

Hydrodynamic Model for Planning Nature Based Solution to Prevent River-Bank Erosion

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Abstract:

River bank erosion is becoming a major problem for the agricultural community living by the river side. With the impact of climate change precipitation pattern is changing and our study in the Brahmaputra Basin of India has revealed that high intensity rainfall will increase further in near and far future to increase devastating flood and erosion. To combat climate change collectively, it is also important to promote nature based solution with vegetative measures wherever possible. A quasi 3-D hydrodynamic model BRAHMA (Braided River Aid: Hydro-Morphological Analyser) is developed along with a vegetation module to simulate impact of different pattern of bank vegetation on the flow field. Out of several patterns tried, hexagonal pattern was found to be more effective in reducing velocity and hence was chosen for implementation to control river bank erosion in an erosion effected reach of Brahmaputra River at Majuli Island, world's largest habitat river island. Based on the study, field implementation of the bio-engineering measures was done during 2022-23 and it has successfully protected the river bank from erosion during last two monsoon seasons and thus has established the great potential of nature Based Solution in erosion control.