Object Based Image Analysis (OBIA) for Land Cover Mapping in a Heterogeneous Landscape : A Comparison of Sample Based and Rule Based Classification

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Abstract: Land cover mapping in a heterogeneous landscape has encountered difficulties due to the variations of land cover characteristics. This variations includes the variety of color, shape, pattern and textures. This paper investigated the potential of object based image analysis (OBIA) for land cover mapping in heterogeneous landscape using ALOS AVNIR-2. Spectral-related land cover classification scheme was chosen to be applied on the classification processes. Three method of classification were used : (i) sample-based nearest neighbor classification that carried out without considering class hierarchy, (ii) sample-based nearest neighbor with hierarchical classification, and (iii) rule-based classification. Comparison of the three method was emphasized on the accuracy of the result and the effectiveness of the effort and time required. The result showed that the first method yields the lowest accuracy that is 78,11%. This method was the simplest method and need the shortest time to operated. The second method achieved 82,35% of overall accuracy. The class hierarchy considered in the second method was improved the accuracy of classification result. The use of class hierarchy was minimized the misclassification that occurred in the classes that have a similar characteristics such as clay roof tile with bare soil or woody broadleaves vegetation with non-woody broadleaves vegetation. The rule-based classification was the most complicated method. The development of the rule took a longer time than the two previous method. However, when this method applied, the highest overall accuracy of 83,76% was achieved. The result demonstrated that land cover in a heterogeneous landscape could be extracted by object based image analysis at a relatively acceptable accuracy level. The sample-based nearest neighbor with hierarchical classification was the most effective classification method due to the ease of process, the time required to be done and the accuracy level of the result that comparable with the rule-based classification result.

Keyword : obia, land cover, heterogeneous landscape, sample-based, rule-based