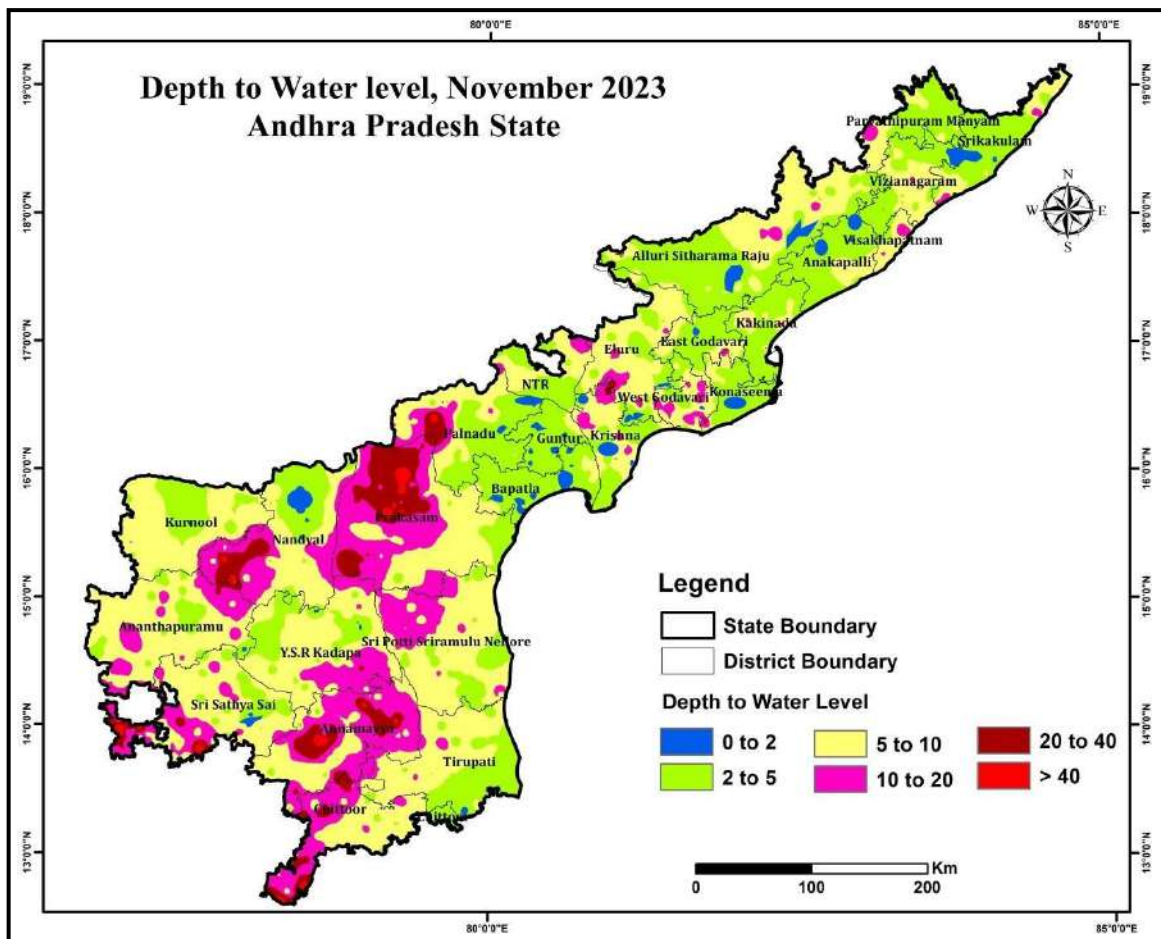


Fig.7.9 : Depth to water level during November 2023

7.1.4 Depth to Water Levels (January, 2024)

The depth to water level of 1376 wells is used for the analysis. Distribution of wells in different depth ranges is depicted in pie diagram **Fig.7.10**. District wise minimum and maximum of water level ranges are given in bar diagram **Fig.7.11** and depth to water level map is given in **Fig.7.12**. Analysis of depth to water level data of 1376 wells (**Annexure - VIII**) shows water levels vary between 0.2 m bgl (Tiruati district) to 100 m bgl (Sri Sathya Sai district). Water level of less than 2 m bgl is recorded in 10 % of wells, between 2 to 5 m bgl in 39% of wells, between 5 to 10 m bgl in 28% of wells, between 10 to 20 m bgl in 15 % of wells, between 20-40 m bgl in 6% of wells and water level more than 40 m bgl is registered in 3 % of wells.

Depth to water level map of January 2024 shows that shallow water level of less than 2 m bgl as isolated patches in parts of Nandyal, Tirupati, Palnadu, Bapatla, Guntur, SPS Nellore, Anakapalli and Eluru districts covering only an area of 1% of the State. Water level of 2 to 5 m bgl is observed mainly in coastal districts of Andhra Pradesh and also YSR Kadapa, Tirupati, Kurnool, Ananthapuramu, Alluri Sitharam Raju, Parvathipuram Manayam, Palnadu, NTR, Nandyal, Sri Satya Sai districts covering an area of 33% of the State. 42% area of the State is covered by depth to water level of 5 to 10 m bgl is observed throughout the state with significant area in Kurnool, Sri Sathya Sai, SPS Nellore, Chittoor, Aanthaparamu, YSR Kadapa, Tirupati, Srikakulam, Krishna, Alluri Sitharam Raju and Palnadu districts. Water level of 10 to 20 m bgl is covered in 18% of the State area and mainly observed in Prakasam, YSR Kadapa, SPS Nellore, Annamayya, Chittoor, Nandyal, Sri Sathya Sai, Ananthapuramu, Eluru, Krishna, West Godavari and Alluri Sitharam Raju districts. Deeper water levels of more than 20 m cover 7 % area of the State covering mainly Prakasam, YSR Kadapa, Annamayya, Chittoor, West Godavari, Sri Sathya Sai, Eluru and Nandyal districts.

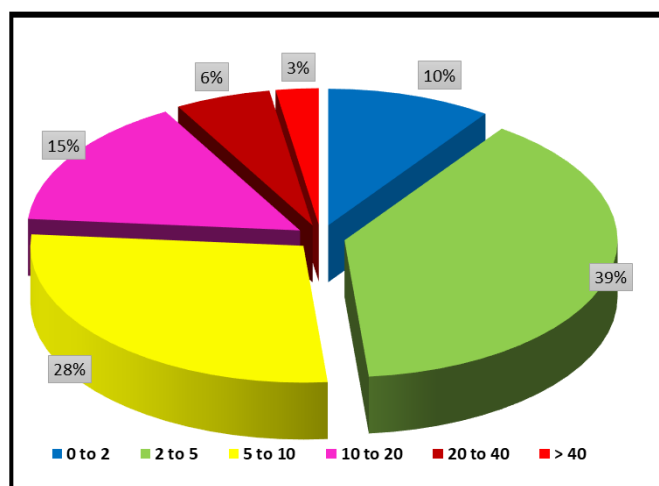


Fig.7.10: Percentage of wells in different depth ranges of groundwater level January 2024

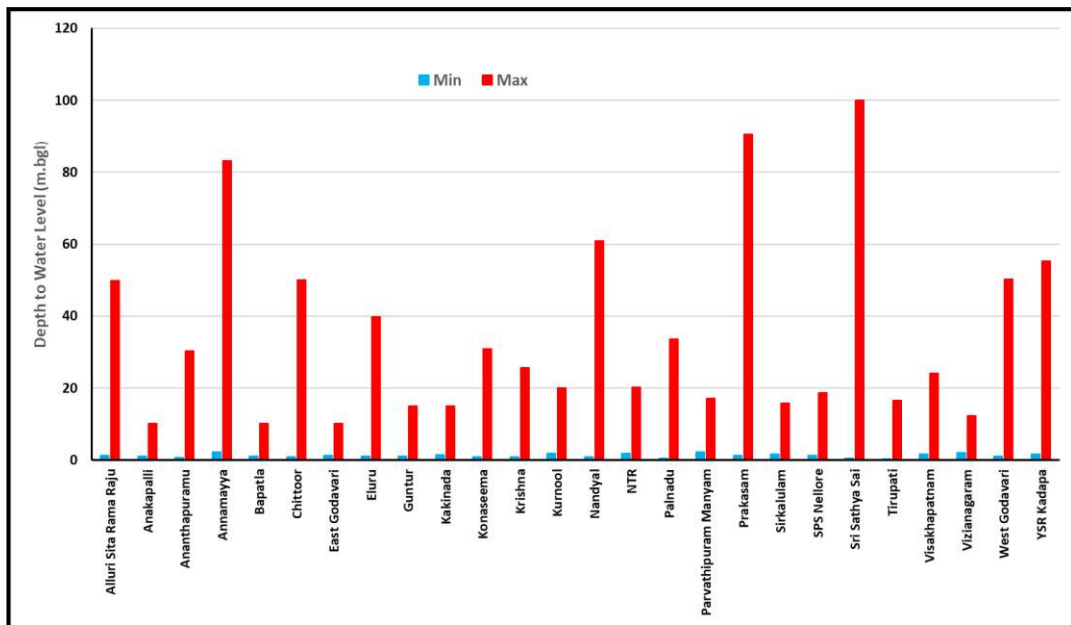


Fig.7.11: District wise minimum and maximum of water levels during January 2024

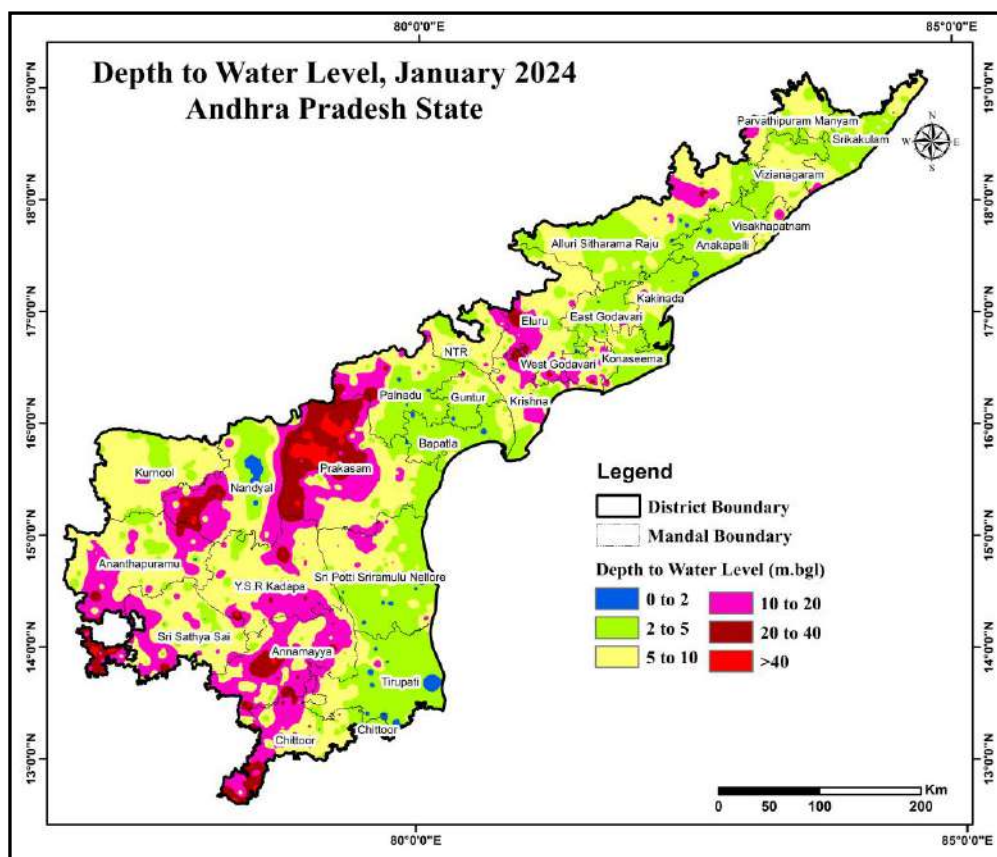


Fig.7.12 : Depth to water level during January 2024

7.2 Piezometric Head (Confined/Semi-confined)

7.2.1 Piezometric Head (May, 2023)

The depth to water levels of confined/semiconfined aquifers during May, 2023 based on analysis of water level data of 524 wells is generalized and given below. Distribution of wells in different peizometric heads is depicted in pie diagram **Fig.7.13** and peizometric head map is given in **Fig.7.15**. District wise minimum and maximum of peizometric heads are given in bar diagram **Fig.7.14**

Analysis of depth to water level data of 524 confined/semiconfined wells (**Annexure -IX**) shows water level variations from less than 0.15mbgl (Palnadu district) m to 65.93 m.bgl (Prakasam district). Water level of less than 2 m bgl is recorded in 6% of wells, between 2-5 m bgl in 21% of wells, between 5-10 m bgl in 37% of wells, between 10-20 m bgl in 24% of wells, between 20-40 m bgl in 9% of wells and > 40 m bgl in 3% of wells. Depth to water level map of confined aquifers of May, 2023 (**Fig.7.15**) shows that, shallow water levels of less than 2 m bgl are noticed as small patches in Palnadu, Bapatla, Anakapalli and Chittoor covering 0.4% of area . Water level 2 to 5 m bgl is covered in 12.5 % of the area, are also noticed as scattered patches in Tirupati, SPS Nellore, Palnadu, Bapatla, Srikakulam, Ananthpuramu and Kurnool districts. Area wise 46% of the state is covered by depth to water level of 5 to 10 m bgl, through out the district . Water level 10 to 20 m bgl is covered in 35% of the area in Annamayya, Ananthapuramu, Chittor, Nandyal, Krishna, Eluru, ASR, Prakasam , Konaseema, East and West Godavari districts. Deeper water levels of more than 20 m bgl covers about 6.3% of the state occurs as small patches in Prakasam , Sri Sathya Sai, Annamayya, Chittoor, Eluru, ASR, Konaseema, West Godavari districts and Nandyal districts.

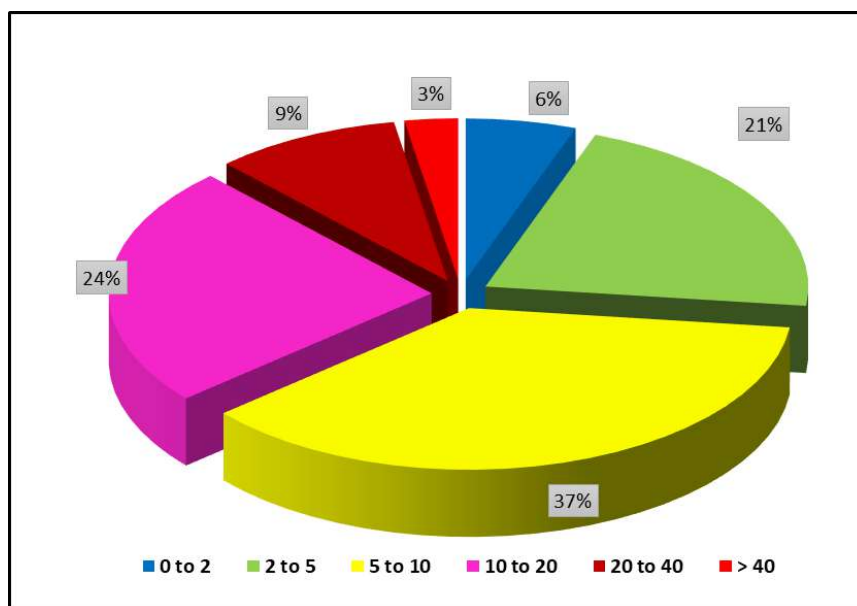


Fig-7.13: Percentage of wells in different depth ranges of Piezometric Head May 2023

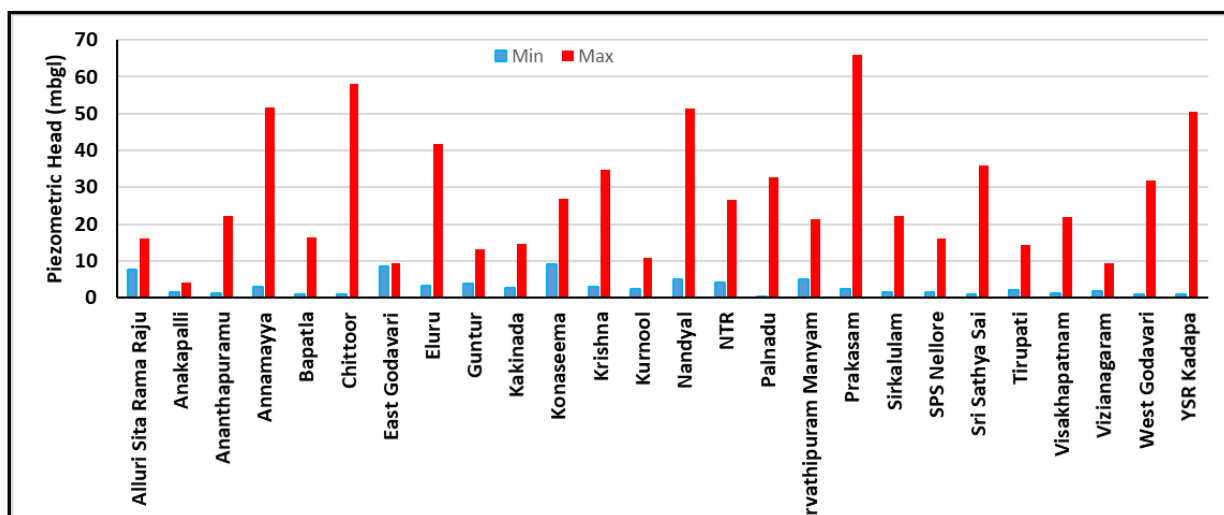


Fig. 7.14: District wise minimum and maximum of piezometric head of Confined/Semi-confined Aquifer during May, 2023

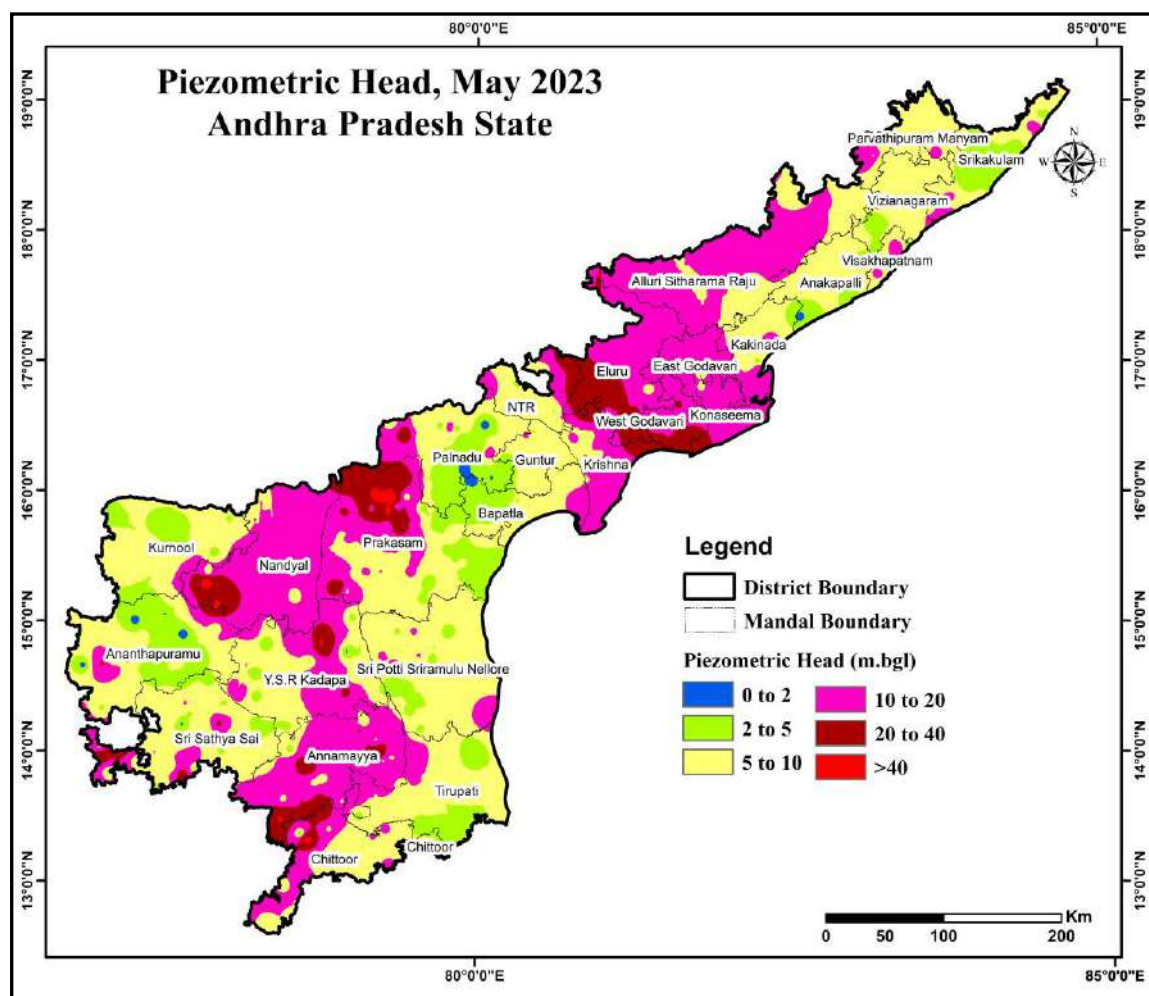


Fig-7.15: Piezometric Head of Confined/Semiconfined Aquifers, May, 2023 in Andhra Pradesh

7.2.2 Piezometric Head - August, 2023

The piezometric head of 537 wells is used for the analysis. Distribution of wells in different piezometric heads is depicted in pie diagram **Fig.7.16**. District wise minimum and maximum of piezometric heads are given in bar diagram **Fig.7.17** and piezometric head map is given in **Fig.7.18**. Analysis of piezometric head data of 537 wells (**Annexure - X**) shows water levels vary between ground level in Srikakulam to 61.2 bgl (Chittoor district). Water level of less than 2 m bgl is recorded in 6 % of wells, between 2 to 5 m bgl in 20% of wells, between 5 to 10 m bgl in 32% of wells, between 10 to 20 m bgl in 29 % of wells, between 20 to 40 m bgl in 9% of wells and water level more than 40 m bgl is registered in 4% of wells.

Piezometric head map of August, 2023 shows that shallow water level of less than 2 m bgl is noticed as isolated patches in Srikakulam, Palnadu, Ananthapuramu, Parvatipuram Manyam and SPS Nellore districts covering an area of 1 % of the State. Water level of 2 to 5 m bgl mainly observed in parts of Ananthapuramu, Prakasam, Sri Sathya Sai, Guntur, Palnadu, Kurnool and YSR Kada districts covering an area of 16% of the State. 40 % area of the State is covered by depth to water level of 5 to 10 m bgl with significant area in SPS Nellore, Sri Sathya Sai, Prakasam, Alluri Sita Rama Raju, Anakapalli, Ananthapuramu and Chittoor districts. Water level of 10 to 20 m bgl is covered in 34% of the State area and mainly observed in Krishna, Prakasam, Chittoor, YSR Kadapa, SPS Nellore and Annamayya districts. Deeper water levels of more than 20 m covers 9% area of the State and mainly observed in Prakasam, Annamayya, Eluru, West Godavari, Krishna, Palnadu and YSR Kadapa districts.

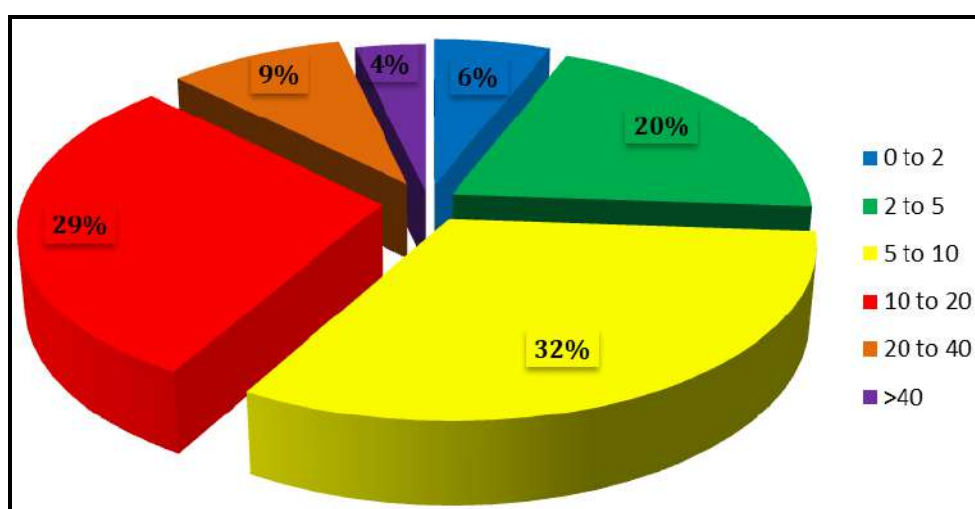


Fig.7.16: Percentage of wells in different piezometric heads (Confined/Semi-confined) August, 2023

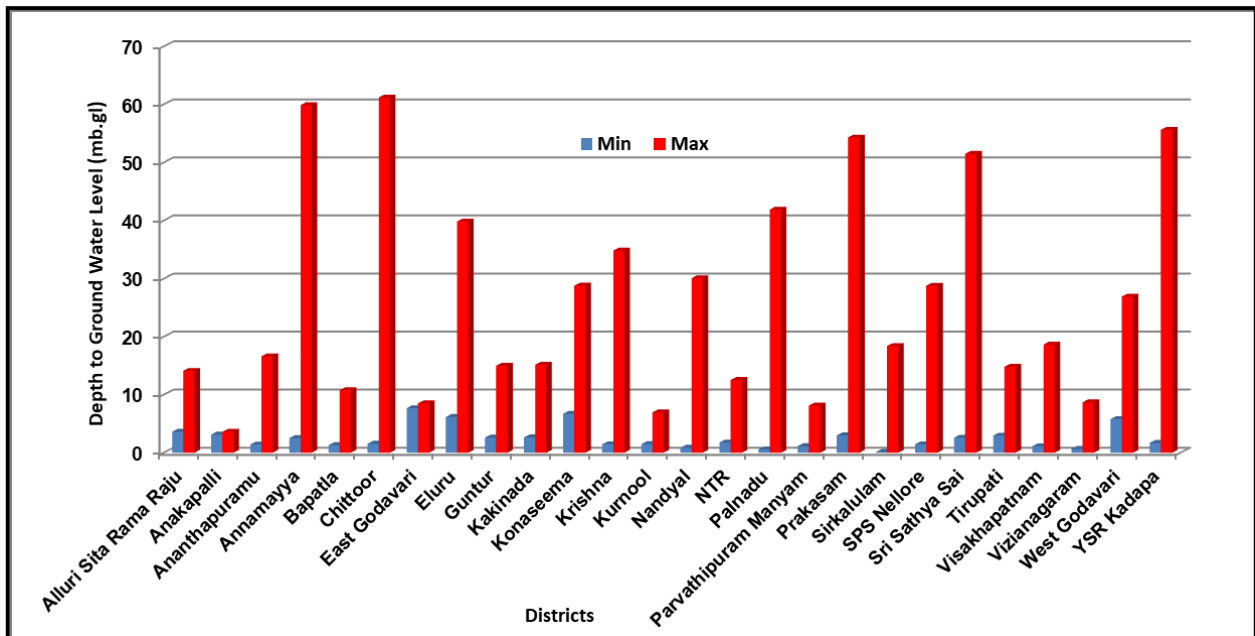


Fig. 7.17: District wise minimum and maximum of piezometric head of Confined/Semi-confined Aquifer during August, 2023

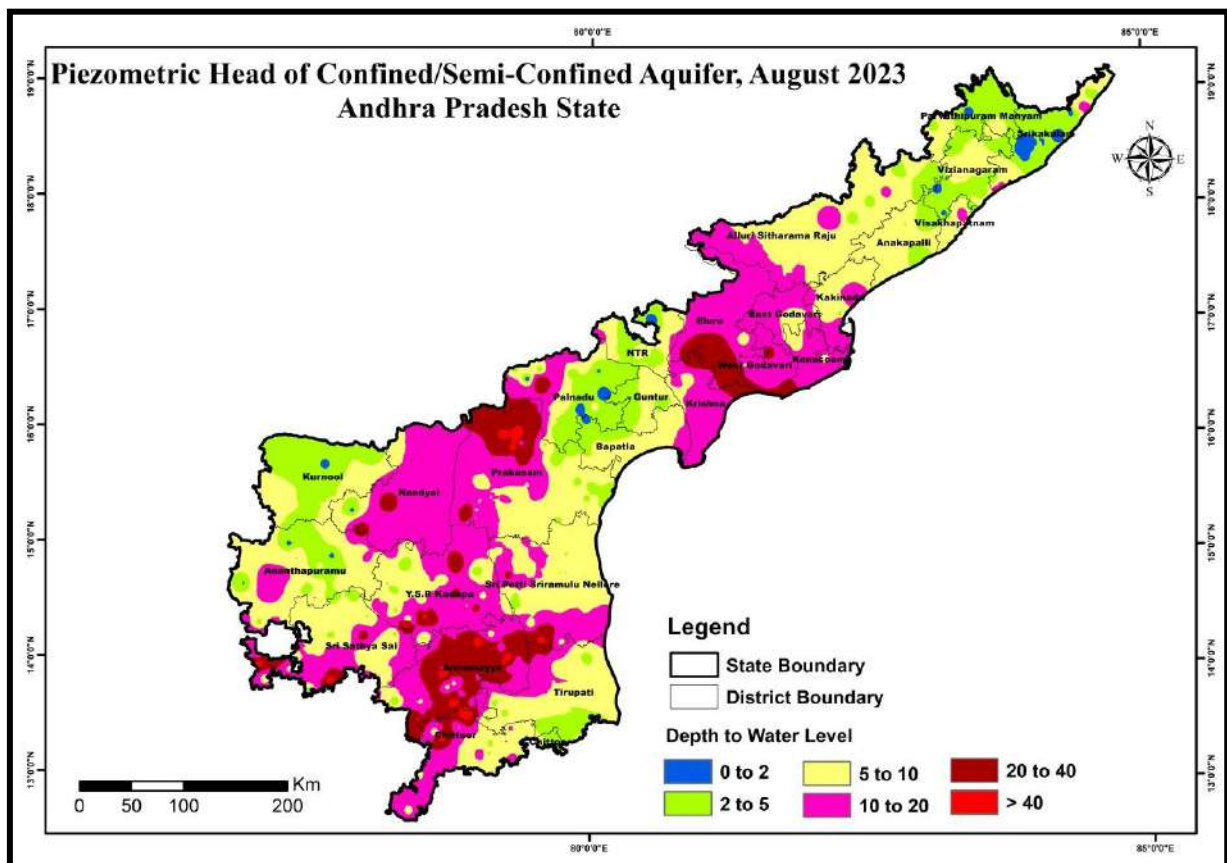


Fig. 7.18: Piezometric Head of Confined/Semi-confined Aquifer in Andhra Pradesh during August, 2023

7.2.3 Piezometric Head - November, 2023

The piezometric head of 528 wells were used for the analysis. Distribution of wells in different piezometric heads is depicted in pie diagram **Fig.7.19**. District wise minimum and maximum of piezometric heads are given in bar diagram **Fig.7.20** and piezometric head map is given in **Fig.7.21**. Analysis of piezometric head data of 528 wells (**Annexure - XI**) shows water levels vary between 0.76 m.bgl (Bapatla) to 68 bgl (Sri Sathya Sai district). Water level of less than 2 m bgl is recorded in 4% of wells, between 2 to 5 m bgl in 21% of wells, between 5 to 10 m bgl in 36% of wells, between 10 to 20 m bgl in 28 % of wells, between 20-40 m bgl in 7% of wells and water level more than 40 m bgl is recorded in 4 % of wells.

Piezometric head map of November, 2023 shows that shallow water level of less than 2 m bgl is noticed in isolated patches in Sirkakulam, Bapatla Palnadu, Vizianagaram, Chittoor and Ananthapuramu districts covering an area of 1 % of the State. Water level of 2 to 5 m.bgl mainly observed in parts of YSR Kadapa, Palnadu, Guntur, Ananthapuramu, Chittoor, Tirupati, Bapatla, Srikakulam, Kurnool, Eluru, SPS Nellore, Sri Sathya sai, Vishakhapatnam, Annakapalli, and NTR districts covering an area of 12% of the State. 44 % area of the State is covered by depth to water level of 5 to 10 m bgl with significant area in Sri Sathya Sai, Prakasam, Krishna, Chittoor, SPS Nellore, YSR Kadapa, Ananthapuramu, Annamayya, Tirupati, Kurnool, Srikakulam, Bapatla, Palnadu, Eluru and Vizianagaram districts. Water level of 10 to 20 m bgl is covered in 35% of the State area and mainly observed in SPS Nellore, Prakasam, Chittoor , Krishna, Sri Sathya Sai, Annamayya, YSR Kadapa Ananthapuramu, West Godavari, Eluru, Konaseema, Alluri Sitharam Raju, Srikakulam and Kakinada districts. Deeper water levels of more than 20 m covers 8% area of the State and mainly observed in Prakasam, Annamayya, Sri Sathya Sai Nandyal, Eluru and West Godavari districts.

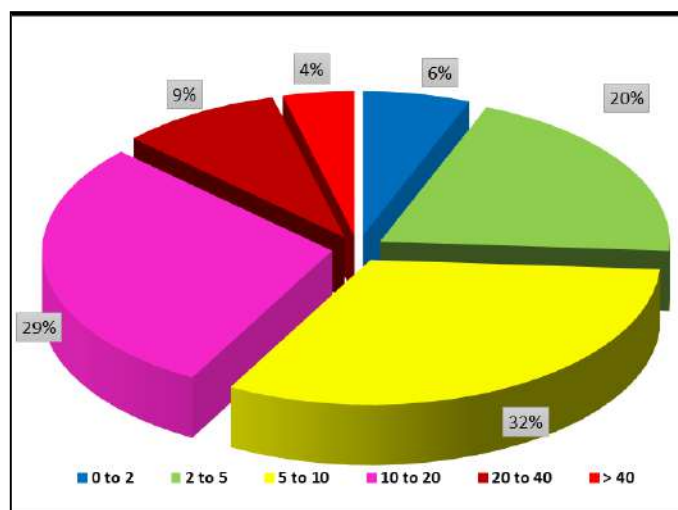


Fig.7.19: Percentage of wells in different piezometric heads (Confined/Semi-confined) November 2023

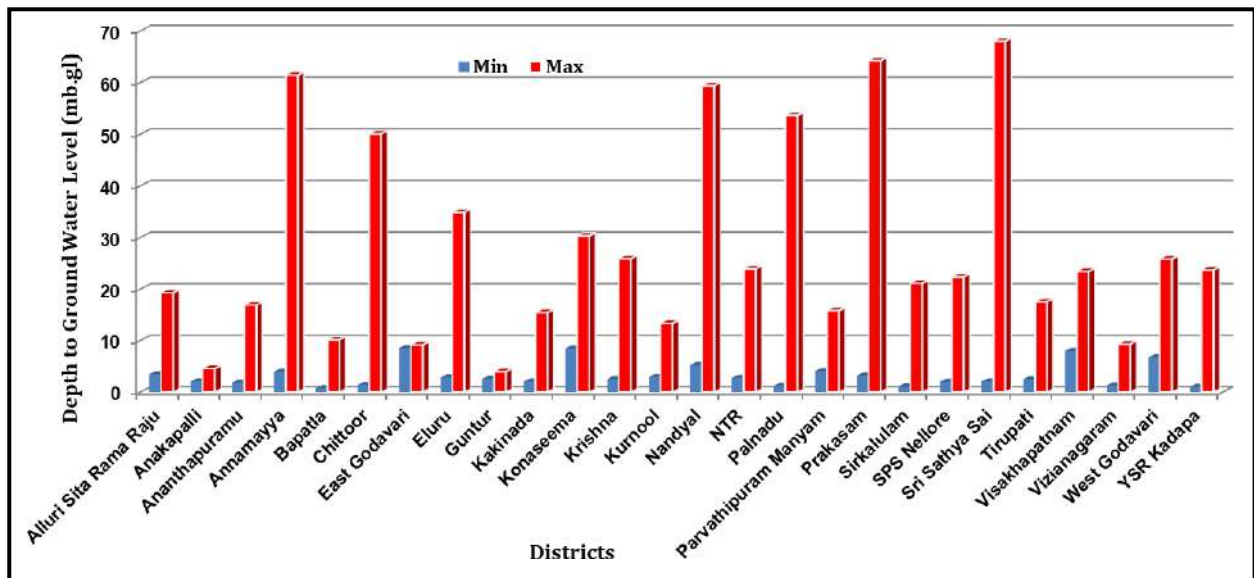


Fig. 7.20: District wise minimum and maximum of piezometric head of Confined/Semi-confined Aquifer during November 2023

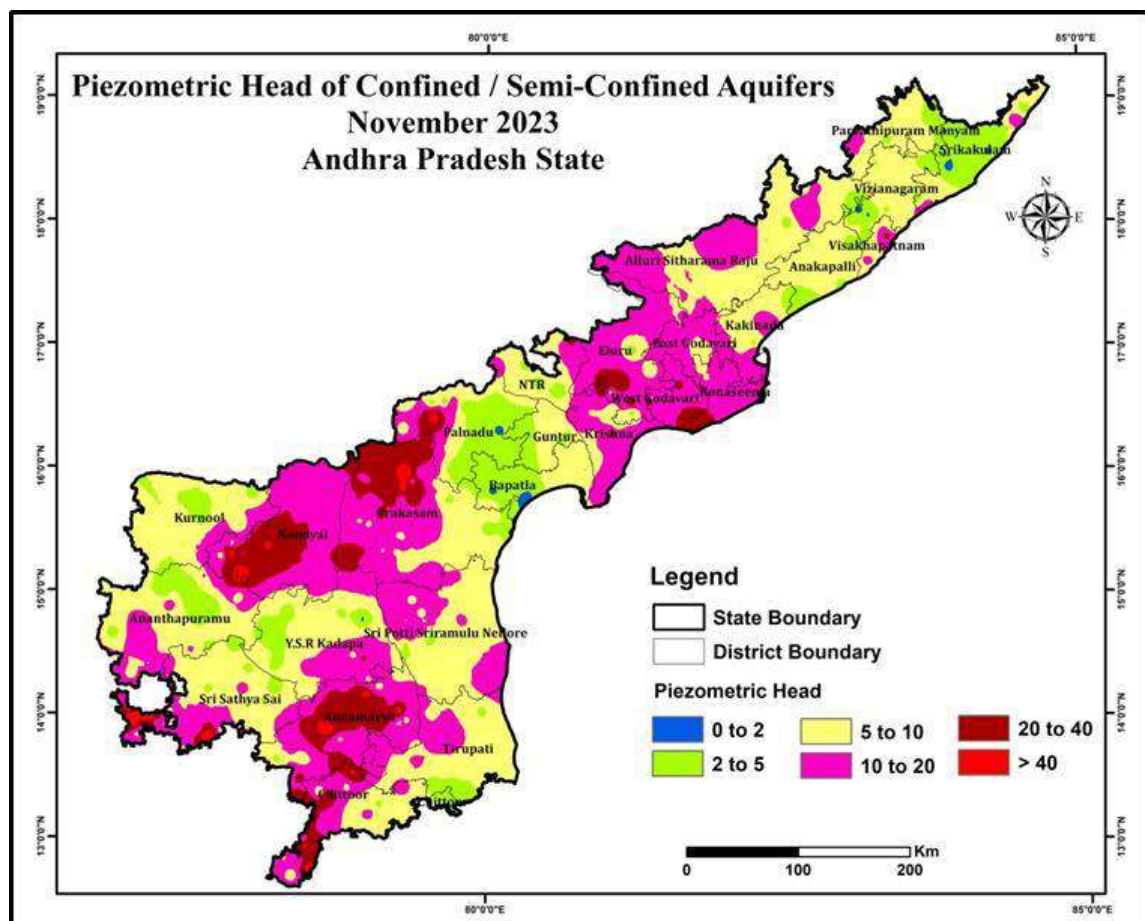


Fig. 7.21: Piezometric Head of Confined/Semi-confined Aquifer in Andhra Pradesh during November 2023

7.2.4 Piezometric Head - January, 2024

The piezometric head of 546 wells were used for the analysis. Distribution of wells in different piezometric heads is depicted in pie diagram **Fig.7.22**, district wise minimum and maximum of piezometric heads are given in bar diagram Fig 7.23 and piezometric head map is given in **Fig.7.24**. Analysis of piezometric head data of 546 wells (**Annexure - XII**) shows water levels vary between 0.36 mbgl (Palnadu) to 100.01 bgl (Sri Sathya Sai district). Water level of less than 2 m bgl is recorded in 10% of wells, between 2 to 5 m bgl in 37% of wells, between 5 to 10 m bgl in 27% of wells, between 10 to 20 m bgl in 16% of wells, between 20-40 m bgl in 7% of wells and water level more than 40 m bgl is registered in 3 % of wells.

Analysis of Piezometric head map of January, 2024 (Fig.7.24) shows that, shallow water levels of less than 2 m bgl are noticed as small patches in Palnadu, Bapatla, Anakapalli and Chittoor covering 0.3% of area . Water level 2 to 5 m bgl is covered in 12 % of the area, are also noticed as scattered patches in Tirupati, SPS Nellore, Palnadu, Bapatla, Srikakulam, Ananthpuramu and Kurnool districts. Area wise 46% of the state is covered by depth to water level of 5 to 10 m bgl, through out the district . Water level 10 to 20 m bgl is covered in 37.2% of the area in Annamayya, Ananthapuramu, Chittoor, Nandyal, Krishna, Eluru, ASR, Prakasam , Konaseema, East and West Godavari districts. Deeper water levels of more than 20 m bgl covers about 14.3% of the state occurs as small patches in Prakasam , Sri Sathya Sai, Annamayya, Chittoor, Eluru, ASR, Konaseema, West Godavari districts and Nandyal districts.

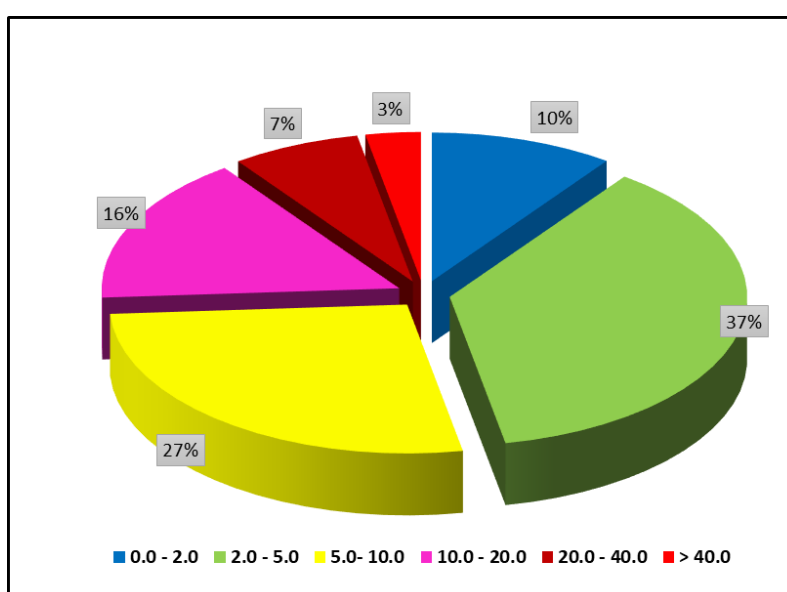


Fig.7.22: Percentage of wells in different piezometric heads (Confined/Semi-confined) January, 2024

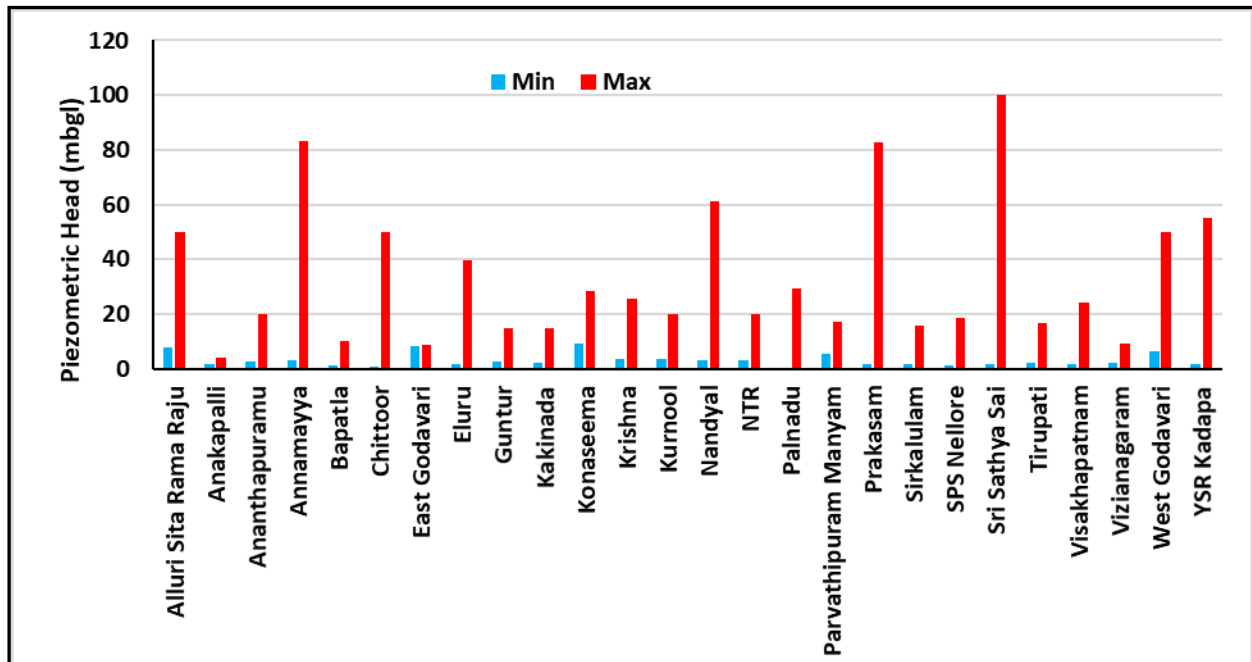


Fig. 7.23: District wise minimum and maximum of piezometric head of Confined/Semi-confined Aquifer during January 2024

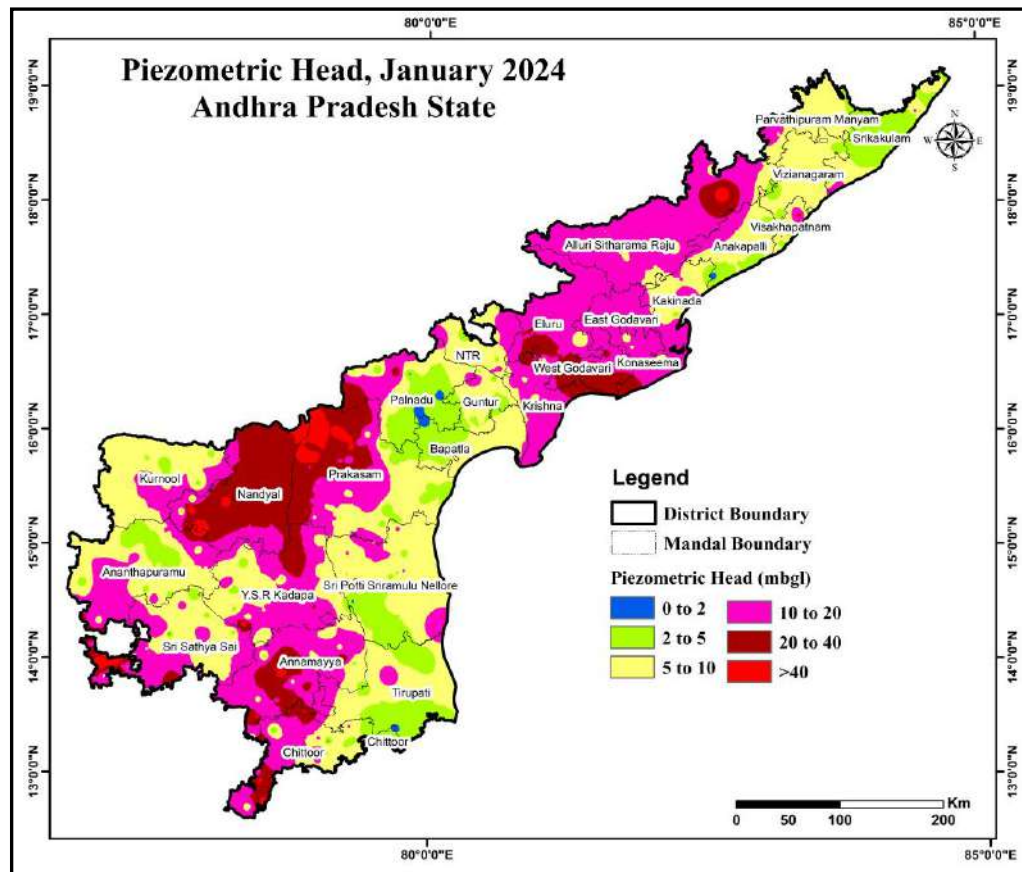


Fig.7.24: Piezometric Head of Confined/Semi-confined Aquifer in Andhra Pradesh during January, 2024

7.3 Fluctuations with Pre-Monsoon Water Level

7.3.1 Water Level Fluctuation (From May, 2023 to August, 2023)

Water level fluctuation of August, 2023 from May 2023 is presented in **Annexure-XIII**. Percentage of wells showing fluctuation of August, 2023 from May 2023 is represented as bar diagram in **Fig.7.25** and water level fluctuation map of August, 2023 from May 2023 is depicted in **Fig.7.26**. Analysis of data of 972 wells shows that water level rise is recorded in 62% wells (598wells), water level fall is recorded in 38% wells (374 wells).

Area wise, 51% of the State experienced water levels rise when compared with the May 2023. Out of 598 wells, water level rise of less than 2 m is recorded in 67% wells, 2 to 4 m in 18% wells and more than 4 m in 15% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Alluri Sitarama Raju, Anakapalli, Konaseema, Srikakulam, Vizianagaram, Visakhapatnam, Kakinada, East Godavari, Krishna, NTR, Eluru, Bapatla and Guntur districts. Water level rise of 2 to 4 m is observed mainly in Srikakulam, Vizianagaram, Alluri Sitarama Raju, Parvathipuram Manyam, Eluru, and NTR districts. Rise of more than 4 m is significantly observed in Alluri Sitarama Raju, NTR, Srikakulam, Prakasam, Kurnool, Nandyal, Eluru and Parvathipuram Manyam districts.

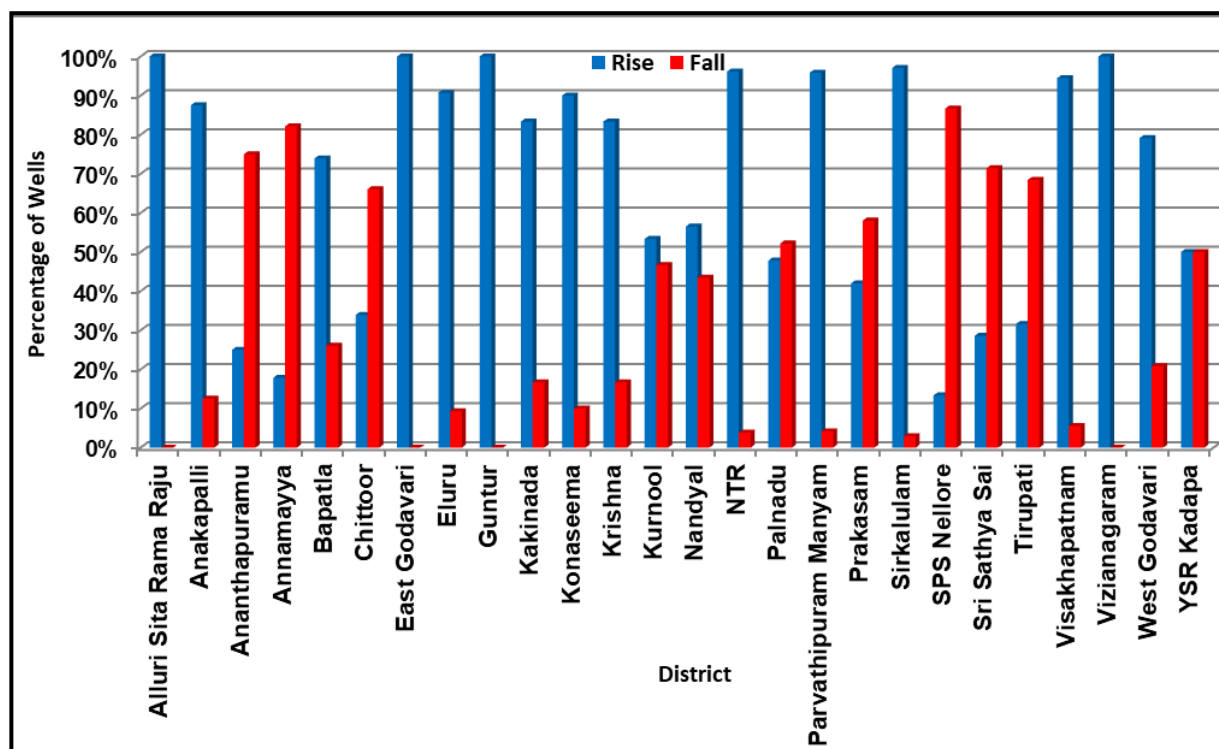


Fig. 7.25: Percentage of wells showing fluctuation from May 2023 to August, 2023

In the State about 49% of the area experienced fall in water levels when compared with May 2023. Out of 374 wells that have registered fall in water levels, 47% have recorded less than 2 m while 30% in the range of 2 to 4 m and remaining 22% wells registered water level fall of more than 4 m. Fall in water level is mainly observed in Rayalaseema region of Andhra Pradesh. Fall of less than 2 m is mainly observed in parts of Tirupati, SPS Nellore, Annamayya, Chittoor, Prakasam and Sri Sathya Sai districts. Fall of 2 to 4 m is observed as isolated patches mainly in parts of observed as small specks in Annamayya, Sri Sathya Sai, Ananthapuramu, Krishna, SPS Nellore, Prakasam and YSR Kadapa districts.

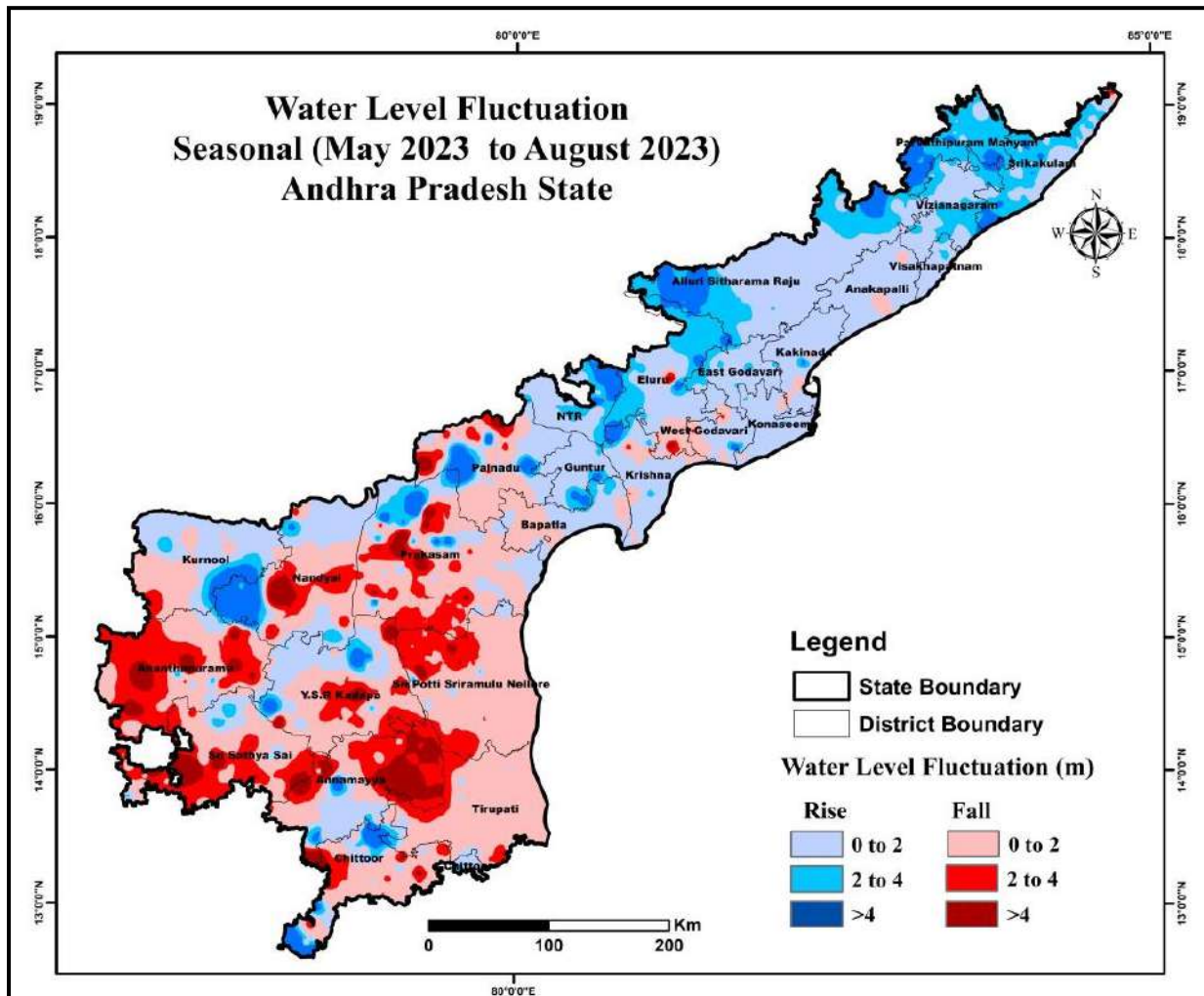


Fig. 7.26: Seasonal water level fluctuation from May 2023 to August, 2023

7.3.2 Water Level Fluctuation - from May, 2023 to Nov, 2023

Water level fluctuation of November, 2023 from May 2023 is presented in **Annexure-XIV**. Percentage of wells showing fluctuation of November, 2023 from May 2023 is represented as bar diagram in **Fig.7.27** and water level fluctuation map of November, 2023 from May 2023 is depicted in **Fig.7.28**. Analysis of data of 1239 wells shows that water level rise is recorded in 38% wells (469 wells), water level fall is recorded in 62% wells (770 wells).

Area wise, 39% of the State experienced water level rise when compared with the May 2023. Out of 469 wells, water level rise of less than 2 m is recorded in 64% wells, 2 to 4 m in 17% wells and more than 4 m in 19% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Srikakulam, Vizianagaram, Krishna, Chittoor, Palnadu, Guntur, Alluri Sitharam Raju, NTR, Bapatla and East Godavari districts. Water level rise of 2 to 4 m is observed mainly in districts such as, Srikakulam, Kurnool, Parvathipuram Manyam , Annamayya, Alluri Sitharam Raju, Chittoor, YSR Kadapa, Krishna, Guntur and Bapatla districts. Rise of more than 4 m is significantly observed in Eluru, YSR Kadapa, Krishna, Annamayya, Srikakulam, Chittoor, Parvathipuram manyam Nandayal, Palnadu and Alluri Sitharam Raju districts.

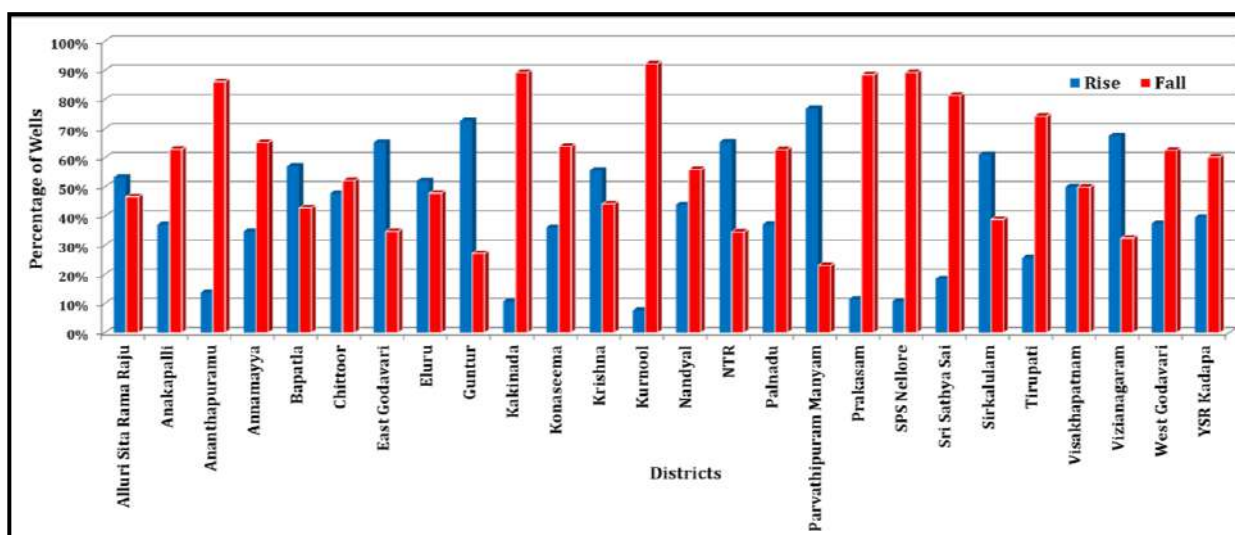


Fig. 7.27 : Percentage of wells showing fluctuation from May 2023 to November 2023

In the State about 61% of the area experienced fall in water levels when compared with May 2023. Out of 770 wells that have registered fall in water levels, 64% have recorded less than 2 m while 19% in the range of 2 to 4 m and remaining 17% wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Prakasam, Sri Sathya Sai, Palnadu, Ananthapuramu, Srikakulam, SPS Nellore, Konaseema, YSR Kadapa, Kakinada, Tirupati, Kurnool Anakapalli, and Eluru districts. Fall of 2 to 4 m is observed mainly in Prakasam, SPS Nellore, districts and in Rayalseema region. Fall of beyond 4 m is observed as isolated patches in Prakasam, SPS Nellore, Annamayya, Sri Sathya Sai, Ananthapuramu, Chittoor, Palnadu and Nansyal districts.

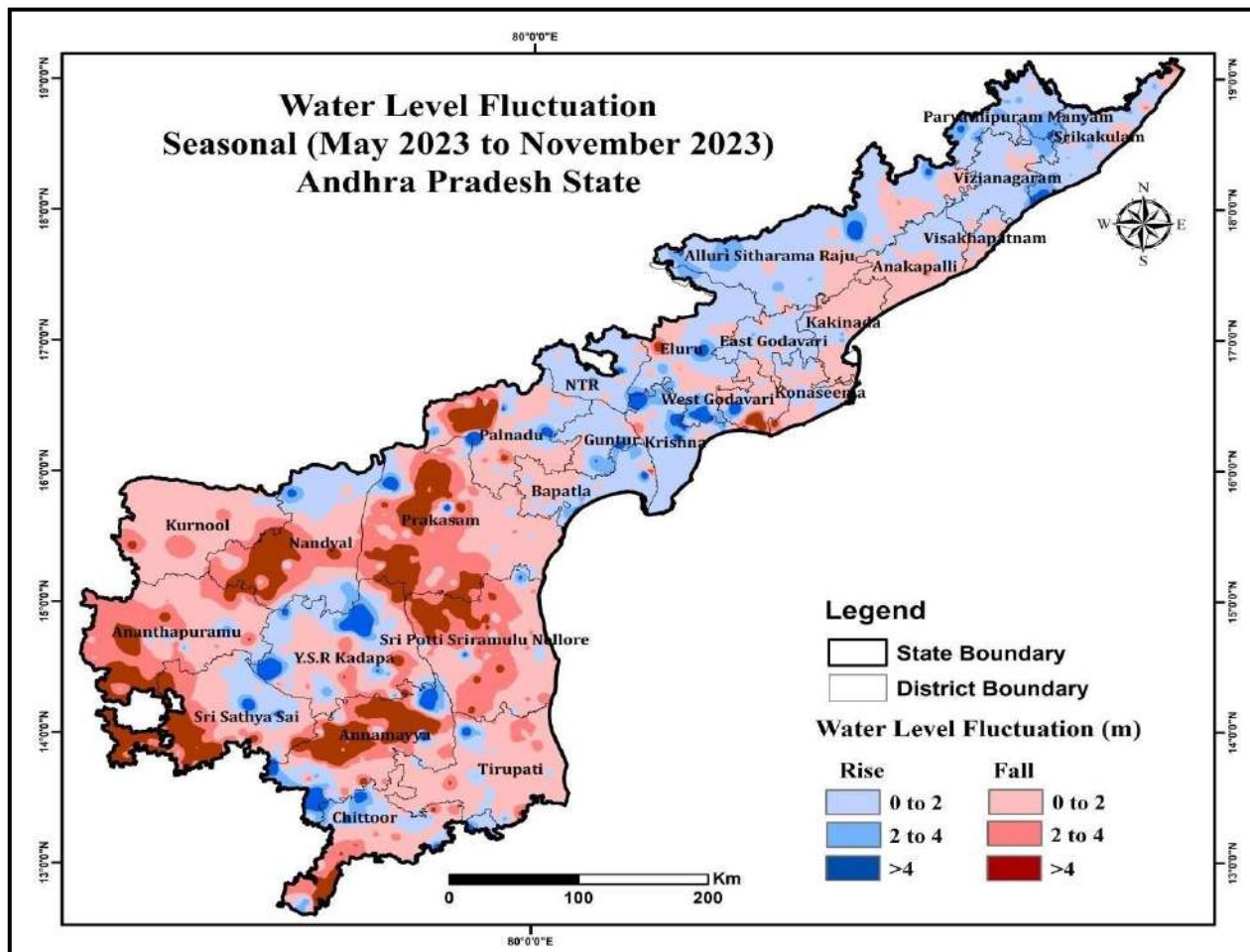


Fig. 7.28: Seasonal water level fluctuation from May 2023 to November 2023

7.3.2 Water Level Fluctuation - from May, 2023 to January, 2024

Water level fluctuation of January, 2024 from May 2023 is presented in **Annexure-XV**. Percentage of wells showing fluctuation of January 2024 from May 2023 is represented as bar diagram in **Fig.7.27** and water level fluctuation map of January 2024 from May 2023 is depicted in **Fig.7.28**. Analysis of data of 1231 wells shows that water level rise is recorded in 40% wells (488 wells), water level fall is recorded in 60% wells (743 wells).

Area wise, 38% of the State experienced water level rise when compared with the May, 2023. Out of 488 wells, water level rise of less than 2 m is recorded in 67% wells, 2 to 4 m in 16% wells and more than 4 m in 16% of the wells. Water level rise of less than 2 m is seen through out the State except Kurnool and Ananthapuramu. Water level rise of 2 to 4 m is observed mainly in districts such as Tirupati, Sri Sathya Sai, Annamayya, YSR Kadapa, Eluru, West Godavari, Palnadu districts and rise of more than 4 m is significantly observed in Tirupati, Sri Sathya Sai, Annamayya, Eluru and West Godavari districts.

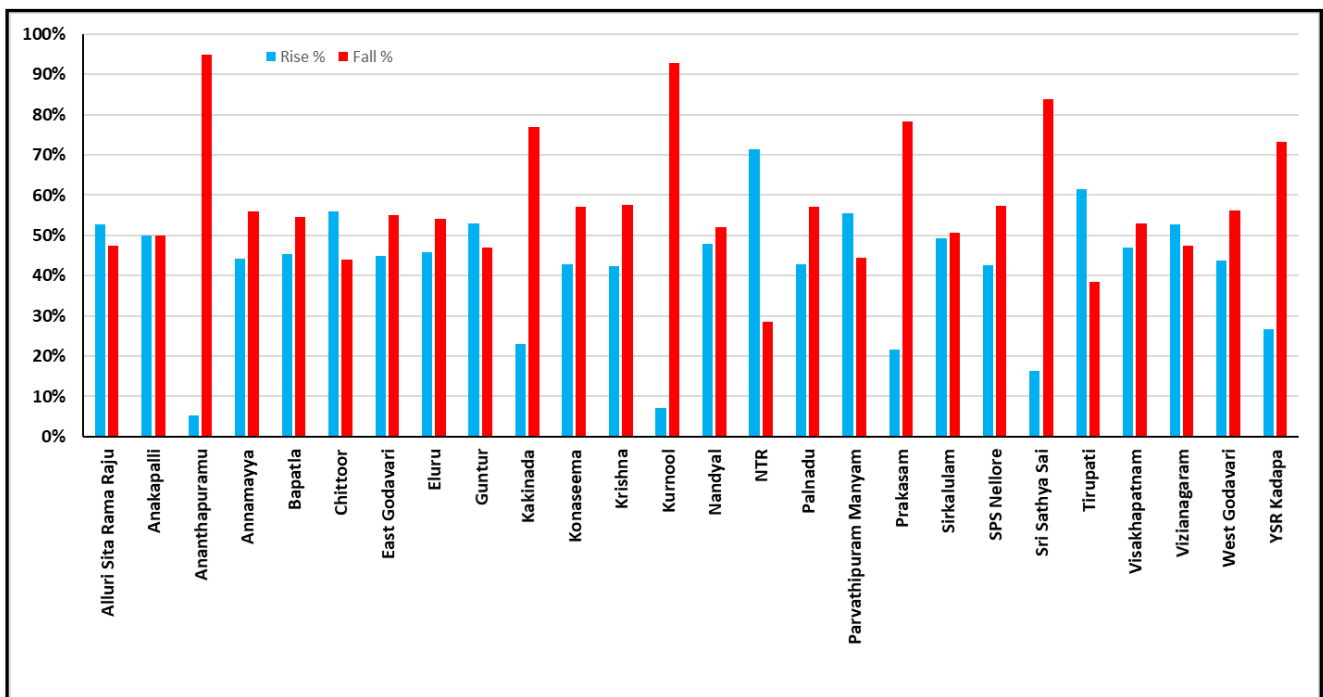


Fig. 7.29 : Percentage of wells showing fluctuation from May 2023 to January 2024

In the State about 62% of the area experienced fall in water levels when compared with May, 2023. Out of 743 wells that have registered fall in water levels, 67% have recorded less than 2 m while 16% in the range of 2 to 4 m and remaining 17% wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in through out the districts majorly in parts of Kurnool, Nandyal, Prakasam , Ananthapuramu, YSR Kadapa, Sri Sathya Sai, Annamayya, and Chittoor districts. Fall of 2 to 4 m is also observed throughout the district and fall of beyond >4 m is observed mainly in Kurnool, Nandyal, Prakasam , Ananthapuramu, YSR Kadapa, Sri Sathya Sai, Annamayya and Chittoor districts.

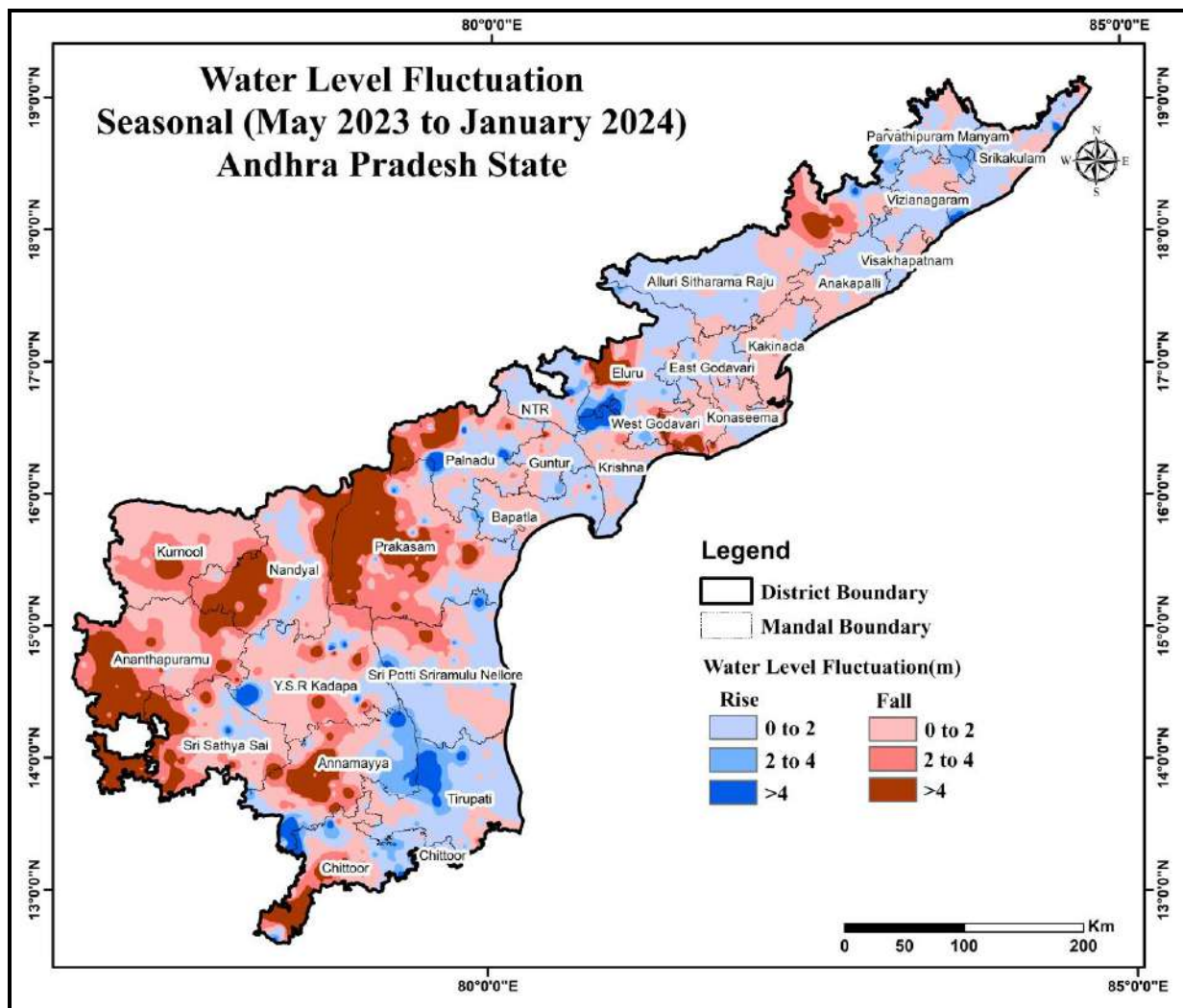


Fig 7.30 Seasonal water level fluctuation from May 2023 to January, 2024

7.4 Annual Water Level Fluctuation

7.4.1 Water Level Fluctuation: May, 2022 to May, 2023

Water level fluctuation of May, 2023 from May, 2022 is presented in **Annexure-XVI**. Analysis of 836 wells shows that water level rise is recorded in 54% wells (451wells) and fall is recorded in 46% wells (385 wells). Percentage of wells showing annual fluctuation is shown as bar diagram in **Fig.7.29** and spatial distribution is given in **Fig 7.30**

About 49 % of the area (385 wells) experienced fall in water levels compared to pre-monsoon period (May, 2022). Out of the 385 wells that have registered fall in water levels, 67% of wells have recorded less than 2 m fall, observed as small patches in Prakasam, Vizianagaram, Annamayya, YSR Kadapa, Bapatla, Palnadu, Alluri Sitharama Raju and Anakapalli districts. 16 % of wells recorded fall of 2 to 4 m, observed in Rayalaseema region and in parts of SPS Nellore, Eluru, Palnadu and Vizianagaram districts. 17 % of wells recorded fall of > 4 m, observed in small patches in Eluru, Chittoor, Prakasam, SPS Nellore and Annamayya districts.

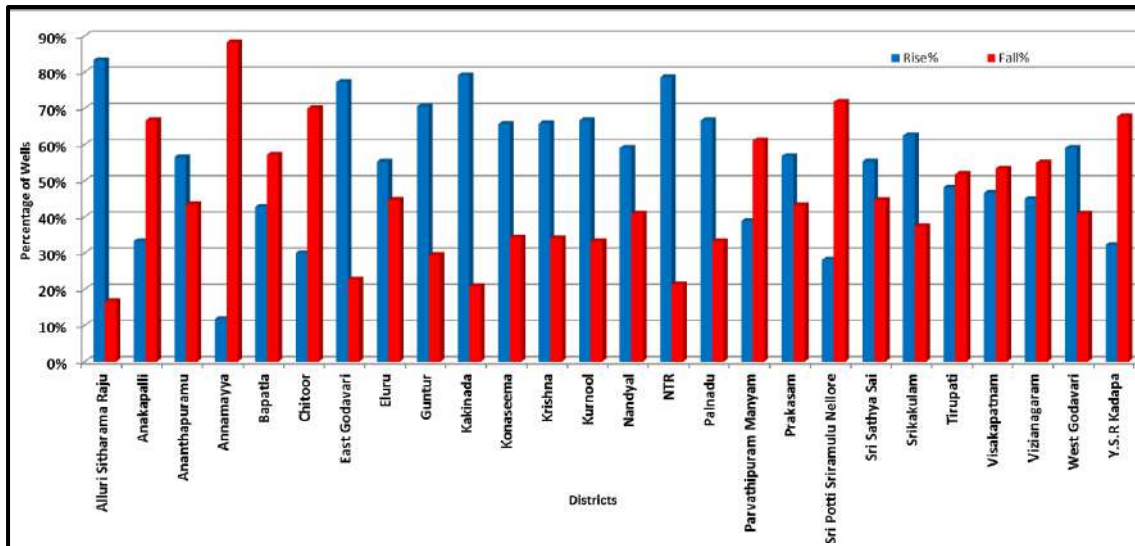


Fig.7.31: Percentage of wells in different ranges of depth to water level (May,22 to May, 23)

In the state about 51% of the area (451 wells) experienced rise in water levels compared to the pre-monsoon period May 2022. Out of the 451 wells, 77% of wells have recorded water level less than 2 m ,which is observed in parts of Palnadu, Alluri Sitharama Raju, Krishna, Prakasam, Prakasam, Srikakulam, Konaseema, Ananthapuramu, Eluru and NTR districts. Water level rise of 2 to 4 m is observed in 12% wells covering Alluri Sitharama Raju, Prakasam, Ananthapuramu, Nandyal and Sri Sathya Sai districts. 10% of wells recorded rise of water level more than 4 m and is observed mainly in Prakasam, Sri Sathya Sai, Eluru, Alluri Sitharama Raju and Ananthapuramu districts.

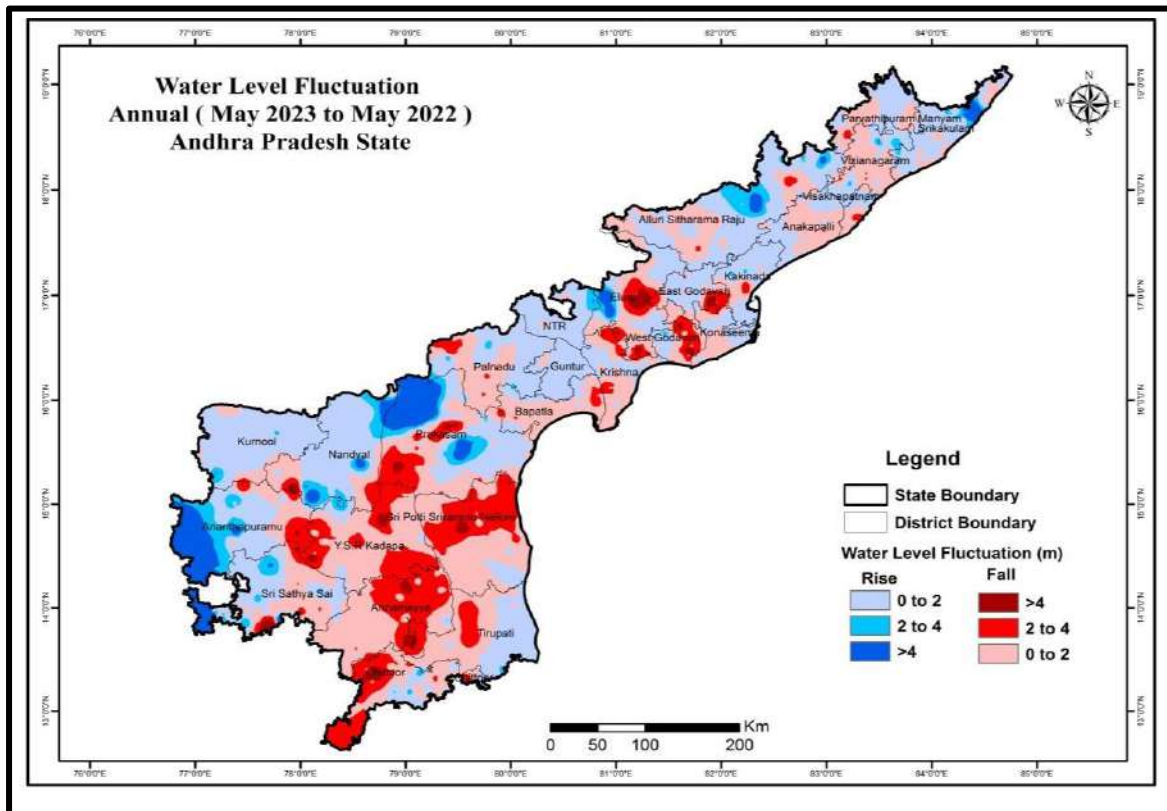


Fig.7.32: Spatial distribution of water level fluctuation from May, 2022 to May, 2023

7.4.2 Water Level Fluctuation (August, 2022 to August, 2023)

Water level fluctuation of August, 2023 from August, 2022 is presented in **Annexure-XVII**. Analysis of 805 wells shows that water level rise is recorded in 32% wells (259 wells) and fall is recorded in 68% wells (546 wells). Percentage of wells showing annual fluctuation is shown as bar diagram in **Fig.7.31** and spatial distribution is given in **Fig.7.32**.

About ~76% of the areas have witnessed a decline in water levels compared to the pre-monsoon period of August 2022. Among the 546 wells indicating decreased water levels, around 65% have recorded a fall of less than 2m, observed across the entire state. Notably, 18% of these wells have experienced a decline ranging from 2 to 4 m, particularly in the RayalaSeema regions and parts of Prakasam, Palnadu, and SPS Nellore districts. Moreover, 17% of the wells have shown a substantial fall more than 4m, occurring sporadically in Annamayya, Sri Sathya Sai Prakasam, Palnadu, YSR Kadapa, Chittoor, and Nandayal districts. In Kadapa and Prakasam region, there is deficit rainfall in August 2023 compared to same period in 2022 which has resulted in fall in water level in this region. The deeper water level in Rayalaseema region can also be attributed to the stress on groundwater for irrigation purposes.

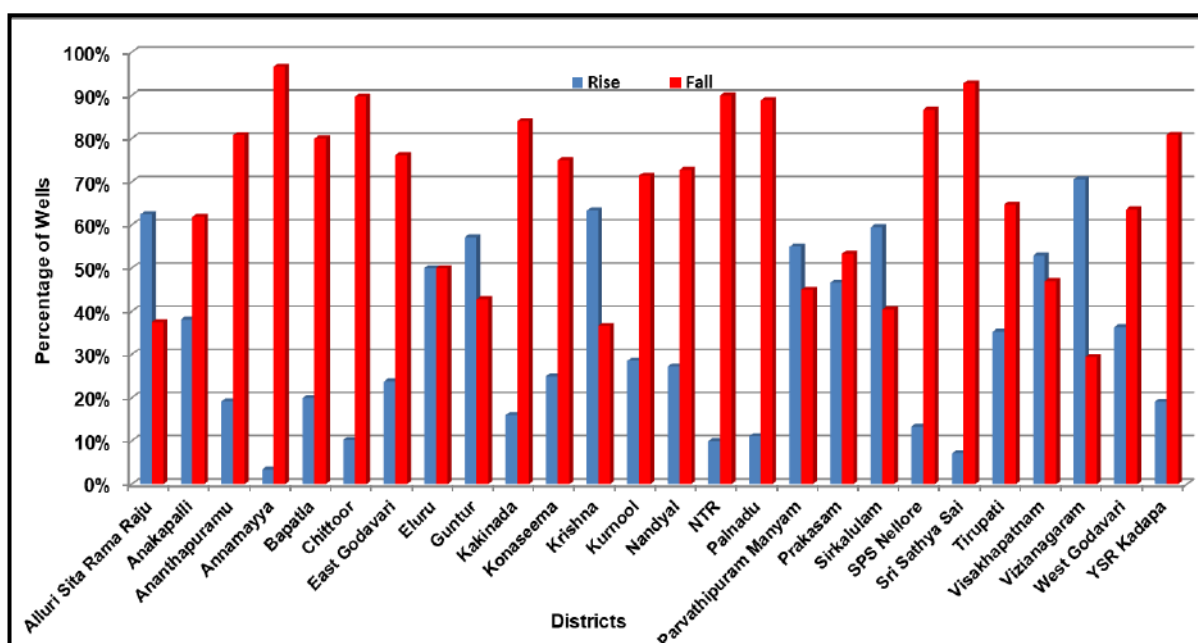


Fig.7.33: Percentage of wells in different ranges of depth to water level from August, 22 to August,23

In the State about 24% of the areas experienced rise in water levels when compared to the mid-monsoon period (August, 2022). Out of 259 wells, 76% of wells have recorded rise in water level less than 2 m and is observed throughout the district, mainly in Alluri Sita Rama Raju, Srikakulam, Prakasam, Krishna, Eluru, Guntur, Tirupati, Vizianagaram and Kurnool districts. Water level rise of 2 to 4 m is observed in 13% wells covering Parvatipuram Manyam, Prakasam, YSR Kadapa and Eluru districts. 11% of wells recorded rise of water level more than 4 m and observed mainly in Prakasam, Ananthapuramu and Krishna districts.

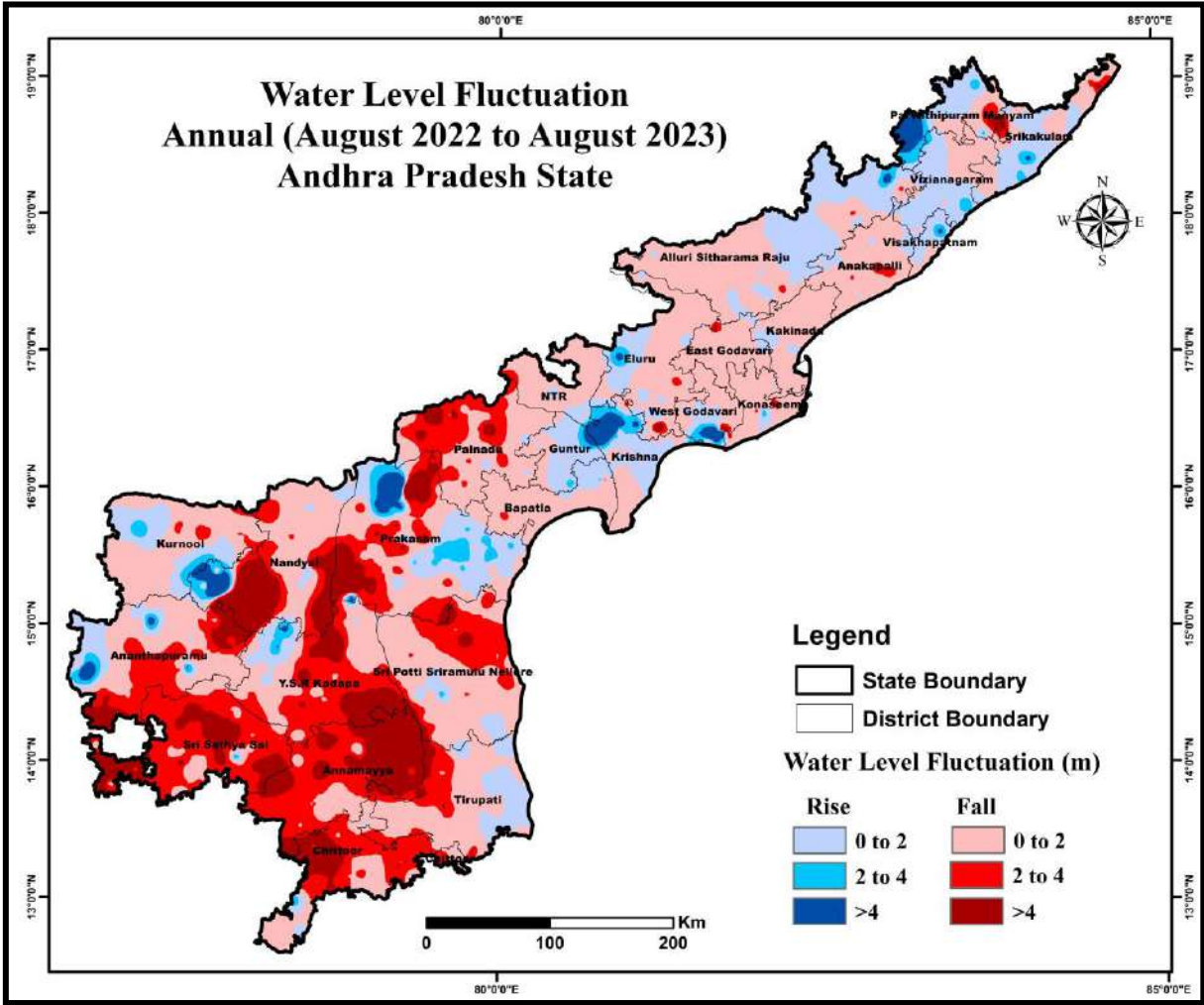


Fig. 7.34: Annual water level fluctuation from August, 2022 to August, 2023

7.4.3 Water Level Fluctuations (November, 2022 to November, 2023)

Water level fluctuation of November, 2023 from November, 2022 is presented in **Annexure-XVIII**. Analysis of 932 wells shows that water level rise is recorded in 10% wells (90 wells) and fall is recorded in 49% wells (842 wells). Percentage of wells showing annual fluctuation is shown as bar diagram in **Fig.7.33** and spatial distribution is given in **Fig.7.34**.

Analysis of water level fluctuation shows that only 4% of the area (90 wells) experienced rise in water levels when compared to the post-monsoon period November, 2022. Out of 90 wells, 62% of wells have recorded rise in water level less than 2 m and is observed throughout the district, mainly in Prakasam, Bapatla, Chittoor, Annamayya, Krishna and Vizianagaram districts. Water level rise of 2 to 4 m is observed in 14% wells covering Krishna, Bapatla, Alluri Sitharam Raju, Chittoor and Prakasam districts. 23% of wells recorded rise of water level more than 4 m and observed mainly in Krishna, Eluru and Annamayya districts.

The monsoon in 2023 witnessed significant fluctuations in rainfall pattern across the state. The evident decline in annual groundwater level during November 2023 in Andhra Pradesh can be attributed to a substantial -36% deficit rainfall when comparing 2023 to 2022. This drastic reduction in rainfall has far-reaching implications, leading to a further depletion of groundwater resources. Rainfall distribution varied with some part of coastal Andhra Pradesh received good rainfall during July 2023 while Rayalaseema region experienced comparatively weaker rainfall.

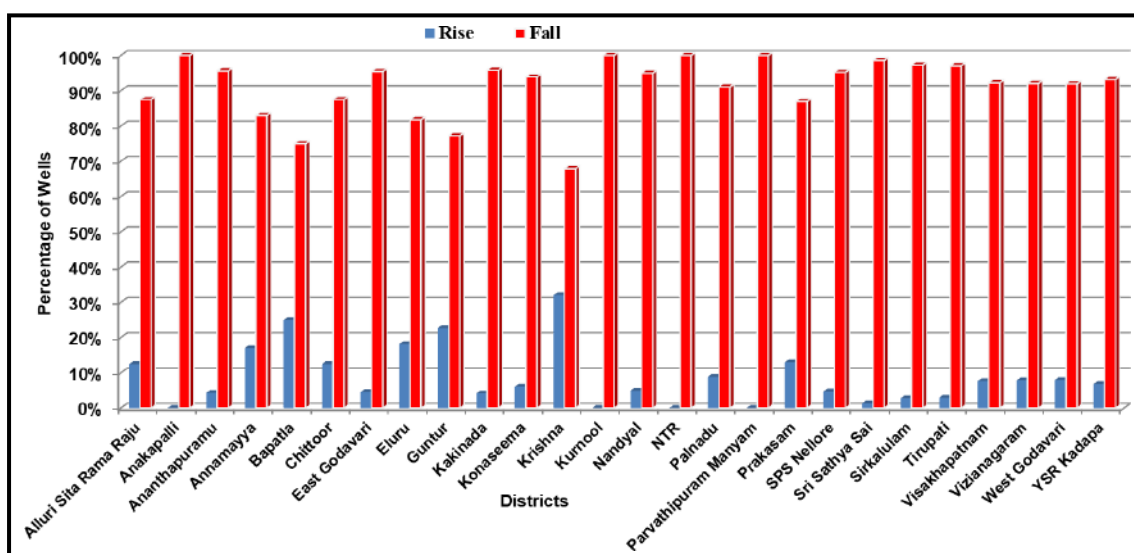


Fig 7.35 Percentage of wells showing fluctuation from November 2022 to November 2023

In the State about 96 % of the area (842 wells) experienced fall in water levels when compared to post-monsoon period (November, 2022). Out of 842 wells that have registered fall in water levels, 47% of wells have recorded less than 2 m fall, observed throughout the district, mainly in Alluri Sitharam Raju, YSR Kadapa, East Godavari, Srikakulam, Palnadu, Krishna, Konaseema, Prakasam, Chittoor, West Godavari, Eluru, Bapatla, Guntur and Sri Sathya Sai districts. 30% of wells recorded fall of 2 to 4 m, observed significantly in Chittoor, Sri Sathya Sai, Prakasam, SPS Nellore, Vizianagaram, Ananthapuramu, Palnadu, Tirupati, Anakapalli, Eluru, YSR Kadapa and Kurnool districts. 23 % of wells recorded fall beyond 4 m, observed significantly in Rayalaseema region.

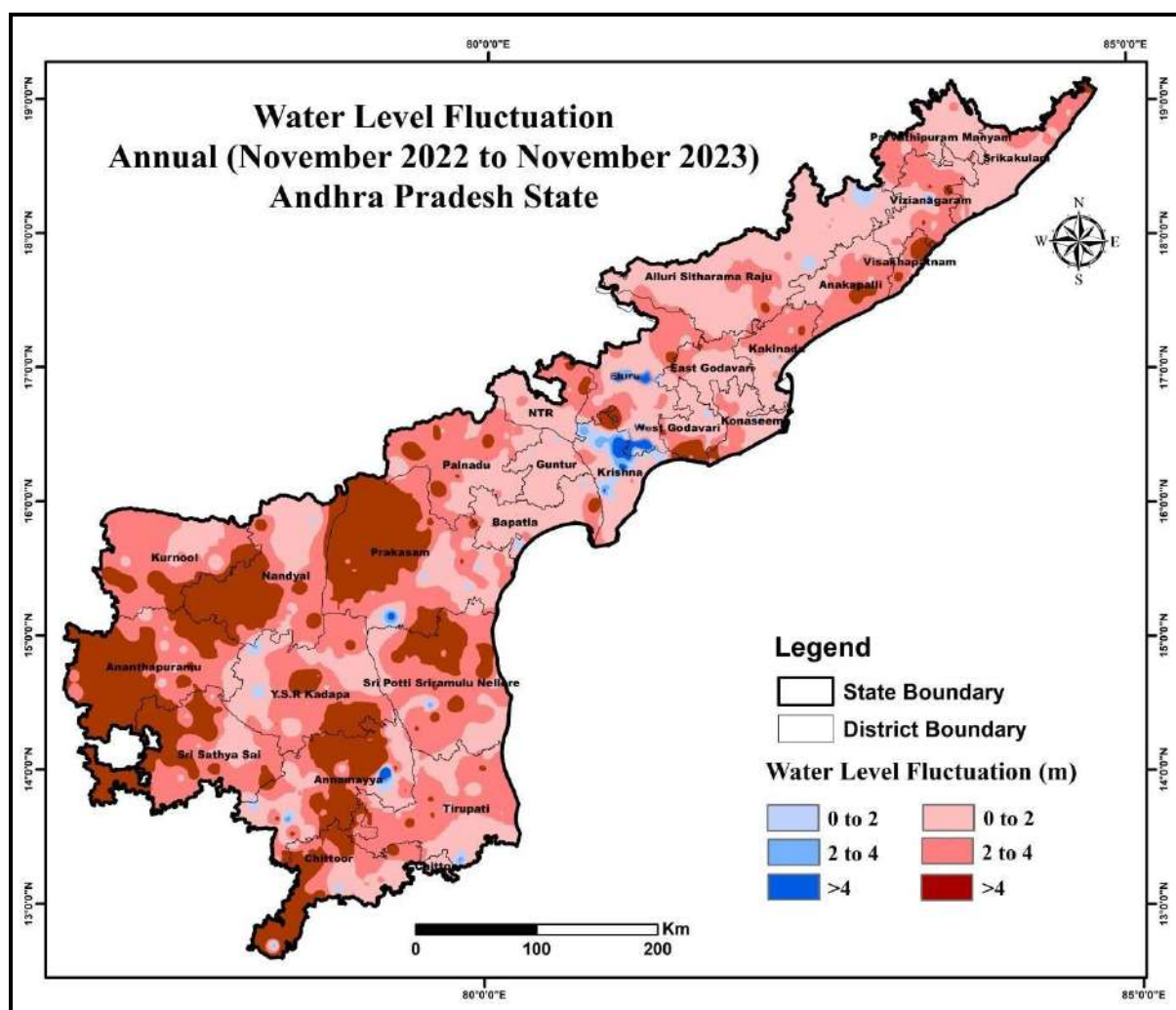


Fig. 7.36 : Annual water level fluctuation from November, 2022 to November, 2023

7.4.4 Water Level Fluctuations (January, 2023 to January, 2024)

Water level fluctuation of January, 2023 from January, 2022 is presented in **Annexure-XIX**. Analysis of 1068 wells shows that water level rise is recorded only in 13% wells (142 wells) and fall is recorded in 87% wells (926 wells). Percentage of wells showing annual fluctuation is shown as bar diagram in **Fig.7.35** and spatial distribution is given in **Fig.7.36**.

In the State about 93.7 % of the area (in 926 wells) experienced fall in water levels when compared to post-monsoon period (January, 2023). Out of 926 wells that have registered fall in water levels, 43% of wells have recorded less than 2 m fall, observed throughout the district. 23 % of wells recorded fall of 2 to 4 m, observed in parts of Prakasam, Sri Sathya Sai, Chittoor, Annamayya, Nandyal, Kurnool, Ananthapuramu, YSR Kadapa, SPS Nellore, Alluri Sitharama Raju, Palnadu, Vishakhapatnam, Vizianagram, Srikakulam and West Godavari districts. 27% of wells recorded fall beyond 4 m, observed in Prakasam, Chittoor, Sri Sathya Sai, Nandyal, Kurnool, Ananthapuramu, YSR Kadapa, Annamayya, Palnadu, Alluri Sitharama Raju, Vishakhapatnam, Eluru and West Godavari districts.

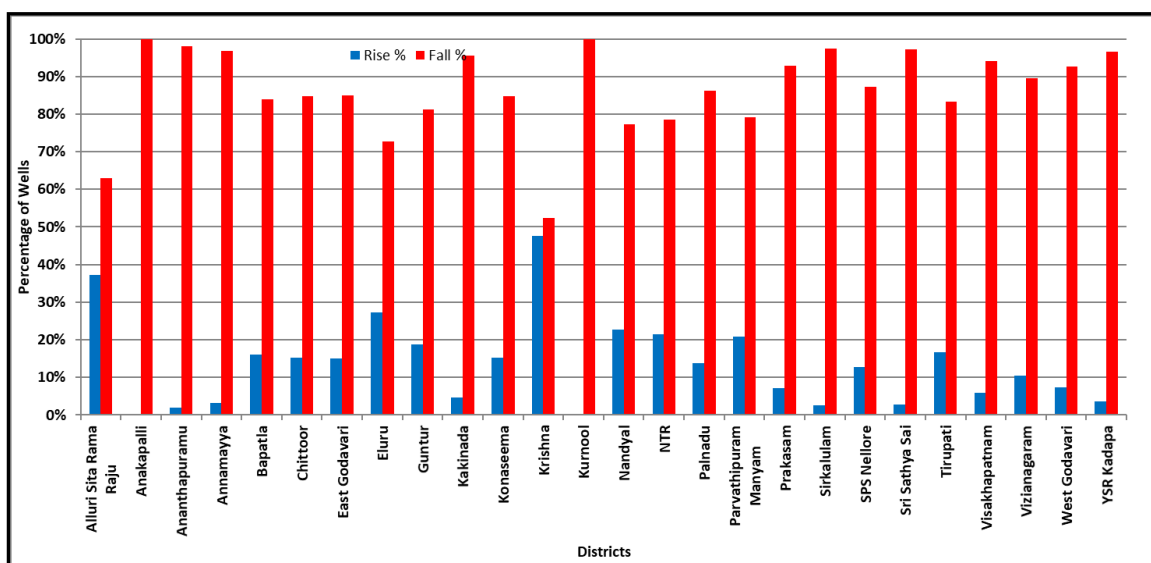


Fig 7.37: Percentage of wells showing fluctuation from January 2023 to January 2024

In the State about 6.3% of the area (in 142 wells) experienced rise in water levels when compared to the post-monsoon period January, 2024. Out of 142 wells, 69% of wells have recorded rise in water level less than 2 m and is observed in parts of Alluri Sitarama Raju, NTR, Krishna and West Godavari districts. Water level rise of 2 to 4 m is observed in 13% wells in patches covering Alluri Sitarama Raju, Krishna, NTR and Sri Satya Sai districts. 18% of wells recorded rise of water level more than 4 m and observed mainly in Krishna, Alluri Sitarama Raju and Sri Sathya Sai districts.

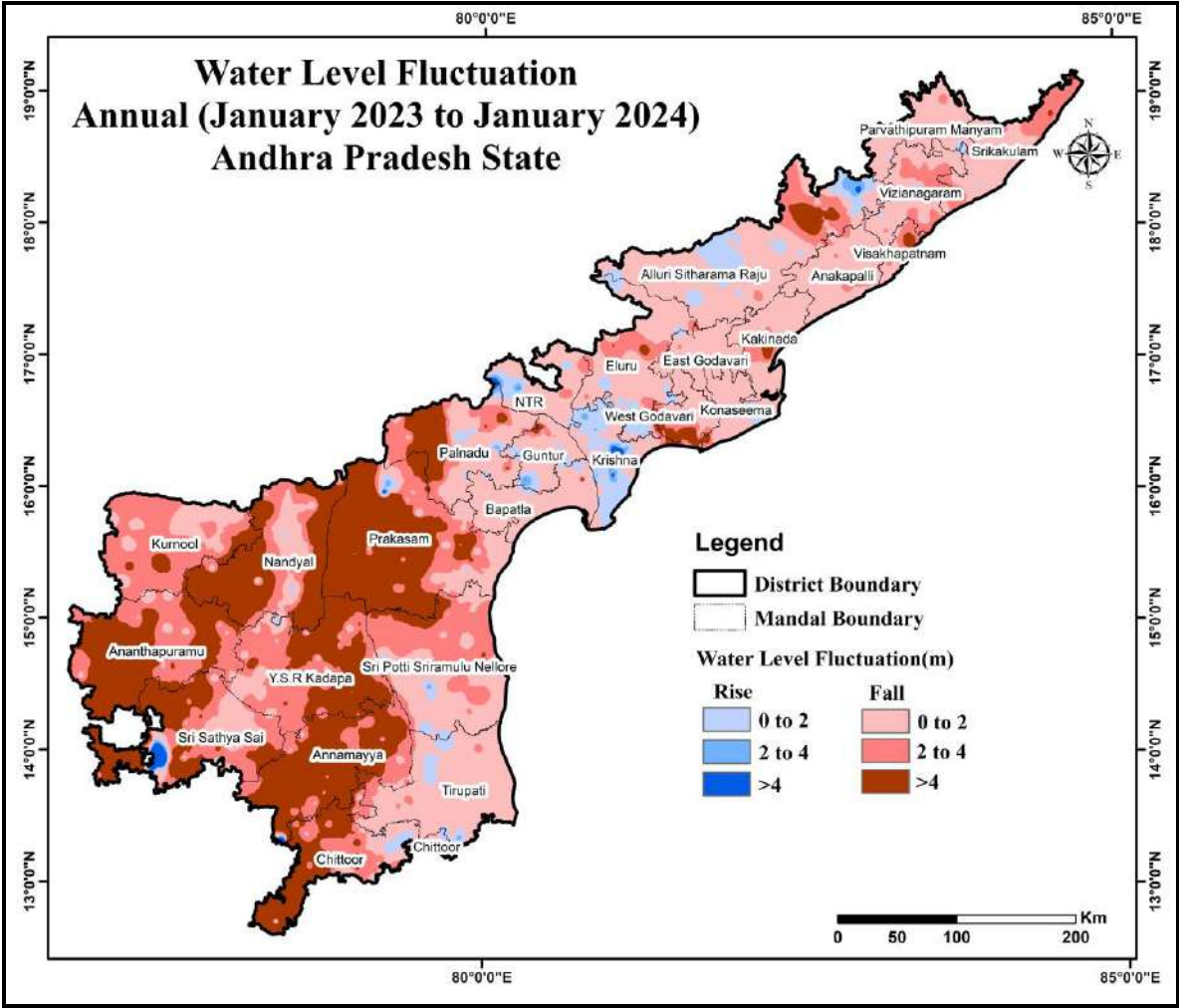


Fig. 7.38 : Annual water level fluctuation from January, 2023 to January, 2024.

7.5 Decadal Water Level Fluctuations

7.5.1 Water Level Fluctuations - Decadal mean of May (2013-22) to May, 2023

Water level fluctuation of May, 2023 from Decadal Mean of May (2013-2022) is presented in **Annexure-XX**. Percentage of wells showing fluctuation of May, 2023 from Decadal Mean of May, (2013-2022) is represented as bar diagram in **Fig.7.37** and water level fluctuation map of May, 2023 from Decadal Mean of May (2013-2022) is depicted in **Fig.7.38**. Analysis of data of 724 wells shows that water level rise is recorded in 78% wells (567 wells) and water level fall is recorded in 22% wells (157 wells).

Area wise, 90% of the state experienced water level rise compared with the decadal mean of May (2013-2022). Out of 567 wells, water level rise of less than 2 m is recorded in 72% wells, 2 to 4 m in 19% wells and more than 4 m in 9% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Konaseema, Alluri Sita Rama Raju Palnadu, Prakasam, Bapatla, NTR, Krishna, YSR Kadapa, East Godavari and West Godavari districts. Water level rise of 2 to 4 m is observed mainly in Rayalseema region such as Ananthapuramu, Palnadu, Prakasam, Tirupati, Sri Sathya Sai, Chittoor, YSR Kadapa, Kurnool, SPS Nellore and parts of Prakasam and Nandyal districts. Rise of more than 4 m is significantly observed in Prakasam, Kurnool, Sri Sathya Sai, Annamayya and Tirupati districts. The notable rise in the water level in 90% of the area with respect to decadal mean can be attributed to the above normal rainfall received during June 2020 to May 2023.

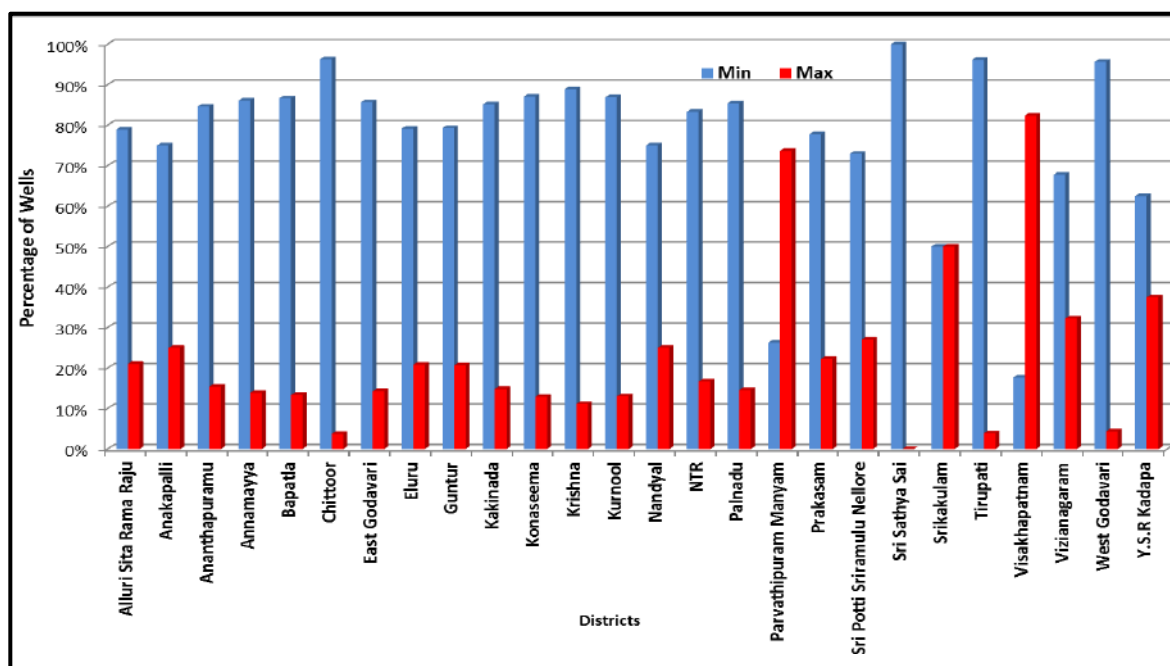


Fig.7.39: Percentage of wells showing fluctuation: Decadal Mean (May 2013-22) to May, 2023

In the state about 10% of the area experienced fall in water levels compared with decadal mean May (2013-2022). Out of the 157 wells that have registered fall in water levels, 84% have recorded less than 2 m while 11% in the range of 2 to 4 m and remaining 5% wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Parvathipuram Manyam, Prakasam, Srikakulam, Vizianagaram and Visakhapatnam districts. Fall of 2 to 4 m is observed as isolated patches in parts of Ananthapuramu, Annamayya, Prakasam, Visakhapatnam and Parvathipuram Manyam districts. Water level of more than 4 m is observed as isolated patches in Parvathipuram Manyam, Srikakulam, Nandyal, Kakinada, SPS Nellore and NTR districts.

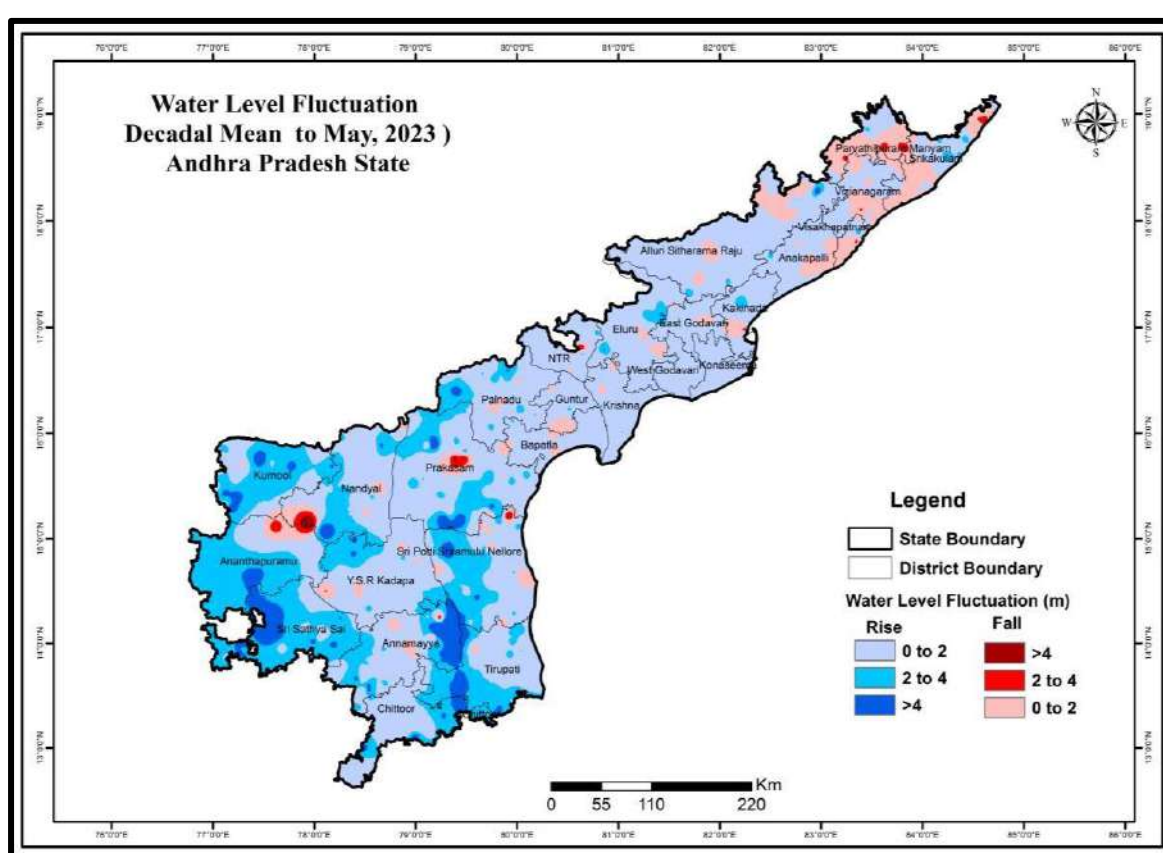


Fig. 7.40: Water Level Fluctuation: Decadal Mean (May 2013-22) to May, 2023

7.5.2 Water Level Fluctuation: Decadal Mean (Aug, 2013-Aug, 2022) to August, 2023

Water level fluctuation of August, 2023 from Decadal Mean of August (2013-2022) is presented in **Annexure-XXI**. Percentage of wells showing fluctuation of August, 2023 from Decadal Mean of August, (2013-2022) is represented as bar diagram in **Fig.7.39** and water level fluctuation map of August, 2023 from Decadal Mean of August (2013-2022) is depicted in **Fig.7.40**. Analysis of data of 737 wells shows that water level rise is recorded in 61% wells (448 wells), while fall is recorded in 39% wells (289 wells).

Area wise, 76% of the State experienced water level rise when compared with the decadal mean of August (2013-2022). Out of 448 wells, water level rise of less than 2 m is recorded in 61% wells, 2 to 4 m in 21% wells and more than 4 m in 18% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Srikakulam, Vizianagaram, Bapatla, Eluru, Krishna, NTR, Guntur, Prakasam, Alluri sita Rama Raju, SPS Nellore and Sri Sathya Sai districts. Water level rise of 2 to 4 m is observed mainly in Prakasam,YSR Kadapa, SPS Nellore, Sri Sathya Sai,Tirupati,Annamayya and Kurnool districts and rise of more than 4 m is significantly observed in Rayalaseema area mainly inYSR Kadapa, Prakasam, Kurnool, Chittoor, SPS Nellore, Sri Sathya Sai, Annamayya, Tirupati and Ananthapuramu districts.

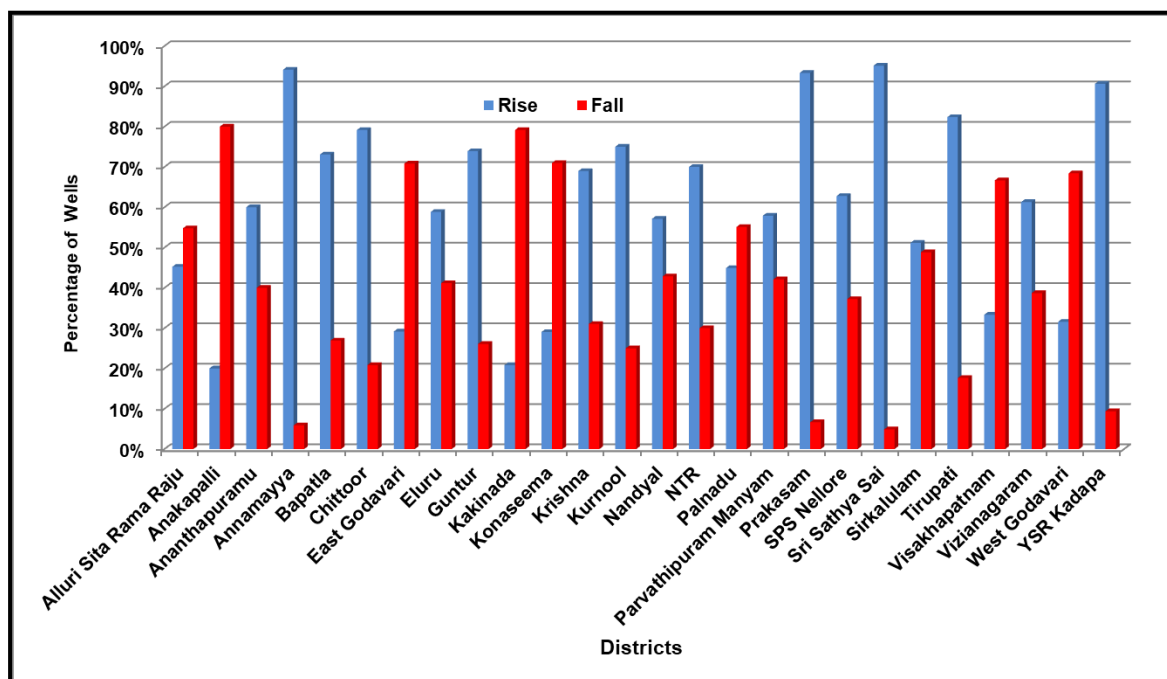


Fig.7.41: Percentage of wells showing fluctuation from Decadal Mean (August 2013-22) to August, 2023

In the State about 24% of the area experienced fall in water levels when compared with decadal mean August (2013-2022). Out of the 289 wells that have registered fall in water levels, 84% have recorded less than 2 m while 10% in the range of 2 to 4 m and remaining 6% wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Alluri sita Rama Raju, Anakapalli, East Godavari, West Godavari, Kakinada, Konaseema, Palnadu, Srikakulam, Vizianagaram and Visakhapatnam districts. Fall of 2 to 4 m is observed as isolated patches in parts of Palnadu, Anakapalli, Nandyal, SPS Nellore, Prakasam and Srikakulam districts. Fall of more than 4 m is recorded as small specks Palnadu, Nandyal and Kakinada districts.

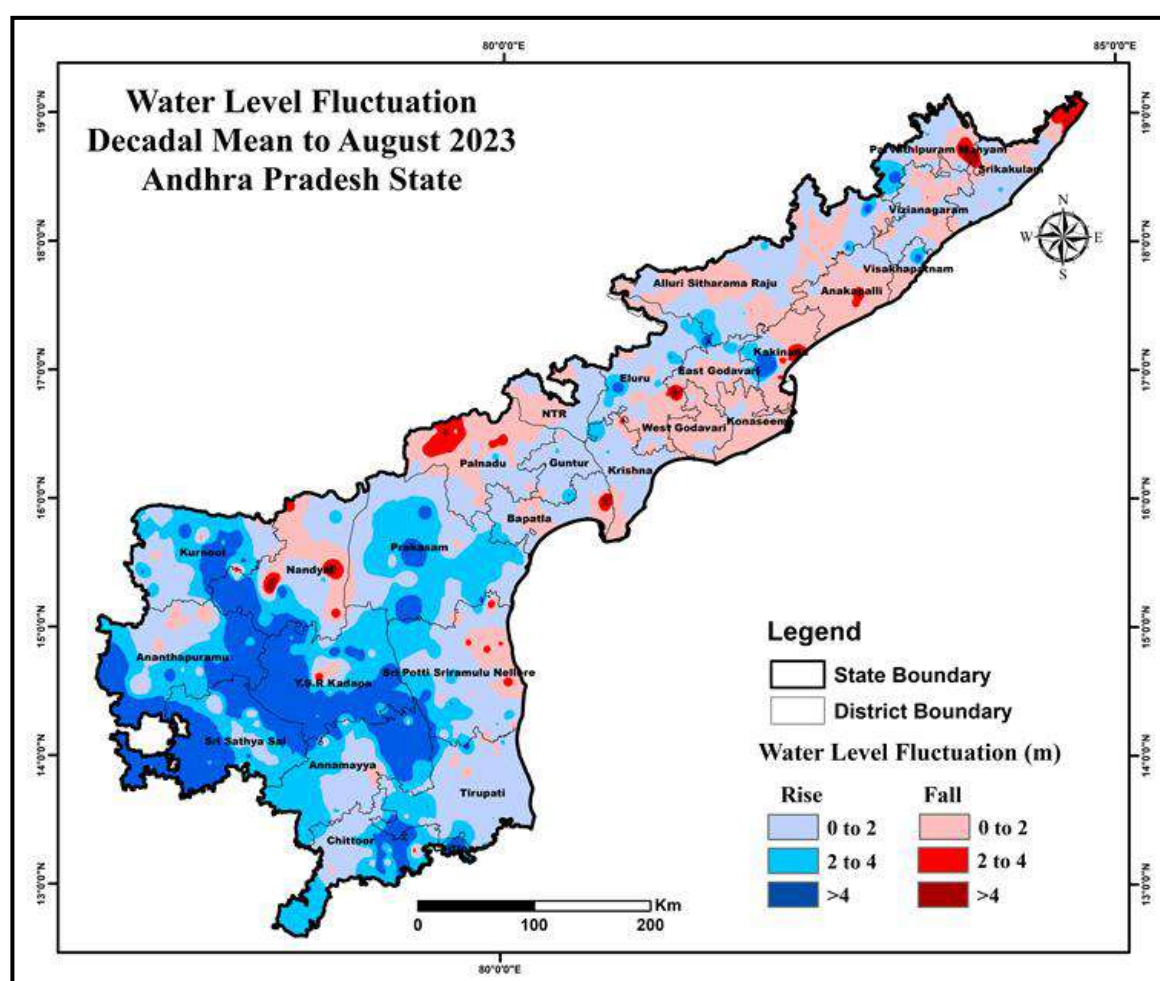


Fig. 7.42: Water Level Fluctuation from Decadal Mean (August 2013-22) to August, 2023

7.5.3 Water Level Fluctuation: Decadal Mean (Nov, 2013-Nov, 2022) to November, 2023

Water level fluctuation of November 2023 from Decadal Mean of November (2013-2022) is presented in **Annexure-XXII**. Percentage of wells showing fluctuation of November 2023 from Decadal Mean of November, (2013-2022) is represented as bar diagram in **Fig.7.41** and water level fluctuation map of November 2023 from Decadal Mean of November (2013-2022) is depicted in **Fig.7.42**. Analysis of data of 693 wells shows that water level rise is recorded only in 22% wells (153 wells), water level fall is recorded in 78% wells (540 wells).

Area wise, 33% of the State experienced water level rise when compared with the decadal mean of November (2013-2022). Out of 153 wells, water level rise of less than 2 m is recorded in 60% wells, 2 to 4 m in 18% wells and more than 4 m in 22% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Rayalaseema region. Water level rise of 2 to 4 m is observed mainly in YSR Kadapa, Ananthapuramu, Sri Sathya Sai, Prakasam and Chittoor districts and rise of more than 4 m is significantly observed in YSR Kadapa, Sri Sathya Sai and Annamayya districts.

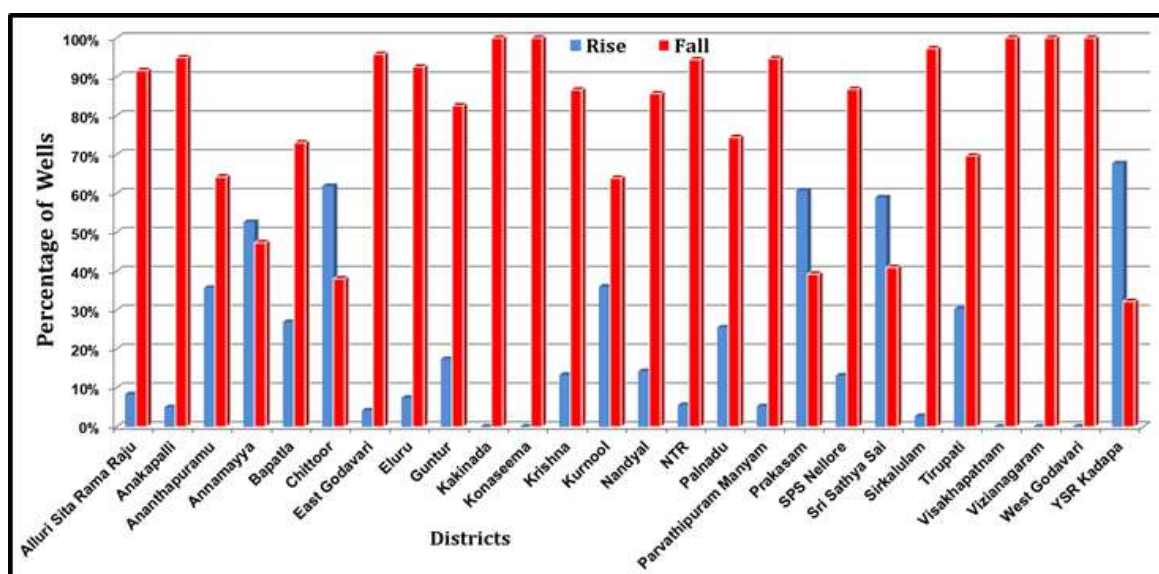


Fig.7.43: Percentage of wells showing fluctuation from Decadal Mean (November 2013-22) to November 2023

In the State about 67% of the area experienced fall in water levels when compared with decadal mean November (2013-2022). Out of the 540 wells that have registered fall in water levels, 71% have recorded less than 2 m while 22% in the range of 2 to 4 m and remaining 7% wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in all districts mainly in parts of Palnadu, Konaseema, Alluri Sitharam Raju, Krishna, SPS Nellore, Srikakulam,, East Godavari, Krishna and Guntur districts. Fall of 2 to 4 m, recorded in Vizianagaram, Srikakulam, Eluru, SPS Nellore, Parvathipuram Maniyam, Palnadu, Visakhapatnam, Tirupati, Kakinada, and Kurnool districts. Fall beyond 4 m is recorded mainly in Ananthapuramu, Nandyal, SPS Nellore, Palnadu, Srikakulam, Anakapalli, Prakasam, West Godavari and Kakinada districts.

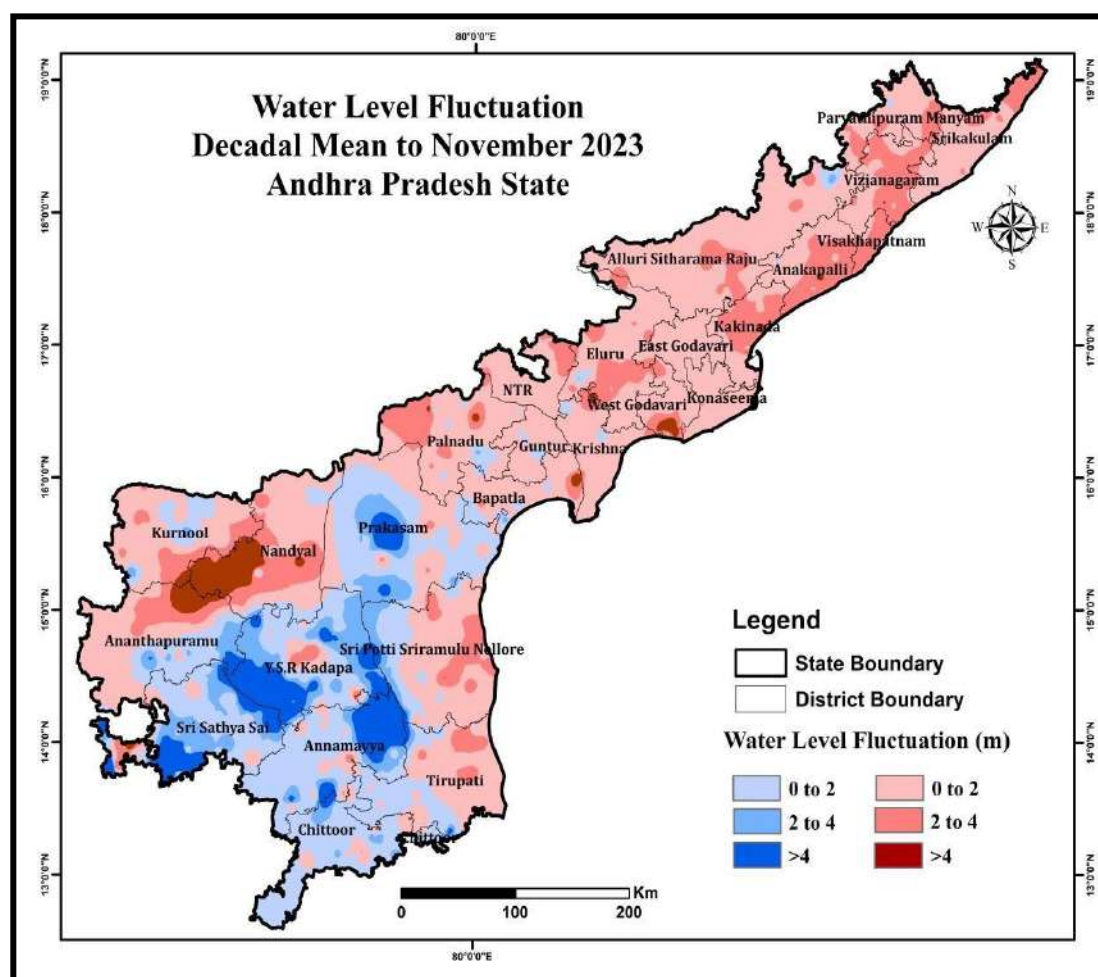


Fig. 7.44: Water Level Fluctuation from Decadal Mean (November 2013-22) to November 2023

7.5.4 Water Level Fluctuation: Decadal Mean (Jan, 2014-Jan, 2023) to January, 2024

Water level fluctuation of January 2024 from Decadal Mean of January (2014-2023) is presented in **Annexure-XXIII**. Percentage of wells showing fluctuation of January 2024 from Decadal Mean of January, (2014-2023) is represented as bar diagram in **Fig.7.43** and water level fluctuation map of January 2024 from Decadal Mean of January (2014-2023) is depicted in **Fig.7.44**. Analysis of data of 717 wells shows that water level rise is recorded in 69% wells (496 wells), water level fall is recorded in 31% wells (221 wells).

Area wise, 64% of the State experienced water level rise when compared with the decadal mean of January (2014-2023). Out of 153 wells, water level rise of less than 2 m is recorded in 76% wells, 2 to 4 m in 13% wells and more than 4 m in 11% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Rayalaseema region, Parvathipuram Manyam, Srikakulam, Anakapalli, Vizianagaram, Konaseema, ASR, West & East Godavari, Eluru, NTR, Palnadu and Guntur districts. Water level rise of 2 to 4 m is observed mainly in Eluru, West Godavari, Prakasam , Palnadu, Nandyal, Ananthapuram, Sri Sathya Sai, YSR Kadapa, Annamayya and Chittoor districts and rise of more than 4 m is significantly observed in Prakasam , Nandyal, Ananthapuramu, YSR Kadapa, Sri Sathya Sai and Annamayya districts.

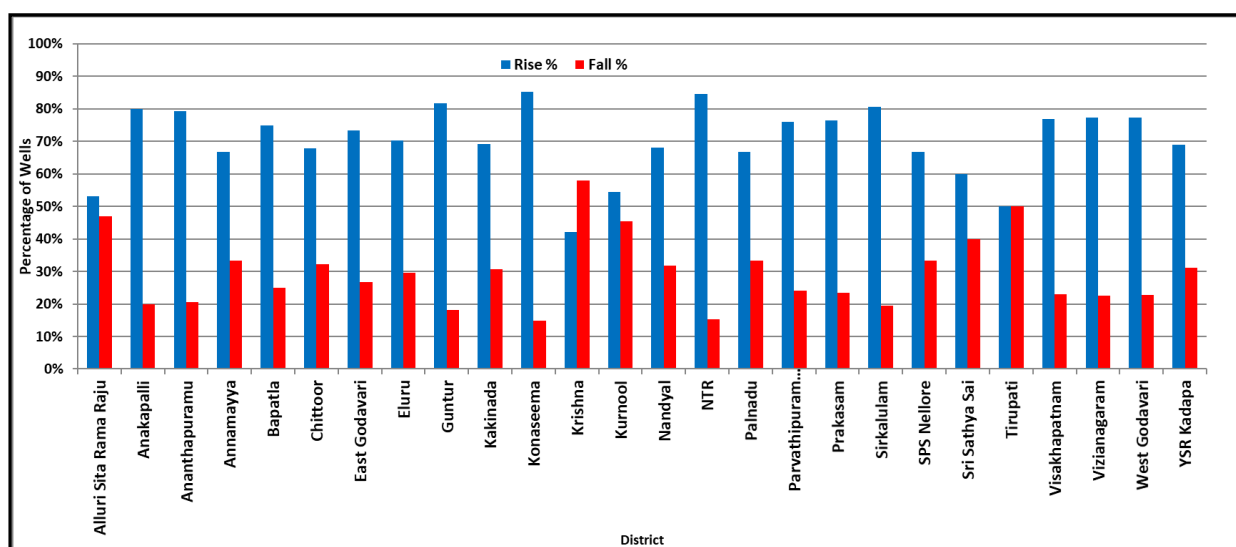


Fig.7.45: Percentage of wells showing fluctuation from Decadal Mean (January 2014-23) to January 2024

In the State about 36 % of the area experienced fall in water levels when compared with decadal mean January (2014-2024). Out of the 221 wells that have registered fall in water levels, 57% have recorded less than 2 m while 21% in the range of 2 to 4 m and remaining 22% wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in all districts mainly in parts of Alluri Sitharam Raju, Kakinada, Krishna, SPS Nellore and Tirupati districts. Fall of 2 to 4 m, recorded in Alluri Sitharam Raju, Kakinada, Krishna, SPS Nellore and Tirupati districts. Fall beyond 4 m is recorded mainly in Ananthapuramu, Kurnool, Palnadu, Alluri Sitharam Raju , Kakinada , Prakasam, Annamayya, YSR Kadapa, Sri Sathya Sai, Chittoor, Krishna and Kakinada districts.

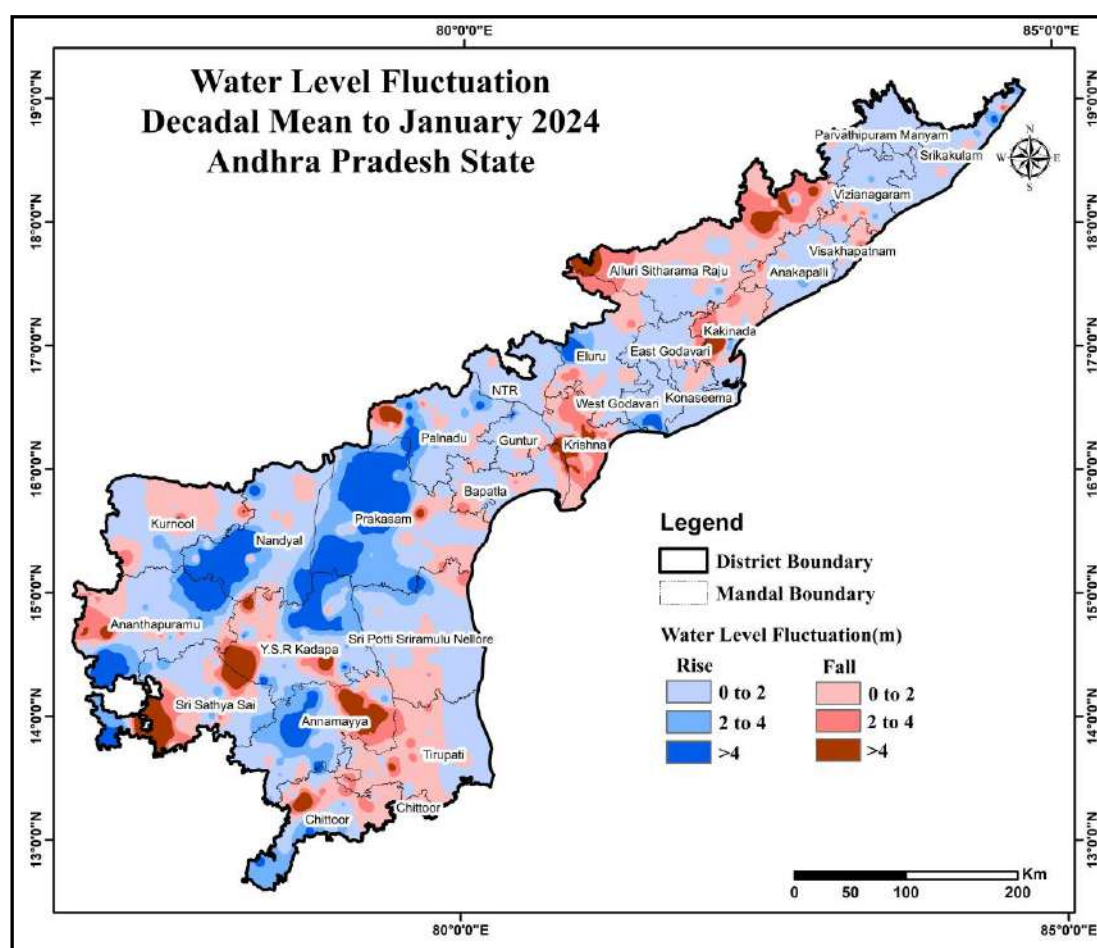


Fig. 7.46: Water Level Fluctuation from Decadal Mean (January 2014-23) to January 2024

7.6 Aquifer wise water levels

Aquifer wise water level analysis shows that during pre-monsoon, average water levels in most of the formations are between 5-10 m bgl. Deeper water level of more than 50 m bgl is encountered mainly in Shale, limestone and Banded Gneissic complex. The deficit in rainfall is clearly reflected in the water level during post-monsoon season by average water levels become more deeper in majority of the aquifers. The maximum water level in shale and banded gneissic complex exceeded 70 m. Aquifer-wise water level scenario is presented in **Table-7.1**.

Table-7.1: Aquifer-wise Minimum, Maximum and Average values of water levels, Andhra Pradesh State.

Principle Aquifer	Pre-monsoon May, 2023			Post-monsoon November, 2023		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Alluvium	0.3	50.43	6.88	0.3	53.2	6.13
Banded Gneissic Complex	0.04	57.96	7.03	0.31	87.51	8.77
Basalt	1.9	3.43	2.67	2.69	2.78	2.74
Charnockite	0.23	15.96	4.35	0.8	16	3.78
Gneiss	0.85	14.86	5.76	1.2	19.25	5.07
Granite	0.09	35.93	6.36	1.32	59.6	8.95
Intrusives	4.53	8.06	6.30	4.68	4.8	4.74
Khondalite	0.67	34.72	6.97	0.86	23.4	5.67
Limestone	0.09	51.4	8.34	0.72	53.61	10.36
Laterite	1.67	8.7	3.67	1.92	9.45	5.04
Quartzite	1.4	27.09	10.14	1.26	30.67	12.46
Schist	0.35	28.48	5.82	1.9	35.9	8.40
Shale	0.71	65.93	13.01	0.89	72.11	13.34
Sandstone	0.25	28.65	7.88	1.02	28.35	6.92

7.7 Long-term Water Level trends:

7.7.1 Pre-Monsoon trend map:

It is inferred from the pre-monsoon water level trend map that the falling trend in water level of 0 to >2 m/yr is observed in 42% of the area and rising trend of 0 to 2m / yr in water level is observed in 54% of the area in the state. Falling trend is recorded at 357 locations while 370 locations have recorded rising trend during May. Falling trend of 0 to 2 m/yr is more prevalent in coastal and hilly areas and observed mainly in parts of Parvathipuram Manyam, Srikakulam, Vizianagaram, Alluri Sitharama Raju, Vishakhapatnam, Anakapalli, Kakinada, East and West Godavari, Konaseema, Eluru, NTR, Krishna, Guntur, Bapatla, Prakasam, Palnadu, SPS Nellore, Tirupati, Kurnool, Nandyal and Ananthapuramu districts. Deep falling trend of 2 to 4 m/yr is observed in parts of Nandyal, Ananthapuramu and Kakinada districts as small patches. Rising trend of 0 to 2 m/yr. is predominant in Ananthapuramu, Annamayya, Chittoor, Tirupati, YSR Kadapa, Prakasam, Kurnool, Sri Sathya Sai, Alluri Sitharama Raju, Srikakulam and Vizianagaram districts. Falling trend ranges from 0.0005 m/yr. to 5.13 m/yr while rising trend while rising trend ranges from 0.00052 to 4.92 m/yr. (Fig.7.28)

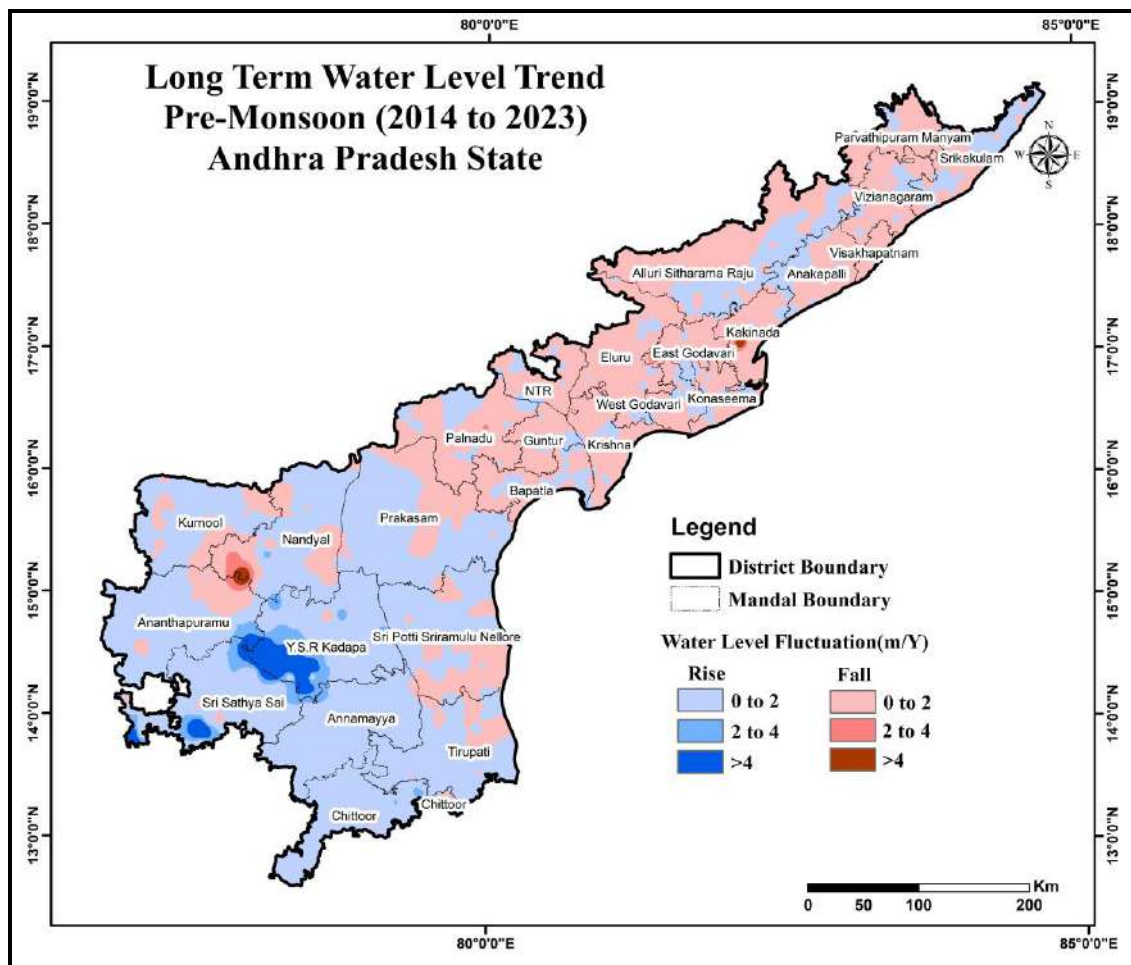


Fig-7.47 Long term water level trend - Pre-Monsoon period (2014-2023)

7.7.2 Post-Monsoon trend map:

It is inferred from the post-monsoon water level trend map that the falling trend in water level of 0 to >2 m/yr is observed in 41% of the area and rising trend of 0 to >4 m/yr in water level is observed in 56% of the area in the state. Falling trend is recorded at 341 locations while 408 locations have recorded rising trend. Falling trend of 0 to 2 m/yr is more prevalent in parts of Parvatipuram Manyam, Srikakulam, Visakhapatnam, Vizianagaram, Anakapalli, Kakinada, East Godavari, West Godavari, Eluru, NTR, Palnadu, Bapatla, Prakasam, Nandyal, SPS Nellore and Tirupati district. Rising trend of 0 to 2 m/yr is predominant in all the districts. Rising trend of 2 to 4 m/yr is seen as patches in Annamayya, Sri Satya Sai and YSR Kadapa district. Falling trend ranges from 0.0009 m/yr to 4.83 m/yr, while rising trend ranges from 0.0006 to 5.92 m/yr. (Fig.7.29)

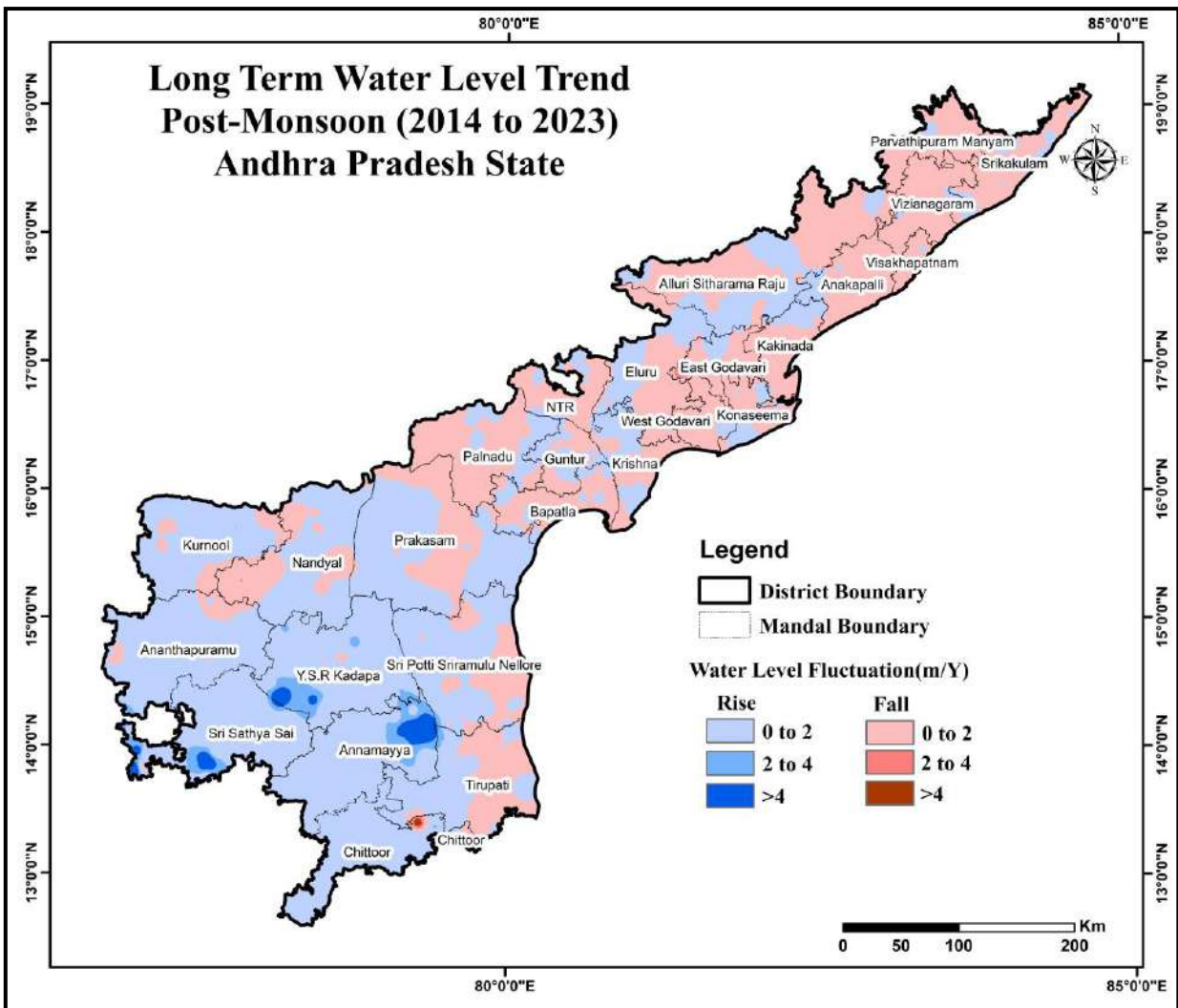


Fig -7.48 Long term water level trend Post-Monsoon period (2014-2023)

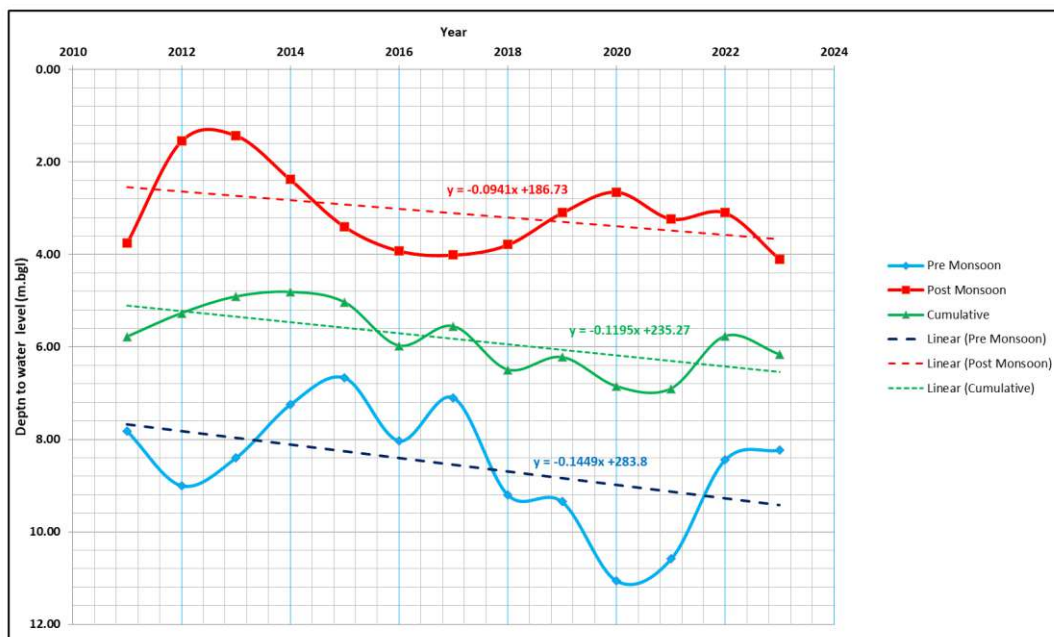
7.8 Hydrographs of water level

Total 15 hydrographs are generated (**Fig. 7.30(a-o)**). Out of 15, 5 wells show rising trends in both seasons, 8 shows falling trend in both season and rest shows mixed trend (**Table-7.2**).

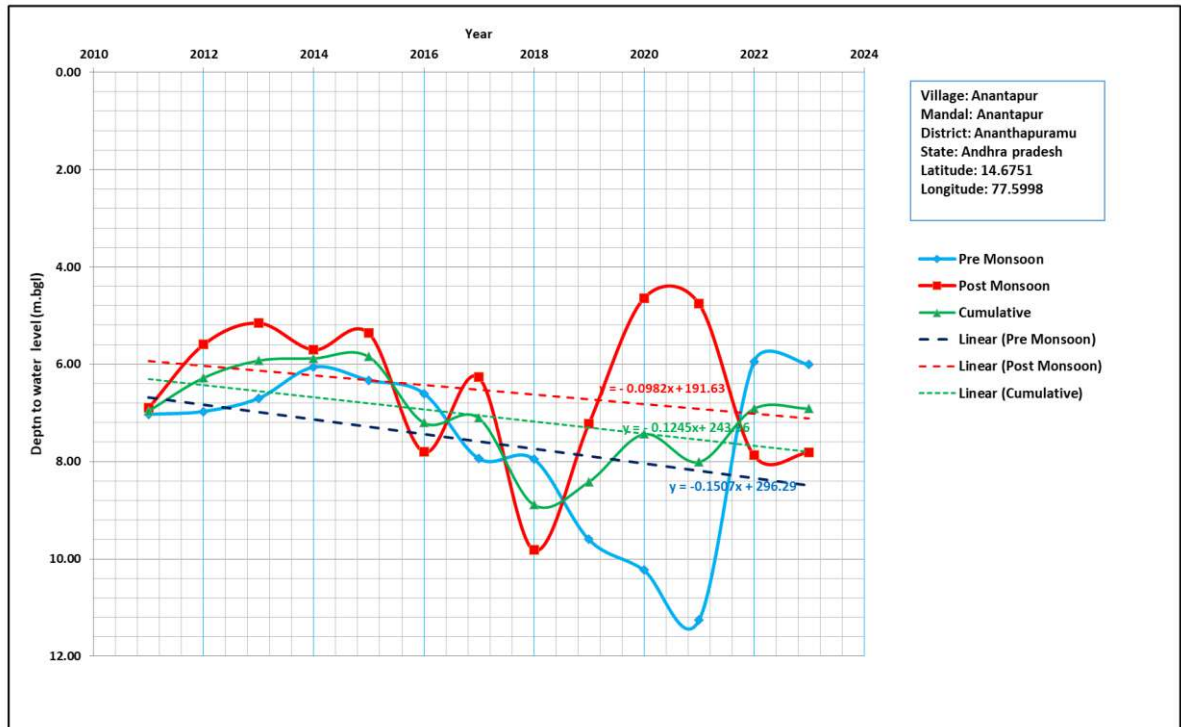
Table-7.2: Representative Hydrographs showing rising and falling trends in Andhra Pradesh State.

S. No.	Fig No.	Location	District	Pre (m/yr.)		Post (m/yr.)	
				Rise	Fall	Rise	Fall
1	7.30a	Chintur	Alluri Sita Rama		0.0941		0.1449
2	7.30b	Anantapur	Ananthapuramu		0.0982		0.1507
3	7.30c	Chinnamandem	Annamayya	0.1098		0.1857	
4	7.30d	Bapatla	Santamaguluru	0.0133		0.0436	
5	7.30e	Dowalaiswaram	East Godavari		0.1315		0.1315
6	7.30f	Eluru	Eluru		0.5173		0.7974
7	7.30g	Kothapeta	Konaseema		0.2408		0.1819
8	7.30h	Bapulapadu	Krishna		0.9137		0.3768
9	7.30i	Yemmiganur	Kurnool	0.1882		0.5362	
10	7.30j	Muktyala	NTR	0.0436		0.0087	
11	7.30k	Vinukonda	Palnadu	0.032			0.0984
12	7.30l	Rajupalem	Prakasam		0.1259		0.2514
13	7.30m	Amarapuram	Sri Satya Sai		0.382		0.6619
14	7.30n	Akiveedu	West Godavari	0.214			0.3449
15	7.30o	Pullareddy Pet	YSR Kadapa	0.3124		0.3492	

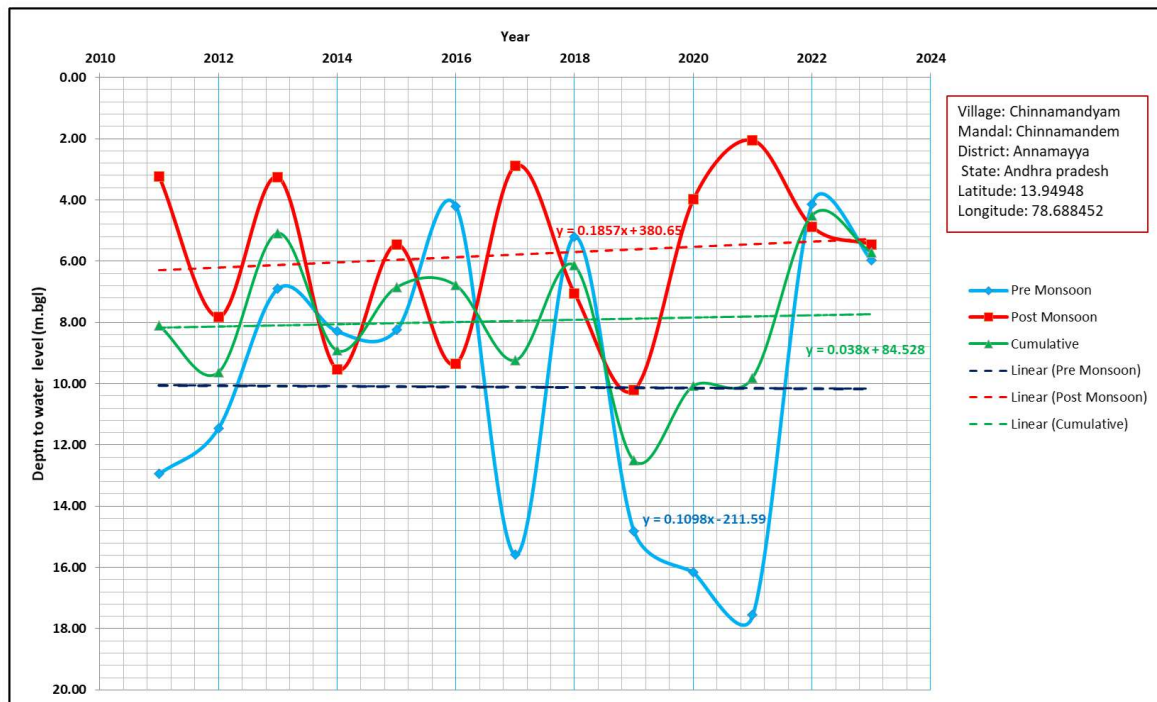
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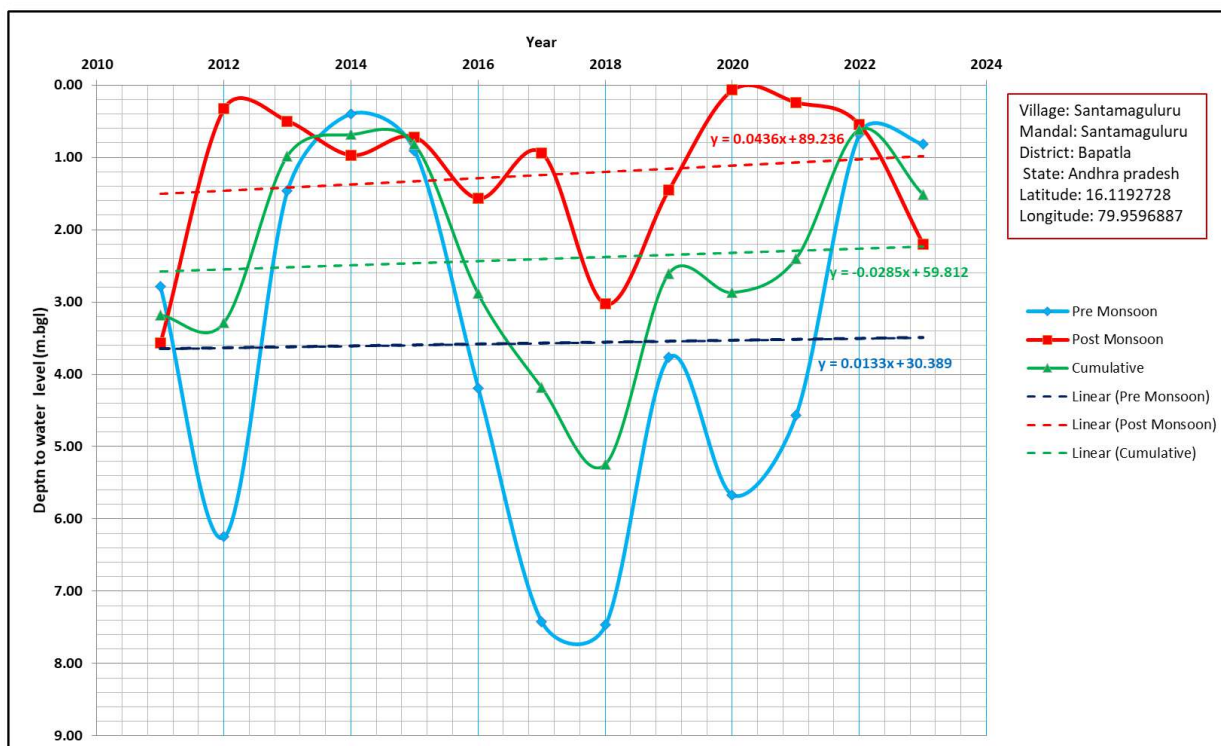
7.49b



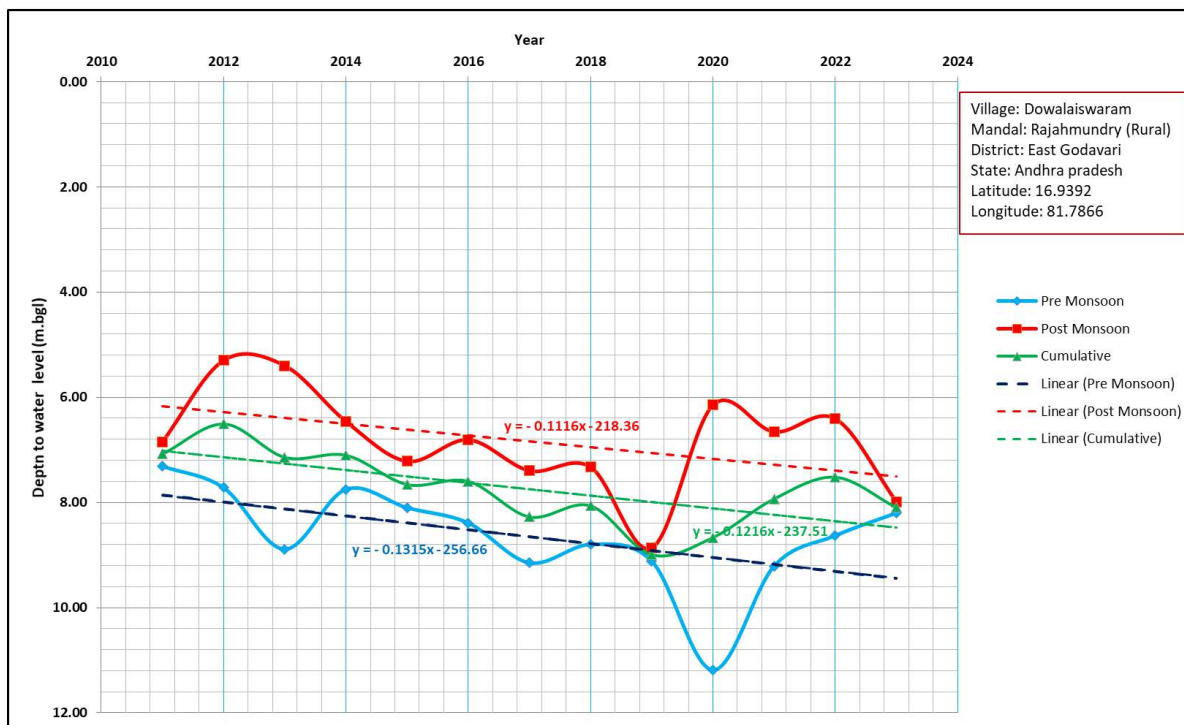
7.49c



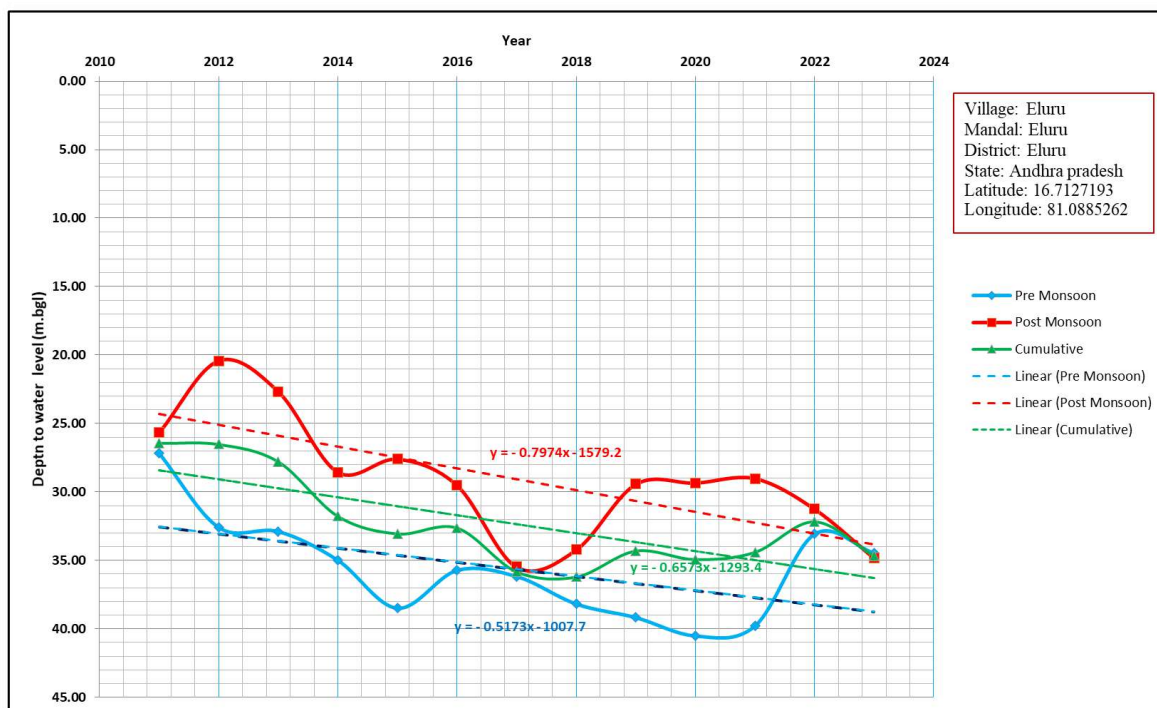
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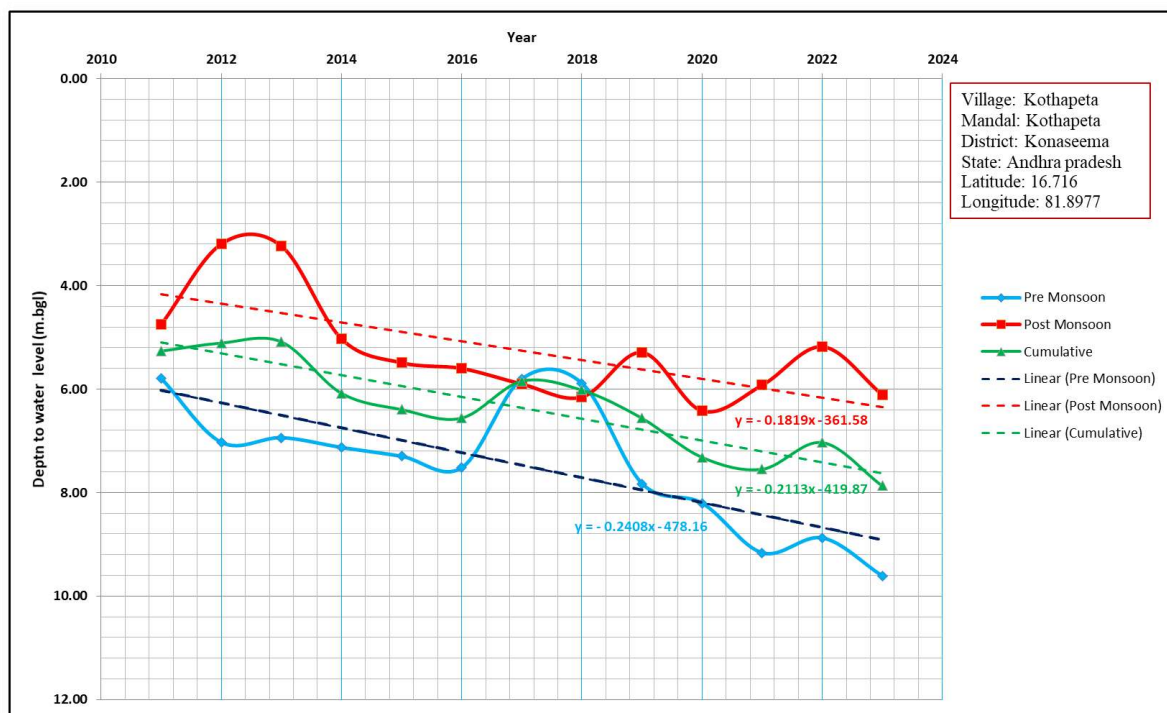
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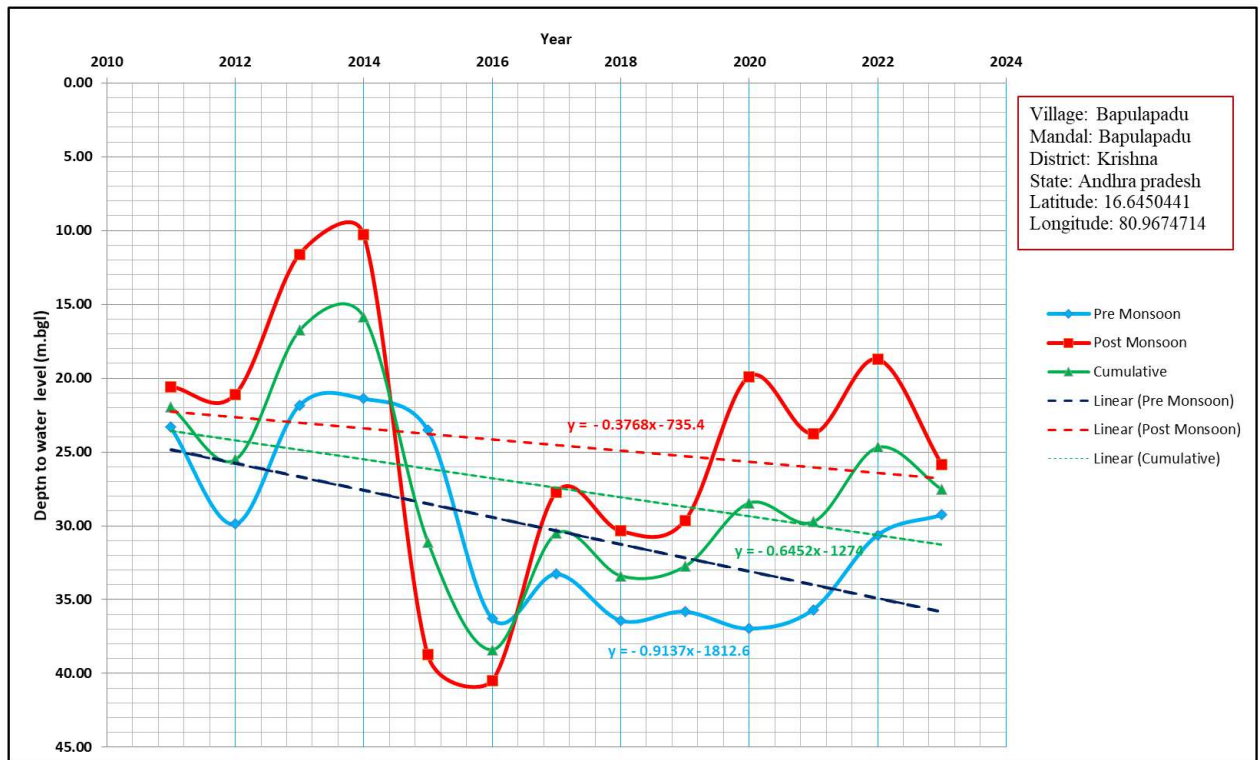
7.49f



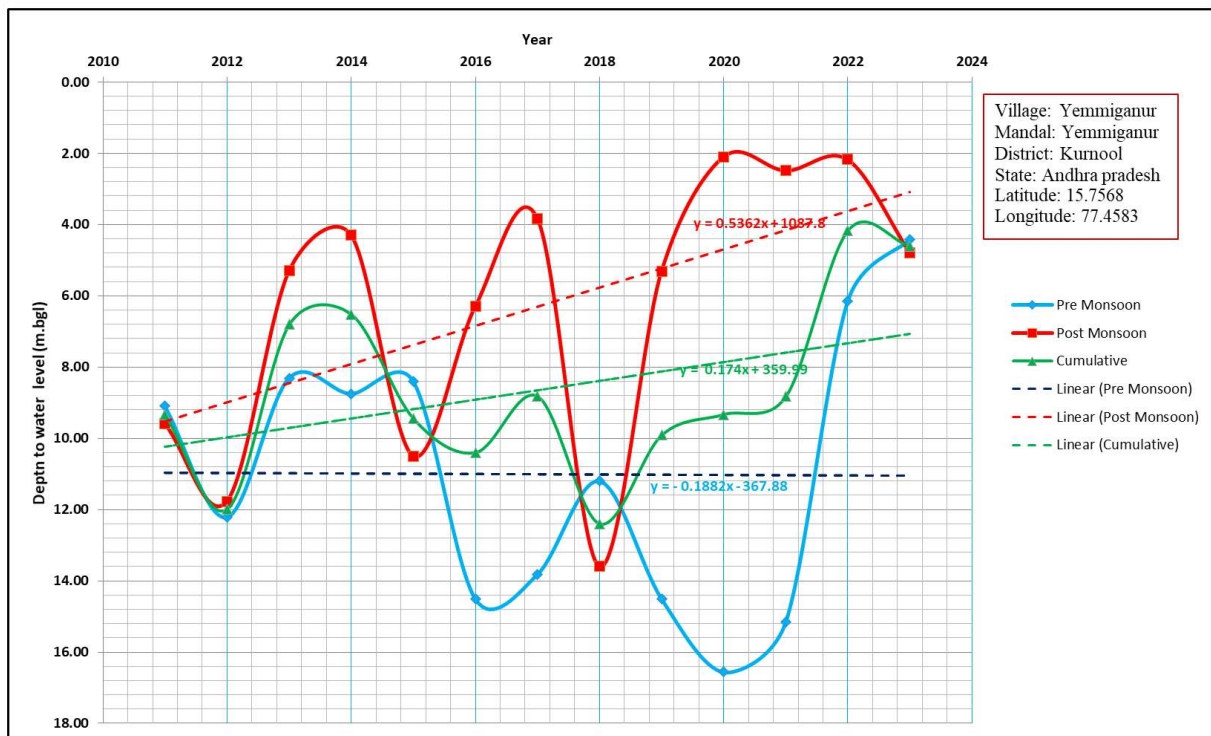
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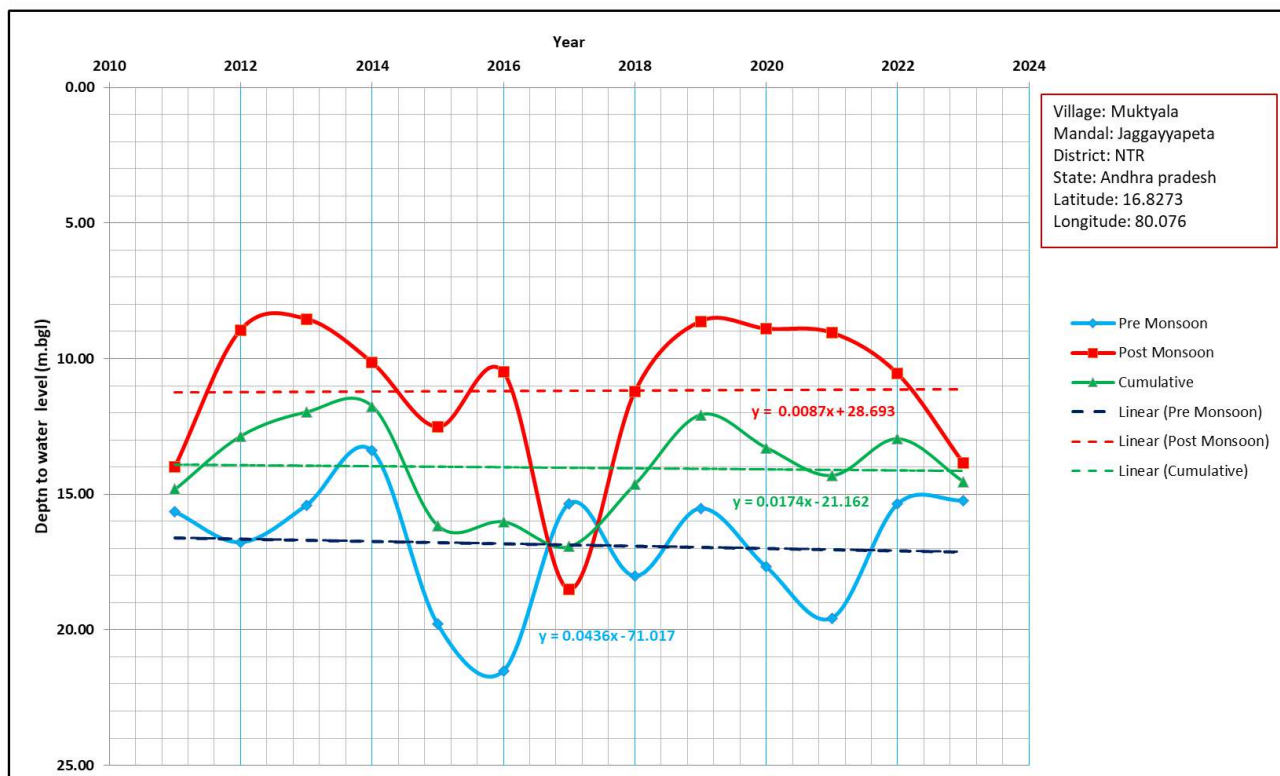
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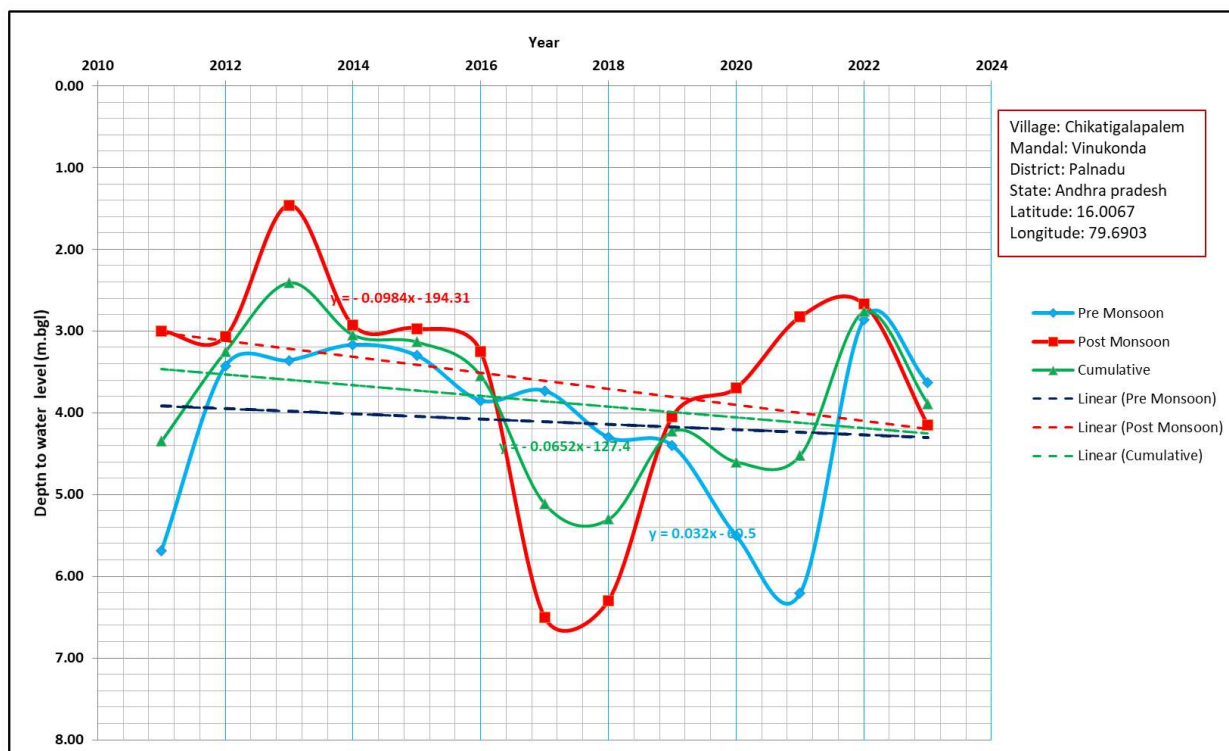
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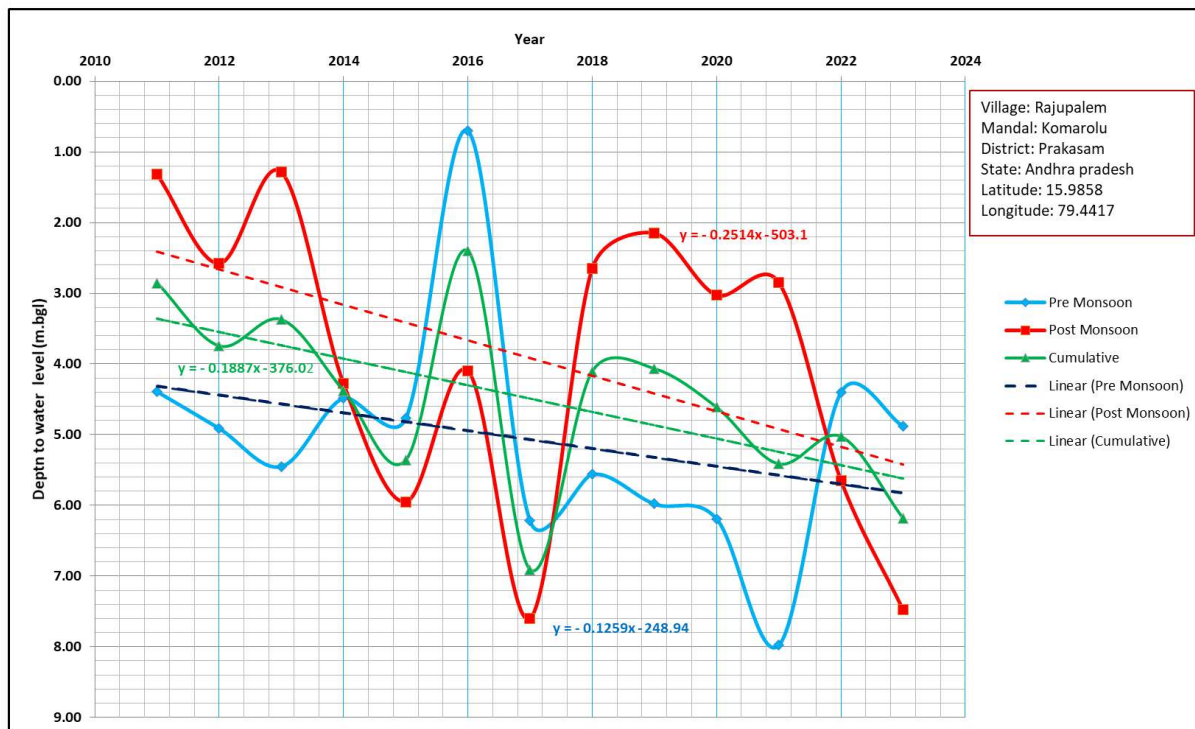
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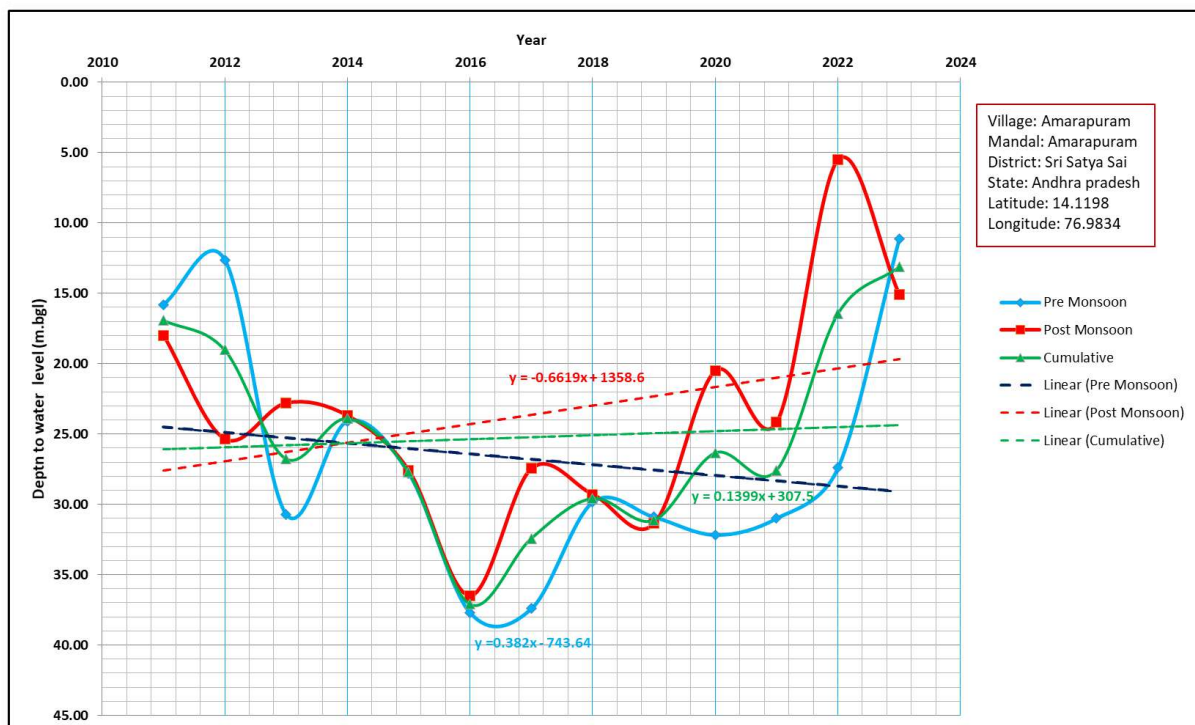
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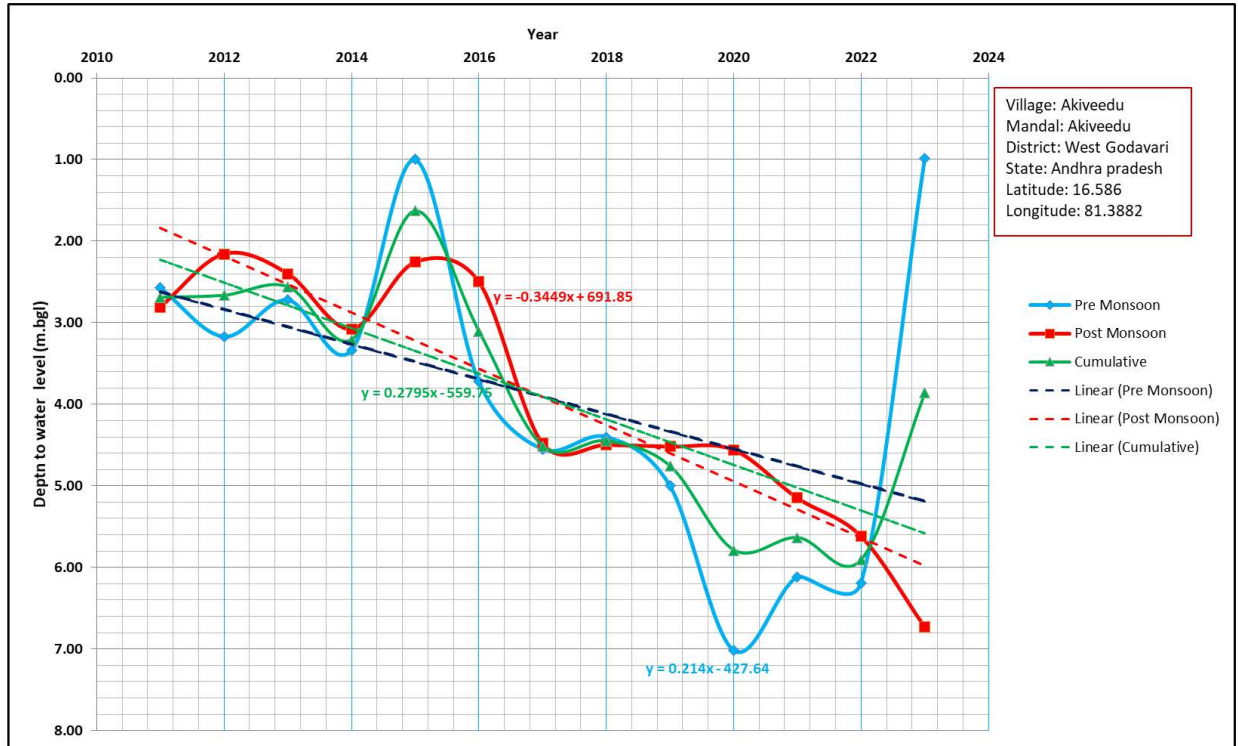
7.49 I



7.49 m



7.30n



7.30o

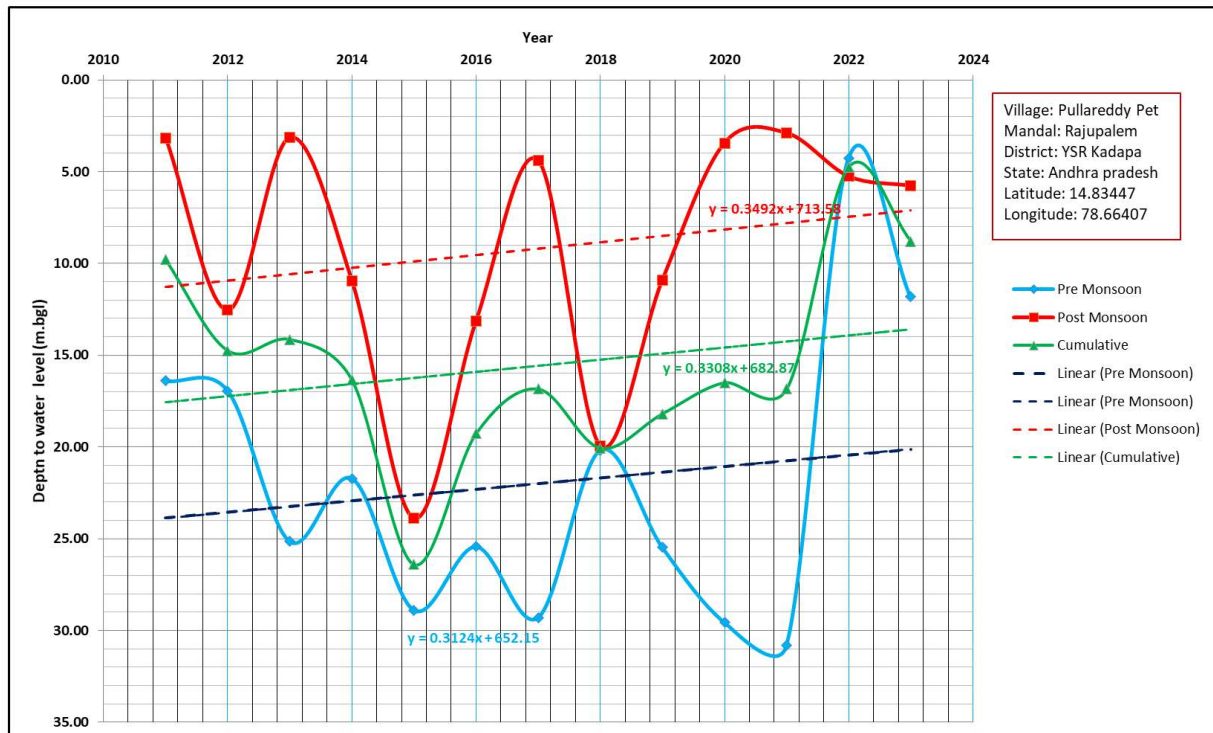


Fig.7.30 (7.30a to 7.30o): Representative Hydrographs of water level trend in Andhra Pradesh State.

District wise status of Groundwater Monitoring Wells, Andhra Pradesh : May, 2023																						
Annexure- I																						
S. No.	District	No of Stations to be monitored			No of Stations where WL data Recorded			No of Stations Monitored as Dry			No of Stations not Monitored due to Various Reasons			No of Stations Abandoned			No of Stations Established			No of Stations as on May, 2023		
		DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total
1	Alluri Sitharama Raju	42	13	55	38	7	45	0	0	0	7	6	13	0	0	0	3	0	3	45	13	58
2	Anakapalli	20	4	24	24	4	28	0	0	0	0	0	0	0	0	0	4	0	4	24	4	28
3	Ananthapuramu	8	60	68	8	55	63	0	0	0	0	6	6	0	0	0	0	1	1	8	61	69
4	Annamayya	15	65	80	20	56	76	0	0	0	1	9	10	0	0	0	6	0	6	21	65	86
5	Bapatla	24	13	37	23	12	35	0	0	0	1	1	2	0	0	0	0	0	0	24	13	37
6	Chittoor	15	69	84	10	66	76	0	1	1	5	6	11	0	0	0	0	4	4	15	73	88
7	East Godavari	21	4	25	20	3	23	0	0	0	1	1	2	0	0	0	0	0	0	21	4	25
8	Eluru	29	23	52	29	22	51	1	0	1	4	1	5	0	0	0	5	0	5	34	23	57
9	Guntur	23	12	35	21	11	32	2	0	2	0	0	0	0	0	0	0	0	0	23	11	34
10	Kakinada	21	8	29	22	6	28	0	0	0	1	1	2	0	0	0	1	0	1	23	7	30
11	Konaseema	28	12	40	29	8	37	0	0	0	1	4	5	0	0	0	2	0	2	30	12	42
12	Krishna	29	52	81	26	41	67	1	1	2	2	12	14	0	0	0	0	2	2	29	54	83
13	Kurnool	17	12	29	17	14	31	0	0	0	0	2	2	0	0	0	0	4	4	17	16	33
14	Nandyal	18	6	24	21	4	25	1	0	1	1	2	3	0	0	0	3	0	3	23	6	29
15	NTR	18	12	30	17	10	27	2	0	2	1	3	4	0	0	0	2	0	2	20	13	33
16	Palnadu	41	26	67	46	28	74	0	0	0	1	1	2	0	0	0	6	3	9	47	29	76
17	Parvathipuram Manyam	20	6	26	18	6	24	4	0	4	0	0	0	0	0	0	2	0	2	22	6	28
18	Prakasam	24	91	115	24	91	115	0	0	0	0	7	7	0	0	0	0	8	8	24	98	122
19	SPS Nellore	45		45	49	29	78	2	0	2	1	0	1	0	0	0	7	29	36	52	29	81
20	Sri Sathya Sai	45	34	79	38	61	99	0	0	0	7	4	11	0	0	0	0	32	32	45	65	110
21	Srikakulam	17	76	93	17	69	86	0	0	0	0	5	5	0	0	0	0	0	0	17	74	91
22	Tirupati	34	15	49	33	8	41	0	0	0	1	7	8	0	0	0	0	0	0	34	15	49
23	Visakhapatnam	16	4	20	13	4	17	3	0	3	0	0	0	0	0	0	0	0	0	16	4	20
24	Vizianagaram	31	14	45	31	14	45	1	0	1	0	0	0	0	0	0	1	0	1	32	14	46
25	West Godavari	18	14	32	22	12	34	0	0	0	0	2	2	0	0	0	4	0	4	22	14	36
26	Y.S.R Kadapa	14	56	70	12	54	66	2	0	2	0	5	5	0	0	0	1	0	1	14	59	73
	Total	633	701	1334	628	695	1323	19	2	21	35	85	120	0	0	0	47	83	130	682	782	1464

District wise status of Groundwater Monitoring Wells, Andhra Pradesh: August , 2023														Annexure- II								
S. No.	District	No of Stations to be monitored			No of Stations where WL data Recorded			No of Stations Monitored as Dry			No of Stations not Monitored due to Various Reasons			No of Stations Abandoned			No of Stations Established			No of Stations as on August, 2022		
		DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total
1	Alluri Sitharama Raju	45	14	59	40	11	51	0	0	0	5	3	8	0	0	0	0	0	0	45	14	59
2	Anakapalli	24	4	28	24	3	27	0	0	0	0	1	1	0	0	0	0	0	0	24	4	28
3	Ananthapuramu	8	60	68	8	52	60	0	0	0	0	8	8	0	0	0	0	0	0	8	60	68
4	Annamayya	19	66	85	17	62	79	2	1	3	0	3	3	0	0	0	0	0	0	19	66	85
5	Bapatla	24	12	36	23	12	35	0	0	0	1	0	1	0	0	0	0	0	0	24	12	36
6	Chittoor	15	72	87	12	67	79	0	0	0	3	5	8	0	0	0	0	0	0	15	72	87
7	East Godavari	21	4	25	18	3	21	0	1	1	3	0	3	0	0	0	0	0	0	21	4	25
8	Eluru	35	23	58	33	19	52	0	0	0	2	4	6	0	0	0	0	0	0	35	23	58
9	Guntur	23	12	35	22	11	33	0	0	0	1	1	2	0	0	0	0	0	0	23	12	35
10	Kakinada	22	8	30	21	7	28	0	0	0	1	1	2	0	0	0	0	0	0	22	8	30
11	Konaseema	30	12	42	30	8	38	0	0	0	0	4	4	0	0	0	0	0	0	30	12	42
12	Krishna	29	56	85	26	43	69	0	3	3	3	10	13	0	0	0	0	0	0	29	56	85
13	Kurnool	17	16	33	17	9	26	0	0	0	0	7	7	0	0	0	0	0	0	17	16	33
14	Nandyal	22	5	27	21	5	26	0	0	0	1	0	1	0	0	0	0	0	0	22	5	27
15	NTR	20	13	33	20	12	32	0	0	0	0	1	1	0	0	0	0	0	0	20	13	33
16	Palnadu	46	30	76	44	29	73	1	1	2	1	0	1	0	0	0	0	0	0	46	30	76
17	Parvathipuram Manyam	22	6	28	20	6	26	0	0	0	2	0	2	0	0	0	0	0	0	22	6	28
18	Prakasam	24	98	122	19	86	105	1	0	1	4	12	16	0	0	0	0	0	0	24	98	122
19	SPS Nellore	54	27	81	49	27	76	0	0	0	5	0	5	0	0	0	0	0	0	54	27	81
20	Sri Sathya Sai	47	64	111	45	61	106	1	0	1	1	3	4	0	0	0	0	0	0	47	64	111
21	Srikakulam	17	74	91	17	66	83	0	0	0	0	8	8	0	0	0	0	0	0	17	74	91
22	Tirupati	34	15	49	34	13	47	0	0	0	0	2	2	0	0	0	0	0	0	34	15	49
23	Visakhapatnam	16	4	20	14	4	18	1	0	1	1	0	1	0	0	0	0	0	0	16	4	20
24	Vizianagaram	32	14	46	32	12	44	0	0	0	0	2	2	0	0	0	0	0	0	32	14	46
25	West Godavari	22	14	36	21	14	35	0	0	0	1	0	1	0	0	0	0	0	0	22	14	36
26	Y.S.R Kadapa	15	58	73	15	56	71	0	0	0	0	2	2	0	0	0	0	0	0	15	58	73
	Total	683	781	1464	642	698	1340	6	6	12	35	77	112	0	0	0	0	0	0	683	781	1464

District wise status of Groundwater Monitoring Wells, Andhra Pradesh : November , 2023:														Annexure- III								
S. No.	District	No of Stations to be monitored			No of Stations where WL data Recorded			No of Stations Monitored as Dry			No of Stations not Monitored due to Various Reasons			No of Stations Abandoned			No of Stations Established			No of Stations as on November, 2022		
		DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total
1	Alluri Sitharama Raju	45	14	59	40	10	49	0	0	0	5	4	9	1	0	1	0	0	0	44	14	58
2	Anakapalli	24	4	28	23	4	27	1	0	1	0	0	0	0	0	0	0	0	0	24	4	28
3	Ananthapuramu	8	60	68	8	55	63	0	0	0	0	5	5	0	0	0	0	0	0	8	60	68
4	Annamayya	19	66	85	17	59	76	1	1	2	1	6	6	0	0	0	0	0	0	19	66	85
5	Bapatla	24	12	36	24	12	36	0	0	0	0	0	0	0	0	0	0	0	0	24	12	36
6	Chittoor	15	72	87	12	67	79	1	0	1	2	5	7	0	0	0	0	0	0	15	72	87
7	East Godavari	21	4	25	21	3	24	0	1	1	0	0	0	0	0	0	0	0	0	21	4	25
8	Eluru	35	23	58	28	20	48	2	0	2	5	3	8	1	1	2	0	0	0	34	22	56
9	Guntur	23	12	35	23	10	33	0	0	0	0	2	2	0	0	0	0	0	0	23	12	35
10	Kakinada	22	8	30	21	7	28	0	1	1	1	0	0	0	0	0	0	0	0	22	8	30
11	Konaseema	30	12	42	30	11	41	0	0	0	0	1	1	0	0	0	0	0	0	30	12	42
12	Krishna	29	56	85	28	43	71	0	3	3	1	10	11	0	0	0	0	0	0	29	56	85
13	Kurnool	17	16	33	16	12	28	1	0	1	0	4	4	0	0	0	0	0	0	17	16	33
14	Nandyal	22	5	27	22	5	27	0	0	0	0	0	0	0	0	0	0	0	0	22	5	27
15	NTR	20	13	33	17	12	29	2	0	2	1	1	2	0	0	0	0	0	0	20	13	33
16	Palnadu	46	30	76	44	27	71	0	1	1	2	2	4	2	1	3	0	0	0	44	29	73
17	Parvathipuram Manyam	22	6	28	22	5	27	0	0	0	0	1	1	0	0	0	0	0	0	22	6	28
18	Prakasam	24	98	122	22	86	108	0	4	4	2	8	10	0	0	0	0	0	0	24	98	122
19	SPS Nellore	54	27	81	49	26	75	1	0	1	4	1	5	2	0	2	0	0	0	52	27	79
20	Sri Sathya Sai	47	64	111	41	57	98	3	0	3	3	7	10	0	0	0	0	0	0	47	64	111
21	Srikakulam	17	74	91	16	72	88	0	0	0	1	2	3	0	1	1	0	0	0	17	73	90
22	Tirupati	34	15	49	33	12	45	0	0	0	1	3	4	0	0	0	0	0	0	34	15	49
23	Visakhapatnam	16	4	20	12	3	15	1	0	1	3	1	1	0	0	0	0	0	0	16	4	20
24	Vizianagaram	32	14	46	31	12	43	0	0	0	1	2	3	1	0	1	0	0	0	31	14	45
25	West Godavari	22	14	36	20	14	34	0	0	0	2	0	1	0	0	0	0	0	0	22	14	36
26	Y.S.R Kadapa	15	58	73	14	50	64	1	0	1	0	8	8	0	2	2	0	0	0	15	56	71
	Total	683	781	1464	634	694	1328	14	11	25	35	76	105	7	5	12	0	0	0	676	776	1452

District wise status of Groundwater Monitoring Wells, Andhra Pradesh : January, 2024																	Annexure-IV					
S. No.	District	No of Stations to be monitored			No of Stations where WL data Recorded			No of Stations Monitored as Dry			No of Stations not Monitored due to Various Reasons			No of Stations Abandoned			No of Stations Established			No of Stations as on January, 2023		
		DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total
1	Alluri Sitharama Raju	44	14	58	39	12	51	0	0	0	5	2	7	0	1	1	0	0	0	44	13	57
2	Anakapalli	24	4	28	23	4	27	0	0	0	1	0	1	0	0	0	0	0	0	24	4	28
3	Ananthapur	8	60	68	8	58	66	0	0	0	0	2	2	0	1	1	0	0	0	8	58	66
4	Annamayya	19	66	85	18	59	77	0	0	0	1	7	8	0	0	0	0	0	0	19	64	83
5	Bapatla	24	12	36	24	12	36	0	0	0	0	0	0	0	0	0	0	0	0	24	12	36
6	Chittoor	15	72	87	12	65	77	0	0	0	3	7	10	0	0	0	0	0	0	15	70	85
7	East Godavari	21	4	25	20	4	24	0	1	1	1	0	1	0	0	0	0	0	0	21	4	25
8	Eluru	34	22	56	34	22	56	1	0	1	0	0	0	0	0	0	0	0	0	34	21	55
9	Guntur	23	12	35	23	12	35	0	0	0	0	0	0	0	0	0	0	7	7	23	18	41
10	Kakinada	22	8	30	19	8	27	0	1	1	3	0	3	0	0	0	0	0	0	23	7	30
11	Konaseema	30	12	42	29	11	40	0	0	0	1	1	2	0	0	0	0	0	0	30	12	42
12	Krishna	29	56	85	29	47	76	0	2	2	0	9	9	0	0	0	0	0	0	29	56	85
13	Kurnool	17	16	33	17	16	33	1	0	1	0	0	0	0	0	0	0	0	0	17	15	32
14	Nandyal	22	5	27	22	5	27	0	0	0	0	0	0	0	0	0	0	0	0	22	5	27
15	NTR	20	13	33	20	12	32	0	0	0	0	1	1	0	0	0	0	6	6	20	19	39
16	Palnadu	44	29	73	44	29	73	0	1	1	0	0	0	0	0	0	1	0	1	46	28	74
17	Parvathipuram	22	6	28	22	6	28	0	0	0	0	0	0	0	0	0	0	0	0	22	6	28
18	Prakasam	24	98	122	24	91	115	1	0	1	0	7	7	0	0	0	0	0	0	24	98	122
19	Sirkalulam	52	27	79	51	25	76	1	0	1	1	2	3	0	0	0	0	0	0	51	29	80
20	SPS Nellore	47	64	111	45	59	104	0	0	0	2	5	7	0	0	0	0	0	0	45	66	111
21	Sri Sathya Sai	17	73	90	17	71	88	0	0	0	0	2	2	1	1	2	0	0	0	17	74	91
22	Tirupati	34	15	49	33	11	44	0	0	0	1	4	5	0	0	0	0	0	0	34	16	50
23	Visakhapatnam	16	4	20	16	4	20	0	0	0	0	0	0	0	0	0	0	12	12	16	16	32
24	Vizianagaram	31	14	45	31	14	45	1	0	1	0	0	0	0	0	0	0	0	0	31	14	45
25	West Godavari	22	14	36	21	14	35	0	0	0	1	0	1	0	0	0	0	0	0	22	14	36
26	YSR Kadapa	15	56	71	15	49	64	0	0	0	0	7	7	0	1	1	0	0	0	15	58	73
	Total	676	776	1452	656	720	1376	5	5	10	20	56	76	1	4	5	1	25	26	676	797	1473

Depth to water levels and percentage of wells (Unconfined and Semiconfined/Confined) in different depth ranges, Andhra Pradesh: May, 2023															Annexure-V	
Sl. No	District	No of Wells Analysed	Depth to Water Level (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
			Min	Max	0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
					No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	45	0.85	16.06	2	4%	18	40%	19	42%	6	13%	0	0%	0	0%
2	Anakapalli	28	1.4	12.45	1	4%	21	75%	4	14%	2	7%	0	0%	0	0%
3	Ananthapuramu	63	0.71	29.5	9	14%	24	38%	17	27%	11	17%	2	3%	0	0%
4	Annamayya	76	0.38	43.93	1	1%	14	18%	23	30%	22	29%	14	18%	2	3%
5	Bapatla	35	0.23	10.53	6	17%	16	46%	11	31%	2	6%	0	0%	0	0%
6	Chitoor	76	1.03	58.06	2	3%	14	18%	39	51%	17	22%	2	3%	2	3%
7	East Godavari	23	0.55	9.34	1	4%	11	48%	11	48%	0	0%	0	0%	0	0%
8	Eluru	51	0.25	41.62	8	16%	13	25%	11	22%	12	24%	5	10%	2	4%
9	Guntur	32	0.73	15.92	3	9%	15	47%	12	38%	2	6%	0	0%	0	0%
10	Kakinada	28	0.36	14.5	5	18%	16	57%	4	14%	3	11%	0	0%	0	0%
11	Konaseema	37	0.3	28.65	2	6%	21	58%	8	22%	2	6%	4	11%	0	0%
12	Krishna	67	0.46	35.22	2	3%	22	33%	18	27%	18	27%	7	10%	0	0%
13	Kurnool	31	0.09	10.9	1	3%	14	45%	15	48%	1	3%	0	0%	0	0%
14	Nandyal	25	0.09	44.77	2	8%	13	52%	7	28%	2	8%	0	0%	1	4%
15	NTR	27	0.95	26.6	1	4%	11	41%	11	41%	3	11%	1	4%	0	0%
16	Palnadu	74	0.15	51.22	6	8%	38	51%	24	32%	3	4%	2	3%	1	1%
17	Parvathipuram Manyam	24	1.07	21.46	0	0%	6	25%	16	67%	1	4%	1	4%	0	0%
18	Prakasam	115	0.96	65.93	2	2%	22	19%	48	42%	27	23%	8	7%	8	7%
19	Sri Potti Sriramulu Nellore	99	0.7	22.24	4	4%	38	38%	48	48%	9	9%	0	0%	0	0%
20	Sri Sathya Sai	86	0.35	16.15	6	7%	22	26%	40	47%	12	14%	6	7%	0	0%
21	Srikakulam	78	0.04	35.93	3	4%	32	41%	35	45%	6	8%	2	3%	0	0%
22	Tirupati	41	0.4	14.35	1	2%	26	63%	11	27%	3	7%	0	0%	0	0%
23	Visakapatnam	17	1.2	21.95	1	6%	6	35%	8	47%	1	6%	1	6%	0	0%
24	Vizianagaram	45	1.42	14.3	1	2%	19	42%	23	51%	2	4%	0	0%	0	0%
25	West Godavari	34	0.57	50.43	7	21%	16	47%	2	6%	3	9%	5	15%	1	3%
26	Y.S.R Kadapa	66	0.72	50.6	1	2%	21	32%	25	38%	14	21%	4	6%	1	2%
	Total	1323	0.04	65.93	78	6%	489	37%	490	37%	184	14%	63	5%	18	1%

Depth to water levels and percentage of wells (Unconfined and Semiconfined/Confined) in different depth ranges,Andhra Pradesh: August , 2023															Annexure -VI	
Sl. No	District	No of Wells Analysed	Depth to Water		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
			Level (m bgl)		0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	50	0.4	14.1	16	32%	18	36%	13	26%	3	6%	0	0%	0	0%
2	Anakapalli	27	1.0	11.4	6	22%	15	56%	5	19%	1	4%	0	0%	0	0%
3	Ananthapuramu	60	1.4	26.5	4	7%	24	40%	12	20%	19	32%	1	2%	0	0%
4	Annamayya	79	0.9	51.8	1	1%	11	14%	22	28%	21	27%	16	20%	8	10%
5	Bapatla	35	0.5	10.8	11	31%	12	34%	8	23%	4	11%	0	0%	0	0%
6	Chitoor	79	1.6	61.1	1	1%	15	19%	34	43%	24	30%	2	3%	3	4%
7	East Godavari	21	0.6	8.5	9	43%	8	38%	4	19%	0	0%	0	0%	0	0%
8	Eluru	52	0.1	44.2	18	35%	12	23%	7	13%	7	13%	7	13%	1	2%
9	Guntur	33	0.02	15.0	13	39%	17	52%	1	3%	2	6%	0	0%	0	0%
10	Kakinada	28	1.1	15.2	11	39%	11	39%	3	11%	3	11%	0	0%	0	0%
11	Konaseema	38	0.9	28.8	15	39%	13	34%	6	16%	1	3%	3	8%	0	0%
12	Krishna	69	0.6	34.8	22	32%	5	7%	10	14%	28	41%	4	6%	0	0%
13	Kurnool	26	1.1	8.6	2	8%	13	50%	11	42%	0	0%	0	0%	0	0%
14	Nandyal	26	0.2	48.7	10	38%	8	31%	2	8%	3	12%	2	8%	1	4%
15	NTR	32	0.8	12.5	4	13%	20	63%	6	19%	2	6%	0	0%	0	0%
16	Palnadu	73	0.6	41.9	10	14%	33	45%	21	29%	6	8%	2	3%	1	1%
17	Parvathipuram Manyam	26	0.7	22.3	10	38%	12	46%	3	12%	0	0%	1	4%	0	0%
18	Prakasam	105	1.1	54.0	4	4%	17	16%	38	36%	25	24%	13	12%	8	8%
19	Sri Potti Sriramulu Nellore	76	0.1	18.4	37	49%	19	25%	16	21%	4	5%	0	0%	0	0%
20	Sri Sathya Sai	106	1.5	28.8	3	3%	30	28%	52	49%	18	17%	2	2%	1	1%
21	Srikakulam	83	1.0	51.5	5	6%	23	28%	36	43%	12	14%	2	2%	5	6%
22	Tirupati	47	1.5	14.8	4	9%	24	51%	18	38%	1	2%	0	0%	0	0%
23	Visakapatnam	18	1.1	18.6	2	11%	7	39%	7	39%	2	11%	0	0%	0	0%
24	Vizianagaram	44	0.6	13.2	12	27%	23	52%	8	18%	1	2%	0	0%	0	0%
25	West Godavari	35	0.6	50.4	14	40%	8	23%	3	9%	4	11%	5	14%	1	3%
26	Y.S.R Kadapa	71	1.7	55.6	1	1%	22	31%	21	30%	20	28%	4	6%	3	4%
	Total	1340	0.02	61.1	245	18%	420	31%	367	27%	211	16%	64	5%	32	2%

Depth to water levels and percentage of wells (Unconfined and Semiconfined/Confined) in different depth ranges,Andhra Pradesh: November, 2022															Annexure-VII	
Sl. No	District	No of Wells Analysed	Depth to Water		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
			Level (m bgl)		0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	50	1.1	19.25	5	10%	22	44%	19	38%	4	8%	0	0%	0	0%
2	Anakapalli	27	1.2	10.4	3	11%	20	74%	2	7%	2	7%	0	0%	0	0%
3	Ananthapuramu	63	1.08	24.3	4	6%	21	33%	24	38%	13	21%	1	2%	0	0%
4	Annamayya	76	0.98	61.42	3	4%	6	8%	30	39%	25	33%	6	8%	6	8%
5	Bapatla	36	0.75	13.68	13	36%	13	36%	8	22%	2	6%	0	0%	0	0%
6	Chitoor	79	1.36	51.5	2	3%	18	23%	33	42%	19	24%	0	0%	7	9%
7	East Godavari	24	1.1	9.14	6	25%	13	54%	5	21%	0	0%	0	0%	0	0%
8	Eluru	48	0.94	34.84	6	13%	21	44%	14	29%	3	6%	4	8%	0	0%
9	Guntur	33	0.99	5.85	6	18%	25	76%	2	6%	0	0%	0	0%	0	0%
10	Kakinada	28	1.6	15.43	4	14%	17	61%	3	11%	4	14%	0	0%	0	0%
11	Konaseema	41	1.02	30.28	8	20%	22	54%	6	15%	1	2%	4	10%	0	0%
12	Krishna	71	0.86	25.84	12	17%	19	27%	19	27%	17	24%	4	6%	0	0%
13	Kurnool	28	1.32	13.36	1	4%	12	43%	12	43%	3	11%	0	0%	0	0%
14	Nandyal	27	0.72	59.36	5	19%	11	41%	6	22%	2	7%	0	0%	3	11%
15	NTR	29	2.2	23.92	0	0%	16	55%	10	34%	2	7%	1	3%	0	0%
16	Palnadu	71	1.19	53.61	7	10%	39	55%	19	27%	3	4%	2	3%	1	1%
17	Parvathipuram Manyam	27	1.42	15.8	3	11%	15	56%	8	30%	1	4%	0	0%	0	0%
18	Prakasam	108	2.06	64.25	0	0%	14	13%	43	40%	29	27%	16	15%	6	6%
19	Sri Potti Sriramulu Nellore	75	1.12	21.11	12	16%	39	52%	20	27%	3	4%	1	1%	0	0%
20	Sri Sathya Sai	98	2.08	22.34	0	0%	27	28%	39	40%	31	32%	1	1%	0	0%
21	Srikakulam	88	0.31	68	6	7%	18	20%	40	45%	16	18%	3	3%	5	6%
22	Tirupati	45	0.3	17.5	2	4%	20	44%	20	44%	3	7%	0	0%	0	0%
23	Visakapatnam	15	2.5	23.4	0	0%	6	40%	7	47%	1	7%	1	7%	0	0%
24	Vizianagaram	43	1.3	12.9	3	7%	27	63%	12	28%	1	2%	0	0%	0	0%
25	West Godavari	34	0.92	53.2	8	24%	13	38%	3	9%	4	12%	5	15%	1	3%
26	Y.S.R Kadapa	64	0.89	23.68	4	6%	25	39%	22	34%	11	17%	2	3%	0	0%
	Total	1328	0.3	68	123	9%	499	38%	426	32%	200	15%	51	4%	29	2%

Depth to water levels and percentage of wells (Unconfined and Semiconfined/Confined) in different depth ranges, Andhra Pradesh: January, 2024														Annexure- VIII			
Sl. No	District	No of Wells Analysed	Depth to Water Table (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of												
					0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0		
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	
1	Alluri Sitharama Raju	51	1.3	49.76	7	14%	18	35%	15	29%	5	10%	4	8%	2	4%	
2	Anakapalli	27	1.05	10.12	5	19%	18	67%	2	7%	1	4%	1	4%	0	0%	
3	Anantapur	66	0.68	30.3	3	5%	20	30%	18	27%	20	30%	4	6%	1	2%	
4	Annamayya	77	2.25	83.2	1	1%	19	25%	24	31%	21	27%	7	9%	5	6%	
5	Bapatla	36	1	10.07	7	19%	18	50%	9	25%	1	3%	1	3%	0	0%	
6	Chittoor	77	0.9	50.05	6	8%	20	26%	23	30%	19	25%	4	5%	5	6%	
7	East Godavari	24	1.22	10.09	5	21%	13	54%	2	8%	2	8%	1	4%	1	4%	
8	Eluru	56	1.05	39.82	9	16%	16	29%	13	23%	6	11%	10	18%	2	4%	
9	Guntur	35	1.08	15.02	2	6%	25	71%	6	17%	2	6%	0	0%	0	0%	
10	Kakinada	27	1.45	14.98	8	30%	11	41%	3	11%	4	15%	1	4%	0	0%	
11	Konaseema	40	0.9	30.95	7	18%	21	53%	8	20%	0	0%	4	10%	0	0%	
12	Krishna	76	0.74	25.61	8	11%	21	28%	14	18%	24	32%	7	9%	2	3%	
13	Kurnool	33	1.85	20.1	1	3%	11	33%	17	52%	2	6%	1	3%	1	3%	
14	Nandyal	27	0.75	60.95	6	22%	14	52%	0	0%	4	15%	0	0%	3	11%	
15	NTR	32	1.8	20.15	1	3%	15	47%	8	25%	7	22%	1	3%	0	0%	
16	Palnadu	73	0.36	33.63	10	14%	40	55%	13	18%	5	7%	4	5%	1	1%	
17	Parvathipuram Manyam	28	2.2	17.19	0	0%	10	36%	16	57%	2	7%	0	0%	0	0%	
18	Prakasam	115	1.19	90.5	4	3%	22	19%	29	25%	20	17%	26	23%	14	12%	
19	Sirkalulam	76	1.68	15.73	4	5%	42	55%	26	34%	4	5%	0	0%	0	0%	
20	SPS Nellore	104	1.17	18.69	12	12%	42	40%	33	32%	16	15%	1	1%	0	0%	
21	Sri Sathya Sai	88	0.4	100.01	6	7%	18	20%	33	38%	24	27%	3	3%	4	5%	
22	Tirupati	44	0.2	16.46	10	23%	26	59%	7	16%	1	2%	0	0%	0	0%	
23	Visakhapatnam	20	1.62	24.13	1	5%	8	40%	6	30%	4	20%	1	5%	0	0%	
24	Vizianagaram	45	1.94	12.32	1	2%	24	53%	16	36%	2	4%	1	2%	1	2%	
25	West Godavari	35	0.97	50.22	11	31%	9	26%	4	11%	5	14%	4	11%	2	6%	
26	YSR Kadapa	64	1.6	55.24	2	3%	14	22%	27	42%	15	23%	5	8%	1	2%	
	Total	1376	0.2	100.01	137	10%	515	37%	372	27%	216	16%	91	7%	45	3%	

Depth to water levels of confined/semiconfined aquifer in different depth ranges, Andhra Pradesh: May, 2022															Annexure - IX	
Sl. No	District	No of Wells Analysed	Depth to Water Level (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
					0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	7	7.65	15.96	0	0%	0	0%	4	57%	3	43%	0	0%	0	0%
2	Anakapalli	3	1.56	4.05	1	33%	2	67%	0	0%	0	0%	0	0%	0	0%
3	Ananthapuramu	27	1.15	22.26	6	22%	12	44%	5	19%	3	11%	1	4%	0	0%
4	Annamayya	38	2.94	51.5	0	0%	4	11%	8	21%	12	32%	11	29%	3	8%
5	Bapatla	12	0.82	16.43	1	8%	2	17%	7	58%	2	17%	0	0%	0	0%
6	Chittoor	46	1.03	57.96	2	4%	6	13%	23	50%	12	26%	2	4%	1	2%
7	East Godavari	2	8.54	9.34	0	0%	0	0%	2	100%	0	0%	0	0%	0	0%
8	Eluru	17	3.31	41.62	0	0%	1	6%	3	18%	6	35%	5	29%	2	12%
9	Guntur	11	3.79	13.28	0	0%	2	18%	7	64%	2	18%	0	0%	0	0%
10	Kakinada	4	2.74	14.5	0	0%	1	25%	1	25%	2	50%	0	0%	0	0%
11	Konaseema	5	9.18	26.87	0	0%	0	0%	1	20%	2	40%	2	40%	0	0%
12	Krishna	43	2.99	34.72	0	0%	2	5%	15	35%	20	47%	6	14%	0	0%
13	Kurnool	9	2.31	10.9	0	0%	5	56%	3	33%	1	11%	0	0%	0	0%
14	Nandyal	4	4.89	51.4	0	0%	1	25%	0	0%	1	25%	0	0%	2	50%
15	NTR	7	4.13	26.6	0	0%	3	43%	2	29%	1	14%	1	14%	0	0%
16	Palnadu	23	0.15	32.68	5	22%	7	30%	7	30%	3	13%	1	4%	0	0%
17	Parvathipuram Manyam	6	4.87	21.36	0	0%	1	17%	4	67%	0	0%	1	17%	0	0%
18	Prakasam	66	2.25	65.93	0	0%	14	21%	21	32%	22	33%	4	6%	5	8%
19	Sri Potti Sriramulu Nellore	27	1.48	22.24	3	11%	7	26%	9	33%	6	22%	2	7%	0	0%
20	Sri Sathya Sai	50	1.4	16.15	4	8%	14	28%	26	52%	6	12%	0	0%	0	0%
21	Srikakulam	49	0.95	35.93	1	2%	14	29%	22	45%	7	14%	5	10%	0	0%
22	Tirupati	8	2.1	14.35	0	0%	4	50%	2	25%	2	25%	0	0%	0	0%
23	Visakapatnam	4	1.1	21.95	1	25%	0	0%	1	25%	1	25%	1	25%	0	0%
24	Vizianagaram	11	1.75	9.5	2	18%	1	9%	8	73%	0	0%	0	0%	0	0%
25	West Godavari	9	0.99	31.68	1	11%	0	0%	1	11%	3	33%	4	44%	0	0%
26	Y.S.R Kadapa	36	0.82	50.6	2	6%	9	25%	11	31%	10	28%	3	8%	1	3%
	Total	524	0.15	65.93	29	6%	112	21%	193	37%	127	24%	49	9%	14	3%

Depth to water levels of confined/semiconfined aquifer in different depth ranges, Andhra Pradesh: August , 2023															Annexure- X	
Sl. No	District	No of Wells Analysed	Depth to Water Level (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
					0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	10	3.6	14.1	0	0%	3	30%	4	40%	3	30%	0	0%	0	0%
2	Anakapalli	2	3.12	3.6	0	0%	2	100%	0	0%	0	0%	0	0%	0	0%
3	Ananthapuramu	27	1.42	16.59	3	11%	12	44%	5	19%	7	26%	0	0%	0	0%
4	Annamayya	41	2.55	59.9	0	0%	1	2%	9	22%	12	29%	12	29%	7	17%
5	Bapatla	12	1.31	10.76	1	8%	2	17%	7	58%	2	17%	0	0%	0	0%
6	Chittoor	52	1.56	61.2	1	2%	7	13%	19	37%	20	38%	2	4%	3	6%
7	East Godavari	2	7.67	8.52	0	0%	0	0%	2	100%	0	0%	0	0%	0	0%
8	Eluru	15	6.16	39.84	0	0%	0	0%	2	13%	7	47%	6	40%	0	0%
9	Guntur	11	2.6	14.98	0	0%	8	73%	1	9%	2	18%	0	0%	0	0%
10	Kakinada	4	2.65	15.15	0	0%	1	25%	1	25%	2	50%	0	0%	0	0%
11	Konaseema	5	6.7	28.8	0	0%	0	0%	3	60%	0	0%	2	40%	0	0%
12	Krishna	43	1.45	34.83	1	2%	1	2%	9	21%	28	65%	4	9%	0	0%
13	Kurnool	6	1.5	6.95	1	17%	3	50%	2	33%	0	0%	0	0%	0	0%
14	Nandyal	5	0.86	30.08	1	20%	2	40%	0	0%	0	0%	2	40%	0	0%
15	NTR	10	1.76	12.54	1	10%	6	60%	2	20%	1	10%	0	0%	0	0%
16	Palnadu	22	0.59	41.89	6	27%	7	32%	4	18%	3	14%	1	5%	1	5%
17	Parvathipuram Manyam	6	1.13	8.14	1	17%	3	50%	2	33%	0	0%	0	0%	0	0%
18	Prakasam	63	3	54.3	0	0%	8	13%	22	35%	22	35%	8	13%	3	5%
19	Sri Potti Sriramulu Nellore	27	0.13	18.4	10	37%	4	15%	9	33%	4	15%	0	0%	0	0%
20	Sri Sathya Sai	51	1.45	28.75	2	4%	6	12%	27	53%	13	25%	2	4%	1	2%
21	Srikakulam	47	2.58	51.5	0	0%	10	21%	23	49%	9	19%	1	2%	4	9%
22	Tirupati	11	2.93	14.81	0	0%	6	55%	4	36%	1	9%	0	0%	0	0%
23	Visakapatnam	4	1.1	18.63	1	25%	0	0%	1	25%	2	50%	0	0%	0	0%
24	Vizianagaram	10	0.65	8.7	2	20%	5	50%	3	30%	0	0%	0	0%	0	0%
25	West Godavari	9	5.8	26.9	0	0%	0	0%	2	22%	4	44%	3	33%	0	0%
26	Y.S.R Kadapa	42	1.7	55.64	1	2%	10	24%	9	21%	16	38%	4	10%	2	5%
	Total	537	0.13	61.2	32	6%	107	20%	172	32%	158	29%	47	9%	21	4%

Depth to water levels of confined/semiconfined aquifer in different depth ranges, Andhra Pradesh: November , 2023															Annexure- XI	
Sl. No	District	No of Wells Analysed	Depth to Water Level (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
					0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	9	3.5	19.25	0	0%	2	22%	3	33%	4	44%	0	0%	0	0%
2	Anakapalli	3	2.1	4.6	0	0%	3	100%	0	0%	0	0%	0	0%	0	0%
3	Ananthapuramu	29	1.9	16.9	1	3%	11	38%	11	38%	6	21%	0	0%	0	0%
4	Annamayya	38	4.01	61.42	0	0%	2	5%	10	26%	16	42%	5	13%	5	13%
5	Bapatla	12	0.76	10.14	3	25%	2	17%	6	50%	1	8%	0	0%	0	0%
6	Chittoor	53	1.36	50.05	1	2%	9	17%	19	36%	18	34%	0	0%	6	11%
7	East Godavari	2	8.5	9.14	0	0%	0	0%	2	100%	0	0%	0	0%	0	0%
8	Eluru	18	2.9	34.84	0	0%	6	33%	6	33%	2	11%	4	22%	0	0%
9	Guntur	10	2.66	4.0	0	0%	10	100%	0	0%	0	0%	0	0%	0	0%
10	Kakinada	4	2.13	15.43	0	0%	1	25%	0	0%	3	75%	0	0%	0	0%
11	Konaseema	5	8.46	30.28	0	0%	0	0%	2	40%	1	20%	2	40%	0	0%
12	Krishna	43	2.56	25.84	0	0%	3	7%	19	44%	17	40%	4	9%	0	0%
13	Kurnool	7	2.93	13.36	0	0%	5	71%	1	14%	1	14%	0	0%	0	0%
14	Nandyal	5	5.28	59.36	0	0%	0	0%	2	40%	0	0%	0	0%	3	60%
15	NTR	9	2.83	23.92	0	0%	4	44%	3	33%	1	11%	1	11%	0	0%
16	Palnadu	21	1.19	53.61	2	10%	12	57%	4	19%	1	5%	1	5%	1	5%
17	Parvathipuram Manyam	5	4.12	15.8	0	0%	2	40%	2	40%	1	20%	0	0%	0	0%
18	Prakasam	66	3.26	64.25	0	0%	3	5%	24	36%	23	35%	13	20%	3	5%
19	Sri Potti Sriramulu Nellore	26	1.12	21.11	8	31%	5	19%	9	35%	3	12%	1	4%	0	0%
20	Sri Sathya Sai	48	2.08	22.34	0	0%	6	13%	17	35%	24	50%	1	2%	0	0%
21	Srikakulam	48	2.1	68	0	0%	6	13%	25	52%	12	25%	1	2%	4	8%
22	Tirupati	10	2.54	17.5	0	0%	3	30%	5	50%	2	20%	0	0%	0	0%
23	Visakapatnam	3	8	23.4	0	0%	0	0%	1	33%	1	33%	1	33%	0	0%
24	Vizianagaram	10	1.3	9.3	2	20%	4	40%	4	40%	0	0%	0	0%	0	0%
25	West Godavari	9	6.73	25.8	0	0%	0	0%	2	22%	4	44%	3	33%	0	0%
26	Y.S.R Kadapa	35	1.01	23.68	2	6%	12	34%	11	31%	9	26%	1	3%	0	0%
	Total	528	0.76	68	19	4%	111	21%	188	36%	150	28%	38	7%	22	4%

Depth to water levels of confined/semiconfined aquifer in different depth ranges, Andhra Pradesh: January , 2024															Annexure- XII	
Sl. No	District	No of Wells Analysed	Depth to Water Table (m bgl)		No and Percentage of Wells Showing Depth to Water Table (m bgl) in Range of											
					0.0 - 2.0		2.0 - 5.0		5.0- 10.0		10.0 - 20.0		20.0 - 40.0		> 40.0	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Alluri Sitharama Raju	6	7.77	49.76	0	0%	0	0%	2	33%	3	50%	0	0%	1	17%
2	Anakapalli	3	1.7	3.82	1	33%	2	67%	0	0%	0	0%	0	0%	0	0%
3	Anantapur	29	2.43	19.85	0	0%	12	41%	9	31%	8	28%	0	0%	0	0%
4	Annamayya	37	2.94	83.2	0	0%	6	16%	10	27%	13	35%	3	8%	5	14%
5	Bapatla	11	1	10.07	2	18%	2	18%	6	55%	1	9%	0	0%	0	0%
6	Chittoor	50	0.9	50.05	3	6%	6	12%	16	32%	17	34%	4	8%	4	8%
7	East Godavari	2	8.19	8.82	0	0%	0	0%	2	100%	0	0%	0	0%	0	0%
8	Eluru	17	1.9	39.82	1	6%	1	6%	5	29%	3	18%	7	41%	0	0%
9	Guntur	15	2.55	15.02	0	0%	9	60%	4	27%	2	13%	0	0%	0	0%
10	Kakinada	4	2.1	14.98	0	0%	1	25%	0	0%	3	75%	0	0%	0	0%
11	Konaseema	5	9	28.44	0	0%	0	0%	3	60%	0	0%	2	40%	0	0%
12	Krishna	43	3.8	25.61	0	0%	2	5%	12	28%	23	53%	6	14%	0	0%
13	Kurnool	9	3.37	20.1	0	0%	5	56%	2	22%	1	11%	1	11%	0	0%
14	Nandyal	5	3.27	60.95	0	0%	2	40%	0	0%	0	0%	0	0%	3	60%
15	NTR	13	3.1	20.15	0	0%	5	38%	3	23%	4	31%	1	8%	0	0%
16	Palnadu	21	0.36	29.35	3	14%	12	57%	2	10%	2	10%	2	10%	0	0%
17	Parvathipuram Manyam	6	5.5	17.19	0	0%	0	0%	4	67%	2	33%	0	0%	0	0%
18	Prakasam	68	1.92	82.67	1	1%	8	12%	16	24%	17	25%	19	28%	7	10%
19	Sirkalulam	26	1.68	15.73	3	12%	10	38%	9	35%	4	15%	0	0%	0	0%
20	SPS Nellore	49	1.18	18.69	4	8%	11	22%	21	43%	13	27%	0	0%	0	0%
21	Sri Sathya Sai	47	1.58	100.01	1	2%	5	11%	21	45%	16	34%	2	4%	2	4%
22	Tirupati	9	2.03	16.46	0	0%	5	56%	3	33%	1	11%	0	0%	0	0%
23	Visakhapatnam	15	1.62	24.13	1	7%	4	27%	5	33%	4	27%	1	7%	0	0%
24	Vizianagaram	10	1.94	9.1	1	10%	3	30%	6	60%	0	0%	0	0%	0	0%
25	West Godavari	9	6.29	50.01	0	0%	0	0%	2	22%	4	44%	2	22%	1	11%
26	YSR Kadapa	37	1.9	55.24	1	3%	5	14%	13	35%	13	35%	4	11%	1	3%
	Total	546	0.36	100.01	22	4%	116	21%	176	32%	154	28%	54	10%	24	4%

District wise fluctuation and frequency distribution from different ranges from May, 2023 to August, 2023																				Annexure-XIII				
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation														Total No. of Wells			
			Rise		Fall		Rise						Fall											
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4							
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%
1	Alluri Sita Rama Raju	39	0	12.76	-	-	24	62%	7	18%	8	21%	0	0%	0	0%	0	0%	39	0	100%	0%		
2	Anakapalli	16	0	1.5	1.43	1.6	14	100%	0	0%	0	0%	2	100%	0	0%	0	0%	14	2	88%	13%		
3	Anantapur	36	0	14.62	1.06	10.72	5	56%	2	22%	2	22%	10	37%	8	30%	9	33%	9	27	25%	75%		
4	Annamayya	56	0.24	13.66	1.15	17.16	6	60%	0	0%	4	40%	16	35%	14	30%	16	35%	10	46	18%	82%		
5	Bapatla	23	0	3.99	1.14	4.65	13	76%	4	24%	0	0%	4	67%	0	0%	2	33%	17	6	74%	26%		
6	Chittoor	56	0	51.16	1.06	8.92	10	53%	5	26%	4	21%	19	51%	13	35%	5	14%	19	37	34%	66%		
7	East Godavari	21	0	2.83	-	-	15	71%	6	29%	0	0%	0	0%	0	0%	0	0%	21	0	100%	0%		
8	Eluru	43	0	29.35	3.16	19.14	22	56%	9	23%	8	21%	0	0%	1	25%	3	75%	39	4	91%	9%		
9	Guntur	32	0.05	9.16	-	-	24	75%	5	16%	3	9%	0	0%	0	0%	0	0%	32	0	100%	0%		
10	Kakinada	12	0	6.04	1.1	1.54	9	90%	0	0%	1	10%	2	100%	0	0%	0	0%	10	2	83%	17%		
11	Konaseema	30	0.05	8.25	1.42	5	23	85%	2	7%	2	7%	2	67%	0	0%	1	33%	27	3	90%	10%		
12	Krishna	48	0.04	11.77	1.27	3.66	33	83%	4	10%	3	8%	4	50%	4	50%	0	0%	40	8	83%	17%		
13	Kurnool	15	0.06	3.79	1.09	2.93	7	88%	1	13%	0	0%	6	86%	1	14%	0	0%	8	7	53%	47%		
14	Nandyal	23	0.1	50.54	1.11	10.47	9	69%	0	0%	4	31%	4	40%	2	20%	4	40%	13	10	57%	43%		
15	NTR	26	0.14	17.47	1.56	1.56	15	60%	5	20%	5	20%	1	100%	0	0%	0	0%	25	1	96%	4%		
16	Palnadu	46	0	20.55	1.06	8.11	17	77%	1	5%	4	18%	7	29%	13	54%	4	17%	22	24	48%	52%		
17	Parvathipuram Manyam	24	0.87	17.56	2.09	2.09	9	39%	5	22%	9	39%	0	0%	1	100%	0	0%	23	1	96%	4%		
18	Prakasam	81	0	12.4	1.08	12.47	21	62%	4	12%	9	26%	20	43%	15	32%	12	26%	34	47	42%	58%		
19	SPS Nellore	68	0	9.24	1.31	3.07	32	48%	23	35%	11	17%	1	50%	1	50%	0	0%	66	2	97%	3%		
20	Sri Sathya Sai	75	0.01	6.06	1.06	15.89	8	80%	1	10%	1	10%	42	65%	17	26%	6	9%	10	65	13%	87%		
21	Srikakulam	56	0	5.09	1.06	14.05	11	69%	3	19%	2	13%	16	40%	12	30%	12	30%	16	40	29%	71%		
22	Tirupati	19	0	0.61	1.06	5.24	6	100%	0	0%	0	0%	8	62%	3	23%	2	15%	6	13	32%	68%		
23	Visakhapatnam	18	0	5.05	4.2	4.2	12	71%	4	24%	1	6%	0	0%	0	0%	1	100%	17	1	94%	6%		
24	Vizianagaram	39	0.31	4.4	-	-	26	67%	11	28%	2	5%	0	0%	0	0%	0	0%	39	0	100%	0%		
25	West Godavari	24	0.04	14.18	1.3	4.81	16	84%	2	11%	1	5%	3	60%	0	0%	2	40%	19	5	79%	21%		
26	Y.S.R Kadapa	46	0	14.14	1.14	11.81	16	70%	3	13%	4	17%	9	39%	9	39%	5	22%	23	23	50%	50%		
	Total State	972	0.00	51.16	1.06	19.14	403	67%	107	18%	88	15%	176	47%	114	30%	84	22%	598	374	62%	38%		

District wise fluctuation and frequency distribution from different ranges from May, 2023 to November, 2023																			Annexure-XIV					
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation														Total No. of Wells			
			Rise		Fall		Rise						Fall											
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4							
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%
1	Alluri Sita Rama Raju	45	0.12	11.86	0.04	4.39	17	71%	4	17%	3	13%	19	90%	1	5%	1	5%	24	21	53%	47%		
2	Anakapalli	27	0.11	2.25	0.1	2.88	9	90%	1	10%	0	0%	16	94%	1	6%	0	0%	10	17	37%	63%		
3	Anantapur	58	1.89	15.16	0.02	10.96	1	13%	5	63%	2	25%	31	62%	10	20%	9	18%	8	50	14%	86%		
4	Annamayya	69	0.02	25.72	0.06	40.25	7	29%	8	33%	9	38%	16	36%	10	22%	19	42%	24	45	35%	65%		
5	Bapatla	35	0.15	15.23	0.01	12.35	13	65%	4	20%	3	15%	12	80%	1	7%	2	13%	20	15	57%	43%		
6	Chittoor	69	0.12	9.49	0.05	40.05	20	61%	7	21%	6	18%	18	50%	11	31%	7	19%	33	36	48%	52%		
7	East Godavari	23	0.04	3.03	0.14	1.43	14	93%	1	7%	0	0%	8	100%	0	0%	0	0%	15	8	65%	35%		
8	Eluru	48	0.09	17.8	0.27	7.26	10	40%	3	12%	12	48%	19	83%	3	13%	1	4%	25	23	52%	48%		
9	Guntur	33	0.14	9.5	0.13	0.99	17	71%	4	17%	3	13%	9	100%	0	0%	0	0%	24	9	73%	27%		
10	Kakinada	28	0.22	6.61	0.17	9.83	1	33%	0	0%	2	67%	21	84%	2	8%	2	8%	3	25	11%	89%		
11	Konaseema	36	0	4.15	0.13	9.28	11	85%	1	8%	1	8%	22	96%	0	0%	1	4%	13	23	36%	64%		
12	Krishna	61	0.02	13.36	0.09	7.64	21	62%	4	12%	9	26%	25	93%	1	4%	1	4%	34	27	56%	44%		
13	Kurnool	26	0.21	1.35	0.04	5.57	2	100%	0	0%	0	0%	19	79%	4	17%	1	4%	2	24	8%	92%		
14	Nandyal	25	0.2	5.11	0.02	25.01	7	64%	3	27%	1	9%	8	57%	2	14%	4	29%	11	14	44%	56%		
15	NTR	26	0.04	7.04	0.08	2.28	15	88%	1	6%	1	6%	8	89%	1	11%	0	0%	17	9	65%	35%		
16	Palnadu	70	0.05	15.55	0.14	17.63	19	73%	2	8%	5	19%	32	73%	7	16%	5	11%	26	44	37%	63%		
17	Parvathipuram Manyam	26	0.33	5.56	0.04	0.72	8	40%	7	35%	5	25%	6	100%	0	0%	0	0%	20	6	77%	23%		
18	Prakasam	105	0.32	13.24	0.05	20.46	7	58%	3	25%	2	17%	44	47%	21	23%	28	30%	12	93	11%	89%		
19	SPS Nellore	93	0.06	6.97	0.11	9.48	5	50%	2	20%	3	30%	23	28%	38	46%	22	27%	10	83	11%	89%		
20	Sri Sathya Sai	81	0.12	10.11	0.07	38.57	11	73%	1	7%	3	20%	33	50%	17	26%	16	24%	15	66	19%	81%		
21	Srikakulam	72	0.06	8.46	0.03	4.02	26	59%	11	25%	7	16%	26	93%	1	4%	1	4%	44	28	61%	39%		
22	Tirupati	39	0.18	7.35	0.33	5.8	6	60%	3	30%	1	10%	19	66%	7	24%	3	10%	10	29	26%	74%		
23	Visakhapatnam	14	0.1	1.4	0.2	1.45	7	100%	0	0%	0	0%	7	100%	0	0%	0	0%	7	7	50%	50%		
24	Vizianagaram	40	0.1	3.5	0.07	1.85	25	93%	2	7%	0	0%	13	100%	0	0%	0	0%	27	13	68%	33%		
25	West Godavari	32	0	24.63	0.22	30.02	9	75%	1	8%	2	17%	16	80%	1	5%	3	15%	12	20	38%	63%		
26	Y.S.R Kadapa	58	0.04	24.74	0.13	6.96	10	43%	4	17%	9	39%	21	60%	7	20%	7	20%	23	35	40%	60%		
	Total State	1239	0.00	25.72	0.01	40.25	298	64%	82	17%	89	19%	491	64%	146	19%	133	17%	469	770	38%	62%		

District wise fluctuation and frequency distribution from different ranges from May, 2023 to January, 2024																				Annexure-XV			
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation																
			Rise		Fall		Rise						Fall						Total No. of Wells				
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4						
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%	
1	Alluri Sitharama Raju	38	0.07	5.69	-34.9	-0.12	17	85%	2	10%	1	5%	16	89%	1	6%	1	6%	20	18	53%	47%	
2	Anakapalli	26	0.13	2.33	-1.58	-0.02	12	92%	1	8%	0	0%	13	100%	0	0%	0	0%	13	13	50%	50%	
3	Anantapur	58	0.25	2.05	-24.71	-0.1	2	67%	1	33%	0	0%	30	55%	14	25%	11	20%	3	55	5%	95%	
4	Annamayya	68	0.1	19.96	-41.81	-0.05	5	17%	14	47%	11	37%	23	61%	5	13%	10	26%	30	38	44%	56%	
5	Bapatla	33	0.16	6.88	-6.88	-0.06	10	67%	4	27%	1	7%	15	83%	1	6%	2	11%	15	18	45%	55%	
6	Chittoor	66	0.19	8.88	-37.83	-0.17	20	54%	10	27%	7	19%	14	48%	6	21%	9	31%	37	29	56%	44%	
7	East Godavari	20	0.11	3.43	-2.07	-0.05	8	89%	1	11%	0	0%	10	91%	1	9%	0	0%	9	11	45%	55%	
8	Eluru	48	0.19	28.81	-37.89	-0.22	12	55%	3	14%	7	32%	21	81%	1	4%	4	15%	22	26	46%	54%	
9	Guntur	34	0.32	9.48	-8.94	-0.05	14	78%	3	17%	1	6%	12	75%	3	19%	1	6%	18	16	53%	47%	
10	Kakinada	26	0.02	5.54	-6.59	-0.1	5	83%	0	0%	1	17%	16	80%	3	15%	1	5%	6	20	23%	77%	
11	Konaseema	35	0.01	4.98	-7.44	-0.05	12	80%	2	13%	1	7%	17	85%	2	10%	1	5%	15	20	43%	57%	
12	Krishna	66	0.03	12.87	-10.82	-0.03	17	61%	1	4%	10	36%	32	84%	2	5%	4	11%	28	38	42%	58%	
13	Kurnool	28	0.34	0.36	-14.85	-0.19	2	100%	0	0%	0	0%	18	69%	5	19%	3	12%	2	26	7%	93%	
14	Nandyal	25	0.12	2.59	-26.39	-0.01	9	75%	3	25%	0	0%	8	62%	1	8%	4	31%	12	13	48%	52%	
15	NTR	28	0.1	7.48	-4.02	-0.15	17	85%	0	0%	3	15%	6	75%	1	13%	1	13%	20	8	71%	29%	
16	Palnadu	70	0.05	17.59	-24.75	-0.08	24	80%	3	10%	3	10%	27	68%	5	13%	8	20%	30	40	43%	57%	
17	Parvathipuram Manyam	27	0.08	4.89	-2.08	-0.1	6	40%	6	40%	3	20%	11	92%	1	8%	0	0%	15	12	56%	44%	
18	Prakasam	102	0.09	4.99	-77.93	-0.08	15	68%	4	18%	3	14%	30	38%	17	21%	33	41%	22	80	22%	78%	
19	Sirkalulam	73	0.06	12.9	-3.23	-0.02	22	61%	9	25%	5	14%	34	92%	3	8%	0	0%	36	37	49%	51%	
20	SPS Nellore	94	0.01	8.19	-7.24	-0.01	26	65%	9	23%	5	13%	32	59%	18	33%	4	7%	40	54	43%	57%	
21	Sri Sathya Sai	80	0.05	6.15	-64.54	-0.05	10	77%	0	0%	3	23%	30	45%	15	22%	22	33%	13	67	16%	84%	
22	Tirupati	39	0.03	7.33	-4.15	-0.08	16	67%	3	13%	5	21%	14	93%	0	0%	1	7%	24	15	62%	38%	
23	Visakhapatnam	17	0.03	2.18	-2.18	-0.07	6	75%	2	25%	0	0%	8	89%	1	11%	0	0%	8	9	47%	53%	
24	Vizianagaram	38	0.02	2.19	-1.81	-0.01	18	90%	2	10%	0	0%	18	100%	0	0%	0	0%	20	18	53%	47%	
25	West Godavari	32	0.09	9.31	-29.42	-0.01	12	86%	1	7%	1	7%	15	83%	0	0%	3	17%	14	18	44%	56%	
26	YSR Kadapa	60	0.05	14.02	-11.83	-0.02	9	56%	2	13%	5	31%	26	59%	11	25%	7	16%	16	44	27%	73%	
	Total	1231	0.01	28.81	-77.93	-0.01	326	67%	86	18%	76	16%	496	67%	117	16%	130	17%	488	743	40%	60%	

DISTRICT WISE FLUCTUATION AND FREQUENCY DISTRIBUTION FROM DIFFERENT RANGES FROM ONE PERIOD TO OTHER Annexure: XVI																						
MAY, 2022 TO MAY, 2023																						
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation															
			Rise		Fall		Rise						Fall						Total No. of Wells			
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4					
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise %	Fall %
1	Alluri Sita Rama Raju	42	0.04	12.37	0.29	9.21	27	77%	5	14%	3	9%	4	57%	2	29%	1	14%	35	7	83%	17%
2	Anakapalli	24	0.17	2.1	0.13	2.21	6	75%	2	25%	0	0%	14	88%	2	13%	0	0%	8	16	33%	67%
3	Ananthapuramu	23	0.37	13.42	0.02	6.79	7	54%	0	0%	6	46%	9	90%	0	0%	1	10%	13	10	57%	43%
4	Annamayya	34	0.1	2.46	0.11	12.3	3	75%	1	25%	0	0%	19	63%	6	20%	5	17%	4	30	12%	88%
5	Bapatla	28	0.07	3.95	0.01	7.48	10	83%	2	17%	0	0%	11	69%	2	13%	3	19%	12	16	43%	57%
6	Chittoor	40	0.05	6.41	0.04	28.9	9	75%	2	17%	1	8%	14	50%	6	21%	8	29%	12	28	30%	70%
7	East Godavari	22	0.05	2.02	0.07	0.45	16	0.94	1	0.05%	0	0	5	100	0	0%	0	0%	17	5	77%	23%
8	Eluru	38	0.02	7.6	0.01	28.8	18	86%	0	0%	3	14%	9	53%	1	6%	7	41%	21	17	55%	45%
9	Guntur	17	0.31	1.01	0.01	0.9	12	100	0	0%	0	0%	5	100	0	0%	0	0%	12	5	71%	29%
10	Kakinada	24	0.03	2.63	0.41	7.4	16	84%	3	16%	0	0%	3	60%	0	0%	2	40%	19	5	79%	21%
11	Konaseema	32	0.02	8.55	0.06	26.9	19	90%	1	5%	1	5%	9	82%	0	0%	2	18%	21	11	66%	34%
12	Krishna	41	0.03	10.68	0.09	10.4	23	85%	2	7%	2	7%	7	50%	4	29%	3	21%	27	14	66%	34%
13	Kurnool	24	0.15	4.39	0.03	5.56	13	81%	2	13%	1	6%	6	75%	0	0%	2	25%	16	8	67%	33%
14	Nandyal	22	0.41	7.68	0.03	12.9	8	62%	2	15%	3	23%	7	78%	1	11%	1	11%	13	9	59%	41%
15	NTR	14	0.25	4.27	0.12	0.73	8	73%	2	18%	1	9%	3	100	0	0%	0	0%	11	3	79%	21%
16	Palnadu	51	0.01	3.76	0.05	5.31	29	85%	5	15%	0	0%	10	59%	5	29%	2	12%	34	17	67%	33%
17	Parvathipuram	18	0.04	2.68	0.02	3.98	6	86%	1	14%	0	0%	10	91%	1	9%	0	0%	7	11	39%	61%
18	Prakasam	81	0.06	21.4	0.01	15.0	28	61%	7	15%	11	24%	22	63%	6	17%	7	20%	46	35	57%	43%
19	Sri Potti Sriramulu	39	0.03	1.27	0.23	11.1	11	100	0	0%	0	0%	14	50%	9	32%	5	18%	11	28	28%	72%
20	Sri Sathya Sai	47	0.1	37.8	0.04	25.3	12	46%	4	15%	10	38%	14	67%	4	19%	3	14%	26	21	55%	45%
21	Srikakulam	40	0.07	36.02	0.21	2.57	20	80%	4	16%	1	4%	13	87%	2	13%	0	0%	25	15	63%	38%
22	Tirupati	27	0.2	4.18	0.02	4.41	9	69%	3	23%	1	8%	11	79%	1	7%	2	14%	13	14	48%	52%
23	Visakhapatnam	15	0.3	5.95	0.54	6.05	5	71%	1	14%	1	14%	4	50%	2	25%	2	25%	7	8	47%	53%
24	Vizianagaram	40	0.37	5.87	0.02	3.28	12	67%	5	28%	1	6%	17	77%	5	23%	0	0%	18	22	45%	55%
25	West Godavari	22	0.01	5.2	0.1	30.3	11	85%	1	8%	1	8%	5	56%	1	11%	3	33%	13	9	59%	41%
26	Y.S.R Kadapa	31	0.01	1.46	0.02	15.8	10	100	0	0%	0	0%	14	67%	2	10%	5	24%	10	21	32%	68%
	Total	836	0.01	37.8	0.01	30.3	348	77%	56	12%	47	10%	259	67%	62	16%	64	17%	451	385	54%	46%

District wise fluctuation and frequency distribution from different ranges from August, 2022 to August, 2023																				Annexure-XVII				
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation														Total No. of Wells			
			Rise		Fall		Rise						Fall											
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4							
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%
1	Alluri sita Rama Raju	40	0.07	7.09	0.12	3.54	24	96%	0	0%	1	4%	12	80%	3	20%	0	0%	25	15	63%	38%		
2	Anakapalli	21	0.02	0.79	0.11	3.24	8	100%	0	0%	0	0%	9	69%	4	31%	0	0%	8	13	38%	62%		
3	Anantapur	26	0.28	9.18	0.37	4.48	2	40%	0	0%	3	60%	10	48%	8	38%	3	14%	5	21	19%	81%		
4	Annamayya	30	0.53	0.53	0.59	43.99	1	100%	0	0%	0	0%	6	21%	6	21%	17	59%	1	29	3%	97%		
5	Bapatla	25	0.28	7.09	0.05	7.32	4	80%	0	0%	1	20%	17	85%	1	5%	2	10%	5	20	20%	80%		
6	Chittoor	39	0.01	2.9	0.56	24.25	3	75%	1	25%	0	0%	15	43%	13	37%	7	20%	4	35	10%	90%		
7	East Godavari	21	0.2	0.46	0.02	2.57	5	100%	0	0%	0	0%	15	94%	1	6%	0	0%	5	16	24%	76%		
8	Eluru	30	0.04	5.01	0.03	17.8	11	73%	2	13%	2	13%	11	73%	2	13%	2	13%	15	15	50%	50%		
9	Guntur	21	0.01	3.15	0.01	1.82	11	92%	1	8%	0	0%	9	100%	0	0%	0	0%	12	9	57%	43%		
10	Kakinada	25	0.01	1.38	0.02	1.87	4	100%	0	0%	0	0%	21	100%	0	0%	0	0%	4	21	16%	84%		
11	Konaseema	28	0.01	8.26	0.07	8.23	6	86%	0	0%	1	14%	18	86%	2	10%	1	5%	7	21	25%	75%		
12	Krishna	30	0.03	21.18	0.18	22.83	15	79%	1	5%	3	16%	9	82%	1	9%	1	9%	19	11	63%	37%		
13	Kurnool	21	0.01	3.99	0.11	5.55	5	83%	1	17%	0	0%	11	73%	3	20%	1	7%	6	15	29%	71%		
14	Nandyal	22	0.06	42.54	0.03	41.04	4	67%	0	0%	2	33%	8	50%	2	13%	6	38%	6	16	27%	73%		
15	NTR	20	0.01	0.23	0.03	4.82	2	100%	0	0%	0	0%	16	89%	1	6%	1	6%	2	18	10%	90%		
16	Palnadu	45	0.07	2.37	0.06	7.63	4	80%	1	20%	0	0%	28	70%	5	13%	7	18%	5	40	11%	89%		
17	Parvathipuram Manyam	20	0.02	18.63	0.15	20.34	5	45%	4	36%	2	18%	6	67%	2	22%	1	11%	11	9	55%	45%		
18	Prakasam	75	0.12	24.02	0.05	44.38	15	43%	12	34%	8	23%	22	55%	10	25%	8	20%	35	40	47%	53%		
19	SPS Nellore	42	0.03	5.28	0.01	6.58	21	84%	3	12%	1	4%	14	82%	2	12%	1	6%	25	17	60%	40%		
20	Sri Sathya Sai	45	0.06	3.29	0.16	9.5	5	83%	1	17%	0	0%	27	69%	8	21%	4	10%	6	39	13%	87%		
21	Srikakulam	42	0.7	4.31	0.21	44.5	1	33%	1	33%	1	33%	14	36%	8	21%	17	44%	3	39	7%	93%		
22	Tirupati	34	0.06	2.16	0.1	5.36	11	92%	1	8%	0	0%	17	77%	3	14%	2	9%	12	22	35%	65%		
23	Visakhapatnam	17	0.09	5.83	0.02	1.82	7	78%	1	11%	1	11%	8	100%	0	0%	0	0%	9	8	53%	47%		
24	Vizianagaram	17	0.19	3.02	0.02	1.18	11	92%	1	8%	0	0%	5	100%	0	0%	0	0%	12	5	71%	29%		
25	West Godavari	22	0.02	26.37	0.01	16.5	6	75%	0	0%	2	25%	12	86%	1	7%	1	7%	8	14	36%	64%		
26	Y.S.R Kadapa	47	0.02	4.65	0.09	11.26	5	56%	3	33%	1	11%	18	47%	11	29%	9	24%	9	38	19%	81%		
	Total	805	0.01	42.54	0.01	44.5	196	76%	34	13%	29	11%	358	65%	97	18%	91	17%	259	546	32%	68%		

District wise fluctuation and frequency distribution from different ranges from November, 2022 to November, 2023																					Annexure-XVIII	
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation															
			Rise		Fall		Rise						Fall						Total No. of Wells			
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4					
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%
1	Alluri sita Rama Raju	40	0.02	2.59	0.43	6.13	4	80%	1	20%	0	0%	26	74%	7	20%	2	6%	5	35	13%	88%
2	Anakapalli	24	–	–	0.7	6.33	0	–	0	–	0	–	12	50%	9	38%	3	13%	0	24	0%	100%
3	Anantapur	46	0.088	1.61	0.67	15.17	2	100%	0	0%	0	0%	11	25%	14	32%	19	43%	2	44	4%	96%
4	Annamayya	47	0.05	19.41	0.1	41.52	6	75%	0	0%	2	25%	13	33%	11	28%	15	38%	8	39	17%	83%
5	Bapatla	32	0	2.32	0.11	12.71	7	88%	1	13%	0	0%	17	71%	4	17%	3	13%	8	24	25%	75%
6	Chittoor	56	0.1	3.27	0.39	44.89	6	86%	1	14%	0	0%	17	35%	20	41%	12	24%	7	49	13%	88%
7	East Godavari	22	0.08	0.08	0.46	3.78	1	100%	0	0%	0	0%	18	86%	3	14%	0	0%	1	21	5%	95%
8	Eluru	33	2.57	31.71	0.46	6.6	0	0%	1	17%	5	83%	14	52%	11	41%	2	7%	6	27	18%	82%
9	Guntur	22	0.15	9.35	0.02	2.19	4	80%	0	0%	1	20%	15	88%	2	12%	0	0%	5	17	23%	77%
10	Kakinada	24	3.42	3.42	0.48	5.77	0	0%	1	100%	0	0%	12	52%	8	35%	3	13%	1	23	4%	96%
11	Konaseema	33	0.04	2.9	0.34	13.58	1	50%	1	50%	0	0%	19	61%	9	29%	3	10%	2	31	6%	94%
12	Krishna	53	0	13.14	0.22	18.34	5	29%	4	24%	8	47%	22	61%	9	25%	5	14%	17	36	32%	68%
13	Kurnool	23	–	–	0.76	6.87	0	–	0	–	0	–	9	39%	9	39%	5	22%	0	23	0%	100%
14	Nandyal	20	0.46	0.46	0.29	33.76	1	100%	0	0%	0	0%	10	53%	2	11%	7	37%	1	19	5%	95%
15	NTR	17	–	–	0.5	5.16	0	–	0	–	0	–	8	47%	5	29%	4	24%	0	17	0%	100%
16	Palnadu	45	0.02	2.05	0.05	10.56	3	75%	1	25%	0	0%	22	54%	14	34%	5	12%	4	41	9%	91%
17	Parvathipuram Manyam	21	–	–	0.25	4.72	0	–	0	–	0	–	13	62%	6	29%	2	10%	0	21	0%	100%
18	Prakasam	69	0.12	5.93	0.77	20.72	7	78%	1	11%	1	11%	17	28%	18	30%	25	42%	9	60	13%	87%
19	SPS Nellore	42	0.05	4.09	0.34	13.77	1	50%	0	0%	1	50%	9	23%	17	43%	14	35%	2	40	5%	95%
20	Sri Sathya Sai	73	1.24	1.24	0.16	46.18	1	100%	0	0%	0	0%	16	22%	19	26%	37	51%	1	72	1%	99%
21	Srikakulam	36	0.1	0.1	0.57	5.06	1	100%	0	0%	0	0%	22	63%	12	34%	1	3%	1	35	3%	97%
22	Tirupati	34	4.7	4.7	0.43	5.27	0	0%	0	0%	1	100%	15	45%	13	39%	5	15%	1	33	3%	97%
23	Visakhapatnam	13	0.1	0.1	1.05	16.1	1	100%	0	0%	0	0%	4	33%	6	50%	2	17%	1	12	8%	92%
24	Vizianagaram	38	0.3	6.35	0.85	5.5	2	67%	0	0%	1	33%	15	43%	15	43%	5	14%	3	35	8%	92%
25	West Godavari	25	0.7	4.73	0.22	31.03	1	50%	0	0%	1	50%	17	74%	2	9%	4	17%	2	23	8%	92%
26	Y.S.R Kadapa	44	0.42	2.61	0.01	10.59	2	67%	1	33%	0	0%	22	54%	10	24%	9	22%	3	41	7%	93%
	Total	932	0	31.71	0.01	46.18	56	62%	13	14%	21	23%	395	47%	255	30%	192	23%	90	842	10%	90%

District wise fluctuation and frequency distribution from different ranges from January 2023 to Januray 2024																				Annexure-XIX			
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation																
			Rise		Fall		Rise						Fall						Total No. of Wells				
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4						
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	Rise	Fall	Rise%	Fall%	
1	Alluri sita Rama Raju	35	0.12	5.58	-37.02	-0.03	9	69%	3	23%	1	8%	19	86%	2	9%	1	5%	13	22	37%	63%	
2	Anakapalli	22			-3.52	-0.01	0	0%	0	0%	0	0%	17	77%	5	23%	0	0%	0	22	0%	100%	
3	Anantapur	53	0.1	0.1	-28.84	-0.36	1	100%	0	0%	0	0%	13	25%	18	35%	21	40%	1	52	2%	98%	
4	Annamayya	61	1.73	14.67	-77.05	-0.6	1	50%	0	0%	1	50%	11	19%	19	32%	29	49%	2	59	3%	97%	
5	Bapatla	31	0.03	3.38	-6.19	-0.1	2	40%	3	60%	0	0%	23	88%	2	8%	1	4%	5	26	16%	84%	
6	Chittoor	72	0.16	6.93	-46.44	-0.15	10	91%	0	0%	1	9%	20	33%	20	33%	21	34%	11	61	15%	85%	
7	East Godavari	20	0.2	1.63	-2.44	-0.17	3	100%	0	0%	0	0%	16	94%	1	6%	0	0%	3	17	15%	85%	
8	Eluru	33	0.13	16.77	-8.48	-0.1	7	78%	0	0%	2	22%	16	67%	4	17%	4	17%	9	24	27%	73%	
9	Guntur	32	0.19	9	-10.82	-0.01	3	50%	1	17%	2	33%	21	81%	3	12%	2	8%	6	26	19%	81%	
10	Kakinada	22	0.39	0.39	-10.09	-0.15	1	100%	0	0%	0	0%	18	86%	1	5%	2	10%	1	21	5%	95%	
11	Konaseema	33	0.15	4	-10.4	-0.14	4	80%	0	0%	1	20%	25	89%	2	7%	1	4%	5	28	15%	85%	
12	Krishna	65	0.05	38.44	-15.38	-0.04	13	42%	8	26%	10	32%	24	71%	5	15%	5	15%	31	34	48%	52%	
13	Kurnool	25			-5.72	-0.52	0	0%	0	0%	0	0%	12	48%	10	40%	3	12%	0	25	0%	100%	
14	Nandyal	22	0.33	0.85	-35.19	-0.63	5	100%	0	0%	0	0%	10	59%	0	0%	7	41%	5	17	23%	77%	
15	NTR	28	0.1	6.55	-3.63	-0.12	4	67%	0	0%	2	33%	16	73%	6	27%	0	0%	6	22	21%	79%	
16	Palnadu	58	0.04	4.28	-23.41	-0.06	7	88%	0	0%	1	13%	34	68%	7	14%	9	18%	8	50	14%	86%	
17	Parvathipuram Manyam	24	0.21	2.62	-4.13	-0.22	4	80%	1	20%	0	0%	13	68%	5	26%	1	5%	5	19	21%	79%	
18	Prakasam	98	0.07	6.18	-81.42	-0.04	5	71%	1	14%	1	14%	22	24%	13	14%	56	62%	7	91	7%	93%	
19	SPS Nellore	38	0.73	0.73	-4.87	-0.3	1	100%	0	0%	0	0%	25	68%	9	24%	3	8%	1	37	3%	97%	
20	Sri Sathya Sai	47	0.06	2.81	-16.08	-0.32	5	83%	1	17%	0	0%	20	49%	16	39%	5	12%	6	41	13%	87%	
21	Srikakulam	74	0.6	48.11	-63.31	-0.2	1	50%	0	0%	1	50%	22	31%	18	25%	32	44%	2	72	3%	97%	
22	Tirupati	36	0.19	3.37	-3.26	-0.08	5	83%	1	17%	0	0%	26	87%	4	13%	0	0%	6	30	17%	83%	
23	Visakhapatnam	17	1.93	1.93	-11.23	-0.22	1	100%	0	0%	0	0%	11	69%	3	19%	2	13%	1	16	6%	94%	
24	Vizianagaram	38	0.19	4.18	-3.95	-0.31	3	75%	0	0%	1	25%	19	56%	15	44%	0	0%	4	34	11%	89%	
25	West Godavari	27	0.23	8.81	-29.87	-0.12	1	50%	0	0%	1	50%	23	92%	0	0%	2	8%	2	25	7%	93%	
26	Y.S.R Kadapa	57	0.15	0.85	-32.34	-0.2	2	100%	0	0%	0	0%	19	35%	17	31%	19	35%	2	55	4%	96%	
	Total	1068	0.03	48.11	-81.42	-0.01	98	69%	19	13%	25	18%	495	53%	205	22%	226	24%	142	926	13%	87%	

District Wise Fluctuation And Frequency Distribution From Different Ranges, Andhra Pradesh Decadal Mean (May, 2013 To May, 2022) To May, 2023																					Annexure-XX	
	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation															
Sl. No							Rise		Fall		Rise				Fall				Total No. of Wells			
							0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4		Rise	Fall	Rise%	Fall%
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%				
1	Alluri Sita Rama Raju	38	0.06	6.54	0.26	2.10	26	87%	3	10%	1	3%	7	88%	1	13%	0	0%	30	8	79%	21%
2	Anakapalli	20	0.07	2.91	0.11	0.74	13	87%	2	13%	0	0%	5	100%	0	0%	0	0%	15	5	75%	25%
3	Ananthapuramu	13	0.26	9.80	0.11	2.85	3	27%	5	45%	3	27%	1	50%	1	50%	0	0%	11	2	85%	15%
4	Annamayya	36	0.57	20.94	0.20	3.47	18	58%	5	16%	8	26%	2	40%	3	60%	0	0%	31	5	86%	14%
5	Bapatla	30	0.01	2.19	0.04	0.23	25	96%	1	4%	0	0%	4	100%	0	0%	0	0%	26	4	87%	13%
6	Chittoor	27	0.65	5.27	0.06	0.06	19	73%	3	12%	4	15%	1	100%	0	0%	0	0%	26	1	96%	4%
7	East Godavari	21	0.04	2.44	0.14	1.05	17	94%	1	6%	0	0%	3	100%	0	0%	0	0%	18	3	86%	14%
8	Eluru	24	0.02	4.74	0.11	0.90	14	74%	3	16%	2	11%	5	100%	0	0%	0	0%	19	5	79%	21%
9	Guntur	29	0.03	3.33	0.04	1.73	20	87%	3	13%	0	0%	6	100%	0	0%	0	0%	23	6	79%	21%
10	Kakinada	27	0.02	3.92	0.07	5.99	22	96%	1	4%	0	0%	3	75%	0	0%	1	25%	23	4	85%	15%
11	Konaseema	31	0.08	1.40	0.01	0.24	27	100%	0	0%	0	0%	4	100%	0	0%	0	0%	27	4	87%	13%
12	Krishna	27	0.05	2.46	0.51	1.27	21	88%	3	13%	0	0%	3	100%	0	0%	0	0%	24	3	89%	11%
13	Kurnool	23	0.11	5.59	0.01	1.39	9	45%	4	20%	7	35%	3	100%	0	0%	0	0%	20	3	87%	13%
14	Nandyal	16	0.44	6.87	0.58	7.22	6	50%	3	25%	3	25%	3	75%	0	0%	1	25%	12	4	75%	25%
15	NTR	18	0.43	2.56	0.25	5.15	12	80%	3	20%	0	0%	2	67%	0	0%	1	33%	15	3	83%	17%
16	Palnadu	48	0.05	6.16	0.01	1.79	27	66%	11	27%	3	7%	7	100%	0	0%	0	0%	41	7	85%	15%
17	Parvathipuram Manyam	19	0.19	3.38	0.03	5.92	4	80%	1	20%	0	0%	10	71%	3	21%	1	7%	5	14	26%	74%
18	Prakasam	63	0.03	10.70	0.04	5.50	26	53%	15	31%	8	16%	11	79%	1	7%	2	14%	49	14	78%	22%
19	Sri Potti Sriramulu Nellore	37	0.06	5.76	0.03	5.07	16	59%	9	33%	2	7%	7	70%	2	20%	1	10%	27	10	73%	27%
20	Sri Sathya Sai	22	0.33	10.48	-	-	8	36%	8	36%	6	27%	0	0%	0	0%	0	0%	22	0	100%	0%
21	Srikakulam	34	0.05	4.07	0.17	4.76	13	76%	3	18%	1	6%	16	94%	0	0%	1	6%	17	17	50%	50%
22	Tirupati	26	0.27	7.86	1.05	1.05	9	36%	13	52%	3	12%	1	100%	0	0%	0	0%	25	1	96%	4%
23	Visakhapatnam	17	1.40	3.92	0.11	3.34	1	33%	2	67%	0	0%	11	79%	3	21%	0	0%	3	14	18%	82%
24	Vizianagaram	31	0.38	1.95	0.02	2.55	21	100%	0	0%	0	0%	9	90%	1	10%	0	0%	21	10	68%	32%
25	West Godavari	23	0.13	1.06	0.01	0.01	22	100%	0	0%	0	0%	1	100%	0	0%	0	0%	22	1	96%	4%
26	Y.S.R Kadapa	24	0.09	4.30	0.16	2.83	7	47%	7	47%	1	7%	7	78%	2	22%	0	0%	15	9	63%	38%
	Total	724	0.03	17.74	-6.98	-0.07	406	72%	109	19%	52	9%	132	84%	17	11%	8	5%	567	157	78%	22%

District wise water level fluctuations and frequency in different fluctuation ranges from November, 2022 to November, 2023.																						Annexure-XXII
Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation															
			Rise		Fall		Rise						Fall						Total No. of Wells			
			Min	Max	Min	Max	0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4		Rise	Fall	Rise%	Fall%
							No	%	No	%	No	%	No	%	No	%	No	%				
1	Alluri Sita Rama Raju	40	0.02	2.59	0.43	6.13	4	80%	1	20%	0	0%	26	74%	7	20%	2	6%	5	35	13%	88%
2	Anakapalli	24	—	—	0.7	6.33	0	—	0	—	0	—	12	50%	9	38%	3	13%	0	24	0%	100%
3	Ananthapuramu	46	0.088	1.61	0.67	15.17	2	100%	0	0%	0	0%	11	25%	14	32%	19	43%	2	44	4%	96%
4	Annamayya	47	0.05	19.41	0.1	41.52	6	75%	0	0%	2	25%	13	33%	11	28%	15	38%	8	39	17%	83%
5	Bapatla	32	0	2.32	0.11	12.71	7	88%	1	13%	0	0%	17	71%	4	17%	3	13%	8	24	25%	75%
6	Chittoor	56	0.1	3.27	0.39	44.89	6	86%	1	14%	0	0%	17	35%	20	41%	12	24%	7	49	13%	88%
7	East Godavari	22	0.08	0.08	0.46	3.78	1	100%	0	0%	0	0%	18	86%	3	14%	0	0%	1	21	5%	95%
8	Eluru	33	2.57	31.71	0.46	6.6	0	0%	1	17%	5	83%	14	52%	11	41%	2	7%	6	27	18%	82%
9	Guntur	22	0.15	9.35	0.02	2.19	4	80%	0	0%	1	20%	15	88%	2	12%	0	0%	5	17	23%	77%
10	Kakinada	24	3.42	3.42	0.48	5.77	0	0%	1	100%	0	0%	12	52%	8	35%	3	13%	1	23	4%	96%
11	Konaseema	33	0.04	2.9	0.34	13.58	1	50%	1	50%	0	0%	19	61%	9	29%	3	10%	2	31	6%	94%
12	Krishna	53	0	13.14	0.22	18.34	5	29%	4	24%	8	47%	22	61%	9	25%	5	14%	17	36	32%	68%
13	Kurnool	23	—	—	0.76	6.87	0	—	0	—	0	—	9	39%	9	39%	5	22%	0	23	0%	100%
14	Nandyal	20	0.46	0.46	0.29	33.76	1	100%	0	0%	0	0%	10	53%	2	11%	7	37%	1	19	5%	95%
15	NTR	17	—	—	0.5	5.16	0	—	0	—	0	—	8	47%	5	29%	4	24%	0	17	0%	100%
16	Palnadu	45	0.02	2.05	0.05	10.56	3	75%	1	25%	0	0%	22	54%	14	34%	5	12%	4	41	9%	91%
17	Parvathipuram Manyam	21	—	—	0.25	4.72	0	—	0	—	0	—	13	62%	6	29%	2	10%	0	21	0%	100%
18	Prakasam	69	0.12	5.93	0.77	20.72	7	78%	1	11%	1	11%	17	28%	18	30%	25	42%	9	60	13%	87%
19	SPS Nellore	42	0.05	4.09	0.34	13.77	1	50%	0	0%	1	50%	9	23%	17	43%	14	35%	2	40	5%	95%
20	Sri Sathya Sai	73	1.24	1.24	0.16	46.18	1	100%	0	0%	0	0%	16	22%	19	26%	37	51%	1	72	1%	99%
21	Sirkalulam	36	0.1	0.1	0.57	5.06	1	100%	0	0%	0	0%	22	63%	12	34%	1	3%	1	35	3%	97%
22	Tirupati	34	4.7	4.7	0.43	5.27	0	0%	0	0%	1	100%	15	45%	13	39%	5	15%	1	33	3%	97%
23	Visakhapatnam	13	0.1	0.1	1.05	16.1	1	100%	0	0%	0	0%	4	33%	6	50%	2	17%	1	12	8%	92%
24	Vizianagaram	38	0.3	6.35	0.85	5.5	2	67%	0	0%	1	33%	15	43%	15	43%	5	14%	3	35	8%	92%
25	West Godavari	25	0.7	4.73	0.22	31.03	1	50%	0	0%	1	50%	17	74%	2	9%	4	17%	2	23	8%	92%
26	YSR Kadapa	44	0.42	2.61	0.01	10.59	2	67%	1	33%	0	0%	22	54%	10	24%	9	22%	3	41	7%	93%
	Total	932	0	31.71	0.01	46.18	56	62%	13	14%	21	23%	395	47%	255	30%	192	23%	90	842	10%	90%

District Wise Fluctuation And Frequency Distribution From Different Ranges, Andhra Pradesh Decadal Mean (January 2015 To January 2024) To January 2024 **Annexure-XXIII**

Sl. No	District	No of Wells Analysed	Range of Fluctuation (m)				No of Wells / Percentage Showing Fluctuation															
							Rise								Fall				Total No. of Wells			
			Rise		Fall		0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4		Rise	Fall	Rise%	Fall%
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%				
1	Alluri Sita Rama Raju	32	0.04	3.32	-19.42	-0.02	14	82%	3	18%	0	0%	7	47%	3	20%	5	33%	17	15	53%	47%
2	Anakapalli	20	0.13	3.59	-4.48	-0.24	15	94%	1	6%	0	0%	3	75%	0	0%	1	25%	16	4	80%	20%
3	Ananthapuramu	34	0.1	16.61	-10.12	-0.4	14	52%	9	33%	4	15%	3	43%	2	29%	2	29%	27	7	79%	21%
4	Annamayya	30	0.15	12.56	-26.25	-0.5	9	45%	6	30%	5	25%	5	50%	2	20%	3	30%	20	10	67%	33%
5	Bapatla	24	0.12	2.82	-7.8	-0.21	17	94%	1	6%	0	0%	3	50%	2	33%	1	17%	18	6	75%	25%
6	Chittoor	28	0.05	5.58	-20.96	-0.08	13	68%	3	16%	3	16%	4	44%	3	33%	2	22%	19	9	68%	32%
7	East Godavari	15	0.1	1.3	-3.64	-0.16	11	100%	0	0%	0	0%	2	50%	2	50%	0	0%	11	4	73%	27%
8	Eluru	27	0.01	15.99	-4.11	-0.09	15	79%	3	16%	1	5%	4	50%	3	38%	1	13%	19	8	70%	30%
9	Guntur	22	0.14	5.41	-4.5	-0.11	14	78%	2	11%	2	11%	3	75%	0	0%	1	25%	18	4	82%	18%
10	Kakinada	13	0.25	6.01	-36.35	-0.49	7	78%	0	0%	2	22%	2	50%	1	25%	1	25%	9	4	69%	31%
11	Konaseema	27	0.07	5.2	-4.2	-1.26	22	96%	0	0%	1	4%	1	25%	2	50%	1	25%	23	4	85%	15%
12	Krishna	38	0.02	3.34	-21.36	-0.34	13	81%	3	19%	0	0%	9	41%	2	9%	11	50%	16	22	42%	58%
13	Kurnool	22	0.17	3.1	-6.09	-0.31	11	92%	1	8%	0	0%	7	70%	1	10%	2	20%	12	10	55%	45%
14	Nandyal	22	0.03	27.08	-2.62	-0.09	8	53%	1	7%	6	40%	6	86%	1	14%	0	0%	15	7	68%	32%
15	NTR	13	0.2	1.52	-0.46	-0.07	11	100%	0	0%	0	0%	2	100%	0	0%	0	0%	11	2	85%	15%
16	Palnadu	51	0.02	11.71	-25.59	-0.09	26	76%	2	6%	6	18%	13	76%	2	12%	2	12%	34	17	67%	33%
17	Parvathipuram Manyam	25	0.11	2.92	-2.45	-0.29	16	84%	3	16%	0	0%	5	83%	1	17%	0	0%	19	6	76%	24%
18	Prakasam	34	0.21	18.89	-5.72	-0.15	10	38%	3	12%	13	50%	6	75%	1	13%	1	13%	26	8	76%	24%
19	Sri Potti Sriramulu Nellore	36	0.11	5.44	-5.51	-0.04	21	72%	7	24%	1	3%	6	86%	0	0%	1	14%	29	7	81%	19%
20	Sri Sathya Sai	36	0.04	8.54	-3.73	-0.05	21	88%	1	4%	2	8%	10	83%	2	17%	0	0%	24	12	67%	33%
21	Srikakulam	25	0.29	25.97	-24.06	-0.15	9	60%	4	27%	2	13%	5	50%	2	20%	3	30%	15	10	60%	40%
22	Tirupati	32	0.03	1.57	-8.47	-0.09	16	100%	0	0%	0	0%	9	56%	5	31%	2	13%	16	16	50%	50%
23	Visakhapatnam	13	0.48	3.58	-11.34	-3.55	9	90%	1	10%	0	0%	0	0%	2	67%	1	33%	10	3	77%	23%
24	Vizianagaram	31	0.09	2.85	-3.53	-0.01	21	88%	3	13%	0	0%	4	57%	3	43%	0	0%	24	7	77%	23%
25	West Godavari	22	0.06	26.59	-4.41	-0.03	16	94%	0	0%	1	6%	4	80%	0	0%	1	20%	17	5	77%	23%
26	Y.S.R Kadapa	45	0.28	20.26	-26.37	-0.89	19	61%	5	16%	7	23%	3	21%	5	36%	6	43%	31	14	69%	31%
	Total	717	0.01	27.08	-36.35	-0.01	378	76%	62	13%	56	11%	126	57%	47	21%	48	22%	496	221	69%	31%

CONSERVE WATER FOR THE FUTURE



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NH – IV, Faridabad

Haryana

Tel: 0129-2419105

Website: www.cgwb.gov.in

Email: rdsr-cgwb@nic.in



CONCLUSION

In the pre-monsoon season of 2023, approximately 85% of the state's area had a water table depth of less than 10 meters below ground level. However, by the post-monsoon season, this percentage decreased to 81%. Notably, in the pre-monsoon period, deeper water levels were recorded in areas such as Prakasam, Nandyal, Annamaya, Chittoor, Anantapur, Sri Satya Sai, and Eluru districts. Similarly, during the post-monsoon season, deeper water levels persisted in the Prakasam, Annamaya, Chittoor, and Nandyal districts.

The annual water level fluctuation during the pre-monsoon period showed a rise in water levels across 51% of the state's area. However, by the post-monsoon period, about 96% of the state experienced a decline in annual water level fluctuation. This can be attributed to significant fluctuations in the 2023 monsoon rainfall patterns across the state. The sharp decline in groundwater levels in Andhra Pradesh by November 2023 is linked to a notable -36% rainfall deficit compared to 2022. This substantial reduction in rainfall has severely impacted groundwater resources. While parts of coastal Andhra Pradesh received good rainfall in July 2023, the Rayalaseema region experienced relatively weaker rainfall.

In the decadal mean water level fluctuation, 90% of the state's area experienced a rise from 2012-2021 compared to May 2023. However, only 33% of the area showed a rise in the decadal mean water level from 2013-2022 relative to November 2023.

The pre-monsoon water level trend map indicates a decline in water levels, ranging from 0 to over 2 meters per year, across 42% of the area, while 50% of the state shows an increase in water levels within the same range. Specifically, in May, 357 locations recorded a decreasing trend, whereas 370 locations observed a rising trend. In the post-monsoon map, 41% of the area showed a decline in water levels ranging from 0 to over 2 meters per year, while 56% of the state experienced an increase in water levels, with some areas recording an increase of up to 4 meters per year. During this period, 341 locations reported a downward trend, while 408 locations exhibited a rise in water levels.

A total of 15 hydrographs were generated, one for each district. Among these, 5 wells show an upward trend in groundwater levels during both the pre-monsoon and post-monsoon seasons, while 8 wells exhibit a consistent decline in both periods. The remaining wells display a mixed trend, with water level fluctuations varying between the seasons.