

Geomorphological Studies of Bagmati Basin of Kosi River System

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ABSTRACT

Geomorphology is generally considered as the science of land reforms. In the field of flood control measure and engineering projects, the adequate knowledge of geomorphology of the region is of importance, since the geomorphological characteristics of river basins in mountainous areas affect runoff process and formation flood. In spite of the fact that the hydrologic balance of a region is dynamic and ever changing, different approaches have been made to obtain relationships involving morphological, geological and climatic characteristics.

For the purpose of hydrological studies of a basin the geomorphological characteristics of basins are very much essential for understanding the hydrological behaviour. The most important factors influencing the runoff and sediment production rate are the climate, soil conditions, vegetation, land use, geology and topography of a watershed. Vegetation and geology are difficult to be quantified. Therefore, a logical alternative, which has already been used successfully, has been utilised in order to model the hydrologic responses such as mean annual runoff, average sediment production rate and probabilistic annual runoff of a watershed by using mean annual rainfall and basin characteristics in the form of geomorphic parameters.

The geomorphology study of Bagmati basin has been suggested by Bihar State Irrigation Department. The river Bagmati is a inter-country river which has more than fifty percent catchment area in Nepal. This restricts the availability of hydrological data of complete basin. The river Bagmati passes through two distinctly different terrains. From the origin to a little above the Indo-Nepal borders, the catchment is hilly and forested while further down to its confluence with the Kosi, it is almost plain. As the river Bagmati has been shifting its course constantly in the past within the measuring zone, it become necessary to have a clear idea of geomorphological characteristics of the basin.

In this report a comprehensive review of various geomorphological properties covering the linear, areal and relief aspects of the basin is presented. Methodology for the estimation of some of the important geomorphological parameters is also described. Further some of the major and widely used geomorphological parameters of the Bagmati basin upto Hayaghat have been evaluated. The review of various hydrological studies reveals that the different geomorphological parameter derived for Bagmati basin can be utilised for modelling of hydrologic response.