

THESIS

**SIMPLE PROCEDURE FOR DEVELOPING FLOW DURATION CURVES
AT UNGAUGED SITES USING REGIONALIZATION APPROACH.**

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ABSTRACT

The irrigation and hydropower potential of the river generally depends on the water availability and the hydraulic head at particular site. Thus, a hydrologic concern in the planning and design of diversion structure is to estimate the flow availability at the site, which is expressed by the flow duration curves. These curves provide a basic hydrologic information needed in the designing of water resources development projects including storage dams and canal headworks.

The flow duration curve was regionalized by using selected morphoclimatic characteristics of a drainage basin. The daily flow duration characteristics at eight sample watersheds in the sub humid to humid region of Pakistan were first parameterized. A flow duration curve model (FDCM) was developed to estimate the discharge.

The best daily FDCM is a mathematical power model. It is a relationship between magnitude of discharge and percent of time for each magnitude to be equalled or exceeded.

Using multiple regression and regionalization techniques, the geographic variation of each parameter of the FDCM was explained in terms of the mean annual areal precipitation, the drainage area, the drop in elevation and the mean elevation of the watersheds. The regionalized regression equations can successfully be used to synthesize

flow duration curves at other locations within the hydrologically homogeneous regions.

The technique is useful in obtaining estimate of water availability for hydropower or other water development projects at ungauged sites within the homogeneous regions.

A good agreement was found between observed and synthesized flow duration curves at tested watersheds developed by FDCM and regionalized relationships.