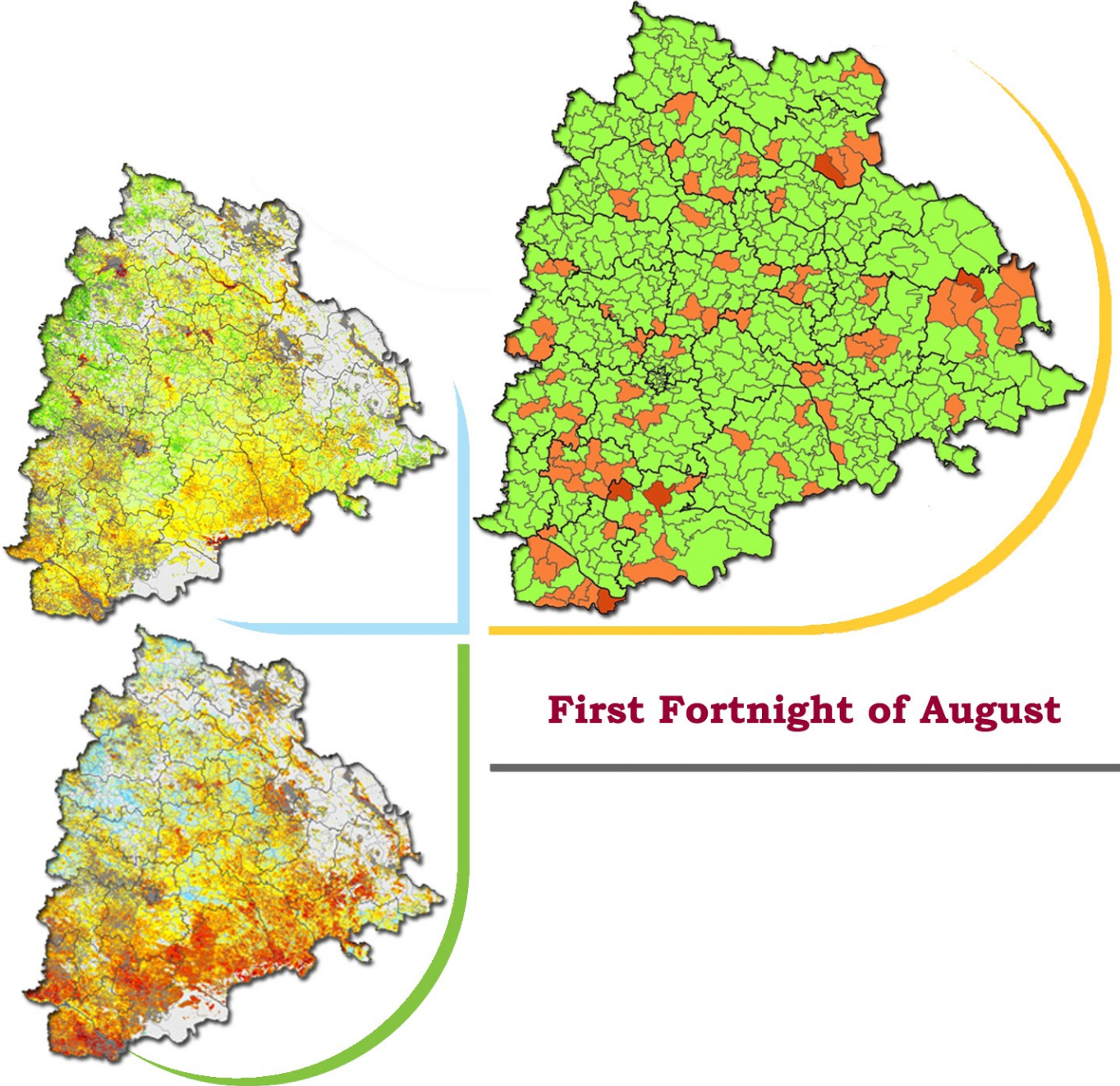


# FORTNIGHTLY REPORT OF SEASONAL CONDITION

## INTEGRATED SEASONAL CONDITION MONITORING SYSTEM



**First Fortnight of August**





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### **Acknowledgement**

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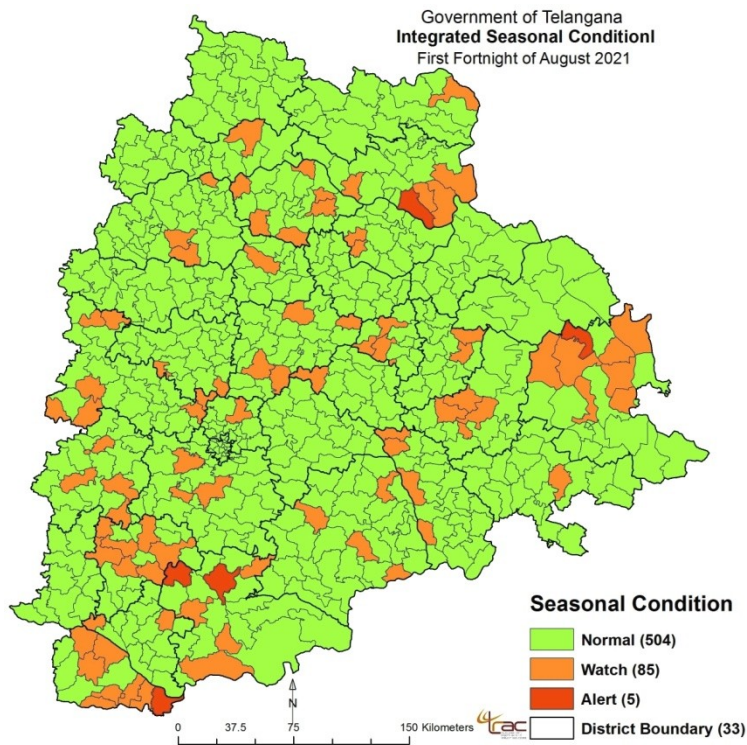


## HIGHLIGHTS

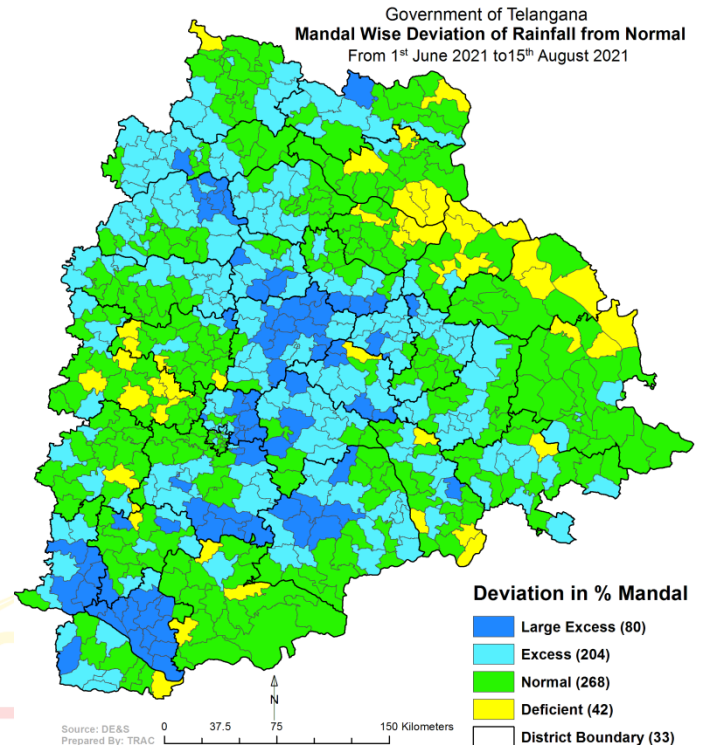
### INTEGRATED SEASONAL CONDITION MONITORING SYSTEM (ISMS) - TELANGANA

#### Cumulative Report up to 15<sup>th</sup> August, 2021

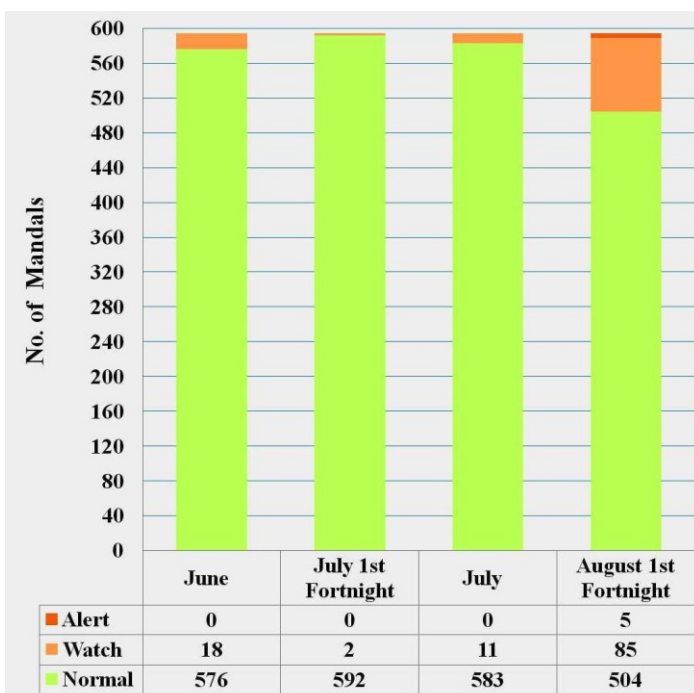
- Seasonal condition is categorised as “Normal” in **504** Mandals as on date 15<sup>th</sup> August, 2021
- Seasonal condition is categorised as “Watch” in **85** Mandals as on date 15<sup>th</sup> August, 2021
- Seasonal condition is categorised as “Alert” in **5** Mandals as on date 15<sup>th</sup> August, 2021



Seasonal Condition First Fortnight of August 2021



Rainfall from 1<sup>st</sup> June to 15<sup>th</sup> August 2021



Seasonal condition of Telangana First Fortnight of August 2021

#### Rainfall 01<sup>st</sup> June to 15<sup>th</sup> August, 2021

**80** Mandals (**13.47%**) of the state received **Large Excess** rainfall, **204** Mandals (**34.34%**) of the state received **Excess** rainfall, **42** Mandals out of 594 (**7.07%**) of state received **Deficient** rainfall.

**268** Mandals (**45.12%**) have received **Normal** rainfall respectively.



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## 1. Background and Rationale

Drought is a complex natural hazard. It is defined as any deficiency of water to satisfy the normal need to agriculture, livestock, industry, or human population. Drought assessment and monitoring is essential for the agricultural sector to take appropriate mitigation measures. Drought indices derived from satellite data play a major role in assessing the health and condition of the crops/vegetation.

National Agricultural Drought Assessment and Monitoring System (NADAMS) project of National Remote Sensing Centre (NRSC), Indian Space Research Organization (ISRO) established a remote sensing based drought assessment protocol utilizing the Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI). The Government of India has established Mahalanobis National Crop Forecast Centre (MNCFC) under Department of Agriculture and Cooperation, New Delhi for carrying out drought assessment at national level.

The Department of Agriculture and Cooperation, Government of India published a drought manual in 2016 which suggested parameters like rainfall deficiency, area under sowing, NDVI, NDWI, Moisture Adequacy Index (MAI) and other indicators to declare drought. State Government monitor drought by obtaining information from various sources on key variables of drought which include rainfall, reservoir / lake water levels, surface water / groundwater, soil moisture and sowing / crop conditions etc. The key variables for monitoring drought in Telangana are:

- Meteorological Data - Rainfall and other parameters like Temperature, Wind speed and Relative Humidity (AWS data)
- Weather forecast - Short, medium, extended range
- Soil Moisture (Moisture Adequate Index)
- Sown Area / Crop Health / Stress
- Satellite based Vegetation Index (NDVI/NDWI)
- Stream Flow - Discharge
- Groundwater Levels
- Reservoir and Lake Storage / Level
- Impacts - distress sale and migration of cattle, human migration, fodder availability, drinking water, animal health, employment opportunities in agriculture sector

An extensive weather observation network of 1044 Automatic Weather Stations (AWS) is established in Telangana. Telangana State Development Planning Society (TSDPS) monitors the data and maintains the networks. Figure 1 showing the location of AWS stations in Telangana.

Government of Telangana  
Automatic Weather Stations (AWS)

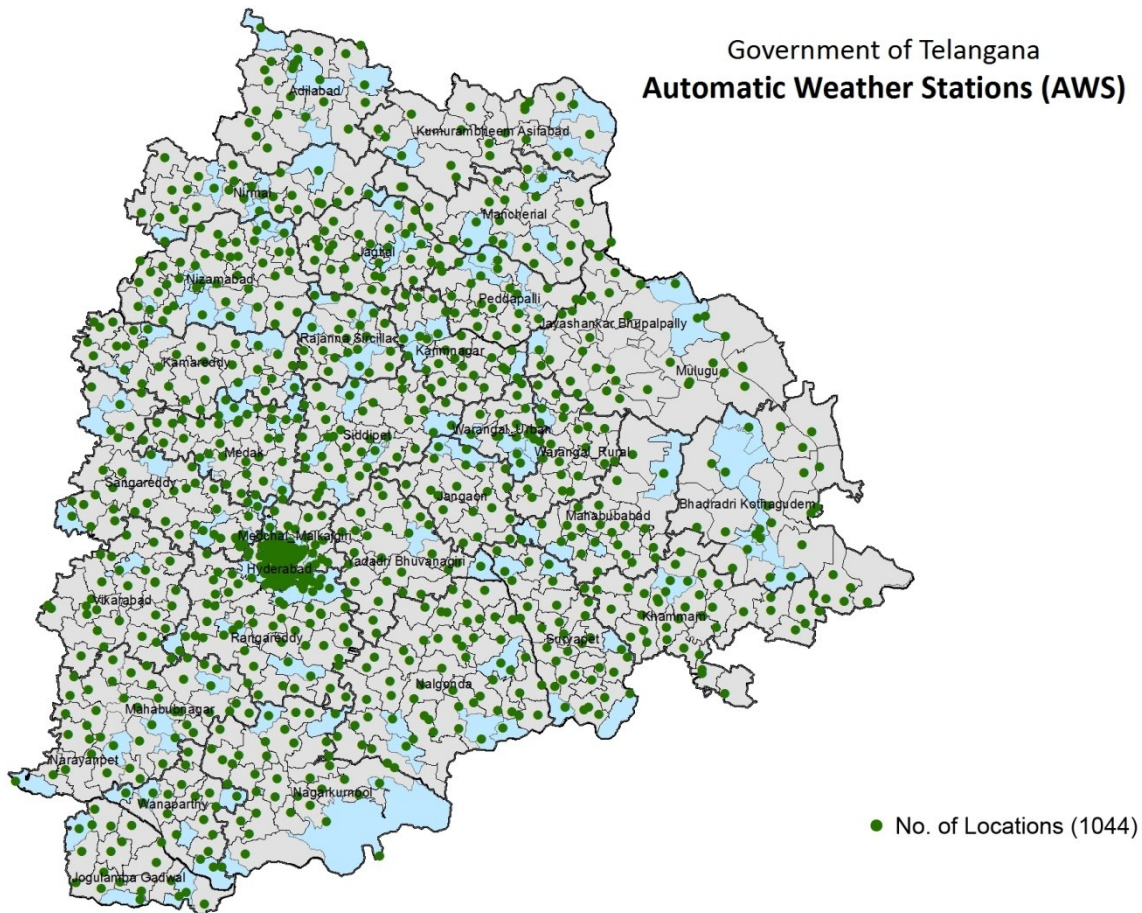


Figure 1: Location of automatic weather stations

Telangana State Remote Sensing Applications Centre (TRAC) has established a protocol ***Integrated Seasonal Condition Monitoring System (ISMS)***. The objectives of the ISMS are

- *Concurrent monitoring of seasonal conditions using remote sensing, extensive weather network data and continuous ground truth.*
- *Develop an early warning (monitoring and forecasting) of drought using suite of indicators, which will help to increase drought preparedness, and identify and implement appropriate Disaster Risk Reduction (DRR) measures.*
- *Early warning to the Districts/Mandals.*

ISMS uses the rainfall data provided by Directorate of Economics & Statistics (DE&S), weekly progress of crop area sowings, groundwater level and its fluctuation, command and non-command area, water releases data, reservoir levels in addition to the Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI) based methodology of MNCFC. This output is verified through ground truth, additionally in context of the state specific drought declaration criteria. The agricultural situation is classified in three to four categories as per the NRSC i.e. Normal, Watch, Alert for June to August and Normal, Mild, Moderate and Severe for September to October. The details of the classification of agricultural situation are given in Table 1.



**Table. 1. Classification of agricultural situation**

<b>Duration</b>	<b>Condition</b>	<b>Description</b>
July - August	Normal	<ul style="list-style-type: none"> <li>• Agricultural situation is normal</li> </ul>
	Watch	<ul style="list-style-type: none"> <li>• Progress of agricultural situation is slow</li> <li>• Ample scope for recovery</li> <li>• No external intervention needed</li> </ul>
	Alert	<ul style="list-style-type: none"> <li>• Very slow progress of agricultural situation</li> <li>• Need for intervention.</li> <li>• Develop and implement contingency plans to minimise loss</li> </ul>
September - October	Mild drought	<ul style="list-style-type: none"> <li>• Crops have suffered stress slightly</li> </ul>
	Moderate drought	<ul style="list-style-type: none"> <li>• Considerable loss in production.</li> <li>• Take measures to alleviate suffering</li> </ul>
	Severe	<ul style="list-style-type: none"> <li>• High risk significant reduction in crop yield</li> <li>• Management measures to provide relief</li> </ul>

## 1. Data used, Indicators and Methodology

### 2.1. Data used

Details of data used under project are discussed in Table 2.

**Table. 2. Data source and indicators**

<b>Data source</b>	<b>Product</b>	<b>Indicators</b>
MODIS (250/500m)	Surface reflectance	NDVI & NDWI
AWiFS	Surface reflectance	NDVI & NDWI
AWS/ DES	<ul style="list-style-type: none"> <li>• Daily rainfall</li> <li>• Crop sown area</li> <li>• Crop cutting experiments</li> </ul>	<ul style="list-style-type: none"> <li>• Rainfall deviation</li> <li>• Dry spells</li> <li>• Crop yield</li> </ul>
Agriculture Department, GoTS	Weekly sowing progress	District wise sown areas deviation from normal
Irrigation Department, GoTS	Reservoir levels/ Water release data	Command area Mandals under canal irrigation

## 2.2. Indicators and Index

### 2.2.1. Rainfall data

In Telangana, South-West Monsoon is crucial for agriculture sector. ISMS uses integrated (AWS+DES+IMD) Mandal wise rainfall data provided by Directorate of Economics & Statistics (DES). This data is used for computation of meteorological drought situation and to derive the mandal wise spatial distribution of rainfall in the state.

### 2.2.2. Reservoir water levels and water release - major and medium project

A scheme having Culturable Command Area (CCA) up to 2,000 hectares individually is classified as minor irrigation scheme. A scheme having CCA more than 2,000 hectares and up to 10,000 hectares individually is a medium irrigation scheme. A scheme having CCA more than 10,000 hectares is major irrigation scheme. In Telangana, water is released during Kharif season to major and medium command areas.

### 2.2.3. Crop sowing progress

Weekly crop sowing progress reports are taken from 'Season and Crop Coverage Report-Kharif 2019' of Commissioner of Agriculture, Telangana. The report includes current status of Weather condition, Water level, Crop sowing and Agricultural Operations.

### 2.2.4. Vegetation index

The crop/vegetation reflects high energy in the near infrared band due its canopy geometry and health of the standing crops/vegetation and absorbs high in the red band due to its biomass and photosynthesis. Uses of these contrast characteristics of vegetation in near infrared and red bands indicate both the health and condition of the crops/vegetation. Normalised Difference Vegetation Index (NDVI) is widely used for operational drought assessment because of its simplicity in calculation, easy to interpret and its ability to partially compensate for the effects of atmosphere, illumination geometry etc., (Malingreau 1986, Tucker and Chowdhary 1987, Kogan 1995). NDVI is derived by the difference of these measurements and divided by their sum.

$$NDVI = \frac{(NIR - Red)}{(NIR + Red)}$$

The vegetation index is generated from each of the available satellite data irrespective of the cloud cover present. To minimize the cloud, monthly time composite vegetation index is generated.

### 2.2.5. Surface wetness indicator

Shortwave Infrared (SWIR) band is sensitive to moisture available in soil as well as in crop canopy. In the beginning of the cropping season, soil background is dominant hence SWIR is sensitive to soil moisture in the top 1-2 cm. As the crop progresses, SWIR becomes sensitive to leaf moisture content. SWIR band provides only surface wetness information. When the crop is grown-up, SWIR response is only from canopy and not from the underlying soil. NDWI using SWIR can complement NDVI for drought assessment particularly in the beginning of the cropping season. NDWI is derived as under;

$$NDWI = \frac{(NIR - SWIR)}{(NIR + SWIR)}$$

Higher values of NDWI signify more surface wetness. The wetness index is generated from each of the available satellite data irrespective of the cloud cover present. To minimize the cloud, monthly time composite wetness index is generated.

### 2.2.6. Vegetation condition index

Kogan (1995) developed Vegetation Condition Index (VCI) using the range of NDVI as under,

$$VCI = \frac{(NDVI - NDVI \min)}{(NDVI \max - NDVI \min)} * 100$$

The current drought assessment expressed as percentage of deviation of NDVI and NDWI based on 10 year NDVI and NDWI index values. The minimum and maximum value of NDVI and NDWI, the VCI discriminated between the weather components.

### 1.3 Methodology

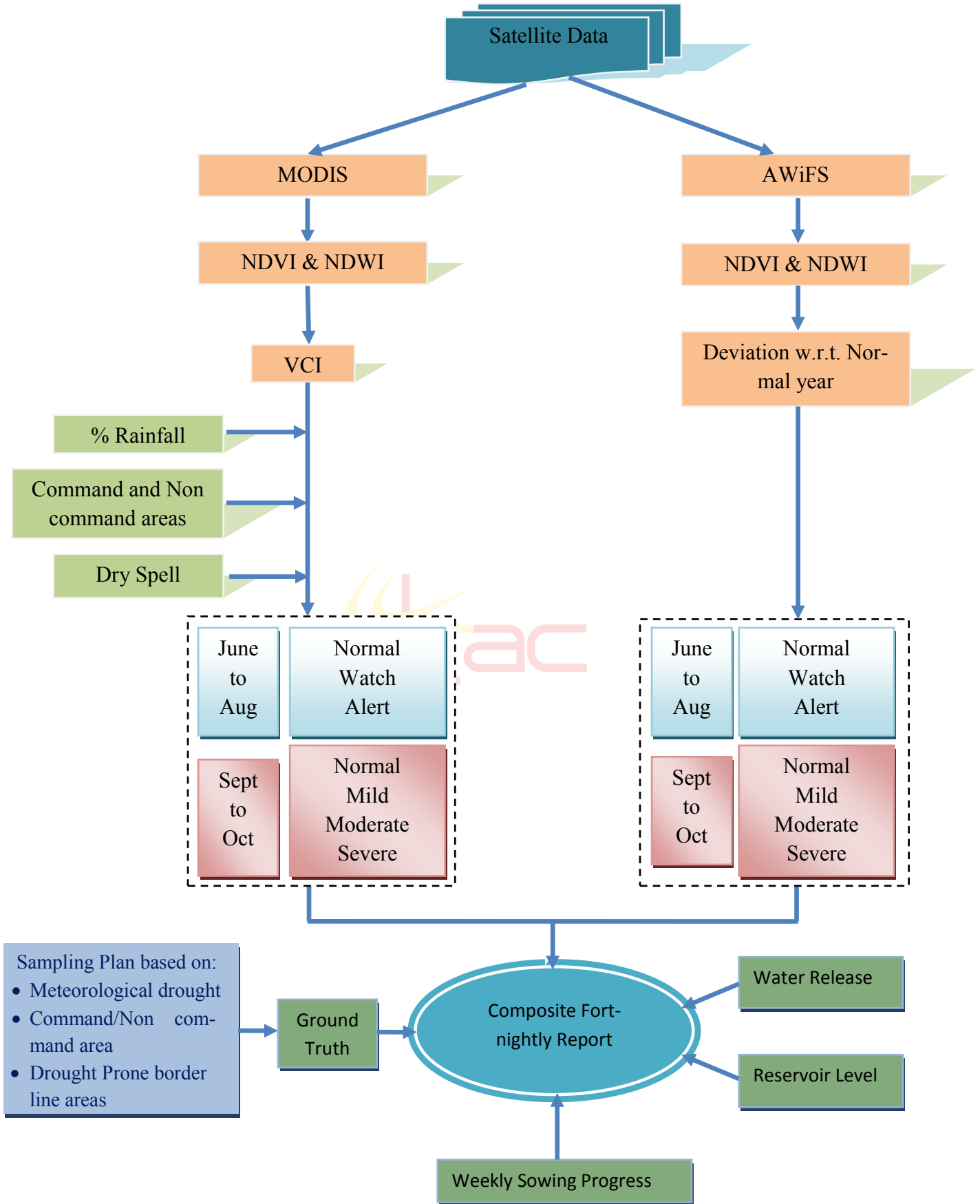


Figure 2: Flow chart of drought assessment methodology



The methodology to assess and monitor the agricultural conditions and situation in the state at district and Mandal level uses IRS Resourcesat-2 AWiFS data. Indian Remote Sensing satellite (IRS) Resourcesat-2 having Advanced Wide Imaging Field Sensor (AWiFS) payload collects data in two spectral bands 0.62-0.68  $\mu\text{m}$  (red) and 0.77-0.86  $\mu\text{m}$  (near infrared) with spatial resolution of 56 m and ground swath of 740 km with a revisit period of 5 days. Along with this MODIS 250/500 m satellite data provide spectra, radiometric and spatial resolutions products for better monitoring of the agriculture. The combination of AWiFS and MODIS is useful to increase the frequency of images.

The different activities carried out through ISMS commence with acquisition of MODIS (250 m) and AWiFS (56 m) satellite data. The satellite data being processed and NDVI and NDWI indices are developed. Based on these indices deviation with respect to normal year (2013) is calculated and Mandal wise statistics are derived. The agricultural situation is assessed incorporating rainfall deviation, command and non command areas, dry spell, drought prone border line areas, crop sown area progress and ground truth along with satellite derived indices. The flow chart of methodology is shown in Figure 2.

### 3. Present status up to First Fortnight of August 2021

#### 3.1. Rainfall data

The status of rainfall as on 15<sup>th</sup> August 2021 is shown in Table.3.

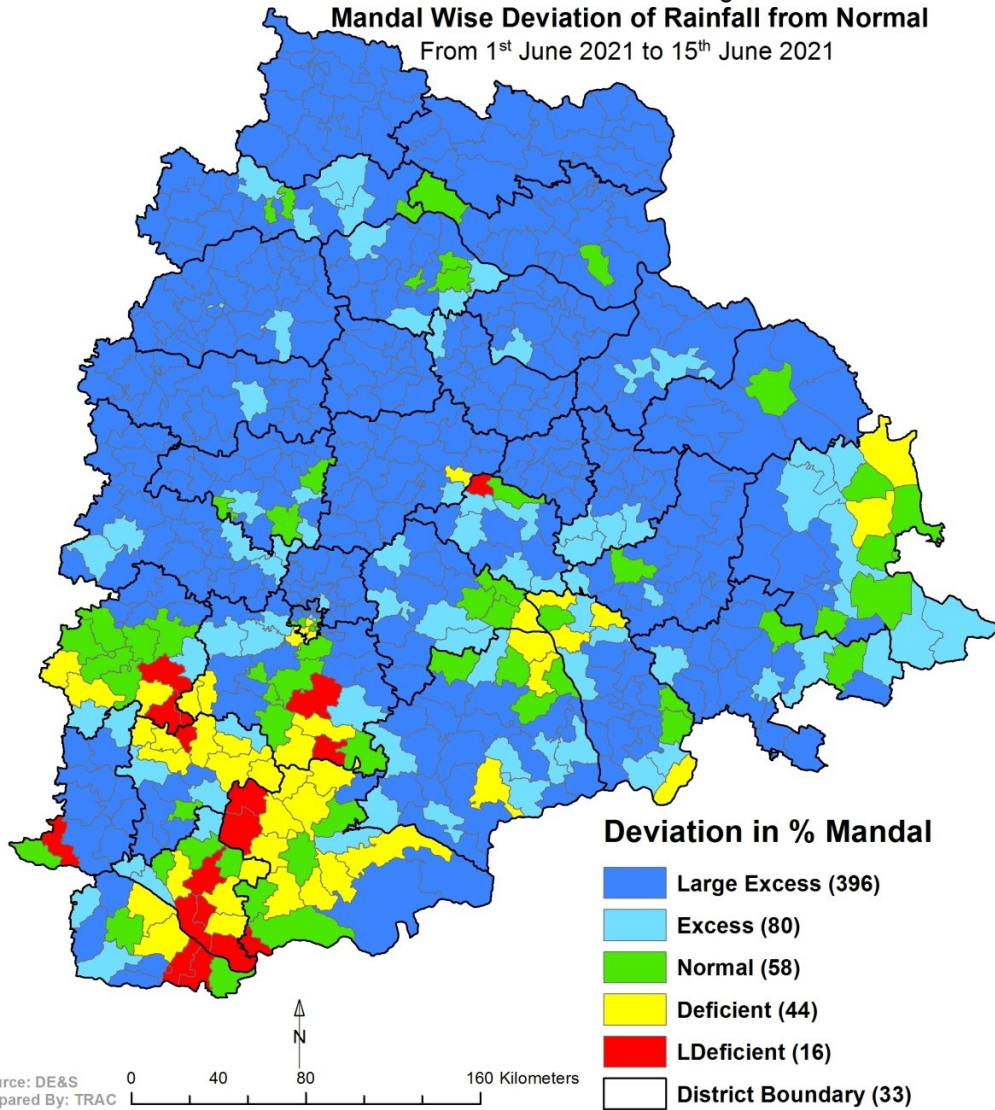
- **80** Mandal (**13.47%**) of the state received **Large Excess** (+60% and above) rainfall.
- **204** Mandals (**34.34%**) of the state received **Excess** (+20% to +59%) rainfall.
- **42** Mandals (**7.07%**) of state received **Deficient** (-20% to -59%) rainfall.
- **268** Mandals (**45.12%**) have received **Normal** (+19% to -19%) rainfall.

**Table. 3. Rainfall status as on 15<sup>th</sup> August 2021**

S. No	District Name	Large Excess	Excess	No Rain	Normal	Deficient	Large Deficient	Total
1	Adilabad		7		10	1		18
2	Bhadradi Kothagudem		3		17	3		23
3	Hyderabad		5		11			16
4	Jagtial		10		8			18
5	Jangoan	4	6		1	1		12
6	Jayashankar Bhupalpally		3		4	4		11
7	Jogulamba Gadwal	1	5		5	1		12
8	Kamareddy		12		10			22
9	Karimnagar	3	6		7			16
10	Khammam		9		11	1		21
11	Kumurambheem Asifabad	1	6		7	1		15
12	Mahabubabad		9		7			16
13	Mahabubnagar	3	4		9			16
14	Mancherial		1		12	5		18
15	Medak	1	2		14	4		21
16	Medchal_Malkajgiri	8	5		2			15
17	Mulugu				6	3		9
18	Nagarkurnool		1		16	3		20
19	Nalgonda	6	12		13			31
20	Narayanpet	5	4		2			11
21	Nirmal	1	11		7			19
22	Nizamabad	6	14		9			29
23	Peddapalli				11	3		14
24	Rajanna Sircilla	4	7		2			13
25	Rangareddy	8	9		10			27
26	Sangareddy		4		17	6		27
27	Siddipet	11	11		2			24
28	Suryapet	1	6		12	4		23
29	Vikarabad		4		13	2		19
30	Wanaparthy	12	1		1			14
31	Warangal_Rural	1	9		6			16
32	Warangal_Urban	1	9		1			11
33	Yadadri Bhuvanagiri	3	9		5			17
	<b>Total</b>	<b>80</b>	<b>204</b>		<b>268</b>	<b>42</b>		<b>594</b>

SOURCE: DE&S

Government of Telangana  
**Mandal Wise Deviation of Rainfall from Normal**  
 From 1<sup>st</sup> June 2021 to 15<sup>th</sup> June 2021



Government of Telangana  
**Mandal Wise Deviation of Rainfall from Normal**  
 From 1<sup>st</sup> June 2021 to 30<sup>th</sup> June 2021

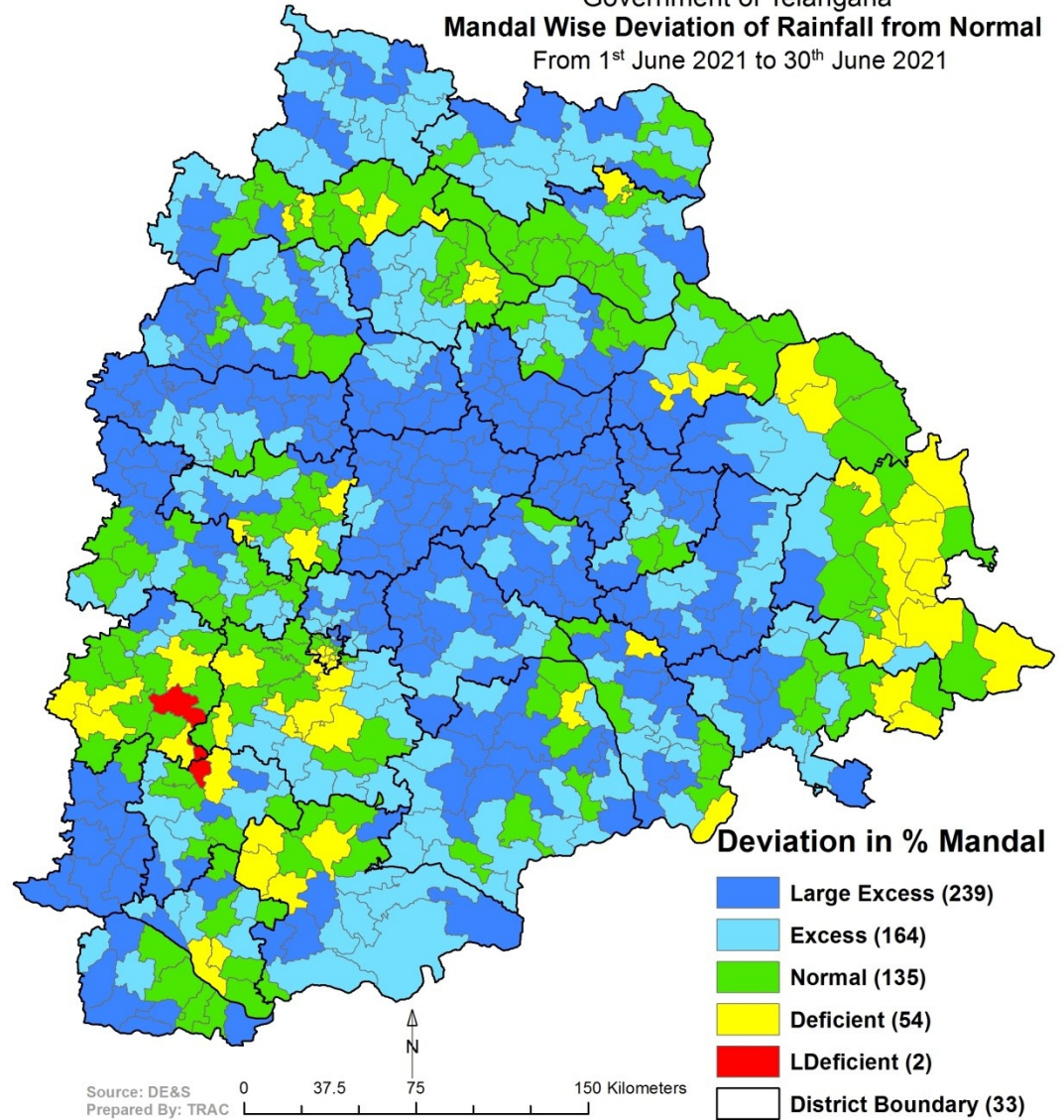


Figure 3: Deviation of rainfall in percent w.r.t. normal from June 01<sup>st</sup> to June 15<sup>th</sup>, 2021

Figure 4: Deviation of rainfall in percent w.r.t. normal from June 01<sup>st</sup> to June 30<sup>th</sup>, 2021



Government of Telangana  
**Mandal Wise Deviation of Rainfall from Normal**  
 From 1<sup>st</sup> June 2021 to 15<sup>th</sup> July 2021

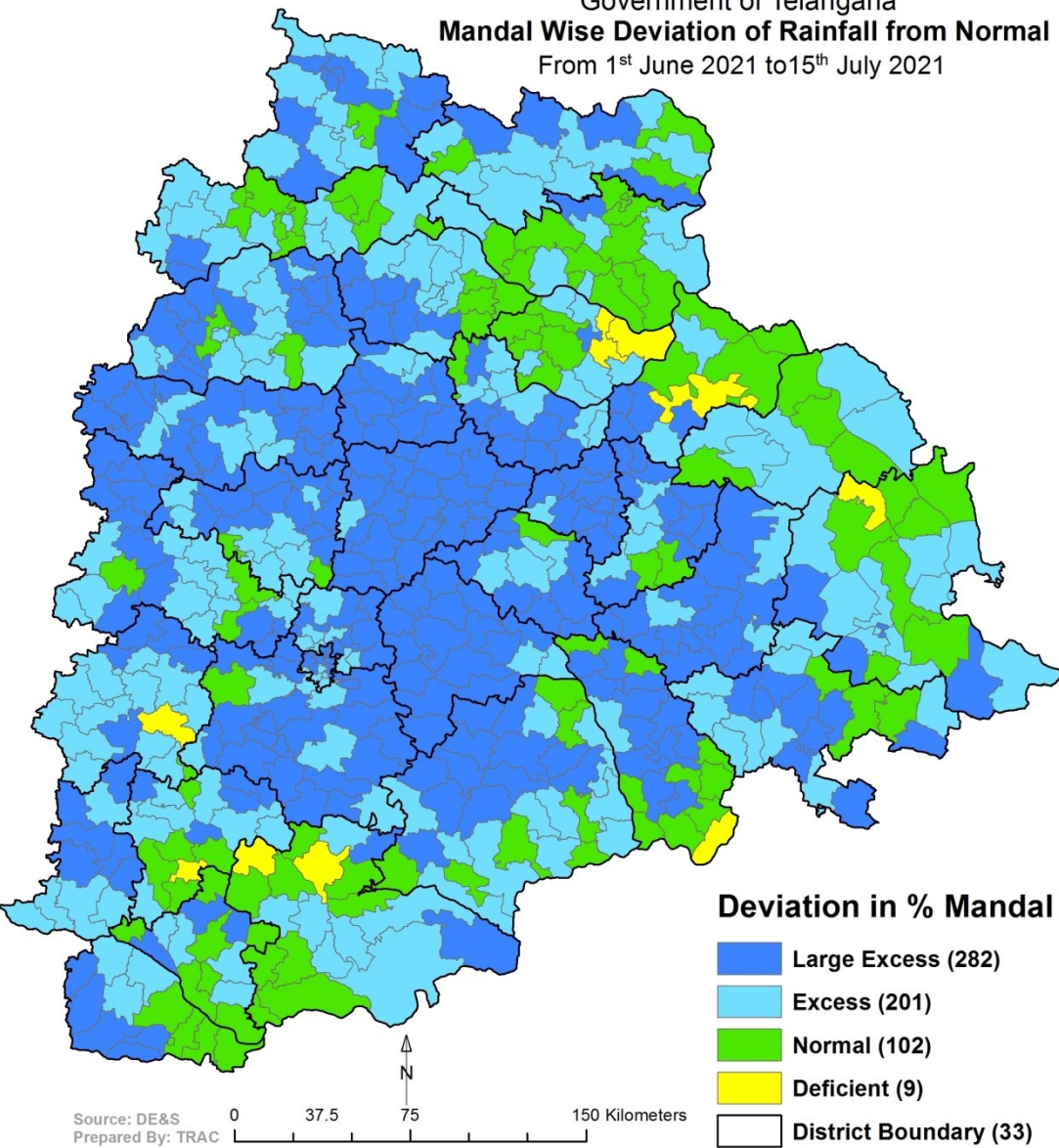


Figure 5: Deviation of rainfall in percent w.r.t. normal from June 01<sup>st</sup> to July 15<sup>th</sup>, 2021

Government of Telangana  
**Mandal Wise Deviation of Rainfall from Normal**  
 From 1<sup>st</sup> June 2021 to 31<sup>st</sup> July 2021

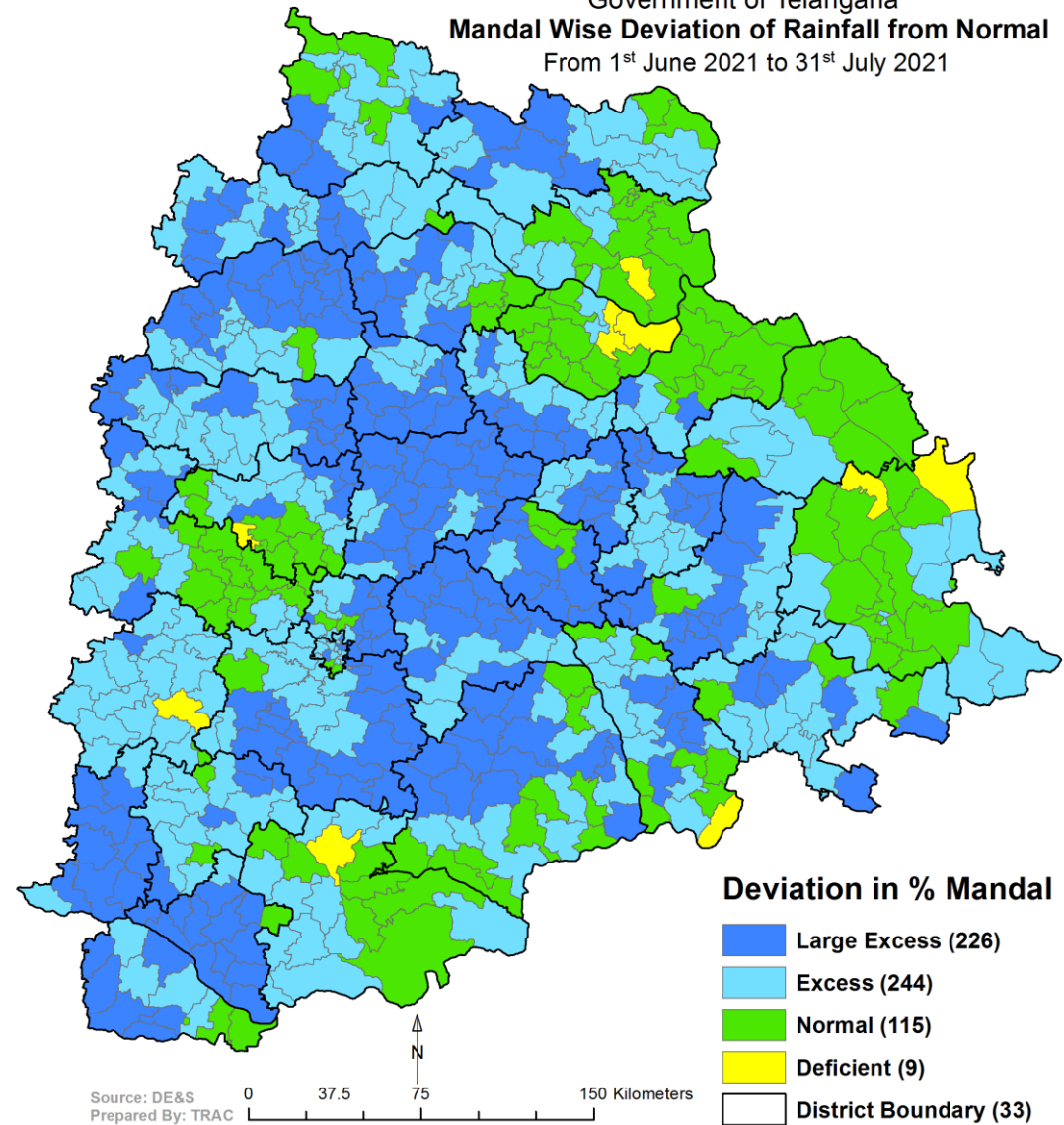


Figure 6: Deviation of rainfall in percent w.r.t. normal from June 01<sup>st</sup> to July 31<sup>st</sup>, 2021



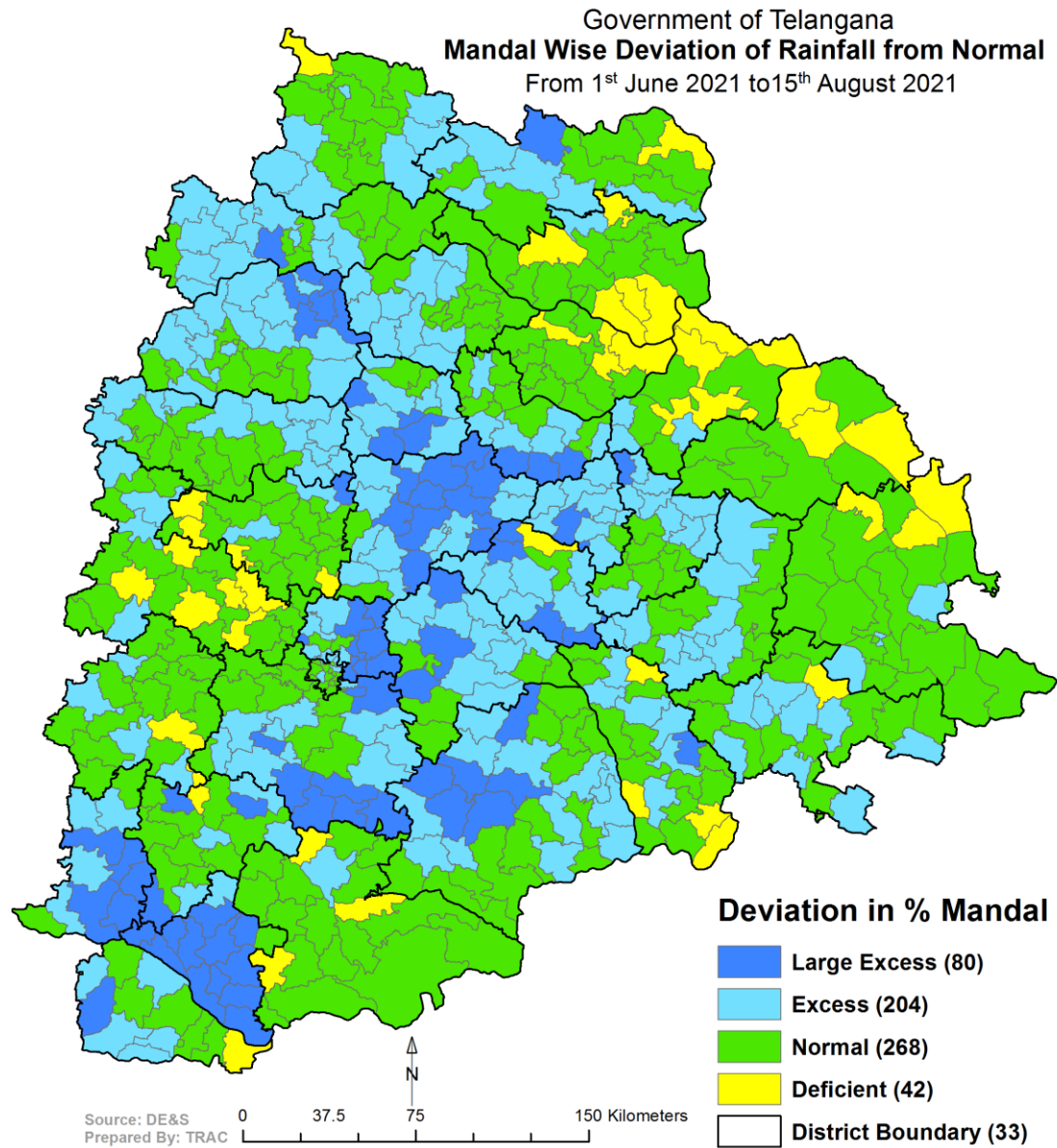


Figure 7: Deviation of rainfall in percent w.r.t. normal from June 01<sup>st</sup> to August 15<sup>th</sup>, 2021

### 3.2. Reservoir water levels

All the major reservoirs are holding 1072.32 TMC as on 15-08-2021 and as on date last year the level had stood at 852.26 TMC. The details of water levels of all major reservoirs as on 15-08-2021 are furnished hereunder in Table.4.

**Table.4. Reservoir Water Levels**

PARTICULARS OF MAJOR RESERVOIRS AS ON 15 / August / 2021										
Sl No	Reservoir Name	Time	FRL	Gross Capacity	THIS YEAR				LAST YEAR	
					As on				As on	
					15 / August/ 2021				15 / August / 2020	
					Level	Gross Storage	Inflow	Outflow	Level	Gross Storage
(in feet)	(TMC)	(Cusecs)	(Cusecs)	(in feet)	(TMC)					
<b>Krishna Basin</b>										
1	Almatti	6:00	1705	129.721	1704.72	128.2	30444	18257	1702.76	117.59
2	Jurala	6:00	1045	9.657	1044.13	9.11	5981	3180	1043.31	8.61
3	Nagarjunasagar	6:00	590	312.045	589.6	310.85	60644	67561	565.4	245.1
4	Narayanapur	6:00	1615	37.646	1612.47	34.17	18900	8502	1612.27	33.9
5	Srisaillam	6:00	885	215.807	882	198.81	13300	72081	867.7	132.44
6	Tungabhadra	6:00	1633	100.86	1632.91	100.51	11466	15473	1631.62	95.61
7	Ujjaini	6:00	1630	117.24	1623.97	97.01	2717	432	1619.31	83.57
<b>Godavari Basin</b>										
8	Jaikwad	6:00	1522	102.732	1508.96	57.06	0	919	1513.93	72.38
9	Kaddam	6:38	700	7.6	695.28	6.43	222	904	695.93	6.58
10	Lower Manair Dam	7:00	920	24.074	915.1	19.99	1654	5289	901	10.792
11	Nizam sagar	6:00	1405	17.803	1397.41	8.8	0	0	1377.66	0.97
12	Singur	6:00	1717.93	29.91	1711.72	20.72	506	506	1683.4	2.27
13	Sri Ram Sagar	6:00	1091	90.313	1089.2	80.66	6551	7711	1076.1	42.45

Source: Irrigation Department, Hyderabad

### 3.3. Crop Sowing Progress

For the 11<sup>th</sup> August 2021, the total area sown in the state **104,22,992** ha as against the normal sown area of **92,88,317** ha. as on date. The details are shown in Figure 8 and the deviation graph is shown in Figure 9.

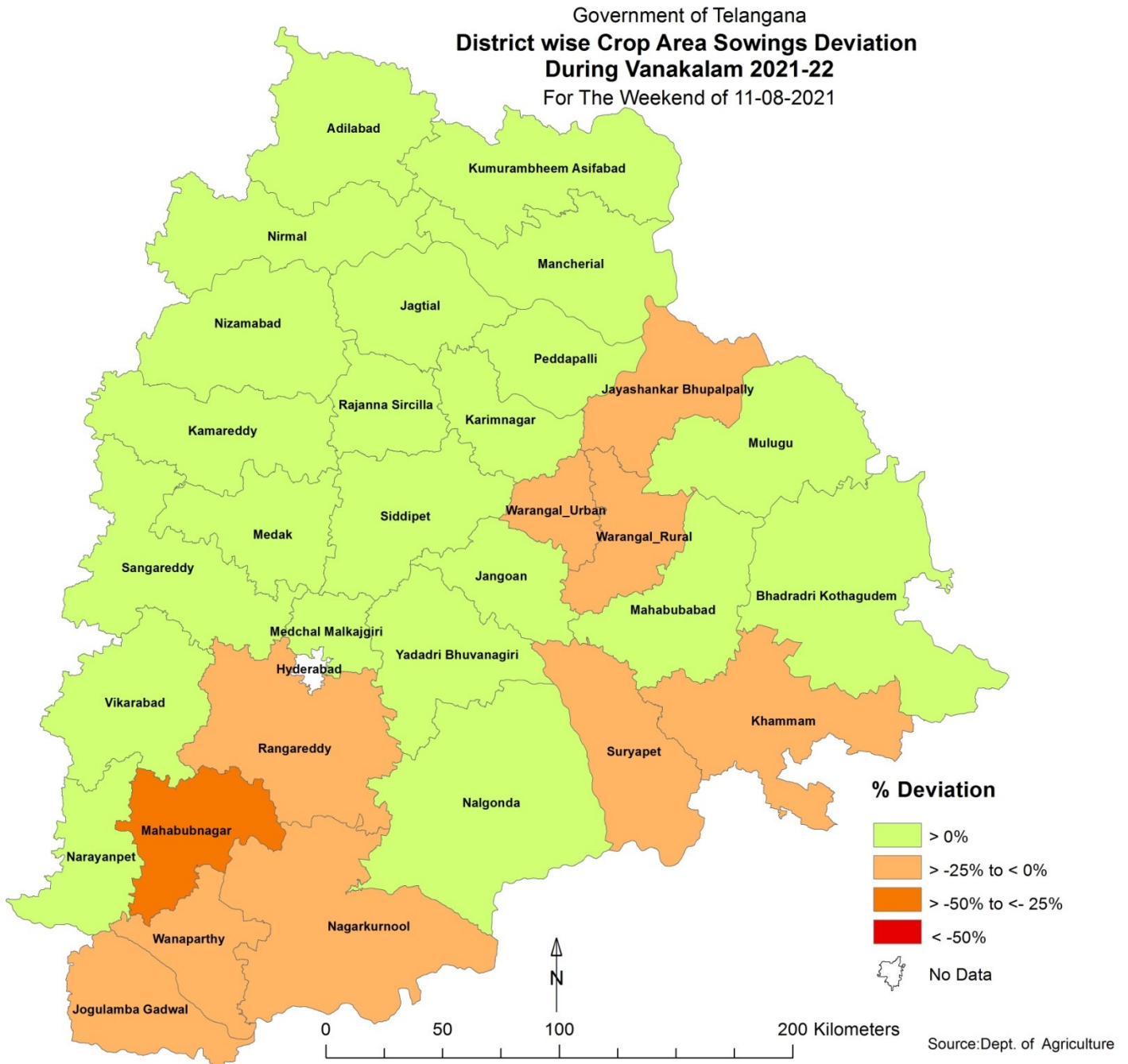


Figure 8: District wise deviation from normal crop sown area as on date 11-08-2021

**Table 5: District Wise Crop Sowing Area - Up to the week ending 11.08.2021**

S. No	District Name	Normal (ha)	Actual (ha)	Deviation %
1	<b>Mahabubnagar</b>	453788	294080	-35.19
2	Wanaparthy	129000	100974	-21.73
3	Suryapet	244605	195803	-19.95
4	Warangal Urban	141555	118254	-16.46
5	Jayashankar Bhupalpally	212313	180976	-14.76
6	Jogulamba Gadwal	222928	191334	-14.17
7	<b>Rangareddy</b>	359500	310271	-13.69
8	Nagarkurnool	479980	427403	-10.95
9	<b>Khammam</b>	391075	356370	-8.87
10	<b>Warangal Rural</b>	284214	267279	-5.96
11	<b>Hyderabad</b>	0	0	0.00
12	Jangaon	251349	253885	1.01
13	Siddipet	421154	427209	1.44
14	Medchal Malkajgiri	14209	15107	6.32
15	Rajanna Sircilla	197173	211210	7.12
16	Nirmal	340540	366203	7.54
17	Mahabubabad	245024	269106	9.83
18	<b>Adilabad</b>	499727	556098	11.28
19	<b>Nizamabad</b>	368906	426908	15.72
20	Kumarambheem Asifabad	300058	373285	24.40
21	Kamareddy	359702	454454	26.34
22	Bhadradi Kothagudem	261628	331592	26.74
23	Vikarabad	414110	530378	28.08
24	<b>Nalgonda</b>	725584	929401	28.09
25	<b>Karimnagar</b>	246576	318203	29.05
26	Jagtial	199043	257027	29.13
27	Yadadri Bhuvanagiri	254046	340210	33.92
28	Mancherial	180102	243691	35.31
29	Sangareddy	509159	689490	35.42
30	Peddapalle	180150	245033	36.02
31	Mulugu	38785	60488	55.96
32	<b>Medak</b>	184540	307546	66.66
33	Narayanpet	177794	373724	110.20
		<b>92,88,317</b>	<b>104,22,992</b>	



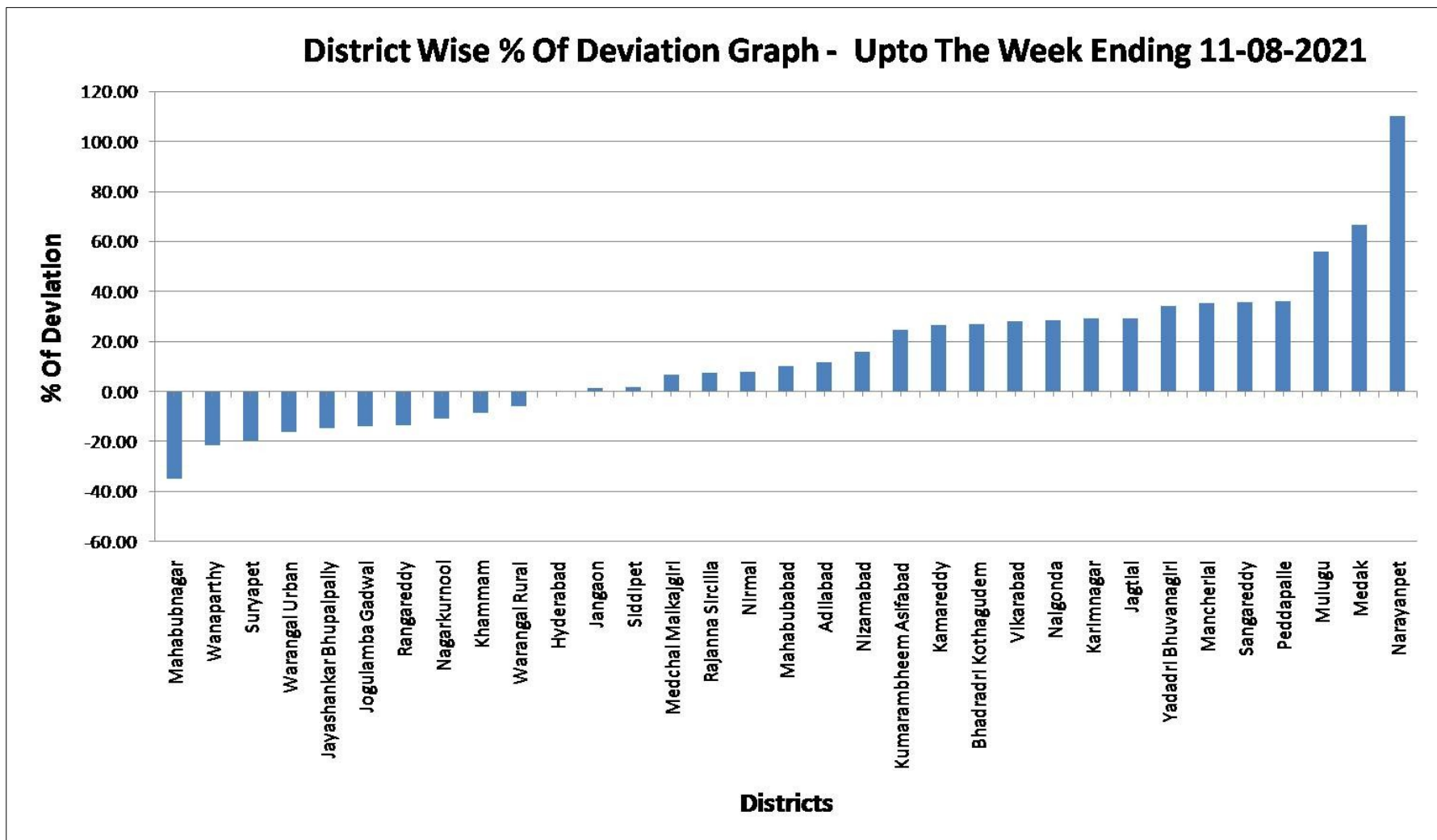


Figure 9: District wise deviation (graph) from normal crop sown area as on date 11-08-2021

### 3.4. Vegetation index

The Normalized Difference of Vegetation Index (NDVI) for the First Fortnight of August 2021 is shown in the figures and also compared with 2020 and 2019. The year 2013 is treated as a normal year. Mandal wise NDVI, Fortnightly agricultural situation for the year 2021, 2020 and 2019, deviation of NDVI w.r.t. 2013 are shown in the Figures 10, 11, and 12 respectively. As per NDVI deviation w.r.t normal mild stress is observed in parts of Jangoan, Khammam, Mahabubabad, Mahabubnagar, Nalgonda, Nagarkurnool, Siddipet and Suryapet districts. As per rainfall distribution the progress of agricultural situation and the vegetation condition in the state is normal and likely to improve in coming fortnight.

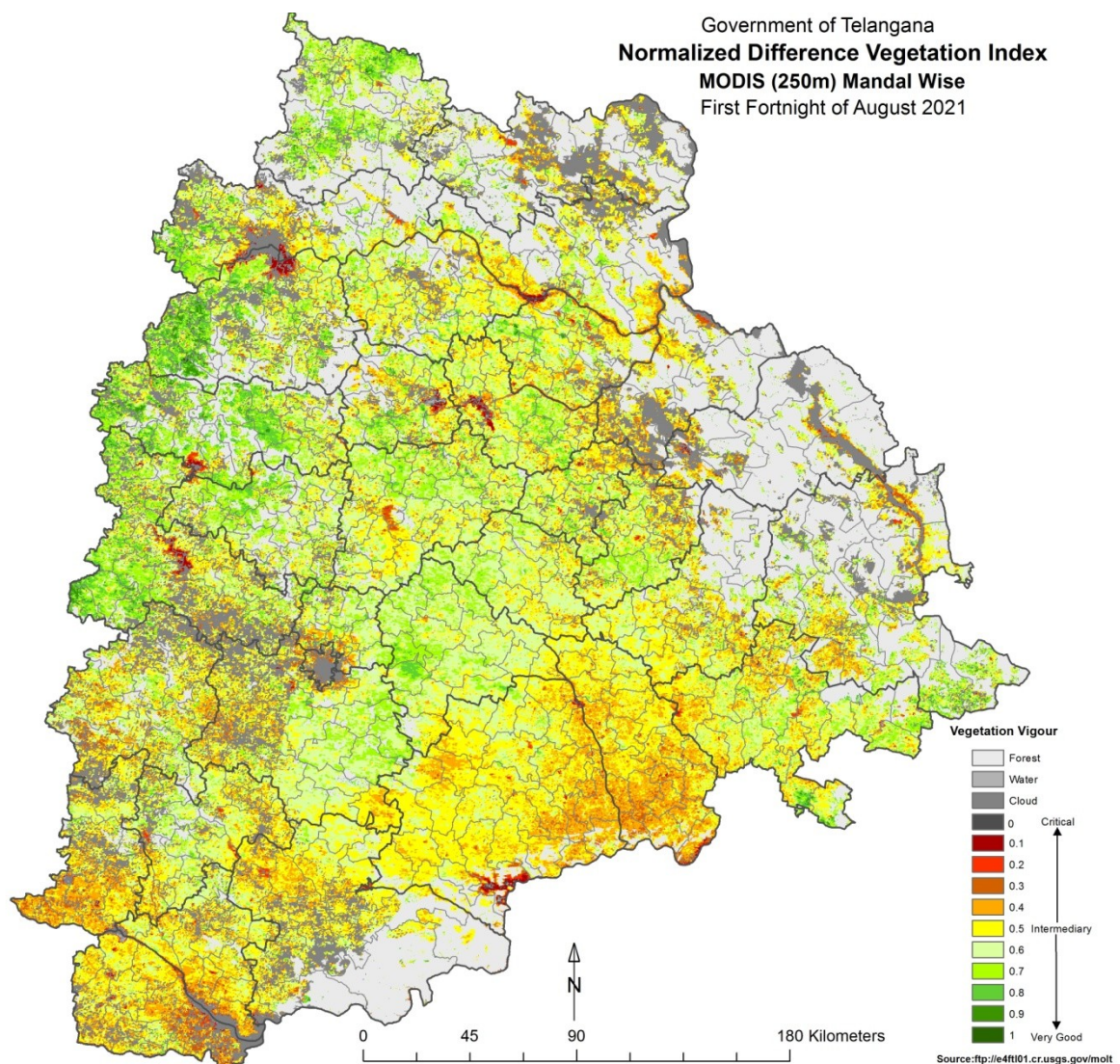


Figure 10: NDVI - MODIS: First Fortnight of August 2021



Government of Telangana  
**Normalized Difference Vegetation Index**  
**MODIS (250m) Mandal Wise**

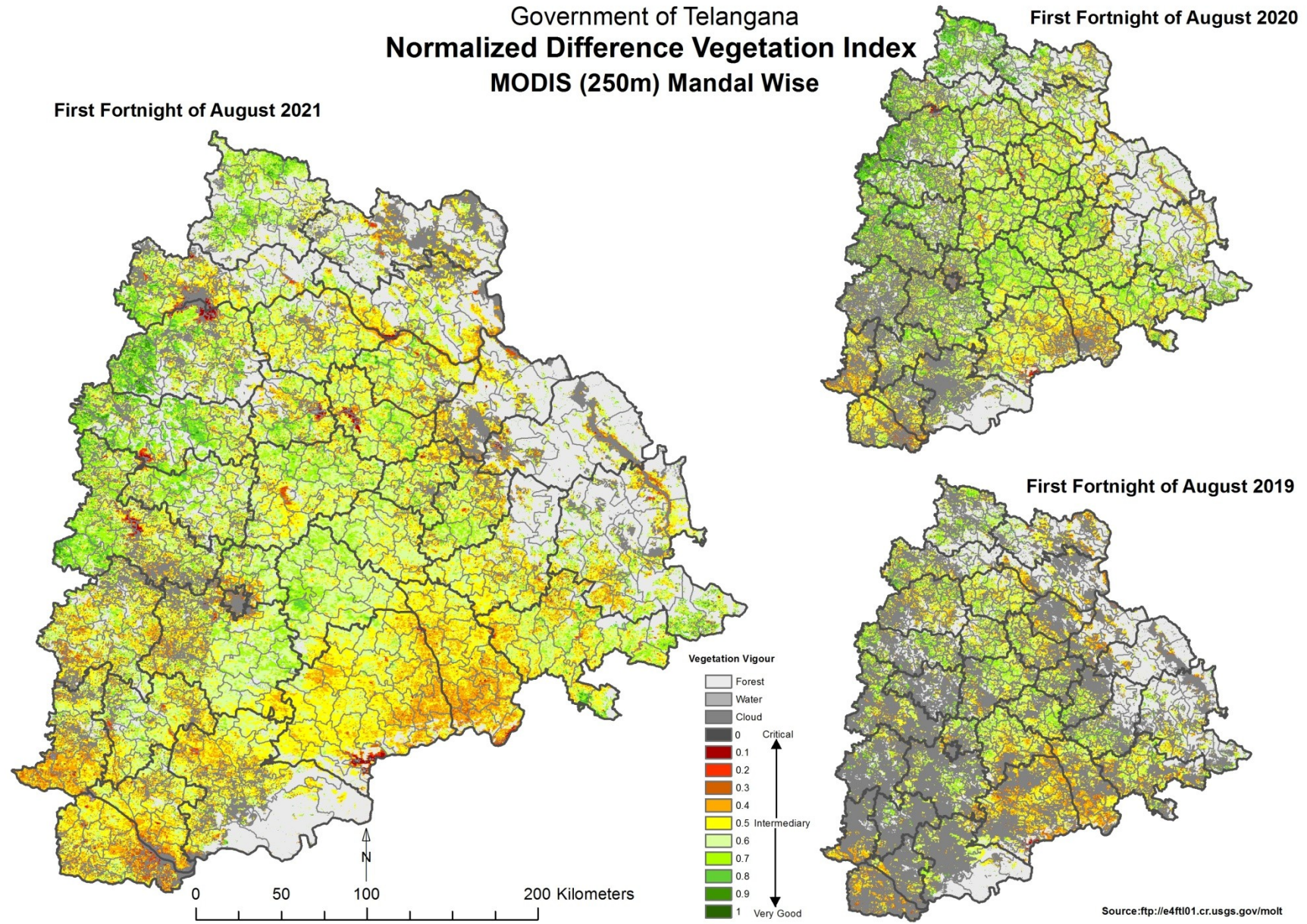


Figure 11 : NDVI - MODIS, Fortnightly agricultural situation from August 2021, 2020 and 2019



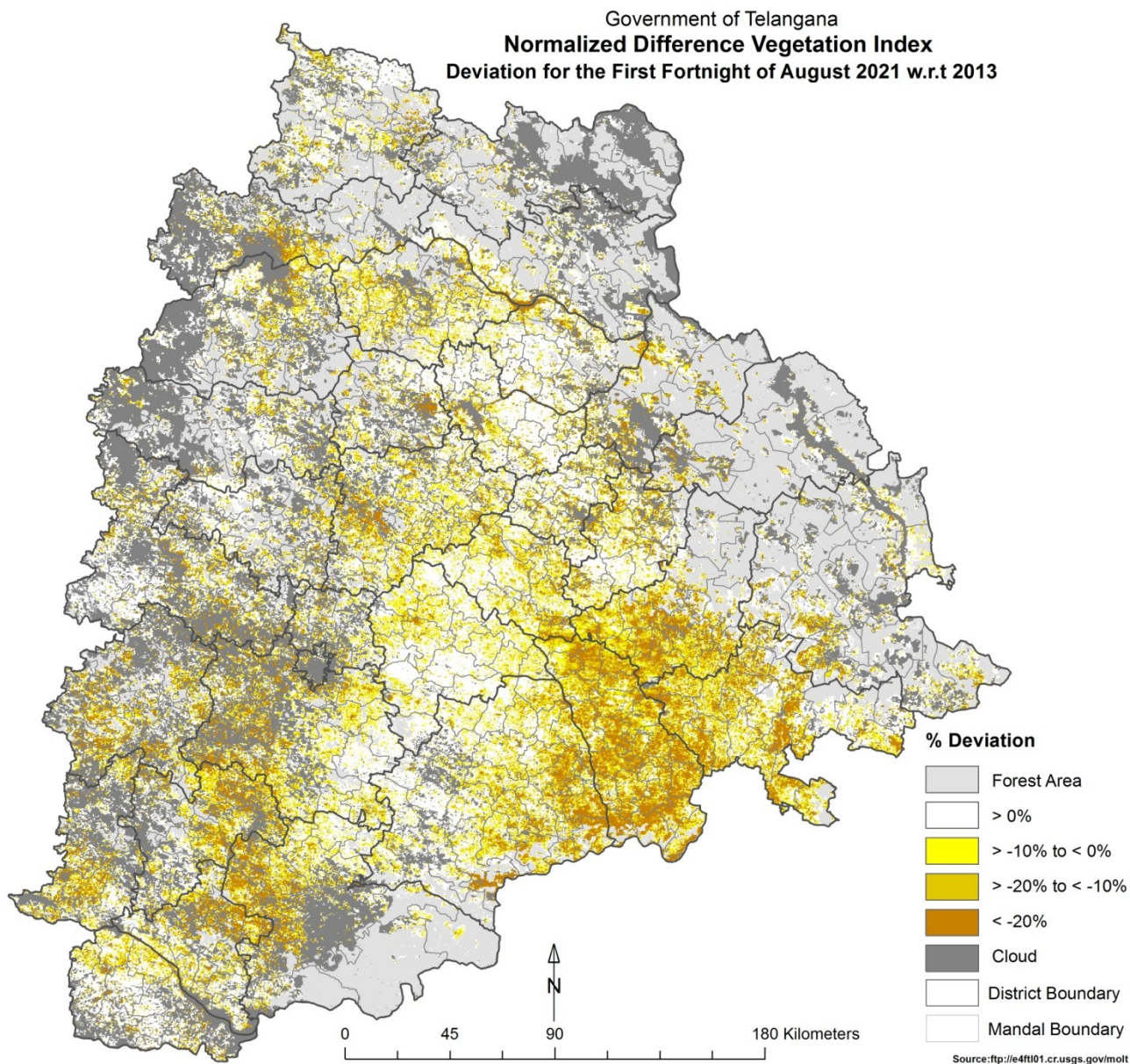


Figure 12: NDVI deviation (MODIS - 250m), First Fortnight of August 2021 w.r.t. 2013



### 3.5. Surface wetness indicator

The map indicates status of moisture availability in soil as well as in crop canopy for the First Fortnight of August 2021. The year 2013 is treated as a normal year. Mandal wise Normalized Difference Water Index (NDWI) situation the year 2021, 2020 & 2019, Fortnightly agricultural situation deviation of NDWI w.r.t. 2013 are shown in the Figures 13, 14 and 15 respectively. As per NDWI deviation w.r.t normal Khammam, Mahabubabad, Mahabubnagar, Nalgonda, Nalgondakurnool, Siddipet, Suryapet and Wanaparthy districts are under mild stress condition. As per rainfall distribution the progress of agricultural situation is normal and the soil moisture condition in the state is very much likely to improve in next fortnight.

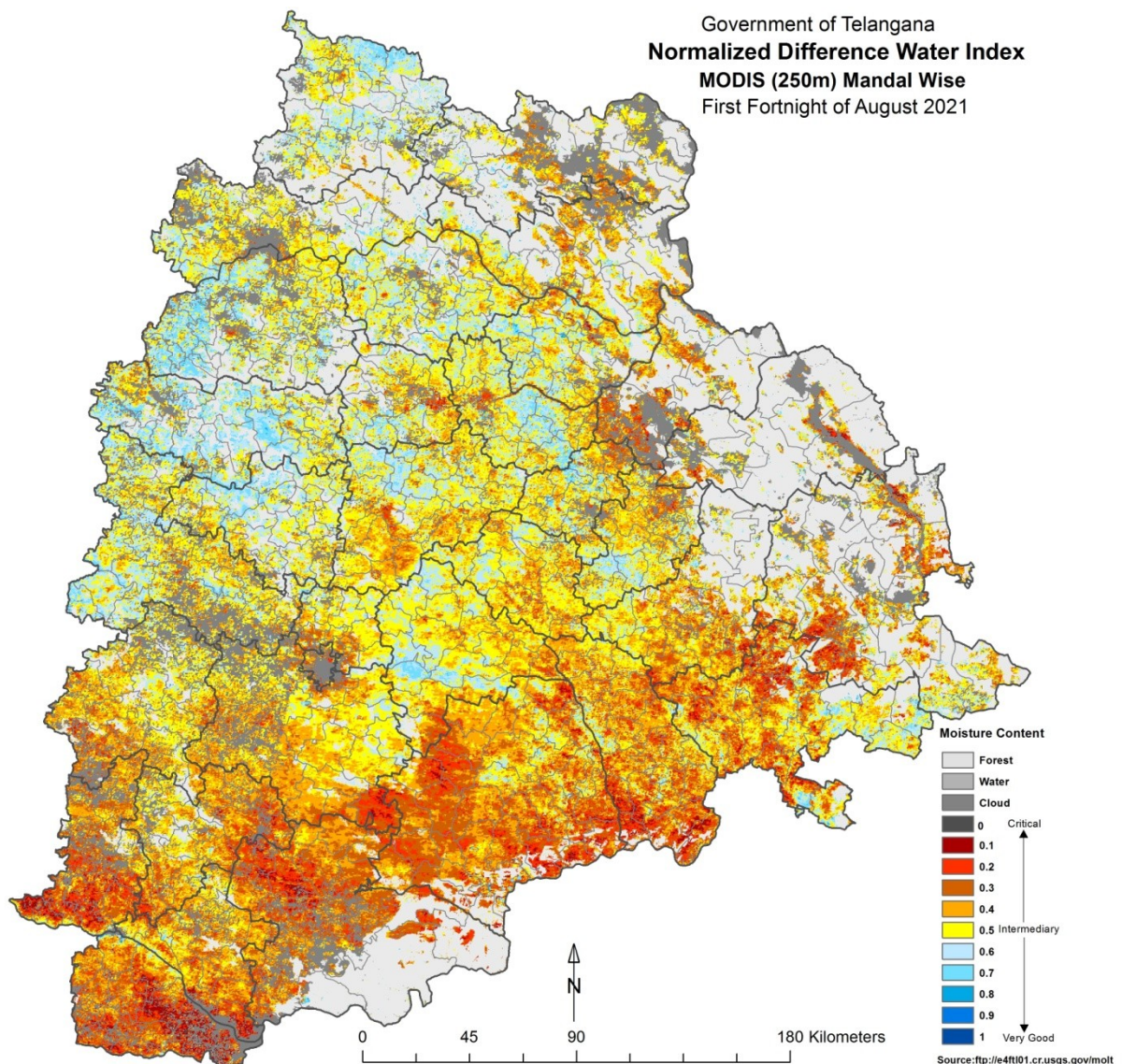


Figure 13: NDWI - MODIS: First Fortnight of August 2021



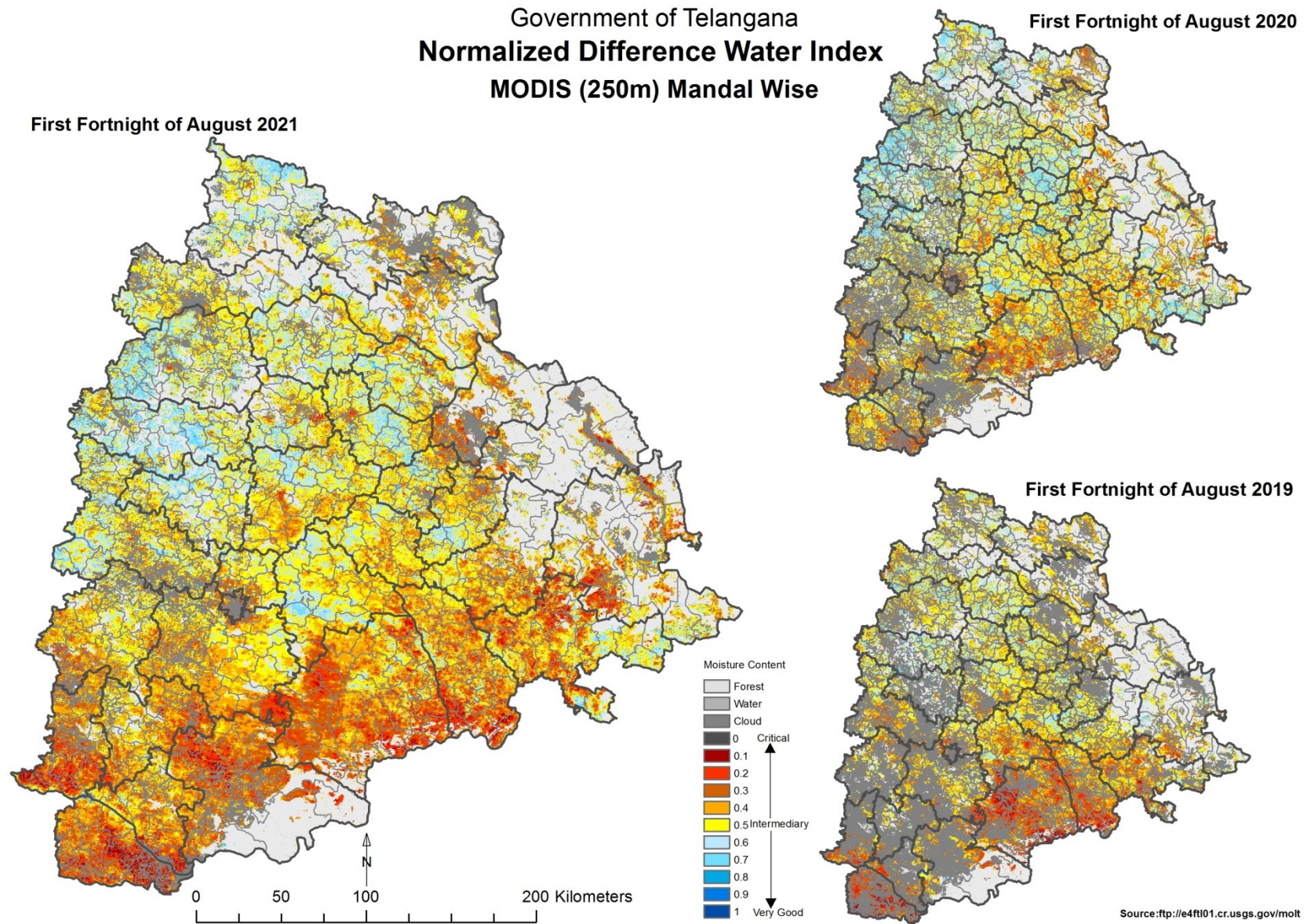


Figure 14: NDWI - MODIS, Fortnightly agricultural situation from August 2021, 2020 and 2019



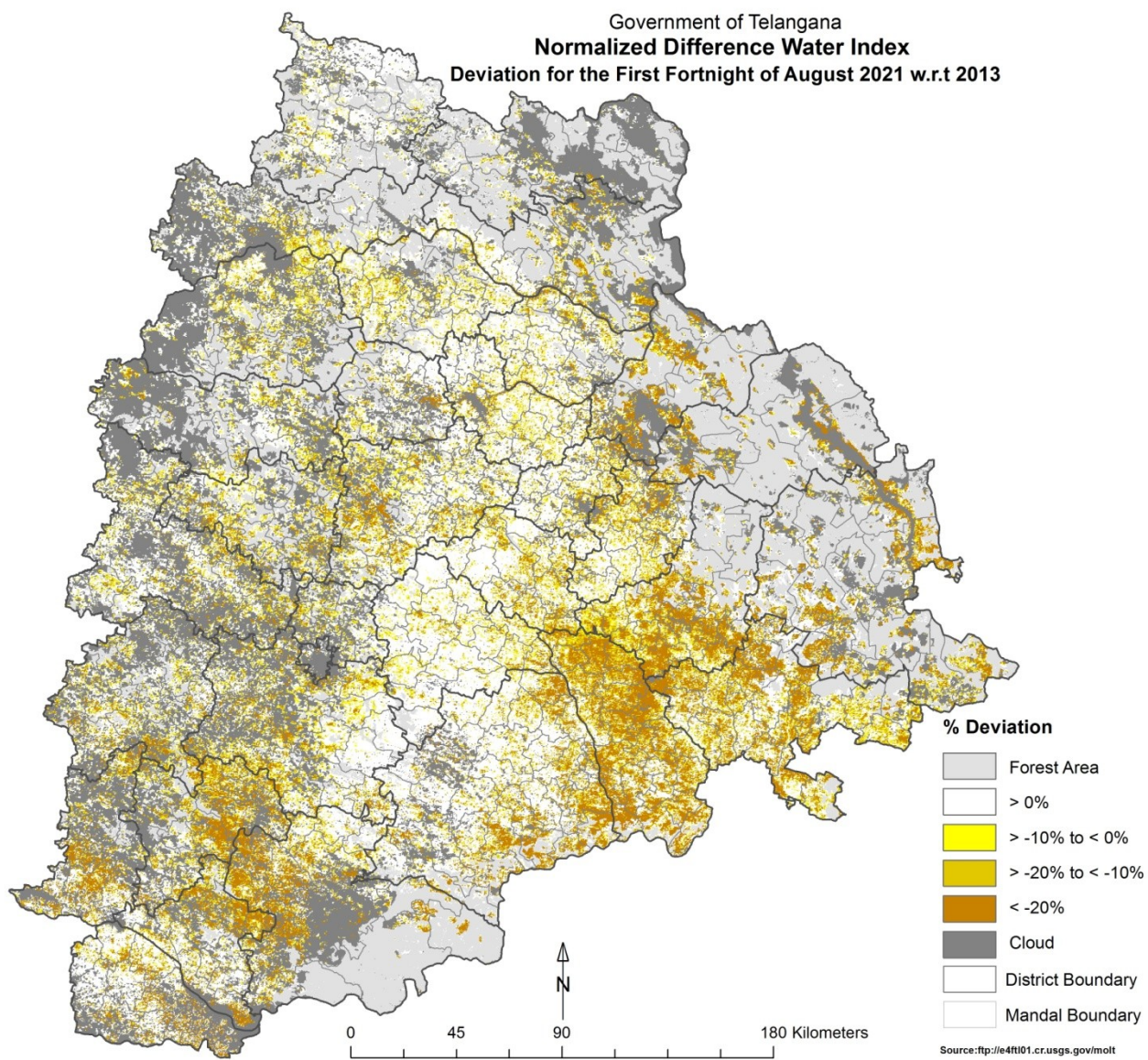


Figure 15: NDWI deviation (MODIS - 250m), First Fortnight of August 2021 w.r.t. 2013

### 3.6. Drought situation of Mandals

#### 3.6.1 Composite criteria

The drought situation in the state is assessed using different indicators viz., NDVI, NDWI and rainfall deviation of mandals. Compositing all indicators, mandals were categorised into Normal, Watch. Mandal-wise analysis for the First Fortnight of August 2021 indicated “**Normal**” agricultural situation in **504** Mandals. The agricultural situation is categorized as “**Watch**” in **85** Mandals, The agricultural situation is categorized as “**Alert**” in **5** Mandals. The Mandals under Watch categories are given in the Table.6 and their spatial distribution is shown in Figure 16.

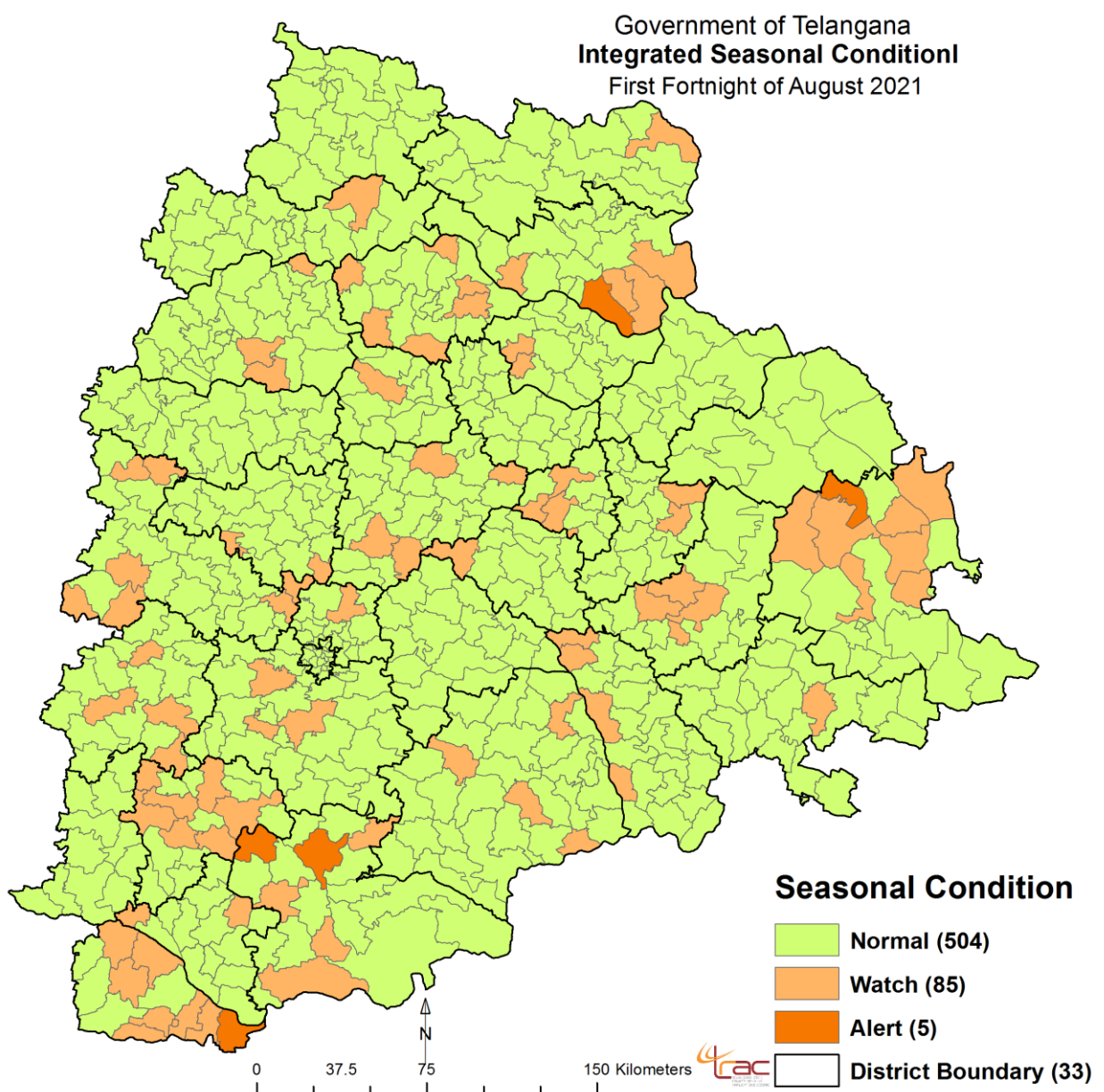


Figure 16: Mandal wise drought assessment based on August ISMS criterion

**Table.6. Mandals under Watch and Alert category based on ISMS criteria**

<b>District Name</b>	<b>Watch(85)</b>	<b>Alert(05)</b>
<b>Bhadradi Kothagudem</b>	<b>Total: 07</b> Allapalli, Aswapuram, Burgampadu, Cherla, Gundala, Laxmidevipalli, Manuguru.	<b>Total: 01</b> Karakagudem.
<b>Jagtial</b>	<b>Total: 06</b> Beerpur, Buggaram, Gollapalle, Ibrahimpatnam, Kathlapur, Kodimial.	
<b>Jangoan</b>	<b>Total: 01</b> Bachannapeta.	
<b>Jogulamba Gadwal</b>	<b>Total: 07</b> Dharur, Gadwal, Maldakal, Manopad, Rajoli, Undavelli, Waddepalle.	<b>Total: 01</b> Alampur.
<b>Khammam</b>	<b>Total: 01</b> Thallada.	
<b>Komaram Bheem Asifabad</b>	<b>Total: 01</b> Chintalamanepally.	
<b>Mahabubabad</b>	<b>Total: 04</b> Chinnagudur, Kesamudram, Mahabubabad, Nellikudur.	
<b>Mahabubnagar</b>	<b>Total: 07</b> Bhoothpur, Gandeed, Hanwada, Jadcherla, Koilkonda, Mahabubnagar Rural, Nawabpet.	
<b>Mancherial</b>	<b>Total: 04</b> Bheemaram, Chennur, Kotapalle, Luxettipet.	<b>Total: 01</b> Jaipur.
<b>Medak</b>	<b>Total: 02</b> Chilipched, Manoharabad.	
<b>Medchal Malkajgiri</b>	<b>Total: 01</b> Shamirpet.	
<b>Nagar Kurnool</b>	<b>Total: 04</b> Charakonda, Kollapur, Lingal, Nagar Kurnool.	<b>Total: 02</b> Kalwakurthy, Thim-majipeta.
<b>Nalgonda</b>	<b>Total: 04</b> Adavi devula palli, Anumula Haliya, Chandur, Nakrekal.	
<b>Nirmal</b>	<b>Total: 01</b> Pembi.	



<b>Nizamabad</b>	<b>Total: 03</b> Dichpalle, Indalwai, Mendora.	
<b>Peddapalli</b>	<b>Total: 02</b> Elgaid, Julapalle.	
<b>Rajanna Sircilla</b>	<b>Total: 01</b> Konaraopeta.	
<b>Rangareddy</b>	<b>Total: 03</b> Maheshwaram, Moinabad, Nandigam.	
<b>Sangareddy</b>	<b>Total: 07</b> Gummadidala, Jharasangam, Jinnaram, Kalher, Kohir, Mogdampalle, Sirgapor.	
<b>Siddipet</b>	<b>Total: 04</b> Chinnakodur, Gajwel, Husnabad, Jagadevpur.	
<b>Suryapet</b>	<b>Total: 04</b> Nagaram, Neredcherla, Suryapet, Thungathurthi.	
<b>Vikarabad</b>	<b>Total: 04</b> Kotepally, Kulkacharla, Pargi, Yelal.	
<b>Wanaparthy</b>	<b>Total: 02</b> Amarchinta, Gopalpet.	
<b>Warangal Rural</b>	<b>Total: 02</b> Nallabelly, Narsampet	
<b>Warangal Urban</b>	<b>Total: 03</b> Dharmasagar, Elkathurthi, Velair.	

### 3.7. District Wise NDVI / NDWI / VCI

**Table.7 District wise NDVI / NDWI / VCI Status**

NDVI/NDWI/VCI status as on 15/08/2021, Telangana								
S.No	District	NDVI Value	Average NDVI	NDWI Value	Average NDWI	VCI (NDVI)	VCI (NDWI)	VCI Condition
1	Adilabad	0.502	0.367	0.426	0.286	75.505	84.819	Normal
2	Bhadradri-Kothagudem	0.383	0.333	0.277	0.271	69.913	56.293	Normal
3	Hyderabad	0.348	0.300	0.293	0.224	60.778	65.549	Normal
4	Jagtial	0.254	0.205	0.228	0.156	50.785	63.957	Normal
5	Jangaon	0.459	0.430	0.437	0.350	70.455	86.305	Normal
6	Jayashankar-Bhupalpally	0.520	0.411	0.416	0.292	85.842	86.875	Normal
7	Jogulamba-Gadwal	0.270	0.292	0.211	0.233	52.816	47.416	Mild
8	Kamareddy	0.407	0.262	0.301	0.175	78.053	74.068	Normal
9	Karimnagar	0.528	0.366	0.463	0.293	80.733	89.044	Normal
10	Khammam	0.478	0.402	0.390	0.309	76.466	75.423	Normal
11	Komaram Bheem-Asifabad	0.433	0.385	0.330	0.297	68.465	63.287	Normal
12	Mahabubabad	0.321	0.323	0.268	0.259	55.203	57.967	Mild
13	Mahabubnagar	0.444	0.357	0.339	0.274	77.295	76.274	Normal
14	Mancherial	0.410	0.226	0.314	0.164	82.608	87.690	Normal
15	Medak	0.424	0.275	0.359	0.220	77.500	81.015	Normal
16	Medchal-Malkajgiri	0.464	0.280	0.398	0.219	78.679	84.075	Normal
17	Mulug	0.465	0.262	0.363	0.185	87.813	97.499	Normal
18	Nagarkurnool	0.321	0.229	0.231	0.179	67.857	65.750	Normal
19	Nalgonda	0.403	0.257	0.256	0.145	83.826	84.965	Normal
20	Narayanpet	0.436	0.313	0.303	0.187	83.639	87.539	Normal
21	Nirmal	0.359	0.227	0.276	0.159	77.696	84.152	Normal
22	Nizamabad	0.437	0.339	0.390	0.279	69.419	77.092	Normal
23	Peddapalli	0.485	0.350	0.410	0.293	76.541	79.669	Normal
24	Rajanna-Siricilla	0.448	0.346	0.415	0.291	80.094	85.285	Normal
25	Rangareddy	0.447	0.319	0.354	0.225	80.693	88.588	Normal
26	Sangareddy	0.404	0.245	0.326	0.182	78.059	84.084	Normal
27	Siddipet	0.453	0.328	0.380	0.245	74.459	79.221	Normal
28	Suryapet	0.465	0.382	0.379	0.274	74.226	80.912	Normal
29	Vikarabad	0.411	0.338	0.309	0.241	68.301	71.119	Normal
30	Wanaparthy	0.366	0.230	0.304	0.171	73.411	78.896	Normal
31	Warangal Rural	0.405	0.227	0.304	0.156	84.654	86.712	Normal
32	Warangal Urban	0.442	0.371	0.375	0.296	74.633	76.277	Normal
33	Yadadri-Bhongir	0.558	0.370	0.437	0.256	92.436	94.009	Normal

\*Normalized Difference Vegetative Index (NDVI) Value - Current year NDVI

\*Normalized Difference Wetness Index (NDWI) Value - Current year NDWI

\*Average NDVI - Average of previous 17 years NDVI

\*Average NDWI - Average of previous 17 years NDWI

\*VCI (NDVI) - Vegetation Condition Index based on NDVI

\*VCI (NDWI) - Vegetation Condition Index based on NDWI

\*NDVI/NDWI Condition - VCI $\geq$ 60 (Normal), VCI $\geq$ 40 (Mild), VCI $\geq$ 20 (Moderate), VCI $<$ 20 (Severe)

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