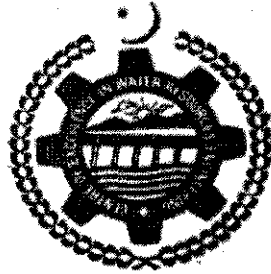


THESIS

**RAINFALL RUN OFF RELATIONSHIP FOR DARABI
WATERSHED IN CHAKWAL**



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ABSTRACT

Rainfall-Runoff relationship is essential for planning and design of soil and water conservation structures, flood estimation and control. Runoff is a complex interaction between precipitation and landscape. Water is one of the most important resource available and it is controlled by a natural phenomenon of "Hydrological Cycle". Hydrological modeling is a complex phenomenon in which a relationship is created between the input and output parameters. In this study the detailed analysis of runoff mechanism was done by using a selected empirical approaches e.g Rational formula, Inglis formula, Lacy,s formula , Khosla Formula and Semi distributed approach(TOPMODEL). The outcome of this study is quite helpful for future work in water resources development techniques such as construction of small dams, ponds, soil and water conservation structures for agriculture purposes. Lacy formula, Inglis formula, khosla formula and Rational formula were applied for flow simulation. Inglis formula can be applied in the catchment where rainfall is more than 180 mm and khosla formula can be applied where the rainfall is more than 110 mm below these values these approaches will give very strange results that is not possible. Comparison of low, medium and peak flow events were made for Rational and Lacy formula. It was observed that in low flows Rational formula made under estimation and in medium and peak flow events Rational formula made overestimation. Lacy formula could not estimate low, medium and flow accurately than Rational formula. Rational formula is best from selected Empirical approaches but results obtained from rational formula were not satisfactory. Flow was also simulated by TOPMODEL. Low, medium and peak flow events were selected to check the results. TOPMODEL showed a very good simulation results against all selected events and showed a satisfactory results. Model

efficiency for Dharabi watershed was 74%. Comparison of low, medium and peak flows of best selected empirical relationship was made with semi distributed approach (TOPMODEL). Results of research showed that the simulated flow by TOPMODEL was very near to the observed flows both in low, medium and peak flows. Hence the semi distributed(TIPMODEL) was suitable for Dharabi watershed. Runoff fraction was determined for Dharabi watershed which was 0.73. Rainfall runoff relationship was also determined by using TOPMODEL $y = 12359x + 81183$, $R^2 = 0.844$ in which X =Rainfall (mm), Y =Volume (mm)