Mapping Bamboo Forest Distribution using Multi-temporal Landsat-8 OLI Data and Random Forest Classification Algorithm

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In recent years, the spatial distribution of bamboo forest has been expanding rapidly in various areas in Japan, resulting from cessation of appropriate forest management. Expansion of bamboo forest is considered as a problem that will cause difficulties such as: increase of the breeding habitat potentially preferred by vermin; and deterioration of traditional rural landscapes. To address this problem, it is essential to have a reliable information about the spatial distribution of bamboo forest over a broad spatial scale. Satellite remote sensing is expected to have potential to periodically identify the extent and distribution of bamboo forest over a nationwide scale. This study estimates land-use and land-cover (LULC) class using Landsat-8 OLI data to generate a LULC map product including a bamboo forest class. We used the Landsat-8 OLI multi-temporal imagery acquired in the period from 2013/09/01 to 2014/08/19. Random Forest classification algorithm was employed for each scene first, and a set of multi-temporal classification results were then aggregated based on probably vector approach. Classification accuracy of the final LULC map was accessed in terms of Cohen's Kappa coefficient. The result showed that the classification accuracy was fair to good (Kappa coefficient = 0.65), which was lower than expected. Future work includes: (1) refining the training data; (2) exploring the best combination of features; and (3) assessing the appicability of our approach to other areas.

Keywords: Landsat-8 OLI, Land Use and Landcover, Random Forest