

Evaluation of Precipitation Gauge Density in Punpun Catchment of Ganga River System

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ABSTRACT

Design of data collection network to provide information for assessing, developing and managing the Water Resources is to evolve the total number of key stations for precipitation, river stage and discharge measurement, their efficient location based on certain scientific criteria for selection of each station; the time span and frequency of observation, and determination of priority of network establishment. It aims to provide density and distribution of stations in a region such that by interpolation between data sets at different stations, it should be possible to determine with sufficient accuracy, the characteristics of hydro meteorological elements anywhere in the region.

Precipitation is one of the basic data required for water resources studies. Estimation of the number and locations of the rain gauge stations which will provide sufficient information regarding rainfall falling over the catchment is referred as network design. A network of rain gauges are intended to serve general as well as specific purposes such as water supply, hydropower generation, flood forecasting, irrigation and flood control. During recent years, some network design studies have been carried out but in spite of its importance, studies for determining optimum density of hydrometric network in particular are not extensive in India.

In the present report a study for design of rain gauge network in Punpun catchment which is one of the important right bank tributaries of the river Ganga has been carried out. At present the Punpun river system, comprising an area of 8530 Sq.km., is having 29 rain gauge stations located inside or in the vicinity of the catchment. The river system receives about 85 to 87 percent of its annual rainfall during South-West monsoon period which occurs from June to September. For providing better estimates of aerial rainfall for operational purposes, during the flood and other hydrological factors, the network design of rain gauges were estimated using three methods namely ;

- (a) Optimal raingauge network,
- (b) Hall's method involving key station network and
- (c) Kagan's method involving the spatial interstation correlation.

The results indicated that the aerial rainfall in the catchment should be estimated with desired accuracy, and the variation in the aerial distribution as well as time distribution should be identified. All the three techniques for the network design have yielded comparable results.