



National Level Programmes and Applications in Weather Forecasting Services

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**भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT**

Ministry of Earth Sciences (MoES)

- MoES is mandated to translate Science to Services for the Society in providing services for weather, climate, ocean and coastal state, hydrology, seismology, and natural hazards; to explore and harness marine living and non-living resources in a sustainable manner for the country and to explore the three poles of the Earth (Arctic, Antarctic and Himalayas).
- These services include weather forecasts (both on land and in the Oceans) and warnings for various natural disasters like tropical cyclones, storm surge, floods, heat waves, thunderstorm and lightning; alerts for Tsunamis and monitoring of earthquakes, etc. The services provided by the Ministry are being effectively used by different agencies and state governments for saving human lives and minimising damages to the properties due to natural disasters.
- R & D and operational (services) activities of MoES are carried out by ten Institutes of MoES
 1. India Meteorological Department (IMD),
 2. National Centre for Medium Range Weather Forecasting (NCMRWF),
 3. Centre for Marine Living Resources and Ecology (CMLRE),
 4. National Centre for Coastal Research (NCCR),
 5. National Centre for Seismology (NCS),
 6. National Institute of Ocean Technology (NIOT),
 7. Indian National Centre for Ocean Information Service (INCOIS),
 8. National Centre for Polar and Ocean Research (NCPOR), Goa,
 9. Indian Institute of Tropical Meteorology (IITM), Pune
 10. National Centre for Earth Science Studies (NCESS).

A fleet of oceanographic and coastal research vessels of the Ministry provide required research support for scheme.
- Earth System Sciences deal with all the five components of the earth system: atmosphere, hydrosphere, geosphere, cryosphere, and biosphere and their complex interactions. The Ministry of Earth Sciences (MoES) holistically addresses all the aspects relating to the Earth System Science. The overarching scheme of PRITHVI will holistically address all the five components of earth system to improve the understating of the Earth System Sciences and to provide reliable services for the country. Various components of PRITHVI scheme are inter-dependent and are carried out in an integrated manner through combined efforts of the concerned Institutes under MoES. The overarching scheme of Prithvi Vigyan will enable development of integrated multi-disciplinary earth science research and innovative programs across different MoES institutes. These integrated R&D efforts will help in addressing the grand challenges of weather and climate, ocean, cryosphere, seismological science and services and explore the living and non-living resources for their sustainable harnessing.



Overarching scheme “PRITHvi Vigyan (PRITHVI)” of the Ministry of Earth Sciences

▪The Union Cabinet Chaired by the Prime Minister, Shri Narendra Modi has approved the overarching scheme “PRITHvi Vigyan (PRITHVI)” of Ministry of Earth Sciences, for implementation during the period from 2021-26 at an overall cost of Rs. 4,797 crore.

The scheme encompasses five ongoing sub-schemes namely

1. “Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)”,
2. “Ocean Services, Modelling Application, Resources and Technology (O-SMART)”,
3. “Polar Science and Cryosphere Research (PACER)”,
4. “Seismology and Geosciences (SAGE)” and
5. “Research, Education, Training and Outreach (REACHOUT)”.



Major Objectives of the overarching Prithvi Scheme

- Augmentation and sustainance of long-term observations of the atmosphere, ocean, geosphere, cryosphere and solid earth to record the vital signs of the Earth System and change
- Development of modelling systems for understanding and predicting weather, ocean and climate hazards and understanding the science of climate change
- Exploration polar and high seas regions of the Earth towards discovery of new phenomena and resources;
- Development of technology for exploration and sustainable harnessing of oceanic resources for societal applications
- Translation of knowledge and insights from Earth systems science into services for societal, environmental and economic benefit.



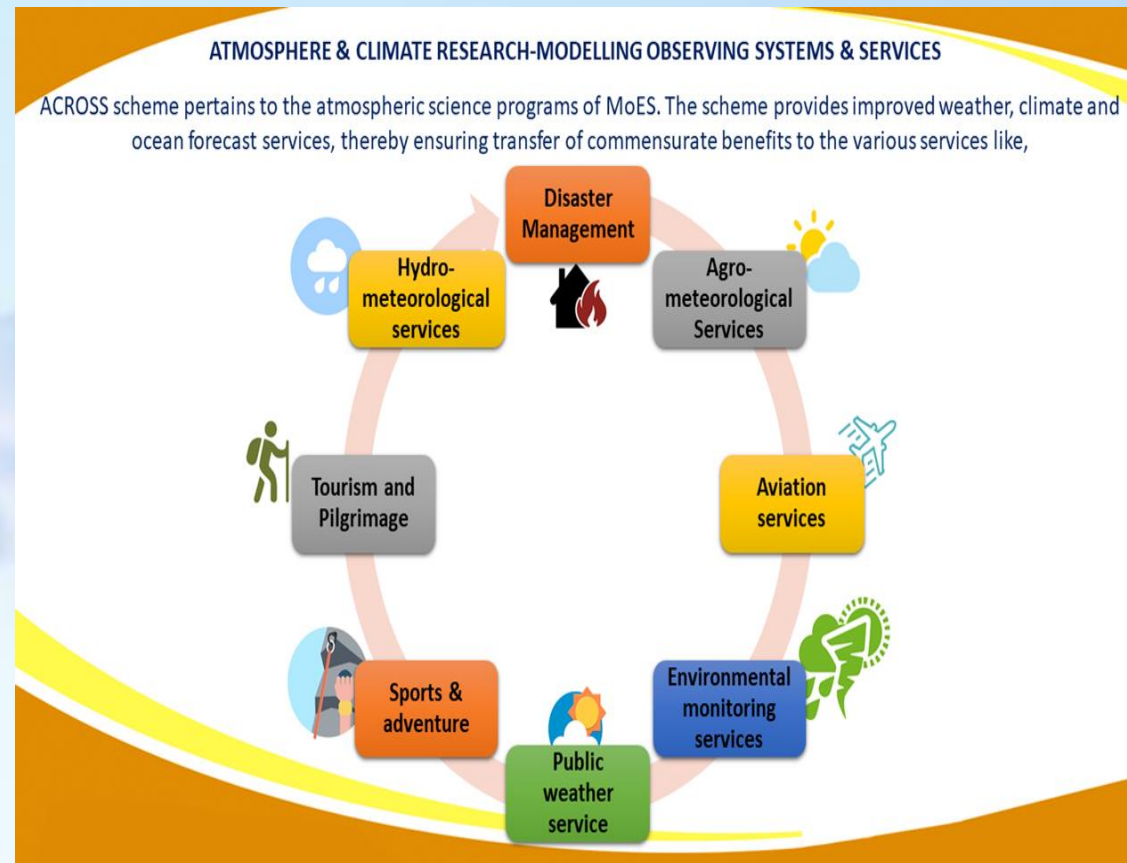
Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)

The entire gamut of weather/climate prediction involves the observational systems, assimilation of meteorological observations, understanding the processes, research and development of dynamical models and providing the forecast services.

ACROSS is implemented by four different institutions under MoES namely:

- ❖ India Meteorological Department (IMD),
- ❖ National Centre for Medium Range Weather Forecasting (NCMRWF),
- ❖ Indian Institute of Tropical Meteorology (IITM)

and Indian National Centre for Ocean Information Services (INCOIS) which implements a small part of the sub scheme.






Atmospheric, Climate Science and Services

ACROSS is composed of

- Monsoon Convection, Clouds, and Climate Change (MC4)
- High Performance Computing System (HPCS)
- Monsoon Mission (MM-II)
- Atmospheric Observations Network
- Weather & Climate Services
- Upgradation of Forecast System
- Commissioning of Polarimetric Doppler Weather Radars (DWRs)



Climate Research & Services

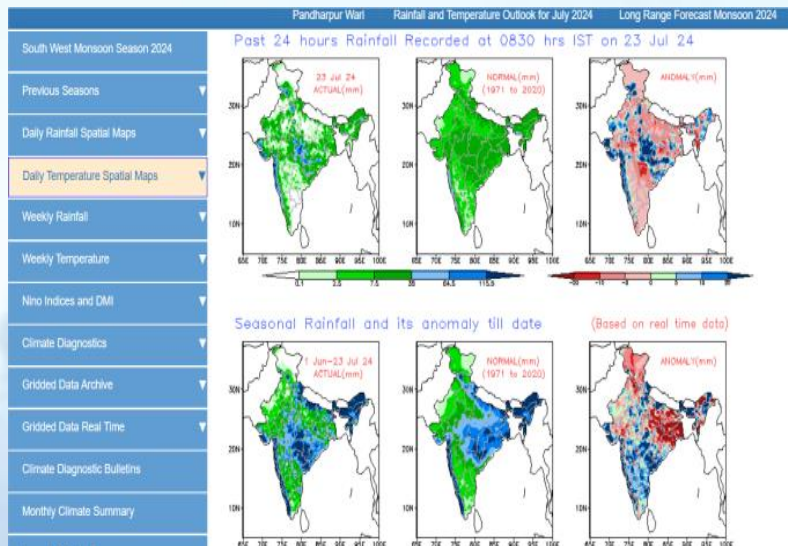
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भारत मौसम विज्ञान विभाग | India Meteorological Department
पृथ्वी विज्ञान मंत्रालय | Ministry of Earth Sciences
भारत सरकार | Government of India

मराठी हिन्दी

Home Climate Monitoring Climate Prediction Climate Application Climate Information Surface Instruments Agromet Services Weather Reports News

★ PRESS RELEASE : Updated Long Range Forecast Outlook for the 2024 Southwest Monsoon Season Rainfall (June - September) ★

Climate monitoring



Climate prediction

- Long Range Forecast
- Spatial Probability Forecast
- Spatial Forecast Verification
- ENSO Buletin
- Climate Outlook (South Asia)
- CFS Probability Forecast
- CFS Anomaly Forecast
- Model Details
- PPT Hindcast Verification
- SST Hindcast Verification

Climate application

- Agricultural Application
- Agricultural Drought Monit. & Prediction
- Drought Monitoring & Prediction (AAI)
- Drought Monitoring & Prediction (SPI)
- Drought Monitoring & Prediction (SPEI)
- Health Application
- Weekly Health Bulletin
- Heat Wave
- Background Information
- Heat Wave 2024
- River Basin Raintal

Climate information

- Smart Cities
- Statewise Temperature Trends
- Normal Climate Data
- Climate Probability
- Extreme Climate Data
- Spatial pattern of normals
- Climatology of Wind
- Climatology of Relative Humidity
- Climatology of Temperature
- Raintal Trends in frequency of
- District Raintal Normals



CLIMATE PREDICTION

Long Range Forecasting (LRF)

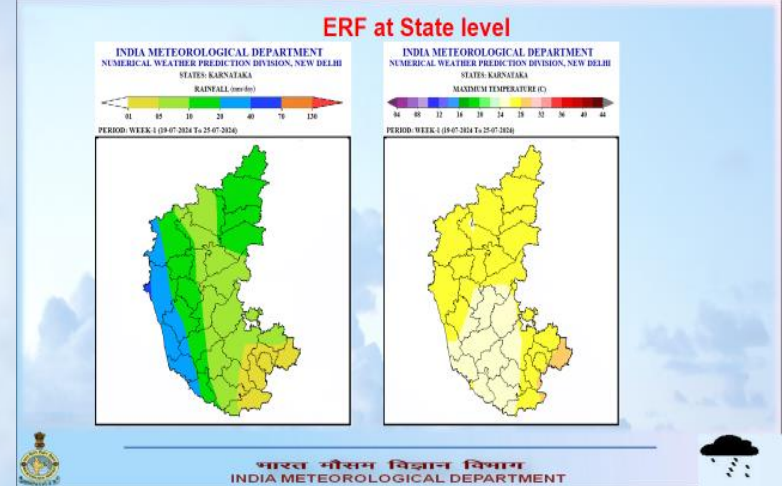
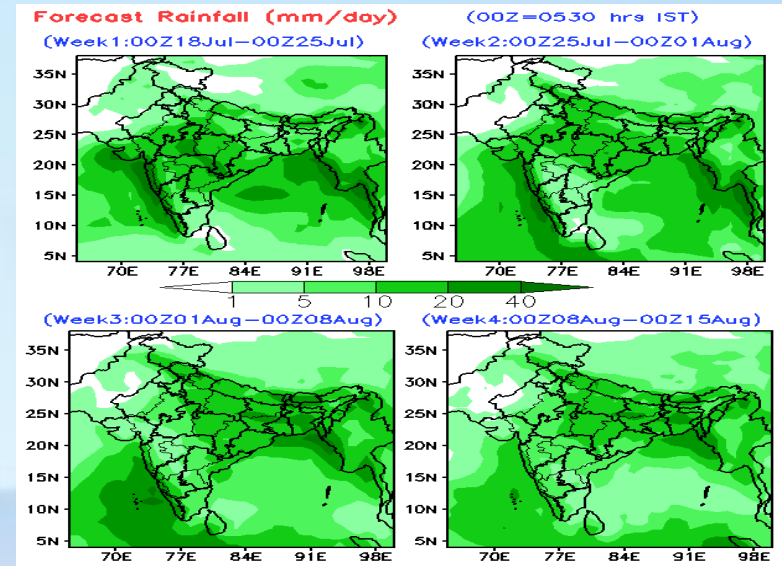
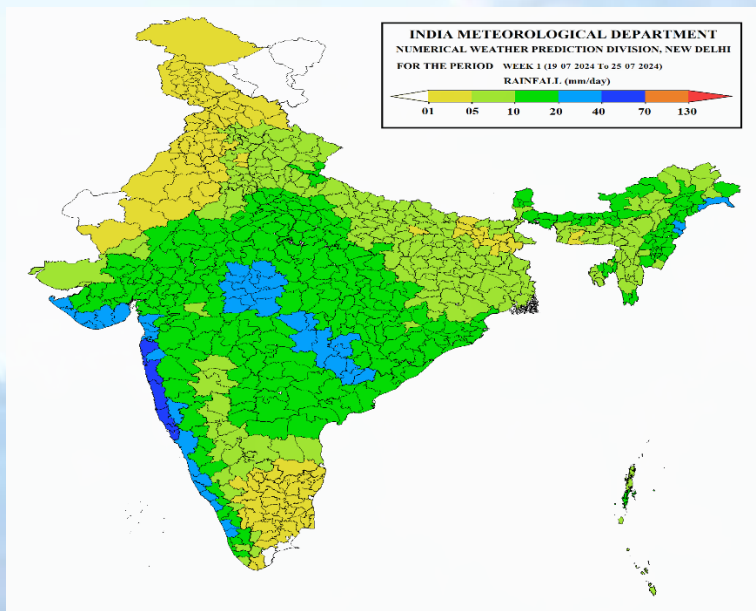
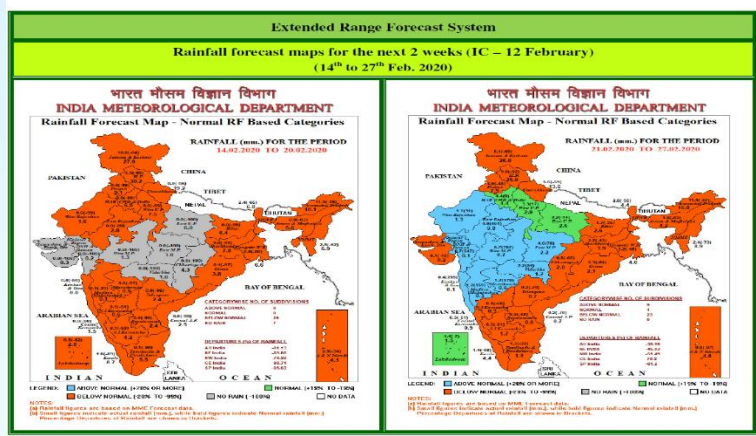
- To prepare and issue operational extended and long range forecasts for the country.
- Grid point rainfall data over the country: Prepares daily grid point rainfall data at two different high resolution spatial grids ($1^\circ \times 1^\circ$ and $0.5^\circ \times 0.5^\circ$).

The daily, monthly and seasonal rainfall maps prepared based on these data are available through IMD, Pune website (www.imdpune.gov.in).

- IMD has implemented a new strategy for issuing monthly and seasonal operational forecasts for the southwest monsoon rainfall over the country by modifying the existing two stage forecasting strategy.
- The new strategy uses both dynamical and statistical forecasting system. Multi-Model Ensemble (MME) forecasting system based on coupled global climate models (CGCMs) from different global climate prediction centres, including IMD's Monsoon Mission Climate Forecast System (MMCFS) are used in dynamical forecast system.



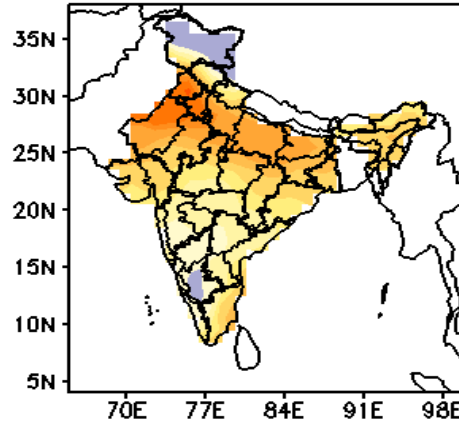
Extended range forecast



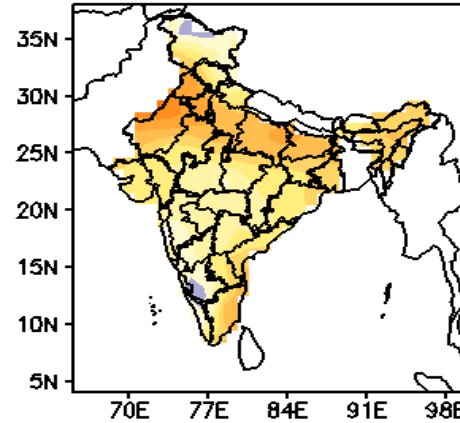
Extended range forecast

MME Bias corrected forecast Tmax (Deg C)

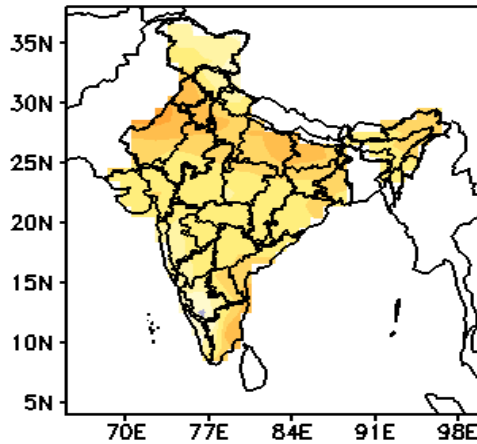
(Week1: 19Jul-25Jul)



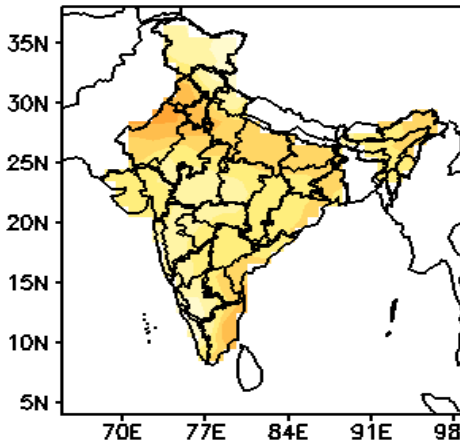
(Week2: 26Jul-01Aug)



(Week3: 02Aug-08Aug)



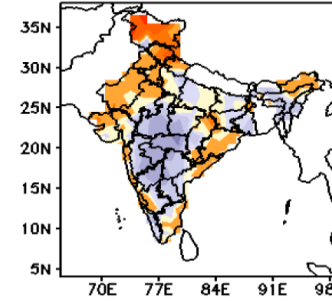
(Week4: 09Aug-15Aug)



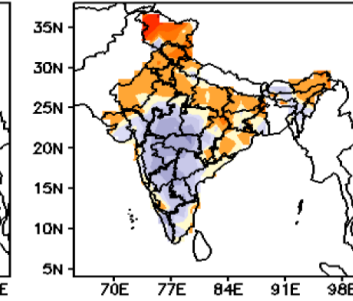
Maximum and Minimum temperature anomaly ($^{\circ}$ C) forecast for next 2 weeks (1C - 12 February) (14th to 27th Feb. 2020)

MME forecast Tmax anomaly (Deg C)

(Week1: 14Feb-20Feb)

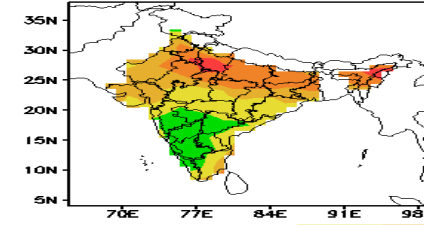


(Week2: 21Feb-27Feb)

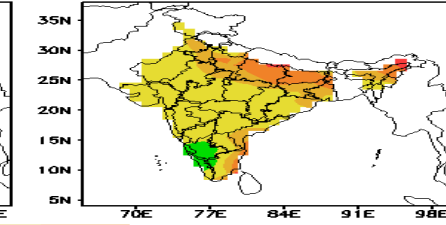


MME Bias corrected forecast MAX HI (Deg C)

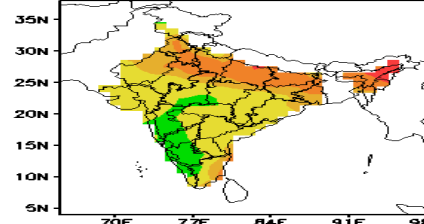
(Week1: 19Jul-25Jul)



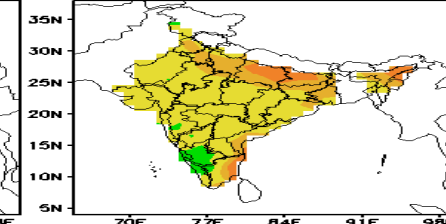
(Week2: 26Jul-01Aug)



(Week3: 02Aug-08Aug)



(Week4: 09Aug-15Aug)



Tentative annual time schedule for issuing various operational long range forecast/ outlook

S. No	Forecast to be issued	Tentative time of issue
1	First Stage Forecast for the Season (June – September) Rainfall over the country as a Whole	Mid April
2	Date of Monsoon Onset over Kerala	Around 15th May
3	Second Stage Forecast consisting of update for the first stage forecast, forecast for monthly rainfall over the country as a whole for the months of July & August, and the season rainfall over four geographical regions of the country.	First week of June
4	Mid Monsoon Review and Outlook for Second half of Season (August-September).	End week of July
5	Outlook for September Rainfall over the country as a whole.	End week of August
7	NE Monsoon Season (October to December) rainfall for south Peninsula.	End of September
8	Winter season (Jan- March) precipitation over north India.	End of December



SWM Seasonal/monthly Forecast

PRESS RELEASE
New Delhi, 27 May 2024

Tercile probability rainfall forecast for 2024 southwest monsoon season



भारत सरकार
Government of India
पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)
Ministry of Earth Sciences (MoES)



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

Updated Long Range Forecast Outlook for the 2024 Southwest Monsoon Season (June-September) Rainfall and Monthly Rainfall and Temperature for June 2024

Highlights

- a) Quantitatively, the southwest monsoon seasonal rainfall over the country as a whole is likely to be **106%** of the long period average (LPA) with a model error of $\pm 4\%$.
Thus Above Normal rainfall is most likely over the country as a whole during the monsoon season (June to September), 2024.
- b) The southwest monsoon seasonal (June to September, 2024) rainfall is most likely to be above normal over Central India and South Peninsular India (>106% of LPA), normal over Northwest India (92-108% of LPA) and below normal over Northeast India (<94% of LPA).
- c) The southwest monsoon seasonal rainfall over the Monsoon Core Zone (MCZ) consisting of most of the rainfed agriculture areas in the country is most likely to be **Above Normal** (>106% of LPA).
- d) **Above Normal** rainfall is most likely over most parts of the country except many areas of northern part of Northwest India, Northeast India and eastern part of the Central India and adjoining areas of east India, where below normal to normal rainfall is most likely.
- e) Normal rainfall (92-108% of LPA) is most likely over the country as a whole during June, 2024. The above normal monthly rainfall is most likely over most areas of the south peninsula, and adjoining areas of central India and over isolated areas of Northwest and Northeast India. Below normal rainfall is most likely over many areas of northern and eastern parts of Northwest India and eastern part of Central India, and over some areas over Northeast India and southeastern part of South Peninsula.

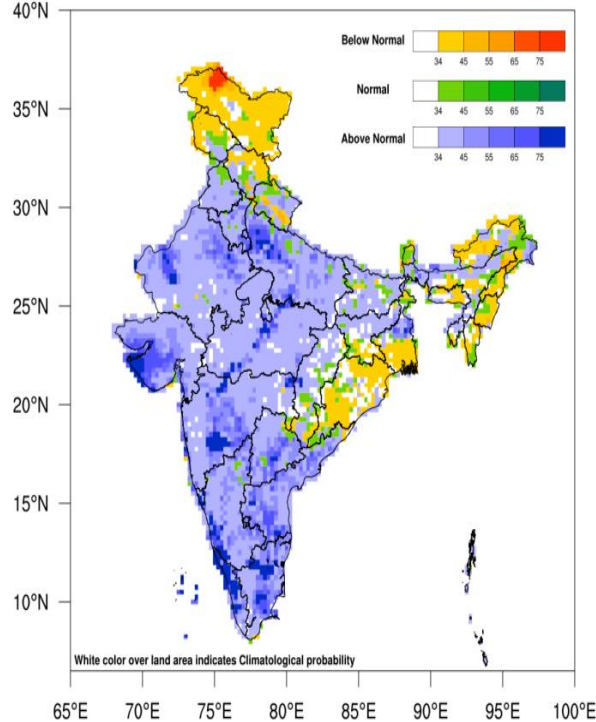


Fig.1. Updated Probability forecast of tercile categories* (below normal, normal, and above normal) for the seasonal rainfall over India during the 2024 southwest monsoon season (June-September). The figure illustrates the most likely categories as well as their probabilities. The white shaded areas within the land area represent climatological probabilities. The probabilities were derived using the MME forecast prepared from a group of coupled climate models. (*Tercile categories have equal climatological probabilities, of 33.33% each).



Government of India
Ministry of Earth Sciences
India Meteorological Department



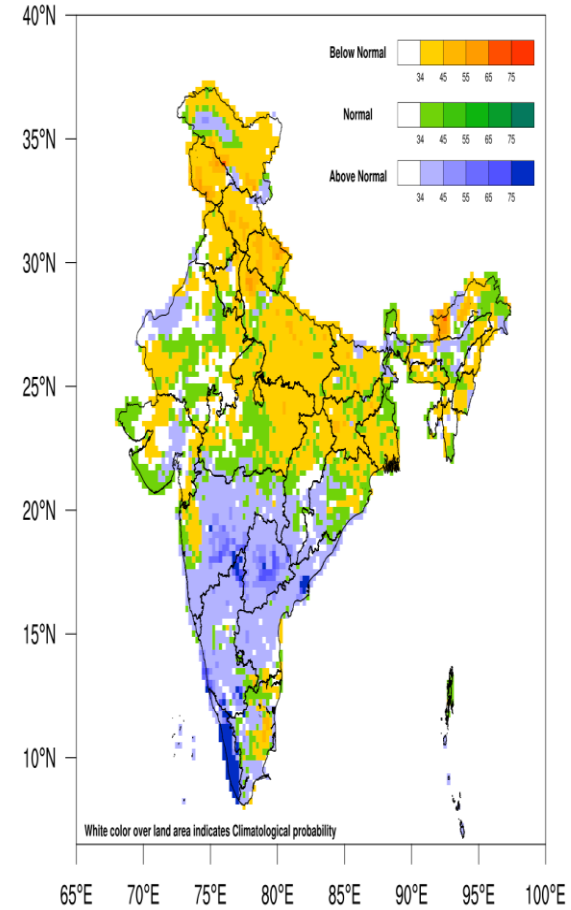
Press Release
Date: 18th June, 2024
Time of Issue: 2030 hours IST

Sub: Monthly forecast update for June 2024

1. Current Status of Advance of Monsoon and Rainfall for the month of June (till 18 June 2024)

Advance of Southwest Monsoon 2024: Southwest Monsoon advanced into some parts of Nicobar Islands on 19th May, 2024. It further advanced subsequently over most parts of south and some parts central Bay of Bengal by 26 May in association with the cyclone, REMAL. On 30th May, Monsoon set in simultaneously over Kerala and northeastern states. Hence, Onset over Kerala was 2 days before and over northeast India, 6 days before the normal date. Thereafter, the north-ward progress of Monsoon was gradual and it covered entire states of Kerala, Karnataka, Rayalaseema, Goa & Telangana; most parts of South Maharashtra and some parts of South Chhattisgarh, South Odisha; most parts of Sub-Himalayan West Bengal & Sikkim and entire northeastern States by 12th June. Thereafter, monsoon has not progressed and the Northern Limit of Monsoon on 18th June, passes through 20.5°N/60°E, 20.5°N/63°E, 20.5°N/70°E, Navsari, Jalgaon, Amravati, Chandrapur, Bijapur, Sukma, Malkangiri, Vizianagaram, 19.5°N/88°E, 21.5°N/89.5°E, 23°N/89.5°E and Islampur (refer figure 1).

probability rainfall forecast for 2024 JUN



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



El-Nino Southern Oscillation(ENSO) bulletin



Earth System Science Organization (ESSO)
Ministry of Earth Sciences (MoES)
India Meteorological Department (IMD)
WMO Regional Climate Centre
Pune, India

El Niño Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) Bulletin

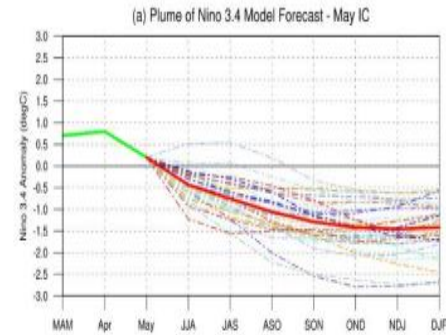
June 2024

Highlights

Currently ENSO neutral conditions are observed over the equatorial Pacific. The sea surface temperatures (SSTs) are above average in the equatorial western and central Pacific Ocean, and below-average over the eastern equatorial Pacific Ocean. The latest MMCFS forecast indicates that the ENSO-neutral conditions are likely to continue with strong possibility of transition to La Niña conditions around August-October 2024 season.

At present, neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean. The latest MMCFS forecast indicates enhanced probability for neutral IOD conditions to continue. At the same time, the possibility for the emergence of the positive IOD conditions during the monsoon season has reduced significantly. Up to last month, many global models including MMCFS were predicting the development of positive IOD conditions during the monsoon season.

(a)



(b)

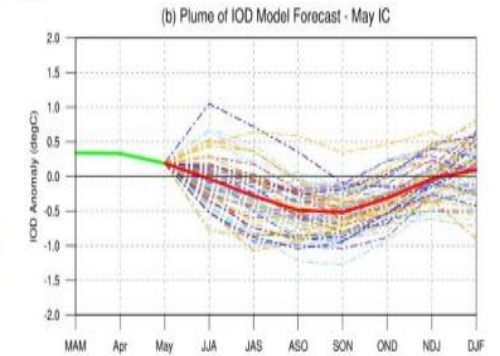


Fig.4: Plume of (a) Niño 3.4 SST index, (b) Indian Ocean Dipole (IOD) Mode Index forecasted by high-resolution MMCFS. The forecasts were PDF corrected for bias and variance. The solid green line is the observed SST anomaly (ERSSTv5, NOAA) and the solid red line is the ensemble mean SST anomaly forecast of 59 members (MMCFS). The individual ensemble member forecasts are shown in light dotted lines of different colours.



Weather & Climate Services

- IMD provides services to weather-sensitive sectors viz. agriculture, irrigation, shipping, aviation, offshore oil explorations, etc.
- Over the years, specialized services have also been built for state-of-the-art Monitoring, Detection and Early Warning of extreme weather phenomena including tropical cyclones, severe thunderstorms, dust storms, heavy rains and snowfall events, cold and heat waves, etc.
- The meteorological services have significant societal impact. Public/private/government sectors demand for accurate prediction of weather and climate at various temporal and spatial scales is increasing due to possible impacts of global climate variability and change.
- The weather services are dependent on the sustained investments in Research and Development (R&D) and capacity building so that advances in weather and climate sciences get inducted in to service through a focused performance evaluation in a semi-operational environment.
- Further improvement of current services requires effective conversion of R&D results into fully operational products, services and effective means to develop linkages with decision-makers and users. Especially, effective use of public weather services to communicate through tools, products and services that are useful for decision-making is the need of the hour.



Weather and Climate Services

Major components of “Weather and Climate Services” are:

- Gramin Krishi Mausam Sewa (Agrometeorological Advisory Services)
- Augmentation of Aviation Meteorological Services
- Climate Services
- Training in Operational Meteorology
- Capacity Building



Weather and Climate Services-Objectives

- Develop an Advanced Weather Prediction System for block level forecasts, skilful for next 3-5 days and develop advisories for sectors like Agriculture, Disaster Management, Water resources, Power, Tourism and Pilgrimage, Smart cities, Renewable Energy sector and Transport.
- Setting up of District Agro-Met Units (DAMUs) in all the districts of the country for extension of Agromet Advisory Services (AAS).
- To expand the outreach of weather based Agromet advisories to the 94 million farmers through multiple means of communication, collection of feedback and impact assessment of AAS.
- Develop a state-of-the-Art support system for Aviation safety with the automated Aviation Weather Observing System and advanced forecasting tools for all the civil airports in the country.
- Establishing new Aerodrome MET Offices at Greenfield Airports and setting up of automated Heliport Weather Observing & Transmitting System at Heliports, Landing ground and other strategic locations to support the Helicopter and low-level flight operation of Indian Air Force, Indian Army and also at important tourist and pilgrimage locations.
- Establish a state-of-the-art Climate Data Centre with integrated advanced climate data services portal for rendering national and regional climate services. The climate data centre will provide a comprehensive set of improved and specialized climate services for the country through upgradation of the existing operational activities of climate monitoring, climate prediction, climate data management and climate application.
- Provide appropriate climate services to South Asia as WMO recognized Regional Climate Centre (RCC) for the region.
- To upgrade the training infrastructure and facilities to enhance the capacity of the training establishment to bear increased loads of long-term ab-initio training courses for new entrants, career progression courses and short term courses in specialized topics, training to the personnel from countries.
- Contributions among WMO, Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)/ Economic and Social Commission for Asia and the Pacific (ESCAP)/ Global Framework for Climate Services (GFCS) in South Asia etc.
- Conduct of workshops, Seminars, Trainings, Symposiums, Users meet, Advertising & Publicity, Outreach activities etc



Upgradation of Forecast System

- This is a part of the sub-scheme “Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)” of MoES.
- Upgradation of Forecast System is aimed at improving the accuracy of weather forecasts to bring it at par with the international standards which will help many sectors like army operations, air operation, agriculture, tourism, mountaineering, aviation, roads and communications, power generation, water management, environmental studies, Sports & Adventure, Transport, Government Authorities, NGOs and Public in general.

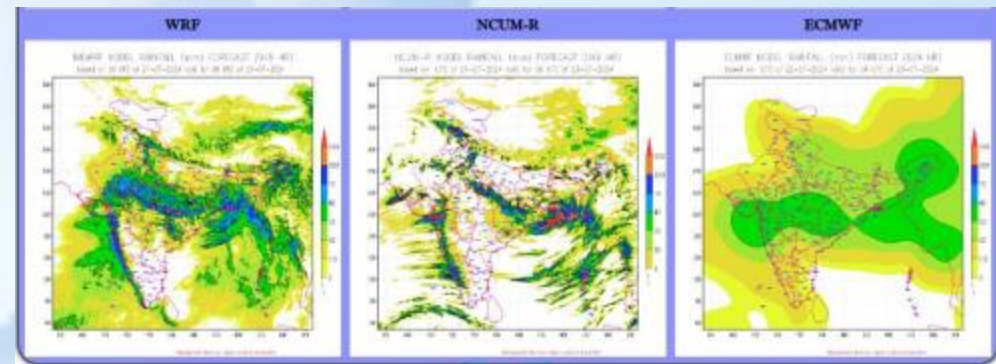
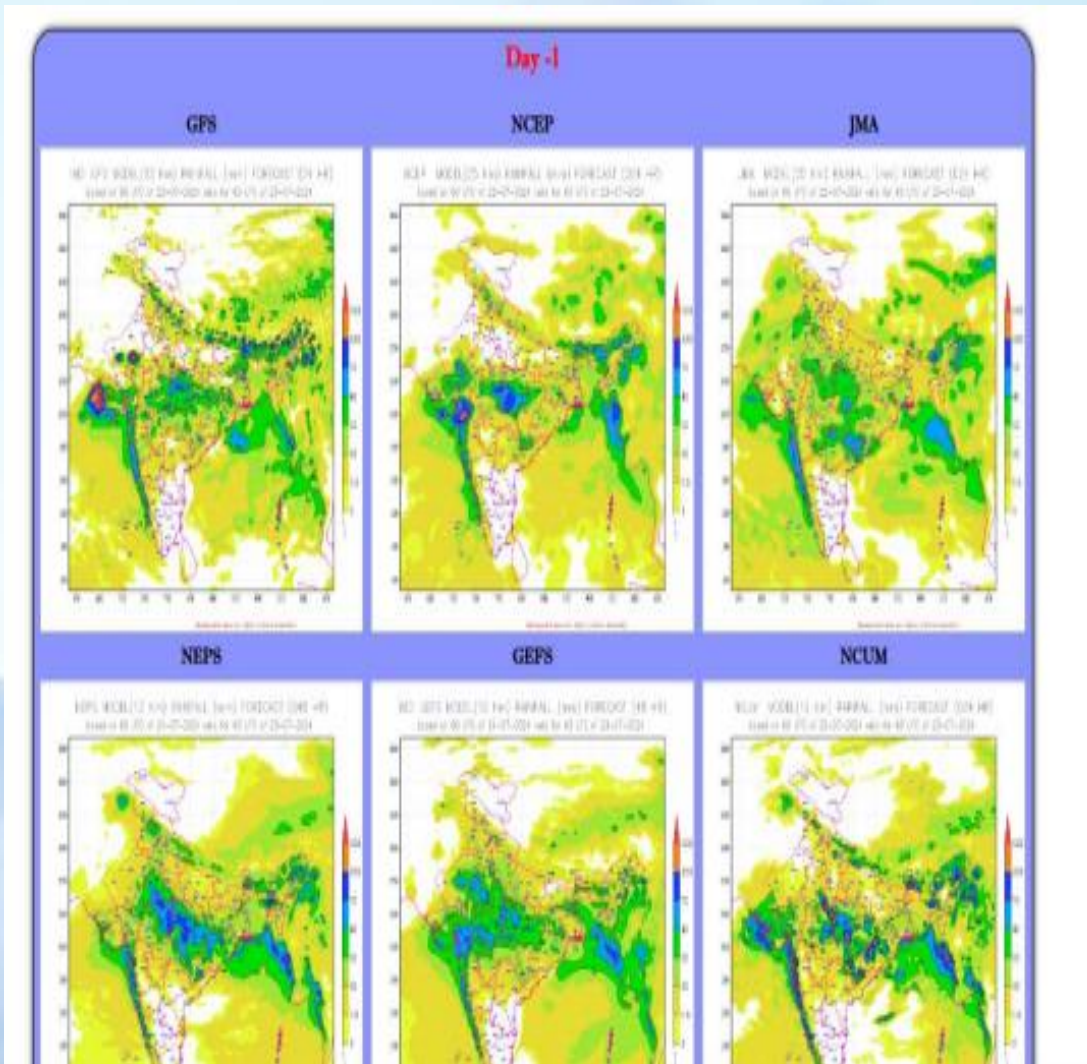


Upgradation of Forecast System-Objectives

- Upgradation and sustenance of Communication Systems for Data and Product transmission.
- Development of an advanced Operational Forecast System, Delivery System for Forecast and other services.
- Conduct of special campaign for improving Cyclone, Thunderstorm and Fog forecasting through Aircraft reconnaissance and provision of additional observations.
- Integrated Himalayan Meteorological Programme for Western & Central Himalayas.
- Capacity Building, Outreach, Planning and sustenance of specific process related observing systems over India.



Multi model forecast products



Forecast Bulletins



राष्ट्रीय मौसम पूर्वानुमान केन्द्र
भारत मौसम विज्ञान विभाग
पृथ्वी विज्ञान मंत्रालय



National Weather Forecasting Centre
India Meteorological Department
Ministry of Earth Sciences

Monday, July 22, 2024
Time of Issue: 1335 hours IST
(MID-DAY)

ALL INDIA WEATHER SUMMARY AND FORECAST BULLETIN

Significant Weather Features:

Weather Systems

- ✓ The **Well marked low pressure area** over interior Odisha & adjoining Chhattisgarh has weakened into a Low-Pressure Area over East Madhya Pradesh & adjoining Chhattisgarh.
- ✓ The Monsoon trough is active and lies south of its normal position. It is likely to move northwards during next 24 hours.
- ✓ The **shear zone** lies in lower & middle tropospheric levels along 21°N tilting southwards with height.
- ✓ The **off-shore trough** at mean sea level along South Gujarat-Kerala coasts.
- ✓ A fresh **Western Disturbance** seen as a trough in middle tropospheric levels roughly along Long. 65°E to the north of Lat. 30°N.

Forecast & Warnings: (Annexure II)

❖ West, Central, East and South Peninsular India

- ✓ Fairly widespread to widespread light to moderate rainfall accompanied with thunderstorm & lightning very likely over the region during next 5 days.
- ✓ **Isolated extremely heavy rainfall very likely over Gujarat State, Konkan & Goa, Madhya Maharashtra during 22nd-24th and West Madhya Pradesh on 22nd July.**
- ✓ **Very heavy rainfall very likely at isolated places over East Madhya Pradesh during 22nd-24th; Chhattisgarh, Vidarbha, Coastal Karnataka on 22nd; Konkan & Goa, Madhya Maharashtra, Gujarat State 25th & 26th; West Madhya Pradesh and Odisha on 23rd & 24th July.**
- ✓ **Heavy rainfall** very likely at isolated/some places over Coastal & South Interior Karnataka during 22nd-26th; Coastal Andhra Pradesh & Yanam, Telangana on 22nd; Odisha, Kerala & Mahe, North Interior Karnataka on 22nd, 25th & 26th; Jharkhand during 22nd-25th; Gangetic West Bengal during 22nd-24th; Madhya Pradesh on 25th & 26th; Chhattisgarh on 23rd & 24th July.
- ✓ **Strong surface winds (30-40 kmph)** very likely over south peninsular India during next 2 days.

❖ Northwest India

- ✓ Scattered to fairly widespread light to moderate rainfall **accompanied with thunderstorm & lightning** very likely over Himachal Pradesh, Uttarakhand, East Rajasthan, Haryana-Chandigarh-Delhi, Uttar Pradesh and isolated to scattered rainfall over Jammu-Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, West Rajasthan during next 5 days.
- ✓ **Isolated very heavy rainfall also likely over Uttarakhand on 22nd & 23rd; West Uttar Pradesh, Punjab, Haryana on 23rd and East Rajasthan on 23rd & 24th July.**
- ✓ Isolated **heavy rainfall** very likely over Himachal Pradesh, Uttarakhand, West Uttar Pradesh, East Rajasthan during 22nd-26th; Punjab & Haryana-Chandigarh during 22nd-24th; East Uttar Pradesh during 23rd- 26th July.
- ✓ **Hot & humid weather** is likely over West Rajasthan during next 2 days.

❖ Northeast India

- ✓ Fairly widespread to widespread light to moderate rainfall with **accompanied with thunderstorm, lightning** very likely over Northeast India during next 5 days.
- ✓ Isolated **heavy rainfall** very likely over Assam & Meghalaya during next 5 days; Arunachal Pradesh, Nagaland, Manipur during 22nd-24th July.

* Red colour warning does not mean "Red Alert", Red colour warning means "Take Action".
Forecast and Warning for any day is valid from 0830 hours IST of day till 0830 hours IST of next day.
For more details, kindly visit <https://mausam.imd.gov.in> or contact: 011-2434-4599
(Service to the Nation since 1875)



राष्ट्रीय मौसम पूर्वानुमान केन्द्र
भारत मौसम विज्ञान विभाग
पृथ्वी विज्ञान मंत्रालय



National Weather Forecasting Centre
India Meteorological Department
Ministry of Earth Sciences

Table-1

7 Days Rainfall Forecast								
S. No.	Subdivision	22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1	ANDAMAN & NICOBAR ISLANDS	SCT	FWS	WS	WS	WS	WS	WS
2	ARUNACHAL PRADESH	WS	FWS	FWS	SCT	SCT	FWS	FWS
3	ASSAM & MEGHALAYA	WS	WS	FWS	FWS	FWS	FWS	FWS
4	NAGALAND, MANIPUR, MIZORAM & TRIPURA	WS	WS	WS	FWS	FWS	FWS	FWS
5	SUB-HIMALAYAN WEST BENGAL & SIKKIM	WS	WS	FWS	FWS	FWS	FWS	WS
6	GANGETIC WEST BENGAL	WS	WS	WS	WS	WS	FWS	FWS
7	ODISHA	WS	WS	WS	WS	FWS	FWS	FWS
8	JHARKHAND	WS	WS	WS	WS	WS	FWS	FWS
9	BIHAR	SCT	SCT	SCT	SCT	SCT	SCT	SCT
10	EAST UTTAR PRADESH	SCT	FWS	FWS	FWS	SCT	SCT	SCT
11	WEST UTTAR PRADESH	SCT	FWS	FWS	FWS	FWS	FWS	SCT
12	UTTARAKHAND	WS	WS	WS	WS	WS	WS	WS
13	HARYANA CHANDIGARH & DELHI	FWS	FWS	FWS	SCT	FWS	SCT	SCT
14	PUNJAB	SCT	FWS	FWS	SCT	SCT	SCT	FWS
15	HIMACHAL PRADESH	FWS	FWS	FWS	FWS	WS	WS	WS
16	JAMMU & KASHMIR AND LADAKH	ISOL	SCT	SCT	SCT	SCT	SCT	ISOL
17	WEST RAJASTHAN	SCT	ISOL	SCT	SCT	SCT	SCT	SCT
18	EAST RAJASTHAN	SCT	FWS	FWS	FWS	FWS	FWS	FWS
19	WEST MADHYA PRADESH	WS	WS	WS	WS	WS	FWS	FWS
20	EAST MADHYA PRADESH	WS	WS	WS	WS	FWS	FWS	FWS
21	GUJARAT REGION	WS	WS	WS	WS	WS	WS	WS
22	SAURASHTRA & KUTCH	WS	WS	WS	WS	WS	WS	WS
23	KONKAN & GOA	WS	WS	WS	WS	WS	WS	WS
24	MADHYA MAHARASHTRA	WS	WS	FWS	FWS	FWS	FWS	FWS
25	MARATHAWADA	WS	FWS	SCT	SCT	SCT	SCT	SCT
26	VIDARBHA	WS	WS	FWS	FWS	FWS	FWS	FWS
27	CHHATTISGARH	WS	WS	FWS	FWS	FWS	FWS	FWS
28	COASTAL ANDHRA PRADESH & YANAM	SCT	SCT	SCT	SCT	SCT	SCT	SCT
29	TELANGANA	FWS	SCT	SCT	SCT	SCT	SCT	SCT
30	RAYALASEEMA	ISOL	ISOL	ISOL	ISOL	ISOL	ISOL	ISOL
31	TAMILNADU PUDUCHERRY & KARAIKAL	ISOL	ISOL	ISOL	ISOL	ISOL	ISOL	ISOL
32	COASTAL KARNATAKA	WS	WS	WS	WS	WS	WS	WS
33	NORTH INTERIOR KARNATAKA	WS	FWS	FWS	FWS	FWS	FWS	FWS
34	SOUTH INTERIOR KARNATAKA	FWS	SCT	SCT	SCT	SCT	SCT	SCT
35	KERALA & MAHE	FWS	FWS	FWS	WS	WS	WS	WS
36	LAKSHADWEEP	FWS	FWS	FWS	FWS	FWS	FWS	FWS

Legend	Category	% Stations
WS	Widespread/Most Places	76-100
FWS	Fairly Widespread/Many Places	51-75
SCT	Scattered/ A Few Places	26-50
ISOL	Isolated Places	1-25
DRY	No Rain	0

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All India Impact Based Weather Warning Bulletin



राष्ट्रीय मौसम पूर्वानुमान केंद्र
भारत मौसम विज्ञान विभाग
पृथ्वी विज्ञान मंत्रालय



National Weather Forecasting Centre
India Meteorological Department
Ministry of Earth Sciences

Monday, July 22, 2024
Time of Issue: 1330 hours IST
(MID-DAY)

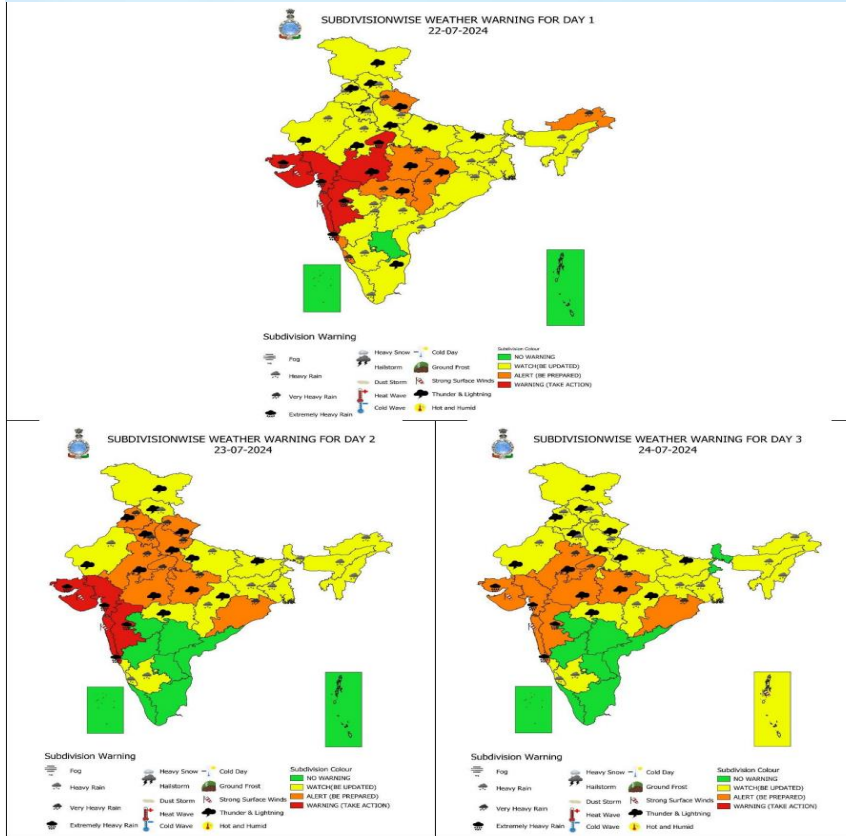
All India Impact Based Weather Warning Bulletin

22 July (Day 1):

- ❖ **Heavy to very heavy rainfall with extremely heavy falls (≥ 20 cm)** very likely at isolated places over East Madhya Pradesh, Konkan & Goa, Madhya Maharashtra, Gujarat state; **Heavy to very heavy rainfall (≥ 12 cm)** likely at isolated places over Uttarakhand, East Madhya Pradesh, Vidarbha, Chhattisgarh, Arunachal Pradesh, Coastal Karnataka; **Heavy rainfall (≥ 7 cm)** at isolated places over Himachal Pradesh, West Uttar Pradesh, Rajasthan, West Bengal & Sikkim, Jharkhand, Odisha, Nagaland, Manipur, Mizoram & Tripura, Marathwada, Kerala & Mahe, Coastal Andhra Pradesh & Yanam, Telangana and Interior Karnataka.
- ❖ **Thunderstorm accompanied with lightning** very likely at isolated places over Jammu-Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, Himachal Pradesh, Uttarakhand, Punjab, Haryana-Chandigarh-Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Vidarbha, Chhattisgarh, Bihar.
- ❖ **Squally weather with wind speed reaching 35 kmph to 45 kmph gusting to 55 kmph** likely to prevail over northeast and adjoining northwest Arabian sea, most parts of east central & many parts of west central Arabian sea, northern parts of southeast and southwest Arabian sea, Karnataka, north Kerala coast, gulf of Mannar, off Sri Lanka coasts, over many parts of south and most parts of central Bay of Bengal & north Bay of Bengal, North Andaman Sea. **Squally weather with wind speed reaching 45 kmph to 55 kmph gusting to 65 kmph** likely to prevail along and off Gujarat adjoining northeast Arabian sea, Maharashtra, Konkan, Goa coasts, along and off north Andhra Pradesh, Odisha coasts, most parts of westcentral & southern parts of north Bay of Bengal. **Squally winds with speed reaching 45 kmph to 55 kmph gusting to 65 kmph** likely to prevail over central Arabian sea & adjoining areas of southeast and southwest Arabian sea, along & off Somalia & Oman coasts.

23 July (Day 2):

- ❖ **Heavy to very heavy rainfall with extremely heavy falls (≥ 20 cm)** very likely at isolated places over Konkan & Goa, Madhya Maharashtra, Gujarat state; **Heavy to very heavy rainfall (≥ 12 cm)** likely at isolated places over Uttarakhand, West Uttar Pradesh, East Rajasthan, Madhya Pradesh, Odisha; **Heavy rainfall (≥ 7 cm)** at isolated places over Himachal Pradesh, Punjab, Haryana-Chandigarh, Uttar Pradesh, Chhattisgarh, West Bengal & Sikkim, Jharkhand, Bihar, Arunachal Pradesh, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Coastal Andhra Pradesh & Yanam, Rayalaseema, Coastal Karnataka and South Interior Karnataka.
- ❖ **Thunderstorm accompanied with lightning** very likely at isolated places Jammu-Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, Himachal Pradesh, Uttarakhand, Punjab, Haryana-Chandigarh-Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Vidarbha, Chhattisgarh, Bihar.
- ❖ **Squally weather with wind speed reaching 35 kmph to 45 kmph gusting to 55 kmph** likely to prevail over northeast and adjoining northwest Arabian sea, most parts of east central & many parts of west central Arabian sea, northern parts of southeast and southwest Arabian sea, Karnataka coast, gulf of Mannar, off Sri Lanka coasts, over many parts of south and most parts of central Bay of Bengal & north Bay of Bengal, North Andaman Sea. **Squally weather with wind speed reaching 45 kmph to 55 kmph gusting to 65 kmph** likely to prevail along and off Gujarat adjoining northeast Arabian sea, Maharashtra, Konkan, Goa coasts, along and off north Andhra Pradesh, off Odisha coasts, most parts of central & many parts of north Bay of Bengal. **Squally winds with speed reaching 45 kmph to 55 kmph gusting to 65 kmph** likely to prevail over central Arabian sea & adjoining areas of southeast and southwest Arabian sea, southern parts of north Arabian Sea, along & off Somalia & Oman coasts.



IMPACT & ACTION SUGGESTED due to

- ✓ Isolated extremely heavy rainfall very likely over Gujarat State, Konkan & Goa, Madhya Maharashtra during 22nd-24th and West Madhya Pradesh on 22nd July.
- ✓ Very heavy rainfall very likely at isolated places over East Madhya Pradesh during 22nd-24th; Chhattisgarh, Vidarbha, Coastal Karnataka on 22nd; West Madhya Pradesh, East Rajasthan and Odisha on 23rd & 24th; Uttarakhand on 22nd & 23rd; West Uttar Pradesh, Punjab, Haryana on 23rd; Konkan & Goa, Madhya Maharashtra, Gujarat State 25th & 26th July.

- Localized Flooding of roads, water logging in low lying areas and closure of underpasses mainly in urban areas of the above region.
- Occasional reduction in visibility due to heavy rainfall.
- Disruption of traffic in major cities due to water logging in roads leading to increased travel time.
- Minor damage to kutcha roads.
- Possibilities of damage to vulnerable structure.
- Localized Landslides/Mudslides/landslips/mud slips/land sinks/mud sinks.
- Damage to horticulture and standing crops in some areas due to inundation.
- It may lead to riverine flooding in some river catchments (for riverine flooding please visit Web page of CWC)

Action Suggested

- Check for traffic congestion on your route before leaving for your destination.
- Follow any traffic advisories that are issued in this regard.
- Avoid going to areas that face the water logging problems often.

Agromet advisories for Heavy Rainfall likely over various parts of the country

- Make provision for draining out excess water from crop fields to avoid water stagnation in North Eastern States, Odisha, Himachal Pradesh, Uttarakhand, West Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Vidarbha, Konkan & Goa, Ghat areas of Madhya Maharashtra, Gujarat State, Kerala, Coastal Karnataka and Telangana.
- Postpone transplanting of rice in south Gujarat and Chhattisgarh; rice, early cauliflower, tomato, chilli and brinjal in Madhya Pradesh.
- Postpone sowing of soybean, groundnut, sesame, green gram, black gram and ginger in Madhya Pradesh and soybean, red gram, green gram, black gram, kharif maize and finger millet in south Chhattisgarh.
- Provide mechanical support to horticultural crops & staking to vegetables.

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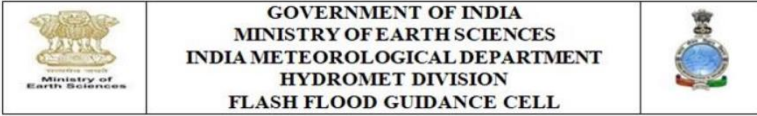
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भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



Flash Flood Guidance



GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
INDIA METEOROLOGICAL DEPARTMENT
HYDROMET DIVISION
FLASH FLOOD GUIDANCE CELL

National Flash Flood Guidance Bulletin

DATED: 18-07-2024 TIME OF ISSUE: 0645 IST VALID TILL: 1130 IST

From: India Meteorological Department, New Delhi (Email Id: sasiaffg.imd@gmail.com)

To: RMC Chennai; RMC Mumbai; MC Bangalore, MC Thiruvananthapuram, MC Goa and all concerned FMO's.

Area of Concern (AoC): Few watersheds & neighborhoods of Coastal Karnataka, Kerala & Mahe, SI Karnataka and Konkan & Goa Met subdivisions.

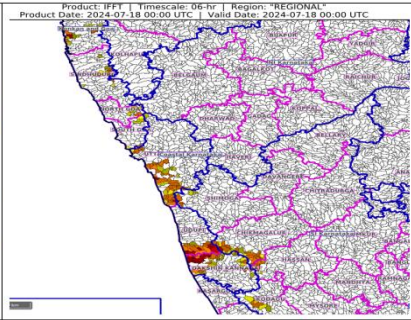
Diagnostic Guidance: Based on Merged Mean Areal Precipitation at 0530 IST, recorded rainfall is up to **80 mm** in last 6 hours and up to **240 mm** in last 24 hours over few watersheds and neighborhood of AoC. Land Surface Model shows few nearly saturated watersheds up to **95 to 100 %** over AoC and up to 50% soil saturation over remaining parts of the country.

Prognostic Guidance: Dynamic Global (GFS) & Mesoscale Model (WRF & NCUM) forecasts extremely heavy rainfall up to **230 mm** in next 24 hours.

Observed Flash Flood Threat (IFFT) till 0530 IST of 18-07-2024 :

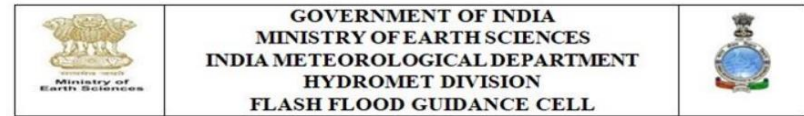
Low to Moderate flash flood threat observed over few watersheds & neighbourhoods of following Met Sub-divisions during last 6 hours.

Coastal Karnataka - Dakshin Kannada, Udupi and Uttar Kannada districts.
SI Karnataka - Chikmagalur, Hassan, Kodagu and Shimoga districts.
Konkan & Goa - North Goa, South Goa, Ratnagiri and Sindhudurg districts.



Disclaimer: This is only a guidance bulletin and not a warning for flash floods.

Contact: WMO Regional Centre (SASIAFFGS),
Hydromet Division, Flash Flood Guidance Cell
Phone: 011-43824359/011-43824410
Email: sasiaffg.imd@gmail.com



GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
INDIA METEOROLOGICAL DEPARTMENT
HYDROMET DIVISION
FLASH FLOOD GUIDANCE CELL

Persistent Flash Flood Threat (PFFT) till 1130 IST of 18-07-2024 :

Low to Moderate flash flood threat likely over few watersheds & neighbourhoods of following Met Sub-divisions during next 6 hours.

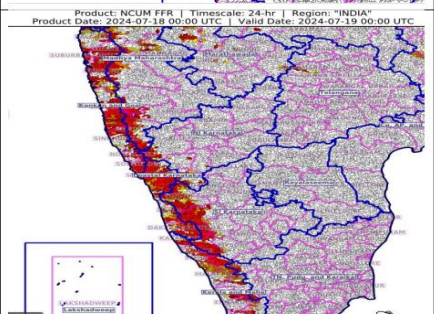
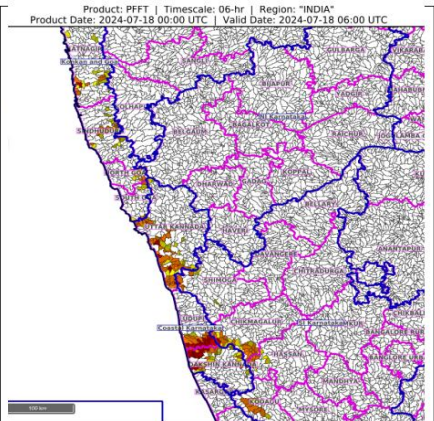
Coastal Karnataka - Dakshin Kannada, Udupi and Uttar Kannada districts.
SI Karnataka - Chikmagalur, Hassan, Kodagu and Shimoga districts.
Konkan & Goa - North Goa, South Goa, Ratnagiri and Sindhudurg districts.

Surface runoff/ Inundation may occur at some fully saturated soils & low-lying areas over AoC as shown in map due to expected rainfall occurrence in next 6 hours.

24 hours Outlook for the Flash Flood Risk (FFR) till 0530 IST of 19-07-2024 :

Low to Moderate flash flood risk likely over few watersheds & neighbourhoods of **Coastal Karnataka adjoining SI Karnataka, Kerala & Mahe** and **Konkan & Goa** Met Sub-divisions during next 24 hours.

Surface runoff/ Inundation may occur at some fully saturated soils & low-lying areas over AoC as shown in map due to expected rainfall occurrence in next 24 hours.



Note: Next Bulletin will be issued based on 1130 IST of 18-07-2024 .

Disclaimer: This is only a guidance bulletin and not a warning for flash floods.

Contact: WMO Regional Centre (SASIAFFGS),
Hydromet Division, Flash Flood Guidance Cell
Phone: 011-43824359/011-43824410
Email: sasiaffg.imd@gmail.com



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



Gramin Krishi Mausam Sewa (Agrometeorological Advisory Services)

- **GKMS Background**
- **Objective**
- **Agromet advisory services**
- **Network**
- **Source of Observations**
- **Agromet products**
- **R&D collaborations**
- **Block level forecast & advisory dissemination for Karnataka**



GKMS

- **Growing uncertainties of weather and climate pose a major threat to food productivity and security of the country and thus, warrant for farmers' empowerment of informed decisions in agricultural risk management.**
- **However, adverse effects on crops can often be mitigated.**
- **Risk in agricultural operations can be minimized by the provision of weather information properly interpreted for their agricultural significance, containing advisories for farm operations, and disseminated well in advance of the impending weather.**
- **IMD, MoES in collaboration with ICAR and SAUs and other institutions is rendering weather forecast based District/Block level Agrometeorological Advisory Services (AAS) for the benefits of farmers in the country under the scheme "Gramin Krishi Mausam Sewa (GKMS)"**

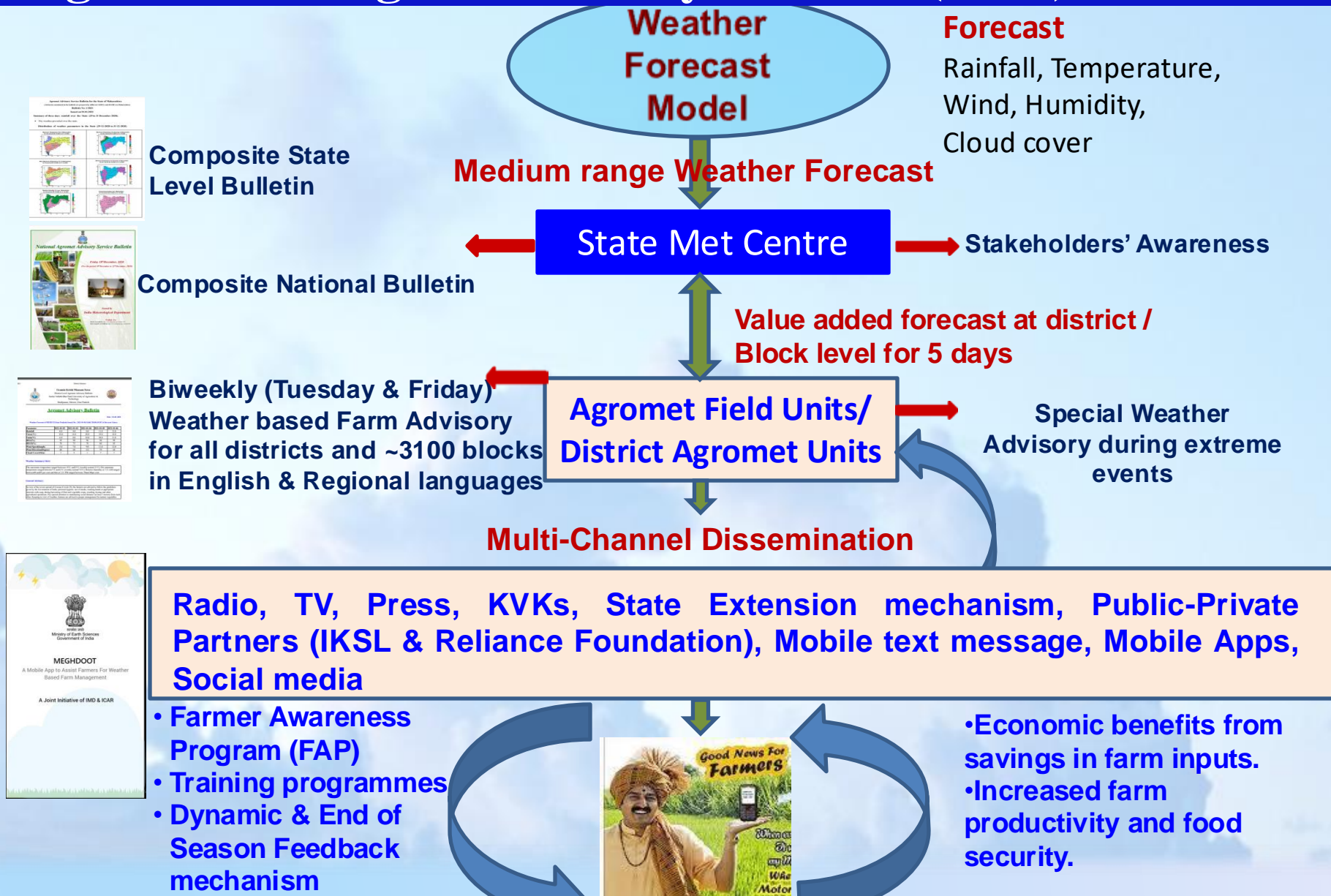


Objectives of GKMS

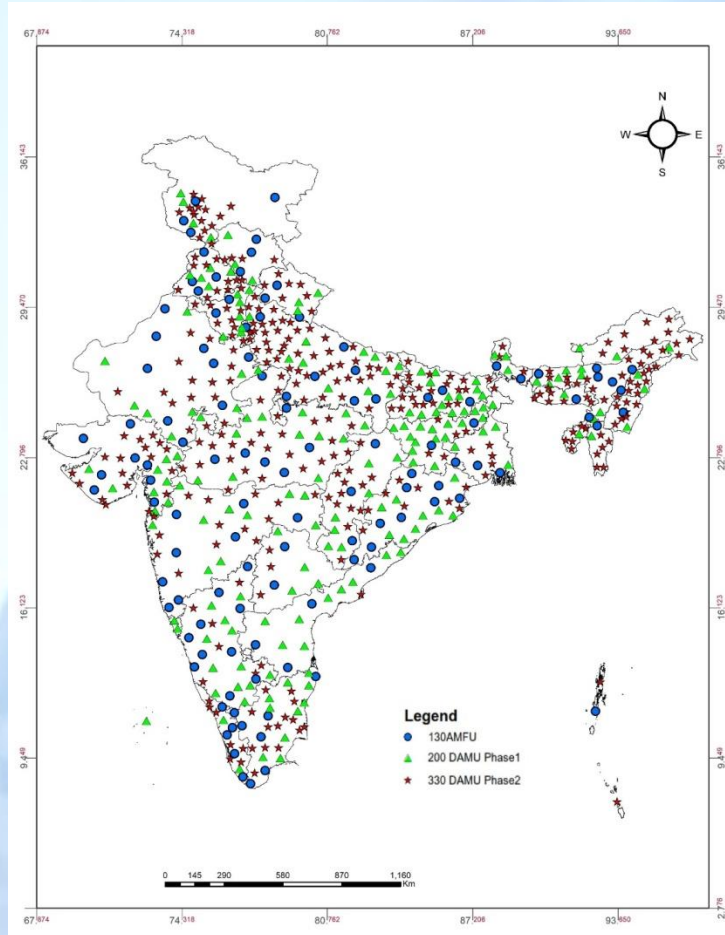
- To continuously improve the existing District level Agromet Advisory Services (AAS) and extend them further to Block level.
- To establish District Agro-Met Units (DAMUs) in close cooperation with ICAR at Krishi Vigyan Kendra's (KVKs).
- To expand the existing channels of communication of weather based agro-met advisories to the farmers so as to expand the outreach to cover all farmer households in the country.
- Promote Research & Excellence in Agro-meteorology in support of targeted improvement to the operational services.



Agrometeorological Advisory Services (AAS) to Farmers



GKMS network



- ❖ Existing 130 AMFUs Network
- ❖ Services rendered for ~700 district and ~3100 blocks.

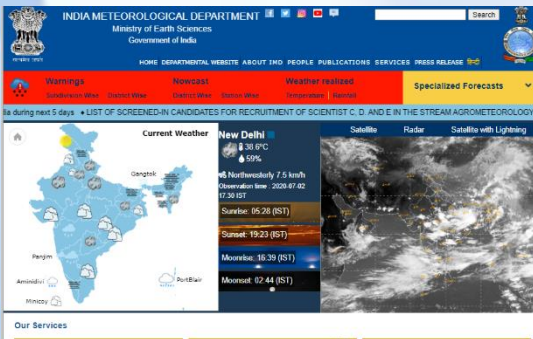


Source of Observation

- Weather Observation from established observatory of IMD
- State observatory network data (If available)
- Long term weather data to compute normal and probability of extreme climatic events
- Soil moisture observation using Augur method
- Crop, P&D related data from State agencies
- AWS at DAMUs

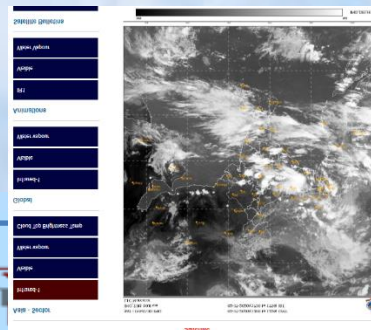
IMD Website

<https://mausam.imd.gov.in/>



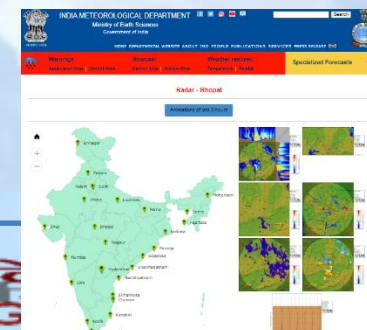
Satellite Information

https://mausam.imd.gov.in/imd_latest/contents/satelite.php



RADAR information

https://mausam.imd.gov.in/imd_latest/contents/index_radar.php



Agromet Product

<http://imdagrmet.gov.in/imdproject/AGIndex.php>



भारत
INDIA

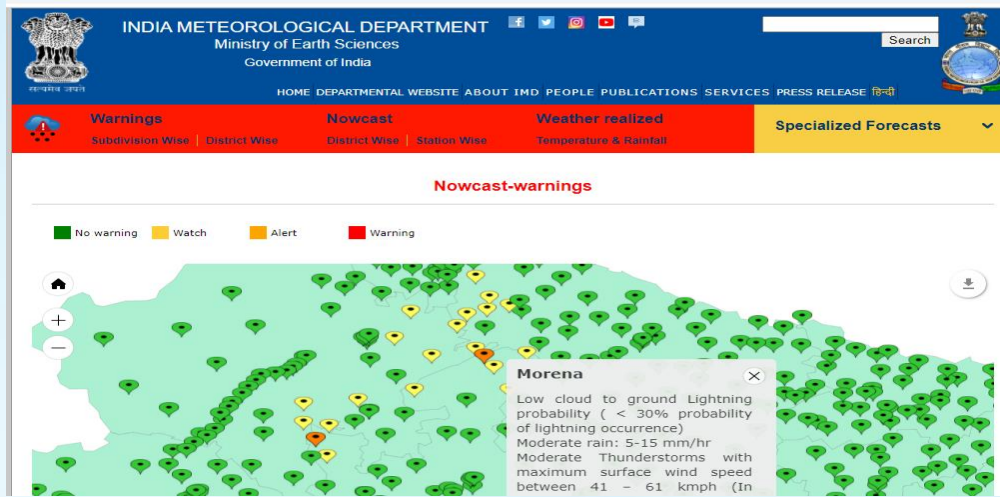
DEPARTMENT



Weather Forecast spectrum for Agriculture

- ❑ Nowcast for 3 hours (**Location specific**)
- ❑ Medium Range up to 10 days (**Block/City/District/ Met Subdiv.**) with probability
- ❑ Extended range for 4 weeks (**Met Sub-div. / State / Homogeneous regions**)
- ❑ Long range for season (**Homogeneous regions / country**)
- ❑ Early warning system on extreme events: Cyclone / Hailstorm / Thunderstorm / Cold & Heat wave / Drought.





Nowcast

Thunderstorm, Hailstorm Squall

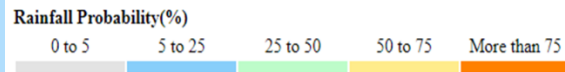
Medium range Forecast
NWP model: T-1534
Res: 12.5 km

Cuttack : Weather forecast of next 5 days issued on 04-03-2022

Date	05-03-2022	06-03-2022	07-03-2022	08-03-2022	09-03-2022	Total / Average
Rainfall (mm)	0.0	0.0	0.0	0.0	0.0	0
Max. Temp. (°C)	36.0	35.0	36.0	36.0	37.0	36
Min. Temp. (°C)	22.0	22.0	21.0	21.0	22.0	21.6
Cloud Cover (octa)	5	6	3	1	0	---
RH Max. (%)	77	64	80	71	68	72
RH Min. (%)	22	16	17	17	16	17.6
Windspeed(kmph)	6.0	3.0	3.0	4.0	5.0	4.2
Wind Dir.(Deg)	242	286	222	264	215	---

ANTHIKKAD : Weather forecast of next 5 days issued on 12-06-2019

DAY	Rainfall > 2.5mm	Rainfall > 15.6mm	Rainfall > 65.5mm	Rainfall >110.0mm	Rainfall > 195.0mm
1	Orange	Orange	Blue		
2	Orange	Orange	Blue		
3	Orange	Orange	Blue		
4	Orange	Yellow			
5	Orange	Yellow			



**Probabilistic block level
medium range forecast**



Inputs for Preparation of Agromet Advisories

Past Weather

Agro-met Advisory Service bulletin for the District

South 24 Parganas
(Period to 31st July to 4th August, 2019)
Issued jointly by GKMS, Kakdwip, BCKV and IMD
From RRS, Kakdwip, Bidhan Chandra Krishi Viswavidyalaya
Email: aaskakdwip@rediffmail.com, shibani.bckv@gmail.com

Bulletin No.:60 Date: 30th July, 2019

Weather for last four days (26th July to 29th July, 2019)

	26.07.19	27.07.19	28.07.19	29.07.19
Rainfall (mm)	0.0	48.0	0.0	17.0
Maximum Temperature (°C)	30.0	30.0	32.0	32.5
34.5 Minimum Temperature (°C)	24.0	23.5	25.0	24.0
Relative Humidity (%)	89	92	88	95
Wind Speed (Km ph)	1	1	1	1

Quantitative medium range weather Forecast for next Five days

Weather forecast for next five days 31st July to 4th August, 2019)

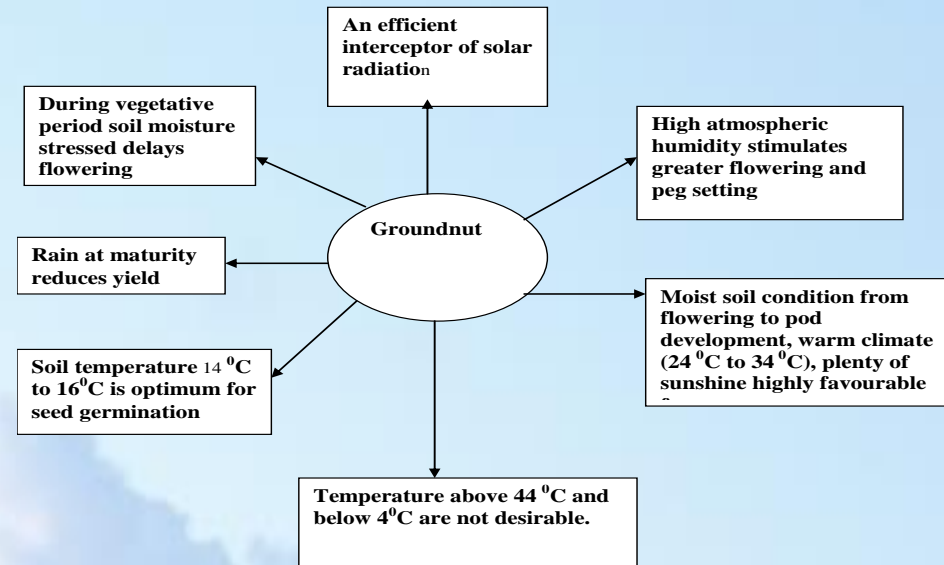
- Light rainfall is predicted in next five days .
- Sky will mainly cloudy in the next five days.
- Wind speed will be 13.7-26.5 km/hr and the predominant wind direction will be Southerly to Westerly.
- Maximum temperature is expected to be around 33.0°C-36.0°C and minimum temperature is likely to be around 27.0°C- 29.0°C.
- Maximum and minimum relative humidity will be in the range of 75%-80% and 53% -61%.

Diagnose weather related stresses

Moisture, weather based pest & disease occurrence, excessive Heating & dessication, cold injury and frost, soil born biotic stress, soil health & nutrient related issues, extreme weather related issues.


AND ADVISE MITIGATION

Sensitivity of Crop to weather



Crop stage & state and advisories

Weather based Agro-Advisories

Crop	Stage	Disease pest	Advisory
Aman wet seeded paddy	seedling		--Moderate rainfall is received so in seed bed where seedlings are not ready still now use rain water for irrigation and arrange bunding for restricting run off of rain water --Before uprooting the seedlings from seed bed apply Carbofuran@3g/mt ² for preventing stem borer
Aman wet seeded paddy	Transplanting		-- Prepare area with low land for transplanting by ploughing at a depth of 12-15 cm and puddle the field --Apply 7quintal organic manure per bigha in main field --Check the bund around the field --In low land area where seedlings are ready start transplanting
Betel vine	Green leaf		--Keep the drainage channel clean --No irrigation required for next five days
Tomato, chilli, brinjal			--Complete sowing of tomato, chilli, brinjal seeds, in upland area for transplanting at the end of August on comparatively upland area with proper drainage channel. --Select some hybrid variety of tomato for sowing like Avinash-2, 448 etc.
Poultry	At all stages	Fungal attack due to wet weather	--Change the litter --Mix lime and old news paper in the litter --Apply proper warming in case of new born chicks



Agromet Bulletin-Sample


Azadi Ka Amrit Mahotsva
Agromet Advisory Service Bulletin for Koppal District
 ICAR-Krishi Vigyan Kendra Gangavathi (Koppal)
 District Agro-Meteorological Unit (DAMU)
 (Period 05 March to 09 March 2022)
 (Issued jointly by DAMU, University of Agricultural Sciences, Raichur and India Meteorological Department)

Date: 04-03-2022

Significant past weather condition prevailed during last week

Weather Parameters	02-03-2022	03-03-2022	04-03-2022
Rainfall (mm)	0	0	0
Maximum Temperature (°C)	35	35	34
Minimum Temperature (°C)	16.5	15.5	16.5
Max. Relative Humidity (%)	57	61	61
Min. Relative Humidity (%)	24	25	25
Wind speed (kmph)	0	0	2
Wind direction (deg)	0	0	50
Total cloud cover (Octa)	0	0	0

Weather forecast issued by the India Meteorological Department for Koppal District for the coming five days

Weather Parameters	DAY-1 (05.03.2022)	DAY-2 (06.03.2022)	DAY-3 (07.03.2022)	DAY-4 (08.03.2022)	DAY-5 (09.03.2022)
Rainfall (mm)	0	0	0	0	0
Maximum Temperature (°C)	34	34	35	34	34
Minimum Temperature (°C)	16	17	18	18	19
Max. Relative Humidity (%)	61	61	62	64	64
Min. Relative Humidity (%)	35	35	36	37	37
Wind speed (kmph)	2	2	2	3	2
Wind direction (deg)	108	101	108	112	144
Total cloud cover (Octa)	2	2	2	2	2

Summary of Weather Forecast for Next Five Days

As per the forecast issued by the India Meteorological Department, Bangalore for Koppal district, the sky will be slightly clear and there is no chance of occurrence of rainfall for next five days. The maximum temperature will be around 34-35 °C and minimum temperature will be around 16-19 °C. In case of maximum relative humidity will be 61-64 per cent and minimum relative humidity will be 35-37 per cent. The wind speed will be around 2.0-3.0 kmph.

As per ERFs products, Above normal rainfall may occur in Koppal district for first (04 March to 10 March) and second week, likely to receive below normal rainfall 11 March to 17 March 2022.

Farmers are requested to maintain social distance in the field activities especially at the time of weeding and harvesting. Cover the nose and mouth with mask and wash your hands with soap after completion of work. Please join hands to reduce the spread of Corona virus.


Azadi Ka Amrit Mahotsva
ಕೊಪ್ಪಳ ಜಿಲ್ಲೆಯ ಕೃಷಿ ಹವಾಮಾನ ಸಲಹಾ ಸೂಚಕ
 ಐ.ಸಿ.ಎ.ಆರ್. ಕೃಷಿ ವಿಜ್ಞಾನ ಕೇಂದ್ರ ಗಂಗಾವತಿ (ಕೊಪ್ಪಳ)
 ಜಿಲ್ಲಾ ಕೃಷಿ ಹವಾಮಾನ ಘಟಕ (ಡಿ.ಎಂ.ಯು)
 (ದಿನಾಂಕ 05 ಮಾರ್ಚ್ ರಿಂದ ಮಾರ್ಚ್ 09 2022)
 (ಕೃಷಿ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ರಾಯಚೂರು ಹಾಗೂ ಭಾರತೀಯ ಹವಾಮಾನ ಇಲಾಖೆ ಇವುಗಳ ಜಂಟಿ ಪ್ರಸಾರ)

ದಿನಾಂಕ: 04-03-2022

ಹಿಂದಿನ ವಾರದ ಹವಾಮಾನ ಮಾಹಿತಿ

ಹವಾಮಾನ ಖರೀದಾಂಶಗಳು	02-03-2022	03-03-2022	04-03-2022
ಮಳೆಯ ಪ್ರಮಾಣ (ಮಿ. ಮಿ.)	0	0	0
ಗರಿಷ್ಠ ಉಷ್ಣಾಂಶ (°ಸೆ)	35	35	34
ಕನಿಷ್ಠ ಉಷ್ಣಾಂಶ (°ಸೆ)	16.5	15.5	16.5
ಗರಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ (%)	57	61	61
ಕನಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ (%)	24	25	25
ಗಾಳಿಯ ವೇಗ (ಕಿ.ಮೀ./ಘಂಟೆಗೆ)	0	0	2
ಗಾಳಿಯ ದಿಕ್ಕು	0	0	50
ಮೊಂಡದ ಪ್ರಮಾಣ (ಆಕ್ಟಾ)	0	0	0

ಮುಂದಿನ ಐದು ದಿನಗಳ ಕೊಪ್ಪಳ ಜಿಲ್ಲೆಯ ಹವಾಮಾನ ಮುನ್ಸೂಚನೆ

ಹವಾಮಾನ ಖರೀದಾಂಶಗಳು	ದಿನ-1 (05.03.2022)	ದಿನ-2 (06.03.2022)	ದಿನ-3 (07.03.2022)	ದಿನ-4 (08.03.2022)	ದಿನ-5 (09.03.2022)
ಮಳೆಯ ಪ್ರಮಾಣ (ಮಿ. ಮಿ.)	0	0	0	0	0
ಗರಿಷ್ಠ ಉಷ್ಣಾಂಶ (°ಸೆ)	34	34	35	34	34
ಕನಿಷ್ಠ ಉಷ್ಣಾಂಶ (°ಸೆ)	16	17	18	18	19
ಗರಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ (%)	61	61	62	64	64
ಕನಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ (%)	35	35	36	37	37
ಗಾಳಿಯ ವೇಗ (ಕಿ.ಮೀ./ಘಂಟೆಗೆ)	2	2	2	3	2
ಗಾಳಿಯ ದಿಕ್ಕು	108	101	108	112	144
ಮೊಂಡದ ಪ್ರಮಾಣ (ಆಕ್ಟಾ)	2	2	2	2	2

ಹವಾಮಾನ ಮುನ್ಸೂಚನೆ

ಭಾರತೀಯ ಹವಾಮಾನ ಇಲಾಖೆ, ಬೆಂಗಳೂರು ಮುನ್ಸೂಚನೆಯಂತೆ ಕೊಪ್ಪಳ ಜಿಲ್ಲೆಯ ಮುಂದಿನ ಐದು ದಿನಗಳಲ್ಲಿ ಮಳೆಯಾಗುವ ಸಾಧ್ಯತೆ ಇಲ್ಲ. ಗರಿಷ್ಠ ಉಷ್ಣಾಂಶ 34-35°ಸೆ ಮತ್ತು ಕನಿಷ್ಠ ಉಷ್ಣಾಂಶ 16-19°ಸೆ ಇರುವ ಸಾಧ್ಯತೆ ಇದೆ. ಅದೇ ರೀತಿ ಗರಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ 61-64% ಮತ್ತು ಕನಿಷ್ಠ ಆದ್ರತೆಯ ಪ್ರಮಾಣ 35-37% ಇರುವ ಸಾಧ್ಯತೆ ಇದೆ. ಗಾಳಿಯ ವೇಗ 2.0-3.0 ಕಿ.ಮೀ. ಪ್ರತಿ ಘಂಟೆಗೆ ಇರುವ ಸಾಧ್ಯತೆ ಇದೆ.

ವಿಸ್ತೃತ ಶ್ರೇಣಿಯ ಮುನ್ಸೂಚನೆ ವ್ಯವಸ್ಥೆ ಪ್ರಕಾರ ಕೊಪ್ಪಳ ಜಿಲ್ಲೆಯಲ್ಲಿ ಮೊದಲನೇ ವಾರ (04 ಮಾರ್ಚ್ -10 ಮಾರ್ಚ್ 2022) ವಾಡಿಕೆಗಿಂತ ಹೆಚ್ಚಿನ ಮಳೆಯಾಗಬಹುದು. ಮತ್ತು ಎರಡನೇ ವಾರದಲ್ಲಿ (11 ನೇ ಮಾರ್ಚ್ - 17 ಮಾರ್ಚ್ 2022) ವಾಡಿಕೆಗಿಂತ ಅಡಿಮೆ ಮಳೆಯಾಗಬಹುದು.

ಕೃಷಕರು ಹೊಲದಲ್ಲಿ ಕೃಷಿ ಚಟುವಟಿಕೆಗಳನ್ನು ಮಾಡುವಾಗ, ವಿಶೇಷವಾಗಿ ಕೆಳ ಮತ್ತು ಕೊಯ್ಲು ಮಾಡುವ ಸಮಯದಲ್ಲಿ ಸಾಮಾನ್ಯ ಅಂತರವನ್ನು ಕಾಪಾಡಿಕೊಳ್ಳಬೇಕು. ಮೂರು ಮತ್ತು ಬಾರಿಯನ್ನು ಮುಖ ಗವಚದಿಂದ ಮುಚ್ಚಿ ಮತ್ತು ಕೆಲಸ ಮುಗಿದ ತಕ್ಷಣ ಕೈಗಳನ್ನು ಸಾಬೂನಿನಿಂದ ತೊಳೆಯಬೇಕು. ಕೊರನಾ ವೈರಸ್ ಹರಡುವುದನ್ನು ತಡೆಗಟ್ಟಲು ದಯವಿಟ್ಟು ಎಲ್ಲರೂ ಕೈ ಜೋಡಿಸಬೇಕು.



AAS Bulletin



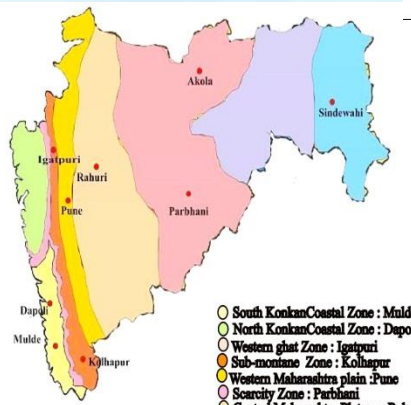
Agromet Advisory Bulletin for the State of Maharashtra
Bulletin No. 86/2014
Issued on Tuesday
24.6.2014 to 26.6.2014
Part 1: Rainfall and forecast weather

Summary of past four days over the State (23rd to 26th June 2014, Morning):
Rainfall occurred at a few places over Konkan and at isolated places over rest of the State.

Chief amounts of rainfall in cm:

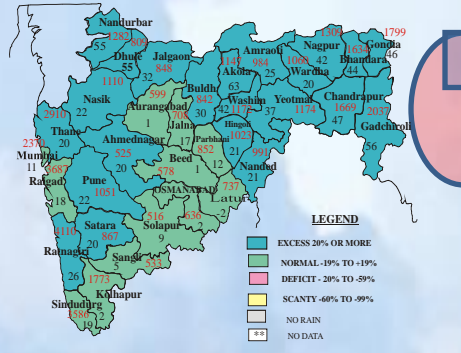
Date	Rainfall	Maharashtra	Maharashtra	Maharashtra
23-6-14	Chilgaon 5, Pan 7, Sangamnerwade, Narwartha & Chapla, Lonje 5 each, Chapla, Chintga 3 each, Solapur, Lonje 2 each, Dhule 1, Chapla 3, Khatga, Lonje, Chintga 3, Vaidharwad 1	Sangamner 14, Mhadgaon 4, Panhala 5, Nohadgaon, Margaon 5 each, Jalgaon, Kolhapur, Mangarvli 2 each, Dhule 1	Ahmednagar, Chitga 1, Orwad, Jalgaon, Bhatga 2 each, Parbhani, Jalga, Bhat, Parbhani 2 each	Bhamburda, Mantra 1 each, Bhandara, Wadga 2 each, Dargaajga, Srasga 2 each, Solapur 1, Sangam 1, Gondga 2, Dhule 1
24-6-14				
25-6-14				
26-6-14				

Distribution of weather parameters in the State (18.6.14 to 22.6.14):



State Level Bulletin

1/6/13 to 30/9/13



District & Block Level Bulletin

महाराष्ट्र पुराने पुराने विभाग
पुराने विभागमधिल विभाग, पुराने विभागमधिल विभाग, पुराने विभागमधिल विभाग

विभाग प्रमुख - डॉ. एस. बी. खखडे

संयोजक - डॉ. एम. डी. खखडे

दूरध्वनी क्रमांक - २५५२८००१

संयोजक अणुवायु विभाग

संयोजक अणुवायु विभाग

संयोजक अणुवायु विभाग

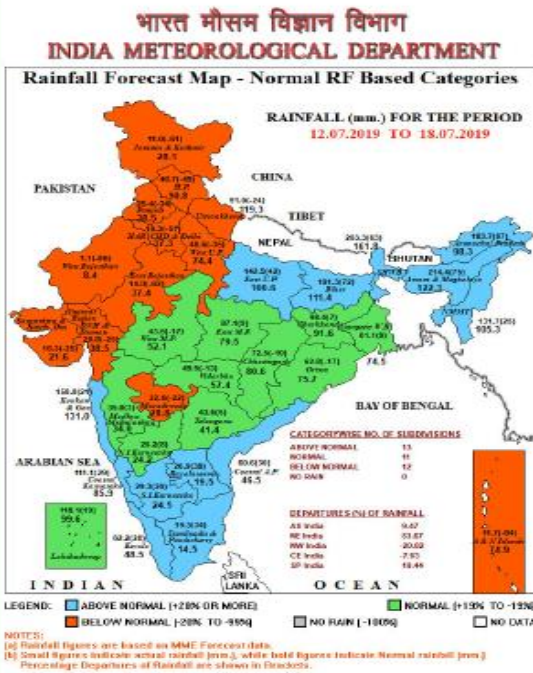
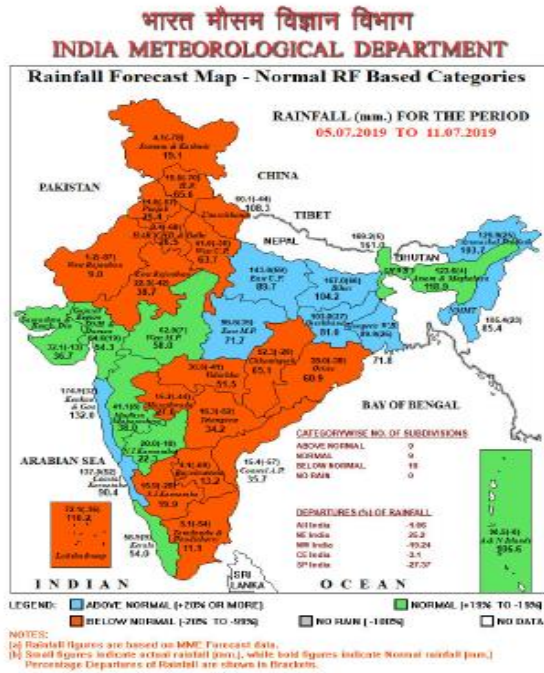
संयोजक अणुवायु विभाग



National Agromet Advisory Service Bulletin based on Extended range weather forecast (ERF)

Extended Range Forecast System

Rainfall forecast maps for the next 2 weeks (IC – 03 July)
(5th July to 18th July 2019)



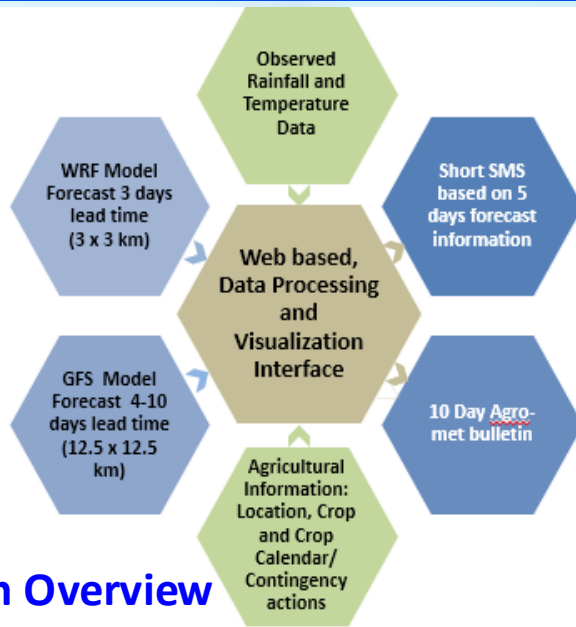
National Agromet Advisory Service Bulletin
Based on
Extended Range Weather Forecast (ERFS)

Validity: 05 to 18 July 2019
Date of issue: 05 July 2019

Issued by
Indian Council of Agricultural Research (ICAR)
All India Coordinated Research Project on Agricultural Meteorology (AICRPAM),
Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad
&
Earth System Science Organization
India Meteorological Department

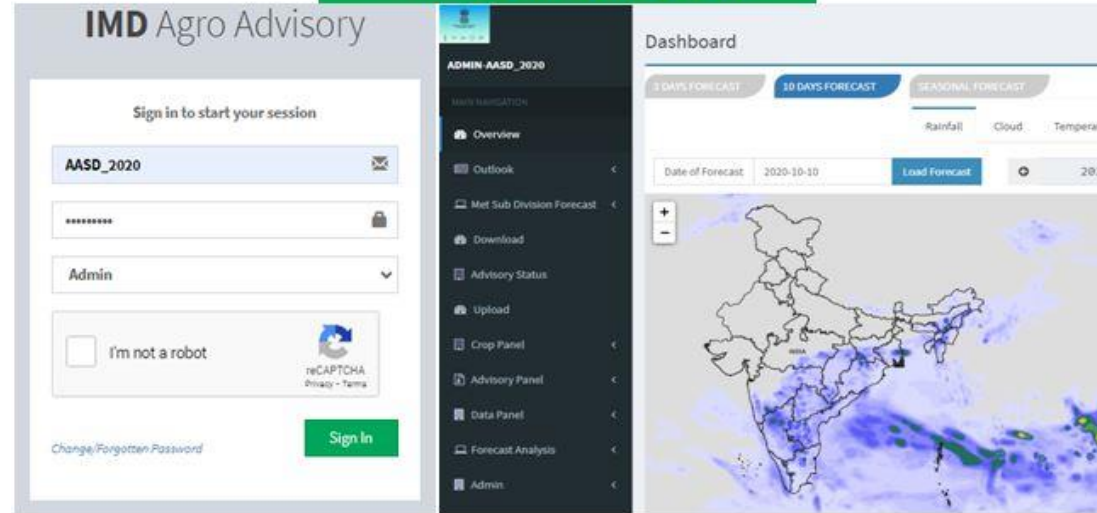


Agromet Decision Support System (<http://agromet.imd.gov.in>)



System Overview

IMD Agromet -DSS
URL: agromet.imd.gov.in



Modules available in Agromet-DSS

Location Specific Observation Data

This module displays a table of observation data for various locations, with columns for location name and multiple data points.

Dynamic Crop Calendar & Crop Contingency Plan

This module provides a detailed interface for managing crop calendars and contingency plans, including various input fields and dropdown menus.

Expert Intervention in Forecasts (Value Addition)

This module allows for expert intervention in forecasts, featuring a grid of input fields for data entry.

Automatic Weather based advisory Preparation

This module automates the preparation of weather-based advisories, with fields for crop selection and advisory type.

Real time Forecast Validation

This module provides a real-time forecast validation interface, showing a bar chart comparing observed data with forecast data over time.

Automatic Multi-mode Dissemination

This module handles the automatic dissemination of advisories through multiple communication channels.



Agromet Products

❖ In Use

- Spatial distribution of weather parameters (Daily, Weekly, Fortnightly, Monthly, Seasonal)
- Soil Moisture maps
- Crop weather calendar
- Pest weather calendar

Weekly products:

- SPI & SPEI, both realized and forecasted
- Normalized Differential vegetation Index
- Vegetation Condition Index
- Temperature Condition Index
- Vegetation Health Index

❖ In pilot mode

- Reference evapotranspiration (daily)
- Insolation on daily scale
- Evaporation (Daily, Weekly)
- Soil Temperatures at different depths (Daily, Weekly)



Development of Forewarning model for Pest and Disease

Based on
 Min & Max
 Temperature ,
 Relative humidity,
 Rainfall, Cloud ,
 Soil moisture, Wind
 Speed,
Forewarning
 models.
 & Pest weather
 calendars prepared
 by using these
 parameters, act as
reference tool for
 agromet advisory.

PEST WEATHER CALENDAR

STATE:KERALA CROP:RICE SEASON : KHARIF
 STATION:PATTAMBI PEST:GALL MIDGE

Weather warnings	Max. temp. 0C	>33.3°C(36 wk)									
	Min. temp. 0C										
	Morning RH (%)										
	Afternoon RH (%)	>71.0%(36 wk)									
	Sunshine hours	>7.4hour(36 wk)									
	Total Rainfall (mm)										
Weekly normal weather	Rainfall(mm) total	37.9	33.8	41.5	65.7	47.2	55.2	78.1	61.7	53	
	Max. temp. °C	30.1	30.5	30.6	30.5	30.8	31.2	31.5	31.4	31.9	
	Min. temp. °C	22.8	22.9	22.9	22.9	22.9	22.9	22.9	22.8	22.7	
	Sunshine hours	6.3	6.8	6.3	6.3	6.0	6.3	5.7	6.2	6.7	
	Morning RH (%)	94	94	94	94	95	95	95	94	94	
	Afternoon RH (%)	70	67	70	67	69	68	68	67	64	
Mean dates of important epochs of crop growth and pest development											
	Standard weeks	36	37	38	39	40	41	42	43	44	
Months	SEPTEMBER					OCTOBER					



Dissemination of AAS



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



Dissemination of AAS

- SMS advisories in regional languages are sent through mKisan portal of MOAg (currently SMS are sent for extreme weather events only).

MOAg is developing platform where farmers can pull the information.

- **Mobile App:** Meghdoot, Umang, Kisan Mitra, Kisan Suvidha, Damini (for nowcast)

- **Website:**

IMD-Agrimet, State Agriculture University, KVK of ICAR, IIT, MSSRF, eNAM

- **Mass media:**

DD KISAN, Regional DD centers, Private TV Channels

Newspaper and All India Radio (AIR)

- **PPP Mode:** Kisan Sanchar, Reliance Foundation, NGOs
- **Dissemination through WhatsApp** Presently 11,89,000 farmers in 1,10,820 villages are receiving advisories directly through 14845 WhatsApp groups.
- **Extension system of State Agriculture Department:**
 - Integration of weather forecast and advisory with the Apps/ Web services
 - Disseminated through Rural Ag. Extension officers at village level



Integration with State Govt. Mobile App/Web Services

State	No. of farmers covered (In Lakhs)
Madhya Pradesh	10
Tamil Nadu	10
Gujarat	36
Nagaland	0.79
Chhattisgarh	2
Haryana	3.6

***Integration is in process for remaining states**



Dissemination through Website

<http://imdagrismet.gov.in/imdproject/AGIndex.php>

Agricultural Meteorology Division / कृषि मौसम विज्ञान प्रभाग
Climate Research and Services/ जलवायु अनुसंधान और सेवाएँ
India Meteorological Department / भारत मौसम विज्ञान विभाग
Ministry of Earth Sciences / पृथ्वी विज्ञान मंत्रालय

Home About Agrimet Observations & Forecast Agromet Products Agromet Advisories Other Services Do's & Don'ts Links

*** Happy New Year 2021 ***

राष्ट्रीय कार्यशाला - कृषि मौसम विज्ञान
13 वीं वार्षिक समीक्षा बैठक
(ग्रामीण कृषि मौसम सेवा)

संयोजक: डॉ. ए. ए. शर्मा, अध्यक्ष, कृषि विज्ञान विभाग, भारत मौसम विज्ञान विभाग, दिल्ली
आयोजक: डॉ. क. क. सिंघ, अध्यक्ष, कृषि विज्ञान केंद्र, इंदौर

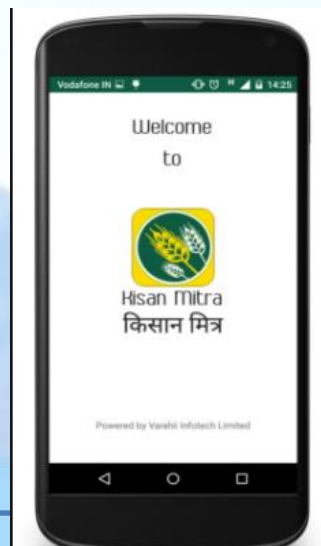
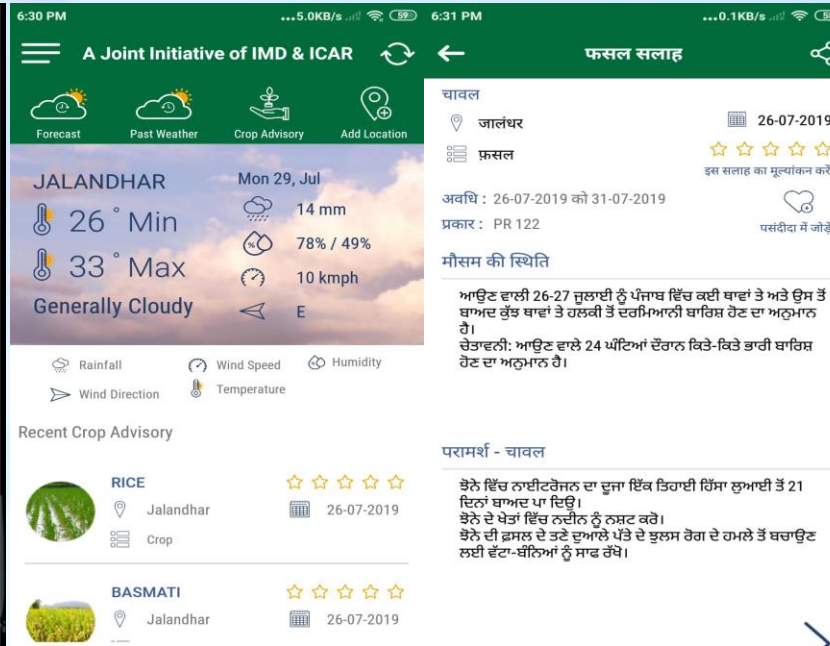
13th Annual Review Meeting (ARM) on "Gramin Krishi Mausam Sewa (GKMS) scheme in the country" held at Rajmata Vijayaraje Scindia Krishi Vigyan Kendra, Indore

New

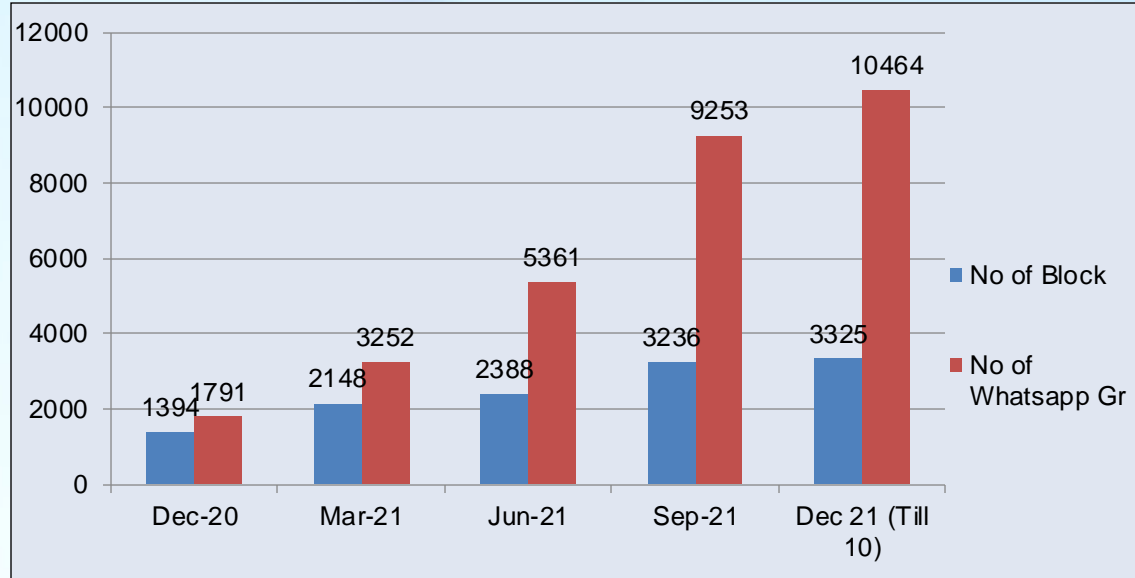
- Farmer Registration (Hindi, English & Other Languages)
- Feedback for agromet advisory services
 - English
 - Hindi
- GKMS newsletter July-September 2020
- MEGHDOOT - A Mobile App to Assist Farmers For Weather Based Farm Management
- Video on agromet services under GKMS
- Damini-Lightning Alert
- Standard operating procedure for preparation of AAS bulletins



Dissemination through Mobile Apps

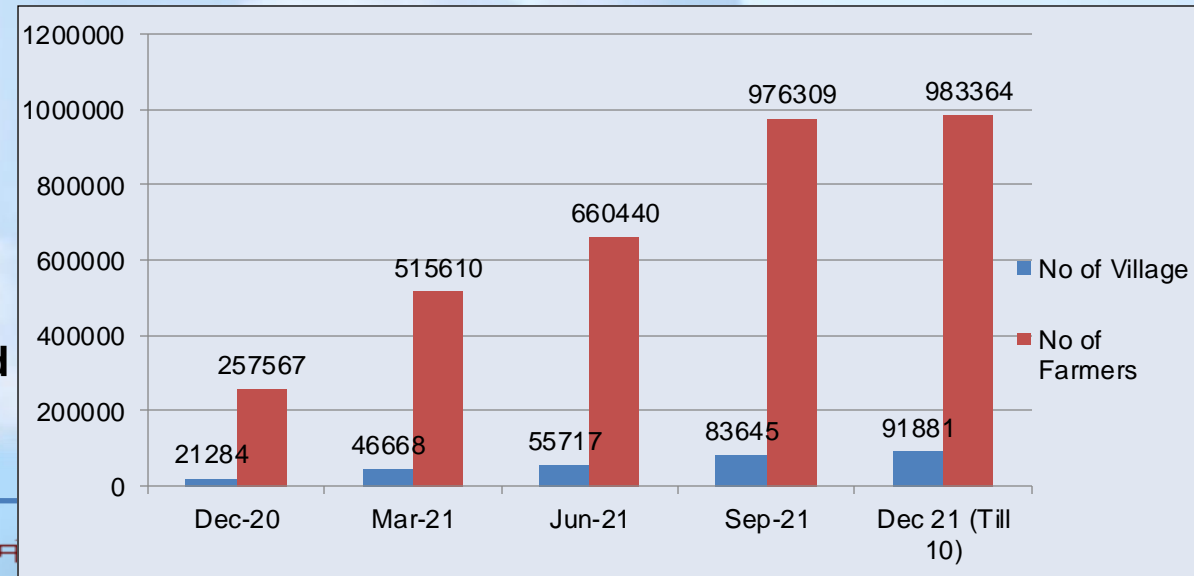


Dissemination through WhatsApp



No. of WhatsApp Gr. & Block covered

No. of Farmers & Villages covered



Extension System Of SAD for dissemination

Social media: Whatsapp

SAD: State Agriculture Department
DAO: District Agriculture Officer
BAO: Block Agriculture Officer
RAEO: Rural Agriculture Extension
Officer Department

State Department of Agriculture

DAOs

BAOs

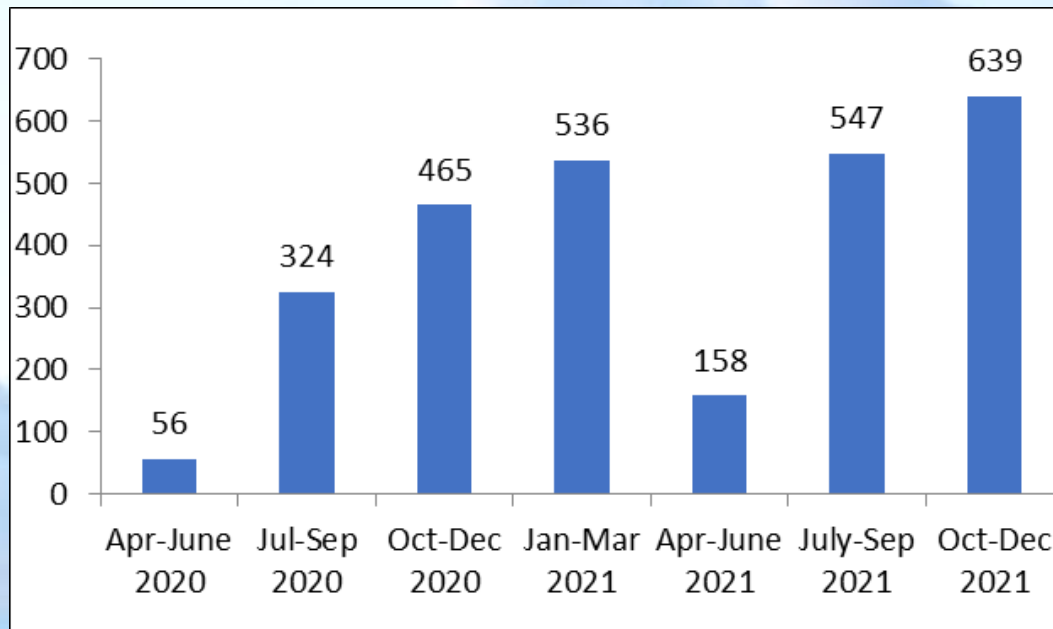
RAEOs

Farmers



Farmers Awareness Programme

- **1384** FAPs have been organized during the 2020-21
- **1432** FAPs have been organized since 2021-22.
- AMFUs/DAMUs also arranged field visits, field demonstration, farmers' interaction and also participated in Kisan Mela
- Popularizations of Meghdoot App
- GKMS services also demonstrated in FAP organized under other programmes of KVK



DAMU-Hagari, Ballari



DAMU-Gangavathi



DAMU-Haveri



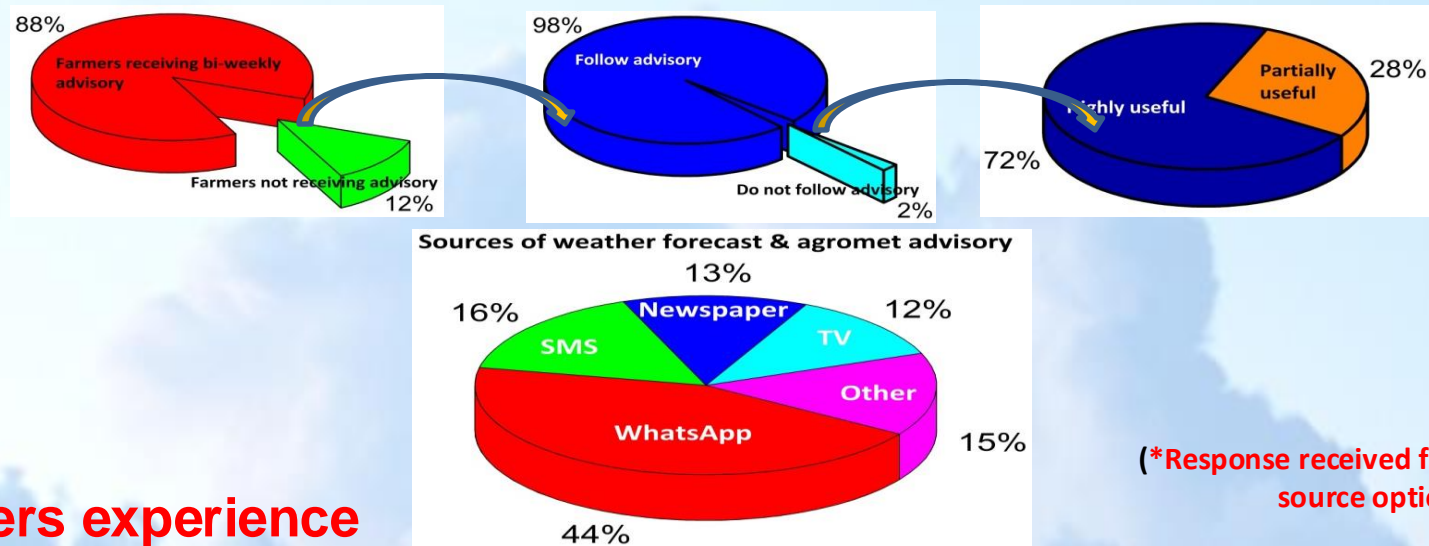
Feedback on AAS

Dynamic real-time

Weekly/fortnightly feedback from farmers on weather forecast and crop advisory (to be made App based in future) and their analysis initiated by ~165 DAMUs and ~55 AMFUs

End of season report using questionnaire survey

Farmers feedback is collected at national level using Google platform through TO / SMS. 2614 feedback received at the end of Kharif 2020.



Farmers experience

- ❖ 88 success stories uploaded on Agrimet Pune dashboard since Apr 2021
- ❖ Since Oct 2020, 226 videos on farmer's feedback uploaded on YouTube channel of AAS-<https://www.youtube.com/channel/UCjlclwtznloxlqa0Xh4j5qQ/videos>



R&D New Initiative



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



Dynamic Crop Weather Calendar(DCWC) in Collaboration with ICAR-CRIDA

- Variable sowing window
- Duration of varieties
- Incorporation of weather forecast
- Estimation of sowing date based on soil water balance/cumulative rainfall or both
- Prediction of phenology
- Estimation of stage wise crop water requirement
- Probability of dry/wet spells/extreme rainfall events
- Linking with contingency plans (CRIDA)
- Linking with pest and disease models

- Validated at 31 locations.
- Predicated sowing dates using soil water balance showed good agreement between predicted and observed dates.
- Handing over DCWC to DAMU KVKs to run DCWC at their centres.
- Collation of weather and crop experimental data from Units.
- Inclusion of more features in the DCWC based on feedback from DAMUs.

Dynamic Crop Weather Calendar

Station Name: Ranchi | Latitude: 23.17 | Longitude: 85.19 | Altitude: 651 | Crop: Upland Rice | Base Temperature(C): 10 | Period of advisory (days): 10

Date of Simulation: Day: 25, Month: 6, Year: 2020 | Sowing Window (JD): Minimum: 152, Maximum: 190 | Date of Sowing (JDay): Earliest in the season: 164

Soil Properties: Initial Soil Moisture (mm): 0, Field Capacity (mm): 140, Permanent Wilting Point (mm): 40, Runoff Threshold (mm): 50

Crop Duration (days): Initial: 30, Development: 30, Mid Season: 40, End Season: 30

Crop Coefficients (Kc): Initial: 1, Mid Season: 1.15, End Season: 0.75

Advisory for Requested Period

Stage	1
Julian Day	187
CWR(mm)	39
ER(mm)	219
IR(mm)	0

Advisory for Crop Season based on Weather Forecast

Stage	1	2	3	4	5
Julian Day	206	241	261	271	285
CWR(mm)	174	135	76	38	51
ER(mm)	498	350	157	83	64
IR(mm)	0	0	0	0	0

Charts:

- Ranchi : Upland Rice Stage wise average CWR (mm)
- Ranchi : Upland Rice Stage wise average GDD
- Ranchi : Year wise estimated Date of Sowing (Julian Day)



Experimental Monthly and Seasonal forecast at State level

Methodology

Forecast From GCM/AOGCM

Evaluation & Bias Correction

Multi-Model Ensemble

Deterministic

- 1.Simple Mean (MME1)
- 2.Superensemble(MME2)
- 3.Supervised PCR (Sup-PCR)
- 4.Canonical Correlation Analysis (CCA)

Combined Forecast

Probabilistic

Validation in Hindcast

Final Forecast



THANKS



भारत मौसम विज्ञान विभाग
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