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### KADDAM RIVER FLOOD OF 31 AUGUST 1958

Kaddam River is a small tributary draining into River Godavari (Fig. 1). The basin of this river lies mostly in the Adilabad district of Andhra Pradesh. According to the statements in the press and radio, there was a big flood in the Kaddam river on 31 August 1958 which over-topped and damaged a newly constructed dam across the river that was nearing completion. This dam is said to have been designed to pass a peak flood of 250,000 cusecs. The peak discharge during the 31 August flood has been estimated as 574,000 cusecs, more than double the design discharge adopted for the dam. Based on these information a cursory and rough examination of the current years' flood and the adopted design flood has been attempted in this note.

The area of the Kaddam basin is about 1100 sq. miles. The basin is approximately

rectangular in shape with a river length of about 40 miles. The time of concentration of a basin of these dimensions works out to about 7 hours. The flood peak during any storm covering the entire rain will, therefore, be decided by the maximum seven-hour rainfall that occurs in the basin during the storm. Assuming a storm run-off coefficient of 0.80 (which is indeed very high), the average rainfall intensity in inches per hour during a seven-hour period, which would cause a peak discharge of 574,000 cusecs from the basin can be obtained from the formula  $640 \times A \times K \times i = Q_m$  where  $Q_m$  is the maximum discharge in cusecs,  $A$ , the area of basin in sq. miles,  $K$ , the run-off coefficient and  $i$  the average intensity of rain in inches per hour over the basin for a duration equal to the concentration period.

We have, therefore,

$$640 \times 1100 \times .8 \times i = 574000$$

$$\text{or } i = 1.01''$$

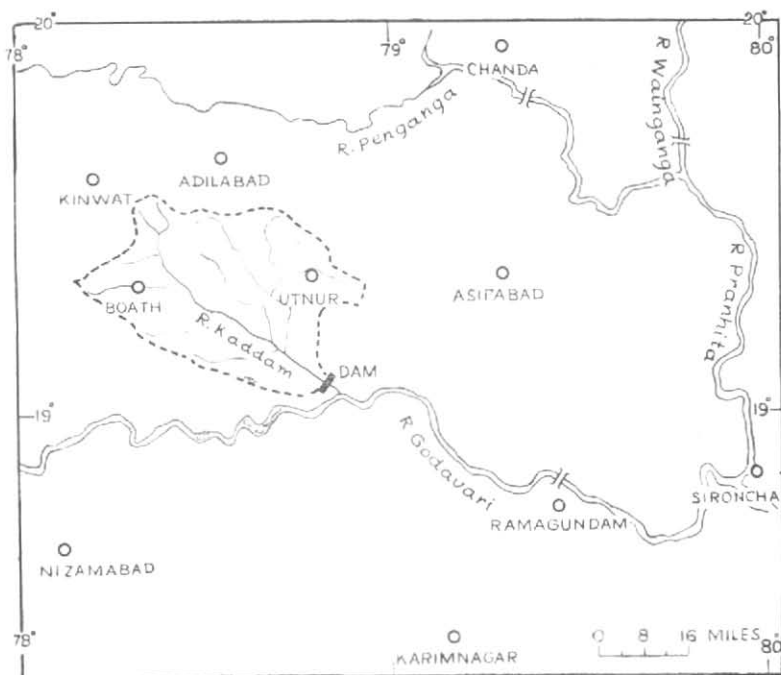


Fig. 1

From this calculation it will be seen that if the estimate of the flood is correct, the basin should have received a rainfall of nearly 7" within 7 hours during 30-31 August.

No data of rainfall within the basin is available, but in the neighbourhood, Asifabad recorded 10.4", Chanda 6.5" and Adilabad 7.2", all on 31 August. It is, therefore, not improbable that within the basin, rainfall of 8" to 10" occurred during 30-31 August and that most of this amount was concentrated within a 7-hour period.

Considering the design of the dam to pass a peak discharge of 250,000 cusecs this design has allowed for a maximum rainfall of about 3" in 7 hours. If we make the plausible assumption that 2/3 of the 24-hour rainfall on a heavy rainfall occasion occurs within a period of 7 to 10 hours (this is on the low side), the provision that has been kept in the dam design is only for a 24-hour rainfall of 4.5". From the frequency analysis of the daily rainfall data of stations

in Hyderabad area (Hyderabad and Mahbubnagar), Rao (1958) has derived probabilities in years of 24 hours rainfall exceeding various amounts and has shown that a rainfall of 6" in 24 hours can be expected once in about 35 years, a rainfall of 7.5" once in 75 years and 8" once in 100 years. When we compare these figures with the provision kept in the dam, namely, 4.5" in 24 hours, it is seen that this has been rather on the low side as the recurrence period of the design flood is of the order of 30 years or so only.

K. PARTHASARATHY

*Meteorological Office,*

*New Delhi*

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REFERENCE

- Rao, K. N. 1958 An approach to the problem of determination of probable maximum hourly rainfall from daily rainfall (unpublished).