

## 森林・農業班 B

## ラオス北部における土地利用の動態－ベン川流域における村落調査から－

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**Dynamics of Land Use Changes in Northern Laos: - A Village-level Study in the Nam Beng River Basin****Yasuyuki KONO (Center for Southeast Asian Studies, Kyoto University)****Shinsuke TOMITA (Center for Southeast Asian Studies, Kyoto University)****Kastutoshi SAKURAI (Faculty of Agriculture, Kochi University)****Badenoch, N (Graduate School of Asian and African Area Studies, Kyoto University)****Saphangthong T (Graduate School of Asian and African Area Studies, Kyoto University)**

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## 1. Introduction

More than 75% of the areas of Laos are hilly and mountainous, which had been dominated by shifting cultivation and forests particularly in the northern Laos. In the region, land use has drastically changed during the past several decades. Forest cover has been decreased and degraded, and grass and bush lands, in addition to agricultural land, expanded. This process is simply understood that population growth of shifting cultivators required the expansion of shifting cultivation and resulted in forest degradation. This understanding is clearly reflected in the recent Laos Government policy to give more priority to protect forest resources by means of reducing shifting cultivation. The present study focuses on village-level changes in land use during the last three decades in order to identify how land use was changed and what caused these changes. The Nam Beng River basin is chosen as our study site. This watershed has typical ecological, biophysical and ethnic compositions and various changing process is expected to be observed.

## 2. Material and methods

The Nam Beng River basin covers three districts of Oudomxay province: Beng, Houn and Pak Beng. Three different types of villages are selected based on the ecological and biophysical setting. These are, from upstream to downstream, Napa Tai, Samkang and Oudom villages. The data sources of land use include Corona-2 (1973, 20feet/mm), Aerial photos (1982, 1:30,000), Aerial photos (1999, 1:50,000), Topographical map (1965, 1:50,000), and some GPS ground control points (GCPs). We first digitized contours, peaks, and river system of topographic maps to generate a digital elevation map (DEM). Then we used ERDAS Orthobase to georectify aerial photos based on our produced DEM and GCPs. These images were visually interpreted. All of land use maps were finally geo-registered on the same projection coordinate system (UTM, WGS84 datum, Zone 47

North). Field survey was carried out several times in the years 2000, 2001 and 2002 to collect information on changes in land use, cropping system and people' s livelihood.

### 3. Village-level land use change

Changes in land use in the three villages are summarized in figure 1 and 2.

Napa Tai village was purely a lowland paddy-based village in the 1970s, and it is still the major agricultural activity now. The lowland paddy increased from 97 ha in 1973 to 117 ha in 1999 which increasing rate was much less than the population growth rate during the same period. Upland fields, mostly of shifting cultivation, jumped up from almost null in 1973 to 190 ha in 1982 and slightly decreased till 1999. Grassland occupied 440 ha in 1982 and 730 ha in 1999, which indicated that the fallow period of shifting cultivation was 5 to 6 years in the early 1980s and 3 years in the late 1990s. Dense forest cover decreased from 95% in 1973 to 57% in 1982 and then it was maintained up to 1999.

Samkang village was a mixed type village in the 1970s. It had 53 ha of lowland paddy and 31 ha of upland field in 1973. Since then, expansion of upland field was much larger than that of paddy field. Upland field increased to 175ha in 1982 and 266 ha in 1999, while paddy field slightly increased to 87 ha. This must reflect lack of available land for further expansion of paddy field. Grassland occupied 405 ha in 1982 and 395 ha in 1999, which indicated that the fallow period of shifting cultivation was 2 to 3 years in the early 1980s, and then reduced to 2 years in the late 1990s. Dense forest cover decreased from 83% in 1973 to 30% in 1982, and then it was maintained up to 1999.

Oudom Village has been a purely upland-based village. It has 11 ha of lowland paddy field in 1999, but it could not be expanded more due to highly permeable soil. Upland field increased from 20ha in 1973 to 124 ha in 1982 and 243 ha in 1999, probably according to the population growth. Grassland occupied about 100 ha in 1973, 530 ha in 1982 and 270 ha in 1999, which suggested recent changes in cropping practice from shifting cultivation to permanent cropping. Dense forest cover decreased from 81% in 1973 to 47% in 1982, and then slightly increased to 50% in 1999.

### 4. Changing process

The results of the village-level land use analysis show the gradual expansion of agricultural land in all villages during the last three decades, even though the major mode of agriculture differs among the three selected villages. This should basically suggest the population growth is the major factor of the expansion. Changes in forest cover, however, did not correlate with that of agricultural land. The area of dense forest sharply dropped down between 1973 and 1982 and maintained till now in all villages. Rapid deforestation in the late 1970s and early 1980s are thought to be caused by some external factors such as high demand for food and construction material after the war. Shortening of fallow period of shifting cultivation during the last two decades is clearly observed. This suggests selective introduction of permanent cropping is an urgent issue in order to establish sustainable cropping system in this area.

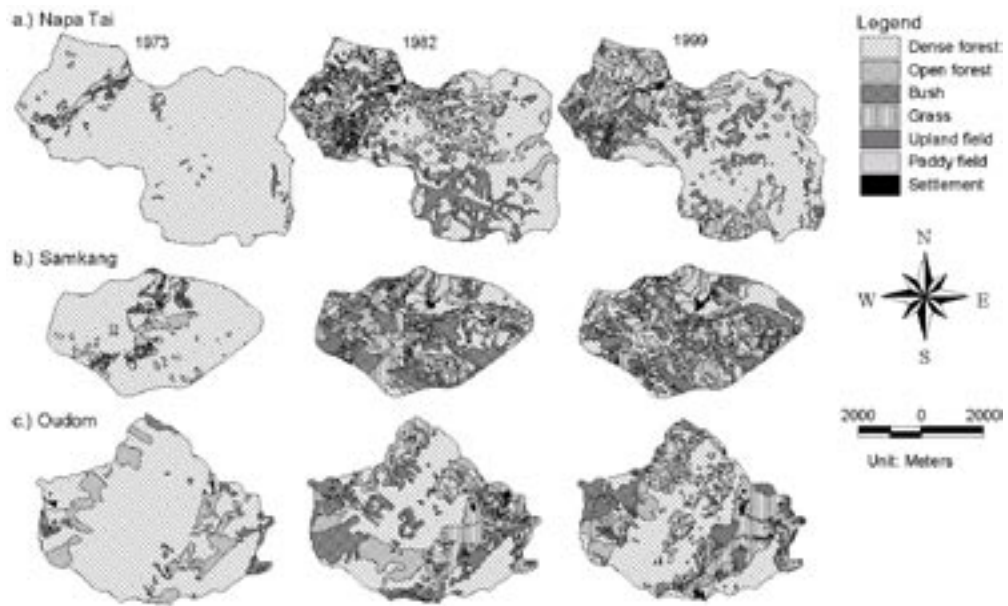


Figure 1: Land use maps of three villages in the Nam Beng River Basin

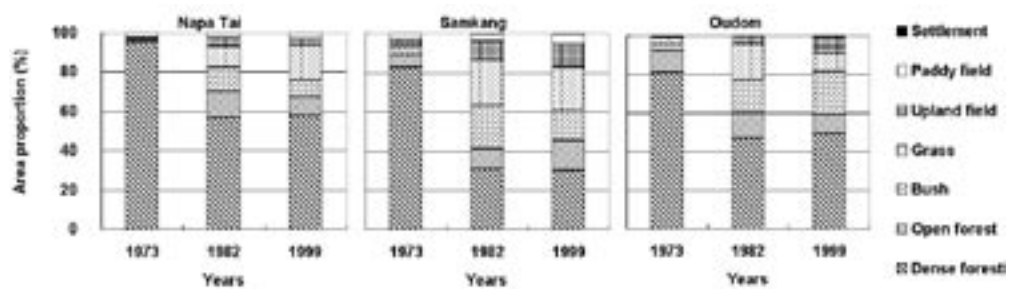


Figure 2: Land use changes in three villages during the period from 1973 to 1999