551·577·37 (54)

# A note on the variation of rainfall in Malabar

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Twenty seven years' rainfall data from 1926 to 1952 were collected from the rainfall report published in the Fort St. George Gazette for the nine taluka headquarters of Malabar district. The technique of Analysis of Variance (Fisher 1938) is made use of in testing the significance of variances due to years and between talukas. Interplace correlations have been worked out to have an idea of the homogeneity of the region.

The range, mean, standard deviation and coefficient of variability of the annual rainfall of the nine talukas comprising the district and represented by their headquarters are indicated in Table 1. Table 2 (a) gives the analysis of variance. Since the data for each of the nine talukas extend over a period of 27 years, there is a total of $(9\times27)-1=242$ degrees of freedom. The total sum of squares can be partitioned into three parts as follows, and the relevent degrees of freedom corresponding to each factor are also noted against.

| | |
|---|---|
| (*i*) Between location | 8 degrees of freedom |
| (*ii*) Between years | 26 degrees of freedom |
| (*iii*) Residual | 208 degrees of freedom |

The variance in each case is got by dividing the sum of squares by the corresponding degrees of freedom. It is clear that the variances due to locations and years are both many times greater than the error variance. The calculated ' F ' values in both these cases are considerably greater than the observed values of ' F ' even at 1 per cent level. The variations due to these factors are, therefore, highly significant. The variation between years is high showing thereby that a large part of the total variability of rainfall is controlled by seasonal fluctuations.

Similar analysis of rainfall data—Table 2 (b) —for the month of July which is the rainiest month of the district also confirms the tentative conclusions.

Table 3 sets forth the interplace correlations of the rainfall amount. The correlation coefficients are all positive and according to Fisher, they are all significant. Using Walker's criterion extended by Gopal Rao and Savur 34 correlations only are significant, the two remaining being less than ·55. Looking at the correlation coefficients between coastal localities, it is evident, they are highly significant. Moreover, in the analysis of variance of rainfall for these five places alone, the error variance, *i.e.*, variation due to chance is much greater than the same between localities. Therefore the region comprising these five localities may be regarded as a separate homogeneous unit as far as rainfall is concerned.

*REFERENCE*

Fisher, R.A. (1938). *Statistical Methods for Research Workers.*

**TABLE 1**

**Statistics of rainfall distribution**

| Talukas (represented by Headquarters) | Range | Mean | Standard deviation | Coefficient of variability |
|---|---|---|---|---|
| Palghat | 52·56 | 82·99 | 12·16 | 14·65 |
| Perinthalmanna | 64·03 | 111·21 | 16·27 | 15·97 |
| Manjeri | 92·56 | 116·16 | 23·19 | 20·11 |
| Manatoddy | 66·74 | 104·36 | 16·12 | 15·44 |
| Cannanore | 85·30 | 123·19 | 20·67 | 16·78 |
| Tellicherry | 87·23 | 128·13 | 21·82 | 17·03 |
| Badagara | 70·18 | 135·07 | 19·48 | 14·42 |
| Calicut | 67·02 | 125·84 | 17·62 | 14·01 |
| Ponnani | 73·79 | 115·30 | 18·68 | 16·20 |

**TABLE 2(a)**

**Analysis of Variance of annual rainfall**

| Source of Variation | Sum of squares | Degrees of freedom | Variance | Calculated 'F' |
|---|---|---|---|---|
| Years | 63352 | 26 | 2437 | 25 |
| Localities | 51512 | 8 | 6439 | 66 |
| Error | 20339 | 208 | 98 | |
| Total | 135203 | 242 | | |

**TABLE 2 (b)**

**Analysis of Variance of July rainfall**

| Source of Variation | Sum of squares | Degrees of freedom | Variance | Calculated 'F' |
|---|---|---|---|---|
| Years | 20162 | 26 | 7755 | 722 |
| Localities | 6349 | 8 | 794 | 7050 |
| Error | 296 | 208 | 1·1 | |
| Total | 26807 | 242 | | |

**TABLE 3**

**Interplace correlations**

| | Perinthalmanna | Manjeri | Manantoddy | Cannanore | Tellicherry | Badagara | Calicut | Ponnani |
|---|---|---|---|---|---|---|---|---|
| Palghat | ·61 | ·44 | ·71 | ·75 | ·61 | ·72 | ·74 | ·67 |
| Perinthalmanna | | ·71 | ·78 | ·53 | ·59 | ·63 | ·56 | ·74 |
| Manjeri | | | ·64 | ·59 | ·66 | ·74 | ·72 | ·66 |
| Manantoddy | | | | ·78 | ·71 | ·70 | ·75 | ·69 |
| Cannanore* | | | | | ·85 | ·87 | ·87 | ·64 |
| Tellicherry* | | | | | | ·98 | ·97 | ·62 |
| Badagara* | | | | | | | ·99 | ·68 |
| Calicut* | | | | | | | | ·62 |
| Ponnani* | | | | | | | | |

NOTE—All the correlation coefficients are positive

*Headquarters of coastal talukas