ANNEX 1: PAPER 1

MAJOR NUTRIENT DEFICIENCIES AND INTERVENTION PROGRAMMES IN MALAYSIA

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ABSTRACT

The rapid socio-economic development and parallel improved health care in Malaysia has brought about improved health and nutrition situation in the country. While the overall nutrition situation has improved, various studies carried out have shown that pockets of malnutrition exist among various rural and urban underprivileged communities. Overt nutritional deficiencies have rarely been encountered, but mild-to-moderate undernutrition affects significant proportions of the population. The major nutrient deficiencies in the country are protein and energy malnutrition, iron deficiency anaemia, vitamin A deficiency and endemic goitre. Growth retardation has been reported to occur among rural preschool and school-age children. The prevalence of acute undernutrition (wasted) and severe chronic undernutrition (wasted and stunted) is low, but a considerable amount of chronic undernutrition (stunted) and underweight are known to exist. Iron Deficiency anaemia remains a problem of considerable magnitude, afflicting mainly women of child-bearing age and young children. Vitamin A deficiency does not appear to pose a serious problem in the country. Goitre has been found to affect selected communities in the interior parts of Peninsular Malaysia, while the problem is known to be of a considerable magnitude in Sarawak. A variety of intervention programmes have been implemented to reduce the extent of these nutrient deficiencies. Interventions and programmes carried out by the Ministries of Health, Agriculture, Education and Rural Development are among the major strategies undertaken to improve the overall nutritional well-being of the communities.

1 Introduction

Concern for the nutritional status of an individual or community stems from the fact that nutritional deficiencies can result in such deleterious effects as depressed physical and mental development, reduced resistance to infections, greater risk to premature delivery, increased maternal and foetal mortality and morbidity and reduced work performance. These consequences of malnutrition waste human resources and add to the social costs of the nation. Therefore, it is imperative for nutritionists to work closely with policy makers in identifying nutritional problems that may exist so that timely intervention could be implemented.

The overall nutrition situation in Malaysia has been shown to have improved steadily over the years (Tee, 1991). However, as can be expected, owing to the uneven distribution of facilities and resources, pockets of malnutrition exist in

various parts of the country. This paper highlights the major nutrient deficiencies encountered by various communities, particularly the underprivileged rural and urban communities. Data cited in this paper have been derived from nutrition studies carried out by various insitutions in the country. Several intervention programmes which have been implemented to improve the nutrition situation are also summarised. A more detailed review of the nutritional problems in the country and intervention strategies has been given by Tee and Cavalli-Sforza (1992).

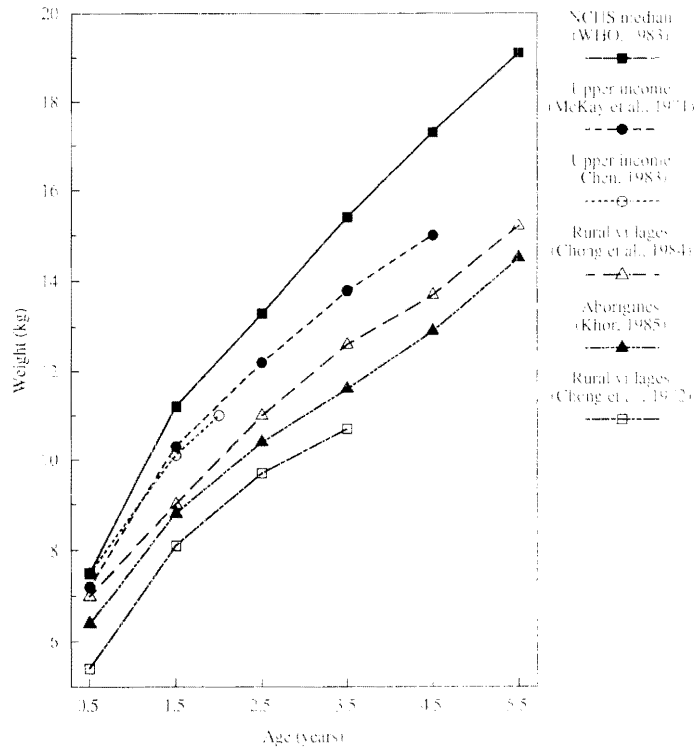
2 Major Nutritional Deficiencies

2.1 Protein-energy malnutrition

Some recent data (Chen, 1983; Chong *et al.*, 1984; Khor, 1985) on growth performance of pre-school children are shown in Figure 1.1. These weight-for-age data were plotted alongside some data collected in the 1970's (McKay *et al.*, 1971; Chong *et al.*, 1972), and the NCHS median (WHO, 1983). A general trend in growth performance of these children may be seen and some of the highlights include:

- upper income children had better weight-for-age achievement than those from rural areas;
- an apparent gain in weight-for-age among the preschoolers of poor rural communities over a decade period;
- there seemed to be less gain in weight-for-age for the upper income group (for which relatively less data are available) after more than a decade;
- the group of aborigine children studied in the mid-1980's appeared to be worse off than the rural poor Malay children.

Figure 1.1
Weight-for-Age of Malay Pre-School Children, Peninsular Malaysia (sexes combined)

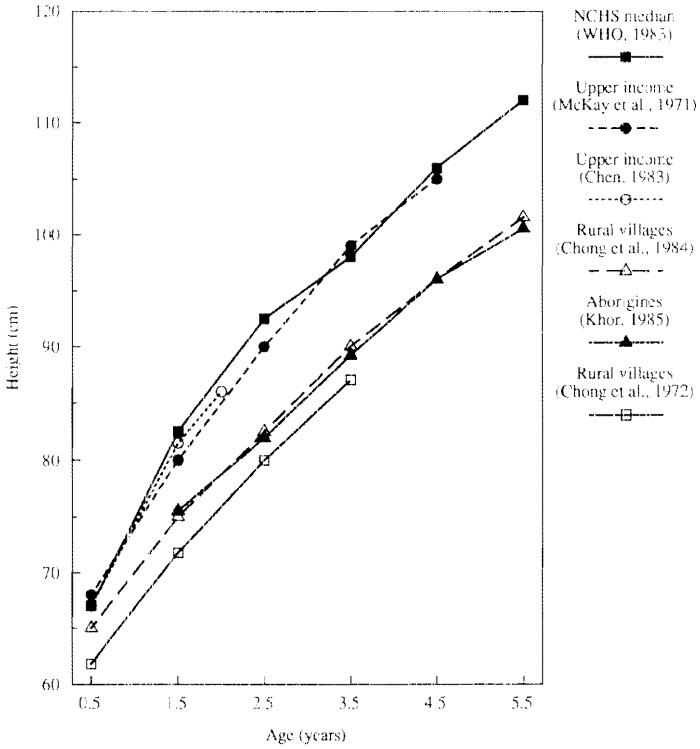


Source: Tee and Khor (1986).

The height-for-age data of these groups of children were similarly plotted and shown in Figure 1.2. It can be seen that:

- height-for-age achievement of the upper income children, which seemed to approximate the NCHS median, was clearly better off than that of the rural children;
- there was a similar improvement in height-for-age over the last decade among the rural pre-school children;

Figure 1.2
Height-for-Age of Malay Pre-School Children, Peninsular Malaysia (sexes combined)

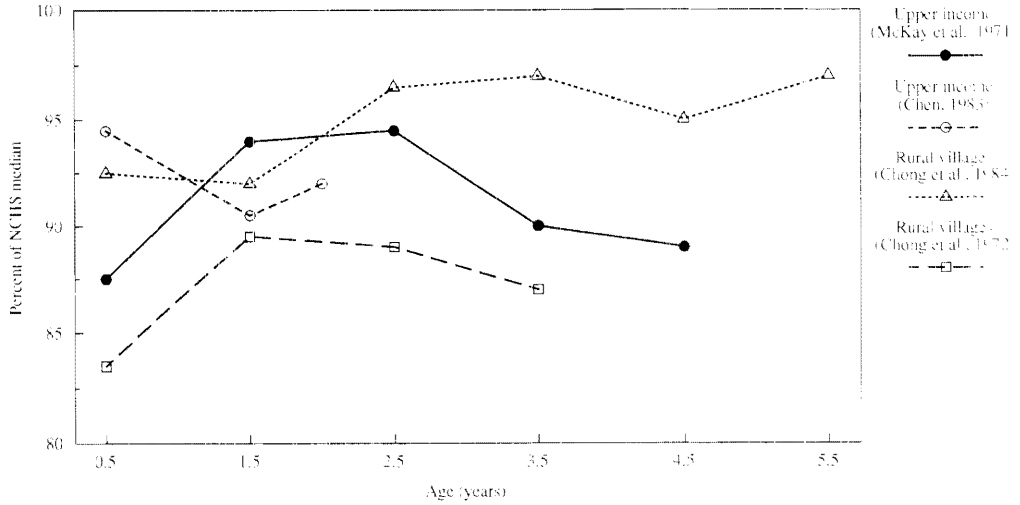


Source: Tee & Khor (1986)

When expressed in terms of weight-for-height (Figure 1.3):

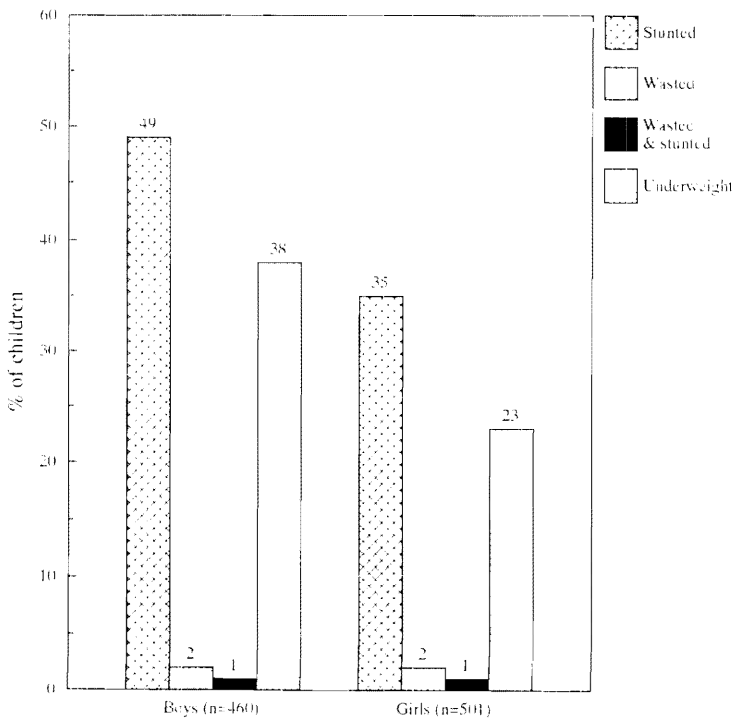
- the rural preschoolers showed achievements of 92-98% of the NCHS reference, compared to 83-89% a decade ago;
- there was a clear trend for the upper income children: they possessed weight-for-height achievements that range between 87 to 95% of the NCHS reference.

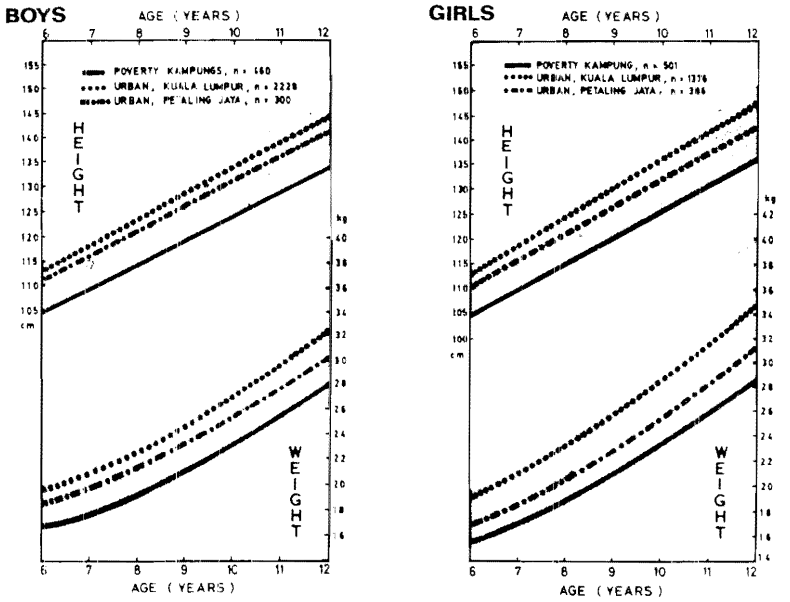
Figure 1.3
Weight-for-Height of Malay Pre-School Children, Peninsular Malaysia (sexes combined)



Growth performance of primary school children have also been given considerable attention by investigators. Some recent data from rural children in Peninsular Malaysia (Chong *et al.*, 1984) are given in Figure 1.4. The prevalence of acute malnutrition (wasted) and severe chronic undernutrition (wasted and stunted) were minimal, but considerable amount of chronic undernutrition (stunted) and underweight were seen. Compared to their urban counterparts, the median weight and height curves of these children were clearly inferior to their urban counterparts in Kuala Lumpur and Petaling Jaya (Figure 1.5). Such differences in growth achievement of rural and urban school children have also been reported earlier (Rampal, 1977).

Figure 1.4 Prevalence of Growth Retardation in Primary School Children of Rural Villages, Peninsular Malaysia





(a) (b)

Figure 1.5 Comparative Growth Achievenment of (a) Primary School Boys, and (b) Primary School Girls in Selected Rural Villages and Urban Areas

Several studies have been undertaken to quantitate food consumption of communities, emphasising particularly protein and energy intake. Examples of recent large scale studies include the household food consumption of 14 rural villages in Peninsular Malaysia (Chong *et al.*, 1984) and studies on five communities in Sabah (Chen *et al.*, 1981). In the former study, the investigators reported that 66% of the households were not able to meet their requirement for calorie and 34% of households their requirement for protein. Similarly for the Sabah study, there was a wide range of nutrient consumption, and for 3 of the communities, some 75% of the households had a median calorie intake that were below their requirements. In the case of protein, it was found that 10-30% of the households did not meet requirement.

Several recent studies on food consumption by individual household members have been reviewed by Tee and Khor (1986). In general, protein intake by adolescents and preschool children appeared to be adequate. As has been found for household food consumption data, adequacy for calorie had been observed to be a greater problem than protein.

2.2 Nutritional anaemia

Besides poor growth achievement, another major nutritional problem in Malaysia is iron deficiency anaemia, which has been investigated for some years in the country (Tee, 1985). Some selected data (Chong *et al.*, 1984; Anderson, 1976, 1977, 1978a, 1978b; Chen *et al.*, 1981; Kandiah *et al.*, 1984) amongst children of various population groups studied in the late 1970's and early 80's are shown in Table 1.1. It can be seen that the problem is of a considerable magnitude, including amongst children in the Peninsula, with prevalence rates ranging from 16 to 45 %.

Table 1.1
Prevalence of Anaemia Amongst Children of Various Communities[1]

		< 1yr	1-6 yrs	7-12 yrs
Peninsular Malaysia				
a.	rural villages	-	33 %	39 %
	number of children	-	512	910
	(Chong *et al.*, 1984)			
Sarawak				
a.	riverine Iban	44 %	26 %	-
	number of children	107	1082	-
	(Anderson, 1976,1977,1978a)			
b.	inland Penan		45 %	
	number of children		123 (6 mths - 8 yrs)	
	(Anderson, 1978b)			
Sabah				
a.	Interior, West Coast & Kudat	-	20-31 %	16-31 %
	number of children	-	(total n = 3672)	
	(Chen *et al.*, 1981)			
b.	Bengkoka Peninsula	-	44 % (0-72 mths)	
	number of children	-	(total n = 90)	
	(Kandiah *et al.*, 1984)			

[1]based on the following haemoglobin concentration cut-off levels:

< 6 years : < 11 g/dl
6 - 12 years : < 12 g/dl

The anaemia problem amongst pregnant women has also received particular attention. Like the growing children, these women are at particular risk to the development of anaemia due to increased requirements. In a recent study (Tee *et al.*, 1984) concluded at the Maternity Hospital, Kuala Lumpur, a moderately high prevalence of anaemia amongst a group of pregnant women of lower socio-economic status was reported (Table 1.2). Anaemia in the study population was said to be related mostly to iron and, to a lesser extent, folate deficiency.

Table 1.2. Nutritional Anaemia Amongst Pregnant Women in the Maternal Hospital, Kuala Lumpur

Parameters	Ethnic groups			
	Chinese	Malays	Indians	Combined
Hemoglobin				
n	104	109	63	276
mean ± SD (g/dl)	11.48 ± 1.80	11.15 ± 1.51	10.51 ± 1.68	11.13 ± 1.70
% < 11 g/dl	30.8	47.7	58.7	43.8
Packed Cell Volume				
n	104	109	63	276
mean ± SD (%)	35.03 ± 4.58	34.75 ± 4.50	33.67 ± 4.42	34.99 ± 4.60
% < 33%	24.0	31.2	47.6	32.2
Serum Iron				
n	117	121	71	309
mean ± SD (%)	60.18 ± 35.07	48.45 ±33.53	47.38 ±38.88	52.65 ±35.89
% < 50 ug/dl	45.3	60.3	69.0	56.6
Transferrin Saturation				
n	117	121	71	309
mean ± SD (%)	19.45 ± 9.91	15.87 ± 8.44	15.23 ± 8.39	17.08 ± 9.21
% < 15%	38.5	51.2	54.9	47.2
Ferritin				
n	110	103	67	280
mean ± SD (%)	21.86 ± 25.34	11.09 ± 8.80	12.61± 15.32	15.69 ± 19.02
% < 12 ng/dl	40.9	61.2	62.7	53.6
Serum Folate				
n	104	101	66	271
mean ± SD (%)	4.70 ± 5.06	3.30 ± 3.83	2.47 ± 2.44	3.64 ± 4.19
median	3.15	2.40	1.60	2.40
% < 3 ng/dl	45.2	66.3	77.3	60.9
Serum Protein				
n	117	121	71	309
mean ± SD (%)	6.03 ± 0.35	6.21 ± 0.43	6.13 ± 0.36	6.12 ± 0.39
% < 6 g/dl	36.5	23.1	25.4	28.8
Serum Albumin				
n	117	121	71	309
mean ± SD (%)	3.24 ± 0.24	3.11 ± 0.32	2.99 ± 0.30	3.13 ± 0.30
% < 3 g/dl	11.1	25.6	66.5	24.9

Source: Tee *et al.* (1984)

2.3 Vitamin A deficiency

Studies carried out in several poverty villages in Peninsular Malaysia have indicated that vitamin A deficiency does not appear to pose a serious problem in the communities studied (Chong *et al.*, 1984). Clinical signs of xerophthalmia were rarely encountered. Eye signs that could be associated with vitamin A deficiency were dryness and wrinkling of the conjunctiva, observed in some 10% of the school children. Data on serum vitamin A status obtained for a small number of children showed that there was a low prevalence of low levels of the vitamin (Table 1.3). There was a problem of obtaining sufficient blood from the children for biochemical analysis. Among the adults (16-45 years), from whom it was possible to obtain enough blood from a larger number of subjects, the results indicated with more certainty that vitamin A deficiency did not appear to constitute a serious problem in the communities studied.

Table 1.3. Serum Vitamin A Levels in Rural Villages, Peninsular Malaysia

Age groups	Mean ± SD (μg/dl)	% with "low" vitamin A
Pre-school		
n = 25	31 ± 9.5	12
Primary school		
n = 40	33 ± 12.5	10
Boys, 12-17.9 years		
n = 32	44 ± 22	16
Girls, 12-17.9 years		
n = 61	55 ± 19	3
Men, 18-45.9 years		
n = 152	46 ± 19	7
Women, 18-45.9 years		
n = 353	47 ± 24	12
Men, 46 years and above		
n = 14	54 ± 33	0
Women, 46 years and above		
n = 14	42 ± 17	7

Source: Chong *et al.* (1984)

In a recent thorough review of the literature Tee (1988) reported that the vitamin A deficiency problem appeared to be confined to certain groups, mainly in the rural areas, and did not pose a major health hazard nationwide. The problem also appeared to have lessened over the years. It was however noted that there are many remote areas in the country where the vitamin A status is not known, including among urban squatter areas. It was pointed that the lack of comprehensive data should not be taken as indicative of absence of the problem. Extensive mapping of the vitamin A status of children in the country remains an important task.

2.4 Iodine deficiency

Endemic goitre too does not appear to be a major nutritional problem in Peninsular Malaysia, except for a few studies which have indicated high prevalence rates in isolated parts of the Peninsula. The problem is however, much more extensive in Sarawak. A recent review (Tan 1982) indicated that 12 of the State's 25 districts have been identified as goitrous, with varying rates of prevalence and occurring mainly in the inland areas (Table 1.4). It has been estimated that there were at least 20,000 cases of endemic goitre in Sarawak, representing about 1.5% of its total population. The problem is said to be caused primarily by iodine deficiency in the diet, and goitrogens probably play a small and unimportant role in most of Sarawak (Chen, 1981).

Table 1.4. Summary of Goitre Studies in Sarawak

Location	Ethnic groups	Age (years)	Total number	Prevalence (%)
First division	Chinese, Malay	10-14 (female)	273	49.8
	Biduyah	> 15 (female)	157	52.2
Second division	Iban, Malay	10-14 (female)	147	38.8
	Chinese	> 15 (female)	161	80.7
Third, sixth & seventh	Iban, Chinese	10-14 (female)	252	34.5
divisions	Malay, Kejaman	> 15 (female)	589	55.2
Fifth division	Malay, Chinese	10-14 (female)	20	45.0
	Iban	> 15 (female)	151	45.0
	Total	> 10 (female)	1750	50.0
		> 15 (female)	1058	58.0
Third division	Iban	All ages	608	8 (male)
Rejang River (interior)		(both sexes)		33 (female)
Second division	Iban	> 11 (both sexes)	167	99.5
Lubuk Antu (interior)				
Ruba (coastal)	Iban	> 11 (both sexes)	38	74.1
Bajong (coastal)	Iban	> 11 (both sexes)	122	3.0
Second division	Iban	5 - 8 (both sexes)	388	76.5
Lemanak River (interior)		mothers only	166	90.5
Fourth division	Kayan/Kenyah	< 7 (both sexes)	556	30.4
Middle Bayam		4 - 8 (both sexes)	372	55.1
(intermediate)		mothers only	142	50.0
Muda area (interior)	Punan	All ages		
	(nomadic tribe)	(both sexes)	334	59.3
Seventh division	Iban	< 7 (both sexes)	414	7.0
Sut/Mujong River		mothers only	106	30.2
(interior)				
Second division	Iban	> 15 (female)	75	93.3
Upper Lemanak River		8 - 12 (both sexes)	152	21.7
(interior)				
Third division	Iban	> 15 (female)	137	38.7
Kanowit District				
(Rejang River interior)				
Kanowit Town	Iban, Chinese	7-12 (both sexes)	542	0.7
Fourth division	Kayan, Kenyah	10-14 (female)	110	78.0
Tinjar River	Iban	> 15 (female)	157	77.7
		10-14 (female)	114	78.6

Source: Tan (1982)

3 Intervention Programmes Affecting Nutritional Status

3.1 Programmes and interventions of the Ministry of Health

3.1.1 The Applied Food and Nutrition Programme

The Applied Nutrition Programme was launched in a pilot project area of Mukim Tanjong Dua Belas in Kuala Langat district in 1969. The project was then coordinated by the Ministry of National and Rural Development with the Ministries of Health, Education, Agriculture and Information as the major participating ministries, with international assistance from WHO, UNICEF and FAO. This community development project, aiming to improve the nutritional status of the community through the community's own efforts, got off the ground in 1971. The project was coordinated by the Prime Minister's Department and implemented by working committees at the national,

state and district levels and administered at the district level by the District Officer and Assistant District Officer (Community Development).

In 1974, the Applied Project was renamed Applied Food and Nutrition Programme (AFNP). The programme involved integrated and coordinated efforts in the Sectors of Economy and food production, nutrition education and home economy, health, sanitation and supplementary feeding in order to improve the nutritional status of the rural population. The health activities related specially to nutrition were: i. nutrition surveillance; ii. treatment and follow up of malnourished cases; iii. nutrition education including cooking demonstrations; and iv. supplementary feeding.

Following the recommendation of the National Seminar on Food and Nutrition in Melaka, the project was expanded to states with a high toddler mortality rate. By the end of 1974, 9 districts in the states of Selangor were included and up to 1980 the programme was expanded to 43 selected districts in Peninsular Malaysia.

To ensure the success of the programme, departmental and inter-departmental training courses, workshops and seminars on nutrition were conducted, at national, state and district level. Up to the end of 1980, 24 inter-departmental workshops had been held at national level. A total of 853 supervisory and 2,006 auxiliary health workers had been given special training in nutrition up to the end of 1980. In addition, in order to strengthen the role and increase the effectiveness of the Ministry of Health in the programme, state nutrition officers were posted to the states since 1975.

To coordinate the activities of various agencies, state and district committees were formed. The former are chaired by the State Development Officer, and the latter by the District Officer. The village development committee provides the community support and participation forum at the grass-root level. At the national level, the coordinating committee at the Prime Minister's Department continues to provide the coordinating mechanism.

An impact evaluation of the programme was carried out in 1979 in selected AFNP areas. Improvements in several general health parameters were reported. However, detailed information on changes in the prevalence of malnutrition, coverage rates, etc. during the programme implementation, and compared to areas where the AFNP did not take place were not available.

Under the Fifth Malaysia Plan, the AFNP was further extended to other districts in Peninsular Malaysia, and to Sabah and Sarawak.

3.1.2 Health programme for the development of "the very poor"

In the review of the strategies for poverty eradication as indicated in the New Economic Policy by the Malaysian Government, it was found that there still exist very poor families living in the rural areas even though the rate of poverty has been reduced tremendously since 1970. Thus in 1989 a comprehensive programme was launched for these families which is aimed to enable them to participate in the stream of development and become economically more productive. The programme was coordinated by the Implementing and Coordinating Unit (ICU) in the Prime Minister's Department and the role of the Ministry of Health is to ensure that the health needs of these families are identified and fulfilled.

The Ministry of Health's present network of health facilities and services covers a large proportion of the rural population, therefore the strategy adopted by the Ministry of Health was to ensure that the identified "hardcore poverty" families had easy accessibility to the health facilities and used the existing health services.

Components of the Programme include home visits *(lawatan mesra)* by the health staff to every poverty family which has been identified by the district officer. The purpose of the visit is to establish rapport between health staff and the family, to assess the health conditions of the house, give basic health education on health problems and motivate the family members to use the nearest health facility. Nutrition education through cooking demonstrations in the community are provided where there are 5 or more poverty families in one area. Food supplements are also given to malnourished children in the poverty families.

3.1.3 Supplementary feeding programme

Supplementary feeding in the form of instant full cream milk powder is being given free to selected children (aged 6 months to 7 years), pregnant women, lactating mothers and school children who are found to be underweight or at higher risk to undernutrition. Beneficiaries who conform to selection criteria are entitled to receive an issue of 1 kg of milk powder per beneficiary per month for 3 consecutive months.

3.1.4 Rehabilitation programme for malnourished children

A National Nutrition Surveillance System (NNSS) was implemented from 1982 to 1986 to determine and monitor the nutritional status of children in Malaysia. From the survey, it was found that in 1983, 25.6% of children below 7 years were moderately to severely malnourished (weight for age below 80% of the NCHS standard while in 1986, this percentage was reduced to 21.9%. A special briefing was held in June 1988 where the report on the nutritional status of Malaysian children (based on NNSS data) was presented to the Prime Minister. A mandate was then given to plan an immediate strategy to assist these children while the medium and long term strategies are being implemented.

A budget of $12 mill was approved for the Programme for a period of two years (1989 - 1990) to rehabilitate 12,000 children who are severely to moderately malnourished. Based on this directive, the Rehabilitation Programme for Malnourished Children was formulated. In this Programme, food aid is given to selected malnourished children. The food aid is considered as a form of treatment while other interventions are implemented, that is immunisation, health and nutrition education, treatment of diseases and close growth monitoring. The food aid consists of essential food items worth $60 a month for each child including supplementary multivitamins.

The condition of the family is evaluated as a whole to obtain aid and services from other related agencies that can assist the family to improve their socioeconomic status and ultimately become independent. In short, this Programme will be used as an entry point for the uplifting of the socio-economic status of the poor families.

The Programme is continuously monitored and an evaluation was done. Each recipient of the food aid is monitored in terms of weight and height attainment. These data are recorded and sent to the Information Management Division of the Prime Minister's Department to be analyzed centrally. From the preliminary evaluation, it can be said that the Programme has showed a promising impact and it is hoped that later evaluations will show that the Programme is, to a certain extent, able to rehabilitate these children even though it is known that other actions have to be taken to alleviate the socio-economic status of the families so that they can be completely rehabilitated from poverty.

For the period of the 6th Malaysian Plan, this Programme will be continued and an allocation of $33.6 million has been approved.

3.2 Nutrition related activities of the Ministry of Agriculture

Activities of the Ministry of Agriculture are focussed on smallholders to improve food production through improved agricultural services such as irrigation and drainage, agricultural inputs, research, credit, marketing and others. Such services are required by smallholders in order to produce enough food for the nation and to improve their income.

When the AFNP was implemented in the 70's and 80's through concerted efforts of several agencies (section 3.1.1), agricultural programmes specially targetted to the problem areas for nutrition were identified and implemented. Efforts were made to expand production and improve productivity and incomes of farmers and supply of food. Programmes and projects within the agricultural sector have been aimed at contributing to the uplifting of income levels and increasing employment opportunities in the sector through programmes aimed at productivity, land development and provision of a wide range of social services to raise the living standards of low income groups. Emphasis has been given to the production of vegetables and fruits, the diversification of farm activities and the expansion of livestock and fishing to generate additional income. As a means of improving nutritional status and income of the smallholders, the cultivation of fruits and vegetables was stepped up, to cover more rural areas.

The Farm Family Development Programme (FFD) was established in 1968 with the assistance of several American Peace Corp Volunteers, UN experts and a few local staff who are graduates with Diploma in Agriculture. The programme was then known as the Home Economics Extension Unit of the Extension Branch of the DOA. At the state level, there are corresponding units responsible for carrying out the Home Economics Programme for the rural women according to the guidelines provided by the headquarters unit.

The objective of the FFD programme in the area of food and nutrition is the improvement of the quality of life among farm families through balanced food consumption, diversified diet and sanitary food preparation. Various strategies were adopted, including developing an active Women Extension Group (WEG) in the rural society for socio-economic development. Farm women were encouraged and trained in agro-based economic activities for example the production of food produce and downstream activities such as post harvest, processing and production of handicrafts.

Under the Sixth Malaysia Plan, FFD programmes have been allocated 2.5 million ringgit to implement four projects, including strengthening the organisation and leadership training in the WEG, promoting entrepreneurship among the WEG, improving quality of life among farmers families and activating the process of technology transfer.

3.3 Health and nutrition programmes of the Ministry of Education

3.3.1 The School Health Programme (SHP)

The SHP is an integrated programme designed to protect, promote and maintain optimum health of pupils and school personnel, promote healthy school living and develope desirable knowledge, attitudes and practices pertaining to health within the perspective of community health as a whole, through the involvement, participation and co-operation of the school, the parents and the community.

For purpose of economy and to avoid overlapping or duplication of services, and to make maximum utilization of limited resources, including personnel, at the national, state and district levels, the co-ordination of the SHP is undertaken by the Joint School Health Committee at each level. The membership of the committee is drawn from governmental, private, and voluntary agencies involved in health, education and related areas. The Joint School Health Committees in turn are assisted by a Working Committee

of experts and adhoc committees. The permanent Secretariat for the above committee is provided by the Ministry of Education at the national level, and by the State/District Department of Education at the state/district level.

3.3.2 *The School Health Education*

It is well recognised that health education is a fundamental means by which to improve individual and community practices pertaining to health and nutrition. Health and nutrition education in schools form an integral part of community health education and is concerned with the sum total of experiences generated through formal instruction and the provision of various health and related services. However, in conjunction with the present objectives of the primary school education to acquire the three basic skills (3 R's - reading, writing and arithmetics), Health Education is not being taught as a subject in primary schools. On the contrary, it is being integrated in various subjects such as Man and His Environment, Moral Education, Religious Education, Music, Languages etc.

In secondary schools, however, health education is integrated with physical education and is now known as Physical and Health Education. It has been recognised as one of the core subject from form one up to form five.

3.3.3 *The School Supplementary Feeding Programme*

The Programme started in 1976 as a component of the Applied Food and Nutrition Programme (AFNP) (described in section 3.1.1.). From 1979, The Programme is fully managed and has become part and parcel of the Ministry of Education's programme. Its scope and coverage has expanded covering schools beyond the AFNP areas. Initially, it covered only small schools in rural areas. Subsequently, as from 1989, it has become part of the National Development Programme For The Poor. Since then, it covered both rural and urban schools.

Although the Programme falls short of a full-fledged school lunch programme, it is aimed at providing about 1/4 - 1/3 of a child's daily nutritional requirements, through a "balanced snack" given to those deserving selected children (mainly from low-income families), as a breakfast substitute or supplementation. The Programme is also aimed at creating opportunities for formal/informal nutrition education (balanced diet, sources of nutrients, personal cleanliness, food sanitation etc.) through the use of locally available foodstuffs and thus develope good eating habits. The Programme also serves as a focal point for school-community co-operation by allowing the involvement and participation of Parent-Teacher Associations and community groups.

Up to 1991, this Programme has benefited more than half million primary school children mainly of low socio-economic status. A set of 10 menus suggested by the Institute of Medical Research, has been rotated in the implementation. Daily allocation per child is 45 sen in Peninsular Malaysia, and 50 sen in Sabah and Sarawak for the period of 135 schooling days, involving a total allocation of more than 30 million ringgit.

3.3.4 *The School Milk Programme (SMP)*

The SMP is another effort undertaken by the Ministry of Education to help improve the nutritional status of the school children and to promote a milk drinking habit among children. Its inception can be traced as far back as after the Second World War, by the British Military Administration (BMA), using skimmed milk. Subsequently, voluntary

organisations, such as the Malaysian Council For Child Welfare and the Central Welfare Council continue this undertaking. However, the programme was carried out a small scale and lasted for only a few years.

In the 1970's, the Programme continued as part of the Applied Food and Nutrition Programme in rural areas, run by the Veterinary Services Department. However, due to some logistical problem and inability to cope with the demand, this programme has come to a standstill.

In 1983, the School Milk Programme with its new approach and concept was launched as a pilot project in 20 districts, involving 800 primary schools and about 5,000 pupils. By 1984, this programme was extended to 1500 more schools including the state of Sarawak and benefiting about 1.1 million pupils. As from 1985 the SMP covers the entire country except Sabah (the state of Sabah has its own SMP under Sabah Foundation Funds). Since its inception, various studies and evaluations have carried out by various agencies.

3.3.5 Other programmes

Realizing the importance of school canteens in providing food to school children, and to ensure that the foods sold are safe and of certain quality, the Ministry of Education and the Ministry of Health have developed the "School Canteen Guideline". It is hoped that these guidelines will help school administrators and school canteen operators in the management of school canteens and food handling. Administrative and professional circulars will also be released from time to time based on current needs and problems.

3.4 Programmes and interventions of the Community Development Division (KEMAS), Ministry of Rural Development

At the time when the country gained independence, the government was faced with nation building. Inspite of the need to concentrate on construction of infrastructures the government did not lose sight of the need for improvement of the quality of life of its citizens. Due to limited resources and trained health personnel, the Adult Education Programme was started in 1961 through the establishment of the Ministry of Rural Development, focussing on health improvement of rural communities. A number of activities were developed and implemented from 1961 till currently, which have a direct bearing on improving the nutritional status of Malaysians, especially those in rural areas. Activities directly related to nutritional interventions included the development of home economics started in 1963, the pre-school/Taman Bimbangan kanak-kanak programme in 1971, the community kitchen project in 1990 and the nurseries in 1991.

Nutritional interventions were carried out indirectly as well as directly. This was to ensure that there is a quality, healthy and productive work force and citizens to embark on nation building. As a strategy to realize this, a nationwide programme on nutrition education for rural women was launched by KEMAS through its Home Economics Programmes. This was an educational process focussing on subjects such as conserving nutritional values, food production, selection, preparation, processing and preservation. Good eating habits and healthy practices were propagated to all. This Programme was found to be well received as reflected by the increase in the number of participants of the programme from 28,793 in 1964 to 60,403 in 1991. Increase in participation would also mean an increase in numbers exposed to nutritional education through the non-formal education system.

In 1970, the pre-school/Taman Bimbingan Kanak-kanak (TABIKA) Programme for children aged 4 to 6 years was started as a pilot project and became a regular programme in 1972. The rationale for its implementation was to help improve the health status of rural children who were in much worse conditions compared to urban children. Health disparity between ethnic groups was also observed. Supplemental nutritionally balanced food was given to children at TABIKA to supplement 20% of their daily nutritional requirement. This programme was aimed at providing a good nutritional headstart to underprivileged rural children. In view of the success of the programme in up-lifting the children's health status, the government gave this programme due importance by increasing the annual budget required for supplementary food for children.

In 1990, with the introduction of the Hard Core Poverty Eradication Programme, the government further intervened to ensure that the very most unfortunate children be given the nutritional food required for five days weekly. This was carried out through TABIKA and nursery/TASKA for children aged below 4 years. For those not included in either of these programmes, food was provided through the 'Community Kitchen' project whereby food packages or assistance for food production projects is given to hard - core poor families.

4 Conclusions

Available data show that nutritional status of Malaysians has been improving over the years. Frank nutritional deficiencies are rarely encountered. Nevertheless, mild to moderate malnutrition exists amongst various population groups, especially the vulnerable groups in socio-economically disadvantaged communities. Growth retardation and anaemia are the major problems encountered, while vitamin A deficiency and iodine deficiency goitre are prevalent among selected population groups. A variety of intervention programmes have been implemented to ameliorate these problems, and these would need further intensification to achieve the targeted objectives.

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