

Abstract

The Kolong River, a distributary of the Brahmaputra River of Assam represents an extremely polluted and flow-starved river system of the region. An earthen embankment erected at its takeoff point is responsible for its present moribund condition. The negative impacts of the embankment on the fluvio-geomorphological regime of the Kolong River and on the large number of static waterbodies (wetlands) strewn over the floodplain is no doubt very significant. However, no serious effort has so far been taken to collate and sieve through the scientific data available so far relating to the effects of the dyke put across its channel on the flow regime, fluvial geomorphology and water quality of the river. Nor was there any systematic scientific investigation made towards restoration of the river.

In the present study an attempt is made to establish a comprehensive and coherent river restoration plan for the degraded Kolong River based on the existing geo-environmental, hydro-meteorological and socio-political scenario of the study area. Assessment of water quality based on Water Quality Index (WQI) calculations was done which clearly depicts the extremely polluted condition of the river. Topographic maps, computer based digital surface models and hydrological models have effectively delineated the micro-geomorphic configuration of the river channel and its watershed and the transformation it has undergone during the period under investigation. An elaborate hydrological database containing peak-discharge, design discharge (10 year, 25 year, 50 year and 100 year), bankfull discharge, stage-discharge rating curve, basin runoff etc was developed for the Kolong River and its tributaries. Furthermore, hydraulic geometry relationships of the Kolong River are explored. Morphological study of the river channel, its shifting pattern, rate of erosion and deposition etc was carried out through field surveys and analysis of spatial databases under GIS environment. Finally, based on the baseline geo-environmental setting and analysis of fluvial, ecological and socio-economic databases, a scheme for reviving the degraded Kolong River has been proposed. Application of remote sensing, GIS, and GPS techniques together with high resolution UAV (Unmanned Aerial Vehicle) mapping served as basic field survey and mapping tools for creation of simulation-based alternative scenarios of river flow management for the purpose of river eco-system rehabilitation.