



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS**

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**SHORT ABSTRACT**

Urbanization is an inevitable component of economic growth. However, hasty and unplanned expansion of an urban area into its eco-sensitive areas like hills, wetlands, and forests is a key concern, mainly in developing countries. By understanding the process and causes of such unplanned urban expansion, the urban settlement projection in those areas is of paramount importance for framing sustainable urban development policies. This study presents a modelling concept named as the model for Assessment of Settlements in Eco-sensitive Area (ASEA) that relates urban settlement in such ecosensitive areas with potential socio-economic, demographic and geographical factors. The model is applied to an Indian city Guwahati, which is experiencing serious environmental degradation due to unplanned urban settlement in its eco-sensitive hilly areas. Projection of urban settlement in hills of Guwahati city has been performed by using this model deriving the input model parameters concerning the master plan of the city. Urban flash flood and the blockage of drainage system by sediment brought down from the inhabited hills of Guwahati city are two major urban related concerns of today's Guwahati city. The projected Landuse Land Cover (LULC) map of the hills of Guwahati city has been utilized in watershed-hydrological impact analysis of the projected urban settlement increment. Estimates of future peak runoff generation from the hilly watershed indicate that urban flash flood problem is going to be worsened in future in Guwahati city. Apart from this, the present study emphasizes the need for consideration of soil loss from the steep hill cuts associated with urban settlement in a hilly area through the introduction of a new factor called "Hill Cut Factor". Because, in ortho-rectified images, instead of the actual area

only the projected area of these steep hill cuts is visible, which leads to underestimation of soil loss from an urban hilly watershed. In comparison to the peak runoff, the soil loss from hilly watersheds of Guwahati city was found more sensitive to urban settlement increment. This type of the future scenarios of landscape and hydrology developed by using future socio-economic and, demographic conditions derived from the master plan of a city provides an opportunity to reexamine the master plan. Finally, to bring the peak runoff and sediment loss from hilly watersheds within a permissible limit, the optimal allocation of ecological management practices has been suggested with the fulfilment of their suitability and applicability criteria at a minimum possible cost.

