# Assessing the land use dynamics in a peri-urban environment influenced by wastewater irrigation

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Peri-urban areas are characterized by multifunctional land-use patterns forming a mosaic of built-up and agricultural areas. They are critical for providing food and other agricultural products, livelihood opportunities and various ecosystem services and therefore understanding and predicting land-use changes is essential for integrated resources management strategies. Here we analyzed land use changes in the Kachiwani Singaram micro-watershed of Musi River basin in India mapped using Google Earth data for a 17 year period (years 2000 to 2016), to understand the temporal dynamics of the peri-urban system. This research study mainly aims at understanding the peri-urban agriculture and peri-urban landscape changes over the years as related to the change in use of wastewater and groundwater for irrigation in the watershed. A total of 38 images covering the watershed area over the 17 year period were utilized to analyze the temporal land use change in the watershed with object-based classification method. The temporal dynamics of peri-urban agricultural and urban landscapes including the changes in built-up, paragrass, paddy rice and vegetable cultivation, groundwater irrigated and wastewater irrigated areas in the watershed over two decades were evaluated. The detected changes indicate that the consequence of urban pressures, agricultural landscapes are being converted into built-up areas and at the same time, new peri-urban areas converted to agricultural plots. The mapped land use data are used in landscape modeling for predicting and understanding the future peri-urban agricultural dynamics and land use change influences in the watershed. The modeling approach is based on the urban and agricultural landscape changes with three impact scenarios i. current water use trend, ii. change in wastewater use and iii. change in groundwater use. Combined with the impact assessments of wastewater irrigation on groundwater and land use change analysis, our results form the basis for integrated water-soil-waste management in the wastewater influenced peri-urban system.