

## LAND USE AND FARMING SYSTEMS AT THE PERIPHERY OF THE CROCKER RANGE NATIONAL PARK SABAH, MALAYSIA

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### ABSTRACT

*Shifting cultivation which usually employs slash-and-burn farming practice and commonly interwoven with cultural attributes of the Murut and Dusun communities, is now a dying culture. This paper argues that the transformation of this age-old farming system is attributed to both external and internal factors.*

### INTRODUCTION

The Dusun and Murut communities in Tenom and Keningau districts reflect a typical rural sector in transition. These indigenous peoples whose ancestors had inhabited the fringes of the Crocker Range rainforest reserves for centuries, are both subsistence and smallholder farmers. Although quite a substantial number of them are still cultivating upland rice using a slash-and-burn farming method, such traditional farming practice has gradually given way to commercial agriculture in recent years.

The transformation of this traditional farming system, from one which was solely based on shifting cultivation of upland rice to mixed cropping that emphasises cash crops cultivation alongside food crop production appeared to be attributed to both internal and external agents. The most important external agents that were instrumental in exposing these indigenous communities to cash economy (through cash crops cultivation) were the North Borneo Company and the colonial government of North Borneo. However, it was not until the North Borneo territory joined the Federation of Malaysia in 1963 (which was subsequently renamed as Sabah), that a cash economy made a significant in-road to these local communities.

On the other hand, the most important internal agents are state agencies. They are directly responsible for implementing government policy towards commercialisation of agriculture at the state and community levels. Cash crops cultivation was intensified through a direct political intervention in the past three decades by the state government of Sabah. This policy helped promote and establish a crucial linkage between farm production and market, principally to discourage shifting cultivation among indigenous peoples in Sabah. As we shall see later in the subsequent discussion, the crop diversification strategy used by farmers to cope with the demand of market economy has significantly reduced shifting cultivation among the Dusun and Murut communities.

The second internal agent that has a significant influence in the diffusion and adoption of cash cropping has been the need for cash to meet family financial requirement. As a result, cultivation of cash crops such as rubber and cocoa has become a very attractive means for diversifying agricultural production. This has inevitably changed the agro-economic activities

of the Dusun and Murut communities from being heavily dependent on upland rice cultivation, fishing, hunting and gathering of forest products to a commodity-based economy. As pointed by Lim and Douglas (1998: 317), “cash crop income is necessary to pay for children education and other family requirements.” This socio-economic change, although it might be slow, has provided a very important synergy for subsequent psychological and physical changes that occur in the two communities today. For instance, the government efforts in promoting cash crops cultivation also have improved the accessibility of the Dusun and Murut communities to government facilities and services. These efforts have triggered local initiatives through community-based organisations, which in turn have a significant impact in raising the standard of living of these indigenous peoples. This article highlights the characteristics of the Dusun and Murut farming systems, crop diversification strategy, land utilisation and a conflict between local communities and the conservation policy of the Crocker Range National Park in Tenom and Keningau districts.

## STUDY SITE

The present baseline field investigation covered nine selected villages: Tukulilan, Sembiling, Undusan, Mantailang, Pulong, Keritan, Mongool, Senagang Ulu, and Bariawak Ulu. These villages were selected on the request of the Director Sabah National Parks, with the objective of understanding the current farming systems and land utilisation among the Murut and Dusun communities residing in the periphery of the Crocker Range National Park. Listing of households from each village was carried out prior to the actual field study. For the purpose of this study, each household head was arbitrarily assigned with an identification number. Out of 355 household heads listed, 228 were randomly selected using a table of random numbers.

## METHODOLOGY

The data for this study were collected by using a face-to-face interview technique. Both key-informants and group interviews were also conducted in selected villages. To cut cost, we trained selected interviewers from each village to collect relevant information from the respondents. Both “closed” and “open-ended” options were used in our structured interview schedule. In addition, we also employed personal observations for soliciting sensitive information from the respondents, which could not be obtained through structured interviews. For this baseline study, only qualitative analysis was used. The raw data were coded and processed using the Statistical Package for Social Science (SPSS). Descriptive statistics such mean, range and percentage were used for organising and summarising the findings of the present study.

## RESULTS AND DISCUSSION

### **Changing Characteristics of Farming Communities**

The socio-cultural transformation among the Dusun and Murut farming communities in Tenom and Keningau districts can be examined from the diffusion-adoption perspective. While diffusion of agricultural innovation (such cash cropping) demonstrates deliberate

efforts of external agents, adoption on the other hand, reflects farmers' responses to the innovation. Thus, this diffusion-adoption process inevitably involves a trade-off between traditions and modernisation, which has resulted in both loss and gains of social and cultural attributes. The following discussion demonstrates how diffusion-adoption process has influenced some pertinent socio-economic attributes and labour relations in the two communities over time.

### **Education and Age Factor**

It appears that the younger generations are no longer interested in taking farming as their occupation. An out-migration of school leavers to town centres is commonplace. The blame is put on the lack of employment in rural areas and social policy failure, which is urban-bias. Apparently, those who still carrying out farming were mainly consisted of older generation, mostly who are illiterate and lack skills and predominantly have low level of formal education (Table 1). As we can see in Table 1b, 67.7% of the respondents interviewed were smallholder farmers, and majority (45.6%) of whom had only primary school education, while 30.3% had never been to school at all. These respondents belonged to the older age group (Table 1 a).

### **Occupation**

In the past, the Dusun and Murut communities were typically shifting cultivators, hunters and gatherers. The diffusion-adoption of cash cropping has changed all this today. Although most of the respondents in the ten communities were still actively involved in farming (67.6%), the data clearly suggest a changing pattern of employment in these communities in recent years (Table 1). Almost one third (32.4%) of the respondents were employed both in the public and private sectors, 36.4% were employed as manual labourers outside the agriculture sector. Some has already ventured into small business (4%) and are self-employed. The same proportion (4%) of them had chosen other occupations, while only 2% were unemployed.

A physical mobility associated with changing occupations also has facilitated social mobility among the Dusun and Murut farming communities. The process of social mobility has a strong link with an improvement in socio-economic conditions associated with better income, especially for those respondents who were employed outside the farming sector.

### **Extended Family**

These farming communities have a remarkable ability in maintaining cohesiveness among members of their extended families. The rationale for maintaining extended families can be examined not only from the sociological perspective (in terms of labour supply), but also from the economic viewpoint. Excess family labour is seen as a commodity to be sold/or traded out for generating family income. Surplus labour from extended families can be channelled to off-farm employment, in addition to providing family workforce required for various agro-economic activities.

The data show that 85.1% of our respondents were having family members employed as farmers. Extended families are very common among the Murut and Kadazan and/or Dusun in Keninggau and Tenom districts. The average number of family members per household was 7. Majority (61%) of the respondents has extended family consisting between 6-10 family members per household; 28.1% has 1-5 family members, 10.5% has between 11-15 and more

members per household.

*Table 1. Respondents' Demographic Characteristics*

	<b>N</b>	<b>Percent</b>
<b>a. Age in Years</b>		
20 - 30	12	5.3
31 - 40	73	32.0
41 - 50	56	24.5
51 - 60	50	22.0
61 - 70	28	12.3
71 - 80	8	3.5
81 - 90	1	0.4
Total	228	100.0
<b>b. Years of Formal Education</b>		
0	69	30.3
1 - 6	104	45.6
7 - 9	38	16.6
10 - 11	11	4.8
12 - 13	3	1.3
14 and above	3	1.3
Total	228	100.0
<b>c. Respondents' Occupation</b>		
Unemployed	5	2.2
Farmers	147	67.6
Labourers	25	11.0
Government servants	16	7.4
Workers & officials in the private sector	9	4.0
Own business	9	4.0
Other occupation	9	4.0
<b>d. Extended Family</b>		
0	1	0.4
1 - 5	64	28.1
6 - 10	139	61.0
11 - 15	23	10.1
16 & above	1	0.4
Total	228	100.0

### **Income Diversification Strategy**

Another striking indicator, which demonstrates the Dusun and Murut communities in transition, can be viewed from diversified sources of family income (Table 2). For the purpose of securing reliable data on monthly household income, we asked our respondents to list all possible sources of income for every respondent we interviewed. As summarised in Table 2, agriculture constitutes the most important source of family income (40.32%).

Fishing hunting and gathering which were once an important economic activities of the Murut and Dusun communities are now no longer sustainable. The two activities hardly contributed one percent of the monthly household income. Declining fishery resources have been attributed to river pollution due to excessive logging, over exploitation as a result of competing interests among stakeholders and also due to illegal chemical fishing. Likewise, depleting animal resources is also linked to logging; population pressure and restriction

imposed on harvesting of wildlife by the Crocker Range National Park which have significantly reduced hunting and fishing activities. Ironically, utilisation of common resources among the Dusun and Murut communities seems to follow a typical pattern of a tragedy of the common.

Diversification of family income is also associated with a declining importance of traditional farming sector as an income generator. Surplus labour provided by extended family members which was mainly required for subsistence farming, fishing, hunting and gathering is now being sold as a commodity in exchange for monetary gain. The data show that 11.19% of the monthly income was derived from manual labour jobs (Table 2).

*Table 2. Total Household Income Per Month*

<b>Sources</b>	<b>RM</b>	<b>Percent</b>
Agricultural Products	39,286.00	40.32
Fishing and Hunting	900.00	0.90
Labourer	10,902.00	11.19
Salaried job	30,851.73	31.66
Remittance	9,925.00	10.18
Business	2,800.00	5.00
Welfare	670.00	0.70
<b>Total</b>	<b>97,434.73</b>	<b>100.00</b>

As indicated in Table 2, salaried jobs are increasingly important today. This accounted for 31.66% of the total monthly household income. Quite a substantial proportion of respondents derived their monthly income from remittance (10.18%). Although small business only contributed 5% of the total monthly family income, it appeared to indicate an emergence of entrepreneurship among the Murut and Dusun communities. The data suggest that economic betterment has become a strong motivating factor for these indigenous peoples to participate in market economy.

Monthly household income range from as low as RM10 to RM3,000 with the average of RM430.46 per month. The results of the study indicate that 94.3% of the respondents have monthly income below the mean. This figure shows that most respondents were currently living below the poverty line.

### **Land Tenure**

In the past, the relationship between land tenure and the livelihood of the Dusun and Murut communities at the fringes of the Crocker Range National Park was intricately interwoven with shifting cultivation and food security. Their access to and control over land resource has allowed them to grow their own food crops, while pursuing fishing, hunting and gathering of forest products to make ends meet. The adoption of cash cropping by these indigenous peoples has a strong link with their need for cash. When these cash crops compete with food crop for the same pool of scarce land resource, the existing land tenure is no longer tied to food production system, but also serve as a critical resource for economic and/or financial security of local communities. This is clearly demonstrated by the data on cash crops diversification in section 6.

There are two types of land which the Murut and Dusun communities own: titled land which is under lease from the Sabah state government and customary land inherited from past generations.

**Titled Land.** Fifty two percent of the respondents owned titled land. We found that 30.3% of them who possessed untitled land but had been registered or surveyed by the land office were from Kampung Monggol, Kampung Senaggang Ulu and Kampung Keritan Ulu. Only 7.2% claimed to have titled customary land, while the remaining 11% either did not own any land or refused to respond to our questions concerning land ownership (Table 3a). It is important to mention in passing that the approval for land application often takes a long time. This might be one of the reasons why a substantial area of registered farmlands had been included within the Crocker Range National Park when the boundary between local communities and the park was re-drawn.

With respect to the number of pieces of land owned by individual households, the data indicate that the majority of respondents (71.9%) owned only one piece, 11.8% had two pieces and the remaining 5.3% owned between 3-5 pieces of land (Table 3b). The size of land ranged from 0.9 to 30 hectares with the average of 8.6184 hectares (Table 3c). More than one third (37.8%) have 0.9-5 hectares; slightly more than one quarter (26.3%) claimed to have owned between 5.1-10 hectares; 24% owned between 10.1-15 hectares and the rest (8.8%) owned more than 15 hectares.

**Customary land.** Judging from the data, customary land ownership is not widespread among the Murut and Dusun communities in Tenom and Keninggau districts. All customary rights land in the Dusun and Murut communities studied have been given documents of title. However, those who owned it, only have between one and two small pieces (Table 3d). The size of customary land owned by the respondents range from 1- 30 hectares with the average of 3.71 hectares per household (Table 3e). It was found that 65.8.5% have less than the average. The data indicate that 32.19% owned between 1-5 hectares; 25% owned between 5- 10 hectares, 39%. Some 28% have between 11-15 hectares, and only a small proportion (3.57%) have more that 15 hectares. Customary lands were mostly acquired through a variety of ways such as by felling primary forest (57.9%), through inheritance (26.8%), purchased them from other people (4.8%). Another 4.8% claimed rights over empty land, which had been destroyed by fire.

*Table 3. Land Ownership Among Murut and Dusun Communities*

	N	Percent
<b>a. Categories of Land</b>		
Titled Land Only	118	51.8
Titled Customary Land	14	7.2
Registered Land (title pending)	17	30.0
Did not own any land or No response	25	11.0
Total	228	100.0
<b>b. Number of Pieces</b>		
0	25	11.0
1	164	71.9
2	27	11.8

3	7	3.1
4	4	1.8
5	1	0.4
<b>Total</b>	<b>228</b>	<b>100.0</b>
<b>c. Total of land owned in hectares</b>		
0	25	11.0
0.1 – 5.0	68	37.8
5.1 – 10.0	60	26.3
10.1 – 15.0	55	24.1
15.1 – 20.0	10	4.4
20.1 – 25.0	5	2.2
25.1 – 30.0	5	2.2
<b>Total</b>	<b>228</b>	<b>100.0</b>
<b>d. No. of Pieces of Customary land</b>		
0	143	62.7
1	82	36.0
2	3	1.3
<b>Total</b>	<b>228</b>	<b>100.0</b>
<b>e. Size of Customary Land (hectares)</b>		
0	144	63.2
1 – 5.0	27	11.8
5.1 – 10	21	9.2
10.1 – 15.0	33	14.4
15.1 and above	3	1.2
<b>Total</b>	<b>228</b>	<b>100.0</b>
<b>f. Number of pieces of title land</b>		
1	107	81.1
2	15	11.4
3	5	3.8
4	4	3.0
5	1	0.7
<b>Total</b>	<b>132</b>	<b>100.0</b>
<b>g. Size of titled land (he ctares)</b>		
0.1 – 5.0	48	36.4
5.1 – 10.0	46	34.8
10.1 – 15.0	29	22.0
15.1 – 20.0	5	3.8
20.1 – 25.0	2	1.5
25.1 – 30.0	2	1.5
<b>Total</b>	<b>132</b>	<b>100.0</b>

Land registration, although it has guaranteed land tenure security for the Dusun and Murut communities, also imposes restriction on opening of new forestland for farming. Such restriction reinforces the impact of cash cropping in stabilising shifting cultivation among the Dusun and Murut communities. It reduces the availability of farmland for upland rice cultivation, and subsequently shortening the fallow period. In addition, population pressure and the conversion of the Crocker Forest Reserve to a National Park status no longer permits local communities to practice shifting cultivation indefinitely. This is because such age-old farming practice requires vast tracts of forestland to make it sustainable for supporting rural livelihood. And if this continues, the conservation efforts of Sabah Parks are only futile exercises.



Figure 1: A typical view of upland rice cultivation areas. Most of these areas are actually within the national park boundaries

### Land Utilisation

Most of the available lands in the communities studied were fully utilised for various crops. Only 26.04% of their total land remained uncultivated at the time of the study. Slightly more than half (55.72%) of the available land had been planted with long-term cash crops such as rubber, cocoa, fruit trees, bananas and coffee. Another 15.8% were planted with short-term crops (such as rice cultivation, vegetables, groundnuts, maize, and tobacco (Table 4).

Based on the total size of cultivated land, rubber is certainly the most important cultivated crop. Some 76.52% of total farm lands was in this crop, followed by fruit trees (9.53%), cocoa (8.75%), maize, vegetables (2.18%) and rice (1.84%) coffee (1.34%) and the least important crop is tobacco (0.046%). Livestock rearing is not commonplace among the Murut and Dusun communities in the periphery of the national park as only 0.07% of total land use is for such activities.

Nevertheless, we hardly saw any aquaculture project being undertaken by the respondents in the study area. Apart from home rearing of livestock (goats, poultry and pigs) for consumption, we did not find any big-scale rearing of livestock by the respondents. Similarly, buffaloes are commonly reared for ploughing wet-padi fields for those who could not afford to rent power tiller.

Table 4. Land Utilisation for Agro-Economic Activities

a. Category	Total Area (Ha)	Average (Ha)	Range (Ha)	Percent
Long-term Crops	1015.20	4.4526	1.0-23	55.72
Short-term Crops	287.39	1.26	0.5-10	15.77
Empty land	474.50	2.811	1-28	26.04
House sites & others	45.00	0.1974	0.5-6	2.47
<b>Total</b>	<b>1822.09</b>			<b>100.00</b>
b. Types of Crops	Area (Ha)			
Rubber	830.70	3.6434	1-23.0	76.52
Fruit trees	103.50	0.4539	0.5-13	9.53
Cocoa	95.00	0.4167	0.5-6.0	8.75
Maize	35.00	0.1570	0.3-2.0	3.23
Vegetables	23.70	0.1039	0.2-4.0	2.18
Padi	19.99	0.0877	0.1-4.0	1.84

Coffee	14.50	0.0636	0.5-4.0	1.34
Tobacco	0.50			0.0004
<b>c. Livestock</b>	<b>7.70</b>	<b>0.9625</b>	<b>0.2-2.0</b>	<b>0.0071</b>

## Farming Systems

**Agricultural Diversification:** Farming systems that are currently being practised by the Dusun and Murut communities in Tenom and Keninggau districts are predominantly characterised by mixed cropping and/or inter-cropping. Rubber appeared to be the most important cash crop planted by farmers, followed by cocoa. Cultivation of vegetables and fruits are increasingly important agro-economic activities today. This is partly due to increasing population, which creates internal market demand for fresh local fruits and vegetables. This in turn provides economic motivation and opportunities for farmers to cultivate off-season crops such as maize, groundnuts, and encourage farmers to participate in market gardening to supplement their household income. Crops diversification strategy has been used by these indigenous peoples to cushion themselves from the impact of fluctuating commodity prices in the world market and unforeseen environmental uncertainties, which are beyond their control.



Figure 2: Coffee inter-cropped with bananas and tree crops

**Inter-cropping:** Joint cultivation of cash crops such as rubber with cocoa, cocoa and bananas rubber and coffee, coconut and bananas is a very common cropping pattern currently being adopted by the Dusun and Murut farmers studied. We also noticed traditional ago-forestry practices being carried out by these farmers, where rubber trees, durian, mangoes, mangosteen, langsat, bread fruit, rattan, bamboo, wild palms, etc. are grown on the same plot of land. However, such practices appeared to be characterised by a subsistence mode of production rather than the commercial or economic oriented approach.

**Rice Farming:** There are two types of rice cultivation methods adopted by the local communities studied: **double cropping of wet rice and upland or hill rice** cultivation. Most respondents (84.6%) were planting their own rice for household consumption. Of these, 37.7% cultivated wet rice, 36.8% planted hill rice while 10.1% planted both wet and hill rice at the same time (Table 5a). Only 37.3% of them have enough farmland for rice cultivation, the rest did not. While wet rice is typically mono cropping, upland rice cultivation, on the

other hand, is characterised by mixed cropping and/or inter-cropping. Maize, tapioca, yam, long beans, cucumber, pumpkin, brinjal, etc., are grown together with upland rice on the same plot of farmland.

The data suggest a relatively low level of food security among the Dusun and Murut communities. On the average, rice production could last them for 6.7 months. About 16.2% of the sampled households have harvest that hardly could last for a month; 16.3% stated that it could last for 3-5 months; 35.7% could last between 6-8 months; and 14.4% last between 9-11 months. Only 18% of the respondents stated that their rice production could meet family food requirement for one whole year. From what we gathered, failure to meet family rice requirement is due to low yield and small farm size. This has caused most of the farmlands which were previously cultivated with upland rice are now being put under long terms cash crops such as rubber and cocoa.

With respect to those who did not plant their own rice, various reasons were cited. Of these, 73.9% stated that they did not possess any farmland. We found that 14.44% of the respondents mentioned that they had no available workforce. The remaining 9.59% had stated various reasons for not growing rice. These include (1) their lands were rented to other farmers, (2) time constraint as they have permanent jobs elsewhere (e.g. working as civil servant), (3) inability to open burning due to bad weather, and (4) it is cheaper to buy rice than to plant them.

**Wet Rice Cultivation:** Most of the farmers in the study are planted wet rice. Although most of them are growing rice on their own land, it was also discovered that many of them are renting from others. It is important to highlight here that share cropping was also being practised by residents of Kampung Undusan and Kampung Mantailang. They are currently renting farmland from Chinese landlords, ranging from RM100- 150/acre/season. When share cropping is practised, one third of the yield goes to the landlord while the other two thirds belong to the operator. We have no hard data for explaining how and why these indigenous peoples had lost their land.



Figure 3: Wet rice cultivation

**Upland Rice:** Hill rice is mainly cultivated on undulating and/or mountain slopes. Land clearing was mainly carried through cooperative labour exchange (*meguyu*). Drying

*(kepuaan)* may range from one to two weeks duration, depending on the types of undergrowth cleared. Planting or seeding usually takes one day. A family usually grows 2 or 3 crops (batches) on the same piece of land, after which the land is left fallow for 2-3 years. A short fallow indicates the lack of land available for bush-fallow farming system because most lands are already planted with permanent crop such rubber, cocoa, coffee and fruit tress.



Figure 4: Upland rice cultivation

**Farm Labour:** Rice production relied mainly on family labour (67.1%) and sometimes, on gotong-royong (22.3%) practices. As far as our field observation was concerned, upland rice production is not identified with gender, because both male and female are equally involved in farm operations. When the institution of gotong-royong (or *meguyu* in Murut) is used, be it land clearing or planting, it usually involves relatives and friends from the same village. This somewhat indicates that *meguyu* is apparently an intra-village activity, and rarely being applied to inter-community wide cooperation, primarily because *meguyu* itself is considered a family and/or a community-based activity.

**Crop Rotation:** The negative image of hill rice cultivation has long been associated with slash-and-burn shifting cultivation. On the other hand, the field data suggest that the Murut and Dusun communities in Tenom and Keninggau districts are no longer carrying out the traditional form of shifting cultivation. What is commonly practised by the local communities is essentially a traditional form or a type of **crop rotation**. A farmland is left fallow for couple of years after being planted with rice and other subsistence crops such sweet potatoes, maize, cucumber, pumpkin, and so on. The farmer will return to the same plot of land only when the soil has regained its fertility. Unlike, the traditional form of shifting cultivation, these communities do not open new farmland by cutting down of primary and/or secondary forests.

As the data in Table 4 clearly demonstrate, shifting cultivation is a dying culture. There are several reasons for this. All their farmlands have been registered surveyed and most have been issued titles by the state government. The area under rice covers only 1.84% of the total area of land owned by the communities studied. More than 90% of land area are under cash crops cultivation such rubber, cocoa, coffee, vegetables and fruit tress. Double cropping of rice has been practised by farmers where irrigation and drainage facilities have already been provided by the government. A short fallow period between 2-3 years also indicates that there

is no opening of new land for upland rice cultivation. Farmers are thus compelled to cultivate the same plot of land for 2-3 consecutive years in a row before leaving the land fallow.

Some villagers are currently participating in group-farming concept where unused or old and/or unproductive rubber lands are consolidated into economic holdings and replanted with high yielding rubber clones. Another important historical factor was the North Borneo Company of which its ownership is now under Malaysian Plantation Company (at Melalap) had cultivated most agriculture lands in the area. This suggests that shifting cultivation has long been curbed by authorities to encourage local communities to adopt permanent form of agriculture as evidenced by well-developed drainage and irrigation for wet cultivation, and crops diversification as mentioned earlier. Upland rice cultivation is now being carried out mostly by older generation, as younger people are working in town centres.

### Traditional Land Use versus Conservation

There is a great concern over the encroachment by local communities into the Crocker Range National Park (CRNP). Although this problem is not very serious, nonetheless, shifting cultivation is posing a threat to forest-land if remains unchecked. For instance, recently established community at Bariawak Ulu, which is located near the CRNP headquarters, has already posed problems to forest and wild life conservation efforts. It was reported that they are encroaching into the forest reserve for short-term cash crops cultivation as well as for shifting cultivating of upland rice.

*Table 5a. Land for Rice Cultivation*

	<b>N</b>	<b>Percent</b>
<b>a. Rice Cultivation</b>		
Hill Rice	84	36.8
Wet Rice	86	37.7
Wet and Hill Padi	23	10.1
None	35	15.4
<b>Total</b>	<b>228</b>	<b>100.0</b>
<b>b. No. of Pieces unused land</b>		
0	177	77.6
1	44	19.3
2	6	2.6
3	1	0.4
<b>c. Size of unused land</b>		
0	178	78.1
1-5	22	9.6
6-10	17	7.5
11-15	7	3.0
16-20	3	1.2
21 & above	1	0.4
<b>e. Land for other livestock</b>		
Yes	8	3.5
No	220	96.5
<b>Total</b>	<b>228</b>	<b>100.0</b>

*Table 5b. Agricultural Diversification*

	<b>N</b>	<b>Percent</b>
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<b>a. Rubber Garden (hectares)</b>		
0	76	33.3
1-5	105	46.1
6-10	34	14.9
11-15	9	3.9
16-20	2	0.9
21-25	2	0.8
Total	228	100.0
<b>b. Coffee (hectares)</b>		
0	217	95.2
0.5	3	1.3
1	5	2.2
2	2	0.9
4	1	0.4
Total	228	100.0
<b>c. Fruit Orchard (hectares)</b>		
0	179	78.5
0.5-3.0	39	17.1
3.5-5.0	6	2.6
5.5-7.0	3	1.3
7.5-9.0		
9.5 & above	1	0.4
Total	222	100.0
<b>d. Maize (hectares)</b>		
0	189	82.9
0.3	1	0.4
0.5	13	5.7
1	21	9.2
2	4	1.8
Total	228	100.0
<b>e. Vegetables (hectares)</b>		
0	201	88.2
0.2	1	0.4
0.25	2	0.9
0.5	14	6.1
1	6	2.6
2	3	1.3
4	1	0.4
Total	228	100.0
<b>f. Rice (hectares)</b>		
0	217	95.2
1	5	2.2
1.99	1	0.4
2	3	1.3
3	1	0.4
4	1	0.4
Total	228	100.0
<b>g. Tobacco (hectares)</b>		
Yes	1	0.4
No	227	99.6
Total	228	100.0

However, a major problem faced by the CRNP now, is not so much on the encroachment by local communities. What is more serious is the technical errors involved in the drawing up of the boundaries between registered farmlands and the national park. As mentioned earlier, many of the villagers claimed that their registered (with the land office) farmlands are now included in the park area. Out of the total 228 respondents interviewed, 17.1% of them have farmlands located within the Crocker Range National Park. It was also reported that some illegal logging activities occasionally occur in the area. As summarised in Table 6, some 29.1% of the respondents had acquired farmlands in the past ten years, but documents of title are yet to be issued to respective individuals. This could be because the procedures of processing land application were time consuming. From what we gathered, this problem was not widespread as originally expected, because it was confined to Kampung Bariawak Ulu, Kampung Mongool, Kampung Senagang Ulu, Kampung Keritan Ulu, Kampung Melalap and also Kampung Sumbiling. The area of farmland covered by the national park was 139 hectares with the average of 3.564 hectares per affected household.

Most local communities are already aware of the need to conserve forestland and wild life. As much as illegal encroachment into the forest reserve has caused a great deal of concern to the authorities, it has also become problematic to local communities, in view of their heavy dependency on natural resources to sustain their livelihood. Restrictions on foraging on forest products, hunting, gathering and fishing activities imposed by CRNP has restricted their rights of access to land resource and has affected food security.

What is required now is a new legislation to resolve this problem, because of the fact that these farmlands have already been registered prior to the demarcation of the present boundaries. For now, however, the understanding is that farmers are still being allowed to manage their existing farms within the national park, but are prohibited to open new land for cultivation.

A conflict between policy and practice is inevitable because to rural communities, subsistence farming, hunting, fishing, gathering and foraging is a question of survival that run in a collision course with conservation. Again, the challenge remains that for CRNP to be able to effectively implementation its conservation strategy it has to incorporate the participation of local communities — end-users of the forest, without which good intention will likely to be futile in the long-run in the absence of local support. By building social capital among stakeholders, both local communities and CRNP can co-operate with each other in resolving conflicts resulting from divergent of interests, as seen in this case.

*Table 6. Overlapping of Boundaries Between Farmlands and Crocker Range National Park*

	<b>N</b>	<b>Percent</b>
<b>f. Land acquired in the last 10 years</b>		
0	164	71.9
1-5	41	18.0
6-10	15	6.6
11-15	6	2.6
16-20	2	0.8
Total	228	100.0

<b>g. No. of pieces of Land acquired in the last 10 years</b>		
0	164	71.9
1	51	22.9
2	5	2.2
3	2	0.9
4	3	1.3
5	2	0.9
6	1	0.4
Total	228	100.0
<b>h. No. of pieces of Land within National Park</b>		
0	189	82.9
1-5	32	14.0
6-10	6	2.7
11-15	1	0.4
Total	228	100.0
<b>i. No. of pieces located Land outside National Park</b>		
0	143	62.7
1-3	80	34.0
4-7	4	1.7
8-10	1	0.4
Total	228	100.0

## CONCLUSIONS

Crop diversification is one of the most important strategies used by farmers to participate in the market economy (Table 4). However, farmers' efforts are stifled largely by external factors that are beyond their control. These factors include fluctuation of prices of agricultural commodities, inaccessibility to market, lack of technical advisory services due to poor communication linkage between farmers and the Agriculture Department and Farmers Organisations.

What is striking to report here is that shifting cultivation is a dying culture among the nine Dusun and Murut communities under study. This is due to many reasons, which include the followings: (1) all farmlands have been surveyed (some of which have already given documents of title), (2) legislation of the Crocker Range Forest Reserve into a National Park, (3) the introduction of cash cropping through crops diversification schemes, and (4) population pressure which have drastically reduced the availability of land for upland rice cultivation. As a result, the younger generation is also being pushed out of this traditional agriculture sector to service and manufacturing sectors in urban centres. The present study seems to indicate that unless there is a direct political intervention in rural industrialisation, the likelihood of attracting younger people to remain in rural areas is very slim due to the absence of employment opportunities.

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