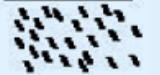


AGRICULTURAL ASPECTS OF SOUTHWEST MONSOON 2015

By

Dr. N. Chattopadhyay

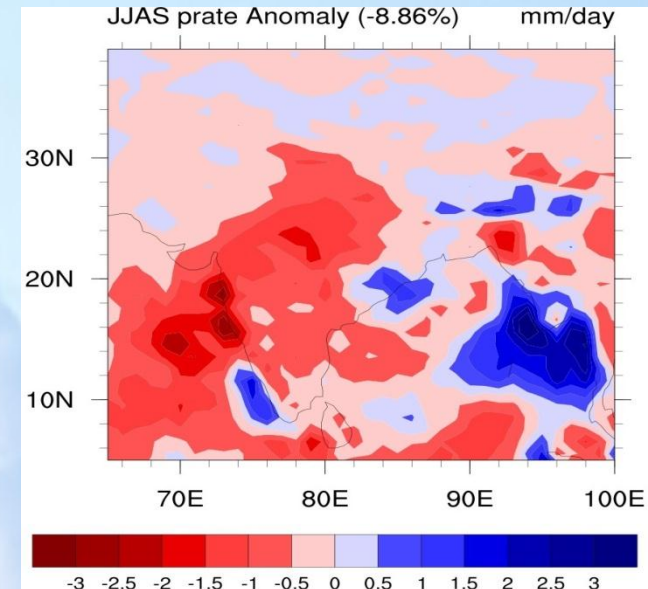
**Deputy Director General of Meteorology
(Agrimet Division), IMD, Pune**



Preparedness under Kharif Crop Campaign based on Seasonal Rainfall Forecast

Operational Seasonal Rainfall Forecast for Monsoon 2015

- The forecast indicates below normal rainfall for the country as a whole with a quantitative value of 93% of its long period average with a model error of $\pm 5\%$.
- The experimental seasonal rainfall forecast during JJAS 2015 based on the coupled model CFSv2 run at MoES-IITM, Pune indicates below normal rainfall over many parts of India.
- **Below normal** rainfall over **Uttar Pradesh, East Rajasthan, Madhya Pradesh, Gujarat, Marathwada, Interior Karnataka, Telangana, Rayalaseema and Coastal Andhra Pradesh.** Remaining subdivisions may experience normal or above normal rainfall.



Enhancing the Preparedness for Agricultural Contingencies in Kharif 2015 for Karnataka, Maharashtra, Telengana, Gujarat

- Overall objective of this meeting was to sensitize the various stakeholders on the ensuing kharif season with regard to the forecast of seasonal monsoon.
- to prepare the action plans based on available district contingency plans in the eventuality of deficient rainfall during kharif 2015 season based on IMD monsoon forecast.
- Issues related to alternate seed varieties, quantity available, identification of contingency crops and their seed availability, fertilizer requirement etc.

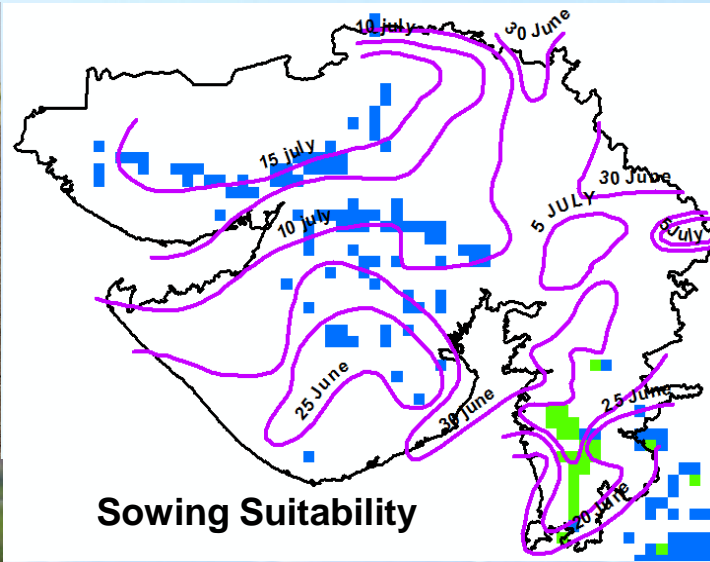


Sowing/transplanting of crops in June

- ❖ Advance of monsoon after timely onset over Andaman Sea on 16th May was sluggish resulting in onset over Kerala on 5th June, **five days late from normal onset** and forecast dates. It **advances rapidly** during second and **third week of June**, covering entire country by 26th June against normal date of 15th July. As the June rainfall is important during the kharif season for land preparation, sowing/ nursery sowing and transplanting of crops. In June, rainfall has been quite satisfactory in most parts of the country.
- ❖ **Utilizing the realised rainfall during the month of June the following Agricultural operations were carried out:**
 - In Kerala, transplanting of *virippu* and wet seeding of rice (Uma variety), in Assam, nursery bed preparation for *sali* rice.
 - In Konkan, direct sowing of *kharif* rice and ragi in uplands. In Madhya Maharashtra, sowing of bajra, soybean, jowar, groundnut, cotton, green gram and black gram.
 - Sowing of maize, groundnut, jowar and red gram in South Interior Karnataka and sowing of green gram, black gram, jowar, soybean and pigeon pea in North Interior Karnataka.
 - In Madhya Pradesh, sowing of soybean, groundnut, maize, red gram, black gram and green gram, nursery sowing of rice. In Chhattisgarh, nursery sowing of rice, soybean, groundnut, sesame.

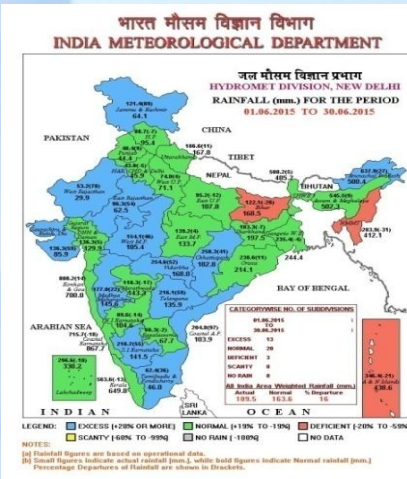
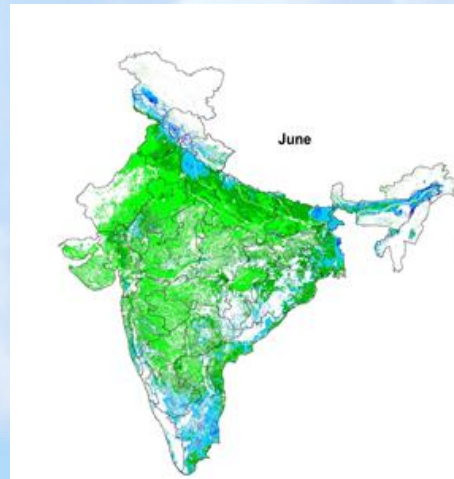


Agriculture in June

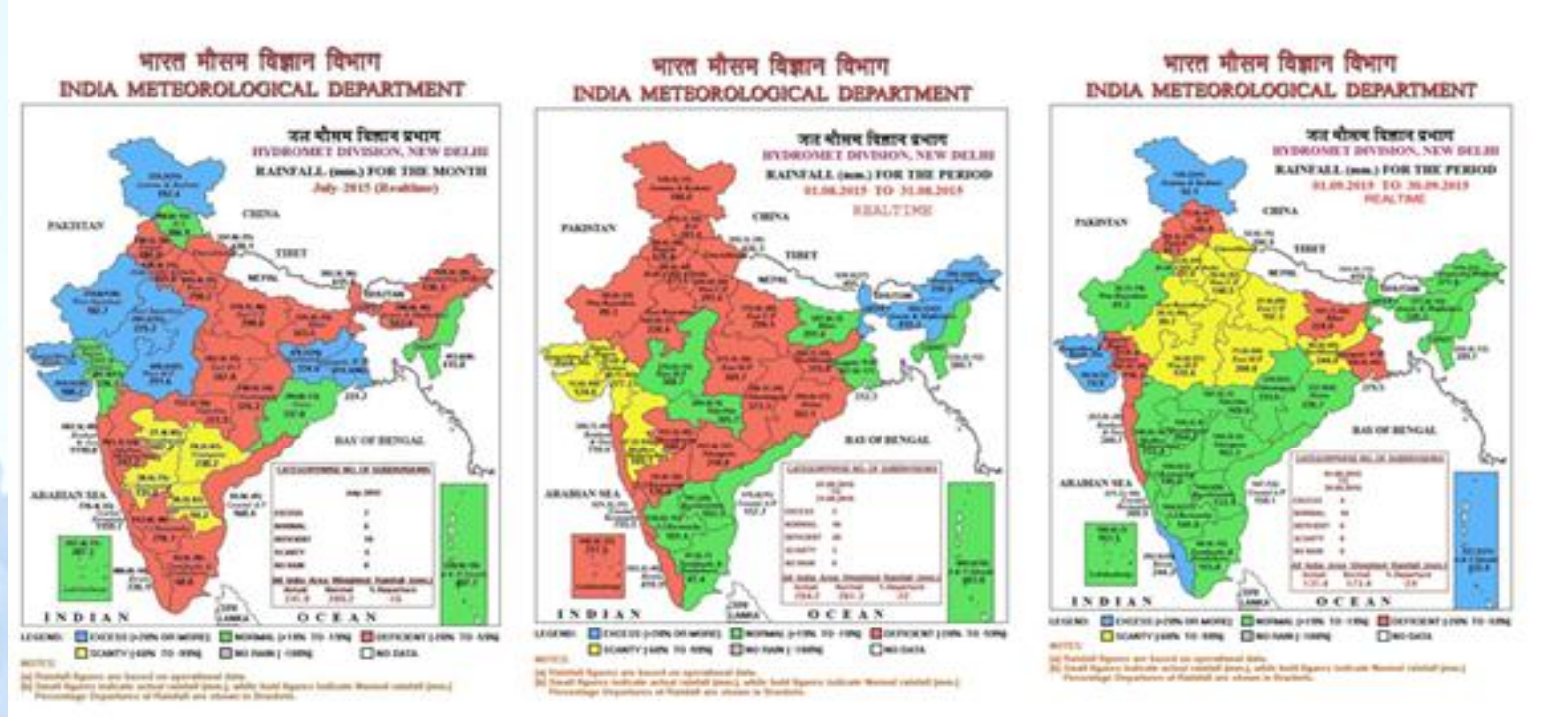


As far as the first month of this monsoon season is concerned, rainfall has been quite satisfactory and conducive for sowing and transplanting.

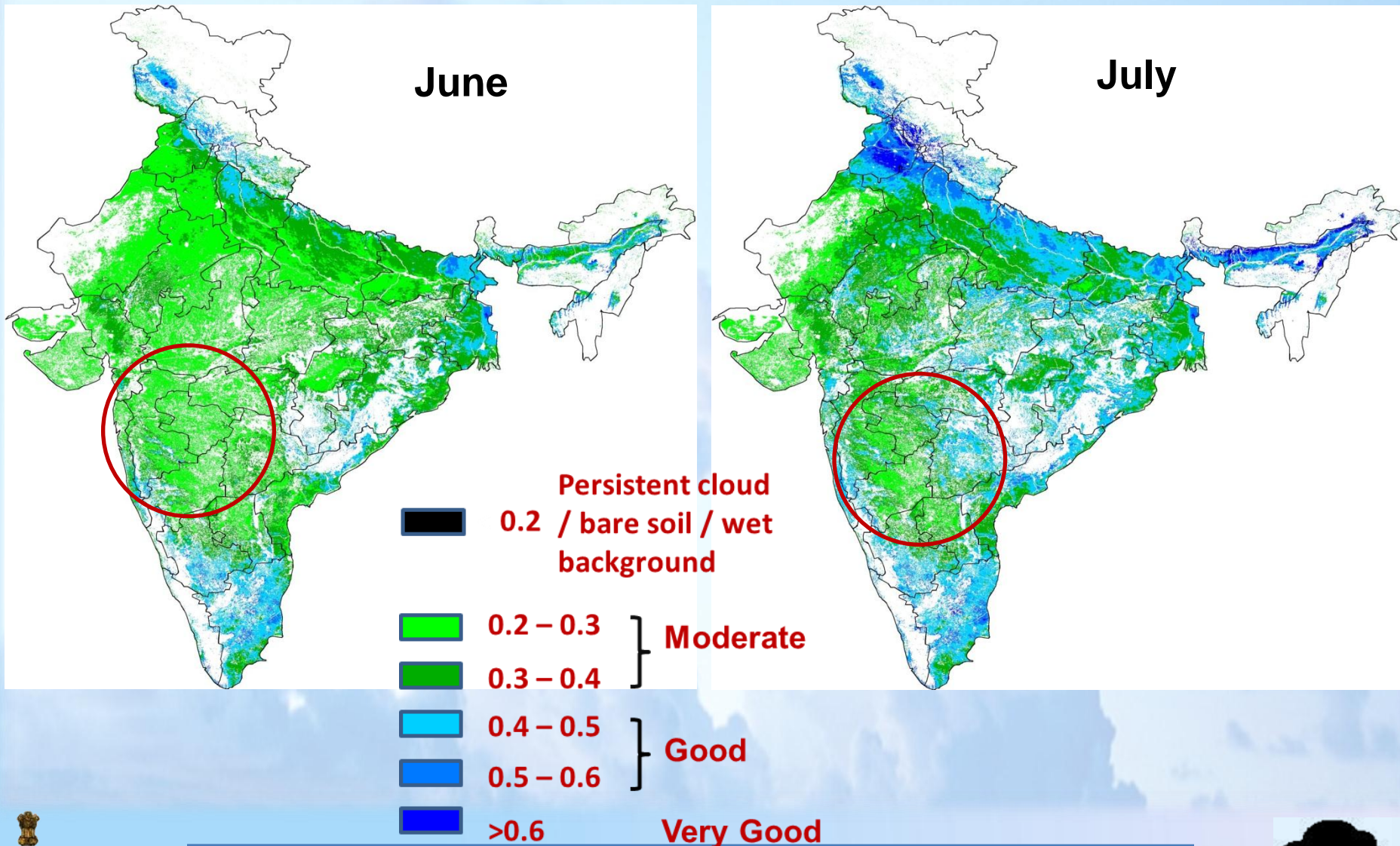
- Sown/transplanted crop area (Soil moisture > 0.2 m³/m³ and NDVI > 0.3)
- Potential crop area conducive for sowing /transplanting (Soil moisture > 0.2 m³/m³ and NDVI < 0.3)



Realized Rainfall maps for the months of June to September 2015

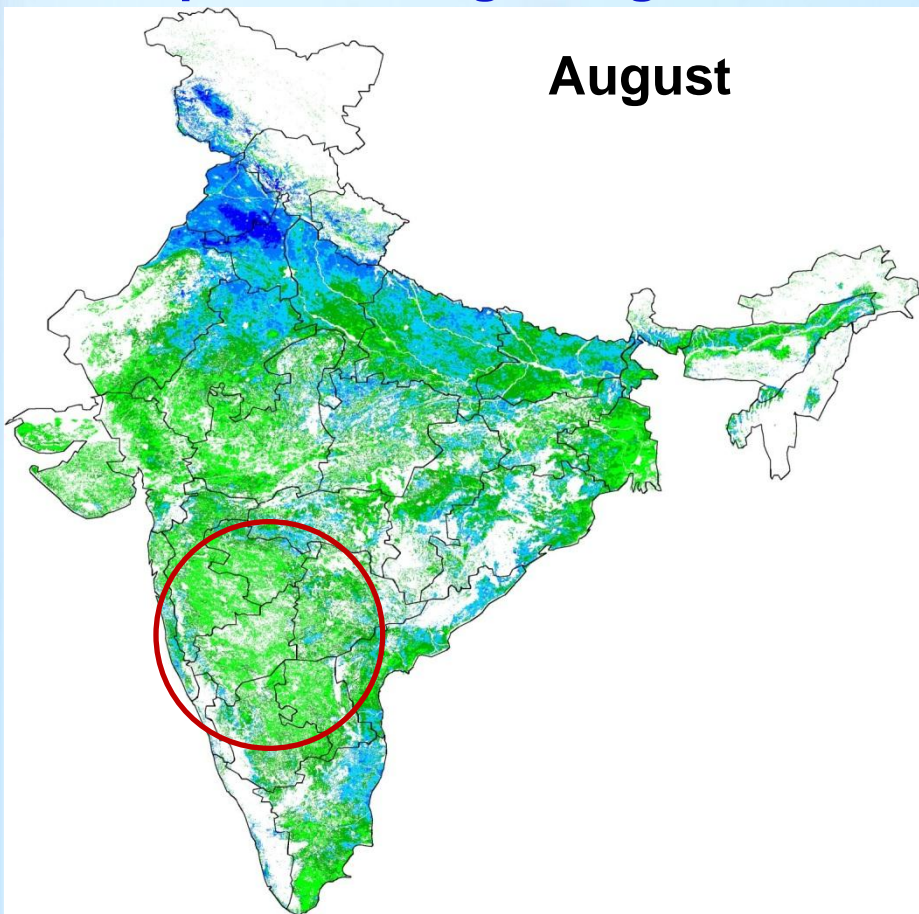


Crop Monitoring using Satellite NDVI (Southwest monsoon of 2015)

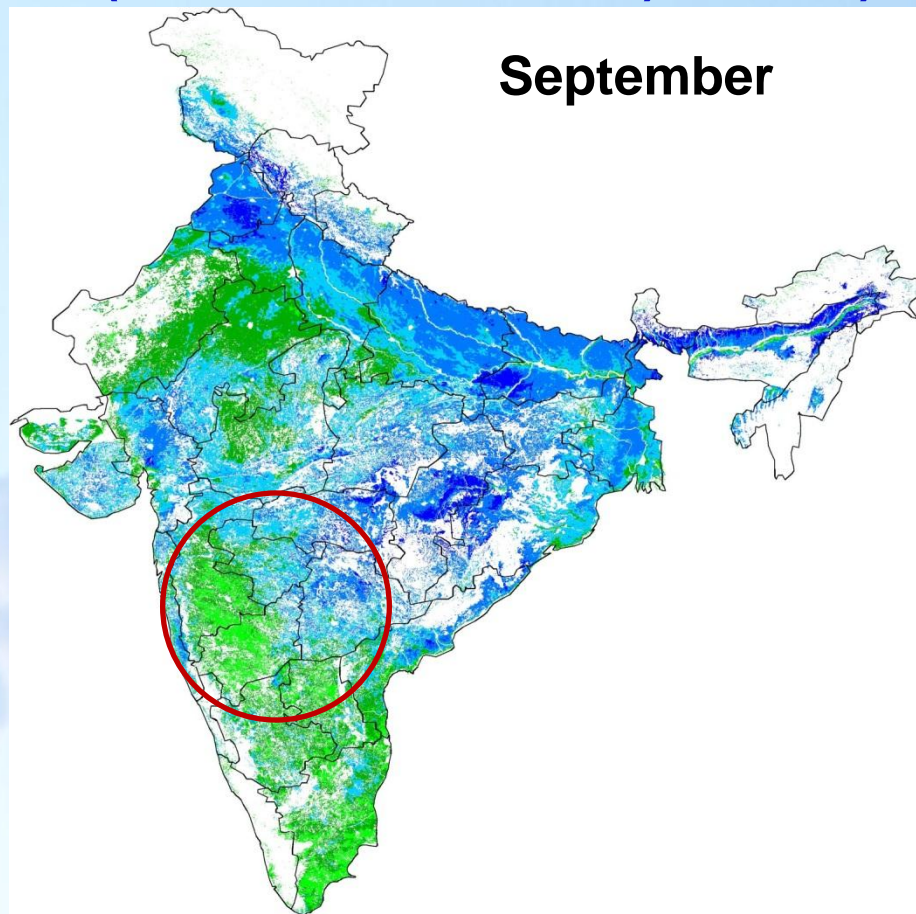


Crop Monitoring using Satellite NDVI (Southwest monsoon) of 2015)

August



September



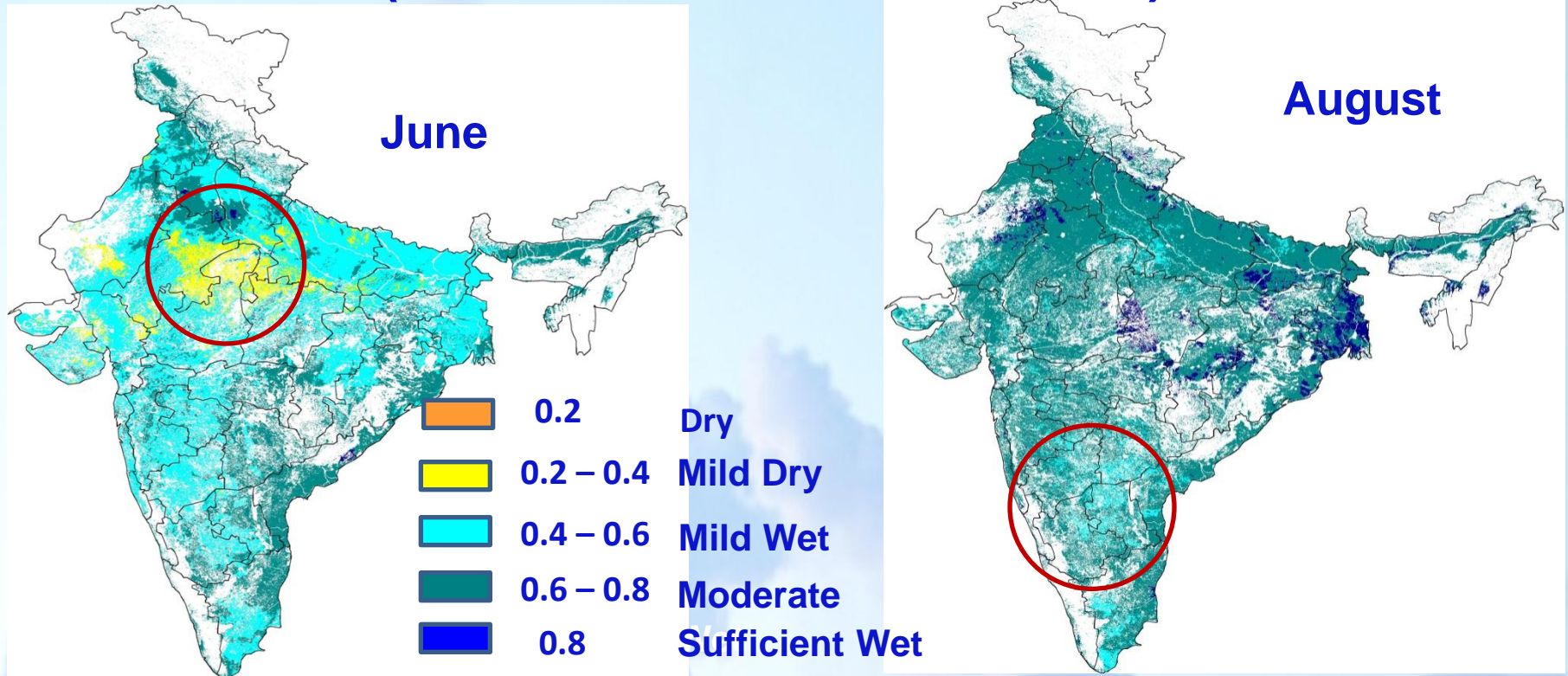
The low rainfall during the southwest monsoon of 2015 was reflected in the reduced crop vigor over many parts of the country.

The most affected were the states of Maharashtra and Karnataka.

The crop growth in the states of Punjab, Haryana, Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh was normal by the end of the season.



Available Surface moisture Monitoring using Satellite LSWI (Southwest monsoon of 2015)



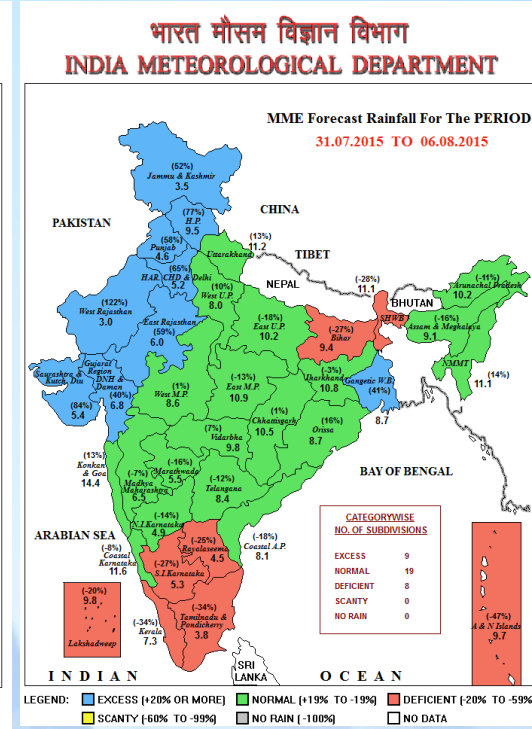
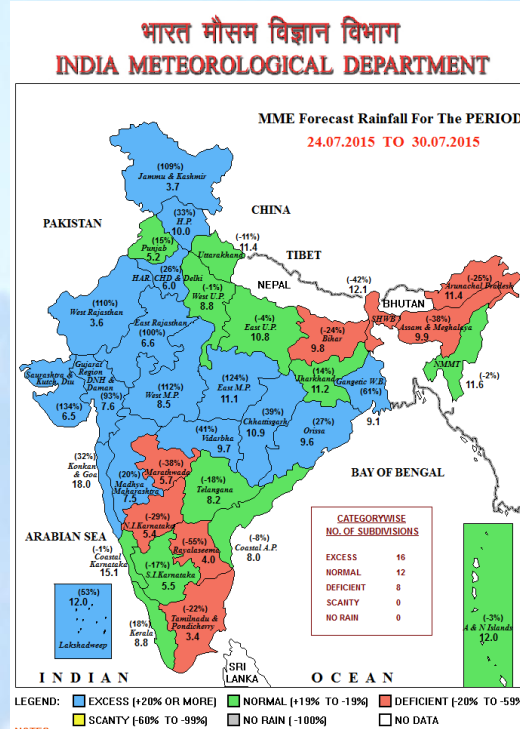
Some part of Rajasthan, Uttar Pradesh and Madhya Pradesh shows mild dry moisture status start of June. The affected states of Maharashtra and Karnataka show mild wet conditions throughout the season.

The moisture status in the states of Punjab, Haryana, Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh was moderately wet in the month of August.



Extended Range Weather Forecast (24 July – 6 August, 2015)

- ❖ Normal or above normal rainfall would occur in next fortnight over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, Haryana & Delhi, Uttar Pradesh, Rajasthan, Jharkhand, Odisha, Gangetic West Bengal, Chhattisgarh, Madhya Pradesh, Gujarat State, Konkan & Goa, Madhya Maharashtra, Vidarbha, Nagaland, Manipur, Mizoram, Tripura, Coastal Karnataka, Telangana and Coastal Andhra Pradesh.
- ❖ Normal or above normal rainfall would occur in either of the next two weeks in Marathwada, Interior Karnataka, Assam & Meghalaya, Arunachal Pradesh and Kerala.
- ❖ Below normal rainfall occurred in the last two weeks over remaining parts of the country.



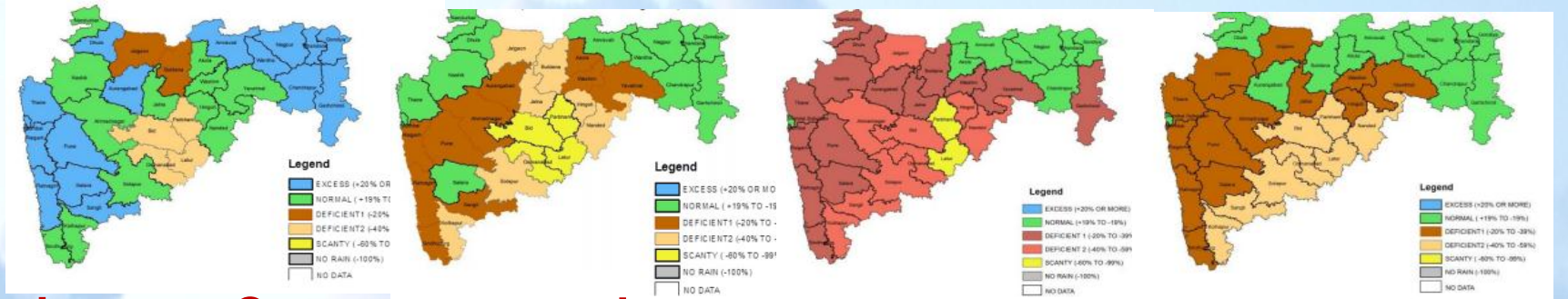
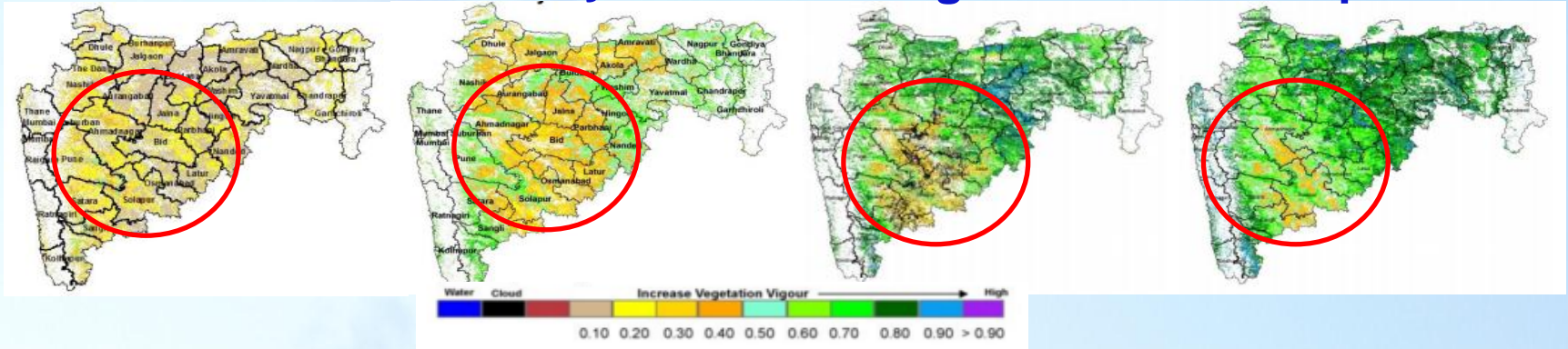
Crop status using NDVI in Maharashtra

June

July

August

September



Contingency Crops suggested

Maharashtra- Normal crops - Rice, Groundnut, Soybean, cotton, Sugarcane, Sorghum)

In Madhya Maharashtra medium/ short duration sunflower, pigeonpea, soybean, pearl millet were recommended. In Marathwada pigeon pea, pearl millet, sorghum, soybean, black gram were sown.

- In Marathwada intercropping of short duration varieties of soybean + red gram (4:2), cotton + red gram (6:2), jowar + red gram (4:2) and fodder sorghum against normal crops of soybean and cotton. Also in Marathwada in view of cultivation of sugarcane is restricted and drip irrigation is advised for standing crop.



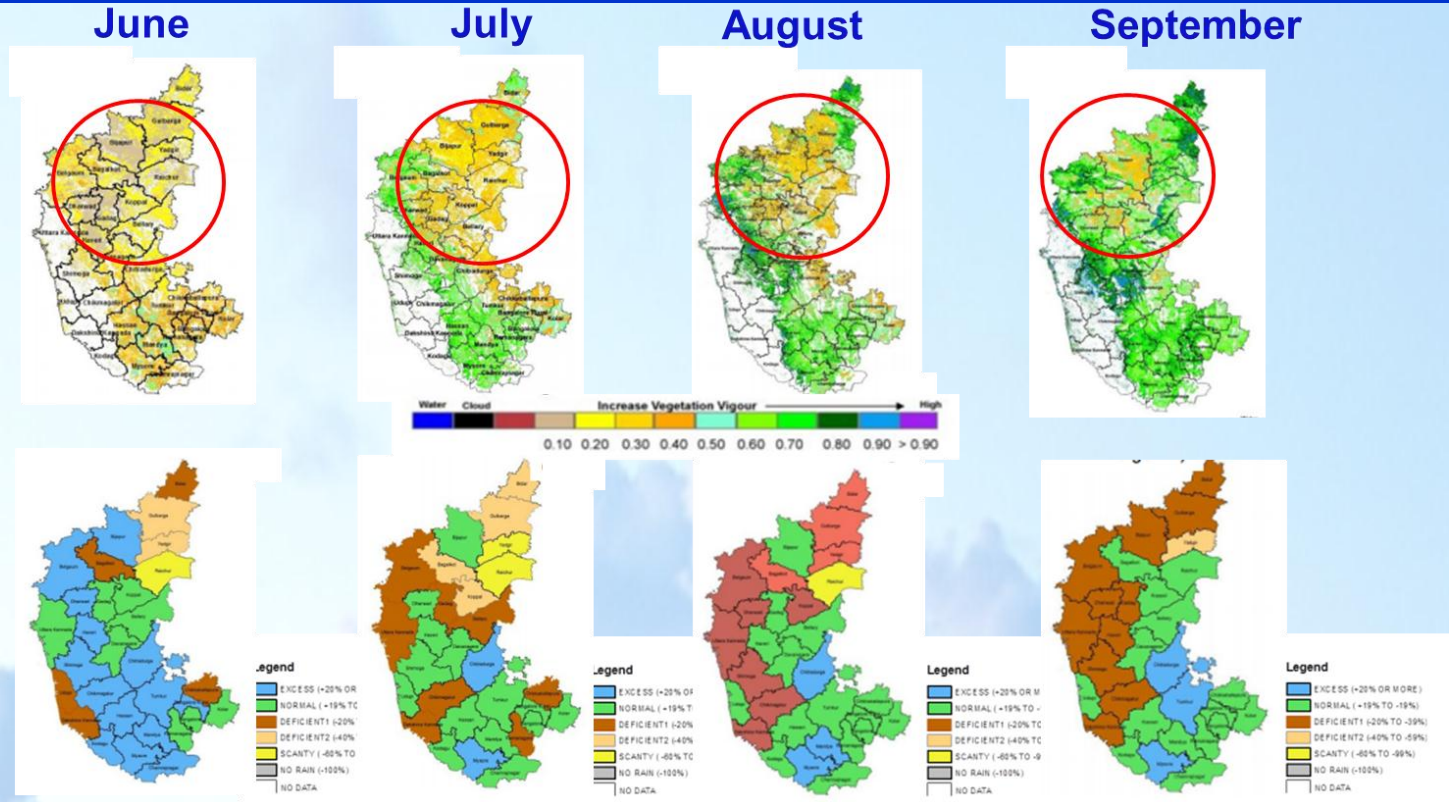
Dry spells during the season



- The districts in Marathwada like Beed, Osmanabad, Parbhani, Latur, Jalna, Hingoli, Aurangabad, Nanded worst were affected.
- Government may consider ban on cultivation of sugarcane crop in drought affected areas.
- 628 farmers suicides reported in Marathwada.
- State gets 556 crores to tackle drought situation



Crop status using NDVI in Karnataka



- In North Interior Karnataka instead of normal crops (**Ragi, red gram and green/black gram**), sowing of niger, foxtail millet, mataki, horse gram, castor as well as intercropping of pearl millet + pigeon pea (2:1), pigeon pea + Sesame (1:2 or 2:4), bajra + castor (2:1) in light and medium black soils and bajra, pigeon pea, castor, chilli, sesame, foxtail millet, onion, bajra + castor (2:1), fodder crops in medium black soils was advised. (Vari. finger millet , maize and sunflower (KBSH-42 and KBSH-44) up to 15th August, horse gram, foxtail millet, pearl millet + pigeonpea (2:1) were recommended)



Contingent planning for Rayalaseema

- Due to lack of sufficient rains already sown rainfed crops had been suffering from moisture stress in Rayalaseema districts and area sown under various crops was less than 40% of the normal due to deficit rainfall. Sowing of contingency crops, as mentioned below, after receipt of sufficient rain instead of normal crops like **Groundnut, jowar, bajra, sesame, rice (nursery), cotton**.
- Sowing of sorghum, pearl millet, pigeon pea, horse gram, castor, cowpea, cluster bean and field bean in rainfed light soils in August; sowing of castor, cotton, chilly in rainfed heavy soils up to end of August in Ananthapur and Kurnool districts.
- Varieties for sowing of red gram are LRG-41, ICPL-85063 for black soils and PRG-158, PRG-100 red soils in rainfed tracts of Kurnool district.
- Sowing of pigeon pea, sorghum, black gram, green gram, castor, cowpea, field bean and sunflower up to end of August in rainfed light soils and sowing of horse gram, pillipesara and sunnhemp in rainfed heavy soils in Chittoor, Nellore and Cuddapah districts.
- Spraying of 2% urea solution + 10 g MgSO₄ / litre of water followed by DAP 15-20 g + 10 g Potassium Nitrate (KNO₃) / litre of water at weekly interval to control wilting in rainfed cotton in Cuddapah district.



Contingent planning for Uttar Pradesh

- ❖ **East Uttar Pradesh – Normal crops** - Rice, Maize, Bajra, Sorghum, Black gram, Groundnut , Red gram, Sesame.
- ❖ Transplanting of rice upto 20-22nd August and direct sowing of short duration varieties of paddy and Shusk Samrat and mustard after 22nd August.
- ❖ Intercultural operation in green gram and black gram and thinning in jowar and bajra.
- ❖ Undertake gap filling to maintain plant population of rice.



Contingent planning for Gujarat

Gujarat Region – Normal crops- **Rice, cotton, groundnut, maize**

- In early sown crops, undertake intercultural operations, weeding in groundnut, soybean, pigeon pea and vegetable crops and gap filling in cotton, to conserve soil moisture and to maintain optimum plant population. Mulching with crop residues.

Middle Gujarat Zone

- Undertake sowing of medium/short duration varieties of sorghum, oilseed crops like sunflower and sesamum, pulse crops like black gram, green gram, cowpea and fodder sorghum.
- Sowing of moderate duration varieties of pearl millet, maize with intercropping of green gram, pigeon pea, guar in bajra.

South Gujarat Heavy Rainfall Zone

- Transplanting of kharif rice, under irrigation facilities.
- Use of SRI technique for transplanted paddy in case of nursery failure.
- Use of sprouted seed technique for paddy sowing.
- Intercultural operations and hand weeding after vapsa condition in earlier sown pulse crops.
- Hand weeding and mulching using dry leaves of sugarcane to conserve soil moisture.

Saurashtra & Kutch- Normal crops-**Ground nut, Castor, Bajra**)

- Intercultural operations, weeding, gap filling and mulching with wheat straw, groundnut shell and available farm residues in groundnut, cotton, sesame, pearl millet and pulses to conserve soil moisture.
- Sowing of alternate crops like groundnut bunch type, sesamum, hybrid bajra, green gram, black gram, pigeon pea, cowpea, fodder sorghum, maize, cotton (short duration Bt. cotton varieties) for the areas in Surendranagar, Jamnagar districts where sowing of crops could not be done due to less rainfall.



ALL INDIA STORAGE

Basin	This Year	Last Year	Last 10 Year
Ganga	19.727	19.132	13.176
Indus	13.040	11.451	10.481
Narmoda	14.766	13.503	11.202
Tapi	5.069	4.489	4.588
Mahi	3.306	2.513	2.667
Sabarmati	0.629	0.186	0.372
River of Kutch	0.773	0.173	0.389
Godavari	4.874	7.725	7.558
Krishna	9.993	18.383	24.545
Cauvery	4.435	5.706	5.321
Mahanadi	7.302	9.498	7.926
West flowing river of south	7.159	10.829	10.546

Figures as on August 20,2015; Storage in billion cubic metre

As per the Central Water Commission, total storage in 91 reservoirs across the country has dipped below the average of the last 10 years.

Except north and central regions of the country, the storage level was shrinking by the end of August.



Flood in ASSAM, West Bengal and Odisha



- 12 districts in Gangetic West Bengal (Murshidabad, Burdwan, Nadia, Hooghly, North 24 Parganas, Howrah, west Midnapore, Bankura, Puruliya, Birbhum, South 24 Paraganas and East Midnapore) were affected by floods during August.
- In Odisha, in Mayurbhanj, Keonjhar, Jajpur, Bhadrak and Balasore districts were affected.
- In Assam Goalpara, Kamrup, Malbari, Bongaigaon, Barpeta, Kokrajhar, Dhemaji, Lakhimpur and Sonitpur were affected. 1.7 lakh hectare crop field was under water.



White fly on cotton in Punjab and Haryana

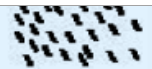
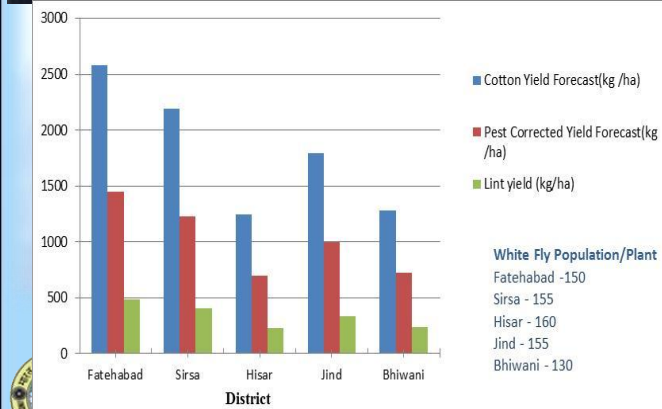
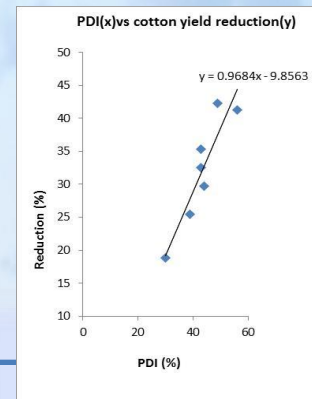
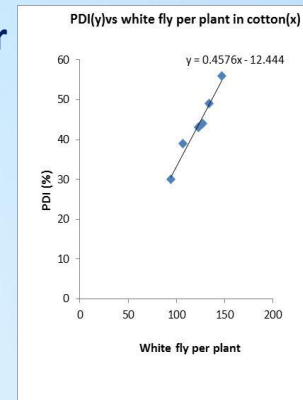


- White fly ruins 2/3 rd of Punjab Cotton, 15 farmers kill self
- Because of deficient rain, severe attack of white fly was on cotton crop in Punjab and Haryana. It has affected about two thirds of standing cotton crop in the state causing an estimated loss of Rs. 4200 crores.

Whitefly-moderated cotton yield forecast (F2) for Haryana during *kharif* 2015

Calculation (Eg: Fatehabad):

- white fly per plant = 150
 $PDI = 0.457 \times \text{white fly (150)} - 12.44 = 56.11 \%$
- Seed Cotton Yield reduction = $0.968 \times 56.11 - 9.856 = 44.45\%$
- Therefore round figure for pest correction is 44 %
- Yield loss = $25.8 \times 44\% = 11.4 \text{ q/ha}$
- Pest-corrected yield = $25.4 - 11.4 = 14.5 \text{ q}$
- Lint yield – $14.5 \times 0.33 = 480 \text{ kg / ha}$



Impacts of dry Spell on Livestock

- ❖ Persistent dry spells in Marathwada, caused fodder shortage and farmers were unable to bear the growing expenses of fodder.
- ❖ No water for drinking for cattle
- ❖ They cannot keep or sell their cattle.
- ❖ In many cases farmers in distress were forced to sell their livestock at throwaway prices as they were unable to keep their livestock.

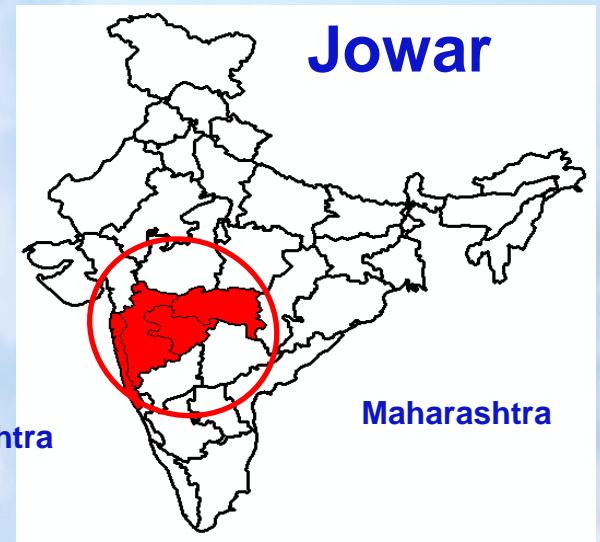
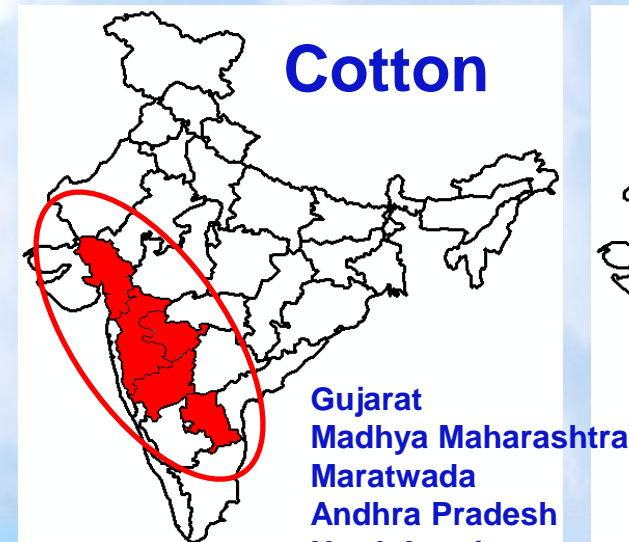
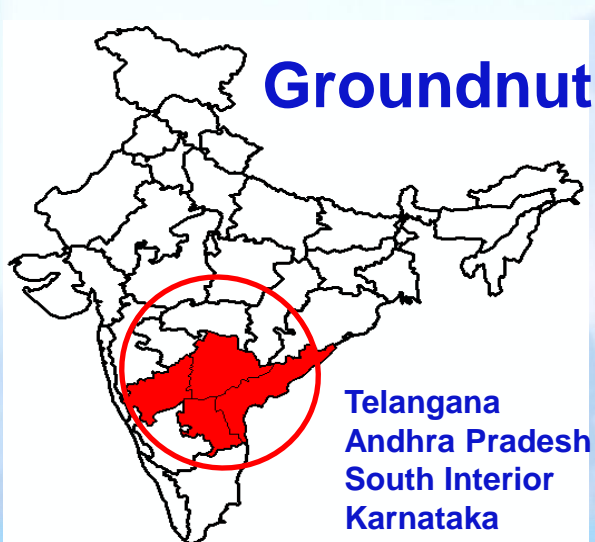
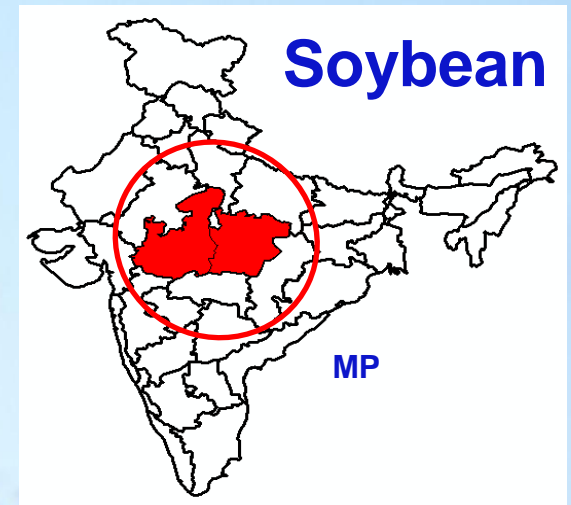
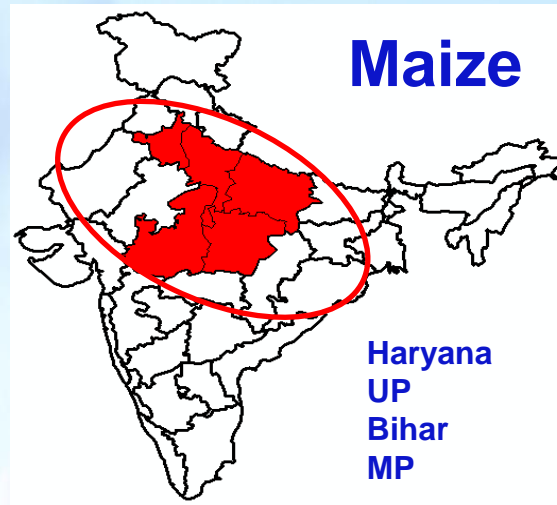
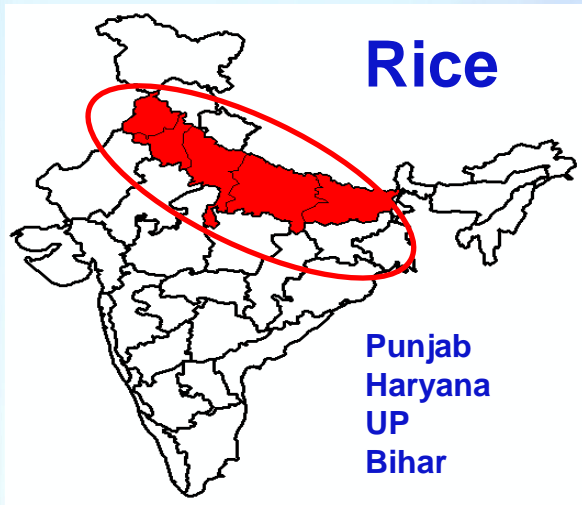


Impacts of dry Spell on Seed storage

- ❖ The forecast of below normal rainfall this year made farmers wary of buying seeds from the market. Many relied on their own stock.
- ❖ Deficient rainfall situation (in Maharashtra) during kharif season have resulted in thousands of quintals of crop seeds (soybean, paddy, bajra, maize) unused with losses estimated to crores of rupees.
- ❖ Over 40K quintal of seeds mainly soybean and paddy were unused, which cannot be used next year.



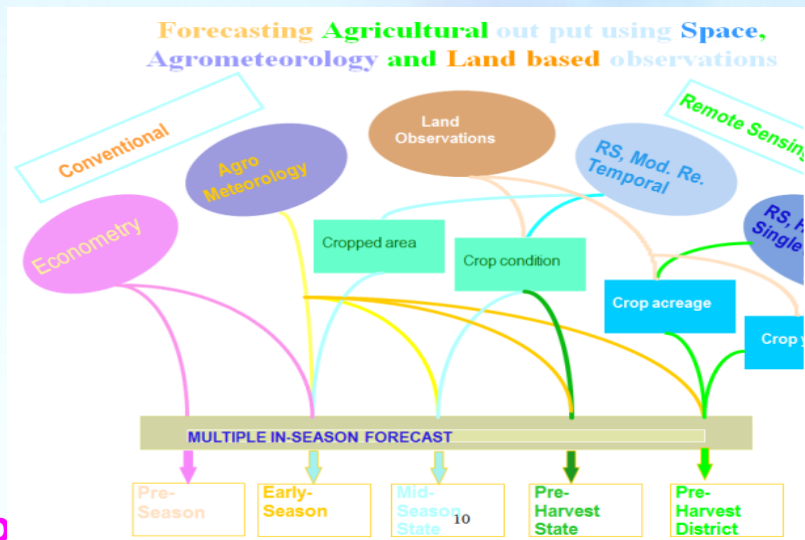
Crops affected in different States due to deficient rainfall



Forecasting Agriculture output using Space, Agrometeorology and Land based observations

Aims at providing multiple pre-harvest production forecasts of crops at National/State/ District level

Date of issue of Forecast (2015-16)



S N	Crop	Date of Issue		
		Planting stage (F1)	Mid season stage (F2)	Pre harvest stage (F3)
I	<i>Kharif 2015</i>			
	Jute	-	-	16/07/2015
	Rice	28/08/2015	28/09/2015	-
	Rice (Tamilnadu)	-	-	28/12/2015
	Cotton	-	29/10/2015	29/11/2015
	Sugarcane	10/07/2015	-	29/11/2015
II	<i>Rabi 2015-16</i>			
	Rapeseed-Mustard	30/12/2015	30/01/2016	27/02/2016
	Wheat	30/01/2016	27/02/2016	30/03/2016
	Potato	14/01/2016	27/02/2015	-
	Sorghum	-	25/01/2016	-
	Summer/Rabi Rice	-	-	28/03/2015

Crop

- Kharif :** Jute, Rice, Cotton, Sugarcane
 - Rabi :** Rapeseed-Mustard, Wheat, Winter potato, Sorghum and Rabi Rice
- Coordinated programme on Horticulture Assessment & Management using geoinformatics (CHAMAN)
winter potato, rabi onion, tomato, chilli and onion banana, mango

Sugarcane

Jute

Rice
kharif

Mustard

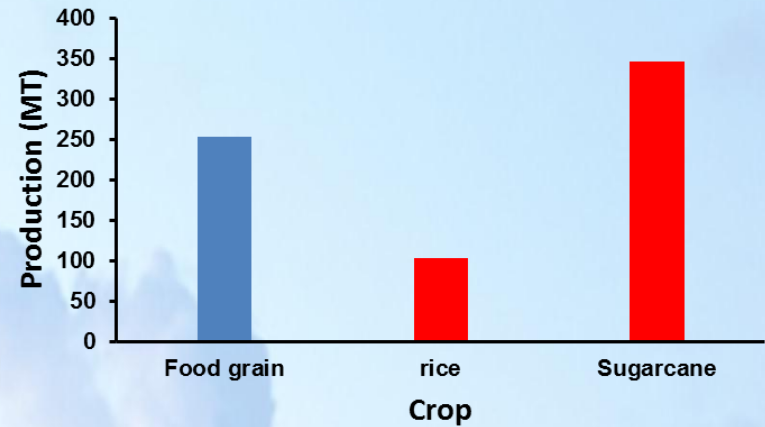
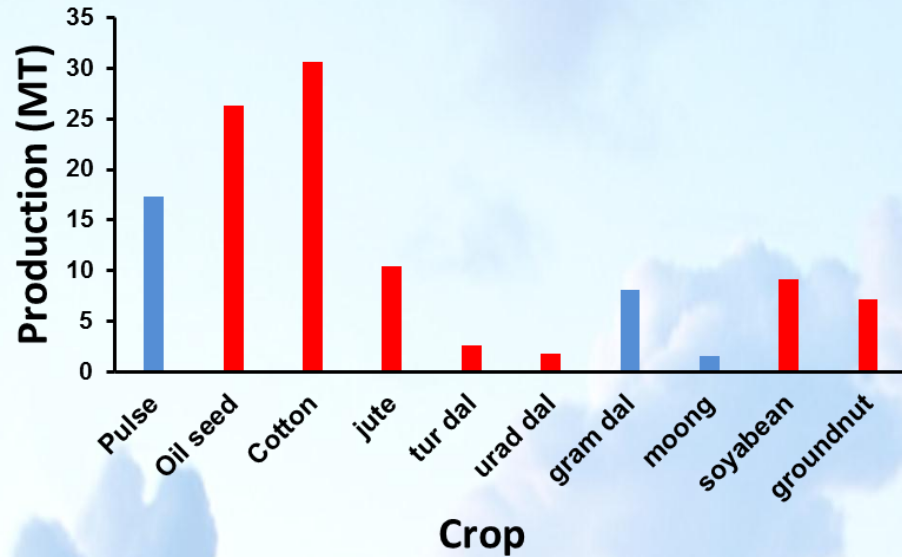
Potato

Wheat

Rice
rabi



Estimated crop production during *kharif* 2015



 Decrease in crop production compare to last year



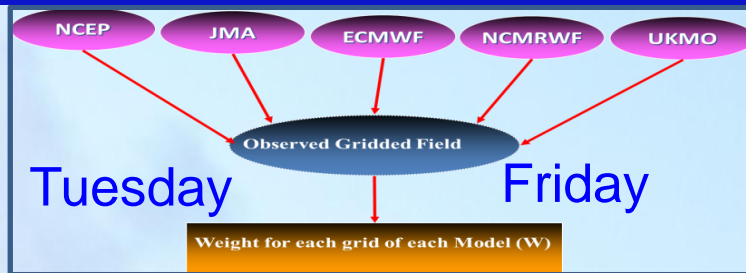
Estimated crop production during *kharif* 2015

Sr.No.	CROP	Estimated PRODUCTION Kharif 2015 (MT)	Remark
1	Food grain	253.16	Better than last year
2	Wheat	93.82	Increased than last year
3	Pulse	17.33	increase marginally than last year
4	rice	103.61	drop by 2 per cent than last year
5	coarse cereal	38.40	Decline than last year
6	Oil seed	26.33	drop than last year
7	Sugarcane	346.3	pegged lower than last year
8	Cotton	30.69 million bales of 170 kg each	pegged lower than last year
9	jute	10.40 million bales of 180 kg each	pegged lower than last year
10	tur dal	2.55	decline than last year
11	urad dal	1.74	decline than last year
12	gram dal	8.09	Higher than last year
13	moong	1.55	increase marginally than last year
14	soyabean	9.13	decline than last year
15	groundnut	7.18	fall marginally than last year



Operational Agromet Advisory Services in India

Preparation of value added medium range forecast at district level

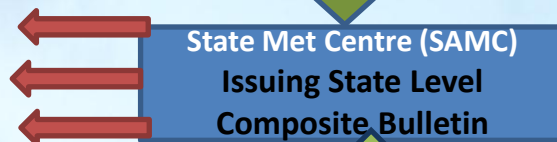


Parameters

Rainfall, Wind speed and direction, Maximum temperature, humidity, Cloud cover, Relative Minimum temperature

From Composite State Level Bulletin, Agrimet Division, IMD preparing National AAS bulletin

NWP products



Conducting State Level Meeting

Also Brochures for Awareness were completed for 14 languages

Issuing District Level Bulletin In all total 608 bulletins in 13 languages & uploading in the website of Agrimet Division (<http://imdagrimet.gov.in>)

Value addition



Conducting Farmer Awareness Programme, Completed at 106 stations, will be conducting more in 71 locations

Dissemination of Agromet Advisory, alerts in extreme weather through Multi-Channel

Organised different training programmes. Established feedback mechanism

Agromet Advisory



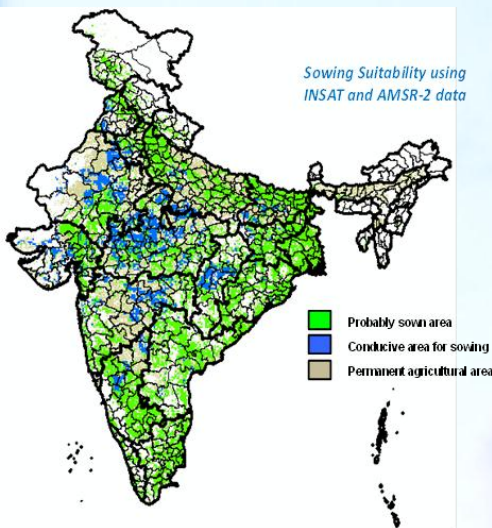
At present only 10 to 15 percent of the farmers are benefitting from the SMS services and about 24% farmers are aware about Agromet services. The economic benefit of these services which has been estimated by National Council of Applied Economic Research (NCAER) at Rs.50,000crores per year is extrapolated to rise to Rs.211,000 crores, if the entire farming community in the country were to apply agromet information for their agricultural activity.



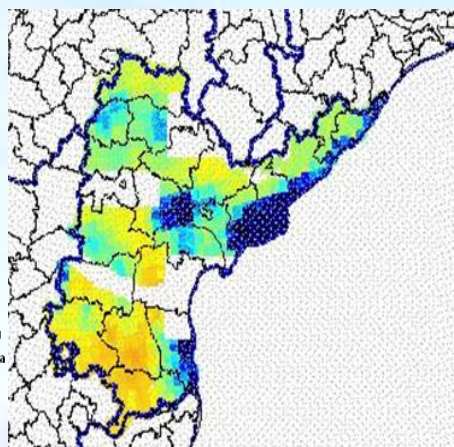
Satellite Products used for AAS

Sowing Suitability of crops

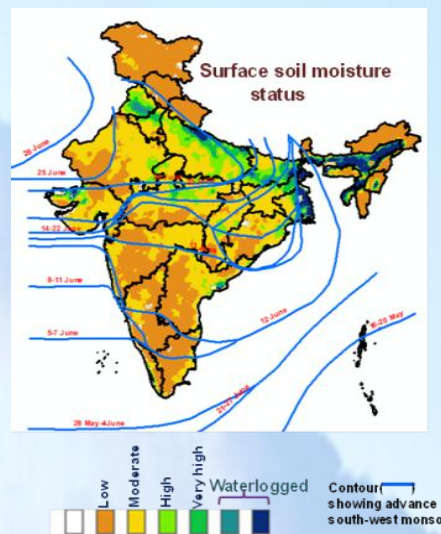
Sowing Suitability using INSAT and AMSR-2 data



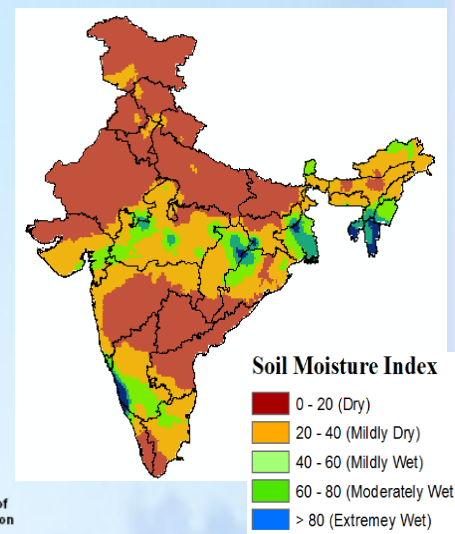
Surface Soil Moisture from SMOS



Surface soil moisture estimation by passive microwave sensor



Surface soil moisture estimation by water balance method

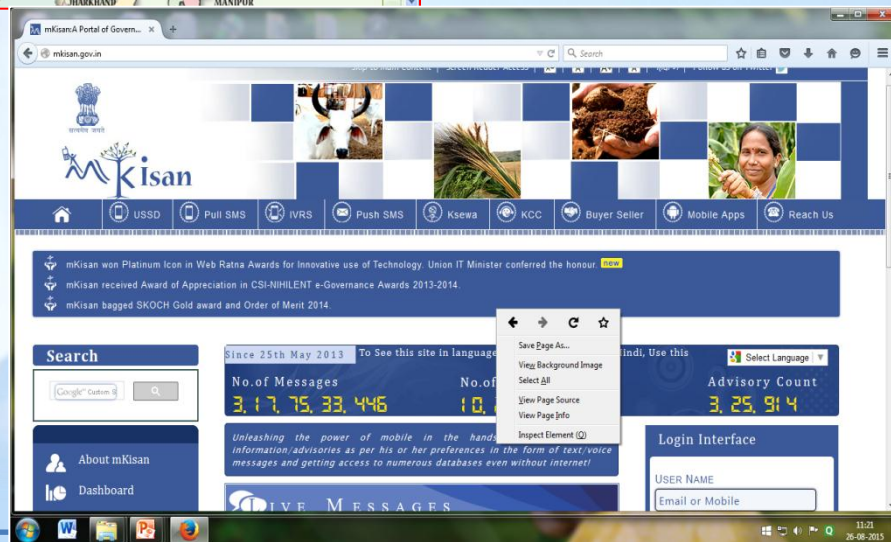


Agromet advisories are disseminated to 11.5 million farmers in both regional and English languages through SMS through this portal.

E-Agromet
Bulletin
Generation



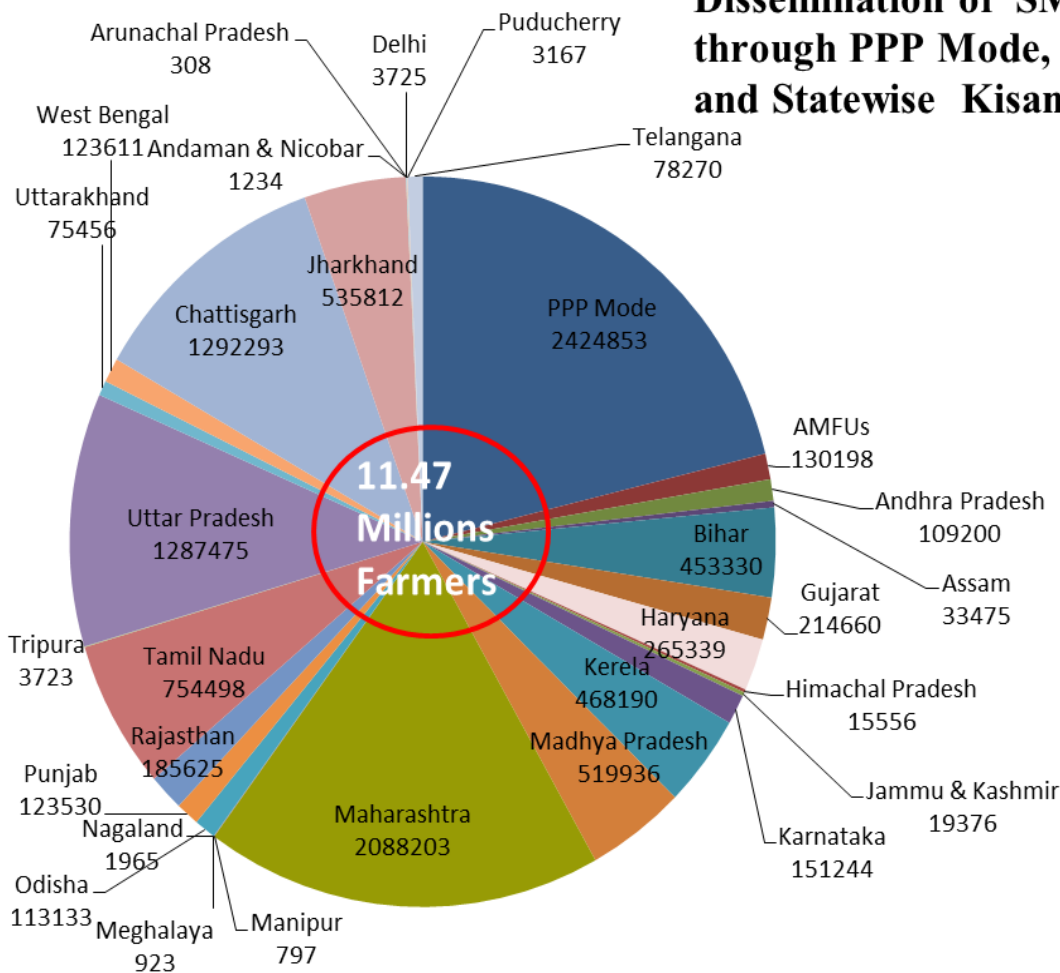
Weather alerts
were also
given to the
farmers in
flood/drought
situation



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

Statewise information on dissemination of SMS under PPP mode

Dissemination of SMS through PPP Mode, AMFUs and Statewise Kisan Portal



One in nine farmer families has been reached.



Farmer's Registration for SMS advisory through Ministry of Agriculture

Agricultural Meteorology | x imdagrimet.gov.in/farmer/ x

← → ↻ imdagrimet.gov.in/farmer/Form.php ☆ ☰

Farmer Registration Form

Farmer Name*

Mobile No*

State*

District*

Block*

Crop 1

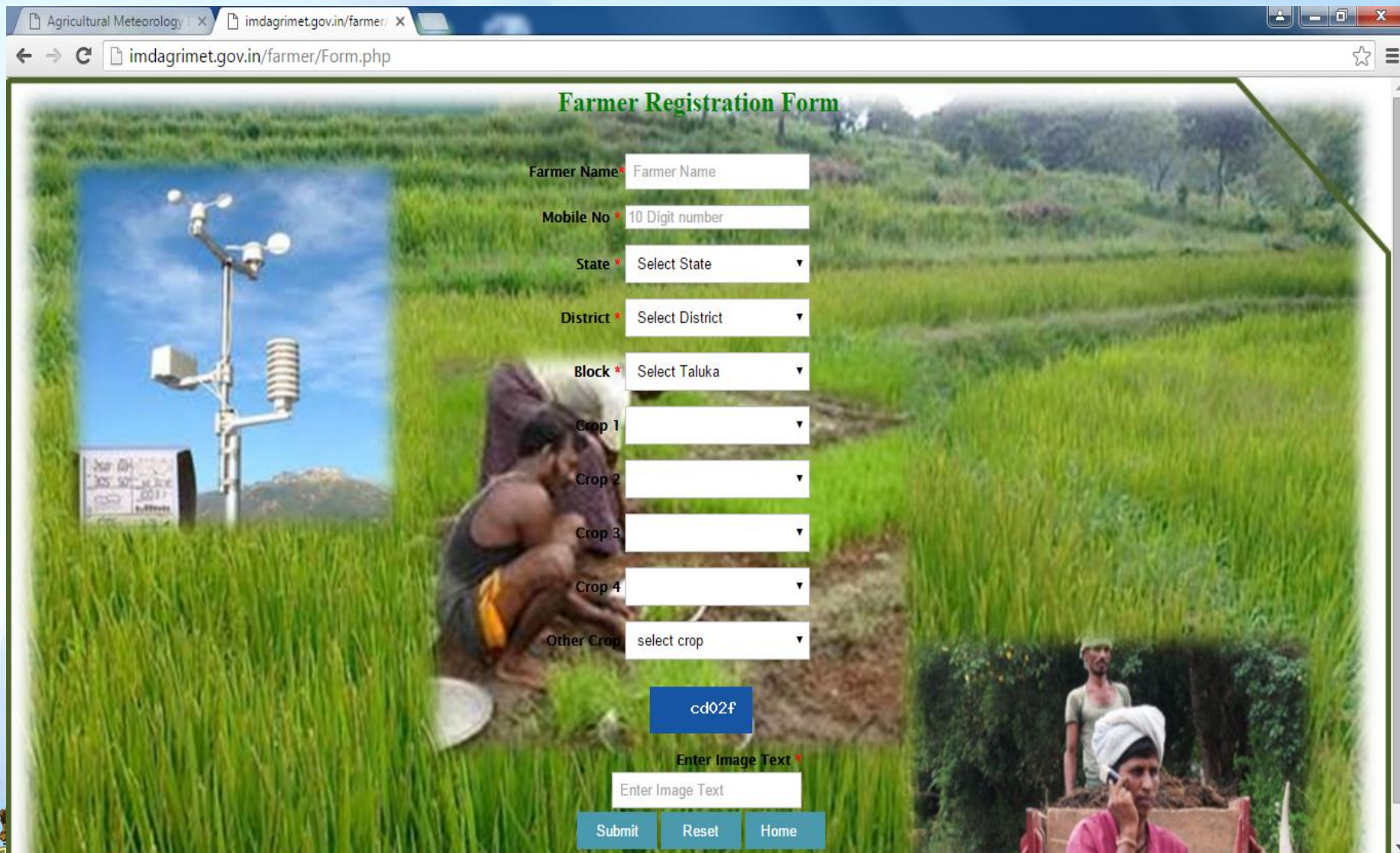
Crop 2

Crop 3

Crop 4

Other Crop

Enter Image Text*



GKMS: Farmers Awareness Programme

Farmer Awareness Programmes were conducted at 135 Agromet Field Units upto 2015. Ranguages distributed to farmers to record rainfall at farm level.



Distribution of ranguages in Farmer Awareness Programmess

The objective of these programmes is to make farmers become more self-reliant in dealing with weather and climate issues that affect agricultural production on their farms and to increase the interaction between the farmers and the AgroMeteorological Service providing agencies i.e. IMD, SAUs, ICAR etc.



Proposed districts to establish DAMUs

State	No of KVK	District for KVK
Andhra Pradesh	3	Adilabad, Khamam, West Godavari
Arunachal Pradesh	2	East Siang, Papampur
Assam	3	Golaghat, Kamrup, Tinsukia
Bihar	5	East Champaran, Aurangabad, Nawadah, Buxar, Saharsa
Chhattisgarh	3	Jashpur, Dantewada, Bilaspur
Goa	1	North Goa
Gujarat	5	Valsad, Panchmahal, Sabarkanta, Bhavnagar, Jamnagar
Haryana	4	Ambala, Karnal, Gurgoan Mahendragarh
Himachal Pradesh	3	Shimla, Bilaspur, Sirmur
Jammu and Kashmir	4	Poonch, Kathua, Udhampur ,Badgam
Jharkhand	4	Dhanbad, Lohardaga, West Singbhum, Garhwa
Karnataka	5	Chickmagalore, Kodagu, Dakshin Kannad, Haveri, Tumkur
Kerala	3	Ernakulam, Mallapuram, Kollam
Maharashtra	6	Satara, Wardha, Washim, Gondia, Dhule, Aurangabad
Madhya Pradesh	6	Seoni, Dindori, Raisen, Rewa, Shajapur, Betul

Meghalaya	1	West Khasi Hills
Mizoram	1	Mamit
Manipur	1	Ukhrul
Nagaland	1	Mokokchung
Odisha	5	Cuttack, Rayagada Bhadrak, Sambalpur, Boudh
Punjab	4	Kapurthala, Ropar, Firozpur, Mansa
Rajasthan	4	Baran, Chittorgarh, Sikar, Hanumangarh
Sikkim	1	East Sikkim
Tamil Nadu	6	Dindigul, Cuddalore, Salem, Kanchipuram, Krishnagiri, Thanjavur
Tripura	1	South Tripura
Uttar Pradesh	9	Fatehpur, Ballia, Gorakhpur, Jaunpur, Kheri Lakhimpur, Maharajganj, Bijnor, Hamirpur, Mainpuri
Uttarakhand	2	Almora, Tehri Garwhal
West Bengal	5	Bankura, North 24 Parganas, Jalpaiguri, Malda, Burdwan
Pondicherry	1	Pondicherry
Lakshadweep	1	Karavatti



Advanced Crop Estimates

- ❖ India's foodgrain production is estimated to increase marginally to 253.16 million tonnes in 2015-16 crop year on likely improvement in output of wheat and pulses despite back-to-back drought.
- ❖ The estimate is, however, lower than the record 265.04 million tonnes (MT) in the 2013-14 crop year (July-June), but slightly better than 252.02 MT achieved last year.
- ❖ Wheat, rice, coarse cereals and pulses are part of the food grain basket.





**T
H
A
N
K

Y
O
U**



You are very difficult to please. During drought, you complained there was no food. Now there is rain, you grumble there is no roof over your head.

This delay in the monsoon is causing you anxiety, Is it? Don't worry, I will appoint an inquiry committee to look into the matter.

