

C-01: Low flow studies in Sri Lankan rivers

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Diversion of base flow of rivers without impounding water had been in practice before reservoir concepts, even in Sri Lanka during the ancient hydraulic civilization. However analysis of low flow was not given much prominence by hydrologists, in comparison to flood peak analysis. More recently, a greater awareness of ecological factors concerning the environmental degradation of river systems specially during droughts demanded the hydrologist to pay more attention to the analysis of low flow regime in rivers.

This paper attempts to highlight the procedures and criteria to be adopted, to develop flow duration curves and flow frequency curves for river basins with definitions of indices to characterize the low flows. Such indices are required to correlate the base flow characteristics of a river basin to physical properties, such as land use, land slopes and hydrogeological parameters. Therefore this analysis will eventually lead to the regionalisation of low flows and will be useful to determine the characteristics of flow in ungauged catchments from the physiography of the river basin.

For this study, 10 small catchments in the central part of the country (located in Matale, Kandy, Kegalle, Nuwara Eliya, Ratnapura and Badulla districts) were selected. In order to obtain long term time series (30 years), these catchments were mathematically modelled from available records of rainfall and runoff. From the annual average flow series derived from generated long term data, flow duration curves and frequency curves were derived and flow indices such as Base flow Index (BFI) Flow duration curves for D days (Q 95), Mean Annual Minima (MAM 7) and Recession constant (REC 50) were estimated. These indices will provide the preliminary basis for flow estimates at the ungauged catchments in the absence of detailed hydrogeological data.