

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 4377
TO BE ANSWERED ON FRIDAY, JULY 19, 2019**

DELAYED PATTERN OF ARRIVAL OF MONSOON

**4377. SHRI V.K. SREEKANDAN:
SHRI M.K. RAGHAVAN:**

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether the Government has conducted any study on the delayed pattern of arrival of monsoon in the country for several years now, if so, the details thereof;**
- (b) whether the progress of the monsoon during the current monsoon season has not been accurately predicted by the India Meteorological Department, if so, the details thereof and the reasons therefor;**
- (c) whether any advance scientific upgrades and equipments have been made for progressive predictions and identifying the reasons for delayed occurrences of monsoon in the country, if so, the details thereof; and**
- (d) the other steps being taken to ensure accurate prediction of monsoon progress?**

ANSWER

**MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. HARSH VARDHAN)**

- (a) Yes Sir. The arrival (onset) of monsoon over the country is always being monitored. There is no such pattern obtained on the late arrival of monsoon. However, this year monsoon onset over Kerala had been delayed, but it was predicted by the India Meteorological Department (IMD). The dates of onset of monsoon over Kerala for the last 10 years are given in table below :**

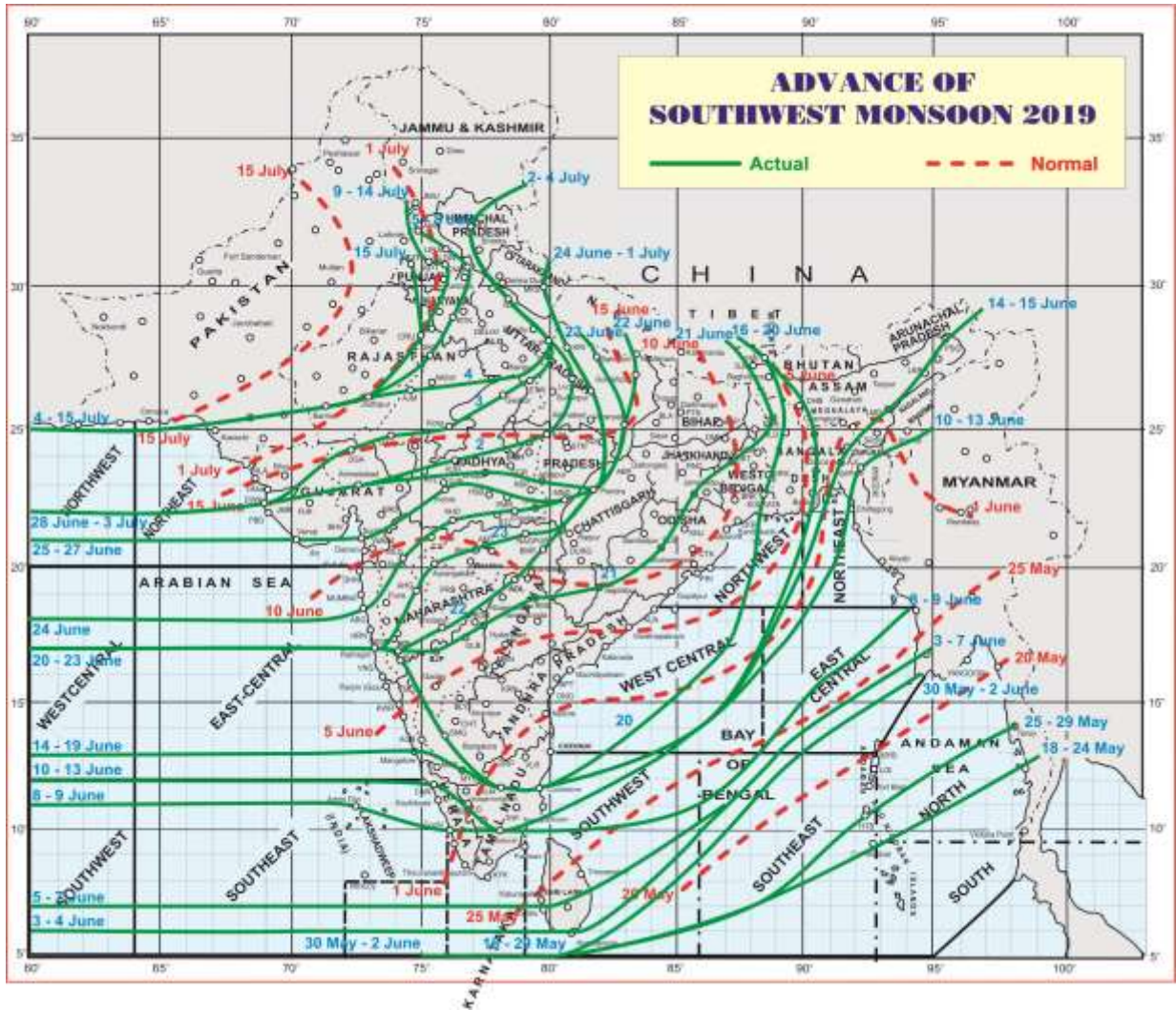
Year	Date of onset over Kerala
2009	23 May
2010	31 May
2011	29 May
2012	5 June
2013	1 June
2014	6 June
2015	5 June
2016	8 June
2017	30 May
2018	29 May

(b) No Sir. As per IMD's forecast, onset of monsoon over Kerala for this year was likely to be delayed and was expected on 6th June with a model error of ± 4 days. The onset of monsoon over Kerala has occurred on 8th June 2019 within the forecast limit, against the normal date of 1st June. Afterwards also there had been delay in the further progress of monsoon in the country due to weakening of monsoon current, in view of formation of a cyclonic Storm 'VAYU' in the Arabian Sea.

The progress of southwest monsoon till 15th July 2019 is shown in Fig-1 and the Press Release, issued on 15th May 2019, regarding the forecasting of date of onset of Southwest Monsoon 2019 over Kerala is given in Annexure.

(c) & (d) India Meteorological Department has the state of the art prediction models and other tools for monitoring and predicting various characteristics of monsoon. Under National Monsoon Mission, Ministry of Earth Sciences (MoES) has implemented two state of the art dynamical prediction systems for short, medium & extended range forecasts and seasonal forecasts. All these initiatives have helped to improve the accuracy of forecast. An improved suite of prediction models have already been implemented operationally at IMD for enhanced short range forecast through assimilation of all available Indian and global satellite data in real time. Even though there is a method for predicting monsoon onset over Kerala, the progress of monsoon across the country is made by considering spatial continuity of rainfall pattern and satellite imageries and advance of monsoon over the country is predicted based on above mentioned models.

Fig-1



PRESS RELEASE
New Delhi, 15 May 2019



भारत सरकार
Government of India
पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)
Ministry of Earth Sciences (MoES)
भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

Forecast of the Onset Date of Southwest Monsoon - 2019 over Kerala

1. Background

Southwest monsoon sets over Kerala on 1st June with a standard deviation of about 7 days. The event marks the start of rainy season over the region and as the monsoon progresses northward, relief from scorching summer temperatures is experienced over the areas. India Meteorological Department (IMD) has been issuing operational forecasts for the date of monsoon onset over Kerala from 2005 onwards. An indigenously developed state of the art statistical model with a model error of ± 4 days is used for the purpose. The 6 Predictors used in the models are; i) Minimum Temperatures over North-west India, ii) Pre-monsoon rainfall peak over south Peninsula, iii) Outgoing Long wave Radiation (OLR) over south China Sea, (iv) Lower tropospheric zonal wind over southeast Indian ocean, (v) upper tropospheric zonal wind over the east equatorial Indian Ocean, and (vi) Outgoing Long wave Radiation (OLR) over the south-west Pacific region.

IMD's operational forecasts of the date of monsoon onset during the past 14 years (2005-2018) were proved to be correct except in 2015. Forecast verification for the recent 5 years (2014-2018) is given in the table below.

Year	Actual Onset Date	Forecast Onset Date
2014	6th June	5th June
2015	5th June	30th May
2016	8th June	7th June
2017	30th May	30th May
2018	29 th May	29 th May

2. Advance of monsoon over the Andaman Sea

Conditions are becoming favourable for advance of southwest monsoon over the southern part of Andaman Sea, Nicobar Islands and adjoining southeast Bay of Bengal during 18-19th May 2019.

3. Forecast for the 2019 Monsoon Onset over Kerala

This year, the statistical model forecast suggests that the monsoon onset over Kerala is likely to be slightly delayed. The southwest monsoon onset is likely to set over Kerala on 6th June with a model error of ± 4 days.