

## Land Use Changes during the 1960s–1990s around the Lambir Hills National Park, Sarawak, and Backgrounds to the Changes

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### Introduction

In order to examine influences of human-activity impacts on forest biodiversity, this paper clarifies the land use changes during these 40 years and the social and economic backgrounds behind the changes. It also examines the differences between land use changes according to the actors of the land use. The main actors in the study area are: the Iban, a native people of Sarawak, and enterprises and government. The study area is around the Lambir Hills National Park, Sarawak (Figure1) and the area is around 27,000 ha. The area was almost all covered by primary forests around 100 years ago. The question is, how have the forests been converted to today's land uses, which are swidden agricultural fields, secondary forests, mono-crop plantations, and small areas of primary forest?

### Methods

The methods of the study are: 1) to read land use from aerial photographs taken in 1963, 1977 and 1997 by colonial and state government and draw land use maps for each year, 2) to calculate the transition of each land use and transition possibility, and 3) to conduct document surveys and interviews on the background to the land use changes with local villagers and governments staff who know about those changes.

### Results

#### ***Land-use maps:***

Figure 2 shows the land-use changes from 1963 to 1997 as a result of reading aerial photographs. The actors who have caused the land-use changes are mainly divided into two. One is the Iban, a native people of Borneo who have lived in the area for a long time and who use forests products and the forests themselves for their subsistence economy. The other is government and corporate actors who have used forests to gain economic benefits on a bigger scale. In figure 2, those areas are shown as “Iban territory” and “state land,” respectively.

#### ***Matrix and its graphing:***

The area of land-use transition and transition possibility from 1963 to 1977, and from 1977 to 1997 are calculated (Table 1) and the result is graphed out (Figure 3). As the next step, the transitions for each area, the Iban territory and state land, are calculated and also graphed out (Figure 4 and 5). Historical trend of the changes in the 2 areas is shown in the figure 6 and 7. From those figures, some trends and characteristics of the land use can be extracted: 1) conversion from primary forest to other land use in the Iban territory started earlier (around 1900) than that in the state land (1960s). The conversion in the Iban territory was mainly for subsistence agriculture, for example for hill and swamp paddy fields. These fields are relatively small (more

or less 1 ha) and dispersed, dotted around the Iban territory. 2. The land use in the state land started for commercial logging and large-scale rubber plantation development from the 1960s.

Backgrounds of the land use changes (figure 7): The main land use changes in the Iban territory and the social and economic backgrounds to such changes are: Settlement of the Iban in the study area around 1900, supported by government policies; swidden agriculture in hills and swamps until the 1960s to maintain subsistence economy; expanding area of rubber groves in the 1950s and 1960s after an increase of rubber price in the international market; expanding swamp paddy fields in the 1960s and 1970s as a result of increase in rice demand from logging camps appearing when commercial logging was prosperous, and; value of forest products and fruits as commodities increased in the 1980s and 1990s following the urbanization of Miri city.

The main land-use changes in the state land and those social and economic backgrounds are: rubber plantation development and its failure in the 1960s in the period when rubber price fluctuated in the international market; commercial logging in large areas from the 1960s following increasing demand in the international market; the establishment of the National Park in 1974 when international movements of nature conservation appeared, and; oil palm plantation development after the 1980s when the price increased in the international market.

## Conclusion

The land-use changes around the Lambir Hills National Park would be evaluated as below from the viewpoint of biodiversity conservation. In both the Iban territory and state land, a common trend of land use changes is conversion of primary forest into other land uses for economic improvement and development. However, in more detailed observation, the way the changes occur differ between the two types of land. In the Iban territory, the primary forests were mainly converted to small agricultural fields, and those have always been left for fallow and the land returned to secondary forests. The Iban's lands are seen as a mosaic pattern consisting of small patches of agricultural fields in the large secondary forests. In contrast, in the state land, commercial logging started in the 1960s and large areas became logged forests. After the 1980s, oil palm plantation development in large scale started around the study area. In conclusion, in state land, large scale developments have been brought about in a relatively short period, which seriously affects biodiversity conservation, while the land use of the Iban territory is characterized as relatively slow change in small scale in individual patches of agricultural fields. However, if the national park had not been established, the primary forest in it would have been logged by enterprises and also by the Iban. The roles of both the native's land use and government policies are important for biodiversity conservation.

## Reference

Ichikawa, M. (2007) Degradation and loss of forest land and land use changes in Sarawak, East Malaysia: a study of native land use by the Iban. *Ecological Research* 22. 403-413.

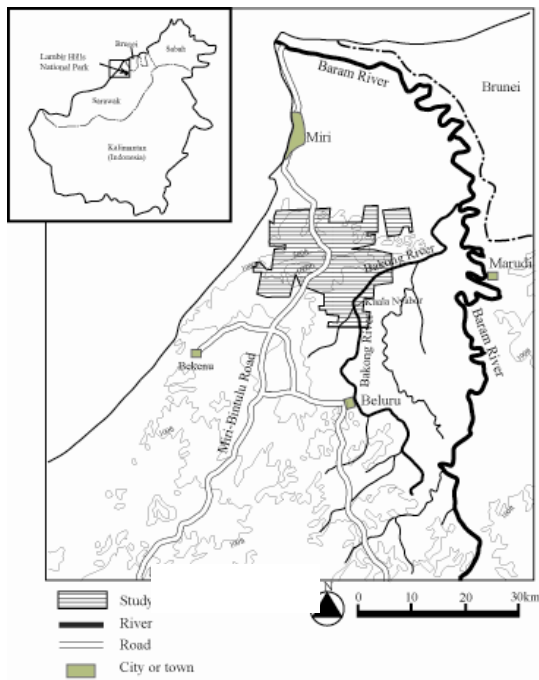
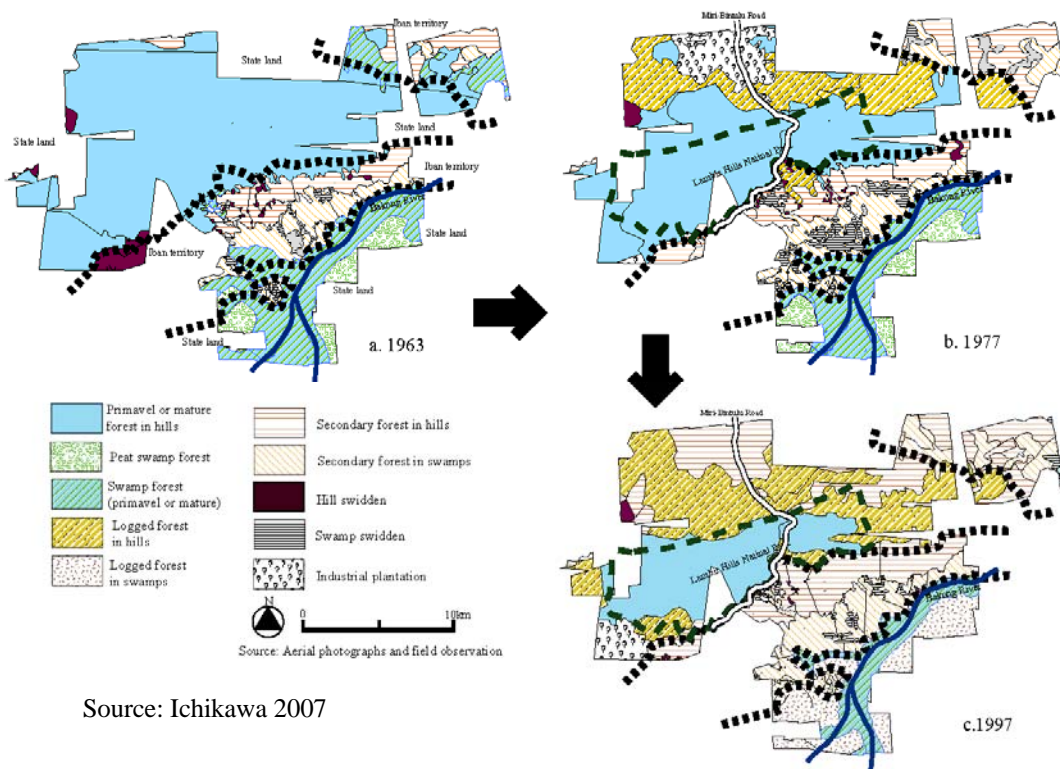


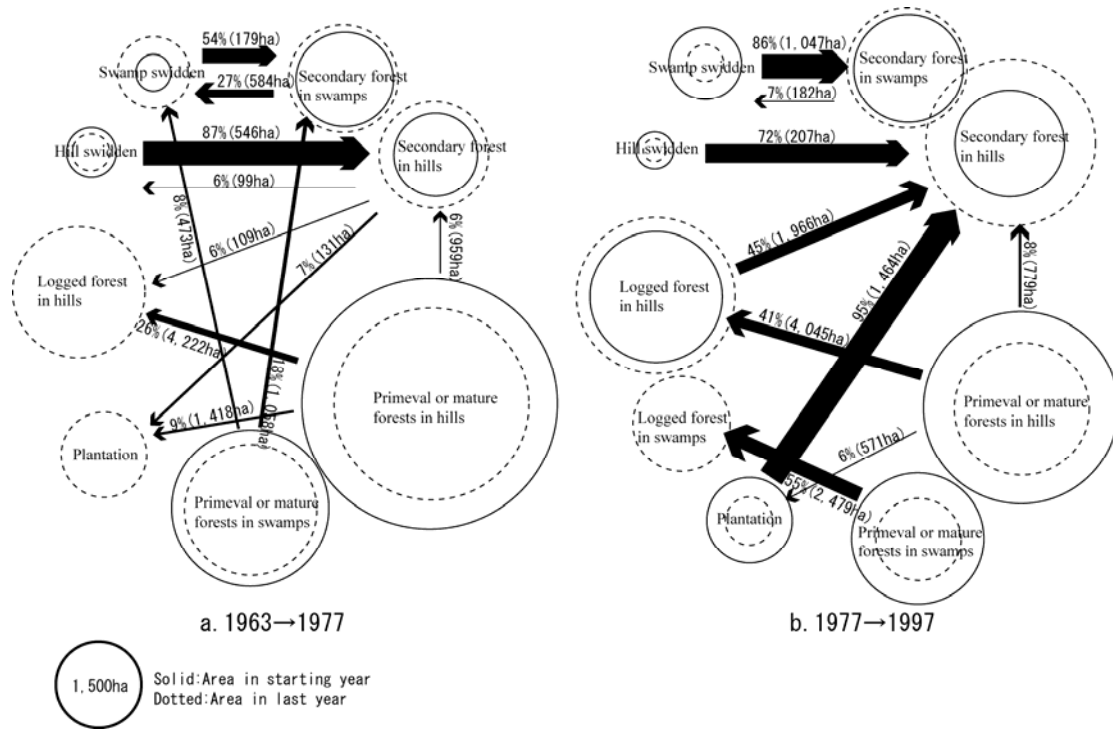
Figure 2. The Study Area

Figure 1 The study area

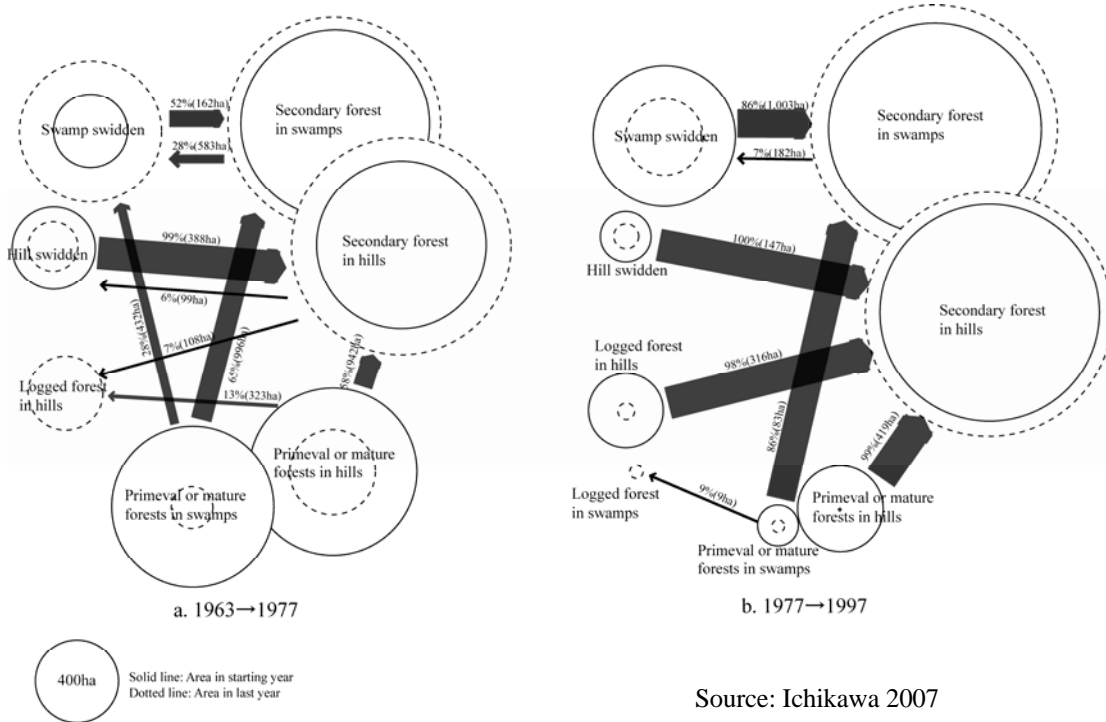


Source: Ichikawa 2007

Figure 2 Land use maps in each year

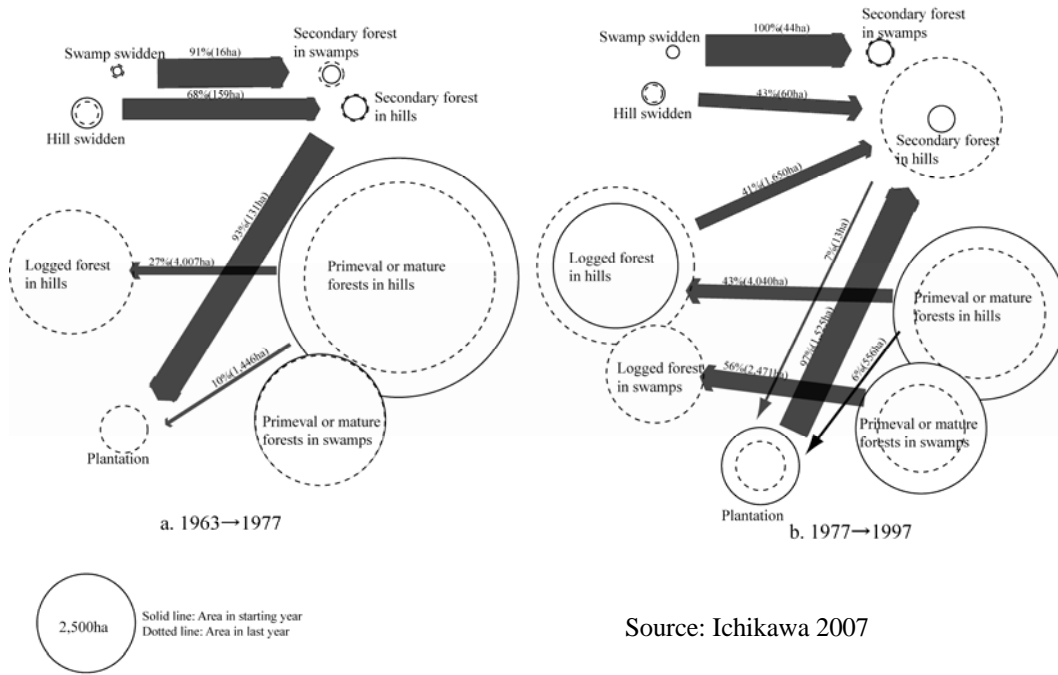


**Figure 3** Land use changes in whole study area, 1963 to 1977, and 1977 to 1997

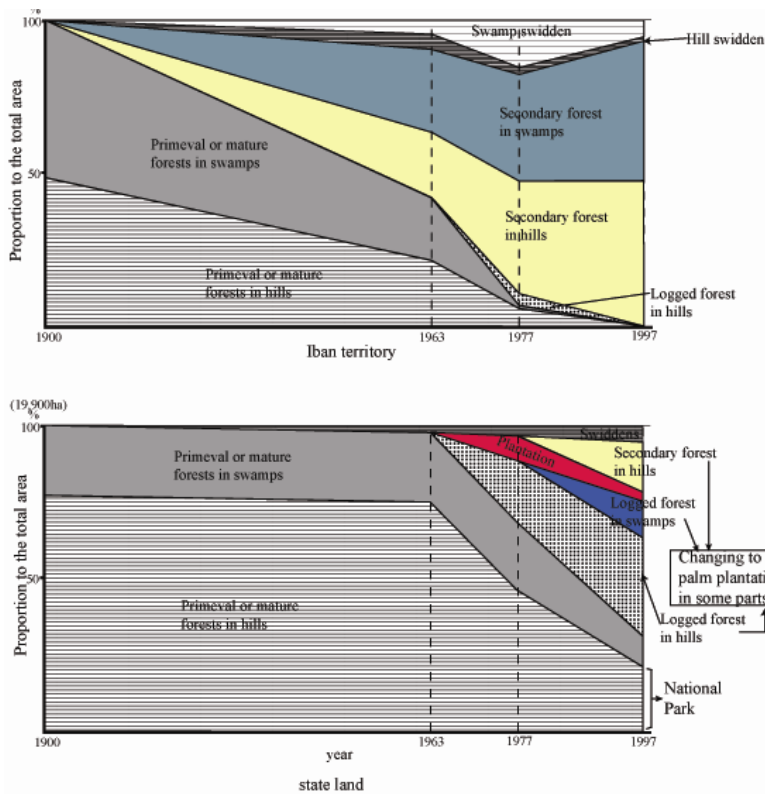


Source: Ichikawa 2007

**Figure 4** Land use changes in the Iban territory, 1963 to 1977, and 1977 to 1997



**Figure 5** Land use changes in the state land, 1963 to 1977, and 1977 to 1997



**Figure 6** Characteristics of land use changes in the Iban territory and the state land  
Source: Ichikawa 2007

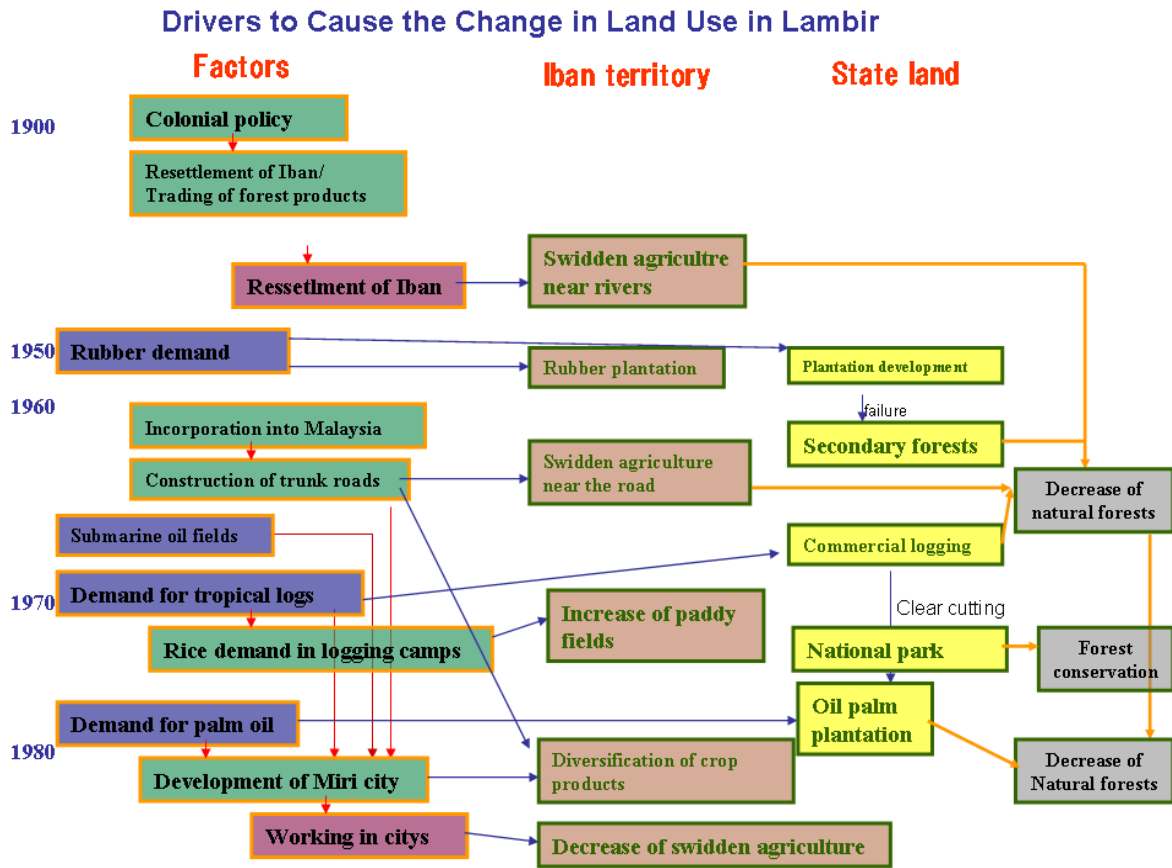


Figure 7 Background of land use changes