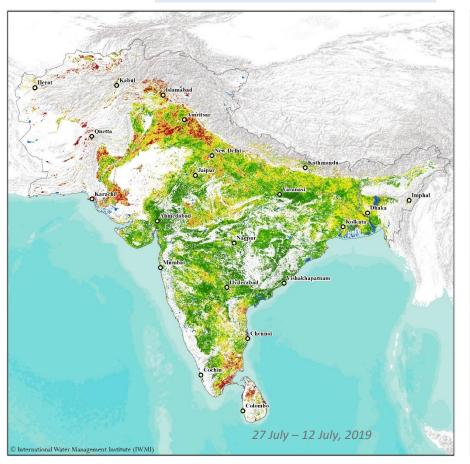
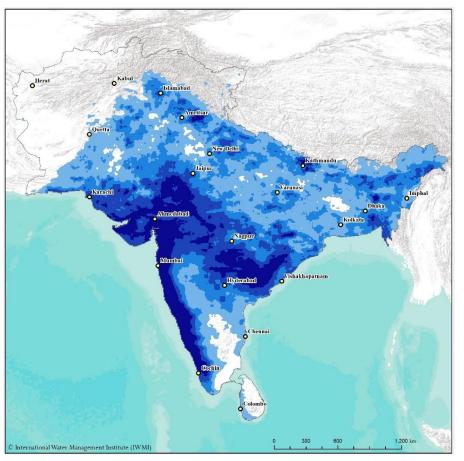
Agriculture drought condition for South Asia

Current Rainfall condition in reference to historical rainfall









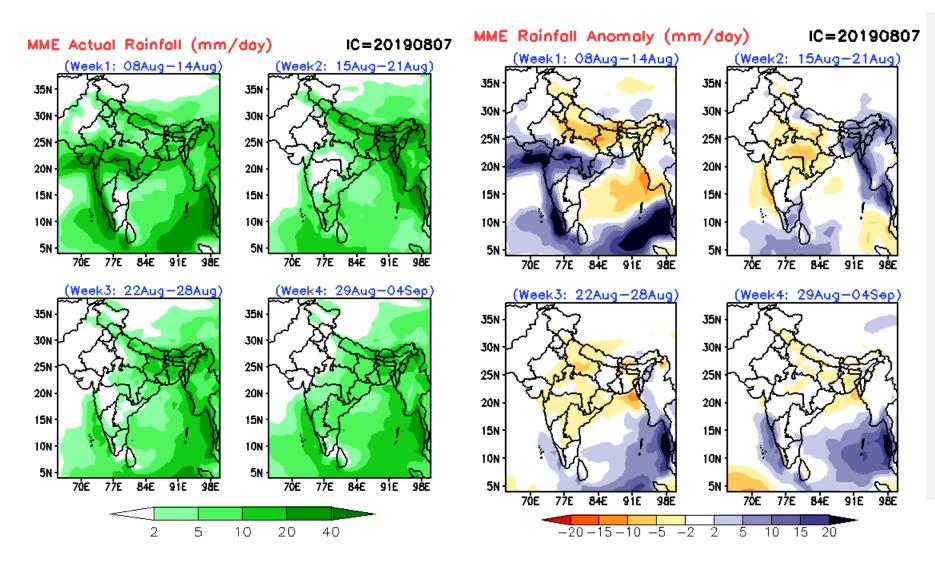


South Asia Drought Monitoring System (SADMS) drought weekly bulletin is produced by International Water Management Institute (IWMI) and is funded by the Indian Council of Agricultural Research (ICAR), the CGIAR Research Program on Water, Land and Ecosystems (WLE) and the Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan. Development of the beta-monitoring system was made possible at this inception through IDMP supported by WMO/GWP. The bulletin supports the government and other users to strengthen the potential use of satellite technology and modeling tools to reduce the impacts on agriculture risks and support in drought contingency plans and mitigation efforts.

Published Date: 14 August 2019

Rainfall Summary - Predicted week wise rainfall for South Asia

Multi Model Ensemble (MME) Seasonal Prediction System for 2019 Monsoon Season



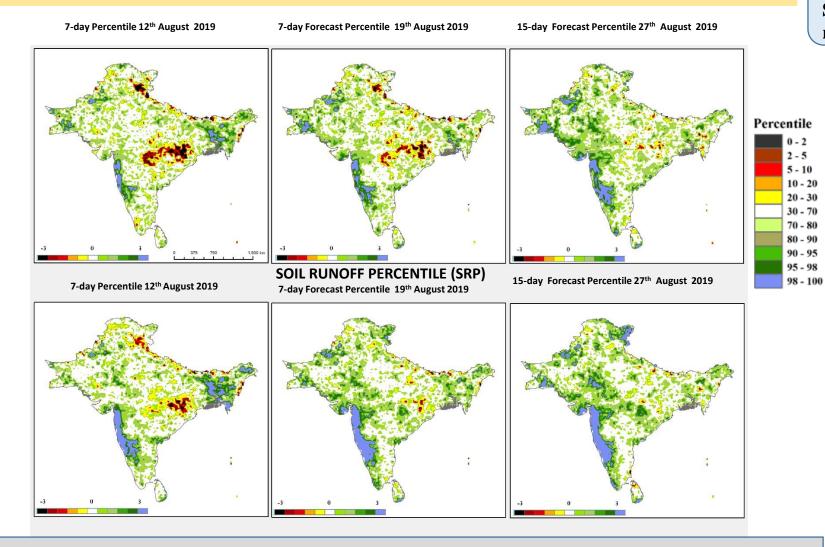
- Rainfall for UP, MP and Kerala experience in the next week;
- Nepal, Bhutan, south Assam, North and north east Arunachal might experience a decrease in rainfall, however the rainfall anomaly explains deficit rainfall in last week of July.
- Most of India might experience decreasing in rainfall by ending of August.
- Maharashtra, Gujarat, Karnataka and Tamilnadu may experience decreasing rainfall from 8th August to 21st August.
- Sri Lanka for Northern, North Central and Eastern province explains less rainfall on beginning Aug. and will be increased on ending. western might experience excess rainfall in month of beginning of Aug to ending August.
- Nepal rainfall anomaly explains a decrease in rainfall but in Bhutan it will slightly increase in end of August.
- Overall Pakistan shows normal in rainfall.

Note: The summary on country specific details described above based on the ERPAS MME information product do not imply the expression of any opinion whatsoever on the part of the IWMI and its partners as well the data provided by IITM.

SOUTH ASIA DROUGHT EARLY WARNING SYATEM (SADEWS)

SOIL MOISTURE PERCENTILE (SMP)

SOIL RUNOFF PERCENTILE (SRP)



The SADEWS is regional scale early warning system developed as a collaborative project between International Water Management Institute (IWMI) and Indian Institute of Technology – Gandhinagar (IIT-GN).

Disclaimer: The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the International Water Management Institute (IWMI) and its partners concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of IWMI.

Current Condition: 12th Aug 2019

Forecast Period: 12th Aug and 27th Aug 2019 Standardized Soil Moisture and Runoff Index for regional drought and early warning

Summary:

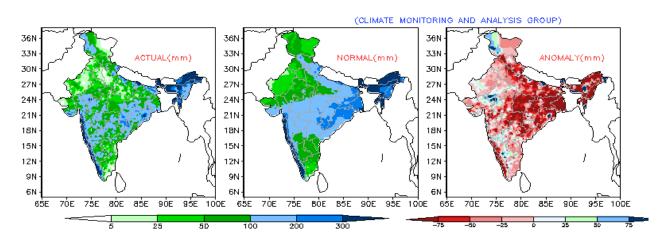
The experimental drought forecast products for research/scientific use based on 12th August 2019 initial condition. These forecast products are based on the real time weekly operational forecast generated by Global ENSemble (GEFS), a weather forecast model made up of 21 separate forecasts, or ensemble members developed at The National Centers for Environmental Prediction (NCEP), NOAA.

Drought Forecast Outlook:

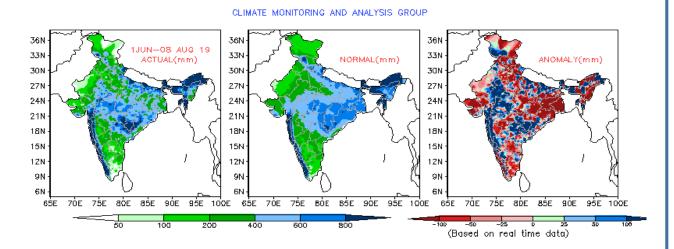
- Rainfall of, Maharashtra, Gujarat, Karnataka and Punjab, will be increasing rainfall in coming two weeks.
- Initial condition on the Soil Runoff Index (SRI) explains similar trend to SSI.
- Dryness is decreasing from mid of Aug and it will be further decreasing in the 4th week of August all over India.
- South, and some Western patches of Sri Lanka will get more rain when rainfall. North west boundary of the India will depict rainfall decrease encompassed from UP and Bihar.
- The areas are in deficit rainfall condition which may affect the crop productivity and advance need for State and Local authorities for better planning and coordination on water resources management.

INDIA - Monthly Rainfall Condition (Actual vs. Anomaly)

Actual Rainfall – June 2019



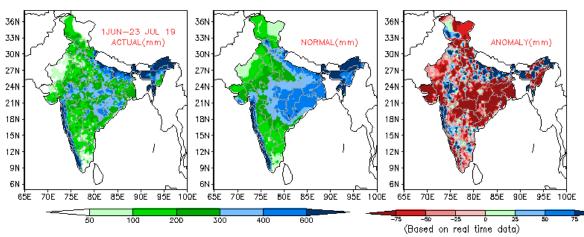
Actual Rainfall – Seasonal 2019 (till 08th Aug.)



Data Source: IMD

Actual Rainfall – Jul 2019

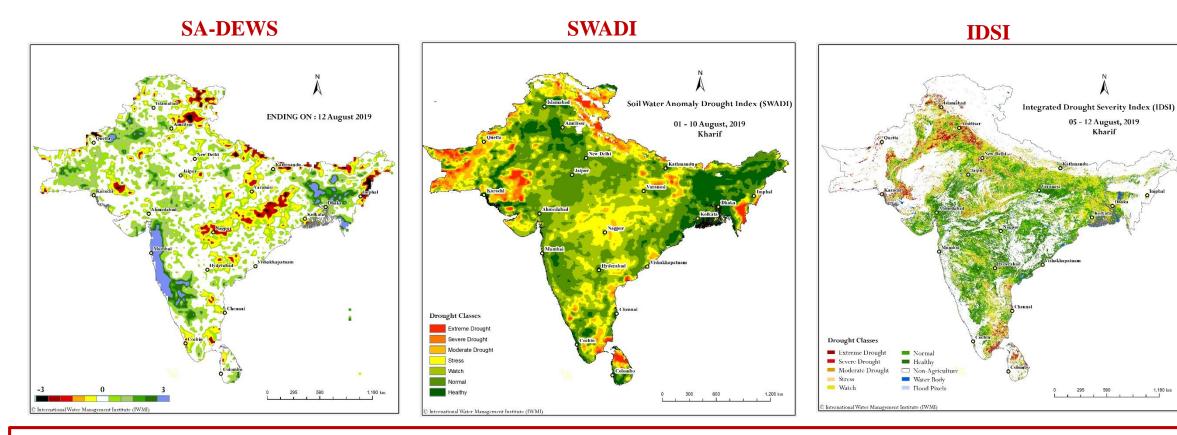




- Several parts of the India there is an increase in rainfall for the month of Aug compared to the long-term anomaly, however, North and North west districts specially in Karnataka, Maharashtra, Odisha, Bihar, South Rajasthan, Assam had excess rainfall in July.
- Month of June has experienced mostly negative anomalies across India except some patches of western and northern terrestrial area.
- There has a reduction and slightly decreased in rainfall in the month of June, July and it has increased from second week of July most part over the India.
- Overall there is the most same pattern in whole concern period.

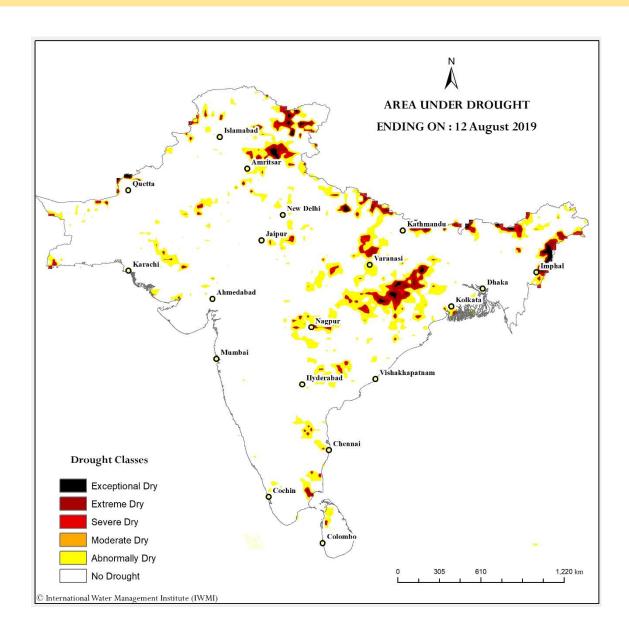
Note: Simple qualitative assessment on the performance on rainfall condition was described here to cross compare with SADMS – IDSI products for evaluation purpose only.

South Asia Drought Indices – A Comparison & Assessment



- South Asia-Drought Early Warning System (SA-DEWS) is an integrated approach based on satellite estimates of rainfall temperature, wind and soil type utilized in VIC model and the derived outputs namely Standardized Precipitation Index (3-Month), Standardized Soil Moisture Index (SSI) and Standardized Runoff Index (SRI).
- Soil Water Anomaly Drought Index (SWADI) is derived from satellite based decadal soil moisture product of ASCAT provided by EUMETSAT.
- Integrated Drought Severity Index (IDSI) is an integrated index that has been formulated using VCI, TCI & PCI at 500m resolution for agricultural land-use over South Asia.
- It can be observed, that during this time period, all the three indices shows a relation with each other. The peninsular India is reviving from the drought situation to good condition except Tamilandu state and North and Northeast of Sri Lanka.

South Asia Drought Forecast

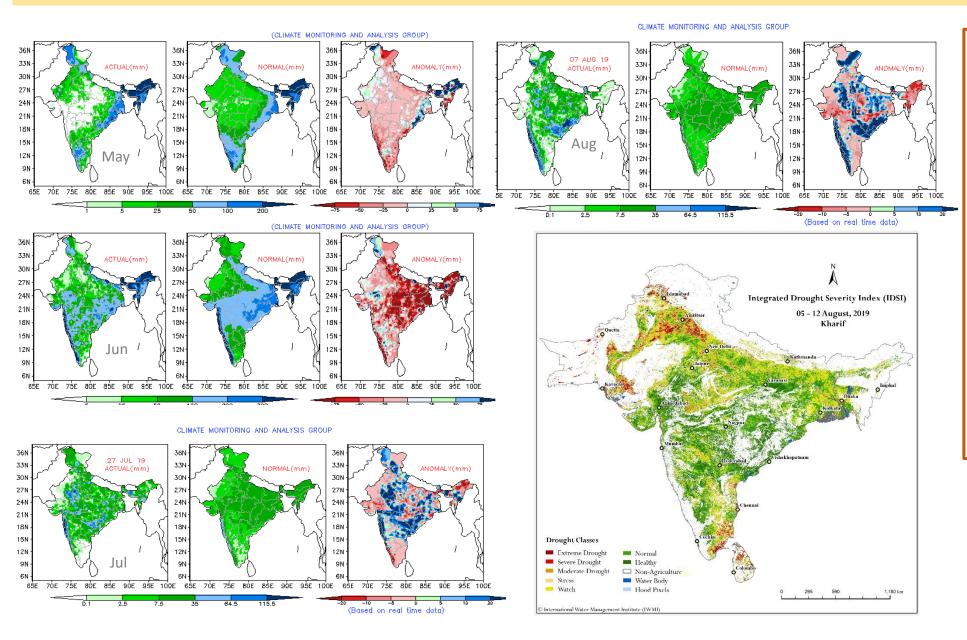


- Using the initial condition i.e. 27th July 2019 based on satellite rainfall estimates of 3B42RT daily time-step integrates in the VIC model and the derived outputs namely Standardized Precipitation Index (3-Month), Standardized Soil Moisture Index (SSI) and Standardized Runoff Index (SRI)
- The extreme values of all three conditions are statistically combined to generated areas under drought for entire South Asia
- Extreme dry condition of Jarikand, North of Telangana, Himachal and Northern Haryana is decreased.
- Part of Jammu & Kashmir, and parts of northeastern belt are observed to have decreasing dry condition. Also, North east of Sri Lanka are under Abnormally/moderate dry condition.
- Reference to IMD SPI data is well correlated to the area under drought predicted by drought algorithm.

India – State wise analysis



India Monthly Rainfall Comparison & Assessment

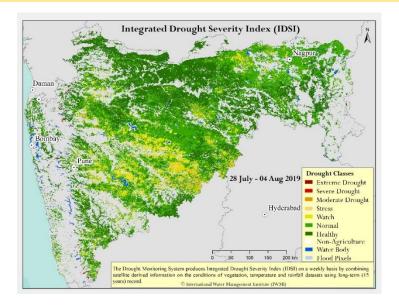


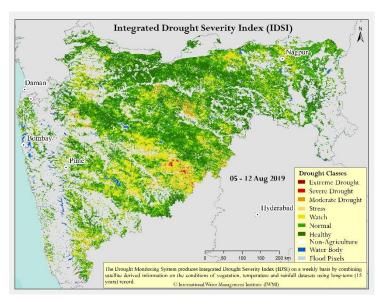
Summary:

Rainfall deficit in whole India from May is recovered mostly on July month. However on July; the rainfall excess level of some area became much higher when compared with June. In many states of the country and the reduced the vegetation stress while converting severe drought to normal and healthy condition in the agricultural land, which is clearly reflected in the IDSI.

Similar pattern has been revealed by monthly rainfall anomaly report from IMD.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Maharashtra)



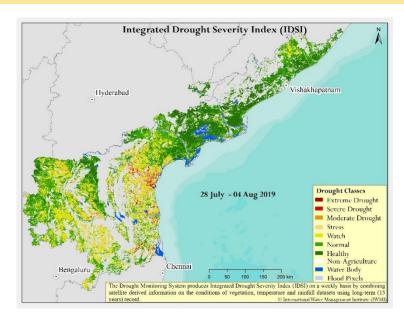


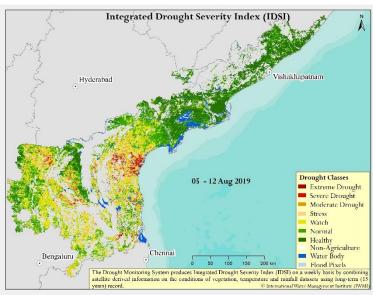
INDIA METEOROLOGICAL DEPARTMENT

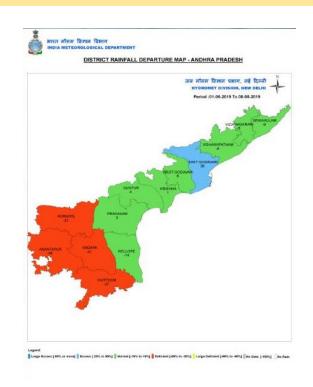


- SADMS framework was applied for the agriculture drought monitoring in Maharashtra for current obtained mainly from satellite remote sensing data. The index (Integrated Drought Severity Index IDSI), Indian Meteorological Rainfall maps were analysed to understand rainfall deficit which could help in validating the drought maps with the absence of in-situ observations.
- Several districts are denoted Excess and Normal level of drought at the beginning of Aug 2019. Also it is clearly indicate from rainfall anomaly.
- Increase of Rainfall in state has reduced the vegetation stress in the agricultural land and the excess rainfall caused to flood it is also clearly reflected in stress of vegetation in IDSI (watch-due to execs water). Watch to Normal and Healthy drought condition has improve in to normal most of the State. Similar pattern has been revealed by seasonal rainfall report from IMD.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Andhra Pradesh)







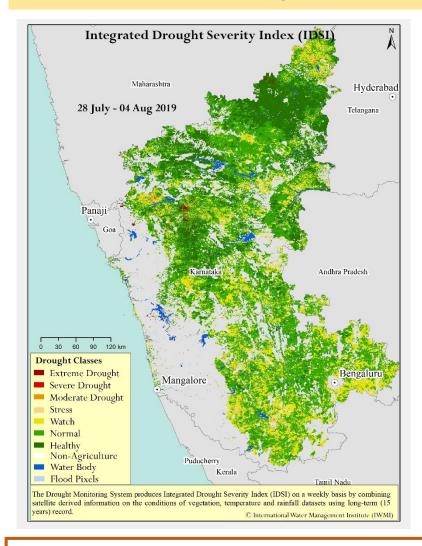
District-Wise, Month-Wise Rainfall Status from 01/06/2019									
District	Actual	Normal	Deviation(%)	Status					
Srikakulam	307.7	369.4	-16.7	Normal					
Vizianagaram	307.4	354.1	-13.2	Normal					
Vishakapatnam	396.6	371.2	6.8	Normal					
East Godavari	425.4	425.7	-0.1	Normal					
West Godavari	378.7	432.3	-12.4	Normal					
Krishna	311.7	356.5	-12.6	Normal					
Guntur	225.3	268.8	-16.2	Normal					
Prakasham	166.4	174.5	-4.6	Normal					
Nellore	116.1	170.9	-32.1	Deficient					
Chittoor	153.3	224.0	-31.6	Deficient					
Kadapa	106.2	200.1	-46.9	Deficient					
Anantapur	76.1	152.5	-50.1	Deficient					
Kurnool	144.5	230.8	-37.4	Deficient					
State	232.6	287.0	-19.0	Normal					

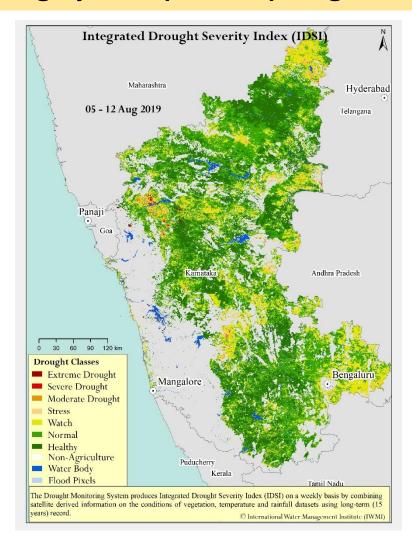
Rainfall Status (Avg from 01-06-2019 to till date)

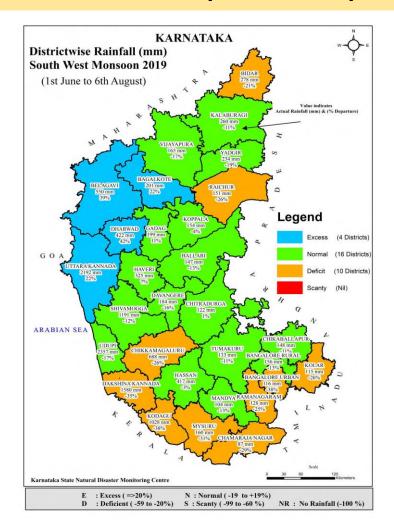
Data Source: APSDPS

- •Out of the 13 districts in A.P., several districts (09) had normal and excess rainfall had normal rainfall from June 1 to 12th Aug 2019;
- 'Extreme to Stress drought' category is remain and most probably same all over the district from previous week in IDSI.
- •Negative rainfall anomalous condition has reduced from 01 June to 12th Aug 2019. it is the indication of reducing the extreme drought condition in to watch to normal category. Still some patches observed the drought condition in the middle and near south west boundary of the state.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Karnataka)



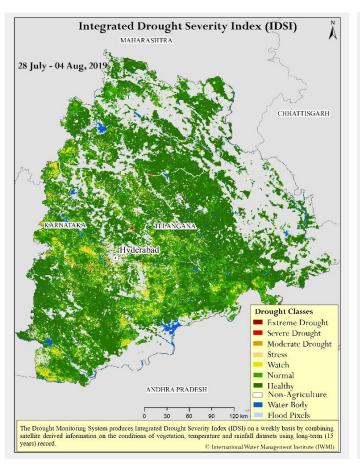


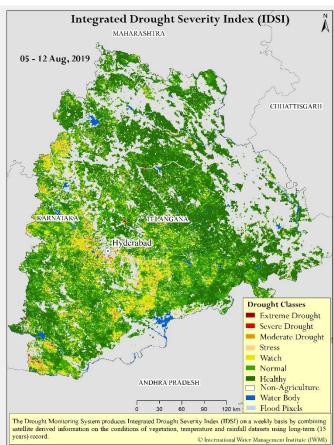


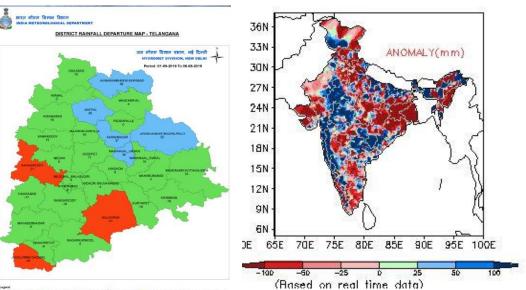
The Integrated Drought Severity Index (IDSI) for Karnataka were assessed at district level. All over the State reduce the drought condition due continues rainfall. Specially in majority of IDSI category of all districts are Watch to Normal and Normal to Healthy simultaneously.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Telangana)





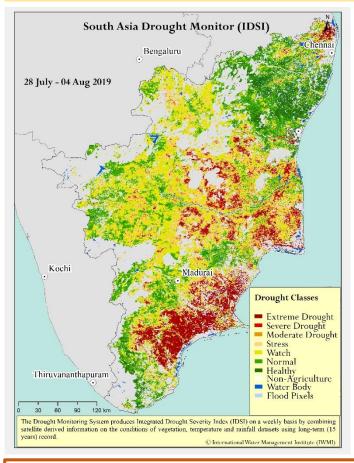


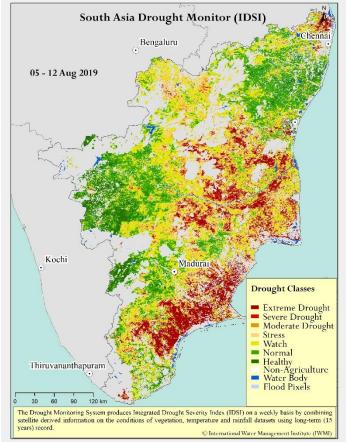


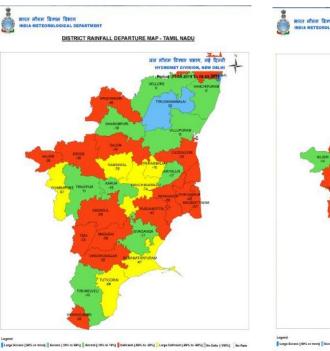
Summary:

The Integrated Drought Severity Index (IDSI) for Telangana was assessed at district level. There seems some areas are staying normal and healthy level. Others have slight increased of crop stress may be due to excess soil moisture under continues rainfall specially in center part of state.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Tamil Nadu)



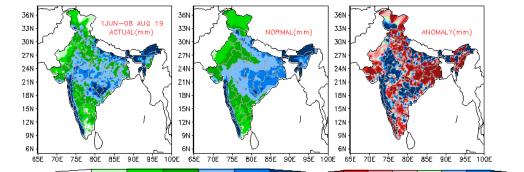




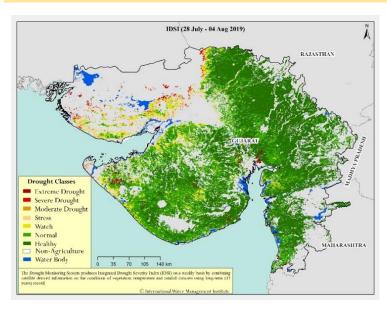


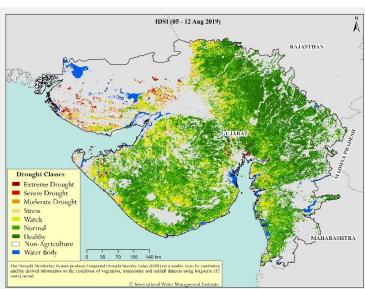
01st June – 12th Aug 2019 CLINATE MONITORING AND ANALYSIS GROUP

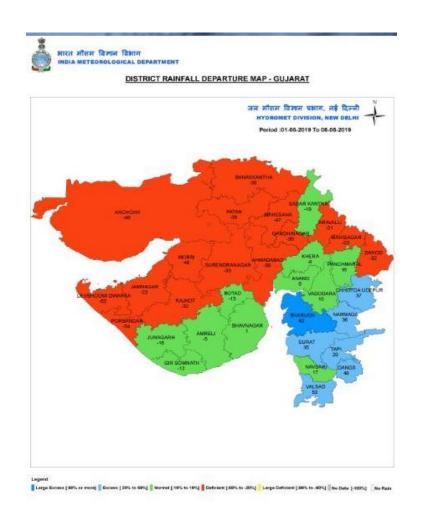
- Obviously, overall drought condition is still same condition from previous analysis cycle. Also center area of the state seems to have 'watch' to 'normal' drought at the week ending on 12th of Aug 2019.
- Overall, it can be observed that the same rainfall pattern of the area during both periods.

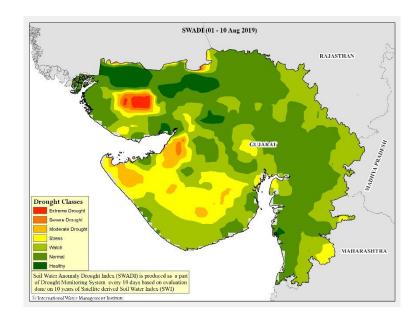


South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Gujarat)



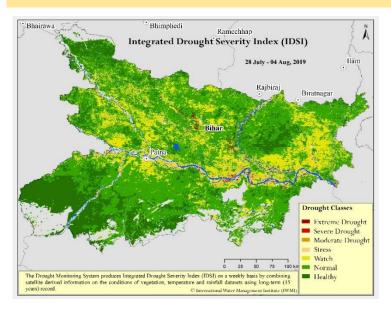


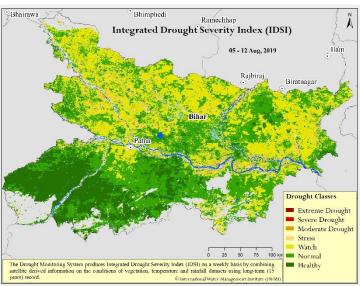


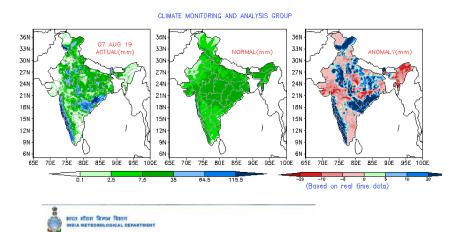


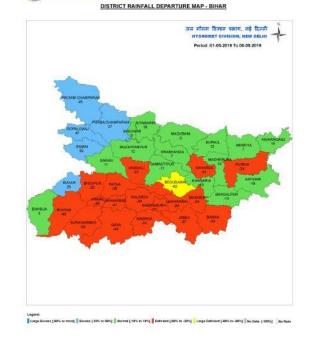
- Overall the state is prevailing from normal to watch drought condition form previous to resent week.
- There is deficit rainfall for 80% of the state but still there are some districts with normal and excess rainfall from 1st June to 06th Aug.
- Additionally, it can be observed that most of the area of north eastern staying same drought condition during the both period.

South Asia Drought Monitoring System (SADMS) - Agriculture Assessment (Bihar)









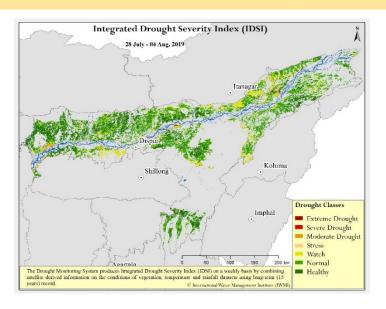


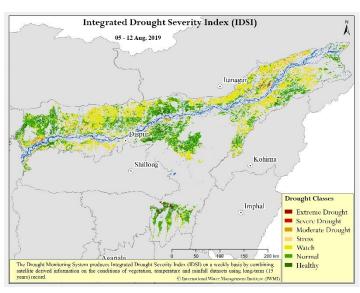
DISTRICT-WISE RAINFALL DISTRIBUTION

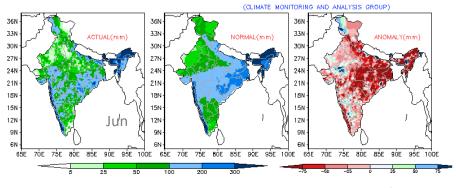
		Day :08-08-2019				Period:01-06-2019 To 08-08-2019			
S NO	MET. SUBDIVISION/UT/STATE/DIS TRICT	ACTUAL (mm)	NORMAL (mm)	%DEP.	CAT.	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT
	SUBDIVISION : BIHAR	1.7	6.9	-75%	LD	554.2	584.5	-5%	N
1	ARARIYA	0.7	7.7	-92%	LD	851.7	804.9	6%	N
2	ARWAL	0.0	7.2	-100%	NR	227.8	414.7	-45%	D
3	AURANGABAD	4.6	5.6	-18%	N	343.3	480.7	-29%	D
4	BANKA	2.3	7.4	-69%	LD	346.9	509.8	-32%	D
5	BEGUSARAI	2.5	6.0	-58%	D	228.3	591.4	-61%	LD
6	BHABUA	1.5	8.6	-82%	LD	517.8	503.3	3%	N
7	BHAGALPUR	13.0	3.6	262%	LE	508.4	559.2	-9%	N
8	BHOJPUR	0.0	8.6	-100%	NR	408.7	513.3	-20%	D
9	BUXAR	0.0	9.5	-100%	NR	600.4	452.5	33%	E
10	DRABHANGA	0.0	8.7	-100%	NR	547.9	517.0	6%	N
11	GAYA	3.6	7.8	-54%	D	303.6	499.3	-39%	D
12	GOPALGANJ	0.0	6.0	-100%	NR	795.2	543.4	46%	E
13	JAHANABAD	0.0	5.9	-100%	NR	283.2	444.6	-36%	D
14	JAMUI	1.8	6.6	-73%	LD	402.3	530.1	-24%	D
15	KATIHAR	2.1	5.3	-61%	LD	524.5	635.6	-17%	N
16	KHAGARIA	4.1	5.6	-28%	D	480.3	565.1	-15%	N
17	KISHANGANJ	2.7	9.6	-72%	LD	1230.4	1071.3	15%	N
18	LAKHISARAI	0.0	6.0	-100%	NR	337.7	454.9	-26%	D
19	MADHEPURA	0.0	6.3	-100%	NR	727.5	642.8	13%	N
20	MADUBANI	0.0	3.8	-100%	NR	562.2	584.5	-4%	N
21	MUNGER	5.6	4.4	27%	Е	441.0	582.0	-24%	D
22	MUZAFFARPUR	0.8	5.7	-87%	LD	618.1	557.2	11%	N
23	NALANDA	0.0	7.3	-100%	NR	331.2	489.3	-32%	D
24	NAWADA	6.0	8.1	-26%	D	381.6	478.4	-20%	D
25	PACHIM CHAMPARAN	0.0	5.7	-100%	NR	1076.1	747.1	44%	E
26	PATNA	0.5	11.1	-96%	LD	343.6	526.2	-35%	D
27	PURBA CHAMPARAN	0.0	7.3	-100%	NR	767.3	613.2	25%	E
28	PURNIA	2.3	7.2	-68%	LD	663.5	873.7	-24%	D
29	ROHTAS	3.2	9.5	-66%	LD	319.5	475.9	-33%	D
30	SAHARSA	0.0	9.9	-100%	NR	567.7	785.6	-28%	D
31	SAMASTIPUR	0.2	5.3	-97%	LD	506.7	549.3	-8%	N
32	SARAN	0.0	5.8	-100%	NR	567.3	514.1	10%	N
33	SHEIKHPURA	0.0	7.1	-100%	NR	311.2	494.9	-37%	D
34	SHEOHAR	0.0	4.3	-100%	NR	641.8	601.9	7%	N
35	SITAMARHI	0.0	6.4	-100%	NR	730.4	637.9	14%	N
36	SIWAN	2.3	7.0	-67%	LD	794.1	529.3	50%	E
37	SUPAUL	0.0	5.7	-100%	NR	730.2	652.8	12%	N
38	VAISHALI	0.0	5.7	-100%	NR	413.5	542.5	-24%	D

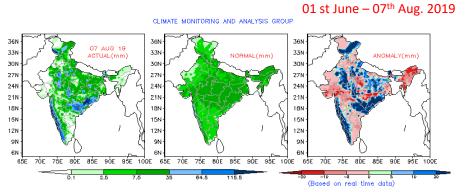
- The crop stress most parts of Bihar seems to be increased. This is mainly due to the widespread flooding and crop damages due to excess rainfallHowever, southern area of the state has some increased healthy level.
- This has happened because of all the district in Northern and two from Western are normal to excess rainfall but southern district rainfall has decreased compare to the previous week.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Assam)











India Meteorological Department Hydromet Division, New Delhi

DISTRICT-WISE RAINFALL DISTRIBUTION

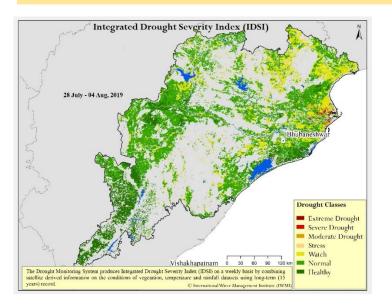
S NO	MET. SUBDIVISION/UT/STATE/DIS TRICT	Day :08-08-2019				Period:01-06-2019 To 08-08-2019			
		ACTUAL (mm)	NORMAL (mm)	%DEP.	CAT.	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT
	STATE: ASSAM	8.7	9.7	-11%	N	922.9	946.5	-2%	N
1	BAKSA	8.9	3.5	153%	LE	1460.9	852.8	71%	LE
2	BARPETA	23.1	10.5	120%	LE	1784.5	1537.0	16%	N
3	BONGAIGAON	22.7	6.4	255%	LE	1816.7	1483.5	22%	Е
4	CACHAR	6.9	18.6	-63%	LD	1189.5	1173.8	1%	N
5	CHIRANG	27.0	4.1	559%	LE	2004.7	1556.7	29%	E
6	DARRANG	11.6	8.7	33%	E	154.0	820.9	-81%	LD
7	DHEMAJI	0.0	10.3	-100%	NR	1834.4	1090.5	68%	LE
8	DHUBRI	17.8	10.1	76%	LE	1183.7	1435.6	-18%	N
9	DIBRUGARH	1.0	9.4	-89%	LD	903.7	997.8	-9%	N
10	GOALPARA	19.3	9.8	97%	LE	1137.3	1202.0	-5%	N
11	GOLAGHAT	13.3	9.6	38%	E	481.5	648.9	-26%	D
12	HAILAKANDI	47.2	13.0	263%	LE	978.0	1006.0	-3%	N
13	JORHAT	1.7	14.3	-88%	LD	698.3	753.4	-7%	N
14	KAMRUP METRO	0.0	4.2	-100%	NR	491.8	635.9	-23%	D
15	KAMRUP RURAL	0.0	6.2	-100%	NR	553.9	848.9	-35%	D
16	KARBI ANALOG	0.0	6.6	-100%	NR	272.0	513.8	-47%	D
17	KARIMGANJ	25.4	14.2	79%	LE	1290.6	1415.2	-9%	N
18	KOKRAJHAR	38.2	10.7	257%	LE	2250.2	1737.6	30%	Е
19	LAKHIMPUR	1.4	14.9	-90%	LD	1410.4	1249.5	13%	N
20	MORIGAON	0.0	13.5	-100%	NR	469.6	714.3	-34%	D
21	N.C HILLS	8.2	10.8	-24%	D	635.4	738.7	-14%	N
22	NAGAON	10.5	6.9	53%	Е	433.9	618.8	-30%	D
23	NALBARI	4.9	6.7	-27%	D	1422.2	1056.3	35%	Е
24	SIBSAGAR	0.0	11.3	-100%	NR	527.6	743.4	-29%	D
25	SONITPUR	4.4	10.4	-57%	D	805.9	728.4	11%	N
26	TINSUKIA	0.0	9.6	-100%	NR	975.8	957.6	2%	N
27	UDALGURI	5.0	9.3	-46%	D	1139.1	949.7	20%	Е

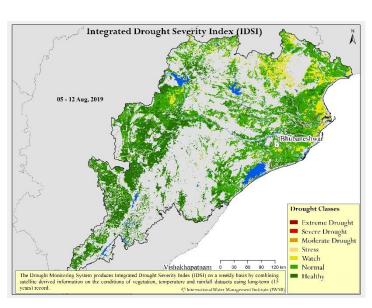
Summary:

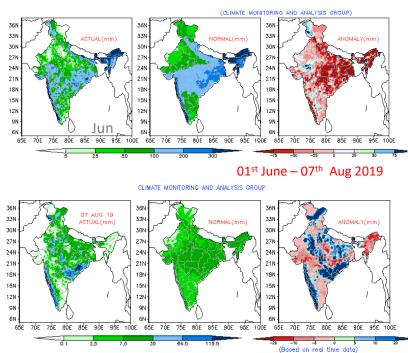
The drought severity in many parts of Assam seems to be slightly decreased compare to previous week. Normal in north-eastern districts, simultaneously normal to watch drought category observed rest of the area.

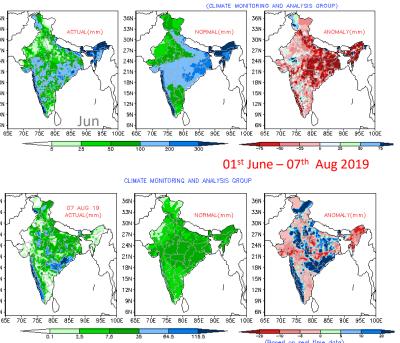
This has happened because of most of central districts shows increase the rainfall. However increase the rainfall due to activation of South west monsoon over India.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Odisha)













DISTRICT-WISE RAINFALL DISTRIBUTION

S NO	MET. SUBDIVISION/UT/STATE/DIS TRICT	Day :08-08-2019				Period:01-06-2019 To 08-08-2019				
		ACTUAL (mm)	NORMAL (mm)	%DEP.	CAT.	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT	
	SUBDIVISION : ODISHA	59.3	13.1	352%	LE	610.6	667.7	-9%	N	
1	ANUGUL	29.0	11.3	156%	LE	426.7	633.4	-33%	D	
2	BALANGIR	106.5	12.8	732%	LE	543.4	703.9	-23%	D	
3	BALESHWAR	8.1	14.0	-42%	D	380.6	672.8	-43%	D	
4	BARAGARH	72.5	16.2	348%	LE	637.8	705.4	-10%	N	
5	BAUDA	70.5	16.6	325%	LE	606.4	639.4	-5%	N	
6	BHADRAK	73.2	16.0	357%	LE	476.8	590.3	-19%	N	
7	CUTTACK	37.0	13.2	180%	LE	655.5	654.1	0%	N	
В	DEOGARH	26.1	17.0	53%	Е	467.7	761.7	-39%	D	
9	DHENKANAL	33.4	13.9	140%	LE	559.4	644.5	-13%	N	
10	GAJAPATHI	51.2	8.7	489%	LE	454.6	583.8	-22%	D	
11	GANJAM	20.0	6.8	194%	LE	502.8	481.3	4%	N	
12	JAGATSINGHAPUR	15.7	11.7	34%	Е	556.1	594.0	-6%	N	
13	JAJAPUR	117.5	19.3	509%	LE	637.5	788.2	-19%	N	
14	JHARSUGUDA	200.1	16.2	1135%	LE	695.3	694.0	0%	N	
15	KALAHANDI	105.3	15.5	579%	LE	778.8	723.3	8%	N	
16	KANDHAMAL	54.9	12.3	347%	LE	663.6	674.0	-2%	N	
17	KENDRAPARHA	56.0	13.2	324%	LE	478.1	614.2	-22%	D	
18	KENDUJHAR	38.3	10.6	262%	LE	472.3	661.4	-29%	D	
19	KHORDHA	10.8	12.7	-15%	N	584.3	610.5	-4%	N	
20	KORAPUT	96.1	17.6	446%	LE	1045.3	704.9	48%	Е	
21	MALKANGIRI	29.4	13.6	116%	LE	849.3	720.0	18%	N	
22	MAYURBHANJ	20.5	11.4	80%	LE	518.0	725.9	-29%	D	
23	NABARANGAPUR	91.3	19.7	363%	LE	930.7	783.3	19%	N	
24	NAYAGARH	17.3	7.4	134%	LE	519.7	628.3	-17%	N	
25	NUAPARHA	73.8	9.5	676%	LE	514.1	593.5	-13%	N	
26	PURI	2.5	13.9	-82%	LD	663.1	534.8	24%	Е	
27	RAYAGARHA	78.5	10.5	647%	LE	648.9	575.4	13%	N	
28	SAMBALPUR	72.0	17.0	323%	LE	539.4	761.7	-29%	D	
29	SUBARNAPUR	78.4	11.0	613%	LE	667.5	712.9	-6%	N	
30	SUNDARGARH	83.4	11.0	658%	LE	503.1	693.4	-27%	D	

Summary:

Through out the Odisha state the drought condition ,most same in IDSI category when compare to previous week.

Still about 95% of State observed deficient but due to continues rainfall over the state change the vegetation condition to normal.



Disclaimer

All content within this bulletin is based upon the most current available data. As the drought is a dynamic situation, the current realities may differ from what is depicted in this document. The product has not been validated and used only the weather forecast and remote sensing observation. We welcome the feedback from the end-users and request you to provide field observations and any other details which can improve the product quality and prediction skills in the near future.

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