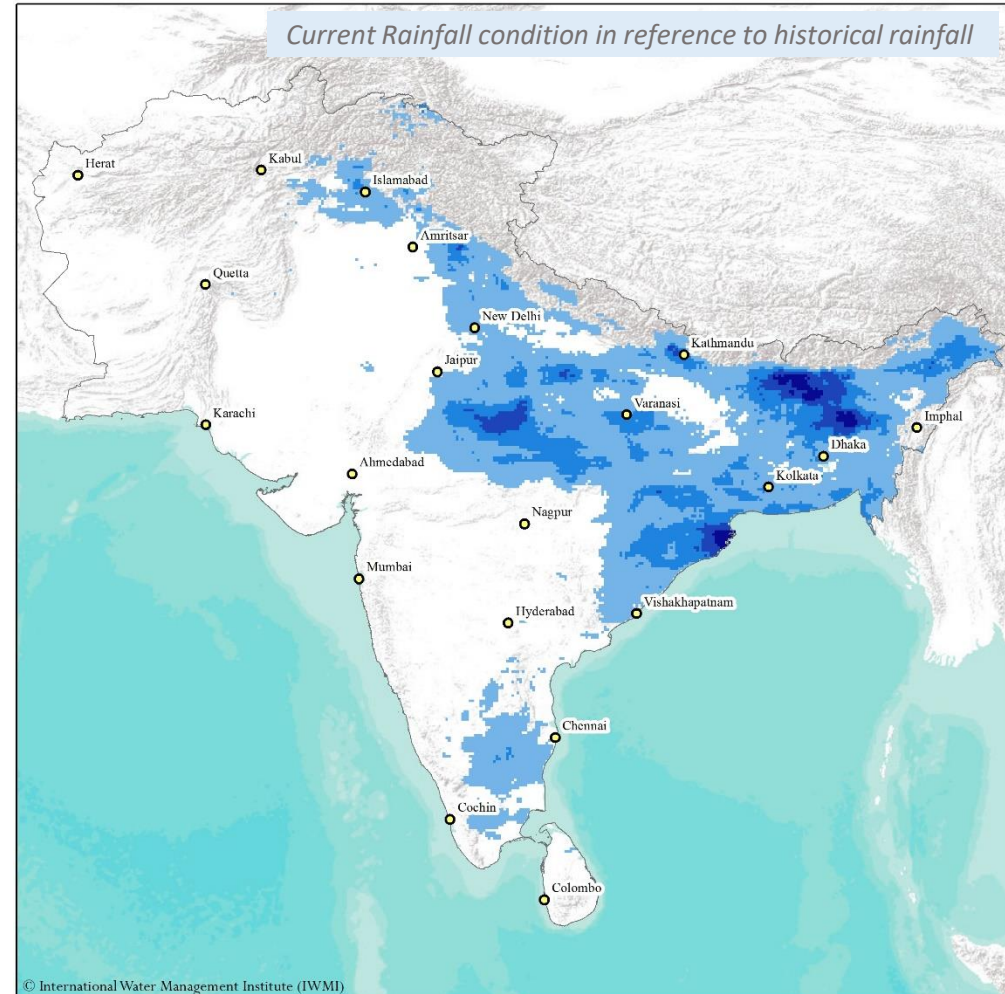
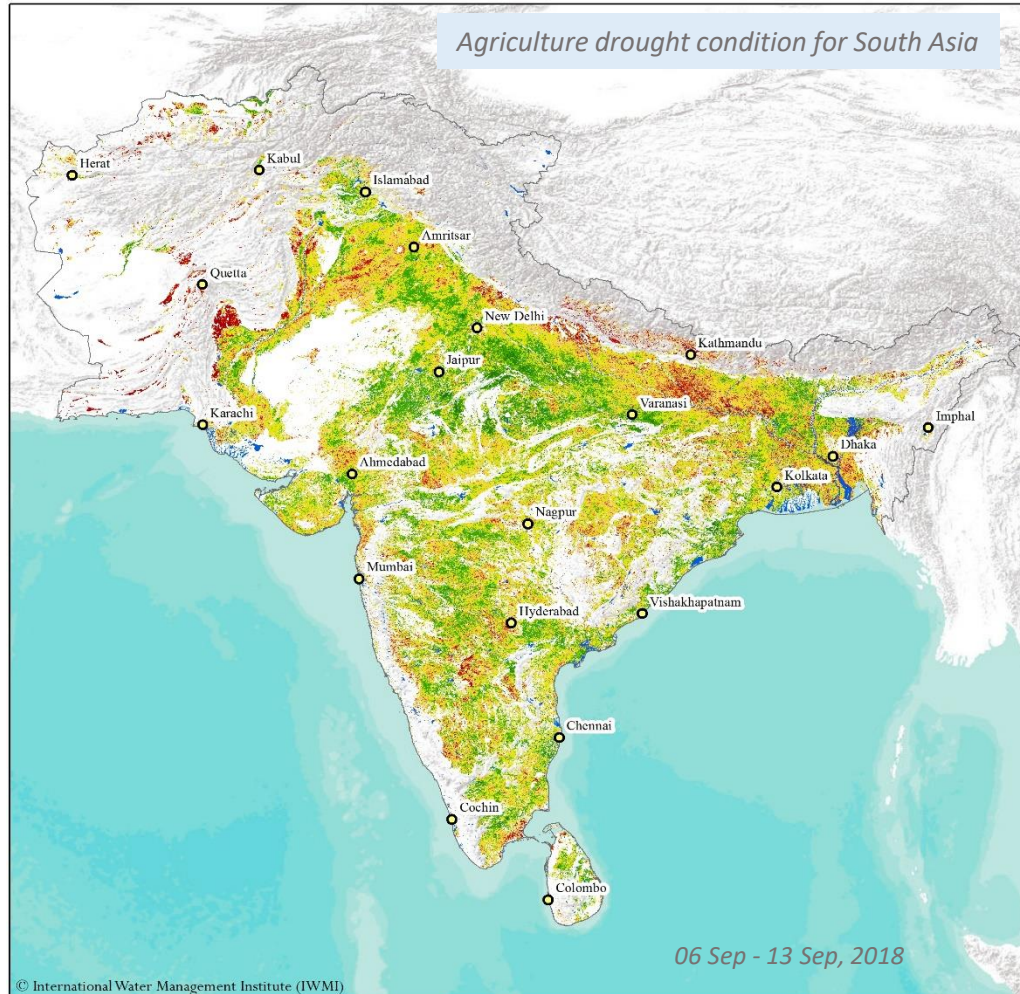


SADMS DROUGHT BULLETIN

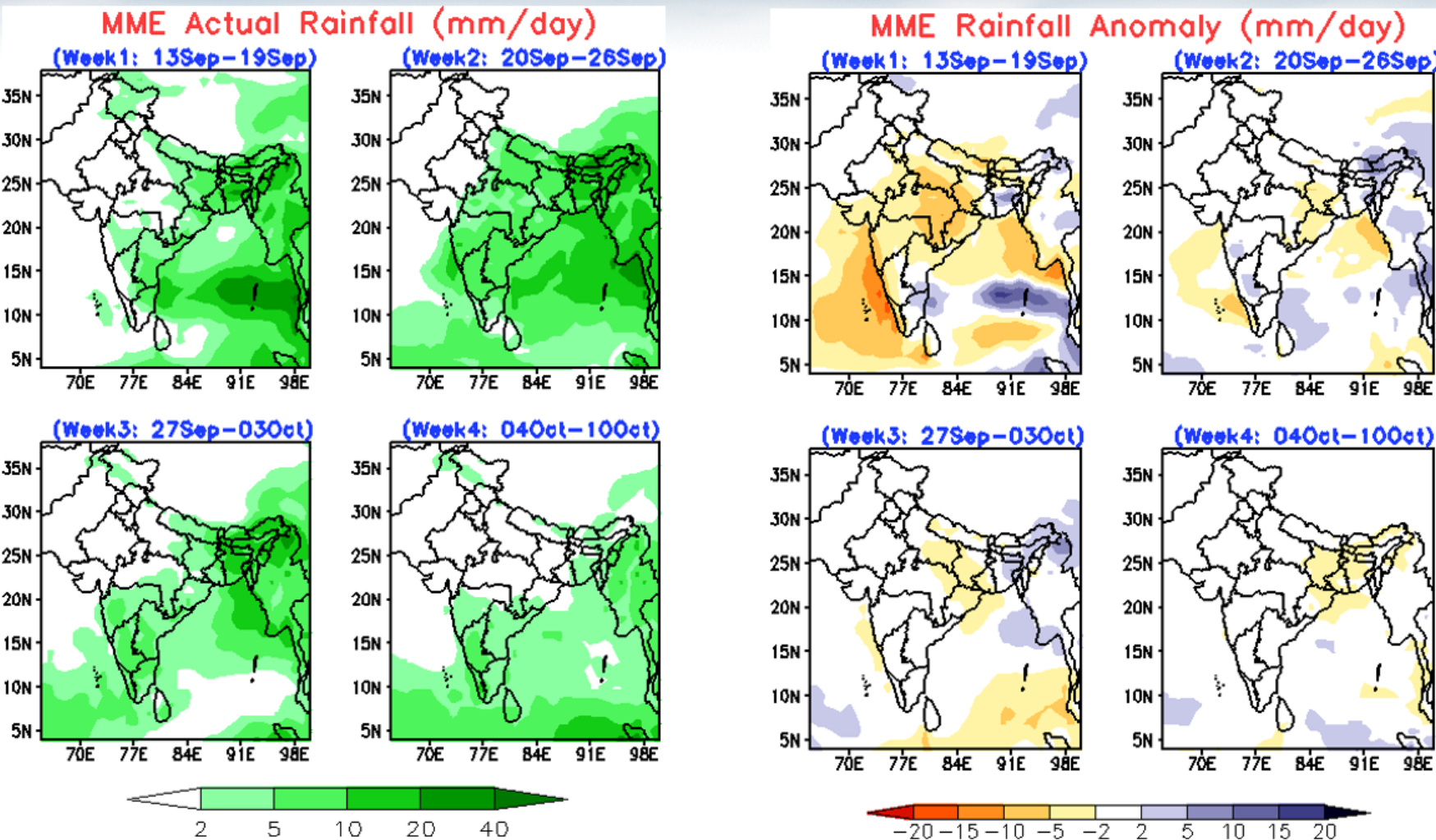
20 Sep 2018 | ISSUE 9



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.

Rainfall Summary - Predicted week wise rainfall for South Asia

Multi Model Ensemble (MME) Seasonal Prediction System for 2018 Monsoon Season



- Rainfall for MP, south and north-west Maharashtra, west Karnataka and southern part of Kerala might experience in the next week; east Bhutan, north west Assam, south west Arunachal might experience a slight increase in rainfall, however the rainfall anomaly explains deficit rainfall.
- MP, UP, Bihar, West Bengal, North Odisha might experience decrease in rainfall by beginning of October.
- Gujarat, Rajasthan, Punjab, Haryana, Himachal Pradesh, Uttaranchal may experience deficit rainfall from 13th Sep to 10th Oct.
- Sri Lanka for Central, Northern and Western Provinces explains low rainfall but the condition might improve from mid of September to first week of October.
- Nepal rainfall anomaly explains a decrease in rainfall including Bhutan.
- Overall Pakistan shows no anomaly in rainfall.

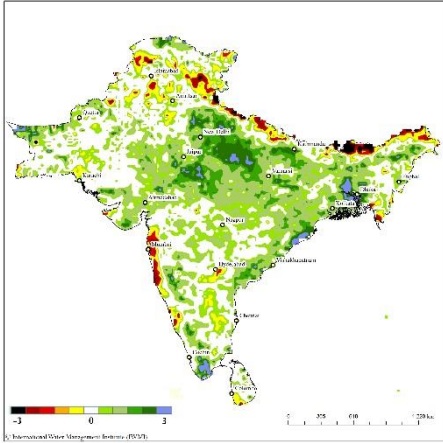
Note: The summary on country specific details described above based on the ERPAS MME information product do not imply the expression of any opinion whatsoever on the part of the IWTM and its partners as well the data provided by IITM.

SOUTH ASIA DROUGHT EARLY WARNING SYSTEM (SADEWS)

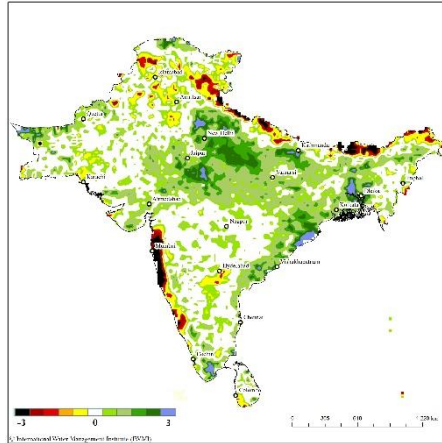
Current Condition: 20 Sep 2018
Forecast Period : 20 Sep and 05 Oct 2018
Standardized Soil Moisture and Runoff Index
for regional drought and early warning

SOIL MOISTURE PERCENTILE (SMP)

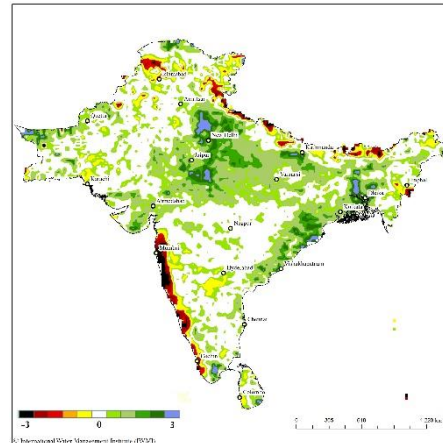
7-day Percentile 20th Sep 2018



7-day Forecast Percentile 27th Sep 2018

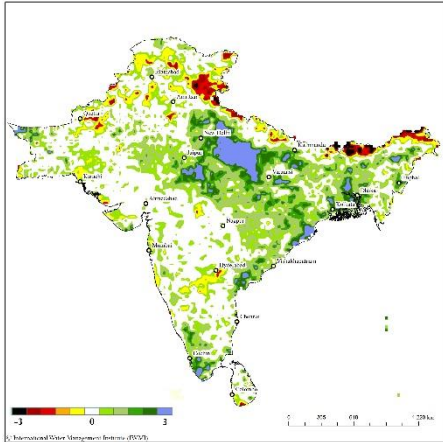


7-day Forecast Percentile 05th Oct 2018

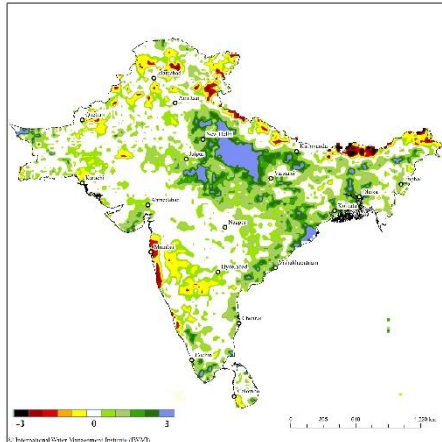


SOIL RUNOFF PERCENTILE (SRP)

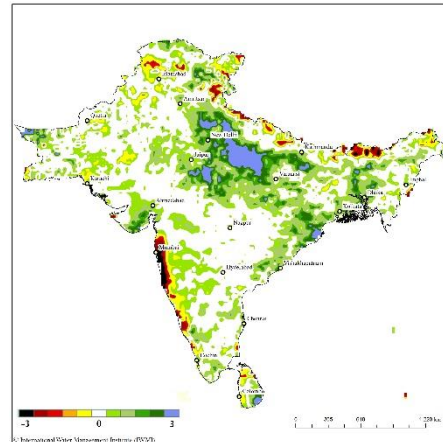
7-day Percentile 20th Sep 2018



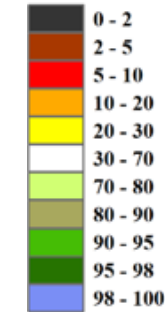
7-day Forecast Percentile 27th Sep 2018



7-day Forecast Percentile 05th Oct 2018



Percentile



SOIL RUNOFF PERCENTILE (SRP)

Summary:

The experimental drought forecast products for research/scientific use based on 20th September 2018 initial condition. These forecast products are based on the real time weekly operational forecast generated by Global ENSEMBLE (GENS), 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 UP, Southern Tamil Nadu will be decreasing while rainfall will be increasing in Eastern part of Panjab, Northern part of MP and Haryana except north-west Haryana in coming two weeks.
- Initial condition on the Soil Runoff Index (SRI) explains similar trend to SSI.
- Dryness is increasing in the following weeks over western belt of India such as western Maharashtra, Karnataka and Kerala.
- Parts of Pakistan, Jammu & Kashmir, Himachal Pradesh, Uttaranchal, Nepal and Bhutan 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.

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.

INDIA – Monthly Rainfall Condition (Actual vs. Anomaly)

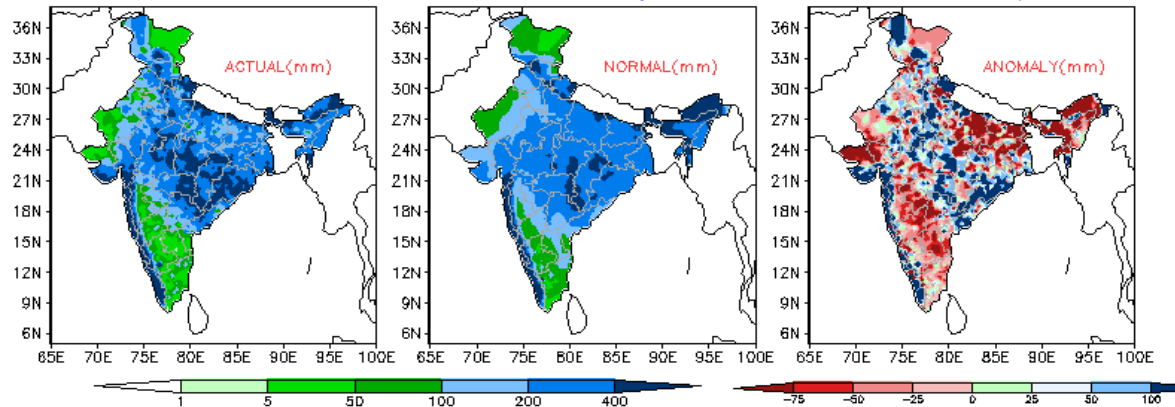
Actual Rainfall – July 2018

RAINFALL OVER THE COUNTRY FOR JUL 2018

ACTUAL – 272.4 mm NORMAL – 289.2 mm (94.2 % of Long Period Average)

(Based on real time data)

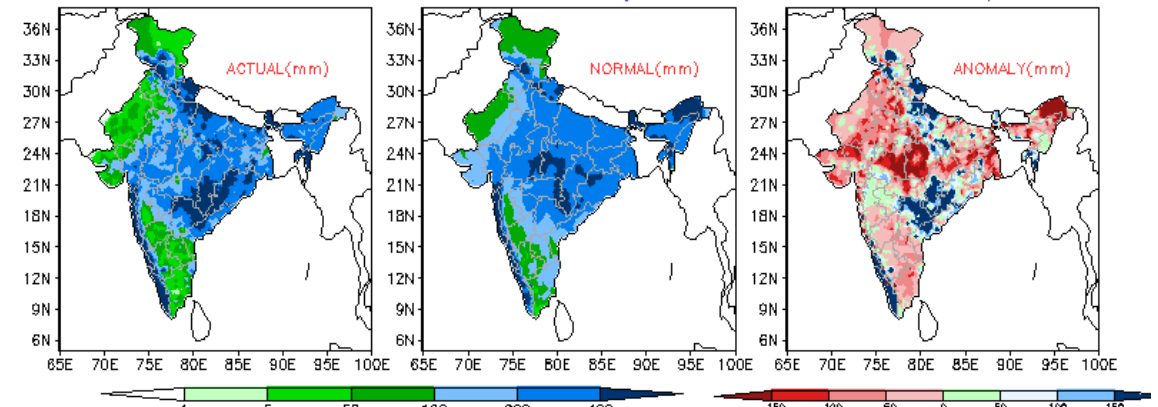
(CLIMATE MONITORING AND ANALYSIS GROUP)



Actual Rainfall – Aug 2018

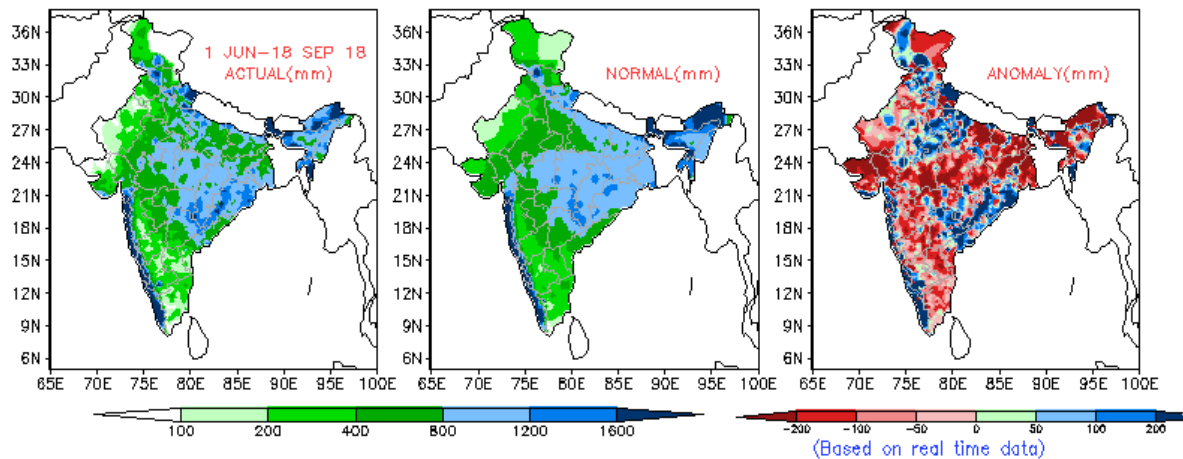
RAINFALL OVER THE COUNTRY FOR AUG 2018

(CLIMATE MONITORING AND ANALYSIS GROUP)



Actual Rainfall – Seasonal 2018

CLIMATE MONITORING AND ANALYSIS GROUP



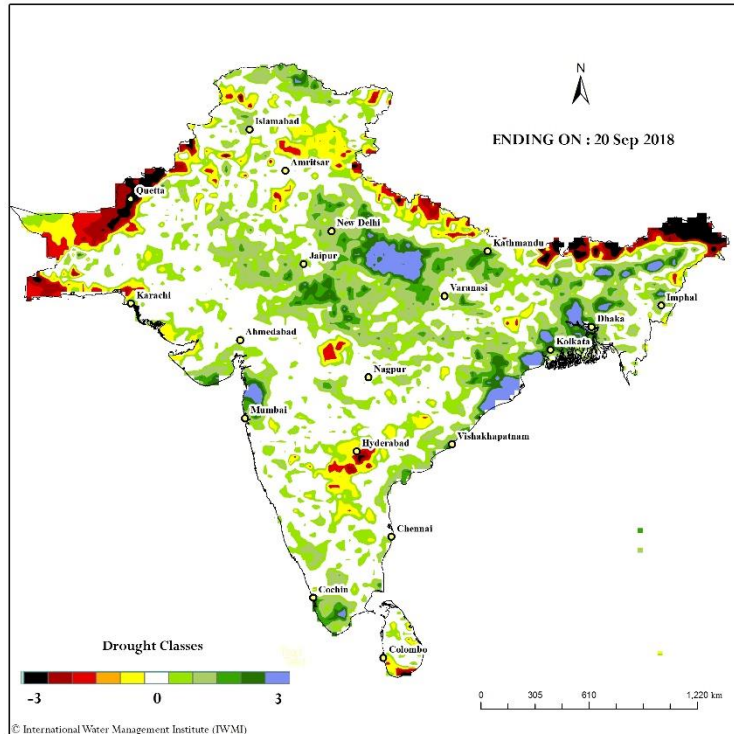
- Overall there is an decrease in rainfall for the month of August compared to the long-term anomaly, however some coastal areas in Kerala, southern Gujarat, Odisha, Chhattisgarh, along with south of Jammu & Kashmir had excess rainfall.
- Month of July has experienced both positive and negative anomalies across India. An excess rain fall was received along the southwest coastal line till Gujarat and some parts of central India (Odisha, Chhattisgarh, MP, UP, Uttaranchal) and isolated patches in northern and southern parts of Jammu & Kashmir.
- There has been a slight reduction in rainfall in the month of August over MP, Rajasthan and Gujarat.
- Overall there has been an excess rainfall along the western coast of India.
- Central, Western and Northeast (except Manipur) parts of the region along with Tamil Nadu are facing serious deficit of rainfall. This might highly affect the crop productivity during this year's Kharif season.

Data Source: IMD

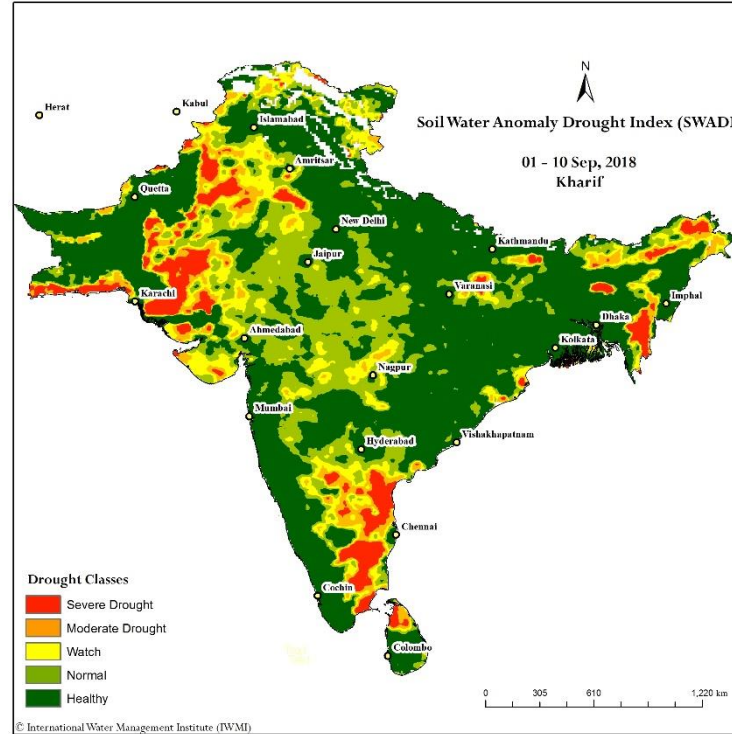
Note: Simple qualitative assessment on the performance on rainfall condition was described here to cross compare with SADMS – IDSI products for evaluation purpose only.

South Asia Drought Indices – A Comparison & Assessment

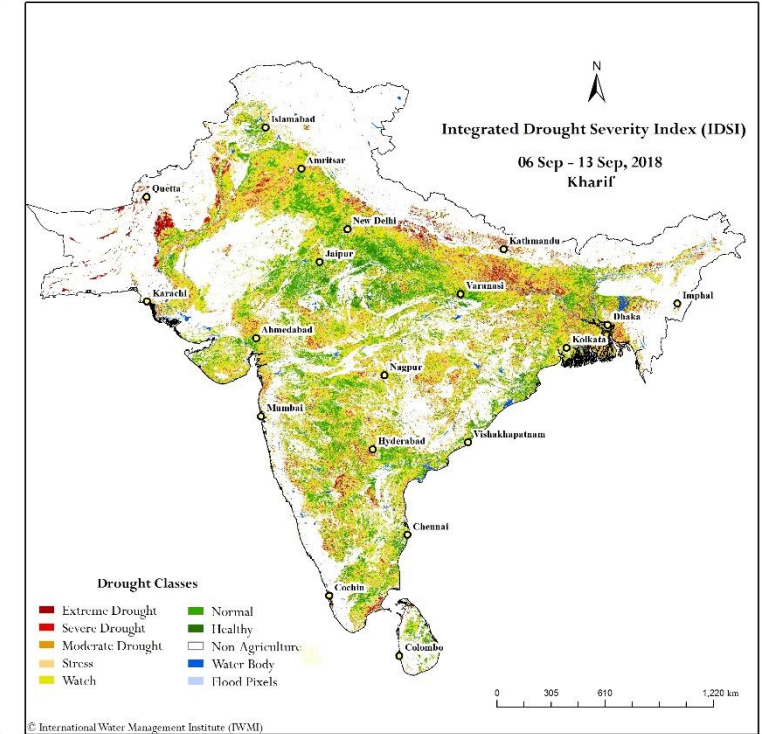
SA-DEWS



SWADI

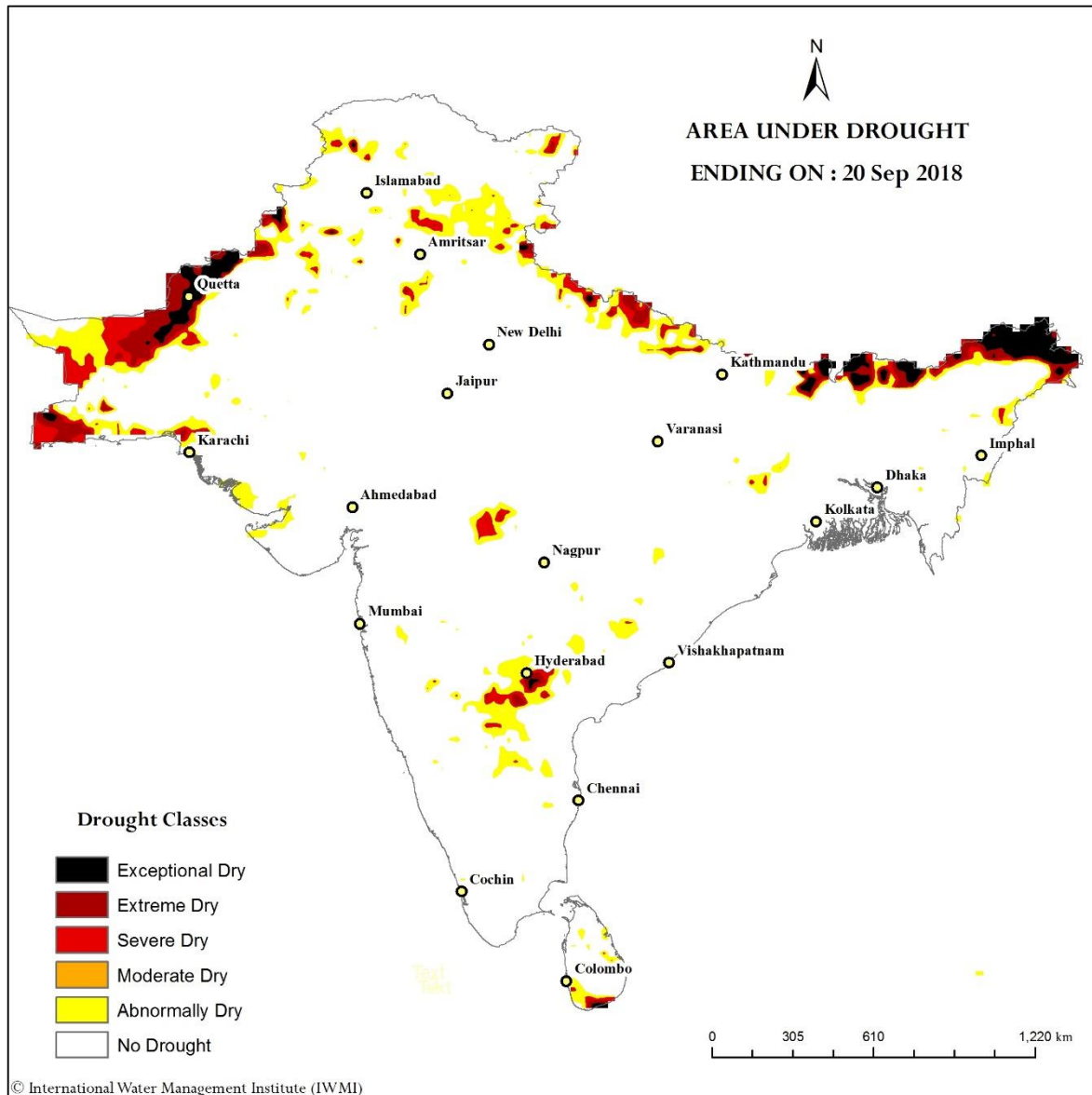


IDSII



- 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 (IDSII) 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 good relation with each other. The peninsular India is reviving well from the drought situation, except Tamil Nadu, south and west of AP and Northern parts of Sri Lanka. The regions of Central India has changed from moderate to normal.

South Asia Drought Forecast



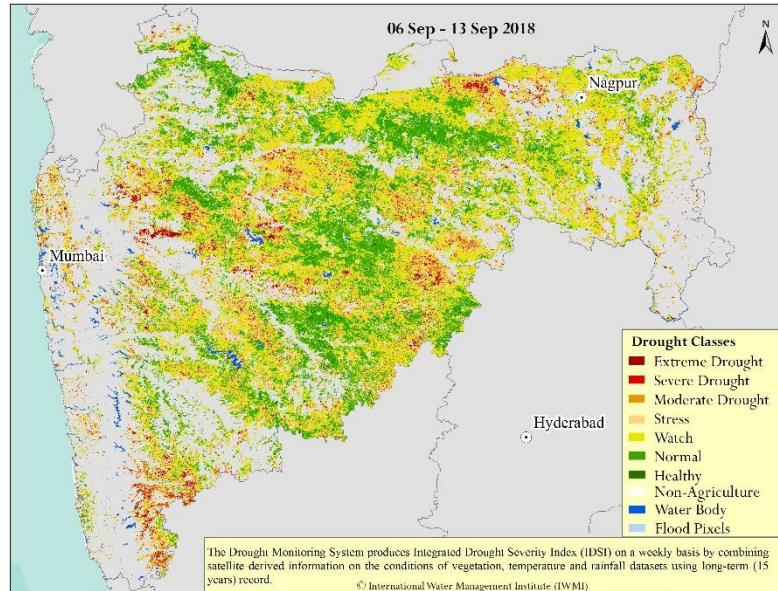
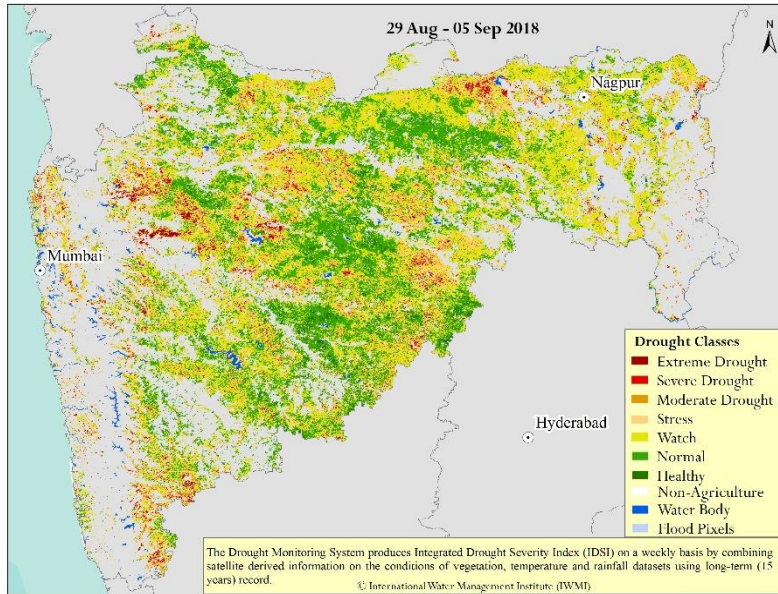
Summary:

- Using the initial condition i.e. 20th September 2018 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 MP, Talangana and few patches of Northern Karnataka have increased.
- Jammu & Kashmir, and parts of northeastern belt are observed to have Severe to Extreme/Exceptional dry condition. Also, Bhutan, Pakistan, Nepal and south of Sri Lanka are under extremely/exceptionally severe drought condition.
- *Reference to IMD SPI data is well correlated to the area under drought predicted by drought algorithm.*

India – State wise analysis



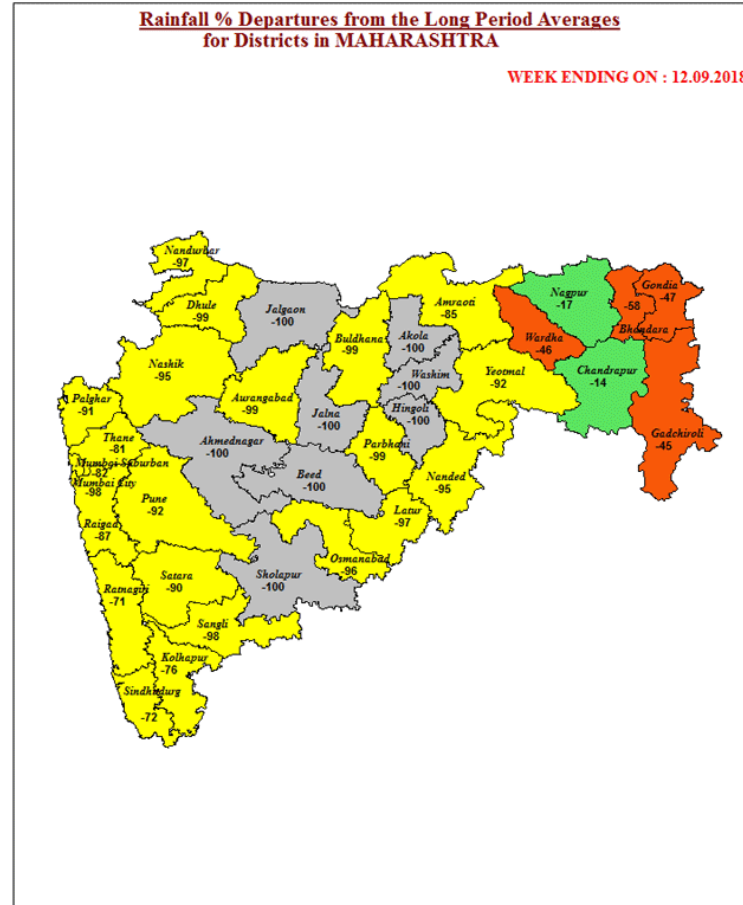
South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Maharashtra)



INDIA METEOROLOGICAL DEPARTMENT RMC MUMBAI

Rainfall % Departures from the Long Period Averages
for Districts in MAHARASHTRA

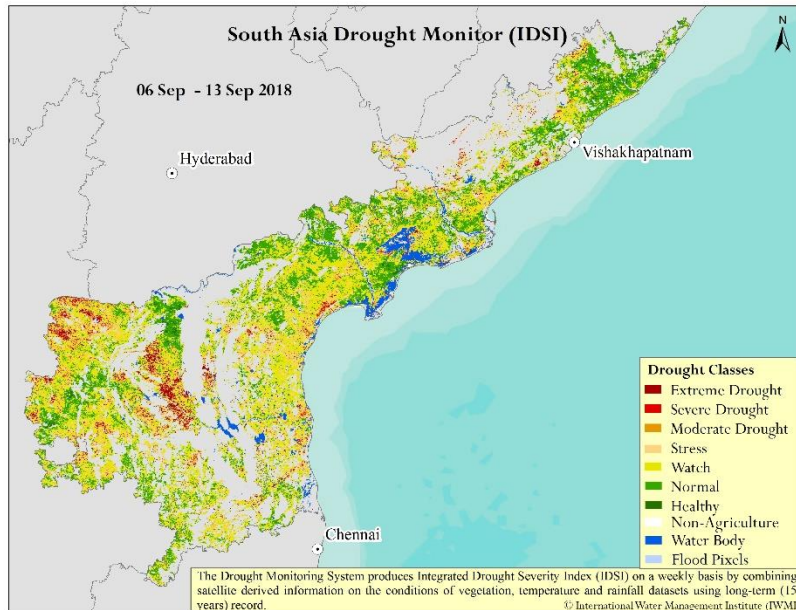
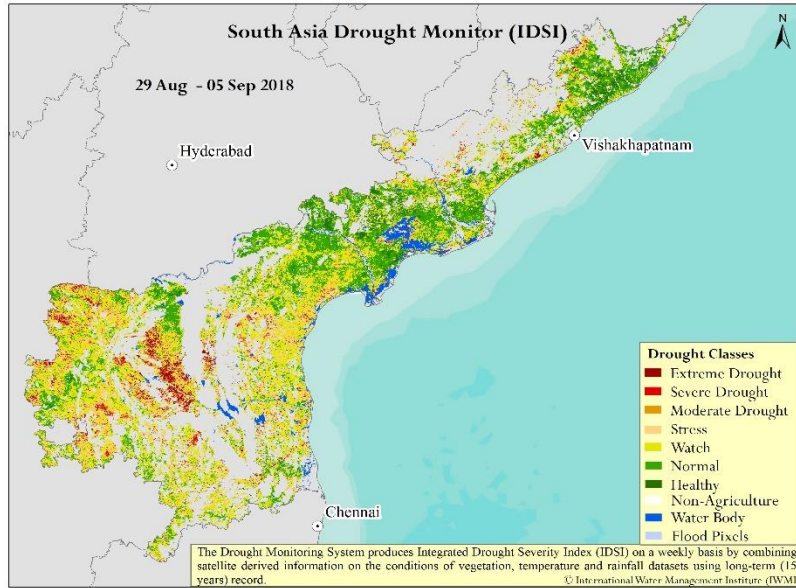
WEEK ENDING ON : 12.09.2018



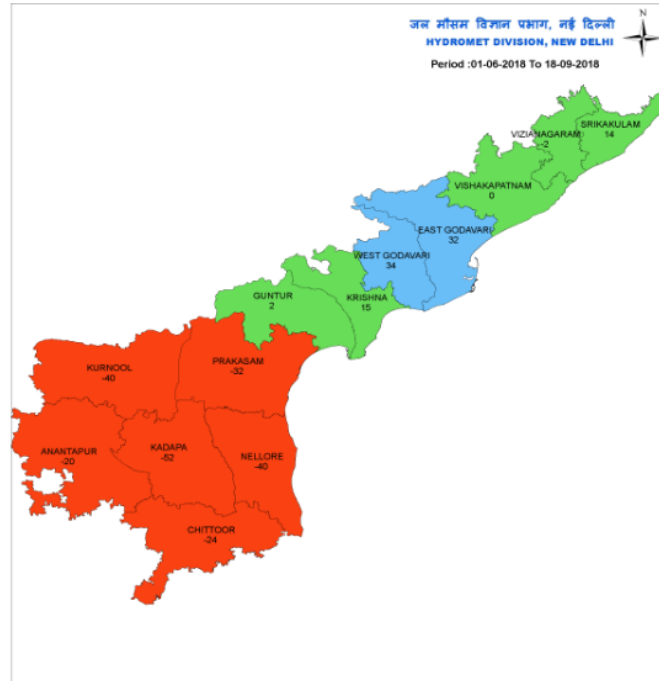
Summary:

- 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.
- Rainfall deficit in beginning of the month of September has increased the vegetation stress in the agricultural land, which is clearly reflected in the IDSI. ‘Stress’ condition has increased most of the State; while isolated patches of Nashik, Ahmednagar, Nanded, Kolhapur and Amravati show severe to extreme drought condition. Similar pattern has been revealed by seasonal rainfall report from IMD.

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



DISTRICT RAINFALL DEPARTURE MAP - ANDHRA PRADESH



Legend
Large Excess (>80% or more) Excess (>20% to 80%) Normal (-15% to 15%) Deficient (-45% to -20%) Large Deficient (-99% to -40%) No Rain (-100%) NO DATA

Rainfall Status (Avg from 01-06-2018 to till date)
Actual **418.0mm**, Deviation **-14.6%**

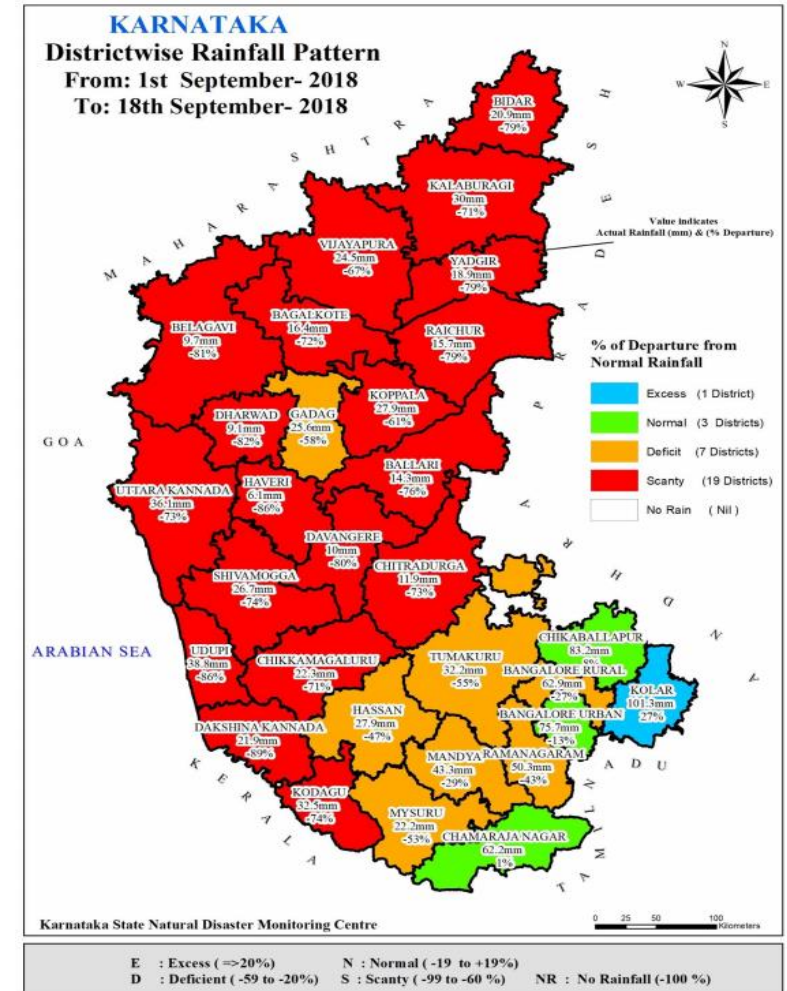
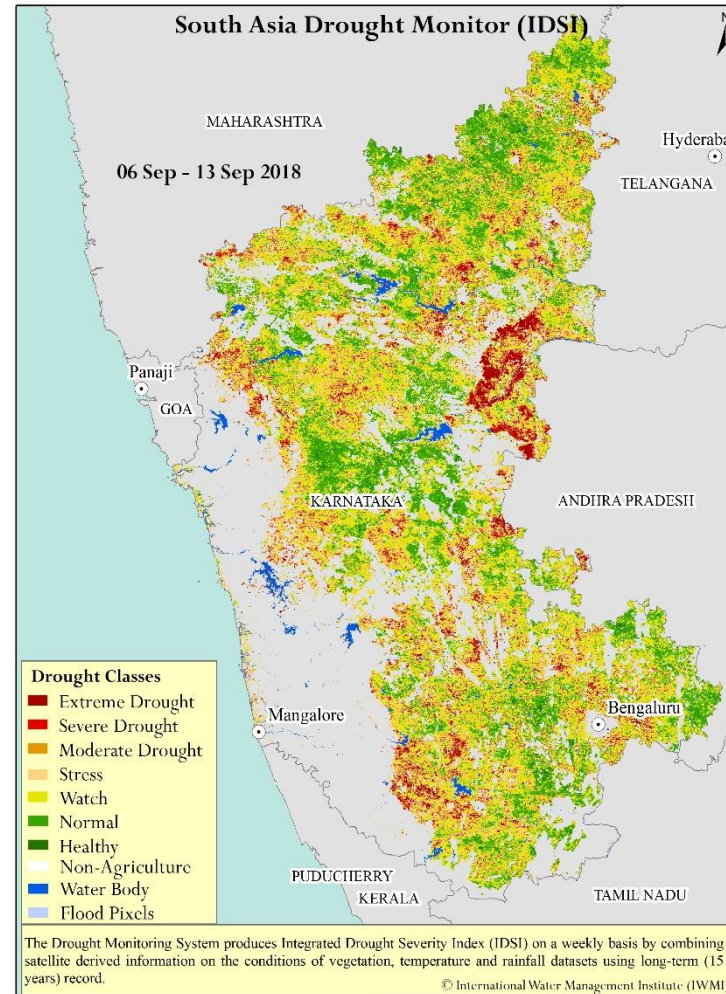
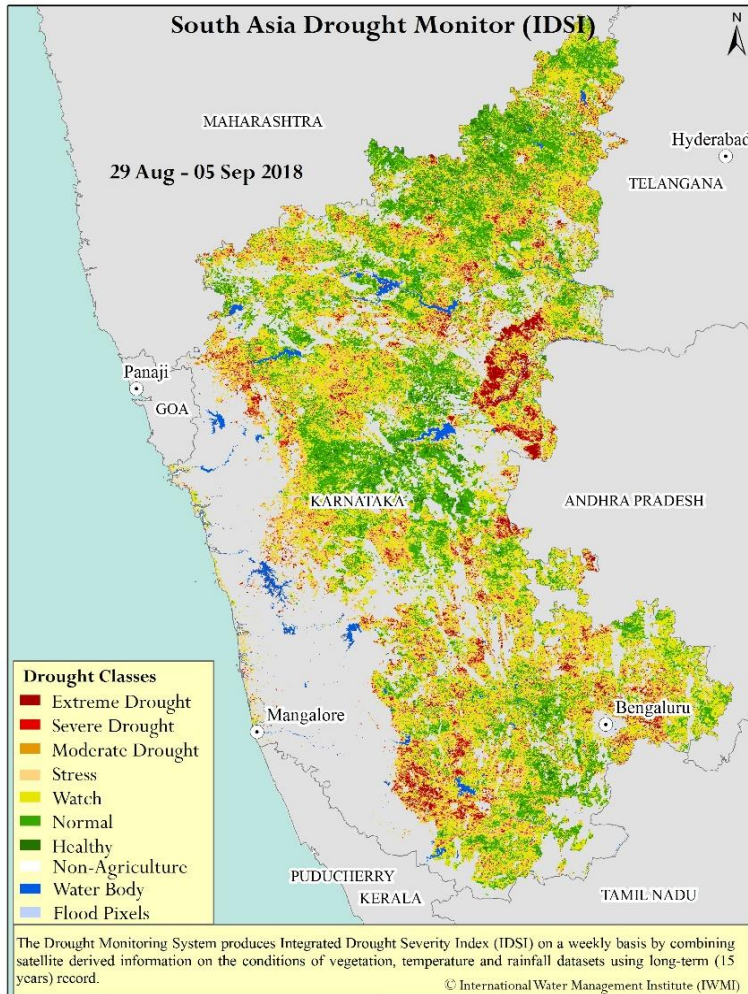
District-Wise, Month-Wise Rainfall Status from 01/06/2018				
District	Actual	Normal	Deviation(%)	Status
Srikakulam	671.5	630.5	6.5	Normal
Vizianagaram	555.5	620.4	-10.5	Normal
Vishakhapatnam	608.7	634.0	-4.0	Normal
East Godavari	735.0	683.0	7.6	Normal
West Godavari	843.3	715.3	17.9	Normal
Krishna	623.8	614.7	1.5	Normal
Guntur	380.0	456.3	-16.7	Normal
Prakasham	200.1	319.9	-37.4	Deficient
Nellore	157.7	280.4	-43.8	Deficient
Chittoor	270.9	381.6	-29.0	Deficient
Kadapa	169.8	347.8	-51.2	Deficient
Anantapur	189.6	284.0	-33.2	Deficient
Kurnool	225.8	394.3	-42.7	Deficient
State	418.0	489.4	-14.6	Normal

Data Source: APSDPS

Summary:

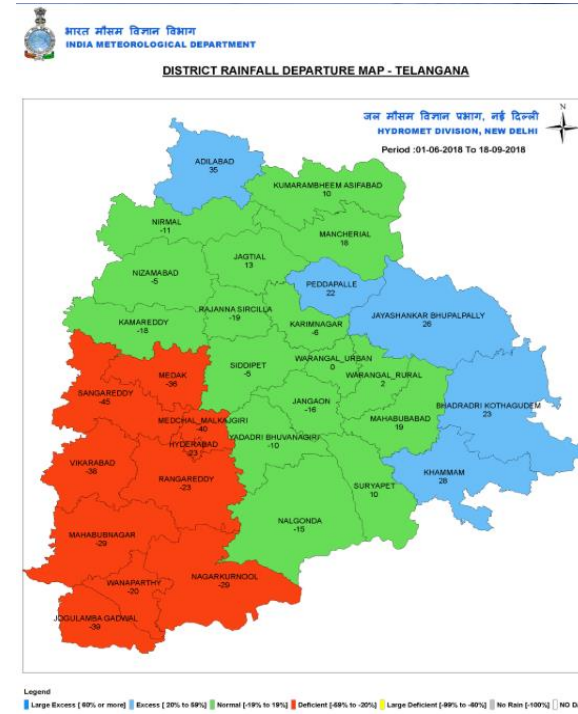
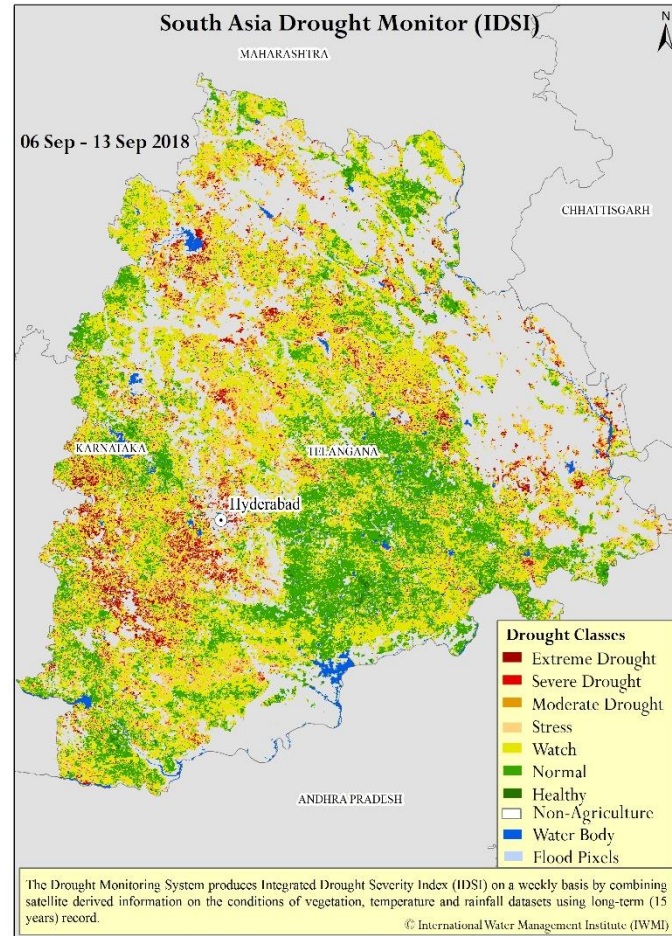
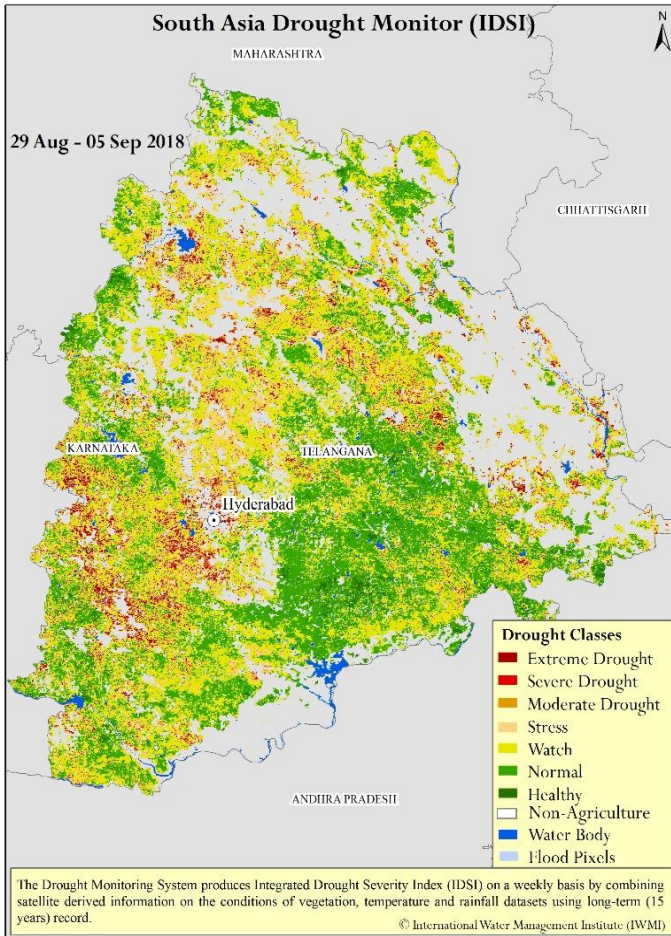
- Out of the 13 districts in A.P., 6 districts had low rainfall (Prakasham, Nellore, Chittoor, Kadapa, Anantapur and Kurnool) from June 1 to 18 Sep 2018;
- 'Stress' category has been increased all over the district; while reducing the 'Normal' category of Krishna, West Godavari, Guntur and Yanam in previous map.
- Prakasham, Nellore, Chittoor, Kadapa, Anantapur and Kurnool show Sever or Extreme patches more then other districts cover.

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

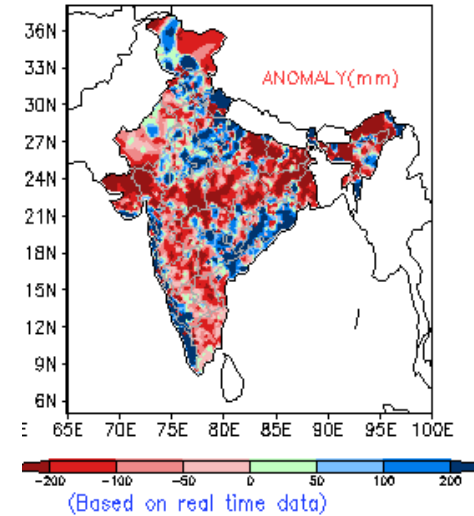


The Integrated Drought Severity Index (IDSI) for Karnataka were assessed at district level. The condition of vegetation has been slightly affected along northern, southern and eastern areas of the State, except normal category for a few patches at the central region. Extreme drought condition in the central eastern districts has not changed drastically. 'Normal' category is increased from 'watch' category in Kolar district and this district is having excess rainfall according to rainfall map.

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



01 June – 18 Sep 2018

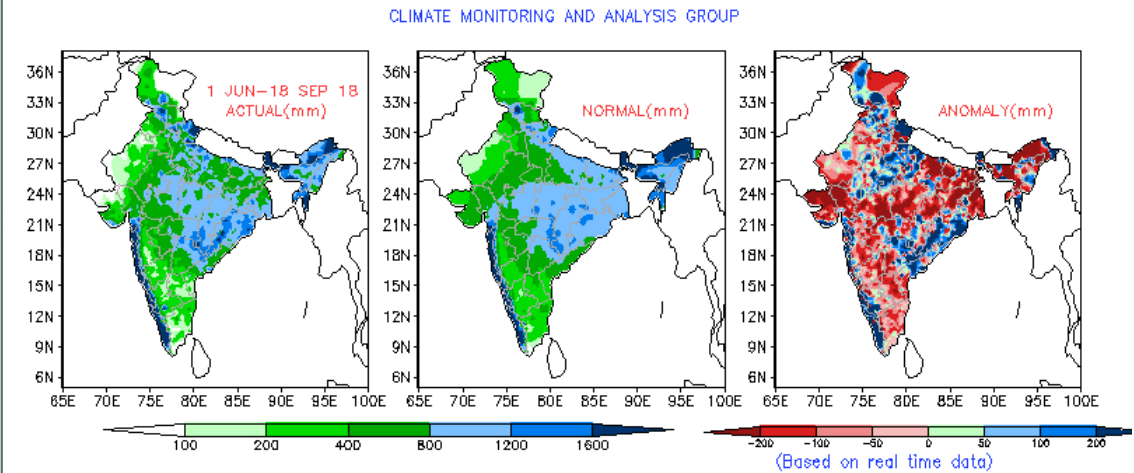
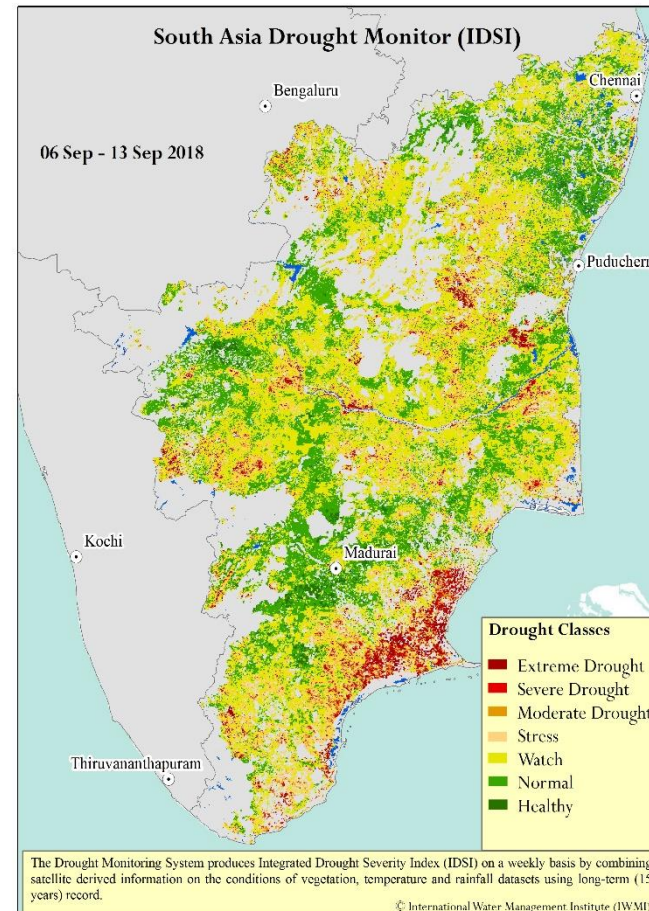
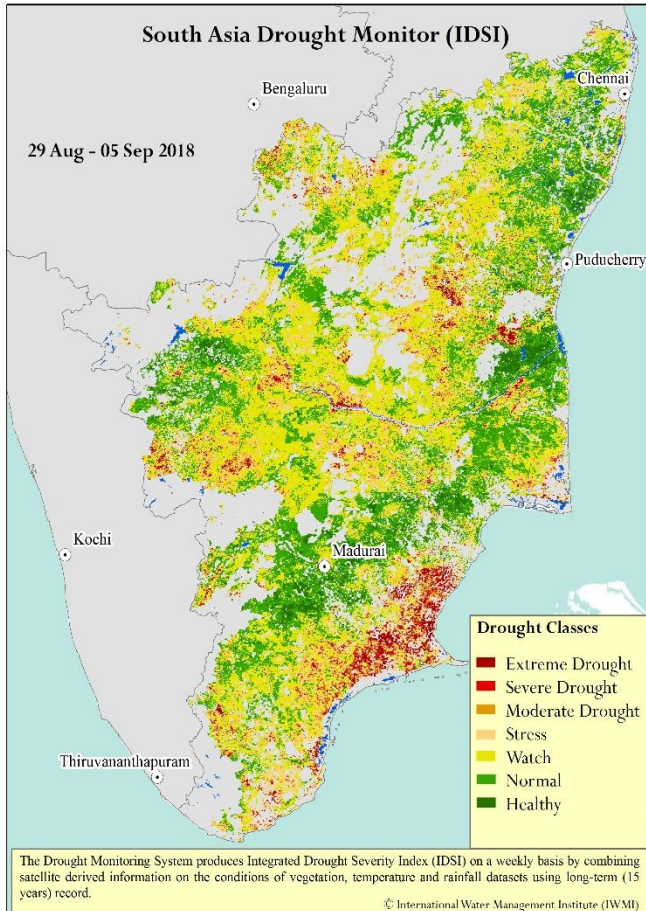


Summary:

The Integrated Drought Severity Index (IDSI) for Telangana was assessed at district level. There seems to be increase in stress levels in the State as shown by the rainfall departure map. Western States are also observed to have moved from normal category to stress, Moderate or severe category, while south eastern part of Telangana moved from healthy to normal/watch category.

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

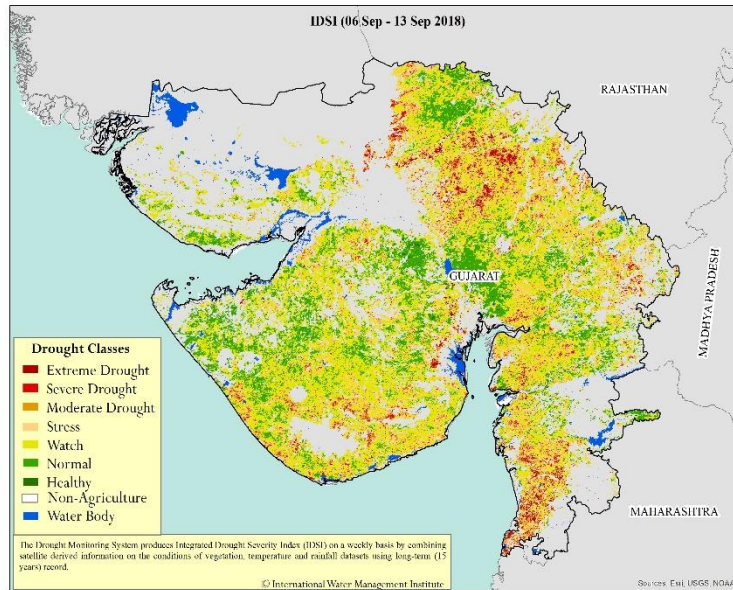
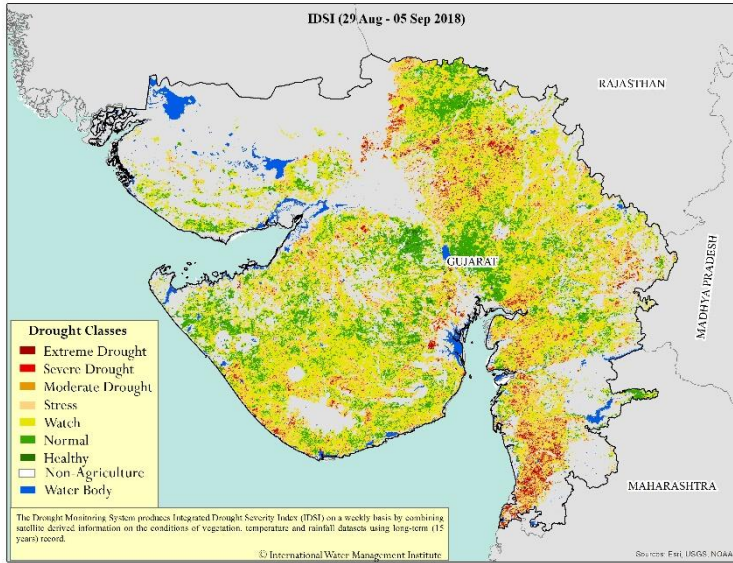
01 June – 18 Sep 2018



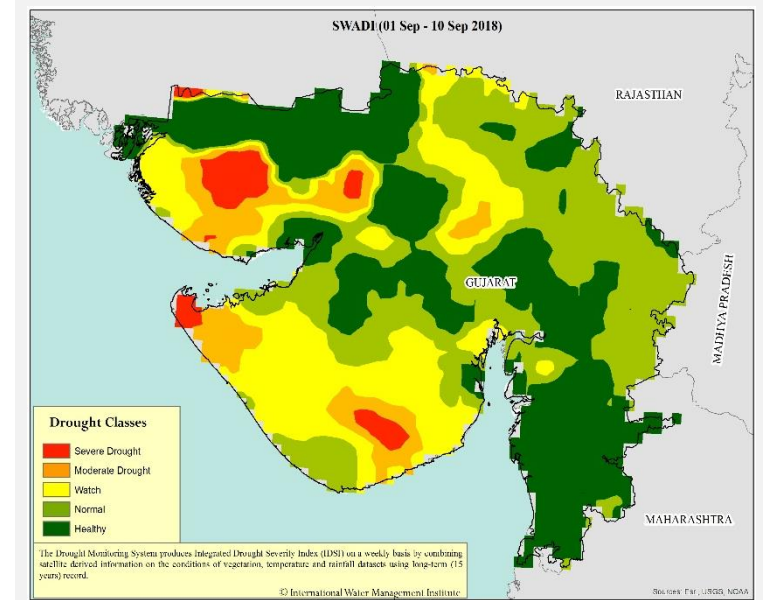
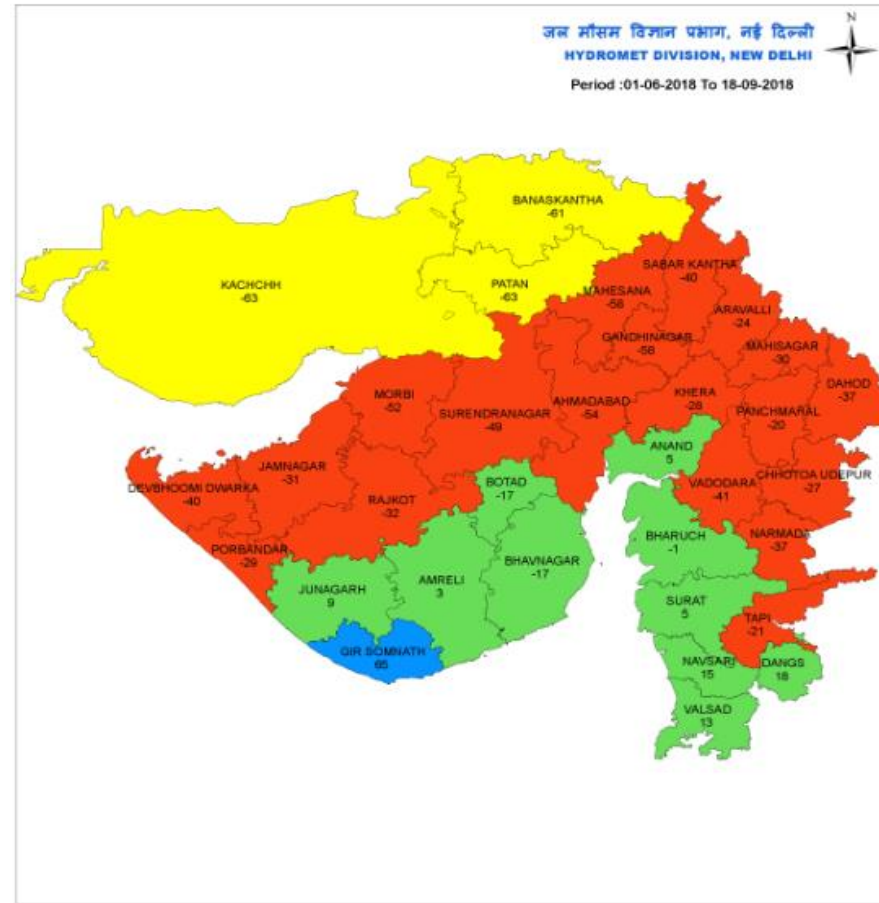
Summary:

- Overall condition of the stress has increased from previous analysis cycle. Also south-east and north-central parts of Tamil Nadu seem to have higher stress similar to the week ending on 05th of September. Isolated patches of Virudhunagar, Sivaganga, Pudukkottai, Tanjavur, Madurai and Nagapattinam have slightly moved from normal to watch category.
- Overall, it can be observed that all districts have similar drought classes as compared to the previous week except the locations mentioned above.

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



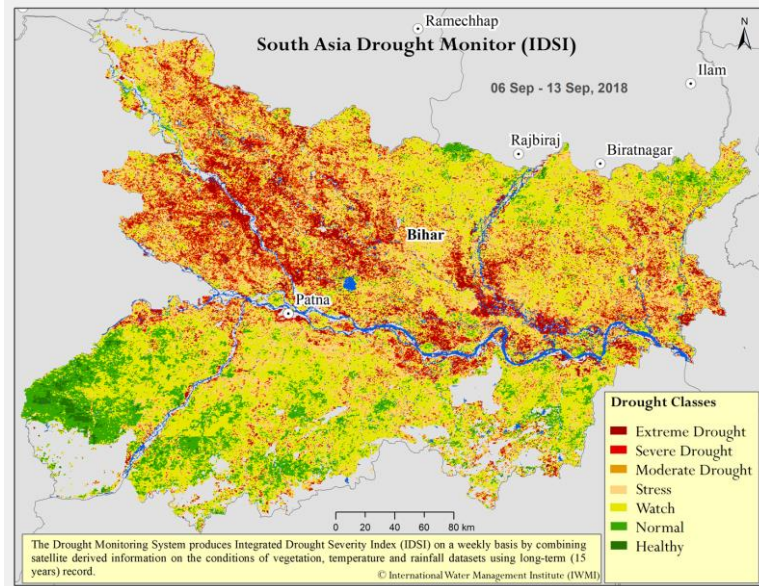
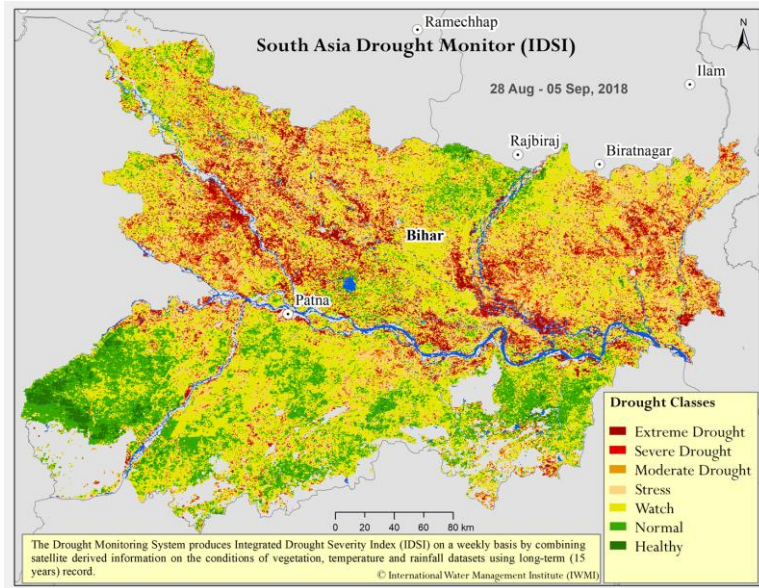
DISTRICT RAINFALL DEPARTURE MAP - GUJARAT



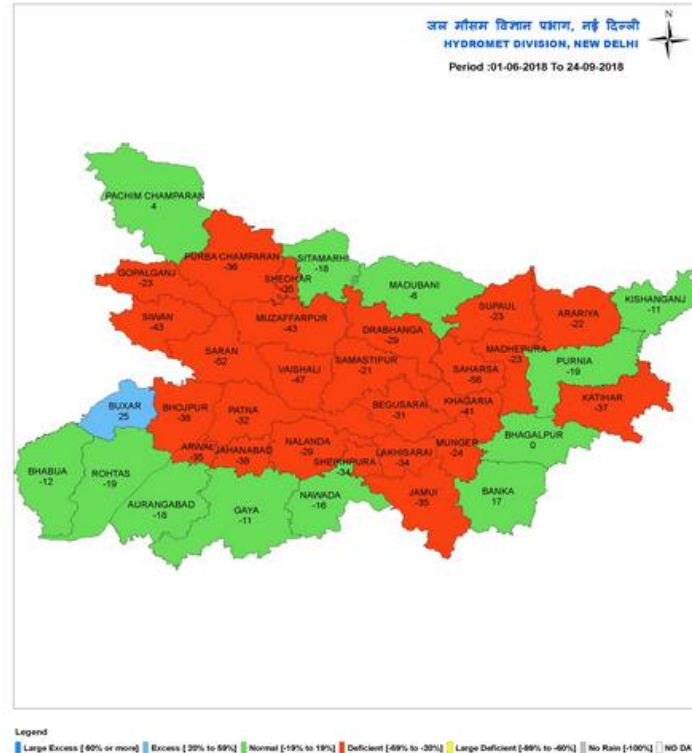
Summary:

- Overall condition of the stress is higher compared to the previous analysis cycle. Also most parts of Gujarat seems to have changed to 'stress' from 'watch' or 'normal' as compared to the week ending on 05th of September.
- Overall, it can be observed that all districts have moved towards higher drought classes as compared to the previous week.

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



DISTRICT RAINFALL DEPARTURE MAP - BIHAR



India Meteorological Department
Hydromet Division, New Delhi

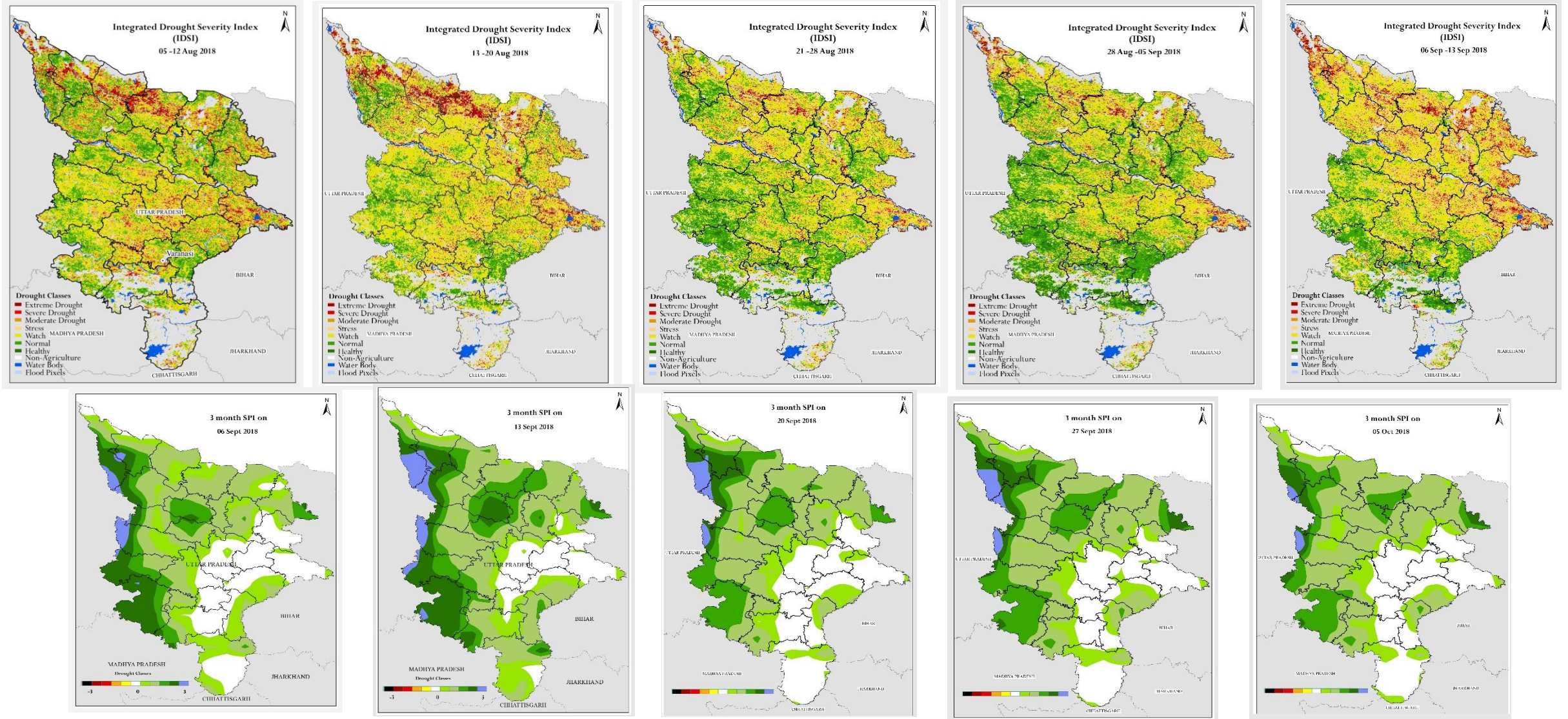
DISTRICT-WISE RAINFALL DISTRIBUTION

S NO	MET. SUBDIVISION/UT/STATE/DISTRICT	Week:13-09-2018 To 19-09-2018				Period:01-06-2018 To 19-09-2018			
		ACTUAL (mm)	NORMAL (mm)	%DEP.	CAT.	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT.
1	ARARIYA	62.7	73.1	-14%	N	998.2	1263.9	-21%	D
2	ARWAL	3.1	54.5	-94%	LD	485.5	745.3	-35%	D
3	AURANGABAD	0.0	52.3	-100%	NR	681.5	822.5	-17%	N
4	BANKA	0.0	48.8	-100%	NR	933.6	780.6	20%	E
5	BEGUSARAI	0.7	46.3	-99%	LD	597.9	850.2	-30%	D
6	BHABUA	0.0	71.5	-100%	NR	846.0	943.7	-10%	N
7	BHAGALPUR	11.0	53.3	-79%	LD	883.0	894.3	-1%	N
8	BHOJPUR	0.0	59.9	-100%	NR	550.4	875.8	-37%	D
9	BUXAR	0.0	62.4	-100%	NR	1046.3	833.6	26%	E
10	DRABHANGA	34.7	36.5	-5%	N	823.1	859.3	-27%	D
11	GAYA	0.0	40.5	-100%	NR	748.0	828.9	-10%	N
12	GOPALGANJ	0.0	76.9	-100%	NR	718.9	942.1	-24%	D
13	JAHANABAD	3.2	61.7	-95%	LD	478.7	787.5	-39%	D
14	JAMUI	0.0	49.2	-100%	NR	575.9	888.6	-34%	D
15	KATIAR	13.8	59.7	-77%	LD	639.7	1007.2	-36%	D
16	KHAGARIA	8.3	73.7	-89%	LD	579.7	993.6	-40%	D
17	KISHANGANJ	82.5	84.0	-2%	N	1488.2	1648.8	-10%	N
18	LAKHISARAI	0.0	50.1	-100%	NR	594.7	890.0	-33%	D
19	MADHEPURA	33.9	57.7	-41%	D	841.0	1073.7	-22%	D
20	MADUBANI	51.2	41.2	24%	E	966.3	1000.7	-3%	N
21	MUNGER	1.2	50.1	-98%	LD	672.7	890.0	-24%	D
22	MUZAFFARPUR	1.4	57.4	-98%	LD	512.9	920.5	-44%	D
23	NALANDA	0.0	52.7	-100%	NR	568.3	816.6	-30%	D
24	NAWADA	0.0	41.7	-100%	NR	717.1	842.4	-15%	N
25	PACHIM CHAMPARAN	104.5	89.5	17%	N	1296.4	1210.6	7%	N
26	PATNA	1.2	55.1	-98%	LD	598.8	876.5	-32%	D
27	PURBA CHAMPARAN	7.8	52.5	-85%	LD	628.2	960.3	-35%	D
28	PURNIA	99.8	71.7	39%	E	1011.7	1212.5	-17%	N
29	ROHTAS	0.0	56.3	-100%	NR	853.6	795.1	-18%	N
30	SAHARSA	17.3	80.0	-78%	LD	591.4	1325.0	-55%	D
31	SAMASTIPUR	16.0	63.6	-75%	LD	748.8	940.5	-20%	D
32	SARAN	0.0	56.6	-100%	NR	432.6	913.8	-53%	D
33	SHEIKHPURA	0.2	42.5	-99%	LD	519.9	805.1	-35%	D
34	SHEOHAR	10.5	45.3	-77%	LD	688.7	1030.2	-33%	D
35	SITAMARHI	22.2	45.3	-51%	D	866.6	1030.2	-16%	N
36	SIWAN	0.2	76.8	-99%	LD	536.3	945.6	-43%	D
37	SUPAUL	47.8	57.4	-17%	N	781.3	998.0	-21%	D
38	VAISHALI	0.0	45.0	-100%	NR	491.4	945.5	-48%	D

Summary:

- The drought severity in all parts of Bihar seems to have raised one class towards severity in the week ending on 13th of September, compared to previous week.
- This has happened because of all the district shows deficient rainfall compared to normal for this monsoon season. 25 Districts out of the 38 districts are experiencing scarcity of rainfall this season which is largely to affect the rainfed agricultural system of Bihar.

South Asia Drought Monitoring System (SADMS) – Agriculture Assessment (Eastern UP)



Summary:

• There can be seen increasing of drought condition by 13th September all over the state; Stress condition is expected to increase further by end of September.

Thanks.....

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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