

Hierarchical Object-Based Classification System For Land Use/Cover Mapping Of Vietnam

Arga Pandiwijaya¹, Vanesza Anjani¹, Andree Ekadinata¹, Sonya Dewi¹

¹World Agroforestry Centre,
Jl. CIFOR, Situ Gede, Sindang Barang, Bogor 16115, West Java, Indonesia,
a.pandiwijaya@cgiar.org, v.anjani@cgiar.org, a.ekadinata@cgiar.org, s.dewi@cgiar.org

Abstract: Over the past decades, technical advances in image classification for land cover mapping have been marked, especially through object-based image analysis. As part of a bigger effort in analyzing forest and tree cover transition in South East Asia over the past twenty years (1990, 2000, 2010), we conduct land use/cover mapping of Vietnam, wall-to-wall, using hierarchical object based classification approach. The first step is to decide a classification scheme that is consistent and comparable across the region through an expert panel discussion. The hierarchy is divided into 4 levels. *Level 1* differentiates between forest and non-forest classes. In *Level 2*, forests are differentiated further into undisturbed and logged-over, and non-forests into tree, non-tree and non-vegetation. *Level 3* addresses finer differentiation, i.e., agroforest, cropland, settlement, estate/monoculture/orchard, forest plantation and etc. The last level, *Level 4*, differentiates further into rubber and others agroforest, pulp plantation, teak plantation, oil palm monoculture, rubber and others monoculture, shifting cultivation and etc.

Following this, the first technical step is the segmentation process to group spectrally and spatially homogeneous pixels into objects. Secondly, the objects are classified according to the hierarchical structure, using the rule sets developed based both on spectral and spatial/contextual characteristics. As we move from Level 1 toward Level 4, we increasingly rely on information additional to spectral characteristics that capture processes on the ground observed from field study, such as distance to settlement, proximity to logging road, forest concession, and plantation map, and use these in forming the rule sets of the classification. The enriched information used in the classification process result in an improved quality of land use/cover maps.

Keyword : Image classification, spectral, hierarchical structure, object-based, Vietnam