

Floods in the north Indian rivers during June-July 1955*

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1. Once again this year, severe floods have occurred in the Himalayan rivers traversing through the regions of Uttar Pradesh, Bihar, Bengal and Assam causing untold suffering to thousands of people and extensive damage to property and cattle. The areas affected by floods are shown in Fig. 1. The floods in east Uttar Pradesh in the second half of July 1955 have been described as the worst in that area for the past 70 years or so. These floods followed the heavy concentrated rain during the period 18-22 July 1955 in the contiguous districts of Jaunpur, Faizabad, Gorakhpur, Azamgarh and Gonda.

Some of the noteworthy falls were :

17 July	Jaunpur	5.0"
18 July	Azamgarh	7.3"
19 July	Banaras	4.8"
	Macchlishahr	6.8"
	Mariahu	14.6"
	Jaunpur	6.2"
20 July	Jaunpur	8.5"
21 July	Bahraich	7.3"
	Gonda	8.5"
	Amethi	5.1"
	Faizabad	9.4"
22 July	Faizabad	6.5"

During this week the rainfall in these districts were 3-4 times their normal amounts. Antecedent to the floods, this region had good monsoon from the second week of June with a spell of heavy rainfall during 18-20 June 1955. As a result, all the rivers, streams,

puddles and low lying areas would have been filled before the onset of the flood producing storm in July. Southeast Uttar Pradesh, being somewhat in the shape of a bowl, gets water-logged easily so that when the heavy concentrated rains set in, it would appear that the run-off could not be contained within the rivers and, there being no easy way out, resulted in floods. The Gomati and its tributaries, particularly the Tons, reached flood levels which were reported to have surpassed any during the last 70 years or so.

2. The floods in north Bengal were the consequence of a spell of very heavy rainfall in the last week of July associated with a period of 'break' conditions in the monsoon. An idea of the magnitude of rainfall during this period may be had from the following rainfall records:

24 July	Jalpaiguri	4.0"
25 July	Cooch-Behar	8.6"
26 July	Jalpaiguri	7.7"
	Cooch-Behar	8.9"
27 July	Cooch-Behar	5.8"
30 July	Jalpaiguri	4.4"
	Kalimpong	4.0"
31 July	Jalpaiguri	4.6"
	Cooch-Behar	6.5"
1 August	Kalimpong	5.4"

The pre-existing conditions in this area also were very favourable for the occurrence of severe flood. From 10 June when the monsoon first advanced over this region, the Darjeeling, Cooch-Behar and Jalpaiguri districts had been getting good rainfall till the third week of July, with a short respite for

*This article was prepared by K. Parthasarathy, Meteorological Office, New Delhi

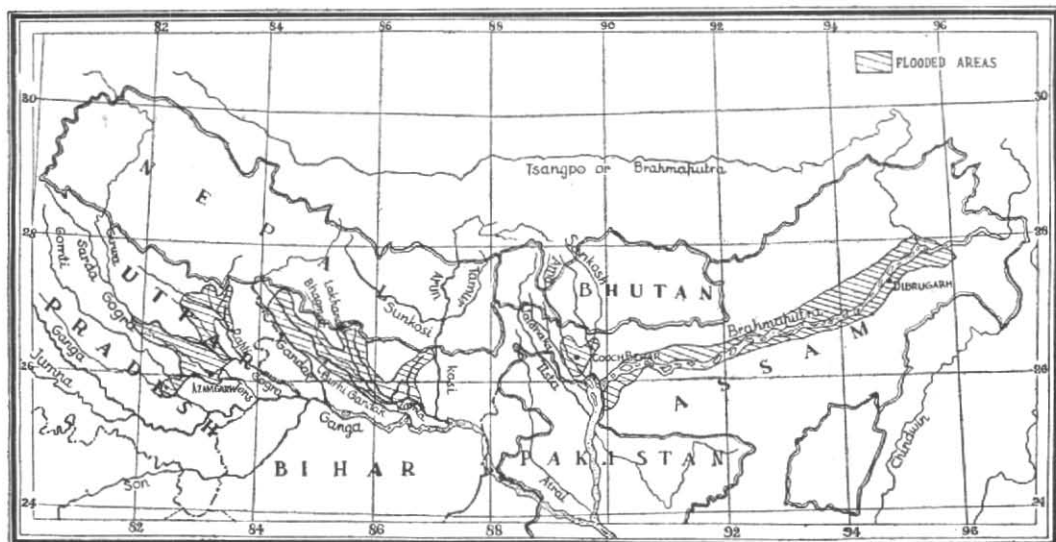


Fig. 1. Map showing areas flooded during June-July 1955

about a week. The very heavy rains following this period of good rainfall naturally caused severe floods in the Tista, Jaldhaka and other rivers of north Bengal towards the end of July. Cooch-Bihar and Jalpaiguri districts were very badly hit by the floods.

3. The main floods in Upper Assam also occurred about the same time as the floods in north Bengal and due to the same cause. The districts of Darrang, Kamrup and Goalpara had been having good monsoon rainfall from the beginning of June with a heavy spell between the 19th and 22nd of that month. Moderate floods occurred in the rivers of this region about the middle of June. The heavy rainfall during the 'break' in the last week of July came at a time when the Brahmaputra and its tributaries were already in spate and this resulted in these rivers overflowing their banks and flooding the areas and causing considerable damage. Actual records of rainfall in Northeast Frontier Agency are not available but it may be presumed that the region should have had abnormal heavy rainfall during this period.

4. In Table 1 is given the distribution of rainfall week by week in the different districts affected by floods. The figures given are the

ratios of the actual to the normal rainfall for the weeks. It will be seen from the above table that during the period of floods these districts received 3-4 times or more of their normal weekly rainfall. Even this heavy rainfall was not spread throughout that week but occurred in the course of 4 or 5 days only. This will give an idea of the intensity of the rainfall and hence the magnitude of the resulting run-off rates.

5. The following brief description of the course of the monsoon during June and July 1955 will bring out the factors which were responsible for the rainfall pattern leading to the floods detailed in the preceding paragraphs. The monsoon advanced into Assam and sub-Himalayan West Bengal about the usual time in the first week of June and into Bihar by 10 June. It continued to be active over these areas till 22 June. A land depression which formed over Vindhya Pradesh on the 16th and moved eastwards to Bihar and filled up by 22nd, extended the monsoon into east Uttar Pradesh, and also caused a spell of heavy rainfall in the region from Bihar to Upper Assam between the 18th and 22nd. During this period, Champaran and Darbhanga districts of Bihar, Darjeeling and Cooch-Bihar districts of West Bengal and Goalpara

TABLE 1

State	District	Ratio of actual/normal rainfall for the week ending						
		22 Jun	29 Jun	6 Jul	13 Jul	20 Jul	27 Jul	3 Aug
Uttar Pradesh	Allahabad	1.7	0.2	2.2	0.8	3.5	0.6	0.5
	Banaras	1.8	0.3	3.1	0.4	6.0	0.5	0.0
	Jaunpur	2.3	1.4	5.0	0.2	7.2	0.7	0.0
	Gazipur	1.5	..	1.5	0.2	3.9	0.3	0.0
	Ballia	5.0	..	1.3	0.2	2.6	0.9	0.2
	Gorakhpur	7.2	0.0	1.0	0.1	1.7	0.1	1.0
	Azamgarh	3.4	0.3	1.0	0.8	5.2	0.2	0.1
	Faizabad	6.0	0.5	4.5	0.3	6.1	5.9	0.8
	Gonda	3.3	0.6	1.8	0.5	3.6	4.1	1.0
Bahraich	4.7	1.5	1.0	1.0	3.6	6.6	1.7	
North Bihar	Champaran	2.1	0.0	0.1	0.2	1.3	1.6	2.1
	Darbhanga	1.9	0.1	1.4	1.1	4.0	1.0	4.1
	Purnea	1.3	0.0	1.7	0.6	1.9	2.0	1.3
North Bengal	Jalpaiguri	1.8	1.5	0.9	0.9	1.2	4.0	2.9
	Darjeeling	0.7	0.7	1.1	0.7	1.3	0.7	0.9
	Cooch-Bihar	1.2	0.3	1.4	1.2	0.7	4.3	2.5
North Assam	Goalpara	2.3	5.3	0.7	0.4	1.4	4.7*	..
	Kamrup	2.8	0.3	1.5	0.5	1.8	1.8	0.1
	Darrang	0.9	1.8	1.8	0.4	1.8	1.5	0.3
	Lakhimpur	0.5	1.1	1.3	1.7	1.5	1.8	0.6

* Rainfall data upto 25 July only available

and Darrang districts of Assam and most of the eastern districts of east Uttar Pradesh experienced heavy rainfall nearly 2-3 times their normal rainfall. After 22 June, rainfall decreased considerably over the region extending from east Uttar Pradesh to Assam as the activity of the monsoon was diverted to the central parts of the country and north Peninsula under the influence of two depressions which formed in the north Bay of Bengal and moved westnorthwestwards across Orissa and Madhya Pradesh. During the first week of July, the monsoon trough shifted north of its normal position and the rainfall increased in the hills and sub-montane districts from east Uttar Pradesh to Assam. The second week of July was a period of weak monsoon activity over the whole country. The monsoon strengthened again on 15 July and a depression of small extent formed

over Bihar on the 16th. It intensified into a deep depression and moving slightly westwards remained stationary over southeast Uttar Pradesh centred near Azamgarh till the 22nd and then weakened. This very slow moving depression was responsible for very heavy concentrated rainfall over a limited area around its centre between 18 and 22 July and it was this rainfall that was responsible for the severe floods in the eastern districts of Uttar Pradesh. With the weakening of the depression, the axis of the monsoon trough which was already north of its normal position shifted towards the foot of the Himalayas and ushered in the well-known 'break' conditions. Thereafter, till the end of July, rainfall was confined to the hills of sub-montane regions from Bihar to Assam. The strengthening of the Bay of Bengal branch of monsoon about 24 July and the

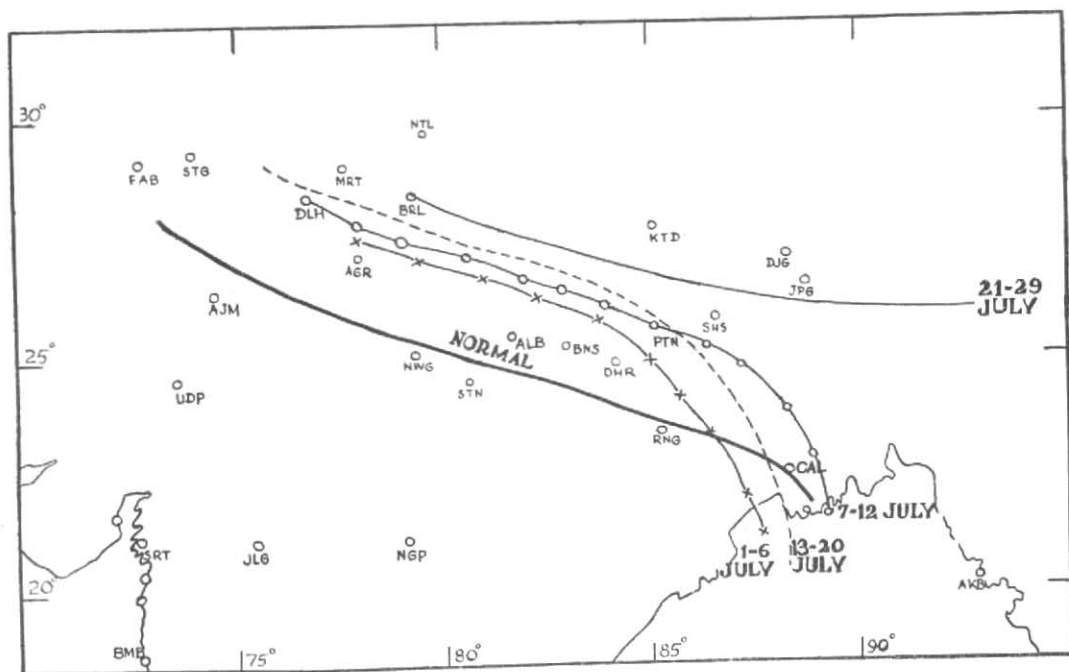


Fig. 2. Map showing the positions of the axis of the monsoon trough during July 1955

movement of an upper air trough across the central Bay of Bengal caused a vigorous inflow of the Bay monsoon air to the eastern Himalayas, so that during the period, 24 to 28 July, very heavy rainfall occurred in sub-Himalayan West Bengal and Upper Assam. Towards the end of the month the monsoon trough shifted back to its normal position and the rainfall of the sub-montane regions decreased considerably.

6. An important feature of the period from the middle of June to the end of July was the continued displacement of the monsoon trough north of its normal position during most of this period. Fig. 2 shows the positions of the axis of the monsoon trough during different periods in July. This resulted in rainfall being more in the region from Uttar Pradesh to Assam than further southwards. With this disposition of the trough, there

was practically no monsoon depression during July, while only one land depression developed in and near east Uttar Pradesh and caused extensive rain over this area. The Bihar rivers, particularly the Kosi did not appear to have had such heavy floods this year as in the last year. The rainfall data of the Kosi catchment in Nepal during June-July 1955 show that that catchment did not receive any unusual rainfall this year whereas in July 1954 most of the stations in the Kosi catchment received 2 or 3 times their normal July rainfall in the course of the last 10 days of July. It would appear from the absence of spells of heavy rainfall in the interior of Nepal that one of the chief causes of last year's floods, *viz.*, the movement of active waves in the westerlies across the southern periphery of the Himalayas did not play any active part in this year's floods.