Pertanika J. Soc. Sci. & Hum. 2(2): 123-132 (1994) ISSN: 0128-7702

Resettlement and Nutritional Implications: the Case of Orang Asli in Regroupment Schemes

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Keywords: Orang Asli, regroupment schemes, nutritional status, subsistence cropping, cash cropping

ABSTRAK

Sejak pertengahan tahun 1970an, semakin ramai Orang Asli dari pedalaman telah dipindahkan ke kawasan khas yang dinamakan Rancangan Pengumpulan Semula (RPS). Di skim RPS, mereka diperkenalkan kepada tanaman komersial termasuk getah dan kelapa sawit. Ini melibatkan perubahan cara hidup yang ketara bagi Orang Asli yang lebih biasa dengan tanaman makanan, hasil memburu dan mendapatkan makanan hutan untuk penggunaan isirumah. Lepas 15 tahun RPS dilancarkan, status pemakanan kanak-kanak Orang Asli di RPS boleh dihuraikan sebagai rendah kerana didapati prevalens yang sederhana hingga tinggi bagi masalah kekurangan berat, malnutrisi akut dan kronik dikalangan kanak-kanak. Pengambilan kalori dan beberapa nutrien utama adalah pada paras defisiensi. Kertas kerja ini juga menunjukkan impek negatif terhadap pengumpulan semula di negara lain. Didapati andaian bahawa penglibatan dalam tanaman komersial akan menghasilkan pertambahan pendapatan, yang akan memberikan lebih wang kepada isirumah untuk membeli makanan, dan ini seterusnya akan memperbaiki status pemakanan. Hasil daripada kajian telah menunjukkan bahawa perkara ini yang berkaitan satu sama lain tidak semestinya berlaku. Sebenarnya, pengumpulan melibatkan pindahan budaya dan perubahan kepada cara hidup. Perubahan ketara tersebut mungkin tidak dapat di atasi dengan pemberian kemudahan fisikal dan insentif ekonomi sahaja.

ABSTRACT

Since the mid-1970s, increasingly more Orang Asli from the interior have been relocated into regroupment schemes, where they are introduced to the cultivation of cash crops including rubber and oil palm. This involves a major change to their socio-economic lifestyle, in having to switch from subsistence cropping coupled with hunting-gathering activity to being drawn into the market economy. Some 15 years after relocation, the nutritional status of Orang Asli children in regroupment schemes can be described as poor with a moderate to high prevalence of underweight, acute and chronic malnutrition. Their dietary intakes are deficient in calories and several major nutrients. This article also presents findings of the deleterious impact of resettlement on nutritional status experienced in other countries. There exists an over-simplified assumption that introduction to cash cropping will lead to increased income, which will provide more money for food, and in turn result in improvement in nutritional status. Evidence involving indigenous groups and peasant farmers is provided to show that this linkage does not necessarily emanate. In reality, relocation entails cultural uprooting and lifestyle changes which may not be overcome by the provision of physical facilities and economic incentives only.

INTRODUCTION

There exists a current of opinion that an effective way of improving the nutritional status of a community is by means of bettering the economic status of the people. The implicit assumption here is that increased income will provide more money for food which, in turn, will reduce the risk of hunger and malnutrition. There is no doubt that income plays a central role in affecting nutritional status. Its significance is underscored by the observation that "even where cultural blocks (such as local beliefs and practices) to good dietary practice are most strongly in evidence, it is rare to find undernutrition among the wealthiest segments of a population" (Fleuret and Fleuret 1980). On the other hand, a low income often has a strong correlation with poor nutritional status (Harrell *et al.* 1989). This has led to an emphasis on increasing income as a necessary prelude to improving nutritional sta-

tus. For peasant farmers and subsistence cultivators, this is often translated to mean shifting to cash cropping or commercial agriculture.

It is contentious whether the introduction of commercial agriculture will bring about an improvement in nutritional status. The income and nutritional outcomes of changes from subsistence to commercialized crop production may be time- and place-specific, thereby giving rise to apparently conflicting reports (Immink and Alarcon 1991). While there are studies that have reported positive effects on household income and nutritional status of children as a consequence of cash cropping (von Braun, Hotchkiss and Immink 1989; von Braun, Puetz and Webb 1989), there are also reports of agricultural development projects which not only had no impact on nutrition, but even worse, have led to a deterioration in the nutritional status of those at risk (Smith 1986; Harper 1986).

In Bouis and Haddad's study (1990) on the nutritional outcomes of the conversion from corn smallholdings to large sugarcane farms in Mindanao, the Philippines, it was found that export cropping had brought about an increase in household income. However, it was not accompanied by improvement in nutritional status of the sugar-household preschoolers. The authors observed a high prevalence of morbidity among these children and this was attributed to the unsanitary conditions in the farms. In reality, while raising household income is a necessary condition, it is not sufficient by itself to improve nutritional status.

Many studies have shown that when income is increased, expenditures on nonfood goods and services occur as a priority over expenditures on food items. (Immink and Alarcon 1991). In the study by Kennedy (1989) in Kenya, increased income obtained by the sugarcane producing households was spent on housing and education. While these may serve important household needs in the long run, the immediate impact of economic gains was not reflected in the health and nutritional status of the children.

This article focuses on the specific situation on Orang Asli (indigenous people in Peninsular Malaysia) from the interior, a significant proportion of whom are being resettled into regroupment schemes ("Rancangan Pengumpulan Semula") or RPS settlements. The general aim of the regroupment plan is to improve the socio-economic status of the settlers through organised economic activities including cash cropping. It has been more than 15 years since the first RPS settlement was set up and today there are over a dozen such settlements in Peninsular Malaysia. The concern of this article is directed at the nutritional status of the RPS settlers, in particular that of the children. Has the change from a subsistence way of life to one dependent on cash cropping brought about a satisfactory nutritional status among the RPS children? This article also draws on the experience of other countries on the impact of resettlement on health and nutritional status of the settlers.

Concept and Implementation of Regroupment Schemes

The first time Orang Asli were subjected to resettlement was in 1951 when the colonial power forced about 25,000 Orang Asli from the interior into hastily prepared camps in an attempt to remove them from the influence of communists terrorists. However, many Orang Asli died as they were unaccustomed to the heat of the lowlands, the abrupt changes in diet, exposure to diseases and from mental torment (Polunin 1953). After the end of the Malayan Emergency in 1960, the Department of Orang Asli Affairs ("Jabatan Hal Ehwal Orang Asli") or JHEOA adopted a more benign attitude by allowing the Orang Asli to lead their traditional way of life in the interior and providing them with clinics, schools and other facilities.

In the mid-1970s with increasing communist incursions from South Thailand, the security of Orang Asli in the interior was again threatened. A comprehensive plan was drawn up with the twin aims of providing security and improving the socio-economic conditions of Orang Asli in the interior. This was in line with the overall development strategy of JHEOA to bring about development of Orang Asli through integration and assimilation into the mainstream of Malaysian society.

The socio-economic objectives of the RPS plan include developing a healthy community as outlined below (JHEOA 1992a):

a) to modernise the lifestyle of interior Orang Asli.
b) to create a community that is healthy and fit.

c) to instil confidence in Orang Asli with regard to the education for their children and skill development for themselves.
d) to create a class of young Orang Asli entrepreneurs.
e) to encourage growth centres through management of the traditional villages and land reservations of Orang Asli.
f) to upgrade cultural and art works of Orang Asli for tourism.
g) to eradicate or reduce poverty among Orang Asli.
h) to identify an effective and well-coordinated administration for the development of the Orang Asli community.

The original regroupment plan envisaged a total of 25 RPS settlements to regroup approximately 23,000 Orang Asli living in the interior along the Main Range mountains ("Kawasan Titiwangsa"), stretching from the border of Malaysia/Thailand to the boundary of Perak/Selangor (Federal Town and Country Planning Report 1979). The plan recommended that, as far as possible, all Orang Asli villages affected would be regrouped within their traditional areas, and not separated into aggregates of individual villages.

In practice, regroupment of Orang Asli into RPS schemes has been carried out by two approaches. One approach is by relocating several villages to designated RPS settlements, as was done when the Temenggor Dam in northern Perak was constructed. The Orang Asli who were affected (Temiar and Jahut subtribes mainly) were given the choice to move to one of three resettlements namely, RPS Fort Kemar, RPS Air Banun or RPS Air Dala. The second approach, which is also more commonly practiced, is by grouping neighbouring villages into a single administrative settlement within their existing location.

Commencing with the Third Malaysia Plan (1976-1979), through the Fourth and Fifth Malaysia Plans (1981-1985 and 1986-1990 respectively), ten RPS schemes were implemented, and seven additional RPS projects were approved under the Sixth Malaysia Plan (1991-1995). The first ten settlements were set up at a total cost of RM64.5 million (JHEO 1992b). The high cost involved is largely due to the fact that many of these RPS settlements are located in the interior of the country, and forest land had to be cleared. In terms of the number of Orang Asli relocated, about 1,999 families or 9,395 persons were settled in the ten RPS schemes set up in the 1980s. By 1993, it was estimated that a total of 24,567 Orang Asli, comprising 7,390 in Perak, 3,409 in Kelantan and 13,768 in Pahang were living in RPS schemes.

The JHEOA plays a central role in the development of the regroupment schemes assisted by several government agencies, including the Departments of Agriculture, Surveys and National Mapping, Land and Mines, Rural and Town Planning and Public Works, the Federal Land Development Authority (FELDA), and the Federal Land Consolidation and Rehabilitation Authority (FELCRA). The "FELDA model" of land development is adopted for the setting up of the RPS schemes. In this model, FELDA clears the forest land, provides the basic infrastructure (such as roads, electricity and water supply), builds the houses, offices, schools and clinics, and plants the tree crops for the settlers. When the crops are about to mature, the settlers are brought into the settlement.

According to the RPS plan, each family is given the right to work on between 1.6 - 2.4 hectares of land for rubber or oil palm cultivation, and 0.8 hectare for fruit trees. The Orang Asli do not own the land which is administered as an Orang Asli reserve. While waiting for the rubber or oil palm to mature for harvesting, each family is given a monthly cash subsidy of RM50.00. The RPS plan also recommended introducing cottage agro- and forest-based industries, social development activities aimed at instilling a more dynamic work habit and greater community cooperation among the RPS settlers.

In reality, development in RPS schemes has been slow even in the provision of the basic facilites. For example, in RPS Air Banun, 14 years after its establishment, only 15 housing units had been built for a total population of 266 families (Itam Wali 1993). Most of them had to build their own houses in the traditional manner. As for agricultural activities, two projects have been attempted so far. The first was an orchard ("dusun") project which failed, as there was no follow-up after a contractor was paid to clear 117 hectare of forest land; and the other project in-

volved planting of rubber in 1993; this means that there will be no income for the families involved until 1999.

Health and Nutritional Status of RPS Orang Asli

There are not many studies which focus on the nutritional status of RPS settlers. One of the earlier studies on the nutritional status of an RPS scheme was undertaken in Fort Kemar in Perak by Khoo (1977). A group of 305 Temiar families who were relocated as a result of the construction of the Temenggor Dam were assessed. Khoo found that the dietary habits of the Temiar had changed drastically after one year of moving into RPS Fort Kemar. Their access to forest plant foods and wildlife had been curtailed substantially as their traditional foraging territory had been taken up by the Temenggor Dam. They had become dependent on commercial and processed foods sold in the supply shops in the settlement. Foods such as sweetened condensed milk, milk powder, sardines, sugar, cooking oil and wheat flour were popular items. Their dietary intakes were found to be inadequate for calories and several nutrients with the exception of vitamin C. The latter nutrient is derived mainly from tapioca roots and leaves. Tapioca which is a hardy plant with abundant roots provides a traditional staple food for Orang Asli. Khoo (1977) also found that a marked proportion of the children under five years of age were underweight (too thin for age) and stunted (too short for age). A high percentage of the female adults was identified to be anaemic due to iron deficiency.

In a more recent study on RPS children, Ismail Noor, Wong and Zawiah Hashim (1988) reported on the nutritional status of Semai children from 13 villages in RPS Betau, Pahang which was established in 1979. Out of 111 children assessed, 52% of the preschoolers were found to be underweight and 60% were stunted. The latter finding implies that these children have been malnourished since the early years of life. The older children aged between seven and ten were also reported to be underweight (27%) and stunted (35%). Their average intakes of calories, niacin, and vitamin A were lower than the levels recommended for Malaysians (Teoh 1975). Nonetheless, vitamin C, calcium, iron, riboflavin and thiamin intakes were adequate. Among the older children who attended the RPS boarding school, some showed better nutrient intakes than the non-schoolers, because the schoolers received meals in the school. Lunch and dinner usually consisted of rice, sardine, dried fish and some vegetables. Overall, the results indicate the presence of moderate to high levels of underweight, acute and chronic malnutrition amongst the Betau children.

Semai children in RPS Betau were also the subjects of a nutritional assessment in 1992. In this study involving 70 boys and 59 girls of age eight years and below, Massitah Sin (1992) reported a moderate prevalence of underweight (34% among the boys and 32% of the girls), and stunted children (40% of the boys and 37% of the girls). Dietary evaluation of the children showed intakes of calories, calcium, iron, thiamin and niacin below the recommended levels. The low intake of calories by the Semai children reported in this study and by Ismail Noor, Wong and Zawiah (1988) is a matter of particular concern, because fulfilling energy needs for the growing child is vital; otherwise the growth process is retarded. Moreover, it is known that children who are undernourished tend to be less active physically and socially; they may possess a lower concentration span, and could also exhibit lower cognitive competence.

In his study on utilisation of health services in RPS Betau, Sua (1992) reported a rather high prevalence of morbidity among 82 Semai men and women interviewed. He found 62% of them to suffer from acute symptoms during the two weeks prior to his study and 43% had chronic illnesses. Cough and skin diseases were the two most common types of chronic complaints. The Semai blame the dirty river water in which they bathe and wash clothes for their constant skin problems. Their chronic cough could be related to their smoking habit. Sua observed that many of the men and older women were heavy cigarette smokers. Osman *et al.* (1991) had also made a similar finding among Orang Asli in Kuala Pangsoon where about one-quarter of the adults in the community smoked more than 10 cigarettes a day.

No comprehensive nutritional or health studies on the RPS Orang Asli were undertaken prior to their moving into their settlements for com-

parisons to be made with post resettlement evaluation. However, a proximate comparison, based on nutritional studies of interior Orang Asli carried out before the establishnment of RPS schemes, is possible.

A number of the studies undertaken in the 1960s and early 1970s reported that Orang Asli children from various sub-tribes living in the interior were in relatively good health. By the use of biochemical and anthropometric criteria, the nutritional status of those children was found to be not significantly different from that of urban children (Brearly 1970; Robson *et al.* 1973). These authors attributed the good health to two factors. Firstly, it was suggested that the low population density of the Orang Asli villages helps to reduce the spread of diseases. Secondly, the Orang Asli can be characterised as having omnivorous food habits, meaning that they consume wide ranging types of food items which help to provide nutritional adequacy.

Like other indigenous comunities around the world, the Orang Asli traditionally "live naturally with the land", implying that they live in a physical and spiritual harmony with their habitats, as the land provides food, fuel, medicines, housing construction materials, and other resources for their living needs. The diet of the indigenous people were originally based on hunting-fishing-gathering and a wide diversity of animal and plant foods is known to be consumed. For example, the Australian Aborigines, prior to European contact, subsisted on a variety of small mammals, reptiles, birds, fish and other sea food enriched with a wide range of plant foods that included starchy tubers, seeds, fruits and nuts (Brand *et al.* 1983). Likewise, Orang Asli particularly those from the interior, also used to depend on a diversity of wildlife, fish and forest plants for their sustenance (Bolton 1972; Khor 1985). The traditional hunting-fishing-gathering diet is usually not high in fat, as wild animals have a much lower carcass fat than domesticated animals, while forest plant foods offer high fibre and complex carbohydrates (O'Dea 1991). Wild foliage plants serve as important sources of nutrients, notably vitamin A, niacin, calcium, iron and protein (Fleuret 1979).

When the indigenous people take to growing food crops, they often plant a variety of staple crops that mature at different times during the year, whether they be rice, cassava, sorghum or banana. In this way, their subsistence cultivation and foraging habits go towards meeting the family's dietary needs, except when disturbed by exogenous forces (Fleuret and Fleuret 1980).

The traditional lifestyle of the interior Orang Asli, involving moderate to high level of physical activity and coupled with a diet that is low in fat and refined carbohydrate, is believed to be the main factor for their relatively low levels of serum cholesterol and blood pressure (Burns-Cox *et al.* 1972). Chong and Pang (1978) attested to this finding as they also found the deep forest Orang Asli showed the lowest level of the risk factors for coronary heart disease followed by the forest fringe and periurban groups.

The above-mentioned studies on interior Orang Asli undertaken before the RPS era indicate that the interior Orang Asli, living by their traditional lifestyle, seem to possess good health nutritional status.

It must be pointed out that some recent studies have shown the interior Orang Asli living outside RPS settlements to be in a relatively poor nutritional status (Khor 1988; Osman Ali *et al.* 1991). In the study by Khor (1988) which involved 1,180 Semai children between the ages of one to twelve from non-RPS villages in the periurban to interior areas in Batang Padang district in Perak, it was found that half the number of the children were underweight and more than two-thirds were stunted. Their dietary intakes were grossly inadequate in calories, protein, iron, calcium and thiamin. Almost half the number of the children could be classifed as anaemic. The factors influencing the nutritional status of these Orang Asli differ depending on whether they are from the periurban or interior areas. Among periurban Orang Asli, some do not have access to nearby land for subsistence cultivation, even if they wish to supplement their diet with home grown plant food; their earnings are meagre on average and they can hardly afford to purchase a variety of nutritious food. The interior Orang Asli have access to land for subsistence cropping, but their traditional plant-fallow-plant cropping style tends to provide only a limited quantity and variety of food for the household. Also, the interior Orang Asli increasingly face depleting forest food re-

sources including fishes and wildlife, which means that they have to cover a wider territory and spend much more time foraging for forest food and other resources.

From the above examples, it is seen that non-RPS Orang Asli, like their RPS counterparts, possess moderate to high levels of underweight, acute and chronic malnutrition. However, since the RPS schemes are being implemented at a high cost (about seven million ringgit per settlement in the 1980s and probably more presently) and as the RPS plan is aimed at improving the health status of the settlers, one would expect the health of the settlers to be better than that of their non-RPS counterparts some 15 years after its implementation.

Resettlement and Nutritional Status in Some Developing Countries

Resettlement of peasants and indigenous groups accompanied by introduction of cash cropping has been carried out in various countries in South America, Africa and the Asia-Pacific region. The effects of resettlement on the health and nutritional status as reported by some major studies on this subject are discussed below.

In a study by Shack, Griveti and Dewey (1990a; 1990b), the nutritional status of three groups living in a rubber resettlement project in lowland Papua New Guinea was compared with that of their counterparts from their respective places of origin. These groups represented hunter-gatherers, sedentary agriculturalists, and hunter-gatherers with limited agriculture. The resettlement project was begun in the late 1970s and this report was undertaken in 1986. In terms of growth achievement of children and health status of mothers, the group which benefited most from resettlement was the agriculturists, who possess cultivation skills necessary for growing food and cash crops. Their children showed highest weight-for-age, height-for-age and hemoglobin status. In comparison, resettlement was least beneficial for the hunter-gatherers group who were unaccustomed to agriculture and did not possess cultivation experience. This study clearly shows that it is important to consider a group's skill in land use if cash crops are expected to provide income and food in a resettlement.

The investigations by Hernandez *et al.* (1974) and Dewey (1981) in Tabasco, Mexico rank as landmark studies on the dietary consequences of transformation from subsistence to commercial agriculture. Before 1958, the affected area in Tabasco suffered from periodic extensive flooding resulting in destruction and fatalities. The Chontalpa Plan was implemented whereby about 6,000 families were relocated. Each family was allocated two hectares of land to farm as they wished, in addition to 13 hectares per family devoted to the collective production of cash crops and cattle. The traditional agriculture of the Chontalpa area used to be based on shifting cultivation of a wide variety of crops including maize, beans, tapioca, sweet potatoes, squash, rice, bananas and many types of fruits. With the Chontalpa Plan, cultivation of cash crops (coffee and cocoa) and export crops (sugar cane and bananas), and also rearing of cattle became the dominant forms of land use. The switch to cash cropping imposed a heavy demand on labour and time, and this invariably led to a decrease in the cultivation of subsistence crops for family consumption. The peasants became increasingly dependent on purchased foods. In this study area of low wages and high food prices, the poorest 30% of the population was found to benefit least, if at all, from the resettlement. The low nutritional status of their children remained poor, although the community in general had enjoyed an increase in household income from cash cropping. However, the marginal income increase for the lowest income group was negated by the rapid increase in food prices.

A different situation where peasants were relocated out of their land for a private commercial agricultural scheme served as part of a study by Kennedy (1989) in the Nyanza Province in Kenya. The study focused on the nutritional impact of a shift from maize cultivation on a semi-subsistence basis to the commercial production of sugar cane. The sugar scheme affected a group of about 2,000 households who were relocated for the construction of a sugar factory. The relocated households were compensated for their land, and although nearly three-quarters of them purchased land with the money they received, the average size of land owned decreased from 5.1 hectares before relocation to 1.2 hectares. They could not afford to purchase more land as the price of land had inflated during the transition period. Due to the reduction in their land hold-

ings, more than half of their income depended on non-farm employment. This study found that 35% of the relocated households were consuming grossly inadequate levels of calories (at and below 80% of caloric requirements), and 91% of them claimed that their lives had been worse after the development of the sugar scheme.

In summary, the above studies indicate that resettlement of indigenous groups and peasant farmers, and drawing them into the market economy through cash cropping, does not intrinsically bring about an improvement in nutritional status of the settlers. This is especially true if the change from subsistence cropping to cash cropping results in only a marginal increase in income, while prices of food and other goods increase rapidly as a consequence of the change in agricultural production.

DISCUSSION AND CONCLUSION

Prior to regroupment, Orang Asli villages were scattered and they had access to land close to their villages for the growing of hill rice and other food crops. The swidden type of subsistence agriculture once practised by Orang Asli allows areas to be left fallow long enough for the native vegetation to return. In this way, there is less chance of a permanent loss of the wild food plants as compared with intensive cash cropping. Following regroupment, the Orang Asli settlers have been expected to switch to cash cropping and reduce subsistence cropping. In reality, subsistence planting and foraging for forest resources persisted after regroupment.

However, compared to the situation prior to regroupment, the settlers now have to compete with a relatively large number of fellow settlers for limited and depleting resources in the hinterland of the RPS location. For example, in RPS Betau which brought together 17 villages with a population of 244 Semai families or 914 people, over-crowding is one of the major complaints (Sua 1992). The population size of Betau is unusually large for Orang Asli villages. Non-RPS Orang Asli villages in the interior usually have about 100 or less people in a village, while those in periurban areas tend to carry a larger population, but even then, they seldom have more than 200 to 250 people in a village (Khor 1985). Friction arises due to the competition for scarce resources, and due to social problems because of the large concentration of people in one area (Zahid Emby 1990). Adjustment problems faced by RPS Orang Asli pose as one of the most intractable challenges to the success of the regroupment plan.

A congested settlement aggravated by unsatisfactory sanitary and water supply services can easily give rise to an outbreak and spread of infectious diseases. In several studies undertaken by the International Food Research Policy Institute (IFRPI) on the health and nutritional effects of cash cropping, one common finding is that poor sanitary and community health services and conditions in the study areas contribute to poor nutritional status (Kennedy 1989; Bouis and Hadddad 1990). In an interview with 83 settlers in RPS Betau, more than half identified the lack of environmental cleanliness, including the indiscriminate disposal of garbage, and inadequate water supply as major community health problems (Sua 1992). Improvement of community health services should be undertaken in tandem with agricultural modernisation.

The socio-economic status of the RPS settlers in general remain low, although several of the settlements have been in existence for more than a decade. The objective of the RPS plan to improve the socio-economic livelihood of Orang Asli through greater involvement in commercial agricultural practices is yet to be attained, as exemplified by RPS Betau and RPS Banun. In the former scheme, only a few heads of households derive their primary source of income from cash crops. In the studies of Massitah Sin (1992) and Sua (1992), the majority of the male household heads reported their primary occupation as labourers (with JHEOA and FELCRA). They also tend small plots of hill padi, maize and fruit trees for family consumption. A significant number of them are also engaged in selling forest products (e.g. rattan, bamboo, fruits) to supplement their income. However, their average monthly income is low, at less than RM250. In RPS Banun, only a few families have remained with cash crops solely (rubber and fruit trees). The rest of the settlers have reverted to their traditional life of subsistence cropping, and selling rattan and bamboo, some of whom manage to earn RM400 monthly (Itam Wali 1993).

When income is meagre and access to forest resources becomes limited, nutritional status es-

pecially that of the children and women can be expected to be negatively affected. Although their traditional diet of tapioca, wildlife and forest greens could be described as balanced, this does not necessarily mean that Orang Asli possess sound nutritional knowledge. Their traditional dietary practices could be described as a product of history and environment. When their traditional sources of food are reduced or lost, as is happening not only in RPS areas but elsewhere, Orang Asli should be provided with nutritional information and advice, especially pertaining to commercial and processed food which they are increasingly dependent upon. RPS Fort Kemar exemplifies this situation where a high reliance on processed food contributed to the detriment of the nutritional status of the RPS children (Khoo 1977).

Arising from a low income and with few supplements from home grown food or food from the forest, the diet of the Orang Asli is reduced in dietary diversity. Dietary diversity is important as it is closely associated with dietary quality, that is, eating a variety of food enhances the chances of consuming many of the nutrients required. A decline in food diversity and dietary quality is known to correlate with nutrient deficiency and poor nutritional status (Caliendo and Sanjur 1978; Moreno-Black 1983). The marked prevalence of current and chronic malnutrition found among the RPS children could be attributed to a lack of dietary diversity; that is they are subsisting on a few food items only, especially on tapioca roots and leaves.

The linkage between agricultural production, income, consumption and nutritional status is complex, involving many coincident and influencing factors related to food policy, market forces, socio-economic conditions and cultural practices (Paine 1990; Martorell 1989). It is argued that nutritional status will be affected in a significant way only to the extent that consumption is affected, either by an increase of food produced for consumption, or by additional food purchased with income that is derived from the sale of the increase in food or cash crop produced (Pinstrup-Andersen 1984). This suggests that changes in cropping system that do not enable farmers to increase the quantity and quality of food available for family consumption will have little permanent impact on nutritional well-being.

The development slogan, "If you give a man a loaf of bread, you feed him a day; if you give him a hoe, you feed him a lifetime" reflects the philosophy that agricultural development - "the giving of the hoe" - is considered a more effective way of alleviating malutrition than nutrition interventions - "the giving of the loaf of bread" - since the latter can only provide a temporary solution (Luven 1982). Nonetheless, agricultural development projects will fail to meet their objectives if the organising agency hands out the wrong type of hoes, or hand out hoes to the wrong people who are not motivated to hoe.

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(Received 17 August 1993)