THESIS

PREDICTION/FORECAST OF SEASONAL INFLOWS FOR KUNHAR & NEELUM RIVERS ON THE BASIS OF HYDRO METEOROLOGICAL PARAMETERS BY STATISTICAL APPROACH

By

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ABSTRACT

Jhelum River is one of the major tributary of the Indus basin river system. It drains the north-eastern part of Pakistan, which includes the territory of occupied Kashmir, Azad Jammu and Kashmir, Northwest Frontier Province (NWFP) and Punjab. It is the source of supply of water for inhabitants in this region, and is the main source of supplying water for irrigation and hydropower development. Efficient water resource management plans for the said purpose through Mangla reservoir need reliable prediction of monthly and seasonal inflows. The scarcity of detail catchment and hydro-meteorological data of Jhelum River Basin do not admit using any deterministic approach of forecasting inflows. Presently WAPDA (WRMD) have evolved a prediction procedure of its own, based on premise that Rabi follows Kharif season flows and Kharif follows Rabi season inflows. This study was framed to analyze statistical approach with the objective to improve prediction accuracy of two main tributaries of River Jhelum namely Kunhar and Neelum.

The objectives of the study were to assess hydro-meteorological (precipitation, temperature, flows) parameters responsible of runoff and correlating them with flows. Using that parameter as a seed in Thomas Feiring and ARIMA model for inflow prediction, which has strong correlation with flows

Long term (6 monthly) Prediction of Kunhar and Neelum River inflows was generated by using WRMD approach and its %age error with observed flows was computed.

Thomas Feiring model was used for short (monthly) and long (6 monthly) term forecast of inflow of Kunhar and Neelum. The input parameters used in this model were

historic mean flows, Slope, Standard deviation and random number. The prediction obtained by using Thomas Feiring model was compared with observed data and WRMD forecast

ARIMA model was used for long (6 monthly) term forecast of inflow of Kunhar and Neelum. The input parameters used in this model were historic monthly flows. The prediction of ARIMA model was compared with observed data and WRMD forecast.

No significant correlation has been found between inflow of Kunhar and Neelum with last month's precipitation and temperature except in few months. Strong correlation has been found between current and last month flows of Kunhar and Neelum. Correlation coefficient (r) varies from 0.5 to 0.8 in serial correlation of flows of Kunhar and Neelum.

The average Kharif and Rabi season forecast of Kunhar and Neelum River by WRMD approach has error of 15 to 25 % with observed flows. The average Kharif and Rabi season forecast of Kunhar and Neelum River by Thomas Feiring has error of 15 to 25 % with observed flows. The error of 15 % and 50 % has been observed in Kunhar and Rabi seasonal forecast by ARIMA.

It has been found that Kharif season forecast of ARIMA for Kunhar and Neelum was comparatively more close to observed flows. In Rabi season of Kunhar the result of WRMD forecast were found comparatively less erroneous. Thomas Feiring model was performing better for Rabi season forecast of Neelum in comparison to WRMD approach and ARIMA model

The findings of the study were that Kharif season forecast of Neelum and Kunhar should be based on ARIMA model. Thomas Fering and WRMD approach should be preferred for Rabi season forecast of Kunhar and Neelum respectively.