BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE BENCH AT CHENNAI

APPEAL NO. 51 OF 2022

1. K. RUKMANGADA REDDY
S/o Shri K Mumnuswamy Reddy
R/o KapuVeedhi, Puttur,
Tirupati District, Andhra Pradesh and 2 others .....**APPELLANTS**

Versus

UNION OF INDIA
Through Secretary, Government of India
Ministry of Environment, Forests and Climate Change
Indira ParyavaranBhawanJorBagh Road,
New Delhi-110003
Secy-moef@gov.nic.in
Contact no. +91 11 20819308, 20819408 and 5 others .....**RESPONDENTS**

COUNTER AFFIDAVIT FILED BY THE 4th RESPONDENT

DATE-11-11-2022

M/s MADHURI DONTI REDDY
ADVOCATE
STANDING COUNSEL FOR GOVERNMENT OF ANDHRA PRADESH
A.P. POLLUTION CONTROL BOARD
T.T.D. SUPREME COURT OF INDIA
#S2, Royal Castle, 26, Gill Nagar Extension, Choolaimedu, Chennai – 600 094.
Mobile: 98407 98460 / 63831 21322, Email: reddymadhuri09@gmail.com

Counsel for 4th Respondent

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE BENCH AT CHENNAI

APPEAL NO. 51 OF 2022

1. K. RUKMANGADA REDDY
S/o Shri K Mumnuswamy Reddy
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It is certified that all the documents contained in the above annexure are true copies.

Date: 11.11.2022

Director of Mines and Geology
Govt. of Andhra Pradesh
Ibrahimpatnam, Vijayawada.
Krishna District.

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE BENCH AT CHENNAI

APPEAL NO. 51 OF 2022

1. K. RUKMANGADA REDDY
S/o Shri K Mumnuswamy Reddy
R/o KapuVeedhi, Puttur,
Tirupati District, Andhra Pradesh

2. B. VENKATARAMA RAJU
S/o Shri B. Chengalraju,
R/oOntimitta, Rachapalam, Puttur,
Tirupati District, Andhra Pradesh

3. K. MANOHAR
S/o ShriNarasimha Reddy,
R/o 17-193 Beedi Colony,
Puttur, Tirupati District,
Andhra Pradesh

.....APPELLANTS

Versus

1. UNION OF INDIA
Through Secretary, Government of India
Ministry of Environment, Forests and Climate Change
Indira ParyavaranBhawanJorBagh Road,
New Delhi-110003
Secy-moef@gov.nic.in.
Contact no. +91 11 20819308, 20819408

2. STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ANDHRA PRADESH
Through Member Secretary
Ministry of Environment, Forests & Climate Change
Government of India
apseiaams@gmail.com
Contact no. 9949122144

3. COLLECTOR AND DISTRICT MAGISTRATE,
Tirupati Road, New Balaji Colony,
Tirupati District,
Andhra Pradesh-517501
collectortirupati@gmail.com
Contact No. 0877 227 0984

4. DEPARTMENT OF MINING AND GEOLOGY
Government of Andhra Pradesh,
Through its Secretary,
State government office,
Ibrahimpatnam, Krishna district,
Andhra Pradesh 521456
admin@apmines.gov.in/directormines@yahoo.com.
Contact no. 0866-2882170

Director of Mines and Geology
Govt. of Andhra Pradesh
Ibrahimpatnam, Vijayawada.
Krishna District.

5. ANDHRA PRADESH STATE POLLUTION CONTROL BOARD
Through Member Secretary
1st APSFC Building, Balaji Colony, Tirupati,
Andhra Pradesh 517502
Contact No. 040-23451133

6. M/s AMARAM COMMODITY VENTURES,
Through the Proprietor,
SyNo. 388/1, 388/2, 387/3, 383 & 6P(old Sy.No.6)
Eswarapuram village, Puttur Municipality,
TirupatiDistrict, Andhra Pradesh-636451
amaram22.494@gmail.com.
Contact No. 9490951922/ 8555952708

...RESPONDENTS

COUNTER AFFIDAVIT FILED BY THE 4th RESPONDENT

I, V.G. Venkata Reddy, S/o. Subba Reddy, Aged about 56 years, Occ: Director of Mines and Geology, Andhra Pradesh do hereby solemnly and sincerely affirm and make oath and state as follows:

1. I am the Director of Geology and Mining and I am filing this affidavit on behalf of the 4th Respondent herein and as such I am well acquainted with the facts of the case.
2. This respondent denies each averment made in the affidavit filed in support of the application as false and incorrect except those that are specifically admitted herein in this counter affidavit.
3. The Answering Respondent states that the Environment Clearance has been granted to the private Respondent after following due procedures, as contemplated under law, and taking to account all factors that are required to be considered before such grant.
4. It is submitted that the petitioner has mentioned the 6th respondent as M/s Amaram Commodity Ventures in the affidavit. But, as per the records of this office, the 6th respondent name is M/s Amara Commodities, Prop: Smt P.Prathyusha.

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5. With regard averments made in introductory paragraph 1 to 5 of the Appeal is denied, the same are false. It is submitted that the Appeal has been filed against the Environmental Clearance (EC) vide Order No. SELAA/AP/CTR/MIN/03/2022/4101/194.51&191.34 dated 16.08.2022 granted to **M/S AMARA COMMODITIES,** Respondent No.6 herein, by the State Environment Impact Assessment Authority (SEIAA) Andhra Pradesh, the Respondent No.2 herein, in respect of the Quarry Lease for Colour Granite, over an extent of 6.553 Hectares, in Sy.No.388/1,388/2,387/3,383&6P Sy.No.6) of Eswarapuram Village, Puttur Mandal, Chittoor District for a period of 20 years.

6. With regard averments made in facts in Brief paragraph No 1& 2 of the Appeal are likewise denied as false. It is submitted that it is a fact that upon receipt of a Quarry Lease Application on 01-11-2019 for grant of Quarry Lease for Colour Granite, in the area in question and based on the recommendation proposals of the Asst. Director of Mines and Geology, Chittoor, this respondent granted the in principle quarry lease for colour granite an extent of 6.553 Hectares, in Sy.No.383 & 388/2 (Old Sy.No.6) of Eswarapuram Village, Puttur Mandal, Chittoor District for a period of 20 years in favour of the private respondent by way of proceedings in Notice No.1218/D13-1/2021, dated 21/06/2021 and the private respondent was required to submit mining plan approved by the Deputy Director of Mines and Geology within a period of one year from the date of the issue of that order along with Environmental Clearance and Consent For Establishment.

7. It is submitted that after submission of Approved Mining Plan (AMP) by the Deputy Director of Mines and Geology, Chittoor, Environmental Clearance (EC) by State Environment Impact Assessment Authority & Consent for Establishment (CFE) issued by Andhra Pradesh Pollution Control Board, the Quarry Lease for Colour Granite, over an extent of 6.553 Hectares, in Sy.No.383 & 388/2 (old Sy.No.6) of Eswarapuram Village, Puttur Mandal, Chittoor District for a period of 20 years was

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granted in favour of **M/S AMARA COMMODITIES,** Prop: Smt P.Prathyusha as per Rule 12(5) of Andhra Pradesh Minor Mineral Concession Rules, 1966 vide Director of Mines and Geology, Ibrahimpatnam Proc.No. 1218/D13-1/2020-2, Date:22-08-2022.

8. It is submitted that the Assistant Director of Mines and Geology, Chittoor has executed the lease deed on 26-09-2022 and issued work orders vide his Proc.No.5571/Q2/2019, Dated:26-09-2022. The lease period of 20 years is from 26-09-2022 to 25-09-2042.

9. It is submitted that this Respondent No.6 has submitted Consent for Operation (CFO) issued by the Andhra Pradesh Pollution Control Board (APPCB) on 01-10-2022 and started quarry operations.

10. With regard averments made in facts in Brief paragraph No- 3 of the Appeal is denied, the same are false. It is submitted that it is a fact that the Assistant Director of Mines and Geology, Chittoor has issued a Letter bearing No.5571/Q1/2019, Dated:19-03-2022 informing the existence of Three (03) Quarry Leases for Colour Granite within the radius of 500 Mts, from the area in question, on the request made by the Respondent No.6 for the purpose of obtaining Environment Clearance. Similarly, letters were issued by the Assistant Director of Mines and Geology, Chittoor to other Four Applicants viz., (1) M/s Amaram Commodity Ventures, (2) M/s Ushasree Commodity Ventures, (3) M/s Sudarsana Granites & (4) M/s Amaram Commodity Ventures regarding existence of leases within 500 Mts, radius from the areas applied by them for the purpose of obtaining Environment Clearances on 19-03-2022.

11. With regard averments made in facts in Brief paragraph No- 4 to 6 of the Appeal is denied, the same are false.It is submitted that the Government of Andhra Pradesh has issued a Gazette Notification Dt.02-04-2022 for re-organization of existing 13 Districts into 26 Districts in the State of Andhra

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Pradesh. According to the said Notification, the District of Tirupathi was formed by including 20 Mandals of erstwhile Chittoor District and 14 Mandals of erstwhile SPSR Nellore District. The Puttur Mandal of erstwhile Chittoor District is now part of the newly constituted Tirupathi District.

12. The primary contention raised in the present petition appears to be that because the erstwhile Chitoor District came to be bifurcated as referred above by forming the new District of Tirupati in the absence of a separate mining plan being made post bifurcation no lease could be granted is legally not sustainable.

13. It is submitted that the Mining Plan was approved by the Deputy Director of Mines and Geology, Chittoor vide Lr.No.1949/MP/CG/CTR/2021, Dated:14-07-2021 which is prior to the re-organization of the Districts in the State of Andhra Pradesh.

14. There is no requirement in law for conducting a separate mining plan approval process every time there is a reorganization of a District for administrative reasons. The approval of the mining plan is based on the topography and other relevant considerations under the Rules and Regulations and a change of boundary limits by such reorganization will not affect the validity and enforceability of the mining plan already approved for the consolidated area. As stated earlier in the instant case the mining plan for the erstwhile district of Chitoor was approved as recently as on 15.7.2021 and the subsequent reorganization on 2.4.2022 will not affect the enforceability of the originally approved plan.

15. It is submitted that this Respondent No.6 has filed an Application for grant of Environmental Clearance (EC) before the SEIAA, AP duly enclosing the Approval Mining Plan (AMP) which is a requisite document along with other documents to file the Application as per EIA Notification, 2006, prior to the re-organization of the Districts in the State of Andhra Pradesh.

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16. It is submitted that in this regarding the District Survey Report (DSR), vide Cir. Memo.No.911/P-DS Report/2014, Dt.18-12-2018, the Director of Mines and Geology, Ibrahimpatnam has directed the Assistant Director of Mines and Geology, Chittoor to place the DSRs in the public Domain in respective District Web Site. In this connection, the Assistant Director of Mines and Geology, chittoor vide Lr.No.6356/Misc/2013, Dt.20-12-2018 **(Annexure-1)** has requested the In-charge officer, District National Informatics Centre, Chittoor to upload the District Survey Reports in the Public Domain of Chittoor District. On the same day, the District National Informatics Centre has published DSRs in the web site chittoor.ap.gov.in.Further, vide Cir.Memo.No.911/P-DS Report/2014, Date:24-09-2021 the Director of Mines and Geology, Ibrahimpatnam has directed the Assistant Director of Mines and Geology, Chittoor to place the DSR in the public domain in respective District web site. In this connection, the DSR prepared by the M/s APSAC (Andhra Pradesh Space Applications Centre) is placed in public Domain on District web site on a period of 21 days and also communicated the email ID suggestionsondsr@gmail.com to receive suggestions from the general public on 29-09-2021. However no suggestions/ comments were received from the public including the present Petitioner. Having so not participated in the public hearing, it is submitted that the Petitioner has no locus standi to maintain this petition. In the petition, no explanation was given for his non -participation.

17. In the absence of any objections it is submitted that a note was submitted to the District Collector, Chittoor for approval of the DSRs and to upload the same in the District web site for public information. The DSRs, Chittoor District was published in the District web site Chittoor.ap.gov.in on 29-09-2021 and it is in force in public domain.

18. It is submitted that as per the Ministry of Environment, forest & Climate Change Notification O.S.No.3611(E), Dated:25-07-2018, the DSR shall be updated once every five years. **(Annexure-2)**

Director of Mines and Geology
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19. It is submitted that the DSR of erstwhile Chittoor District was uploaded into District Web Site on 20-12-2018. Hence, it shall be in force upto five years i.e., upto 19-12-2023.

20. It is submitted that the District Survey Report of the newly formed Tirupathi District will be prepared and uploaded into District Web Site before 19-12-2023 i.e., before the validity period of the DSR of erstwhile Chittoor District.

21. It is submitted that it is pertinent to mention here that the nature of the Mineral Deposits will not change when parts of the Revenue areas of erstwhile Chittoor and SPSR Nellore Districts are united to carved out the newly formed Tirupathi District.

22. It is further submitted that the following four quarry leases for Colour Granite are in existence prior to grant of the quarry lease for Colour Granite to the Respondent No.6 and these four leases were already having Environmental Clearances and are in working condition.

Sl. No.	Name of the lesse	Location	Extent in Hects	Mineral	Status of lease period	EC No. & Date
1	M/s Pokarna Limited	Sy.No.6/P of Eswarapuram Vg., Puttur Mandal, Chittoor District	6.000	Colour Granite	28-01-2010 to 27-01-2030	SEIAA/AP/CTR /894/2013, Dt.10-06-2013
2	M/s Patel Stone India (Transferred from C.Sathish Kumar)	Sy.No.6 of Eswarapuram Vg., Puttur Mandal, Chittoor District	2.417	Colour Granite	06-09-2012 to 05-09-2032	DEIAA/AP/CTR – 115/2018-115, Dt.19-02-2018
3	M/s Sri Shiridi Sai Granites, Prop: Sri V.Thippaiah	Sy.No.6 of Eswarapuram Vg., Puttur Mandal, Chittoor District	4.000	Colour Granite	05-09-2014 to 04-09-2034	SEIAA/AP/CTR-42/2012-5523, Dt.26-12-2013
4	Sri M.K.N. Jaishankar (Lease transferred to M/s A.R.S Granites on 01.09.2022)	Sy.No.6 of Eswarapuram Vg., Puttur Mandal, Chittoor District	2.500	Black Granite & Colour Granite	03-07-2015 to 02-07-2035	SEIAA/AP/CTR-366/2012-1301, Dt.28-01-2015

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23. It is submitted that no complaints were received from the public with regard to Pollution aspect in the offices of Respondent No.4 (Department of Mines and Geology) on the above said four quarry leases.

24. It is submitted that the above said lease areas including the lease area granted to Respondent No.6 are located about 9.6 Kilo meters distance from the border of the present Chittoor District.

25. It is submitted that in Granite Quarrying, no intensive blasting will be used to extract the Granite Blocks, otherwise even thin hair line cracks if developed due to blasting operations, the Granite blocks extracted will become un-marketable since these cracks will be water absorbed after polishing, leading to breakage of the polished slabs.

26. Further, it is submitted that regarding distances from the Pollution point of view, (i) the Hon'ble NGT Principal Bench, New Delhi vide their Judgment dated: 21-07-2020 in O.A.No.304/2019 filed by M.Haridasan & Ors V/s State of Kerala has ordered the SPCBs throughout the India to follow the minimum distance criteria suggested by the CPCB in its report Dated:09-07-2020 for permitting stone quarrying. **(Annexure-3)**

Mining Type		Minimum Distance	Locations
1	When Blasting is not involved	100 M	Residential / Public buildings, Inhabited sites, locations to be considered by states.
2	When Blasting is involved	200**	

****Note:** The regulations for danger zone (500 m) prescribed by Directorate General of Mines Safety also have to be complied compulsorily and necessary measures should be taken to minimize the impact on environment. However, if any state is already having stringent criteria than the above for minor mineral mining (i.e., more prescribed distance than the above), the same shall be applicable". The CPCB may monitor compliance.

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27. It is submitted that the quarry lease area granted in favour of Respondent No.6 is located about 650 Mts, which is more than 500 Mts, distance from the Water Summer Storage Tank and Human Habitation. Hence, the quarry lease granted to the Respondent No.6 is with due compliance of the Hon'ble NGT orders Dt.21-07-2020. It is further submitted that the order of Hon'ble Supreme court in Mohammad Haroon Anssari & Anr. V. District Collector, Rangareddy District (Civil Appeal No.1907-1908 of 2000) is not relevant in the facts of the present case. The aforesaid order of the Hon'ble High Court dated 21.07.2020 is directly applicable.

28. With regard to averments made in facts in Brief paragraph No- 7 t o 19 & grounds of the Appeal, not related to this respondent and hence there are no remarks.

29. It is submitted that respondent craves leave of this Hon'ble Tribunal to address any further queries that may arise during the course of proceedings, through an additional counter, if required.

In the above circumstances, it is humbly prayed that this Hon'ble Tribunal may be pleased to dismiss the above Appeal No.51 of 2022 and pass such further or other orders, as this Hon'ble Tribunal may deem fit and proper in the facts and circumstances of the case and thus render justice.

Solemnly affirmed Vijayawada
Andhra Pradesh on
this the 11th day of November 2022
and signed his name in my presence

BEFORE ME

Director of Mines and Geology
Govt. of Andhra Pradesh
Ibrahimpatnam, Vijayawada.
Krishna District.

Advocate

VERIFICATION

I, V.G. Venkata Reddy, S/o. Subba Reddy, Aged about 56 years, Occ: Director of Mines and Geology, Andhra Pradesh hereby verify that the contents of Para's of Counter Affidavit are based on record and information are true to the best of my knowledge and belief.

Hence, verified on the 11th day of November 2022 at Vijayawada

DEPONENT

Director of Mines and Geology
Govt. of Andhra Pradesh
Gollapudi, Vijayawada.
Krishna District.

GOVERNMENT OF ANDHRA PRADESH
DEPARTMENT OF MINES & GEOLOGY

From

N.Venkata Krishna, M.Sc., P.G.D.S.,
Asst.Director of Mines & Geology,
Chittoor.

To

The Incharge Officer,
District National Informatic Centre,
New Collectorate,
Chittoor.

Letter No.6356/Misc/2013, Dt.20-12-2018.

Sir,

Sub:- MISC – Department of Mines & Geology – Office of the Asst.Director of Mines & Geology, Chittoor – Preparation of District Survey Reports for Sand Mining or River Bed Mining and Mining of other all Minor Mineralrs – Request to Place the District Survey Reports in the public Domain in respective District websites – Regarding.

Ref:- Cir.Memo.No.911/P-DS Report/2014, Dt: 18-12-2018 of the Director of Mines & Geology, Ibrahimpatnam.

-:oOo:-

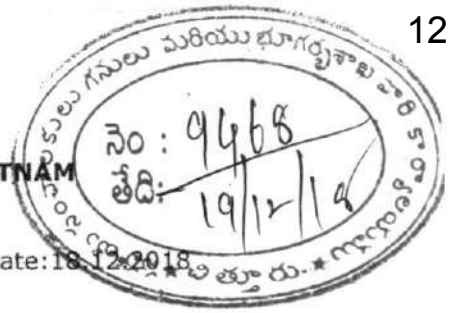
I invite your attention to the subject and reference cited. Through the reference cited, the Director of Mines & Geology, Ibrahimpatnam, Vijayawada has directed all ADM&G in the state to place the District Survey Reports in the public domain in respective District websites.

In this connection, I herewith request to upload the District Survey Reports in the Public domain of Chittoor District as early as possible.

Yours faithfully,

Asst. Director of Mines & Geology,
Chittoor

Copy submitted to the District Collector Chittoor for favour of information.
Copy submitted to the Deputy Director of Mines & Geology, Kadapa for favour of information.



GOVERNMENT OF ANDHRA PRADESH
DEPARTMENT OF MINES & GEOLOGY:: IBRAHIMPATNAM

Cir. Memo No. 911/P-DS Report/2014 Date: 18.12.2018

Sub: Mines & Minerals –Preparation of District survey reports for Sand Mining or river bed mining and mining of other all minor minerals – Called for- To place the DSRs in the Public Domain in respective District Websites - Requested - Reg.

Ref: 1. EIA Notification 2006 in Notification No. S.O.3611 (E), dt.25.07.2018 (copy enclosed)
2. This office Circular Memo No. 911/P-DSR/2014, dt.05.12.2018
3. DSRs for all 13 Districts received from M/s APSAC Ltd., through e-mail.

*****

The attention of the all ADM&Gs in the State is drawn to the subject and references cited. Through the reference 2nd cited, this office has issued instructions for uploading the DSRs in respective District Websites. Through the reference 3rd cited, M/s APSAC submitted final version of DSRs for all 13 Districts (attached to the mail).

In view of the above, the all ADM&Gs (Regular) are directed to place the DSRs in the public domain in respective District websites.

This may be treated as **"MOST URGENT"**.

Sd/- D. Nagaraju
for Director of Mines & Geology

Encl: (As above)

To
All the ADM&Gs (Regular) in the State.

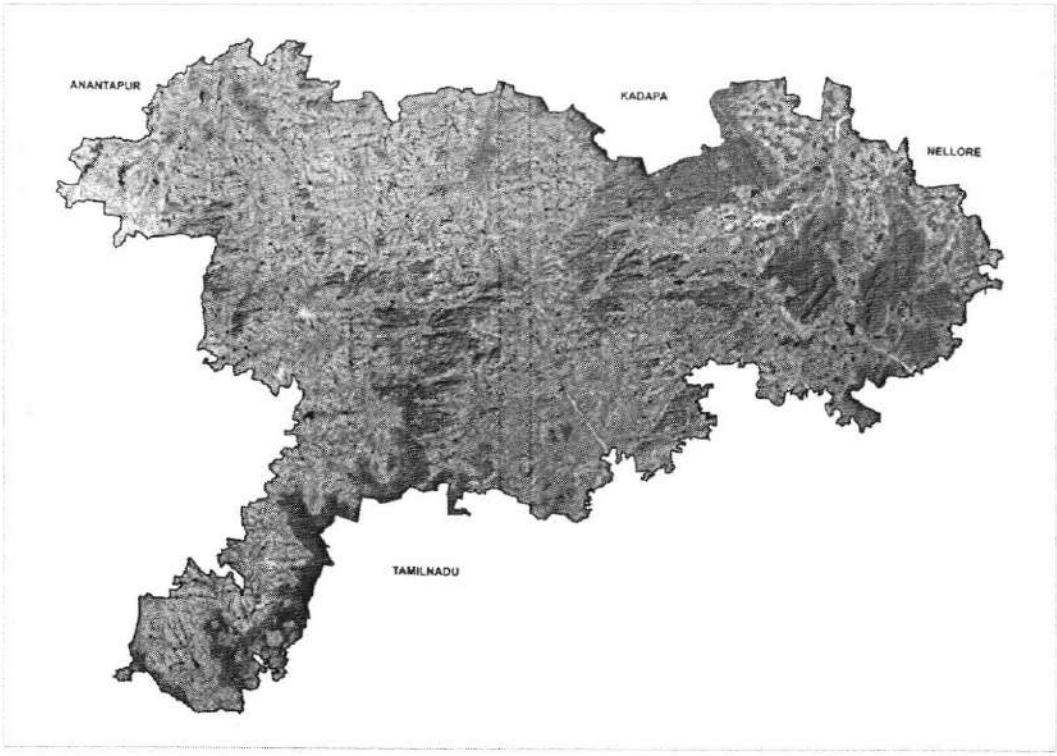
Copy to all DDM&Gs, in the State for favour of information
Copy to the APSAC, Vijayawada for favour of information.

Copy to IT Section in Head Office for posting the District Survey Reports in Department Website.

//Attested//

Asst. Geologist

DEPARTMENT OF MINES AND GEOLOGY
Government of Andhra Pradesh
DISTRICT SURVEY REPORT- CHITTOOR DISTRICT



Prepared by

APSAC
ISO 9001:2015

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

2018

ACKNOWLEDGEMENT

APSAC wishes to place on record its sincere thanks to Sri B.Sreedhar IAS, Secretary to the Government (Mines) and the Director, Department of Mines and Geology, Govt. of Andhra Pradesh for entrusting the work for preparation of District Survey Reports of Andhra Pradesh. The team gratefully acknowledge the help of the Commissioner, Horticulture Department, Govt. of Andhra Pradesh and the Director, Directorate of Economics and Statistics, Planning Department, Govt. of Andhra Pradesh for providing valuable statistical data and literature. The Project team is also thankful to all Joint Directors, Deputy Directors, Assistant Directors and the staff of Mines and Geology Department for their overall support and guidance during the execution of this work. Also sincere thanks are due to the scientific staff of APSAC who has generated all the thematic maps.

VICE CHAIRMAN
APSAC

List Of Figures

List Of Tables

1. Salient Features of Chittoor District

Chittoor district is one of the chronically drought affected Rayalaseema districts of Andhra Pradesh. It is the Southern most District covering a geographical area of15152Sq.km situated between 12° 37" and 14° .00. North latitudes and 78° 03 and 79° 55 Eastern longitudes. This District is bounded by Tamilnadu State on the South and Karnataka state on the West.On the North, it is bounded by Ananthapuramu, Kadapa, & on the East by Nellore districts respectively from west to east. Famous TTD SRI VENKATESWARA TEMPLE is situated in the abode by name TIRUMALA in Seshachalam ranges 70 kms north east of its district head quarters by name CHITTOOR Town.

1.1.Administrative Setup

Administratively the district is divided in to 3 Revenue divisions ,i.e .Chittoor , Madanapally, and Tirupathy ,which are further sub- divided in to 66 Revenue (Fig ,1) for which Chittoor Town acts as District Headquarter.

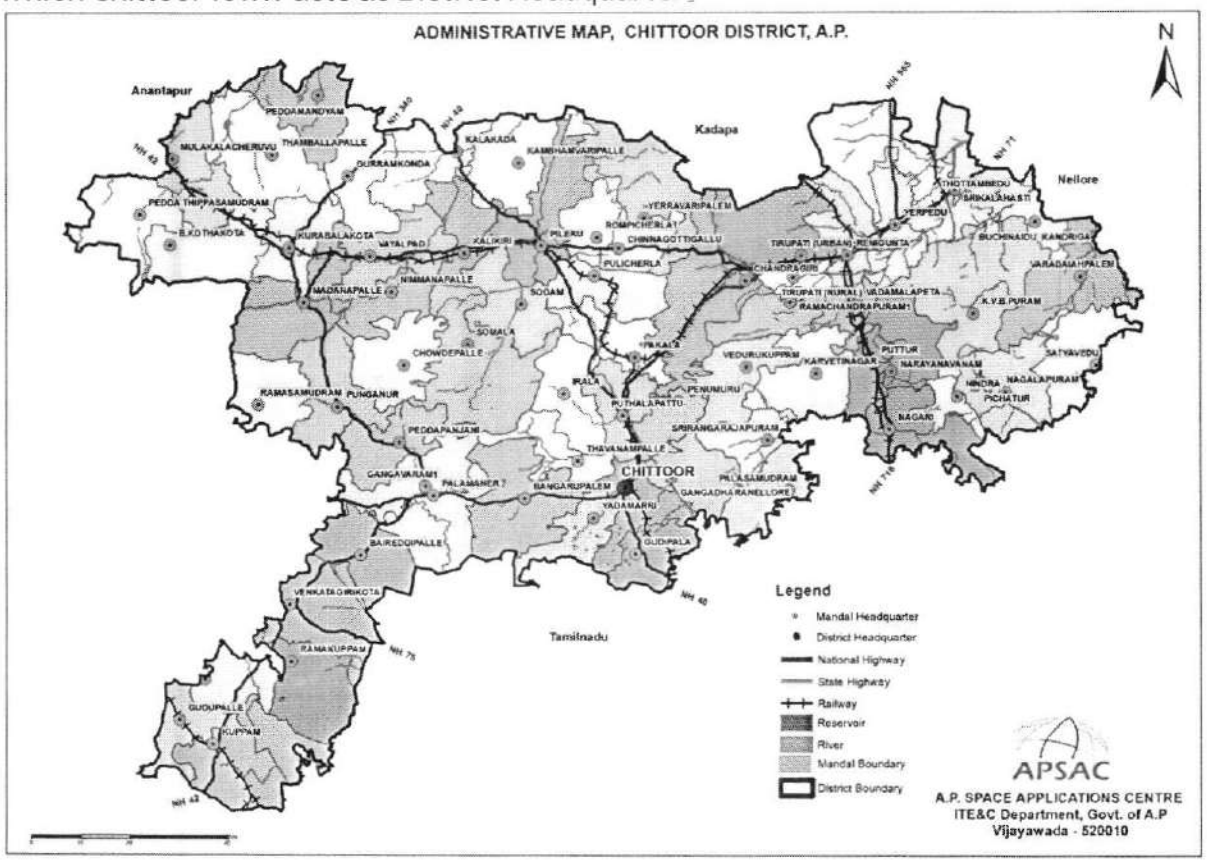


Fig.1Administrative Boundaries of Chittoor District, Andhra Pradesh

C - ADMINISTRATIVE DIVISIONS IN THE DISTRICT

Table:1.Administrative Divisions In The District

No	Chittoor Division	Madanapalle Division	Tirupati Division

1	Bangarupalem	B.Kothakota	Buchinaidu khandriga
2	Chittoor	Baireddipalle	Chandragiri
3	Gangadhara Nellore	Chinnagottigallu	KVB Puram
4	Gudipala	Chowdepalle	Nagalapuram
5	Irala	Yerravaripalem	Pakala
6	Karvetinagar	Gangavaram	Pitchatur
7	Nagari	Gudupalle	Pulicherla
8	Narayanavanam	Gurramkonda	Renigunta
9	Nindra	Kalakada	Sathyavedu
10	Palasamudram	Kalikiri	Srikalahasti
11	Penumuru	Kambhamvaripalle	Thottambedu
12	Puthalapattu	Kuppam	Tirupati (rural)
13	Puttur	Kurabalakota	Tirupati (urban)
14	Ramachandrapuram	Madanapalle	Varadaiahpalem
15	Srirangarajapuram	Mulakalacheruvu	Yerpedu
16	Thavanampalle	Nimmanapalli	
17	Vadamalapeta	palamaner	
18	Vedurukuppam	Peddamandyam	
19	Vijayapuram	Peddapanjani	
20	Yadamari	Peddathippasamudram	
21		Piler	
22		Punganur	

23		Ramakuppam	
24		Ramasamudram	
25		Rompicherla	
26		Sadam	
27		Santhipuram	
28		Somala	
29		Thamballapalle	
30		Valmikipuram	
31		Venkatagirikota	

1.2.Drainage&Physiography

1.2.a. Drainage: There are no major rivers in the district. Most of the rivers are ephemeral in nature carrying large quantities of water immediately after precipitation. The drainage is generally sub- articulate to sub-parallel following straight courses. The important drainage basins are Bahuda, Pincha, Swarnamukhi, Palar, Ponnai and Araniyar. The Bahuda and Pincha are north flowing rivers, Swarnamikhi is east flowing, Palar is southeast flowing, Ponnai towards south and Araniyar is southeast flowing.

1.2.b.Physiography

The District forms a part of the Mysore plateau. The western and southwestern parts comprising Kuppam, Palamaneru, Punganur, Thamballapalle and Madanapalle areas have an altitude between 600 m and 900 m amsl. The altitude of central region comprising Bangarupalem, Chittoor, Piler, Vayalpad, Chandragiri areas has 300 m to 600 m amsl. The eastern/southern parts covering the parts of

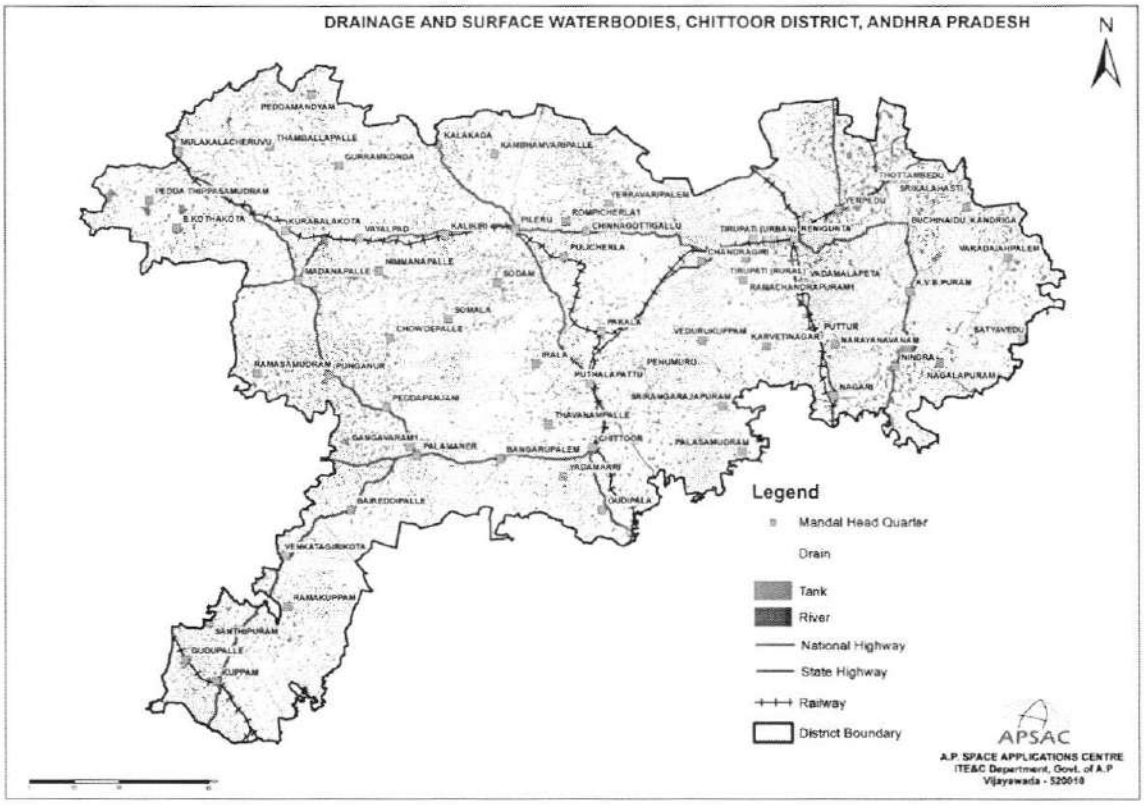


Fig:2.Drainage Network and Surface water bodies of the Chittoor District map

Puttur, Karvetinagar, Satyavedu, Tottambedu and Srikalahasty areas have an altitude of less than 300 m amsl. This indicates that the elevation in the district is highly variable and having steep slopes.

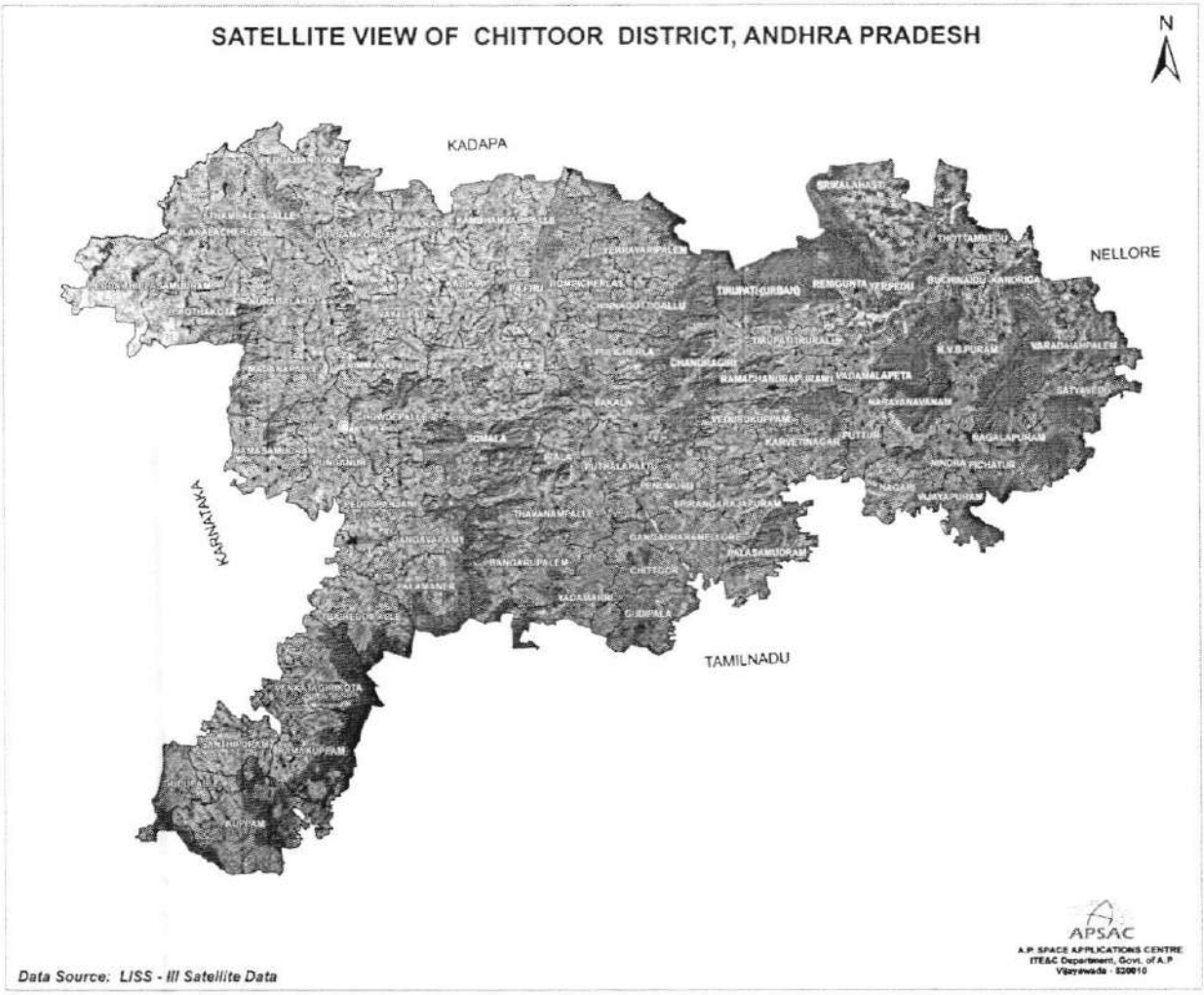


Fig.3. Satellite View of Chittoor District,Andhra Prdesh

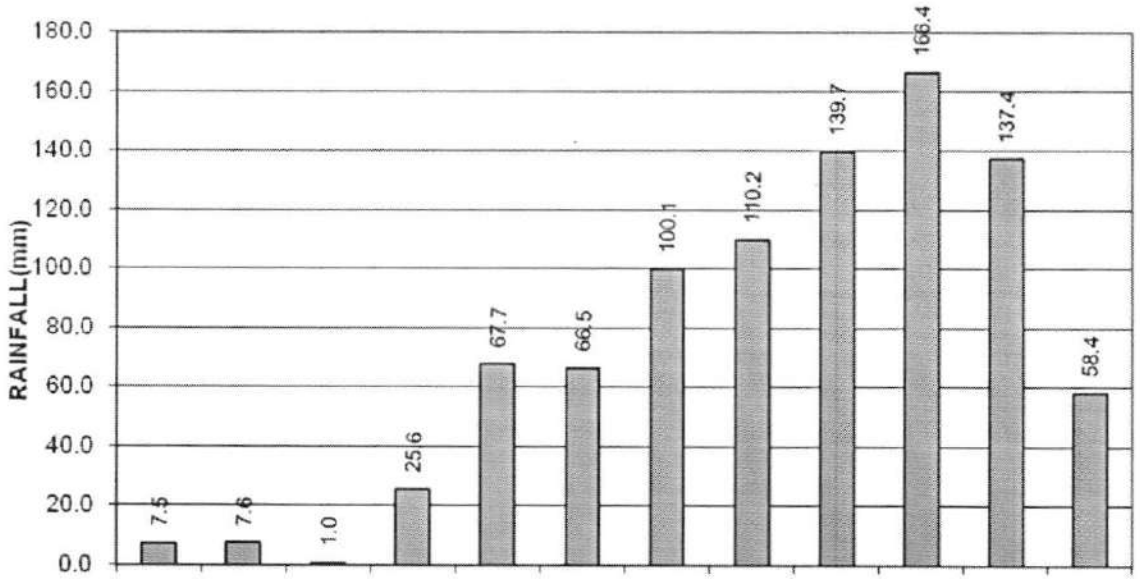
1.3.Climate & Rainfall:

1.3.a.Climate : The Climate of the district is dry. The upland mandals are comparatively cooler than the eastern mandals except Chittoor where the climate is moderate. Horsely Hills is a summer resort located near the town of Madanapalle. It is known to some as the "Andhra Ooty".

1.3.b.Rainfall: The average annual rainfall of the district is 976 mm, which ranges from 1 mm rainfall in March to 166.4 mm in October. October is the wettest month of the year. The mean seasonal rainfall distribution is 466.5 mm in southwest monsoon (June- September), 392.2 mm in northeast monsoon (Oct- Dec), 15.1 mm rainfall in winter (Jan- Feb) and 94.3 mm in summer (March – May). The percentage distribution of rainfall, season- wise, is 46.9% in southwest monsoon, 40.8 % in northeast monsoon, 1.7 percentage in winter and 10.6 % in summer. The mean monthly rainfall distribution is given in Fig.2.

1.3.c. Mean monthly rainfall distribution

Annual and seasonal rainfall distribution with its departure from mean along with year-wise

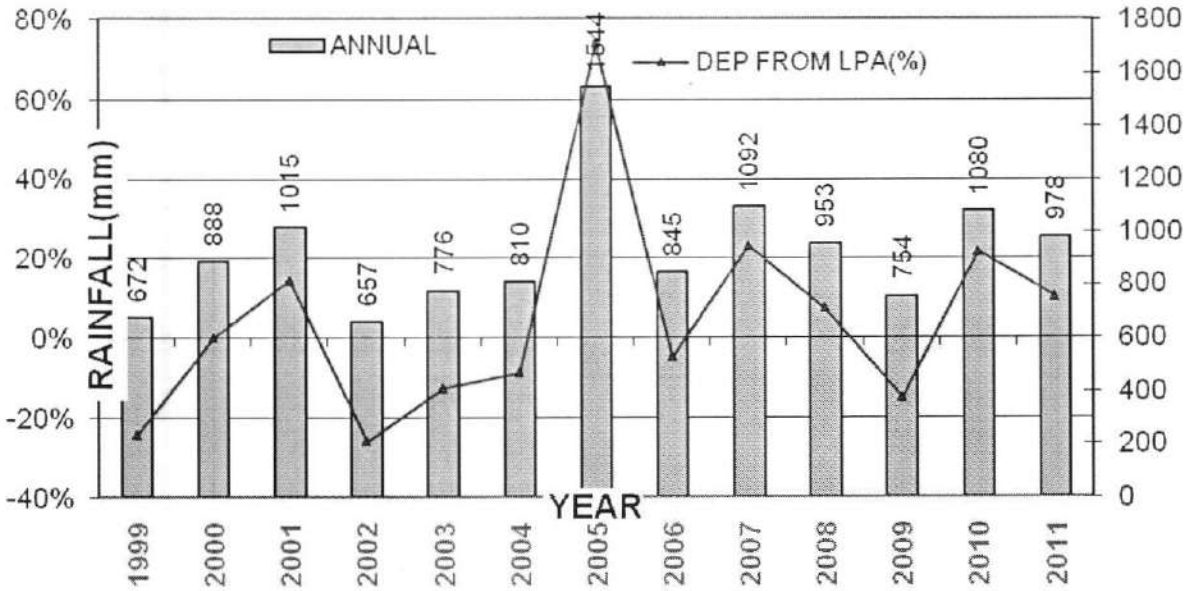


percentage distribution is furnished in Table-2. The annual rainfall ranges from 657.2 mm in 2003 to 1544 mm in 2005. The annual rainfall departure ranges from -26 %in 2002 to 74 % in 2005. The southwest monsoon rainfall contributes about 47 % of annual rainfall. It ranges from 259 mm in 1999 to 573.2 mm in 2005. The year 2002 experienced drought conditions in the district, as the annual rainfall recorded is 26 %less than the long period average (LPA). The cumulative departure of annual rainfall from LPA is presented in Fig.3. It indicates that the rainfall departure, as in 2011 is positive i.e. 59%, showing rainfall excess. Percentage distribution is furnished in Table-2. The annual rainfall ranges from 657.2 mm in 2003 to 1544 mm in 2005. The annual rainfall departure ranges from -26 %in 2002 to 74 %in 2005. The southwest monsoon rainfall contributes about 47 %of annual rainfall. It ranges from 259 mm in 1999 to 573.2 mm in 2005. The year 2002 experienced drought conditions in the district, as the annual rainfall recorded is 26 %less than the long period average (LPA) respectively(check). The cumulative departure of annual rainfall from LPA is presented in Fig.3. It indicates that the rainfall departure, as in 2011is positive i.e. 59%, showing rainfall excess.

Sl No	YEAR	ANNUAL	SWM	NEM	WINTER	SUMMER	SWM(%)	NEM(%)	WINTER(%)	SUMMER(%)	DEP FROM LPA(%)
1	1999	672.0	259.0	307.0	1.0	105.0	38.54%	45.68%	0.15%	15.63%	-24%
2	2000	888.0	447.0	288.0	51.0	102.0	50.34%	32.43%	5.74%	11.49%	0%
3	2001	1014.7	400.0	484.7	5.0	125.0	39.42%	47.77%	0.49%	12.32%	14%
4	2002	657.2	301.1	275.1	17.0	64.0	45.82%	41.86%	2.59%	9.74%	-26%
5	2003	775.5	540.1	191.0	0.0	44.4	69.65%	24.63%	0.00%	5.73%	-13%
6	2004	810.2	352.8	230.3	6.3	220.8	43.54%	28.43%	0.78%	27.25%	-9%
7	2005	1543.9	573.2	792.4	27.1	151.2	37.13%	51.32%	1.76%	9.79%	74%
8	2006	844.6	378.7	315.2	1.5	149.2	44.84%	37.32%	0.18%	17.67%	-5%
9	2007	1092.2	559.1	437.3	2.9	92.9	51.19%	40.04%	0.27%	8.51%	23%
10	2008	953.3	366.5	434.2	19.3	133.3	38.45%	45.55%	2.02%	13.98%	7%
11	2009	754.4	398.1	294.8	1.3	60.2	52.77%	39.08%	0.17%	7.98%	-15%

12	2010	1079.5	530.1	421.6	2.1	125.7	49.11%	39.06%	0.19%	11.64%	22%
13	2011	978.1	507.1	354.4	23.1	93.5	51.85%	36.23%	2.36%	9.56%	10%
		888.0	416.5	362.2	15.1	94.3	46.90%	40.78%	1.70%	10.61%	

Fig- 3 Cumulative departure of annual rainfall from LPA

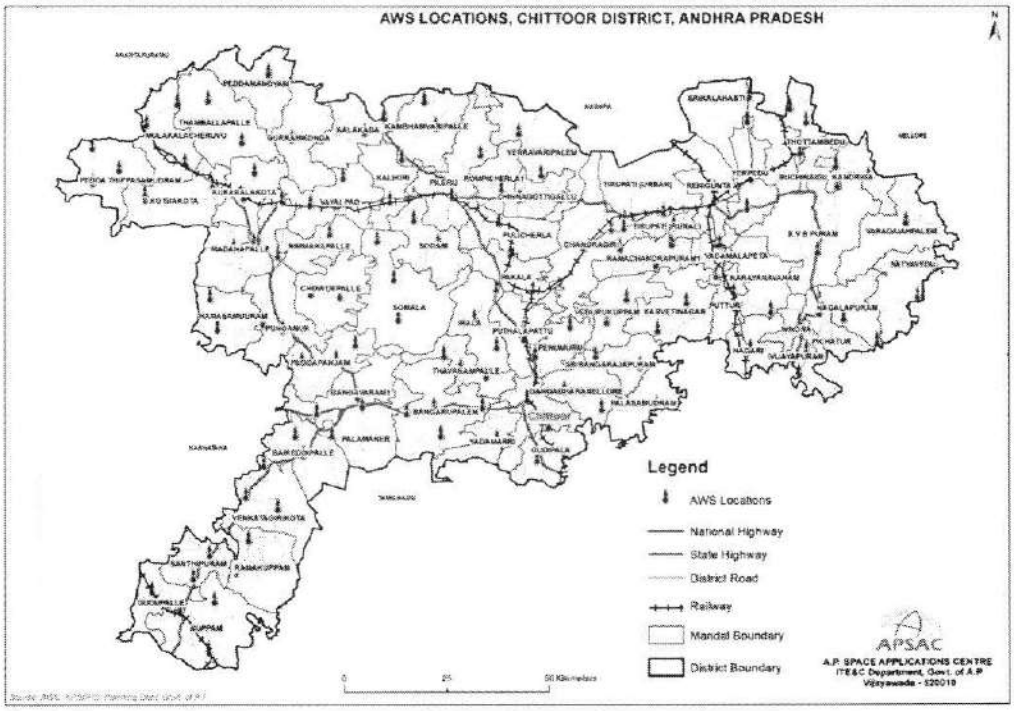


Source: Meteorological Department And Directorate of Economics And Statistics

Table:2 Mandal Wise Average Annual Rainfall (Mm)														
S No	Mandal Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	B Kothakota	0.19	8.35	11.99	20.73	66.62	71.09	83.88	105.27	158.27	152.70	80.61	33.63	793.33
2	Baireedipalle	2.55	6.27	14.69	32.14	79.78	84.50	99.91	106.49	158.60	138.66	101.45	37.91	862.94
3	Bangarupalem	3.58	7.03	14.01	22.84	63.79	65.18	92.78	118.17	151.71	159.03	128.98	48.52	875.63
4	B N Kandriga	17.04	8.60	8.48	15.23	47.41	64.55	106.23	97.04	108.67	243.53	332.46	150.89	1200.13
5	Chandragiri	6.77	7.55	8.68	19.88	66.47	69.92	113.07	128.47	123.70	163.85	164.17	77.65	950.18
6	Chinnagittigallu	1.54	3.06	8.54	21.68	56.20	73.37	92.64	126.76	120.06	120.76	109.99	46.39	780.99
7	Chittoor	4.01	6.28	14.69	38.55	74.56	86.70	131.39	152.77	163.75	166.58	154.06	57.90	1051.24
8	Chowdepalle	0.98	4.17	12.40	16.66	58.94	77.55	92.90	94.27	120.43	132.72	86.83	32.06	729.91
9	Gangavaram	1.88	7.28	16.07	42.82	116.33	129.80	147.14	165.67	213.68	219.99	158.72	54.92	1274.30
10	Gangadharanellore	1.67	6.69	11.83	31.33	74.72	78.76	102.01	126.24	154.28	150.14	135.38	50.32	923.37
11	Gudipalle	1.74	4.96	12.33	33.04	100.50	88.71	76.69	96.73	157.73	159.47	74.73	23.75	830.38
12	Gudipala	2.07	6.93	9.18	30.08	68.44	87.21	96.67	131.08	156.68	148.10	148.90	64.08	949.40
13	Gurramkonda	6.86	5.78	13.12	22.35	56.55	83.78	86.27	118.37	140.18	131.60	97.70	30.45	792.99
14	Irala	2.21	6.54	11.86	24.28	65.82	67.71	95.39	128.77	134.47	164.29	124.63	47.66	873.62
15	Kalakada	0.74	6.58	9.86	16.26	38.89	53.58	95.00	99.22	109.22	113.08	99.14	25.77	667.36
16	Kalikiri	0.29	5.87	4.75	15.19	53.31	79.38	73.37	106.26	132.65	128.17	99.31	42.93	741.46
17	Karvetinagar	4.79	9.24	9.20	28.16	64.91	74.90	120.97	122.71	145.12	171.43	187.51	82.61	1021.54
18	Ramachamdrpuram	4.24	10.97	10.40	26.11	56.43	77.74	90.20	97.05	140.46	185.24	158.04	89.83	946.71
19	Kuppam	1.21	5.22	16.29	32.05	109.23	77.97	69.74	102.80	164.40	144.21	77.89	28.98	829.99
20	Kurabalakota	4.59	3.69	10.88	26.52	56.91	74.08	85.14	99.12	142.30	151.09	94.85	27.98	777.14
21	Kvb Puram	7.68	6.91	9.74	12.10	46.18	63.78	96.49	115.50	92.21	181.07	276.30	122.89	1030.85
22	Kambhamvaripalle	0.00	5.90	9.18	15.99	43.81	64.03	75.10	86.04	108.62	137.13	97.81	37.61	681.22
23	Madanapalle	5.03	8.17	11.02	25.41	69.52	70.60	79.64	101.69	139.92	158.97	103.62	37.67	811.28

24	Mulakalacheruvu	6.02	4.85	10.66	19.62	46.54	50.94	65.68	71.45	123.46	133.03	71.87	23.68	627.79
25	Nagalapuram	7.35	9.21	8.09	23.84	62.51	64.24	102.60	148.07	137.85	200.33	233.13	101.60	1098.82
26	Nagari	2.65	12.82	13.23	28.15	58.84	94.13	127.65	151.61	153.20	173.40	200.89	84.64	1101.21
27	Narayanavanam	4.11	6.92	9.97	26.15	59.97	77.54	127.47	150.61	160.10	196.42	186.76	86.77	1092.80
28	Nimmanapalle	3.93	5.30	9.70	12.88	76.17	68.21	88.02	96.61	111.98	150.51	111.21	37.81	772.34
29	Nindra	7.51	6.72	10.16	22.79	60.70	72.92	115.45	129.03	142.79	182.71	213.16	92.38	1056.30
30	Pakala	5.27	9.52	10.80	29.87	53.46	69.15	117.37	141.07	152.28	143.87	148.02	44.01	924.68
31	Palamaner	2.18	6.74	10.79	24.95	86.18	81.23	94.53	99.76	152.07	162.37	119.62	39.97	880.40
32	Palasamudram	2.68	4.77	8.64	26.68	72.40	91.99	125.24	132.91	158.86	161.67	172.56	66.99	1025.38
33	Peddamanyam	8.29	2.87	8.98	29.20	36.45	63.43	72.46	94.45	99.73	130.30	77.25	29.46	652.89
34	Peddatippasamudram	4.16	4.31	14.21	14.82	56.69	59.79	66.05	74.59	131.42	126.69	76.18	24.49	653.39
35	Peddapanjani	1.82	8.78	9.52	23.68	56.86	76.29	77.99	88.82	127.34	134.32	90.75	32.11	728.27
36	Penumur	3.77	8.67	8.49	29.51	54.86	60.27	104.00	119.65	126.87	150.19	128.63	51.34	846.25
37	Pichatur	5.56	11.55	8.11	22.09	59.77	69.44	116.83	155.98	138.97	200.04	226.52	102.64	1117.51
38	Pileru	2.28	7.65	6.70	17.77	42.51	65.60	86.78	102.14	117.40	133.64	98.59	39.78	720.83
39	Puthalapattu	5.58	9.10	9.50	28.39	52.94	73.88	117.74	131.45	148.88	146.88	122.19	45.89	892.44
40	Pulicherla	4.50	4.97	11.85	31.14	51.37	77.89	110.47	128.16	129.17	132.90	122.45	57.50	862.36
41	Puttur	6.92	9.77	8.60	23.24	58.18	82.14	132.26	151.30	148.18	197.79	214.51	90.11	1123.00
42	Punganur	2.54	5.13	13.42	22.54	71.70	76.96	75.85	87.68	145.96	137.37	96.89	31.97	768.00
43	Ramakuppam	1.20	4.70	11.44	31.07	70.40	76.55	81.55	95.88	146.87	144.25	94.23	31.94	790.08
44	Ramasamudram	2.39	4.11	10.79	28.79	57.11	63.93	72.05	92.67	142.83	136.60	80.18	27.12	718.56
45	Renigunta	12.40	5.66	12.06	17.44	55.92	76.50	121.29	150.68	135.71	181.90	227.53	114.34	1111.43
46	Rompicherla	1.93	2.29	7.44	22.10	52.40	81.79	101.93	134.99	124.73	131.06	111.63	50.28	822.55
47	Satyavedu	10.30	19.77	7.82	28.11	48.81	63.78	112.78	136.25	145.20	248.23	306.81	156.35	1284.21
48	Santhipuram	1.17	4.45	14.63	33.22	83.40	75.36	67.98	103.74	159.55	145.66	77.48	26.76	793.41
49	Sodam	1.86	5.75	9.43	20.36	48.28	69.02	94.53	103.79	124.92	143.31	124.49	42.61	788.33
50	Somala	2.16	7.79	17.02	20.81	63.66	80.67	105.03	112.66	141.42	154.18	124.87	49.79	880.05

51	Sri Kalahasti	17.76	13.40	7.49	7.10	46.28	66.11	109.70	120.45	109.34	248.10	327.27	142.26	1215.27
52	Srirangarajapuram	1.18	11.67	8.16	22.57	42.81	67.60	99.33	108.91	129.87	161.18	151.75	68.80	873.81
53	Tavanampalle	2.46	7.44	11.76	25.28	65.59	69.62	103.46	118.06	152.32	151.68	125.42	52.56	885.64
54	Thamballapalle	2.83	2.85	8.04	21.36	50.07	65.70	89.17	108.88	144.03	133.22	78.86	23.59	728.60
55	Thottambedu	13.20	7.24	7.59	11.49	45.80	75.40	123.41	125.83	114.29	252.33	328.14	149.88	1254.60
56	Tirupati Urban	5.34	6.24	8.37	19.99	56.26	64.60	101.06	125.34	132.48	196.29	203.64	86.56	1006.17
57	Tirupati_Rural	3.20	2.64	12.41	26.58	54.46	73.49	89.99	110.57	139.48	169.33	207.41	91.98	981.51
58	Vadmalapeta	10.11	14.06	11.97	21.62	54.89	74.52	107.57	151.83	141.32	221.73	261.80	120.44	1191.86
59	Varadaiahpalem	15.97	31.21	7.59	16.81	35.17	64.97	96.78	105.08	128.13	229.95	310.54	163.41	1205.59
60	Vayalpad	6.05	11.76	10.46	20.90	60.23	68.24	85.79	98.70	122.24	133.72	95.85	39.41	753.34
61	Vedurukuppam	4.63	6.72	11.10	28.46	53.46	87.49	106.68	119.11	142.00	153.46	166.78	65.38	945.27
62	Venkatgiri Kota	1.34	6.82	14.91	41.67	92.30	85.03	100.67	105.93	155.85	158.86	96.75	39.21	899.33
63	Vijaya Puram	4.47	8.26	6.17	18.47	55.01	64.30	102.97	133.25	138.23	164.69	201.36	97.72	994.90
64	Yedamari	3.26	5.94	12.06	21.64	60.47	61.93	82.59	101.71	140.88	119.88	113.84	50.51	774.70
65	Yerpedu	2.91	9.54	16.00	24.89	55.12	74.10	99.13	135.61	137.50	195.51	198.81	94.57	1043.69
66	Yerravari Palem	0.60	2.56	9.39	21.96	56.76	77.84	86.02	115.32	119.11	133.51	112.54	48.02	783.63
Total		**4.51**	**7.49**	**10.68**	**23.93**	**60.88**	**73.78**	**98.01**	**116.62**	**138.06**	**162.50**	**150.49**	**63.17**	**910.11**



ation of AWS in

Chittoor District, A.P

Source:AWS- APSDPS,Planning Department Govt.of A.P

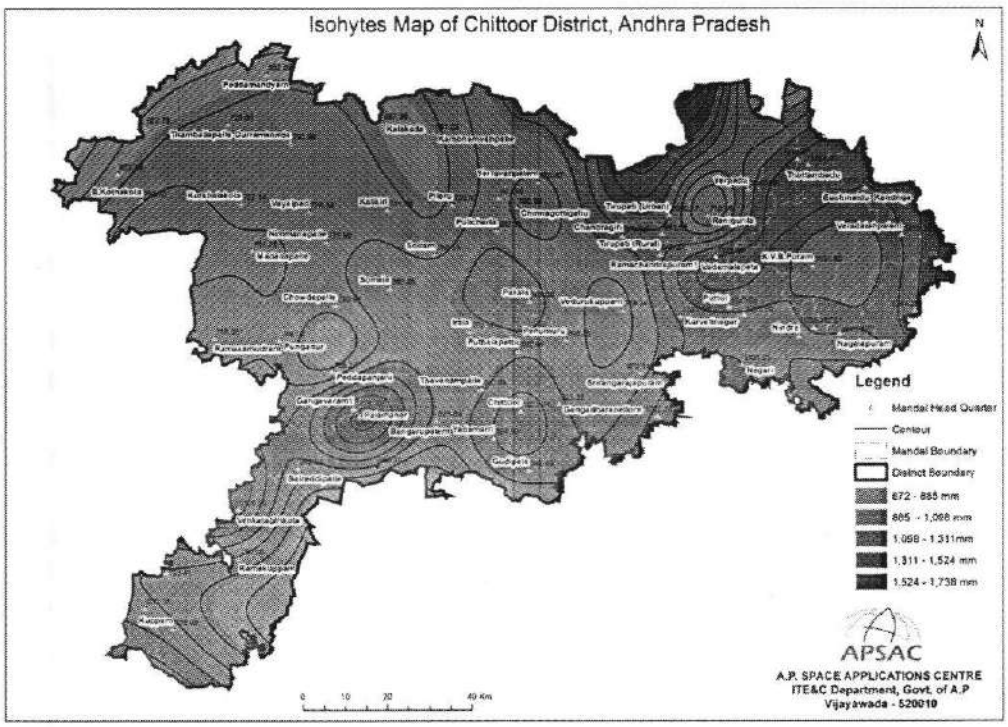


Fig.5.Rainfall distribution Chittoor District, A.P

1.4.Trasport &communication network of chittoor district.

Chittoor district is the Southren most district with a total area of 15152 Sq.km. The district is well connected with surrounding States such as Tamilnadu & Karnataka with Rail, Road net works. The Transport & communication network in the district is as fallows.

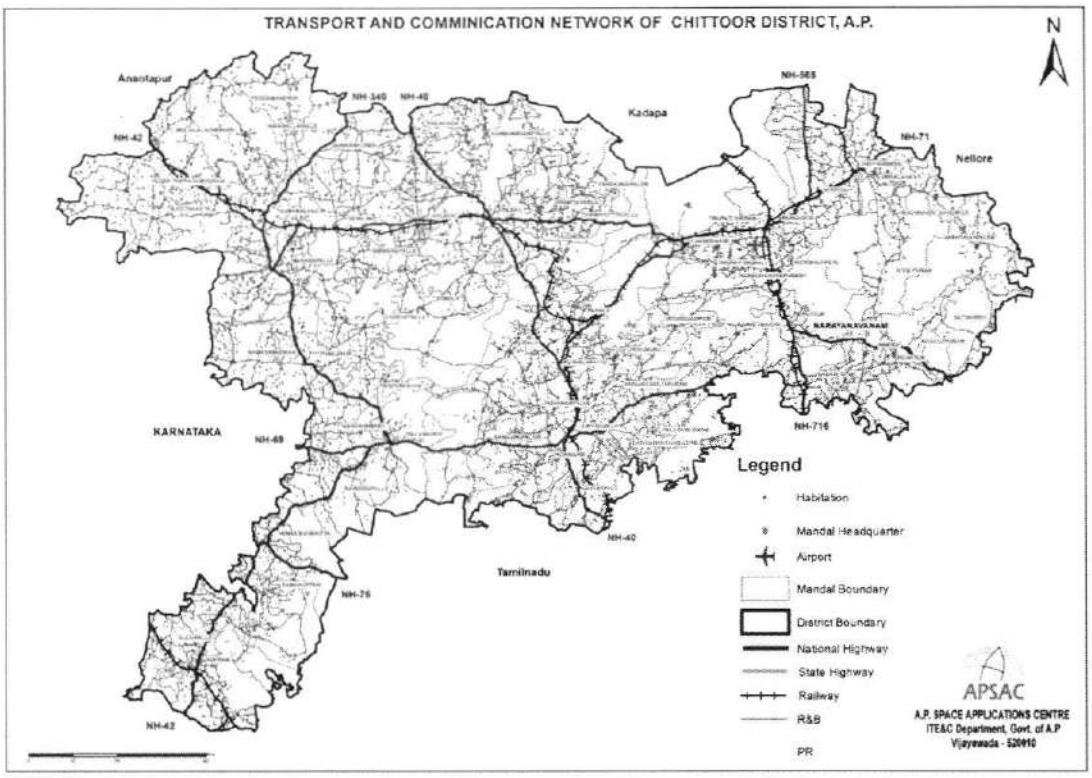


Fig.6.Transport Network of Chittoor District,A.P

Rail Network : Broad Gauge double line network Connecting Mumbai- Chennai passes through the Eastren part of the district connceting Renigunta Junction to Arakonam junction from north to south.A Broad gauge single line connecting Chenni – Howrah line from Gudur junction connecting Srikalahasthi-Renigunta-Tirupathi-Pakala-Chittoor-Katpadi Junction passes through from East to South.One more Broad gauge Single line connecting Pakala-Madanapalli Road-Dhrmavaram Junction passes through the district from East - West.

Road Network: The following National Highways pass through district from North-South & East - West .They are as fallows, NH-40-Connecting Chennai-Chittoor-Hyderabad-Nagpur from South to North.NH-69-Connecting Gudur-Tirupathi-Chittoor-Palamaneru-Mulabagala-Bengaluru, NH-71-Connecting Naidupet-Tirupathi-Vayalpadu-Madanapalle-Kadiri, NH-716-Connecting- Renigunta-Nagari-Chennai and NH42-Connecting-Kadiri- Angallu-Madanapally-Palamaneru-Kuppam-Krishnagiri. In addition to this, R&B&Grampachayat roads connect all 66 Mandal headquarters with road transport.

Air-Connectivity :A National Level/(check) Domestic AIRPORT is Situated at Renigunta which is 10 km from Tirupati which is well connected with Delhi-Chennai,Bangaluru-Tirupati,Vizag-Tirupaty,Hyderabad-Tirupaty,Mumbai-TIRUPATY,Kolkata-Tirupaty air routes,

1.5.Population and literacy

Table:3 Population Statistics Summary, 2001 & 2011 Census

SL NO	ITEM	UNIT	2001	2011	DECENNIAL GROWTH RATE (2001-2011)
1	2	3	4	5	6
1	Population	LAKHS	37.46	41.74	11.43
2	Males	LAKHS	18.9	20.9	10.58
3	Females	LAKHS	18.56	20.84	12.28
4	Geographical Area	000 S.KM	15.15	15.15	0.00
5	Density Of Population	Sqr.KMs	247	275	
6	Females For Thousand Males	No	982	997	
7	Rural Population	LAKHS	29.35	29.43	0.27
8	Urban Population	LAKHS	8.11	12.31	51.79
9	Urban Population As Percentage To Total Population	%	21.65	29.49	
10	Literates	LAKHS	21.77	26.68	22.55
	A. Males	LAKHS	12.74	14.85	16.56
	B. Females	LAKHS	9.03	11.83	31.01
11	Literacy Rate	%	66.77	71.53	
12	Main Workers	LAKHS	14.63	16.7	14.15
13	Marginal Workers	LAKHS	2.9	2.64	-8.97
14	Non – Workers	LAKHS	19.93	22.41	12.44
15	Cultivators (Main)	LAKHS	4.88	4.05	-17.01
16	Agricultural Labour	LAKHS	4.47	6.05	35.35

	(Main)				
17	Scheduled Caste Population	LAKHS	7.02	7.86	11.97
	Scheduled Caste				
18	Population As Percentage	%	18.74	18.83	
	To Total Population				
19	Scheduled Tribe Population	LAKHS	1.28	1.59	24.22
	Scheduled Tribe				
20	Population As Percentage	%	3.42	3.81	
	To Total Population				

Table:3. **Population Statistics Summary, 2001 & 2011 Census**

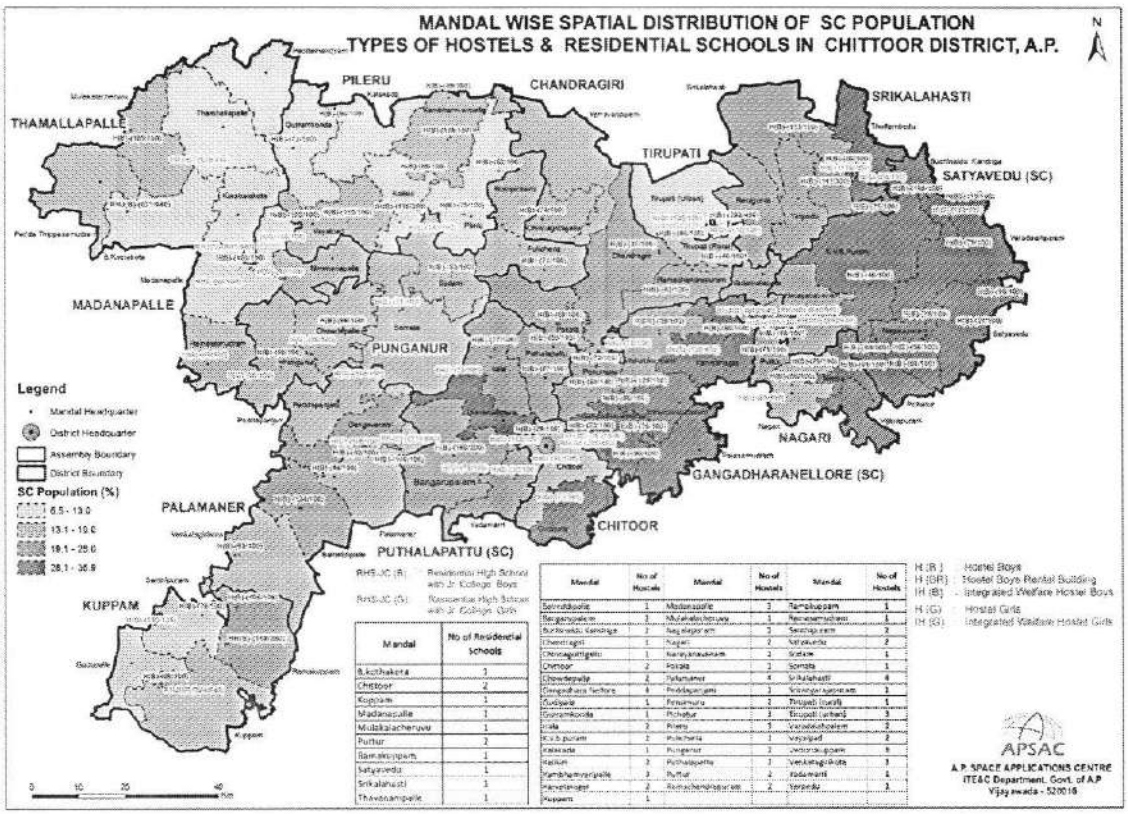


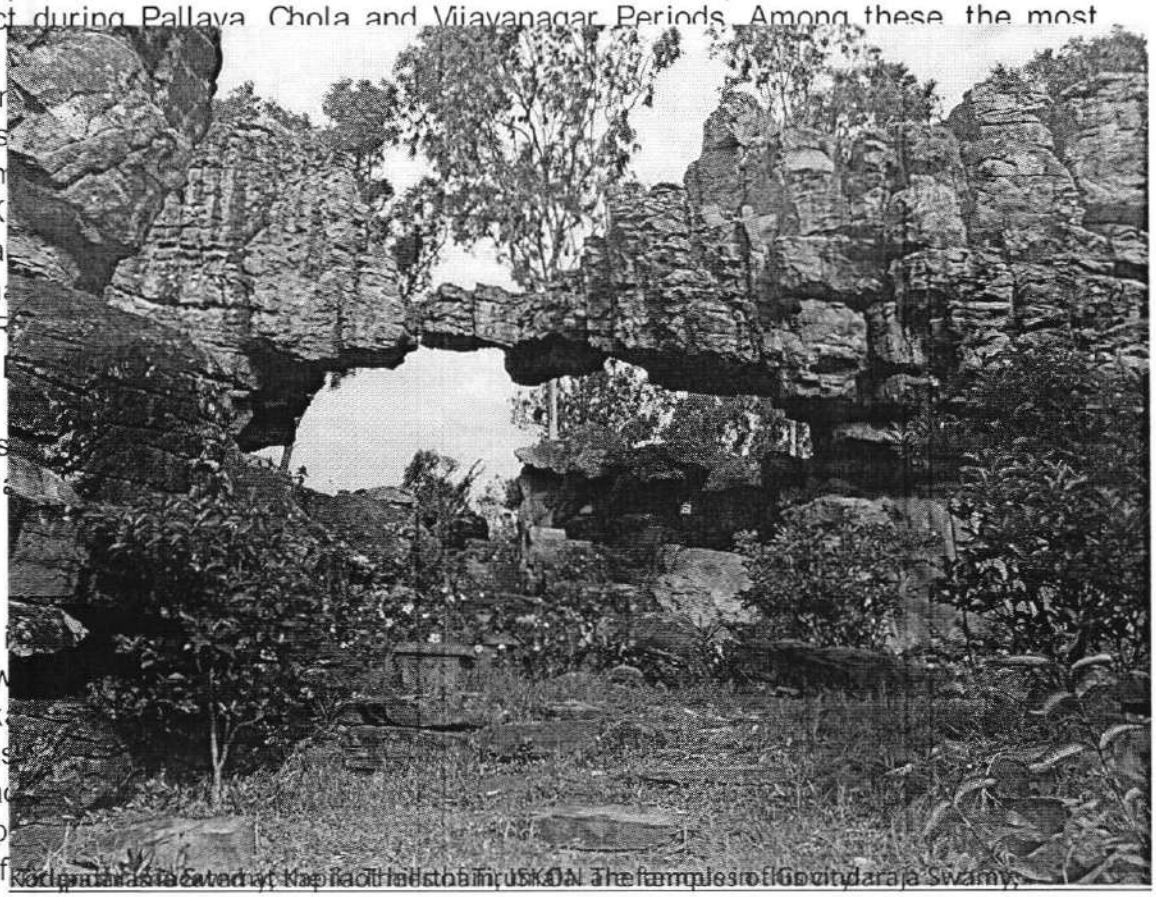
Fig.7.Mandal wise Distribution of schedule caste Population and types of Hostels and residential schools in Chittoor District,Andhra Pradeh

1.6. Important places of Tourism

Historical Temples / Pilgrimage Centres:

Pre-historic sites, Megoliths, ancient cities, Forts and Temples placed the Chittoor Distirct at high place in Indian History. A Large number of Temples were constructed in the district during Pallava, Chola and Vijayanagar Periods. Among these, the most important
Ramaswar
Srikalahas
Parasuran
Temple□K
– Laddiga
Gangamm
Kodanda R
Temples–

The hero s
Andhra Pr



Tirumala:

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Kodandaramaswamy Temple, Tirupati. The temples of Govindaraja Swamy

Fig .8. Natural Rock arch at Thirumala,Chittoor District, Andhra pradesh

Tirupathi: Tirupathi is located at the foot hills of Tirumala. The temples of Govindaraja Swamy, Kodandarama Swamy, Kapila Theertham, ISKON are famous in this city

Tiruchanur :

Tiruchanur also known as Alamelu Mangapuram is home to the temple of Sri Alimelu (Padmavathi), consort of Sri Venkateswara.

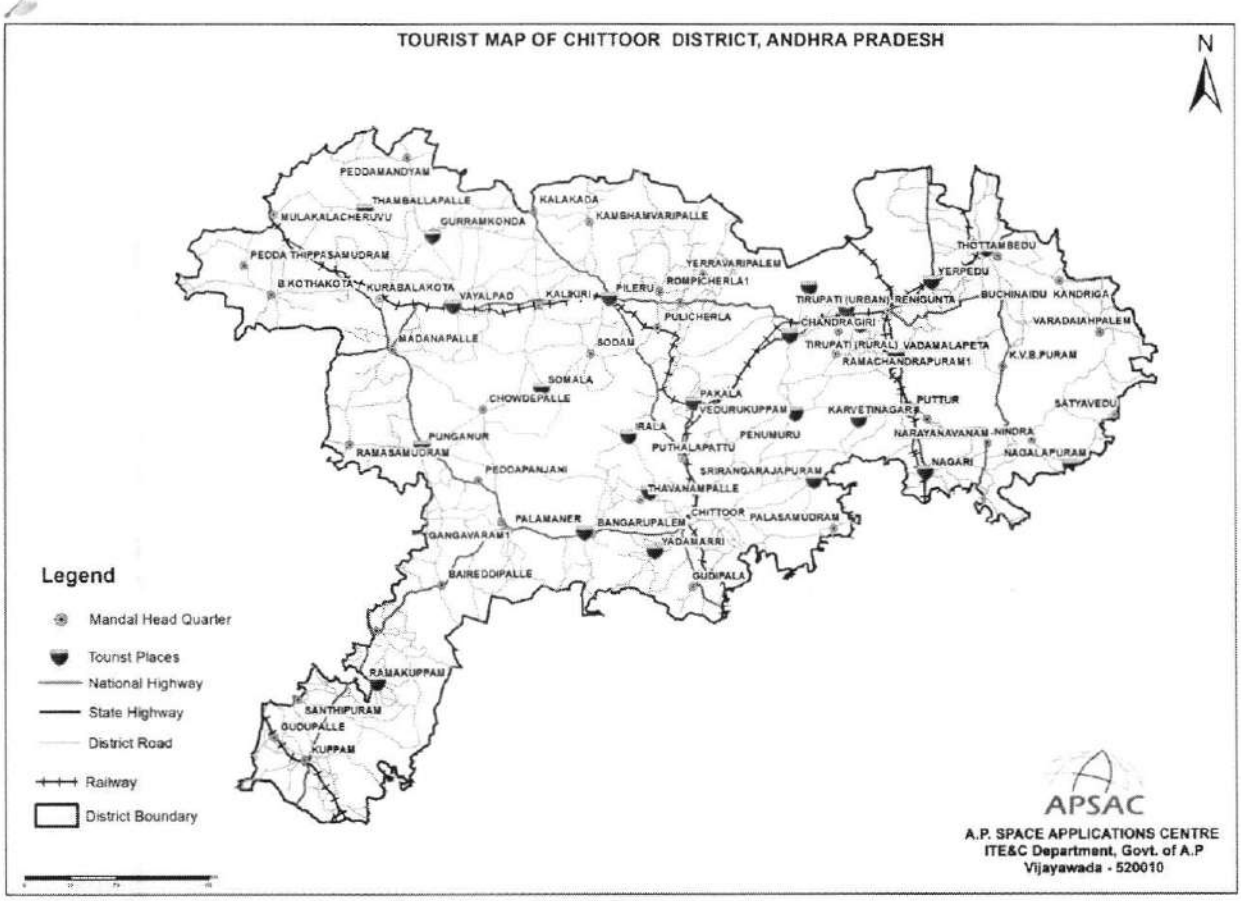


Fig.9 . Some important tourist Places in Chittoor District,A.P

Srikalahasthi :

Srikalahasthi is located on the banks of river Swarnamukhi. It is one of the important Saiva Kshetras of South India. The name of the place Srikalahasthi comes from three animals/creatures Sri (Spider), Kala (Snake) and Hasthi (Elephant) who worshipped shiva and gained salvation here.

Kanipakam :

Kanipakam is situated at a distance of 15 Kms. away from Chittoor. There are three temples in this village. Of these three, Varasiddhi Vinayakaswamy Temple is attracting the people of different regions. The image of Asina (sitting) ganapathi in the Garbhagriha is of peculiar disposition.

Gudimallam :

Gudimallam is seven miles away from Renigunta. Historically, this village is very important because it has a beautiful siva (Parasurameswara) Temple. The Linga in the temple is supposed to be the earliest Linga (3rd or 2nd Century B.C.) discovered so far in India.

Nagalapuram:

Vijayanagara King Srikrishna Devaraya constructed the Vedanarayana Temple at Nagalapuram. The sun rays enter the Garbhagriha on 25th, 26th, 27th of March of every year.

Boyakonda :

Gangamma Temple was constructed at Boyakonda which is in the midst of Madanapalle, Punganur and Chowdepalle mandals. The people from Tamilnadu, Karnataka and Andhra Pradesh visit the temple in large numbers.

Thirthas & Waterfalls :

There are many Thirthas at the sacred place of Tirumala. Among these, the most important are Gogarbham, Akasa Ganga, Papavinasanam, Jabali, Vaikuntam, Chakra, Ramakrishna, Kumaradhara, Thumbura Theertham, Sri Narasimha Pushkarini etc.

The most attractive water falls in the district are Talakona, Sadasivakona, Kailasakona, Nagari water, Veyilingala Kona, Saddhi Madugu, Kaigal, Zurikona, Siddalaya Kandriga, Kalyani River, ngamma(check) Sirassu etc.,

Kailasa Kona:

Kailasa Kona Water fall is situated near Puttur and 8 Kms. from Narayanavanam.

The water fall is attracting not only the people of nearby districts but also from Tamilnadu.

Talakona :

Talakona waterfall is situated near Bakarapeta in Nallamala Hill Range and 40 Km. away from Tirupathi. The height of the water fall here is 270 feet. The forest department is developing the site. Eswara Temple is situated near the water falls.

Kaigal Water falls:

Kaigal Waterfalls are located 6 Kms. away from Baireddipalle. Thousands of tourists from Tamilnadu, Karnataka and Andhra Pradesh visit this place.

Tourist Centres :

The important tourist centres in the district are Tirupathi,Tirumala, Kailasakona, Nagari Nore, Talakona, Kapila Theertham, Kaigal, Horsely Hills, Gurramkonda, Arthagiri, Kanipakam, Rushi Valley, Puligundram, Koundinya, Elephant Project etc. Horsely Hills is known as the "Andhra Ooty" and Palamaner is regard as "Poor man's Ooty".

Chandragiri :

This important and historic place was founded, according to tradition, by a Yadava King named Immadi Narasimha in A.D. 1000, but epigraphical finds in it belong only to the later periods. During the Vijayanagara period, it is the capital of Aravidu rulers

for some time. The most important monuments in the fort at present are Raja Mahal and Rani Mahal.

Horsely Hills :

Horsely Hills is located at a distance of 20 Kms. from Madanapalle. Originally known as "Enugu Mallamma Kondalu", Horsely Hills is a summer resort. It is known to some as the Andhra Ooty. The hills are 4326 feet above the sea level. During the time of British, Horsely, District Collector, Kadapa visited the hill and selected the site for summer residence.

Arogyavaram :

Arogyavaram near Madanapalle is famous for T.B. Centre. This centre was founded by Christian Missionaries. Many patients of the country visit this place for treatment.

Ashramams & Mattas :

The important spiritual centres of the district are Vyasasramam, Suka Bramhasramam, Kalki, Sivagiri, Ramakkamma, Ramakrishna, Hathiramji Mutt, Ramakrishna Mutt, Sankarayacharya, Brahmin Mutt and Iscon Temple

2. Land Utilisation of Chittoor District

2.1.a.Land Use / Land Cover: The comparative area distribution of different land use categories and change are shown in the figure 17 & Table- 31. The major land use / land cover categories (2015 - 16) that have been identified in the district are Built-Up land (416.05Sq.Km), Agricultural land (7810.94Sq.Km), Forest (4259.90Sq.Km), Wastelands (1943.84Sq.Km) and Water Bodies (719.97Sq.Km).

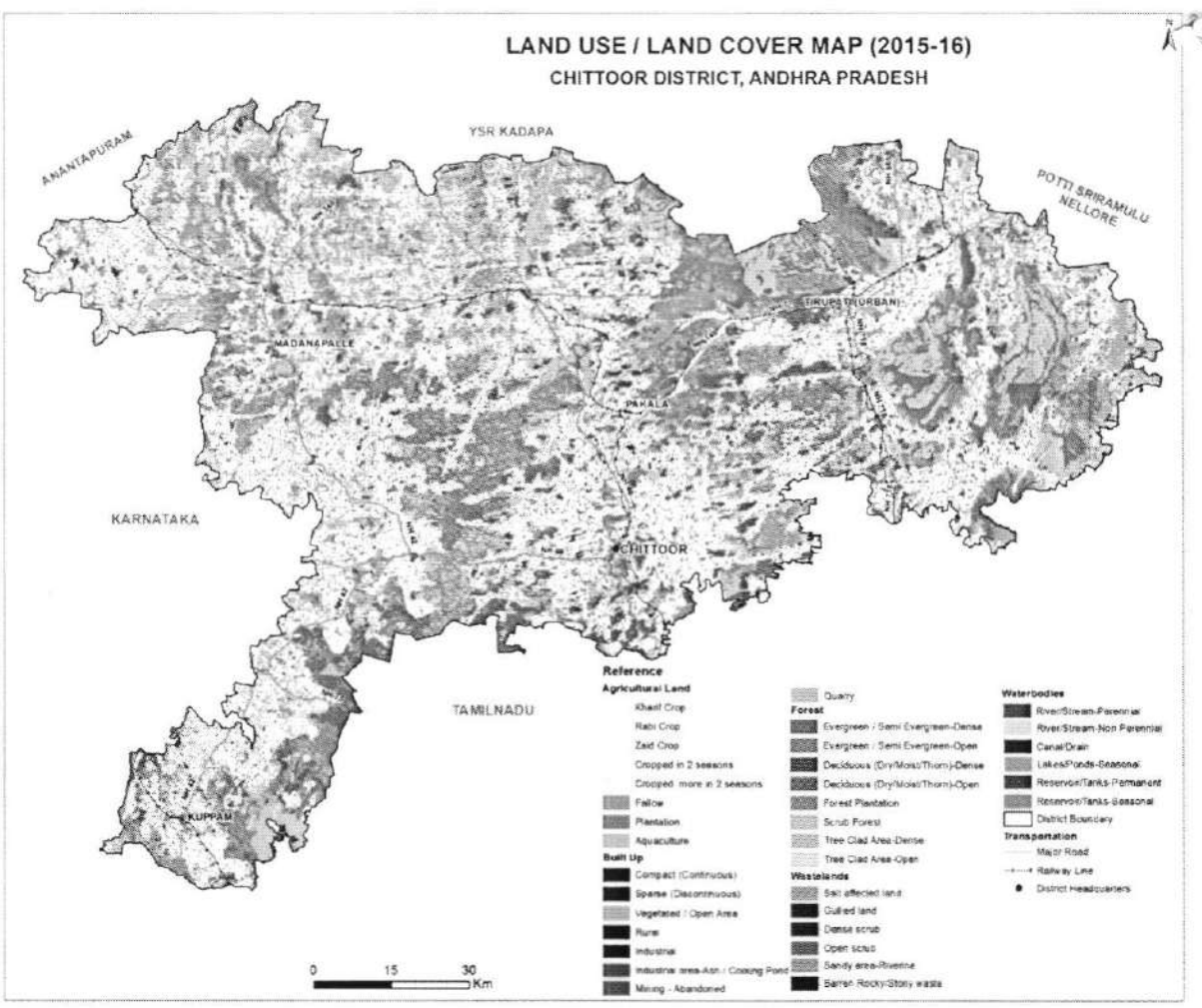


Fig.9. land use / land cover map of Chittoor District 2015- 2016

Table 4. Actual area (Sq. Km) and percent of total area under different land use categories in Chittoor District for 2011- 2012 and 2015- 2016 (in Level- III classification).

S. No	Land Use Categories	Year 2011-12		Year 2015-16		(+/-)Change from 2011-12 to 2015-16	
		Area	%	Area	%	Area	% Increase / Decrease
1	Compact (Continuous)	56.74	0.37	56.85	0.38	0.11	0.00
2	Sparse (Discontinuous)	38.39	0.25	39.30	0.26	0.92	0.01

3	Vegetated / Open Area	1.65	0.01	4.00	0.03	2.35	0.02
4	Rural	171.53	1.13	172.93	1.14	1.40	0.01
5	Industrial	13.34	0.09	30.16	0.20	16.82	0.11
6	Industrial area-Ash / Cooling Pond	0.48	0.00	0.48	0.00	0.00	0.00
7	Mining - Abandoned	0.00	0.00	0.27	0.00	0.27	0.00
8	Quarry	88.86	0.59	112.05	0.74	23.19	0.15
Built Up		**370.99**	**2.45**	**416.05**	**2.75**	**45.06**	**0.30**
9	Kharif Crop	2629.34	17.35	1747.16	11.53	-882.18	-5.82
10	Rabi Crop	247.54	1.63	432.96	2.86	185.42	1.22
11	Zaid Crop	30.65	0.20	21.95	0.14	-8.70	-0.06
12	Cropped in 2 seasons	3143.63	20.75	3970.00	26.20	826.37	5.45
13	Cropped more in 2 seasons	43.77	0.29	28.03	0.18	-15.74	-0.10
14	Fallow	1485.63	9.81	1446.15	9.54	-39.49	-0.26
15	Plantation	211.51	1.40	164.68	1.09	-46.83	-0.31
16	Aquaculture	0.01	0.00	0.01	0.00	0.00	0.00
Agricultural Land		**7792.10**	**51.43**	**7810.94**	**51.55**	**18.84**	**0.12**
17	Evergreen / Semi Evergreen-Dense	0.23	0.00	0.23	0.00	0.00	0.00
18	Deciduous (Dry/Moist/Thorn)-Dense	1416.23	9.35	1416.20	9.35	-0.03	0.00
19	Deciduous (Dry/Moist/Thorn)-Open	1390.92	9.18	1386.89	9.15	-4.03	-0.03
20	Forest Plantation	55.68	0.37	58.73	0.39	3.05	0.02
21	Scrub Forest	1324.83	8.74	1320.88	8.72	-3.94	-0.03
22	Tree Clad Area-Dense	62.14	0.41	61.99	0.41	-0.15	0.00
23	Tree Clad Area-Open	14.98	0.10	14.98	0.10	0.00	0.00
Forest		**4265.00**	**28.15**	**4259.90**	**28.12**	**-5.10**	**-0.03**
24	Salt affected land	89.38	0.59	77.36	0.51	-12.02	-0.08
25	Gullied land	24.07	0.16	23.32	0.15	-0.75	0.00
26	Dense scrub	876.61	5.79	855.02	5.64	-21.59	-0.14
27	Open scrub	767.91	5.07	743.67	4.91	-24.24	-0.16
28	Riverine	0.23	0.00	0.23	0.00	0.00	0.00

29	Barren Rocky/Stony waste	250.39	1.65	244.24	1.61	-6.15	-0.04
Wastelands		**2008.58**	**13.26**	**1943.84**	**12.83**	**-64.74**	**-0.43**
30	River/Stream-Perennial	7.08	0.05	7.08	0.05	0.00	0.00
31	River/Stream-Non Perennial	104.36	0.69	104.27	0.69	-0.09	0.00
32	Canal/Drain	34.26	0.23	36.18	0.24	1.92	0.01
33	Lakes/Ponds-Seasonal	0.00	0.00	0.04	0.00	0.04	0.00
34	Reservoir/Tanks-Permanent	63.44	0.42	101.59	0.67	38.15	0.25
35	Reservoir/Tanks-Seasonal	505.57	3.34	470.81	3.11	-34.76	-0.23
Waterbodies		**714.71**	**4.72**	**719.97**	**4.75**	**5.26**	**0.03**
Total		**15151.18**	**100.00**	**15151.18**	**100.00**	**0.00**	**0.00**

2.1.b.Analysis

From the analysis, it is observed that there is a Major change in Built up, Agriculture,Wasteland and Forest areas. Built - Up Land increased from 370.99Sq.Km in the year 2011 to 416.05Sq.Km in 2015. With the growth of settlements, non-agricultural activities and Industrial area has also increased (45.06Sq.Km). Agricultural land got converted to built-up land (23.86Sq.Km). In the agricultural category, the kharif crop decreased from (2629.34Sq.Km) in the year in 2011 to (1747.16Sq.Km) in 2015. kharif crop converted roppedin 2 seasons area(942.53Sq.Km),rabicrop(81.29Sq.Km),canal(1.36Sq.Km),fallow (285.54Sq.Km),built up area(9.66Sq.Km).cropped in 2 seasons converted to built up (5.61Sq.Km), kharif(92.99Sq.Km), rabi(120.33Sq.Km),Fallow(45.70Sq.Km).fallow converted to Kharif(305.47Sq.Km) , cropped in 2 seasons (54.06Sq.Km), rabi crop (30.76Sq.Km).Plantation converted to cropped in 2 seasons (26.19Sq.Km), fallow (20.852q.Km). Forest area converted into agriculture land(4.55Sq.Km). Wastelands converted to built up land (20.12Sq.Km). More changes Occurred in Agricultue land(43.56Sq.Km) Major in Kharif(9.92Sq.Km) and rabi crop(25.28Sq.Km). Minor changes were observed in Water bodies and remaining classes. The matrix table shows the accurate change statistics for LULC analysis (Table 32)

Built-Up

These are the areas of human habitation that have a cover of buildings, transport and communication, utilities in association with water, vegetation and vacant lands. It consists of built-up (Compact & Sparse), Vegetated / Open Area, Rural, Industrial and Mining/Quarry. It occupies an area of 416.05 sq. km, which is about 2.75% of the total geographical area of the district. Of which, rural area contributes 3.65%which is more than 50%of the built-up category.

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 when the urban structures and transport network (i.e. impermeable surfaces) occupies more than 80 % of the surface area. This category occupied 56.85 sq. km, which are found in urban areas.

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 30 and 80 %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 39.30 sq. km, which are found in peri- urban areas.

Vegetated / Open Area

These are vegetated areas within urban agglomeration (situated within or in contact with urban areas). Vegetation cover of trees, shrubs, and herbs covers at least 5%of the total surface area which has been delineated. Parks, sport and leisure facilities, camping grounds, sports grounds, leisure parks, golf courses, race courses, including formal parks, etc are considered in this category. This category occupies an area of 4.0 sq. km.

Built- Up – Rural

These are the lands used for the human settlement of size comparatively less than the urban settlements of which more than 80% of the people are involved in the primary activity of agriculture and associated with non-commercial and with allied classes are identified as built up (rural) category. The rural area contributed is about 172.96 sq. km.

Industrial

Non-linear impervious surfaces are included in this class which is related to trade, manufacturing, distribution and commerce. These are areas where the human activity is observed in the form of manufacturing along with other supporting establishments for maintenance. The industrial area occupies an area of 28.63 sq. km, which is observed in and around towns.

Industrial area- Ash / Cooling Pond

These are the portions of 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, categorized as other waste which is delineated under this category. A stockpile of storage dump of industrial raw material or slag/effluents or waste material or quarried/mixed debris from earth's surface is considered under this category. It is observed that this category is found around the industrial areas with an area of 0.48 sq. Km

Mining – Abandoned

These are the areas where large-scale surface operations of removal of economically important ores are carried out in the past, but presently kept abandoned due to various reasons like economical, operational, viability, disturbances etc. Only 1.27 sq. km has been contributed under this category.

Quarry

These are manifestations of surface mining operations wherein small-scale excavation of land surface for sand, gravel, clay-phosphate mines, limestone quarries, etc. are taking place. They are mostly characterized by their nearness to urban areas. It contributes an area of about 112.85 sq.km.

Agricultural Land

The land use category primarily used for the production of food, fiber, and other commercial and horticultural crops. It includes land under crops namely cropland, fallow land, agricultural plantation and aquaculture. The agricultural category is found as the major category covering 7810.94 sq. km (51.75%) during 2015-16. It is also found that double-cropped area is about 32%of the district total.

Kharif Crop

Agricultural area cultivated between June/July to September/ October coinciding with SW monsoon season is considered Kharif crop. It is associated with rain-fed crops under dryland farming with limited or no irrigation and areas of rain-fed paddy and other dry crops. Kharif is found to be the second major agricultural category with an extension of 1747.16 sq. km (11.53%).

Rabi Crop

These areas are cultivated between November/December to February/March. It is associated with areas under assured irrigation irrespective of the source of irrigation. However, rabi cropped areas also occur in rain-fed regions, under residual soil moisture conditions especially in black soil areas with high rainfall during Kharif season. The extent of rabi cropped area is about 432.96 sq. km (2.86%).

Zaid Crop

These are the areas that are cropped during summer (April – May) which are mostly associated with irrigated areas with fertile soils, confined to plains/delta areas. The areas are found in 85.57 sq. km during 2015-16.

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 3970 sq. km (26.20%)

Cropped in more than two seasons

These are the areas which are cropped in more than two cropping seasons. It includes triple cropped areas (Kharif, Rabi and Zaid), areas under multiple cropping. Long duration crops like sugarcane, cotton, banana, pineapple etc., are considered under this category. It contributes an area of 28.03 sq. km (0.18%).

Fallow land

The agricultural land which is being used for cultivation but is temporarily allowed to rest or un-cropped for one or more seasons, but not less than a year and for not more than five years is referred to as fallow land. The fallow land occupies an area of 1446.15 sq. km.

Agricultural Plantation

These are the areas under agricultural tree crops planted adopting agricultural management techniques. These also include the areas of land use systems and practices wherein cultivation of herbs, shrubs, and vegetable crops are deliberately integrated with agricultural crops mostly in irrigated conditions for ecological and economic reasons. These areas are separable from cropland, especially with the data acquired during rabi/zaid season. Plantations appear in dark-red to red tone of different sizes with regular and sharp edges indicating the presence of a fence around it. With 164.68 sqkm under this category, it is found that 1.09% of the land is under plantation crops during 2015-16.

Forest

The term forest is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha. Forest is determined both by the presence of trees and the absence of other predominant land uses within the notified forest boundaries. The trees should be able to reach a minimum height of 5 m within the notified forest boundaries. The forest cover is occupied about 4259.90 sq. km (28.12%). ever green / semi ever green is 0.23 sqkm

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 1416.20 sq. km.

Deciduous (Dry/ Moist/ Thorn)- Open

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 forest areas where the canopy cover/density ranges between 10 and 40 percent. An area of 1386.89 sq. km is attributed to this category.

Forest Plantation

These are the areas of tree species of forestry importance, raised and managed especially in the notified forest areas. Most of these are located in uplands, coastal areas within notified areas. Many of these can be identified based on the sharp boundary exhibited by them. The distribution of forest plantation is 58.73 sq. km.

Scrub Forest

These are the forest areas which 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 size and shapes as manifested on the imagery are also included in this category. It is attributed

an area of 1320.88 sq. km .

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. bamboos 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% It occupied an area of 61.99 sq. km.

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 and being at least 3 m tall. Plants essentially herbaceous but with a woody appearance (e.g. bamboos 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 forest areas where the canopy cover/density ranges between 10 and 40 percent. It is attributed to an area of 14.98 sq. km.

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 1943.89 sq. km (12.88%).

Salt- affected land

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 they also become saline when soils have developed on salt containing parent materials or have saline ground water. These lands are accounted for 77.36sq. km only.

Gullied land

Gullies are formed as a result of localized surface run-off affecting the unconsolidated material resulting in the formation of perceptible channels causing undulating terrain. Gullies develop from rills which are tiny water channels with a few centimeters deep, formed as a resultant impact of heavy rainfall and wearing action of run-off generated there from. They are commonly found in sloping lands, developed as a result of concentrated run-off. Further classification of this category is possible based on the depth, width, bed slope, frequency and morphology of bed material of the ravines. They

appear in light yellow to bluish green in color depending on the surface moisture and depth of erosion. They vary in size, shape with irregular broken network pattern. These lands accounted to 23.32 sq.km(0.15%)

Dense scrub

The scrub is usually confined to topographically elevated areas, on the hill slopes generally surrounded by agricultural lands. These areas possess shallow and skeletal soils, at times chemically degraded, extremes of slopes, severely eroded and lands subjected to excessive aridity with scrubs dominating 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 and occupied an area of 855.02 sq. km.

Open scrub

This category has a similar description as mentioned in the dense scrub excepting that they possess sparse vegetation or devoid of scrub and have a thin soil cover. The open scrub is found at foothills surrounded by agricultural lands with an account of 743.67 sq.km

Ravinous land

Gullies are formed as a result of localized surface run-off affecting the unconsolidated materialresulting in the formation of perceptible channels causing undulating terrain. Gullies develop from rills which are tiny water channels with a few centimeters deep, formed as a resultant impact of heavy rainfall and wearing action of run-off generated there from. They are commonly found in sloping lands, developed as a result of concentrated run-off. Further classification of this category is possible based on the depth, width, bed slope, frequency and morphology of bed material of the ravines. They appear in light yellow to bluish green in color depending on the surface moisture and depth of erosion. They vary in size, shape with irregular broken network pattern. These lands amounted to 0.23 sq.km.

Barren Rocky/ Stony waste

The barren rock exposures are especially confined to hilly terrain with down slope with rock outcrops, stony waste and fragments. The area under this category is 244.24 sq.km

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 color depending on the depth of water. Waterbody category occupies an area about 719.97 sq. km with 4.75% of the district.

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. The rivers/streams that

flow continuously throughout the year are considered perennial. It contributes an area of 7.08 sq. km.

River/ Stream- Non Perennial

When the water covers the surface for less than nine months in each year, it is considered non perennial. This also includes the dry part of river generally characterized by the presence of sand or exposed rocks. It is found that most of the streams are under non perennial category and contribute an area of 104.27 sq. km.

Canal/ Drain

Canals and drains are artificial watercourse constructed for irrigation, navigation or to drain out excess water from agricultural lands. It is found mostly in coastal plains with an area of 16.18 sq. km.

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. This category occupies an area of 101.59 sq. km.

Reservoir/ Tanks- Seasonal

Dry reservoirs/tanks are those which do not have water spread throughout the year and such are considered seasonal. It is found that many of the tanks fall under seasonal category with an area of 470.81sq. km.

Lake/ Pond : Lakes / ponds are those that retain water in them either for one season or throughout the year and usually not subject to extreme fluctuation in water level. Ponds are body of water limited in size, either natural or artificial, regular in shape, smaller in size than a lake, generally located near settlements. These accounted for an area of 0.04 sq.km

2.1c.Eco sensitive areas : Three eco sensitive areas were identified in the district which are

1.Sri venkateswara national Park
2. Sri venkateswara wild life sanctuary
3. Koundinya wild life sanctuary

1.Sri venkateswara national Park(SVNP): Its situated at the foothills of Tirumala in between Alipiri and Srinivasa mangapuram which covers an area of 353 .62 2 km and

consist of various wildlife animal species which are natural habitants of the terrain. It is maintained by TTD and locally called zoological park

2. 2. Sri venkateswara wildlife sanctuary : It is situated at the foothills of the Tirumala covering bakarapeta , Talkona reserved forest and it is on the way to Tirupati to madanapalli, it covers on area 172.35 sq km and consists of various rare botanical species like red sandERS and sandle wood species, even animal species like panthers and leopard . It is a place of scenic beauty

3. Koundinya wildlife sanctuary": It is situated in Palamaneru , Kuppam and Santhipuram Mandal hill tracks and it has wild Elephants . It Comprises an area of 355sq km . Bangalore highway passes throw this sanctuary .This is a totally protected reserved forest for wild elephants. It covers 3 - 4 mandals of erstwhile Kuppam revenue Division.

ping areas are observed in parts

Table 5. Land use / Land cover change

Land Use Land Cover Change Matrix of Chittoor District 2011-12 to 2015-16

Land Use 2011-2012	2015-2016																																		Grand Tot
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
1	56.74																																			56.
2		38.39																																		38.
3			1.65																																	1.
4				171.53																																171.
5					13.34																															13.
6						0.48																														0.
7							0.00																													0.
8							0.06	88.80																												88.
9	0.08	0.10	0.51	0.11	7.47			1.39	1303.26	81.29	5.03	942.53		285.54	0.68																	1.33			0.02	2629.
10					0.07				18.39	159.48	0.66	60.29		8.38	0.22																	0.05				247.
11		0.05							8.17	1.01	5.48	13.25		1.89	0.81																					30.
12	0.03	0.64	0.83	0.42	2.85			0.84	92.99	120.33	6.58	2866.00		45.70	3.97																	0.27	0.04		2.15	3115.
13								0.09	1.73	10.60		2.70	28.03	0.62																						43.
14				0.70	3.13			3.66	305.47	30.76	1.85	54.06		1083.50	2.32																	0.19				1485.
15			0.24	0.06	0.41			0.18	6.00	3.44	1.98	26.19		20.52	152.49																					211.
16																0.01																				0.
17																	0.23																			0.
18									0.03									1416.20																		1400.
19					0.08			0.15		0.04		0.07							1386.89	1.93	1.73														0.02	1435.
20										0.26										46.84	8.58															55.
21					0.11			0.58	1.20	0.46		1.73								9.96	1310.57											0.02			0.19	1324.
22					0.12			0.03														61.99														62.
23																							14.98													14.
24		0.13	0.33	0.09	0.75		0.21	0.92	0.93	7.64	0.03	0.86												77.36											0.11	89.
25								0.07	0.41			0.05													23.32										0.22	24.
26			0.44		0.75			4.38	2.18	7.66	0.17	1.76			3.60											855.02						0.03			0.61	876.
27					1.07			4.81	6.40	9.98	0.17	1.20			0.52												743.67					0.01			0.09	767.
28																												0.23								0.
29								6.15																					244.24							250.
30																														7.08						7.
31																															104.27				0.09	104.
32																																34.26				34.
33																																	0.00			0.
34																																		49.61	13.83	63.
35				0.01											0.08																	0.04		51.98	453.46	505.
Grand Total	56.85	39.30	4.00	172.93	30.16	0.48	0.27	112.05	1747.16	432.96	21.95	3970.69	28.03	1446.15	164.68	0.01	0.23	1416.20	1519.89	58.73	1320.88	61.99	14.98	77.36	23.32	855.02	743.67	0.23	244.24	7.08	104.27	36.18	0.04	101.59	470.81	**15151.**

2.2.Slope Map of the District

The concept of measuring slope from a topographic map is a familiar one for most professionals in the natural resources and landscape planning / management and surveying professions. Slope is a measurement of how steep the ground surface is. Steeper the ground surface is, greater the slope. Slope is measured by calculating the tangent of the surface. The tangent is calculated by dividing the vertical change in elevation by the horizontal distance. Slope is normally expressed in planning as a percent slope which is the tangent (slope) multiplied by 100. Percent Slope = Height / Base * 100

Reliable estimation of the stability of slopes and foundations is very demanding because it is important for terrain analysis to understand the natural process in the disciplines of topography, geology, soils, hydro-geology, infrastructure planning, hazard management both at surface and subsurface. In view of this, slope plays an important role while doing decentralized planning at grassroots level. Traditionally information about contours from 1:50,000 or 1:25,000 topographic maps are used for preparation of slope by manual procedures based contour value difference for unit horizontal distance. The emergence of remote sensing & GIS systems and the availability of topographic data in DEM or TIN formats, slope maps can be generated using image processing and GIS methods. Representation of slope in percentage is understandable rationale for the resource mapping and planning. Slope information as one of the GIS layers plays an important role in natural resources and district planning process. It is proposed to generate the necessary slope layer from the available digital topographic data such as Carto DEM and open source Digital Elevation Model data (NRSC, 2009).

From Fig. 12, it is observed that majority of the District is covered with level to nearly level slope. It is observed in North eastern part and in southern westren part also. it is undulating in the following categories (Please check)

matrix from 2011-12 to 2015-16 in Chittoor District.(Area in Sq.Km)

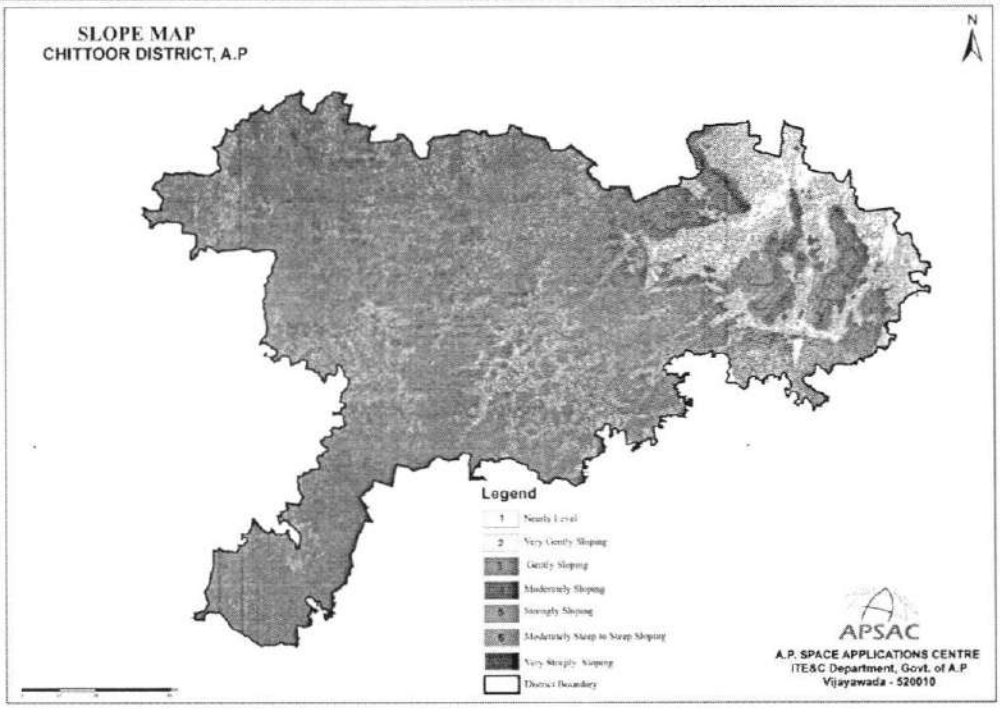


Fig:11Slope map of chittoor district,A.P

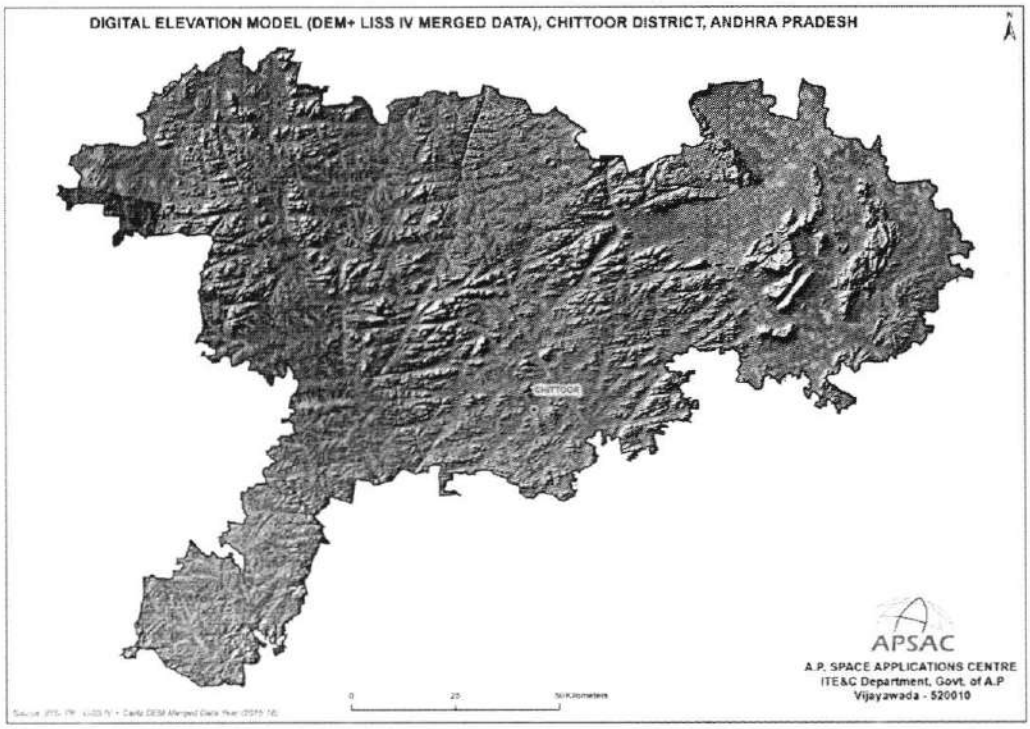


Fig.12 Digital Elevation Map Of Chittoor District,A.P

2.3 Forest Cover Distribution

The term forest is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha. Forest is determined both by the presence of trees and the absence of other predominant land uses within the notified forest boundaries. The trees should be able to reach a minimum height of 5 m within the notified forest boundaries. The forest cover occupied about 4259.90 sq. km (28.12%). ever green / semi ever green is 0.23 sqkm

.

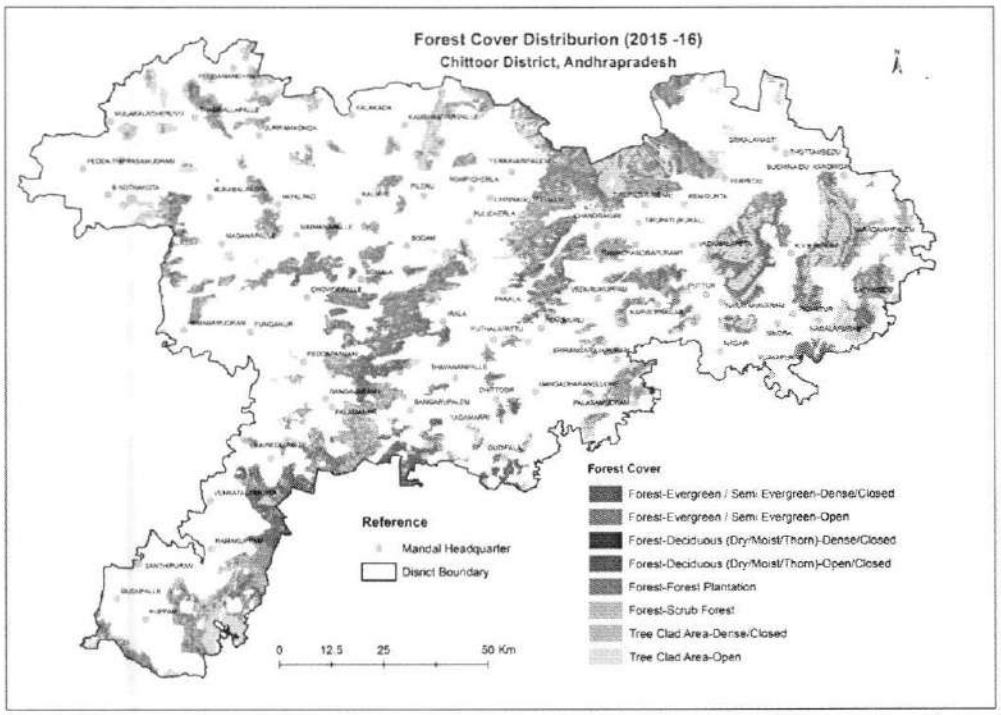


Fig:13 Forest cover map of Chittoor district,A.P

Table:6.Types of forest in Chittoor District.

Evergreen / Semi Evergreen-Dense	0.23	0.00	0.23	0.00	0.00	0.00
Deciduous (Dry/Moist/Thorn)-Dense	1416.23	9.35	1416.20	9.35	-0.03	0.00
Deciduous (Dry/Moist/Thorn)-Open	1390.92	9.18	1386.89	9.15	-4.03	-0.03
Forest Plantation	55.68	0.37	58.73	0.39	3.05	0.02
Scrub Forest	1324.83	8.74	1320.88	8.72	-3.94	-0.03
Tree Clad Area-Dense	62.14	0.41	61.99	0.41	-0.15	0.00
Tree Clad Area-Open	14.98	0.10	14.98	0.10	0.00	0.00
Forest	**4265.00**	**28.15**	**4259.90**	**28.12**	**-5.10**	**-0.03**

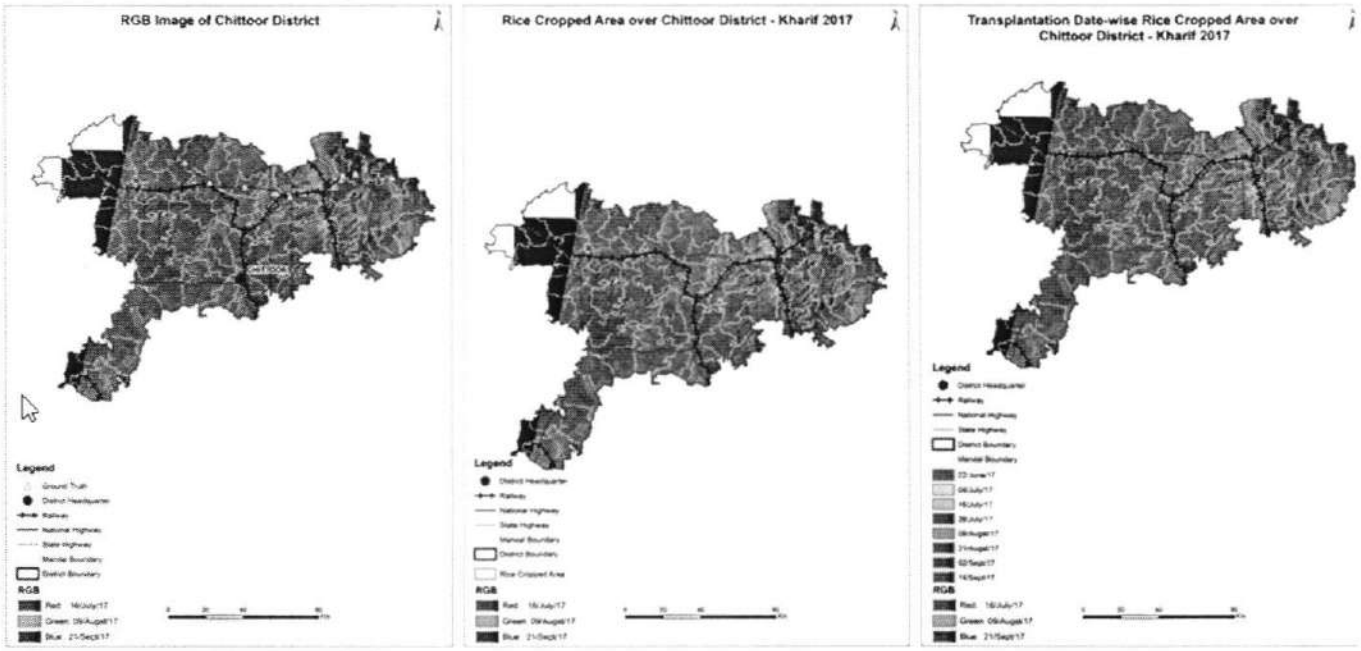
3. Agriculture and Soil Resources in the Chittoor District

Remote sensing technology has been successfully used by APSAC during the last two decades in the areas of agriculture both in spatial and temporal domains under various

projects. APSAC carried out in-season forecasting of acreage for major crops i.e. Kharif rice, Rabi rice, cotton, groundnut etc, at state/ district level for the last two decades in Andhra Pradesh to enable the administrators and planners to take strategic decisions on import-export policy matters and trade negotiations. Rice and Cotton are the most dominant crops in Andhra Pradesh in both Kharif seasons. In this connection, Department of Agriculture and Directorate of Economics & Statistics are generating data on conventional methods for estimation of crop area and production. In this regard, satellite remote sensing plays a pivotal role with limited field visits for timely estimation and monitoring the crops.

3.1. Kharif Rice Estimation using SAR data

Andhra Pradesh Space Applications Centre (APSAC) has carried out *Kharif* rice crop acreage estimation over Chittoor district using Microwave Remote Sensing (Sentinel-1A) data under FASAL project. Sentinel-1A Synthetic Aperture Radar (SAR) VV polarization data (Spatial Resolution 20m) is used for the analysis. The rice acreage using sentinel-1 microwave remote sensing data for Chittoor district was estimated as 8,928 ha.



(a)
(b)
(c)

Fig:14(a) Ground truth data overlaid on multi-temporal RGB image, (b) Rice cropped area and (c) Transplantation date-wise rice cropped area over Chittoor District

3.2.Soils

The major portion of the district is covered by red soils with portions of Alluvial soil in Chittoor and Bangarupalem erstwhile taluks. According to an assessment made on the basis of village records, 57%of the soils of the district are red loamy and 34%red sandy. The remaining 9%is covered by Black Clay (3%), Black Loamy (2%), Black Sandy (1%) and Red Clay(3%)Cand Red Clay (3%)

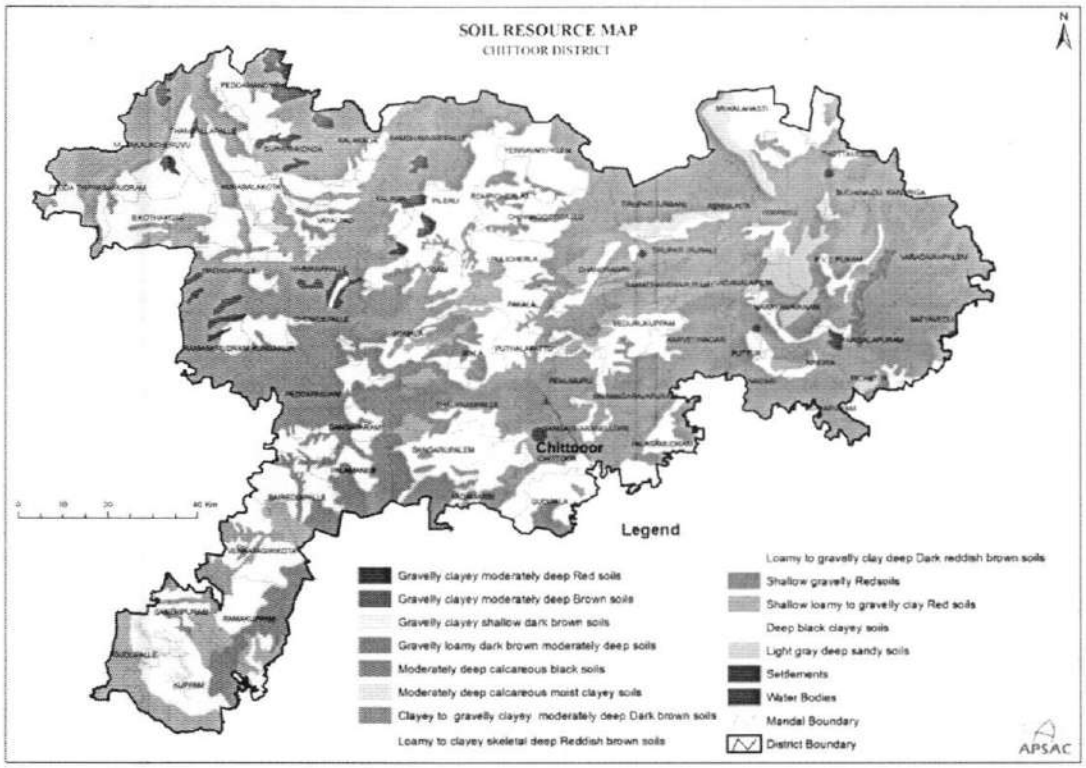
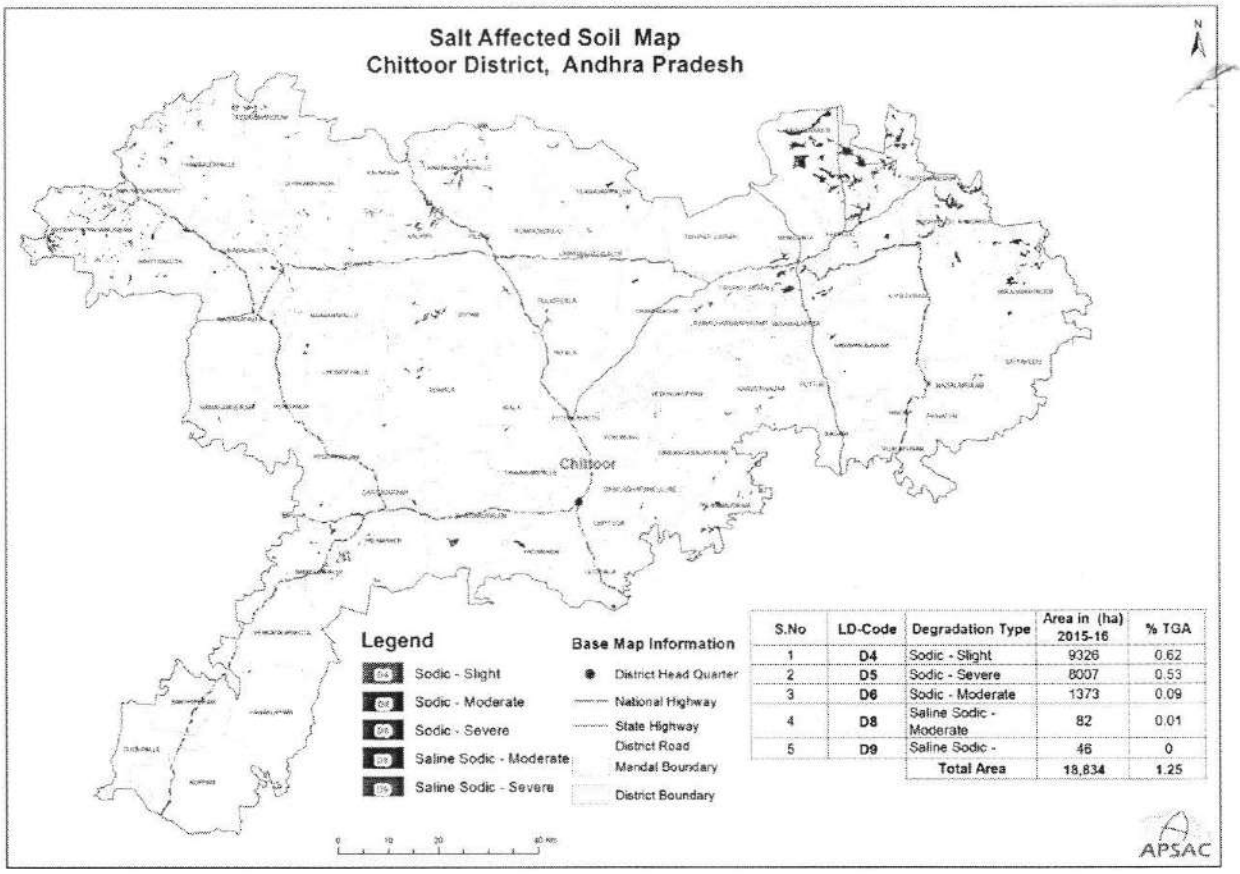


Fig.15 Soil Resource Map of Chittoor Distrcit,A.P

3.2.a. Salt-affected land:

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 sea water in coastal regions and/or use of high-salt containing ground water. They also become saline when soils have developed on salt containing parent materials or have saline ground water. Coastal saline soils may be with or without ingress or inundation by sea water. These lands are accounted for 0.26 sq. km only.



S.No	LD-Code	Degradation Type	Area in (ha) 2015-16	% TGA
1	D4	Sodic - Slight	9326	0.62
2	D5	Sodic - Severe	8007	0.53
3	D6	Sodic - Moderate	1373	0.09
4	D8	Saline Sodic - Moderate	82	0.01
5	D9	Saline Sodic -	46	0
		Total Area	18,834	1.25

Fig.16, Salt affected land of Chittoor District,A.P

3.3.Horticulture : **Apart from Agriculture, Land utility in Chittoor district is taken by Horticulture. A Total of 1, 96, 815.745 Ha is cultivated under horticultrure specices/ species and the above said area consists of (Please have uniform notation Ha/ha)**

1. Fresh fruits 115017.245 ha,

Vegetables 595 577 ha

Plantations 3399 ha

species 8875 ha

Flowriculture 9396.5 Ha

aromatic and Medicinal plants 1155 ha

The details of each crop vaiety is attached herewith in the excel table form

Fresh fruits: In this category, a total of 11507 .25 ha is irrigated with an annual prodction of 2090216.64 MT in which Mango plantations rank high with a cultivable area of 990291 ha, and total yield of 1390077 MT, as on 2017-18

Table: 7: Aerial Extent (Ha) of Fresh Fruits with Production (MT) in Chittoor District(2017-18)			
Sl.No	Name of The Fresh Fruit	Statistics	
1	Amla	*Area*	212

		Production	4240
2	**Banana**	*Area*	2323
		Production	127765
3	Ber	*Area*	0
		Production	0
3	Lemon (Lime & Other Citrus Fruits)	*Area*	133
		Production	2128
4	Orange & Batavia	*Area*	0
		Production	0
5	Custered Apple	*Area*	536
		Production	4366
6	Grapes	*Area*	49
		Production	980
7	Guava	*Area*	571
		Production	21698
8	Jack Fruit	*Area*	4
		Production	136
9	Mango	*Area*	99291
		Production	1390077
10	Papaya	*Area*	2900
		Production	285650
11	Pineapple	*Area*	0
		Production	0
12	Pomegranate	*Area*	1613
		Production	25808
13	Sapota	*Area*	390
		Production	5308
14	Muskmelon	Area	3877
		Production	130445.51
15	Watermelon	Area	2585
		Production	77756.8
16	Other Fruits	Area	533
		Production	13858
	Total Fresh Fruits	Area	115017.245
		Production	2090216.64

Papaya is cultivated in a vast area of 2900 ha with an yield of 285650 mt. Musk mellon occupies an area of 3877 ha with a production of 130445 Mt and banana occupied an area of 2323 ha in the eastern Chittoor with a production of 127765 MT.

Vegetables : In this category, a total of 59577 ha area is cultivated with a production of 2699768.4 mt. In the westran Chittoor especially madanapsalli , Tomato is cultivated in 30518 ha with an yield of 2058 mt followed by Beans with an area of 34889 ha and an yiled of 54777.3 mt, cauliflower is also culitivated in the westan part of the district in an area of 900 ha with an yield of 13500Mt, Brinjal cultivation occupies the next position with an area 4343 ha and an yiled of 1389 Mt. Green chillies , Bendi and Potato are also culitivated in the district.(Kindly check the paragraph)

Table: 8 Aerial Extent (Ha) of Vegetables with Production (MT) in Chittoor District(2017-18)			
Sl.No	Name of The Vegetables	Statistics	
1	Beans	Area	3489
		Production	54777.3
2	Bitter Guard	Area	997
		Production	17946
3	Bottle Gourd	Area	200
		Production	4200
4	Brinjal	Area	4343
		Production	128987
5	Cabbage & Knol-Khol	Area	1843
		Production	35017
6	Capsicum	Area	5
		Production	165
7	Carrot	Area	271
		Production	5420
8	Cauliflower	Area	900
		Production	13500
9	Cucumber	Area	37
		Production	925
10	Chillies Green	Area	2158
		Production	60424
11	Garlic	Area	0
		Production	0
12	Elephant Foot Yam	Area	42
		Production	252
13	Bhendi	Area	2062
		Production	35054
14	Onion	Area	588
		Production	14700
15	Parwal / Ponted Gourd	Area	0
		Production	0
16	Peas	Area	0
		Production	0
17	Potato	Area	2640
		Production	44880
18	Radish	Area	254
		Production	4572
19	Pumpkin	Area	0
		Production	0
20	Sweet Potato	Area	197
		Production	3915
21	Tapioca	Area	0
		Production	0

22	Tomato	Area	30518
		Production	2058272
23	Other Vegetables	Area	9033
		Production	216792
	Total Vegetables	Area	59577
		Production	2699798.4

Floriculture: Under this category, total area of 9396.5 ha is cultivated with a production of 112840.9 mt. Chrysanthemum Occupies the top position with an area of 2624 ha, and an annual production of 52470 mt, Marrygold is cultivated in an area of 3866 ha, with an yield of 39306 mt

Table: 9 Aerial Extent (Ha) of Flowerswith Production (MT) in Chittoor District(2017-18)

Sl.No	Name of The Flowers	Statistics	
1	Chrysanthemum	*Area*	2624
		Production	52470
2	Jasmine	*Area*	736
		Production	4637
3	Marigold	*Area*	3686
		Production	39306
4	Rose (Lakhs. Of Flowers)	*Area*	373
		Production	1935
5	Tuberose	*Area*	390
		Production	4680
6	Crossandra	*Area*	507
		Production	1673
7	Other Flowers	*Area*	1081
		Production	10075
8	Total Flowers	Area	9396.5
		Production	112840.9

Table:10 Aerial Extent (Ha) of Plantation with Production (MT) in Chittoor District(2017-18)

Sl.No	Name of The Plantation	Statistics	
1	Arecanut	*Area*	0
		Production	0
2	Cashew	*Area*	175
		Production	191
3	Cocoa	*Area*	0
		Production	0
4	Coconut	*Area*	3224
		Production	486
5	Oilpalm	*Area*	0
		Production	0
6	Coffee	*Area*	0
		Production	0
	Total Plantations	Area	3399
		Production	190.75

SPICES : Under this category, an area of 8875 ha is grown with production of 70260 .4 Mt . In the easten Chittoor Perticularly Nagari and puttoor mandals, Betel has been is cultivated under 174 ha, with production of 2967048 mt. Tamarind also is grown as shadow plant along with yield of 31686 MT.

Table: 11 Aerial Extent (Ha) of Spices with Production (MT) in Chittoor District(2017-18)			
Sl.No	Name of The Spices	Statistics	
1	Ajwan	Area	0
		Production	0
2	Betelvine	Area	174
		Production	2967048
3	Pepper	Area	0
		Production	0
4	Chillies (Dried)	Area	2139
		Production	12836.4
5	Coriander	Area	334
		Production	668
6	Ginger	Area	0
		Production	0
7	Tamarind	Area	2876
		Production	31636
8	Turmeric	*Area*	402
		Production	4422
9	Others Spices	*Area*	2950
		Production	20698
	Total (Spices)	Area	8875
		Production	70260.4

4. Water Resources in the Chittoor District

Water resources in chittoor districts can be classified into following categories

1.Surface Water resources

2.Ground water resources

4.1.Surface Water And Irrigation Resorces of The District:

The annual average rainfall of the district is 934 mm, of which 440 mm falls as South West (June-September) and 395 mm as North East (October-December) monsoon. The mean minimum and maximum temperature recorded in the district are 17.5° C in January and 41.5° C in May, respectively.

4.1.a. River Basins in Chittoor District

Chittoor district is partially covered with 08 major basins and 10 minor basins. The basins are Papagni, Cheyyeru, Palar, Swarnamukhi, Minor drainages between Araniar & Kalangi, Aranair, Kusasthali, Upputeru, Kalangi and Ponnair. These 10

minor basins are further divided into 126 sub basins subsequently divided into 3,229 cascades. The catchment area of each basin is delineated using the boundaries from master plan records and updated by super imposing on Survey of India toposheet (1:50K). The sub basins are suitably subdivided into cascades based on local drainage conditions. The number of sub basins, cascades and tanks within the minor basin is given in the table 1and depicted in Fig. 17

Table 12. Hydrological units of Chittoor district

Sr. No.	Minor basin	Major basin	Area, km^2	Hydrological unit, Nos.		
				Sub basins	Cascades	Tanks
1	Papagni	Pennar	1,510	12	358	1,129
2	Cheyyeru		3,506	25	1,052	3,704
3	Palar	Palar	4,874	34	1,138	3,870
4	Swarnamukhi	Swarnamukhi	2,160	16	264	1,043
5	Kalangi	Kalangi	944	12	142	506
6	Aranair	Aranair	911	9	114	738
7	Minor drainages between Araniar and Kalangi		203	4	21	114
8	Kusasthali	Kusasthali	870	8	112	621
9	Upputeru	Upputeru	69	2	14	42
10	Ponnair	Ponnair	104	4	14	89
		Total	**15151**	**126**	**3,229**	**11,856**

Table:13.Drainage System with Description of main rivers

S.No	Name of the River	Area Drained (Sq.KM)	% of Area Drained in the District
1	Papagni	1510	9.973
2	Cheyyeru	8192.5724	54.51
3	Palar	4832.23	31.95
4	Swarnamukhi	3133.22	20.69
5	Kalangi	1236.5	8.16
6	Aranair	901.78	5.96
7	Kusasthali	855.98	5.65
8	Upputeru	72.13	0.46

Table:14.Salient Features of Important Rivers and Streams

S.No	Name of the River or Stream	Total Length in the District (in Kms)	Place of Origin	Altitude at Origin
1	Papagni	56.54	Nandi Hills, Chikballapur district, Karnataka	914 mts

2	Cheyyeru	292.99	Horsely hills, Chittoor District	700 mts
3	Palar	50	Nandi Hills, Chikballapur district, Karnataka	195.75m
4	Swarnamukhi	101.17	Shakumpalli Village,Pakala mandal,Chittoor district	360m
5	Kalangi	37	Varadayapalem	1200m
6	Aranair		Sadasivanikonda	1040
7	Kusasthali	47	Vedurukuppam	1011m
8	Upputeru	20	Kasikonagutta	620m
9	Ponnir	56	musman	

4.2.0. Major and Medium Irrigation Projects

Irrigation has assumed an increasing significance in agriculture in the context of new technology, where high yielding varieties and multiple cropping are 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, medium and minor irrigation projects

4.2.1. Major Irrigation Project: The ongoing major irrigation projects in Chittoor district are (1) NTR Telugu Ganga Project (TGP) which covered an ayacut of 38,938 ac falling in two assembly constituencies namely as Satyavedu and Srikalahasti (2) Handri Neeva Sujala Sravanthi (HNSS) covered an ayacut of 1,40,000 ac falling in two(**Check**) assembly constituencies namely as Chandragiri, Chittoor, G.D.Nellore, Kuppam, Pileru, Madanapalle, Punganur, Puthalapattu and Thambalapalle (3) Galeru Nagari Sujala Sravanthi (GNSS) covered an ayacut of 1,03,500 ac falling in three assembly constituencies namely Nagari, Satyavedu and Srikalahasti and depicted in Fig. 2

4.2.2. Medium Irrigation Project: The completed medium irrigation projects are (1) Swarnamukhi Anicut covering 10,200 ac (2) Kalangi Reservoir Project covering 4,650 ac

(3) Mallimadugu Reservoir Project covering 3,950 ac (4) Araniar Project covering 5,550 ac (5) Krishnapuram Reservoir Project which covers 6,125 ac, (6) Bahuda Reservoir Project covering 2,884 ac (7) Pedderu Reservoir Project covering 4,300 ac, (8) Siddalagandi Project covering 225 ac and depicted in Fig. 2

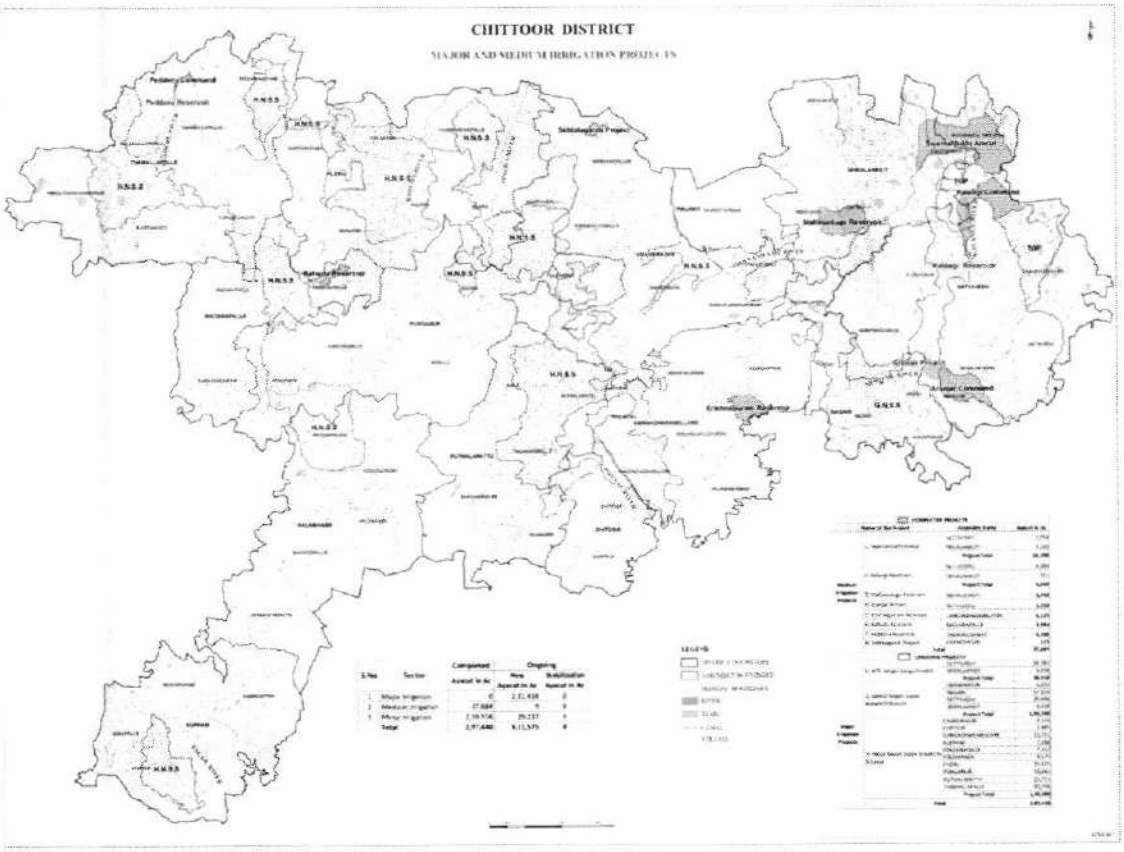


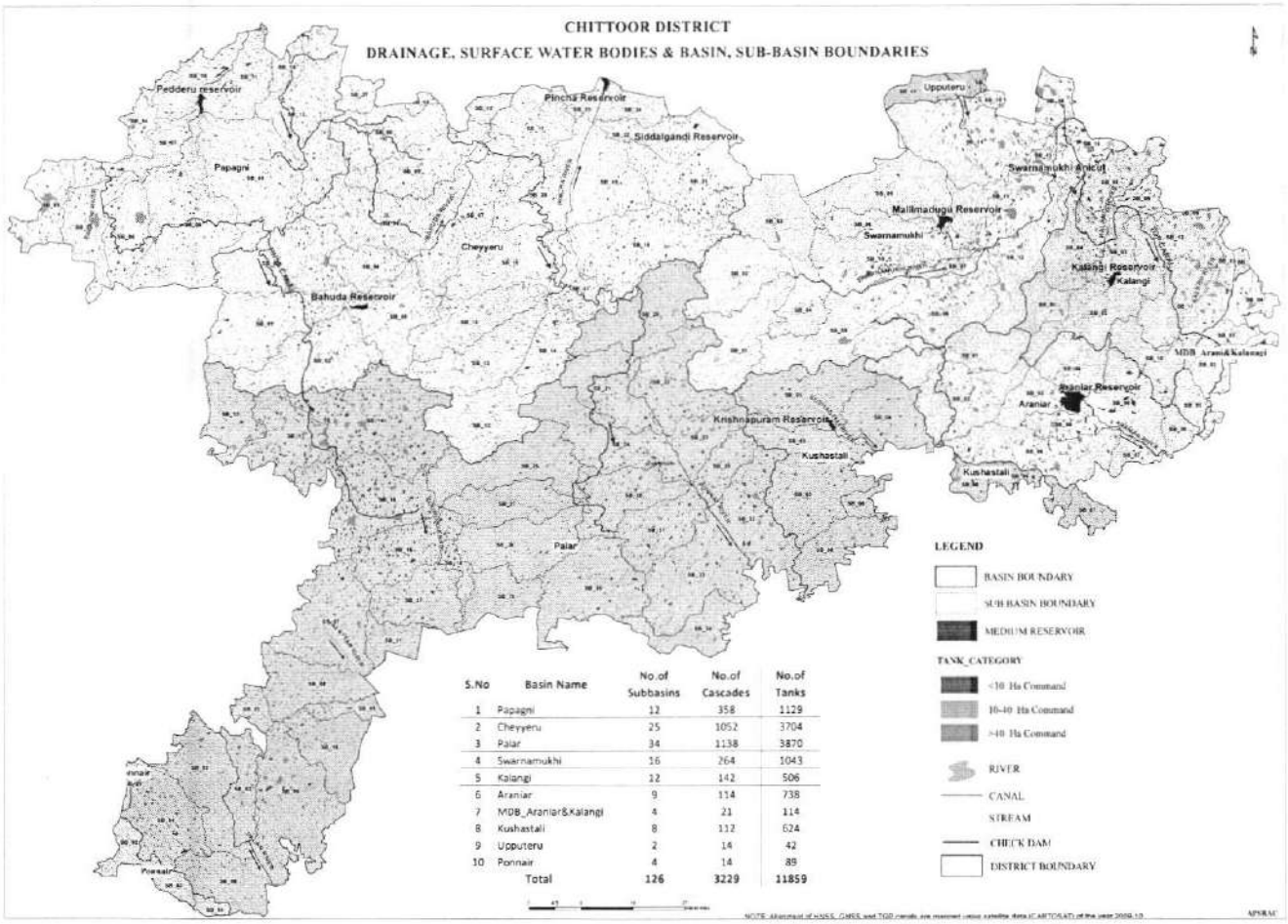
Fig. 15 Major and Medium Irrigation Projects

Name of the Project		Assembly Name	Ayacut in Ac
COMPLETED PROJECTS			
Medium Irrigation Projects	1) Swarnamukhi Anicut	SATYAVEDU	2,958
		SRIKALAHASTI	7,242
		Project Total	**10,200**
	2) Kalangi Reservoir	SATYAVEDU	4,099
		SRIKALAHASTI	551
		Project Total	**4,650**
	3) Mallimadugu Reservoir	SRIKALAHASTI	**3,950**
	4) Araniar Project	SATYAVEDU	**5,550**
	5) Krishnapuram Reservoir	GANGADHARANELLORE	**6,125**
	6) Bahuda Reservoir	MADANAPALLE	**2,884**
	7) Pedderu Reservoir	THAMALLAPALLE	**4,300**
	8) Siddalagandi Project	CHANDRAGIRI	**225**
	Total		**37,884**
ONGOING PROJECTS			
Major Irrigation Projects	1) NTR Telugu Ganga Project	SATYAVEDU	32,382
		SRIKALAHASTI	6,556
		Project Total	**38,938**
	2) Galeru Nagari Sujala Sravanthi Project	CHANDRAGIRI	6,633
		NAGARI	57,824
		SATYAVEDU	30,406
		SRIKALAHASTI	8,638
		Project Total	**1,03,500**
	3) Handi Neeva Sujala Sravanthi Scheme	CHANDRAGIRI	9,574
		CHITOOR	1,905
		GANGADHARANELLORE	11,751
		KUPPAM	7,288
		MADANAPALLE	7,152
		PALAMANER	8,175
		PILERU	33,675
		PUNGANUR	16,062
		PUTHALAPATTU	21,711
		THAMALLAPALLE	22,706
		Project Total	**1,40,000**
	Total		**2,82,438**

4.2.3 Minor Irrigation Tanks

In Chittoor district according to the Irrigation Master Plan records (1993) 9,418 tanks and hydrological clearance data (2011), there are 10,566 tanks including 1,575 kalvas. NIRD study report on irrigation tanks in Andhra Pradesh (2007) lists 8,066 tanks including 676 minor irrigation tanks, while the Survey of India toposheet (1988-89) shows 8,889 tanks.

The tanks were updated with high resolution satellite data of 2009-10 which shows that there are 11,856 tanks including 170 check dams, 08 medium irrigation projects. Andhra Pradesh Space Application centre developed a Web Portal GIS for Tank Information System (TIS) in Andhra Pradesh. In the said web portal, minor irrigation tanks are classified as more than 40 ha, 10 to 40 ha and less than 10 ha command. Information related to nearly 15,000 tanks in Andhra Pradesh has been published in APSAC website and information regarding 1312 tanks (10 to 40 ha) existing in Chittoor district has so far been published in the website.



S.No	Basin Name	No.of Subbasins	No.of Cascades	No.of Tanks
1	Papagni	12	358	1129
2	Cheyyeru	25	1052	3704
3	Palar	34	1138	3870
4	Swarnamukhi	16	264	1043
5	Kalangi	12	142	506
6	Aranar	9	114	738
7	MDB_Aranar&Kalangi	4	21	114
8	Kushastali	8	112	624
9	Upputeru	2	14	42
10	Ponnair	4	14	89
	Total	126	3229	11859

Fig.17. Drainage and surface water bodies, basin boundaries

4.3.Groundwater Resources:

Grondwater resoureces are estmited using spatial technologies. In this process, IRS-P6-2012 was analysed based on the land forms developed..... denudational(check) origin and hydrogeomorphology and structural maps are generated, using GIS both the above maps will be integrated so that ground water resourcemap is generated

4.3.1Geology and Mineral Resources of Chittoor District

The district is underlain by formations of Archaean, Proterozoic, Jurassic Cretaceous Tertiary and Quaternary ages. The oldest rocks in the area belong to Migmatite Complex, represented by migmatised quartzo-felspathic gneiss and are exposed in the northeastern part of the district. Older metamorphics comprise amphibolites, hornblende-talc-mica-schist, fuchsite quartzite, calc-sillicate rock, marble and banded ferruginous quartzite. These older metamorphics occur as enclaves within Peninsular Gneissic Complex (PGC). The PGC comprises a complex assemblage of gneissic variants and granitic rocks, which occupy almost major part of the district. PGC in the area is represented by biottte-homblende gneiss, biotite granite and migmatite. The Dharwar Super group of rocks represented by

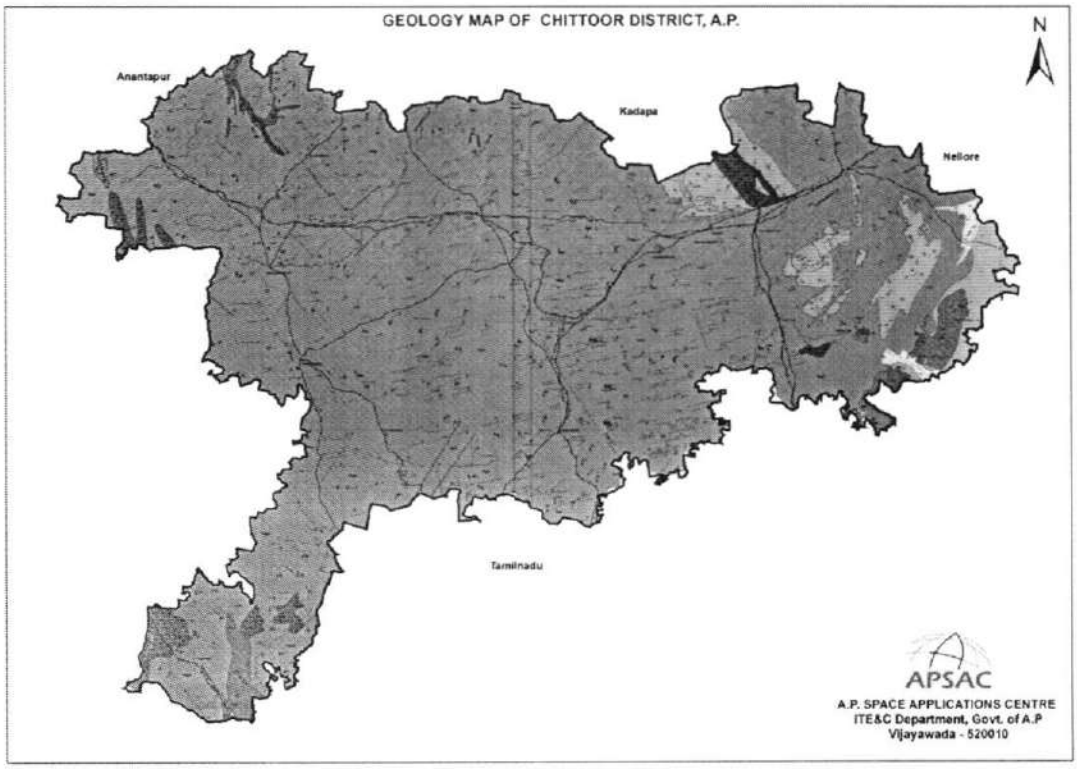


Fig 18: Geology Map of Chittoor District, A.P

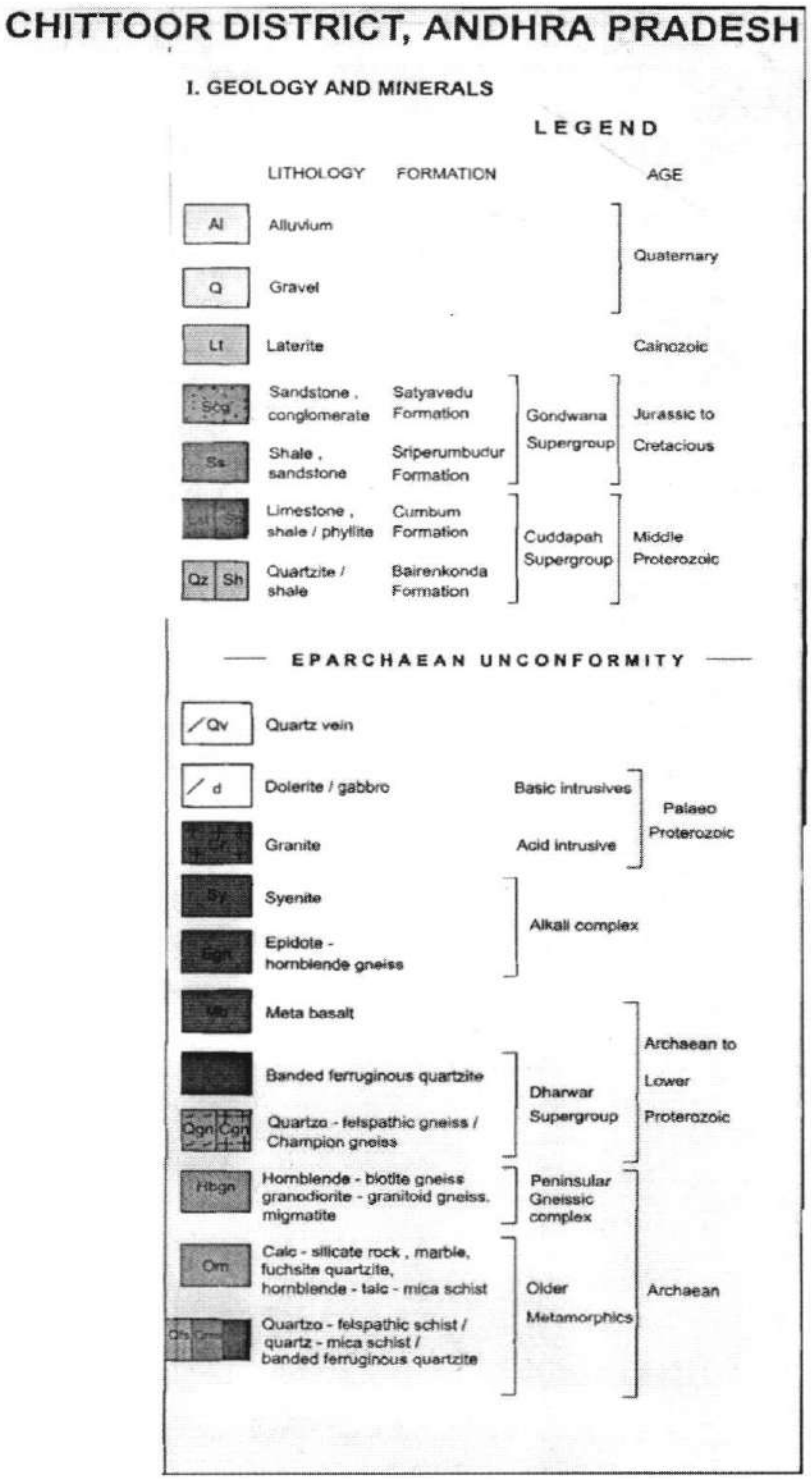


Fig 19: Stratigarphic succssion of Chittoor District, A.P

quartz-mica schist, amphibolite schist, quartzo-flespathic mica schist (Champion gneiss, metabasalt, matadacite and banded ferruginous quartzite, belonging to various schist belts and occur as long linear N-S trending belts and overlie PGC non-conformably. (**Please check the Bracket end**)Acid intrusives of Proterozoic Age comprises granite and quartz veins. The granite plutons are exposed as patches and

linear bodies in southwestern and northwestern parts of the district, respectively. The basic dykes include dolerites. Three sets of dolerite dykes trends E-W, N-S, and NW-SE, traverse the southern tip of the well-known Cuddapah Basin falls in the northeastern part of the district. Shale and quartzite of Bairenkonda Formation, shales/phyllite and limestone of Cumbum Formation are exposed in the district. The rocks of Gondwana Super group occur non- conformably over the PGC in southeastern part of the district, represented by Satyavedu Formation (Upper Gondwana) and comprise motled, ferruginous quartzite and conglomerate with plant fossils. Laterite cappings occur over Gondwana formations. Large tracts of Alluvium occur along the major streams, which belong to Recent Age.

4.3.2.Metlogenic Provinces of Chittoor District:

Mineral provinces:

Chittoor District does not have good mineral resources. The mineral product based industries existing in the district are stone crushing units, and granite polishing units that utilize the pink, black and grey granite deposits found in the District.

Granite Cutting and polishing: Granite deposits are available in Chandragiri, Tirupati and Western parts of the District. Granite metal is used for building construction and polishing purposes. There are units, both in the large or medium and small scale engaged in this line of activity. All the units are working well as there is no marketing problem. Keeping this view, the availability of raw material and assured market of 8 to 10 units can be encouraged in the District.

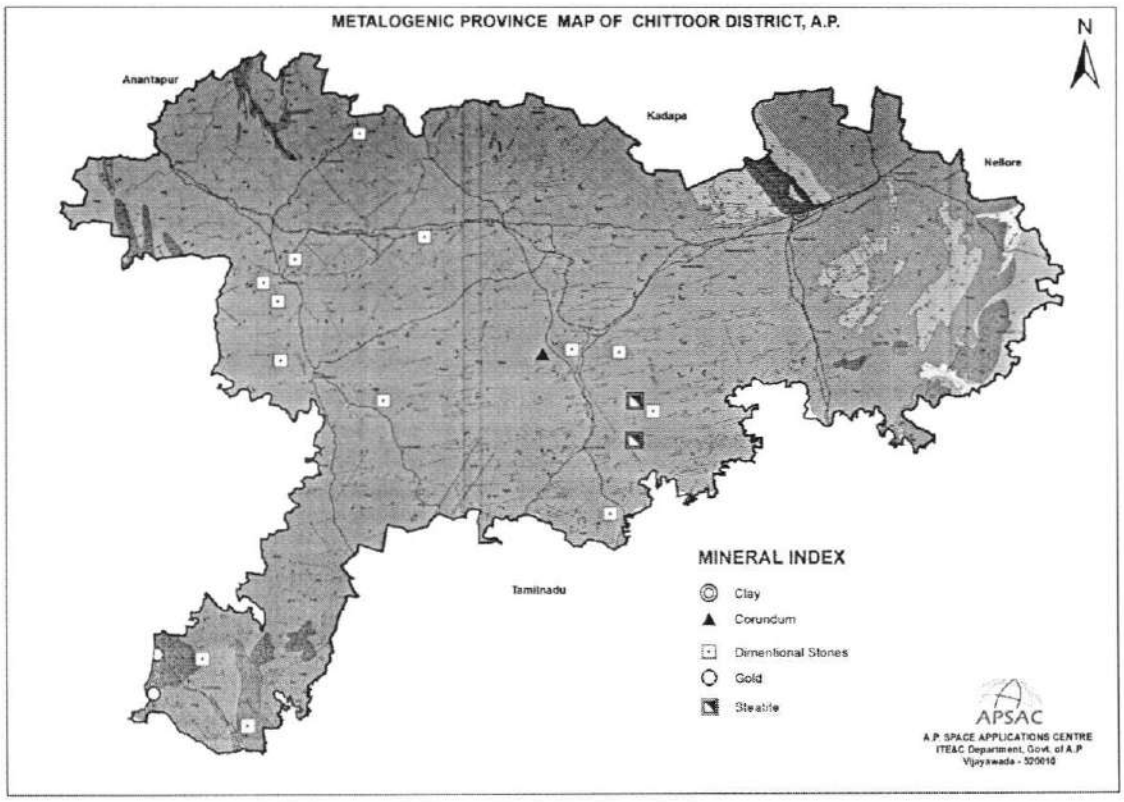


Fig 20: Metalogenic province Map of chittoor district, A.P

Barytes : Barytes veins of 1- 3 cm thickness occur in coarse grained gneiss in gundlamadugu stream near bairaghi kandriga . The barytes is yellowish in color and is associated with quartz& hematite .It is of no economic importance.

Dimensional stones : The granite gneisses , migamatite bairenkonda quartzites and gondwana sand stones of the districts are extensively quarried for building materials. There is flourishing polished stone industry in the district around kuppam where the quarrying for granite was taken up on commercial scale.Chittoor district has been supplying granite monuments to the world market. The commercial varieties are kuppam green (granite gneiss), English teak (multi coloured granite) and black granite (dolerite).Apart from this, the basic dykes and quartzite veins also are used as road metal and railway ballast in the district.

corundum: corundum in the form of crystal of 1 - 3 cm long occurs near yerracheruvupalli and north of polisettipalli in association with mica schist. These deposits are locally quarried and the mineral is used for abrasive wheels.

Corundum is a precious gem that finds some use as an abrasive, owing to the extreme hardness of the material (9 on the Moh's hardness scale). It is used for grinding optical glass and for polishing metals and has also been made into sandpapers and grinding wheels. The extreme hardness of corundum makes it especially useful as an abrasive. Crushed corundum is processed to remove impurities and then screened to produce uniformly sized granules and powders. These are used for grinding media, polishing compounds, sand papers, grinding wheels, and other cutting applications. Corundum has many other uses. It is chemically inert and resistant to heat. These properties make it a perfect material for making refractory products such as fire brick, kiln liners, and kiln furniture. Today, these products are usually made with synthetic corundum. Pure corundum is colourless, transparent, durable, and scratch resistant. Large crystals of clear synthetic corundum are grown, sawn into thin sheets, and then used as the windows of grocery store scanners, watch crystals, aircraft windows and protective covers for electronic devices.

Gold: Gold occurrences are recored from bisantham, Thalachintpalli and Mallappakonda Chigaragunta of Kuppam revenue division. These occurrences form a part of southern extension of kolar gold belt. In Mallappakonda Chigaragunta, G.S.I established sizeble reserves of Gold (**check**) Minor occurrences of gold associated with ferruginous quartzite are also reported from palechuru of Srikalasthi revenue division.

Uses of Gold

Of all the minerals mined from the Earth, none is more useful than gold. Its usefulness is derived from a diversity of special properties. Gold conducts electricity and does not tarnish. It is very easy to work and can be drawn into wire, hammered into thin sheets, alloys with many other metals, can be melted and cast into highly detailed shapes. It has a wonderful colour and a brilliant lustre. Gold has been used to make ornamental objects and jewellery for thousands of years. Gold nuggets found in a stream are very easy to

work and were probably one of the foremost metals used by the humans. Today, most of the gold that is newly mined or recycled is used in the manufacture of jewellery. About 78%of the gold consumed each year is used in the manufacture of jewellery.

Special properties of gold make it perfect for manufacturing jewellery. These include very high lustre, desirable yellow colour, and tarnish resistance. It has the ability to be drawn into wires, hammered into sheets, or cast into shapes. These are all properties of an attractive metal that is easily worked into beautiful objects. Another extremely important factor that demands the use of gold as a jewellery metal is tradition. Pure gold is too soft to stand up to the stresses applied to many jewellery items. Craftsmen learned that alloying gold with other metals such as copper, silver, and platinum would increase its durability. Since then, most gold used to make jewellery is an alloy of gold with one or more other metals.

Hematite: Hematite(Iron ore) occurs in quartzite associated with hornblende schist near sersambedu Konur, Suramala of Srikalasthi revenue division. Hematite occur in the form of lences of about 6 - 7m thickness.

Ochar: Ochar bands of cream brown or pink color occur with in the scale west of karakambadi.These Occar(check) find its use in distempers and paints.

Steatite: Small steatite deposits are useful in ceramic and painting industry that occur at Bakranarasingarayanipet,Anugallu of chittoor revenue division and in keramanda, Bandakindapalli and Thalupalalli.

Talc: Talc occurs in talc tremolite schist of ellampalli and worked locally.

Clays: Inferior quality clays occur as pockets within cumbum shales to the west of karkambadi and near toidavaru

4.3.3Geomorphology:

4.3.4. Land forms of fluvial origin:

The word fluvial is 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 landforms or depositional landforms. The incredible power of running water in carving various erosional and depositional landforms is well known. Although the quantity of water in stream is small at one time during the course of 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).

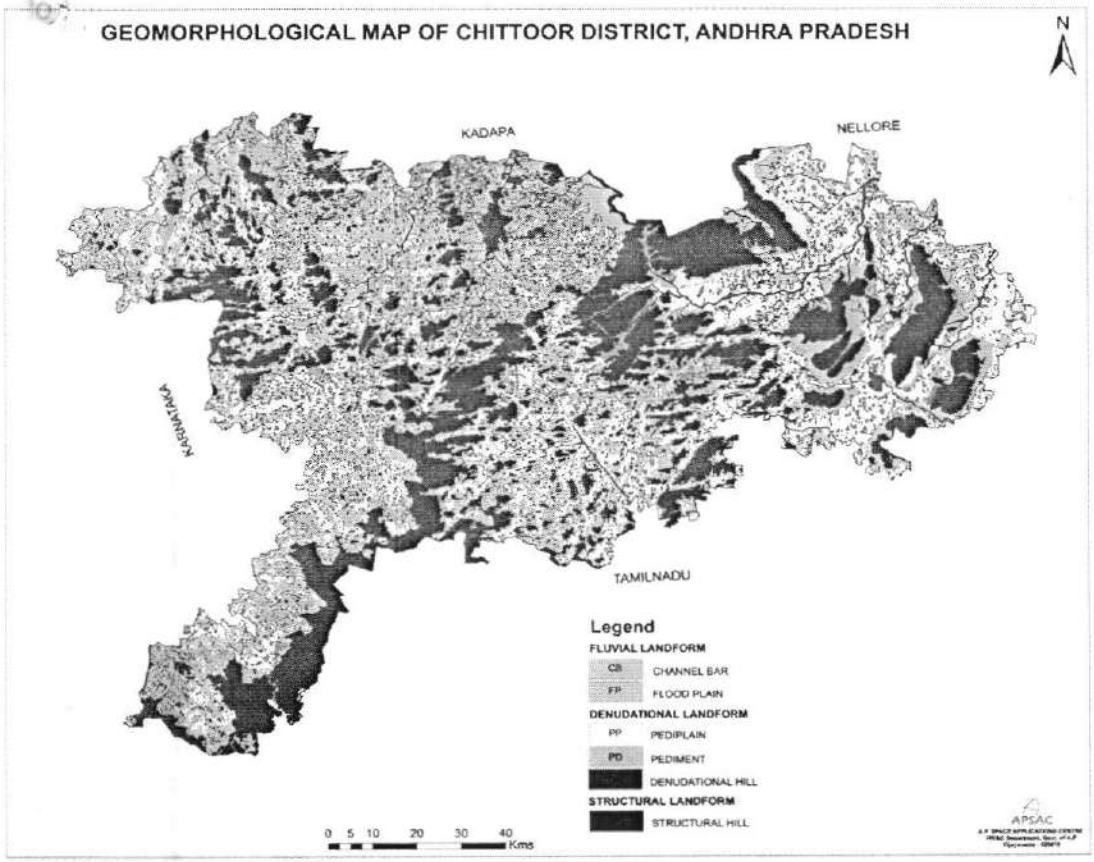


Fig 21:Geomophological Map of Chittoor District,A.P

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.

4.3.5.Denudational origin

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 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 a number of landforms, which have typical shape 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 a raw material for the sedimentary rock and soil. Important denudational landforms to be mapped are explained below. (NRSA,2016).

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

Inselberg:
A prominent, isolated, steep sided, usually smoothed and rounded, residual knob, hill or small mountain of circumdenudation rising abruptly from 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.

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 a and discontinuous veneer of alluvium derived from the upland masses and in transit across the surface

Pediment- Inselberg Complex:
The pediments dotted by numerous inselberg of small sizes, which make it difficult to distinguish from the pediments. Hence, it is called a complex of pediment and inselberg.

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 end 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.
Residual Hill: A small remnant hill, which has witnessed all forms of denudation.

4.3.6. Landform of structural origin:

Landform of structural origin is related to structural aspect of the area. Most of the landforms under this class have genesis related to underlying structure. Structure plays an important role for 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 its 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. Important structural landforms to be mapped are explained below.

Antiformal Hills / Valley: A breached/ unbreached uplift, where the structure is shown directly in the topography and perhaps by drainage pattern. In case of the presence of older rock in the core of the uplift the .....

Basin: It is a general term for a depressed, sediment filled area. It may be an elongated, fault-bordered intermontane basin within an orogenic belt.

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.

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

Dissected Structural Hills and Valleys:

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

Dyke and Sill 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. The concordant equivalents are sill and mostly form sheet like plutons.

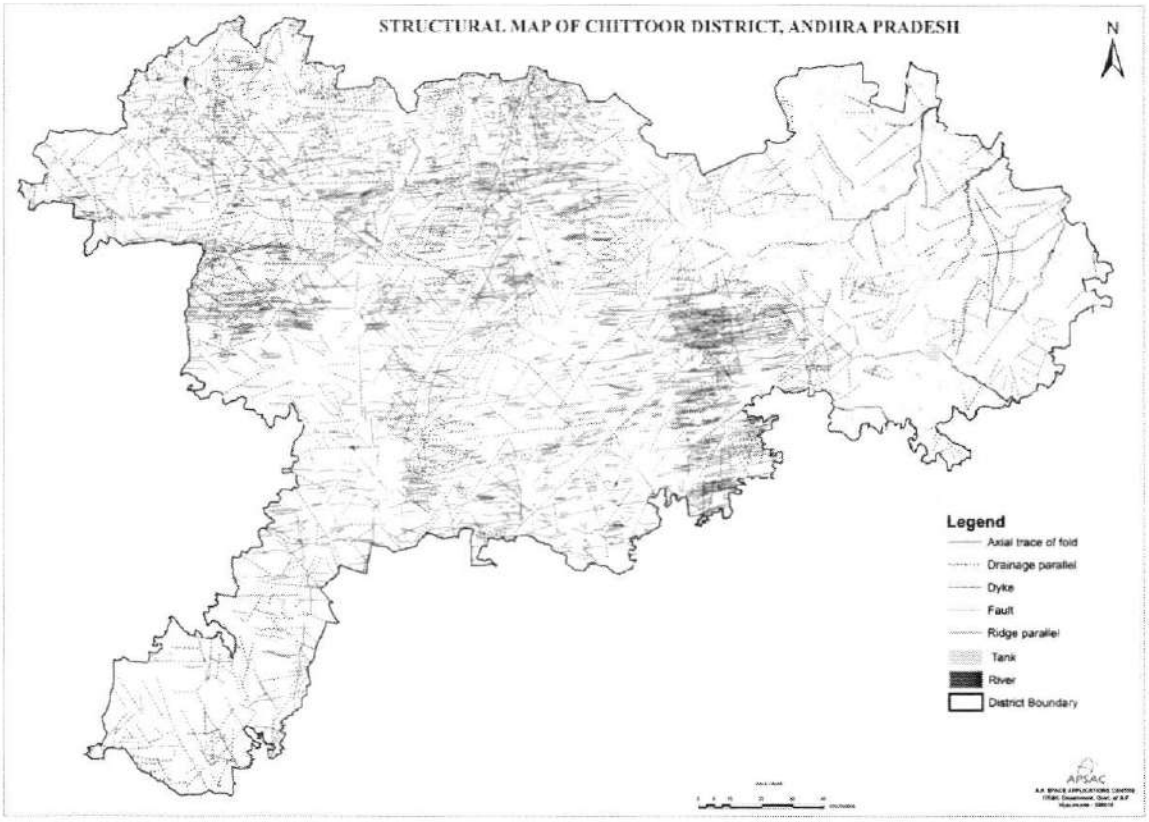
Hogback: It is a long narrow ridge or series of hills, structurally controlled by the presence of homoclinal sedimentary strata that dip steeply (> 500). Hogbacks develop best in sediments that are in hard and soft layers of marked contrast. Because of their steep dips, hogbacks remain more or less fixed in the landscape, and do not retreat as that of a Cuesta

4.3.7.Structural /Lineament Map of Chittor Disrict

All linear features are to be interpreted from the image. The cultural features like road, railway line, high tension lines etc. are to be excluded. The lineament may not be a single

continuous line; rather it has to be shown as discontinuous line segments. Lineaments from remote sensing data can be identified mainly based on their linear nature, presence of moisture, alignment of vegetation, alignment of ponds, straight stream segments, etc. However, interpretation of lineaments is to be done in conjunction with other diagnostic criteria such as channel offset, bank erosion and down-cutting of channel along lineament, warping and displacement of sediment layer, anabranching of river course, abrupt change of river course, presence of dry channel in an active river course, channel rejuvenation and land subsidence, linear ridges, scarp surface, linear alignment of water bodies and straight channel segments.

Fig 22:



Structural Map of chittoor district, A.P

4.4.0.Ground Water Scenario

4.4.1.Hydrogeology: More than 90% of the district is underlain by crystalline formations and the remaining area by semi-consolidated formations. The degree and depth of weathering vary from place to place in crystalline formations and hence the potentiality of shallow aquifers also varies. Ground water occurs under unconfined conditions in weathered portion and semi-confined to confined condition occurs in fractures, joints at deeper depths. Ground water in weathered formations is developed by dug wells. For irrigation purposes, the dug wells are circular or rectangular in shape with 30 to 60 sq.m. The domestic wells are mostly circular in shape and smaller in size. The depth of the wells is upto 10m. The average discharge of energized wells ranges from 18 to 30 cu.m/day. However, during monsoon period, the discharge varies from 80 to 200 cu.m/day and during summer 10 to 50 cu.m/day.

To increase the yield of the dug wells inclined/horizontal bores of 25 mm dia were drilled to a length of around 10m. The deeper aquifers are developed through construction of shallow/deep bore wells. The bore wells are drilled down to 120 m depth with 162 m dia in. However, the encountering of fractures beyond 70 m is very less and at few places, the potential aquifers were encountered beyond 130 at Mogili and Malreddikandriga. This was noticed under the exploration programme by CGWB. The bore well yields generally vary from 0.1 to 5.0 lps. Analysis of fracture pattern and yield of exploratory wells are given in the Table-3.

The Nagari Quartzites are mostly confined to uplands and hilly areas, which are covered by forest. These formations are massive and compact, and possess meagre ground water potential. The ground water development is very less and there is not much habitation in these formations. The alluvium is confined mostly to riverbanks and stream courses with varying width and depth. Ground water development in this formation is mostly by filter points and dug wells. The well yields vary from 3 to 10 lps. with drawdown of 2 to 6 m. They can sustain pumping for 6 to 8 hours/day with fast recovery of water levels. The Hydrogeology of Chittoor district is shown in Fig.21.

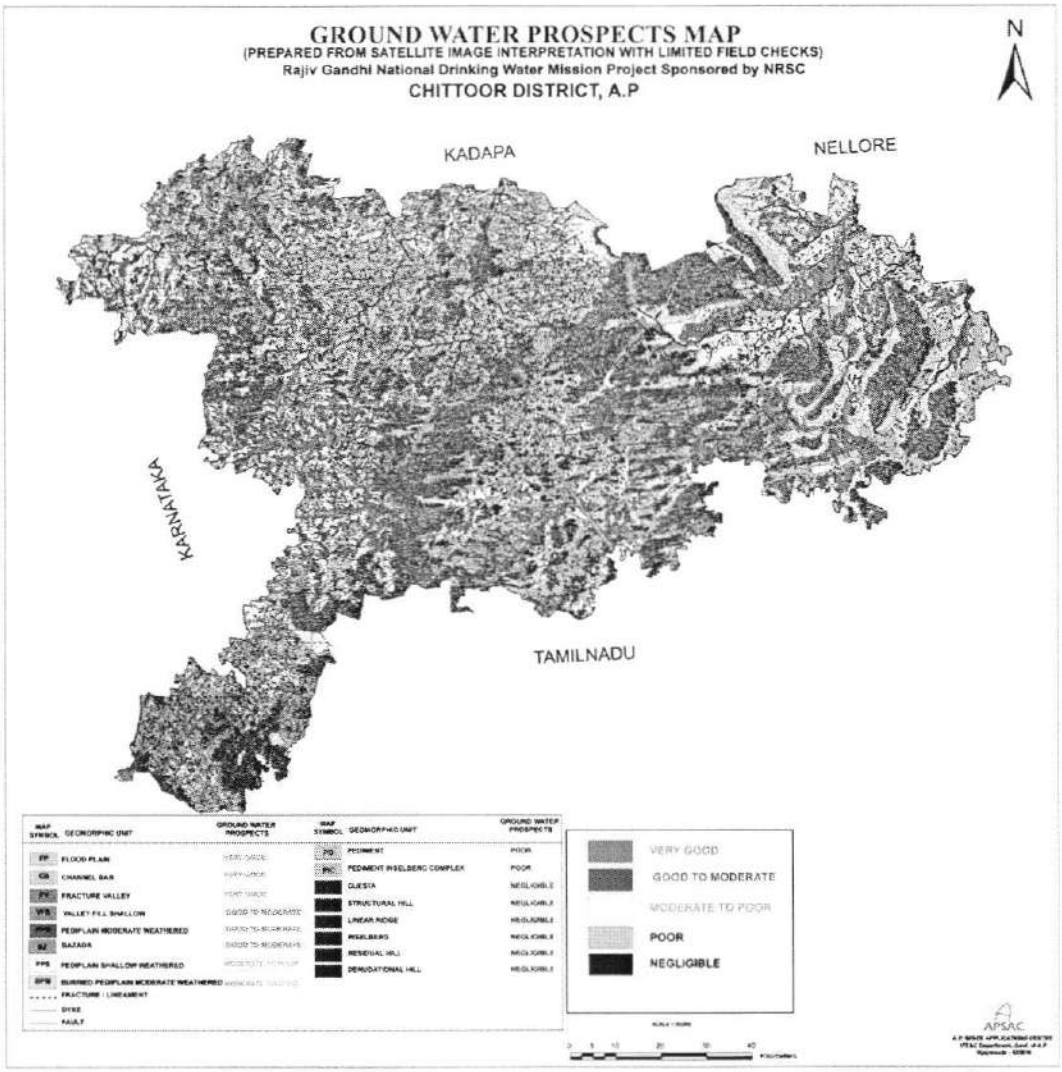


Fig:23.Groundwater prospects map of Chittoor District,A.P

Table- 16. Fracture Pattern & Yield of wells Constructed by CGWB

S. No.	Mandal	Depth drilled (m bgl)	Fracture zones encountered (m bgl)		Discharge Range (lps)
1	Nagari 13° 39' 30" 78° 53' 10"	120	Shallow	16	Traces
			Deeper	115-116	4.9
2	Srikalahasti	200	Shallow	16 35-36 41-42 64-65 81-82	Traces 1.3 2.2
			Deeper	----	--
			Deeper	----	--

Aquifer parameters

In hard rocks, the specific capacity of the bore wells is in the range of 0.13 to 11.38 cu.m/hr/m drawdown. The transmissivity is in the range of 30 to 150 sq.m/d with a maximum value of 824 sq.m/day. The specific capacity of wells in alluvium varies from 0.14 to 1.0 lpm/mdd.

Water Levels

Pre-monsoon, (May 2012)

Depth to water level data of monitoring wells of CGWB and piezometers of APSGWD has been considered for the purpose of analysis. Depth to water levels during pre-monsoon season (2012) is presented in Fig.5. Water levels of 2-5mbgl is observed in the central and eastern parts of the district. 5-10mbgl range of water levels zone is noticed in the central part. More than 10m depth to water levels has been seen in western and as isolated patches in northern and south central regions.

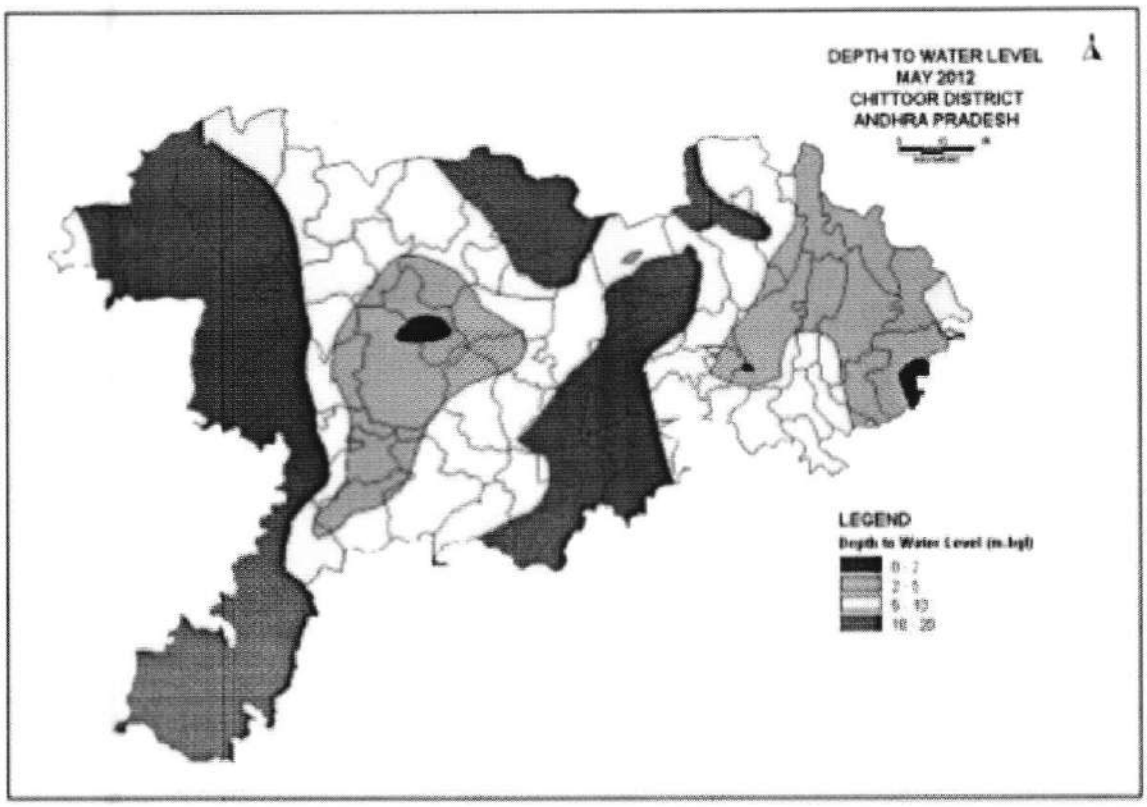


Fig.24. Premonsoon Water levels of Chittoor Distrct.A.P

Post monsoon (November, 2012)

Most of the area in the district has water levels between 5-10 m bgl. However, water levels between 10 and 20mbgl were observed in the extreme western part of the district in and around Madanapalle, Peddamanyam, Ramasamudrum, Pedda Thippasamudrum and Gudipala areas (Fig23). Shallow Water levels less than 2mbgl were observed in the eastern part.

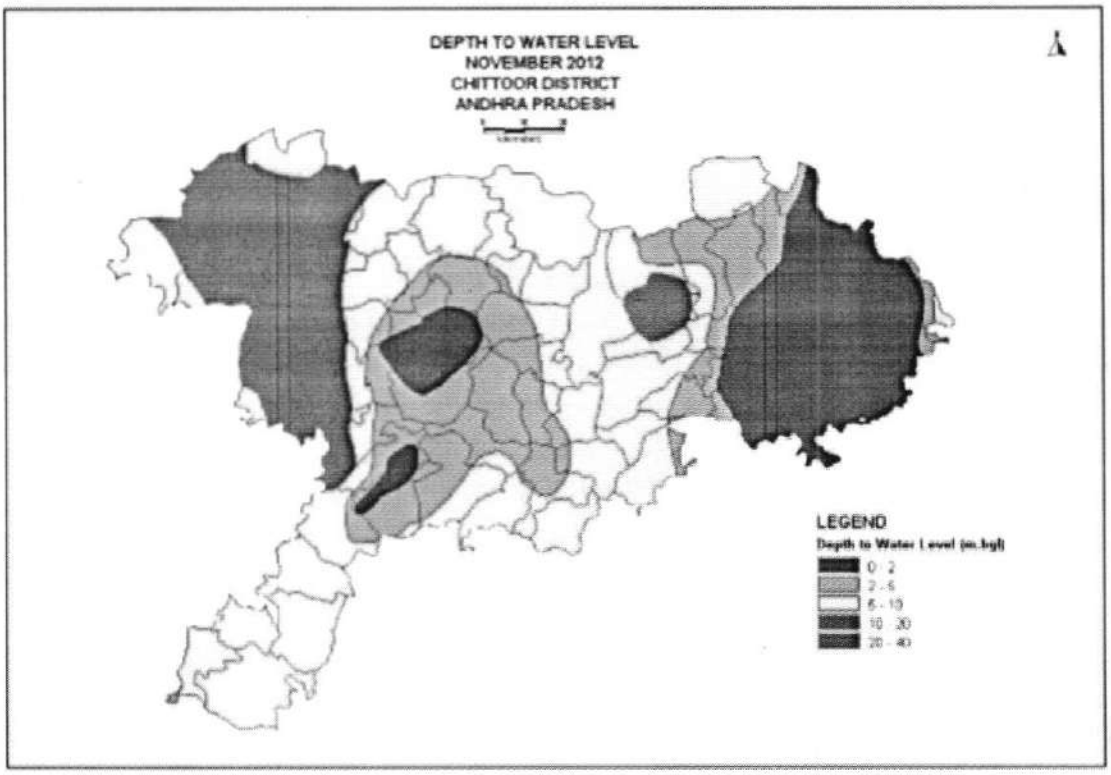


Fig.25. Post monsoon Water levels of Chittoor Distrct.A.P

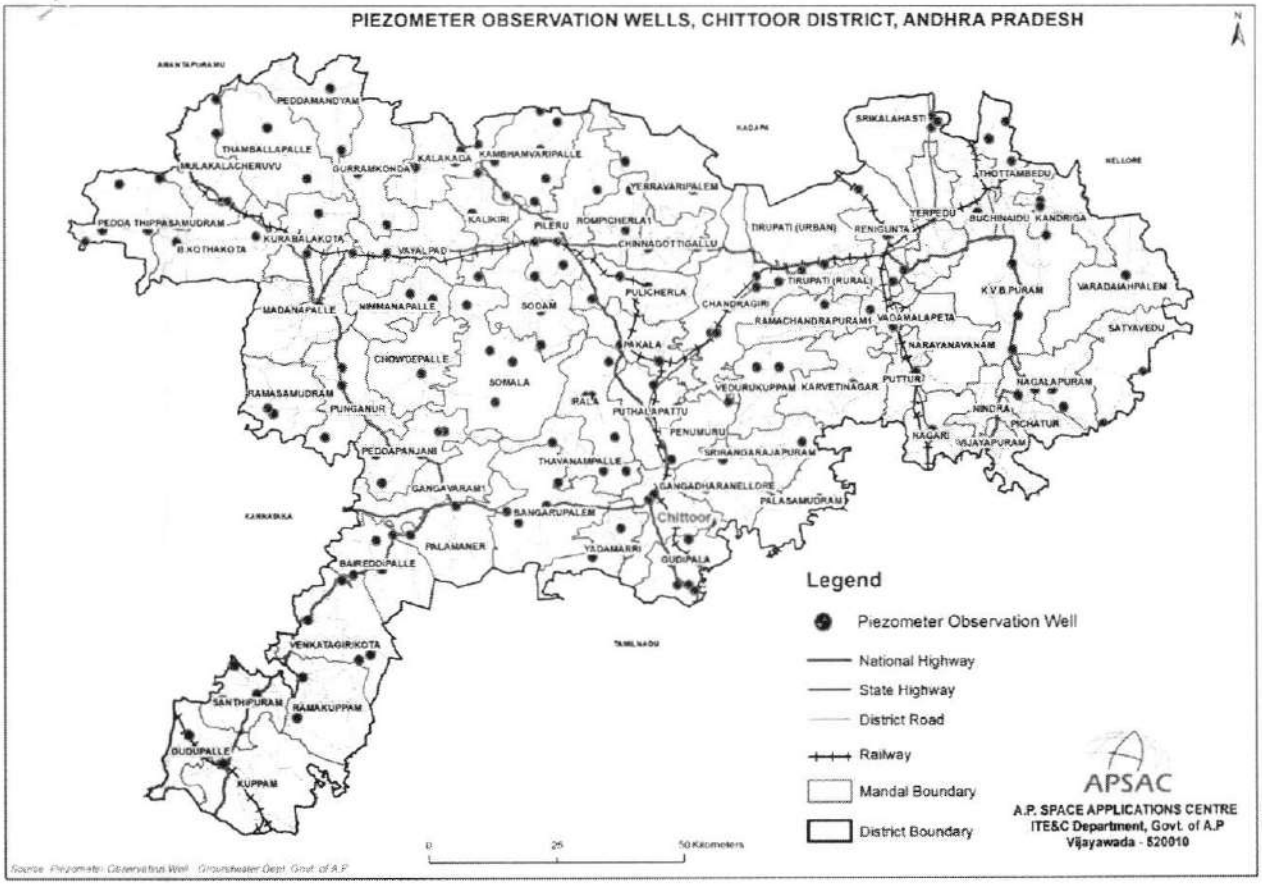


Fig 26: Piezometric observation well Map of chittoor district, A.P

4.4.2. Ground Water Quality Of Chittoor District

Ground water samples were collected from 8003 habitations out of 11349 habitations representing for two seasons i.e., post monsoon and pre monsoon in December 2012 and June 2014 for the entire District. The water samples were collected from Rural Water Supply and Sanitation Department (*RWS & S*) and analyzed for physico-chemical parameters like TDS, TH, Cl, NO3, pH, F, Fe, TA and SO4 using standard techniques in the laboratory and compared with the BIS (10500-2015) standards 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 10% of the area is under non potable category due to high concentration of Nitrate and Total Hardness. About 50%of the area is potable category and the remaining 40%of the area is covered in hills and waterbodies of the entire District. The occurrence and movement of groundwater in an area are governed by several factors such as topography, lithology, geological structure, depth of weathering, extent of factures, drainage pattern, climate conditions and interrelationship between these factors.

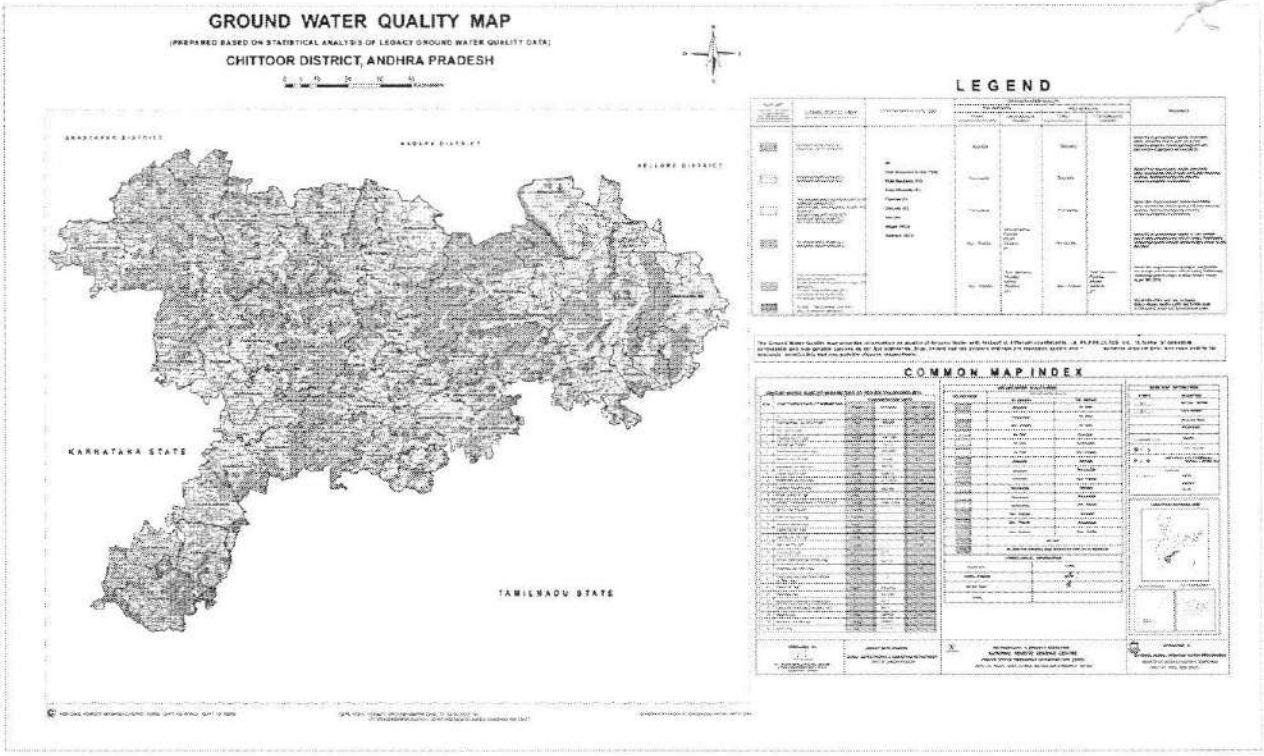


Fig 27: Water Quality Map of Chittoor District, A.P

5. Major And Minor Minerals: Their Production And Revinue

5.1. Administrative set up : The production and revenue of the Major and minor minerals of the state are supervised by the Department of mines and geology under the supervision of Principal Secretary and DG at the state level

At the district level, there are two Assistant Directors, one at the district headquarters (Chittoor) another at Palamaneru. Both of them report to Zonal Joint Direcotor, Department Mines and Geology,Kadapa, A.P

5.2. Overview of Mining Activity in the District

Geologically the rocks of Archaean, Proterozoic, Jurassic-Cretaceous, and Tertiary – Quaternary ages are exposed in the district. The oldest rocks in the area belong to migmatite complex, represented by migmatised quartzo felspathic gneiss and are exposed in the Northeastern part of the district. Older metamorphics comprise amphibolite, hornblende – talc –mica – schist, fuchsite quartzite, cola silicate rock, marble and banded ferruginous quartzite. These older metamorphics occur as enclaves within peninsular Gneissic Complex (PGC).

The PGC comprises a complex assemblage of gneissic variants and granitic rocks which occupy almost the entire area of the district. PGC in the area is represented mostly by biotite – hornblende gneiss, biotite granite and migmatite.

The Dharwar supergroup of rocks represented by quartz – mica schist, amphibolite schist, quartzo – felspathic mica schist (Champion gneiss), metabasalt, metadacite and banded ferruginous quartizite, belonging to various schist belts and occur as long, linear N – S trending belts and overlie PGC non- conformably.

Acid intrusives of Proterozoic age comprise granite and quartz veins. The granite plutons are exposed as patches and linear bodies in southwestern and northwestern parts of the district, respectively. A small syenite body occurs to the southeast of Palamaner. The basic dykes include dolerities. Three sets of dolerite dykes trending E – W, N – S and NW – SE, traverse the PGC. The E- W trending dykes form swarms in the southcentral part of the district.

The southern tip of the well known Cuddapah Basin falls in the North-eastern part of this district. Shale and Quartzite of Balrenkonda Formation. Shales / phylite

and limestone of Cumbhum formation are exposed in the Disrrict. The rocks of gondwana Super Group occur non-conformably over the PGC in south-eastern part of the District represented by Satyavedu Formation (under Gondwana) and comprise mottled, ferruginous quartzite, and conglomerate with plan fossils. Laterite cappings occur over Gondwana formations. Large tracts of Alluvium occur along the major streams which belong to Recent Age.

Mineral Resources in Chittoor District:-

The following table reflects the availability of mineral reserves and resources in the District

Mineral Resources of Chittoor District

Table:17.Mineral resource of Chittoor District

Sl. No.	Mineral	unit	Mineral reserves	Remaining resources	Total Mineral resources
1.	Gold ore (primary	tons		3011532	3011532
2.	Gold metal (primary)	tons		14	14
3.	Quartzite	000tons	1166	415	1581
4.	Quartz	000tons	84	196	281
5.	Granite	000cu.m		504075	504075

* Source: Nation Mineral Inventory – An Overview as on 01-04-2010 by Indian Bureau of Mines.

Gold occurrences are known from Bisanatham, Chiurugunta, Gudupalli, Nandimadugu, Mallappakonda, Kuddittanapalle and Gollapally of Kuppam area with an average grade ranging from 4 to 6 gm for gold per tonne or Ore. The possible reserves are aound 3million tonnes of gold ore.

Chittoor District has become world famous because of the Granite Polishing Industry which was established at Kuppam four decades back. The latter has been supplying monuments to the world market for a long time. Chittoor was also the first district in the State where the quarrying for granite was taken up on commercial scale.

Geologically, this district is covered by peninsular Gneissic Complex consisting of grey granitic gneisses, traversed by the basic and ultra basic intrusives. The basic intrusives are mostly dolerites, though some dykes of gabbroic nature are also encountered.

The dolerite dykes are extensively seen in Gudipala, Chittoor, Yadamari, Bangarupalem, Vayalpadu, Sodum, Somala, Vedurukuppam, Santhipuram, Ramakuppam and Madanapalli areas. These dykes range in width varying from 3 to 100 metres and run discontinuously even up to a few kilometres. The prominent dykes of Gudipala and Basavapalli are extensively quarried near Gudipala, Kuppiganipalli, Basavapalli, Pasumanda, Naragallu and Paradarami, Veerasettipalli, Chittapara and Ragimanupenta R.F etc., The other areas where black granite is exploited are Varathuru, Devalampeta, Mandanapalli, etc.,

Apart from black granite, grey granites are also being quarried in the district. In the areas around Kuppam, the granitic gneisses are greenish in Colour and are being marketed under the trade name of "Kuppam Green" . They are extensively quarried near Yamaganaipalli, Nagaram, Yanadipalli, Bajanam etc., Apart from this, other varieties in District are being marketed under the trade name of "English- teak, Silver Waves, Iscon White, Meera White, Chetah Brown and Multi Colour".

BUILDING MATERIALS

The Arcaean gneisses and granites, Gondwana sandstones and Nagari quartzites found in different parts of the district are utilised as building stones. The Dolerites and Diabase rocks are best suited in cutting and polishing Industry.

Occurrence of Minerals in the District:

Gold – Bisantham, Chigaragunta, Gudupalli, Nandimadugu, Mallappakonda, Kudditanapalle, Golapalle.

Iron & Manganese – Vuddalacheruvu (Yerpedu), Naraharipeta (Gudipala), Kammachinnapalli, Boyakonda, Ethalakonda.

Quartz / Quartzite – Karvertinagar, Thalupalapalli, Chittiboyanipalli (Puthalapattu Mandal).

Chittoor District is well known for Granite and minor occurrences of other minerals like Iron Ore, Gold, Barytes and Steatite etc. At present, there are 714 Quarry leases for Granite, Dimensional Stones, Quartz, Road Metal and Building Stone and Gravel. The mineral deposits are surface and sub-surface, and open cast mining is taking place in Chittoor District. The details of present mining activity is as follows:Table:17.

Table:18. The details of present mining activity

Sl.No.	Name of the Mineral	No. of Working Quarries	Type of Quarrying	No. of workers involved	Remarks
1.	Granite	466	Open Cast	9320	
2.	Dimensional Stones	19		380	
3.	Quartz	6		120	
4.	Road Metal	218		2180	
5.	Gravel	5		20	

Based on the mineral resources available in the District, the following mineral based industries have been established in Chittoor District. The details are as follows:

Table:19. Mineral Resources Available In The District

SI.No.	Name of the Mineral Based Industries	No.of Existing units	No. of Workers involved	Remakrs
1.	Granite Cutting & Polishing Unit	356	4272	
2.	Crushers	156	2340	
3.	Ferro-Alloys Units	1	15	
4.	Silicon Carbide	1	15	
5.	Ready-mix concrete	6	20	
6.	Essential Utility Services (Pipes for water conveying)	1	20	

Details of mineral revenue received in last six years:

The Department of Mines and Geology is entrusted with both promotional and regulatory functions for the overall development of mineral sector and also collection of mineral revenue to the State chequer. The Government has set the target to achieve Rs.118 crores on mining of minerals in Chittoor district during the year 2017-18 and achieved 108 crores with 92% of achievement.

Mineral revenue for the last (6) years

Table: 20.Details of mineral revenue received in last six years

Sl.No.	Year	Target	Achievement	%
1	2012-13	4218.44	4848.88	114.94
2	2013-14	5290.19	5366.72	101.45
3	2014-15	5923.15	6264.35	105.76
4	2015-16	8055.27	7699.77	95.59
5	2016-17	11647.00	10221.00	87.76
6	2017-18	11800.00	10887.50	92.27

2. Note on District-wise availability of Sand / Gravel or aggregate resources:-

There are no major rivers in the district and all are of 3rd and below 3rd order streams. Most of the rivers are ephemeral in nature carrying large quantities of water immediately after precipitation. The drainage is generally subarticulate to sub-parallel following straight courses. The important drainage basins are Bahuda, Pincha, Swarnamukhi, Palar Ponnai and Araniyar. The Bahuda and Pincha are north flowing rivers, Swarnamikhi is east flowing, Palar is southeast flowing, Ponnai towards south and Araniyar is southeast flowing.

According to the assessment made on the basis of village records, 57% of the area is covered by Red loamy soils, 34% by red sandy soils. The remaining 9% is covered by black clay (3%), black loamy (2%), black sandy (1%) and red clay (3%).

MANDAL-WISE MINERAL RESOURCES

		Mineral available	
S.No.	Mandal	Major Minerals	Minor Minerals

1	Mulakalacheruvu	-	Color & Black Granite
2	Thamballapalle	Gold And Associated Minerals	Black Granite, Colour Granite, Quartz
3	Peddamandyam	Feldspar And Quartz	Black Granite, Colour Granite
4	Gurramkonda	Phyrophillite	Colour Granite, Road Metal And Building Stone
5	Kalakada	-	Colour & Black Granite
6	Kambhamvaripalle	-	Colour & Black Granite, Road Metal And Building Stone
7	Rompicherla	-	Black Granite, Colour Granite, Road Metal And Building Stone.
8	Yerravaripalem	Pyrophilite	Road Metal & Building Stone & Black Granite
9	Tirupati (rural)	-	Road Metal & Building Stone, Black Granite
10	Renigunta	Quartz	Road Metal & Building Stone
11	Yerpedu	Quartz	Road Metal & Building Stone
12	Srikalahasti	Quartz, Steatite & Feldspar	Road Metal & Building Stone
13	Thottambedu	-	Road Metal & Building Stone
14	Buchinaidu Kandriga	-	Road Metal & Building Stone
15	Varadaiahpalem	-	Road Metal & Building Stone, Gravel
16	K.v.b.puram	-	Road Metal & Building Stone & Colour Granite
17	Tirupati (urban)	-	
18	Chandragiri	-	Road Metal & Building Stone
19	Chinnagottigallu	Quartz, Phyrophillite	Road Metal & Building Stone
20	Pileru	Quartz	Black Granite, Colour Granite, Road Metal And Building Stone

Mineral available

S.No.	Mandal	Major Minerals	Minor Minerals
21	Kalikiri	-	Colour & Black Granite

22	Vayalpad	-	Black Granite, Colour Granite, Road Metal And Building Stone
23	Kurabalakota	-	Black Granite, Colour Granite, Road Metal And Building Stone
24	Pedda Thippasamudram	-	Colour Granite, Road Metal And Building Stone
25	B.kothakota	-	Black Granite, Colour Granite, Road Metal And Building Stone
26	Madanapalle	-	Colour Granite, Road Metal And Building Stone, Dimensional Stone
27	Nimmanapalle	Quartz	Black Granite, Colour Granite, Road Metal And Building Stone
28	Sodam	Quartz	Colour And Black Granite
29	Pulicherla	-	Road Metal & Building Stone, Black Granite
30	Pakala	-	Road Metal & Building Stone & Black Granite
31	Vedurukuppam	-	Road Metal & Building Stone, Black & Colour Granite
32	Ramachandrapuram	-	Road Metal & Building Stone, Black & Colour Granite
33	Vadamalapeta	-	Road Metal & Building Stone
34	Narayanavanam	-	Road Metal & Building Stone
35	Pichatur	-	Road Metal & Building Stone
36	Satyavedu	-	Road Metal & Building Stone, Gravel
37	Nagalapuram	-	Road Metal & Building Stone
38	Nindra	-	Road Metal & Building Stone
39	Vijayapuram	-	Road Metal & Building Stone & Gravel

Mineral available

S.No.	Mandal	Major Minerals	Minor Minerals
40	Nagari	-	Road Metal & Building Stone, Black & Colour Granite
41	Puttur	-	Road Metal & Building Stone, Black Granite

42	Karvetinagar	-	Road Metal & Building Stone & Black Granite
43	Penumuru	-	Road Metal & Building Stone, Black & Colour Granite
44	Puthalapattu	-	Road Metal & Building Stone, Black Granite
45	Irala	-	Black Granite & Road Metal & Building Stone
46	Somala	-	Colour And Black Granite
47	Chowdepalle	-	Colour And Black Granite
48	Ramasamudram	-	Colour Granite, Road Metal And Building Stone
49	Punganur	-	Colour & Black Granite, Road Metal And Building Stone
50	Peddapanjani	White Clay	Colour And Black Granite
51	Gangavaram	-	Road Metal And Building Stone
52	Thavanampalle	-	Road Metal & Building Stone, Black & Colour Granite
53	Srirangarajapuram	-	Road Metal & Building Stone, Black & Colour Granite
54	Gangadharanellore	-	Road Metal & Building Stone, Black & Colour Granite
55	Chittoor	-	Road Metal & Building Stone, Black & Colour Granite
56	Palamaner	-	Black Granite, Road Metal And Building Stone
57	Baireddipalle	-	Black & Colour Granite, Road Metal And Building Stone
58	Venkatagirikota	-	Colour And Black Granite, Road Metal And Building Stone

Mineral available

S.No.	Mandal	Major Minerals	Minor Minerals
59	Santhipuram	-	Colour Granite, Dimensional Stones, Road Metal And Building Stone.
60	Gudupalle	Gold And Associated Minerals	Black & Colour Granite, Dimensional Stones, Road

			Metal And Building Stone.
61	Kuppam	White Clay	Black Granite, Colour Granite, Road Metal And Building Stone
62	Ramakuppam	-	Colour And Black Granite, Road Metal And Building Stone
63	Bangarupalem	-	Road Metal & Building Stone, Black Granite
64	Yadamarri	-	Road Metal & Building Stone & Black Granite
65	Gudipala	-	Road Metal & Building Stone, Black & Colour Granite
66	Palasamudram	-	Road Metal & Building Stone, Black & Colour Granite

SOURCE:AD OF MINES AND GEOLOGY,CHITTOOR & PALAMANER

MINERAL RESORUCES OF CHITTOOR DISTRICT

Location 1	Accessiblity 2	Geological Setting 3	Grade 4	Reserves 5	Uses 6
BARYTES					
Bairagi Kandriga	10 Kms. South of Kalahasthi Road leading to Middikhandriga	Associated with heamatite Quartzite		NE	Barium Chemicals
CORUNDUM					
Yerracheru Palli Polichettipalli		Associated with Mica Schists	Small Crystals measuring one inch	NE	Grinding Purpose
CHINA CLAY &					

WHITE CLAY					
Karakambadi	1.6 Kms to 2.4 Kms west of Karakambadi	Formed due to alteration of Pullampet Shales of Cuddapah Super Group. The clay occurs in the form of bands varying in Colour, White to green with a thickness ranging from 0.3 to 4 Mts	China Clay – Pinkish, Grity 25% plasticity very poor fire shrink. Age 1260 Deg. 4% prosity – fire dirty pink semi-sintering.	0.1	Ceramics Refractories
COLOURED CLAY					
Mamandur				NE	
CALCAREOUS CONCRETIONS					
Singasamudram				NE	Kilned for white washing
GOLD					
Bisinatham Chigargunta Gudipalli Nandimadugu Mallappakonda Kudditanapalle Golapalle	12 Kms. From Gudupalli R.S. on Bangalore – Madras Broad Gauge Section. Kudditanapalle is one Km. SE of Bisnatham	Occurs as thin stingers, in quartz associated with mafic schists of Archean Green Stone Belt.	Block I 6.22 g/T Block III 4.2 g/T Block IV & V 4.71 g/T	Chigargunta Block I 0.266 Block II 0.795 Total (Possible + Probable) 1 Mil. T with 4.2 to 6.2 gms. Pertone upto 300 Meters. Blocks IV & V3 Mil. T with 4.71 gms. per	For extraction of Gold.
IRON & MANGANESE					
Vaddualacheruvu	1.6 Km. North of Renigunta – Kalahasthi Road, Yerpedu R.S is 4 Km. form the area	Small band of Iron Ore is associated with Archean and the lower and upper Cuddapah Super Group at the contact of Quartizite and Varigated shale.	Haematite Fe 22.27 to 22.41%	NE	
North of Krishna		Associated Banded Ferrugenous quartzite of	Haematie Fe 15 to		

Puram		Precambrian	59.75%		
Naraharipeta Navallagundapally					
Sirasanambedu (Srikalahasthi Mandal)	13 Km. SW of Naidupet		Fe 60%		Spong Iron Pig Iron
Kamachinnapalli Boyankonda Ethalakonda Dadi East of Ramapuram WSW of Gollakandrika		Small occurance of Iron Ore associated with quartizite		Not economic	
LEAD					
Vaddavaripalli					
QUARTZ / QUARTZITE					
SE of Karvetinagar SW of Talupulapalli			Crystals Sio_2 - 99.9	NE	Decorative Electronics
Chittiboyanapalli			Crystals Sio_2 - 99.9	NE	
Kuraviyerpedu Pullur, Tenepalli, Boppepalli, Poosalathithippa (Kambakur R.F) Sivanathapalem Karkambadi Gundlapalli		Occurs as younger intrusives in Peninsular Gneissic complex	Sio_2 - 99.9 Fe_2O_3 - 0.06	NE	Glass, Fibre glass, Ceramics, Re-fractories

STEATITE					
Pullur, G.D.Nellore, Mukkalathur, B.N.R.Peta, Puthalapatu R.F, Nagari, Chittipirla, Yellamanda, Kothapalli, Narasingarayanipeta, Tallupulapalli	Accessible from Tirupathi		Palegreen Fairly by good	 NE NE	Paper, Pesticides Cosmatics Ceramics
SCHEELITE					
Bisnatham area Chigaragunta Mallapakonda	12 Kms from Gudupalli	Scheelite mineralisation is associated with the reefs throughout the schist belt. Occurs mostly as parallerl veins close to the contact of the quartz lode with the amphibolite as dissemination, streeks, blebs lenses pockets. Veinlets of scheelite is seen in the gold quartz lodes.	White in Colour with shades of dirty brown or orange. Traces WO_3. Traces to 0.18% are found in Gold Mine Tailings / Dumps. Dumps WO_3 0.5 to 1% Sio_2 59.97% Mgo 0.71% R_2O_3 4.35% CaO 8.95% H_2O 0.85%		

			CO_2 1.15%		
DOLERITE **(Black Granite)**					
Konerukuppam, Ramakuppam Krishnapuram, Mollur, Gudipala, Basavapalli, Kuppiganipalli, Pasumanda, Naragallu, Varathuru, Devalampeta, Madanapalli	Accessible from Chittoor Chandragiri Puttur Bangarupalem Vyalpadu & Madanapally Mandals.	Occuring as narrow crested ridges and weathered spheroidal boulders. EW trending dykes are younger to NS dykes. EW, ENE – WSW, WNW-ESE, NS, NW-SE, NE-SW trending dykes are found in the area.	Dolerite dykes (Black granite) are fine to coarsed grained, dark green to greenish black in Colour	NE	Useful for cutting and polishing industry, flooring, panelling, mounments, decorative prupose.
GREY GRANITE / GRANITE **GNEISSES**					
Yamaganipalli Nagarm Yanadipalli Bajanam	Accessible from Kuppam	Associated with Peninsular gneissic complex.	Fine to coarse grained Grey, Pink & Multi Coloured	NE	Useful in Cutting & Polishing Industry. Flooring Penneling Monuments kerb stone & decorative Purposes.

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पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 25 जुलाई, 2018

का.आ. 3611(अ).—भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना सं. का.आ. 1533(अ) तारीख 14 सितंबर, 2006, भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (ii) में (जिसे इसमें इसके पश्चात् उक्त अधिसूचना कहा गया है) प्रकाशित की गई थी, जिसके द्वारा पूर्व पर्यावरण निकासी के संबंध में निदेश जारी किए गए हैं ;

और पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय में उक्त अधिसूचना को का.आ. 141(अ) तारीख 15 जनवरी, 2016 द्वारा संशोधित किया है, जिसमें गौण खनिजों के लिए जिला सर्वेक्षण रिपोर्ट तैयार करने की प्रक्रिया को विहित किया गया है ;

और रांची स्थित माननीय झारखंड उच्च न्यायालय ने 2015 की रिट याचिका (पीआईएल) संख्या 1806, स्वप्रेरणा बनाम झारखंड राज्य एवं अन्य के मामले में रिट याचिका (पीआईएल) सं. 2013 की 290, हेमंत कुमार शिल्कारवर बनाम झारखंड राज्य एवं अन्य के मामले में, अन्य बातों के साथ, तारीख 11 अप्रैल, 2018 और 19 जून, 2018 के आदेश में बालू और रेत से भिन्न गौण खनिजों के लिए जिला सर्वेक्षण रिपोर्ट तैयार करने या बालू और रेत से भिन्न गौण खनिजों की जिला सर्वेक्षण रिपोर्ट तैयार करने के लिए शक्तियों का प्रत्यायोजन करने के लिए राज्य सरकार और/या जिला पर्यावरण संघात निर्धारण प्राधिकरण और जिला विशेषज्ञ मूल्यांकन समिति को निदेश दिया है ;

और केंद्रीय सरकार लोक हित में पर्यावरण (संरक्षण) नियम, 1986 के नियम 5 के उपनियम (3) के खंड (क) के अधीन सूचना देने की अपेक्षा से अभिमुक्ति प्रदान करती है ;

और केंद्रीय सरकार, पर्यावरण (संरक्षण) नियम, 1986 के नियम 5 के उपनियम (4) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उपधारा (1) और उपधारा (2) के खंड (v) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना सं. का.आ. 1533(अ) तारीख 14 सितंबर, 2006 में निम्नलिखित और संशोधन करती है, अर्थात् :--

उक्त अधिसूचना में परिशिष्ट 10 के स्थान पर निम्नलिखित रखा जाएगा, अर्थात् :--

"परिशिष्ट 10

[पैरा 7 (iii) (क) देखें]

1. बालू खनन या नदी तल खनन के लिए जिला सर्वेक्षण रिपोर्ट तैयार करने के लिए प्रक्रिया

जिला सर्वेक्षण रिपोर्ट तैयार करने का मुख्य उद्देश्य (भरणीय बालू खनन के लिए मार्गदर्शक सिद्धांतों के अनुसार) निम्नलिखित को सुनिश्चित करना है :--

उच्चयन या जमाव के क्षेत्रों की पहचान, जहां खनन को अनुज्ञात किया जा सकता है ; और भूक्षयण के क्षेत्रों की पहचान तथा अवसंरचना ढांचों और प्रतिष्ठापनों से निकटतता जहां खनन को प्रतिषिद्ध किया जाना चाहिए और भराई की वार्षिक दर की गणना तथा उस क्षेत्र में खनन के पश्चात् भराई के लिए समय को अनुज्ञात करना ।

रिपोर्ट के निम्नलिखित संघटक होंगे :

(1) प्रस्तावना ;

(2) जिले में खनन कार्यकलापों का विहंगावलोकन ;

(3) अवस्थिति क्षेत्र और वैधता की अवधि सहित जिले में खनन पट्टों की सूची ;

(4) पिछले तीन वर्ष में प्राप्त स्वामिस्व या राजस्व के ब्यौरे ;

(5) पिछले तीन वर्ष के दौरान बालू या रेत या गौण खनिज के उत्पादन के ब्यौरे ;

(6) जिले की नदियों में तलछट के जमा होने की प्रक्रिया ;

(7) जिले का साधारण प्रोफाइल ;

(8) जिले में भू उपयोग का पैटर्न : वन, कृषि, उद्यान कृषि, खनन आदि ;

(9) जिले की भूगर्भीय स्थिति ;

(10) मासवार वर्षा ;

(11) भूगर्भ और खनीज संपदा ।

पूर्वोक्त के अतिरिक्त रिपोर्ट में निम्नलिखित अंतर्विष्ट होंगे :

(क) जिलावार नदी या धारा और अन्य रेत के स्रोत के ब्यौरे ;

(ख) जिलावार रेत या कंकड़ या समग्र संसाधनों की उपलब्धता ;

(ग) जिलावार विद्यमान रेत के खनन पट्टों के ब्यौरे और समग्र ।

जिला पर्यावरण संघात निर्धारण प्राधिकरण द्वारा भूविज्ञान विभाग या सिंचाई विभाग या वन विभाग या लोक निर्माण विभाग या भू-जल बोर्ड या सुदूर संवेदन विभाग या खनन विभाग आदि की सहायता से जिले में सर्वेक्षण किया जाएगा ।

मुख्य नदियों के विवरण सहित निकासी प्रणाली

क्रम सं.	नदी का नाम	निष्कासन क्षेत्र (वर्ग किलोमीटर)	जिले में प्रतिशत निष्कासित क्षेत्र
(1)			
(2)			

महत्वपूर्ण नदियों और धाराओं की मुख्य विशेषताएं :

क्रम सं.	नदी या धारा का नाम	जिले में कुल लंबाई (किलोमीटर में)	उद्भव का स्थान	उद्भव के स्थान पर ऊंचाई
(1)				
(2)				

खनिज छूट के लिए सिफारिश किया गया नदी या धारा का भाग	खनिज छूट के लिए सिफारिश किए गए क्षेत्र की लंबाई (किलोमीटर में)	खनिज छूट के लिए सिफारिश किए गए क्षेत्र की औसत चौड़ाई (मीटर में)	खनिज छूट के लिए सिफारिश किया गया क्षेत्र (वर्ग मीटर में)	खनन योग्य खनिज क्षमता (मीट्रिक टन में) (कुल खनिज क्षमता का 60 प्रतिशत)

खनिज क्षमता

बोल्डर (मीट्रिक टन)	रेत (मीट्रिक टन)	बालू (मीट्रिक टन)	कुल खनन योग्य खनिज क्षमता (मीट्रिक टन)

वार्षिक जमाव

क्रम सं.	नदी या धारा	खनिज छूट के लिए सिफारिश किया गया नदी या धारा का भाग	खनिज छूट के लिए सिफारिश किए गए क्षेत्र की लंबाई (किलोमीटर में)	खनिज छूट के लिए सिफारिश किए गए क्षेत्र की औसत चौड़ाई (मीटर में)	खनिज छूट के लिए सिफारिश किया गया क्षेत्र (वर्ग मीटर में)	खनन योग्य खनिज क्षमता (मीट्रिक टन में) (कुल खनिज क्षमता का 60 प्रतिशत)
(1)						
(2)						
जिले के लिए योग						

उप प्रभागीय समिति, जो (i) उप प्रभागीय मजिस्ट्रेट (ii) निम्नलिखित विभागों के अधिकारियों (क) सिंचाई विभाग (ख) राज्य प्रदूषण नियंत्रण बोर्ड या समिति (ग) वन विभाग (घ) भू-विज्ञान या खनन अधिकारी से मिलकर बनेगी, खनन के लिए उपयुक्तता या खनन को प्रतिषिद्ध करने के लिए प्रत्येक स्थान का, जिसके लिए पर्यावरण निकासी का आवेदन किया गया है, भ्रमण करेगी।

खनन क्षमता की संगणना करने के लिए अंगीकृत विधि :

खनन क्षमता की संगणना स्थान की जांच और नदी या धारा के आवाह क्षेत्र के भू-विज्ञान के आधार पर की जाएगी। स्थल स्थिति और अवस्थिति, खनन योग्य खनिजों को परिभाषित किया जाएगा। किसी नदी या धारा में खनिजों के खनन का विनिश्चय भू-आकृति विज्ञान और अन्य कारकों के आधार पर किया जा सकता है, यह किसी विशिष्ट नदी या धारा के क्षेत्र का 50 से 60 प्रतिशत हो सकता है। उदाहरणार्थ कुछ पहाड़ी राज्यों में खनिज संघटक, जैसे बोल्डर, नदी से उत्पन्न रेत, बालू को एक मीटर तक संसाधन खनिज माना जाता है। अन्य संघटक जैसे क्ले और तलछट को किसी विशिष्ट नदी या धारा की खनिज क्षमता की संगणना करते समय अपशिष्ट माना जाता है।

जिला सर्वेक्षण रिपोर्ट जिले में तैयार की जाएगी और उसके प्रारूप को पब्लिक डोमेन में कलेक्टर के कार्यालय में

उसकी एक प्रति रखकर रखा जाएगा तथा उसे 21 दिन के लिए जिले की वेबसाइट पर भी पोस्ट किया जाएगा । प्राप्त टिप्पणियों पर विचार किया जाएगा तथा यदि सही पाया जाता है तो जिला पर्यावरण संघात निर्धारण प्राधिकरण द्वारा छह मास के भीतर तैयार की जाने वाली अंतिम रिपोर्ट में उसे सम्मिलित किया जाएगा ।

जिला सर्वेक्षण रिपोर्ट पर्यावरण निकासी, रिपोर्टों और मूल्यांकन परियोजनाओं को तैयार करने का आधार बनेगी । रिपोर्ट को प्रत्येक पांच वर्ष में एक बार अद्यतन किया जाएगा ।

II. बालू खनन या नदी तल खनन से भिन्न गौण खनिजों के लिए जिला सर्वेक्षण रिपोर्ट तैयार करने की प्रक्रिया

जिला सर्वेक्षण रिपोर्ट को जिले में प्रत्येक गौण खनिज के लिए पृथक् रूप से तैयार किया जाएगा और उसके ड्राफ्ट को पब्लिक डोमेन में कलेक्टर के कार्यालय में उसकी एक प्रति रखकर रखा जाएगा तथा उसे 21 दिन के लिए जिले की वेबसाइट पर भी पोस्ट किया जाएगा । प्राप्त टिप्पणियों पर विचार किया जाएगा तथा यदि सही पाया जाता है तो जिला पर्यावरण संघात निर्धारण प्राधिकरण द्वारा छह मास के भीतर तैयार की जाने वाली अंतिम रिपोर्ट में उसे सम्मिलित किया जाएगा ।

बालू खनन या नदी तल खनन से भिन्न गौण खनिजों के लिए जिला सर्वेक्षण रिपोर्ट नीचे वर्णित संघटकों के अनुसार होगी :--

बालू खनन या नदी तल खनन से भिन्न गौण खनिजों के लिए जिला सर्वेक्षण रिपोर्ट तैयार करने का प्रारूप

(1) प्रस्तावना ;

(2) जिले में खनन कार्यकलापों का विहंगावलोकन ;

(3) जिले का साधारण प्रोफाइल ;

(4) जिले की भूगर्भीय स्थिति ;

(5) सिंचाई निष्कासन पैटर्न ;

(6) जिले में भू उपयोग का पैटर्न : वन, कृषि, उद्यान कृषि, खनन आदि ;

(7) जिले में सतह जल और भूमिगत जल का परिदृश्य ;

(8) जिले में वर्षा वृत्ति और जलवायु स्थिति ;

(9) निम्नलिखित प्रारूप के अनुसार जिले में खनन पट्टों के ब्यौरे :--

क्रम सं.	खनिज का नाम	पट्टेदार का नाम	पट्टेदार का नाम और संपर्क संख्या	खनन पट्टा अनुदान आदेश संख्या एवं तारीख	खनन पट्टे का क्षेत्र (हेक्टेयर में)	खनन पट्टे की अवधि (प्रारंभिक)		खनन पट्टे की अवधि (पहला/दूसरा ..... नवीकरण)	
						से	तक	से	तक
1	2	3	4	5	6	7	8	9	10

खनन प्रचालन के प्रारंभ होने की तारीख	प्रास्थिति (कार्यशील/गैर-कार्यशील पारेषण आदि के लिए स्थायी रूप से कार्यशील)	कैप्टिव/गैर-कैप्टिव	पर्यावरणीय निकासी अभिप्राप्त (हां/नहीं) यदि हां तो पर्यावरण निकासी अनुदत्त करने की तारीख सहित पत्र संख्या	खनन पट्टे की अवस्थिति (अक्षांश एवं देशांतर)	खनन की विधि (खुली/भूमिगत)
11	12	13	14	15	16

(10) पिछले तीन वर्ष के दौरान प्राप्त स्वामिस्व या राजस्व

(11) पिछले तीन वर्ष के दौरान उत्पादन किए गए गौण खनिज के ब्यौरे

(12) जिले का खनिज मानचित्र

(13) निम्नलिखित प्ररूप के अनुसार जिले में आशय पत्र के धारकों की उसकी वैधता सहित सूची :--

क्रम सं.	खनिज का नाम	पट्टेदार का नाम	आशय पत्र धारक का पता एवं संपर्क संख्या	आशय पत्र आदेश की संख्या एवं तारीख	आबंटित किए जाने वाले खनन पट्टे का क्षेत्र	आशय पत्र की वैधता	उपयोग (कैप्टिव/ गैर-कैप्टिव)	खनन पट्टे की अवस्थिति (अक्षांश एवं देशांतर)
1	2	3	4	5	6	7	8	9

(14) जिले में उपलब्ध कुल खनिज भंडार ;

(15) जिले में उपलब्ध खनिज की क्वालिटी / ग्रेड ;

(16) खनिज का उपयोग ;

(17) पिछले तीन वर्षों के दौरान खनिज की मांग और पूर्ति ;

(18) जिले के मानचित्र पर चिह्नांकित खनिज पट्टे ;

(19) उस क्षेत्र के ब्यौरे, जहां खनिज पट्टों का समूह है, अर्थात् खनिज पट्टों की संख्या, अवस्थिति (अक्षांश और देशांतर) ;

(20) जिले में पारिस्थितिकी संवेदनशील क्षेत्र, यदि कोई हो ;

(21) पर्यावरण (वायु, जल, ध्वनि, मृदा, वनस्पति और प्राणी, भू-उपयोग, कृषि, वन आदि) पर खनन कार्यकलाप का संघात ;

(22) पर्यावरण पर खनन संघात को कम करने के लिए उपचारात्मक उपाय ;

(23) खनन किए गए क्षेत्र को पुन: प्राप्त करना (जिले में नियमों और विनियम, प्रस्तावित पुन: प्राप्ति योजना के अनुसार) सर्वोत्तम व्यवहार को पहले ही कार्यान्वित किया गया है ;

(24) जोखिम निर्धारण एवं आपदा प्रबंधन योजना ;

(25) जिले में व्यवसायिक सुरक्षा मुद्दों के ब्यौरे (सिलिकोसिस एवं तपेदिक के रोगियों के पिछले पांच वर्ष के डाटा को प्रस्तुत करने की आवश्यकता है) ;

(26) जिले में पहले ही अनुदत्त पट्टों के संबंध में पौधा रोपण और हरित पट्टी विकास ;

(27) कोई अन्य सूचना ।

जिला पर्यावरण संघात निर्धारण प्राधिकरण (डीईआईएए) जिले में गौण खनिज की किस्म की प्रकृति के आधार पर संबंधित राज्य सरकार के खनिज और भू-विज्ञान विभाग के परामर्श से जिला सर्वेक्षण रिपोर्ट में अतिरिक्त मानकों को सम्मिलित कर सकेगी ।

जिला सर्वेक्षण रिपोर्ट पर्यावरणीय निकासी, रिपोर्टों को तैयार करने और परियोजनाओं के मूल्यांकन के लिए आधार होगी । रिपोर्ट को प्रत्येक पांच वर्ष में एक बार अद्यतन किया जाएगा ।"।

[फा. सं. एल-11011/26/2018-आईए-II(एम)]

ज्ञानेश भारती, संयुक्त सचिव

टिप्पण : मूल अधिसूचना भारत के राजपत्र, असाधारण, भाग II, खंड 3, उप-खंड (ii) में सं. का.आ. 1533(अ) तारीख 14 सितंबर 2006 द्वारा प्रकाशित की गई थी और तत्पश्चात् उसे निम्नानुसार संशोधित किया गया :--

1. का. आ. 1949 (अ), तारीख 13 नवंबर, 2006;
2. का. आ. 1737 (अ), तारीख 11 अक्तूबर , 2007;
3. का. आ. 3067 (अ), तारीख 1 दिसंबर, 2009;
4. का. आ. 695 (अ), तारीख 4 अप्रैल, 2011;
5. का. आ. 156 (अ), तारीख 25 जनवरी, 2012;
6. का. आ. 2896 (अ), तारीख 13 दिसंबर, 2012;
7. का. आ. 674 (अ), तारीख 13 मार्च, 2013;
8. का. आ. 2204 (अ), तारीख 19 जुलाई 2013;
9. का. आ. 2555 (अ), तारीख 21 अगस्त, 2013 ;
10. का. आ. 2559 (अ), तारीख 22 अगस्त, 2013;
11. का. आ. 2731 (अ), तारीख 9 सितंबर, 2013;
12. का. आ. 562 (अ), तारीख 26 फरवरी, 2014;
13. का. आ. 637 (अ), तारीख 28 फरवरी, 2014;
14. का. आ. 1599 (अ), तारीख 25 जून, 2014;
15. का. आ. 2601 (अ), तारीख 7 अक्तूबर, 2014;
16. का. आ. 2600 (अ), तारीख 9 अक्टूबर, 2014;
17. का. आ. 3252 (अ), तारीख 22 दिसंबर, 2014;
18. का. आ. 382 (अ), तारीख 3 फरवरी, 2015;
19. का. आ. 811 (अ), तारीख 23 मार्च, 2015;
20. का. आ. 996 (अ), तारीख 10 अप्रैल, 2015;
21. का. आ. 1142 (अ), तारीख 17 अप्रैल, 2015;
22. का. आ. 1141 (अ), तारीख 2 9 अप्रैल, 2015;
23. का. आ. 1834 (अ), तारीख 6 जुलाई, 2015;
24. का. आ. 2571 (अ), तारीख 31 अगस्त, 2015;
25. का. आ. 2572 (अ), तारीख 14 सितंबर, 2015;
26. का. आ. 141 (अ), तारीख 15 जनवरी, 2016;
27. का. आ. 648 (अ), तारीख 3 मार्च, 2016;
28. का. आ. 2269 (अ) तारीख 1 जुलाई, 2016;
29. का. आ. 2944 (अ), तारीख 14 सितंबर, 2016;
30. का. आ. 3518 (अ) तारीख 23 नवंबर 2016;
31. का. आ. 3999 दिसंबर (अ) तारीख 9 दिसंबर, 2016; और
32. का. आ. 4241 (अ) तारीख 30 दिसंबर, 2016

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 25th July, 2018

S.O. 3611(E).—Whereas by notification of the Government of India in the erstwhile Ministry of Environment and Forest issued *vide* number S.O. 1533(E), dated the 14th September, 2006 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) (hereinafter referred to as the said notification) directions have been given regarding the prior environmental clearance;

And whereas, the Ministry of Environment, Forest and Climate Change has amended the said Notification *vide* S.O. 141 (E) dated 15th January, 2016 wherein the procedure for preparation of District Survey Report for minor mineral has been prescribed;

And whereas, the Hon'ble High Court of Jharkhand at Ranchi in its orders dated the 11th April, 2018 and 19th June, 2018 in W.P. (PIL) No. 1806 of 2015, in the matter of Court on its Own Motion Versus the State of Jharkhand & Others with W.P. (PIL) No. 290 of 2013, in the matter of Hemant Kumar Shilkarwar Versus the State of Jharkhand & Others, has *inter-alia* directed the preparation of District Survey Report for minor minerals other than Sand and Bajri or delegation of the powers for preparation of format of District Survey Report of minor minerals other than sand and bajri to the State Government and/or District Environment Impact Assessment Authority and District Expert Appraisal Committee;

And whereas, the Central Government hereby in the public interest dispense with the requirement of notice under clause (a) of sub-rule (3) of rule 5 of the Environment Protection Rules, 1986,

Now, therefore in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following further amendments to the notification of the Government of India, in the erstwhile Ministry of Environment and Forests *vide* number S.O. 1533(E), dated the 14th September, 2006, namely: –

In the said notification, for Appendix X, the following shall be substituted, namely: -

"APPENDIX - X

[See paragraph 7 (iii) (a)]

I. PROCEDURE FOR PREPARATION OF DISTRICT SURVEY REPORT FOR SAND MINING OR RIVER BED MINING

The main objective of the preparation of District Survey Report (as per the Sustainable Sand Mining Guideline) is to ensure the following: -

Identification of areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.

The report shall have the following structure:

(1) Introduction;

(2) overview of Mining Activity in the District;

(3) the List of Mining Leases in the District with location, area and period of validity;

(4) details of Royalty or Revenue received in last three years;

(5) detail of Production of Sand or Bajri or minor mineral in last three years;

(6) process of Deposition of Sediments in the rivers of the District;

(7) general Profile of the District;

(8) land Utilization Pattern in the district: Forest, Agriculture, Horticulture, Mining etc.;

(9) physiography of the District;

(10) rainfall: month-wise;

(11) geology and Mineral Wealth.

In addition to the above, the report shall contain the following:

(a) District wise detail of river or stream and other sand source;

(b) District wise availability of sand or gravel or aggregate resources;

(c) District wise detail of existing mining leases of sand and aggregates.

A survey shall be carried out by the District Environment Impact Assessment Authority with the assistance of Geology Department or Irrigation Department or Forest Department or Public Works Department or Ground Water Boards or Remote Sensing Department or Mining Department etc. in the district.

Drainage system with description of main rivers

S. No.	Name of the River	Area drained (Sq. Km)	% Area drained in the District
(1)			
(2)			

Salient Features of Important Rivers and Streams:

S. No.	Name of the River or Stream	Total Length in the District (in Km)	Place of origin	Altitude at Origin
(1)				
(2)				

Portion of the River or Stream Recommended for Mineral Concession	Length of area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)

Mineral Potential

Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)

Annual Deposition

S. No.	River or Stream	Portion of the river or stream recommended for mineral concession	Length of area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
(1)						
(2)						
Total for the District						

A Sub-Divisional Committee comprising of (i) Sub-Divisional Magistrate, (ii) Officers from (a) Irrigation department, (b) State Pollution Control Board or Committee, (c) Forest department, (d) Geology or mining officer shall visit each site for which environmental clearance has been applied for and make recommendation on suitability of site for mining or prohibition thereof.

Methodology adopted for calculation of Mineral Potential:

The mineral potential is calculated based on field investigation and geology of the catchment area of the river or streams. As per the site conditions and location, depth of minable mineral is defined. The area for removal of the mineral in a river or stream can be decided depending on geo-morphology and other factors, it can be 50 % to 60 % of the area of a particular river or stream. For Example, in some hill States mineral constituents like boulders, river born Bajri, sand up to a depth of one meter are considered as resource mineral. Other constituents like clay and silt are excluded as waste while calculating the mineral potential of particular river or stream.

The District Survey Report shall be prepared in the district and its draft shall be placed in the public domain by keeping its copy in Collectorate and posting it on the district's website for twenty-one days. The comments received shall be considered and if found correct, shall be incorporated in the final Report to be finalised within six months by the District Environment Impact Assessment Authority.

The District Survey Report shall form the basis for application for environmental clearance, preparation of reports and appraisal of projects. The Report shall be updated once every five years.

II. PROCEDURE FOR PREPARATION OF DISTRICT SURVEY REPORT OF MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING

The District Survey Report shall be prepared for each minor mineral in the district separately and its draft shall be placed in the public domain by keeping its copy in Collectorate and posting it on district's website for twenty-one days. The comments received shall be considered and if found fit, shall be incorporated in the final Report to be finalised within six months by the DEIAA.

The District Survey Report for minor minerals other than sand mining or River bed mining shall be as per structure mentioned below: -

FORMAT FOR PREPARATION OF DISTRICT SURVEY REPORT FOR MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING

(1) Introduction;

(2) overview of Mining Activity in the District;

(3) general Profile of the District;

(4) geology of the District;

(5) drainage of Irrigation pattern;

(6) land Utilisation Pattern in the District: Forest, Agricultural, Horticultural, Mining etc.;

(7) surface Water and Ground Water scenario of the district;

(8) rainfall of the district and climatic condition;

(9) details of the mining leases in the District as per the following format: -

Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1st/2nd…renewal)	
						From	To	Form	To
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Date of commencement of Mining Operation	Status (Working/Non-Working/Temp. Working for dispatch etc.)	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No with date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
11	**12**	**13**	**14**	**15**	**16**

(10) details of Royalty or Revenue received in last three years;

(11) details of Production of Minor Mineral in last three years;

(12) mineral Map of the District;

(13) list of Letter of Intent (LOI) Holders in the District along with its validity as per the following format :-

(14) total Mineral Reserve available in the District;

Sl. 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)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

(15) quality /Grade of Mineral available in the District;

(16) use of Mineral;

(17) demand and Supply of the Mineral in the last three years;

(18) mining leases marked on the map of the district;

(19) details of the area of where there is a cluster of mining leases viz. number of mining leases, location (latitude and longitude);

(20) details of Eco-Sensitive Area, if any, in the District;

(21) impact on the Environment (Air, Water, Noise, Soil, Flora & Fauna, land use, agriculture, forest etc.) due to mining activity;

(22) remedial Measures to mitigate the impact of mining on the Environment;

(23) reclamation of Mined out area (best practice already implemented in the district, requirement as per rules and regulation, proposed reclamation plan);

(24) risk Assessment & Disaster Management Plan;

(25) details of the Occupational Health issues in the District. (Last five-year data of number of patients of Silicosis & Tuberculosis is also needs to be submitted);

(26) plantation and Green Belt development in respect of leases already granted in the District;

(27) any other information.

The District Environment Impact Assessment Authority (DEIAA) based on the nature and type of minor mineral in the District may include the additional parameters in the District Survey Report in consultation with the Department of Mines and Geology of the concerned State Government.

The District Survey Report shall form the basis for application for environmental clearance, preparation of reports and appraisal of projects. The Report shall be updated once every five years";

[F.No. L-11011/26/2018-IA-II (M)]

GYANESH BHARTI, Jt. Secy.

Note : The principal notification was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) *vide* number S.O. 1533 (E), dated the 14th September, 2006 and subsequently amended by :-

1. S.O. 1949 (E), dated the 13th November, 2006;
2. S.O. 1737 (E), dated the 11th October, 2007;
3. S.O. 3067 (E), dated the 1st December, 2009;
4. S.O. 695 (E), dated the 4th April, 2011;
5. S.O. 156 (E), dated the 25th January, 2012;
6. S.O. 2896 (E), dated the 13th December, 2012;
7. S.O. 674 (E), dated the 13th March, 2013;
8. S.O. 2204 (E), dated the 19th July 2013;
9. S.O. 2555 (E), dated the 21st August, 2013;
10. S.O. 2559 (E), dated the 22nd August, 2013;
11. S.O. 2731 (E), dated the 9th September, 2013;
12. S.O. 562 (E), dated the 26th February, 2014;
13. S.O. 637 (E), dated the 28th February, 2014;
14. S.O. 1599 (E), dated the 25th June, 2014;
15. S.O. 2601 (E), dated the 7th October, 2014;
16. S.O. 2600 (E), dated the 9th October, 2014;
17. S.O. 3252 (E), dated the 22nd December, 2014;
18. S.O. 382 (E), dated the 3rd February, 2015;
19. S.O. 811 (E), dated the 23rd March, 2015;
20. S.O. 996 (E), dated the 10th April, 2015;

21. S.O. 1142 (E), dated the 17th April, 2015;

22. S.O. 1141 (E), dated the 29th April, 2015;

23. S.O. 1834 (E), dated the 6th July, 2015;

24. S.O. 2571 (E), dated the 31st August, 2015;

25. S.O. 2572 (E), dated the 14th September, 2015;

26. S.O.141 (E), dated the 15th January, 2016;

27. S.O.648 (E), dated the 3rd March, 2016;

28. S.O. 2269 (E) dated the 1st July, 2016;

29. S.O. 2944 (E) dated the 14th September, 2016;

30. S.O. 3518 (E) dated the 23rd November 2016;

31. S.O. 3999 (E) dated the 9th December, 2016; and

32. S.O. 4241 (E) dated the 30th December, 2016.

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Item No. 09 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 304/2019

(With report dated 09.07.2020)

M. Haridasan & Ors. Applicant(s)

Versus

State of Kerala Respondent(s)

Date of hearing: 21.07.2020

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Respondent(s): Ms. Soni Singh, Advocate for CPCB
Mr. Jogy Scaria, Advocate for KSPCB

ORDER

1. The Issue for consideration is the safeguards in operation of stone quarries close to residences and public roads. At present, the Kerala State PCB has permitted the stone quarry beyond 50 mtrs. from residences and public roads.

2. The Tribunal considered the matter on 28.02.2020. Finding the distance to be inadequate, CPCB was required to consider the matter and report. It was observed:

> *"2. Accordingly, a report has been filed by the Kerala State PCB on 17.12.2019 retreating the distance criteria of 50 mtrs. and mentioning that no study is available with the CPCB.*

3. *We are of the view, as earlier observed that the* ***distance of 50 mtrs. for stone quarry, particularly when blasts are involved, is highly inadequate and can have deleterious effect on noise and air pollution, environment and public health.***

4. In view of above, we direct the ***CPCB to examine and lay down more stringent conditions and appropriately longer distance within one month and convey the same to the State Boards.*** *The State Board may take further action accordingly. Compliance reports be filed before the next date by email at judicial-ngt@gov.in."*

3. Accordingly, the CPCB has filed its report on 09.07.2020 concluding as follows:

"6.0 Conclusion:

In view of available information, following minimum distance criteria may be considered for permitting stone quarrying by SPCBs:

Mining Type		***Minimum Distance***	***Locations***
A.	***When Blasting is not involved***	***100 m***	*Residential/Public buildings, Inhabitedsites, locations to be considered by States.*
B.	***When Blasting is involved***	***200 m *****	

*****Note: The regulations for danger zone (500 m) prescribed by Directorate General of Mines Safety also have to be complied compulsorily*** *and necessary measures should be taken to minimise the impact on environment.*

However, if any states is already having stringent criteria than the above for minor mineral mining (i.e. more prescribed distances than the above), the same shall be applicable."

4. In view of the above, the said criteria be followed throughout India. The CPCB may monitor compliance.

A copy of this order be sent to the CPCB and all the State PCBs/PCCs by email for compliance.

The application is disposed of.

Adarsh Kumar Goel, CP

S. P. Wangdi, JM

Dr. Nagin Nanda, EM

July 21, 2020
Original Application No. 304/2019
AK