Abstract

The present research has attempted to analyze channel planform dynamics of the Chel River during last 62 years in the piedmont of Eastern Sub-Himalayan North Bengal. Channel dynamics is an inherent characteristic of rivers flowing in Terai and Dooars of Sub-Himalayan North Bengal plains and also beyond it southwards in the entire Barind tract of Ganga-Brahmaputra-Meghna system of Bengal basin. In fact, Chel basin falls under the Teesta Basin which is a part of Brahmaputra basin and thus forms a part of the upper Barind tract, an alluvial tract wherein river have been much dynamic and documented records of the same is available for about 250 years since the first maps of the region prepared by Rennell was published in 1780.

Channel dynamics studies in India have been mostly concentrated on the large alluvial rivers of Ganga and Brahmaputra. Huge volume of literature is available for upper and middle Ganga plain followed by similarly of upper and middle course of Brahmaputra. In Bengal the study till day is much focused on Lower Ganga plain. Studies on rivers of Terai and Dooars as such are very less and fragmentary too. Unlike rivers of south Bengal the rivers of north Bengal flow through transitional physiography between Himalayas and lower alluvial plains. Thus, though smaller in size and volume of water, they display great dynamics. Within the Terai and Dooars iteself, we find disparity in the amount of studies among the rivers as much study has been done on rivers like Mahananda, Balason, Teesta, Lish, Gish, Jaldhaka, Torsa whereas comparatively studies on Chel River is less and fragmentary. During extensive literature review, the author came across few published research articles on Chel River but couldn't get any M.Phil and Ph.D dissertation on Chel River basin.

The selection of the Chel river for the present study was also prompted by the fact that the Chel river drains through the tectonically active Himalayan region and its foreland, thus gives an opportunity to test response of drainage lines and watershed to the neotectonics. Further, the entire course of the Chel is accessible to verify the results generated by remote sensing and GIS.

Field surveys were conducted to measure the channel cross profiles and hydrological parameters at 2km interval. Estimation of surface flow out and sediment out has been achieved through GIS based SWAT model. All morphometric analysis was done using toposheets and SRTM DEM in ArcGIS 10.1. Multi-temporal Landsat images and ASTER DEM were used extensively for reconstruction of historical change in channel morphology and planform. Present study generates huge geomorphologic database and thus will help in giving important inputs necessary for formulating plans and in decision making relating to the basin and the region. Thus, the present work attempts to

understand channel dynamics of a small river with 58 km length and 321 km^2 of total watershed area of a data scarce region and basin in particular.