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NOTIFICATION

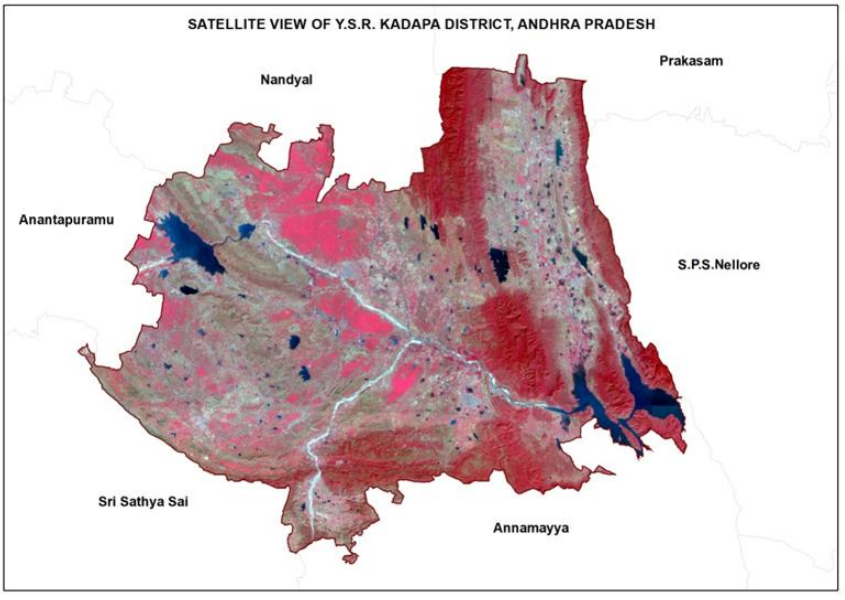
DISTRICT SURVEY REPORT

FOR

SAND AND OTHER MINOR MINERALS

YSR KADAPA DISTRICT

(FOR THE DEPARTMENT OF MINES AND GEOLOGY, GOVT. OF AP)



DISTRICT SURVEY REPORT
FOR
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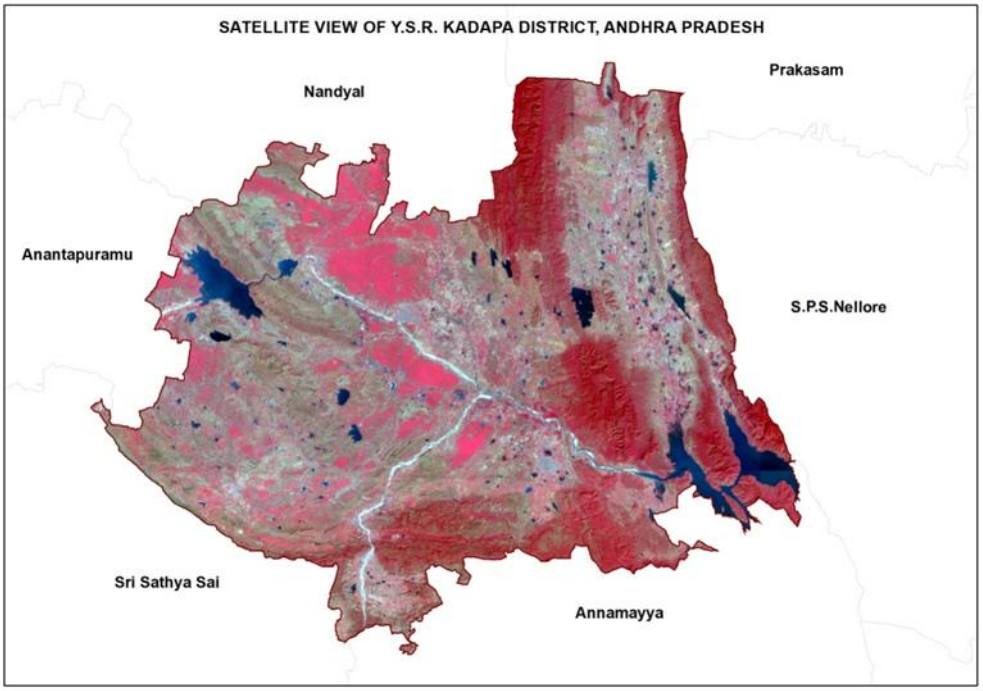
(FOR THE DEPARTMENT OF MINES AND GEOLOGY, GOVT. OF AP)

As per Notification No. S.O. 141 (E), 15.01.2016, S.O. 3611(E), 25.07.2018, & Enforcement & Monitoring Guidelines for Sand Mining 2020 of MOEF&CC, GoI



Prepared by

ANDHRA PRADESH SPACE APPLICATIONS CENTRE (APSAC)
ITE &C Department, Govt. of Andhra Pradesh

Submitted to

DEPARTMENT OF MINES AND GEOLOGY
Government of Andhra Pradesh

December 2023

Andhra Pradesh Space Applications Centre
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12	Affiliation of authors	Andhra Pradesh Space Applications Centre, ITE and C Department, Govt. of Andhra Pradesh		
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Report Scrutiny Mechanism

S. No.	Name of the Chapter	Maps Prepared/ Data Generated by (Senior Project Associate/Project Associate)	Draft Report Prepared by	Quality Checked by
1	Chapter-I	Sri. D.Krishna Smt.N.Vijayasanthi Smt. M.Vanajakshi Sri. N.Venkaiah Smt. D. Jnaneswari Sri.R.Kanaka Durgaiah, Smt. V.Sujatha Sri. G.Suresh Babu Sri. B. Ramanarasimha Rao Smt.B. Sunanda	Sri KLK Reddy Smt. N.Prathyusha Sri.Ch. Tata Babu Sri. Sudheer Kumar Tiwari, Sri. N.Venkaiah Sri.R.Sriramamurty Smt.B. Sunanda Sri. G.Suresh Babu	Sri. G. Prasada Rao, Scientist-SF Dr.M.V.R.Murthy, Scientist-SF Sri. S. Chandra Sekhar, Scientist-SC Sri.Ch.Tata Babu, Scientist-SC Sri R. Kannan, Scientist-SC Sri. Sudheer Kumar Tiwari, Scientist-SC
2				
3				
4				
5				
6	Chapter-II & Chapter-III	Sri. P Raja Babu, Joint Director, DMG Dr.M.J.Ratnakanth Babu, Royalty Inspector, DMG		
7	Report compiled by	Dr.T.Vani, Scientist-SC Smt. D.Radha, Project Associate		
8	Technical Support	Sri. M.N.Naik, Sri.A.Pavan Kumar		

PREFACE

The Natural resource inventory is the assessment of the status of a given natural resource of an area at a given point in time. Population pressure results in over- exploitation of resources. The baseline information on the resources would help the administration for better planning and decision making. The main purpose of the report is to disseminate data on the natural resource up to the lowest administrative functionary to facilitate micro level planning and development. The efforts have been made to assess and document the information on land use land cover, crop, surface water resource, soils, slope, groundwater prospects, groundwater quality, geological information, and minerals resources in YSR Kadapa District, Andhra Pradesh, based on the satellite remote sensing data and socioeconomic information.

The Department of Mines and Geology (DMG), Government of Andhra Pradesh (AP) requested the Andhra Pradesh Space Applications Center (APSAC) to update the district survey reports with availability of sand mineral information, major and minor mineral details, and river morphology for all the districts in the State. The District Survey report emphasizes and updated the major and minor minerals in the districts of AP. The District Survey reports are updated following the "Sustainable Sand Mining guidelines" issued in 2016 and 2020 and SO 741 of 2016 of the Ministry of Environment, Forests and Climate Change provided by the DMG. The comments received from the public, if found fit, shall be incorporated in the report. A list of leases in the district will be provided by the concerned Assistant Directors of Mines and Geology.

The report is an outcome of the efforts of the Scientists and Project Associates at APSAC. I heartily congratulate the team for compiling the report.

(Dr.Sundar Balakrishna, IFS)
Vice-Chairman
APSAC

ACKNOWLEDGEMENTS

Our sincere gratitude to **Sri Gopal Krishna Dwivedi, IAS**, **Principal Secretary,** Department of Mines and Geology, Govt. of Andhra Pradesh for whole-hearted support.

Our sincere gratitude to **Sri Kona Sasidhar, IAS**, **Secretary to Government,** Information Technology, Electronics and Communications (ITE&C), Govt. of Andhra Pradesh and the **Chairman,** APSAC Governing Body, for his constant encouragement.

We would like to express our sincere gratitude to **Dr. Sundar Balakrishna, IFS**, **Special Secretary to Government,** Information Technology, Electronics and Communications (ITE&C), Govt. of Andhra Pradesh and the **Vice-Chairman, APSAC** Govt. of Andhra Pradesh, for his meticulous guidance and supervision.

We are grateful to the **Sri. V.G. Venkata Reddy**, **Director**, Department of Mines and Geology, Govt. of Andhra Pradesh for entrusting the work for the preparation of District Survey Reports of Andhra Pradesh.

We owe a great deal to **Sri. P Raja Babu, Joint Director,** Department of Mines and Geology for his overall support and guidance during the execution of this work.

We are very much thankful to **Dr.M.J.Ratnakanth Babu, Royalty Inspector (Head Office**), Mines and Geology for his support to complete the work successfully.

We are also thankful to the **District Mines and Geology Officer,** YSR Kadapa District for their support in providing information

Our sincere thanks are due to the scientific staff of APSAC who has generated all the thematic maps for District Survey Reports.

APSAC

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LIST OF CONTESTS AS PER THE GAZETTE NO: 2827,Dt:25.07.2018

List of Abbreviations

APSAC	: Andhra Pradesh Space Applications Centre
APMMC	: Andhra Pradesh Minor Mineral Concession
AMSL	: Above Mean Sea Level
AWiFS	: Advanced Wide Field Sensor
APWALTA	: Andhra Pradesh State Water, Land and Trees Authority
APMDC	: Andhra Pradesh Mineral Development Corporation
Bgl	: Below ground level
BT Road	: Bituminous Road
Cl	: Chlorine
CC Road	: Cement concrete
CRZ	: Coastal Regulatory Zone
CPSU	: Central Public Sector Undertaking
CGWB	: Central Ground Water Board
cu.m/day	: Cubic meter per day
DSR	: District Survey Report
DMF	: Distric Mineral Fund
DMG	: Directorate of Mines and Geology
DM&GO	: District Mines and Geology Officer
DES	: Directorate of Economics and Statistics
DEM	: Digital Elevation Model
dS/m	: Decisiemens per meter
EIA/EMP	: Environmental Impact Assessment
F	: Fluorine
FAC	: Full Additional Charge
FASAL	: Forecasting Agricultural output using Space, Agrometeorology and Land-based observations
Fe	: Iron
Ft	: feet
GD	: Geosciences Division
GIS	: Geographical Information System
GSI	: Geological Survey of India
Ha	: Hectare
Km	: Kilometre
IRS	: Indian Remote Sensing Satellite
ITE and C	: Information Technology Electronics and Communications
LISS	: Linear Imaging Self Scanning
LULC	: Land Use / Land Cover

Lps	: Litres per second
M	: meter
Mi	: mile
mm	: millimetre
MERIT	: Mineral Exploration Research Innovation Trust Fund
MT	: Million Tonne
MoEF	: Ministry of Environment and Forests
MSL	: Mean Sea Level
NIRD	: National Institute of Rural Development
NH	: National Highway
$NaNO_3$	: Sodium nitrate
NRSA	: National Remote Sensing Agency
NRSC	: National Remote Sensing Centre
PESA	: Panchayat's Extension to Scheduled Areas
pH	: Power of hydrogen
PSD	: Performance Security Deposit
PSU	: Public sector Undertakings
R2	: ResourceSat-2
RGNDWM	: Rajiv Gandhi National Drinking Water Mission
RWS and S	: Rural Water Supply and Sanitation
SAR	: Synthetic Aperture Radar
SEB	: Special Enforcement Bureau
SO_4	: Sulphate
Sq.Km	: Square Kilometre
Sq.m	: Square metre
TA	: Tantalum
TIN	: Triangular Irregular Network
TGA	: Total Geographical Area
TIS	: Tank Information System
TTD	: Tirumala Tirupati Devasthanams
WBM	: Water Bound Macadam

Chapter I – Introduction & General Profile

1.1 Administrative Setup

Y.S.R. Kadapa district is in the southern part of the Indian state of Andhra Pradesh. It is one of the districts of the Rayalaseema region and is situated in the south-eastern part of the state and formerly known as Cuddapah district. The headquarters of Y.S.R. Kadapa district is the city of Y.S.R. Kadapa. The district is also considered to be one of the districts endowed with rich history.

Geographically, Y.S.R. Kadapa district is bordered by Veligonda hills which separate the districts of Nellore and Kadapa. The district is bounded on north by Nandyal district, on the south by Annamayya district on the west by Anantapuramu & Sri Sathya Sai district and on the east by Sri Potti Sriramulu Nellore district. The total geographical area is 11,228 Sq. Km with 4revenue divisions, 36 revenue mandals covering 728 revenue villages. The Mandals covered in each revenue division are shown in Table-1. The distribution of Mandals covered in each revenue divisions are also shown in the Figure-1 and satellite view of the YSR Kadapa District is shown in Figure-2.

Table 1 List of mandals covered in each Revenue division in YSR Kadapa District

Sl. No	**Badvel Division**	**Sl. No.**	**Jammalamadugu Division**	**Sl. No.**	**Pulivendula Division**	**Sl.No.**	**Y.S.R. Kadapa Division**
1	Atlur	**13**	Jammalamadugu	**20**	Lingala	**27**	Chennur
2	B.Kodur	**14**	Kondapuram	**21**	Pulivendla	**28**	Chinthakommadinne
3	Badvel	**15**	Muddanur	**22**	Simhadripuram	**29**	Kamalapuram
4	Brahmamgarimattam	**16**	Mylavaram	**23**	Thondur	**30**	Pendlimarri
5	Chapad	**17**	Peddamudium	**24**	Veerapunayunipalle	**31**	Sidhout
6	Duvvur	**18**	Proddatur	**25**	Vempalle	**32**	Vallur
7	Gopavaram	**19**	Rajupalem	**26**	Vemula	**33**	Vontimitta
8	Kalasapadu					**34**	Yerraguntla
9	Khajipet					**35**	Y.S.R.Kadapa
10	Porumamilla						
11	S.Mydukur						
12	Sri Avadhutha Kasinayana						

Data Source: APSAC, Vijayawada.

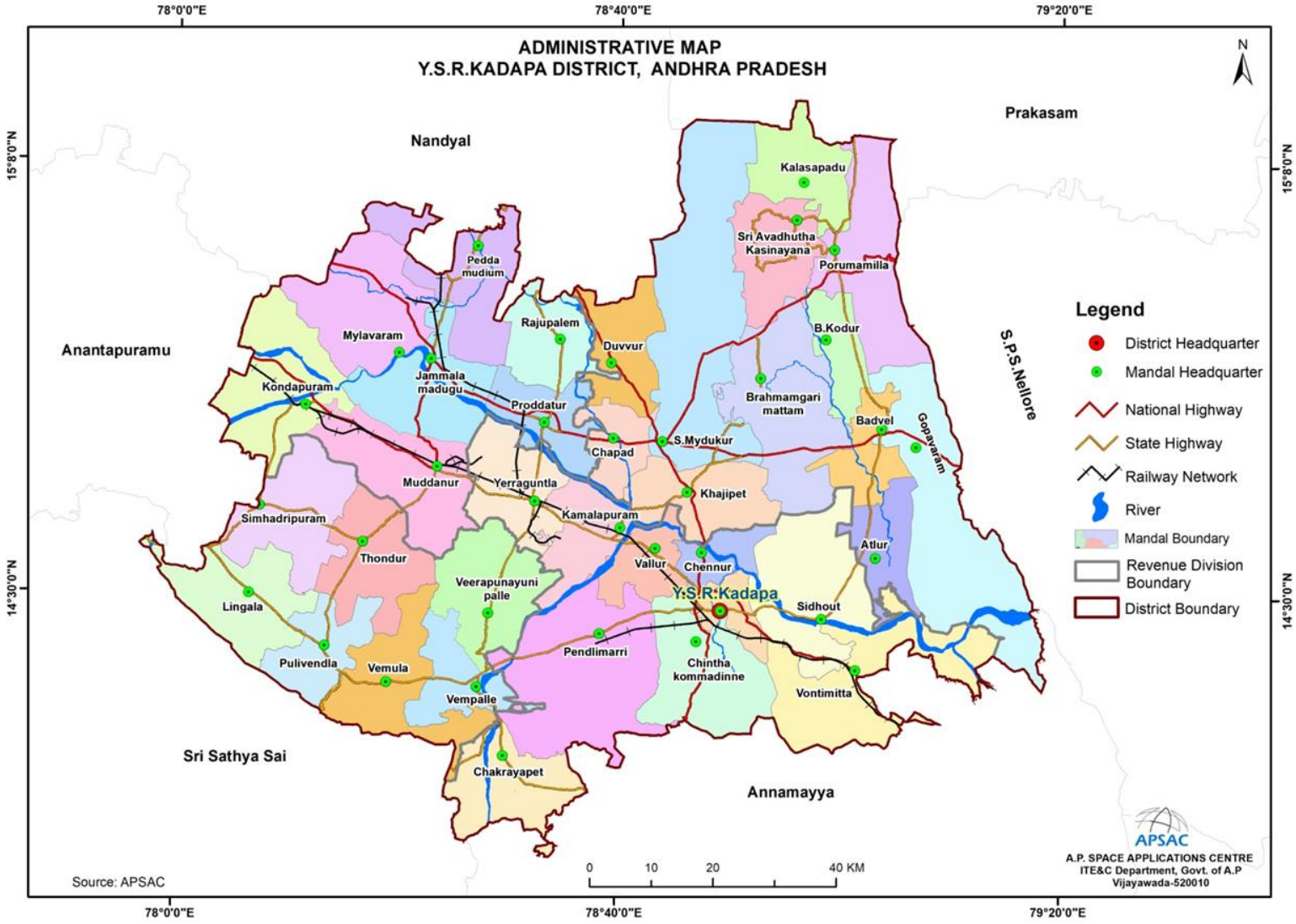


Figure-1: Administrative Map of YSR Kadapa district, Andhra Pradesh

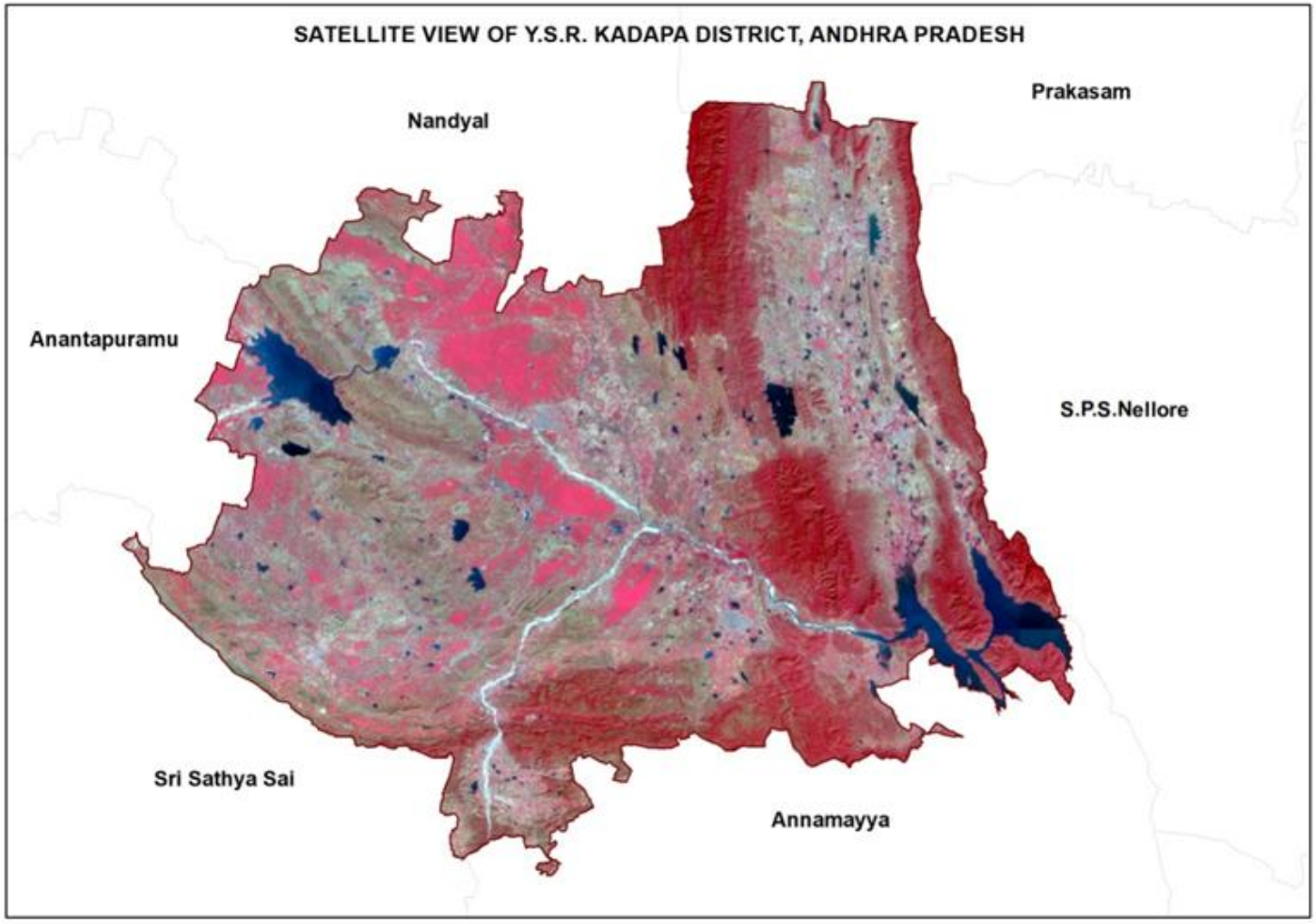


Figure-2: Satellite View of YSR Kadapa District

1.2 Physiography

1.2.1 Physiography

Physiographically Kadapa district is a central upland surrounded by nearly plain and rolling lands to moderately to very steep sloping plains. The very steep sloping areas are mostly in the Eastern and NE parts of the district. The Western part of the district bounded by hilly terrains.

1.2.2 Relief

The slope distribution clearly shows that most of the district has an irregular landscape with several hill ranges and the important hill ranges are Velikonda, Nallamalais, Yerramalai, Palakonda, and Lankamalai. The slope varies from nearly level to very steep slopes (Figure-3). From the slope map, about 50% of the district area is under level to nearly level slop of 0-1%. The nearly level-sloping area is represented in yellow colour. It is found in the northern part, eastern part, central part, and western parts of the district along with very gently sloping areas. These slops are found in the areas of Proddatur, Yerraguntla, Rajupalem, Jammalamadugu, Thondur, Kadapa, S.Mydukur, etc. Most of the gently sloping areas are distributed along the foothill zones and forest fringes. Gently sloping areas are observed in parts of Mylavarm, Lingala, Pendlimarri, and Chinthakommadinne. Strongly sloping areas are found in the forest areas ranging from 10-15%. Moderate and very steep slopes are observed at the peak of the hills and are concentrated more in the forest areas ranging from 15-35% and more than 35%. Very steep sloping categories are found in the western, northeastern, and eastern parts of the YSR Kadapa district.

1.2.3 Climate & Rainfall

1.2.3.1. Climate:

The area of YSR Kadapa is the most part viewed as an upsettingly hot place is presumably because of the early setting in of high temperatures. It is quite often the main station to record a maximum shade temperature of April and May are 41° C. A temperature surpassing 45.5⁰ C is incidentally recorded in the period from about May 16th to May 28th. Automatic weather stations in YSR Kadapa district are shown in Figure-4.

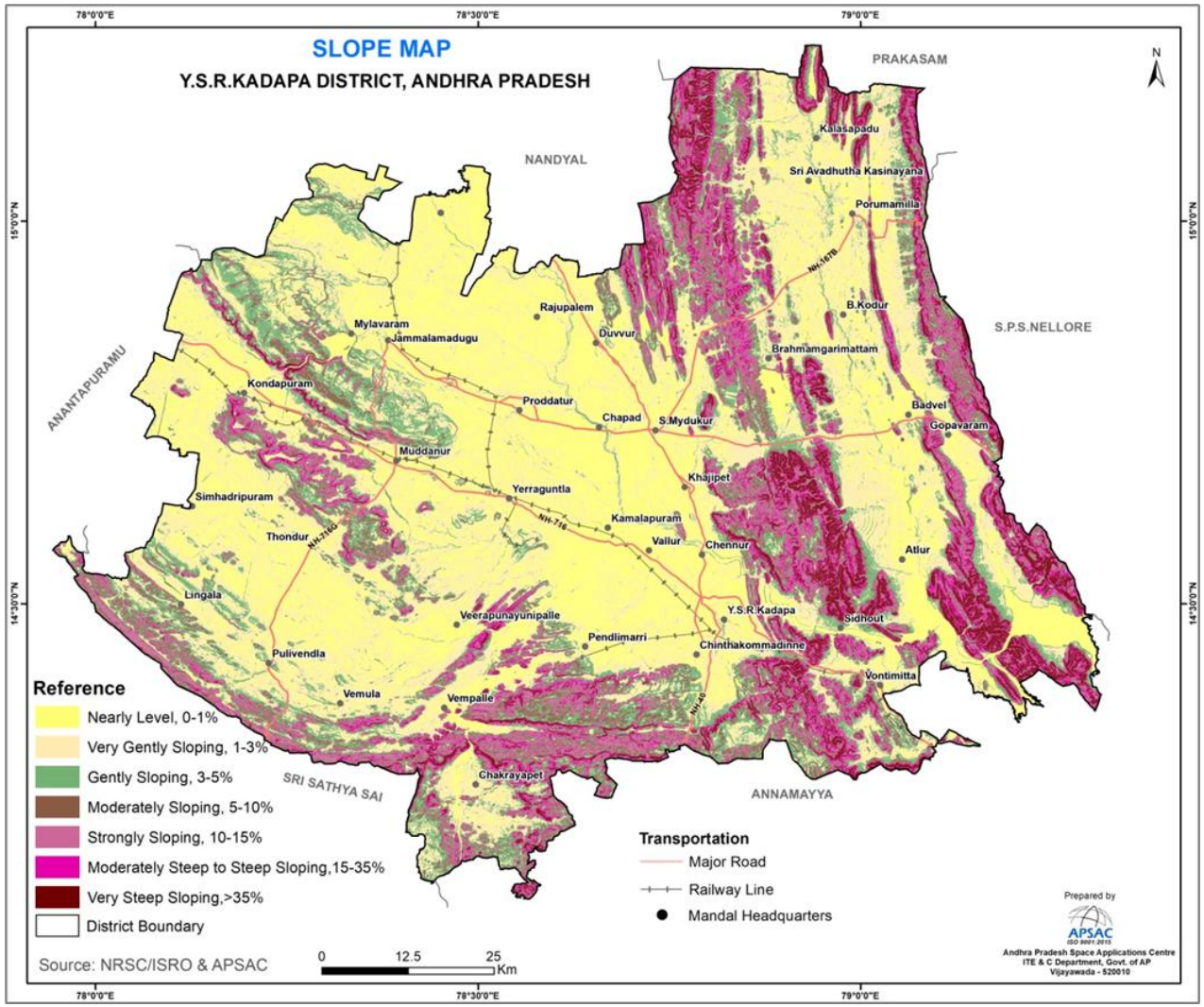


Figure-3: Slope Map of YSR Kadapa District

1.2.3.1. Rainfall:

The Average Annual Rainfall of the district is 676.46 mm, of which 392.6 mm falls as South-West (June-September) and 220.77 mm as North-East (October-December) monsoon. The mean minimum and maximum temperatures recorded in the district are 23.8°C in January and 41° C in May, respectively. The average rainfall for the last 25 years used for the analysis. The average annual rainfall shown in Figure- 5 and details are given in Table: 2.

Table 2 Average Annual Rainfall (mm) in the district

S.No	Month	Average Annual Rainfall (mm)
1	January	2.44
2	February	2.66
3	March	6.76
4	April	15.14
5	May	36.11
6	June	64.57
7	July	90.25
8	August	111.13
9	September	126.65
10	October	128.58
11	November	76.67
12	December	15.52
	Total	**676.46**

Data source: AWS & APSDPS, Vijayawada

1.2.4 Drainage

The Pennar river mainly covered in the district and flows towards west to east direction and the major tributaries are Cheyyeru, Papagni, Chitravathi, Kunderu and Sagileru. The Cheyyeru, Chitravathi, Papagni rivers are flowing north to south direction and Kunderu, Sagileru rivers are flowing south to north direction and merged into pennar river in YSR Kadapa district. Drainage Network and Surface Water bodies of the District shown is Figure-6. The topographical arrangements of the Chitravathi bowl can be comprehensively separated into three unmistakable and all-around stamped bunches viz., the old gathering of

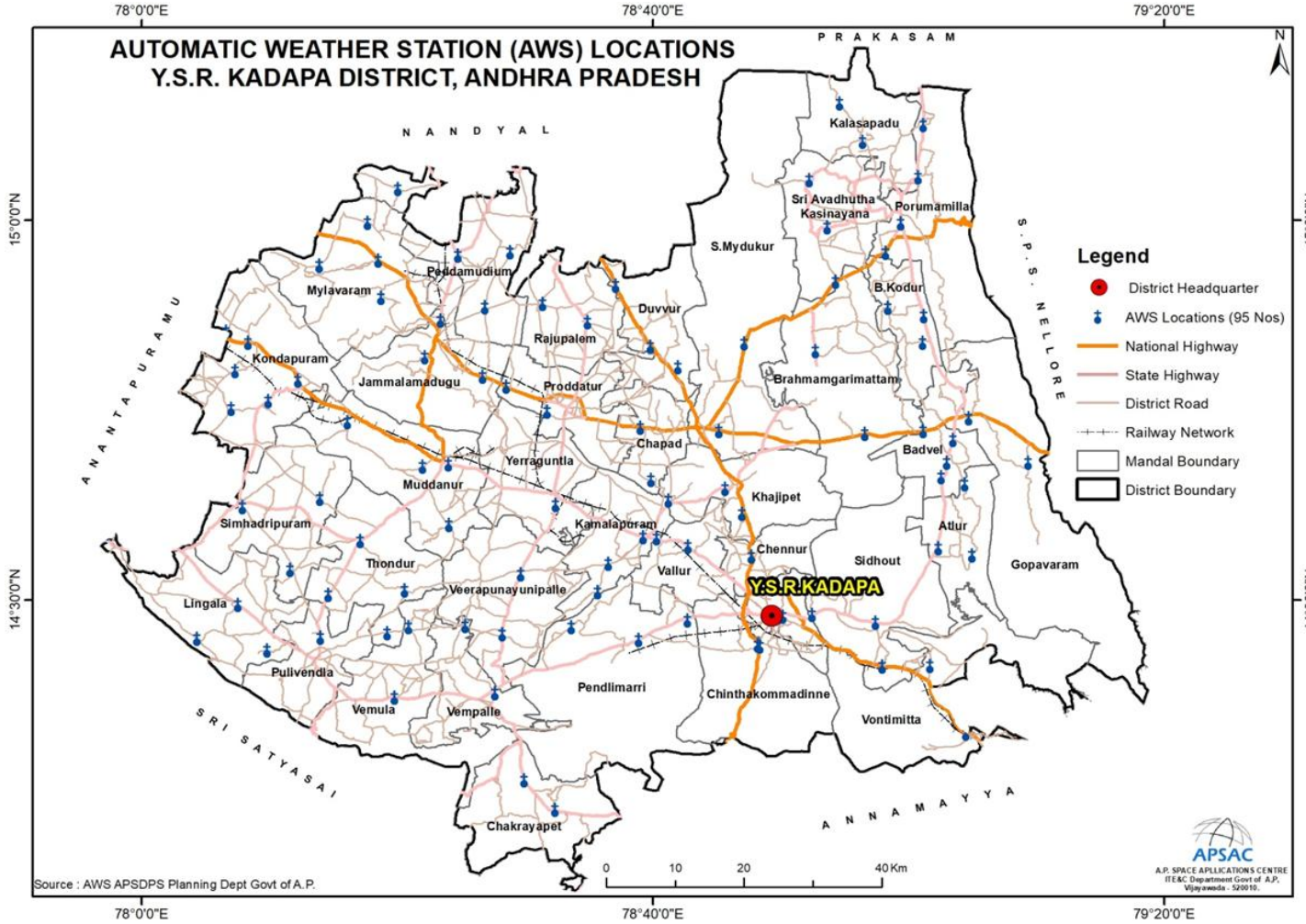


Figure-4: Locations of Automatic Weather Stations (AWS) in YSR Kadapa District

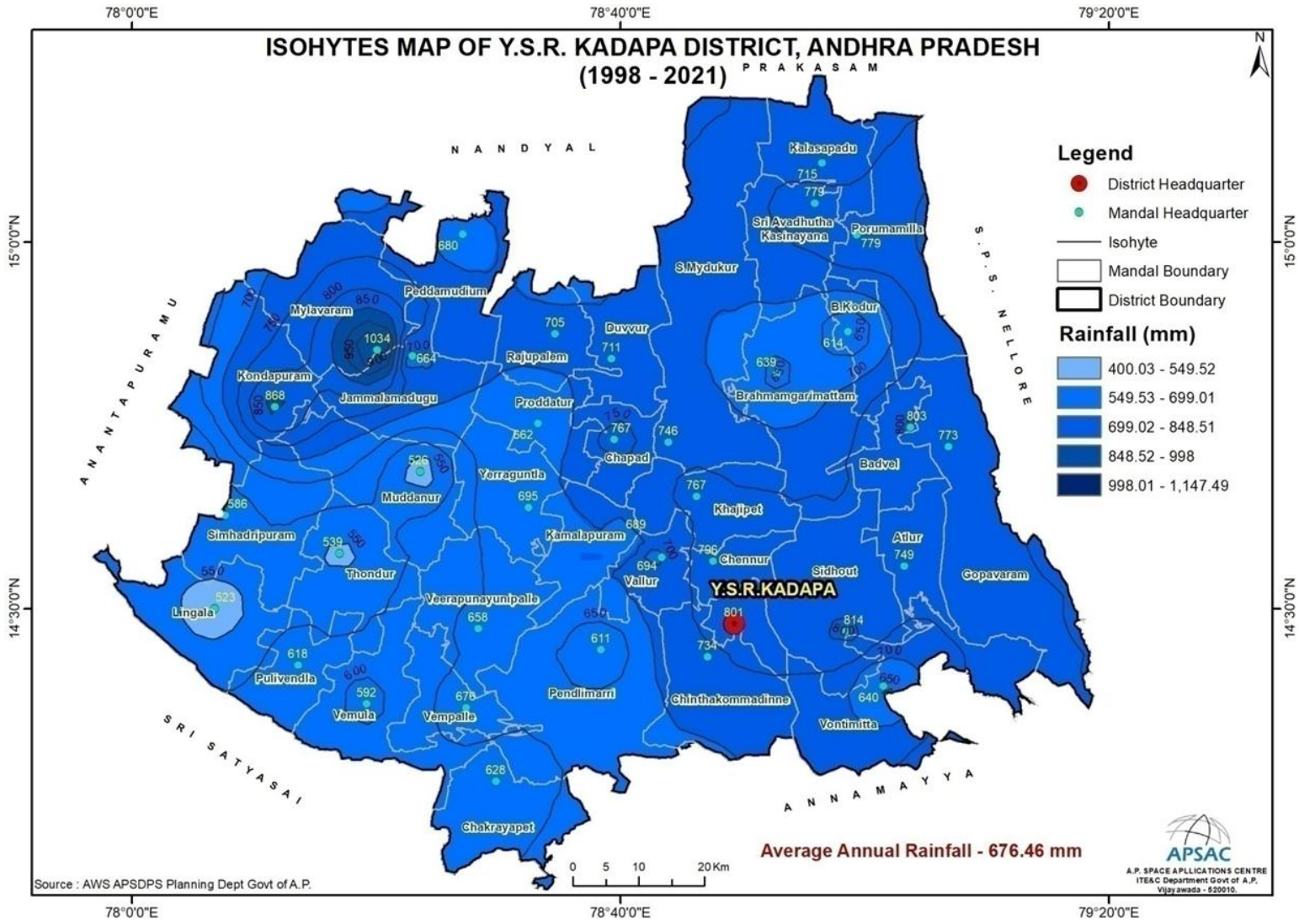


Figure-5: Rainfall distribution in YSR Kadapa District

Archaean Crystalline rocks, the yonder gathering of pre-cambrian sedimentary shake and the ongoing development. The pre-cambrian sedimentary rocks: After the development of the geology of rocks and the later granitic interruptions, there was an extensive time hole before the following arrangement of rocks came to be saved. This vast time interim amid which the current rocks were subjected to disintegration and incomplete evacuation by air offices is known as Eparchian unconformity. Conditions positive for the testimony of residue won in the eastern piece of Anantapur district and other bordering areas towards the east when an immense ocean called Kadapa Ocean appeared here. The silt saved in this after combination shaped clayey, sandy and calcarious rocks which have been currently assigned as Kadapa and Kurnool shakes after the areas where the stones are best uncovered. The Kadapa rocks are accepted to have been kept somewhere in the range of 800 million years prior. In the Chitravathi basin Kadapa and Kurnool arrangement of geographical developments are discovered just in the lower Chitravathi basin covering the mandals of Mudigubba, Simhadripuram, Yellanuru and Kondapuram. Sand is mainly available in the above major rivers and it is replenished even after excavation of sand every year due to flow of water around 9 months in a year. Further Gravel is available in the entire district since the total district except eastern parts of the district comprises of undulated hilly terrain. In eastern plains also abundant gravel is available. Promote Road Metal is accessible pervasively in the district since the most SW part of the region possesses by Granites, Grano Diorites, Gneisses and Migmatites of Peninsular Gneissic Complex. Facilitate later interruption of dolerite ledges in to the Vempalli development from North to South is likewise helpful for Road Metal. Facilitate in SE parts of the district siliceous dolomite is utilized as Road Metal. Subsequently aggrigates are accessible in the whole region.

1.3 Population and Literacy

1.3.1. Population:

Y.S.R. Kadapa district has population of 20,60,654 of which male and female were 10,37,867 and 10,22,787respectively, in 2011 census of India. Kadapa mandal having more population 3,18,916 and B.Kodur mandal having less population 20,471.Total SC Population in the district is 3,37,860 of which male and female were 1,68,117 and

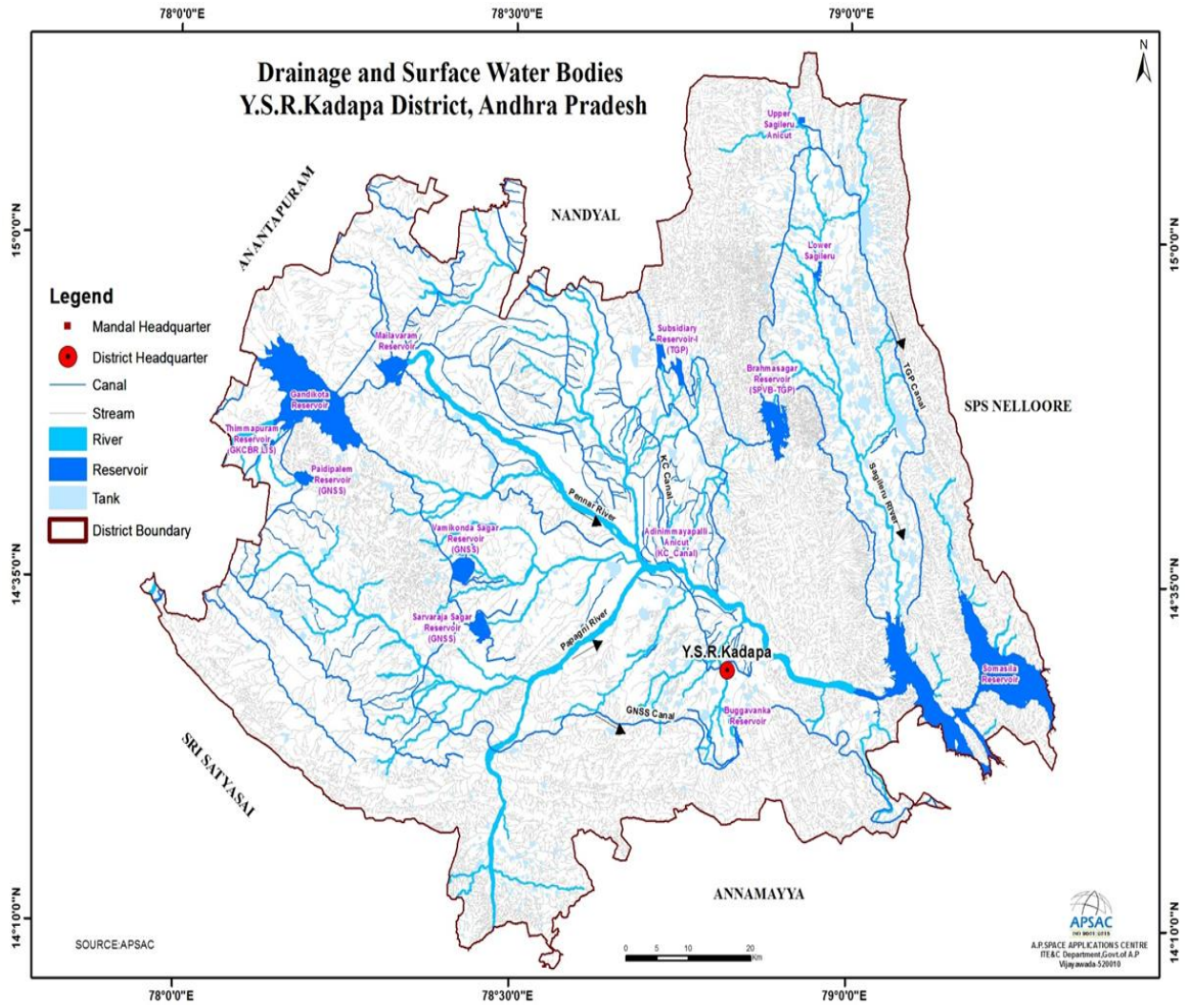


Figure-6: Drainage network and surface water bodies of the YSR Kadapa District

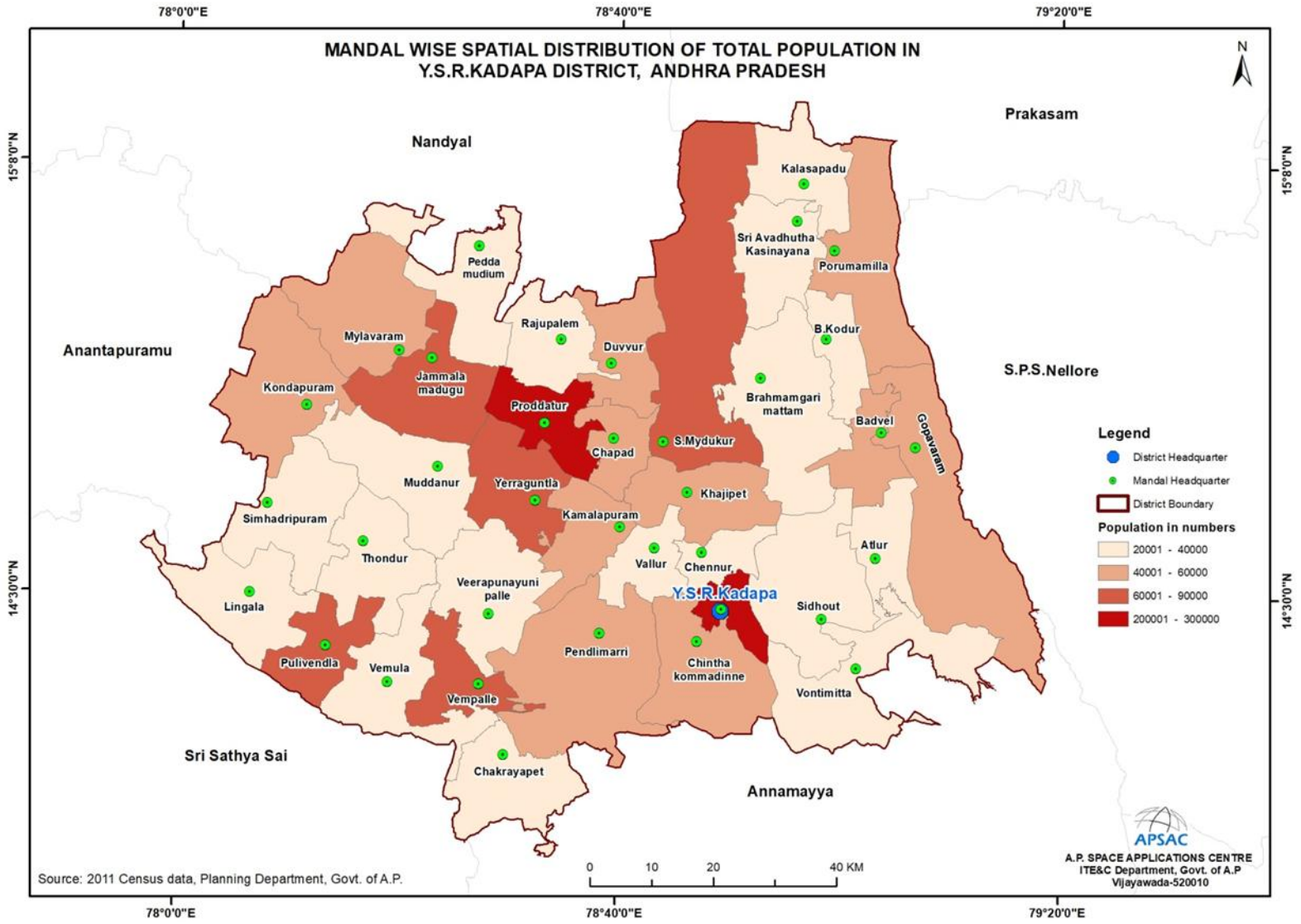


Figure-7: Mandal wise Spatial Distribution of Population in YSR Kadapa district, Andhra Pradesh

Table 3 Population Statistics Summary of 2011 Census

S.No	Mandal Name	Total House Holds	Total Population	Total Male Population	Total Female Population	Total SC Population	Male SC Population	Female SC Population	Total ST Population	Male ST Population	Female ST Population
1	Atlur	6172	24339	12298	12041	8092	4070	4022	637	321	316
2	B.Kodur	4900	20471	10611	9860	4203	2303	1900	283	156	127
3	Badvel	12291	50136	25375	24761	10906	5404	5502	1186	591	595
4	B.Mattam	9269	37278	19413	17865	9078	4602	4476	950	506	444
5	Chakrayapet	7920	31258	16062	15196	4223	2269	1954	1404	761	643
6	Chapad	11120	41379	20765	20614	8912	4425	4487	609	304	305
7	Chennur	9413	36987	18517	18470	7834	3894	3940	996	485	511
8	C.K.Dinne	13506	54788	27753	27035	8500	4260	4240	2770	1406	1364
9	Duvvur	13461	51872	26201	25671	8398	4217	4181	369	173	196
10	Gopavaram	14227	59468	30675	28793	11992	6224	5768	1315	672	643
11	Jammalamadugu	19908	78326	38694	39632	10908	5324	5584	2368	1184	1184
12	Kadapa	71486	318916	160137	158779	36222	17639	18583	6320	3176	3144
13	Kalasapadu	8041	31296	15926	15370	6103	3090	3013	273	143	130
14	Kamalapuram	12664	52168	25969	26199	12053	5738	6315	466	252	214
15	Khajipet	12751	50320	25232	25088	10774	5283	5491	1038	531	507
16	Kondapuram	10799	42093	21046	21047	8037	3977	4060	654	318	336
17	Lingala	7681	29945	15261	14684	3723	1915	1808	205	116	89
18	Muddanur	8570	34366	17239	17127	5930	2998	2932	543	278	265
19	Mylavaram	10840	41925	20789	21136	3474	1761	1713	1556	804	752
20	Peddamudium	8469	32541	16270	16271	5627	2862	2765	106	62	44
21	Pendlimarri	10926	44008	22417	21591	7154	3618	3536	506	251	255
22	Porumamilla	14688	57937	29448	28489	12290	6178	6112	812	416	396
23	Proddatur	62226	258879	129378	129501	29827	14729	15098	2736	1342	1394
24	Pulivendla	19932	78884	39515	39369	10347	5101	5246	2947	1525	1422
25	Rajupalem	8627	32829	16120	16709	8294	3890	4404	346	163	183
26	S.Mydukur	20089	81019	40837	40182	15232	7565	7667	2846	1470	1376
27	Sidhout	9168	37452	18937	18515	9671	4715	4956	952	501	451
28	Simhadripuram	8534	32819	16332	16487	5240	2588	2652	289	150	139
29	Sri Avadhutha	7863	30532	15633	14899	6000	3135	2865	418	226	192

S.No	Mandal Name	Total House Holds	Total Population	Total Male Population	Total Female Population	Total SC Population	Male SC Population	Female SC Population	Total ST Population	Male ST Population	Female ST Population
	Kasinayana										
30	Thondur	6120	23964	11774	12190	3583	1576	2007	292	136	156
31	Vallur	7651	28873	14614	14259	6903	3476	3427	228	102	126
32	Veerapunayunipalle	8479	32910	16534	16376	5786	2863	2923	231	107	124
33	Vempalle	13886	61344	31392	29952	7871	3980	3891	2177	1139	1038
34	Vemula	7477	29160	14855	14305	4529	2305	2224	185	107	78
35	Vontimitta	8112	33100	16900	16200	8105	4142	3963	914	464	450
36	Yerraguntla	19190	77072	38948	38124	12039	6001	6038	1067	531	536
	Grand Total	**506456**	**206064**	**103787**	**102277**	**33786**	**16811**	**16974**	**4094**	**20869**	**20125**

Data Source: 2011 Census of India

Table 4 Literacy statistics summary of 2011 Census

S.No	Mandal Name	Total Literacy	Male Literacy	Female Literacy	Total Illiterates	Male Illiterates	Female Illiterates
1	Atlur	12090	7415	4675	12249	4883	7366
2	B.Kodur	10735	6903	3832	9736	3708	6028
3	Badvel	29027	17109	11918	21109	8266	12843
4	Brahmamgarimattam	20135	12817	7318	17143	6596	10547
5	Chakrayapet	15838	9979	5859	15420	6083	9337
6	Chapad	24110	14272	9838	17269	6493	10776
7	Chennur	21357	12455	8902	15630	6062	9568
8	Chinthakommadinne	32245	18785	13460	22543	8968	13575
9	Duvvur	27702	16838	10864	24170	9363	14807
10	Gopavaram	35166	21035	14131	24302	9640	14662
11	Jammalamadugu	48157	27176	20981	30169	11518	18651
12	Kadapa	224009	121442	102567	94907	38695	56212
13	Kalasapadu	16979	10440	6539	14317	5486	8831
14	Kamalapuram	31806	18045	13761	20362	7924	12438
15	Khajipet	29180	17386	11794	21140	7846	13294
16	Kondapuram	24406	14293	10113	17687	6753	10934
17	Lingala	17655	10417	7238	12290	4844	7446
18	Muddanur	20442	11860	8582	13924	5379	8545
19	Mylavaram	22561	13415	9146	19364	7374	11990
20	Peddamudium	18127	10913	7214	14414	5357	9057
21	Pendlimarri	23513	14254	9259	20495	8163	12332
22	Porumamilla	33301	20035	13266	24636	9413	15223
23	Proddatur	169332	95001	74331	89547	34377	55170
24	Pulivendla	49960	28188	21772	28924	11327	17597
25	Rajupalem	19175	11048	8127	13654	5072	8582
26	S.Mydukur	46089	27405	18684	34930	13432	21498
27	Sidhout	21782	12917	8865	15670	6020	9650
28	Simhadripuram	21416	12182	9234	11403	4150	7253
29	Sri Avadhutha Kasinayana	16285	10087	6198	14247	5546	8701
30	Thondur	13372	7710	5662	10592	4064	6528
31	Vallur	16505	9859	6646	12368	4755	7613
32	Veerapunayunipalle	18937	11181	7756	13973	5353	8620
33	Vempalle	35197	20528	14669	26147	10864	15283
34	Vemula	16450	9906	6544	12710	4949	7761
35	Vontimitta	18890	11342	7548	14210	5558	8652
36	Yerraguntla	47654	27466	20188	29418	11482	17936
	Grand Total	1249585	722104	527481	811069	315763	495306

Data Source: 2011 Census data, Planning Department & DES

1,69,743. ST Population is 40,994 of which male and female were 20,869 and 20,125 respectively. Below table shows the mandal wise and its category wise population of the Y.S.R. Kadapa district (Figure-7 and Table-3).

1.3.2. Literacy:

The total literacy in the district is 12,49,585; of which male and female are 7,22,104 and 5,27,481 respectively. The total illiterates is 8,11,069; of which male and female are 3,15,763 and 4,95,306 respectively, as per the 2011 census of India (Table-4).

1.3.3. Details of the Occupational Health issues in the District (Last five-year data of number of patients of Silicosis): No cases were reported during last 5 years due to mining activity.

1.4 Land Utilization Pattern

1.4.1 Land Use / Land Cover

The Land Use / Land Cover (LU-LC) pattern of any region is an outcome of various physical, cultural factors and their utilization by a man in time and space. Land use refers to the type of utilization to which man has put the land. It also refers to the evaluation of the land with respect to various natural characteristics. But land cover describes the vegetal attributes of land. Land use/land cover data is essential for planners, decision makers and those concerned with land resources management. The proper understanding of the influence of the various human-induced land use practices about the environmental change, it is essential to help simulate the land use changes. Remote sensing technology is considered most effective as it provides timely and authentic information about the spatial distribution of land use/land cover, while Geographical Information System (GIS) provides a flexible digital environment for collecting, storing, visualizing and analyzing the spatial data. Remote sensing as a vital tool helps in rapid assessment and monitoring of a natural resource. When combined with GIS, it makes it possible to map land use/cover phenomena in detailed for further planning, development, and decision-making, which is essential for meeting the increasing demands and welfare of the ever-growing population.

The Land Use/Land Cover (LULC) pattern of any district is a result of different physical, social variables and their utilization by a man in time and space. Land utilize alludes to the sort of usage to which man has put the land. It additionally alludes to the assessment of the land for different normal attributes. Be that as it may, arrive cover portrays the vegetal properties of land. Land use/land cover information is basic for organizers, leaders and those worried about land resources management. The correct comprehension of the impact of the different human-prompted arrive utilize hones concerning the natural change, it is basic to help recreate the land utilize changes. Remote detecting innovation is viewed as best as it gives convenient and valid data about the spatial circulation of land utilize/arrive cover, while Geographical Information System (GIS) gives an adaptable advanced condition to gathering, putting away, envisioning and examining the spatial information. Remote detecting as an indispensable apparatus helps for fast evaluation and observing of a characteristic asset. At the point when joined with GIS, it makes it conceivable to delineate Land Use / Land Cover phenomena in detailed for additionally arranging, advancement, and decision-making, which is essential for meeting the increasing demands and welfare of the ever-growing population.

1.4.2 Spatial Distribution of Land Use / Land Cover

Using satellite data from the three seasons (Kharif, Rabi, and Zaid), various land use/land cover categories have been identified under level-3 classification. The LULC map has been generated using visual image interpretation techniques i.e., size, shape, color, tone, texture, association, and pattern (NRSA, 2006). This information is used for general planning purposes at district/mandal level. The broad categories are built-up, agricultural, forest, wastelands, and water bodies. The spatial distribution of land use/land cover of the YSR Kadapa district is shown in Figure- 8 and area statistics presented in Table-5.

The major common LULC categories such as built-up (288.52 sq. km), agriculture (5101.80 sq. km), forest (3017.09 sq. km), wastelands (2094.99 sq. km), and water bodies (725.60 sq. km) were identified and delineated. The study area has been classified into 33 LULC classes of level-III. Agriculture land is the most common type, followed by forests.

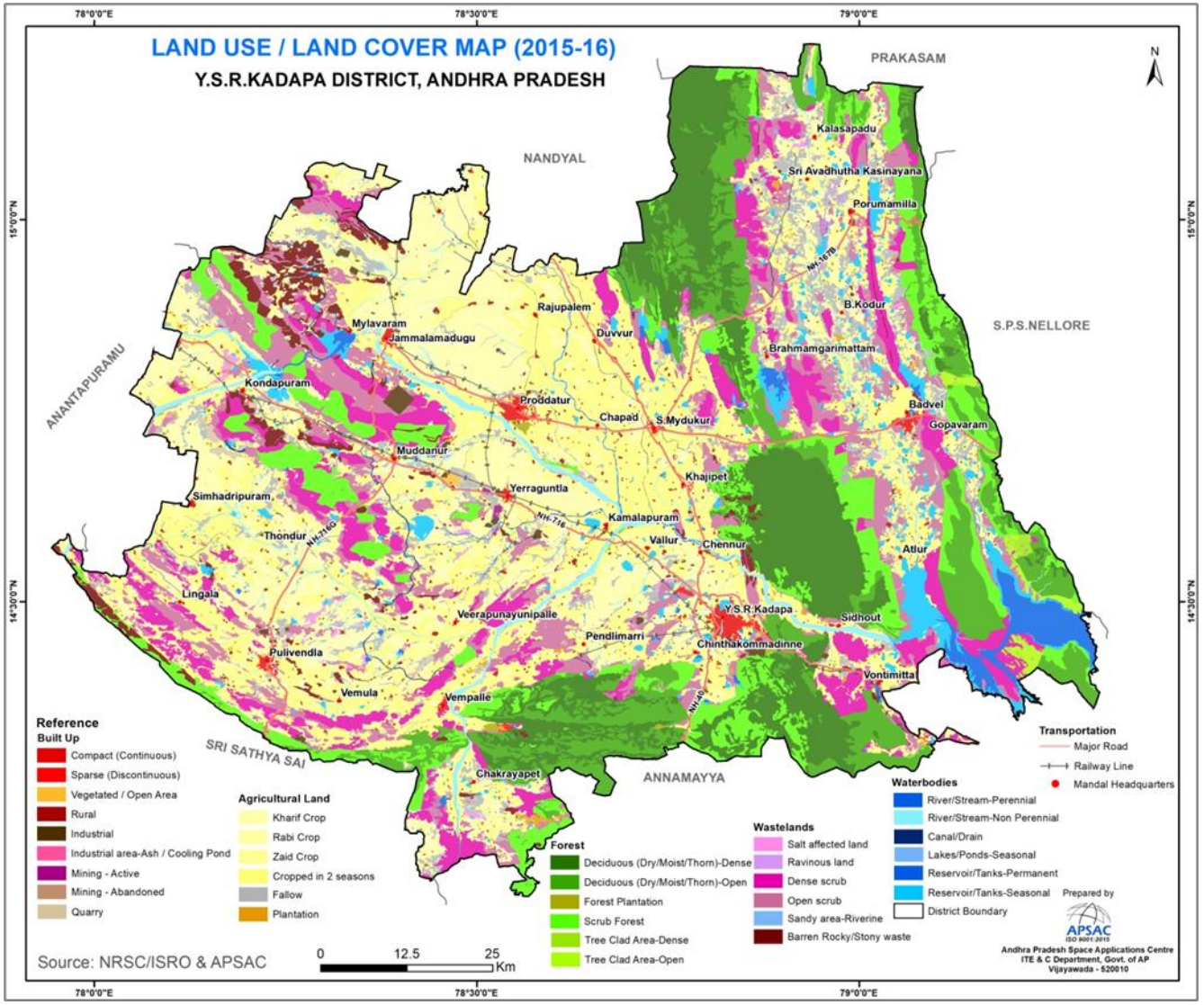


Figure-8: Land use / land cover map of YSR Kadapa District 2015-16

Table 5 Category-wise distributions of Land Use/Land Cover during 2015-16

S. No	LULC categories	Area in sq. km	% to total
Built-Up		**288.52**	**2.57**
1	Compact (Continuous)	41.26	0.37
2	Sparse (Discontinuous)	19.61	0.17
3	Vegetated / Open Area	12.51	0.11
4	Rural	122.14	1.09
5	Industrial	35.74	0.32
6	Industrial area-Ash / Cooling Pond	1.84	0.02
7	Quarry	51.77	0.46
8	Mining - Abandoned	0.52	0.00
9	Mining - Active	3.13	0.03
Agricultural Land		**5101.80**	**45.44**
10	Kharif Crop	961.31	8.56
11	Rabi Crop	986.17	8.78
12	Zaid Crop	9.50	0.08
13	Cropped in 2 seasons	2543.30	22.65
14	Fallow	561.94	5.00
15	Plantation	39.58	0.35
Forest		**3017.09**	**26.87**
16	Deciduous (Dry/Moist/Thorn)-Dense/Closed	1097.56	9.78
17	Deciduous (Dry/Moist/Thorn)-Open/Closed	934.24	8.32
18	Forest Plantation	8.72	0.08
19	Scrub Forest	929.13	8.28
20	Tree Clad Area-Dense/Closed	7.35	0.07
21	Tree Clad Area-Open	40.09	0.36
Wastelands		**2094.99**	**18.66**
22	Salt affected land	26.30	0.23
23	Ravinous land	11.32	0.10
24	Sandy area-Riverine	0.76	0.01
25	Dense scrub	860.98	7.67
26	Open scrub	1002.07	8.92
27	Barren Rocky/Stony waste	193.57	1.72
Water bodies		**725.60**	**6.46**

S. No	LULC categories	Area in sq. km	% to total
28	Reservoir/Tanks-Permanent	145.92	1.30
29	Reservoir/Tanks-Seasonal	317.31	2.83
30	Canal/Drain	29.67	0.26
31	Lakes/Ponds-Seasonal	0.53	0.00
32	River/Stream-Non Perennial	209.79	1.87
33	River/Stream-Perennial	22.38	0.20
Total		**11228.00**	**100.00**

Data source: NR Census 3rd cycle mapping, NRSC/ISRO & APSAC, GoAP

1.4.2.1. Built-Up

Built-up land includes educational, health, and socioeconomic facilities such as game/sport viewing centres and shops, among other things. These characteristics are distinguished by their dark bluish-green tone in the core and bluish tone on the periphery. They have a typical coarse and molted texture. The network of highways and railroads is also connected to these areas. The study area contains urban areas, rural settlements and tiny towns. The total area in the YSR Kadapa district that is occupied by the major and minor settlements is 288.52 sq. km, which is about 2.57% of the district's total area.

1.4.2.2. Built-up - Compact (Continuous)

Most of the land is covered by buildings, roads, and artificially surfaced area and cover almost all the ground. The built-up-compact class is assigned where the impermeable surfaces such as the transportation network and urban structures take up more than 80% of the surface area. This category occupied 41.26 sq. km, which is found in urban areas like Kadapa, Proddatur, and other small towns.

1.4.2.3. Built up - Sparse (Discontinuous)

Most of the land is covered by the structures like buildings, roads and artificially surfaced areas associated with vegetated areas and bare soil, which occupy discontinuous but significant surfaces. Between 10 to 40 % of the total surface should be impermeable. Scattered blocks of residential flats, hamlets and small villages are delineated under this category. It contributes an area of 19.61 sq. km, which is found in peri-urban areas.

1.4.2.4. Vegetated / Open Area

These are vegetated areas within urban agglomeration (situated within or in contact with urban areas). The vegetation cover of trees, shrubs, and herbs covers the surface area, and it has been delineated. Open areas used as Parks, sports and leisure facilities, camping grounds, sports grounds, leisure parks, golf courses, and racecourses, including formal parks, etc are considered in this category. This category occupies an area of 12.51 sq. km. These areas are found along the fringe area and outskirts of the urban areas.

1.4.2.5. Built-Up – Rural

These are the lands used for human settlements of a smaller size than urban settlements, with more than 30% of the population engaged in primary agricultural activity and associated with non-commercial and allied classes and are classified as built up (rural). About 122 sq. km of rural built-up area were mapped.

1.4.2.6. Industrial Area

This class includes non-linear impervious surfaces related to trade, manufacturing, distribution, and commerce. These are areas where human activity can be seen in the form of manufacturing as well as other maintenance-related establishments. The industrial area encompasses 35.74 sq. km and can be found in and around towns.

1.4.2.7. Industrial area-Ash / Cooling Pond

These are the portions of the industry which are used for temporary storage of ash, contaminated soil, rubble, cooling of hot water, or tailing pond associated with the industry. The areas where industrial waste is permanently kept are categorized as other waste which is delineated under this category. A stockpile of a storage dump of industrial raw material or slag/effluents or waste material or quarried/mixed debris from the earth's surface is considered under this category. It is observed that this category is found around the industrial areas with an area of 1.84 sq. km.

1.4.2.8. Mining – Active

Mining areas encompass area under surface operations. It is easy to spot these activities' effects on the landscape because they have left behind

enormous giant pit mines. Currently, there are extensive surface operations being conducted in the active mining areas to remove economically significant ores. A total of 2.82 sq. km. is contributed by the active mining area.

1.4.2.9. Mining – Abandoned

These are the locations where extensive surface operations to remove economically significant ores were once conducted but are currently being left unfinished for a variety of reasons, including economic, operational, viability, disturbances, etc. Only about 0.52 sq. km. has been contributed under this category.

1.4.2.10. Quarry

These are signs of small-scale surface mining operations, which involve the surface of the land being excavated for sand, gravel, clay-phosphate mines, limestone quarries, etc. They are primarily distinguished by their proximity to urban areas. It contributes to an area of about 51.77 sq km.

1.4.2.11. Agricultural Land

This category devoted primarily to growing crops for commercial and horticultural purposes as well as those for food, fiber, and other commodities. Most of the population depends on agriculture for livelihood. Cropland, fallow land, agricultural plantations, and aquaculture are all included in this category. The agricultural land is a major category, accounting for 5101.80 (45.44% of the district's total area). It is also found that cropped in two seasons i.e., double-cropped area is about 22% of the district total. The major crops in the district are Paddy, Groundnut, Sunflower, Cotton, Betel leaves, and Horticultural crops like Mango, Papaya, Banana, Lemon and Oranges.

1.4.2.12. Kharif Crop

The Kharif crop is defined as any agricultural area that is grown from June/July to September/October, which coincides with the South-West monsoon season. It is linked to rain-fed crops in dry land farming with little or no irrigation, as well as areas of rain-fed paddy and other dry crops. Rice, sugarcane, jowar, maize, redgram, cotton, castor, and other crops are commonly grown, and an area of 961.31 sq. km (8.56%) has been mapped under the Kharif cropland.

1.4.2.13. Rabi Crop

These areas are cultivated from November/December to February/March. It is associated with areas under assured irrigation irrespective of the source of irrigation. However, rabi-cropped areas also exist in rain-fed areas, particularly in black soil regions with high rainfall during the Kharif season and under conditions of residual soil moisture. Mainly irrigated crops are grown during the rabi season by utilizing canals, tanks and groundwater resources. In some places, lift irrigation is also practiced in the district. The total area cultivated under the Rabi season is about 986 sq. km (8.78%).

1.4.2.14. Zaid Crop

These are the areas that are planted with crops during the summer (April to May), and they are primarily connected to fertile, irrigated plains and delta regions. The Zaid crop areas cover an area of 9.50 sq. km during 2015-16.

1.4.2.15. Cropped in two seasons

These are the areas that are cropped during two cropping seasons that are often seen associated with irrigated areas. Three combinations are possible in this category viz., - Kharif + Rabi, Kharif + Zaid and Rabi + Zaid. It is found that this is the major agricultural category with an extent of 2543.30 sq. km (22.65%). These are found in the areas of S.Mydukur, Proddatur, Duvvur, Badvel, etc with assured irrigation facilities from canals, tanks and groundwater.

1.4.2.16. Fallow land

The term "fallow land" refers to agricultural land that is actively being farmed but is occasionally allowed to rest or un-cropped for one or more seasons, but not for less than a year and not for more than five years. The fallow land occupies an area of 561.94 sq. km (5%), which is found in the east and north-eastern parts of the district comprising the areas of Kalasapadu,Sri Avadhutha Kasinayana, B.Kodur, Brahmamagarimattam, etc.

1.4.2.17. Agricultural Plantation

These are areas where agricultural tree crops have been planted using agricultural management techniques. These also include the regions of land use systems and practices where the cultivation of herbs, shrubs, and vegetable crops is purposefully combined with crops, primarily in irrigated

conditions, for ecological and financial reasons. These areas can be distinguished from cropland, particularly when using data collected during the rabi/zaid season. Plantations have irregular and sharp edges and appear in dark red to red tones in a variety of sizes, indicating that a fence surrounds them. In the years 2015–16, plantation crops were grown on 39.58 sq. km (0.35%) of the total area.

1.4.2.18. Forest

Land with a tree canopy cover of more than 30 percent and an area of more than 0.5 ha is referred to as a forest. Forest is determined both by the presence of trees and the absence of other predominant land uses within the notified forest boundaries. Within the notified forest boundaries, trees should be able to grow to a minimum height of 5 meters. About 3017.09 sq. km (26.7%) of the land is covered in forest. The forest cover is found in the eastern, western, northern and central parts of the YSR Kadapa district, where several forest species grow. The important species are teak, nalla maddi, rosewood, devadari, sanders etc.

1.4.2.19. Deciduous (Dry/Moist/Thorn)-Dense

This category is predominantly composed of species, which shed their leaves once a year, especially during summer. These are mostly broad-leaved tropical forests with a tendency to shed their leaves annually. This category includes all the areas where the canopy cover/density is more than 40% and contributed 1097.56 sq. km. In the district, most of the forests are deciduous forests and are found along the Eastern Ghats hill range, which is parallel to the Bay of Bengal coast.

1.4.2.20. Deciduous (Dry/Moist/Thorn)-Open

Most of the species in this category only lose their leaves once a year, usually in the summer. Most of these tropical forests are broad-leaved and have a yearly leaf-falling tendency. All forest areas that fall into this category have a canopy cover/density of between 10 - 40%. These forests contain a wide range of fauna, including tigers, leopards, wolves, bears, etc in addition to timber. This category is attributed to 934.24 sq. km (8.32%) of the total land area.

1.4.2.21. Forest Plantation

These are the areas where important tree species for forestry are grown and managed, particularly in notified forest areas. Most of these are in uplands

and foothill areas. Many of these can be identified based on the sharp boundary exhibited by them. The distribution of forest plantations is 8.72 sq. km, which are found in the fringe areas of the notified forests. Forest plantations mainly teak, bamboo, casuarinas, etc have been delineated.

1.4.2.22. Scrub Forest

These are the forest areas that are generally seen at the fringes of dense forest cover and settlements, where there is biotic and abiotic interference. Most times they are located closer to habitations. Forest blanks which are the openings amidst forest areas, devoid of tree cover, observed as openings of assorted sizes and shapes as manifested in the imagery, are also included in this category. It is spread over an area of 926.13 sq. km (8.28%).

1.4.2.23. Tree Clad Area-Dense

Areas with tree cover lying outside the notified forest area with a woody perennial plant with a single, well-defined stem carrying a more-or-less-defined crown and being at least 3 m tall. Plants essentially herbaceous but with a woody appearance (e.g., bamboo and ferns) are also classified as trees if the height is more than 5 m and as shrubs, if the height is less than 5 m. This category includes all the areas where the canopy cover/density is more than 40%. The dense tree-clad area contributes an area of 7.35 sq. km, which is found along with forest areas.

1.4.2.24. Tree Clad Area-Open

Areas with tree cover lying outside the notified forest area with a woody perennial plant with a single, well-defined stem carrying a more-or-less-defined crown andbeing at least 3m tall. Plants essentially herbaceous but with a woody appearance (e.g., bamboo and ferns) are also classified as trees if the height is more than 5m and as shrubs, if the height is less than 5 m. This category includes all the forest areas where the canopy cover/density ranges between10 – 40%. The tree-clad open category has been mapped with an area of 40.09 sq. km.

1.4.2.25. Wastelands

Wasteland is described as degraded land which can be brought under vegetative cover with reasonable effort, and which is currently underutilized and land which is deteriorating for lack of appropriate water and soil management or on account of natural causes. Wastelands can result from

inherent/imposed disabilities such as by location, environment, chemical and physical properties of the soil, or financial or management constraints. The area under this category is 2094.99 sq. km (18.66%). These are the areas found entire district, mostly concentrated in the eastern, western and southern parts of the district.

1.4.2.26. Salt-affected land

Salinization can be caused by inadequate canal irrigation water management, which causes the water table to rise and, as a result, salts to build up in the root zone in arid, semi-arid, and sub-humid (dry) conditions, as well as by seawater intrusion in coastal regions and/or the use of groundwater with high salt content. They also turn salty when ground water is salty, or soils have grown on salty parent materials. The area of these lands is 26.30 sq. km.

1.4.2.27. Dense scrub

The scrub is typically restricted to topographically elevated areas, on the slopes of hills that are typically surrounded by agricultural lands. These regions are characterized by extreme slopes, severe erosion, shallow and skeletal soils, sometimes chemically degraded soils, and lands subjected to excessive aridity with scrubs predominating the landscape. It is found with varying sizes of small to large areas having a contiguous or dispersed pattern. The dense scrub is mostly identified on the hills with gentle to steep sloping areas and occupies an area of 860.98 sq. km.

1.4.2.28. Open scrub

This category has a similar description as mentioned in the dense scrub except that they possess sparse vegetation or devoid of scrub and have thin soils cover. The open scrub is found in the foothills surrounded by agricultural lands. The open scrub mapped an area of 1002.07 sq. km.

1.4.2.29. Riverine sand

Riverine sands are the accumulations of sand that are seen as sheets in the flood plain as a result of river flooding. The sandy areas occurring within or in continuity to the river course are to be excluded from this category. These occupy a tiny 0.76 sq. km of land along the Pennar River.

1.4.2.30. Barren Rocky/Stony waste

The barren rock exposures are especially confined to hilly terrain with down slopes with rock outcrops, stony waste, and fragments. Barren rocky areas have been observed as rocky outcrops in the forest and scrubland. The area under this category is 193.57 sq. km and it occupies 1.72 % of the district. It is found that most of the barren rocky areas are being quarried for various construction activities in the district.

1.4.2.31. Water Bodies

This category comprises areas with surface water, either impounded in the form of ponds, lakes and reservoirs or flowing as streams, rivers, canals etc. These are seen clearly on the satellite image in blue to dark blue or cyan colour depending on the depth of water. The water body category occupies an area of about 725.60 sq. km with 6.46% of the district total. The Papagni, Chitravathi, Mandavya, Penna, and Cheyyeru Rivers flow through many stunning valleys in the district. The most significant river that runs through the district is the river Penna.

1.4.2.32. River/Stream-Perennial

Rivers/streams are the natural course of water flowing on the land surface along a definite channel/slope regularly or intermittently towards a sea in most cases or a lake or an inland basin in desert areas or a marsh or another river. These are the rivers/streams that flow continuously throughout the year as considered perennial. It contributes an area of 22.38 sq. km. The important river that drains through the district is Pennar which is perennial and flows in the NW-SE direction.

1.4.2.33. River/Stream-Non-Perennial

The water covers the surface for less than nine months in each year considered as non-perennial. This also includes the dry part of the river generally characterized by the presence of sand or exposed rocks. It is found that most of the streams are under the non-perennial category and contribute an area of 209.79 sq. km (1.87%). It is found that the Chitravathi, Cheyyair, Papagni, Kundair, Sagileru, etc are delineated under the non-perennial category.

1.4.2.34. Canal/Drain

Drains and canals are man-made waterways that are built for irrigation, navigation, or to remove extra water from agricultural lands. It is found

mostly in plains with the outlet of reservoirs like Gandikota, Telugu Ganga, and Somasila. This category contributed an area of 29.67 sq. km.

1.4.2.35. Reservoir/Tanks-Permanent

The reservoir is an artificial lake created by the construction of a dam across the river specifically for hydel power generation, irrigation, and water supply for domestic/ industrial needs, flood control, either singly or in combination. Tanks are small lakes of impounded waterways constructed on land surface for irrigation. They are associated with croplands, low lands and reservoirs surrounded by hills without vegetation. This includes all reservoirs/tanks with water spread seen at least during one season in a year is considered under the permanent category. The major reservoirs under this category are Somasila Gandikota and Telugu Ganga. This category occupies an area of 145.92 sq. km.

1.4.2.36. Reservoir/Tanks-Seasonal

Dry reservoirs/tanks are those, which do not have water spread throughout the year, and are considered as seasonal. The tanks under the seasonal category are spread over an area of 317.31 sq. km and found this category is predominant among the water bodies.

1.4.3 Forest Cover Distribution

The interpretation of various topographical maps from different sources and IRS R2 LISS III satellite data (2015-16) were used to create the forest cover maps. Land with a tree canopy cover of more than 10% and a size of more than 0.5 ha is referred to as a forest. The notified forest boundaries are considered to contain a forest if there are both trees and no other dominant land uses there. The trees should be able to reach a minimum height of 5 m within the notified forest boundaries. Major forest areas of YSR Kadapa district fall under Dry deciduous and Scrub spiny forests. These forests are rich in diversity, with Nallamalais, Seshachalam, and Erramalais vegetation. The spatial distribution of forest cover and its statistics of the YSR Kadapa district are presented in Figure-9, and Table-6. As per the Forest Department, Government of Andhra Pradesh the Forest boundary map is presented in Figure-10.

Table 6 Forest cover distribution in YSR Kadapa District

S. No	Forest Category	Area in sq. km	% to district total
1	Deciduous (Dry/Moist/Thorn)-	1097.56	9.78

S. No	Forest Category	Area in sq. km	% to district total
	Dense/Closed		
2	Deciduous (Dry/Moist/Thorn)-Open/Closed	934.24	8.32
3	Forest Plantation	8.72	0.08
4	Scrub Forest	929.13	8.28
5	Tree Clad Area-Dense/Closed	7.35	0.07
6	Tree Clad Area-Open	40.09	0.36
	Total	**3017.09**	**26.87**

Data source: NR Census 3rd cycle mapping, NRSC/ISRO & APSAC, GoAP

The district has a variety of vegetation types rich in flora and fauna. Its varied topography ranging from the hills of Eastern Ghats and plains supports varied ecosystems and is placed among the largest forest range. A larger part of the YSR Kadapa district is inhabited by this forest. The total forest area in the district is 3017.09sq. km, accounting for 26.87% of the total geographical area of the district. The forest cover extends over the entire southern parts and eastern parts of the district. The forest cover vegetation is largely dry deciduous type with a mixture of Teak, Bamboo, Red Sandal, Devadharu, etc. Red Sanders is highly valued for its rich red colour and grain pattern. A rare form of sandalwood is abundant in this region.

1.4.4 Agricultural Resources in YSR Kadapa District

Remote sensing technology has been successfully used by APSAC during the last two decades in the areas of agriculture both in the spatial and temporal domain under various projects. Advancements in satellite remote sensing technology have enabled regular monitoring of crop conditions/vigor over large regions. Among the various spectral vegetation indices commonly derived from remote sensing data, the Normalized Difference Vegetation Index (NDVI) is most widely used for operational assessment of drought owing to the ease in calculation and interpretation and also its ability to partially compensate for the effects of atmosphere, illumination geometry, etc. APSAC carried out in-season crop condition assessment at the Mandal level in Andhra Pradesh to enable the administrators and planners to take strategic decisions on the management of drought, import-export policy matters, and trade negotiations.

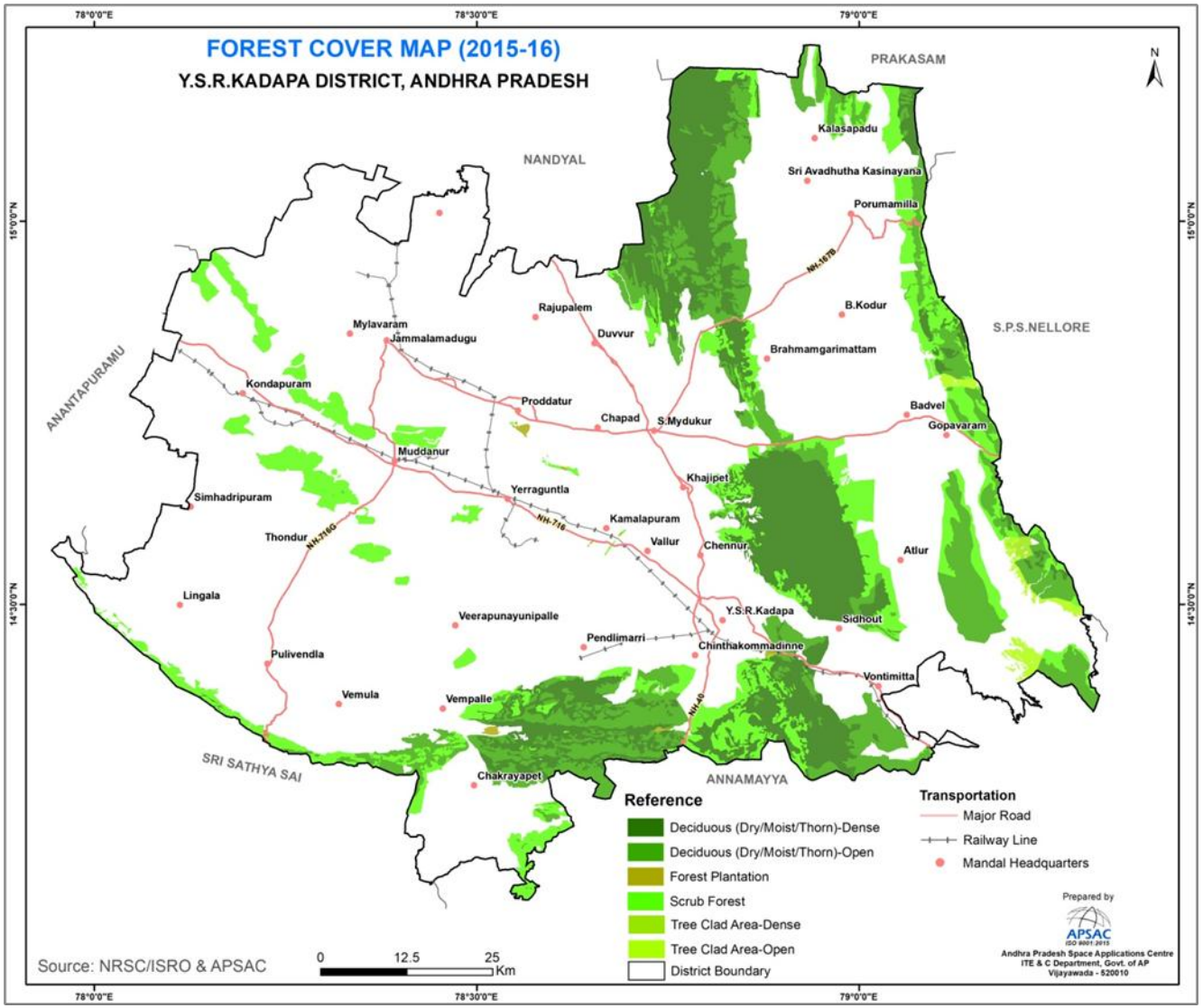


Figure-9: Forest cover map of YSR Kadapa District

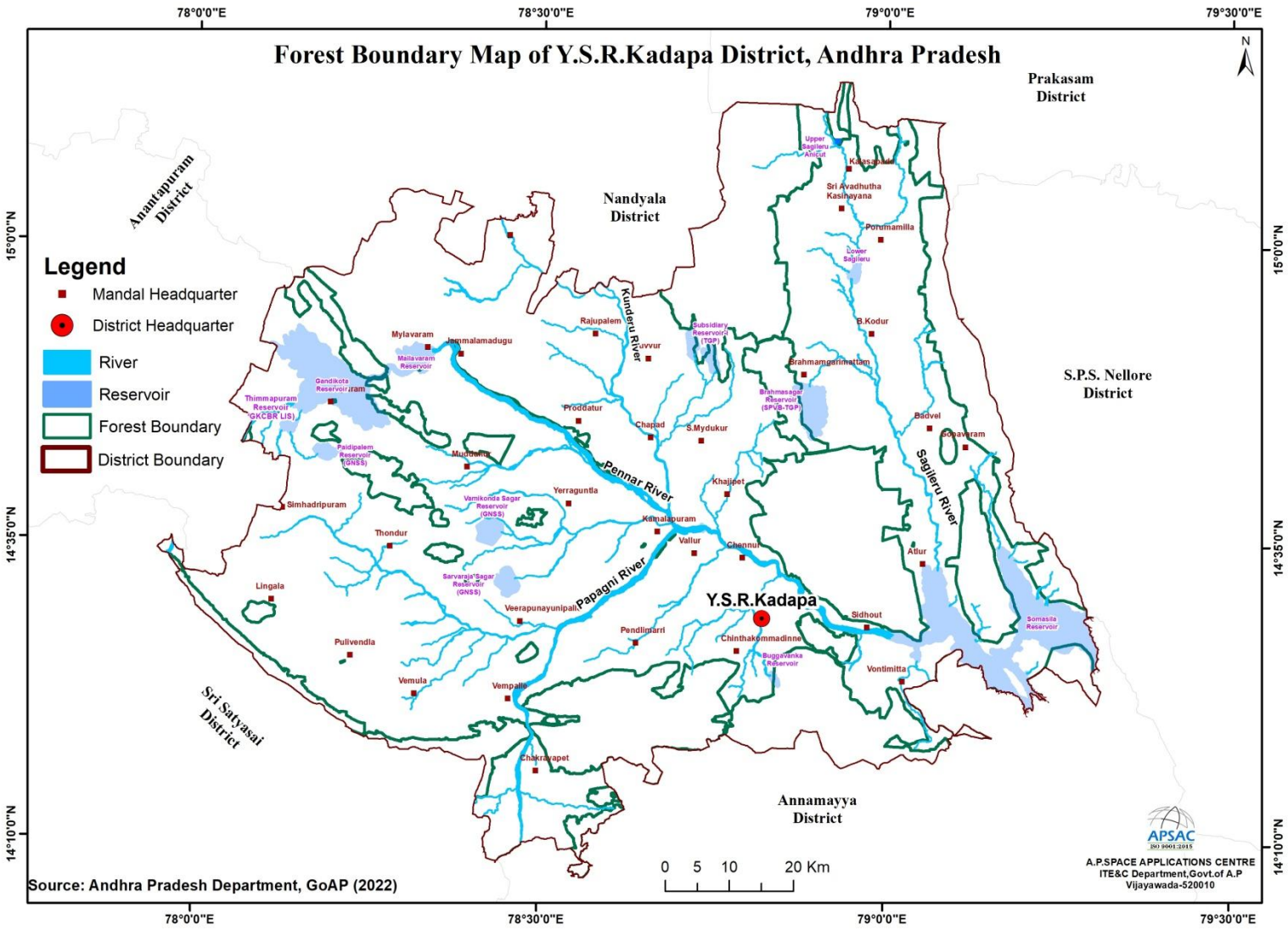


Figure-10: Forest boundary map of YSR Kadapa District

The NDVI is derived using the formula (NIR–Red)/(NIR+Red), where NIR and Red are the reflectance in visible and near infrared channels. Water, clouds and snow have a higher reflectance in the visible region and consequently NDVI assumes negative values for these features. Bare soil and rocks exhibit similar reflectance in both visible and near IR regions and the index values are near zero. The NDVI values for vegetation generally range from 0.2 to 0.6, the higher index values being associated with the greater green leaf area and biomass. Shortwave Infrared (SWIR) band is sensitive to moisture available in the soil as well as in the crop canopy. In the beginning of the cropping season, soil background is dominant, hence,The SWIR is sensitive to soil moisture in the top 12 cm. As the crop growth progresses, the SWIR becomes sensitive to leaf moisture content. SWIR band provides only surface wetness information. Normalized Difference Wetness Index (NDWI), computed using SWIR data, can complement NDVI for drought assessment, particularly in the beginning of the cropping season. NDWI is derived as follows: NDWI=(NIR-SWIR)/(NIR+SWIR) where, NIR and SWIR are the reflected radiation in Near Infrared and Shortwave Infrared channels. Higher values of NDWI signify more surface wetness.

Satellite based crop condition anomalies which point towards agricultural drought can be generated by the computing Vegetation Condition Index (VCI) of NDVI and VCI of NDWI. While combining VCI of NDVI and NDWI, the minimum of two values can be taken, i.e., if at least one is in Severe category, the category will be considered as severe. If at least one is moderate, then the category will be taken as moderate. The vegetation condition and range in percentage is given in Table-7.

Table 7 Vegetation condition and range in percentage

VCI range (%)	Vegetation	Description
60-100	Normal	Crop condition is Normal
40-60	Moderate	Crop condition is Moderate
0-40	Severe	Crop condition is Severe

Data Source: APSAC, Vijayawada

1.4.5 Soil Resources of the YSR Kadapa District

The different types of soils encountered in the YSR Kadapa District of Andhra Pradesh. The predominant soil types in the district are Shallow gravelly red soils 1985.48 sq. km (19.65%) followed by Gravelly loamy dark brown moderately deep soils 1903.6 sq. km (18.84%), Deep black clayey soils 1455.89 sq .km (14.41%), Moderately deep calcareous black soils 1412.99 sq. km (13.98%), Gravelly clayey moderately deep desert soils 1090.97sq. km (10.80%) and Gravelly clayey shallow dark brown soils 894.03 sq.km. (8.85%). The soil resource map of district is shown in Figure- 11. The soil category, area and percentage of contribution is shown in Table: 8

Table 8 Soil classes in YSR Kadapa district

S.No	Classification	Area in Sq.km	Percentage
1	Clayey to gravelly clayey moderately deep Dark brown soils	167.46	1.66
2	Deep black clayey soils	1455.89	14.41
3	Gravelly clayey moderately deep desert soils	1090.97	10.80
4	Gravelly clayey moderately deep Redsoils	222.24	2.20
5	Gravelly clayey shallow dark brown soils	894.03	8.85
6	Gravelly loamy dark brown moderately deep soils	1903.6	18.84
7	Loamy to clayey skeletal deep Reddish brown soils	343.47	3.40
8	Loamy to gravelly clay deep Dark reddish brown soils	289.57	2.87
9	Moderately deep calcareous black soils	1412.99	13.98
10	Settlements	14.21	0.14
11	Shallow gravelly Redsoils	1985.48	19.65
12	Shallow loamy to gravelly clay Red soils	42.76	0.42
13	Water Bodies	283.1	2.80
	Total Area	**10105.77**	**100**

Data Source: APSAC, Vijayawada

1.4.6 Salt-affected land:

The term 'salt-affected soil/land' refers to soils in which salts interfere with normal plant growth. Salt-affected soils can be divided into saline, saline-sodic and sodic, depending on salt amounts, type of salts, amount of sodium present, and soil alkalinity. (Reference FAO Soils Portal)

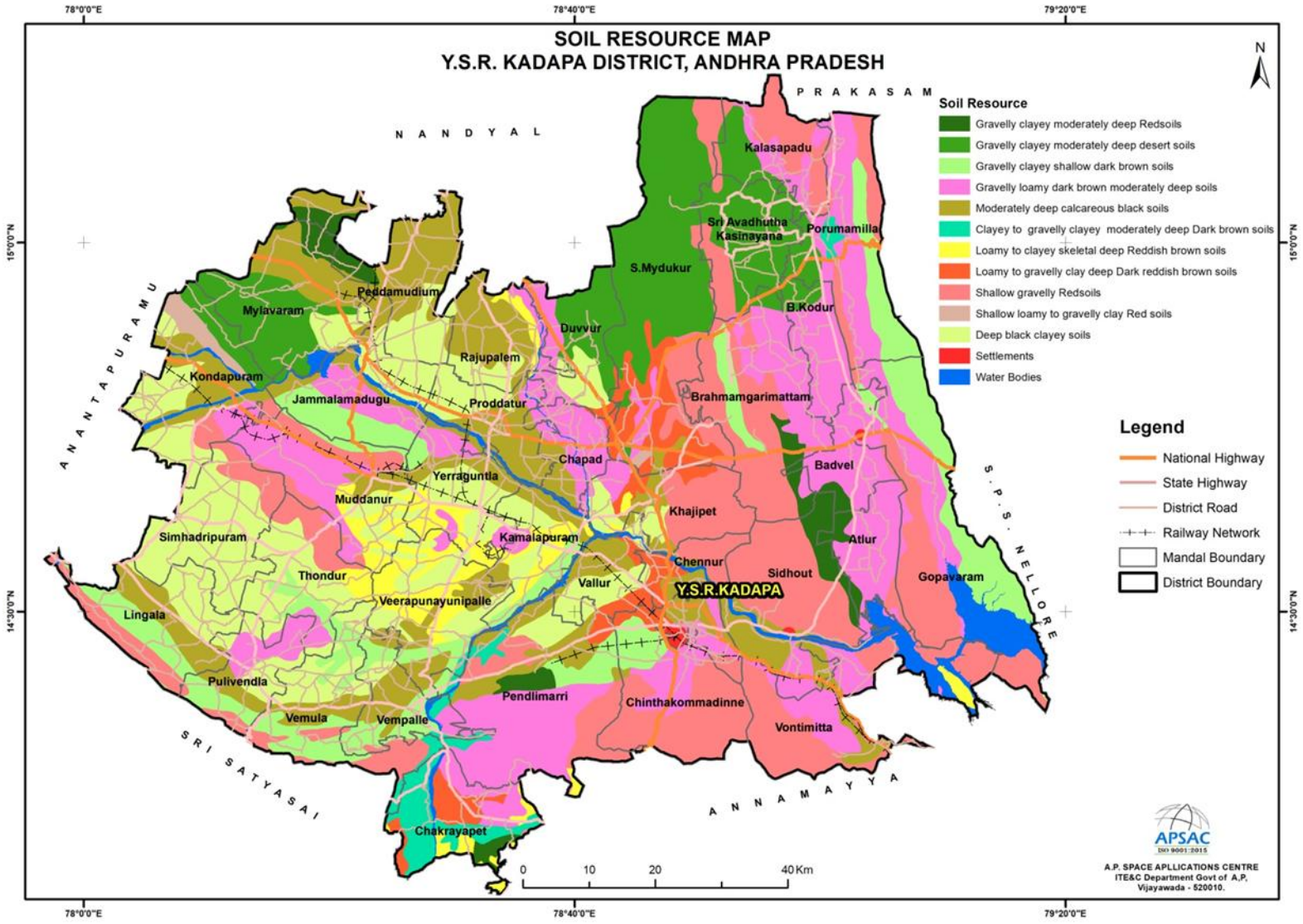


Figure-11: Soil resource map of YSR Kadapa District

These lands are containing an excessive concentration of salts (soluble salts or exchangeable saline or both). Salinization can result from improper management of canal irrigation water resulting in the rise of the water table and consequent accumulation of salts in the root zone in arid, semi-arid, and sub-humid (dry) conditions and ingress of seawater in coastal regions and/or use of high salt containing groundwater. They also become saline when soils have developed on salt-containing parent materials or have saline groundwater. Coastal saline soils may be with or without ingress or inundation by seawater. The Salt-affected soil/ land area in the YSR Kadapa district is 5,447 hectares. The spatial distribution of salt affected soils is shown in the Figure-12.

1.4.7 Horticulture

Horticulture is a science, as well as, an art of production, utilisation and improvement of horticultural crops, such as fruits and vegetables, spices, ornamental, plantation, medicinal and aromatic plants. It also includes plant conservation, landscape restoration, landscape and garden design, construction, and maintenance, and arboriculture, ornamental trees, and lawns.In the Y.S.R Kadapa district, Sweet Orange is the major horticulture crop, cultivated in the area of 6587.45 ha. followed by Banana (830.54ha.), Mangoes (656.53 ha.) and Acid Lime (283.96 ha.) and the total area under horticulture crops is 8695.08. The crop wise detail shown in the Table-9.

Table 9 Area of horticultural crops in YSR Kadapa district

S.No	Crop	Area in ha
1	Sapota	30.92
2	Black Berry	4.37
3	Lime/Lemon/Citrus	46.78
4	Jamun	10.99
5	Anjura(Fig)	5.41
6	Dragon Fruit	9.97
7	Papaya	32.4
8	Banana	830.54
9	Bael	0.85
10	Custard Apple	7.68
11	Sweet Orange	6587.45
12	Sweet Lime	43.14

S.No	Crop	Area in ha
13	Strawberry	1.2
14	Mangoes	656.53
15	Guava	90.12
16	Pomegranate	41.45
17	Acid Lime	283.96
18	Mandarin Orange	3.32
19	Mulberry	8
Total		**8695.08**

Source: Government of Andhra Pradesh Rashtriya Krishi Vikas Yojana-2022-23.

1.5 Ground Water Prospects in the District:

YSR Kadapa/Kurnool developments comprise of for the most part shales, quartzites, and lime stones/dolomites. Groundwater happen submerged table conditions in weathered segment of the arrangement and the thickness of the weathered portion is around 10m bgl. The Ground water is developed in weathered elixir through vast distance across burrowed wells (6m). As the pressure on ground water levels, the water levels were brought down and the yields from burrowed wells diminished and once in a while went away in the dry spell years. The details groundwater prospect shown in Figure- 13.

1.6 Infrastructure

1.6.1 Transport Network

Y.S.R.Kadapa district, located in the state of Andhra Pradesh, India, has a well-connected transport network comprising various modes of transportation which includes.

1.6.1.1. Road Transport: Y.S.R. Kadapa district in Andhra Pradesh, India, has a well-developed road network that facilitates connectivity within the district and to other major cities and towns. The road network includes national highways, state highways, and district roads. Here are some key roads in Kadapa district.

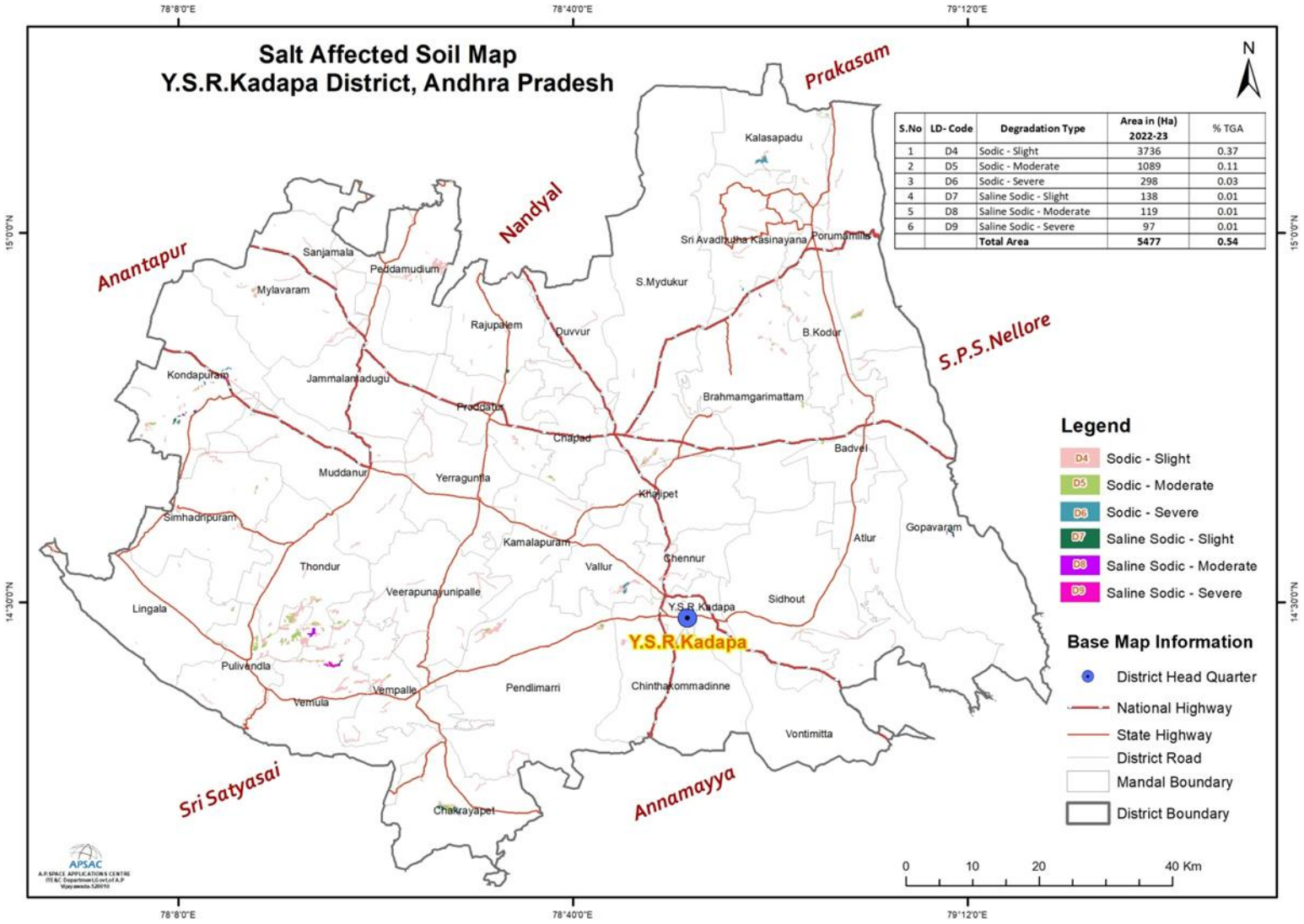


Figure-12: Illustrates the spatial distribution of salt affected soil in YSR Kadapa district.

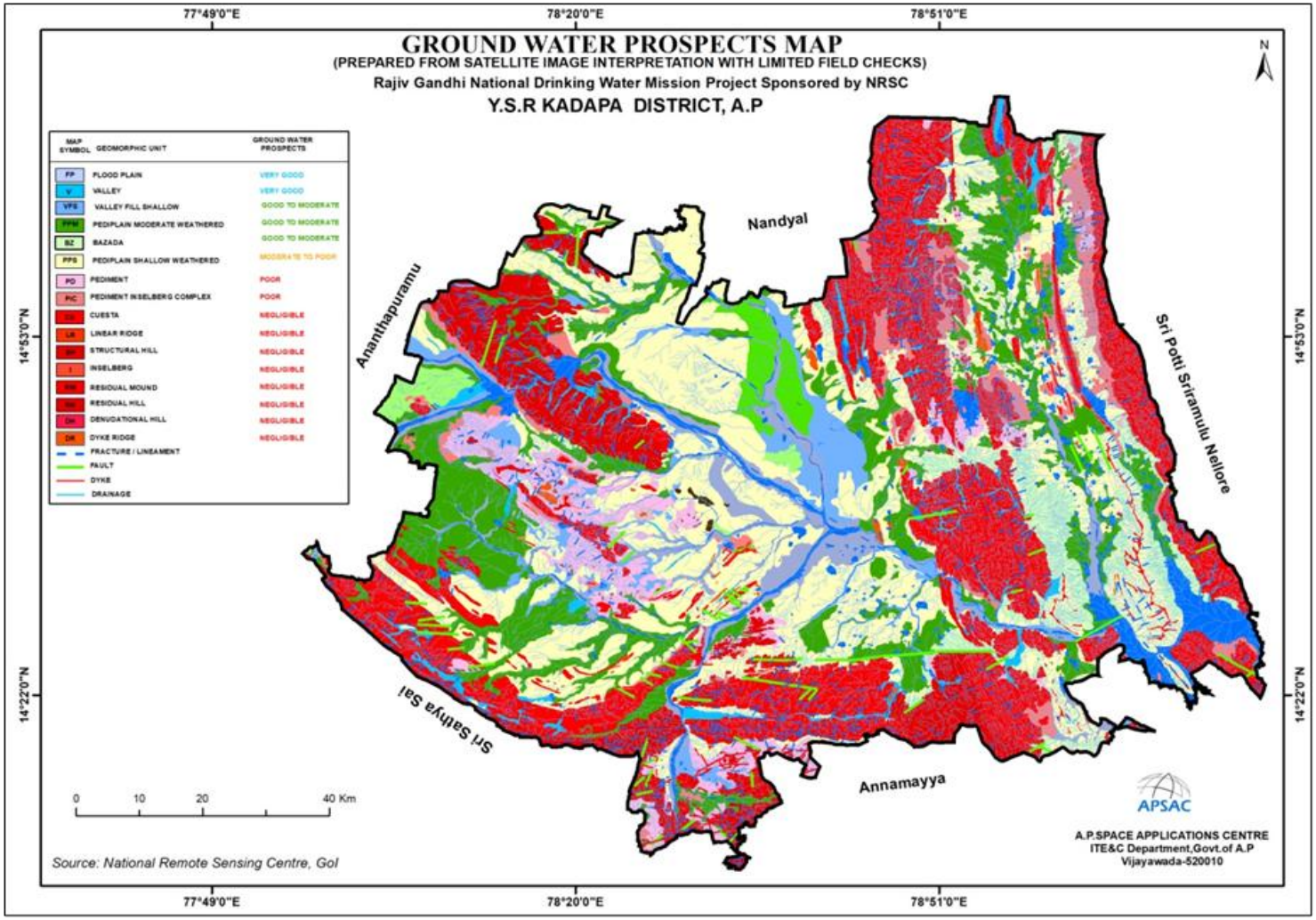


Figure-13: Ground Water prospects in YSR Kadapa District, Andhra Pradesh

The district has an extensive road network of 16528.53 km with various types of roads such as, National Highways, State Highways, District Roads and Other Roads. The district has a total length of 361.86 Km of National Highways, The district is well-served by state highways, which connect major towns and cities within Y.S.R. Kadapa district, as well as neighbouring districts with a length of 609.71 Km, has an extensive network of district roads, connecting towns, villages, and rural areas. These roads provide accessibility to remote areas and serve as vital links for transportation with a road length of 2833.55 Km of district roads (Figure-14). The district ensures connectivity to remote rural areas as well which includes Panchayat Raj roads, village roads, cart track, foot path are also available. The road network has been delineated by using high resolution satellite data under Space Based Information Support for Decentralized Planning (SIS-DP) project and arrived the lengths of the road network Y.S.R. Kadapa district is traversed by four National Highways namely:

1.6.1.1.1. National Highway 40 (NH40): Junction with NH-44 near Kurnool -Nandyal, Cuddapah, Pileru, Putalapattu and Chittoor-Tamil Nadu Border. This highway passes through Kadapa district and connects it to major cities like Chennai, Bengaluru, and Hyderabad. It starts from Chennai in Tamil Nadu and goes through Kadapa, Kurnool, and Anantapur districts before entering Karnataka.

1.6.1.1.2. National Highway 716 (NH716): Tamil Nadu Border-Renigunta, Mamanduru, Settigunta, Koduru, Pullampeta, Rajampet, Nandalur, Madhavaram, Vonimitta, Bhakarapet, Kadapa (Cuddapah), Kuarunipalli, Vellore, Thapetla, Kothapalli, Hidipirala, Pandillapalle, Thiparulu, Yeragunttla, Nidizivve, Chillamakuru, and terminating at its junction with NH-67 near Muddanuru, it connects Kadapa district to the neighboring Prakasam district. It starts from Kadapa and passes through Rajampet and Giddaluru, eventually joining National Highway 65 (NH65) in Prakasam district.

1.6.1.1.3. National Highway 67 (NH67): Karnataka Border- Gooty, Tadapatri, Muddanru, Maidukuru, Badvel, Atmakur, Nellore on NH-16-Krishnapatnam Port.

1.6.1.1.4. National Highway 167B (167B): Mydukuru market junction i.e. intersection with NH-67-Onipenta-Porumamilla-Kammavaripalli village on MDR 4809 -Rajasaheb Peta, Tekuri Peta, Seetharamapuram, Kothapalli, Ambavaram, Ganeshunipalli, Darsi Gunta (D.G)Petaand

Chandrasekharapuram, Kmovilampadu, Khamampadu, Bookapuram, Tumalgunta, Pamaru, Nuchhupada,Inimerla, Lakshmi Narsapuram, Mopadu, Botalagudur, Ayyavaripalli, Malakonda, ChundiAyyavaripalem, Chundi, Veletivaripalem, Pokuru, Nukavaram, Badevaripalem, Cherlopalem, Kundukur, Malyadri Colony, Oguru, Kanumalla -junction of NH-16 at Singarayakonda. Figure-14 is showing the Transport Network of NTR district, Andhra Pradesh.

Table 10 Road Type and Length in the YSR Kadapa District

S.No	Road Type	Length in Km
1	National Highway	361.86
2	State Highway	609.71
3	District Road	2833.55
4	Village Road	6187.13
5	Cart Track	4516.36
6	Foot Path	1716.16
7	City Road	303.76
Total Length		**16528.53**

Data Source: APSAC, Vijayawada

1.6.1.2. Railways: Y.S.R. Kadapa district is served by the Indian Railways, with several railway stations catering to the transportation needs of the people. It has an Extensive Rail Network of 230.70 Km length with 20 railway stations; among these Kadapa railway station is the major railway station in the district, Four important railway stations (i.e.Kamalapuram, Kondapuram, Muddanuru, Yerraguntla Junction) and 15 train stations (i.e. Bhakarapet, Ganganapalle, Gangayapalle, Jammalamadugu, Kalamalla, Kanamalopalle, Krishnapuram, Mangapatnam, Mantapampalle, Ontimitta, Pendlimarri, Proddatur, Regadipalli, S Uppalapadu, Yerragudipad).

Y.S.R. Kadapa district in Andhra Pradesh, India, is traversed by a significant railway line that connects various parts of the district and provides connectivity to neighbouring regions. The main railway line that passes through Kadapa district is Chennai-Mumbai main line which is a major trunk route that connects Chennai in Tamilnadu with Mumbai in Maharashtra. It passes through Kadapa district, with important railway stations like Kadapa railway station and Yerraguntla railway station,

railway station falling along this line. The Chennai-Mumbai main line is a vital railway corridor, facilitating passenger and freight transportation across the region.

In addition to the main line, there are various branch lines and spur lines that extend from the main line to connect specific towns and industrial areas within Kadapa district. These lines provide local connectivity and transportation services to different parts of the district.

1.6.1.3. Air Transport: The district has its own airport, Kadapa airport, also known as Cuddapah airport. It offers domestic flights to cities like Hyderabad, Bangalore and Chennai. The airport has a single runway and can handle small to medium-sized aircraft. Air transport in Kadapa district primarily focuses on domestic flights. The airport is operated by the Airports Authority of India (AAI).

1.6.2 Irrigation

1.6.2.1. Major and Medium Irrigation Projects in YSR Kadapa district

Irrigation has assumed an increasing significance in agriculture in the context of new technology, where high yielding varieties and multiple cropping is being practiced. The main reasons for low yields are inadequate rainfall, uneven and uncertain rains during the period of crop growth. It is generally found that the introduction of irrigation is associated with changes in the cropping pattern. The shift from traditional cropping pattern to the most advantageous cropping pattern is possible only in the presence of irrigation facilities. The new agricultural technology is highly based on sufficient moisture conditions. Thus, the development of irrigation is crucial for increasing agricultural production. The irrigation projects are classified as major, and medium irrigation projects shown in Table: 11 and Figure- 15.

1.6.2.1.1. Major Irrigation Projects:

There are 10 major irrigation projects in the district, out of these 03 major projects are completed and the other 07 are ongoing projects. The major completed projects are Kurnool-Kadapa Canal (KC-Canal), Mailavaram Project and Srisailam Right Bank Canal (SRBC) and the major ongoing projects are Chitravathi balancing reservoir (Lingala Canal System), Pulivendula Branch Canal (PBC), Krishna Devaraya Galeru Nagari Sujala Sravanthi (GNSS), Telugu Ganga Project (TGP), Gandikota Lift Irrigation Scheme, Gandikota-CBR Lift Irrigation Scheme and Poola Venkata Subbaiah Veligonda Project.

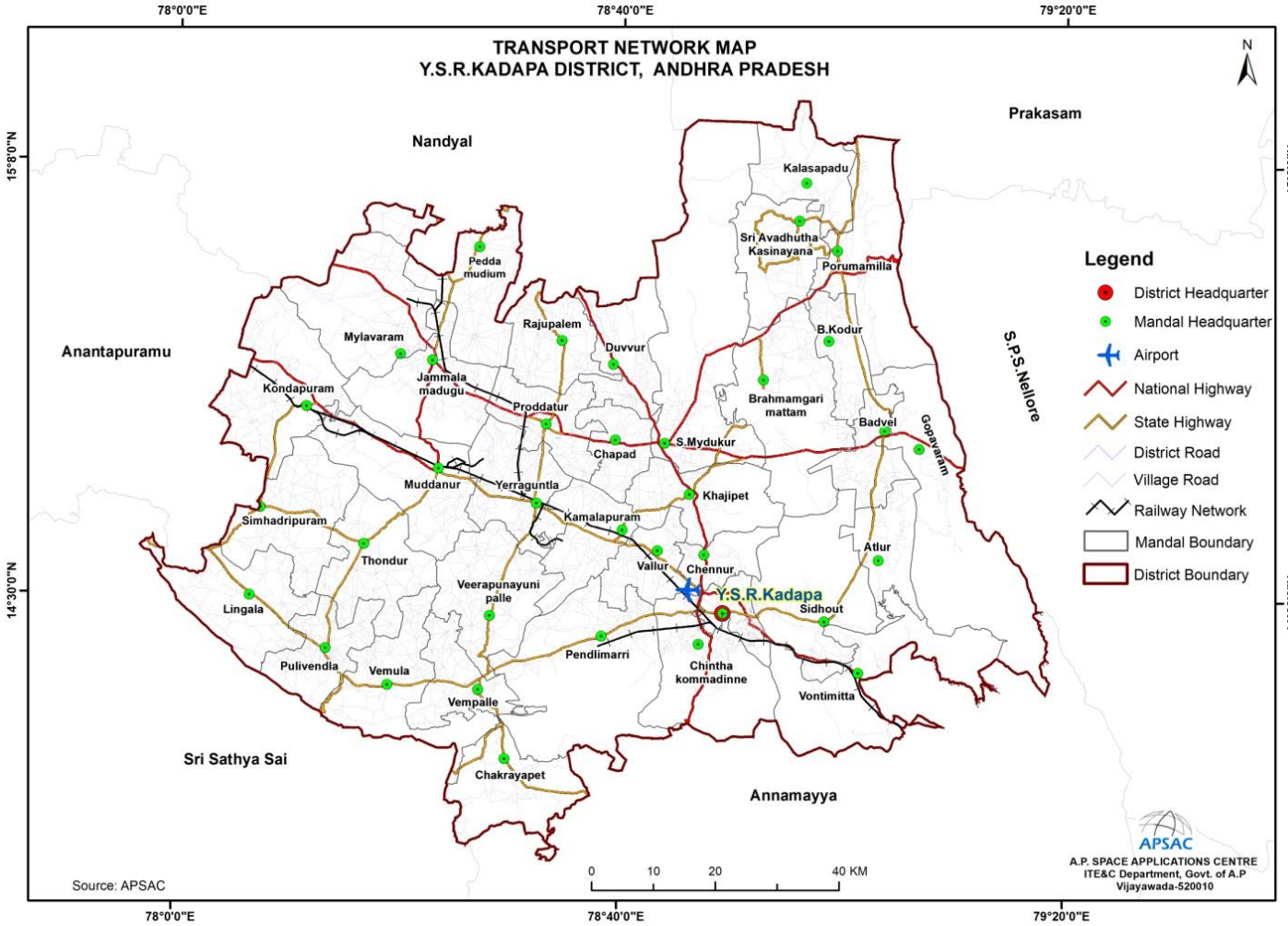


Figure-14: Transport Network of YSR Kadapa district, Andhra Pradesh

Table 11 Road Type and Length in the YSR Kadapa District

S.No	Project Type	Name of the Project	Status	Ayacut in Ac
1	**Major**	KC-Canal	Completed	92,001
2		Mailavaram Project		75,000
3		Srisailam Right Bank Canal (SRBC)		29,199
4		Chitravathi Balancing Reservoir (Lingala Canal System) (**Combined District**)	Ongoing	59,400
5		Pulivendula Branch Canal (PBC)		50,780
6		Krishna Devaraya Galeru Nagari Sujala Sravanthi (GNSS) (**Combined District**)		1,03,500
7		Telugu Ganga Project (TGP)		1,77,000
8		Gandikota Lift Irrigation Scheme		47,500
9		Gandikota-CBR Lift Irrigation Scheme		7,000
10		Poola Venkata Subbaiah Veligonda Project		27,200
11	**Medium**	Buggavanka Reservoir Project	Completed	12,850
12		Upper Sagileru		5,335
13		Lower Sagileru		12,869
Total				**6,99,634**

Data source: WRD, APWRIMS, Govt. of A.P.

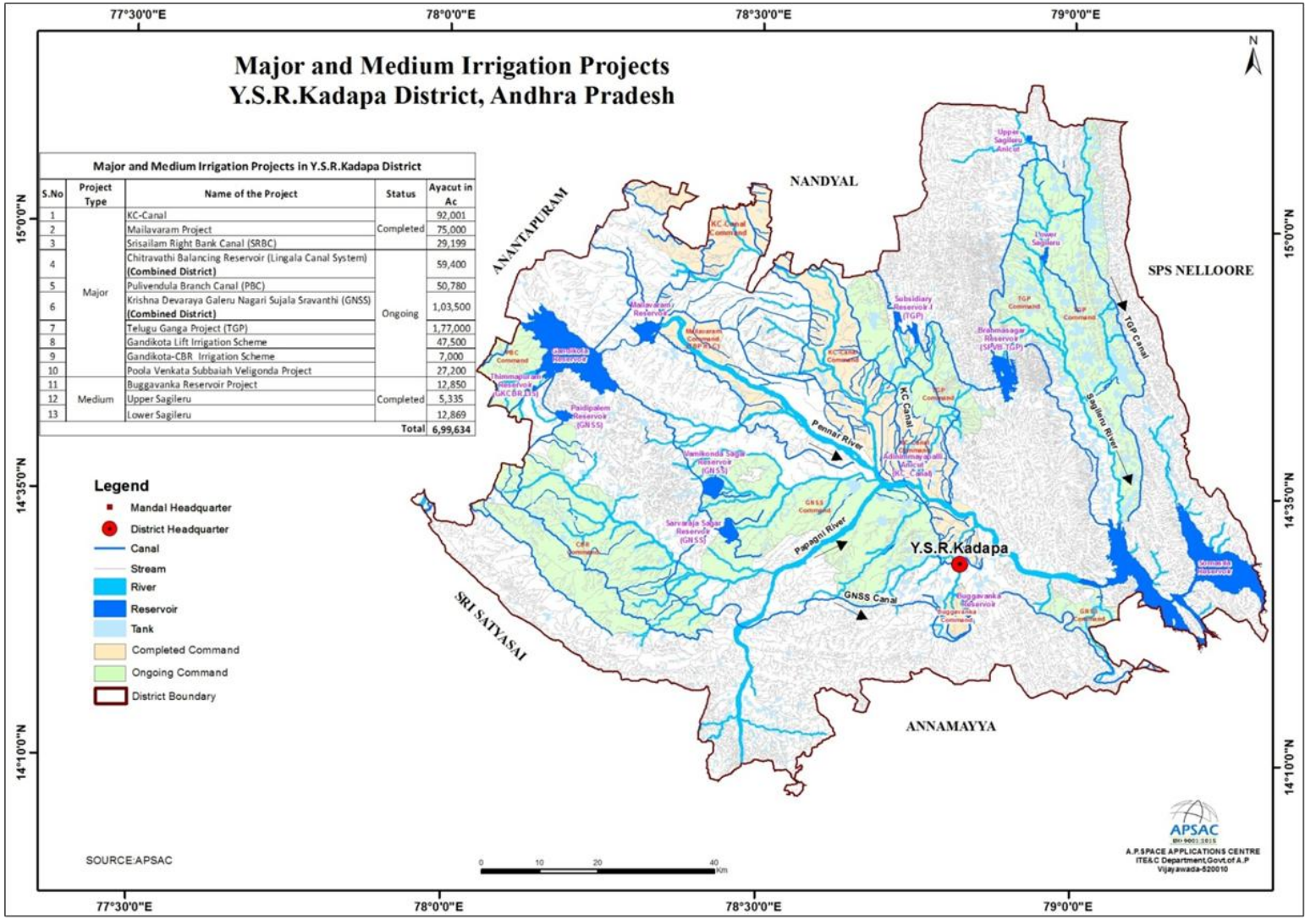


Figure-15: Major and Medium Irrigation Projects of YSR Kadapa District

1.6.2.1.2. Medium Irrigation Projects:

The medium irrigation projects (completed) are Upper Sagileru Project, Lower Sagileru Project and Buggavagu Project. The project wise ayacut details are Upper Sagileru Project is 5,335 Ac, Lower Sagileru Project is 12,869 Ac and Buggavagu Project is 9,700 Ac.

1.6.2.2. Tank Information System

There are 400 Minor Irrigation Tanks in the district, data available WRD department WEB Portal. The Designed Storage Capacity of MI tanks in YSR Kadapa district 9,346.48 mcft and Current Storage Capacity of MI tanks 6,686.02 mcft. The mandal wise MI Tanks details of YSR Kadapa district shown in Table-12.

Table 12 Mandal wise Minor Irrigation Tanks details of YSR Kadapa district

S.No	Mandal	No.of MI Tanks	DesignedStorage Capacity (mcft)	Current Storage Capacity (mcft)
1	ATLUR	26	212.52	145.72
2	B KODUR	26	470.44	162.66
3	BADVEL	28	3,171.68	2,762.89
4	BRAHMAMGARIMATTAM	30	412.56	269.74
5	CHAKNAYAPET	27	429.54	249.81
6	CHENNUR	2	4.31	1.08
7	CHINTHA KOMMADINNE	22	194.6	80.53
8	CUDDAPAH MANDAL	13	86.06	32.73
9	DUVVUR	3	54.99	52.49
10	GOPAVARAM	22	220.98	193.31
11	JAMMALAMADUGU	10	128.14	117.11
12	KALASAPADU	15	490.94	366.57
13	KAMALAPURAM	5	176.51	149.46
14	KHAJIPET	2	157.6	78.8
15	LINGALA	5	75.5	26.93
16	MUDDANUR	10	117.49	74.22
17	MYLAVARAM	10	102.48	69.9
18	PEDDAMUDIUM	2	24	18
19	PENDLIMARRI	7	117.7	109.15
20	PORUMAMILLA	40	1,069.05	932.94
21	PULIVENDLA	5	74.1	45.58
22	S MYDUKUR	14	185.83	75.02
23	SIDHOUT	4	17.76	0.96

S.No	Mandal	No.of MI Tanks	DesignedStorage Capacity (mcft)	Current Storage Capacity (mcft)
24	SIMHADRIPURAM	2	46.22	46.22
25	SRI AVADHUTHA KASINAYANA	26	521.76	211.92
26	THANDUR	10	57.54	37.45
27	VALLUR	10	205.97	71.2
28	VEERAPUNAYUNIPALLE	4	16.43	13.57
29	VEMPALLE	5	94.87	74.69
30	VEMULA	5	188.06	163
31	VONTIMITTA	8	217.87	51.17
32	YERRAGUNTLA	2	2.96	1.2
	TOTAL	400	9,346.48	6,686.02

Data source: WRD, APWRIMS, Govt. of A.P.

1.6.3 Eco-sensitive areas and Important places :

Y.S.R. Kadapa district in Andhra Pradesh, India, is blessed with several tourist attractions that offer a mix of historical, cultural land natural wonders. Here are some popular Tourist, Religious and Cultural places to visit in Kadapa district. The important popular tourist, religious and culturalplaces to visit in the Kadapa district are shown in the Table-13 and the geographical location of each place is depicted in Figure-16. A brief description of certain tourist places is given below:

Table 13 Important places of Tourism in YSR Kadapa district.

S.No	Name	Village	Mandal
1	Adinimmayapalli Anicut Reservoir View Point	Gandikota	Jammalamadugu
2	Ameen Peer Dargah Kadapa	Kadapa (M)	Kadapa
3	Arogyamatha Kshetram, Kadapa	Viswanathapuram	Chinthakommadinne
4	Bhagvan Mahavir Govt Museum Kadapa	Mamillapalli (U)	Chinthakommadinne
5	Brahmamgari Mattham Temple	Palugurallapalle (Part Iv)	Brahmamgarimatta m
6	Brahmasagar Reservoir View Point	Jangamrajupalle	Brahmamgarimatta m
7	Chand Pira Gumbadh Kadapa	Cuddapah	Kadapa
8	Devuni Kadapa Cheruvu Boating Point	Cuddapah	Kadapa
9	Grannery in Gandikota Fort	Gandikota	Jammalamadugu

S.No	Name	Village	Mandal
10	Kapartheeswara swamy Kona Temple	Forest	Sidhout
11	Madhavaraya Temple, Gandikota Fort	Gandikota	Jammalamadugu
12	Mosque in Gandikota	Gandikota	Jammalamadugu
13	Mylavaram Reservoir, Mylavaram	Mylavaram	Mylavaram
14	Nithyapooja Kona Swamy Temple	Forest	Sidhout
15	Peacock Breed Centre (Idupulapaya)	Idupulapaya	Vempalle
16	Raghunatha Temple, Gandikota Fort	Gandikota	Jammalamadugu
17	Siddaiah Matam	Palugurallapalle	Brahmamgarimattam
18	Siddavatham Fort	Sidhout	Sidhout
19	Sri Agasteswara Swamy Kona Temple, Mylavaram	Khaderabad	Mylavaram
20	Sri Avadhuta Kasinayana Swamy Ashramam	Vellala	Rajupalem
21	Sri Bheemeswara Temple, Puspagiri.	Kotluru	Vallur
22	Sri Gandi Anjaneya Swamy Temple	Rachinnayapalle	Chennur
23	Sri Gurrappa Swamy Kona Temple,Mylavaram	Khaderabad	Mylavaram
24	Sri Indranatheswara Swamy Temple, Puspagiri	Kotluru	Vallur
25	Sri Kodanda Ramaswamy Devasthanam	Vontimitta	Vontimitta
26	Sri lakshmi Venkateswara Swamy Devasthanam Devuni Kadapa	Ukkayapalle	Kadapa
27	Sri Pothuluri Veerabrahmerndra Swamy Temple	Somireddipalle	Brahmamgarimattam
28	Sri Someswaralayam Temple, Devuni Kadapa.	Ukkayapalle	Kadapa
29	Sri Vidyanatheswara Temple,Puspagiri	Kotluru	Vallur
30	YSR Memorial Park (Idupulapaya)	Idupulapaya	Vempalle

Data Source: Tourism Department, Government of Andhra Pradesh.

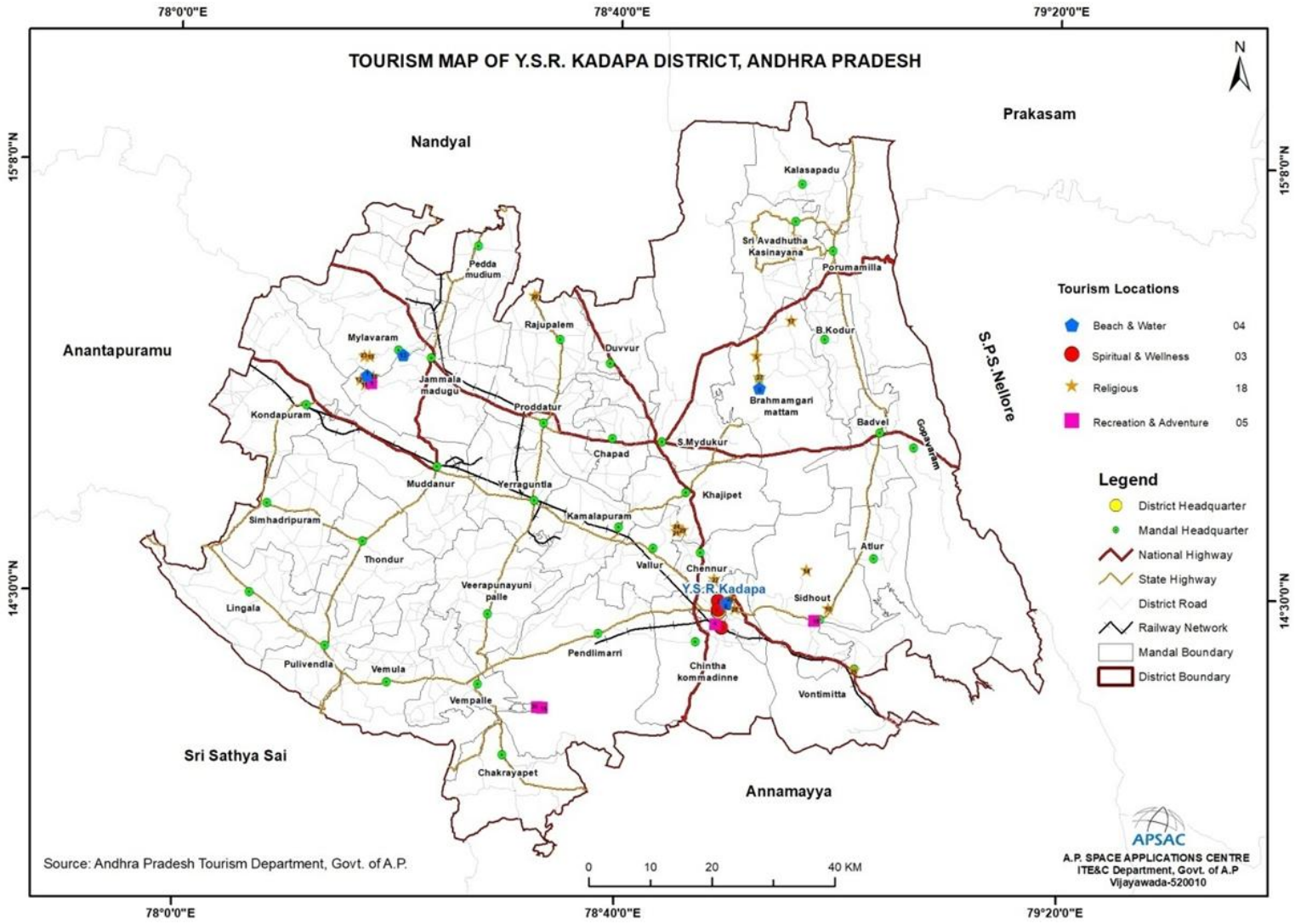


Figure-16: Tourist Map of YSR Kadapa District, Andhra Pradesh

A brief description of certain tourist places is given below:

1.6.3.1. Gandikota Fort and Grand Canyon of India: Located on the banks of the Pennar River, Gandikota Fort is an ancient fort known for its architectural marvels. The fort offers breathtaking views of the gorge, often referred to as the Grand Canyon of India
Siddavatam Fort: Siddavatam Fort is a historical fort known for its strong fortifications and architectural brilliance. It houses the Siddeswara Swamy Temple, dedicated to Lord Shiva.

1.6.3.2. Mylavaram Dam: Mylavaram Dam is a scenic reservoir located on the Pennar river. The dam offers picturesque views and is a popular spot for picnics and boating.

1.6.3.3. Lankamalleswaram Wildlife Sanctuary: One of the reserved forest and main habitat of the rare and endangered species of bird called Jerdon's Courser, It is a verdant paradise with its thick tree cover, deep valleys, steep slopes and picturesque waterfalls adding to the scenic beauty of the place

1.6.4 Places of Religious and Cultural importance

YSR Kadapa district is mostly known for its historical and religious significance. The most popular places here are shown below:

1.6.4.1. Pushpagiri Temples: Pushpagiri is home to a group of ancient temples dating back to the 9th and 10th centuries. These temples showcase exquisite architectural details and intricate carvings.

1.6.4.2. Ontimitta: Ontimitta is known for the Sri Rama Temple, which hosts the famous Kodandarama Swamy Brahmotsavam festival. The temple architecture and the festivities attract devotees from far and wide.

1.6.4.3. Ameen Peer Dargah: Ameen Peer Dargah is a revered Sufi shrine in Kadapa district. It is a popular pilgrimage site and attracts devotees of all faiths.

1.6.4.4. Devuni Kadapa: Near Kadapa city, Devuni Kadapa is a place that is accepted to be the doorstep of Tirupati. Before continuing towards Tirumala Tirupati, pioneers stop at this place to pay their praise to the managing divinity. The celebrated Venkateswara temple here highlights a

special icon of the Lord which has on its invert, a picture of Anjaneya. Worked in the Vijayanagara style of design, it has a great figure of the moving Vigneswara in the Mukha Mandapam, which is highly appreciated.core of Kadapa town. Worked in a square building, it has a vast

1.6.4.5. Masjid-E-Azam: This impressive mosque has a Persian inscription in it, which identifies it as being built in 1691 A.D, during the reign of Aurangazeb.

1.6.4.6. Chand-Phira-Gumbadh: This mausoleum of Syed Shah Mohammed Hussian is arranged in the vault in the middle limited by tall dividers. The parapets of the building are enhanced with arabesque boards in mortar.

1.6.4.7. Brahmamgari-Matham: It is the place where Sri Potuluri Veerabrahmam who was famous for his preaching and mainly for his predictions about the future of the world, stayed in Kandimallayapalli. Brahmamgari Matham was built in Kandimallayapalli after the death of Veerabrahmam. The Matham does not look like temple but has beautifully carved statues and its walls are full of Veerabrahmendra Swamy's preaching and his predictions.

1.7 Drainage Pattern

1.7.1 Drainage

The Pennar river mainly covered in the district and flows towards west to east direction and the major tributaries are Cheyyeru, Papagni, Chitravathi, Kunderu and Sagileru. The Cheyyeru, Chitravathi, Papagni rivers are flowing north to south direction and Kunderu, Sagileru rivers are flowing south to north direction and merged into pennar river in Kadapa district. Drainage Network and Surface Water bodies of the district shown in Figure-17.

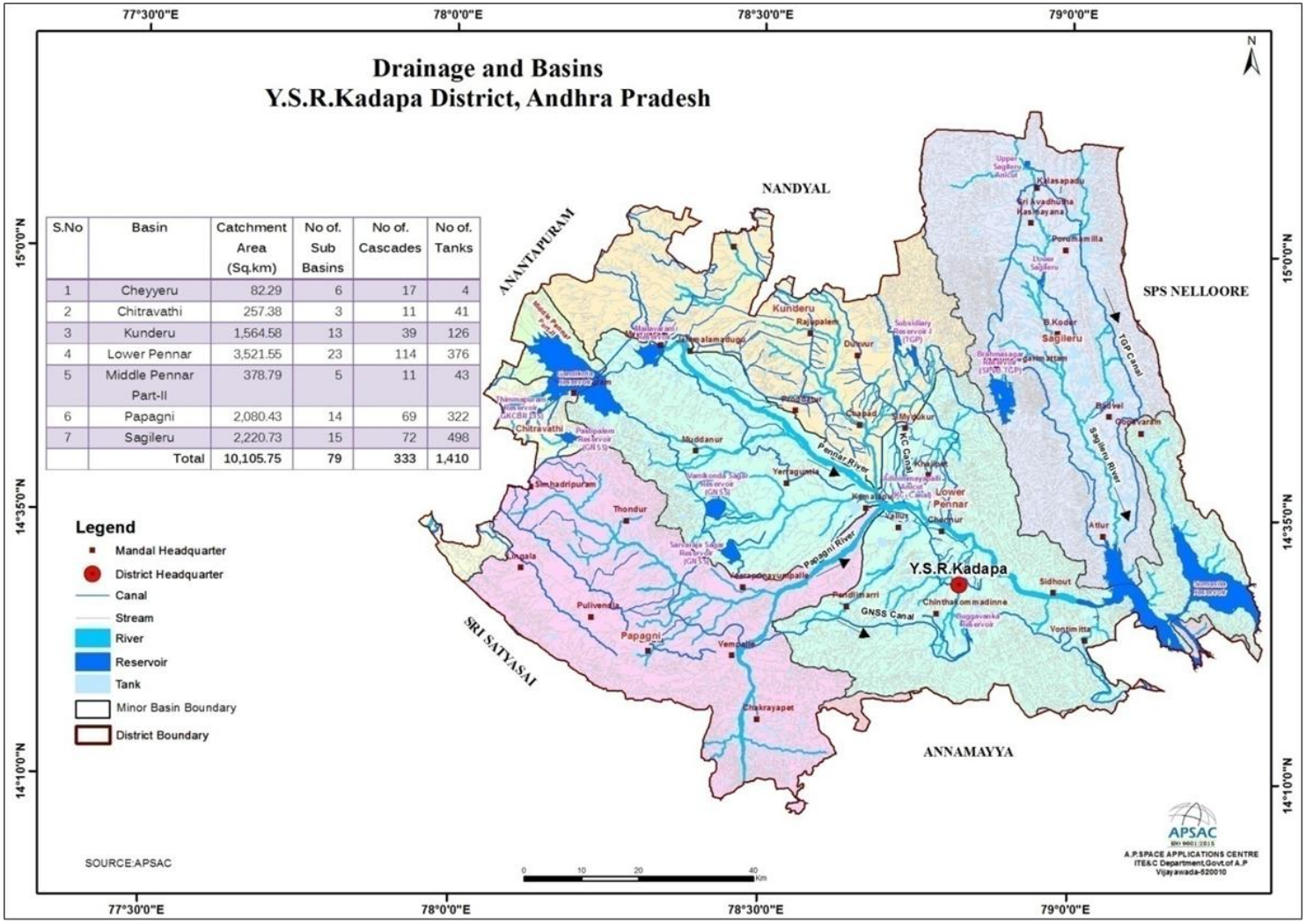
1.7.2 Geomorphology of the District:

Geographically the territory is contained YSR Kadapa Super gathering of rocks upper Proterozoic age. The taluk is in the southeastern bit of the kadapa basin, the arrangements have least thickness andare un-metamorphosed with basic aggravations like collapsing, blaming and jointing. The beds indicate delicate dunks and variety in strike heading Groundwater in the investigation region happens in weathered and cracked zone. Event and development of groundwater is essentially

controlled by the land, geomorphological and basic set up of the territory shown in Figure-18.

1.7.3 Landforms of Fluvial origin

The word fluvialis used in earth science to refer to processes and landforms produced by running water. As with other surficial processes, running water can either erode material from the earth's landscape, or deposit layers of sediment. The resulting landforms can thus be classified as either erosional landformsor depositional landforms. The incredible power of running water in carving various erosional and depositional landforms is well known. Although the quantity of water in a stream is small at one time during the year, very large volumes of water move through the channel and they form an important component in the hydrological cycle. The fluvial dissection of the landscape consists of valleys and their included channel ways organized into a system of connection known as a drainage network. Drainage networks display many types of quantitative regularity that are useful in analyzing both the fluvial systems and the terrains that they dissect (NRSA,2007).



S.No	Basin	Catchment Area (Sq.km)	No of. Sub Basins	No of. Cascades	No of. Tanks
1	Cheyyeru	82.29	6	17	4
2	Chitravathi	257.38	3	11	41
3	Kunderu	1,564.58	13	39	126
4	Lower Pennar	3,521.55	23	114	376
5	Middle Pennar Part-II	378.79	5	11	43
6	Papagni	2,080.43	14	69	322
7	Sagileru	2,220.73	15	72	498
	Total	10,105.75	79	333	1,410

Figure - 17: Drainage Network and Surface Water Bodies of the YSR Kadapa District

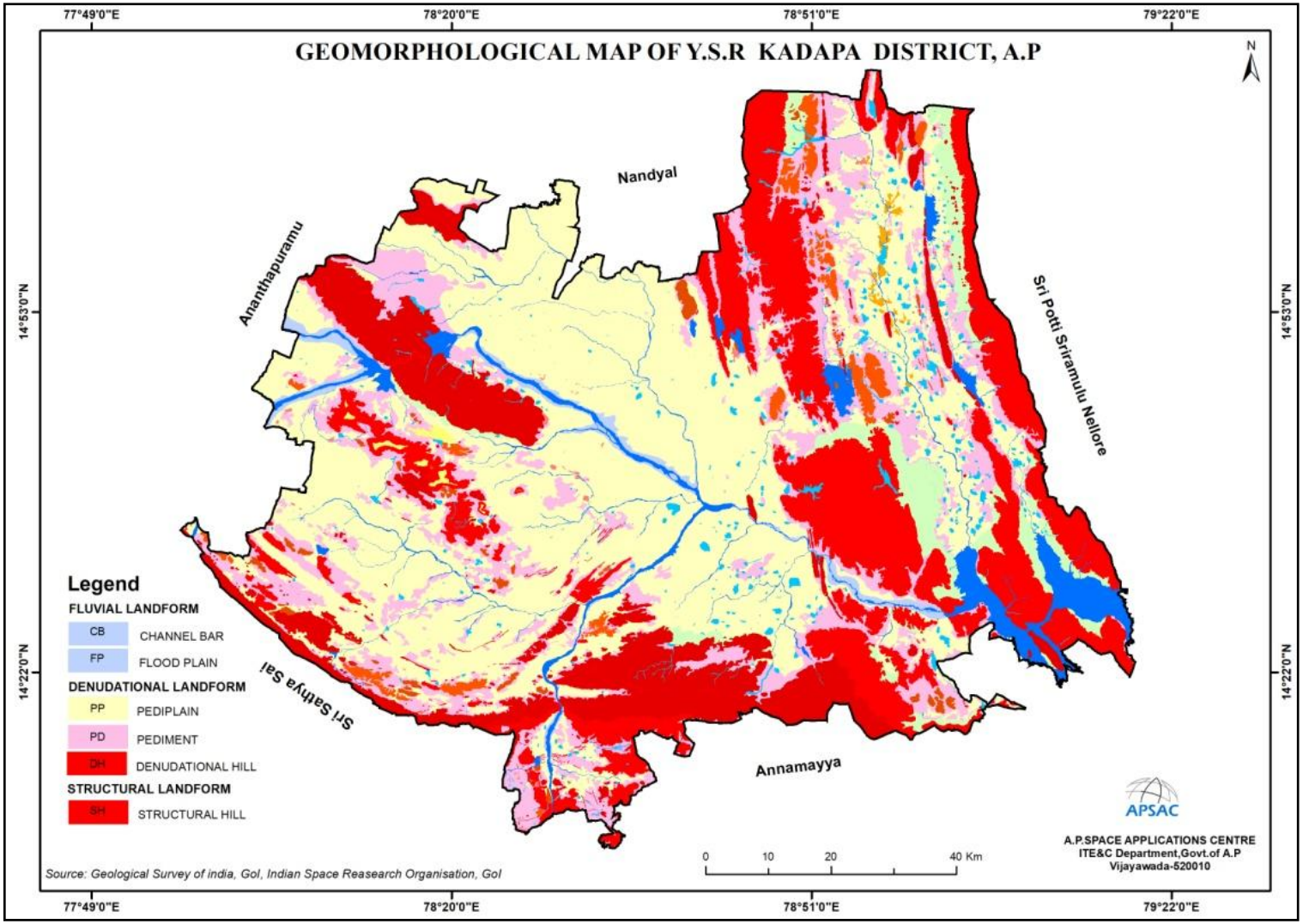


Figure-18: Geomorphology of YSR Kadapa District, Andhra Pradesh

1.7.3.1. Alluvial plain: A level or gently sloping tract or a slightly undulating land surface produced by extensive deposition of alluvium, usually adjacent to a river that periodically overflows its banks; it may be situated on a flood plain, a delta, or alluvial form. This landform is predominantly seen in the nothern part of the district.

1.7.3.2. Palaeochannel: Deep valleys cut in the bedrock terrain and today filled largely with alluvium, glacial outwash gravels and sands or with tills. These are good source of underground water.

1.7.3.3. Flood plain: The surface or strip of relatively smooth land adjacent to a river channel constructed (or in the process of being constructed) by the present river in its existing regimen and covered with water when the river overflows its banks at times of high water. It is built of alluvium carried by the river during floods and deposited in the sluggish water beyond the influence of the swiftest current.

1.7.3.4. Delta: The low, nearly flat, and alluvial tract of land deposited at or near the mouth of a river, commonly forming a triangular or fan shaped plain of the considerable area enclosed and crossed by many distributaries of the main river. Perhaps extending beyond the general trend of the coast and resulting from the accumulation in a wider body of water (usually a sea) of sediment supplied by a river in such quantities that it is not removed by tides, waves and currents.

1.7.3.5. Valley fill: The unconsolidated sediment deposited by any agent to fill or partly fill a valley.

1.7.4 Landforms of Structural Origin

Landform of structural origin is related to structural aspect of the area. Most of the landforms under this class had genesis related to underlying structure. Structure plays an important role in reducing the resistance of rock which manifests itself in different geomorphic forms. Some of the variation is minor and some are in mega scale. The mega scale forms have a dramatic effect on the genesis of landforms and hence mapping of such forms indirectly indicates the structural set up of the area. The mega scale structural features like fault and fold depending on type plays an

important role in genesis of structural landform. The influence of geologic structures on the development and appearance of landscapes is prominent. The influence of geologic structures ranges from large features, which exert a dominant influence on the form of an entire landscape, to small features, which affect an individual landform and the geomorphic processes operating on it. The structural control could be active structures whose form is directly impressed on the modern landscape or ancient structural features whose influence on a modern landscape is due primarily to differential erosion (NRSA, 2007).

1.7.4.1. Dome: A general term for any dome-shaped landform or rock mass, such as a smoothly rounded rock-capped mountain summit, roughly resembling the dome of a building.

1.7.4.2. Structural Hills: Hills and valleys, which are originated due to tectonic process and are highly dissected by the drainage lines. This can be further classified as highly, moderately and low dissection depending on the density of joints and drainage. Mostly this will be interpreted from planimetric satellite data and the classification is highly subjective.

1.7.4.3. Dyke Ridge: Intrusive features that are emplaced within the pre-existing fractures or where the fluid pressure is great enough for them to form their own fracture during emplacements. They are discordant bodies.

1.7.4.4. Cuesta: A hill or ridge with a gentle slope on one side and a steep slope on the other; specifically an asymmetric ridge with one face (dip slope) long and gentle and conforming with the dip of the resistant bed or beds that form it, and the opposite face (scarp slope) steep or even cliff-like and formed by the out crop of the resistant rocks, the formation of the ridge being controlled by the differential erosion of the gently inclined strata.

1.7.5 Landforms of denudational origins

The landform of denudational origin is formed where the denudation process dominates over the other process. Most of the landform resulting due to this process is the combined effect of mechanical and chemical weathering. Denudation is the process of removal of material by erosion and weathering. This has direct influence on the relief of the area

especially in the reduction of relief to the base level. The agents are mostly water, ice and wind. The major factors affecting denudation are geology, climate, tectonics and anthropogenic effects. All rocks and minerals at or near-surface are attacked by a physical and chemical process. The effect of this process is not the same everywhere because of rocks' varying resistance to change. As a result, weathering and erosion yield several landforms, which have typical shapes and forms. Weathering is an essential part of the rock cycle. The parent material or rock weathered material is disaggregated to form smaller fragments and some of the minerals are dissolved and removed by the agent of water. This removal of material is erosion and is accomplished by running water, wind, glacier etc. The weathering provides the raw material for the sedimentary rock and soil (NRSA, 2007).

1.7.5.1. Denudational Hill: It is a highly dissected hill that has obliterated the structures.

1.7.5.2. Inselberg: A prominent, isolated, steep-sided, usually smoothed and rounded, residual knob, hill or small mountain of circumdenudation rising abruptly and surrounded by an extensive and nearly level, lowland erosion surface in a hot, dry region (as in the deserts of southern Africa or Arabia), generally bare and rocky although partly buried by the debris derived from and overlapping its slopes; it is characteristic of an arid or semiarid landscape in a late stage of the erosion cycle.

1.7.5.3. Pediment: A broad, flat or gently sloping, rock floored erosion surface or plain of low relief, typically developed by sub aerial agents (including running water) in an arid or semiarid region at the base of an abrupt and receding mountain front or plateau escarpment and underlain by bedrock (occasionally by older alluvial deposits) that may be bare but more often partly mantled with and discontinuous veneer of alluvium derived from the upland masses and in transit across the surface.

1.7.5.4. Pediplain: An extensive, multi-concave, rock-cut erosion surface formed by the coalescence of two or more adjacent pediments and occasional desert domes and representing the result (the "peneplain") of the mature stage of the erosion cycle. Based on the thickness of weathering they are further classified as shallow, moderate and deep pediplains.

1.7.6 Structural Features of YSR Kadapa District

Lineaments are the linear features of tectonic origin then are identified as long narrow and relatively straight tonal alignments visible in satellite images. A lineament may be a fault, fracture, master joint, a long and linear geological formation, the straight course of streams, vegetation served may be the result of faulting and fracturing and hence it is inferred that they are the areas and zones of increased porosity and permeability in hard rock areas. These have more significance in the ground water studies. Remote sensing data provides useful information to identify structural features and lineaments. The Cuddapah basin is a major synformal structure with minor antiforms and synforms There are some trend lines showing the strike directions of the rocks in the area. Many lineaments trend NE-S W and are rough parallel to the trends of geological formations, other lineaments run either in a ENE- WSW or E-W direction.

Lineaments are the main features that control the occurrence of groundwater. Secondary porosity is imparted by joints and fractures in the areas of higher values of lineament density. The lineament density map reveals the variations of ground water potentiality in the basin. The high lineament density is noticed as isolated patches with small areal extent in the central and western parts of the basin indicating high groundwater potential especially associated with shale with dolomitic limestones. Medium lineament density patches with limited areal extent indicate a moderate groundwater potential distributed mostly in the central and as a small patch in the western parts of the basin. A large part of the basin area is occupied by low lineament density indicating a poor groundwater potential shown in Figure-19.

1.7.7 Ground Water Quality in the YSR Kadapa District

Ground water quality laboratory analyzed for physico-chemical parameters like TDS, TH, Cl, NO_3, pH, F, Fe, TA and SO_4 using standard techniques, ground water quality samples were collected for two seasons i.e., post monsoon and pre monsoon in December 2017 to June 2019 from Rural Water Supply and Sanitation Department (RWS and S) and compared with the BIS (2015), in terms of desirable, permissible and non potable classes. Blue, yellow and red colours indicate pre monsoon quality and +, ., -, symbols indicate post monsoon quality for desirable, permissible and non-potable classes respectively.

From the analysis it has been observed that the ground water is polluted in pre monsoon and post monsoon about 20% of the area is under non potable category due to high concentration of Nitrate, Fluoride and Iron. About 50% of the area is potable category remaining 30% of the area is covered in hills and Waterbodies of entire District (Fig: 19). The occurrence and movement of groundwater in an area is governed by several factors such as topography, lithology, geological structure, depth of weathering, extent of factures, drainage pattern, climate conditions and inter relationship between these factors (APSAC, 2017b). Ground Water Quality Map of YSR Kadapa District is showing in Figure-20.

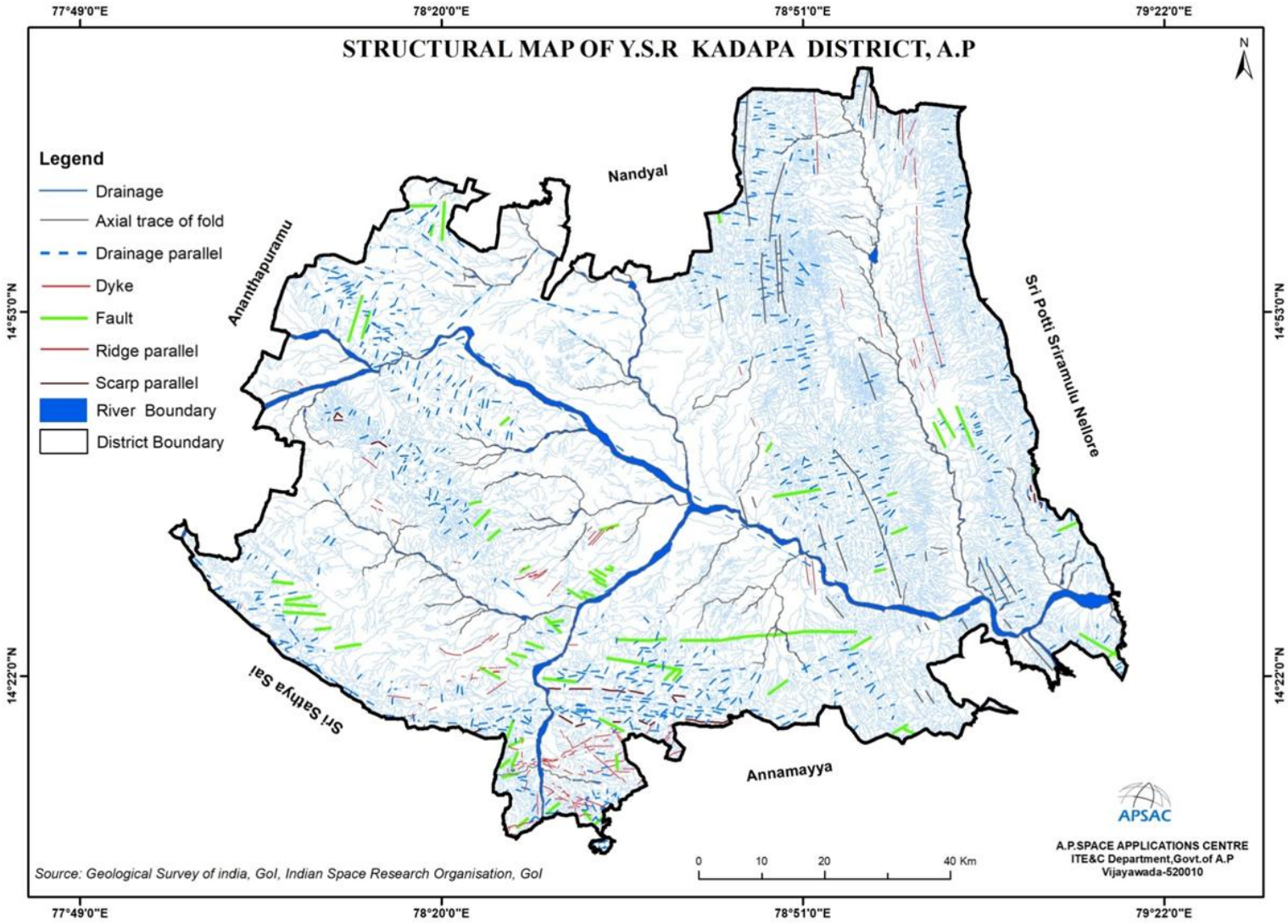


Figure-19 : Structural Map of YSR Kadapa District, Andhra Pradesh

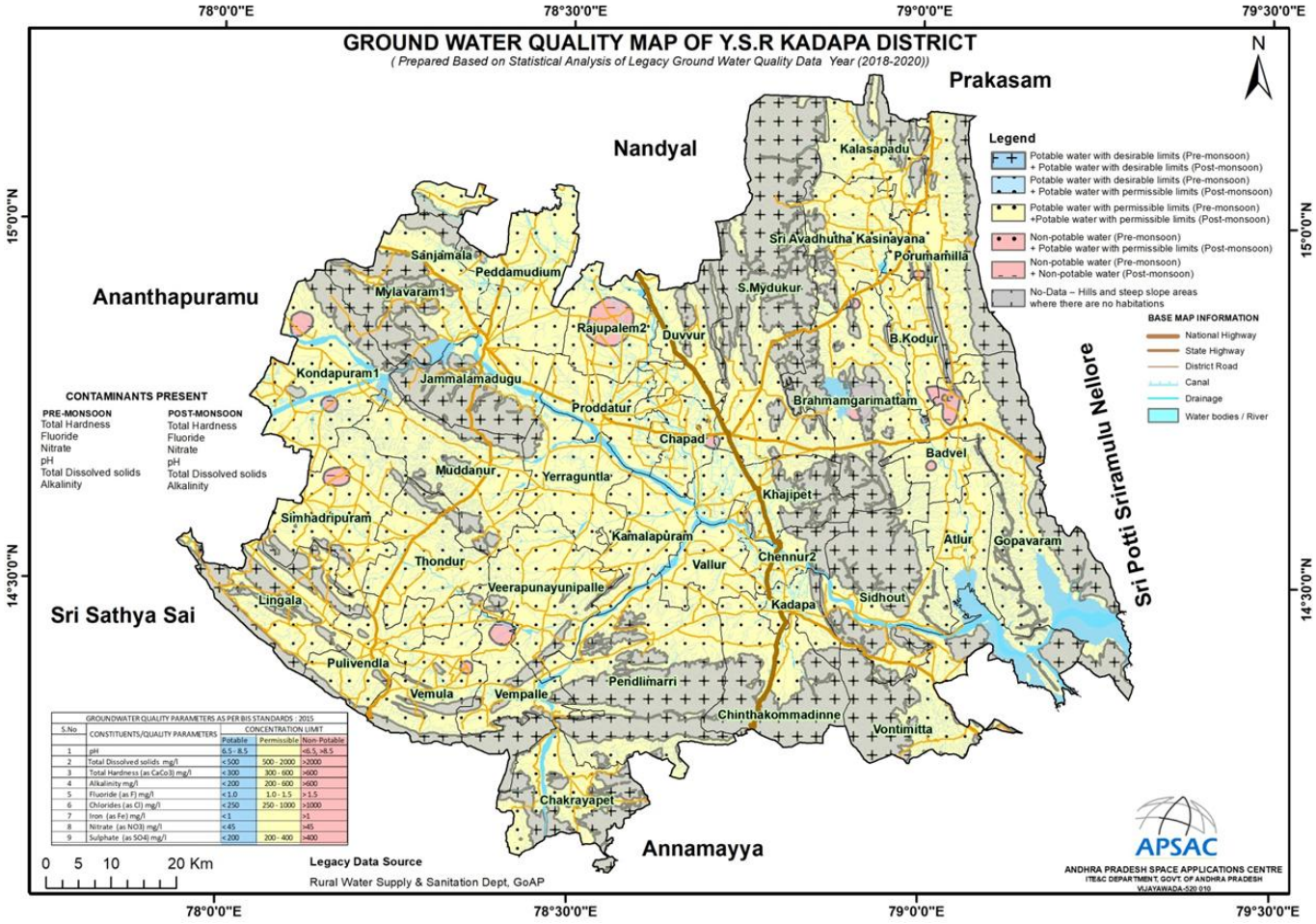


Figure-20: Ground Water Quality Map of YSR Kadapa District

Chapter – II Minor Minerals

2.1 Overview of Mining Activity

The following leases exist in this YSR Kadapa office jurisdiction. Mineral Regulatory, the important functioning of this office in these aspects are:-

i. Achievement of Targets of Mineral Revenue collections being fixed to this office annually
ii. Receiving and processing of the Mineral Concession Applications duly conducting the technical inspection, Survey and demarcation of the Mineral bearing applied areas
iii. Execution and Regulation of the operations of the Mining / Quarry leases in accordance with the Acts and Rules
iv. Issuing of dispatch permits duly collecting the Advance Royalty / Seig.fee from the lease holders on the minerals produced and intend to dispatch from their leased areas through online permit system
v. Controlling the illegal Mining / Quarrying and transportation by conducting the periodical inspections of the Mines and Quarries and also conducting the surprise vehicular checking and imposing the penalties
vi. Finalisation of Demand, Collection and Balance statements of the leases on annual basis

Geologically, the YSR Kadapa district forms a part of south-western and southern part of Cuddapah Basin which is named after the town "Kadapa" where the Cuddapah Systems of rocks best developed. The rocks exposed in the district belonging to Archaean (oldest rocks) or early Proterozoic Era, Cuddapah Super group and Kurnool Group of middle to upper Proterozoic age. Gneisses and granites with Veligallu, and Tsundupalli schist belts constitute the main rock types of the Archaean. The Cuddapah Super group of rocks unconformably overlie the Archaeans and consists of Gulcheru and Vempalli Formations of Papaghni Group, Pulivendula, Tadipatri and Gandikota Formations of Chitravathi Group, Bairenkonda (Nagari) and Cumbum (Pullampeta) Formations of Nallamalai Group. The next younger groups of rocks are the Kurnools comprises of Banganapalli Quartzites, Narji Limestone, Ouk Shale, Paniam Quartzite, Koilakuntla Limestone and Nandyal Shale. The town "Kadapa" is situated over the Nandyal Shale of Kurnool Group.Mineral resources in the YSR Kadapa district, in geological parlance, are widely distributed in time and associated with rocks from Archaean to Kurnool Group of rocks. Barytes,

chrysotile Asbestos, clays, limestone and Kadapa slabs/napa slabs are some of the well known workable mineral deposits associated with Proterozoic sedimentary rocks belonging to Cuddapah Super group and Kurnool Group in YSR Kadapa district. Iron ore, dolomite, steatite, magnesite, yellow ocher, Quartz and Granite/black granite (dimensional stone) are some of the other minerals occurred in the district. Besides, the district has extensive reserves of building material in quartzites, limestones granites and granite gneisses which are quarried throughout the district.

It is estimated that during the year 2022-23, a total of 56668 Cum of gravel, 102025 Cum of Road metal, etc are produced in YSR Kadapa district.

2.2 Geology of the District

2.2.1. Genaralized Litho-stratigraphic Succession of Andhra Pradesh

Geological Time (a)	Supergroup (b)	Group (c)	Formation (d)
Holocene	-	-	Alluvium, river terraces, beach sands and soils
Pleistocene	-	-	Laterite and Gravel
Mio-Pilocene	-	-	Rajahmundry Fm.
Late Cretaceous Eocene	-	-	Deccan Trap with infra-and inter-trappeans
Lower Cretaceous to Upper Carboniferous	Gondwana	Upper Gondwana	Godavari Valley (Fluviatile) Chikiala Fm. Gangapur Fm.
			Coastal Area (Fluvio-marine) Tirupati Fm. (Vejendla Fm) Raghavapuram Fm. (Vemavaram), Kandukuru, Sriperambadur Fms)
		Lower Gondwana	Kota Fm. Maleri Fm.
			Gollapalle Fm. (Satyavedu Fm.) Kamthi Fm. Barren Measures, Barakar Fm. Talchir Fm.

			Cuddapah Basin	**Pakhal Basin**
				Sullavai Sandstone
Middle to Upper Proterzoic (980-500 m.y)		Kurnool	Nandyala Shale Koilakuntla Limestone Panyam Quarzite Owk Shale Narji Limestone Banaganapalli Quartzite	Putnur Limestone Penganga Group Takalapalle Arkose
			Srisailam Quartzite	**Alabaka Sandstone**
Middle Proterozoic (1600-1300 m.y.)	Cuddapah	Nallamalai	Cumbum Fm. Mulug Group Bairankonda Quartzite	Lankavaram Shale Pattipalle Quartzite Polavaram Fm. Jakaram Arkose
		Chitravathi	Gandikota Quartzite Tadipatri Fm.	Pandikunta Shale Gunjeda Dolomite
		Papaghni	Pulivendula Quartzite Mallampalli Group Vempalle Fm. Gulcheru Quartzite	Bayyaram Quartzite Bolapalle Fm.

EPARCHAEAN INTERVAL

Middle Proterozoic to Late Archean (2600-970 m.y)	Eastern Ghats	Charnockite	Charnockite with megacrystic k-feldspar charnockite
		Khondalites	Two pyrozene granulite / amphibolite Calc-silicate / granulite, Garnet-

			sillimanite-quartz-graphite gneiss (biotite-k-feldspar (Khondalite) Quartzite (gernet, sillimanite)
Late Archaean (2700 m.y)	Dharwar	Ramagiri-Penakacherla, Kolar, Kadiri, Gadwal-Narayanpet, Jonnagiri, Veligallu Peddavuru Schist Belts &W.Part of Nellore Belt.	Pyroclastic Rocks, local conglomerate / event conglomerate Metabasalt (Pillowed), Acid volcanics, minor andesite, dacite, rhyodacite, amphibolites, metaultramafics, minor quartzite, calcsilicates, phyllites, intrusives of basic rocks and granites, rare lamprophyres.
Middle Archaean (3100-2900 y.m)	Older Supracrustals (Sargur)	Eastern and Southern parts of Nellore.	High Grade schists include include garnet, staurolite, kyanite, sillimanite, cordierite (rarely sapphirine-kornuropine as in Karimnagar) Mica schists, calcilicate rocks, crystalline limestone (minor). BIF, fuchsite quartzite, hornblende granulite, amphibolite, migmatite streaky biotite gneiss.
Gneissic Complex			Banded Tonalite-Trondhjemite Gneiss.

Geologically, the State of Andhra Pradesh forms a part of peninsular India and is one of the most ancient land masses. The geological formations of Andhra Pradesh range from the oldest to the recent.

Sargur Supracrustals is the oldest rock in Southern India. They are mostly present as enclaves. They occur as enclaves within the migmatitic gneiss. These supracrustals are exposed in the eastern and southern part of the Nellore schist best. The lithology of Sargur mostly comprises of garnet, staurolite, kayanite schists, BIFs, quartzites, granulites, amphibolites. The gneissic complex comprises of banded tonalite trondhjhemite gneiss

which is the basement rock of the study area alongwith migmatitic gneiss and biotite granite gneiss. TTGs are sodic, quartz-bearing granitic (plutonic) rocks with plagioclase as the most common feldspar, and K-feldspar ranging from subordinate to nearly absent. The Dharwarian rocks in Andhra Pradesh are exposed in the western part of the Nellore belt and in many other areas like Ananatapur, Ramagiri-Penakacherla, Kolar, Kadiri, Gadwal-Narayanpet, Jonnagiri, Veligallu Peddavuru Schist Belts &western part of Nellore Belt. The lithology mostly comprises of Metabasalt (Pillowed), Acid volcanics, minor andesite, dacite, rhyodacite, amphibolites, metaultramafics, minor quartzite, calcsilicates, phyllites, intrusives of basic rocks and granites,rare lamprophyres also some Pyroclastic Rocks and local conglomerate / event conglomerate defining hiatus in stratigraphy is observed in the study area. Rocks of middle Proterozoic to late Archaen are exposed in the eastern ghat mobile belt, they are extremely high grade and fall under granulite metamorphic facies. They mostly include khondalites and charnockites. The metamorphic facies of rocks of eastern ghats goes upto granulite facies. Charnockite with megacrystic k-feldspar, two pyrozene granulite / amphibolite, Calc-silicate / granulite, Garnet-sillimanite-quartz-graphite gneiss(Biotite-k-feldspar, Quartzite (gernet, sillimanite) and were exposed in most of the state. Cuddapah basin is a part of Dharwar craton and is the second largest purana basin of Peninsular India. It marks the profound unconformity Eparchaen unconformity in early literature. The Cuddapah basin formation exposes rocks of late Proterozoic to upper Proterozoic. The Cuddapah basin is divided into four groups, Nallamalai, Chitravathi, Papaghni and Kurnool. Papaghni comprises of dolomite and limestones, Chitravathi comprises of shale, dolomite and quartzites, Nallamalai comprises of shale, quartzites and arkosic sandstones, Kurnool comprises of shales, quartzites and limestones. The Cuddapah basin is characterised by rhythmic pattern of quartize-shale-carbonates cycle. Uraniferous limestone is also reported from Cuddapah basin. The major exposures of purana rock formations were in Prakasam, Kurnool, Cuddapah, Chittoor, Nellore. The Deccan traps are found in East and West Godavari districts, exposures are near Rajahmundry. Outcrops Tertiary formations are found in East and West Godavari and Visakhapatnam districts and the Quaternary sediments occurring as thick blankets of alluvium are found in the river valleys, deltas and along the East coast.

2.2.2. The YSR Kadapa district area is underlain by various rock types belong to Late Archaean or Early Proterozoic era which are succeeded by

rocks of Dharwarian Age, and both are traversed by dolerite dykes. The older rocks are overlain by rocks of Cuddapah Super group and Kurnool Group belonging to Middle and Upper Proterozoic Age. The Cuddapah Sedimentary Basin, which is a huge depression formed over the denuded surfaces of older rocks extending into neighbouring districts occupies a major part of the district. The major rock types are quartzites, shales, limestones, phyllites, granites, granodiorites and granite gneiss. The Archaean comprises the Peninsular Gneissic Complex, represented by granite, granodiorite, granite-gneiss and migmatite. These rock types occur in the southwestern part of the district. Both the Archaean and Dharwar are traversed by dolerite dykes and quartz reefs. Alluvium consisting of gravel, sand, silt and clay occur along the river courses in the district shown in Fig: 21 and 22.

Kurnool Group

Nandyal Shale
Koilakuntla Limestone
Paniam Quartzite
Owk Shale
Nargi Limestones
Banagenapalli Formation
Unconformity----------
Cuddapah Supergroup

Kurnool Group sedimentation cycle was evident intwo cycles of Quartzite-Limestone-Shale deposition and was invariably deposited over the different units of Cuddapah Supergroup.

The Kurnool group is exposed in Kundair Valley in the west and the Palnadu area in the Northeast and was unconformaly overlain the basement gneiss of Papaghni and Chitravathi groups. Thick conglomerate and sandstone form the base of Banaganapelli formation and has a thickness of 10-50m. Nalgi Limestone represents the basin limestone and are massive to floggy in nature. The buff white and purple shales constitute the Owk Shales that overlies the Nargi Limestone.

The second cycle of deposition is Paniam Quartzite and Conglomerate. Koilakuntla Limestone is siliceous with good quality limestone and is overlaid by purple coloured Nandyal Shale.

Diamond bearing Wajrakarur Kimberlite form occurs in quartzites of Banagenapalli formation.

Thus, the cyclic nature of sedimentary structure indicates overall shallow marine depositional environment.

The Geological Survey of India (GSI, 2000) gave a detailed account of the geology/lithothogy of the district with a map on 1:250,000 scale (Figure-21) and an elaborate legend with stratigraphic sequence as below.

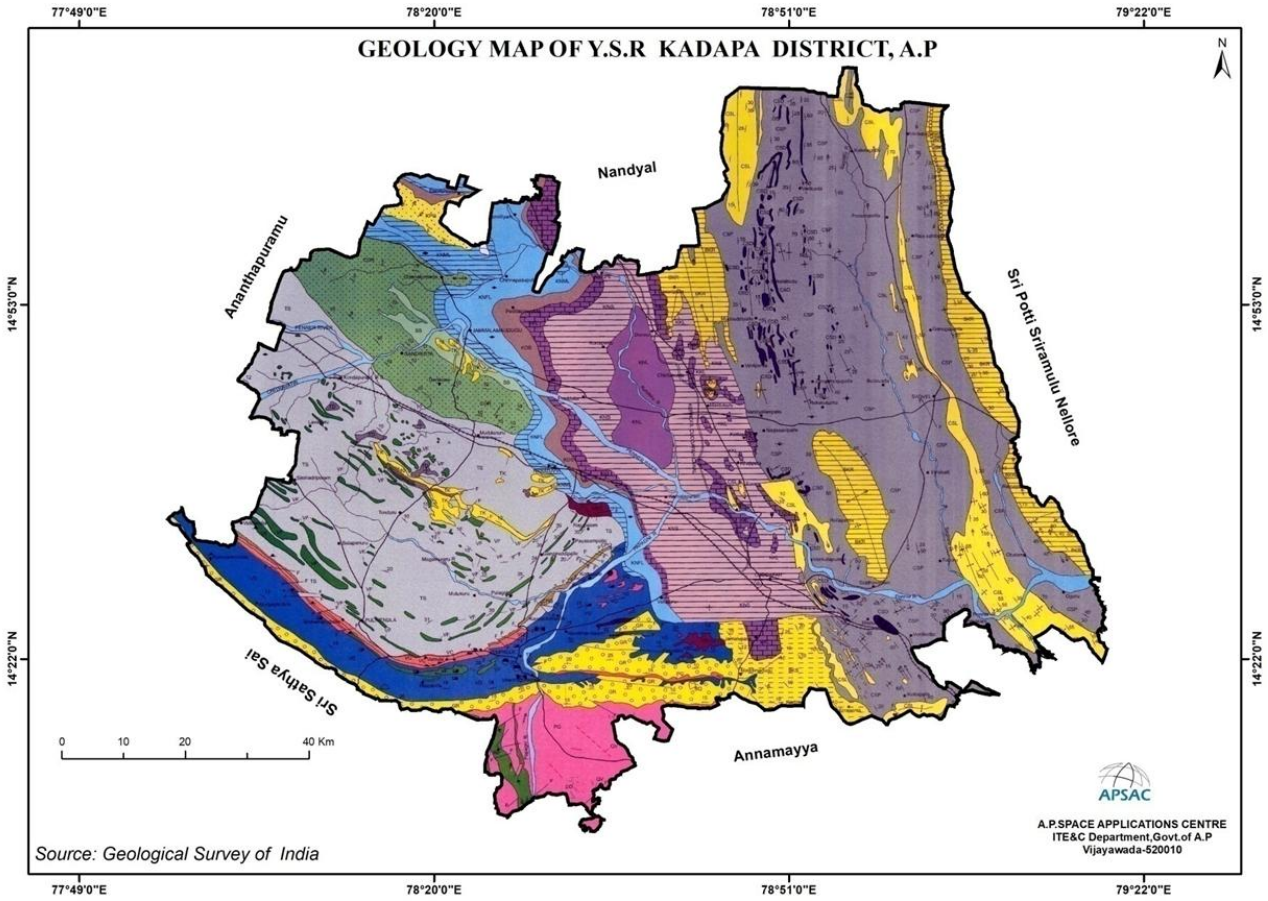
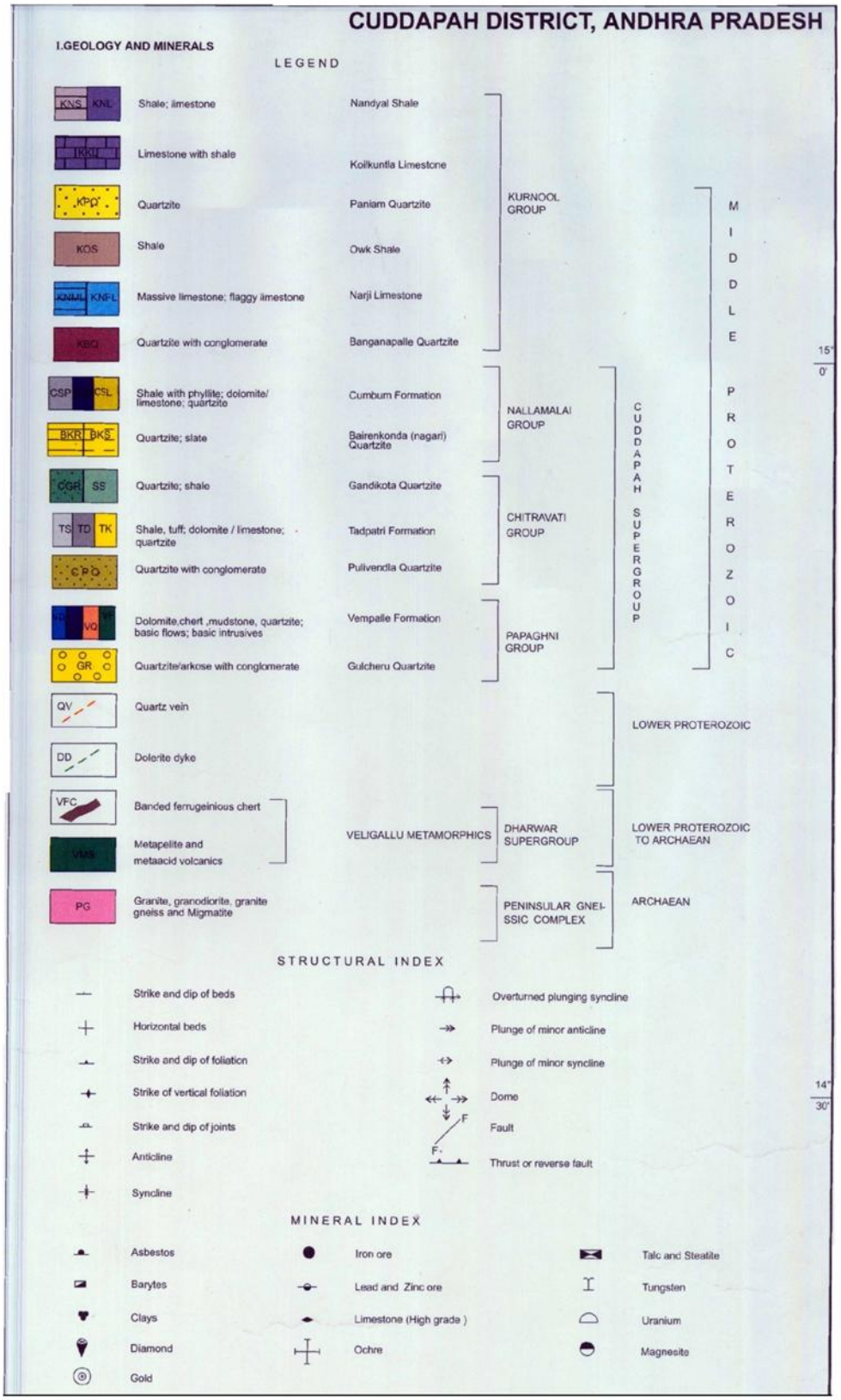


Figure 21: Geology of YSR Kadapa District, Andhra Pradesh (Source: GSI, 2000)



Detailed Legend with Stratigraphic Sequence of YSR Kadapa District

2.3 Minor Mineral Resources of YSR Kadapa District:

As per literature (GSI, 2000) the following minerals are available in YSR Kadapa District:

2.3.1. Limestone Slab (Black):

Napa slabs/ Kadapa slabs are black coloured limestone belonging to Koilakuntla Limestones of Kurnool Group. They occur in the area of Yerraguntla Mandal and Sugumanchupalli areas of Jammalamadugu Mandal. Due to the development of perfect basal cleavage planes, this rock can be extracted with a thickness ranging from 10mm to 20mm and any size up to 8 feet length. There are about 150 polishing industries in the district and these polished slabs mainly utilized for flooring. Available Poorvapusugumanchipa Village in Jammalamadugu Mandal, Nallingayapalle Village in Kamalapuram Mandal, Nidizivve Village in Yerraguntla Mandal

2.3.2. Barytes:

Andhra Pradesh is the leading producer of barytes and contributes about 90% of the total country's production. Huge reserves of barytes are found in Kadapa, Prakasam and Nellore districts. Barytes occurs in Vempalli dolomite and associated basic igneous rocks as veins in Pulivendula, Kamalapuram and Kadapa taluks. On the average the veins are one meter in thickness. Quartz and calcite occur associated with barites. Pyrite, chalcopyrite and malachite are found disseminated in the barites. The barite is white, buff or pink in colour. It was estimated that there were reserves of the order of about 45million tonnes of barytes of all grades within depth of 30 m to 218m from the surface in the mineralized belt extending for about 100km form Velidandla in the west to Mittamindapalle in the east. YSR Kadapa district is well known not only in the country but also in the world.

Barytes deposits of this district can be divided into two types, 1) Grey Barytes and 2) Conventional Barytes.

Conventional Barytes occurs in Vempalli dolomite and associated basic igneous rocks as veins in Pulivendula, Kamalapuram and Kadapataluks. On the average the veins are one meter in thickness. Quartz and calcite

occur associated with Pyrite, chalcopyrite and malachite. The barite is white, buff or pink in colour.

The White baryte is broadly used in high-grade paint, paper-making, pharmaceutical, rubbe available in Pulugurallapalle Village in Brahmamgarimattam Mandal, Mamillapalle Village in Kalasapadu Mandal, Sankavaram village in Kalasapadu Mandal, Chinnakudala, Ippatla Village, Lopatnuthala Villages in Lingala Mandal, Gondi palle, Voillage, Nandimandalam Villages in Pendlimarri Mandal, K.velamavanipalle Village in Pulivendla Mandal, Kathaluru, T.velamvaripalle, Tallapalle Villages in Vempalle Mandal, Meedipentla, Peddajutur, Velpula , Vemula Village in Vemula Manda.
The Mangampet store in the Cuddapah area of Andhra Pradesh is the single biggest barytes used in oil and Gas Drilling, Chemiacal, Paint, Glass and Rubber available in Papanapalle Village in B Kodur Mandal, Kongalaveedu Village in Badvel Mandal, Chilekampalle Village in Chakrayapet Mandal.

2.3.3. Ochres: are naturally occurring mineral pigments in various shades i.e., red, brown etc. They are also called "coloured earths". Hydrous iron oxide present in it imparts colour. Iron oxide present in ochres in variable between 20% to 70%. Yellow Ochere is very common containing yellow hydrated iron oxides. Yellow Ochere occurs associated with Vempalle and Pulivendula Formations of Cuddapah Supergroup in cuddapah district. There are no serious environmental issues involved in Ochre mining as it is a simple, manual operation. Any earthy looking material that has intrinsic iron and manganese oxides in it and capable of imparting coloration is an ochrous material. In view of its increasing utility, it is worth combing the weathered mantles of all litho-units capable of yielding ochrous material. In Kadapa, ochres are found in Rajupalem, Chabali, Yerragondlakota, Mandapampalle, Sidhout and Nereducherla.

2.3.4. Quartz, quartzite, and silica sand are the various forms of silica. The chemical composition of silica is SiO_2. These forms of silica are used in several industries, the important being glass, foundry, sodium silicate, silicon alloys: iron and steel, refractory and ceramic industries.The Mining leases falls in Munnelli, Village in B Kodur Mandal, Kongalaveedu Village in Badvel Mandal, Chakrayapet village in Chakrayapet Mandal, Mangapatnam Village in Muddanur Mandal of YSR Kadapa District.

2.3.5. Dolomite is a double carbonate of calcium and magnesium ($CaCO_3$, $MgCO_3$), theoretically contains $CaCO_3$ 54.35% and $MgCO_3$ 45.65% or CaO 30.4%, MgO 21.9% and CO_2 47.7%. However, in nature, dolomite is not available in this exact proportion. Hence, in commercial parlance, the rock containing 40 - 45% $MgCO_3$ is usually called dolomite. Deposits of Dolomite occurfrom SE of Guvvalacheruvu to the west of Mutssukota including Nandimandalam and Vempalle. Flux and other grades of Dolomite are known around Parnapalle, Ippatla, Middipendtla and Vempalli.

2.3.6. Road Metal: The road metal utilized as construction purpose, also as railway ballast and available in Chakrayapet , Errabommanapalle Villages in Chakrayapet Mandal, Chinnachowk Village Kadapa Mandal, Gopavaram Village in Gopavaram Mandal, Sankavaram village in Kalasapadu Mandal, Dondlavagu Village in Lingala Mandal, Bondalakunta Village in Muddanur Mandal, Chinnadudyala, Mangapatnam Villages in Muddanur Mandal, Golla palle Village in Mylavaram Mandal, Nandyalampeta, Settivaripalle Villages in S Mydukur Mandal, Balayapalli Village S.A.K.N. Mandal, Alidena, Animela , Lingala Villages in Veerapunayunipalle Mandal.

2.3.7. Marble: Marbles are used principally for buildings and monuments, interior decoration, statuary, tabletops, and novelties and available in Gundlamoola Village in Sidhout Mandal, Mallela Village in Thondur Mandal.

The above mineral map is showing at mandal wise in Figure-22 and the statement is showing the list of leases in the district below Table-14.

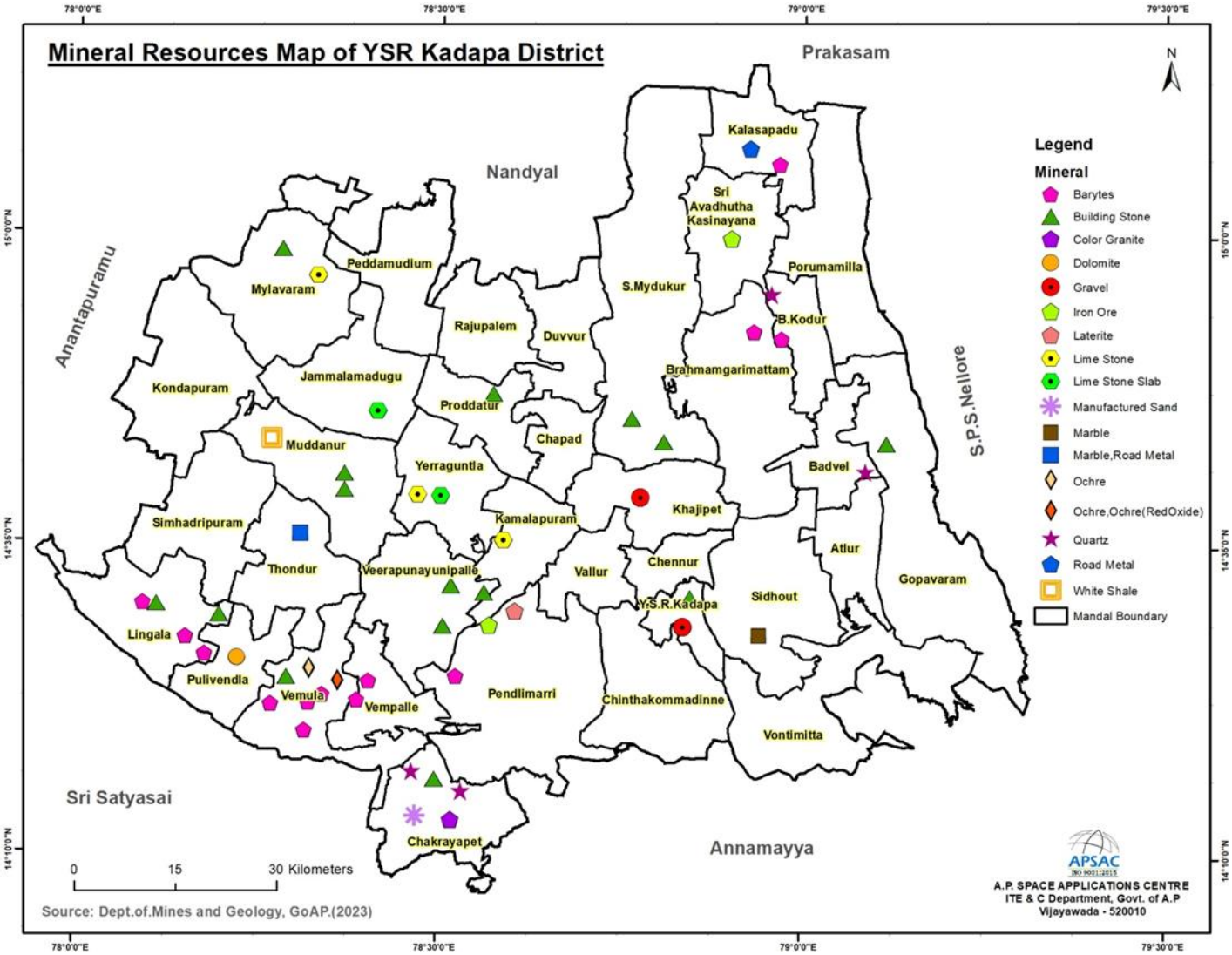


Figure-22: Mineral Resurce Map of YSR Kadapa District

Table 14: Details of Minor Mineral Mining Leases In The District Of YSR Kadapa

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
1	2	3	4		5	6	7	8	9	10	11	12	13	14	15		16
1	Barytes	M. Indra Prasad Reddy,	M. Indra Prasad Reddy, Kalasapadu Village & Post, Kadiri Mandal, Anatapuram Dist, Cell no.9676663369	1/1-	6253/D12-1/2018, dt:23-03-2022	6.610	19/05/2022	18/05/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2020/1619/160.23 & 156.23-440, dt:22-07-2021	N 14-51-50.81	E 78-57 32.88"	Underground)
2	Barytes	Sri Devasani Chinna Govinda Reddy	D.No.12/330, T.B. Road, Porumamilla Village & Mandal, YSR District, Cell No.9849046531	2/P	3562/D12-1/2021, dt:20-04-2022	4.950	02/09/2022	01/09/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/12/2021/3717/171.87 & 168.70, dt:26-01-2022	N 14-51-50.921	E 78-34 14.7"	Underground)
3	Quartz	M/s Midwest Granite Pvt Ltd, Dir: K.Ramachandra (Transferred from M/s S.R Minerals)	S/o. K. Rama Raghava Reddy, D.No.8-2-684/3/25 & 26, Road No.12, Banjara Hills, Hyderabad - 500034	1857/P	7750/D12-1/2019, dt:22-02-2022	1.960	04/04/2022	03/04/2042	-	-	-	Working	Non Captive	SEIAA/AP/Kadapa/MIN/10/2020/2210-103, dt:14-06-2021	14-54-23.06579	78-59-25.07732'	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
4	Barytes	K.Jayarami Reddy	10/117-4, NGOs Colony, PRODDATUR, YSR District	2229	4742/D12-1/2021, dt:18-02-2022	3.860	23/02/2022	22/02/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/11/2021/3582/169.84 &166.50 , dt:06-01-2022	14-14-11.61269	79-05-56.67516	Underground)
5	Quartz	K. Bharati (Seshagiri Rao)	-	51	411, Dt:21-10-2002	2.310	29-06-2004	28-06-2024	-	-	-	Non Working	Non Captive	-	14-43-55.89	78-56-50.41	Open cast
6	Quartz	M/s Midwest Granite Pvt Ltd, Dir: Sri K.Ramachandra (Transferred from M/s S.R Minerals)	S/o. K. Rama Raghava Reddy, D.No.8-2-684/3/25 & 26, Road No.12, Banjara Hills, Hyderabad - 500034	534/2P	6279/D12-1/2019, dt.27-08-2020 2692/D12-1/2022, dt:08-04-2022	4.788	04/09/2020	03/09/2040	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/12/2019/1546-67, dt. 11-06-2020	14-27-24.35938	78-56-44.22688	Open cast
7	RM&BS & Dimensional Stone	M/s Sri Lakshmi Venkateswara Stone Cutters LCCS	D.No.12/24, C.K.Dinne (Village & Mandal), YSR District Cell No.9989290818	869 (Old Sy.No.756)	2771/Q1/2017, Dt:19-07-2018	0.404	15-10-2018	14/10/2028	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-18 (54), Dt:30-04-2018	14-22-04.20	78-47-10.30"	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
8	Colour Granite	R.Chanadra Obula Reddy	D.No.4/52, Ganganapalli Village, Thondur Mandal, YSR District, Cell No.7013699477	773/1	31674/R5-2/2018, Dt:13-06-2018	2.000	30-06-2018	29-06-2038	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-18(68), Dt:30-04-2018	N 14-13.37.90	E 78-32-13.80	Open cast
9	Quartz	M/s Rishi Minerals & Ores India (P) Ltd.	Director : Rajesh Bhutra, Plot No.25, APIIC Gollapuram, Hindhupuram, Cell No.9900598866	780/P	20526/R5-2/2016, Dt:29-06-2018	10.000	10/08/2018	09/08/2038	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/02/2018-499, Dt.19-04-2018	N 14-14.35.6	E 78-26-03.9	Open cast
10	Quartz	M/s Sesha Sai Mines and Minerals, Sri G.Balakrishna	D.No.41/1225-1, Bhagyanagar Colony, Kadapa Town, YSR Dist - Cell No.9246940444	1304 (OldSy.No. 1)	4093/D12-1/2018, dt:20-07-2021	5.000	02/08/2021	01/08/2041	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/08/2020/2050-851, dt:16-12-2020	N 14-15'.37.3"	E 78-35-50.9"	Open cast
11	Quartz	G.Pulla Reddy	S/o. G. Chinna Pulla Reddy, Kothapalli Village, Pendlimarri mandal, YSR Dist, Cell No. 9949902841	1/Part	419/D12-1/2019, dt:20-05-2022	3.868	30/09/2022	29/09/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2021/2774/163.17&160.14/586, dt:26-08-2021	14-13-40.43497"	78-26-02.47152"	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
12	RM&BS	G. Veera Shiva Reddy	D.No.8-3-293/82/A/281M, Jublee Hills, Hyderabad, Cell No.9849233533	942 (Old Sy.No. 166/P), 899/P & 909/P (Old Sy.No.899/P & 909/P)		4.388	21-06-2021	20-06-2031	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/06/2020/1848-dt.26-11-2020	14-14-20.661486	78-29-36.24665	Open cast
13	RM&BS	M.Muralidhar Reddy	Nallaguttapalli, Ramapuram, Cell No.9701299495	884/P	786/Q1/2021, dt:11-07-2022	4.000	19/07/2022	18/07/2022	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/05/2021/3196/186.22/183.17, dt:25-07-2022	14-15-26.40	78-30-32.40	Open cast
14	RM&BS	M.Muralidhar Reddy	Nallaguttapalli, Ramapuram, Cell No.9701299495	939 (Old Sy.No.794)	3984/Q1/2017-2, dt.08-01-2019	4.000	04/04/2019	03/04/2029	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2018-19/81, Dt:18-11-2018			Open cast
15	RM&BS and Gravel	M/s Satyagangamma Infrastructures, Mg. Director. Sri S.V. Sathish Kumar Reddy	H.No.2/104, Kaapu Street, Vempalli Mandal, YSR Dist,	1/P1	4428/Q1/2018,Dt.30-06-2020	5.000	03/03/2021	02/03/2031	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/03/2019/882-235, DT:11-02-2020	14-15-20.49532	78-26-32.08569	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
16	M.Sand	M/s Rajeswari M. sand Mines and Minerlas, Mg.ptr Sri K. Rajagopal Reddy	D.No.41/747, Sankarapuram, kadapa, Cell No.9052019669	1/P	1521/Q1/2019, dt.13-05-2020	2.500	03/02/2021	02/02/2036	-	-	-	Non Working	Non Captive	SEIAA/AP/KDP/MIN/08/2019/1170-1485, Dt.25-11-2019	14-12-14.50380	78-27-06.3344	Open cast
17	RM&BS	M/s Dwaraka Constructions	Mgptr: R. Murali Mohan Reddy, D.No.1/722-1, Dwaraka Nagar, Kadapa , Cell No.9866316544	2040 (Old Sy.No.1624/P)	1142/QL/2017-3, Dt:04-11-2017	9.500	16-11-2017	15-11-2027	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/07/2017/356, Dt:01-09-2017	14-41-14.00276	79-06-38.91682	Open cast
18	Gravel	Sri G. Chenna Reddy	D.No.4/11, Sivalayam Veedhi, Patha Kadapa,Cell No.9550438376	919/1P	691/Q1/2019, dt.24.07.2020	1.762	10/06/2020	09/06/2025	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/07/2019/1150-182 dt.11.06.2020	14-29-59.20406	78-51-24.04115	Open cast
19	Gravel	K.Ramakrishna Reddy	D.No.6/48, Modammidipalli , Pathakadapa, Kadapa	919/1	1731/Q1/2019, dt:20-10-2022	2.000	28/10/2022	27/10/2027	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/05/2022/4336/196.69&193.62, dt:23-09-2022	14-29-58.21020	78-50-20.5478	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
20	RM&BS & Gravel	O. Bala Kondaiah	S/o. O. Kondaiah, D.No.2/1275, Chalamareddypalli Village, 3rd Division, Chinnachowk, Kadapa, Cell No.7893202227	919/P	596/Q1/2019, dt.18-07-2020	3.998	14-08-2020	13-08-2030	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/12/2019/1509-87 dt.11-06-2020	14-29-49.68712	78-51-50.70303	Open cast
21	Road Metal & Building Stone, Ballast, Gravel & Ordinary Earth	Smt. Singamreddy Sivamma	D.No.9/83, TG Palli, Thollaganganapalle (V) Vallur (M) YSR District	919/P	3302/Q/2021, dt:02-11-2022	4.628	24/11/2022	23/11/2032	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/6/2022/4419/197.67/194.56, dt:07-10-2022	14-30-29.866	78-51-27.327	Open cast
22	Dimensti onal Stone for kerbs & Cubes, Gravel / Morruam / Ordinary Earth, Rough Stone / Boulders	M/s Sai Vinee Agnecies Smt. M.Vineela	D.No.39/440-6, Patel Roa, Aravinda Nagar, Kadapa, YSR District,	919/1P	1042/Q1/2021, dt:03-01-2022	4.364	24/02/2022	23/02/2032	-	-	-	Non working	Non Captive	SEIAA/AP/KDP/MIN/08/2021/3387/166.81&163.57 865, dt:27-09-2021	14-31-09.71339	78-51-07.5648	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
23	RM&BS & Gravel	Smt. S. Radhika	D.No.208, Stree No.320, Reva Reddy Street, kadapa, Cell No.9391385696	919/1	1866/Q1/2019, dt.23-01-2020	4.864	05/03/2020	04/03/2030	-	-	-	Non working	Non Captive	SEIAA/AP/KDP/MIN/10/2019/1260-07 dt.18-12-2019	14-30-34.58423	78-51-15.98754	Open cast
25	Barytes	Smt C. Kasturi Bai	D.No.20 /1064, Co-operative Colony, Kadapa, YSR District Cell No.9052707833	1 & 133	GO Ms.No.224, dt: 11-04-2001	30.696	02/11/2001	01/11/2021	1st Renewal applied	-	-	Non working	Non Captive		15-06-24.6	78-58-06.7	Underground)
26	Gravel	L.Gangulaiah	L. Gangulaiah, Pathuru, Khajipeta Mandal	1155/P	2720/Q/2021, dt:13.06.2022	1.700	17/06/2022	16/07/2027	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/03/2022/4114/185.7/182.6, dated.18.05.2022	14-40-55.51431	78-47-52.26150	Open cast
27	Gravel	K.Venkata Reddy	D.No.7/9, Thippireddypalli Village, Chapadu mandal, Kadapa Dist,	1155/P	2719/Q1/2021, dt:29-09-2022	3.000	17/10/2022	16/10/2027	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/03/2022/4007/ 190.04/187.2, dt:08-07-2022	14-40-42.60001	78-47-42.7200	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
28	RM&BS	L.Dastagiri Reddy	D.No.1/62, Pandillapalli Village, Kamalapuram Mandal, YSR Dist-516289	2267 (Old No.1910)	2491/KDP/2011, DT:16-11-2011	4.149	18-11-2011	31/03/2023	-	-	-	working	Non Captive	-	14-44'-31.26709"	78-48-20.26037"	Open cast
29	RM&BS and Gravel	Sri N.Balasubbaiah	S/o. N. Subbaiah, D.No.2/167, Sttivaripalli (V), Mydukur (M), YSR Dist, Cell No.8861915555	2283/8P, 2285/1P, 2287/2P, 2287/5P, 2296/P (old Sy.No.1910)	3064/Q1/2021, dt:13-04-2022	2.572	26/04/2022	25/04/2032	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/01/2022/3923/180.9/178.07, dt:25.03.2022	14-44-17.83084	78-48-18.04301	Open cast
30	RM&BS	K.Purushotham Reddy	Settivaripalli Village, Mydukur Mandal, YSR Dist, Cell No.8861915555	1542 (Old Sy.No.1453)	1014/Q/KDP/2010, dt:23-09-2011	2.145	08/11/2011	07/11/2021	-	-	-	Non Working	Non Captive	-	14-43-42.96894"	78-47-55.27108"	Open cast
31	Barytes & Dolomite	V.Venkatasubbaiah	D.No.2/92-B, Vellatur Village, Pendlimarri Mandal, YSR District, Cell No.9949713844	480/1P (Old Sy.No.473)	20527/R5-2/2016, Dt:17-08-2018	17.800	15/10/2018	14/10/2038	-	-	-	working	Non Captive	SEIAA/AP/KDP/MIN/05/2018/564 (529), Dt:11-06-2018	N 14-25-54.6	E 78-34-14.70	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
32	Barytes	M/s A.K.R Minerals Pvt.Ltd.,	-	1999/P, 2021/2 etc.,	GO Ms.No.256 dt: 18-06-2008	3.643	06/06/2008	05/06/2028	-	-	-	Non Working	Non Captive	-	-	-	Underground)
33	RM&BS, Gravel	K.VENURAMI REDDY	D.No.1-5-A, Settivaripalli Village, S.Mydukur Mandal, YSR Dist- 516173,	1453/P	3063/QL/2021, dt:13.04.2022	2.978	29/04/2022	28/04/2037	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2022/3911/179.58/177.37, dt:24.03.2022	14-45-12.9307"	78-47-28.7776"	Open cast
34	RM&BS, Gravel	K.VENURAMI REDDY	D.No.1-5-A, Settivaripalli Village, S.Mydukur Mandal, YSR Dist- 516173,	1453/P	3062/QL/2021, dt:13.04.2022	1.994	29/04/2022	28/04/2037	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2022/3913/179.29/177.38, dt:24.03.2022	14-45-13.89871	78-47-46.11500	Open cast
35	RM&BS & Gravel	K.V. Narayana Reddy	D.No:10/15, Middela, Narasapuram Post, SAKN Mandal, Y.S.R. District	688, 689/1 & 690 (Old Sy.No.174 /P)	2869/Q1/2019, dt.05-07-2021	4.000	16-07-2021	15-07-2031	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/10/2020/2291-, dt:22-06-2021	15-03-51.11096	78-52-23.13754	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
36	RM&BS	K.V.Narayana Reddy	D.No:10/15, Middela, Narasapuram Post, SAKN Mandal, Y.S.R. District	174/P	122/QL/2012, Dt: -07-2012	2.000	26/07/2012	31/03/2023	-	-	-	Non working	Non Captive	-	-	-	Open cast
38	Marble	M/s Midwest Granites Pvt. Ltd.	S/o. K. Rama Raghava Reddy, D.No.8-2-684/3/25 & 26, Road No.12, Banjara Hills, Hyderabad - 500034	57/P	28335/R5-2/2009, Dt:24-03-2009	6.000	07/05/2009	06/05/2029	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/06/2018/639-757, Dt.14-08-2018	14-27-24.35938	78-56-44.22688	Open cast
39	Barytes	M. Siva Reddy	S/o. M. Pedda Gangi Reddy , D.No.4-5-36, Brahmanapalli Road, Pulivendula Mandal, YSR Dist, Cell No.9440284482	99/A, 1002/2, 101/1	Proc.No.'7140/D12-1/ 2019, dt: 23-09-2020	1.125	8/24/2022	8/23/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIM/10/2021/3519/180.73/178.60, dt.29-03-2022	15-05.49.50	78-58-11.70	Underground)
40	Barytes	M. Siva Reddy	S/o. M. Pedda Gangi Reddy , D.No.4-5-36, Brahmanapalli Road, Pulivendula Mandal, YSR Dist, Cell No.9440284482	131/P, 132/1A& B & 130/2	Proc.No.'1576/D12-1/2018, dt: 23-07-2020	0.675	7/14/2021	7/13/2041	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIM/11/2019/1397/1845 dt.14-12-2020	15-05.59.77318	78-58-09.89901	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
41	R.M & B.S and Gravel	M/s Sri Shirdi Sai Metals, Mg.Ptnr: Sri .P. Muni Sekhar Reddy	Mgptr: P. Muni Reddy , Duvvur Village & Mandal	1442/3	-	3.000	9/7/2022	9/6/2032	-	-	-	Non Working	Non Captive	-	-	-	Open cast
42	Napa Slabs	A.Chandra Sekhar Reddy	D.No.2/859-1, Buddayapalli, Proddutur, Y.S.R. District	306/1A1A2, 306/1A, 1B, 306/1A1C2, 306/1A1D & 307/1A	Proc.No.2064/QL/2016, dt: 30-06-2017	1.582	10-08-17	8/9/2027	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-19, Dt.17-04-2017	14-47-07.11314	78-27-41.28346	Open cast
44	Barytes	G. Raghava Reddy	S/o Ranga Reddy, D.No.2-2-103, Rangareddi Street, Pulivendula, Y.S.R. District, Cell No.9989106662	438/2	GO.Ms.No. 284, date: 29-10-2007	3.663	29/03/2008	28/03/2028	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-39, dt.03-08-2017	14-25-21.17476	78-10-31.03202	Underground)
45	Barytes	Y.S.Venkata Reddy	Y S Venkat Reddy, D No 3-4-12, Raja Reddy Stree,t Pulivendula, YSR District, Cell No.9703799824	288/1, 4, 5, 6 & 7		2.890	2/16/2018	2/15/2028	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-37, dt.03-08-2017	14-27-07.95965	78-09-01.35520	Underground)
46	Barytes	Smt. C.B. Sivamma	Smt. C.B. Sivamma, W/o C. Reddaiah, D.No.13/349F1, Vempalli Village & Mandal, Y.S.R. District	210 & 219	Procd. No.5989 / R5-2/2005, dt: 14-02-2018	6.291	4/13/2018	4/1/2038	-	-	-	Working	Non Captive	SEIAA/APKDP/MIN 08 2017 385, dt. -09-2016	14-30-33.15554	78-04-40.95824	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
47	Dolomite	Smt. R. Varalakshmi	Smt.R.Varalakshmi, Prop M/s. Anusha Mines & Minerals, D No 1/483, Maruthi Bazar, Ankalamapet, Pulivendula, YSR District, Cell No.9440725804	1/2D,	GO.Ms.No. 297. date: 15-07-2002	4.776	19-11-2002	18-11-2022	-	-	-	Working	Non Captive	SEIAA/AP/KDP-101/2015, Dt.12-11-2015	14-27-42.81673	78-07-10.89509	Open cast
48	R.M. & B.S.	V.Vidyananda Reddy		427/1(Old Sy.No. 380/P)		4.985	10/20/2020	10/19/2030	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/01/2020/164155, dt. 11.06.2020	14-28-49.29594	78-11-15.29872	Open cast
49	Barytes	M.Siva Reddy	1/545-A, Brahmanapalli Road, Near Srirama Theatre, Pulivendula, YSR District, Cell No.9440284482	347/1A & 347/1B	GO.Ms.No. 40. date: 17-01-2001	2.390	27/01/2001	26/01/2021	-	-	-	Not-Working	Non Captive	SEIIA/AP/KDP/MIN/11/2021/3609, Dt.18.04.2022	-	-	Open cast
50	R.M. & B.S.	Sri G. Chenna Kesava Naidu	S/o. Paradesi Naidu, D.No.4-209, Potladurthi Village, Yerraguntla Mandal, YSR District-516360, Cell No.9290075738	242 (oldSy.No. 221)	Proc.No.2064/Q-YGL/2015, dt: 13-05-2015	10.117	20-5-2015	19-5-2025	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/VI0/07/2019/1084-832, dt. 18.12.2020	14-38-34.21905	78-21-18.79288	Open cast
51	R.M. & B.S.	M/s TRKR Stone Crusher, Mg. Ptnr: T. Ramakrishna Reddy	T. Ramakrishna Reddy, D.No.2-1-668, Maheswara Nagar, Yerraguntla	1337 (Old Sy.No.730 /P)	Proc.No.415/Q2/2020, dt: 27-02-2020	2.120	2/15/2021	2/14/2031	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/08/2020/2076/859, dt. 18.12.2020	14-42-41.37783	78-17-44.29249	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
52	RM & BS and Gravel	Syed Alisher	4/134, Jammalamadugu Road, Muddanur (Po), YSR District, Cell No.9885609847	713 & 714	-	3.240	4/30/2022	4/29/2032	-	-	-	Working	Non Captive	-	-	-	Open cast
53	Quartzite & Silica Sand	Sri P. Venkata Shiva Reddy	Sri P. Venkata Shiva Reddy, D.No.1/21, Gundlakunta Village, Peddamudium Mandal, YSR Dist	677 (Old Sy.No. 425)	Proc.No.11779/D12-1/ 2018, dt: 05-08-2022	8.000	11/4/2022	11/3/2042	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/03/219/852/161.38 & 158-26-476, dt. 29-07-2021	-	-	Open cast
55	R.M. & B.S.	Sri. M. Muni Reddy	Sri. M. Muni Reddy, S/o, Obula Reddy, H.No.2/24, Rangasaipuram, Chowduru Panchyat, Proddatur	224/1 & 2	2701/Q2/2017, dt: 08-01-2019	2.000	4/2/2019	4/1/2029	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2018-19-89, Dt. 02-04-2019	14-57-35.95713	78-15-55.78837	Open cast
56	Dimensional Stone used for Kerbs and Cubes,Cubes,Kerbs	M. Venkata Ramanaiah	D.No.2/12, Talamanchipatnam Village, Mylavaram Mandal, Y.S.R. District, Cell No.9010229053	881	Proc.No.2554/QL/2016, dt: 03-10-2017	1.728	8/3/2017	8/2/2027	-	-	-	Not-Working	Non Captive	-	-	-	Open cast
57	Dolomite	Sri P. Nagaraju	4-7-288/1, SBI Colony, pulivendula, YSR District, Cell No. 9493035343	S.No.278/2 of	Go.Ms.No. 331, dt: 17-12-2008	8.097	27-11-2013	26-11-2023	-	-	-	Working	Non Captive	SEIAA/AP/KDP-13/2009-1034, Dt.21-07-2009	14-23-07.13318	78-13-49.64482	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
61	Black Granite	Sri S.Jakeer Hussain	4/135, Jammalamadugu Road, Muddanur Mandal, YSR District Cell No. 9000713527	333	Proc.No.1127/R5-2/2009, dt: 06-04-2016	2.000	11/5/2016	10/5/2036			-	Not-Working	Non Captive	-	-	-	Open cast
62	R.M. & B.S.	K. Rajasekhar Reddy	D.No.7-16, Buchupalli Village, Thondur Mandal, YSR District	1191/2	500/Q2/2020, dt.13-06-2022	2.173	9/7/2022	9/6/2032	-	-	-	Working	Non Captive	-	14 36' 28.42732 N	78 18' 21.50947 " E	Open cast
63	Marble	S. Kareemunnisa Begum	4/134, Jammalamadugu Road, Muddanur (Po), YSR District, Cell No.9885609847	120	4029/Q/2001, dt: 20-01-2003	6.700	19-04-2013	18-04-2033	-	-	-	Not-Working	Non Captive	-	14-37-23.83979	78-18-07.96248	Open cast
64	R.M. & B.S & Gravel	P. Subba Reddy	13/2-12, B Society Colony, Kamalapuram, YSR Dist	712 (Old Sy.No.374)	Proc.No.5240/Q2/2017, dt: 15-02-2021	1.971	5/12/2021	5/11/2031	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/08/2020/2081-868, dt.18-12-2020	14-30-46.10119	78-33-08.10403	Open cast
65	R.M. & B.S.	J. Kiran Reddy Transferred to B. Balakrishna	S/o. J. Krishna Reddy ,D.No.5/1895-A upstairs, Geetha Asharamam Road, Proddatur. Cell No.9963351526	598	Proc.No1051/Q/2008, dt: 24-09-2008	2.000	11/18/2018	11/17/2028	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/07/2019/1189, Dt. 25-11-2019	14-30-29.70996	78-32-00.06153	Open cast

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							From	To	From	To							
66	R.M. & B.S.	J. Kiran Reddy	S/o. J. Krishna Reddy ,D.No.5/1895-A upstairs, Geetha Asharamam Road, Proddatur. Cell No.9963351526	603/P (Old No.598)	677/Q2/2019-2, dt: 13-04-2023	10.985	6/12/2023	6/11/2033	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/04/2019/941/164.59&161.50,dt:09-09-2021	-	-	Open cast
66	Barytes, Dolomite, Soap Stone	G. Shiva Kumar REDDY	D.No.45/394-5, Balaji Nagar, Chemmumaipet, Kadapa	501/P	4754/D12-2/2021, dt: 21-02-2023	4.980	4/21/2023	4/20/2043	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/05/2022/4324/191.58 &188.47 ,dt:02-08-2022	14-26-19.25933	78-30-13.22639	Open cast
67	R.M. & B.S.	B.Balakrishna	-	713/2	-	3.587	10/3/2019	10/2/2029	-	-	-	Working	Non Captive	SEIIA/AP/KDP/MIN/04/2019/918719, dt. 06.08.2019	14-31-09.15980	78-32-42.29841	Open cast
68	R.M. & B.S.	Y. Nagendra Reddy	D.No.2-1-878, Maheswara Nagar, Yerraguntla	1614 (Old Sy.No.1426/P)	Proc.No.3230/Q2/2019, dt: 18-07-2020	5.000	8/12/2020	8/11/2030	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2020/1636-08, Dt.11-06-2020	14-28-52.24780	78-30-37.49280	Open cast
69	Barytes	B. Vishwanatha Reddy	-	319	-	1.140	6/22/2022	6/21/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/04/2021/3097/165.27 & 162.26-770, Dt.21-09-2021	-	-	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Mehod of Mining (Open cast/ Underground)
							From	To	From	To							
70	Barytes	B. Niranjan Reddy	D.No.2-163, Copu Street, Vempalli Village & Mandal, YSR Dist	351/5	Proc.No.11755/D12-2/2018, dt: 31-05-2022	1.000	9/13/2022	9/12/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2022/3871/183.44 & 180.29, Dt. 18-04-2022	-	-	Underground)
71	Barytes, Dolomite, Soap Stone	M/s S.A.P. Mines & Minerals	D.No.2/346, Ramnagar, T.B.Road, Proddutur, Y.S.R. District-516360, Cell No.9989155755	2506	Go.Ms.No. 340, dt: 22-12-2005	97.750	13/02/2006	12/02/2026	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
72	Dolomite	J.V. Lakshmi Reddy	H.No.1/1494, Upstairs, Near saraswathi Vidya Mandir, Pulivendula, YSR District, Cell No.9441226766	502, 314/4, 314/12P,	Go.Ms.No. 493, dt: 28-12-2002	32.190	24-11-2003	23-11-2023	-	-	-	Not-Working	Non Captive	-	-	-	Open cast
73	Gravel	Ms. Bharathi		1/P	-	1.00	2/23/2023	2/22/2028	-	-	-	Working	Non Captive	-	-	-	Open cast
74	Barytes	K. Gopal Reddy		132/3 & 139/A	-	2.520	8/21/2018	8/20/2038	-	-	-	Working	Non Captive	DEIAA/AP/KDP-2017-18(56), Dt.30-04-2018	14-22-12.84561	78-22-58.20678	Underground)

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							From	To	From	To							
75	Barytes	L. Ravisankar Reddy	L. Ravisankar Reddy, S/o. L. Somi Reddy, D.No.2/11, Thummalapalli Village & Post, Yerraguntla Mandal, YSR Dist, Cell No. 9866169119	680	Proc.No.22609/Rd-2/2017, dt: 07-08-2018	4.680	8/7/2018	8/6/2038	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-18(55), dt.30-04-2018	14-22-44.97802	78-25-39.28450	Underground)
76	Barytes	M. Jagan Mohan Reddy	D.No.1/125 , Thatimakulapalli Village, Thalapalli Post, Vempalli Mandal, YSR District, Cell No. 9550795838	214/C, D, E Part	GO.Ms.No. 210, dt: 02-09-2009	11.978	31/07/2013	30/07/2033	-	-	-	Not-Working	Non Captive	SEIIA/AP/KDP/MIN/11/2021/3586, Dt.20.01.2022	-	-	Underground)
79	Barytes	M/s. Mahalakshmi Micro Minerals	D.No.1/397-1, Court Road, Kadapa, Y.S.R. District, Cell No.9490449987	266/2, 705/2 and 706/2	GO.Ms.No. 134, dt: 29-04-2006	2.032	20/06/2006	19/06/2026	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
80	Barytes	M/s.Sri Pavan Micro Minerals	D No 1/1928(2), Near Railway Station, Kadapa YSR District, Cell No.9246940789	187/P, 186/1A & 193	GO.Ms.No. 30, dt: 15-02-2003	2.222	17/03/2003	16/03/2023	-	-	-	Non-working	Non Captive	-	-	-	Underground)
81	Barytes	M.Obula Krishna Reddy	Thatimakulapalli Village, Thalapalli Post, Vempalli Mandal, YSR District, Cell No. 9550795838	258	GO.Ms.No. 289, dt: 25-05-2000	3.360	04/04/2001	03/04/2021	-	-	-	Not-Working	Non Captive	-	-	-	Underground)

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							From	To	From	To							
82	Barytes	Shaik Vazeer Ahmed & Sons	Shaik Vazeer Ahmed & Sons, D No 19/299, Varaswamimundy Street, Kadapa, YSR District, Cell No. 9440428881	252	GO.Ms.No. 165, dt: 12-03-2001	4.554	26/05/2001	25/05/2021	-	-	-	Not-Working	Non Captive	SEIIA/AP/KDP/MIN/58/ 2019, Dt 25-10-2013	-	-	Underground)
84	Barytes	V.Rama Mohan	D No 5-113-A, CMR Palli, Near TGP Colony, Kadapa, YSR District, Cell No.9849387447	515, 516, 504/2P	GO.Ms.No 361, dt: 26-06-2001	5.340	08/10/2001	07/10/2021	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
85	Barytes	J.V.Lakshmi Reddy	H.No.1/1494, Upstairs Near Saraswathi Vidya Mandir, Parnapalli Road, Pulivendula, YSR District, Cell No. 9441226766	190/P	GO.Ms.No. 494 dt: 28-12-2002	58.704	24/11/2003	23/11/2023	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
86	Barytes	Sri Md. Karamathullah	D No 11/104/1, Kagithalapenta, Kadapa YSR District, Cell No. 9951461073	224 214/B	GO.Ms.No. 741 dt: 05-08-1970	6.479	05/01/1971	04/01/1991	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
87	Barytes	M/s Krupa Mining and Minerals	M/s Krupa Mining and Minerals, H.No.44/28-1-24, Vijayanagar Colony, Chemmumiape, Kadapa - 516003,	1061/2	Proc.No.12724/R5-2/ 2017, dt: 01-01-2018	15.985	2/9/2018	2/8/2038	-	-	-	Working	Non Captive	SEIAA/AP/KDP/ MIN/09/2017/441, dt.12-10-2017	14-20-46.7	78-19-05.01	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
			Cell No.8985899998														
88	Barytes	Sri S.Shukur Basha		230 & 211/A	GO.Ms.No. 197, dt: 28-03-2001	2.194	03/08/2021	02/08/2031	-	-	-	Working	Non Captive	SEIIA/AP/KDP-51/2013, 23-10-2013	14-22-16.86291	78-16-02.01705	Underground)
89	Barytes	Smt. P.Varalaskhmi	1/1278, Ankalamma Temple Street, Pulivendula, Cell No.9247472536	208/A1 A2	GO.Ms.No. 195 dt: 01-07-2003	1.812	06/09/2003	05/09/2023	-	-	-	Working	Non Captive	-	14-22-10.09695	78-16-03.96205	Underground)
90	Barytes	M/s.Sri Sai Lakshmi Narasimha Mines & Minerals	6-9, Near Krishnappa Compund, Professors colony, CMR Palli, Cell No. 9440428419	977/1A	GO.Ms.No. 66 dt: 07-03-2006	1.623	10/04/2006	09/04/2026	-	-	-	Working	Non Captive	SEIAA/AP/CDP-45/2013, dt.30-07-2013	14-20-56.07596	78-18-10.34037	Underground)
92	Barytes	L. Venkata Malla Reddy	-	703/3	-	0.829	3/8/2019	3/7/2039	-	-	-	Working	Non Captive	DEIAA/AP/KDP-2018-19/79, Dt.18-11-2018	14-19-45.24652	78-19-55.03705	Underground)
93	Barytes	N. Bayapu Reddy	-	705/1 & 708/1	-	1.780	3/30/2019	3/29/2039	-	-	-	Working	Non Captive	DEIAA/AP/KDP-2018-19/86, Dt.18-11-2018	14-19-41.42883	78-19-54.53237	Underground)
94	Barytes	P. Ramanjaneyulu	P. Ramanjaneyulu, S/o Late Pedda Pullaiah, D.No.3/59, Vemula (V) & (M), Y.S.R. District.	917/1	-	2.089	1/10/2018	1/9/2038	-	-	-	Working	Non Captive	DEIAA/AP/KDP-2017-41, Dt.03-08-2017	14-21-11.13882	78-17-47.89396	Underground)
95	Barytes	Sri Shoaib Syed Khadri	-	230 & 211/A	GO.Ms.No. 308, dt: 04-06-	0.444	03/08/2021	02/08/2031	-	-	-	Working	Non Captive	SEIIA/AP/KDP-50/2013-4381, 23-10-2013	14-22-10.73416	78-15-59.73528	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
					2001												
96	Barytes	Sri Basha Syed Sajjad	-	230 & 211/A	-	1.102	03/08/2021	02/08/2031	-	-	-	Working	Non Captive	SEIAA/AP/KDP-52/2013, dt.23-10-2013	14-22-05.11399	78-15-58.65322	Underground)
97	Barytes	M. Ramachandra Reddy	M.Ramachandra Reddy, D No 1/395, Near Sree Rama Theatre, Pulivendula Post, YSR District 516390, Cell No.9440583125	1021/34 & 76 and 1021/P	GO.Ms.No. 234 dt: 18-10-2004	4.000	31/12/2004	30/12/2024	-	-	-	Non Working	Non Captive	SEIAA/AP/CDP-43/2013, dt.15-07-2013	14-20-28.84659	78-19-08.90834	Underground)
98	R.M. & B.S.	Sri V. Vara Prasad	4-8-263/20, Market Road, Behind Narayana School, Pulivendula,	732/1	Proc.No.1491/Q/2018, dt: 04-06-2020	1.887	6/4/2020	3/3/2030	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/07/2019/1074-1355, Dt.07-11-2019	14-23-09.24377	78-16-11.20729	Open cast
99	R.M. & B.S.	Sri V. Vara Prasad	4-8-263/20, Market Road, Behind Narayana School, Pulivendula,	731/4	Proc.No.1492/Q/2018, dt: 04-06-2020	1.800	6/4/2020	3/3/2030	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/07/2019/1073-1382, Dt.07-11-2019	14-23-12.66988	78-16-04.96699	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
100	Yellow Ochre	M/s. Karthika Mines & Minerals Pvt Ltd., Director: S.Chandra Sekhar Reddy	M/s Karthika Mines & Minerals (P) Limited, H.No.13/338/1-0-E, Near TVS Show Room, Pulivendula Road, Vempalli - 516329, Cell No.8884791234	65/4,5,6 & 72/5,6,7	Proc.No.11250/R5-2/2015, dt: 18-10-2017	4.322	12/15/2017	12/14/2037	-	-	-	Working	Non Captive	DEIAA/AP/KDP/2017-35, Dt.03-08-2017	14-23-37.04690	78-20-59.09141	Open cast
101	Yellow Ochre	M/s Sree Maruthi Mines and Minerals, Prop: Sri A. Bala Swamy Reddy	Alavalapadu Village, Vempalli Mandal, YSR District, Cell No. 9989049450	613	GO Ms.No.102, dt: 21-04-2008	4.940	1/19/2009	1/18/2029	-	-	-	Working	Non Captive	SEIAA/AP/KDP-57/2013-5416, Dt.25-10-2013	14-23-39.24051	78-20-18.81140	Open cast
102	Yellow Ochre	M/s Sri Balaji Minerals	-	313/1	-	4.265	6/29/2022	6/28/2042	-	-	-	Working	Non Captive	-	14-23-44.44767	78-18-55.50446	Open cast
103	Barytes	M/s Sree Mining & Minerals Mg.Ptnr: Sri D. Vijay Kumar Reddy	-	972/2 (Old Sy.No. 721/4)	-	8.000	5/25/2022	5/24/2042	-	-	-	Working	Non Captive	-	-	-	Open cast
104	Barytes	G. Gangadhar	D No 1/759-B, SB Colony, Bramhanapalli Road, Pulivendula, YSR District 516 390, Cell No. 9440280027	921/1	-	1.167	6/17/2022	6/16/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP-MIN/04/2021/3137/165.64 & 162.58-792, Dt.21-09-2021	-	-	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
105	Barytes	M. Sai Niranjan Babu	H.no. 1-793, Gandhi Nagar, Kadapa, YSR Dist	326/2	Proc.No. 18345/D12-2/2017, dt: 12-09-2022	0.425	10/28/2022	10/27/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP-MIN/2012/2020/2714/176.66 &173.41 , Dt.09-03-2022	14-22-08.00	78-22.30.5	Open cast
106	Barytes	N. Ramamohan Reddy	-	899/3 & 899/4	-	1.780	11/10/2022	11/9/2042	-	-	-	Working	Non Captive	-	-	-	Open cast
107	Barytes	N. Ramamohan Reddy	-	703/1B	-	1.174	11/10/2022	11/9/2042	-	-	-	Working	Non Captive	-	-	-	Open cast
108	Barytes	Smt. Mallisetty Rajitha	-	1053/3	-	1.924	11/18/2022	11/17/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/03/2022/4116/184.94 &181.64 , dt: 17-05-2022	-	-	Open cast
109	Barytes	K.Ramachandra Reddy	-	504	-	1.614	11/18/2022	11/17/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/03/2022/4090/184.85/18158, dt: 16-05-2022	-	-	Open cast
110	Yellow Ocher	Sri S.K. Yella Reddy	-	573/2 & 574	-	4.734	9/20/2022	9/19/2042	-	-	-	Working	Non Captive	-	-	-	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
112	Barytes	M/s.Sri Sai Lakshmi Narasimha Mines & Minerals	6-9, Near Krishnappa Compund, Professors colony, CMR Palli, Cell No. 9440428419	901 & 902	-	4.581	09/01/2009	08/01/2029	-	-	-	Not-Working	Non Captive	SEIAA/AP/CDP-47/2013, dt.30-07-2013	14-21-05.08925	78-17-42.85033	Open cast
113	Barytes	P. Narasa Reddy		709/2	-	0.886	8/10/2018	8/9/2038	-	-	-	Not-Working	Non Captive	.DEIAA/AP/KDP/2017-18(56), dt.30-04-2018	14-19-40.97888	78-19-43.80223	Open cast
114	Barytes	Sri V.Kiran Kumar, GPA Holder of V.V.Rangaiah Chetty	S/o. V. Subbarangaiah, 2-147, Main Bazar, Vemula, YSR District-516349, Cell No. 9030210660	606/P, 571	5213/D12-2/2021, dt.13-06-2023	1.052	01/04/2023	31/03/2033	-	-	-	Not-Working	Non Captive	SEIIA/AP/KDP/MIN/11/2021/3586, Dt.20.01.2022	-	-	Open cast
119	Barytes	M/s. Ashok Minerals	S/o Ranganatham, 1/1988, Krishnappanagar, Kadapa, YSR District 516001, Cell No. 9490245070	606/P	-	0.955	09/05/2003	08/05/2023	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
120	Barytes	Smt Y.S.Lakshmi	Smt YS Lakshmi, 9/61, Raja Reddy Street, Pulivendula, YSR District, Cell No. 9440203750	1021/2	-	1.036	23/03/2005	22/03/2025	-	-	-	Not-Working	Non Captive	-	-	-	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
121	Barytes	Smt. V. Renuka Devi	W/o. V. Naga Raju, Vemula Village and Mandal, Y.S.R. District, Cell No. 9573400403	1021/22, 1021/P	-	1.300	31/08/2007	30/08/2027	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
122	Barytes	Sri Y.S.Venkata Reddy	Y S Venkat Reddy, D No 3-4-12, Raja Reddy Stree,t Pulivendula, YSR District, Cell No.9703799824	1021/1	-	1.643	12/12/2006	11/12/2026	-	-	-	Not-Working	Non Captive	-	-	-	Underground)
124	Barytes	M/s.Sri Sai Lakshmi Narasimha Mines & Minerals	6-9, Near Krishnappa Compund, Professors colony, CMR Palli, Cell No. 9440428419	1003/1, 1003/2	-	1.881	08/12/2008	07/12/2028	-	-	-	Not-Working	Non Captive	-	14-20-41.73038	78-18-45.71459	Underground)
128	Barytes	Smt.V.Renuka Devi	W/o. V. Naga Raju, Vemula Village and Mandal, Y.S.R. District, Cell No. 9573400403	1021/23	-	4.591	09/06/2004	08/06/2024	-	-	-	Not-Working	Non Captive	-	-	-	Underground)

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
136	Yellow Ochre	M/s. Karthika Mines & Minerals Pvt Ltd., Director: S.Chandra Sekhar Reddy	M/s Karthika Mines & Minerals (P) Limited, H.No.13/338/1-0-E, Near TVS Show Room, Pulivendula Road, Vempalli - 516329	203/1 to 4,6,7, 204/4&5, 208/1 & 2 and 209/3 to 11	-	4.241	23-10-2013	22-10-2033	-	-	-	Not-Working	Non Captive	-	-	-	Open cast
137	R.M. & B.S.	Sri R.Sathish Kumar Reddy		819/P, 1054/1P, 1054/2P &435/3P	-	4.690	4/24/2021	4/23/2031	-	-	-	Not-Working	Non Captive	-	-	-	Open cast
140	Napa Slabs	S. Raviprasad Reddy		57	-	1.469	6/9/2020	6/8/2030	-	-	-	Working	Non Captive	DEIIA/AP/KDP/2017-18(67), dt. 30.04.2018	14-39-30.47171	78-30-05.60394	Open cast
141	Napa Slabs	Y.Mallikarjuna Gowd		166	-	1.500	11/9/2021	11/8/2031	-	-	-	Working	Non Captive	-	-	-	Open cast
142	Quartz & Feldspar	M/s. Ramakrishna Enterprises, Prop: R.P. Venkateswara Reddy		519 (old Sy.No.191)	2884/R5-2/2017, dt.01-12-2022	9.250	12/1/2022	11/30/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/05/ 2018-586, dt.14-08-2018	-	-	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
142	Barytes	Sri Obula Reddy Raja Reddy		703/2	1626/D12-2/2021, dt.01-06-2023	1.000	7/10/2023	0-07-2043	-	-	-	Working	Non Captive	-	-	-	Underground)
143	Quartzite	Sri P.Venkata Siva Reddy		678 (Old Sy.No.425)	11781/D12-2/2018, dt.21-06-2023	18.00	8/26/2023	8/25/2043	-	-	-	Working	Non Captive	-	-	-	Open cast
144	Quartzite, White Shale, Ochre	M/s. Mangalore Mineral Traders	M/s. Mangalore Mineral Traders, Transferred from Smt. S. Khader Bee, Mineral House, Hampan Matta,Mangalore	730	GO.Ms.No 151, date: 17-7-2004	40.469	29-7-2003	28-07-2023	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/06/2017.331, dt:01-09-2017	14-42-49.64	78-18-38.55"	Open cast
145	Quartzite, White Shale, Ochre	M/s. Mangalore Mineral Traders,	M/s. Mangalore Mineral Traders, Transferred from Smt. S. Khader Bee, Mineral House, Hampan Matta,Mangalore	425	GO.Ms.No. 136, date: 30-06-2004	43.32	8/4/2003	7/4/2023	-	-	-	Non-Working	Non Captive	-	-	-	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
146	Quartz	Dr.S. Ravindranath Reddy	Silpa Nursing Home, Near Municipal Office, Kadiri, Ananthapuram District , Cell No.9440173240	1/P	413/D12-1/2022, dt.01-06-2023	22.946	4/1/2023	3/31/2033	-	-	-	Working	Non Captive	-	14-14-27.11841"	78-25'-50.2811"	Open cast
147	Barytes	M/s Naga Mineral Industries, Prop: Sri K.K.Rajasekhar		1003-2	6561/D12-2/2018, dt.04-07-2023	1.492	9/5/2023	9/4/2043	-	-	-	Working	Non Captive	-	-	-	Open cast
148	RM&BS	Dasamaneni Sai Sampath Kiran		743/P	3494/Q1/2022	4.89	3/24/2023	3/23/2033	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/01/2023/4861/210.56 & 207.46 dt:22-02-2023	14-28-52.2804"	78-23'-34.8252"	Open cast
149	Quartz	M/s. Sai Universal Mining Services, Mgptr: K. Prabhakar Reddy	Plot No.15-DP2, KIADB, Sankalapura Industria Area, Ballari Main Road, Hospete - 583201, Ballari Dist, Cell No. 9449815560	683	904/D12-1/2020, dt: 22-09-2022	2.000	11/3/2022	11/2/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/03/2022/4035/183.16/180.09t:16-04-2022	14-49-56.66914"	79-00'-28.41249"	Open cast

S. No.	Minerals	Name of the lessee	Addresss & Contact No of the lessee	Sy.No.	Mining Lease Grant order No& Date	Area of Mining Lease Extent (Hects)	Period of Mining Lease (initial)		Period of Mining Lease (1st & 2nd Renewal		Date of Commencement of Mining Operation	Status (Working /Non working/ Temp. working for dispatch etc.,	Captive/Non Captive	EC Order	Location of the Mining Lease (latitude & Longitude)		Method of Mining (Open cast/ Underground)
							From	To	From	To							
150	Barytes	B. Upendra Reddy	PC Palli Post, Godlaveedu Panchayat, B. Mattam mandal, YSR Dist	1/P	12002/D12-1/2021 dt:23-06-2022	4.324	12/14/2022	12/13/2042	-	-	-	Working	Non Captive	SEIAA/AP/KDP/MIN/02/2022/3989/180.65 & 178.549, Dt. 27-03-2022	15-10-75.7002"	78-96'-89.7999"	Underground)
151	Barytes	M/s. I. Sringeri Mines & Mnerals, Mgpt: I. Venkata Subba Reddy	Mgpt: I. Venkata Subba Reddy, Flat No.411, Jayapadma Towers, Aravinda Nagar, Kadapa	425/2	Proc.No.5132/D12-1/2021, dt: 20-04-2022	3.694	5/6/2022	5/5/2042	-	-	-	Working	Non Captive	-	14-51-00.96958"	78-57-49.28672"	Underground)
152	Barytes	M/s. Kondagangammathalli Mines & Minerals,	Prop: C. Nageswara Reddy, H.No.4/17-1, Chenchaiahgaripalli, Mamillapalli, B. Mattam Madnal	147/P	Proc.No.4638/D12-1/2019, dt: 12-04-2022	1-514	5/20/2022	5/19/2042	-	-	-	Working	Non Captive	-	15-06-13.51356"	78-58'-20.38524"	Underground)

Data Source: Assitant Director of Mines and Geology,YSR Kadapa District, Andhra Pradesh

The Details of statement showing the letter of intent (LoI) in the district is showing in Table-15:

Table 15: The list of the letter of intent (LoI) in the District

S. NO	Name of the Mineral	Name of the Lessee	Address & Contact No. of Letter of Intent Holder	Letter of Intent Grant order No. & Date	Area of Mining lease to be allotted	Validity of LoI	Use (Captive /Non-captive)	Location of the Mining lease (Latitude & Longitude)		Remarks
								Latitude	Longitude	
1	2	3	4	5	6	7	8	9		
1	M-Sand & Gravel	M.Vijaya Bhaskar Reddy	D.No.6-116A, Near MRO Office, K.V.Palem Road, Chimakurthi Village & Mandal, Prakasham District - 5123226. Contact No: 9849105747	4156/QL/ 2016, Dt:21-10-2016	Sy.No.675 of Chinthakunta Village, Muddanur Mandal, YSR Kadapa District. Extent:23.000 Hects	20-04-2017	Non-Captive	14° 42' 08.2' N'	78° 18' 16.9"E	Revision filed before the Government on 14-10-2020 against the show cause notice issued by this office
2	Road Metal & Building Stone	M/s AB Mines & Minerals Pvt Ltd, MD: Sri S B Arshad Basha	H.No.19-420, upstairs, S.F.S. Street, Kadapa - 516001. Contact No: 9666635410	1102/Q1/ 2021, Dt:29-05-2021	Sy.No.1137/P of Lakkireddypalli Village & Mandal, YSR District, Extent: 6.928 Hects	28-05-2024	Non-Captive	14° 11' 44.02114' N'	78° 39' 51.78127"E	Accorded permission for extension time vide Proce No.1102/Q1/2021, Dt:12-07-2022 upto 28-05-2024 (02 Years)
3	Road Metal & Building Stone	Sri P.Konda Reddy	S/o P.Malem Konda Reddy, Gopavaram Village, Ramapuram Mandal, YSR Kadapa District - 516233. Contact No: 9701134437	3088/Q/2 021, Dt:27-12-2021	Sy.No.913 (Old Sy.No.743) of Rekulakunta Village, B.Mattam Mandal, YSR Kadapa District. Extent:4.700 Hects	26-12-2022	Non-Captive	14° 43' 35.67011'' N	78° 56' 28.82640"E	Accorded permission for extension time vide Proce No.3088/Q/2021, Dt:27-12-2022 upto 26-12-2024 (02 Years)
4	Road Metal & Building Stone,	Smt G.Nageswari	D.No.4-11, Sivalayam Veedhi, Patha Kadapa, YSR	3299/Q/2 021, Dt:03-01-	Sy.No.919/1 of Chinnachowk Village, Kadapa	02-01-2023	Non-Captive	14° 30' 05.18746''N	78° 51' 36.77592”E	Accorded permission for extension time

	Ballast, Murram/Gravel & Ordinary Earth		Kadapa District - 516002. Contact No:	2022	Mandal, YSR Kadapa District. Extent: 4.607 Hects					vide Proce No.3299/Q/2021, Dt:06-01-2023 w.e.f. 03-01-2023 to 02-01-2025.
5	Road Metal & Building Stone, Ballast, Murram/Gravel & Ordinary Earth	Smt A.Saraswathi	D.No.16-71, Lakshmi Nagar, Chennur Village & Mandal, Ysr Kadapa District - 516162	3300/Q/2021, Dt:03-01-2022	Sy.No.919/1 of Chinnachowk Village, Kadapa Mandal, YSR Kadapa District. Extent: 4.607 Hects	02-01-2023	Non-Captive	14° 30' 14.49891"N	78° 51' 34.37578"E	Accorded permission for extension time vide Proce No.3300/Q/2021, Dt:06-01-2023 w.e.f. 03-01-2023 to 02-01-2025.
6	Road Metal & Building Stone & Ballast	M/s Rithvik Project Private Limited	Plot No.37 & 39, Navodaya Colony, Road No.2, Banjarahills, Hyderabad - 500034. Contact No: 9849003333.	3416/A1/2022, Dt:23-12-2022	Sy.No.743/9 of Rekulakunta Village, B.Mattam Mandal, YSR Kadapa District. Extent: 4.938 Hects	22-12-2023	Non-Captive	14° 43' 44.31541"N	78° 56' 18.16910"E	Preffered bidder is having stipulated time for submission of AMP, EC, CFE
7	Gravel	Sri A. Sriman Narayana Reddy	H.No.4/31, Annapureddy Street, Chinnayyagaripalli, Ward No.2, Mydukur Mandal, Y.S.R Kadapa District - 516173. Contact No: 9246390446	1496/QL/2022, Dt:01-02-2023	Sy.No. 827/P of Settivaripalli Village, Mydukur Mandal, YSR Kadapa District. Extent: 4.993 Hects	31-01-2024	Non-Captive	14° 43' 50.34265"N	78° 46' 36.13928"E	
8	Murram/Gravel & Ordinary Earth	Sri A. Sriman Narayana Reddy	H.No.4/31, Annapureddy Street, Chinnayyagaripalli, Ward No.2, Mydukur Mandal, Y.S.R Kadapa District - 516173. Contact No: 9246390446	2268/QL/2022, Dt:01-02-2023	Sy.No.827/P of Settivaripalli Village, Mydukur Mandal, YSR Kadapa District. Extent: 4.470 Hects	31-01-2024	Non-Captive	14° 43' 38.44889"N	78° 46' 37.42537"E	Preffered bidder is having stipulated time for submission of AMP, EC, CFE
9	Road Metal & Building Stone	Sri A. Sriman Narayana Reddy	H.No.4/31, Annapureddy Street, Chinnayyagaripalli, Ward No.2, Mydukur Mandal, Y.S.R Kadapa District - 516173. Contact No:	195/QL/KDP/2022, Dt:01-02-2023	Sy.No.827/P of Settivaripalli Village, Mydukur Mandal, YSR Kadapa District. Extent: 4.800 Hects	31-01-2024	Non-Captive	14° 43' 47.16656"N	78° 46' 31.24377"E	

			9246390446							
10	Murram/Gravel & Ordinary Earth	M/s Rajesh Constructions, Prop: Sri P.Rajesh Reddy	H.No.8/46-8, Utukur Village, Rajampeta Mandal, YSR Kadapa District - 516126. Contact No: 9951992233	1976/QL/2022, Dt:17-03-2023	Sy.No. 1492/P of Utukur Village, Rajampeta Mandal, YSR kadapa District. Extent: 3.793 Hects	16-03-2024	Non-Captive	14° 10' 49.47446"N	79° 11' 42.01119"E	
11	Murram/Gravel & Ordinary Earth	M/s Sri Venkateswara Mineral Trading , Prop: Akepati Sandya	Sy.No.236/P, 235/2,5, Govimdampalli, Obulavaripalli, Annamayya District.	2028/QL/2022, Dt:17-03-2023	Sy.No. 1492/P of Utukur Village, Rajampeta Mandal, YSR kadapa District. Extent: 4.962 Hects	16-03-2024	Non-Captive	14° 10' 34.94238"N	79° 11' 53.13868"E	
12	Murram/Gravel & Ordinary Earth	M/s Sri Venkateswara Mineral Trading , Prop: Akepati Sandya	Sy.No.236/P, 235/2,5, Govimdampalli, Obulavaripalli, Annamayya District.	2027/QL/2022, Dt:17-03-2023	Sy.No.1492/P of Utukur Village, Rajampeta Mandal, YSR kadapa District. Extent: 3.900 Hects	16-03-2024	Non-Captive	14° 11' 13.43345"N	79° 11' 27.60346"E	
13	Gravel	Sri Shaik Mohammad Amamulla	S/o Shaik Abdul Rawoof, D.No.39/633-21, Patel Road, Y.S.Nagar, Cuddapah - 516002. Contact No: 9490183991.	1985/QL/2022, Dt:04-04-2023	Sy.No.178/P & 436/P of Kadapayarappi & Takkollu Mandal, YSR Kadapa District. Extent: 4.500 Hects	03-04-2024	Non-Captive	14° 30' 11.35211"N	78° 52' 03.21317"E	--
14	Murram/Gravel & Ordinary Earth	M/s Sri Venkateswara Mineral Trading , Prop: Akepati Sandya	Sy.No.236/P, 235/2,5, Govimdampalli, Obulavaripalli, Annamayya District.	2025/QL/2022, Dt:09-05-2023	Sy.No.1492/P of Utukur Village, Rajampeta Mandal, YSR kadapa District. Extent: 4.900 Hects	08-05-2024	Non-Captive	14° 10' 34.94328"N	79° 11' 53.13868"E	--
15	Murram/Gravel & Ordinary Earth	Sri Chinna Subbareddy Ramireddy	2-472, Bebisahebpet, Thamballagondi, YSR Kadapa District - 516501.	1316/Q1/2022, Dt:10-05-2023	Sy.No.1581/P of Chennampalli Village, Badvel Mandal, YSR Kadapa District. Extent: 1.850 Hects	09-05-2024	Non-Captive	14° 43' 35.72730"N	79° 02' 49.37112"E	--

16	Road Metal & Building Stone, Rough Stone & Gravel	M/s GVR Filling Station, A/o Sri G.Venkata Rajendranath Reddy	Sy.No.579/A2A, Veeraballe Village & Mandal, Annamayya District - 516268.	28/QL-e-auction/2023, Dt:20-06-2023	Sy.No.1087 (Old Sy.No.935) of Peddiveedu Village, Veeraballi Mandal, YSR Kadapa District. Extent:4.980 Hects	19-06-2024	Non-Captive	14° 07' 53.63866''N	78° 50' 10.14798"E	--
17	Gravel	M/s RRR Transport, Mg.Pt: Ramanjaneya Reddy Rajula	S/o Rajula Subba Reddy, , D.No.2/66B, Cheemalapenta, Cuddapah, Andhra Pradesh – 516218.	1638/QL/2022, Dt:02/08/2023	Sy.No.1/P of Vempalli Village & Mandal, YSR Kadapa District. Extent: 4.950 Hects	01-08-2024	Non-Captive	14° 22' 28.84731''N	78° 26' 02.82075"E	--
18	Road Metal & Building Stone	Sri C.Seetha Rami Reddy	S/o Sri C.Veera Narayana Reddy, 4/16, Mallepalle, Chenchayyagaripalle Village, Bramamgari Mattam, YSR Kadapa District - 516503. Contact No: 9642077042	1294/QL-e-auction/2023, Dt:24-08-2023	Sy.No.1938/P of Palugurallapalli Village, B.Mattam Mandal, YSR Kadapa District. Extent: 3.000 Hects	23-08-2024	Non-Captive	14° 53' 33.25733''N	78° 54' 39.08505"E	--

Data Source: Assistant Director of Mines and Geology, YSR Kadapa District, Andhra Pradesh

2.4 Details of Royalty in last 3 years

The list of royalty in last 3 years in YSR Kadapa district shown in Table-16.

Table 16 Details of Royalty in last 3 years

Royalty for 2022-23

S. No.	Mineral	Royalty (in Rs. Lakhs)	Consideration Amt. (in Rs. Lakhs)	DMF (In Rs. Lakhs)	MERIT (in Rs. Lakhs)
1	Barytes (Off-Color)	31.875	31.875	9.548	0.637
2	Barytes (White)	94.556	94.556	28.367	1.891
3	Building Stone	1.784	1.784	0.535	0.036
4	Colour Granite (Others)	2.92	1.46	0.365	0.058
5	Dolomite	4.36	4.36	1.308	0.087
6	Gravel	26.173	26.173	7.848	0.523
7	Limestone Slab (Black)	1.008	1.008	0.101	0.02
8	Marble	0.412	0.412	0.124	0.008
9	Ochre	32.503	32.503	9.746	0.65
10	Ordinary Earth	18.869	18.869	5.661	0.377
11	Quartz	19.286	19.286	5.786	0.386
12	Quartzite	60.3	60.3	18.09	1.206
13	Road Metal	94.106	94.106	28.232	1.882
TOTAL		**388**	**387**	**116**	**8**

Royalty for 2021-22

S. No.	Mineral	Royalty (in Rs. Lakhs)	Consideration Amt. (in Rs. Lakhs)	DMF (In Rs. Lakhs)	MERIT (in Rs. Lakhs)
1	Barytes (Off-Color)	44.305	22.1525	13.292	0.886
2	Barytes (White)	94.963	47.4815	28.489	1.899
3	Building Stone	1.558	0.779	0.467	0.031
4	Colour Granite (Others)	43.628	10.907	5.454	0.873
5	Dimensional Stone used for Kerbs and Cubes	0.169	0.0845	0.051	0.003
6	Dolomite	190.91	95.455	57.273	3.818
7	Gravel	34.29	17.145	10.287	0.686
8	Lime Stone Slab (Black)	2.226	1.113	0.223	0.045

9	Marble	0.045	0.0225	0.014	0.001
10	Ochre	34.357	17.1785	10.307	0.687
11	Quartz	7.229	3.6145	2.169	0.145
12	Quartzite	1.8	0.9	0.54	0.036
13	Road Metal	152.339	76.1695	45.702	3.047
Total		608	293	174	12

Royalty for 2020-21

S. No.	Mineral	Royalty (in Rs. Lakhs)	DMF (In Rs. Lakhs)	MERIT (in Rs. Lakhs)
1	Barytes (Off-Color)	64.95	19.485	1.299
2	Barytes (White)	106.887	32.066	2.138
3	Building Stone	2.62	0.786	0.052
4	Colour Granite (Others)	21.883	2.735	0.438
5	Dimensional Stone used for Kerbs and Cubes	0.648	0.194	0.013
6	Dolomite	200.25	60.075	4.005
7	Gravel	34.741	10.422	0.695
8	Limestone Slab (Black)	7.014	0.701	0.14
9	Marble	0.833	0.25	0.017
10	Ochre	15.818	4.746	0.316
11	Quartz	3.15	0.945	0.063
12	Road Metal	119.989	35.997	2.4
Total		**579**	**168**	**12**

Data Source: Assistant Director of Mines and Geology, YSR Kadapa District, Andhra Pradesh

2.5 Details of Production in last 3 years

The details of production in last 3 years in YSR Kadapa district shown in Table-17.

Table 17 Details of Production in last 3 years

Production for 2022-23

S. No.	Mineral	Unit	Production
1	Barytes (Off-Color)	MT	5593
2	Barytes (White)	MT	8316
3	Building Stone	Cubic Meter	1247

S. No.	Mineral	Unit	Production
4	Colour Granite (Others)	Cubic Meter	169
5	Dolomite	MT	3737
6	Gravel	Cubic Meter	56668
7	Limestone Slab (Black)	SQ. Mtr	16800
8	Marble	Cubic Meter	133
9	Ochre	MT	53803
10	Ordinary Earth	Cubic Meter	12648
11	Quartz	MT	20459
12	Quartzite	MT	66778
13	Road Metal	Cubic Meter	102025

Production for 2021-22

S. No.	Mineral	Unit	Production
1	Barytes (Off-Color)	MT	8800
2	Barytes (White)	MT	8633
3	Building Stone	Cubic Meter	1409
4	Colour Granite (Others)	Cubic Meter	2529
5	Dimensional Stone used for Kerbs and Cubes	MT	125

S. No.	Mineral	Unit	Production
6	Dolomite	MT	190910
7	Gravel	Cubic Meter	71935
8	Limestone Slab (Black)	SQ.Mtr	37100
9	Marble	Cubic Meter	13
10	Ochre	MT	54959
11	Quartz	MT	7987
12	Quartzite	MT	1980
13	Road Metal	Cubic Meter	168564

Production for 2020-21

S. No.	Mineral	Unit	Production
1	Barytes (Off-Color)	MT	12890
2	Barytes (White)	MT	9644
3	Building Stone	MT	4367
4	Colour Granite (Others)	Cubic Meter	1249
5	Dimensional Stone used for Kerbs and Cubes	MT	455
6	Dolomite	MT	200250
7	Gravel	Cubic Meter	74193

S. No.	Mineral	Unit	Production
8	Limestone Slab (Black)	SQ.Mtr	116480
9	Marble	Cubic Meter	278
10	Ochre	MT	25409
11	Quartz	MT	2259
12	Road Metal	Cubic Meter	127366

Data Source: Assistant Director of Mines and Geology, YSR Kadapa District, Andhra Pradesh

2.6 Impact on environment

The extraction and utilization of minor minerals have become integral to our modern way of life, fueling infrastructure development, construction, and various industries. However, the impact of these activities on the environment cannot be underestimated. Minor minerals, which include granite, road metal, gravel, clay, and more, play a significant role in shaping the natural landscape and ecosystems. The various environmental consequences associated with the extraction and use of minor minerals are:

i. **Habitat Destruction:** The mining of minor minerals often entails the removal of topsoil and vegetation, leading to habitat destruction. This can disrupt ecosystems, displace wildlife, and threaten the survival of numerous species. Loss of biodiversity is a significant concern in regions with extensive mining operations.

ii. **Land Degradation:** Mining activities can lead to land degradation, including soil erosion and compaction. This not only reduces the land's fertility but also affects its ability to support agriculture and vegetation growth. Moreover, land degradation can contribute to increased vulnerability to natural disasters like floods.

iii. **Water Pollution:** Mining operations can contaminate nearby water bodies through the discharge of sediments, chemicals, and heavy metals. This pollution can have detrimental effects on aquatic life, disrupt local hydrology, and compromise the quality of water available for human consumption.

iv. **Air Quality:** Dust emissions from mining sites can deteriorate air quality in surrounding areas. The fine particles and pollutants released during excavation and transportation of minor minerals can pose health risks to both workers and nearby communities.

v. **Regulatory Challenges:** Enforcing regulations and monitoring mining activities in remote or unregulated areas can be challenging, allowing illegal and unsustainable practices to persist.

The extraction and utilization of minor minerals are essential for economic development, but they come at a cost to the environment. Recognizing the environmental impacts of these activities is crucial for sustainable resource management.

2.7 Remedial Measures

The provisions of Rule 12 (1) and Rule 12 (5) and of Andhra Pradesh Minor Mineral Concession Rules, 1966 allows the State Government to issue the Letters of Intent with the stipulated conditions to submit Approved Mining Plan (AMP), Environment Clearance (EC) and Consent for Establishment (CFE) for grant of lease.

Mine Plan stipulate the maximum permissible annual production of the mineal from the designated lease area and also includes estimated quantum of solid waste generation and its method of disposal, etc. Based on the Approved Mine Plan projections, Environment Management Plan shall be prepared and SEIAA makes the decision to grant the EC based on the EMP.

Leaseholders commit to all the remedial measures in the Mining Plan and the State Environment Impact Assessment Authority (SEIAA) ensures the remedial measures are being adhered to during the tenure of the Environmental Clearance.

Leaseholders in the district have adopted various remedial measures to mitigate the impact of mining on the environment. These measures aim to reduce the environmental footprint of mining operations and address the associated challenges. Some common practices include:

i. **Environmental Impact Assessments (EIAs):** Leaseholders conduct comprehensive EIAs to evaluate the potential environmental consequences of mining projects. They shall use this information to develop mitigation strategies.

ii. **Reclamation and Rehabilitation:** Leaseholders work to restore mined areas by recontouring landscapes, replanting native vegetation, and stabilizing soils to promote ecosystem recovery.

iii. **Water Management:** Proper management of water resources is crucial. Leaseholders use techniques like sedimentation ponds, water recycling, and water treatment facilities to minimize water pollution and ensure responsible water use.

The following preventive measures are being followed for minimizing adverse effects on water regime:

- Small Gully checks, gully check dams, silt settling tanks, silt traps, etc. shall be constructed.
- Along all discharge points leaving the mining lease, into the surrounding area, suitable number of filter walls of sufficient lengths shall be erected across the flow, at intervals, all along the length to prevent suspended solids entering the surrounding streams/ drains/ water courses, to confine the discharge water quality to the permissible limits.
- Regular monitoring may be carried out and further remedial steps as may be necessary may be taken.

iv. **Waste Management:** Effective management of mining waste, such as tailings and slag, involves containment in

secure facilities to prevent soil and water contamination. Advances in waste disposal technologies are also being explored.

Steps being followed for effective waste management:

- Implementation of practices to minimize waste generation at the source. This involves optimizing extraction techniques, reducing overburden removal, and improving resource utilization.
- Encouraging recycling and reuse of waste materials wherever possible within the mining operation.
- Selection of an appropriate disposal methods based on waste characteristics and environmental considerations. Common methods include landfilling, controlled dumping, and backfilling.
- Treatment of contaminated water and effluents using appropriate technologies before discharge.

v. **Afforestation:** Leaseholders carry out a year-wise afforestation plan for the initial years with detailed costing of each plant, its maintenance per piece, etc.

While these measures represent positive steps toward mitigating environmental impact, it's important to note that the effectiveness of these practices can vary widely depending on factors such as the location, scale, and specific mineral being mined. Continuous improvement and adaptation are essential in the mining industry's ongoing efforts

2.8 Reclamation Measures

As per Rule 7A (ii) of Andhra Pradesh Minor Mineral Concession Rules, 1966, Mine Closure Plan shall be submitted by the leaseholder before 6 months of expiry of the lease in the proforma as prescribed by the Director. The Deputy Director concerned shall approve the mine closure plan and ensure compliance of conditions of the approved mine closure plan before expiry of the lease period.

Financial assurance of Rs.50,000/-(Rupees Fifty Thousand) for the quarry lease granted below five (5) hectares and Rs.10,000/- (Rupees Ten Thousand) per Hectare or part thereof for the quarry lease granted five

(5) hectares and above, shall be submitted in the form of deposit. If the leaseholder does not reclamate the area as mentioned in the Mine Closure Plan, the deposit shall be forfeited, and the Department of Mines & Geology ensure the proper implementation of the Mine Closure Plan.

2.9 Risk Assessment & Disaster Management Plan

Leaseholders conduct comprehensive risk assessment, prepare a model disaster management plan and submit in the Mining Plan.

The leaseholders maintain and arrange following resources at the mine site:

a) Firefighting equipment

b) Ambulance services with location

c) List of volunteer organizations

d) List of Civil, Police and other authorities to be informed in case of an accident

e) Last of mobile crane operators (Government, Public Sector, and Private Sector).

f) List of mines, contacts, facility available nearby

g) List of first aiders and contacts.

h) List of Officers of DGMS to be informed in case of serious accidents Concerned DGMS officers concerned is displayed at the mine head.

The leaseholders shall monitor the total execution of the disaster management plan. The resources of all departments including men and material are being promptly made available. They are also conducting regular mock rehearsals with their staff to update the risk register and accordingly, disaster management plan

Mineral Regulatory:

The important functioning of District Mines and geology Officer, YSR Kadapa are:-

1. Achievement of Targets of Mineral Revenue collections being fixed to this office annually

2. Receiving and processing of the Mineral Concession Applications duly conducting the Technical inspection, Survey and demarcation of the Mineral bearing applied areas

3. Execution and Regulation of the operations of the Mining / Quarry leases in accordance with the Acts and Rules

4. Issuing of dispatch permits duly collecting the Advance Royalty / Seig.fee from the lease holders on the minerals produced and intend to dispatch from their leased areas through online permit system

5. Controlling the illegal Mining / Quarrying and transportation by conducting the periodical inspections of the Mines and Quarries and also conducting the surprise vehicular checking and imposing the penalties

6. Finalisation of Demand, Collection and Balance statements of the leases on annual basis

2.10 Plantation & Green Belt Development

Leaseholders are complying with the plantation and green belt development programmes as committed in their Mining Plans.

CHAPTER III: SAND

3.1 Sand Mineral Resources of the YSR Kadapa District

3.1.1 General Sand Mineral Details YSR Kadapa District

(Prepared as per Sustainable Sand Mining Management Guidelines 2016 & 2020), AD Office, DMG, Yerraguntla, YSR Kadapa District.

In YSR Kadapa District in the jurisdiction of O/o Asst., Director of Mines & Geology, Yerraguntla the following 04 rivers covering a total of 380 kms. These rivers are the major contributors for sand deposits. The said rivers are seasonal mostly flowing in rainy season. There is existing 218/04 check dams / reservoirs across the rivers mentioned in table:

Table 18 Details of Production of Sand in Last three years in the District

Sl. No.	Year	Production (in MTs)	Revenue Generated (in Rs)
1	2020-21	--	--
2	2021-22	557845	4,90,90,360
3	2022-23	565702	4,97,81,776

Data Source: Assistant Director of Mines and Geology, YSR Kadapa District, Andhra Pradesh

3.1.2 River Basins in YSR Kadapa District

The Chitravathi and Pennar rises near Nandidurg hills in the Karnataka state and for most of its courses run through Hindupur in Ananthapuram district. The Chitravathi and Pennar rivers joining at Gandikota reservoir, north-west part of YSR Kadapa district near Milavaram (Jamalamadugu Constituency). The source of the Papagni river flows towards Karnataka state and enters in Rayachoti Constituency, Annamayya district of Andhra Pradesh. The Kunderu rises in Kurnool flows towards south direction and drains the through Nandyal district and merged into Pennar river at Proddatur in YSR Kadapa district.

The origin of Sagileru river from the higher peaks of the Nallamala hills in near Badvel Constituency in YSR Kadapa district flows through in a deep

channel along a narrow valley. The Sagileru river flows in south direction and merged with pennar river at Somasila reservoir. The Cheyyeru rises in Horsely hills, Annamayya District and flows through Chittoor district under the name of the Bahuda River and after being fed by several smaller streams the principal of which is the Pincha River follows through the Sheshachalam hills, and the rich valley falls into the Pennar not far from the eastern limit of the district. The Hydrological units of YSR Kadapa district shown in Table-19, Drainage System with Description of main rivers shown in Table-20, Salient Features of Important Rivers are shown in Table-21 and Rivers Lengths of YSR Kadapa district shown in Table-22.

Table 19 Hydrological units of YSR Kadapa District

S.No	Major Basin	Minor Basin	Catchment Area (Sq.km)	No of. Sub Basins	No of. Cascades	No of. Tanks
1	Pennar	Cheyyeru	82.29	6	17	4
2		Chitravathi	257.38	3	11	41
3		Kunderu	1,564.58	13	39	126
4		Lower Pennar	3,521.55	23	114	376
5		Middle Pennar Part-II	378.79	5	11	43
6		Papagni	2,080.43	14	69	322
7		Sagileru	2,220.73	15	72	498
Total			**10,105.75**	**79**	**333**	**1,410**

Data source: APSAC, Vijayawada

Table 20 Drainage System with Description of main rivers

S.No	Name of the Minor Basin	Area Drained (Sq.Km)	% of Area Drained in the District
1	Manneru	4.025	0.040
2	Cheyyeru	80.138	0.791
3	Papagni	2,073.509	20.479
4	Chitravathi	263.070	2.598
5	Sagileru	2,222.791	21.953
6	Kunderu	1,591.110	15.714
7	Lower Pennar	3,721.945	36.759
8	Middle Pennar Part-II	168.583	1.665

Data source: APSAC, Vijayawada

Table 21 Salient Features of Important Rivers in YSR Kadapa district

S.No	Name of the River	Place of Origin	Altitude at Origin (m)
1	Pennar	Nandidurg hills, Karnataka state	1350
2	Cheyyeru	Horsely hills, Mandanapallimandal,Annamayya District	1,314
3	Kunderu	Nandidurg hills, Karnataka state	310
4	Papagni	Nandi Hills of Chikkaballapur district in Karnataka	800
5	Sagileru	Nallamala hills, Badvel, YSR Kadapa district	829
6	Chitravathi	Nandi Hills of Chikballapur District, Karnataka State	800

Data source: APSAC, Vijayawada

Table 22 Drainage System with description of main rivers in yerraguntla Jurisdiction

Sl.No	NAME OF RIVER	AREA DRAINED (km^2)	% AREA DRAINED
01	Penna	15354	100%

Data Source: Asst. Director of Mines and Geology (FAC), Yerraguntla, YSR Kadapa District, Andhra Pradesh

The details of the rivers information of the district is showing in Table-23.

Table 23 Rivers detailed Information of the District

Sl. No	NAME OF RIVER	Total Stretch of River (in km)	Total Length in the District	Type of River (Perennial or Non-Perennial)	Place of Origin	Altitude at Origin
01	Penna	597	167	Non-Perennial	NandhiHills,Chikballapur, KARNATAKA	1478
02	Papagni	205	84	Non-Perennial	Nandhi Hills, Chikballapur,	914

					KARNATAKA	
03	Kunderu	250	80	Non-Perennial	Vempenta, Andhra Pradesh	310
04	Chitravathi	265	28	Non-Perennial	Chikballapur, KARNATAKA	225

Data Source: Asst. Director of Mines and Geology (FAC), Yerraguntla, YSR Kadapa District, Andhra Pradesh

The details of the reivers information of the district is showing in Table-24.

Table 24 River Lengths in YSR Kadapa District

S.No	Name of the Major Basin	Name of the Minor Basin	Name of the River	River Length in Km
1	Pennar	Pennar	Amudaleru	4.41
2			BuggaVanka	27.09
3			Bukkaneru River	9.81
4			ChinnagadiVanka	9.90
5			Chitravati River	9.91
6			ElupukonaVagu	7.88
7			ErraVanka	22.08
8			ErramasupalleVanka	30.00
9			KaletiVanka	0.34
10			Kunderu River	29.70
11			MaddimaduguVanka	1.91
12			Maderu River	30.10
13			MalideviVagu	0.99
14			MamidikonaVagu	5.06
15			Moderu River	46.07
16			Mogamureru River	187.41
17			MuttalamvariVanka	13.59
18			Nalla Vagu	17.36
19			Pageru River	60.20
20			Papagni River	21.57
21			PeddaVanka	48.14
22			Pennar River	199.24
23			PirchipaduVanka	39.44
24			PuttaKatava	2.56
25	Pennar	Pennar	RallaVanka	7.57
26			Sagileru River	74.19
27			TadukuVagu	15.82

S.No	Name of the Major Basin	Name of the Minor Basin	Name of the River	River Length in Km
28			Tangamarla Chela	2.50
29			TekatlaVagu	2.01
30			ThummalaVagu	11.13
31			Tigaleru River	49.91
32			UppuVagu	11.50
33			VakkileruNadi	45.10
Total				**1,044.44**

Data source: APSAC, Vijayawada

3.1.2.1. Penna Riveris a river of southern India. This is a unique river in world where after originating from Nandi hills, it flows as two different streams, one in North and South directions. The Penna rises in the Nandi Hills in Chikkaballapur District of Karnataka state and runs north and east through the states of Karnataka and Andhra Pradesh to empty into bay of bengal in Andhra Pradesh. It is 597 kilometres long, with a drainage basin covering 55,213 sq.km, 6,937 sq.km in Karnataka and 48,276 sq.km in Andhra Pradesh. Along with this mainstream there is another stream south towards Tamilnadu with the name Then Pennai or south Pennar which further moves towards the east to empty into the Bay of Bengal. The Penna River basin lies in the rain shadow region of Eastern Ghats and receives 500 mm average rainfall annually.

The Penna gains the volume but loses stream by the time it crosses Palakondalu and enters Kadapa district of Andhra Pradesh. It regains the stream in district after meeting many tributaries including Chitravati, Bahuda, Papagni, Kunderu, Sagileru and Cheyyeru and flows near the towns like Kodur, Jammalamadugu, Proddatur, Kamalapuram and Siddhavattam.The Penna meets its major tributary Chitravati at Gandalur near the Gandikota at 336 km from its source. The Chitravati rises near the Chikballapur town in the Chikballapur district of Karnataka and traverses 218 km in northeast direction in Kolar, Anantapur and Cuddapah districts before joining the Penna on the right bank. The Penna River forces through Gandikota gorge and flows east through a gap in the Eastern Ghats to go to the plains of Coastal Andhra. The rivers Papagni and Kunderu meets the Penna near Kamalapuram. The Papagni river rises near Sidlaghatta town in Kolar district of Karnataka and traverses 205 km before joining the Penna on the right bank. The Kunderu river rises in Kurnool district of Andhra Pradesh and travels 205 km before joining the

Penna on the left bank. The Penna River continues in southeastern direction and cuts across the Nallamala hills. The river meets sagileru and turns east. The Sagileru rises in Prakasam district and flows south to meet the Penna. The Penna River meets Cheyyeru at Boyanapalli and Gundlamada near the Sidhout on the right bank. The Cheyyeru river is formed by the confluence of the rivers Bahuda and Puncha that originate in the Chittoor district of Andhra Pradesh. The two streams join at Rayavaram and flows towards north for 87 km before joining the Penna.

3.1.2.2. Chitravathi River is an inter-state river in southern India that is a tributary of the Penna River. Rising in Karnataka, it flows into Andhra Pradesh and its basin covers an area of over 5,900 sq.km. The pilgrim town of Puttaparthi is located on its banks. Chitravathi river originates at Chikkaballapur and flows through the Chikkaballapur district of Karnataka before entering Andhra Pradesh where it drains the districts of Anantapur and Cuddapah before joining the Penna River. The Chitravathi river basin covers an area of 5,908 sq.km. The mandals that it drains in the two states are Bagepalli, Gorantla, Hindupur, Puttaparthi, Bukkapatnam, Dharmavaram, Tadipatri and Mudigubba. The river joins the Penna at Gandikota in Kadapa district where the Gandikota irrigation project is being undertaken by the Government of Andhra Pradesh as part of its Jalayagnam project. Chitravathi is a seasonal river that comes alive after the monsoons. Along with the Papagni, it forms a part of the middle Penna sub-basin and is a right bank tributary of the Penna.

3.1.2.3. Papagni River is a non-perennial, inter-state river in southern India that flows through the states of Karnataka and Andhra Pradesh. It is a right bank tributary of the Pennar river. The Papagni originates in the Nandi Hills of Chikkaballapur district in Karnataka. It is a non-perennial river that is rainfed with its basin receiving 60–80 cm of rainfall annually. It traverses through a region of granitic deposits and red soil that is frequently affected by soil erosion. It drains the districts of Kolar in Karnataka and the districts of Chittoor, Anantapur and Kadapa in Andhra Pradesh. The basin covers an area of 8,250 sq.km. and drains 30 mandals of which 21 lie in the Rayalseema region of Andhra Pradesh. It joins the Pennar near Kamalapuram in Andhra Pradesh.

3.1.3 Process of Deposition of Sediments in the Rivers of the District

Sediment transport is a natural process, and many have argued that the point of rivers is to move sediment downstream. However, with land use changes, e.g., deforestation and construction; agricultural practices; and

development activities, accelerated erosion rates is ubiquitous. Sediment in the water column reduces transparency and can be deposited downstream and exacerbate flooding. Three principal sources of sediment are the following:

Sediment transport is the movement of organic and inorganic particles by water. In general, the greater the flow, the more sediment that will be conveyed. Water flow can be strong enough to suspend particles in the water column as they move downstream, or simply push them along the bottom of a waterway. Transported sediment may include mineral matter, chemicals and pollutants, and organic material. Another name for sediment transport is sediment load. The total load includes all particles moving as bedload, suspended load, and wash load.

3.1.3.1. Bedload

As the name suggests, this element of sediment movement consists of loose, granular particles at the sediment-water interface (such as a stream bed or tidal flat). Air or water that moves across the bed will being to move grains if the flow velocity is great enough to overcome the force of gravity and any resistance at grain contacts. This is the **threshold velocity**.

The bedload contains two main components:

- the **traction load**, or traction carpet, and
- the **saltation loads**.

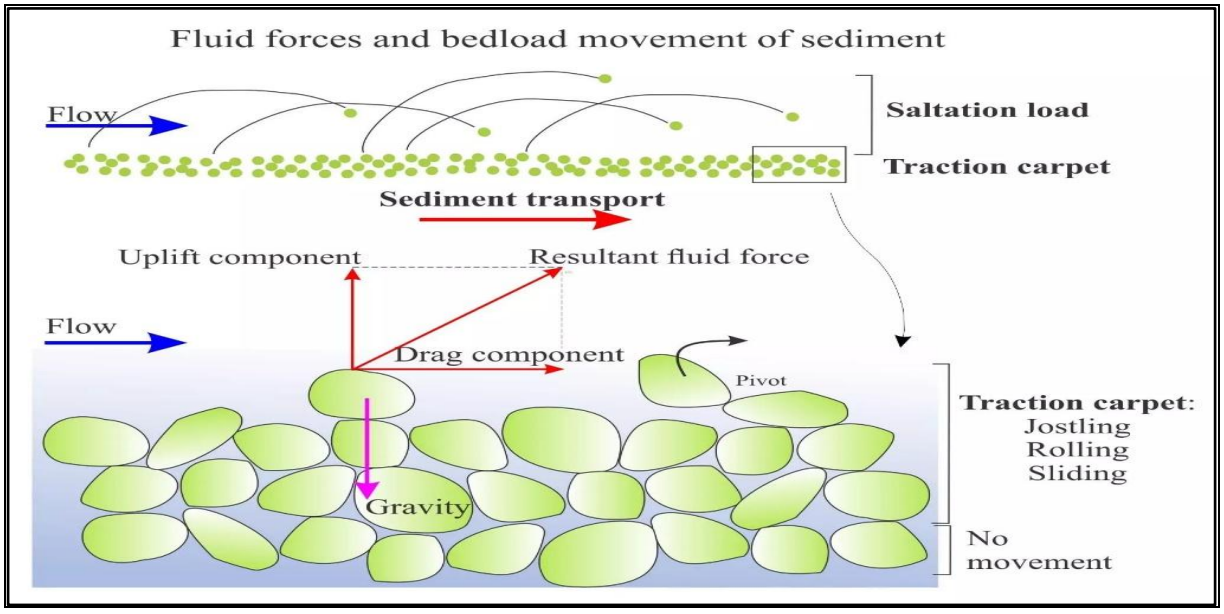

Figure-23: Bedload Movement of Sediment

The various components of force involved in initiation of grain movement are shown above. Here, fluid flowing over a sediment bed produces shear stresses that can be resolved into a component of drag (parallel to the bed) and a lift component normal to the bed. At the threshold velocity when the resultant fluid force on grains is greater than gravity, grains begin to roll, slide and jostle along the bed like a moving carpet – the **traction carpet** (Figure-23).

3.1.3.2. Suspended Load Most natural flows in rivers, shallow marine settings and air are turbulent. Even at low-flow velocities, the speed and trajectories of flow can vary considerably – witness the eddies and boils in seemingly tranquil streams. Very fine particulate sediment (particularly clays) can be kept in suspension for long periods by turbulence; the stresses generated by turbulent flow balance or overcome the gravitational force acting on the particles (Figure-24).

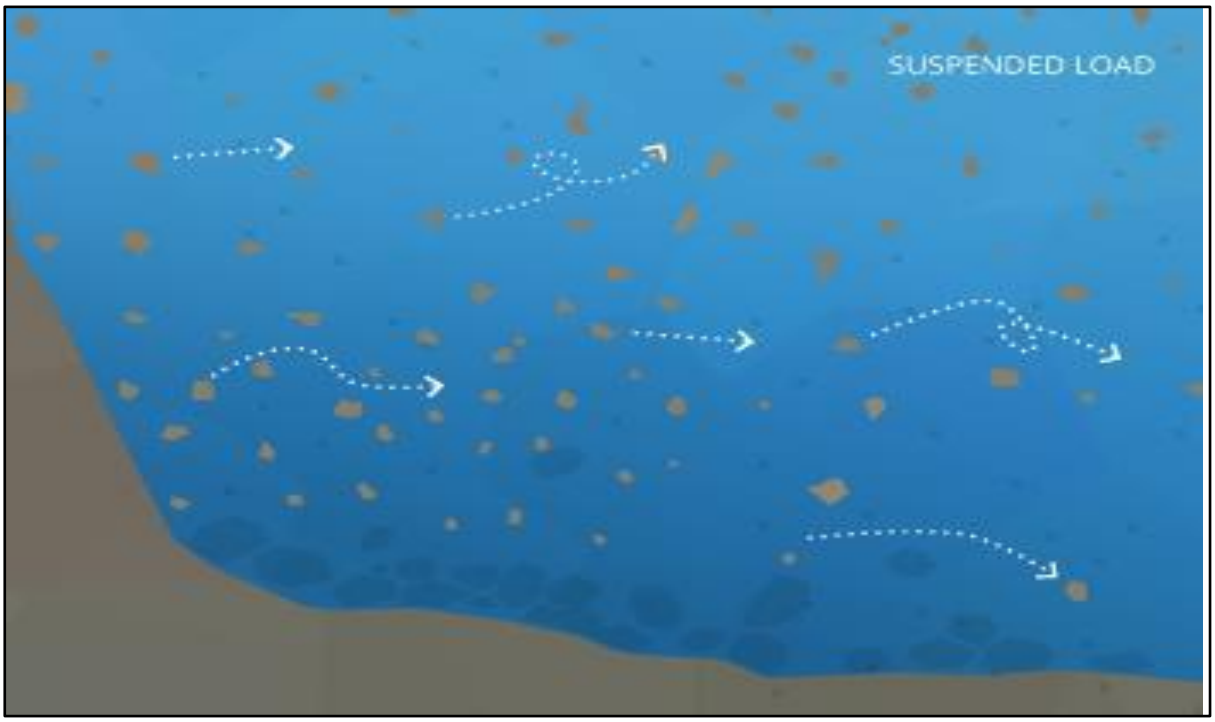

Figure-24: Sediment Load

If turbulence decreases significantly, for example when a river empties into a lake, then most particles will gradually settle to the sediment bed. The rate at which a particle settles out of suspension is called the **settling velocity**, where the force of gravity (downwards) exceeds the combined effects of upward-directed **buoyancy forces** acting on a grain

and the drag on a particle caused by **fluid (viscous) resistance**. Thus, the rate of settling depends on the size, shape and density of particles, and the viscosity of the fluid. In general, settling through air is much more rapid than through water. Both bedload and suspension load are important processes in the generation of sedimentary structures. Bedload transport of loose sand is the critical process for growth of bedforms and their internal cross-stratification (crossbedding). The description of **bedforms** (crossbeds) and the flow conditions (**flow regime**) under which they form have been described in other posts.

3.1.3.3. Wash Load

The wash load is the portion of sediment that will remain suspended even when there is no water flow. The wash load is a subset of the suspended load. This load is comprised of the finest suspended sediment (typically less than 0.00195 mm in diameter). The wash load is differentiated from the suspended load because it will not settle to the bottom of a waterway during a low or no flow period. Instead, these particles remain in permanent suspension as they are small enough to bounce off water molecules and stay afloat. However, during flow periods, the wash load and suspended load are indistinguishable. Turbidity in lakes and slow-moving rivers is typically due the wash load 8. When the flow rate increases (increasing the suspended load and overall sediment transport), turbidity also increases. While turbidity cannot be used to estimate sediment transport, it can approximate suspended sediment concentrations at a specific location (Figure-25).

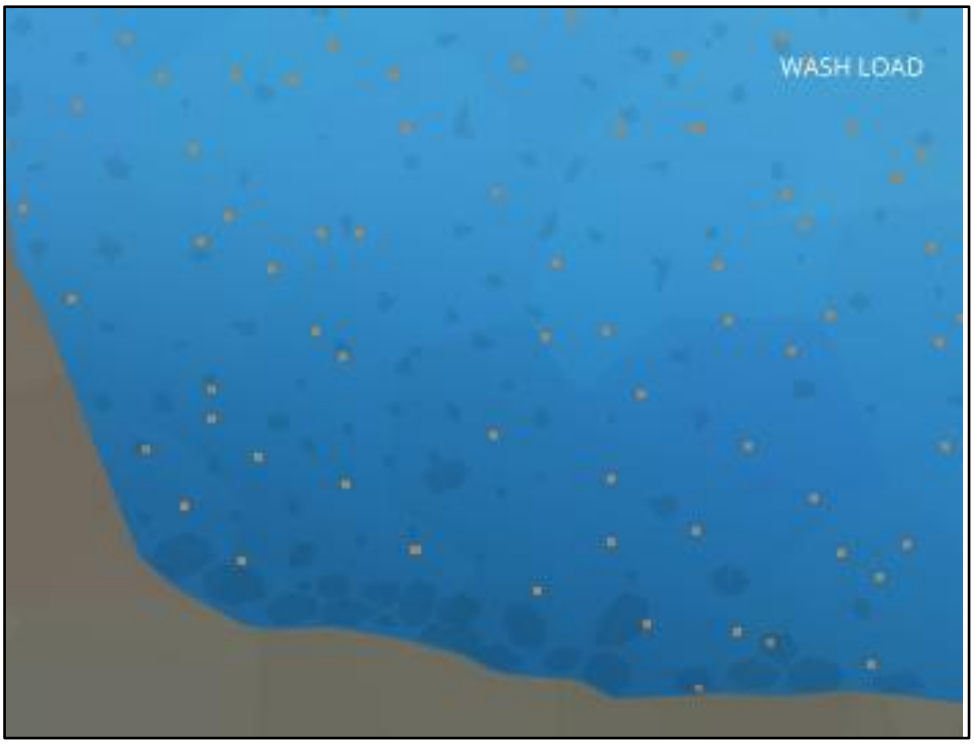

Figure-25: Wash Load

3.1.3.4. Settleable Solids

The suspended particles that fall to the bottom of a water body are called settleable solids. As they are found in riverbeds and streambeds, these settled solids are also known as bedded sediment. The size of settleable solids will vary by water system – in high flow areas, larger, gravel-sized sediment will settle out first. Finer particles, including silt and clay, can be carried all the way out to an estuary or delta (Figure-26).

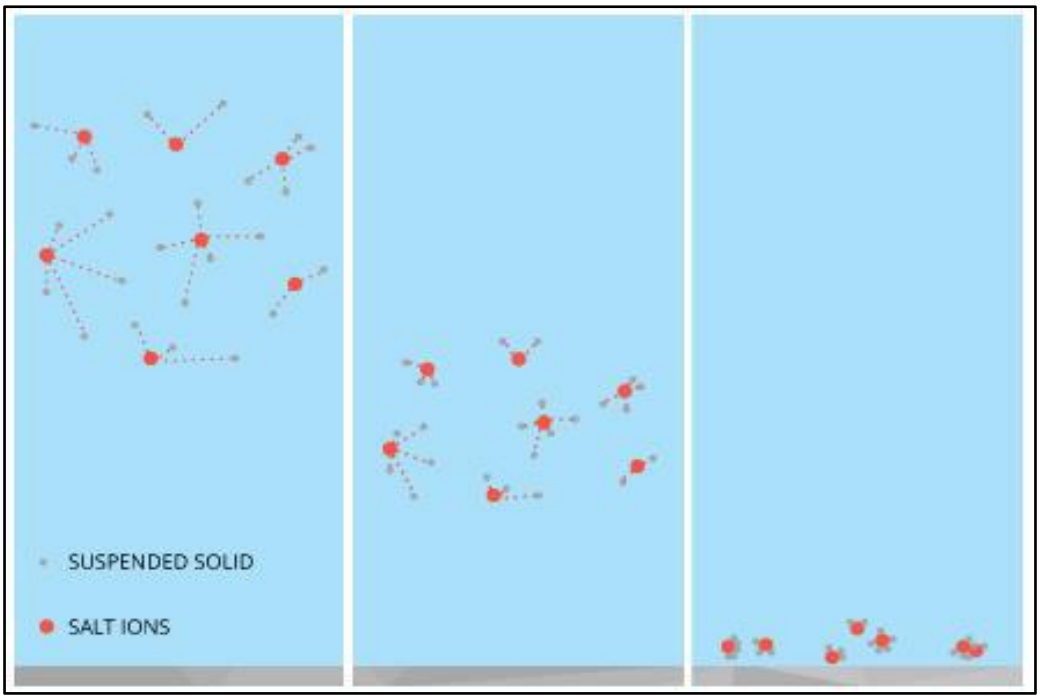

Figure-26: Settleable Solids

3.1.3.5. Sediment Deposition

Sediment is necessary to the development of aquatic ecosystems through nutrient replenishment and the creation of benthic habitat and spawning areas. These benefits occur due to sediment deposition – when suspended particles settle down to the bottom of a body of water. This settling often occurs when water flow slows down or stops and heavy particles can no longer be supported by the bed turbulence. Sediment deposition can be found anywhere in a water system, from high mountain streams, to rivers, lakes, deltas and floodplains. However, it should be noted that while sediment is important for aquatic habitat growth, it can cause environmental issues if the deposition rates are too high, or too low. Sediment transportation and Deposition depends upon various factors like Slope of the Area, Annual Rainfall, Lithology, flow intensity of River, Geomorphology, Soil, Geology and Land use (Figure-27).

In sediment transport a distinction is generally made between fine and coarse sediment, because the transport mechanisms differ. Coarse sediment (grain size >63 μm) tends to be characterised by particles that remain separate and are chemically inert; fine sediments (<63 μm) on the other hand tend to come together as flocculated populations (flocs) and have the tendency to attract organic material and contaminants to their surface. A great deal has been researched and written about the

break up and flocculation of these primary particles under turbulence and subsequent settling (e.g., Uncles et al., 2010). These differences imply important variations in the rate of transport and settling characteristics for the same flow conditions for different sediments. The nature of the physical environment also has an important bearing on this, in that fine sediment tend to be found in sheltered environments (shallow, enclosed estuarine systems), while beaches on open coasts are characterised by coarser materials. This reflects the energy of the water in which the particles become suspended and their subsequent fate.

Rates of transport of material are generally expressed in terms of a flux, as kg/s for example, where this figure is generally obtained by considering the product of the flow rate (in m^3/s) and the concentration of material in suspension (kg/m^3). This does not necessarily imply a requirement for the material to be suspended; it is equally possible to express a bed load using the same units, for example, but it does imply that to obtain an estimate of the sediment flux it is necessary to know both the concentration and the flow rate over a given cross section. Both these quantities can be measured and there are a variety of techniques available to do this, using insitu collection or sampling, in situ optical or acoustic methods, or remote sensing from aircraft or satellites (Uncles and Mitchell, 2017)

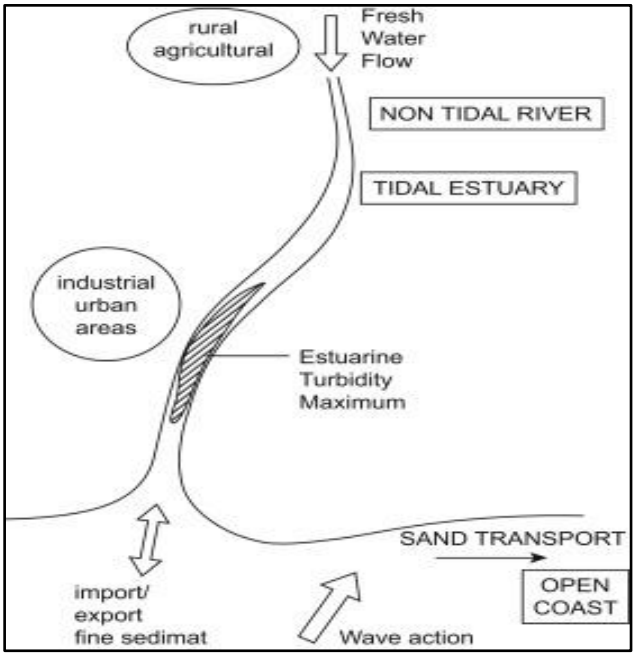

Figure-27: Sediment Deposition Process

Process of Deposition of Sediments in the Rivers of the District Sand is deposited because of the following reasons: (a) Floods: The surface or

strip of relatively smooth land adjacent to a river channel constructed (or in the process of being constructed) by the present river in its existing regimen and covered with water when the river overflows its banks at times of high water. It is built of alluvium carried by the river during floods and deposited in the sluggish water beyond the influence of the swiftest current (b) Valley fill: The unconsolidated sediment deposited by any agent so as to fill or partly fill a valley.

3.1.4 Replenishment Study

A replenishment study for riverbed sand is required in order to nullify the adverse impacts arising due to excessive sand extraction. Mining within or near the riverbed has a direct impact on the stream's physical characteristics, such as channel geometry, bedelevation, substratum composition and stability, in-stream roughness of the bed, flowvelocity, discharge capacity, sediment transport capacity etc.For sustainable river sand mining, it is necessary that the mine pits formed as a resultof sand excavation are refilled with sand by the natural process of replenishment in a reasonable period so that the area is again available for mining. The rate of gross erosion is dependent upon many physical factors like climatic conditions, the nature of the soil, the slope of the area, topography and land use. The effect of any of these variables may vary greatly from one geographic location to another, and the relative importance of controlling factors often varies within a given land resource area(Dendy, 1976).

There is no denial of the fact that bed load changes from hour to hour, day to day, and year to year; estimating annual bed load rates is a dynamic process involving careful examination. Therefore, proper care has been taken before applying the empirical model to calculate the sediment yield from the watershed.

The estimation of sand replenishment is based on empirical and analytical approaches. There are many sediment transport equations as well as models which are suitable for use in the prediction of the replenishment rate of rivers/watersheds. The sedimentation models include SWAT, HEC-HMS etc. These models are developed based on the fundamental hydrological and sedimentological processes. They may provide detailed temporal and spatial simulation but usually require extensive data input. Hourly/daily input values of meteorological and radiation variables are required for continuous simulations. Some of the empirical equations for estimating sediment transport are as follows.

Annual Replenishment Rate for sand for Major Sand Resource Area is determined using emperial mathematical expression Dendy Bolton Equation and reproduced below:

- Einstein (1950)
- Laursen (1958)
- Bagnold (1966)
- Engelund-Hansen equation (1967)
- Yang equations (1973)
- Dendy- Bolton equation (1976)
- Modified Universal Soil Loss Equation (MUSLE) developed by Williams and Berndt (1977)
- Van Rijn (1984)
- Zanke (1987)

To estimate the transport capacity or the sediment load being conveyedby a water stream, one of the many transport equations that are available in the literature is frequently used. Einstein (1950) introduced statistical methods to represent the turbulent behaviour of the flow. Bagnold (1966) introduced an energy concept and related the sediment transport rate to work done by the fluid. Engelund and Hansen (1967) presented a simple and reliable formula for the total load transport in rivers. The Yang equation makes use of the total bedhydraulic radius, and studies show that it is good for estimating the sediment transport in the channel for the condition of dunes on the bed. MUSLE includes only one type of sediment yield (sheet and rill Erosion). Van Rijn (1984) solved the equations of motions of an individual bed-load particle and computed the saltation characteristics and the particle velocity as a function of the flow conditions and the particle diameter for plane bed conditions. The equations of Zanke and Van Rijn seem to be only moderately satisfactory in estimating the sediment transport in the channel for the condition of dunes on the bed. However, it appears that no single equation could provide reliable estimates of a total load of sediment transport for all of the bed forms that could occur sequentially or randomly in alluvial channels or natural water courses. The comparison of the equations for estimating sediment rate is given below Table 25 –

Table 25: Types Sediment Transport Equation

Sl.No.	Sediment Transport Equation	Remarks
1	Einstein (1950)	Bed load function was determined for many but not all types of stream channels
2	Laursen (1958)	Laursen equation outperforms other transport equations in the silt range
3	Bagnold (1966)	Bagnold related the sediment transport rate to work done by the fluid
4	Engelund-Hansen equation (1967)	The original Engelund-Hansen relation (OEH) is based on a single characteristic grain size, which limits its applicability in sand-bed rivers with a wide GSD
5	Yang equations (1973)	It makes use of a total bed hydraulic radius
6	Dendy- Bolton equation (1976)	It uses both drainage area and means annual runoff for estimation of sediment yield. It calculates all types of sediment yield like sheet and rill erosion, gully erosion, channel bed and bank erosion and mass movement
7	Modified Universal Soil Loss Equation (MUSLE) developed by Williams and Berndt (1977)	MUSLE includes only one type of sediment yield (sheet and rill Erosion)
8	Van Rijn (1984)	Calculated equations of motions of an individual bed-load particle for plane bed conditions
9	Zanke (1987)	Zanke was found to be moderately satisfactory for the condition of the dunes on the bed.

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

In this study, the rate of gross silt production in the watershed and the ability of the stream system to transport the eroded material in a river have been carried out by the Dendy-Bolton equation. Dendy-Bolton formula is often used to calculate the sedimentation yield asit uses both drainage area and mean annual runoff as key parameters to give a yield value. Also, Dendy-Bolton equation calculates all types of sediment yield like sheet and rill erosion, gully erosion, channel bed and bank erosion and mass movement and shown in Table-26.

Table 26 Rivers details in YSR Kadapa District

Sl. No.	Name of River	YSR District		Rate of Water Discharge 31st May to 30th June	Projects
		Entrance point	End Point		
1	Penna River	Sugumanchipalli (V), Kondapuram (M)	Penna Peruru (V), Vontimitta (M)	3.5 L Cusec	Gandikota, Mylavaram, Adinimmayapalli Anicut
2	Papagni River	Takkallapalli (V), Chakrayapeta (V) & (M)	Cheruvukindapalli (V), Valluru (M)	1.5 L Cusec	
3	Chitravathi River	Parnapalli (V), Lingala (M)	Gandikota Foreshore	1.1.L Cusec	Chitravathi

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

For Average Annual Run-off less than 2"

$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$ Formula.....(A)

For Average Annual Run-off move than 2"

$S = 1965 \times (e^{-0.055 \times Q}) [1.43 - 0.26 \log (A)]$ Formula.....(B)

Q = Mean Annual Run-off in mm

A = Net drainage Area in Sq. km

S = Sediment yield (tons/Sq. km/yr)

The sedimentation yield for Penna River, Papaghni River and Chitravathi River in YSR Kadapa District is arrived based on the above Dendy Bolton

Equation or Formula (A). The ssedimentation yield in YSR Kadapa District is shown in Table -27.

Table 27 Sedimentation yield for Rivers in YSR Kadapa District

Name of the River	Area Drained (sq. km)	Mean Annual Run-off (in mm)	Rate of Annual Deposition in the River (tons / sq. km /year)	Annual Deposition (tonne)
Penna	15354	1.96	61.98	9,51,644*
Papaghni	2073.5	6.21	158.4	3,28,435**
Chitravathi	263.07	35.88	477.51	1,25,619***

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

In this report, the sediment yield was calculated using the standard records of Department of Water Resources. To ensure systematic and scientific studies, Department of Mines & Geology is in the process of selection of NABET Accredited agency for conducting detailed & regular replenishment studies for potential sand bearing areas.

***Note**: The sedimentation yield was calculated manually by APSAC and the value is **10,47,589 Tones/ year**. The details are provided as an Annexure-I at page number 148-149.

****Note**: The sedimentation yield was calculated manually by APSAC and the value is **3,61,527 Tones/ year**. The details are provided as an Annexure –II at page number 150-151.

*****Note**: The sedimentation yield was calculated manually by APSAC and the value is **1,38,272 Tones/ year**. The details are provided as an Annexure – III at page number 152-153.

3.1.5 Details of Sand Mining Leases:

The rivers Penna, Chitravathi and Papagniare the main source of sand in the YSR Kadapa district through following mandals and the details are given in Table-28.

Table 28: The detail of Potential Sand Mining Leases

Sl.No	River Name	Mandals
1	Penna	Jammalamadugu
2		Chapadu
3		Chennuru
4		Siddavatam
5		Ontimitta
6	Chitravathi	Kondapuram
7		Proddutur
8		Rajupelam
9	Papagni	Vempalli
10		V.N. Palli
11		Kamalapuram

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

Proposed potential Sand Mining Leases for the year of 2023-24 in YSR Kadapa district shown in Table-29.

Table 29 The proposed Potential Sand Mining Leases

Reach Name	Quantity (in MTs)	Remarks	Geo-Coordinates
Gundlamoola	74250	Proposed	14° 27`47.2968"N 78° 56`52.948"E 14° 27`51.7716"N 78° 56`54.949"E 14° 27`54.5472"N 78° 56`44.297"E 14° 27`50.0724"N 78° 56`42.306"E
Kalluru	74805	Proposed	14° 40`59.92"N 78° 34`56.11"E 14° 41`02.49"N 78° 35`01.36"E 14° 41`10.18"N 78° 34`55.95"E 14° 41`07.64"N 78° 34`50.69"E
Hanumangutti	58500	Proposed	14° 40`45.66"N 78° 35`11.34"E 14° 40`41.66"N 78° 35`09.91"E 14° 40`36.08"N 78° 35`18.13"E 14° 40`40.07"N 78° 35`19.56"E
Vibhurapuram	67500	Proposed	14.632114 78.666763 14.633206 78.664193 14.633474 78.666566 14.634578 78.664252
Venkaiahkalva	67500	Proposed	14° 44`21.52"N 78° 04`34.38"E 14° 44`12.75"N 78° 04`29.95"E

			14° 44`14.80"N 78° 04`25.38"E 14° 44`23.56"N 78° 04`29.82"E
Bedururu	60000	Proposed	14° 45`44.80"N 78° 06`44.52"E 14° 45`50.00"N 78° 06`56.79"E 14° 45`47.10"N 78° 06`58.35"E 14° 45`41.92"N 78° 06`46.09"E
Gollapalli	71550	Proposed	14° 27`32"N 78° 59`25"E 14° 27`37"N 78° 59`26"E 14° 27`35"N 78° 59`36"E 14° 27`30"N 78° 59`36"E
Chakrayapeta	82050	Proposed	14° 15`28.01"N 78° 28`19.50"E 14° 15`27.36"N 78° 28`24.48"E 14° 15`38.02"N 78° 28`25.72"E 14° 15`38.70"N 78° 28`20.74"E
Konduru	75000	Proposed	14° 27`37.43"N 78° 31`48.13"E 14° 27`39.15"N 78° 31`44.82"E 14° 27`28.47"N 78° 31`37.88"E 14° 27`26.91"N 78° 31`42.85"E
Peddasettipalli	64350	Proposed	14° 45`10.41"N 78° 79`59.09"E 14° 45`09.95"N 78° 30`10.43"E 14° 45`05.72"N 78° 30`09.94"E 14° 45`05.84"N 78° 29`58.96"E
Chennamukkapalli Sand Reach	67950	Existing/ Non-Working	
Kothagangireddipalli Sand reach	69300	Existing/ Non-Working	
Jammalamadugu Sand Reach	73500	Existing/ Non-Working	

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

Probable Sand bearing areas in YSR Kadapa district shown in Table-30. Name of the sand bearing index are given from North to South direction. The Probable Sand bearing areas were identified through field survey with the help of hand held GPS (Global Positional System) and the help of existing literature.

Table 30 : Probable Sand bearing areas in the YSR Kadapa District

S.No	Name of the River	Sand Bearing Area	Central Coordinates		Area in Ha.
			Longitude	Latitude	
1	Penneru River	A	14° 44' 17.730" N	78° 4' 29.455" E	3.96
2	Penneru River	B	14° 45' 45.238" N	78° 6' 50.667" E	9.69
3	Penneru River	C	14° 51' 32.828" N	78° 21' 54.252" E	51.61
4	Penneru River	D	14° 45' 6.240" N	78° 30' 7.240" E	14.38
5	Penneru River	F	14° 40' 41.739" N	78° 35' 14.720" E	20.22
6	Penneru River	G	14° 36' 6.492" N	78° 41' 53.028" E	31.33
7	Penneru River	H	14° 33' 25.057" N	78° 49' 32.479" E	24.97

8	Penneru River	I	14° 30' 59.004" N	78° 52' 41.540" E	20.04
9	Penneru River	J	14° 27' 29.552" N	78° 31' 41.331" E	33.24
10	Penneru River	K	14° 24' 20.622" N	78° 30' 33.685" E	10.35
11	Penneru River	L	14° 22' 42.299" N	78° 28' 15.365" E	14.51
12	Penneru River	M	14° 22' 26.955" N	78° 27' 56.749" E	11.44
13	Penneru River	N	14° 19' 4.429" N	78° 29' 21.405" E	4.08
14	Penneru River	P	14° 17' 9.283" N	78° 28' 41.732" E	12.31

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.6 Details of De-Siltation Location: (Lakes/Ponds/Dams etc.)

The detailed list of de-siltation locations and quantity of the district are shown in Table-31.

Table 31 List of Potential De-Siltation Location: (Lakes/Ponds/Dams etc.) (Existing and proposed)

Location	Quantity (in MTs)	Existing/ Proposed
Foreshore area of Adinimmayapallianakatta, Cheruvukindapalli, Valluru	123750	Existing/ Non-Working
Foreshore area of Adinimmayapallianakatta, Kommaluru, Tripuravaram, Khajipeta	66375	Existing/ Non-Working
Yeturu, Kondapuram	27600	Existing/ Non-Working
Penna Peruru	120000	Proposed
P. Ananthapuram	90000	Proposed
Yeturu	75000	Proposed

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.7 Details of Patta Lands in the District:

The detail list of Patta Lands in the YSR Kadapa district is shown in Table-32.

Table 32 Details of Patta Lands.

Owner	Sy. No.	Area (Ha)	District	Tehsil	Village	Total Reserve (MT)	Total Mineral to be mined (MT)	Existing/ Proposed
Nil								

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.8 Details of M-Sand Plants in the District:

The details list of Manufacturing Sand in YSR Kadapa district shown in Table-33.

Table 33 Shown Details of Details of M-Sand Plants

Plant Name	Owner	District	Tehsil	Village	Geo-location	Quantity Tonnes/Annum
NIL There are no existing M - Sand units under this YSR Kadapa office jurisdiction						

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.9 Details of Cluster of Sand Mining Leases

The area of Cluster of Mining Leases in YSR Kadapa jurisdiction is shown in Table-34.

Table 34 Details Cluster of Mining Leases in YSR Kadapa District

Sl.No	Name of the Cluster	Location (Latitude and Longitude)	Extent (in Ha)	Total No. of Mining Leases in the Cluster	No.of Leases working	Extent of the working leases (in Ha)
NIL						

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.10 Details of Contiguous Clusters

The area of Contiguous Cluster of Sand Reaches in YSR Kadapa jurisdiction is shown in Table-35.

Table 35 Details of Contiguous Cluster of Sand Reaches in YSR Kadapa District

Sl.No	Name of the Cluster	Location (Latitude and Logitude)	Extent (in Ha)	Total No. of Mining Leases in the Cluster	No.of Leases working	Extent of the working leases (in Ha)
NIL						

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh

3.1.11 Sand Reaches Details in **YSR Kadapa** District

The Department of mines and geology has already identified sand reach points in YSR Kadapa. The sand reaches points locations details are given by District Mines and Geology Officer, YSR Kadapa. Based on the locations details the sand reaches points are shown in Figure-28, Figure-29 and Figure-30. Apart from the existing, new sand reaches identified and shown in Figure-31.

Also, the sand reaches maps are compared with pre-monsoon and post-monsoon seasons shown in Figure-32, Figure-33 and Figure-34.The Figure-35shows the Kunderu river map in YSR Kadapa District and Figure-36 shows the Papagni river map in YSR Kadapa District.

The Probable Sand bearing areas were identified through field survey with the help of hand held GPS (Global Positional System) and the help of existing literature. The Probable Sand bearing areas in the Guntur District is showing in Figure-37.

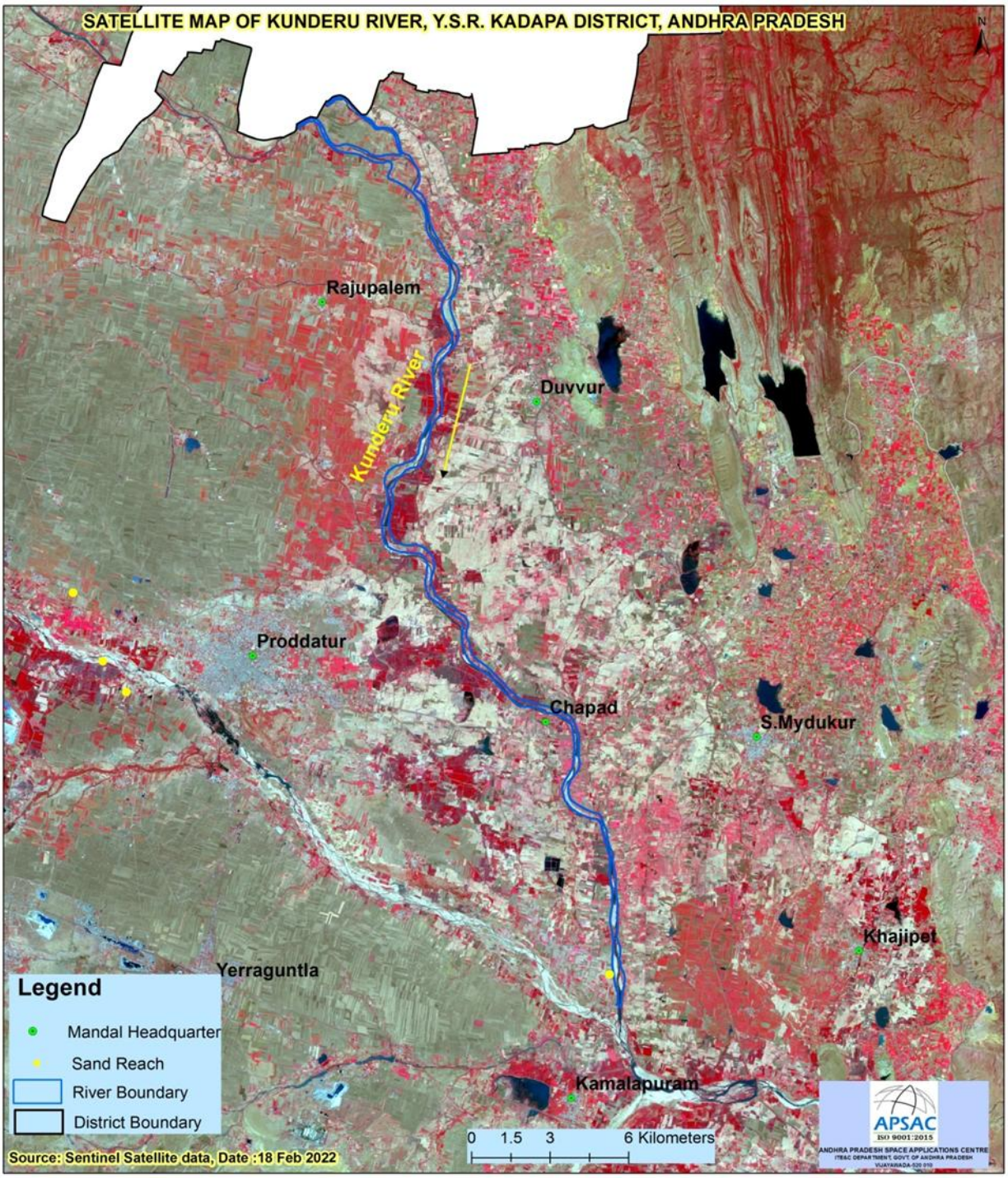

Figure-28: Satellite View of Kunderu River map in YSR Kadapa District.

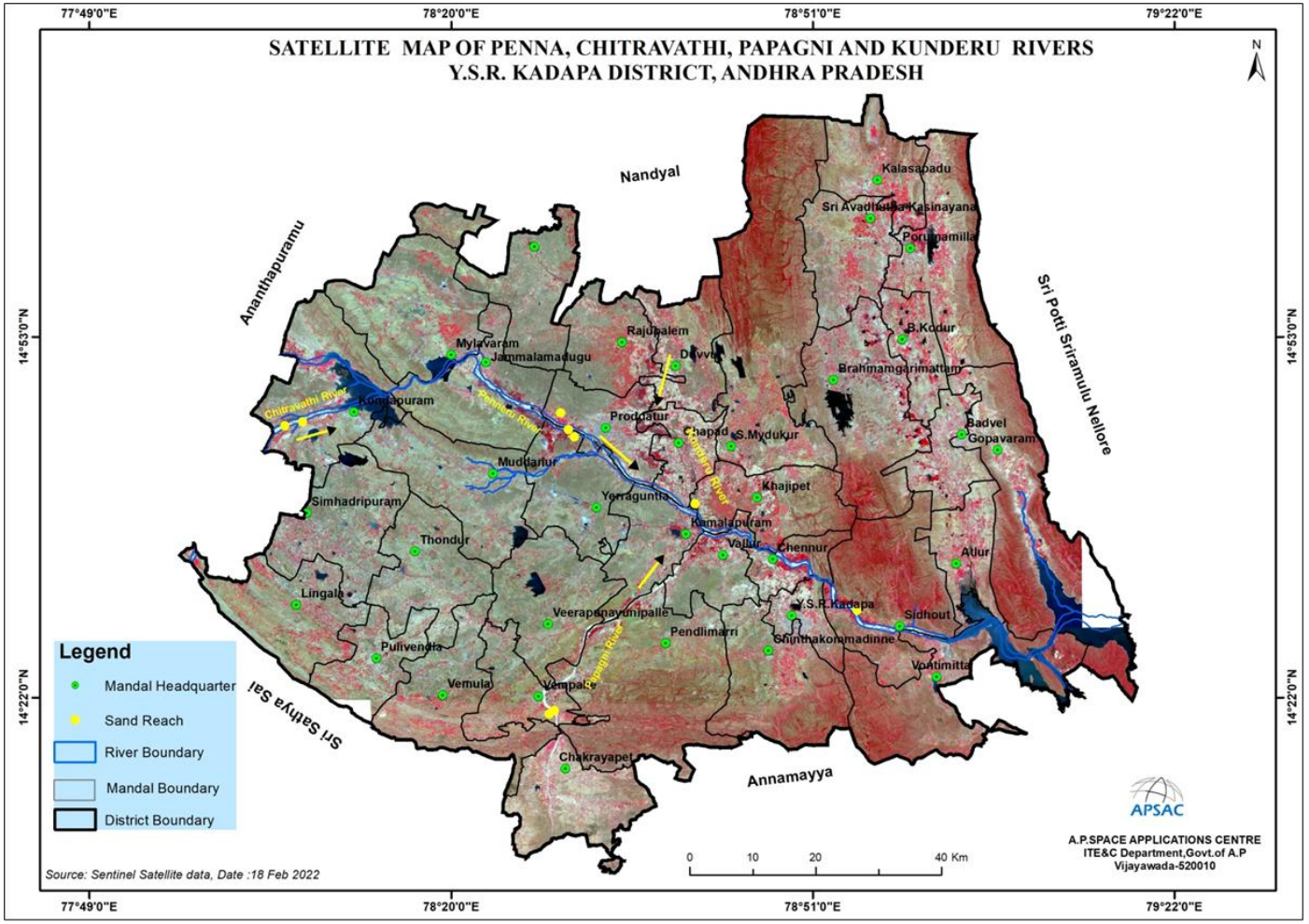

Figure-29: Satellite Map of Sand reaches in YSR Kadapa *District*

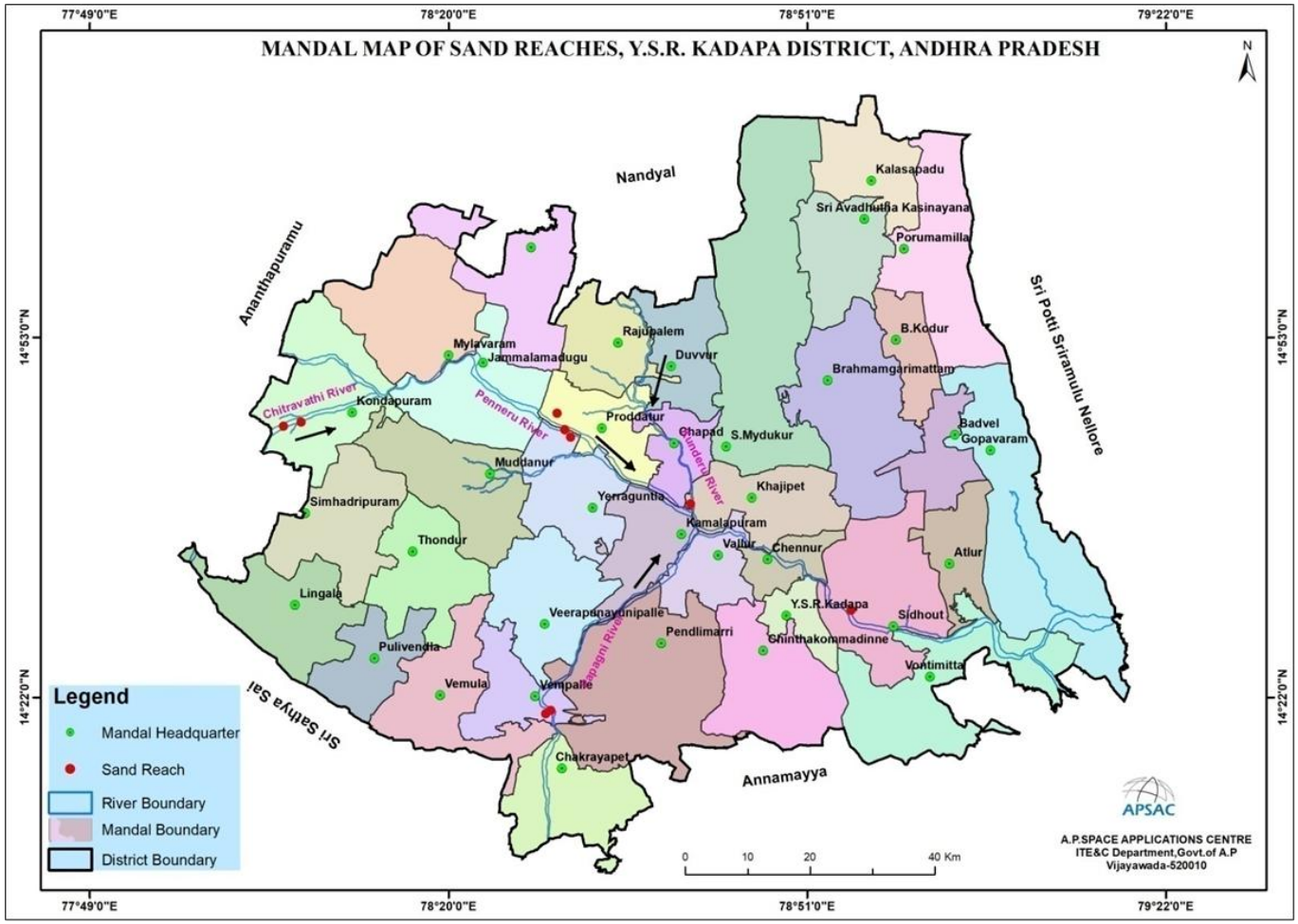

Figure-30: Mandal wise Sand Reaches map in YSR Kadapa *District*

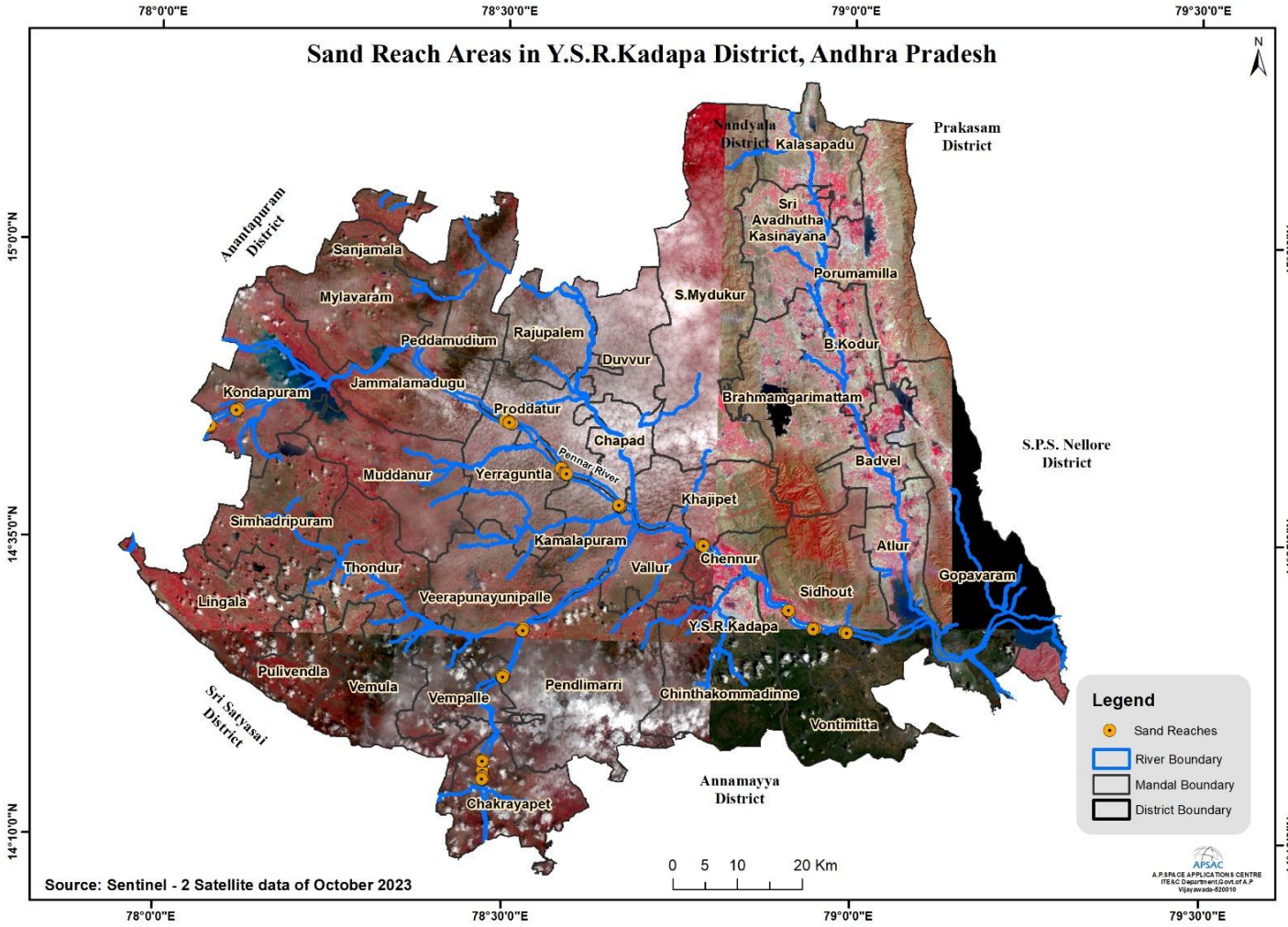

Figure-31: Satellite Map of Sand reaches in YSR Kadapa *District*

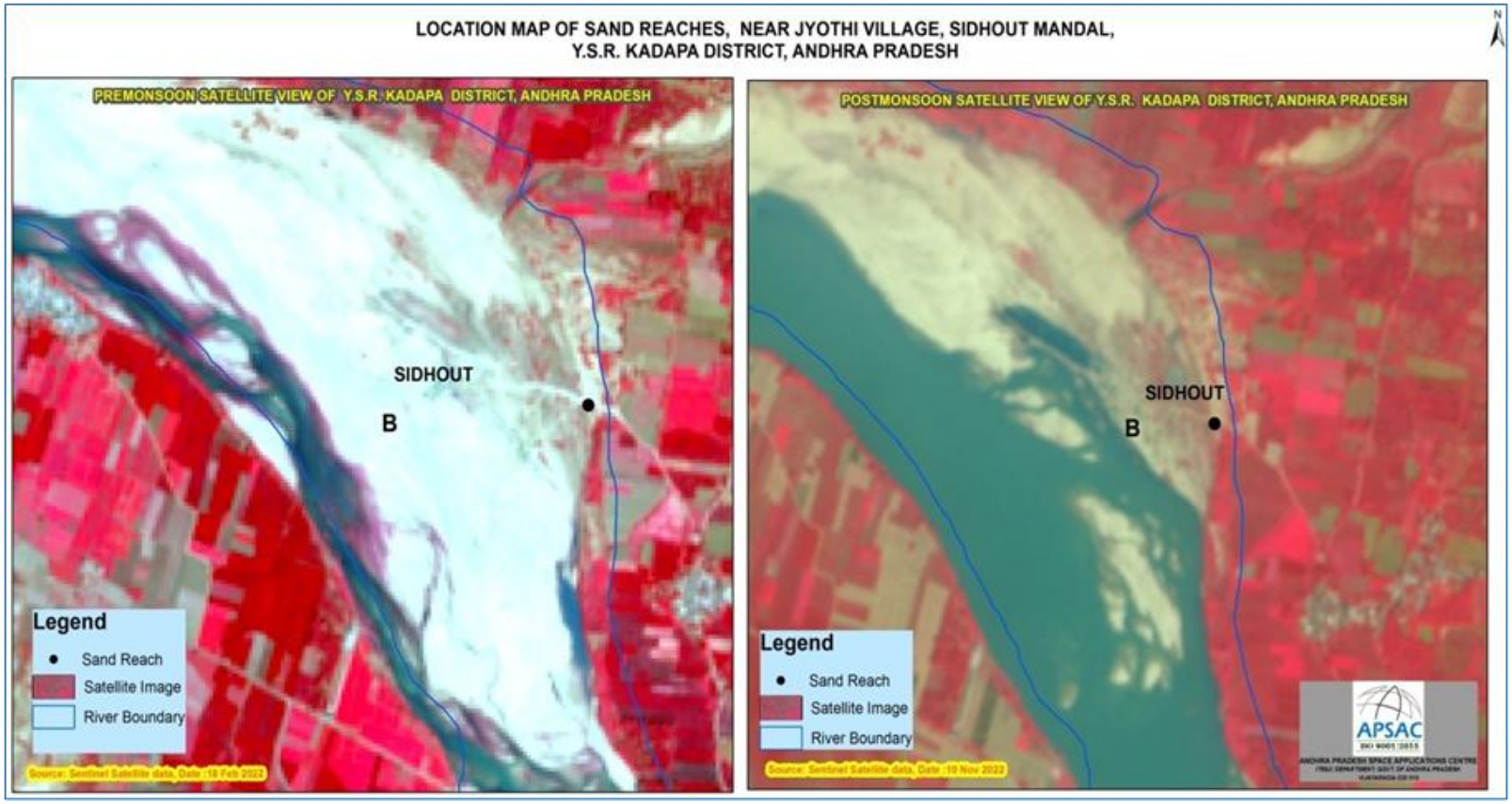

Figure-32: Pre and Post Monsson Sand Reach point at B

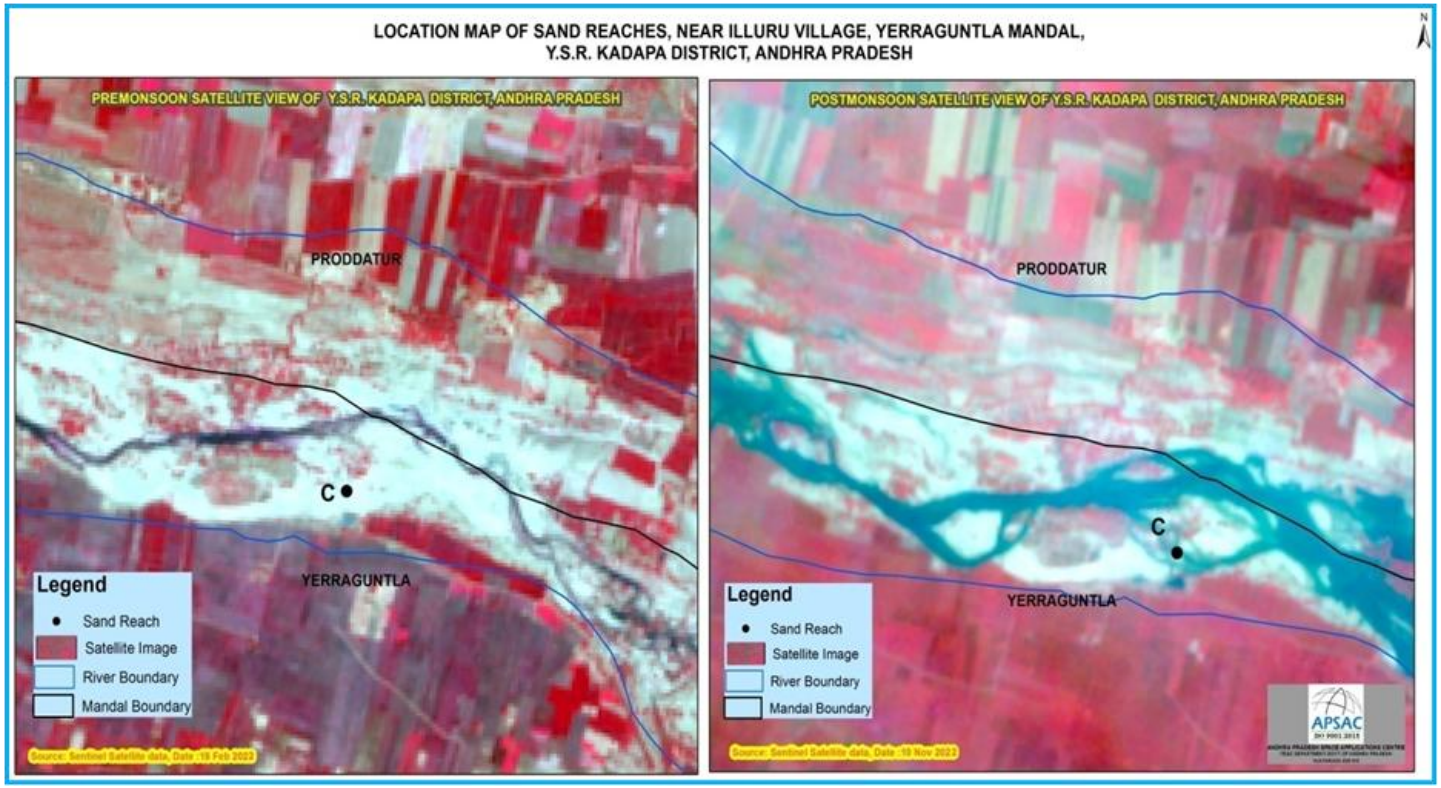

Figure-33:Pre and Post Monsoon Sand Reach point at C

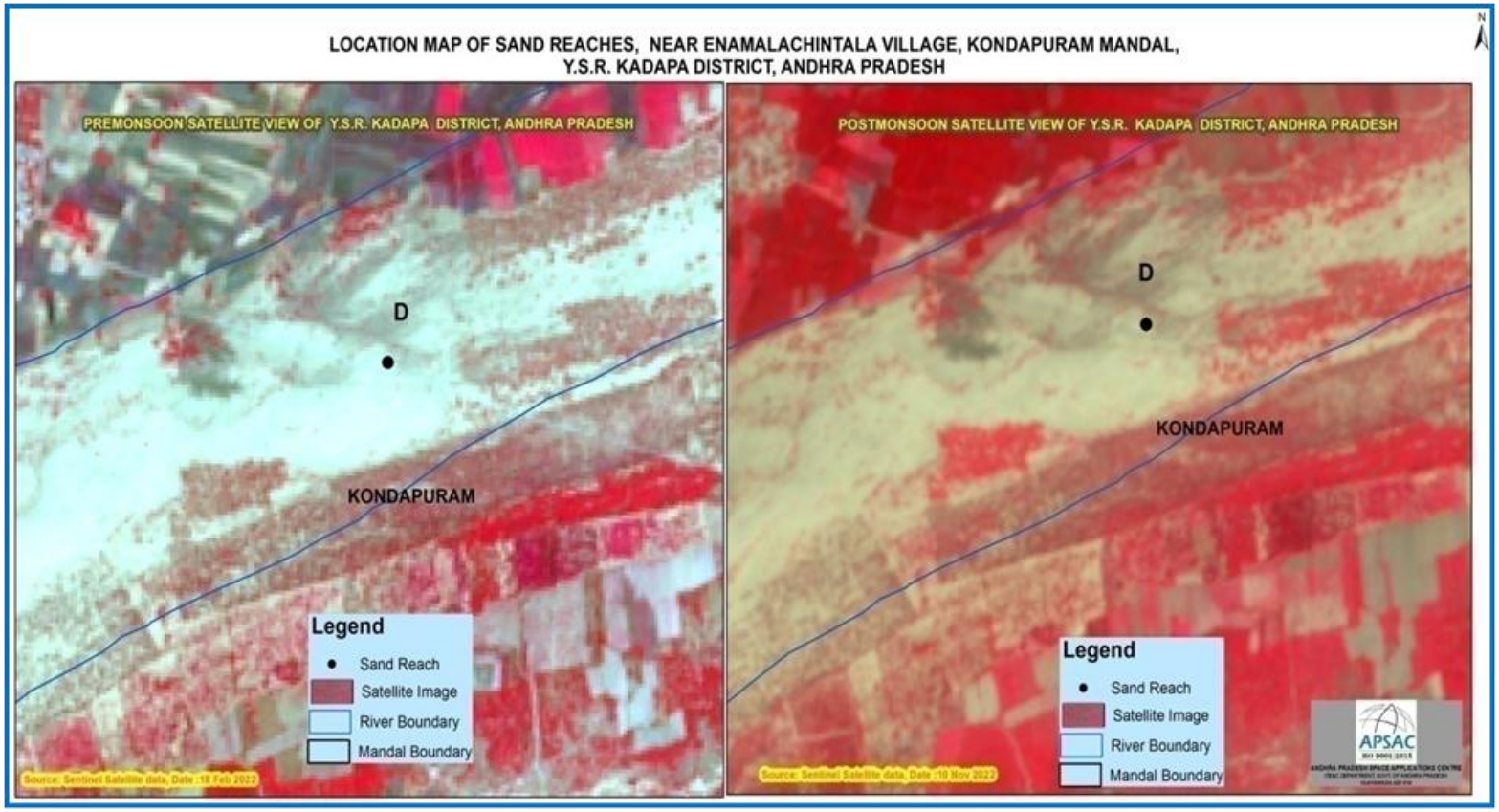

Figure-34: Pre and Post Monsoon Sand Reach point at D

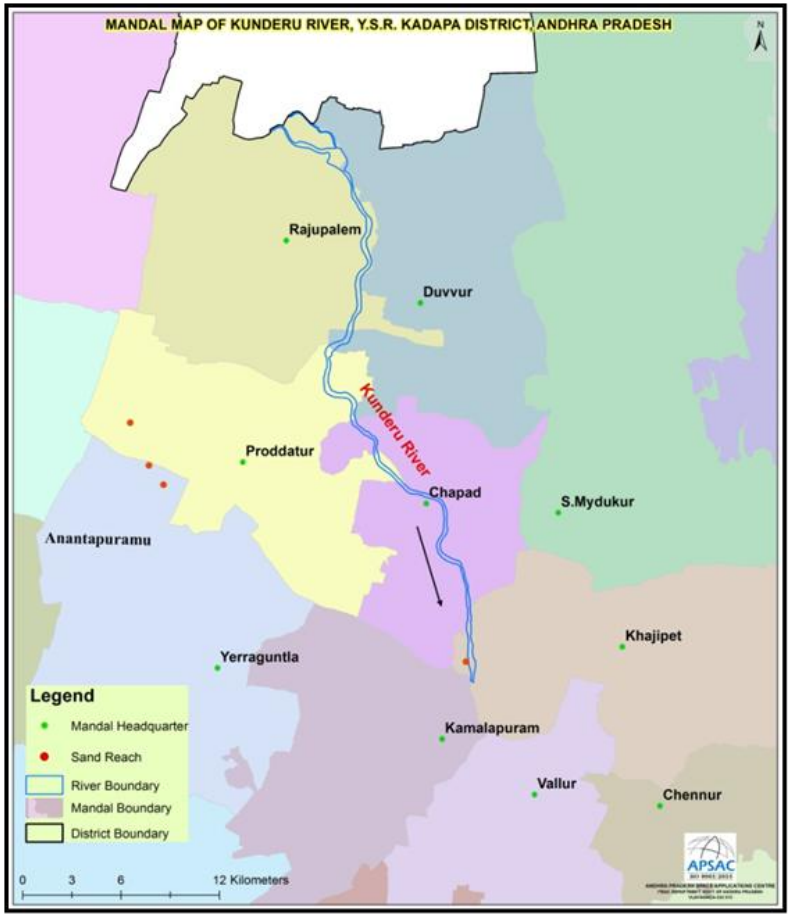

Figure-35 Kunderu river map in YSR Kadapa District

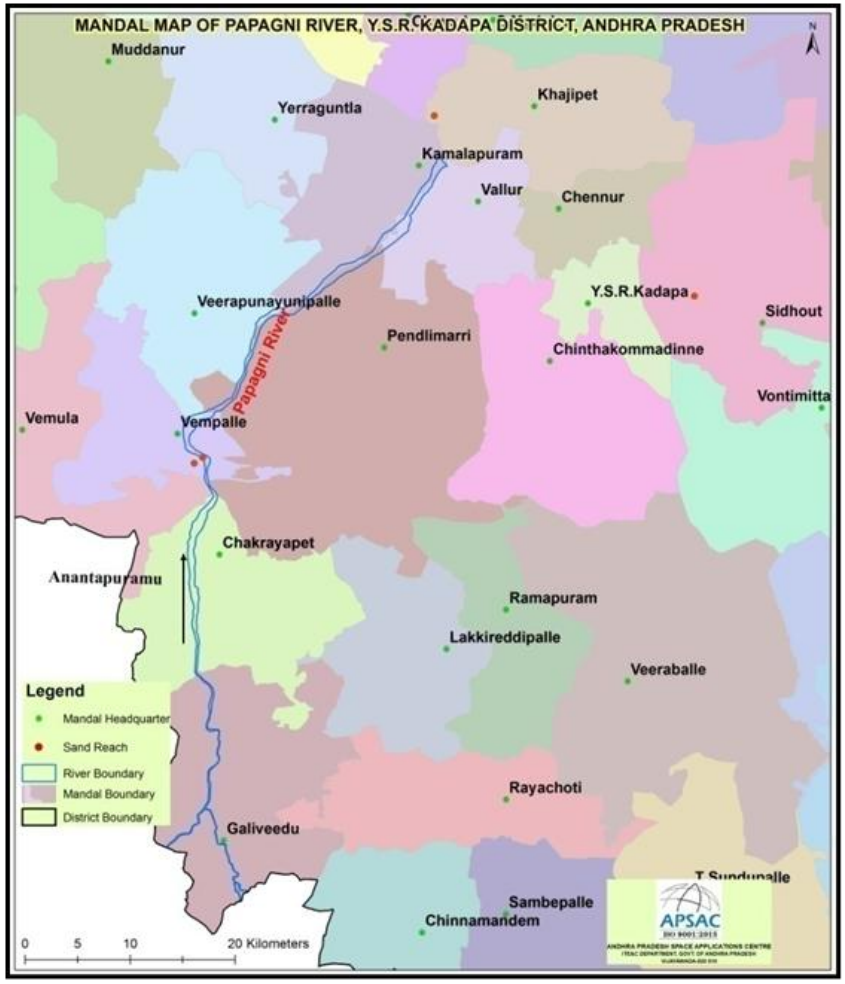

Figure-36 Papagni river map in YSR Kadapa District

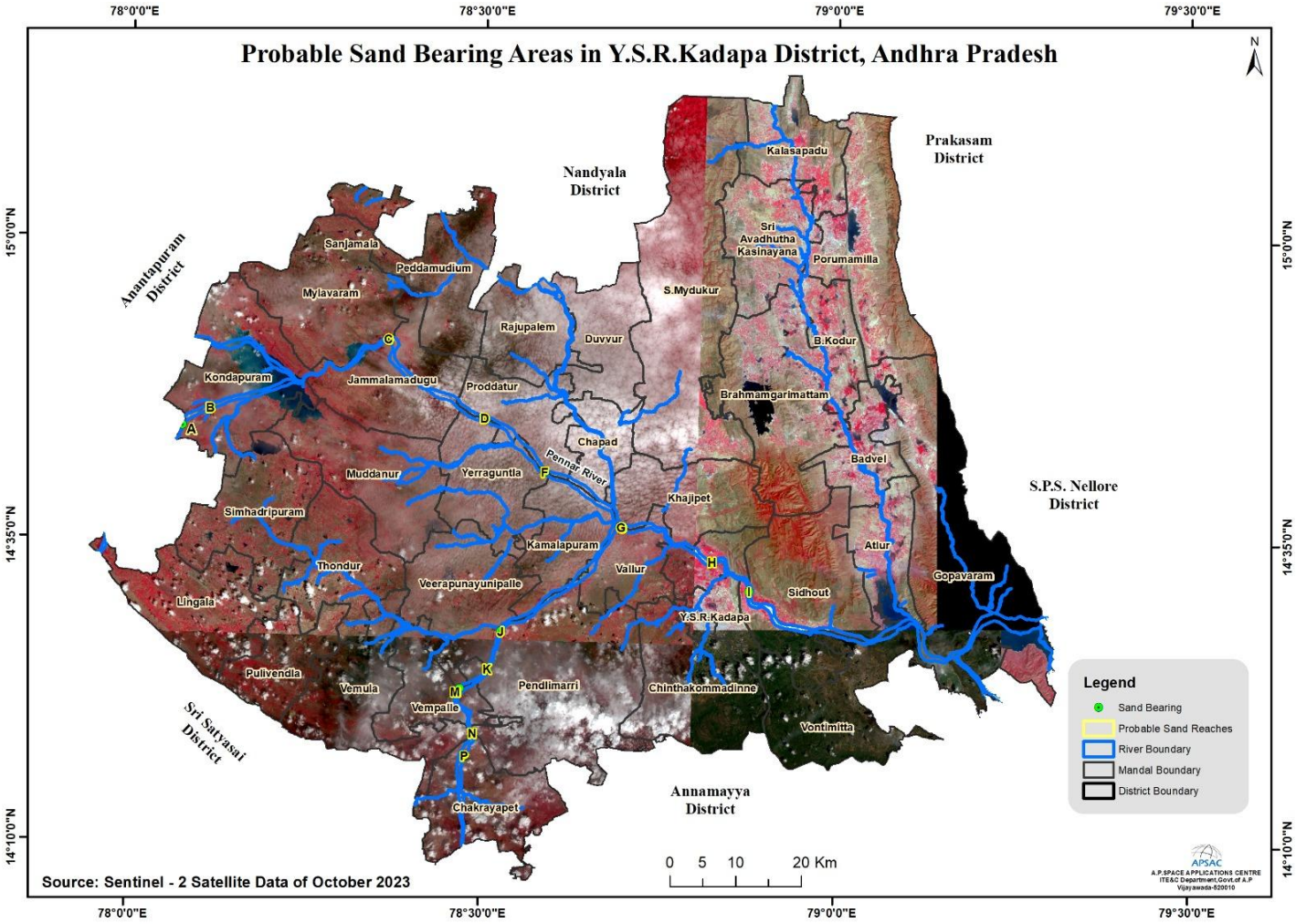

Figure-37: Probable Sand bearing areas in the YSR Kadapa District

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ANNEXURE - I

As the average annual run-off is less than 2" in the YSR Kadapa District, the sedimentation yield for Penna River in YSR Kadapa District is manually arrived by APSAC based on the Dendy Bolton Equation or Formula and is given below.

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$

Q = Mean Annual Run-off in mm
A = Net drainage Area in Sq. km
S = Sediment yield (tons/Sq. km/yr)

Sedimentation yield for the Penna River in YSR Kadapa District

Name of the River	Area Drained (sq. km)	Mean Annual Run-off (in mm)
Penna	15354	1.96

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh and
APSAC, Vijayawada

The given drained area value converted from Sq.Km to Sq.mile and the mean annual run-off converted from mm to inches for the calculations.

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$ **Tones/sq.mile/year**

Drainage Area (A) = 15354 sq. Km (1 Sq.km = 0.386 Sq.mile)
= 15354 x 0.386
A = 5926.644 Sq.mile ----------(1)

Mean Annual Run-off (Q) = 1.96 mm (1 mm = 0.0393 inches)
= 1.96 x 0.0393
Q = 0.077028 inches ----------(2)

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$ **Tones/sq.mile/year**

$$S = 1280 \times (0.077028^{0.46}) [1.43 - 0.26 \log (5926.644)]$$

Log 59 of 2 = 0.7723
0.6 = 4
As per base, the value = 3.0000
_____(+)
Log 5926.644=3.7727 ----------(3)

= 1280 x (0. $077028^{0.46}$) [1.43 – 0.26 x 3.7727]
= 1280 x (0. $077028^{0.46}$) [1.43 – 0.98093]
= 1280 x (0. $077028^{0.46}$) [0.44907]
= 1280 x 0.307509 x 0. 44907
= 176.7592
S = 176.7592 **Tones/sq.mile/year** ----------(4)

For total district Sedimentation Yield =
Per Sq.mile Sedimentation Yield (4) x Total Drainage Area (1)
176.7592 x 5926.644 = 10,47,589

As the Sedimentation yield calculated manually,
The sedimentation in the total River in the YSR Kadapa District = **10,47,589 Tones/ year**

ANNEXURE-II

As the average annual run-off is less than 2" in the YSR Kadapa District, the sedimentation yield for Papaghni River in YSR Kadapa District is manually arrived by APSAC based on the Dendy Bolton Equation or Formula and is given below.

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$

Q = Mean Annual Run-off in mm
A = Net drainage Area in Sq. km
S = Sediment yield (tons/Sq. km/yr)

Sedimentation yield for the Papaghni River in YSR Kadapa District

Name of the River	Area Drained (sq. km)	Mean Annual Run-off (in mm)
Papaghni	2073.5	6.21

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh and
APSAC, Vijayawada

The given drained area value converted from Sq.Km to Sq.mile and the mean annual run-off converted from mm to inches for the calculations.

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$ **Tones/sq.mile/year**

Drainage Area (A) = 2073.5 sq. Km (1 Sq.km = 0.386 Sq.mile)
= 2073.5 x 0.386
A = 800.371 Sq.mile ----------(1)

Mean Annual Run-off (Q) = 6.21 mm (1 mm = 0.0393 inches)
= 6.21 x 0.0393
Q = 0.24405 inches ----------(2)

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$ **Tones/sq.mile/year**

$S = 1280 \times (0.24405^{0.46}) [1.43 - 0.26 \log (800.371)]$

Log 80 of 0 = 0.9031
0.3 = 2
As per base, the value = 2.0000
_____(+)
Log 800.371=2.9033 ----------(3)

= 1280 x (0. 24405 $^{0.46}$) [1.43 – 0.26 x 2.9033]
= 1280 x (0. 24405 $^{0.46}$) [1.43 – 0.75486]
= 1280 x (0. 24405 $^{0.46}$) [0.67514]
= 1280 x 0.52269 x 0.67514
= 451.699
S = 451.699 **Tones/sq.mile/year** ----------(4)

For total district Sedimentation Yield =
Per Sq.mile Sedimentation Yield (4) x Total Drainage Area (1)
451.699 x 800.371 = 3,61,527

As the Sedimentation yield calculated manually,
The sedimentation in the total River in the YSR Kadapa District = **3,61,527 Tones/ year**

ANNEXURE-III

As the average annual run-off is less than 2" in the YSR Kadapa District, the sedimentation yield for Chitravathi River in YSR Kadapa District is manually arrived by APSAC based on the Dendy Bolton Equation or Formula and is given below.

$$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$$

Q = Mean Annual Run-off in mm
A = Net drainage Area in Sq. km
S = Sediment yield (tons/Sq. km/yr)

Sedimentation yield for the Chitravathi River in YSR Kadapa District

Name of the River	Area Drained (sq. km)	Mean Annual Run-off (in mm)
Chitravathi	263.07	35.88

Data Source: District Mines and Geology Officer, YSR Kadapa District, Andhra Pradesh and
APSAC, Vijayawada

The given drained area value converted from Sq.Km to Sq.mile and the mean annual run-off converted from mm to inches for the calculations.

$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$ **Tones/sq.mile/year**

Drainage Area (A) = 263.07 sq. Km (1 Sq.km = 0.386 Sq.mile)
= 263.07 x 0.386
A = 101.545 Sq.mile ----------(1)

Mean Annual Run-off (Q) = 35.88 mm (1 mm = 0.0393 inches)
= 35.88 x 0.0393
Q = 1.41008 inches ----------(2)

$S = 1280 \times Q^{0.46} [1.43 - 0.26 \log (A)]$ **Tones/sq.mile/year**

$S = 1280 \times (1.41008^{0.46}) [1.43 - 0.26 \log (101.545)]$

Log 10 of 1 = 0.0043
0.5 = 23
As per base, the value = 2.0000
_____(+)
Log 101.545=2.0066 ----------(3)

= 1280 x ($1.41008^{0.46}$) [1.43 – 0.26 x 2.0066]
= 1280 x ($1.41008^{0.46}$) [1.43 – 0.52173]
= 1280 x ($1.41008^{0.46}$) [0.90827]
= 1280 x 1.17126 x 0.90827
= 1361.69
S = 1361.69 **Tones/sq.mile/year** ----------(4)

For total district Sedimentation Yield =
Per Sq.mile Sedimentation Yield (4) x Total Drainage Area (1)
1361.69 x 101.545 = 1,38,272

As the Sedimentation yield calculated manually,
The sedimentation in the total River in the YSR Kadapa District = **1,38,272 Tones/ year**

****END****