THESIS

SPATIAL AND TEMPORAL ANALYSIS OF HYDROLOGICAL AND TOPOGRAPHICAL PARAMETER FOR THE DESIGN OF WATER CONSERVATION STRUCTURES

(A Case Study of Pothwar Area)

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ABSTRACT

Pothwar Plateau is the largest contiguous block of rain fed agriculture in Pakistan, covering 28% of the total rain fed area of the province. According to its characterization it has semi-arid to sub-humid climate having hot summer and cold winters which effect agricultural production. The main source of irrigation is rainfall and crop yields are low per unit area due to traditional practices of agriculture. This research aims to determine utilization and conservation of rainfall, estimation of rainy seasons especially in monsoon season and topographical feature of Pothwer area. The main objective of this research was to assess the historical analysis of rainfall in Islamabad, Chakwal and Jhelum districts and the identification of rainfall trends by computing probability distributions. The rainy season of the study area was identified by statistical analysis of ten year daily basis rainfall data. The data was observed on weekly, monthly and annually basis. Exponential distribution of rainfall in each week, month and year was drawn. Using Arc GIS stream network expect of stream slope and classification of the Pothwer area was done. Spatial interpolation of the study area was done by using Inverse distance weighted, Splining and Kriging methods. Using crop factor (Kc) and reference evapotranspiration (ET) of the study area, crop water of the regional crops were calculated.

Time series analysis of rainfall shows that there were two major rainy seasons in study, first starts from mid of January and end in March and second starts from June to mid of October called monsoon. About 60 % of total annual rainfall occurred in these seasons. The distribution pattern of rainfall shows that it follows the exponential distribution pattern. Also in monsoon season same trend was observed. The comparison of crop water requirement of study area and available rain fall shows that rainy water can fulfill the 70 % of annual crop water requirement. Kriging interpolation technique was found better than other interpolation techniques.