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Study on tidal rise and salinity intrusion in Benthara River lowland corridor

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Eighty four percent of the Gross Domestic Production (GDP) of Sri Lanka is based on the agricultural sector. The degradation of productive agricultural lands due to various reasons is a major critical problem for the economy of a developing country like Sri Lanka. Saltwater intrusion is one of the major causes of land degradation along the coastal belt. Benthara lowland corridor is affected by high levels of salinity intrusion and about 80 percent (2279 ha) of productive agricultural lands have been abandoned due to this issue. It is important to predict future land inundation areas due to tidal rise and future salinity transportation along the river to develop future salinity management strategies. Therefore, this study sought to assess and forecast future saltwater intrusion along the Benthara River and propose suitable engineering solutions to mitigate future salinity intrusion in Benthara lowland area. The future land inundation area due to tidal level rise was mapped considering the future tidal level projections according to the analysis results of 20 years tidal data. Light Detection and Ranging (LiDAR) was used to obtain high-resolution land surface elevation. To prepare the digital elevation model for the study area, LiDAR data, contour lines and spot heights were used. DEM and the land inundation forecasting maps were developed in the Arc GIS environment. Salinity intrusion data up to 30 km along the Benthara River and precipitation data were analyzed using SPSS software. Two hypothesis tests were done for this analysis. The results of the analysis were demonstrated graphically and mathematically as an equation.

Keywords: Benthara river, tidal rise, salinity intrusion, LiDAR Data, DEM

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