

# An analysis of upstream withdrawal scenarios using geo-spatial approach in the Surma-Kushiyara river basin

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## Abstract

The upstream withdrawal is a worldwide incident but seen mostly in the developing countries. A downstream country like Bangladesh is facing this problem in all of its large rivers which in turn directly affect her socio-economic, environmental and geo-physical phenomena. It is an open proposal that India is preparing to construct a dam at Tipaimukh and a barrage at Fulertal in the upper reaches of the Barak. In the decisive point of view, it is very important to analyze its effects specifically with hydrodynamic views. The objectives of this research were therefore to investigate the probable impact on inundation pattern in terms of extent and depth due to upstream withdrawal in the Surama-Kushiyara basin by MIKE 11 GIS. Three scenarios of flow regulation chosen for analysis included as (i) average year flow without Tipaimukh dam, (ii) average year flow with Tipaimukh dam, and (iii) average year flow with Tipaimukh dam and Fulertal barrage. A study area in between the two rivers in the basin was selected to analyze the effect of inundation pattern due to upstream withdrawal and/or diversion. The effect of such external changes has been analyzed in terms of reduction in flooded area due to dam as well as dam and barrage operation, but also the change of inundation area in terms of larger depth to shallow depth was analyzed using F0, F1, F2, F3 and F4 type of land classification corresponding to the depth of inundation of 0-30 cm, 30-90 cm, 90-120 cm, 120-360 cm and greater than 360 cm. It appears that in the post-dam situation, the extent of inundation shows a decrease by about 60% in pre-monsoon, 22.5% in monsoon and 63% in post-monsoon season. For the barrage in addition to the dam, no further change in inundation extent was evident from the simulation result with some redistribution of F0, F1, F2, F3 and F4 land types.

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