

Monsoons at Gudiyattam (North Arcot District)

by

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Introduction : At Gudiyattam a Sugarcane Research Station was established by the middle of February, 1935 with the object of catering to the needs of the Central districts of the Madras State, which grow sugarcane on a large scale with the aid of lift irrigation. Sugarcane is a crop that stands in the field for fairly a long period of eleven to twelve months. Though this crop is raised under irrigated conditions, its response to natural rains is really appreciable. Hence a statistical study of interseasonal rains with specific reference to the two monsoon periods was undertaken.

Materials and Methods : The daily rainfall data collected at the Sugarcane Research Station, Gudiyattam were compiled for the years 1937 to 1958, both inclusive and thus twenty-two years data formed the basic material for this paper.

(i) The year was divided into four seasons as dry weather period (January and February), hot weather period (March to May), south-west monsoon period (June to September) and north-east monsoon period (October to December). The details in regard to the pattern of rainfall in these four seasons were worked out individually. While working out rainfall pattern, a day with ten cents and above of rain was taken as a rainy day.

(ii) Interseasonal correlations were worked out both for rainfall and number of rainy days.

(iii) To study the cyclic nature of the performance of each monsoon standard deviation, coefficient of variation and standard error were computed by 'Centre shift average method' for periods of one to eleven years.

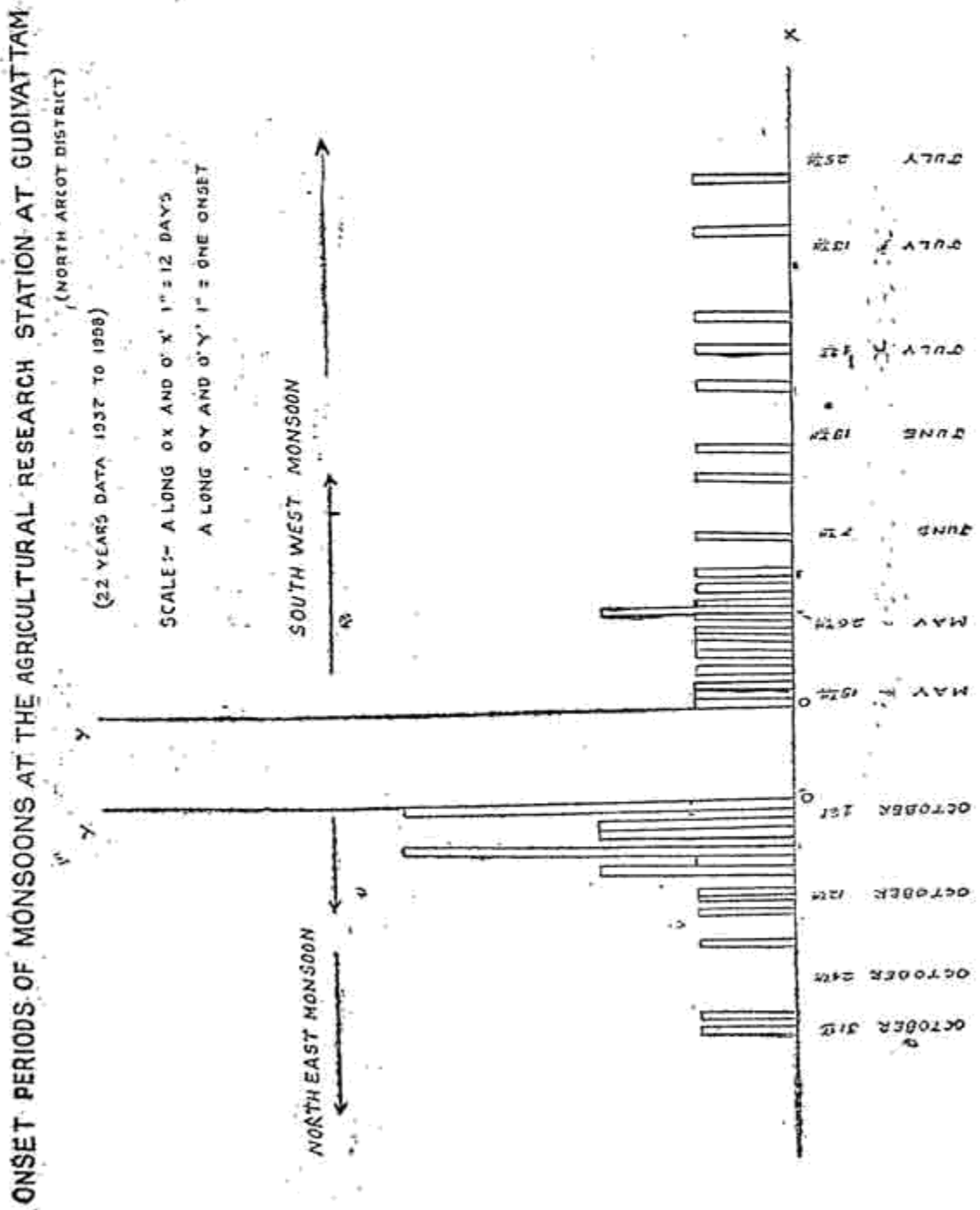
(iv) The dates of onset and cessation of the south-west monsoon and north-east monsoon were compiled and a combined onset diagram was prepared to bring out the probable periods of onset of the monsoon.

Discussion : (i) The rainfall patterns in the four main seasons of the year are indicated in Table I. The inferences drawn from this table are presented hereunder :—

(a) The rains in the first five months of the year, constituting the dry weather and hot weather periods are rather meagre, accounting for only 11.4% and 14.6% respectively of the annual rainfall and number of rainy days.

(b) In regard to the pattern of rainfall in the south-west monsoon period of June to September it is to be noted that it is in this period that 51.2% of the annual rainfall is received and it is distributed evenly to the extent of 50% of the annual number of rainy days.

(c) Coming to the north-east monsoon period of October to December it is seen that only 37.4% of the annual rainfall is received in this period with only 35.4% of the annual number of rainy days.



(ii) The correlations between the rainfall patterns in the four main seasons and also the annual rainfall pattern are presented in Table II. The inferences drawn from this table are detailed below :—

(a) If the rains are above normal in the dry weather period, it is an indication that the rains in that particular year are also likely to be above normal.

(b) If the rains and their distribution in any year are above normal in the south-west monsoon period, it is very likely that in that year the rains and their distribution are also above normal. This is explainable since the rains and their distribution account respectively for 51.2% and 50.0% and 50.0% of the annual rainfall and number of rainy days.

(c) The rainfall pattern in the retreating north-east monsoon period has also a similar influence as that of the main monsoon on the annual rainfall pattern, but to a less marked degree.

(iii). The standard deviation, coefficient of variation and standard error, computed separately for each monsoon by the 'Centre shift average method' are given in Table III for periods from one to eleven years. In all these eleven periods the coefficient of variation goes on decreasing in the case of both the monsoons, thereby connoting that the variation in the performance of the monsoons has a cycle longer than eleven-year period. This indicates that the monsoons are fairly well defined in the locality.

(iv) A study of the onset diagram reveals that in fourteen out of twenty-two years the south-west monsoon has set in the period May 15th to June 1st. This may be tentatively taken as the probable period of the onset of the south-west monsoon, which is the main monsoon.

In regard to the north-east monsoon, only twenty-one onset dates were available as both the onset and subsequent development of this monsoon in 1945 were very weak. In 18 out of 21 years this monsoon has set in the period October 1st to October 14th. The tentative inference is that the north-east monsoon is likely to set in the first fortnight of October.

If data for some more years are collected, it may be possible to narrow down the duration of the two onset periods.

Summary and Conclusion: (i) At Gudiyattam the weather in the first four months of the year is likely to be rather dry with no heavy rains.

(ii) The onset of south-west monsoon will be rather early in the tract and invariably it will be in the second fortnight of May.

(iii) From the points of view of total rainfall and number of rainy days the south-west monsoon is more important than the north-east monsoon, which is only the retreating monsoon.

(iv) The patterns of rainfall in both these monsoons have individually significant influence on the annual rainfall pattern.

(v) If a year starts with good rainfall in its first two months, it may be taken as a tentative indication that in that year the rainfall is likely to be above normal.

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TABLE I
Seasonal Rainfall Pattern

S. No.	Details of Season	Rainfall in inches	Number of rainy days	Percentage on annual		Remark
				Rainfall	No. of rainy days	
1.	Dry weather period (January and February)	0.8	1	2.4	2.1	...
2.	Hot weather period (March to May)	3.0	6	9.0	12.5	...
3.	South-west monsoon period (June to September)	17.1	24	51.2	50.0	...
4.	North-east monsoon period (October to December)	12.5	17	37.4	35.4	...
5.	Annual	33.4	48	100.0	100.0	...

TABLE II
Rainfall Pattern - Inter-seasonal Correlations

Season	Hot Weather Period				South-west monsoon period				North-east monsoon period				Annual			
	A		B		A		B		A		B		A		B	
	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.	r ± S.E.	S.
1. Dry weather period	-0.08 ± 0.22	N	+0.11 ± 0.22	N	+0.38 ± 0.21	N	+0.02 ± 0.22	N	+0.41 ± 0.20	Y1	-0.01 ± 0.22	N	+0.61 ± 0.18	Y2	+0.25 ± 0.22	N
2. Hot weather period	...	...	...	...	-0.28 ± 0.21	N	-0.23 ± 0.22	N	+0.03 ± 0.23	N	-0.11 ± 0.22	N	0.00 ± 0.22	N	+0.22 ± 0.22	N
3. South-west monsoon period	...	...	...	...	...	...	...	...	+0.15 ± 0.22	N	+0.21 ± 0.22	N	+0.07 ± 0.17	Y3	+0.68 ± 0.16	Y3
4. North-east monsoon period	...	...	...	...	...	...	...	...	...	...	...	...	+0.78 ± 0.14	Y3	+0.63 ± 0.17	Y2

Remarks:— (i) 'r' = Correlation Coefficient, S. E. = Standard Error.

(ii) 'S' = Nature of Significance, 'N' = Not significant.

(iii) 'Y1' = Significant for $P = 0.1$, 'Y2' = Significant for $P = 0.01$ and 'Y3' = Significant for $P = 0.001$.

(iv) @ = Actual value of $r = -0.0003$

(v) 'A' = Rainfall; 'B' = Number of rainy days

TABLE III
Cyclic Nature of the Monsoons

S. No.	Centre shift average for	South-west monsoon			North-east monsoon		
		S. D.	C. V. %	S. E.	S. D.	C. V. %	S. E.
1.	One Year	5.7	33.3	1.21	6.2	49.6	1.32
2.	Two years	4.2	24.6	0.91	3.4	27.6	0.74
3.	Three years	3.4	20.2	0.76	2.4	19.4	0.53
4.	Four years	3.0	18.1	0.68	2.3	18.5	0.52
5.	Five years	2.5	15.2	0.60	2.1	17.1	0.50
6.	Six years	2.2	13.5	0.54	1.9	15.4	0.46
7.	Seven years	2.1	13.0	0.53	1.8	14.6	0.45
8.	Eight years	1.9	11.8	0.49	1.7	13.9	0.44
9.	Nine years	1.7	10.6	0.46	1.5	12.4	0.41
10.	Ten years	1.5	9.3	0.42	1.5	12.3	0.42
11.	Eleven years	1.2	7.5	0.34	1.2	9.9	0.34

S. D. = Standard Deviation. C. V. = Coefficient of Variation. S. E. = Standard Error.