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Combined impact of Climate change and Land use on water quality in the mid-21st century: A modelling study for a highly industrialized stretch of Ganga River

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High industrial discharge, excessive agricultural activities, untreated sewage disposal make the Kanpur region one of the most contaminated stretches of the Ganga river. This study analyses water quality for the combined future climate change and land use land cover scenarios for mid-century for a 238km long Kanpur stretch of Ganga river. Climate change projections from 21 General Circulation Models for the scenarios of RCP 4.5 and RCP 8.5 are considered and Land use Land Cover (LULC) projections are made with QGIS software. Streamflow and water temperature are modelled using the HEC-HMS model and a Water-Air temperature regression model, respectively. Water quality analysis is simulated using the QUAL2K model in terms of nine water quality parameters, dissolved oxygen, biochemical oxygen demand (BOD), ammonia nitrogen, nitrate nitrogen, total nitrogen, organic phosphorus, inorganic phosphorus, total phosphorus and faecal coliform. Climate change impact alone is projected to result in degraded water quality in the future. Combined climate change and LULC change may further degrade water quality, especially at the study area's critical locations. Our study will provide guidance to policymakers to safeguard the Ganga river from further pollution.