ECOLOGICAL BASIS OF MALNUTRITION AMONG THE MURUTS OF SABAH

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SUMMARY

A recent anthropometric study of Sabah reported that 37.1 percent of children were nutritional dwarfs, 12.5 percent were acutely malnourished and 9.4 percent were stunted and wasted. It was also noted that Muruts were among the top five most malnourished ethnic groups in Sabah. The present study looks at the ecological basis of malnutrition among Muruts and concludes that a variety of interrelated factors, including the lack of education, climatic and soil conditions, poverty, food habits and taboos as well as diseases from poor sanitation and malaria contribute to the presence of malnutrition among rural Muruts. It is recommended that a multidisciplinary approach be taken to control and prevent malnutrition among the Muruts and that the single most important measure aside from malaria control is education of the people and the development of marketable skills.

INTRODUCTION

In a recent anthropometric study of Sabah carried out by Chen *et al* [1] who examined 3,672 children below the age of 13 years, it was reported that, using Waterlow's [2] system of classification, 40.9 percent of the children were nutritionally normal, 37.1 percent were nutritional dwarfs, 12.5 percent were acutely malnourished and 9.4 percent were stunted and wasted. However, no clinical signs of gross malnutrition were detected. It was also noted that, for the various ethnic groups, Muruts were among the top five most malnourished ethnic groups. Of the 182 Murut children who were sampled for study 33.5 percent were nutritionally normal while 51.6 percent were nutritional dwarfs, 6.6 percent were acutely malnourished and 8.2 percent were both stunted and wasted. In the paper that follows, the ecological basis of malnutrition among the Muruts is examined.

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The total population of Sabah in 1980 was counted at 1,002,608 persons of whom 4.6 percent are of Murut origin. Most of the Muruts live in the Interior Division and parts of the Kinabatangan and Tawau areas of Southern Sabah. Those in the northern part of the Interior Division are also known as Northern Muruts while those in the Kinabatangan, Tawau and southern part of the Interior Division are known as Southern Muruts or Lun Daya.

Ninety seven percent of Muruts are rural dwellers and many still depend upon the forest for all their needs including small game, root vegetables, fruits, tools and clothing. In recent decades there has been concern over the Muruts as a dying race. This has been variously attributed to their poor health status and isolation, as well as to errors of count and of ethnic affliation. Their annual population increase is about half that of the dominant Kadazans and Chinese. Numerous attempts have been made by the government to relocate and resettle the Murut people so that more benefits of development can be enjoyed by them. It is uncertain as to the success of such efforts, although changing the way of a people's life is bound to present numerous problems to all concerned. In the present study we look at a resettled community of Muruts and examine their nutritional problems from the ecological point of view.

MATERIALS AND METHOD

As part of a wider nutrition study reported by Chen *et al* [1] a resettled Murut community of 89 households in the Keningau District was selected for

Fig. 1 A Murut longhouse in Kampung Ansip, Keningau.

detailed ecological study to determine the interplay of various factors in the causation of malnutrition among the Muruts. Detailed enquiries were made into what foods were eaten as well as into the various traditional beliefs and food taboos followed by the people. Dietary patterns, food production, distribution and availability were also noted and enquiries into the socio-economic status of each household were also made.

THE STUDY COMMUNITY

The Murut community of Ulu Ansip in Keningau, consists of 560 people living in 89 households scattered over both sides of a laterite road, some six miles from Keningau town (Fig. 1). Much of the Interior Division including Keningau has a relatively low rainfall of about 60 inches of rain as compared to other areas of Sabah which have about 120 inches of rainfall.

SOCIO-ECONOMIC STATUS

Among the Muruts of Ansip, only 18 percent of the households earned more than $200 per month while 43 percent earned less than $100 per month. The mean cash income was $127.14 per household per month while the mean per capita cash income was a mere $17.84 per month, most of it being derived from the sale of some surplus rice and other produce such as fruits and vegetables. In this Murut community, 85.5 percent of the households had per capita cash incomes of less than $25 per month, and 93 percent had per capita cash incomes of less than $50.00 per month per person. However, it should be noted that the cash income does not include the value of home grown foods and foods obtained by hunting, fishing and gathering.

All of the adult residents are farmers practising shifting agriculture and grow hill padi as well as other staples. In addition, 75 percent are engaged in tapping rubber, and 78.6 percent do some fishing or hunting as a subsidiary activity. Ninety-six percent of the Murut households own the houses they live in, while 93 percent own agricultural land as well, with a median of five acres per household. 60.7 percent of households own a radio. Seventy-five percent of women had had no formal education, while 25 percent of them had had some form of primary education. Among the men, 43 percent had had no formal education while 50 percent had had primary education and 7 percent had had some secondary education.

Eighty-two percent do not possess a latrine and use the bushes for excreta disposal. Thus it is not surprising that the Murut children of Ansip suffer from ascariasis, ankylostomiasis and trichuriasis. In addition malaria is endemic in the area.

FOOD PRODUCTION, DISTRIBUTION AND AVAILABILITY

Food Production

Most of the Muruts practise shifting agriculture growing mainly hill padi as well as some crops such as tapioca, maize and sweet potatoes. However, rainfall approximates 60 inches, and agricultural production will remain poor as long as there is inadequate irrigation. It is not possible to grow wet padi, which has a yield of two to three times that of hill padi, without irrigation.

Vegetables such as *kangkong, cekur manis,* brinjal, bitter gourd and tapioca are planted around the house. There are also some fruit trees such as bananas, papayas and jackfruit. Hunting is an important activity in this community and helps to supplement their diet. The river also provides an important source of protein in the form of fish and prawns.

The main concern in this community is the production of enough food for home consumption and very little surplus is available for sale. Agriculture is at a subsistence level since traditional methods of cultivation of relatively low yielding hill padi produces yields that are insufficient to meet local needs. On the average rice crops last only half a year.

Food Storage

Since there is little sale of food, the main concern is storage of food meant for home consumption.

TABLE I
FOODS CONSIDERED BENEFICIAL TO ALL PERSONS IN GENERAL, OR SPECIFICALLY BENEFICIAL TO TODDLERS AND PREGNANT WOMEN

Type of person	Food group	Beneficial food
All persons	Cereals	Rice, *pulut,* bread, biscuits, noodles, cakes
	Fish and seafoods	Fish roe, fish fry, anchovy, prawn, squid
	Meat and eggs	Beef, poultry, eggs
	Vegetables	*Cekur manis,* long beans, *kangkong,* bitter gourd, okra cabbage, bean sprouts, french beans, brinjal
	Fruits	*Terap,* bananas, papaya, jackfruit
Toddlers and pregnant women	Cereals and starch roots	Maize, sago, tapioca, sweet potatoes
	Fish and seafoods	*Ikan selar, ikan kembong,* sting-ray, *ikan baung,* salted fish, *budu, belacan*
	Vegetables	*Pucuk paku,* sweet potatoes and bamboo, *labu puteh,* pumpkin, cucumber
	Fruits	Pineapple, lemon, *ciku,* guava, water-melon, mangoes, *bachang*
Pregnant women		*Tapai,* spinach

This is important since the amount of food produced may be barely enough. Attempts are made to minimise the loss of food through destruction of pests. Padi is stored in guni sacks or *tong* which are locally woven open containers and kept in a special storage hut. Padi for immediate consumption is kept in flour sacks and laid on the kitchen floor. These storage facilities are, however, highly inadequate and the padi is readily attacked by pests such as weevils and rats.

Food Distribution

Transport facilities for market produce is provided by the Sabah Marketing Corporation Sdn. Bhd. (SAMA). Lorries call at a village according to a schedule and the produce is purchased from the farmer with cash. SAMA also fixes the prices of certain food items on a weekly basis.

FOOD IDEOLOGY

Foods are seen to have varying levels of value from the health point of view. Thus cereals particularly rice as well as a number of other foods such as most fishes are considered beneficial to all persons irrespective of their ages and sex (Table I). Foods that are considered specifically beneficial to toddlers and pregnant women are also listed in Table I.

However, the Muruts of Ansip also practise a number of food taboos. For example, sweet potatoes and cashew shoots are considered harmful to persons of all ages. Other foods specifically harmful to toddlers and women in confinement are listed in Table II. It will be noted that there are relatively few taboo foods. Thus, for the toddlers, only *tapai* and rattan shoots are forbidden in the diet. Other than the shoots of sweet potatoes and cashew nuts, there are no foods which are considered taboo specifically during pregnancy.

During confinement however, the women have to observe more restrictions. Some fish such as sting-ray and *ikan baung* and some preserved fish products such as *budu,* salted fish and *belacan* are considered taboo during this period. Various vegetables such as wild shoots, bamboo shoots, pumpkin, winter melon and cucumber are considered harmful and have to be avoided. Fruits such as pineapple, lemon, *ciku,* guava and *belimbing* are also taboo. *Tapai* and tapioca are also in the same category. However, there seems to be great variety in their diets and there are thus sufficient substitutes available to negate the effects of these taboos (Fig. 2). A glossary of native food names is given in Table IV.

DIETARY PATTERNS

At the time of the study, which was immediately after the harvest, it was noted that the Muruts take three main meals a day together with three snacks (Table III). The three main meals consist of rice, fish and vegetables, which is the typical diet for the native communities. A large variety of food items are included in the diets of this Murut community which thus has a most varied diet. However, it was also noted that during the "hungry months", the quantity of food as well as the number of meals per day decreased to as low as two meals a day.

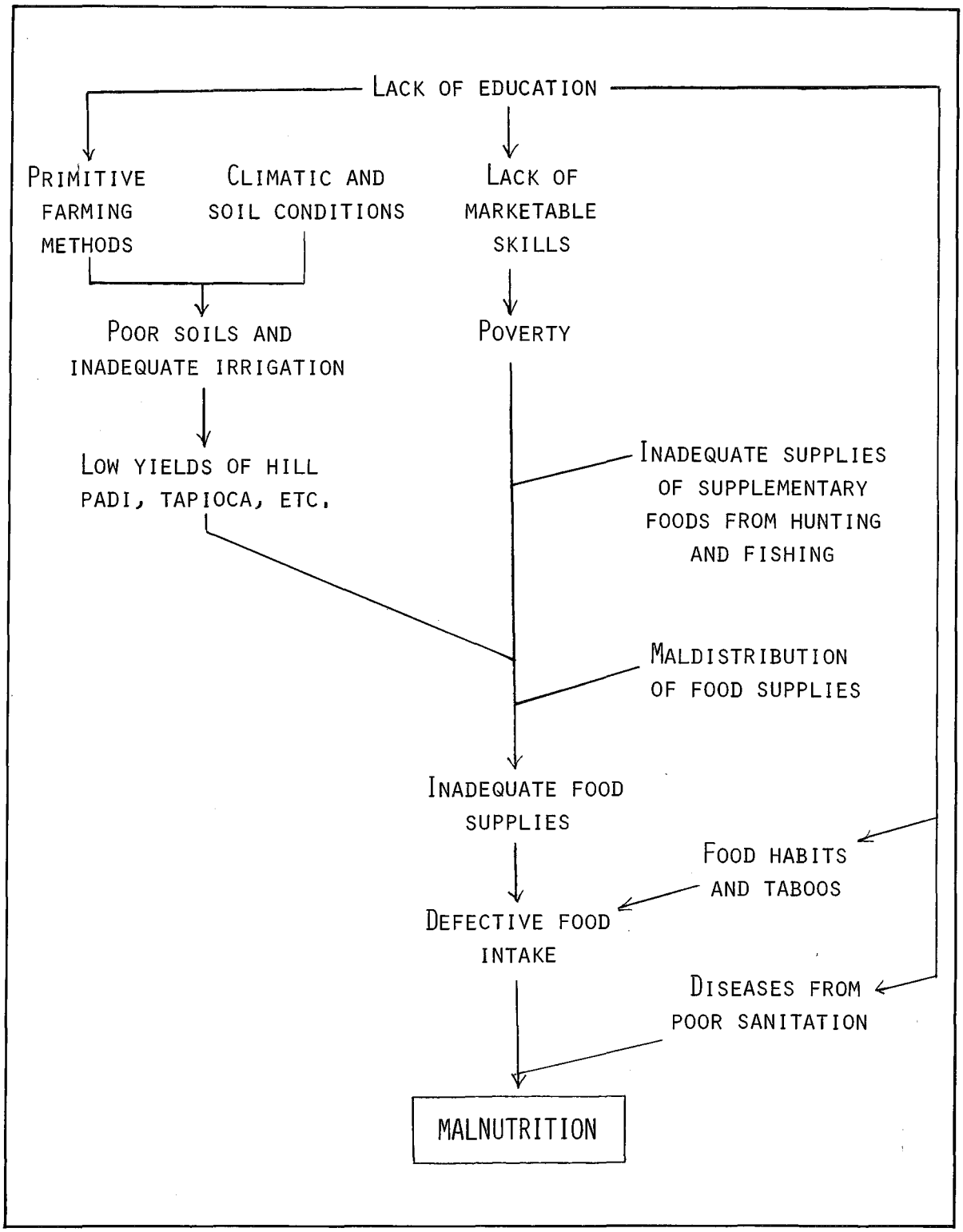

Fig. 2 Diagrammatic representation of the ecological basis of malnutrition among the Muruts of Sabah.

TABLE II

FOODS CONSIDERED AS TABOO FOR ALL PERSONS, OR SPECIFICALLY FOR TODDLERS, PREGNANT WOMEN, OR WOMEN IN CONFINEMENT BY THE MURUTS OF ANSIP

Type of person	Food group	Taboo food
All persons	Vegetables	(Sweet potatoe and cashew nut (shoots
Toddlers		*Tapai*, rattan shoots
Pregnant women		Nil
Women in confinement	Fish	(Sting-ray, salted fish, *budu*, (*belacan, ikan baung*
	Vegetables	(*Pucuk paku, pucuk ubi*, (bamboo shoots, rattan shoots, (cucumber, *labu puteh*, (pumpkin
	Fruits	(Pineapple, lemon, *ciku*, (guava, *belimbing*
		Tapai, tapioca

TABLE III

FOOD ITEMS CONSUMED FOR BREAKFAST, LUNCH, DINNER, AND AS SNACKS BY 28 MURUT HOUSEHOLDS OF ULU ANSIP DURING MONTHS OF "PLENTY"

No. of households consuming food item shown: Breakfast		Lunch		Dinner	
Coffee	28	Rice	28	Rice	28
Tapioca	11	*Pucuk ubi*	12	*Pucuk ubi*	13
Fried rice	10	Fish	11	Brinjal	12
Porridge	9	Brinjal	9	Fish	10
Bread	8	Coffee	7	Coffee	8
Sweet potatoes	6	Sardines	6	Salted fish	6
Maize	4	*Terap*	6	Sardines	6
Cake	4	*Jeruk ikan*	6	*Jeruk ikan*	6
Nestum	3	*Jeruk daging*	6	Spinach	6
		Pucuk paku	6	Long beans	5
		Bamboo shoots	5	Bamboo shoots	4
		Eggs	4	*Kangkong*	4
		Green leafy vegetables	4	*Jeruk daging*	4
		Spinach	3		
		Long beans	3		

No. of households consuming food item shown: Mid-morning Snack		Tea		Supper	
Coffee	19	Coffee	19	Coffee	24
Langsat	14	Guava	12	Milo	4
Guava	12	*Langsat*	7	*Tapai*	3
Mangoes	9	Bread	5	*Jeruk daging*	2
Bread	6	Milo	4	Papaya	2
Oranges	4	Mango	4	Bananas	2
Milk	3	*Terap*	3	Milk	2
Cake	3	Sweetened condensed milk	3		
Biscuits	3	Biscuits	2		
Prawn crackers	3				

Vegetables and fruits play a prominent part in the diet, especially during the fruit season. Wild plant shoots are also an important source of green vegetables in their diet and can be gathered from the surroundings or are available from the local markets at relatively low prices. Fish caught from the rivers and hunting for small game also constitutes an important protein source. However, game is available on a seasonal basis dependant upon the migratory habits of such game.

ECOLOGICAL BASIS OF MALNUTRITION

From the foregoing, it will be obvious that among the Murut, a large variety of interrelated factors act to provide the relatively high rates of malnutrition seen among them. These factors are set out in a diagrammatic scheme in Fig. 3.

RECOMMENDATIONS

Malnutrition among the Muruts is of multifactorial origin as set out in Fig. 3. To adequately control and prevent it will also require a multidisciplinary approach. The control of malaria will go a long way to reduce the chronic effects of the disease. Improved sanitation in the form of safe water supplies and sanitary disposal of faeces would reduce the disease load particularly that posed by helminthiasis. Although food taboos are few, the presence of these food taboos in a situation of inadequate food supplies can also lead to defective food intake. The lack of adequate farming know-how is also a factor contributing to soil erosion, poor soils and inadequate yields. Terracing of hill-sides and other agricultural methods to replace the present wasteful "slash and burn" methods of growing hill padi will need to be considered. In addition, there is a need for the rural Murut to acquire marketable skills that will reduce his total dependence on subsistence farming. All the foregoing revolve around

Fig. 3 The interior of a Murut longhouse showing the kitchen and hearth and householders preparing a meal of fern shoots.

education which is perhaps the single most important preventive measure as far as poverty and malnutrition are concerned. In the long run, education will be one of the most valuable assets in the prevention of malnutrition among the Muruts of Sabah.

As additional measures, supplementary foods particularly for school children combined with an improved distribution of food supplies could be useful as short-term measures. The planting of additional crops, both cash as well as food crops such as vegetables, to supplement the staple foods could also be of value.

It will be obvious that to control and prevent malnutrition among the Muruts, and other ethnic groups in Sabah, the combined efforts of educationists, agriculturists, sanitarians as well as other health professionals will be required.

TABLE IV
GLOSSARY OF LOCAL FOOD NAMES

Native name	Scientific name	Remarks
Bachang	*Mangifera foetida*	fruit
belacan	-	anchovy paste
Belimbing	*Averrhoea belimbi*	fruit
Budu	-	pickled fish
Cekur manis	*Phyllanthus oxyphyllus*	vegetable
Ciku	*Achras sapota*	fruit
Ikan baung	*Macrones spp.*	catfish
Ikan kembong	*Caranx kalla*	chubb mackerel
Ikan selar	*Caranx spp.*	horse mackerel
Jeruk daging	-	salted raw meat
Jeruk ikan	-	salted raw fish
Kangkong	*Ipomoea reptans*	vegetable
Labu puteh	*Lagenaria leucantha*	bottle gourd
Langsat	*Lansium domestica*	fruit
Pucuk paku	*Stenochlaena palustris*	fern shoots
Pucuk ubi	*Manihot utilissima*	tapioca shoots
Pulut	-	glutinous rice
Tapai	-	rice wine
Terap	*Artocarpus elastica*	fruit

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[2] Waterlow J C Classification and definition of protein-energy malnutrition *in* Beaton G H and Bengoa J M (ed.). Nutrition in Preventive Medicine, Geneva, W.H.O. Monograph Series No. 2, 1976.