

PERSISTENCE AND CHANGE IN THE PRACTICE OF SHIFTING CULTIVATION IN THE APO KAYAN, EAST KALIMANTAN, INDONESIA

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INTRODUCTION

The rapid economic and social changes that followed the timber and oil booms of the 1970s in Indonesia's East Kalimantan province (eastern Borneo) led in many parts of the province to major changes in land use, including an increase in commercial logging and forest clearing for commercial and subsistence agriculture (Kartawinata and Vayda 1984). Mechanized logging, immigration of farmers, and the devastating drought and fires of 1982-1983 (Leighton 1984) all had major impacts in the East Kalimantan lowlands.

In the remote interior plateau known as the Apo Kayan, however, the direct effects of regional economic development were few. The most dramatic change affecting agriculture and settlement patterns in recent decades has been a decrease in population as people have migrated to the lowlands in search of better economic opportunities. The population declined from about 12,500 in 1970 to about 8,000 in 1980, at which time emigration was still continuing (Mackie *et al.* 1986). But such population changes are not a new phenomenon. Large-scale migrations into and out of the Apo Kayan and local population movements within the area have occurred for centuries and have long been connected in one way or another with changes in agriculture and forest use (Jessup 1981). The situation I observed in the 1980s was unusual in contemporary Southeast Asia in that population density had been decreasing for a generation or more. However, such local population declines must have occurred many times in the past among tropical shifting cultivators and so the Apo Kayan may illustrate an important source of variation in agricultural practices.

The Apo Kayan was selected as a research location for two successive Man and Biosphere projects between 1979 and 1984.² The focus of the research was on people's forest-related activities, including shifting cultivation, and their biological effects. We chose the Apo Kayan because it was one of the few places in East Kalimantan where long-fallow, forest-maintaining shifting cultivation was still practised almost entirely for subsistence and with few industrial inputs. Most of the 8,000 or so inhabitants of the Apo

Kayan in 1980 were Kenyah Dayaks, upland rice farmers living in longhouse communities of a few hundred people along the upper Kayan River and its tributaries between 500 and 1,000 meters elevation. Most of my research on shifting cultivation, as well as that of my colleagues (Mackie *et al.* 1986), was done in the vicinity of Sungai Barang, a well established Kenyah village of about 375 people close to extensive primary and secondary forests.

SHIFTING CULTIVATION IN THE APO KAYAN

Agricultural practices in the Apo Kayan have been described by Whittier (1973) and are broadly similar to those of other Borneo shifting cultivators as reported by Chin (1985), Freeman (1970), Padoch (1982), Rousseau (1977) and others. Fields are cleared from forest and the cut vegetation is burned. Re-burning is done as necessary, then rice and a mixture of other crops are planted between the remaining stumps and logs using dibble sticks. Fallow fields usually return quickly to forest.

A large number of rice varieties are known and cultivated, although a few predominate. Widjaja collected information on 37 varieties in the village of Sungai Barang alone, of which 23 were still grown and 14 remembered (Widjaja and Jessup 1986). Six varieties had been obtained in recent times from other villages; the origins of the others were not known. The 23 active cultivars included 13 varieties of ordinary rice and 10 of glutinous rice. Of these, six were reported to grow well only in specialized habitats. They included four varieties of swamp rice. A few varieties, perhaps a third or less of those now grown, comprised the majority of all rice in cultivation. Conversely, some varieties were extremely rare (at least one was grown only by a single household). Discussions with farmers indicate that the particular mix of varieties under cultivation has changed over the last generation or two, and also that there are differences between villages in known and cultivated rice varieties.

Other crops in swiddens include maize, cucumber and squash, beans, job's tears, tobacco, cassava, sugar cane, and banana. Except for the cucurbits, which are intercropped with rice by mixing the seeds before planting, these secondary crops tend to be planted in clusters within swiddens (where rice is the predominant crop) or in separate gardens (without rice). Fruit trees are also planted in old swiddens, by trails, and near villages. Wild fruit trees, sago palms, honey trees, and other useful plants are spared when fields are cleared and later protected during and after burning.

Households cultivate around 2 ha of swiddens each, although there is considerable variation between households and from year to year, depending in large part on the availability of labor (Jessup n.d.; Mackie 1986). Swiddens are made in clusters, with a number of households farming together in a group. Farm-group sizes range from two or three up to a dozen or more households, with the fields usually laid out along the course of a river or stream. Most households make two or more swiddens in different locations, which may vary considerably in their environmental characteristics and size as well as in cropping patterns. A common arrangement is to make a large field in well developed secondary forest relatively far from the village for the household's main rice crop and

another, smaller field in young second growth near the village specially for glutinous rice and non-rice crops.

Rice cultivation is usually limited to one or two years, although in swiddens cleared from primary forest (now rare in Sungai Barang but common a generation ago), cultivation for three or even four successive years was reported by farmers. Rice yields from primary forest swiddens are said to increase in the second year of cultivation as organic matter decomposes (Jessup 1981; cf. Driessen *et al.* 1976). Yields decline later as weeds, pests, and diseases build up. There is much variation in yields from year to year depending on weather conditions and success in burning as well as occasional outbreaks of pests. There are also differences between sites in any given year. The mean yield of dry, unhulled rice in Sungai Barang in 1981-1982 was 1.1 tonnes per hectare, which is fairly good for upland rice in Kalimantan. Sungai Barang farmers said this harvest was a bit better than usual.

Fallow periods in the Apo Kayan now range from about 6 years to more than 40 years, with fallows of between 10 and 25 years at most sites. Little primary forest has been cleared since the 1950s. Most farm sites have been re-cleared and cultivated many times, often by successive groups of Kayan and Kenyah shifting cultivators who have migrated through the area (Jessup 1981).

CHANGES IN FOREST USE RESULTING FROM MIGRATION

Shifting cultivation in the Apo Kayan now reflects a long history of forest clearing, reclearing, and abandonment of farm sites. Secondary forest stands of many different ages are present as a result of past cultivation and, in many locations, the emigration of previous cultivators (Jessup 1981). These include Kayans and others who inhabited the Apo Kayan until the late 18th century, when thousands moved to the lowlands of Kalimantan and Sarawak. Other inhabitants in the past were Kenyahs who entered the Apo Kayan in the first part of the 19th century and migrated frequently within the area. Some Kenyahs left the Apo Kayan towards the end of the 19th century, while others and a few remaining Kayan groups emigrated during the 20th century.

The population as a whole has decreased from about 16,000 in 1928, when the first census was taken, to less than 8,000 in the 1980s (Mackie *et al.* 1986). Although some whole villages left, others fissioned, so communities now are considerably smaller than in the past. This has led to changes in agricultural practices, particularly in the age and location of forest cleared for swiddens, as good farm sites under secondary forest near villages are now more abundant than previously. The average distance of swiddens from villages has decreased. The proportion of swiddens cleared from primary forest has also decreased (Mackie *et al.* 1986). Almost all are now made in secondary forest, which is easier to clear than primary forest, especially when labor is not plentifully available. The slash cut from secondary forest also dries more thoroughly and so burns more reliably than primary forest slash. Similar changes in site selection and forest clearing must have occurred after large-scale migrations in past centuries.

Household histories of swidden site selection collected in Sungai Barang since the village was established in 1942 illustrate some of the changes in forest use that have occurred.³ When the present inhabitants moved to Sungai Barang, they continued to cultivate some sites in secondary forest near their previous home some 10 km away. They also used secondary forest sites that had been abandoned by another village, near Sungai Barang, whose inhabitants emigrated in the early 1940s. About a quarter of all swiddens at that time were cleared from old growth or primary forest even in the first few years after the village was established. This proportion decreased after the 1940s when emigration from Sungai Barang occurred. Old field sites (that is, swiddens in their second or later year of cultivation) declined in proportion to those made in old growth forest, because swiddens cleared from secondary forest are less often recultivated than those made in old growth.

PIONEER FARMING: SOME QUESTIONS

In contrast to the re-occupation of previously farmed sites that has occurred repeatedly in the Apo Kayan, many of the migrations of Apo Kayan people to lowland areas involved pioneering, that is, the establishment of new farm sites in primary forest, often in isolation from other groups and far from the migrants' homeland. Some of the agricultural practices and changes in practices that one would expect among pioneers are quite different from those among people making short moves within the homeland area. Others may be common to migrants but differ from those of non-migrants. Questions arise as to how such changes or differences in practices come about and, conversely, whether and how certain other practices persist (cf. Barth 1987; Vayda 1989; Vayda and Jessup 1986).⁴

Farming in a new area may pose certain problems of adjustment for shifting cultivators of upland rice. The timing of cutting, burning, and planting swiddens is closely aligned to seasonal changes, particularly in rainfall, and the pattern of seasonality varies considerably from one part of Borneo to another. Temperature, soil characteristics, and other environmental variables also differ between one region and another. This raises questions about how the necessary adjustments are accomplished. Do farmers moving to a new environment experiment, seek advice from neighboring people, or follow known precedents in adjusting their agricultural calendars, farming techniques, and their mix of cultivars to suit the new conditions?

One Kenyah informant, a man expert in the ritual use of a gnomon or shadow-stick to determine the right planting dates in Sungai Barang, told me that such dates were found empirically after migration to a new area by recording the dates on which rice was planted over a period of several years and comparing the success of the harvest obtained. It is unclear how long it might take to find the "best" date to plant by using such a method and whether the experts made systematic experiments rather than merely recording haphazard variations. Farmers everywhere pay close attention to variations in yield as well as to differences among crop varieties and between contrasting environments such as

wet vs. dry sites. How such observations may be systematized and incorporated into farming traditions in interior Borneo remains a question.

With regard to the allocation of new land for swidden sites, the question arises whether and how precedents are involved in the distribution of land-use rights in a pioneer community. Specifically, are principles of allocation and tenure used in long-settled areas still invoked and somehow applied in areas of pioneer settlement, where unclaimed land is available and no rights to particular sites are yet established? An assumption held by some writers on land tenure in Borneo (e.g. Appell n.d.; Freeman 1970; Leach 1950; Weinstock 1979) is that particular ethnic groups (such as Kayan, Kenyah, Iban and so forth) have broadly defined systems of land tenure that are rather uniform among members of groups in different communities and localities. An implication of this view is that pioneer migrants necessarily replicate their previous land tenure systems with little or no change in the rules or precedents by which they operate.

The assumption of uniform systems of tenure is dubious, given the diversity within some ethnic groups (such as Kenyahs) and the ambiguity of social boundaries between groups (such as Kenyahs and Kayans). Rousseau (1987) poses the question: "Is there a Kayan system of land tenure?" He answers in the negative for the Baluy region in Sarawak, where certain principles of land use are apparently shared by different ethnic groups in the same geographic areas but differ between areas. He and I both observed that certain general rules or principles can yield different practical results in different circumstances. Some rules may be recognized or even asserted by informants but, at the same time, lack relevance in the actual circumstances obtaining in the time and place of field work. For example, I found that Kenyahs in Sungai Barang recognized, and had used in the past, a rule of land tenure that is widespread among shifting cultivators in Borneo: the rule that clearing primary forest from particular sites establishes hereditary rights to re-use them years later when under secondary forest. However, at the time of fieldwork, the population of the village was lower than in the past, sites in secondary forest were abundant, and few people with hereditary rights to those sites remained. Therefore, the rule of land tenure devolving from original clearing was of little relevance. Of more immediate importance than prior rights to land was the need to apportion labor between households with different numbers of workers. The absence of able-bodied men was a problem for women and elderly people in some households. In these circumstances, principles of reciprocity and moral obligation (such as the notion that less fortunate members of the community are entitled to special consideration in the allocation of swidden sites and labor) were more important than any formal rights of tenure.

Since communities may vary in their environmental and economic circumstances and since precedents or procedures for the allocation of land may therefore develop in different ways, one might ask what precedents are invoked when people move from a community and, as pioneers, establish a new one. Are there ready-to-hand rules specifically applicable in pioneer areas, such as the principles of boundaries and claims that Freeman (1970:145) ascribes to Iban pioneers? If so, how have the rules been

remembered since last used and what are the mechanisms by which they are activated? Or do the pioneers make *ad hoc* modifications to existing principles in order to suit their new circumstances? A further possibility to be considered is that precedents used by other communities are known to some of the pioneers but are not regarded by them as appropriate to use until their new circumstances are encountered. An example of recourse to another group's land tenure rules in order to meet new conditions has in fact been reported from West Kalimantan by Dove (1978).

CONCLUSION

Although the direct effects of recent economic development and other changes in East Kalimantan have been relatively slight in the remote Apo Kayan, agriculture there has been indirectly affected by population movements and corresponding changes in settlement patterns. These have led in particular to an increase in the proportion of swiddens made in secondary, rather than old growth, forest, as well as a decrease in the total area cultivated and the distance of swiddens from villages.

Similar large-scale migrations into and out of the Apo Kayan occurred in past centuries. Thus, there is no reason to suppose that in the past such features of shifting cultivation as swidden size, spatial distribution, or type of vegetation cleared have been either constant (as a model of "traditional" agriculture as a stable system might predict) or developing in uni-directional fashion (as some micro-economic or demographic models would suggest). It is apparent, rather, both that changes in agricultural practices have occurred and that these changes have been fluctuating or multi-directional.

Furthermore, there is much variation, both within and between communities (and often irrespective of ethnic identity), in almost any set of agricultural practices one chooses to examine. Those considered in this paper are the cultivation of different rice varieties and secondary crops; the size of swiddens and clusters of neighboring swiddens; and the duration of cultivation and fallow periods (or, conversely, the age of vegetation cleared). How such variation may translate into divergent change or persistence over time is a question for further investigation. A special case where the study of such change may be especially interesting from the standpoint of innovation and transmission of knowledge is that of pioneering. However, it must be said in closing that opportunities for pioneer farming in Kalimantan are rapidly diminishing along with the last great stands of lowland forest.

NOTES

1 Present position: Project leader, Kayan-Mentarang Reserve, World Wide Fund for Nature, P.O. Box 29 JKSKM, Jakarta 12001, Indonesia.

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3 See Mackie *et al.* 1986 for details. Only households' main swiddens are included.

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