TRANSFORMING LIVES AND LANDSCAPES

Land Use Mapping by Remote Sensing with Object-based Method in Upper Mekong Region

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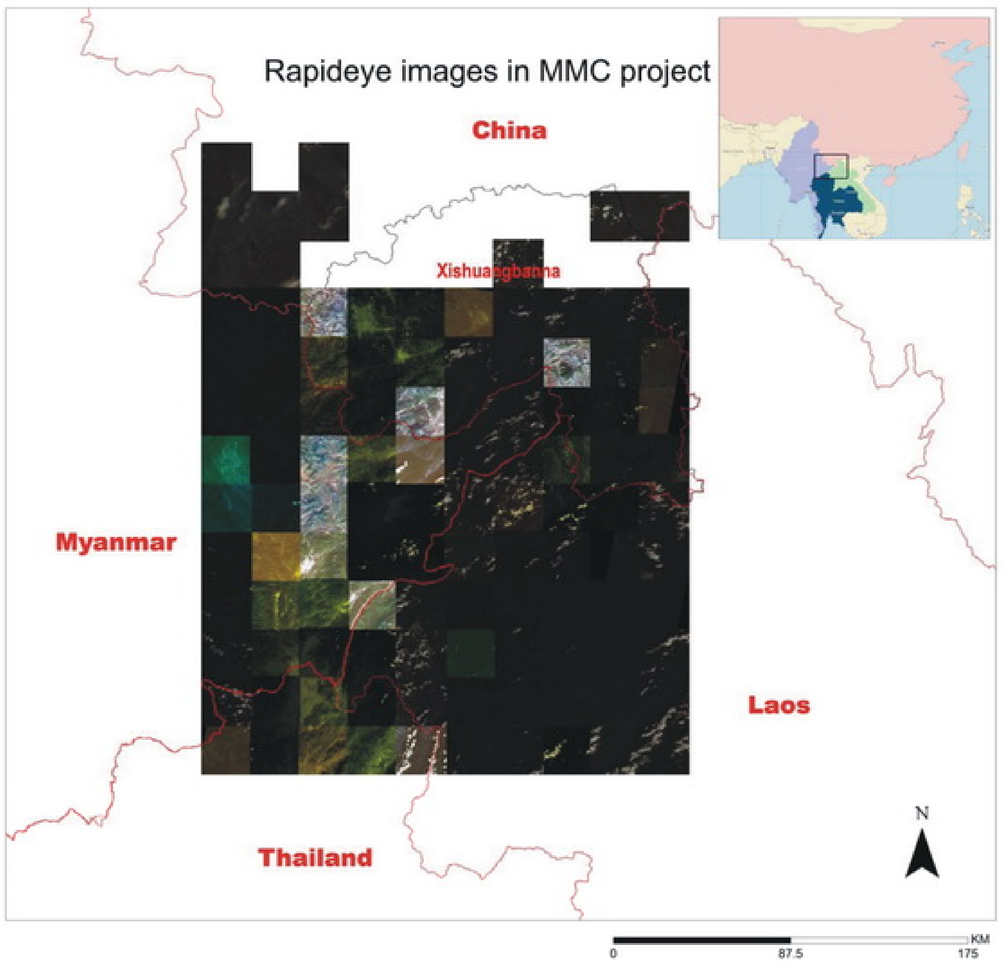
Imagery:

High resolution imagery such as SPOT5 and RapidEye images were used in this project. SPOT5 images are mainly used for land use identification in stepping stones (size of 10 km ×10 km or administrative unit) and RapidEye images are used for regional analysis.
The French SPOT5 satellite provide up to 2.5m-resolution imagery with 4 bands (green, red, infrared and short wave infrared). SPOT5 images are excellent in land use change detection at different scales.
RapidEye imagery is obtained from RapidEye AG, a German geospatial information provider. RapidEye's five satellites, which were launched in August 2008, provide 5-meter resolution imagery with 5 bands (blue 440-510nm, green 520-590nm, red 630-690nm, red edge 690-730nm & near infrared 760-880nm), and are perfectly suitable for land use and land cover analysis as well as large area monitoring. Over 100 scenes of RapidEye images covering about 60,000 sq. km in trans-boundary area between China, Laos, Myanmar and Thailand were obtained. Images from both dry and wet seasons in 2010 will be analyzed.



Software:

eCognition, developed by Definiens Company, Germany, is the first software for object-based image analysis in the world. It mimicks the way in which human perception functions. The basic idea behind eCognition is that image objects and the relation between these objects contain important semantic image information. Pixels from the image are grouped to form objects with the aim of a multiscale segmentation. These objects have a closer resemblance to real geographic entities than single pixels. Additionally, accessorial GIS data such as DEM or other thematic layers can be added to the analysis process.

Method:

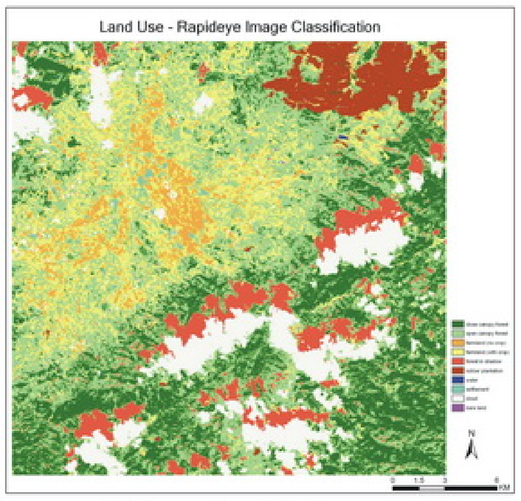
A land use scheme was developed for satellite image classification before image analysis. The scheme contains three levels of land use classes. The basic classes are agricultural land, plantations, forest land, grassland, water, wetland, built-up land and bare land. Image objects can be assigned to classes by a nearest neighbor classifier or by a classification model based on classification rules. In the present study, rule-based classification is primarily applied for RapidEye image classification. Associated threshold values of certain object features are determined and implemented in class membership functions. The advantage of a rule-based classification model is its transferability - “rule sets” of some classes developed from one image can be applied to another.

Classification accuracy assessment

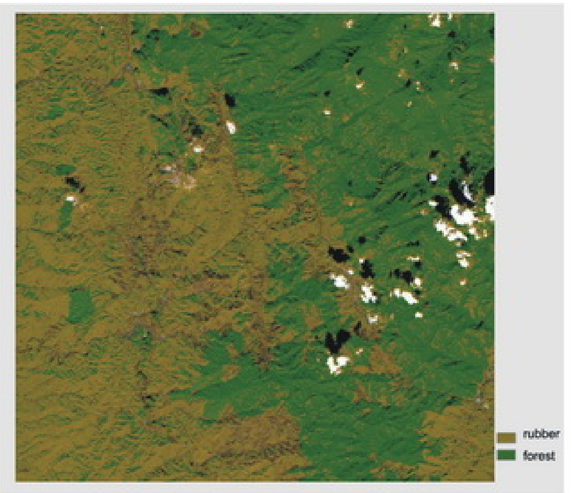
Points of land use types generated from high resolution images on “google-earth” and GPS points collected from ground truthing will be used for classification accuracy assessment.

Result:

Land use will be mapped from images, secondary forests with conservation value will be identified and an attempt will be made to identify potential landscape corridors.
Assessment of structure from remote sensing data can be used for biodiversity assessment by development of link between biodiversity and structure. RapidEye images will be analyzed regarding their potential to reveal structural diversity of different land cover classes.



An example of image classification



An example of thematic information extraction— rubber plantation and forest

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