

Letters to the Editor

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RELATION BETWEEN MONSOON ONSET DATE AND RAINFALL OVER PUNJAB AND HARYANA

Monsoon rains are of paramount importance to agriculturists in India and the economy of the country is very closely linked with monsoon performance. An advance information about onset, breaks and withdrawal of monsoon and its activity during any particular period is helpful to the farmers.

It is well documented fact that the time of arrival of monsoon differs from one year to another. In some years the arrival of monsoon is delayed while in others, it arrives earlier. It may be interesting to study whether the delayed and early arrival of monsoon have any significant influence on the amount of rainfall received during the monsoon season (June-September) over different meteorological sub-divisions of India.

Dhar *et al.* (1980) have studied the relationship of early or late onset of monsoon with the rainfall over the west coast (Kerala, Coastal Karnataka and Konkan). Their analysis revealed that the rainfall received in these sub-divisions during the monsoon season as a whole is independent of onset date.

An attempt has been to study the relationship between the date of onset of monsoon over Punjab and Haryana with the total monsoon rainfall that occurs during subsequent monsoon season (June to September) over these sub-divisions. These sub-divisions have been specially considered as these are the major food producing States of India.

2. The India Meteorological Department has defined the dates of onset (withdrawal) with reference to the rather increase (decrease) shown by the five-day means of rainfall alongwith the changes in the circulation. The middle day of the 5-day period was taken to denote the normal onset dates of monsoon over the sub-divisions, viz., Punjab, Haryana and Kerala (Anantha-krishnan *et al.* 1967; Rao 1976). It is seen (not shown) that the monsoon arrives over southern most tip of the country, i.e., Kerala on first June and covers the entire country by 15 July.

3. The actual onset monsoon dates over the sub-divisions of Punjab, Haryana and Kerala (Table 1) for the recent 30-year period (1951-80) were extracted

TABLE 1

Dates of onset of monsoon over Kerala, Punjab and Haryana

Year	Date of onset		
	Kerala	Punjab	Haryana
1951	31 May	1 July	1 July
1952	20 May	27 June	27 June
1953	7 June	24 June	24 June
1954	31 May	9 July	9 July
1955	29 May	28 June	28 June
1956	21 May	1 July	1 July
1957	1 June	9 July	9 July
1958	14 June	4 July	4 July
1959	31 May	5 July	5 July
1960	14 May	27 June	27 June
1961	18 May	13 June	13 June
1962	17 May	23 June	13 June
1963	31 May	17 July	17 July
1964	5 June	5 July	5 July
1965	26 May	17 July	17 July
1966	1 June	6 July	21 June
1967	8 June	2 July	2 July
1968	8 June	9 July	9 July
1969	25 May	15 July	12 July
1970	26 May	1 July	30 Jun
1971	27 May	24 June	23 June
1972	18 June	29 June	27 June
1973	4 June	6 July	5 July
1974	26 May	12 July	12 July
1975	31 May	30 June	23 June
1976	31 May	15 July	11 July
1977	30 May	30 June	29 June
1978	28 May	30 June	30 June
1979	11 June	21 June	11 July
1980	1 June	26 June	26 June

from the *weekly and Daily Weather Reports* published by the India Meteorological Department. By using the data for the recent 30 years, the mean onset dates for these sub-divisions have been worked out. These normal dates are almost same as have been published by the India Meteorological Department, referred above. The normal rainfall amounts for Kerala, Punjab and Haryana are 185.0 cm, 150.5 cm and 149.3 cm respectively. These averages are close to 1950

TABLE 2(a)

Criteria for classification of percentage departures of onset (1951-80)

S. No.	Category	Onset departure from the normal
1	Normal (N)	± 5
2	Early (E)	-5 to -10
3	Very Early (VE)	-10 or less
4	Late (L)	+5 to +10
	Very late (VL)	+10 or more

TABLE 2(b)

Criteria for classification of percentage departures of rainfall (1951-80)

S. No.	Category	% departure of rainfall from the normal
1	Above normal	10%
2	Normal	$\pm 10\%$
3	Below normal	-10%

normals prepared by the India Meteorological Department. The criteria adopted for classification of percentage departures of rainfall for each sub-division based on the above period is given in Table 2(b).

4. The main objective of this study is to investigate whether the early or late onset of monsoon could provide any conclusion to the amount of rain that would fall during the early monsoon months or the monsoon season as a whole. The onset of the monsoon is divided into various categories of late and early onset (Table 2a). The frequency of early or late occasions and departure from normals of onset of monsoon over Kerala, Punjab and Haryana have been worked out and given in Table 3.

5.1. *Punjab*—For recent 30 years (1951-80), the correlation coefficient between the onset date with the subsequent monsoon rainfall over Punjab has been found equal to -0.27. This suggests that the late (early) arrival of monsoon indicates poor (good) rainfall during subsequent monsoon season over Punjab. It may, however, be mentioned that the relationship is just

TABLE 3

Early or late occasions of onset of monsoon over Kerala, Punjab & Haryana (1951-80)

S. No.	Sub-division	Frequency of early onset of monsoon	Frequency of late onset of monsoon	Earliest onset by	Delayed onset by	Normal onset years
1	Kerala	19	8	18 days (1960)	17 days (1972)	1957, 1966, 1980
2	Punjab	16	13	19 days (1961)	15 days (1963,65)	1967
3	Haryana	16	13	19 days (1961, 62)	15 days (1963,65)	1967

significant at 10 per cent level and may not be of any use for long range prediction. As a matter of fact opposite relationship between onset and total monsoon rainfall was found from 1951 to 1974. In subsequent years, the relationship appeared to have changed as the early onset, started indicating poor monsoon rainfall. This suggests that the relationship after 1974 has become positive which indicates that early (late) onset is followed by poor (good) monsoon.

5.2. *Haryana*—For recent 30 years (1951-80), the correlation coefficient between onset date with the subsequent monsoon rainfall over Haryana is computed and has been found equal to -0.33 which is significant at 10 per cent level. This suggests that the late (early) arrival of monsoon is followed by poor (good) monsoon rainfall over the region. The opposite relationship of the onset date with the subsequent monsoon rainfall is by and large found during recent 30 years. In most of the cases the early onset years have been found to have good monsoon rainfall over the region. The relationship appears to be good and further work seems to be necessary.

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