Evaluation of Land Use and Land Cover Changes of Kabaung Reserved Forest in the Bago Mountains, Myanmar

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Background information of the study area

In Myanmar, the Bago Mountains is one of the places covered with various species of trees. Evergreen forests, deciduous and mixed forests are thriving densely on the Bago Mountains. The teak that grows on the Bago mountains is of the highest quality, the area is called "Home of Teak". In addition to trees, vast areas of bamboo can also be found in Bago Mountains.

The study area, Kabaung Reserved Forest, is situated in the Bago Mountains and covers approximately 78,046 ha, representing one of the best teak forests in Myanmar. Commercial logging operations have been carried out in the study area since 1856 with the introduction of the so-called Brandis Management System, which was modified into Myanmar Selection System (MSS). It is still the main system practiced in the management of natural teak-bearing forests in Myanmar. Timber export constitutes a major source of foreign exchange earning for the country's economy. As a result of teak and other commercial hardwood species extraction, the natural forests and forest genetic resources are affected to some extent. The study area is experiencing forest degradation and is faced with the challenging task of restoring the degraded forests and enhancing the natural stock of teak. Land cover change analysis will be made in Kabaung Reserved Forest by using Remote Sensing and GIS.

Kabaung Village is situated in compartment number 49 of the Kabaung Reserved Forest (Fig 1). The people who live in this village have been practicing shifting cultivation for more than 100 years. Study of shifting cultivation practices and historical distribution of shifting cultivation plots in this village will be conducted through socio-economic survey, GPS mapping and NDVI calculation.
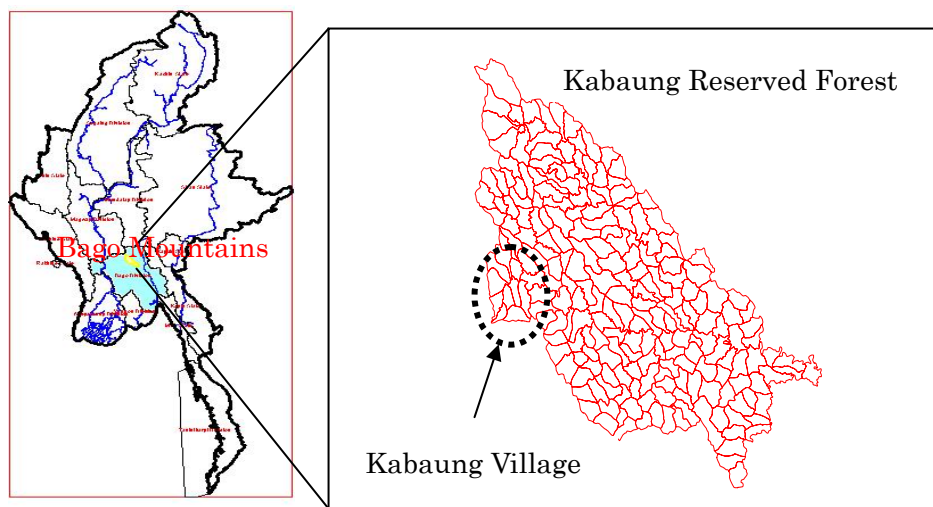

Figure 1. Location of the study area

Research Purpose

The specific objectives of the research are:

(1) to study shifting cultivation practices and historical distribution of the shifting cultivation plots in Kabaung village

(1) to identify land cover changes of the study area during the period of 1989 – 2000 and 2000 – 2003

(2) to analyze the deforestation assessment in each compartment

(3) to find out the possible factors affecting the land cover changes of the study area

The research questions are:

(1) What is the effect of the method on the extraction of shifting cultivation plots and detected land cover changes of the study area?

(2) What are the distribution and rate of the land cover changes of the study area in periods 1989 - 2000 and 2000 - 2003?

(3) Is there any relationship among shifting cultivation, selective logging operation and deforestation ?

(4) Which are the main factors governing forest cover changes of the study area?

Activities during the field trip and research methodology

The shifting cultivation practices conducted by Karen people in Kabaung village were studied through interviews with households of the village. Information about shifting cultivation system, the agricultural calendar, fallow period, number of households, number of household members, population and types of crops grown in shifting cultivation fields was obtained. Kabaung village has 54 households and a population of 293 including 148 of men and 145 of women in 2005 and 2006.

Fig. 2 Current Shifting cultivation plot and Taungya hut   Fig. 3 One year fallow land

The Karen have been practicing shifting cultivation for more than 100 years. Under this system, each household selects a plot depending on the family size and available male labor. The plots are shifted yearly. The main crops they grow are rice, sesame, cotton and chilli. The agricultural calendar of shifting cultivation starts in January with a search for cultivation sites and ends in December. Karen people who live in the Kabaung village wear their traditional clothes and make their own clothes (Fig. 4). Their houses are mainly made of bamboo. Bamboo is used

for various purposes in their daily life such as making houses, cooking, carrying water and making carrying baskets. Moreover, every shifting cultivation plot (in 2005 and 2006) was mapped by using GPS (Fig.5). Then, GPS data were exported into the Map Source. They were subsequently transported into the Arc Map and overlaid on the Satellite Images. Logging records of the Kabaung Reserved Forest during last 11 years were collected from Taungoo district office.

Fig. 4 Villagers making the traditional clothes at home   Fig. 5 Marking the GPS points at shifting cultivation plots

By using the satellite images and NDVI, the extraction of the previous years' shifting cultivation plots (1993 – 2000) will be conducted. Then, distribution of the shifting cultivation plots will be analyzed. For land cover changes of the Kabaung Reserved Forest analysis, 1989, 2000 and 2003 Landsat TM images and logging records from 1993 – 2002 will be used as the data sets. The image classification of the three satellite images will be made with the application of the supervised classification. Extraction of the forest areas with lower NDVI value due to the selective logging will be made by using NDVI. The change distribution maps for two periods, 1989 – 2000 and 2000 – 2003 will be prepared. From these maps, the areas changes from one to another land cover class will be calculated and deforestation analysis for each compartment will be performed. Finally, the main causes of the deforestation of the study area will be observed.

Future plan

In the future, I would like to make analysis of the forest recovery dynamics in fallow periods of the shifting cultivation plots in Kabaung village by combining field observations and remotely sensed data. For this study, sample plots will be taken in different fallow periods and trees, bamboo and undergrowth censuses in each plot will be conducted. Soil fertility dynamics will also be conducted. By overlaying the field data on satellite images, analysis of the forest recovery dynamics will be carried out. In Kabaung Reserved Forest, selective logging is carried out in every year. Due to the logging, the number of trees and species will decline. So, I would like to make analysis of the species composition in some logging compartments of the Kabaung Reserved Forest. If it is possible, I also would like to make land cover classification of the study area by using recent satellite images to be aware of the current land cover changes.