

RAINFALL FEATURES IN THE DISTRICTS OF BIHAR PLATEAU DURING SOUTHWEST MONSOON

1. Bihar receives nearly 85 per cent of its annual rainfall during southwest monsoon season. The season's rainfall in Bihar plateau is higher than that in the Bihar plains. The orography and the proximity of the tracks of monsoon disturbances over Bihar plateau, play an important role in causing more rain over the area.

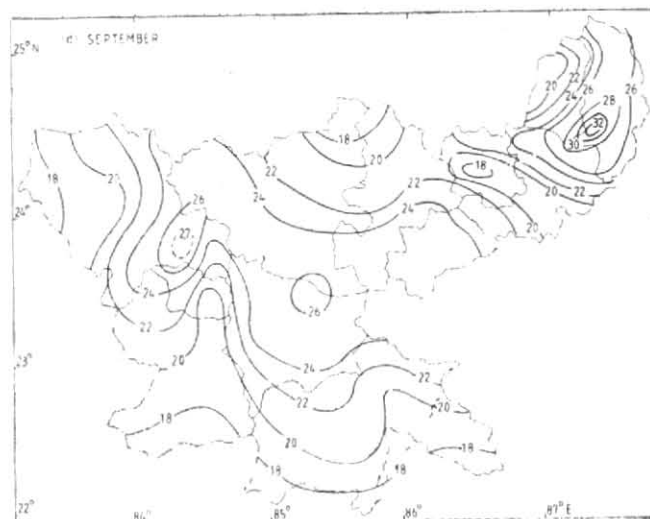
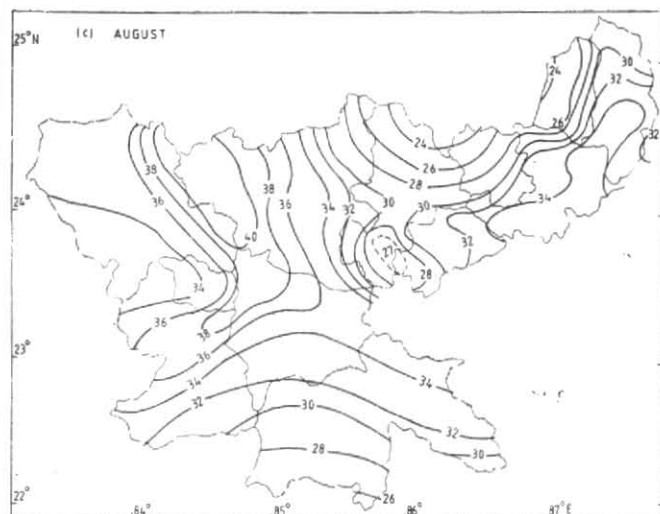
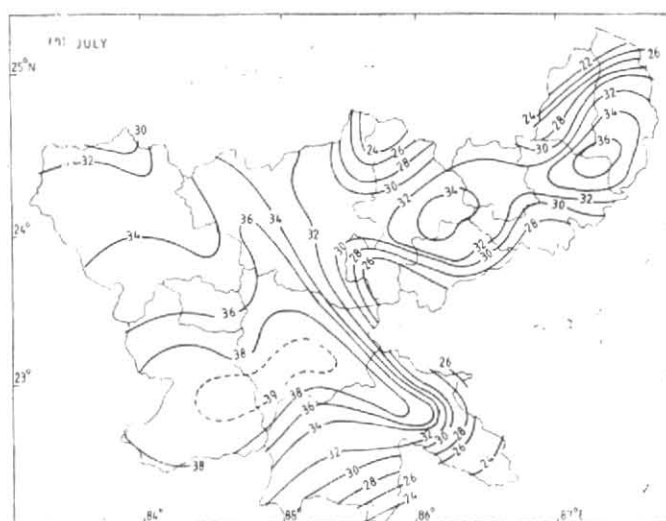
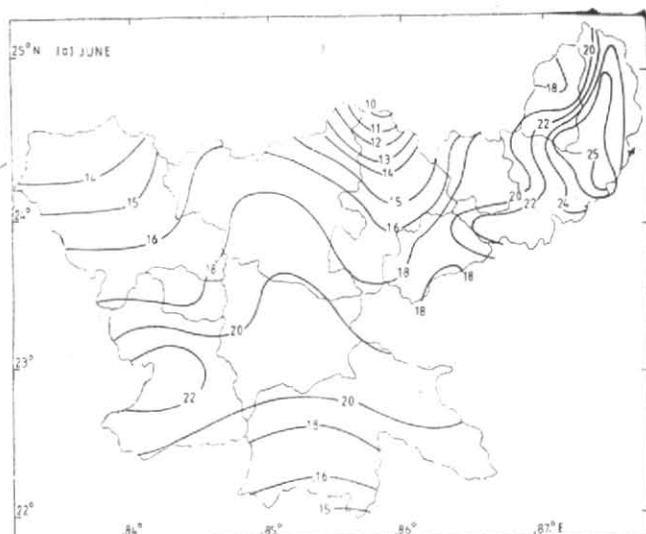
The *Climatological Atlas of India*, Part A, (1981) has limited applications since it does not describe districtwise rainfall distributions. The agricultural experts require districtwise rainfall distribution to study crop and weather parameters. Hence the potential availability of water resources districtwise during southwest monsoon was felt necessary and it is described below.

2. The rainfall data during the period of 1901-70 have been considered. Out of 38 raingauge stations located within the plateau, only 3 stations have rainfall data for less than 20 years. They were 1 out of 2 in Ranchi, 1 out of 2 in Giridih and 1 out of 4 stations in Singhbhum districts. Rest of the stations had data for 20-70 years and most of the stations (28) had data for 40-70 years period.

3. The isohyetal method which employs the areas encompassed between isohyetal contours as weights, has been used for computing average precipitation depths. In regions of physiographic influence, isohyetal contours were drawn by interpolation method.

4.1. The spatial distribution of mean monthly rainfall over districts of Bihar plateau for 4 months, viz., June to September are shown in Figs. 1 (a-d). The main features of the diagrams are given below :

(i) The rainfall increases rapidly from May to July over almost all areas of Bihar plateau. The region of high rainfall belt spreads during mid-monsoon months.



Figs. 1 (a-d). Spatial distribution of mean monthly rainfall

The rainfall over an area decreases relatively at a slower rate from August to September and more rapidly from September to October.

(ii) A high rainfall belt of about 40 cm occurs over northwest of Hazaribagh and adjoining districts of Palamau during August.

(iii) The Bihar plateau receives about 105 cm of rain during southwest monsoon (June-September). The monthly rainfall above 30 cm is recorded during July and August over the region, being slightly more in July in comparison to that in August.

(iv) The monthly rainfall during October (11.7 cm) is slightly more than that in May (9.4 cm) rainfall.

(v) The rainfall in general, falls to the north as well as to extreme south of Bihar plateau. The central belt of plateau records high rainfall comparatively.

4.2. The number of districts in Bihar plateau have increased from 8 to 12 during the years 1981-89. The

larger districts were bifurcated into smaller one. The monthly precipitation depths for each district are given in Table 1. The main features of the table are as follows.

(i) The seasonal mean district rainfall varies between 94-114 cm, being in excess of 100 cm in all districts except Giridih and Deoghar and highest of 114 cm in Ranchi and Sahebganj districts.

(ii) The highest mean monthly district rainfall occurs in Gumla and Ranchi (each about 38 cm) during July. During May, June, September and October, Sahebganj records highest mean monthly rain. During July and August, Gumla Lohardaga, Hazaribagh and Ranchi record high mean monthly rainfall.

(iii) During May and June, the mean monthly rainfall is lowest in Palamau and Giridih.

(iv) Most of the districts record monthly rainfall over or equal to 30 cm during July and August.

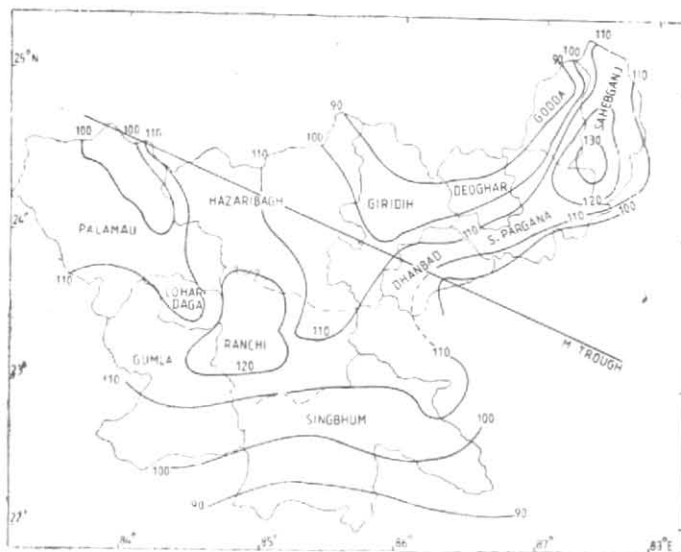


Fig. 2. Distribution of seasonal rainfall

4.3. The seasonal rainfall distribution over Bihar plateau is shown in Fig. 2. It indicates that there are two areas of high rainfall (>120 cm), one over Ranchi and adjoining districts of Gumla and the other covering portions of the districts of Godda, Sahebganj and Santhal Pargana. The highest rainfall belt of 130 cm and more lies over Sahebganj and adjoining area of Santhal Pargana districts.

The three factors, which influence the seasonal rainfall occurrence over Bihar plateau, are orography, monsoon trough and monsoon disturbances in general. The effects of these parameters are given below in brief.

(i) The belt of high mean rainfall (>120 cm) to the south of monsoon trough, lies over an area encompassed between contour height of 1000 m and adjoining area of Ranchi district. The wind generally blow W/SW over the area which are nearly parallel to the contour lines. Except a few monsoon disturbances, most of them pass through the districts to the south of normal monsoon trough line. Due to their passage, there are two types of wind field, one coming with a northerly component to the north of the system and other with the southerly component from the southern system. Due to this dual wind field and favourable topography, the convergence and uplift of moist wind result finally into precipitation over this area.

(ii) The second area of highest rainfall, consisting of the districts of Santhal Pargana, Godda and Sahebganj, do receive wind from all directions which are always at cross points with contour lines. Due to this reason, the rainfall over the area is expected on most of the occasions whenever moist air approaches from any direction.

(iii) Over Bihar plateau, the area with highest contours runs approximately across the central portion of the sub-division from westsouthwest to eastnortheast. The western portion of the sub-division has higher orography than the eastern one, still the highest seasonal rainfall over the western portion is smaller than that over the eastern portion. It is only in July that high rainfall belt appears to be mostly linked to the belt of high contours. In August and September, the agreement between the belt of high contours and the belt of high rainfall is not good.

TABLE 1
Districtwise average monthly rainfall

Districts of Bihar plateau	Average rainfall (cm)						Seasonal rainfall Jun-Sep (cm)
	May	Jun	Jul	Aug	Sep	Oct	
Palamau	1.8	15.5	33.5	34.3	21.8	5.9	105.1
Lohardaga	4.1	18.5	36.2	35.8	21.8	9.0	112.3
Gumla	7.2	20.6	38.0	34.1	19.8	8.4	112.5
Hazaribagh	3.6	16.5	31.4	34.1	22.7	7.1	104.7
Ranchi	5.8	20.3	37.7	32.5	23.5	9.1	114.0
Singhbhum	5.7	18.0	31.2	31.3	20.0	7.1	100.5
Giridih	2.7	15.1	29.1	27.6	22.0	8.4	93.8
Dhanbad	5.0	18.5	29.1	30.5	24.1	9.4	102.2
Deoghar	4.2	17.9	32.0	26.7	21.0	9.0	97.6
Santhal Pargana	6.9	22.3	31.2	32.6	22.8	11.2	108.9
Godda	6.7	20.3	28.5	27.8	23.5	9.8	100.1
Sahebganj	9.4	24.2	31.6	31.5	27.1	11.7	114.4
Total	63.1	227.7	389.5	378.8	270.1	106.1	

Mean seasonal rainfall = 105.5 cm

5. (i) The Bihar Plateau as a whole, receives about 105 cm of rain during southwest monsoon season. The monthly rainfall in the region is over 30 cm during mid-monsoon months of July and August.

(ii) The rainfall in general, decrease to the north and to the extreme southern areas of Bihar plateau. The central belt of the plateau records high rainfall comparatively.

(iii) The seasonal (June-September) rainfall indicates that the rainfall over the 12 districts of Bihar plateau is in the range of 94-114 cm. The districts of Ranchi and Sahebganj record highest seasonal rainfall of about 114 cm.

(iv) During southwest monsoon, the highest monthly rainfall (about 38 cm) is recorded during July in the districts of Gumla and Ranchi.

(v) The seasons' rainfall in the districts of Giridih and Deoghar is lowest and is around 95 cm.

(vi) Though the rainfall occurrence during 'break' monsoon condition is not considered in the present study, it is expected that during the 'break' W/SWly wind blow nearly parallel to the contour height lines over western districts of Bihar plateau and blow nearly perpendicular to the contour height lines over the districts of Godda, Sahebganj and adjoining areas in the east.

References

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