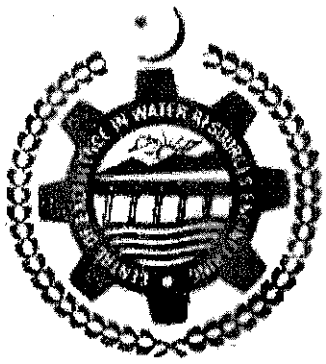
THESIS

IDENTIFICATION OF HOMOGENEOUS REGIONS FOR FLOOD FREQUENCY ANALYSIS OF JHELUM RIVER



By

Zakaullah
(2003-PG-WRE-18)

For the Degree of

MASTER OF SCIENCE

IN

WATER RESOURCES ENGINEERING

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING
University of Engineering and Technology, Lahore, Pakistan

2005

ABSTRACT

Jhelum River is one of the major tributary of the Indus basin river system. It drains the northeastern part of Pakistan, which includes the territory of occupied Kashmir, Azad Jammu and Kashmir, Northwest Frontier Province (NWFP) and Punjab. It is the main source of the supply of water for inhabitants in this region, and is the main source of supplying water for irrigation and hydropower development. The major problem in the Jhelum River Basin is the scarcity of flow data. Therefore, under the circumstances of the lack of sufficient hydrological data, a regionalization technique has been used to provide estimate of the flow characteristics for unguaged catchments. The present study covers the northeast part of Pakistan, up to Mangla dam.

The present study is the extension of the Mr. Jarrar Hassan thesis (2003). He has not used any homogeneity test for the identification of homogenous and non-homogeneous catchments and he has not used any software for the flood frequency analysis.

Flood data were assembled for the fifteen hydrological stations located on upstream of Mangla Dam on Jhelum River Basin. "DFW" software for the flood frequency analysis and "MINITAB 11" software for multiple linear regression technique were used to produce equations for predicting mean annual flood from physiographic and climatological basin characteristics. The best mean annual flood equation for homogeneous catchments obtained by regression analysis is as follow:

$$Q_{mean} = 514 + 0.099*A$$

Similarly best mean annual flood equation for non-homogenous catchments obtained by regression analysis is as follow:

$$Q_{mean} = 147 + 0.085*A$$

Flood frequency analysis was carried out and equations (given below) for different return periods were obtained. The Gumble/Extreme value 1 distribution was used on the basis of Ch-Square test whose parameters were derived by the maximum likelihood method.

$$Q_2 = 499 + 0.0873*A$$

$$Q_5 = 655 + 0.130*A$$

$$Q_{10} = 796 + 0.156*A$$

$$Q_{20} = 910 + 0.183*A$$

$$Q_{50} = 1080 + 0.218*A$$

$$Q_{100} = 1143 + 0.243*A$$

$$Q_{200} = 1276 + 0.269*A$$

$$Q_{500} = 1421 + 0.303*A$$

$$Q_{1000} = 1530 + 0.329*A$$

$$Q_{10000} = 1892 + 0.414*A$$

From the catchment characteristics (A, P, E, Q, S & L) recommended equations require only area A. Homogenous catchments were found to be more feasible than non-homogenous catchments.