



TRADITION AND THE INFLUENCE OF MONETARY ECONOMY IN SWIDDEN AGRICULTURE AMONG THE KENYAH PEOPLE OF EAST KALIMANTAN, INDONESIA

Ndan Imang¹, Makoto Inoue², Mustofa Agung Sardjono³

Abstract

Swidden agriculture, the so called ladang⁴, system has been practised by the indigenous Kenyah people in Apau Kayan for centuries. The ladang system can be regarded as a kind of social forestry practice in the tropics insofar as it involves local people in a process of forest management and succession to ensure economic, ecological and social benefits for the communities and simultaneously sustain the resources. Since the 1950s, thousands of Kenyah people migrated from Apau Kayan downstream to the Mahakam and Kayan, river lowlands where monetary economy had already infiltrated to varying degrees. Monetary economy can lead to changes in the importance of swidden agriculture, changes in ladang practices including traditional knowledge and the farming calendar, labor allocation for mutual aid and reciprocal work, land productivity, livelihood income sources, and gender role in the ladang practices. Despite the influence of the monetary economy, the Kenyah still prefer farming as the main livelihood strategy, maintaining cohesiveness and social ties in daily life among themselves through traditional forms of ladang work organization. Kenyah people in general are quite responsive to changes in livelihood diversification, but rather unenthusiastic about practicing new inorganic agricultural practices due to the legacy of former values and the importance that they still place on strong social bonds and interaction.

Keywords: *swidden agriculture, ladang, Dayak Kenyah, monetary economy, communal-reciprocal work*

Introduction

Swidden agriculture (*ladang*) is one of the traditional practices of forest and land management by people in the tropics, and suitable with social

¹ Faculty of Agriculture/Center for Social Forestry, University of Mulawarman Indonesia. Email: ndan_imang@yahoo.co.id

² Graduate School of Agricultural and Life Sciences, The University of Tokyo.

³ Faculty of Forestry/Center for Social Forestry, University of Mulawarman, Indonesia.

⁴ *Ladang* is the Indonesian term for swidden agriculture. It is used nationwide in Indonesia and frequently used in this article.

typology in which there is a high interdependence between people and the environment (Inoue 2000, Dove 1993, Colfer 1997). Furthermore, Sardjono (1990) maintains that traditional forms of swidden agriculture reflect an optimum interrelationship between the strategy to serve human needs and efforts to maintain ecological balance in tropical regions. Further, these practices can be improved through agroforestry technologies to adapt to local socio-economic dynamics and environmental changes. Conceptually, and indeed practically, swidden agriculture has a close relationship with social forestry. Sardjono (2003) and Pasaribu (2007), for example, define social forestry as any condition and effort which intimately involve local people in forestry activities to ensure economic, ecological and social benefits, and simultaneously sustain the resources.

Dove (1988) considers swidden agriculture as one of the most important local resource management systems in the tropics. Mubyarto (1991) estimated that *ladang* areas cover 30% of exploitable land for agricultural activities in the world, of which 73 million ha are in the Asia Pacific region alone. *Ladang* agriculture is practiced over about 35 million hectares of Indonesian forested land and supports 22 million cultivators. Several authors describe *ladang* as an agricultural strategy that necessitates the slashing, cutting, felling and burning of forest areas for the planting of impermanent garden plots or agricultural fields (Inoue 2004, Dove 1988, Colfer *et al.* 1997); swidden agriculture has been the mainstay of horticulturalists and peasant farmers in the tropics. *Ladang* is a form of slash and burn agriculture characterized by rotation of land rather than crops, or a rotational agriculture with a fallow period longer than the period of cultivation. Essential characteristics of *ladang* are that an area of forest is cleared usually rather incompletely, the debris is burnt, and the land is cultivated for a few years-usually less than five years- then allowed reverts to forest or secondary vegetation before being cleared again (Weinstock & Sunito 1998; Dove 1988, 1993; Sindju 2003; Upadhyay 1995).

One of the indigenous people in East Kalimantan (Indonesia) who have been practicing and highly relying on *ladang* are the Dayak Kenyah⁵ people in Apau Kayan⁶. From the 1950s to the mid-1980s, thousands of Kenyah people

⁵ The Dayak are indigenous people comprising 18 ethnic groups with a combined population of more than 500,000 or 21% of East Kalimantan's population. One of the 18 ethnic groups is the Kenyah Dayak, or "Kenyah," which represent the largest population with around 60,000 people or 12% of the Dayak in East Kalimantan (Widjono 1998, Imang & Kueng 2005). Liman (2003) stated that due to tribal war with the Iban in Sarawak Malaysia, the Kenyah migrated to Apau Kayan Indonesia in the 1890s and established different villages.

⁶ "Apau Kayan" can be described as "highland area in the interior of Kalimantan, covers area of 10,000 km² at the head water of Kayan River". Originally the Apau Kayan was settled by the Kayan also coming from Sarawak. When the Kenyah migrated there in 1820-1850 (Whittier 1973), the Kayan moved out to the upstream area of the Mahakam River and Malaysia. Since then, the Apau Kayan has been occupied and regarded as the native land of the Kenyah people. Establishment of each village is based

migrated downstream from the Apau Kayan to different areas in the lowlands including Batu Majang in the Mahakam River area and Pampang in Samarinda (Colfer *et al.* 1997, Eghenter 1999, Vayda & Jessup 1986). Jessup (1992) estimated that Apau Kayan population declined from about 12,500 in 1970 to about 8,000 in 1980. Imang *et al.* (2004) observed that the migration required a long time, sometimes up to six years to travel the long distance from Apau Kayan to the new settlement, as the people had to stop and farm along the way. Reasons to move included search for better opportunities, the difficulty of getting salt, clothes, gasoline, tobacco, sugar and other goods (Jessup 1992, Inoue & Lahjie 1990, Inoue 1998, Eghenter 1999). As the Kenyah migrated downstream, the infiltration of the monetary economy into villages increased, leading to changes in economic life and social structure.

“Monetary economy” refers to an economic system where products and services are traded in exchange for money. A monetary economy stands in contrast to an economy based on barter, or a household-based self-sufficient economy where goods are not traded, and they are produced and consumed by the same households or given out for free.

Several scholars have researched swidden agriculture as practiced by the Kenyah Dayak people of East Kalimantan (Colfer *et al.* 1997, Jessup 1992, Sindju 2003). Inoue and Lahjie (1990) tried to develop models of the sustainability of Kenyah agricultural systems, including *ladang*. Sindju (2003) qualitatively describes the practice of *ladang* from the technological aspects. However, these studies have paid relatively little attention to important aspects of *ladang* system such as traditional knowledge the role of women, and perceptions of Kenyah farmers about agricultural development. These aspects are important to assess in order to enrich our understanding of *ladang* practices

Moreover, research on the swidden system used by the Kenyah was carried out around 20 years ago, e.g., Inoue and Lahjie conducted research and collected data in 1987–1988 (Inoue & Lahjie 1990, Inoue 2000). During the last 20 years, conditions have changed rapidly due to logging activities, forest fires, increased migration of the Kenyah people to lowland areas. Since 2000, decentralization⁷ policy and regional autonomy at district level have rapidly accelerated development in remote areas.

The research upon which this article is based was conducted in 2006-2007 and provides recent information on the Kenyah in relation to the practice of swidden agriculture. The objectives of this study are to assess (1) the

largely on a sub-ethnic group. For instance Long Payau village in Sub-district of Kayan Hulu is mostly inhabited by Bakung Kenyah or Sei Barang village for the Lepoq Tukung.

⁷ Some decentralization regulations are: Law (UU = *Undang-Undang*) No. 22/1999 (revised on UU No. 32/2004) concerning Local Government, and UU No. 25/1999 (revised UU No. 33/2004) concerning Finance-Balancing between the Central and Regional Government.

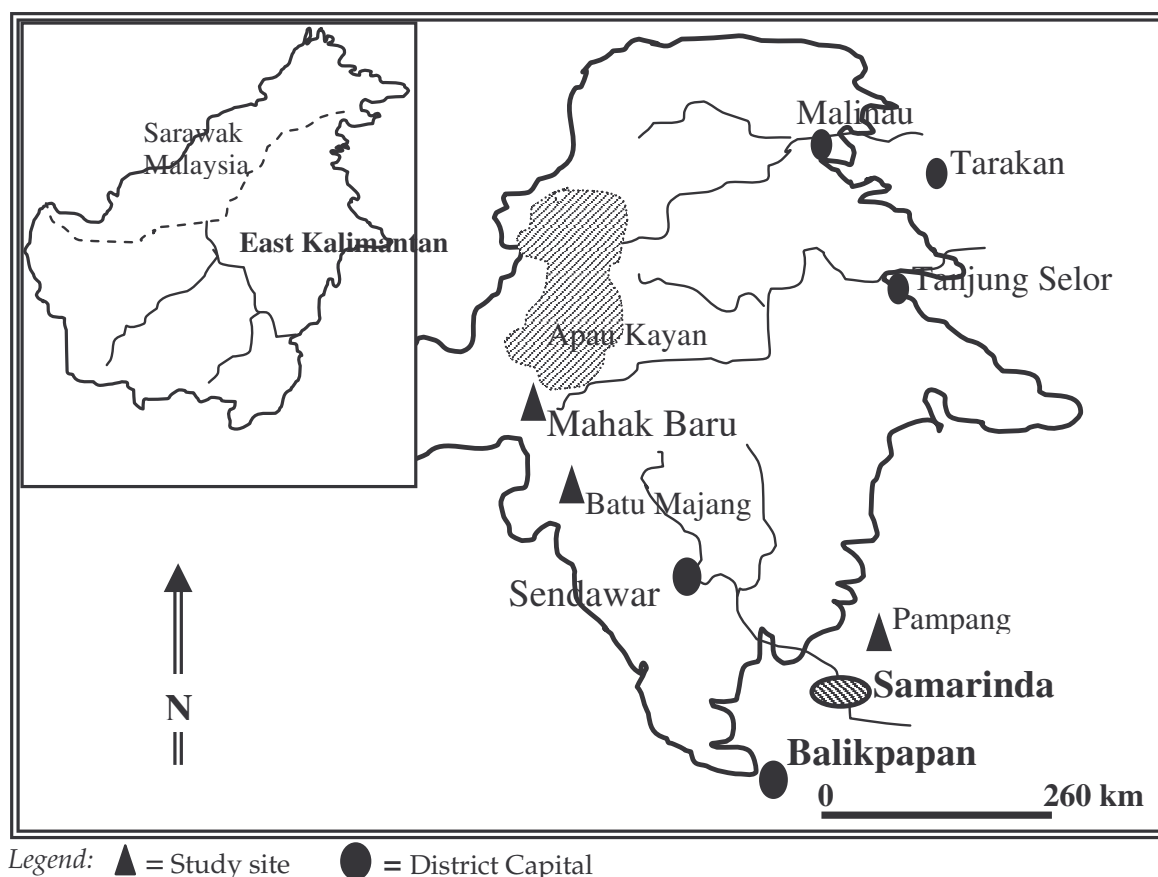
importance and practices of *ladang* for the Kenyah, (2) the *ladang* labor force and gender aspects, (3) economic life after migration to lowland areas and after being incorporated into the monetary economy, and (4) identification of socio-cultural problems and constraints to agricultural development.

Site Selection and Data Collection

1. Research Sites

Based on migration history, we selected three villages to represent different conditions: the new settlement after the migration from the Apau Kayan with easy access to the provincial capital or the economic center; the old settlement in the Apau Kayan with low access to monetary economy; and the Mahakam River area with medium access. The criteria of accessibility are determined based on geographical distance from the capital and economic centers, as well as frequency/regularity of transportation.

Figure 1. Map of study site



1.1. Mahak Baru

Mahak Baru village is the uppermost village on the Boh River, a tributary of the Mahakam River. The location is at coordinates 1° 24' 14" N, 115° 19' 34" E, 527 m above sea level. It was founded in 1966 when people moved from

native settlements in the Apau Kayan two weeks on foot from Mahak Baru. The population in 2006 was 1,103 in 250 households. In 2002, the Regent (*Bupati*) of Malinau District issued a decree (SK, *Surat Keputusan*) No. 229/2002 for the establishment of the new sub-district (*Kecamatan*) Sungai Boh. Mahak Baru was designated capital of the new sub-district.

Although now the capital of the sub-district Sungai Boh, accessibility to Mahak Baru remains a major problem. Mahak Baru is quite isolated and far from the district capital of Malinau (Table 1). The only access by road is the logging road of the forest concession of PT. Sumalindo, which connects Mahak Baru to Batu Majang by an eight-hour, 170-km drive, and an additional 40 hours by river boat. Alternative access to the provincial capital is by small plane, a 90-minute flight.

Table 1. Access to Provincial and District Capitals

Villages	Access from Villages to		Note
	Provincial capital, Samarinda	District capital	
Mahak Baru	Road 170 km (8-hour drive) + river boat (30 hours)	Plane (90 minutes)	Non-regular
Batu Majang	River boat (30 hours)	River (20 hours)	Regular
Pampang	Paved road 18 km (30 minutes)	Car (30 minutes)	Regular

Note: Samarinda is the provincial capital of East Kalimantan.

Source: Field survey (2006).

1.2. Batu Majang

Batu Majang, in the upper Mahakam, is located 200 m above sea level at coordinates 115°12" E and 0°32" N. Its highest mean annual temperature is 32°C and the lowest is 24°C. Yearly rainfall is 1,982–3,895 mm. This village, founded in 1972, has a population of 719 in 154 households (Imang *et al.* 2004). Administratively, Batu Majang belongs to West Kutai District. Batu Majang is also isolated in terms of ground transportation. However, regular river boats to district and provincial capitals are available, except during long droughts. Batu Majang is the last port for all public boats that regularly transport passengers and basic goods for the people in the upper Mahakam. More frequent interaction with traders and logging companies gives this village medium access to monetary economy.

1.3. Pampang

Pampang is an urbanized village of Kenyah people located 11 m above sea level at coordinates 0° 28' 57" S and 117° 9' 23" E. Yearly rainfall is 2,422 mm (Anonymous 2006). Administratively, Pampang belongs to the

Municipality of Samarinda. It was founded in 1980 and has a population of 797 people in 183 households in 2006. Population is mixed Kenyah from different sub-ethnic groups: Lepo' Kulit, Bakung, Lepo' Jalan, Lepo' Timay, and Lepo' Tau. In consideration of its accessibility to and from the provincial capital, and its ethnic composition, the East Kalimantan Tourism Office designated this village a Cultural Park (*Taman Budaya*) in 1996 (Schiller 2001). An 18-km paved road connecting this village to the provincial capital of Samarinda gives this village full access to economic centers.

2. Data Collection

Data was collected by interviewing respondents at each site using a structured questionnaire. Respondents, amounting to 10–20% of the total population, were selected randomly. The authors interviewed 35 respondents in Mahak Baru, 20 in Batu Majang, and 38 in Pampang. Some key informants such as village chiefs (*Petinggi*), customary chiefs (*Kepala Adat*) and elders were also interviewed.

Results and Discussion of Income, Aspects of *Ladang*, and Perception

1. Livelihoods

After Kenyah people have migrated to lowland areas and settled in different places, livelihoods and economic dynamics of the households adjusted to the different economic conditions and environmental changes.

Table 2. Livelihood Strategies

Occupation	Mahak Baru		Batu Majang		Pampang	
	n	%	n	%	N	%
<i>Ladang</i> farmer	209	84	114	83	141	77
Civil servant (PNS, PTT)	18	7	8	6	8	4
Employee at private company	4	2	25	15	9	5
Running store	4	2	4	3	2	1
Handicraft maker, trader, etc.	5	2	3	2	8	4
Other	10	4	5	6	10	8
Total	250	100	154	100	183	100

Note: n = Number of household in each site; PNS = *Pegawai Negeri Sipil*; PTT = *Pegawai Tidak Tetap* (non-permanent governmental official).

Source: Field survey (2006).

Table 2 shows that the main livelihood strategy in 84% of households in Mahak Baru is shifting cultivation, followed by civil servant employment with 7% of the population. The increase in civil servants was due to recruitment of 25 new civil servants after this village became the capital of sub-district Sungai Boh in 2002. They work as officials at the sub-district

office, and as teachers at the local elementary, junior, and newly established senior high schools. The economic life of Batu Majang is similar to Mahak Baru in terms of employment in agricultural activities, but Batu Majang has better market access in term of more intensive interaction with outsiders/traders through river transportation to sell agricultural products and purchasing more goods. Around 83% of the households are swidden farmers, while 15% are private employees of logging company, mostly at PT. Sumalindo and other logging companies nearby the village, with a further 6% being civil servants.

Even though the Kenyah people in Pampang live near the capital of Kalimantan Timur by only 18-km of paved road, the main livelihood strategy remains swidden agriculture (77% of the respondents). Around 85% of the respondents explain that rice from swidden agriculture is primarily for household consumption. The strategic location of Pampang actually offers the possibilities to work for cash, however this percentage remains small among Kenyah respondents. Other ways of earning a living include main livelihoods are coal mining (5%), followed by craftsperson/trader and civil servant. For instance, neighboring groups such as Buginese and Javanese earn much income from poultry farming and cash crops such as pepper, cacao, and rubber.

For Mahak Baru, Batu Majang and Pampang, it is difficult to make a clear distinction between *ladang* farmers alone and farmers planting crops other than rice because the *ladang* farmers are also planting crops at the same time. Total cash value from the livelihood is shown on Table 3 below.

2. Respondents' Income

As the study sites differ in access to market and natural resources, income sources also differ. We found that the average yield of unhulled rice grown by each respondent was 267 tins⁸ (significantly higher) in Mahak Baru, 125 tins in Batu Majang, and 127 tins in Pampang. Assuming that all the rice were sold at the local price of Rp⁹ 25,000/tin, for each respondent the cash value would be Rp 6,675,000 in Mahak Baru, Rp 3,125,000 in Batu Majang, and Rp 3,175,000 in Pampang. Therefore, Mahak Baru has the largest nominal total income as well as the largest contribution of rice to total income (60%), followed by Pampang (35%) and Batu Majang 32%. Although the percentage of Civil Servants as shown on Table 2 was lower (only 4%) in Pampang, the cash from salaried job was higher than of Mahak Baru and Batu Majang. The largest contribution for cash in Pampang was from employees working for coal mining companies around the village.

⁸ Tin, locally called *kaleng*, is the most common measure used by Kenyah farmers in Indonesia. One *kaleng* is equal to 12 kg of un-hulled rice.

⁹ Rp = Rupiah, the Indonesian currency. In 2006 1US\$ = Rp 9,500

Table 3. Total Cash Value, including Rice (in Rp)

Sources of income:	Mahak Baru		Batu Majang		Pampang	
	Rp	%	Rp	%	Rp	%
Rice	6,675,000	60	3,125,000	32	3,175,000	35
Cash crops	413,143	4	2,374,500	24	1,308,026	14
Timber-related activities	114,286	1	2,064,000	21	0	0
Non-timber forest products	2,068,571	19	725,000	7	515,789	6
Handicrafts and tourism industry	87,543	1	420,000	4	1,165,789	13
Services and salaried jobs	1,714,571	15	1,146,000	12	2,924,474	32
Total	11,073,114	100	9,854,500	100	9,089,078	100

Note: 1 US\$ = Rp 9,500 in 2006.

Source: Field survey (2006).

To determine cash income, we calculated (based on data collected from respondents) that 43% of rice is for home consumption, 23% is for sale, and the remaining 34% is kept in reserve for food shortages or famine season. After the following harvest, the remaining rice is just kept in storage (*lumbung*) and replaced by fresh rice. Farmers can occasionally sell rice to NTFP gatherers, newcomers and companies. After Mahak Baru became the capital of sub-district Sungai Boh in 2003, opportunities to sell agricultural and hunting products has increased. By excluding rice for home consumption from the calculation, the contribution of rice to total income in Mahak Baru is only 19%, and therefore, by excluding rice for self-consumption from calculation, Batu Majang has the largest total income, followed by Pampang and Mahak Baru. In Batu Majang, the cash was mostly from selling vegetables and salary of timber related activities or salaried jobs.

Table 4. Main Sources of Cash Income (in Rp)

Sources of Income:	Mahak Baru		Batu Majang		Pampang	
	Rp	%	Rp	%	Rp	%
Rice (only rice sold for cash)	1,057,143	19	700,000	9	776,000	12
Cash crops	413,143	8	2,374,500	32	1,308,026	20
Timber-related activities	114,286	2	2,064,000	28	0	0
Non-timber forest products	2,068,571	38	725,000	10	515,789	8
Handicrafts and tourism industry	87,543	2	420,000	6	1,165,789	17
Services and salaried jobs	1,714,571	31	1,146,000	15	2,924,474	44
Total	5,455,257	100	7,429,500	100	6,690,078	100

Source: Field survey (2006).

Since the 1990s, non-timber forest products (NTFPs) such as *gaharu* (*Aquilarria becariana*), hunting catches, fish, pan-mined gold, and *bezor*, locally called *guliga*,¹⁰ have contributed significantly to cash income in Mahak Baru. NTFPs contribute 18% of total family income, followed by income from services and salaries (civil servant jobs and running stores or other services), which account for 15%. All villagers may freely harvest NTFPs without restriction from customary and village institutions, as it difficult to control the practice of harvesting; this has led to drastic declines of product in the last two years. Inoue (1998) describes this situation as “loose local commons” in which socially accepted rules for resource management are not tightly adhered.

In Batu Majang, cash crops are important and account for 32% of income, followed by timber-related activities at 28%, and services and salaries at 5%. Rice contributes only 9% to the total. Cash crops, particularly vegetables, have been sold to the logging company PT. Sumalindo under a partnership scheme (*kemitraan*) with Batu Majang since 1993. Other important sources of cash income are timber-related activities such as working for logging companies, and services and salaries. We calculated that, on average, the rice production of each respondent meets home needs. Farmers who grow more than they need can sell the excess to logging companies and neighborhood villages.

Even though the main livelihood in Pampang is *ladang*, the salaries of professionals, and employment at coal mining and other private companies contributed 44% of total income, followed by cash crops such as vegetables, cacao, coffee, fruit, bananas, and candlenuts (20%). Such crops are actually potential cash crops if growers improve agricultural practices by, for instance, applying fertilizer and performing intensive maintenance. However, we found that no one was applying fertilizer, and some cacao, coffee, and pepper gardens were untended. After this village was designated as a “cultural park village” in 1986, proceeds from selling handicrafts to tourists and the regional market have been an important source of cash and contribute 17% of total income.

Tabel 2, 3 and 4 indicate that farming, particularly *ladang*, is still the main livelihood strategy in all three villages, but sources of income have changed in relation to the influence of monetary economy and access to market. When the timber and NTFPs were not available in the village territory, they run alternative farming and looked for other sources of income.

¹⁰ *Guliga* is a crystallized gall found inside the large intestine of *Presbytis* spp. The price is around Rp. 200,000–300,000/gram, equivalent to US\$20–30.

3. Aspects of the Ladang System

The detailed description below is aimed to show the differences as a result of access, geography, market and the influence of monetary economy to some important aspects of the *ladang*.

3.1. Ladang Calendar

Figure 2 indicates that farmers in Mahak Baru begin *ladang* activity (*menebas*) in early June, followed by Batu Majang at the end of June. Farmers in Pampang are the last at the end of July. The data shows that the farther downstream a village is, the later *ladang* activities start. What factors cause the difference? Respondents gave a variety of responses, which are summarized as follows: (1) most upstream farmers clear primary and old secondary forests for *ladang*, which takes more time for land selection, land clearing, felling, and also drying before burning; (2) the size of a *ladang* in Mahak Baru is larger than that of a *ladang* in Batu Majang or Pampang, requiring more time to clear the *ladang*, and (3) the *ladang* calendar is adjusted to drought spells and best sowing dates in each location. Figure 2 indicates that sowing dates in Batu Majang and Pampang are, respectively, one and three weeks behind those of Mahak Baru.

Figure 2. Calendar of Land Clearing and Sowing

Land Selection and Clearing:	June	July	August	September
•Mahak Baru	■ ■ ■ ■			
•Batu Majang		■ ■ ■ ■		
•Pampang			■ ■ ■ ■	
First dates for sowing:				
•Mahak Baru			■ ■ ■ ■	
•Batu Majang				■ ■ ■ ■
•Pampang				

Source: Field work (2006)

Traditionally, there has been a lot of variation of the sowing dates among the Kenyah. Figure 2 shows that the earliest dates Mahak Baru people sow seeds are 15–18 August. It is easier for people to remember these dates because August 17 is Indonesia’s Independence Day. The dates are also correlated to traditional practices among the Iban in Sarawak and West Kalimantan who also sow in mid-August (Kendawang *et al.* 2005, Colfer *et al.* 1997). Meanwhile, Batu Majang swiddeners sow at the end of August and those of Pampang in mid-September. An ex-customary chief in Pampang made this statement about sowing dates: “The reason we sow on different dates is to obtain the best yield. Seasonal differences require different sowing

dates. We have tried a couple of times to sow on the same date as we did in Apau Kayan and Mahak Baru, but failed. We call this phenomenon *metang*, meaning that rice grows well but the heads don't fill, and pest attacks are worse." He adds that in former times, the first sowing dates were traditionally determined by observing the sun's shadow¹¹ but only a few elders remember how to practice this traditional technique.

3.2. Land Selection

Through decades of experience farmer learned that productivity depends highly on natural factors such as rainfall, soil fertility, pests and diseases. In this respect, land selection plays an important role for obtaining the best yield because the latter is linked closely to other natural and social factors. An appropriate land selection is one where land is considered fertile and accessible and adjacent in location to other *ladang* so as to form a cluster and minimize pest attack. Sindju (2003) also observes that land selection guarantees successful swidden farming.

Table 5. Considerations in Land Selection for *Ladang*

Considerations	Mahak Baru			Batu Majang			Pampang		
	N	%	R	n	%	R	n	%	R
Fallow period base vegetation	13	37	1	8	36	1	18	47	1
Accessibility	11	31	2	6	34	2	3	8	3
Cluster/group	9	26	3	4	20	3	16	42	2
Other	2	6	4	2	10	4	1	3	4
Total	35	100		20	100		38	100	

Notes: n = Number of respondents; R = ranking

Source: Field survey (2006)

Table 5 shows that "fallow period based on vegetation" is the most important consideration in land selection for *ladang* in Mahak Baru and Batu Majang, and even in Pampang. Vegetational succession among villages and sub-ethnic groups is basically similar. Inoue and Lahjie (1990) classified fallow periods among the Kenyah in Apau Kayan and lowland areas in six categories: *bekan* (0–1 year), *jue dumit* (4 years), *jekau* (7 years), *jekau lataq* (20 years), *empak cen jekau* (more than 40 years), and *mpak* (primary forest). In our observation however, fallow periods had four categories commonly used at field sites: *bekan* (0–2 years), *jekau buet* (5–8 years), *jekau dado'* (more than 9 years), and *mpak* (primary forest).

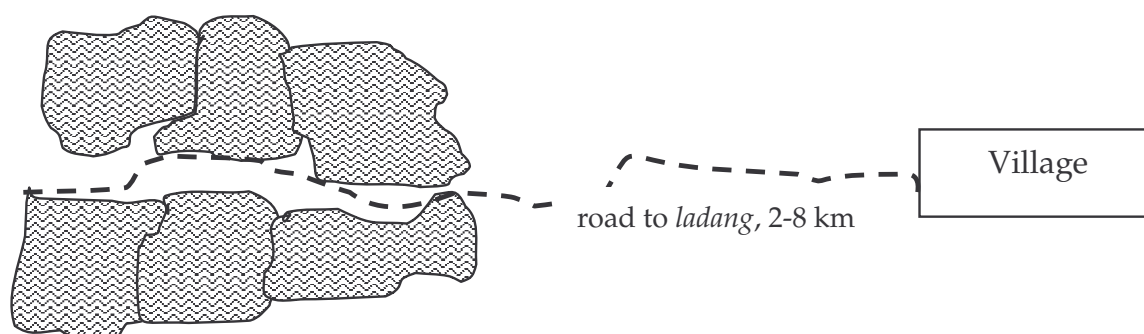
¹¹ Farmers pounded a piece of round wood 1.5 m high and 5 cm in diameter in the ground, then measured the length and change of its shadow on the ground for three days. The shadow's average length was used in determining the most favorable days for sowing

The longer the fallow period, the more fertile the land becomes because of the accumulation of nutrients (Upadhyay 1995, Oyama 2005). In the *ladang* system, vegetational succession is considered more reliable and simpler for farmers than using the number of fallow years. The condition of the vegetation, especially key species, is a direct indication of the level of fertility of the soil. When farmers describe a plot of land as *jekau bu'et* or *jekau dado'*, they are in reality describing the state of ecological succession. If an indicator-species has grown well and dominates the vegetation, it means that the land is already fertile and can be cleared again for cultivation. Inoue and Lahjie (1990) maintain that the range of fallow years is not fixed because the recovery rate of vegetation depends on the soil fertility.

The second and third criteria for land selection both in Mahak Baru and Batu Majang are accessibility to *ladang* and clustered¹² *ladang* (see Figure 3). In Mahak Baru, accessibility and clustering are important because this is linked closely to pest control, specifically grasshoppers, sparrow, monkeys and other mammals. Average distances to *ladang* are less than 90-minute walk. Similarly, Warner (1991) observes that site selection depends not only on soil fertility requirements, but also on distance from one's house or village to the field.

In Pampang, accessibility is only the third criterion because all agricultural areas are easily accessible from the village, at most 6 km away. Some farmers use bicycles and motorbikes to go to their *ladang*. In order to eliminate yield loss caused by the most feared pests, which are sparrows and parrots, farmers prefer open *ladang* in a group of two to four households so that they can control the pests every day by taking turns. Comparatively, in Mahak Baru and Batu Majang, the farmers open *ladang* in a group of 4 to 10 households. It seems that the more difficult the accessibility, the more the number of farmers in one group of *ladang*.

Figure 3. Sketch Map of a Cluster of *Ladang*



Source: Field survey (2006).

¹² *Clustering* is when a number of farmers open *ladang* plots altogether in a large area, for example five to 10 farmers sharing 10 ha for *ladang*.

In former times, the Kenyah ancestors practiced *melaki*¹³, a traditional rite for calling the brahminy kite (a raptor) to give clues for fertile land (Sindju, 2003). Imang and Kueng (2005) also observed that the Punan, an ethnic group of the Dayak, dig soil to test its fertility. In this study we interviewed all respondents to find out if they still practice *melaki* rites or consult with the field agricultural official (PPL, *Petugas Pertanian Lapangan*) in order to determine soil fertility. We found that respondents do not practice traditional rites anymore nor ask PPL to check soil fertility. Instead, farmers use their experience and knowledge with regard to key vegetation species to determine whether a certain plot of land is fertile enough to make a *ladang* (Table 6.)

Table 6. Indicator Vegetation Types by Category of Fallow Period in the Three Villages

Category of Vegetation	Mahak Baru	Batu Majang	Pampang
Shrub (Bekan)	Mpung (<i>Blumea balsamifera</i>), ulem (NI), siit (NI), balang (<i>Lindera polyantha</i>), lebem (<i>Musa acuminata</i>), sawan (NI)	Mpung (<i>Blumea balsamifera</i>), lebem (<i>Musa acuminata</i>)	Mpung (<i>Blumea balsamifera</i>), ulem, udu mawen (NI), udu kere (NI)
Young secondary forest (Jekau bu'et)	Karun (NI), lebem (NI), bine (<i>Maccaranga trichocarpa</i>), belebu (NI), sawan (NI), noh (NI), udu penganen (NI), titeq (<i>Zingiberaceae</i>)	Kayu uwa (NI), belebu, sawan (NI), lebem (NI)	Benuaq (<i>Maccaranga triloba</i>), lendung kapan (NI), aka kelapat (NI)
Old secondary forest (jekau dado')	Benuaq (<i>Maccaranga triloba</i>), karun, pela (NI), sanam pidek (NI), kayu sanam (NI), aka kelese (<i>Spatholobus ferugineus</i>), udip ampang, lengidan (NI), sep busan (NI),	Benuaq (<i>Maccaranga triloba</i>), adeu (<i>Elmerrillia mollis</i>), kideu (<i>Hibiscus macrophyllus</i>), lebem (<i>Musa acuminata</i>),	Benuaq (<i>Maccaranga</i>), kidau (<i>Hibiscus macrophyllus</i>), kayu suang (NI), aka kedating (NI), aka kelese (<i>Spatholobus oblongifolius</i>), kayu uwa (NI), udip ampang (NI),
Primary forest (mpak)	Tenak (<i>Shorea</i> spp), ampang (<i>Shorea</i> spp)	Tenak (<i>Shorea</i> spp), ampang (<i>Shorea</i> spp)	Tenak (<i>Shorea</i> spp), ampang (<i>Shorea</i> spp)

Note: NI = Not identified.

Source: Field survey (2006).

¹³ The overall process is actually long, but briefly, the leader of the *melaki* rite begins by calling the eagle (*pelaki*) asking for good fortune by uttering a prayer. When the *pelaki* appearing, the *pelaki* will give clues to the ceremony leader whether the land is fertile or not.

Table 6 shows that indicator species at the three field sites are similar. In Mahak Baru, Batu Majang, and Pampang, *mpung* and *sawan* are the best indicator vegetation species of fertile soil in shrub vegetation (*bekan*), while *karun*, *lebem*, *kayu uwa*, and *benuaq* (*Maccaranga triloba*) are important indicator species of trees in young and old secondary forests. When the species found are dominant and grow well in a certain area, it means that the land is fertile enough for *ladang*. Kenyah farmers also recognize some dominant species in secondary forests that indicate that the land is not fertile or lacks in soil nutrients needed for rice cultivation. These include: *udu tuen* (NI), *udu ma wen* (NI), *namam* (*Dicranopteris linearis* Burm, Andrew), *kang* (*Melastoma malabathricum* L), *ilalang* (*Imperata cylindrica*), *nyibung* (*Oncosperma horridum*) and *belaban* (*Tristaniopsis whiteana*).

3.3. Labor Organizations

In general, farmers work individually in their own *ladang*, but they also organize themselves in working groups to make certain kinds of labor-intensive work more efficient. Another reason for labor organizations is to strengthen the sense of unity and to enhance social cohesiveness among people. We observed that Kenyah farmers mobilize labor in *ladang* through arrangements called *senguyun*, *pulun*, *mepo*, *mabe* and *metau*. Inoue and Lahjie (1990) observed that *senguyun* is characterized by direct and equal reciprocity of labor, i.e., an equal person-day ratio applied for each participating member. For instance, if a *senguyun* group consisted of six persons, each person is entitled to and owes six person-days of labor. This system can be used at any stage of *ladang* activity. *Pulun*, instead, is a cooperative work system characterized by indirect reciprocity in which the amount of labor supplied is not a really important consideration as long as they working and enjoying altogether. Members of the *pulun* are usually the farmers in a group/cluster of *ladang*.

For instance, household A supplies 2 person-days to household B or C but it is not necessarily for household B or C to supply 2 person-days to household A. It could be less, the same or even more than 2 person-days. *Pulun* is only used for sowing (*nugan*). We observed that by working in *pulun*, it is possible to sow any one field in one day, so that the rice grow up altogether which is also a strategy to minimize the the loss caused by pests. A way to reward the labor input by others is by the concerned family serving big meals to those who participated in the sowing. One respondent in Mahak Baru said, "*pulun* is an important and exciting moment for me. If we no longer practice *ladang*, we could not sustain *pulun* anymore."

Sindju (2003) defines *mepo* as a purely social (philanthropic) work group that emerges spontaneously to assist a person or family thought to be in need of help (for example due to sickness) in completing his or her farm work

without expecting compensation in any form. The concerned farmer serves only light meal for lunch. *Mabe* was originally an obligation of villagers (as commoners) to work together in *ladang* for the village head or customary head (from aristocratic families).

As Kenyah people migrated to areas in the lowlands with different degrees of monetary economy, questions that arise are: to what extent do farmers still practice or arrange such types of work organizations? Is there a tendency for farmers to become more individualistic? Table 7 shows allocated person days for *ladang* and for each of the labor organizations.

Table 7. Labor Allocation in *Ladang*

Labor Allocation	Mahak Baru		Batu Majang		Pampang	
	n	%	n	%	n	%
Total labor allocation for <i>ladang</i>	212	100	122	100	130	100
Family labor	179	84	113	93	122	94
Exchange labor (<i>senguyun</i>)	13	6	3	2	3	2
<i>Pulun</i>	9	5	2	2	3	2
Hired Labor (<i>metau</i>)	11	5	4	3	2	2
<i>Mabe</i>	+		-		-	
<i>Mepo</i>	+		+		+	

Note: n = Average person day; + = practiced; - = not practiced

Source: Field survey (2006).

Table 7 indicates that a farmer in Mahak Baru allocated 212 person days for *ladang* a year, almost double than of Batu Majang and Pampang, respectively 122 and 130 person-days, because the size and vegetation of the *ladang* are different. It means that the importance of *ladang* has gradually decreased, but that the decrease is compensated by increasing time allocated to other farm and off-farm activities for cash.

The practice of *senguyun* and *pulun* also declined because farmers spend more time on their own activities. Time allocated to *senguyun* in Mahak Baru, Batu Majang, and Pampang are respectively 6%, 2%, and 2%, while time allocated to *pulun* are 5%, 2%, and 2%.

As the Kenyah people migrated to Batu Majang and Pampang, *mabe* is no longer practiced. Imang *et al.* (2004) and Lawai (2003) showed that special treatment for aristocratic families has gradually faded along with economic change and the increasing influence of church leaders. Meanwhile, *mepo* is maintained by the Kenyah regardless of the economic situation and monetary economy infiltration.

Metau, or hired labor, is also practiced in *ladang*. Inoue and Lahjie (1990) observed hiring systems such as *bagi hasil* and *barwong*. For instance, a hired-labor is paid of one tin for every four tins of unhulled rice he/she harvests in

the harvest season. But the important points to discuss in this respect are the reasons why farmers hire labor, and what sources of cash are used to pay hired labor. Table 7 shows that allocated person-day for hired labor in field sites are respectively 5%, 4%, and 1%. Even though Mahak Baru is relatively far from economic center (monetary infiltration), farmers hired more labor than the farmers in Batu Majang and Pampang due to their bigger size of *ladang*. Another reason is that most *ladang* in Mahak Baru are made from primary and old secondary forest, so they hired chainsaw operators or a man (in the past) to cut big trees. On the other hand, farmers in Batu Majang and Pampang only hire labor when the concerned farmers are engaged in other activities for cash or hire at the peak of the harvest season. We calculate that 57% of respondents in Mahak Baru pay hired labor in cash. In Mahak Baru, the hired-labors are mostly for felling big trees in primary or old secondary forests, while the *ladang* in Batu Majang and Pampang are mostly in young secondary forests. Around 38% of cash to pay hired-labor in Mahak Baru is obtained from NTFPs, while cash in Batu Majang and Pampang is obtained from wages and salaries.

Gender Aspect in Ladang Activities

From the gender perspective, we found that the main *ladang* workers in Mahak Baru and Batu Majang are women, respectively 54% and 45%. Some men reason that *ladang* work is regarded as women's work, while men's work is hunting and gathering (*ngusa*). In contrast, women and men in Pampang play a similar role in *ladang* related activities. Men also support their wives, who work by growing cash crops and making handicrafts. Overall, the Kenyah women are involved equally in almost all stages of *ladang* (except felling). By comparison, Dove (1988) qualitatively described that the role of Kantu women in the interior of West Kalimantan in *ladang* activity is lesser than that for men. Women are mostly doing easier work such as rubber harvesting.

3.4. Productivity of Ladang

Ladang productivity shown in Table 8 is based on rice yield/ha in each of the phases of the ecological or vegetational succession. However, due to an imbalance in the numbers of respondents on vegetational succession, the discussion is focused on comparing productivity by village instead of by forest category. The most common way to weigh the yield of *ladang* among the Dayak and particularly Kenyah is the "tin," locally called *kaleng*. One *kaleng* is equivalent to 12 kg of unhulled rice (*padei*).

Table 8. Productivity of *Ladang*

Types of vegetation	Mahak Baru (kg/ha)	Batu Majang (kg/ha)	Pampang (kg/ha)
Shrub (<i>Bekan</i>)	NA	850	438
Young secondary forest	996	665	822
Old secondary forest	1,216	1,089	1,063
Primary forest	1,519	595	1,240
Average productivity (kg/ha)	1,270	800	890
Average fallow period (years)	8	5	6

Note: NA = Not available.

Source: Field survey (2006).

Table 8 shows a wide range variation of *ladang* yield in the same category of vegetation but different villages. For example, *ladang* yield per ha for young secondary forest in Mahak Baru, Batu Majang and Pampang respectively is 996 kg, 665 kg and 822 kg. Table 8 also show that *ladang* productivity in Mahak Baru is 1,270 kg/ha, Batu Majang 800 kg/ha, and Pampang 890 kg/ha of unhusked rice. By comparison, Colfer *et al.* (1997) observed that *ladang* productivity of Kenyah Apau Kayan was 1,170–1,370 kg/ha, Inoue *et al.* (1991) found that *ladang* productivity of Punan Dayak of Kelay in the late 1980s was 1,489 kg/ha, while Inoue (2000) found the *ladang* productivity of Kenyah in the late 1980s was more than 2,000 kg/ha in Apau Kayan and 1,900 kg/ha in upper Mahakam.

Data for the productivity was collected by asking the amount of unhulled rice (in *kaleng*) divided by the size of the plot of *ladang* (ha) in the latest harvesting, not the number of *kaleng* of sown rice. Besides soil fertility, other factors that significantly influence the yield are long drought and pest. In certain years and even certain location, *ladang* is severely damaged by pests. An example is shown on Table 8 where the productivity of *ladang* in primary forest of Batu Majang was only 595 kg/ha due to a severe attack of monkeys and grasshoppers.

Information in Table 8 indicates that *ladang* productivity in Mahak Baru remains in the range of previous findings, while *ladang* productivity in Batu Majang and Pampang are rather low. Table 8 also shows that, even if land is fallowed for recovery, shorter fallow periods and fires can decrease land productivity. We observed that the average fallow period, excluding primary forest, is eight years in Mahak Baru, five in Batu Majang, and six in Pampang. Besides secondary forests, farmers in Mahak Baru still have large tracts of primary forests, while *ladang* in Batu Majang and Pampang is limited to young secondary forest.

4. Perception of Sedentary and Intensive Agriculture

Because of transportation and market constraints, it is reasonable for farmers in isolated villages like Mahak Baru to depend heavily on forest products and swidden agriculture instead of practicing sedentary farming (wetland rice) and cultivating cash crops. The transportation to Capital District of Malinau is only by small plane. It is different however with the Kenyah in Batu Majang, which enjoys regular access to market. In 1993, the logging company PT. Sumalindo built a check dam to create a wetland, but farmers prefer to practice *ladang*. The reasons given were mostly along traditional and social considerations: *ladang* is the tradition so that it is more exciting to work in *ladang* compared to wetland rice (*sawah*); farmers do not feel comfortable working by bowing the body, and are not used to working in wet conditions. The different taste of rice was only a minor consideration in why farmers in Batu Majang preferred to work in *ladang* instead of *sawah*. Although there's no irrigation for wetland rice in Mahak Baru and Pampang, respondents also had similar comments to Batu Majang.

Annual cash crops such as cacao, coffee, and rubber were introduced 10 years ago, but farmers in Batu Majang began planting them only very recently. By comparison, Inoue and Lahjie (1990) found that other Dayak groups such as the Tunjung and Benuaq have been successfully harvesting rubber they planted through government-sponsored estate in 1988 as well as by their own initiative several years earlier. Some farmers in Pampang sponsored by the Crop and Estate Office (*Dinas Perkebunan*) have also planted cash crops such as cacao, coffee, and rubber, but with less success than other non-Dayak ethnic groups. Our field observations found that such cash crops were just left to grow naturally without intensive care, and some gardens were even left unattended. Farmers admit that they do not apply agrochemicals or perform maintenance as done by neighboring ethnic groups such as the Buginese and Javanese.

The question is why the Kenyah are less interested in wetland rice and other chemical agriculture. Farmers admitted that they feel "something is missing" and there is a "missing link" to the past if they no longer practice *ladang*. By maintaining *ladang* they can remember the valuable past and can preserve ways of working together through the *senguyun*, *pulun*, *mepo*, or *mabe* systems, which are not appropriate when practicing wetland rice. The reasons were: the conditions, including the (wet) ground are not suitable for such kind of work; very few people have wet rice field; many do not feel comfortable working in wet places (wetland rice), they do not used to hoeing for soil preparation. The main reason why farmers do not apply fertilizer particularly for annual crops is because they are not sure of a return for the high cost of fertilizers. It is apparent that "extractive habits and instant harvesting culture" remain strong among the Kenyah people.

Conclusions

Since the Kenyah people migrated downstream, the monetary economy has influenced them in many aspects of life such as agricultural activities including *ladang*, livelihood, and lifestyle. Although *ladang* is still considered important from the socio-cultural and economic aspects, there has been decline in some aspects. Time allocation and yields of *ladang* have decreased in Kenyah communities who have migrated downriver. Differences of geography and market access have changed some aspects of *ladang* practice including the farming calendar, land productivity and sources of income.

With regard to labor organizations and gender, time allocation for *ladang* seems to decrease, but it is compensated by increasing time allocated for other farm and off-farm activities for cash. The roles of women in *ladang* and other agricultural activities in remote villages are more dominant than those of men, but their roles are almost similar in suburban villages. Even though the Kenyah have been influenced by the monetary economy, they still maintain social cohesion among people through the forms of work organization in *ladang*, i.e., *senguyun*, *pulun* and *mepo*. It is however, these have significantly decreased too.

Where access to an economic-center or the market for agricultural products is low, forested land much larger, inhabitants fewer and companies non-existent, non-timber forest products are an important source of cash-like in Mahak Baru. Because of transportation constraints and food security-especially rice -it is very important for people who want to ensure enough supply of rice to avoid famine. Among those who moved downriver to places with medium market access like Batu Majang, the practice of *ladang* is primarily for the purposes of self consumption and for sale. To generate cash income, they allocate more time to grow cash crops such as vegetables for sale to logging companies, traders and other buyers in neighborhood villages. Such crops have become an important and sustainable source of cash; and cash also helps with regards to food security in famine season by facilitating buying rice in the nearby store.

So far, farmers are more interested in practicing *ladang* compared to wetland rice (*sawah*). They argue that *ladang* is not simply an agricultural or economic activity, but also an important part of their culture and social system. Respondents in Pampang also practice *ladang* for subsistence. They are quite responsive to economic changes by growing cash crops such as vegetables, cacao, rubber, and coffee. By comparison to nearby ethnic groups such as the Buginese and Javanese, the Kenyah people do not grow as many cash crops and are rather reluctant and late in adopting an agricultural system which needs fertilizers and intensive labor input.

It is mentioned earlier that *ladang* is one of the approaches and practices within the social forestry system which maintains the ecological balance

through rotation and fallow period. Noted as well is that most of yield of *ladang* is for subsistence, and therefore farmers seek for cash from other farm and off-farm activities. For a successful social forestry program, the government should combine "reforestation-oriented" with "cash income-oriented" practices such as fruit trees or other traditional practices for cash so that farmers become more interested in social forestry programs. A successful social forestry program needs continuous cash income from other sources or from the social forestry itself. Social forestry programs should also consider local, specific conditions where a particular program is proposed.

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