551 77·3(548·8)

VARIATIONS IN RAINFALL AT SHORT DISTANCES IN MORADABAD AND MEERUT DISTRICTS IN UTTAR PRADESH

In two previous papers (Agarwala 1961, 1962) the author had discussed the results of analysis of mean monthly rainfall in Delhi area as well as certain aspects of heavy rainfall in and around Delhi. A similar study of variations in rainfall at short distances in Moradabad and Meerut district areas in Uttar Pradesh has been made. These two districts have been chosen as they afford a close net-work of raingauge stations and the region also does not have any unusual topographical features. For this purpose the daily rainfall data of 6 raingauge stations situated in Moradabad district and 7 raingauge stations situated in Meerut district during the months July to September 1959 have been taken into consideration. The raingauge stations are—(1) Moradabad, (2) Thakurdwara, (3) Amroha, (4) Hasanpur, (5) Sambhal and (6) Bilari in Moradabad district and (7) Meerut, (8) Sardhana, (9) Mawana, (10) Baghpat, (11) Ghaziabad, (12) Hapur and (13) Dasna in Meerut district. The locations of the above thirteen raingauge stations are indicated in Figs. 1 and 2.

The amounts of monthly rainfall recorded during the months of July, August and September 1959 at these stations are given in Tables 1 and 2.

It will be seen that the space variations are quite considerable. In Moradabad area (Table 1) rainfall amounting to 581 mm for the three months July to September 1959 was recorded at Bilari while it was only 430 mm at Sambhal for the same period, although the straight distance between these two places is only 21 km. The rainfall for each of the months July to September shows similar differences. The figures in Table 2 indicate that the space variations in Meerut area are even larger; while rainfall amounting to 628 mm for the 3-month period was recorded at Mawana, only 276 mm of rainfall was recorded at Baghpat, *i.e.*, about 44 per cent of the former, the straight distance between the two stations being 77 km. When the monthly rainfall in individual months is examined, it is found that the percentage variations are higher. It is also seen that the difference in the total rainfall is the smallest between some pairs of stations.

The space variations based on 24 hours' rainfall values have also been examined.

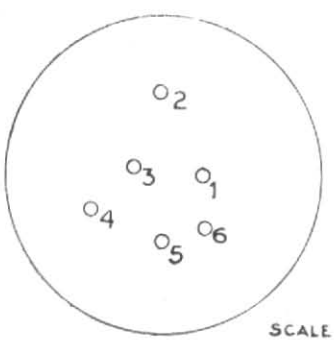

Fig. 1

1. Moradabad
2. Thakurdwara
3. Amroha
4. Hasanpur
5. Sambhal
6. Bilari

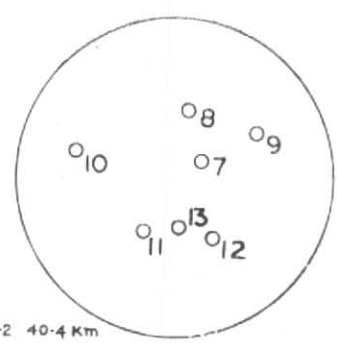

Fig. 2

7. Meerut
8. Sardhana
9. Mawana
10. Baghpat
11. Ghaziabad
12. Hapur
13. Dasna

TABLE 1

Rainfall (mm) during July, August and September 1959 in Moradabad District

Name of observatory	Distance from Moradabad (km)	July	August	September	Total (Jul to Sep)	Normal (Jul to Sep)
Moradabad	..	95·3	362·2	74·5	532·0	762·0
Thakurdwara	25	180·6	321·6	50·6	552·8	842·0
Amroha	31.5	94·6	291·8	138·0	524·4	737·4
Hasanpur	51	132·2	255·0	99·2	486·4	639·3
Sambhal	34	67·4	174·8	187·7	429·9	667·3
Bilari	24	187·8	205·1	188·2	581·1	722·4

TABLE 2

Rainfall (mm) during July, August and September 1959 in Meerut District

Name of observatory	Distance from Meerut (km)	July	August	September	Total (Jul to Sep)	Normal (Jul to Sep)
Meerut	..	43·0	284·3	111·9	439·2	590·6
Sardhana	23	64·1	252·4	92·3	408·8	542·3
Mawana	29	108·1	343·8	175·6	627·5	622·8
Baghpat	53	34·3	162·0	79·7	276·0	533·4
Ghaziabad	40	87·4	146·6	77·3	311·3	433·6
Hapur	34	*	195·1	34·0	..	505·2
Dasna	31	58·3	202·4	61·6	322·3	481·8

* Data not available

TABLE 3

Daily rainfall (mm) in Moradabad area

	Moradabad	Thakurdwara	Amroha	Hasanpur	Sambhal	Bilari
July						
7	25·0	18·0	0·0	6·0	1·8	18·2
8	38·0	25·8	24·0	29·1	17·9	55·0
18	25·0	69·0	13·6	10·0	5·0	13·0
19	0·0	3·8	0·0	1·6	3·1	3·0
August						
2	35·1	9·4	56·0	7·0	2·2	4·0
3	32·0	22·0	12·5	24·0	4·2	0·0
4	78·2	4·2	13·1	4·3	24·2	91·4
5	2·3	1·0	0·0	3·8	8·0	4·6
19	46·2	55·0	104·1	74·2	33·3	48·0
September						
19	0·0	2·0	3·3	8·6	30·6	0·0
20	2·3	2·0	0·0	0·8	0·0	0·0
24	0·0	14·5	42·3	11·7	26·3	7·4

TABLE 4

Daily rainfall (mm) in Meerut area

	Meerut	Sardhana	Mawana	Baghpat	Ghaziabad	Hapur	Dasna
July							
7	14·0	12·9	5·8	1·5	29·5	*	7·6
8	3·0	0·0	21·1	0·0	8·4	*	7·6
August							
2	30·6	19·6	24·4	4·8	13·2	0·0	3·3
11	2·0	2·5	0·8	2·0	1·0	1·3	30·5
16	14·3	9·4	4·8	6·9	0·0	1·3	0·0
17	54·0	53·6	80·0	4·3	0·0	26·9	10·2
19	80·0	64·5	43·2	42·7	30·5	20·6	20·3
September							
3	11·6	2·0	67·3	17·3	53·6	7·9	27·7
24	3·6	5·3	16·5	8·4	11·6	7·1	29·2

*Data not available

The daily rainfall figures for selected days, illustrative of heavy rainfall, moderate rainfall and light rainfall, are given in Tables 3 and 4.

It will be seen from the figures given in Tables 3 and 4 that the rainfall variations are very striking. Although the variations appear to be somewhat random and irregular, certain general conclusions can be drawn. In the case of showery type of precipitation the active rain centre is of limited extent and as such, the variations from station to station, even at short distances, are more pronounced. On the other hand, when the rainfall is continuous and heavy, it generally falls from extensive cloud layers and the space variations at short distances are not, therefore, expected to be so large. The actual position of the active rain centre on a particular epoch is a very important factor in this context. To illustrate the point the pattern of rainfall on 19 August 1959 may be seen when Meerut had a rainfall of 80 mm, while the rainfall was 64·5 mm at Sardhana, 43·2 mm at Mawana, 42·7 mm at Baghpat, 30·5 mm at Ghaziabad, 20·6 mm at Hapur and 20·3 mm at Dasna. Apparently, the active rain centre was situated directly over Meerut on that day. Therefore Meerut received the highest rain, while the other stations which are situated at the periphery received comparatively less rain.

The above study of the rainfall data for the thirteen raingauge stations in Moradabad and Meerut areas confirms the earlier result in respect of the Delhi area, that is, there are appreciable space variations of rainfall at short distances and the rainfall is localised in the Moradabad and Meerut areas.

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