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# Dry and Wet Spells of Weather at Coimbatore

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**Synopsis:** During the pre-monsoon period comprising the months from January to May, the dry spell prevails on an average on 90·1% of the days. The mean rainfall during this period is 6·2", received on 11 rainy days. A continuous dry spell has prevailed for 132 days in the year 1914. In 34 out of 54 years no wet spell occurred during the pre-monsoon period.

In the monsoon period from June to December, the mean duration of dry spell is 168 days covering 78·5% of the period. The mean rainfall is 18·9", received on 34 rainy days. Dry spell may prevail continuously for 46 days, when rainfall is abnormal and for 61 days when the rainfall is sub-normal during this period. During the monsoon period the mean number of rainy days is 34·4 and wet spells of three or more days occur on 12·5 days. Wet spells may occur for 25 days when rainfall is abnormal and for upto 20 days when rainfall is sub-normal.

Considering the year as a whole the mean duration of dry spells is 304 days. The average rainfall is 25·1" and the number of rainy days is 45·5. The rainfall and number of rainy days are more closely associated with the wet spells prevailing during the monsoon period than during the pre-monsoon period.

**Introduction:** The success of cultivated crops depends to a large extent on the proper distribution of rainfall during their respective growth phases. In this paper, the frequency of dry and wet spells and their variations from year to year have been studied in relation to rainfall and number of rainy days, with the daily rainfall data available at the Agricultural College and Research Institute, Coimbatore, in order to obtain a picture of the pattern of distribution of dry and wet spells in the premonsoon and monsoon periods of the year.

**Materials and methods:**

(a) The daily rainfall data collected at the Observatory attached to the Agricultural College and Research Institute, Coimbatore, for a period of 54 years from 1908 to 1961 were examined and the number and duration of dry and wet spells occurring during the pre-monsoon period (January to May) and the monsoon period (June to December) were compiled. The occurrence of dry weather or rainy days, consecutively for atleast three days was treated, respectively, as a dry or wet spell of weather. A day with 10 cents and above of rainfall was considered as a rainy day. Any dry or wet weather prevailing for less than three days was not considered as a spell. Similarly, data were compiled

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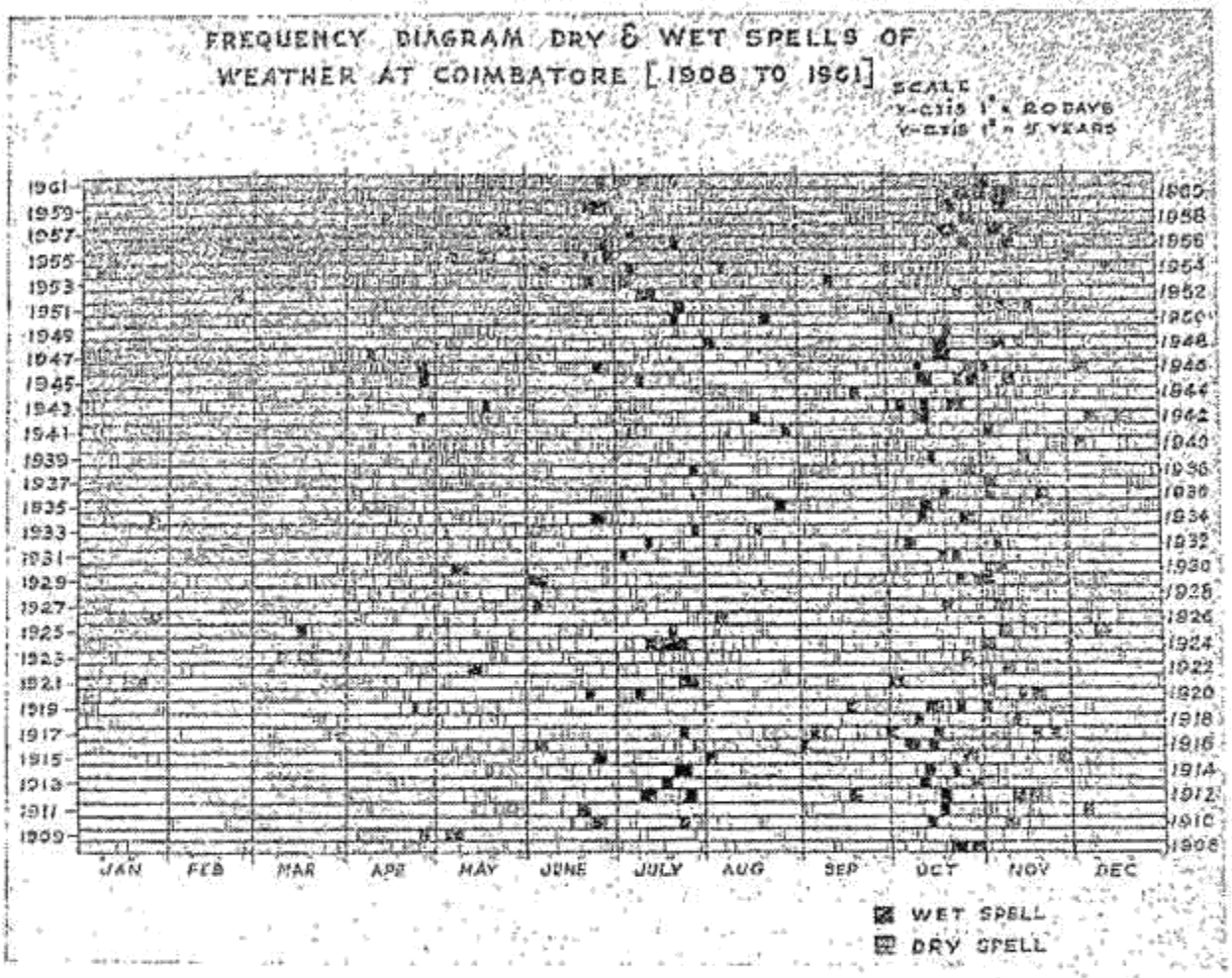
for the entire year, taken as a unit. The data on rainfall and number of rainy days were compiled for the above periods and their respective standard deviations were worked out. Any value exceeding mean plus half the standard deviation




was taken as abnormal and any value less than mean minus half the standard deviation was treated as sub-normal for the respective factors of rainfall, number of rainy days, dry spell and wet spell.

The details of dry and wet spells prevailing in the different periods in the years of abnormal and sub-normal rainfall and rainy days have been furnished in table I. In table II, the particulars of abnormal and sub-normal spells of dry and wet weather in the different seasons have been furnished.

(b) Correlations were worked out respectively between the dry and wet spells, and rainfall and number of rainy days, for the pre-monsoon and monsoon periods, and the year as a whole (table III).

**Results and Discussion :**

(a) *Pre-monsoon period : Dry spell :* During the pre-monsoon period of January to May, the mean duration of dry spell is 136 days with a standard deviation of 5·71 days. Thus, during this period dry spell prevailed on 90·1% of days. The mean rainfall during this period is 6·2", received on 11 rainy days.

TABLE I

*Details of Dry and Wet spells of Weather*

PRE-MONSOON PERIOD

| Details | Dry Spell | | | | | | Wet Spell | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qty. of rainfall or No. of rainy days | No. of years | Mean No. of days | Mean No. of spells | Mean duration | | Mean No. of days | Mean No. of spells | Mean duration | |
| | | | | | Maximum | Minimum | | | Maximum | Minimum |
| In the years of abnormal rainfall | above 7·6″ | 18 | 131·8 | 7·9 | 66·4 | 3·9 | 2·7 | 0·7 | 1·8 | 0·7 |
| In the years of sub-normal rainfall | below 4·8″ | 19 | 140·2 | 5·6 | 74·6 | 7·0 | 0·5 | 0·2 | 0·5 | ... |
| In the years of abnormal number of rainydays | above 13 days | 15 | 129·6 | 8·6 | 67·9 | 3·6 | 3·5 | 1·0 | 2·2 | 1·0 |
| In the years of sub-normal number of rainydays | below 9 days | 14 | 131·7 | 5·0 | 77·6 | 7·7 | 0·9 | 0·2 | 0·9 | ... |

MONSOON PERIOD

| Details | Dry Spell | | | | | | Wet Spell | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qty. of rainfall or No. of rainy days | No. of years | Mean No. of days | Mean No. of spells | Mean duration | | Mean No. of days | Mean No. of spells | Mean duration | |
| | | | | | Maximum | Minimum | | | Maximum | Minimum |
| In the years of abnormal rainfall | above 21·9″ | 15 | 157·6 | 14·5 | 33·3 | 3·2 | 16·4 | 3·9 | 5·7 | 3·2 |
| In the years of sub-normal rainfall | below 15·9″ | 20 | 176·1 | 13·6 | 42·1 | 3·0 | 9·3 | 2·5 | 3·9 | 2·4 |
| In the years of abnormal number of rainydays | above 38 days | 15 | 155·6 | 14·5 | 30·3 | 1·2 | 16·9 | 4·5 | 5·4 | 3·0 |
| In the years of sub-normal number of rainydays | below 30 days | 14 | 179·4 | 12·8 | 46·4 | 3·2 | 7·0 | 1·9 | 3·7 | 2·0 |

TABLE I *(Contd.)*

| Details | ANNUAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DRY SPELL | | | | | | WET SPELL | | | |
| | Qty. of rainfall or No. of rainy days | No. of years | Mean No. of days | Mean No. of spells | Mean duration | | Mean No. of days | Mean No. of spells | Mean duration | |
| | | | | | Maximum | Minimum | | | Maximum | Minimum |
| In the years of abnormal rainfall | above 28·6″ | 17 | 295·3 | 22·0 | 70·9 | 3·0 | 16·4 | 3·6 | 5·8 | 3·0 |
| In the years of sub-normal rainfall | below 21·6″ | 18 | 314·9 | 20·2 | 72·7 | 3·1 | 10·5 | 2·9 | 4·2 | 2·6 |
| In the years of abnormal number of rainydays | above 49 days | 15 | 283·5 | 24·3 | 64·7 | 3·0 | 16·5 | 4·3 | 5·7 | 3·0 |
| In the years of sub-normal number of rainydays | below 42 days | 13 | 317·7 | 19·0 | 75·8 | 3·1 | 9·7 | 2·6 | 4·5 | 3·0 |

TABLE II

*Number of years with abnormal and sub-normal duration of dry and wet spells*

| Details | Pre-monsoon period | | Monsoon period | | Annual | |
|---|---|---|---|---|---|---|
| | No. of days | No. of years | No. of days | No. of years | No. of days | No. of years |
| *Dry spell:* | | | | | | |
| Abnormal | above 139 | 11 | above 173 | 20 | above 309 | 16 |
| Subnormal | below 133 | 13 | below 163 | 19 | below 298 | 18 |
| *Wet spell:* | | | | | | |
| Abnormal | above 3 | 9 | above 15 | 15 | above 17 | 21 |
| Subnormal | ... | 34 | below 10 | 13 | below 12 | 16 |

Any rainfall exceeding 7·6″ and number of rainy days exceeding 13 days were considered as abnormal for this period. Similarly, rainfall below 4·8″ and number of rainy days below 9 days were considered as sub-normal. Abnormal rainfall prevailed in 18 out of 54 years. In these years the total number of dry spells has varied from 6 to 11 and the total duration from 122 to 138 days. The maximum duration of a continuous dry spell has varied from 38 to 93 days. On the other hand, in 19 years, when subnormal rainfall prevailed during this period, the number and total duration of dry spells have varied. respectively,

TABLE III

*Correlations between Dry and Wet spells of Weather and Rainfall pattern*

| S. No. | Period | Details of weather element | Dry Spell | | | Wet Spell | | |
|---|---|---|---|---|---|---|---|---|
| | | | Correlation coefficient | Standard error | Level of significance | Correlation coefficient | Standard error | Level of significance |
| 1. | Pre-monsoon | Rainfall | —0·68 | 0·10 | 0·001 | 0·33 | 0·13 | 0·02 |
| | | Rainy days | —0·92 | 0·06 | 0·001 | 0·36 | 0·13 | 0·02 |
| 2. | Monsoon | Rainfall | —0·69 | 0·10 | 0·001 | 0·59 | 0·11 | 0·001 |
| | | Rainy days | —0·94 | 0·05 | 0·001 | 0·68 | 0 10 | 0·001 |
| 3. | Annual | Rainfall | —0·69 | 0·10 | 0·001 | 0·49 | 0·12 | 0·001 |
| | | Rainy days | —0·94 | 0·05 | 0·001 | 0·58 | 0·11 | 0·001 |

from 2 to 8 spells and 135 to 147 days. The maximum duration of a continuous dry spell has varied from 33 to 132 days. Long dry spells of 132, 101 and 115 days occurred in the years 1914, 1916 and 1956 respectively. This indicates the severity of drought in these years during the pre-monsoon period. The distribution of dry spells during the years with abnormal and sub-normal rainy days closely follows the pattern of rainfall. It is also seen that the mean duration of dry spell in this period is 87·4% when the rainfall is abnormal and 92·7% when the rainfall is sub-normal.

(b) *Pre-monsoon period: Wet spell:* There was no wet spell of 3 days and more in 34 out of 54 years during this period. In the years with abnormal rainfall the number of wet spells has varied from 0 to 3. A wet spell prevailed continuously for 6 days in the year 1955, and for 5 days in 1909 and 1930. In sixteen out of nineteen years of sub-normal rains during the pre-monsoon period no wet spell occurred. In the remaining three years only one wet spell has occurred. The pattern of wet spells in the years with abnormal and sub-normal rainydays follows the same as that of rainfall. In the pre-monsoon period wet spells of three days are few and more than three days are rare.

(c) *Monsoon period: Dry spell:* The mean duration of dry spells during this period is 168 days with a standard deviation of 10·49. On an average dry spell prevails on 78·5% of the days during this period. The mean rainfall during this period is 18·9", received on 34 rainy days. Any rainfall exceeding 21·9" is considered as abnormal and below 15·9" as sub-normal. Similarly, the number of rainy days above 38 days and below 30 days are considered, respectively, as abnormal and sub-normal.

Abnormal rainfall has occurred in 15 years out of 54 years. In these 15 years, the number and total duration of dry spells have varied respectively from 11 to 19 spells and 138 to 174 days. A continuous dry spell of 46 days has occurred in 1961, preceded in 1930 and 1939 by 44 and 43 days respectively.

In twenty years with sub-normal rainfall during the monsoon period, the number and total duration of dry spells have varied from 10 to 18 spells and 159 to 188 days. The maximum duration of dry spells in these years has varied from 27 to 61 days. The dry spells are longer in duration in the periods with sub-normal rainfall than in those of abnormal rainfall. Thus, the detrimental effects of long spells of drought on the crops will be more pronounced in years of sub-normal rainfall than in years of abnormal rainfall. The mean duration of dry spells in the monsoon period in the years of abnormal and sub-normal rainfalls are respectively 73·6% and 82·3%.

Considering the number of rainy days during the monsoon period the maximum duration of a dry spell has fluctuated from 17 to 46 days when the number of rainy days was abnormal and from 28 to 106 days when sub-normal number of rainy days prevailed. The longest dry spell of 106 days has occurred in the year 1918 from 1st June to 14th September, indicating severe drought conditions in that year.

*Monsoon Period: Wet spell:* The mean number of rainy days during the monsoon period is 34·4 and wet spells of more than three days occur on 12·5 days. When the rainfall is abnormal the number and duration of the wet spells vary from 1 to 6 spells and 3 to 25 days, respectively. The maximum duration of a continuous wet spell has varied from 3 to 11 days in these years. In the year 1924 a wet spell occurred continuously for 11 days, followed by 9 days in the years 1930 and 1959. When rainfall was subnormal during this period the maximum duration of a continuous wet spell has fluctuated from 3 to 7 days. A wet spell of 7 days occurred in 1914 and spells of 6 days prevailed in 1908 and 1923, while no wet spell of three days and above occurred in the years 1910 and 1927.

Considering the number of rainy days during this period 2 to 6 spells have occurred in 9 to 25 days, when the number of rainy days was abnormal. It is also noted that the total duration of wet spell covers 7·8% of this period when the number of rainy days is abnormal and 3·3% when it is sub-normal. In the monsoon period with sub-normal rainy days, 0 to 4 wet spells occur in 0 to 14 days.

(e) *Annual: Dry spell*: Considering the year as a whole as one unit, it is seen that the dry spell prevails on the average on 304 days, comprising 83·3% of the year. The average rainfall for the year is 25·1" received on 45·5 rainy days. Any rainfall exceeding 28·6" and below 21·6" were considered respectively as abnormal and sub-normal. Similarly the number of rainy days exceeding 49 were treated as abnormal and below 42 days as sub-normal.

Abnormal rainfall has been received in 17 years and sub-normal rainfall in 18 years, out of 54 years. In the years of abnormal rainfall the total number and duration of dry spells have fluctuated from 17 to 30 spells and 279 to 309 days respectively. The maximum duration of a continuous dry spell has varied

from 42 to 96 days. In the years of sub-normal rainfall the variations of the number of spells and their duration are from 14 to 30 spells and 30 to 132 days. In abnormal years of number of rainy days the variations are from 14 to 22 spells and 51 to 132 days when the number of rainy days is sub-normal.

Dry spells, exceeding three days, prevail on 80·9% of the days in years of abnormal rainfall and on 85·9% of the days when rainfall is sub-normal. Considering the years with abnormal and sub-normal number of rainy days, the variations in the percentages are respectively 79·5 and 87·0.

*Annual: Wet spell:* In years of abnormal rainfall the number and duration of wet spells vary from 1 to 6 and 3 to 25 days. Similar variations have been observed in years of abnormal number of rainy days. In years of sub-normal rainfall they vary from 0 to 5 spells and 0 to 20 days. The maximum duration of a continuous wet spell has been 11 days in years of abnormal rainfall and 7 days in years of sub-normal rainfall.

From table III it may be seen that the co-efficients of correlation between dry spell and rainfall in all the periods are highly significant and negative and of the order of 0·68 to 0·69. The correlations with the number of rainy days are also highly significant and negative and of the order of 0·92 to 0·94. These indicate that the increase in the duration of dry spell results in a decrease in the rainfall and number of rainy days during the pre-monsoon period. The correlations between the duration of wet spell and (i) rainfall and (ii) number of rainy days in the pre-monsoon period are positive and significant at $P=0·02$ level, while the correlations for the monsoon and annual periods are significant at $P= 0·001$ level. This indicates that the rainfall and number of rainy days during monsoon period are more closely associated with the wet spells than during the pre-monsoon period.

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## SUGARCANE CROP YIELD COMPETITION, 1961—'62

Sri S. M. Hajee Mohamed Ismail, Pothagudi village, Thanjavur District has been adjudged as the State Prize Winner in the Sugarcane Crop Yield Competition for 1961—'62 for obtaining an acre yield of 109 tons and 741 kgs. of Cane.

*— From the Director of Agriculture.*