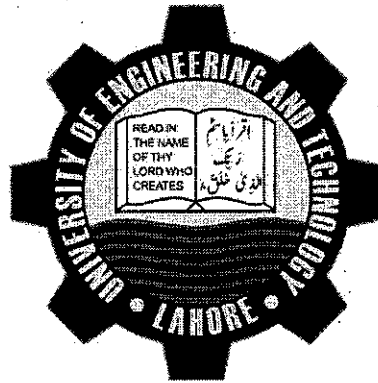


**IMPACT OF LAND USE LAND COVER CHANGES ON  
TRANSBOUNDARY INFLOWS AT DEGH NULLAH BY USING  
SATELLITE-BASED DATA**

Acc # 7548



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## ABSTRACT

Water is the most essential source for living things. Better management and planning associated with water resources is crucial for the sustainable socio-economic development. Land use and land cover (LULC) variations have significant impact on hydrological dynamics and water resources availability. Moreover, collection of hydro-meteorological data is a difficult task due to lack of measurement devices, inaccessibility of the terrain and limitations of space/time especially in the case of transboundary river basins. Therefore, current study investigates the impacts of LULC changes on streamflow by using the satellite based climatic data in a transboundary river Degh Nullah, a natural drain in Rachna Doab of Punjab province.

Impacts of LULC changes on hydrological response were evaluated by using ArcSWAT model. To address the data unavailability issue in Indian occupied Kashmir, satellite-based Climate Forecast System Reanalysis (CFSR) meteorological data were used as an input in SWAT model. Due to deforestation and rapid urbanization in the upper area of the Degh Nullah basin, a significant change was observed in the river streamflow. Results of this study showed significant changes in the land use over the period of 2005-2017, i.e., reduction in forest land (39.3% to 25.7%), increment in agricultural land (25.7% to 30.5%) and urban land (15.2% to 21.7%). SWAT model calibration and validation results indicated the values of statistical measures like  $R^2$ , i.e., 0.86 and 0.86 and Nash-Sutcliffe, i.e., 0.85 and 0.84, respectively. To examine the future impacts of LULC changes on the flows of Degh Nullah, three distinct landuse and land cover change scenarios were proposed based on the urbanization and deforestation. Two out of three scenarios showed an increase

in annual flow in Degh Nullah and the third scenario exhibited decreased mean annual discharge. It is believed that the results of the present study will be helpful to predict the flows in Degh Nullah during monsoon period for the better flood management in the area.