

HGG001-P04

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Characterizing temporal vegetation dynamics of land use: Case of agricultural lands in Java Island, Indonesia

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Monitoring land surfaces continuously allows characterization of temporal vegetation dynamics. Considering seasonal vegetation dynamics in multi-year series data leads to a broader view of land surface information. In tropical regions, e.g. Java Island, a paddy field might undergo a sequence of covers through the year, such as: (1) paddy-bareland-secondary crops-bareland, (2) paddy-bareland-inundated-paddy-bareland-secondary crops, and (3) paddy-bareland-secondary crops-bareland-inundated-paddy, where the sequence is repeated year after year following the seasons.

Characterization of vegetation dynamics has often been made by using vegetation index values, either the normalized difference vegetation index (NDVI) or enhanced vegetation index (EVI). The temporal dynamics of those index values are useful for distinguishing land surface conditions by differentiating among vegetation types and their distributions. We characterized the temporal vegetation dynamics of long-term land use by using multi temporal MODIS EVI 16-day composite data from 2001 to 2007.

The temporal pattern analysis was able to provide information of the planting, heading and harvesting dates of the lands; and also identified the change in dynamic agricultural system, such as cropping system changed from triple cropping system to double cropping system, also delaying of seedling stage while the rain season start changed, and others phenomena; however, the mixed pixel issue is quite problematic when using MODIS data.

The results explained that the seasons, it was the most of important factor which affected the change of dynamics agricultural system. The long-term dry season or extreme season by global climate changed caused many agricultural lands become un-planting as well the planting time was postponed. In some areas, even if the irrigation infrastructure exists locally in these areas, if irrigated water is limited, double or triple cropping may not possible in a given year. However, there are many aspects that impact the agricultural system, such as social capital, farmer welfare, irrigated water, and the price of crops.

Characterizing of temporal vegetation dynamics patterns would provide sufficient, significant and useful information of regarding the patterns of land use; consequently it should be possible to consider the actual subtle of inter-annual land use change as well as overall land use.

Keywords: temporal vegetation dynamics, land use, agricultural land, MODIS, Java Island, Indonesia