

THESIS

IMPROVEMENT AND TESTING THE RELATIONSHIPS BETWEEN THE
TEMPERATURE AND THE JHELUM RIVER FLOWS EMPLOYING THE
UPDATED RECORDS: (Special Reference to the Upper Indus Basin)



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ABSTRACT

The climate change and its potential impacts are continuously contributing to the future demands and availability of water. The temperature variations lead to a vigorous hydrological cycle with fluctuating stream flows. The present study is an extensive updation of the research study conducted by Archer and Fowler in 2008 to investigate the link between climate and discharge for eight gauging stations in the Jhelum catchment. The study analysed the seasonal forecasting of spring and summer inflows to Mangla dam which is a major controlling structure contributing to the Indus Basin Irrigation system.

The present study considered six flow and meteorological stations i.e. Poonch at Kotli, Jhelum at Azad Patt, Jhelum at Kohala, Neelum at Muzaffarabad, Jhelum at Domel and Jhelum at Chinari in the Mangla catchment for detailed analysis. The flow forecasting for the seasons April to June and April to September was made by Archer and Fowler with data set of 1979-1991. The forecast relationship developed with the limited data set was tested in the present study using up to date data and improved forecast models were developed. These improved models explained $R^2 = 81, 21$ and 52 to predict the flows availability within 20% of the observed flow for 95%, 50% and 74% of the total 30 years under consideration (i.e. 1979-2008) during the seasons April to June, July to September and April to September, respectively.

The tested and improved results showed that the flow prediction for spring and summer seasons was better using the updated data-set. The results of this study can be helpful for managing water releases from Mangla dam.