

## ABSTRACT

This study aimed to assess the effectiveness of soil and water conservation measures (SWCM) implemented by the Department of Soil Survey and Soil Conservation (DSSSC) on Land Use Land Cover (LULC) and groundwater level in the Olanthichira watershed, Malappuram, using geospatial techniques. The Olanthichira watershed was delineated using Shuttle Radar Topography Mission (SRTM 30 m) DEM data and topographic map in ArcGIS software. Olanthichira watershed is classified as a fourth-order watershed with dendritic drainage pattern. Morphometric parameters collectively indicated that the watershed has an elongated shape and moderate relief suggested that the watershed has a balanced hydrological response with average infiltration rate and runoff potential. The LULC changes during pre-treatment (2015) and post-treatment (2023) of watershed were analysed. Landsat 8-9 (30 m resolution) satellite images were used for the analysis and classification was carried out using the maximum likelihood algorithm. The overall accuracies of LULC classified map for 2015 and 2023 were 88 and 84.33 percent respectively and the corresponding kappa values were 0.82 and 0.78. The result showed that the built-up area increased by about 8.72 percent and agricultural land by 10.16 per cent while the plantation, barren land and waterbody have decreased by 16.55, 1.58 and 0.75 per cent of the total area respectively indicated positive changes in land use pattern. The Normalised Difference Vegetation Index (NDVI) maps were prepared for the period 2015 and 2023 to obtain knowledge on the change in the vegetation status of the watershed and it showed increase in NDVI index from 0.52 (2015) to 0.59 (2023) indicated an overall increase in vegetative cover. Spatial and temporal variation of water table were analysed from 2015 to 2023 using geostatistical tools in ArcGIS. Spatial variation of groundwater level map during pre-monsoon and post-monsoon indicated that there was increase in groundwater level over entire watershed after implementation of SWCM. It is also noted that during pre-monsoon season, groundwater level fluctuation increased in the range of 0.066 m to 1.434 m and during post-monsoon season, groundwater table fluctuation increased in the range of 1.5 m to 2.75 m implying positive effect of SWCM in the study area. From this study, it can be concluded that the presence of SWCM in Olanthichira Watershed has provided positive impact on LULC and groundwater resources.