

Review of: "Object-Based Classification to Evaluate LULC Changes and Socio-Economic Mobility with Google Earth Engine: A Case Study of Rajarhat-New Town Agglomeration, Kolkata, India"

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Potential competing interests: No potential competing interests to declare.

This paper presents a study on land use and land cover (LULC) changes and associated socio-economic impacts in the Rajarhat-New Town area of Kolkata, India, from 1991 to 2021. The authors employ an object-oriented classification approach using Google Earth Engine (GEE) to analyze multi-temporal Landsat imagery and predict future LULC for 2031. The study integrates machine learning algorithms (SVM and Random Forest) with texture analysis (GLCM) and dimensionality reduction (PCA) techniques. Additionally, the paper examines how urbanization policies have influenced LULC changes and socio-economic mobility in the study area.

The study can be of some interest to the readers; however, relevant major issues must be addressed before reconsidering the paper for publication:

- Figure 1 requires additional labeling and context. The right panel should be clearly indicated as a composite infrared image. The relationship between the images should be visually emphasized to show the zoomed area. A legend is necessary for all maps, particularly for the bottom-left image, which contains unclassified green areas. Please use a single legend for Figure 4.
 - Table 1 contains redundant information and could be streamlined or removed, focusing only on unique and relevant details for each dataset.
 - The use of object-based classification on Landsat data within Google Earth Engine (GEE) is relatively uncommon. The authors should provide comparisons with other relevant studies to contextualize their approach and results.
 - The paper lacks sufficient detail on the implementation of Support Vector Machine (SVM) and Random Forest (RF) algorithms. Specific parameters, optimization procedures, and cross-validation methods should be elaborated upon.
 - The paper incorrectly refers to the 1/3 validation subset as Out-of-Bag (OOB) data for RF. This should be clarified as a separate validation subset.
 - Figure 2's flowchart only mentions SVM classifiers, despite the study using both SVM and RF. This inconsistency should be addressed.
- GLCM Application: The authors should clarify how they obtained the 8-bit greylevel image from PC1, rather than describing the linear combination for obtaining a greylevel image.
- The paper unnecessarily refers to "code" in two steps. These references could be removed for clarity.

- The accuracy assessment should precede the LULC change analysis in the results section, as it is a crucial preliminary step.
- The study lacks information on the most important features for RF classification, which would provide valuable insights into the model's decision-making process.
- The methodology for predicting 2031 LULC is not adequately explained. This is a significant omission that needs to be addressed.
- The reference to "brokers financially influenced farmers to purchase their land" is excessively cited. The authors should select and cite only the most relevant sources.