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FOREST-FALLOW FARMING SYSTEMS IN SARAWAK: PROBLEMS AND PROSPECTS

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Forest-Fallow Farming and Rural Livelihood

Sarawak, a member state of the Federation of Malaysia, occupies an area of some 123,250 square kilometres in the northwestern part of the island of Borneo. Total population—just over 1.2 million—is unevenly distributed. Population density varies from around 50 persons per square kilometre in the region of Kuching, the state capital, to an average of only 3.3 per square kilometre in the northern half of the state. As much as 80 percent of the population was classified as rural in the 1970 census, while 60 percent of the working population was classified as engaged in agriculture.

Of a total of perhaps some 90,000 farm households, it has been estimated that at least 50,000 are engaged in forest-fallow cultivation of hill rice (Hatch). Aerial photographs indicate that 2,894,537 hectares of land have been cleared and burned for hill rice at least once. This represents as much as 23.5 percent of the land area of the state.

The term "forest-fallow" is used here to describe the practice of felling and burning mature rain forest to take a single crop of rice, after which the land is (ideally) left fallow long enough to allow regrowth of forest cover with a closed canopy before being cleared again. The term is used in preference to "shifting cultivation" because it is more precise. Ruthenberg (p. 16) identifies forest-fallow as one of several systems which come under the general heading of "shifting cultivation," pointing out further that the term "shifting cultivation" does not necessarily imply shifting settlements (Ruthenberg, p. 34). This is certainly true of Sarawak, where the practice of migration in order to gain access to better favoured land for hill rice farming has all but ceased. Although forest-fallow is still widespread, it is important now as a component of farming systems which combine hill rice farming with permanent cash crops (principally rubber and pepper), and which involve a significant degree of commitment to the exchange economy.

A series of socioeconomic surveys carried out by the Planning Division of the Sarawak Department of Agriculture in 1977-78 enabled a preliminary classification to be made of farming systems incorporating forest-fallow (Cramb and Dian). Table 1 presents simple models representing the main types identified. The figures for area cropped are based on modal values for the sample holdings, since the frequency distributions of these tend to be skewed. Yields and prices are based on mean values because frequency distributions are generally symmetrical. Output and gross revenue have been calculated directly so that the tabulated figures are internally consistent. The figures in the table do not give a complete picture of a farm's activities and income, but only indicate the scale and productivity of the main crop enterprises in each system. The notes at the foot of each column indicate other subsistence and income earning activities which are important among households represented by the model.

A striking feature of all the systems depicted in table 1 is their large deficit of rice. The negative figures in brackets show household expenditure on rice to meet consumption needs; only in the Bidayuh hilly lowland system is this figure exceeded by the income from rubber and pepper. In both the others there is a shortfall, implying that the household must rely on the activities listed at the bottom of the table to provide even staple subsistence, as well as for additional food and cash income. The conclusion must be that the livelihoods which these systems afford for the rural people who depend on them are at best precarious.

Table 1. Summary Profiles of Main Farming Systems Incorporating Forest Fallow

System/ethnic group District Topography/Soils	Hilly lowland/Bidayuh Serian				Hill/Iban Engkilili			Hill/Kayan Belaga	
	Moderately rolling to steep, slopes of up to 20-25°, red-yellow podsols predominate, some narrow alluvial valleys				Highly dissected, slopes up to 30°, skeletal and shallow red-yellow podsols predominate			Highly dissected, slopes up to 30°, skeletal and shallow red-yellow podsols predominate	
Enterprise	Hill rice	Wet rice	Rubber	Pepper	Hill rice	Rubber	Pepper	Hill rice	Rubber
Area (ha)	1.21	0.20	0.77	0.12	1.82	1.21	0.12	2.43	1.82
Yield (kgs/ha)	478	1,913	194	308	239	120	1,814	598	83
Total output (kgs)	578	388	150	157	435	145	217	1,453	152
Marketed output (kgs)	(-690)		150	157	(-944)	145	217	-484	152
Rice (\$* per kg)	0.63		0.91	2.08	0.63	0.83	2.10	0.63	0.99
Gross revenue (\$*)	(-435)		137	327	(-594)	120	456	(-305)	150
Notes	The mean household has three workers and three dependents. 25 percent of pepper vines immature. Other enterprises: pigs (three head), poultry (eleven head). Other activities: miscellaneous wage work. Rice is unhusked, pepper is black pepper.				The mean household has three workers and three dependents. 30 percent of pepper vines immature. Other enterprises: pigs (two head), poultry (seven head). Other activities: hunting, fishing, extracting timber, wage work.			The mean household has four workers, four dependents. Other enterprises: pepper (immature), pigs, poultry. Other activities: hunting, fishing, collecting jungle produce, trading.	
*\$ Malaysian									

The Arithmetic of Forest Fallow

The only empirical work carried out in Sarawak on the effect of forest-fallow cultivation on the soil is that of Andriess who found that following a single crop of hill rice, a fallow period of 20 years is sufficient to accumulate enough plant nutrients for another crop to be taken. Hatch suggests that a shorter fallow period would be acceptable depending on soil type and slope, but that the cropping:fallow ratio should never be allowed to fall below 1:10.

The arithmetic of forest-fallow to which the title of this section refers is nothing more than simple division. If 10 years of fallow is taken as a desirable minimum, then it follows that to maintain its forest-fallow farming system in equilibrium, a household or village must clear no more than 9 percent of its available land in any one year. If shortage of land causes a larger proportion to be cleared from year to year, then this will result in falling yield, loss of fertility, and eventually land degradation and breakdown of the system.

Sarawak's overall rate of population growth in the period since the 1970 census has been some 2.8 percent per year. In some of the rural areas it has been even higher--at around 4 percent--as improved medical services have reduced the rates of prenatal and infant mortality (Cramb and Dian). Given the overwhelmingly large proportion of the population in rural areas, these rates of growth mean that in spite of some rural-urban migration there will be a continuing absolute increase, over the medium-term future, in the number of people requiring a livelihood within the rural economy. The implications of this for forest-fallow farming are severe. Fallow periods of 6 or 7 years are already more commonly reported than those of 10 years or over, and sometimes land is even reused for hill rice after only 3 to 5 years. This must amount to a virtual breakdown of the forest-fallow component of farming systems such as those reviewed above. But in the face of this, and of their poor current performance in providing livelihoods, even more livelihoods are being demanded from the forest-fallow systems. In many areas then, these systems must be regarded as being in serious crisis. The next section reviews some observed adjustments to this crisis and traces their implications.

Adjustment and Equity

The combination of population growth and declining productivity of hill rice farming makes it imperative for cultivators to find or to expand enterprises which make less prodigal use of land than does forest-fallow. Following the thesis proposed by, for example, Boserup that ecological crisis is the main motive for adoption of new techniques, it can be argued that the planting of pepper and rubber by forest-fallow cultivators should be seen as a response to the need to intensify rather than as a response to the desire for cash income to meet increasing consumption aspirations. Be this as it may, the trend towards cash cropping has two particularly crucial consequences: (1) increasing reliance on the market economy in general, and in particular to make up the food deficit which results from low productivity of hill rice and the diversion of resources from hill rice to cash crops; and (2) a change in the pattern of land tenure in which rights to the use of land provided for by customary law (adat) are being replaced by de facto rights of ownership. This takes place by two means: first by the planting of permanent crops which, being the property of the planter, render ineffective other claims to the land on which they are planted; and second by households' using claims of frequent use and direct parent-offspring inheritance to assert individual rights to particular pieces of land against the claims of other members of their descent group who, according to adat, share rights through common ancestorship.

The extent of food deficit and dependence on the market economy was identified via the farm models presented in table 1. The land tenure changes have been observed in Bidayuh villages by both Best and Grijpstra. Both of these trends, it is suggested, put at a disadvantage the poorer members of village communities and may have the effect of increasing inequalities of income and wealth in communities where these have not to date been particularly significant. Market dependence is risky to the extent that it makes livelihood dependent on the relative prices of the commodities marketed and of the most commonly purchased foodstuffs—rice and sugar (both imported), and cooking oil. It is clearly most risky for those households whose cash income allows only a small margin over expenditure needs. For these, a relatively small price shift may mean the difference between just meeting basic needs and failing to meet them; loss of food self-sufficiency (not necessarily to be deplored in itself) may in effect result in a loss of food security. Competition for land and the consequent trend towards private tenure (with which, it may be suggested, traditional adat is not well-equipped to deal) also must put at a disadvantage those who lack the cash and labour to establish sizeable pepper and rubber gardens or who do not have strong ancestral rights to use of land which they can convert to rights of ownership. Grijpstra (p. 81) suggests that among the Bidayuh—who, in the southwestern corner of Sarawak, are admittedly more short of land than other groups of forest-fallow cultivators—"a landless class might emerge in a few generations."

In some Iban longhouses on the Layar River, Betong District, a spontaneous adjustment to declining hill rice productivity has taken place, which offers more favourable prospects than those outlined above (Cramb and Dian, Vol. 5). Farmers have reduced the size of their hill rice farms by as much as 75 percent, applied fertilizer (supplied under a Government subsidy scheme) at about four times the rate used on traditional extensive farms, and weeded much more thoroughly. The effect of this has been to increase per hectare yield, to release labour for pepper cultivation, and to reduce substantially the area cleared for rice farms each year. Thus the forest-fallow system is being preserved at the same time as commitment of resources to cash cropping is increased. This method of intensification of hill rice farming appears to offer a means of keeping the forest-fallow/pepper/rubber farming system viable for the medium-term future, and of maintaining a stable, rather than declining, degree of food self-sufficiency.

Equity-Oriented Extension

The National Extension Project (NEP), funded by a World Bank Loan, is currently being implemented throughout Malaysia with the aim of strengthening and expanding the extension services of the various State Agricultural Departments. The Training and Visit System (Benor and Harrison) is being used as a model. The Sarawak component of the NEP, which became operational in 1980, has chosen for its pilot phase 10 regions of the state in which hill farming and hilly lowland farming predominate, and which are all experiencing significant poverty and problems of declining productivity in hill rice cultivation. In Sarawak, then, the NEP is explicitly an anti-poverty programme. Fourteen village-level extension workers have so far been posted to 6 of the 10 extension regions, and are paying monthly visits to a total of 78 villages and 102 farmer groups comprising some 1,900 farm households.

The messages being carried to farmers by the NEP are summarized below:

Hill rice: pest and disease identification and control; selection and storage of seed; and intensification of cultivation, including fertilizer and weedicide use.

Rubber: improved tapping and processing technique (to enhance yield and produce higher value sheets); and better maintenance and more intensive tapping of mature gardens.

Pepper: land preparation, including terracing; planting technique; pruning; pest and disease control; and processing.

Wet padi: site selection; water control; nursery technique; fertilizer use; pest disease control; seed selection and storage; and off-season cropping.

Cocoa and coffee: site selection; nursery technique; land preparation; planting; maintenance; pest and disease control; and harvesting and processing.

A thorough assessment of whether the NEP is capable of making a significant impact on the problems of forest-fallow cultivators requires quantitative data on the size of the productivity increases which result from farmers' responding (in whole or in part) to the NEP's messages. Measurements of these will be made over the course of the next year by the NEP's Farm Management Officer (who began work in February 1982), and the data he collects will be used for selecting messages from the repertoire above. All that can be attempted at this stage is a qualitative assessment of the technologies being promoted through the NEP, for which purpose the approach put forward by Chambers is useful. This involves preparing a checklist of criteria which existing or planned technologies should meet if they are to serve the specific needs of the communities for which they are proposed. Chambers suggests as general criteria that any technology should result in efficient use of scarce resources (or those likely to become scarce), in more rather than less equality in distribution of resources, in more rather than fewer livelihoods, and in more rather than less environmental stability. To these criteria, which would surely find very wide acceptance and which can be applied to any type of livelihood system, may be added the specific requirements of Sarawak's hilly lowland and hill farming systems for technologies which: (1) save land (and therefore take pressure off the forest-fallow system and reduce the intensity of competition for land); and (2) improve the productivity of resources devoted to food production (and therefore enhance the scope of households for meeting more of their food needs).

Of the extension messages listed above, those which meet most closely these general and specific criteria are surely the development of wet rice production, and the intensification of hill rice production using the indigenous techniques developed on the Layar River. An exciting development which is still at the field trial stage is the use of bench terracing to permit annual cropping of hill rice plus off-season cropping with legumes and other annuals.

In summary it may be suggested that the scope exists for the NEP to make a significant impact on the current difficulties of forest-fallow systems. That technical solutions should be effective in combating poverty and inequality is not a fashionable conclusion, but it is asserted here on the grounds that the trend towards inequality which has been identified is not deeply rooted in unequal social structures, but is associated with a particular set of technical and agronomic problems; to this extent it may be amenable to technical solutions. Ultimately, however, the success of the NEP as a poverty oriented programme must depend on its village-level extension workers making effective contact on the ground with the poor and disadvantaged members of the communities they serve.

Note

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