Assessment of urban infrastructure revitalization in Prayagraj after 'Kumbh' 2019

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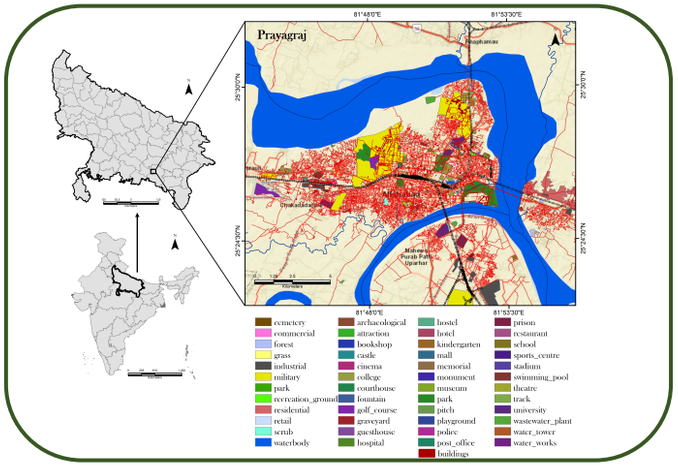
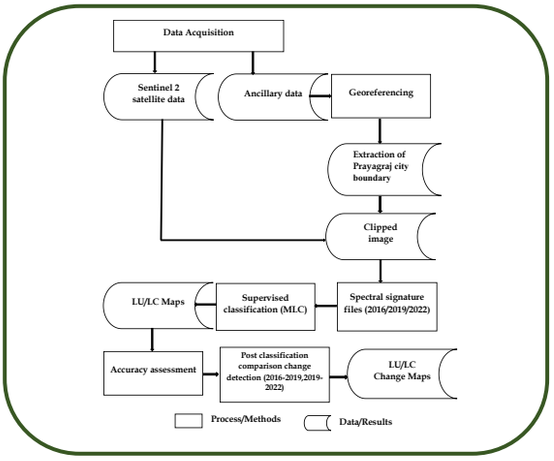
Abstract

'Kumbh Mela' is a temporary Hindu pilgrimage site where millions of pilgrims come for the attainment of objectives related to the problems of mundane existence. Such a huge gathering brings multiple changes around the infrastructure and services in the city hosting such gathering. It is interesting to analyse the changes such pilgrimage and events bring to cities. The objective of the study is to monitor and map Land Use Land Cover change in the city of Prayagraj before and after 'Kumbh Mela', and to assess the impact of 'Kumbh Mela' on the city infrastructural changes. The city Prayagraj hosted 'Kumbh' in 2019. This study has used imageries from Sentinel 2 satellite with a spatial resolution of 10m. These images were classified using supervised classification wherein the Maximum Likelihood Classifier (MLC) method was used for the 3 different time zones at an interval of 2 years, i.e. pre-'Kumbh'(2016), 'Kumbh' (2019) and post-'Kumbh' (2022). The accuracy assessment was for each has been done through ROC and AUC method. AUC range was between 0.9 and 1.0 which means accuracy of mapping is acceptable for such assessments. There is a significant increase in the urbanization pattern which is being done at the cost of vegetation, fallow and agricultural land. An interesting increase in vegetation is also seen that tells the success of the plantation drive and agroforestry policy taken up by the local bodies. The major infrastructural changes are building of civil airport, widening of roads and building of railway tracks and beautification road roundabouts. The results provide new insights and will help in better planning and policy development for sustainable and resilient infrastructure of the city as well as to come up with a sustainable plan for the temporary settlement in the 'Kumbh' area.

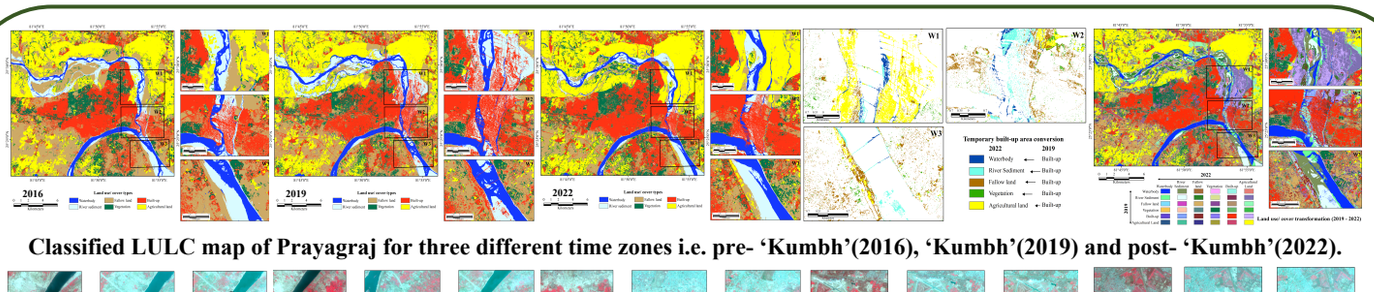
Study Area



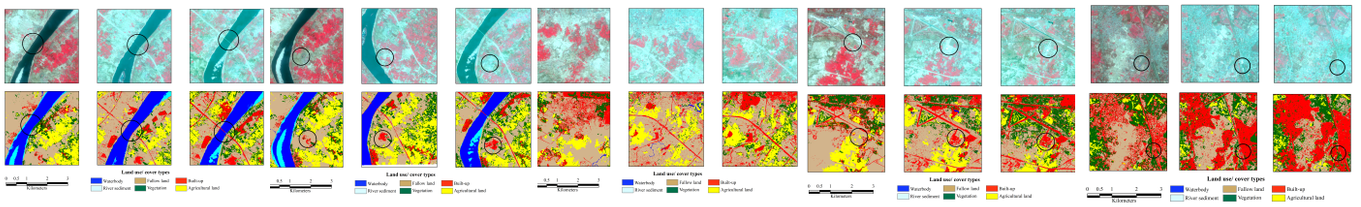
Methodology



Results



Classified LULC map of Prayagraj for three different time zones i.e. pre- 'Kumbh'(2016), 'Kumbh'(2019) and post- 'Kumbh'(2022).



City infrastructural changes: Yamuna railway bridge, Solid liquid biogas plant, urban development in Jhalwa region, new civil airport and urbanization in Naini .

Discussion

- A pilgrimage festival like 'Kumbh' has the potential to change the LULC of the city. 'Kumbh' has the potential to change the physical, social, economical and ecological environment through infrastructure development like the widening of roads, construction of roads, railways and airports, and the building of industries and hotels.
- There was an increase in the trend of the built-up area from 19.39%to 25% area till 2022. There is a significant increase in the urbanization pattern which is being done at the cost of vegetation, fallow and agricultural land. An interesting increase in vegetation is also seen that tells the success of the plantation drive and agroforestry policy. The COVID19 is a blessing in disguise for the ecological environment of the study.
- This research found that not only did the 'Kumbh' bring together a large number of people, but it also improved the holy city's human carrying capacity through infrastructure development and help us to understand how pilgrimage gathering at this level affects LULC of the city.