CHANGING DIETARY INTAKE AND FOOD CONSUMPTION IN MALAYSIA: NUTRITIONAL IMPLICATIONS

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Running head: Dietary intake in Malaysia

SUMMARY

Malaysia comprises the Peninsular Malaysia, Sabah and Sarawak. The outstanding characteristics of Malaysia's population is its highly variegated ethnic mix that makes it one of the prime examples of a multi-racial society in the world. Malaysia has achieved sustained rapid economic growth with low inflation rate, and has attained substantial progress in alleviating poverty amongst the multi-racial communities. The rapid socio-economic development has brought about significant changes in the life styles of Malaysians, including food habits, and food purchasing and consumption patterns. Although no nationwide food consumption surveys have been carried out in the country, several food consumption surveys of various population groups provided some idea of the food consumption pattern of selected rural communities. The diet of the rural poverty villages was generally low in fat and there appeared to be a shortfall in mean energy consumption. Differences in food consumption patterns were observed among the major ethnic groups. Examination of the household food expenditure surveys data showed significant differences in food consumption patterns of different socio-economic groups as well as between urban and rural communities. Food balance sheet data also provided an insight into the trends in food availability in the country and suggested changes in food consumption patterns of Malaysians over the last 3 decades. These changes in food consumption patterns and paralleled improved health care clearly had brought about improved health and nutritional situation in the country. Health indicators such as life expectancy at birth, and infant, toddler and maternal mortality rates, often used as proxy indicators of nutrition situation, have shown clear improvements. 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 various rural and urban underprivileged communities. The major nutrient deficiencies in the country are protein and energy malnutrition, iron deficiency anaemia, vitamin A deficiency and endemic goitre. On the other hand, as a result of the rapid socio-economic development and increased affluence in the country, significant proportions of the affluent segments of the population are now known to be afflicted with various non-communicable diseases associated with overnutrition, namely obesity, hypertension, coronary heart disease and cancer. Nutrition activities and programmes in the country are being directed to tackle both facets of the malnutrition problem in a rapidly-developing economy. The new National Agricultural Policy aims to achieve a balanced development between the agriculture and manufacturing sector, enhancement of the integration of the sector with the rest of the economy and the achievement of a higher level and greater depth of food industry development. Tackling the undernutrition problems remains as a priority for the nation, while particular attention is also being given to overnutrition and chronic diseases. It is imperative that continuous assessment, monitoring and analysis of the nutrition situation and food consumption pattern be carried out, particularly because of the rapidly changing socio-economic scenerio in the country.

INTRODUCTION

Rapid advancements in the socio-economic situation in many countries in Asia, including Malaysia has resulted in significant changes in the life-styles of communities,

including food habits, and food purchasing and consumption patterns. Increasing urbanisation puts further strain on the available health services and other facilities in the cities. There has been increased consumer awareness and sophistication among Malaysians. These changes have resulted in a definite change in the food and nutrition issues facing the communities in Malaysia over the past two decades. These new dimensions in the nutrition situation pose great challenges to the nutritionists and other health workers in the country. There has to be continuous monitoring of the food consumption patterns and nutrition situation of the communities. Like many other societies in transition, Malaysia needs to re-define its policies and programmes to tackle the food and nutrition issues facing the communities.

This report aims to examine the nutritional implications of the changing dietary intake and food consumption in Malaysia. The report first summarises the socio-demographic trends in Malaysia, with particular reference to those that affect food consumption and hence nutritional status, including economic performance and demographic changes. Some data from food consumption studies are summarised to illustrate the food consumption pattern of various communities in the country. Data from household expenditure surveys are also presented to illustrate the food consumption patterns of different socio-economic (income) groups and between urban and rural communities. A detailed analysis of food availability data in the country is also carried out to provide an understanding of probable trends in food consumption patterns. The nutritional implications of these changes in food consumption patterns is next summarised, highlighting the improvements in mortality data and changes in the nutritional status of Malaysians. The current policies, programmes and interventions carried out by various organizations and agencies to ameliorate the nutritional problems are summarised in the subsequent section. Finally, the role of agricultural policies and food supplies in influencing nutritional status in the Malaysian context is discussed.

MALAYSIA: THE COUNTRY AND ITS PEOPLE

Malaysia comprises the Peninsular Malaysia, Sabah and Sarawak. The Peninsula is situated south of Thailand while Sabah and Sarawak occupy northern Borneo. Sabah and Sarawak are separated from the Peninsula by the South China Sea. Peninsular Malaysia extends 740 km from Perlis in the north to the Straits of Johor in the South. It consists of 11 states and the Federal Territory of Kuala Lumpur. The Peninsula's coastline extends for some 1,930 km. Sabah and Sarawak stretch some 1,120 km from Tanjung Datu (Sarawak) in the west to Hog Point (Sabah) in the east, and have a coastline of about 2,253 km.

The country lies entirely in the equatorial zone, with a constantly high average temperature through the year. The climate is governed by the regime of the north-east and south-west monsoons which blow alternately during the course of the year. The north-east monsoon blows from approximately mid November till March, and the south-west monsoon between May and September, the periods of change between the two monsoons being marked by heavy rainfall. The period of the south-west monsoon is a drier period for the whole country, particularly for the other states of the west coast of the Peninsula, sheltered by the land mass of Sumatra (Berita Publishing, 1994).

The outstanding characteristics of Malaysia's population is its highly variegated ethnic mix that makes it one of the prime examples of a multi-racial society in the world. The multi-ethnic character of the country's population has come into being over the course of the last 150 years. Broadly speaking, Malaysia's ethnic groups fall into 2 main categories, namely the bumiputera and non-bumiputera groups.

The bumiputera groups themselves are highly differentiated. There are three broad categories: (1) the aborigines *(orang asli)*; (2) the Malays; and (3) Malay-related. The orang asli represent the oldest element in the population but survive in only small numbers and in scattered groups, mainly in the Malay Peninsula. Malays form the predominant ethnic group in the Malay Peninsula. Other ethnic groups regarded for practical purposes as Malays include the Javanese, the Banjarese, Boyanese, Bugis and Minangkabau. The third or non-Malay bumiputera category consist of ethnic groups found in Sarawak and Sabah. In Sarawak, the largest of these are the Iban, the others include the Bidayuh (formerly known as Land Dayaks), the Melanau, Kenyah, Kayan and Bisayah. In Sabah, the Kadazan (Dusun) form the largest single ethnic group, while the Murut, Kelabit and the Kedayan forming significant minorities. The non-bumiputera groups consist primarily of the Chinese and the Indians, with much smaller communities made up of Arabs, Sinhalese, Eurasians and Europeans. Estimates of the proportions of the various ethnic groups in the country for 1992 are given in Figure 1.

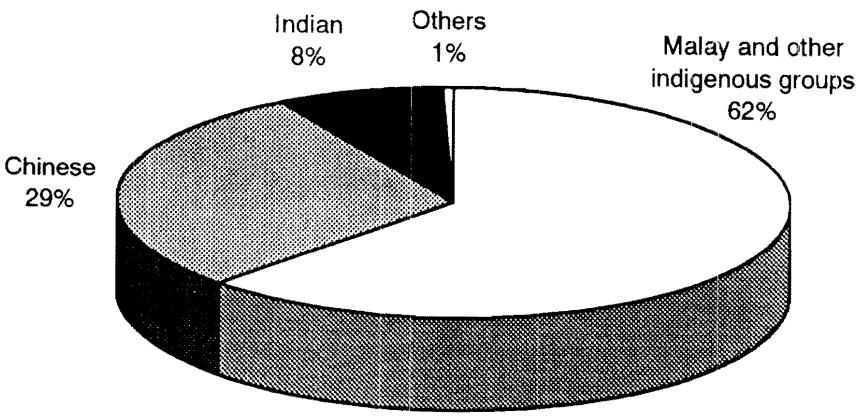

Figure 1. Mid-year population estimates by ethnic groups, Malaysia, 1992

Source: Department of Statistics, Malaysia (1993)

SOCIO-DEMOGRAPHIC TRENDS AFFECTING FOOD CONSUMPTION

The Malaysian economy

Review of development performance

During the Fifth Plan period (1985-1990), the economy experienced extreme variations in its growth performance, ranging from the most severe recession at the

beginning of the Plan to the boom conditions during the last three years. The world economy, which continued to experience sustained growth, has facilitated the expansion of output and trade as well as investment and capital flows. Aside from strong growth in the industralized countries, the period also witnessed rapidly increasing domestic demand in the Asian Newly Industralized Economies (NIEs). These developments have provided a favourable climate for the expansion of the Malaysian economy (Government of Malaysia, 1991).

The economic performance over the Fifth Plan period has been commendable. Overall, the Gross Domestic Product (GDP) in real terms grew by 6.7 per cent per annum between 1985-1990 compared with the Fifth Plan target of 5.0 per cent. This remarkable performance was due to the successful implementation of adjustment measures undertaken since 1983 to consolidate the public sector and reduce its budgetary deficits. In addition, the liberal trade and investment policies introduced at the height of the 1985-86 recession had significantly improved business confidence and increased private investment. These factors, combined with the improvement in the external environment, had brought about a speedy recovery from the recession (Figure 2).

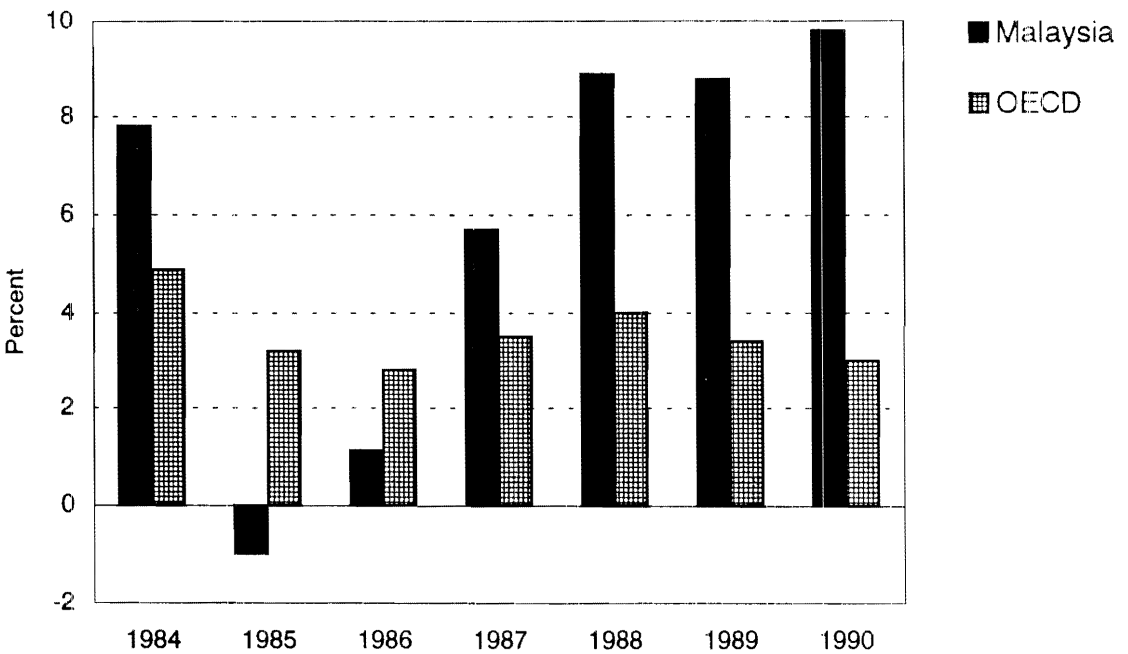

Figure 2. Gross domestic product growth, Malaysia and OECD 1984-1990 (in constant terms)

Source: Government of Malaysia (1991)

The recession at the beginning of the Fifth Plan period was the result of both external and internal factors. There was an across-the-board decline in commodity prices and a weaker demand for the country's manufactured products. The terms of trade deteriorated by 4.5 per cent in 1985 and a further 14.9 per cent in 1986, resulting in a severe balance of payments problem. However, the impact of the terms of trade decline

was offset by rising commodity export volumes, particularly in petroleum, palm oil and cocoa. Other factors which exacerbated the situation were the high value of the ringgit, which resulted partly from the strong inflows of official capital generated by external borrowing, and falling profitability of the tradeable sector. During the recession, there was a virtual collapse of private investment, both domestic and foreign. As a result, GDP registered a negative growth of 1.1 per cent in 1985 and improved only marginally to 1.2 per cent in 1986 (Figure 2).

Various adjustment measures were undertaken by the Government from 1983 to arrest the economic downturn. Aided by improvements in the external environment, the various measures led to the rapid recovery in 1987. External demand picked up briskly, leading to improvement in commodity prices as well as significant increases in demand for manufactures, particularly for semi-conductors and textiles. The decline in the ringgit's nominal exchange rate and the low interest rates further facilitated the recovery process. The growth registered during 1988-1990, which averaged 9.1 per cent per annum, was the highest recorded since independence. As a result, per capita income which declined in 1986, grew at an average rate of 6.1 per cent in nominal terms to reach RM6,180 by 1990.

The implementation of policies and strategies aimed at equitable income distribution coupled with the rapid growth of the economy, especially during the second half of the Plan period, have brought about significant improvements in the pattern of income distribution. The income of the bottom 40 per cent of households, most of whom are in the rural areas, increased faster than that of the other groups while the incidence of poverty dropped significantly, even for the rural households. These improvements were the result of past efforts in raising educational attainment among households and increasing the capacity of the poor to seize the opportunities created by growth. Together with better income and employment opportunities, these have increased the mobility of the labour force and enabled rural workers particularly, to have greater access to the job market and encouraged the trend towards larger number of income earners per household. The increase in the rate of job creation in the modern sectors of the economy provided alternative income and employment opportunities which enabled rural households to lessen their dependence on traditional sources of income.

Prospects for the Malaysian Economy

The medium-term prospects for the Malaysian economy are expected to be better than the progress achieved during the Fifth Plan period. On the external front, with the end of the Gulf War, the world economy is poised to gather momentum for further growth, with lower inflation and better outlook for the industralized countries. While these factors will contribute to the expansion of the Malaysian economy, the nation's overall growth will be sustained largely by increases in domestic demand, particularly from private investment.

The Malaysian economy is expected to grow at an average rate of 7.5 per cent per annum in real terms over the Sixth Plan (1991-1995), largely from the rapid expansion of domestic activities. The external contribution to growth will be greater than the preceding period with exports exceeding imports. GNP in nominal terms is expected to be about RM205,000 million by year 1995, almost double the current level, while the per capita

income is expected to reach about RM10,200.

The terms of trade are expected to improve slightly during the Sixth Plan period, with increases in the price of exports envisaged to exceed those of imports. The export prices are expected to increase by 4.9 per cent per annum against the import prices of 4.5 per cent. With the manufactured products contributing 75 percent of total merchandise export earnings in 1995 compared with 60.4 per cent in 1990, the expected favourable export prices for these products will account for the improved export earnings during the Plan period. In line with these trends, GDP in terms of real purchasing power is projected to increase by 7.8 per cent per annum, slightly higher than the rate of growth of output.

Socio-demographic data

Key socio-demographic data

Malaysia has undergone tremendous socio-economic development since the 1960's, after the country gained independence in 1957. Several selected key socio-economic data for Malaysia are tabulated in Table 1 to illustrate the improved conditions in the country over the past decade. Malaysia has achieved sustained rapid economic growth with low inflation rate, and has attained substantial progress in alleviating poverty amongst the multi-racial communities. With this scenario, it is important to continuously monitor the nutrition situation in the country.

Table 1. Selected demographic statistics, Malaysia (1980-1990)

	1980	*1990*	*1992a*
Population			
Peninsular Malaysia ('000)	11,442	14,620	15,267
Sabah ('000)	1,013	1,474	1,590
Sarawak ('000)	1,309	1,670	1,749
Malaysia ('000)	13,764	17,764	18,606
Vital statistics			
Infant mortality rates (per thousand)	23.9	13.1	12.1
Crude birth rate (per thousand)	30.9	28.4	27.8
Crude death rate (per thousand)	5.3	4.7	4.6
Crude rate of natural increase (per thousand)	25.6	23.7	23.2
Life expectancy at birth			
(Peninsular Malaysia) (years)			
Males	66.4	68.9	69.0
Females	70.5	73.5	73.7
Gross National Product			
Gross National Product (GNP) (current prices) (million ringgit)	51,390	123,530b	140,277
Gross Domestic Product (GDP) (at 1978 prices) (million ringgit)	44,512	86,302b	93,167
Per capita GNP (ringgit) (current prices)	3,734	6,796b	7,541
Annual GDP growth rate (%) (1978 prices)	+ 7.4	+ 8.7b	+ 8.0

[a] provisional figures
[b] figures for 1991

Source: Department of Statistics (1991; 1993)

Population growth and distribution in the last 30 years

Population growth in Malaysia can be divided into two distinct phases: the first, covering the period up to the Second World War, characterized by large-scale immigration of Chinese and Indians; the second, from 1947 to the present, characterized predominantly by natural increase. Malaysia's population has been growing at an average of 2.5% per annum from 8.4 million in 1960 to 18 million in 1990 (Government of Malaysia, 1991). This rate is considerably higher than the average rate of 1.7% for the world as a whole.

Owing to rapid economic progress and a small population base, population growth in Malaysia has not given rise to demographic pressures experienced by many less developed countries (Tey and Thomas, 1993). Efforts in human resource development have produced a skilled labour force to gear the country towards industrialisation. The employment situation is favourable and is projected to grow at 3.2% per annum while unemployment rate for 1990 is 6.0% and is projected to decline to about 4.5% by 1995 (Government of Malaysia, 1991). Unlike other developing countries, Malaysia's urbanization has been rather orderly, with a hierarchy of urban centres. In the past, many potential rural to urban migrants have been channelled to government land schemes in rural areas. However with increasing industrialisation, the rate of urbanization has increased from about 25% in 1960 to 41% in 1990, and is expected to increase to more than 60% by 2020 (Government of Malaysia, 1986). The urbanisation rate for various states and regions in the country over the last two decades is given in Table 2.

Largely as a result of declining fertility there has been some shifts in the age composition of the population during the past decades, as shown in Table 3. The proportion of the population below 15 years of age declined from 45% in 1960 to 37% in 1990. Those in the economically active age group (15-59) have increased correspondingly from 50% to 58%. On the other hand, the proportion of elderly (60+) has increased only marginally. Consequently the median age increased from 17.5 to 21.8 years in the last 30 years. With the expected decline in fertility, the population will continue to 'age'. Tey and Thomas (1993) have given a more detailed picture of the changes in population distribution over the past three decades.

FOOD CONSUMPTION STUDIES

No nation-wide food consumption surveys have been carried out in the country. Nevertheless, several recent food consumption surveys of selected population groups and in different parts of the country have been undertaken by several investigators. However, most of these surveys involved a small number of subjects. Data from a few relatively large scale studies are cited in this paper, in an attempt to provide some idea of the food consumption pattern in the country.

Table 2. Urbanisation rate in different regions/states, Malaysia, 1980-1990

Region/State	*Urbanisation rate (%)*			*Average annual rate of urban growth (%)*		
	1980	*1985*	*1990*	*1981-85*	*1986-90*	*1981-90*
Northern	30.2	32.2	34.3	2.8	2.6	2.7
Kedah	14.5	15.2	16.0	2.5	2.5	2.5
Perak	32.5	32.9	33.6	1.6	1.4	1.5
Perlis	8.9	9.9	11.2	4.3	4.5	4.4
Penang	47.5	54.0	60.4	4.4	3.8	4.1
Central	57.0	57.0	62.8	5.1	4.8	5.0
Malacca	23.5	23.2	23.1	0.9	1.0	0.9
Negeri Sembilan	32.7	37.2	42.1	4.2	4.0	4.1
Selangor	34.5	45.7	55.3	9.2	7.2	8.2
Kuala Lumpur F.T.	100.0	100.0	100.0	3.2	3.4	3.3
Eastern	31.0	32.3	33.7	4.2	4.4	4.3
Kelantan	27.9	29.8	32.2	4.0	4.2	4.1
Pahang	26.4	25.4	24.6	3.6	3.7	3.7
Terengganu	43.0	47.0	51.1	4.9	5.0	5.0
Southern						
Johore	35.5	39.4	43.7	4.5	4.2	4.3
Sabah (including the F.T. of Labuan	20.0	22.6	25.6	6.4	5.9	6.1
Sarawak	17.6	19.2	20.9	4.4	4.2	4.3
Malaysia	34.2	37.4	40.7	4.4	4.2	4.3

F.T. = Federal Territory
Source: Government of Malaysia (1986)

Table 3. Percentage distribution of the population by age, 1960-90, Malaysia

Age-group	*1960*	*1970*	*1980*	*1990*
Under 15	45	45	39	37
15-59	50	50	55	58
60 and over	5	5	6	6
All ages	100	100	100	100
Median age (years)	17.5	17.4	19.6	21.8

Source: Ali Abul Hassan (1991)

Rural poverty villages, Peninsular Malaysia

A series of studies of the nutritional status of 14 rural villages in 4 states in Peninsular Malaysia were conducted by the IMR from 1979 to 1983 (Chong *et al.*, 1984). All the villages were classified as poverty villages, and all study subjects were Malays. A combination of assessment procedures were used, including clinical examination, biochemical determinations on urine and blood samples, and anthropometric measurements. Visits were also made to 503 households to study the socio-economic situation and food consumption patterns. Data from the dietary studies carried out are cited below.

The food consumption pattern per head daily for the poverty villages in the various locations are tabulated in Table 4, and compared with the food availability data for Peninsular Malaysia derived from the food balance sheet for 1979-1981.

Table 4. Food consumption pattern in rural poverty villages, 1979-1983 (means, in grams edible portions per capita)

	Kota Bharu 1979	*Mersing 1981*	*Baling 1982*	*Perak Tengah 1983*	*Combined*	*FBS* 1979-81*
	*(87)**	*(110)*	*(146)*	*(160)*	*(503)*	
Rice	260	261	259	260	260	419
Wheat flour	25	74	57	58	54	93
Wheat products	–	36	12	19	22	–
Roots and tubers	22	29	12	25	22	62
Sugar	43	90	52	86	68	99
Fats and oils (separated)	20	31	20	29	25	30
Pulses and nuts	7	13	18	9	12	15
Fish (including dried fish & other seafoods)	115	99	67	97	95	124
Meat and poultry	7	13	16	21	14	52
Eggs	8	10	8	14	10	20
Milk	6	25	12	16	15	55
Vegetables & fruits	73	70	88	225	114	222

* Figures in parentheses denote the number of households
** Food Balance Sheet data for Peninsular Malaysia, 1979-1981 average

Source: Chong *et al.* (1984)

The staple food, rice, was eaten in essentially the same amounts in all the villages, but the mean amount consumed, 260 g, was considerably less than the 419 g given by the FBS data for the country for 1979-1981. A substantial amount of wheat flour and its products was eaten in the villages studied, although the amounts consumed varied with locations. The consumption of sugar was variable; the villages in Mersing and Perak

Tengah consumed nearly as much as that was available for the country, but sugar consumption in Kota Bharu and Baling was considerably lower. The amounts of roots and tubers eaten in the villages were also less than the food availability data.

An outstanding feature of the village diet was the relatively high consumption of fish, which ranged from 67 g per capita daily in Baling to 115 g per capita in Kota Bharu where the main occupational activity was fishing. When all villages were taken into consideration, fish consumption at 95 g per capita daily was slightly less than the FBS data. In contrast, mean meat and poultry consumption of 14 g per head per day in the poverty villages was considerably lower compared to fish consumption. Likewise, the consumption of milk, eggs, vegetables and fruits at the poverty village level appeared considerably less than what were available according to the FBS data.

Using the Malaysian Food Composition Table (Tee, 1982), the quantities of foods consumed were converted to energy, fat and protein intake. The contribution of various food items to the total energy, fat and protein intake are discussed below to indicate the importance of the various items to the diet of the communities studied.

When data from all the villages were considered together, it can be seen in Figure 3 that rice was the main supplier of energy, providing 51% of the dietary calorie. Next came cane sugar which supplied 14% of total calorie, while wheat products and separated oils contributed to another 11% each.

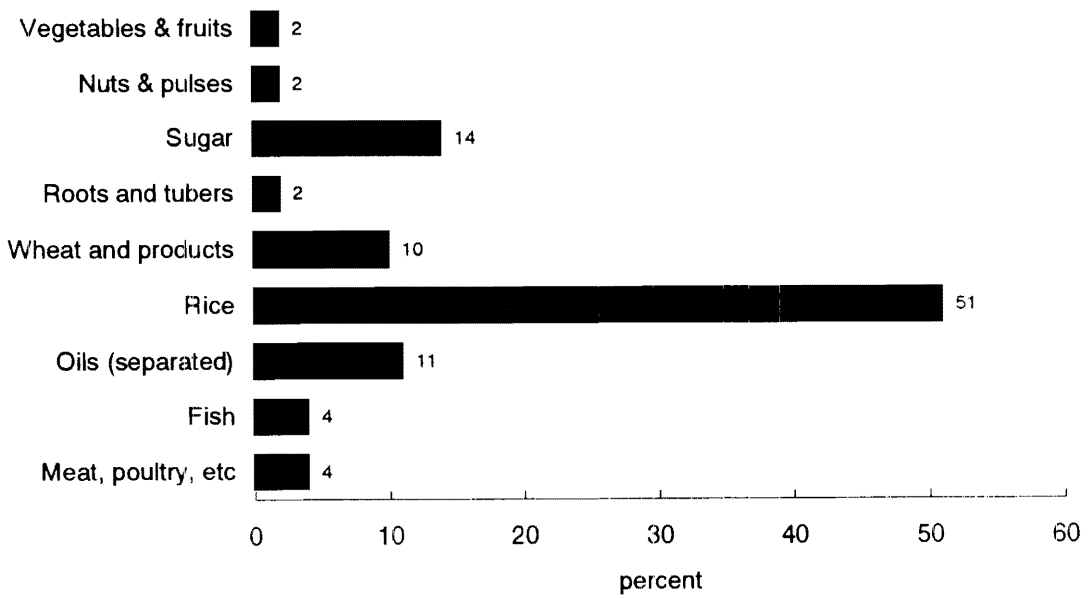

Figure 3. Percent calories from food sources – rural poverty villages, Peninsular Malaysia, 1979-83

Source: Chong *et al.* (1984)

Rice supplied 35% of the dietary protein followed closely by fish at 34%. Owing to the relatively high intake of fish, the contribution of protein from animal sources remained high at 46% in spite of the relatively low consumption of meat, poultry and eggs (Figure 4).

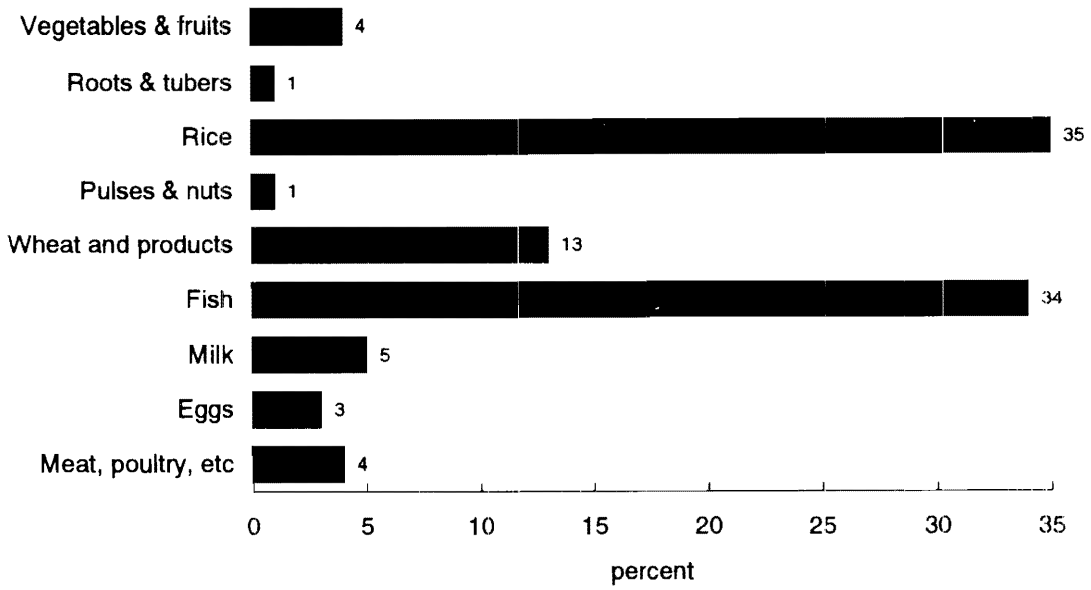

Figure 4. Percent protein from food sources – rural poverty villages, Peninsular Malaysia, 1979-83

Source: Chong *et al.* (1984)

The diet of the poverty villages was generally low in fat. Separated fats contributed 11% of total calories. The total dietary fat intake after taking into account the "invisible" fats in the diet was 18% of total calories.

When calorie and protein consumed were expressed as a percentage of nutritional requirements, there was a shortfall in mean energy consumption in nearly all the villages studied, such that there was an overall 10% deficit in energy intake. Further analysis on the distribution of calorie consumption in households showed that 66% of households were not able to satisfy their daily energy requirements.

In contrast to calorie consumption, protein consumption appeared satisfactory for when taken as a whole, there was an excess of 20% of protein intake over requirement. However, owing to uneven distribution, not all the households enjoyed an excess of protein intake. Some 34% of households actually suffered a deficit of protein.

Rural Malay, Chinese and Indian communities, Peninsular Malaysia

A smaller series of food consumption studies were carried out by the IMR in 1984 (Tee *et al.*, 1985). Three rural communities were studied, namely traditional Malay villages

(kampung), Chinese New Villages, and Indian Estates. The study areas were located in two districts, Ijok in Selangor and Kinta in Perak. Households in the selected areas were visited to study the socio-economic situation and food consumption patterns, using the same methodologies as those for the poverty rural villages. The total number of households thus studied was 350.

Data for the daily per capita consumption of food items for the three communities studied are reported in Table 5. The data were compared with food availability data for 1979-1981 derived from the food balance sheet (last column of Table 5).

Rice was clearly the mainstay of the diet for all the communities studied, with higher amounts consumed by the Indians. The amounts consumed were considerably lower than the figure given in the FBS. The second major source of carbohydrate of the communities was wheat and its products. The consumption of these foods was rather varied in the communities studied. The Malays appeared to consume more of these foods. Roots and tubers constituted the other major carbohydrate foods for the communities. However, these were mainly the more expensive potatoes. Mean consumption of this food group was again found to vary considerably. Relative to the FBS figure of 62 g, larger amounts of these foods were consumed by the Malays and Indians.

The consumption of sugar in the communities studied was generally lower than the availability figure of FBS. Lower consumption levels were observed for the Chinese. A substantial amount of condensed milk was consumed by all groups. The amount of cooking oil consumed did not vary much among the three communities. The level of consumption was also close to the availability figure given by the FBS. Fish and other seafood consumption was found to vary considerably among the communities studied. The Malays consumed more of these foods than the other communities. Egg consumption, on the other hand, showed less variability among the communities. Consumption figures were also closer to the availability value. This was also true for the consumption pattern of meat and poultry. The consumption of milk also showed a similar pattern, with figures considerably lower than the FBS figure.

Among the different communities studied, the consumption of vegetables and fruits was found to be rather varied. Consumption of vegetables was closer to the availability figure. Fruit consumption, on the other hand, was relatively much lower than the FBS value for all the communities.

Energy and protein content of the foods consumed were calculated using the updated Malaysian Food Composition Table (Tee, 1985). The contributions of each food group to the total energy and protein intakes were determined for the communities studied and plotted in Figures 5 and 6 respectively. These results were compared with the study of 14 rural villages discussed in the previous section.

Rice was the main supplier of energy, providing about 40% of the total daily energy intake. Another 10% or so of the energy was contributed by wheat and its products, making energy intake from cereals to half the total energy intake of the households. Roots and tubers contributed to only 2-3% of the total energy intake. Compared with data

Table 5. Food consumption pattern of three rural communities in Peninsular Malaysia, 1984 (means, in grams edible portions per capita)

	Malay Villages	*Chinese New Villages*	*Indian Estates*	*Combined*	*FBS** 1979-81*
	*(130)**	*(117)*	*(103)*	*(350)*	
Rice and products	256	247	333	279	419
Wheat & products	130	69	94	98	118
Roots and tubers	100	30	63	64	62
Sugar	61	19	69	50	99
Fats and oils (separated)	39	33	38	37	30
Condensed milk	33	22	23	26	--
Fish (including dried fish & other seafoods)	188	82	107	126	124
Meat and poultry	47	74	67	63	52
Eggs	24	16	16	19	20
Milk	54	27	26	36	55
Legumes & products	7	6	38	17	15
Vegetables	84	57	105	82	91
Fruits	72	29	42	48	130

* Figures in parentheses denote the number of households

** Food Balance Sheet data for Peninsular Malaysia, 1979-1981 average

Source: Tee *et al.* (1985)

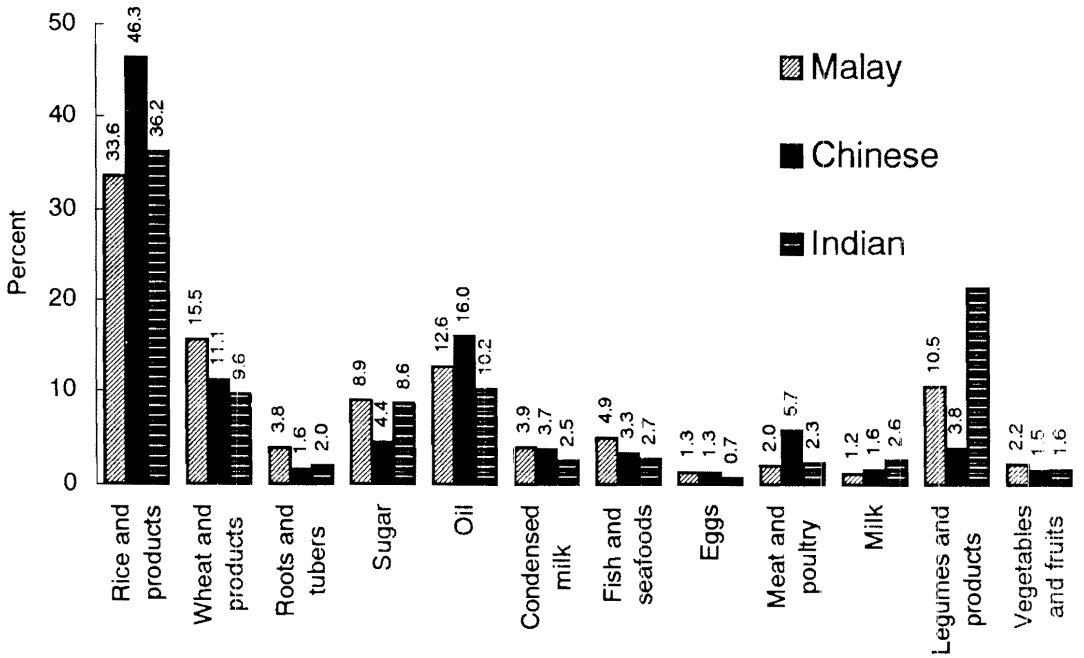

Figure 5. Percent calories from food sources – three rural communities, Peninsular Malaysia. 1984

Source: Tee *et al.* (1985)

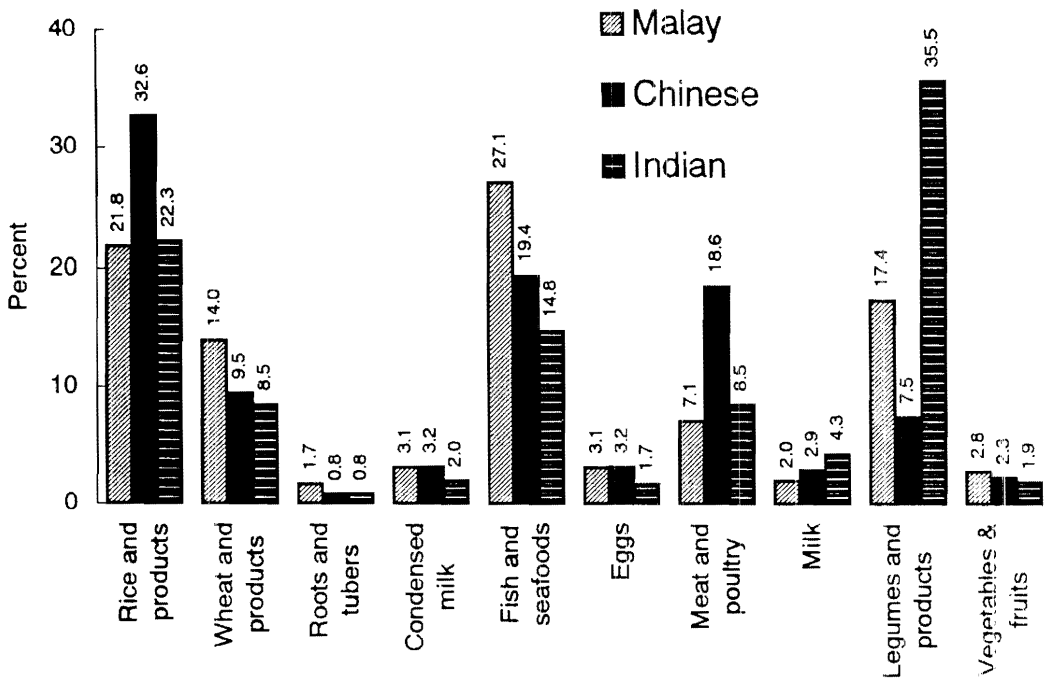

Figure 6. Percent protein from food sources – three rural communities, Peninsular Malaysia, 1984

Source: Tee *et al.* (1985)

reported in 1984 for rural poverty Malay villages, it can be seen that there is less dependence on rice for the energy intake of the communities in this study.

Energy from sugar consumption in these communities was generally below 10% of the total energy intake, with the lowest figures given by the Chinese communities. This figure was lower than the 14% obtained for the rural povery villages. Oil contributed another 12% of total energy intake of the communities studied, similar to that obtained for the poverty villages. Chinese households tended to depend on a slightly higher percentage of their energy intake from oils. Condensed milk contributed a significant 2-4% of the total energy intake of the communities, with lower levels observed for the Indian communities.

Animal foods contributed to about 10% of total energy intake of the communities. This figure was higher than that for the poverty villages, but considerably lower than the FBS figure. The Indian communities had a lower level of energy intake from these foods, compared with the other communities. The major source of energy from animal foods differed among the three communities studied. For the Malays and Chinese, it was quite clearly fish and seafoods, and meat and poultry groups respectively. The Indians, on the other hand, derived equal proportions of their energy from these two food groups, as well as from milk.

The contribution of energy from legumes, nuts and their products varied considerably among the communities studied. Very high levels were observed for the

Indian communities. Energy contribution from fruits and vegetables was around 2% for all three communities. This level was no higher than that for the poverty villages.

On the whole, it was found that the communities studied had a slightly different pattern of energy contribution from various food groups, compared with that for poverty villages reported in 1984. There was less dependence on energy supply from cereals and sugar in the former communities, and higher percentage of energy intake being derived from animal foods (particularly for the Chinese households) and lgeumes, nuts and products (particularly for the Indian communities).

There were considerable variation in the food sources of protein for the three communities studied. In the Chinese diet, rice was the main source of protein, while in the Malay households, fish and other seafoods appeared to be the main supplier. Among the Indians, the legumes and nuts superseded all other sources as the main contributor of protein to the diet.

The contribution of meat and poultry to protein intake was seen to be significant in the Chinese households, being considerably higher than that observed for the diet of the other two communities. Contribution from milk and eggs, particularly the former, was somewhat lower than the FBS availability figures.

Marked differences were observed for the pattern of protein contribution from various foods in the three communities studied. The pattern was also quite different from that observed for the rural poverty villages.

Five rural communities, Sabah

Chen *et al.* (1981) reported a comprehensive study of the nutritional status of five rural communities in the Interior, West Coast and Kudat Divisions of Sabah. Besides anthropometric and biochemical examinations, studies were also carried out on the household socio-economic situation and dietary patterns. The communities studied were 7 Rungus Dusun, 28 Murut, 32 upland Kadazan, 29 coastal plain Kadazan, and 10 Chinese households.

The study communities showed considerable variation in their dietary patterns. The Rungus Dusun of Pitas District had the most monotonous diet with little variation in the food items consumed. The diets of the Chinese community of Ansip showed slightly more variety in the range of food items consumed. They consumed more meat than the Rungus Dusun households, but the preference was for pork, eggs and chicken rather than fish. Only a limited number of types of vegetables were consumed, while fruits did not appear to be a common item in their diet.

The two Kadazan communities exhibited dietary patterns which were intermediate, between that of the above two communities on the one hand, and the Murut community on the other. In these two communities, rice was still the main staple, but other cereals such as bread, biscuits and noodles were also common items in their diet. Vegetables and fruits were also more frequently consumed. Fresh fish and processed fish products were the main source of animal protein in their diet.

The Murut community of Ansip appeared to consume the largest variety of food items in almost all the food groups. Cereals as well as starchy roots and tubers featured prominently in their diets. Wild plant shoots were also frequently gathered and consumed.

In all the communities studied, the main contributor to the calorie intake was from cereals, with contributions ranging from 62% among the Chinese and the Muruts, to about 94% among the Rungus Dusun (Figure 7). The two Kadazan communities were to found to have intermediate values of about 70%.

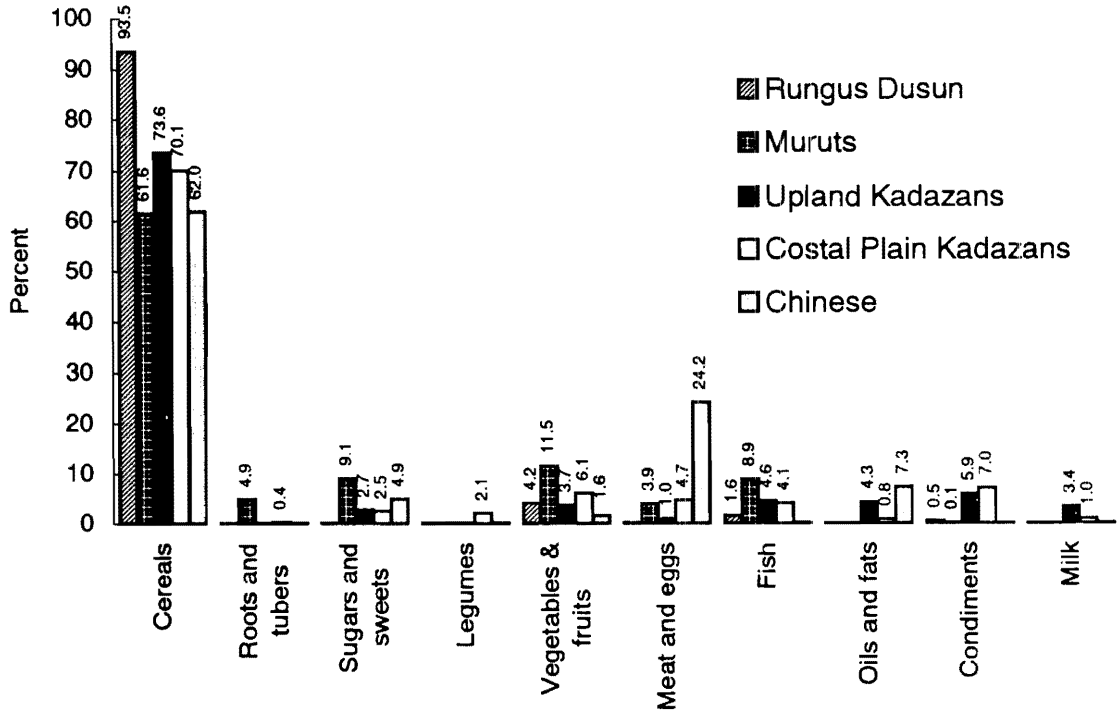

Figure 7. Percent calories from food sources – five rural communities, Sabah, 1981
Source: Tee *et al.* (1985)

Carbohydrate foods such as starchy roots, sugars and sweets formed only a small portion of the calorie intake. Starchy roots contributed only about 5% of the calorie intake among the Muruts, while the contribution of the calorie intake in the other communities was negligible. Contributions from sugars and sweets ranged from negligible proportions among the Rungus Dusun to about 5% among the Muruts.

The contribution of oils and fats to the calorie intake was also minimal, with about 7% among the Chinese community, 4% among the upland Kadazans, to negligible amounts in the other communities. In the Chinese households, meat and eggs contributed about 24% of the calorie intake, unlike the other communities where animal proteins did not contribute much to the caloric content of their diet.

Cereals were also the main source of protein in all the communities studied, contributing about 44% among the Muruts, 49% among the coastal plain Kadazans, 53%

among the Chinese, 53% among the upland Kadazans, while the largest contributor was among the Rungus Dusun, where 73% of the protein intake were derived from cereals (Figure 8).

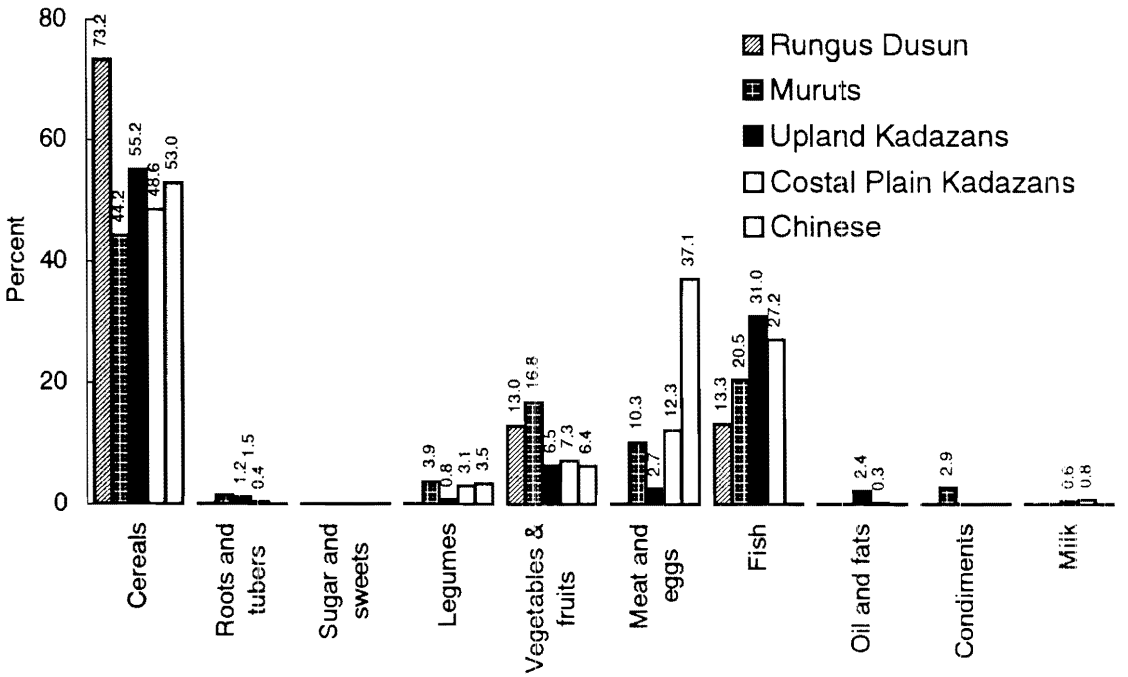

Figure 8. Percent protein from food sources – five rural communities, Sabah, 1981.
Source: Chen *et al.* (1981)

Animal protein was next, with contributions of about 41% among the coastal plain Kadazan, 37% among the Chinese, 36% among the upland Kadazan, 31% among the Muruts, and the lowest was among the Rungus Dusun, with only 14% of its protein intake precursor intakes

TRENDS IN FOOD EXPENDITURE

Household expenditure surveys (HES) also provide some information on the patterns of food intake of communities. Although food expenditure data cannot be equated to food consumption, these data do provide a gross picture of food intake, especially for comparison over time (trend) and among different population groups. The Statistics Department Malaysia conducted a food expenditure survey in 1970 for Peninsular Malaysia and repeated the survey in 1980. A similar survey was conducted for Sabah and Sarawak in 1982. Data on food expenditure from the 1980 HES of Peninsular Malaysia were extracted for discussion in this section, to illustrate the differences in food consumption among different income (socio-economic) groups and between urban and rural areas.

Average monthly household expenditure on food items/groups by different expenditure classes in Peninsular Malaysia are given in Tables 6a and 6b. Figure 9 illustrates these differences for 4 expenditure classes. The different expenditure classes, taken here to indicate different socio-economic groups, show rather different food expenditure patterns. The lower socio-economic groups tended to aportion a higher percentage of their expenditure on cereals and fish and seafoods. On the other hand, these groups tended to spend less on meat and offals. As can be expected, they also spent less on meals away from home. There appeared to be less obvious differences among the socio-economic groups on the percentage of expenditure on vegetables and fruits, milk and eggs and oils and fats.

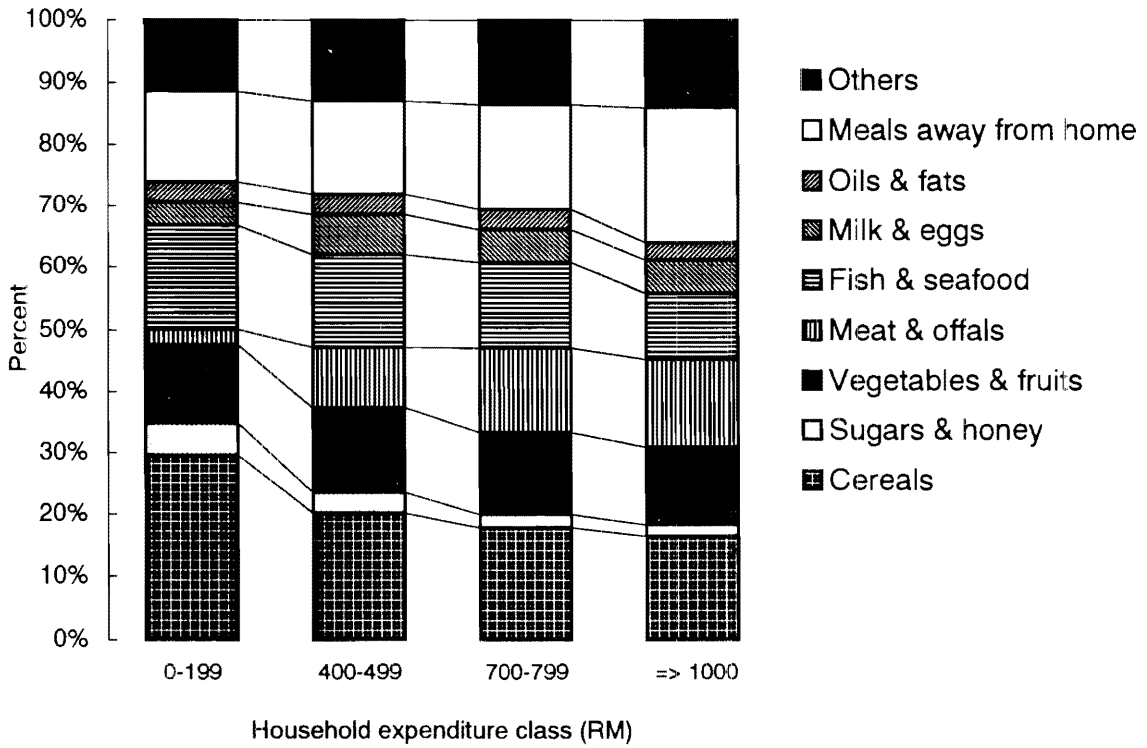

Figure 9. Average monthly household expenditure on food items by expenditure classes, Peninsular Malaysia, 1980

Source: Plotted from data in FAO (1983)

The above mentioned differences are also observed between urban and rural communities in Peninsular Malaysia (Tables 7a, 7b, 7c and 7d). For each of the 4 expenditure classes shown in Figure 10, the urban households tended to spend less on cereals. On the other hand, the urban households tended to spend more on meat and offals, the difference being larger among the lower income groups (expenditure classes less than RM500 per month). For all income groups, the urban households reported spending less on meals away from home.

Table 6a. Average monthly household expenditure on food items/groups by expenditure class

	Monthly household consumption expenditure class (RM)											
	0-199		*200-299*		*300-399*		*400-499*		*500-599*		*600-699*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	22.6	29.5	32.3	23.6	38.4	21.5	42.5	20.0	46.8	18.3	53.7	18.7
Bread	6.7		10.6		14.6		17.0		18.9		23.5	
Rice	15.9		21.7		23.8		25.6		28.0		30.3	
Sugars & honey	4.0	5.2	5.9	4.3	6.4	3.6	7.1	3.3	6.9	2.7	8.3	2.9
Vegetables & fruits	9.8	12.8	17.8	13.0	23.9	13.4	29.4	13.9	34.9	13.6	43.0	15.0
Meat & offals	2.0	2.6	7.2	5.3	13.0	7.3	20.9	9.9	29.1	11.3	35.6	12.4
Fish & seafood	12.8	16.7	21.2	15.5	26.5	14.9	31.5	14.9	35.3	13.8	39.2	13.6
Milk & eggs	2.9	3.8	6.1	4.5	8.5	4.8	13.9	6.6	14.4	5.6	15.4	5.4
Vegetable oils & fats	2.6	3.4	4.4	3.2	5.6	3.1	7.1	3.3	7.6	3.0	9.5	3.3
Stimulants	1.6	2.1	2.6	1.9	3.3	1.9	4.5	2.1	5.6	2.2	6.2	2.2
Beverages	4.9	6.4	11.0	8.1	15.9	8.9	16.3	7.7	23.3	9.1	23.6	8.2
Miscellaneous	2.3	3.0	4.3	3.1	5.9	3.3	6.8	3.2	7.3	2.8	9.0	3.1
Meals away from home	11.2	14.6	23.8	17.4	30.9	17.3	32.0	15.1	45.2	17.6	43.7	15.2
Expenditure on food	76.7	100.0	136.6	100.0	178.3	100.0	212.0	100.0	256.4	100.0	287.2	100.0
Household expenditure, RM	136.5		250.2		348.0		448.5		549.0		648.9	
Food expenditure as a percentage of total household expenditure	56.2		54.6		51.2		47.3		46.7		44.3	

Source: FAO (1993)

Table 6b. Average monthly household expenditure on food items/groups by expenditure class (continued)

	Monthly household consumption expenditure class (RM)									
	700-799		*800-899*		*900-999*		*1000*		*All class*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	54.9	27.8	60.1	17.1	68.3	17.7	79.9	16.3	48.1	18.8
Bread	23.1		25.1		26.0		39.7		20.0	
Rice	31.8		35.0		32.4		40.1		28.1	
Sugars & honey	6.6	2.1	7.3	2.1	11.1	2.9	9.3	1.9	7.0	2.7
Vegetables & fruits	41.1	13.3	49.7	14.1	47.5	12.3	62.0	12.7	34.0	13.3
Meat & offals	42.6	13.8	40.7	11.6	50.5	13.1	69.6	14.2	29.0	11.4
Fish & seafood	42.4	13.7	46.0	13.1	47.3	12.3	51.8	10.6	33.5	13.1
Milk & eggs	16.7	5.4	21.2	6.0	21.7	5.6	26.5	5.4	13.8	5.4
Vegetable oils & fats	10.2	3.3	11.0	3.1	13.0	3.4	13.9	2.8	8.0	3.1
Stimulants	6.8	2.2	8.2	2.3	9.1	2.4	10.5	2.1	5.4	2.1
Beverages	25.9	8.4	31.4	8.9	31.0	8.0	39.8	8.1	21.1	8.3
Miscellaneous	9.4	3.0	13.1	3.7	14.1	3.7	18.6	3.8	8.7	3.4
Meals away from home	52.4	17.0	63.5	18.0	72.5	18.8	107.5	22.0	46.7	18.3
Expenditure on food	309.0	100.0	352.2	100.0	386.1	100.0	489.4	100.0	255.3	100.0
Household expenditure, RM	748.4		845.4		946.2		1771.9		661.4	
Food expenditure as a percentage of household consumption expenditure	41.3		41.7		40.8		27.6		38.6	

Source: FAO (1993)

Table 7a. Average monthly household expenditure on food items/groups by expenditure class and location

	Monthly household expenditure class (RM)											
	0-199				*200-299*				*300-399*			
	Urban		*Rural*		*Urban*		*Rural*		*Urban*		*Rural*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	16.6	20.9	23.6	30.8	20.7	15.7	35.8	25.9	25.0	14.4	43.2	24.0
Bread	7.1		6.6		9.6		10.9		11.7		15.7	
Rice	9.5		17.0		11.1		24.8		13.3		27.5	
Sugars & honey	2.2	2.8	4.3	5.6	2.4	1.8	6.9	5.0	3.2	1.8	7.5	4.2
Vegetables & fruits	11.4	14.4	9.6	12.5	15.4	11.7	18.5	13.4	21.6	12.4	24.7	13.7
Meat & offals	4.5	5.7	1.7	2.2	9.5	7.2	6.5	4.7	17.7	10.2	11.4	6.3
Fish & seafood	12.5	15.7	12.9	16.9	14.1	10.7	23.4	16.9	21.5	12.4	28.2	15.6
Milk & eggs	3.3	4.1	2.8	3.7	5.5	4.2	6.3	4.6	8.7	5.0	8.5	4.7
Vegetable oils & fats	1.8	2.3	2.7	3.5	2.7	2.1	4.9	3.5	4.5	2.6	6.1	3.4
Stimulants	0.9	1.1	1.7	2.2	2.4	1.8	2.6	1.9	2.7	1.6	3.6	2.0
Beverages	5.8	7.3	4.8	6.3	9.6	7.3	11.4	8.3	18.7	10.8	14.9	8.3
Miscellaneous	2.8	3.5	2.3	3.0	2.6	2.0	4.8	3.5	5.1	2.9	6.2	3.4
Meals away from home	17.7	22.2	10.1	13.2	46.7	35.5	17.0	12.3	45.0	25.9	25.9	14.4
Expenditure on food	79.6	100.0	76.5	100.0	131.6	100.0	138.1	100.0	173.7	100.0	180.2	100.0
Household expenditure, RM	145.5		135.1		253.2		249.4		349.4		347.5	
Food expenditure as a percentage of household consumption expenditure	54.7		56.6		52.0		55.3		49.7		51.9	

Source: FAO (1993)

Table 7b. Average monthly household expenditure on food items/groups by expenditure class and location

	Monthly household expenditure class (RM)											
	0-199				*200-299*				*300-399*			
	Urban		*Rural*		*Urban*		*Rural*		*Urban*		*Rural*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	32.5	15.5	46.9	22.0	34.8	13.9	52.8	20.3	.43.7	15.4	59.3	20.5
Bread	13.9		18.3		16.8		19.8		19.7		25.6	
Rice	18.6		28.6		18.0		32.9		24.0		33.7	
Sugars & honey	4.3	2.0	8.3	3.9	4.4	1.8	8.1	3.1	5.8	2.0	9.8	3.4
Vegetables & fruits	28.4	13.5	29.9	14.0	32.6	13.0	36.0	13.9	40.9	14.4	44.2	15.3
Meat & offals	28.1	13.4	17.8	8.3	30.9	12.3	28.2	10.9	39.1	13.8	33.5	11.6
Fish & seafood	28.4	13.5	33.0	15.5	31.3	12.5	37.4	14.4	39.0	13.8	39.4	13.6
Milk & eggs	13.2	6.3	14.3	6.7	12.0	4.8	15.7	6.0	14.6	5.2	15.8	5.5
Vegetable oils & fats	6.0	2.9	7.6	3.6	6.2	2.5	8.4	3.2	8.3	2.9	10.2	3.5
Stimulants	4.3	2.0	4.6	2.2	5.1	2.0	5.9	2.3	5.6	2.0	6.6	2.3
Beverages	14.7	7.0	17.1	8.0	20.3	8.1	24.8	9.5	17.9	6.3	26.9	9.3
Miscellaneous	5.5	2.6	7.3	3.4	6.8	2.7	7.6	2.9	7.5	2.6	9.8	3.4
Meals away from home	44.9	21.4	26.4	12.4	66.0	26.4	34.8	13.4	60.8	21.5	34.0	11.7
Expenditure on food	210.3	100.0	213.2	100.0	250.4	100.0	259.7	100.0	283.2	100.0	289.5	100.0
Household expenditure, RM	449.7		448.1		553.7		546.7		653.5		646.3	
Food expenditure as a percentage of household consumption expenditure	46.8		47.6		45.2		47.5		43.3		44.8	

Source: FAO (1993)

Table 7c. Average monthly household expenditure on food items/groups by expenditure class and location

	Monthly household expenditure class (RM)											
	700-799				*800-899*				*900-999*			
	Urban		*Rural*		*Urban*		*Rural*		*Urban*		*Rural*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	41.2	13.6	60.0	19.3	46.7	14.0	68.1	18.8	50.5	14.2	78.0	19.4
Bread	20.2		24.2		24.7		25.4		24.4		26.9	
Rice	21.0		35.8		22.0		42.7		26.1		51.2	
Sugars & honey	5.1	1.7	7.1	2.3	6.5	1.9	7.7	2.1	7.9	2.2	12.8	3.2
Vegetables & fruits	40.6	13.4	41.2	13.2	49.7	14.9	49.8	13.7	47.7	13.4	47.4	11.8
Meat & offals	40.9	13.5	43.3	13.9	42.4	12.7	39.6	10.9	42.5	12.0	54.9	13.6
Fish & seafood	39.1	12.9	43.7	14.0	47.4	14.2	45.2	12.5	44.8	12.6	48.6	12.1
Milk & eggs	16.9	5.6	16.6	5.3	20.1	6.0	21.8	6.0	21.4	6.0	21.9	5.4
Vegetable oils & fats	8.5	2.8	10.9	3.5	9.3	2.8	12.0	3.3	10.9	3.1	14.1	3.5
Stimulants	6.5	2.1	7.0	2.2	8.5	2.5	8.0	2.2	8.0	2.3	9.6	2.4
Beverages	29.5	9.7	24.6	7.9	20.6	6.2	37.9	10.4	18.8	5.3	37.6	9.3
Miscellaneous	9.5	3.1	9.4	3.0	13.2	3.9	13.0	3.6	12.0	3.4	15.2	3.8
Meals away from home	65.9	21.7	47.4	15.2	70.0	20.9	59.6	16.4	90.5	25.5	62.7	15.6
Expenditure on food	303.7	100.0	311.2	100.0	334.4	100.0	362.7	100.0	355.0	100.0	402.8	100.0
Household expenditure, RM	750.4		747.8		847.2		844.3		950.7		944.0	
Food expenditure as a percentage of household consumption expenditure	40.5		41.6		39.5		43.0		37.3		42.7	

Source: FAO (1993)

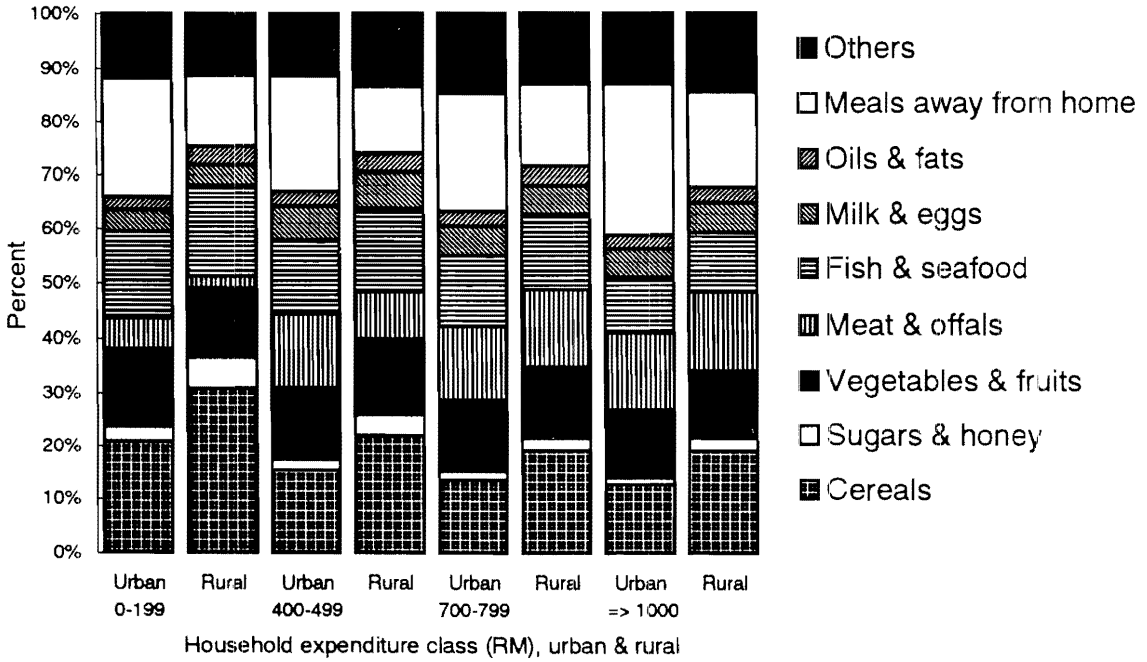

Figure 10. Average monthly household expenditure on food items by expenditure classes, P. Malaysia, urban & rural, 1980

Source: Plotted from data in FAO (1993)

The frequency of consumption of meals away from home has certainly increased over the years. The number of eating places (stalls and restaurants) in the country, especially in urban areas, has increased significantly. In response to this, safety of "street foods" has been given particular attention by the Ministry of Health Malaysia. A Code of Practice for Hawker/Street Food was prepared and shall be implemented soon. The Code is intended to be a guide to the hawker food industry and addresses various aspects including hawkers health status and procedures for preparation, serving, transportation and storage of food.

In connection with meals away from home is the increased consumption of western style "fast foods" in the country. The number of these restaurants in the country has increased . A study by Mohamad Nordin and Mohd Nasir (1989) on a sample of urban households has shown that the frequency of visit to fast food outlets was not excessive and the nutritional implications of these foods was minimal. However, other data are not available and there is a need to monitor the consumption of these foods.

TRENDS IN FOOD AVAILABILITY

An analysis of food availability in the past 3 decades has indicated possible dietary changes of Malaysians. Although these data should not be equated with consumption levels, food balance sheet data are useful in indicating probable trends in food consumption patterns. In the absence of regular nationwide food consumption surveys,

Table 7d. Average monthly household expenditure on food items/groups by expenditure class and location (continued)

	Monthly household expenditure class (RM)							
	> 1000				*All class*			
	Urban		*Rural*		*Urban*		*Rural*	
	RM	*%*	*RM*	*%*	*RM*	*%*	*RM*	*%*
Cereals	60.2	12.7	96.1	19.1	39.5	14.0	51.8	21.3
Bread	32.4		45.8		19.5		20.2	
Rice	27.8		50.3		20.0		31.6	
Sugars & honey	5.9	1.2	12.1	2.4	4.8	1.7	8.0	3.3
Vegetables & fruits	60.8	12.8	63.0	12.6	37.4	13.2	32.6	13.4
Meat & offals	67.6	14.3	71.3	14.2	36.5	12.9	25.7	10.6
Fish & seafood	47.4	10.0	55.3	11.0	33.5	11.8	33.5	13.8
Milk & eggs25.1	5.3	27.6	5.5	15.1	5.3	13.3	5.5	
Vegetable oils & fats	12.2	2.6	15.3	3.0	7.5	2.7	8.1	3.3
Stimulants	10.1	2.1	10.9	2.2	5.8	2.1	5.3	2.2
Beverage	34.8	7.3	43.9	8.7	21.2	7.5	21.1	8.7
Miscellaneous	17.7	3.7	19.3	3.8	9.2	3.3	8.4	3.5
Meals away from home	132.3	27.9	87.1	17.4	72.4	25.6	35.6	14.6
Expenditure on food	474.1	100.0	501.9	100.0	282.9	100.0	243.4	100.0
Household expenditure, RM	1793.2		1770.9		801.2		600.7	
Food expenditure as a percentage of household consumption expenditure	26.4		28.3		35.3		40.5	

Source: FAO (1993)

these data do provide some useful information, within the recognised limitations of such data.

Table 8 and Figure 11 give some data extracted from food balance sheet data for Malaysia, taken from reports of the Food and Agriculture Organization. Over the years from 1960's to the early 1990's, there was a trend of increasing per capita availability of the major macronutrients calories, fat and protein, particularly the former two nutrients. There was also an increasing proportion of the calorie and protein being derived from animal sources.

The changes in the sources of available calories over the 3 decades are given in Tables 9a and 9b. Data for 4 periods are plotted in Figure 12 to facilitate observation of any changes over the years. A decline in calories from complex carbohydrates, notably cereals, has been observed. At the same time, the availability of other fibre-rich foods, such as fruits and vegetables, has not increased. There was a concomitant increase in the

Table 8. Per capita availability of calories, protein and fat in Malaysia, 1960's to 1990's

	1961-63	*1964-66*	*1969-71*	*1972-74*	*1974-76*	*1976-78*	*1979-81*	*1982-84*	*1984-86*	*1986-88*	*1988-90*	*1990-92*
Calories per day												
Total	2337	2320	2445	2516	2552	2610	2623	2642	2655	2641.3	2710.7	2830.3
Vegetable products	2070	2047	2157	2205	2196	2223	2222	2241	2250	2225.3	2276.7	2371.7
Animal products	266	273	288	311	356	387	401	401	405	416.0	434.0	458.3
% Animal sources	11.4	11.8	11.8	12.4	13.9	14.8	15.3	15.2	15.3	15.7	16.0	16.2
Protein (g/day)												
Total	47.1	47.8	49.8	52.4	55.2	58.2	58.8	58.8	58.2	55.2	56.0	58.3
Vegetable products	32.8	32.4	33.2	33.6	33.2	33.3	33.1	32.6	31.6	29.0	29.3	30.4
Animal products	14.3	15.4	16.7	18.8	22.0	25.0	25.6	26.2	26.5	26.2	26.7	27.9
% Animal sources	30.4	32.2	33.5	35.9	39.9	43.0	43.5	44.6	45.5	47.4	47.6	47.8
Fat (g/day)												
Total	46.4	47.4	50.0	52.7	56.9	62.2	63.7	67.7	71.8	86.2	93.5	100.0
Vegetable products	28.7	29.3	30.6	31.9	33.1	37.1	38.1	42.2	46.2	59.4	64.9	69.4
Animal products	17.7	18.1	19.4	20.7	23.8	25.2	25.6	25.5	25.6	26.8	28.6	30.7
% Animal sources	38.1	38.2	38.8	39.3	41.8	40.5	40.2	37.7	35.7	31.1	30.6	30.7

Source: Tabulated from data in FAO (1991); FAO unpublished (1994)

Table 9a. Changes in sources of calories in Malaysia between 1960's and 1990's

	1961-63		*1964-66*		*1969-71*		*1972-74*		*1974-76*		*1976-78*	
	Calories	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*
Cereals	1385	59.3	1363	58.8	1398	57.2	1428	56.8	1425	55.8	1412	54.1
Starchy roots	45	1.9	39	1.7	48	2.0	59	2.3	61	2.4	63	2.4
Sweeteners	255	10.9	261	11.3	318	13.0	317	12.6	304	11.9	304	11.6
Pulses	29	1.2	28	1.2	26	1.1	25	1.0	20	0.8	19	0.7
Nuts & oilseeds	72	3.1	72	3.1	70	2.9	71	2.8	72	2.8	73	2.8
Vegetables	24	1.0	24	1.0	26	1.1	26	1.0	26	1.0	25	1.0
Fruit	77	3.3	68	2.9	67	2.7	68	2.7	69	2.7	71	2.7
Meat & offal	94	4.0	98	4.2	104	4.3	116	4.6	143	5.6	151	5.8
Eggs	14	0.6	19	0.8	21	0.9	28	1.1	33	1.3	33	1.3
Fish & seafood	38	1.6	39	1.7	44	1.8	49	1.9	58	2.3	71	2.7
Milk (ex butter)	77	3.3	75	3.2	70	2.9	74	2.9	80	3.1	91	3.5
Vegetable oils	154	6.6	161	6.9	172	7.0	183	7.3	193	7.6	228	8.7
Animal fats	44	1.9	43	1.9	49	2.0	45	1.8	42	1.6	41	1.6
Spices	13	0.5	16	0.7	16	0.7	14	0.6	14	0.5	14	0.5
Stimulants	2	0.1	2	0.1	2	0.1	2	0.1	2	0.1	1	0.0
Alc. beverages	7	0.3	6	0.3	5	0.2	7	0.3	7	0.3	8	0.3
Miscellaneous	6	0.3	8	0.3	9	0.4	5	0.2	4	0.2	3	0.1
Total	2337	100.0	2320	100.0	2445	100.0	2516	100.0	2552	100.0	2610	100.0

Source: Tabulated from data in FAO (1991); FAO unpublished (1994)

Table 9b. Changes in sources of calories in Malaysia between 1960's and 1990's

	1979-81		*1982-84*		*1984-86*		*1986-88*		*1988-90*		*1990-92*	
	Calories	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*
Cereals	1370	52.2	1312	49.7	1248	47.0	1142	43.2	1132	41.8	1187	42.0
Starchy roots	62	2.4	72	2.7	77	2.9	70	2.7	80	3.0	75	2.6
Sweeteners	322	12.3	347	13.1	377	14.2	354	13.4	350	12.9	362	12.8
Pulses	25	1.0	25	0.9	27	1.0	29	1.1	29	1.1	29	1.0
Nuts & oilseeds	73	2.8	72	2.7	70	2.6	76	2.9	76	2.8	77	2.7
Vegetables	27	1.0	29	1.1	29	1.1	21	0.8	23	0.8	24	0.8
Fruit	76	2.9	78	3.0	77	2.9	72	2.7	74	2.7	67	2.4
Meat & offal	156	5.9	162	6.1	175	6.6	193	7.3	210	7.8	229	8.1
Eggs	32	1.2	32	1.2	34	1.3	41	1.6	48	1.8	55	1.9
Fish & seafood	70	2.7	71	2.7	65	2.4	49	1.8	43	1.6	39	1.4
Milk (ex butter)	106	4.0	102	3.9	100	3.8	100	3.8	100	3.7	103	3.6
Vegetable oils	235	9.0	271	10.3	307	11.6	426	16.1	473	17.5	510	18.0
Animal fats	37	1.4	33	1.2	31	1.2	32	1.2	32	1.2	31	1.1
Spices	16	0.6	20	0.8	22	0.8	19	0.7	18	0.7	20	0.7
Stimulants	2	0.1	2	0.1	2	0.1	22	0.1	4	0.1	4	0.1
Alc. beverages	12	0.5	10	0.4	10	0.4	9	0.3	10	0.4	10	0.4
Miscellaneous	3	0.1	3	0.1	3	0.1	6	0.2	8	0.3	9	0.3
Total	2623	100.0	2642	100.0	2655	100.0	2641	100.0	2711	100.0	2830	100.0

Source: Tabulated from data in FAO (1991); FAO unpublished (1994)

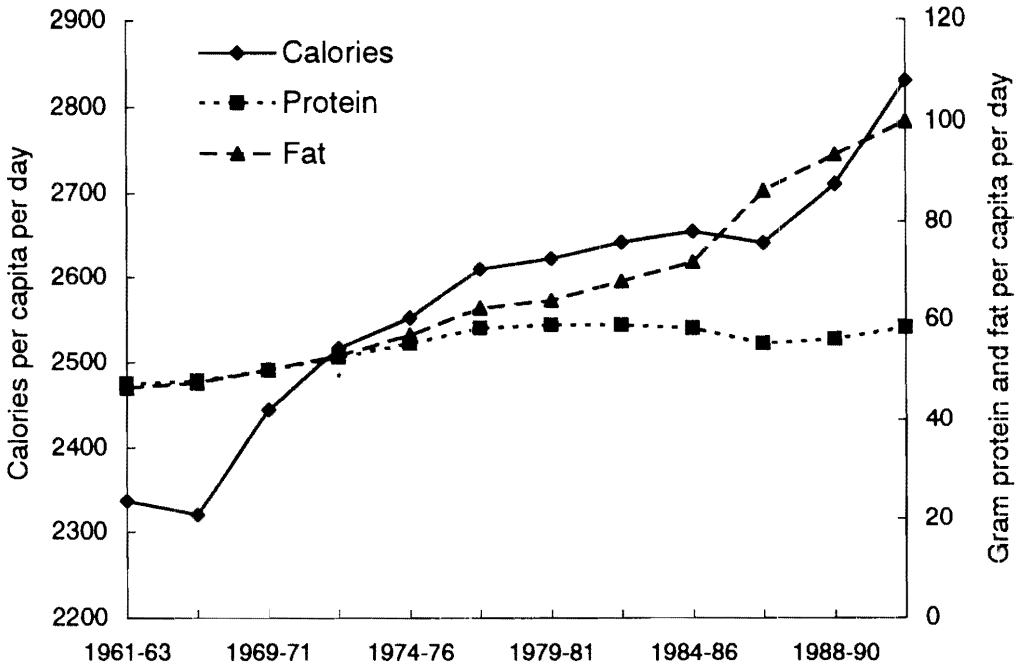

Figure 11. Changes in availability of calories, protein and fat in Malaysia, 1961 to 1992. Source: Plotted from data in FAO (1991); FAO unpublished (1994).

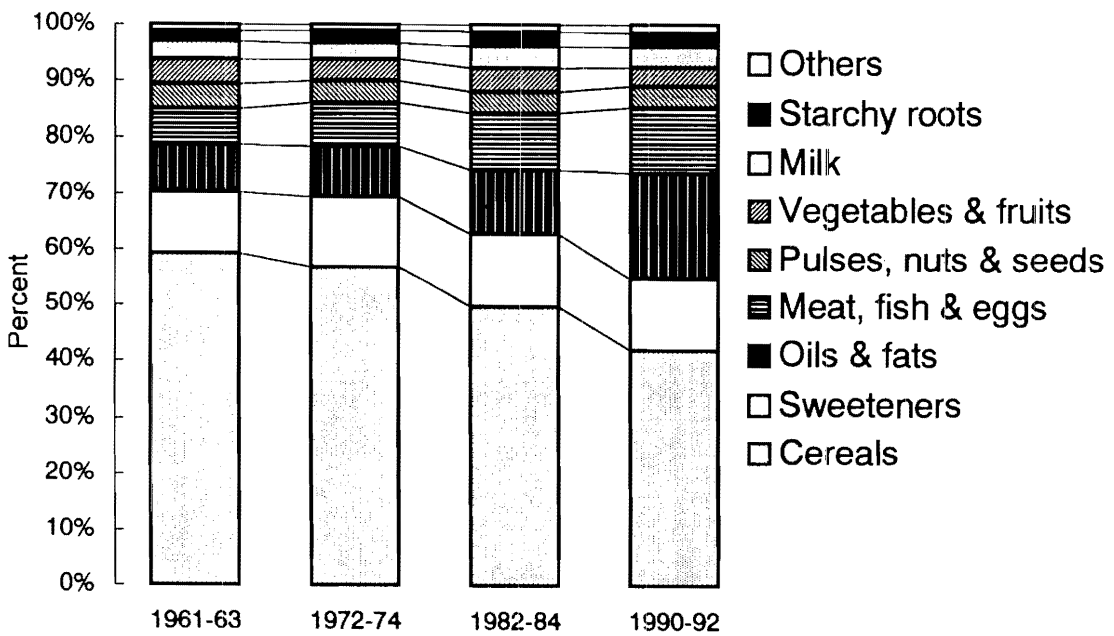

Figure 12. Changes in sources of calories in Malaysia, between 1960's and 1990's. Source: Plotted from data in FAO (1991); FAO unpublished (1994).

proportion of calories from oils and fats, sugars, and meat, fish and eggs over the last two decades.

A similar presentation of changes in sources of available protein from 1960's to 1990's is given in Tables 10a and 10b. Presented graphically for the 4 periods in Figure 13, changes over the years are seen to be similar to those observed for the available calories.

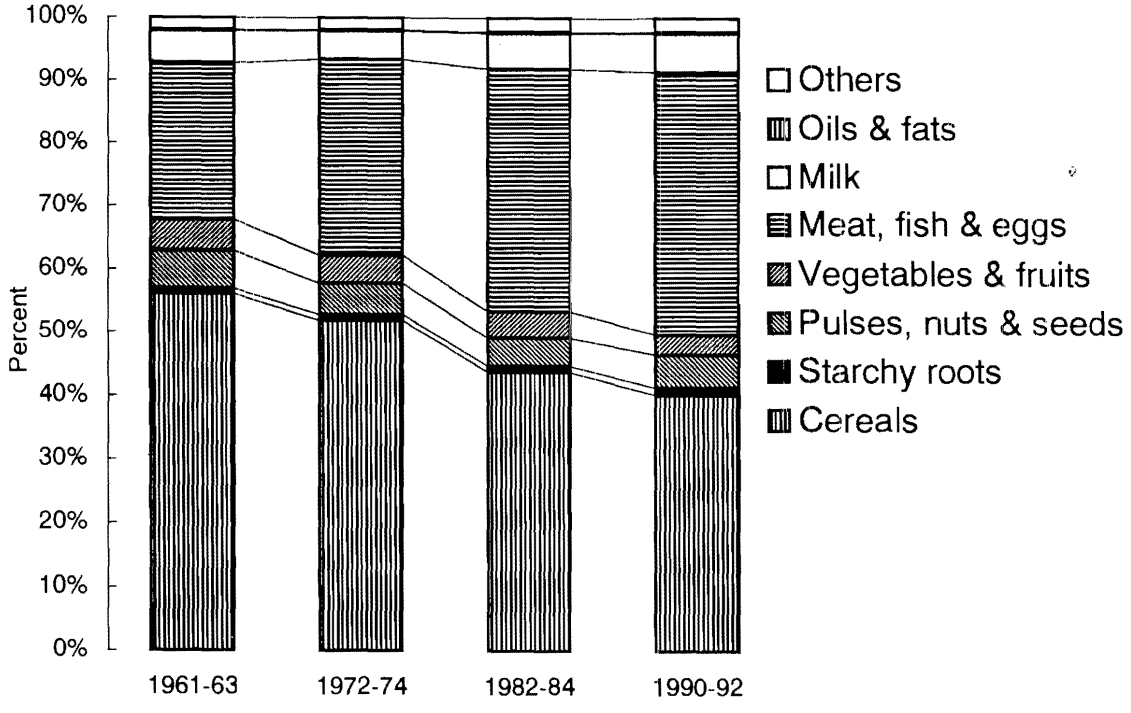

Figure 13. Changes in sources of protein in Malaysia, between 1960's and 1990's. Source: Plotted from data in FAO (1991); FAO unpublished (1994)

Analysing the percentage contribution of the three main nutrients carbohydrates, fat and protein to the total available energy over the past two decades, it can be seen that there was a definite decline in the proportion of energy from carbohydrates, while an increase in the percentage contribution of fat was observed (Table 11, Figure 14). These changes are particularly evident from the 1980's. No major change in the proportion of energy supplied by proteins was observed. However, there has been a definite shift towards an increased availability of animal protein, especially from fish, meat, milk and eggs.

These changes in food availability in Malaysia are consistent with the generally observed patterns for nations with increased national wealth. Using data from food balance sheets of 85 countries, Perisse *et al.* (1969) have shown that the general trends of national food consumption patterns is a function of income. With a rise in income, there is

Table 10a. Changes in sources of protein in Malaysia between 1960's and 1990's

	1961-63		*1964-66*		*1969-71*		*1972-74*		*1974-76*		*1976-78*	
	Calories	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*	*Calories*	*% total*
Cereals	26.4	56.1	26	54.2	26.7	53.6	27.3	51.9	27.3	49.6	27.3	46.8
Starchy roots	0.4	0.8	0.4	0.8	0.4	0.8	0.5	1.0	0.5	0.9	0.5	0.9
Sweeteners	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pulses	1.8	3.8	1.7	3.5	1.6	3.2	1.6	3.0	1.2	2.2	1.2	2.1
Nuts & oilseeds	1	2.1	1.	2.1	0.9	1.8	1	1.9	1	1.8	1.1	1.9
Vegetables	1.3	2.8	1.4	2.9	1.5	3.0	1.4	2.7	1.4	2.5	1.4	2.4
Fruit	1	2.1	0.9	1.9	0.9	1.8	0.9	1.7	0.9	1.6	0.9	1.5
Meat & offal	4.7	10.0	5.3	11.0	5.7	11.4	6.3	12.0	7.4	13.5	7.8	13.4
Eggs	1.1	2.3	1.5	3.1	1.7	3.4	2.2	4.2	2.6	4.7	2.6	4.5
Fish & seafood	6	12.7	6.2	12.9	7.1	14.3	7.9	15.0	9.2	16.7	11.4	19.6
Milk (ex butter)	2.4	5.1	2.4	5.0	2.2	4.4	2.4	4.6	2.6	4.7	3.1	5.3
Vegetable oils	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Animal fats	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Spices	0.5	1.1	0.6	1.3	0.6	1.2	0.6	1.1	0.5	0.9	0.5	0.9
Stimulants	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.3
Alc. beverages	0.1	0.2	0.1	0.2	0	0.0	0.1	0.2	0.1	0.2	0.1	0.2
Miscellaneous	0.1	0.2	0.2	0.4	0.2	0.4	0.1	0.2	0	0.0	0.1	0.2
Total	47.1	100.0	48.0	100.0	49.8	100.0	52.6	100.0	55.0	100.0	58.3	100.0

Source: Tabulated from data in FAO (1991); FAO unpublished (1994)

Table 10b. Changes in sources of protein in Malaysia between 1960's and 1990's

	1979-81		*1982-84*		*1984-86*		*1986-88*		*1988-90*		*1990-92*	
	grams	*% of total*	*grams*	*% of total*	*grams*	*% of total*	*grams*	*% of total*	*grams*	*% of total*	*grams*	*% of total*
Cereals	26.6	45.2	25.8	43.7	24.6	42.3	22.5	40.9	22.4	40.1	23.3	40.2
Starchy roots	0.5	0.9	0.6	1.0	0.6	1.0	0.5	1.0	0.7	1.2	0.6	1.1
Sweeteners	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pulses	1.5	2.6	1.6	2.7	1.7	2.9	1.8	3.2	1.8	3.3	1.8	3.0
Nuts & oilseeds	1.1	1.9	1	1.7	1	1.7	1.1	2.1	1.1	2.0	1.2	2.1
Vegetables	1.5	2.6	1.5	2.5	1.5	2.6	0.9	1.7	1.0	1.8	1.1	1.9
Fruit	1	1.7	1	1.7	1	1.7	0.9	1.6	0.9	1.6	0.8	1.4
Meat & offal	8.2	13.9	8.9	15.1	10.2	17.5	11.3	20.5	12.2	21.9	13.2	22.8
Eggs	2.5	4.3	2.6	4.4	2.7	4.6	3.2	5.9	3.8	6.8	4.3	7.5
Fish & seafood	11.2	19.0	11.2	19.0	10.2	17.5	8.0	14.6	7.2	12.9	6.6	11.3
Milk (ex butter)	3.6	6.1	3.4	5.8	3.3	5.7	3.5	6.4	3.3	5.9	3.6	6.2
Vegetable oils	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Animal fats	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Spices	0.6	1.0	0.8	1.4	0.8	1.4	0.7	1.3	0.7	1.3	0.7	1.3
Stimulants	0.3	0.5	0.3	0.5	0.3	0.5	0.2	0.4	0.4	0.7	0.4	0.7
Alc. beverages	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Miscellaneous	0	0.0	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Total	58.8	100.0	59.0	100.0	58.2	100.0	55.1	100.0	55.7	100.0	58.1	100.0

Source: Tabulated from data in FAO (1991); FAO unpublished (1994)

Table 11a. Changes in composition of calories from protein, fat and carbohydrates in Malaysia, between 1960's and 1990's

	1961-63		*1964-66*		*1969-71*		*1972-74*		*1974-76*		*1976-78*	
	Calories	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*
Protein	188.4	8.1	191.2	8.2	199.2	8.1	209.6	8.3	220.8	8.7	232.8	8.9
Fat	417.6	17.9	426.6	18.4	450.0	18.4	474.3	18.9	512.1	20.1	559.8	21.4
Carbohydrates	1731.0	74.1	1702.2	73.4	1795.8	73.4	1832.1	72.8	1819.1	71.3	1817.4	69.6
Total calories	2337	100.0	2320	100.0	2445	100.0	2516	100.0	2552	100.0	2610	100.0

Table 11b. Changes in composition of calories from protein, fat and carbohydrates in Malaysia, between 1960's and 1990's

	1979-81		*1982-84*		*1984-86*		*1986-88*		*1988-90*		*1990-92*	
	Calories	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*	*Calories*	*%*
Protein	235.2	9.0	235.2	8.9	232.8	8.8	220.8	8.4	224	8.3	233.2	8.2
Fat	573.3	21.9	609.3	23.1	646.2	24.3	775.8	29.4	841.5	31.0	900.0	31.8
Carbohydrates	1814.5	69.2	1797.5	68.0	1776.0	66.9	1644.7	62.3	1645.2	60.7	1697.1	60.0
Total calories	2623	100.0	2642	100.0	2655	100.0	2641.3	100.0	2710.7	100.0	2830.3	100.0

Source. Tabulated from data in FAO (1991); FAO unpublished (1994)

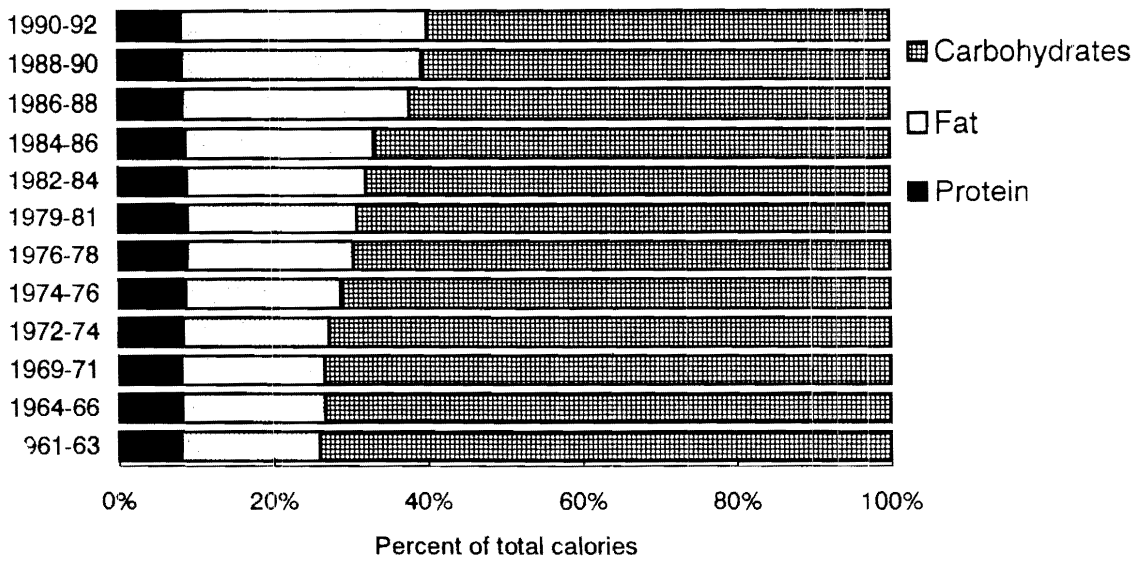

Figure 14. Changes in composition of calories from protein, fat and carbohydrates in Malaysia, between 1960's and 1990's.

Source: Plotted from data in FAO (1991); FAO unpublished (1994)

a steep rise in the consumption of separated fats and of unseparated edible animal fats. At the same time, there is a reduction in the consumption of unseparated vegetable fats. As a result of this, the proportion of energy derived from fats rises steeply with income. There is also a striking change in the type of carbohydrate foods consumed. With a rise in income, nations tend to consume less of starchy staples and there is a sharp rise in the consumption of sugar and sugar-sweetened foods. As a consequence, the proportion of energy supplied by carbohydrates declines as income rises.

NUTRITIONAL IMPLICATIONS

Two main types of data are presented to describe the nature and dimensions of nutritional problems in the country, namely selected mortality rates for various population groups and epidemiological data reported by various investigators.

Improvements in mortality data

Several *mortality rates* have often been used as proxy indicators of the nutritional situation in the country. Some of these data were compiled from various reports of the Department of Statistics to illustrate the improving nutrition situation in Malaysia.

Infant, toddler and maternal mortality rates in Peninsular Malaysia, compiled from various sources, are given in Figure 15 and Table 12 to illustrate the health and

Table 12. Maternal Mortality Rates in Peninsular Malaysia, 1957-1982

Year	*Maternal Mortality Rates (per 1,000 live births)*
1957	3.20*
1967	1.68*
1972	1.07
1974	0.96
1976	0.78
1977	0.79*
1978	0.84
1979	0.69
1980	0.63
1980	0.63
1981	0.59
1982	0.50
1985	0.37
1986	0.30
1987	0.28
1988	0.26
1989	0.20

Source: *Hamid Arshat *et al.*, 1984; others from Department of Statistics

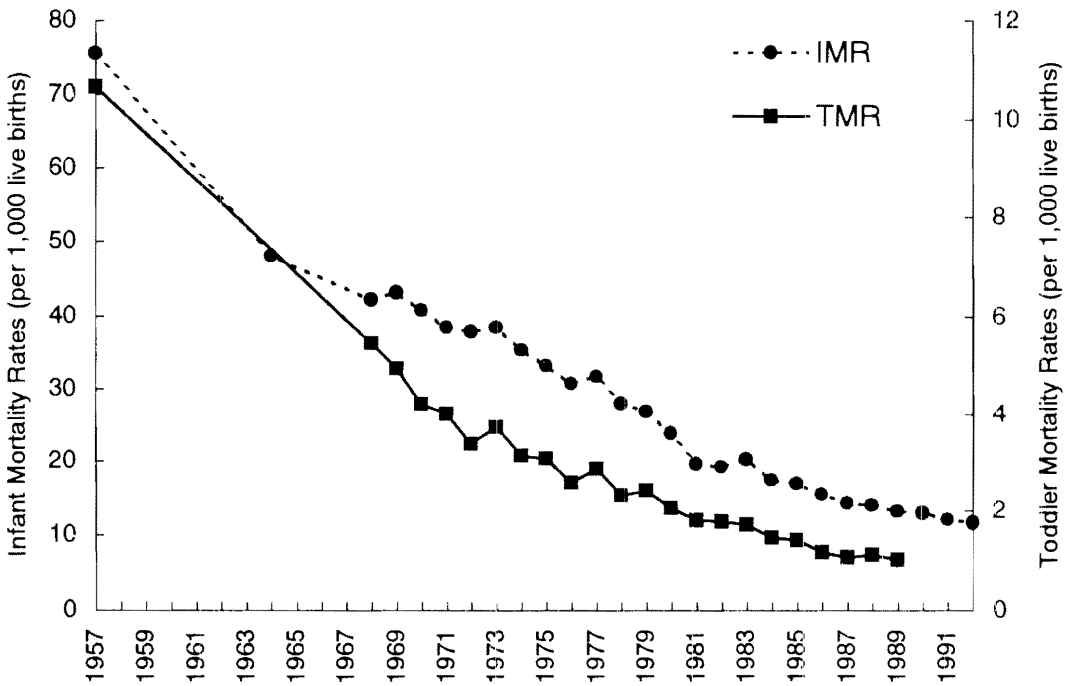

Figure 15. Infant and toddler mortality rates in Peninsular Malaysia, 1957 to 1992

Source: Plotted using data from reports by Department of Statistics.

nutritional status of these vulnerable groups of the population. It can be seen that there has been a dramatic decline in these rates since the country gained Independence in 1957. Infant mortality rates declined from 76 in 1957 to around 12 in 1992. Over the same period, toddler (1-4 years) mortality rates dropped from 10.7 to 1.0, while maternal mortality recorded a decline from 3.20 to 0.20.

However, as can be expected, there were considerable variations in the health status of communities in different parts of the country (Tee, 1993). The highest mortality rates were found in the states of Terengganu, Kelantan, Kedah, Perak and Pahang. Those states with better health status, as reflected by low mortality rates, were the Federal Territory, Selangor and Penang. Within each state, there were again wide variations in mortality rates in the different districts. For example, in Kelantan and Kedah, there were a few districts with infant mortality rates about twice that of the national average. At the same time, several districts in these states recorded death rates of infants at about the level of the national average.

Some selected statistics for recent years from Sabah and Sarawak are presented in Table 13. Although this information is less comprehensive than that for Peninsular Malaysia, and there is probably under-reporting of deaths in these two states, a general decline in mortality rates can be seen, particularly for infants and toddlers.

Table 13. Selected Mortality Rates for Sabah and Sarawak, 1980, 1985-1989

	Neonatal	*Infant*	*Toddler*	*Maternal*
SABAH				
1980	11.3	22.8	2.6	0.1
1985	11.6	17.6	2.0	0.21
1986	14.6	21.2	2.1	0.1
1987	14.2	20.8	2.1	0.14
1988	13.5	19.8	1.6	0.19
1989	11.9	17.6	1.6	0.25
SARAWAK				
1980	12.0	23.8	2.39	0.5
1985	7.5	11.3	0.9	0.1
1986	6.9	10.2	0.9	0.02
1987	6.6	9.1	0.5	*
1988	6.2	9.8	0.6	0.15
1989	6.8	10.5	0.8	0.12

*Only 2 maternal deaths registred.

Source: Vital Statistics, Department of Statistics, Sabah and Sarawak.

It is clear that although these indices do give an indication of the overall nutritional status of the country or state, they do not show the problems existing at the micro level. Thus, while the overall nutrition situation in the country has improved over the years, pockets of malnutrition exist in various parts of the country. An important task is to analyze the characteristics of districts with the highest rates of mortality, morbidity,

low birth weight and PEM, and to derive from this analysis information on action required to improve health and nutrition conditions in the areas of the country and in the population groups at highest risk (Tee and Cavalli-Sforza, 1993).

Nutrient deficiencies

As indicated above, while mortality data do give an indication of the overall nutritional status of the country or state, they do not show the problems existing at the micro level. Thus, while the overall nutrition situation in the country has improved over the years, recent studies have indicated 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 (Tee and Cavalli-Sforza, 1993).

The major nutrient deficiencies in the country are *protein-energy malnutrition* amongst children, *chronic energy deficiency* in adults, and deficiencies of several *micro-nutrients, namely iron, vitamin A and iodine.* Nutrition studies carried out in different parts of the country have shown that frank nutrient deficiencies are rare. Nevertheless, moderate undernutrition is widespread especially among rural under-served communities, and affects mainly young children and pregnant women. *Underweight* and *stunting* occur in significant proportions of pre-school and school children. A Nutrition Surveillance Programme conducted by the Ministry of Health, involving approximately 1.2 million children, found that in 7 states, in 1985-86, the proportion of children below 60% of the Harvard weight/age standard was only 1.1%; the prevalence of moderate underweight (between 60 and 79% of the standard), however, was 16%, below one year, 29% between 1 and 4 years, and 38% at 5-6 years. Besides this tendency of increasing rates of moderate undernutrition as age increases, considerable variation between states was seen.

Several studies on *anaemia in Malaysian children* were carried out since the 1950s. Results of large-scale surveys reported in the last 15 years show that the highest prevalences of anaemia are often found in the first 2 years of life, and range from 30 to 60% in Sarawak, from 15 - 30% in Sabah, and from 12 - 83% in Peninsular Malaysia. A decrease in prevalence has occurred between the 1950s and the 1980s. The main causes are considered to be inadequate supplementary feeding and poor weaning practices, determining lack of iron, protein and other nutrients. Intestinal helminthiases and malaria, in some communities, contribute to determine anaemia.

Anaemia in pregnancy had been recognized by early Malaysian investigators as a major cause of maternal mortality and one of the main complications of pregnancy. In the 1950s and 1960s, about 77% of pregnant women were found to be anaemic. Microcytosis, attributed to iron deficiency, was seen in 76% of cases, and macrocytosis, attributed to folic acid and vitamin B12 deficiency, in most of the remaining cases. Studies in the 1980s have found low levels of serum folate in approximately 60% of pregnant women and low levels of RBC folate in about 30% of them. Serum iron, serum ferritin and transferrin saturation were low in 50 - 60% of cases, serum protein in about 30% . The prevalence of anaemia ranged from 30 - 60% depending on the ethnic group.

Most studies were conducted on urban women. Information is needed on anaemia

in pregnancy in rural areas and on the relative importance of the main nutrient deficiencies in these areas. More data on the prevalence of anaemia could be obtained by compiling and analysing the results of Hb determinations conducted as a routine test in most antenatal clinics, ensuring standardisation of the laboratory methods used.

Vitamin A deficiency in Malaysia was first documented in the 1920s by an ophthalmologist who described cases of keratomalacia that he attributed to deficiency of fat and fat-soluble vitamins. In the 1970s and early 1980s, several rather comprehensive studies found approximately 10% of cases of xerophthalmia among primary school and pre-school children in two states of the Peninsula. In Sarawak, this rate ranged from 2 - 38% in children under 7 years, depending on the ethnic group. For all the Sarawak communities, there was an increasing prevalence with increasing age, peaking at 4-6 years. In the most recent series of studies, serum vitamin A levels below 20 _g/dl were found in about 10% of primary school and pre-school children. The sample size, however, was rather small.

Dietary studies in the early 1980s showed the consumption of both vitamin A-rich animal foods, and fruits and vegetables to be poor, and much lower than the average estimated from food balance sheets. It is therefore likely that, even though the number of cases of frank xerophthalmia found is small, subclinical vitamin A deficiency may affect a considerable proportion of the rural communities studied.

The importance of the problem of vitamin A deficiency has clearly been reduced over the years, since the 1950's, when it was the major single cause of blindness. No precise estimates of the magnitude of the problem are presently available. It is believed that there are probably very few cases of children with eye signs more advanced than conjunctival xerosis, and with serum vitamin A < 10 _g/ml. There are, however, many remote areas in the country where the vitamin A status is not known, including parts of Peninsular Malaysia, and the problem has been little studied among urban squatters. It is therefore necessary to conduct further studies in communities considered at greater risk of vitamin A deficiency because of poverty, characteristics of the diet, or a higher prevalence of PEM.

The problem of *endemic goitre* in Malaysia has been documented since the 1930's. Low levels of iodine in water and salt and low consumption of sea foods are considered the main determinants. Goitrogens contained in cassava, which is consumed in greater quantity by some hill tribes in Sarawak, when their supplies of rice are exhausted, may also play an important role in some population groups. Goitre is found more frequently in females.

A 1982 review of the various studies conducted in Sarawak since the 1950's shows that goitre is endemic in 12 of the state's 25 districts, mainly located in inland areas, with prevalence rates that vary considerably among different communities, mostly between 30 and 80% of the people examined. Few studies on endemic goitre in Sabah have been conducted, a recent one reporting high prevalence rates, related with the degree of remoteness of the areas studied. It was found that only 3% of the people used iodized salt.

In Peninsular Malaysia, the problem of endemic goitre is considered much less serious than in Eastern Malaysia although, in the absence of public health interventions, very high prevalence rates of goitre have been found in villages where the problem was recognized 50 years ago. The suspect that there may be many other foci of endemic goitre in inland areas of Peninsular Malaysia suggests the need for a systematic assessment of the prevalence of iodine deficiency also in this part of the country.

Non-communicable diseases related to lifestyle

As a result of the rapid pace in socio-economic development and increased affluence in Malaysia, there has been a definite change in the nutritional problems in the country. The population is now faced with the other facet of the malnutrition problem, namely chronic diseases associated with excessive consumption of various nutrients (e.g. fat) on the one hand and low levels of intake of other nutrients (e.g. complex carbohydrates and fibre) on the other, such as hypertension, coronary heart disease and certain types of cancers, as evident from mortality data and epidemiologic data.

Mortality data for Peninsular Malaysia have shown that deaths due to diseases of the circulatory system and neoplasms have been on the rise since the 1960's (Table 14 and Figure 16). On the other hand, deaths due to infectious and parasitic diseases, and conditions in the perinatal period reduced in number, reflecting the improved health care facilities in the country over the past three decades. Within the category of "diseases of the circulatory system" the two main causes of death are ischaemic heart disease, cerebrovascular disease and acute myocardial infarction. Since medically certified and inspected deaths amounted to only slightly over a third of all reported deaths in Peninsular Malaysia, the data should be used with caution.

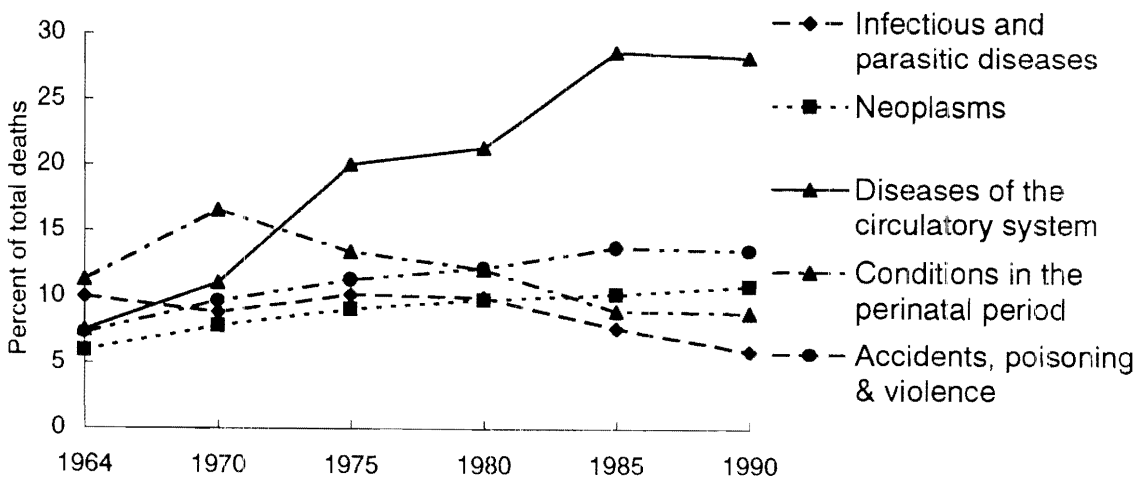

Figure 16. Leading causes of medically certified and inspected deaths in Peninsular Malaysia, 1965-1990

Source: Reports of the Statistics Department (1964, 1973, 1977, 1984, 1987, 1993)

Table 14. Causes of medically certified and inspected deaths in Peninsular Malaysia, 1965-1990

	Causes of death	*1965*		*1970*		*1975*		*1980*		*1985*		*1990*	
		Number	*% total*	*Number*	*% total*	*Number*	*% total*	*Number*	*% total*	*Number*	*% total*	*Number*	*% total*
1	Infectious and parasitic diseases	2286	10.0	1830	8.8	2366	10.1	2872	10.0	1991	7.6	2002	5.8
2	Neoplasms	1349	5.9	1621	7.8	2115	9.1	2810	9.8	2648	10.2	3714	10.8
3	Endocrine, nutritional & metabolic diseases & immunity diseases	169	0.7	238	1.2	334	1.4	486	1.7	482	1.9	764	2.2
4	Nutritional deficiencies	–	–	–	–	171	0.7	75	0.3	59	0.2	43	0.1
5	Diseases of the blood & blood-forming organs (anaemia)	234	1.0	253	1.2	212	0.9	165	0.6	95	0.4	97	0.3
6	Diseases of the nervous system (meningitis)	1004	4.4	1534	7.4	217	0.9	375	1.3	184	0.7	209	0.6
7	Diseases of the circulatory system	1711	7.5	2286	11.1	4672	20.0	6128	21.3	7429	28.5	9631	28.1
8	Diseases of the respiratory system	1530	6.7	1236	6.0	1493	6.4	1806	6.3	1002	3.8	1387	4.0
9	Diseases of the digestive system	1449	6.3	1055	5.1	521	2.2	641	2.2	403	1.5	481	1.4
10	Diseases of the genitourinary system	161	0.7	277	1.3	318	1.4	486	1.7	779	3.0	172	3.4
11	Complications of pregnancy, childbirth & the puerperium	174	0.8	154	0.7	93	0.4	128	0.4	68	0.3	70	0.2
12	Congenital anomalies	141	0.6	338	1.6	573	2.5	665	2.3	661	2.5	1112	3.2
13	Certain conditions originating in the perinatal period	2580	11.3	3426	16.6	3114	13.3	3481	12.1	2326	8.9	3021	8.8
14	Symptoms, signs & ill-defined conditions	6069	26.6	3130	15.1	2875	12.3	2978	10.3	2058	7.9	2312	6.7
15	All other diseases	2307	10.1	1302	6.3	1631	7.0	2209	7.7	2286	8.8	3650	10.6
16	Accidents, poisoning & violence	1660	7.3	2006	9.7	2634	11.3	3499	12.1	3558	13.7	4613	13.5
	Total	22824		20686		23339		28804		26029		34278	

Source: Tabulated from reports of the Department of Statistics (1964, 1973, 1977, 1984, 1987, 1993)

Examination of the official statistics of medically certified and inspected mortality in Peninsular Malaysia for 1970, 1980 and 1990 shows significant changes in the ranking of causes of death in the country for the three time periods (Table 15). In 1990, diseases of the circulatory system tops the list of ten leading causes of death in the country. Ranking third in the list is deaths due to neoplasms, and the two major cancer sites are (a) the digestive organs and peritoneum, and (b) respiratory and intrathoracic organs. These two categories together constitute close to 40% of all medically certified deaths. The increased ranking of these two conditions over the years is evident from the table.

Studies into these diet-related chronic diseases are relatively recent undertakings in the country. Studies into the relationship between diet and coronary heart disease (CHD) were carried out from the 1960's. Several studies on serum lipid levels of Malaysians have shown that hyperlipidemia was also a problem amongst the more

Table 15. Ranking of causes of medically certified and inspected deaths in Peninsular Malaysia, 1970-1990

Causes of death	*1990*		*1980*		*1970*	
	% total	Ranking	% total	Ranking	% total	Ranking
Diseases of the circulatory system	28.1	1	21.3	1	11.1	3
Accidents, poisoning & violence	13.5	2	12.1	2	9.7	4
Neoplasms	10.8	3	9.8	6	7.8	6
All other diseases	10.6	4	7.7	7	6.3	8
Certain conditions originating in the perinatal period	8.8	5	12.1	3	16.6	1
Symptoms, signs & ill-defined conditions	6.7	6	10.3	4	15.1	2
Infectious and parasitic diseases	5.8	7	10.0	5	8.8	5
Diseases of the respiratory system	4.0	8	6.3	8	6.0	9
Diseases of the genitourinary system	3.4	9	1.7	–	1.3	–
Congenital anomalies	3.2	10	2.3	9	1.6	–
Endocrine, nutritional & metabolic diseases & immunity diseases	2.2	–	1.7	–	1.2	–
Diseases of the digestive system	1.4	–	2.2	10	5.1	10
Diseases of the nervous system (meningitis)	0.6	–	1.3	–	7.4	7

Source: Tabulated from reports of the Department of Statistics (1973, 1984, 1993)

affluent segments of the population (e.g. Chong, 1961; Lau *et al.*, 1962; Chong *et al.*, 1971). In his review of serum cholesterol level and prevalence of hypercholesterolemia among various population groups in the country, Chong (1986) has shown that urban Malaysians were faced with greater risk to CHD.

Comparative studies of various coronary risk factors among aborigines in the deep jungle and those in the periurban and jungle-fringe revealed low levels of serum lipids and absence of CHD in the former group, while the latter tended to have higher serum cholesterol and blood pressure values (Burns-Cox *et al.*, 1972). A more recent study of these risk factors was reported for 406 male executives in two urban areas, Kuala Lumpur and Petaling Jaya (Teo *et al.*, 1988). Mean values of selected risk factors of the subjects (total cholesterol, triglycerides and fasting glucose levels) were found to increase with the older age groups. The prevalence of these risk factors was also reported to show a rising trend with age, with the exception of uric acid and cholesterol. Even in the younger age group (25-34 yeras), there was an appreciable prevalence of most of the risk factors studied. Examining the prevalence of the three major risk factors: hypertension, hypercholesterolemia and smoking (Figure 17), the investigators reported that 1.5% of the subjects had all three risk factors. Slightly more than half (51.5%) of the subjects had one or more of these three risk factors. The investigators noted that several of the risk factors studied were comparable with those reported for other more industrialised countries.

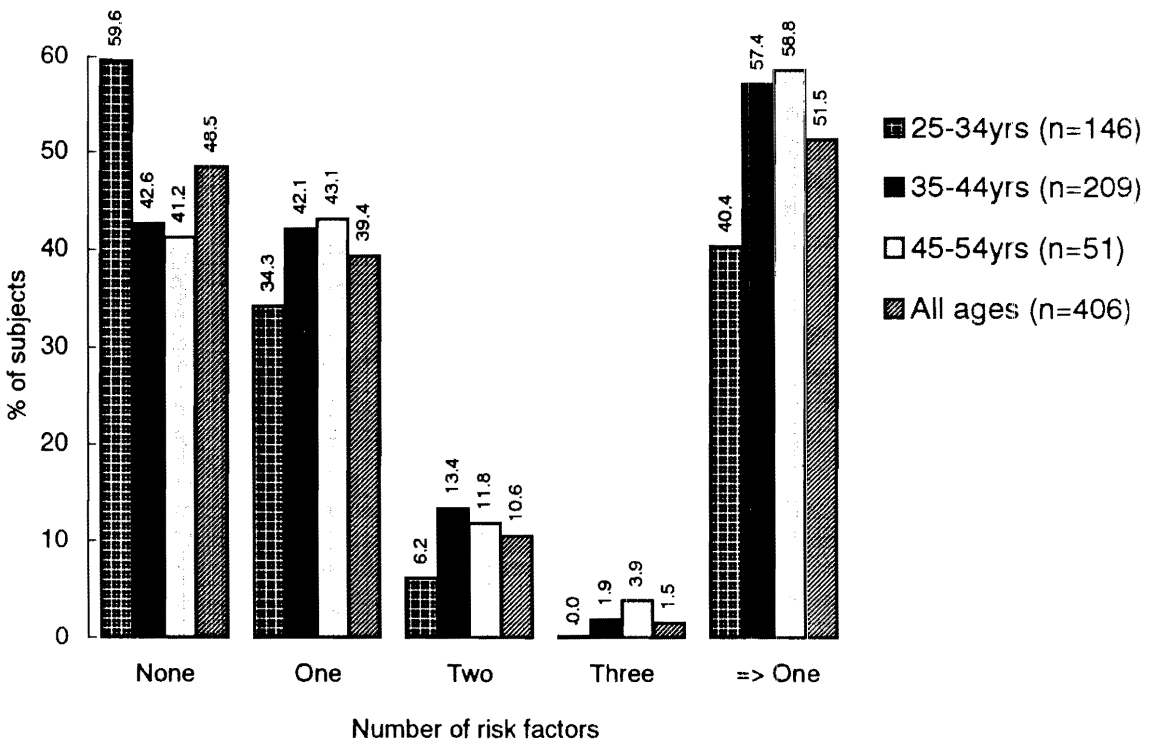

Figure 17. Prevalence of the three major coronary risk factors* among Malaysian male executives

Source: Teo *et al.* (1988)

* Hypertension, cholesterol > 250 mg/dl and smoking > 10 cigarettes/day.

A number of studies have reported the prevalence of overweight among Malaysians, most frequently based on the definition of body mass index (BMI) exceeding 25 kg/m^2. Malays living in poverty villages were found to have a low prevalence of overweight (Chong *et al.*, 1984). In this study, 5% of 522 men and 15% of 965 women aged 18 years and above were identified to be overweight. Among urban subjects, the few available studies showed averagely one quarter to one third of the men and women to be overweight (Jones, 1976; Teo, Chong and Zaini, 1988). A compilation of data of some 3,000 subjects obtained in urban areas in recent years showed that about 50% of males and 40% of females can be classified as normal in terms of having a BMI between 20 and 25; about 22% are *underweight* (BMI <20), and about 28% of men and 34% of women are *overweight* (BMI >25) (Ismail and Zawiah, 1991). Mean body weight is higher than the Malaysian reference value of 55 kg for males and 50 kg for females, and increases with age, in all age groups, except the elderly, and in all three main ethnic groups. Changing food habits and sedentary lifestyles were said to be responsible for the increasing prevalence of overweight in the urban middle-income population.

POLICIES, PROGRAMMES AND INTERVENTIONS

Current programmes and interventions

Various programmes and interventions have been carried out by numerous organizations and agencies to ameliorate the nutritional problems seen in the country (Tee and Cavalli-Sfroza, 1993).

Four major *programmes of the Ministry of Health Malaysia* have been implemented to combat the undernutrition problems in the country. Recognizing that malnutrition and related public health problems were best tackled in the form of coordinated long-term action programmes, the *Applied Nutrition Programme* (ANP) was first launched in the country in 1969 and later renamed *Applied Food and Nutrition Programme* (AFNP) and its implementation expanded to several states with high toddler mortality rates. By the end of 1974, AFNP was implemented in nine districts in Selangor, and by 1980, it was expanded to 43 selected districts in Peninsular Malaysia. It was further expanded to Sabah and Sarawak in the Fifth Malaysia Plan period (1985-1990).

In a review of the strategies for poverty eradication as indicated in the New Economic Policy of the Malaysian Government, it was found that there still existed very poor families living in the rural areas even though the rate of poverty in the country has been reduced significantly since 1970. Thus, in 1989 a comprehensive programme for the *development of "the very poor"* was launched, and the role of the Ministry of Health was to ensure that the health needs of these families were identified and fulfilled. The essential component of the programme was to make visits to the poor families to establish rapport between health staff and the families, and motivate the family members to use the nearest health facility. Basic health and nutrition education were also given, and food supplements provided to malnourished children in the poor families.

Another strategy adopted by the Ministry of Health is the provision of *supplementary feeding* in the form of instant full cream milk powder to selected deserving children (aged 6 months to 7 years), pregnant women, lactating mothers and school

children. The recipients are selected based on a set of criteria, including nutritional status. Eligible beneficiaries were given 1 kg per person per month for three consecutive months.

Data from the National Nutrition Surveillance System implemented from 1983 to 1986 by the Ministry of Health showed that some 20% of children under 7 years of age were moderately to severely malnourished. In order to provide immediate assistance to these children, the *rehabilitation programme for malnourished children* was implemented. Starting from 1989, the programme was expected to rehabilitate some 12,000 malnourished children by the provision of several essential food items. The food aid was considered a form of treatment while other medium and long term strategies are being implemented including immunisation, health and nutrition education, treatment of diseases and close growth monitoring.

Programmes of the Ministry of Agriculture deal mainly with food commodities be they crops, livestock or fish. Activities are focussed on smallholders to improve food production through improved agricultural services such as irrigation and drainage, agricultural inputs, credit, marketing, and other activities. Such services enable the smallholders to increase food production and improve their income. An important programme implemented by the Ministry since 1968 is the *Farm Family Development Programme* (FFD). The programme aims to improve the quality of life of farm families through balanced food consumption, diversified diet and sanitary food preparation. Other activities in the programme include developing active Women Extension Groups in the rural society socio-economic development and to promote and training farm women in agro-based economic activities. The FFD programme will be given further emphasis in the Sixth Malaysian Plan period.

Various health and nutrition programmes have been implemented by the *Ministry of Education* for improving the nutritional status of school children. The *School Health Programme* is an integrated programme designed to protect, promote and maintain optimum health of pupils and school personnel, promote healthy school living and develop desirable knowledge, attitudes and practices pertaining to health. *Health education* is recognized as a fundamental mean by which the individual and the community can improve health and nutrition practices. In the Malaysian primary school syllabus, health education is being integrated in various subjects such as *"man and his environment"*, moral education, religious education, etc. In secondary schools, health education is integrated with physical education and is now known as Physical and Health Education.

Two feeding programmes have been implemented by the Ministry of Education to improve the nutrient intake of needy school children. The first is the *school supplementary feeding programme* which provides a balanced meal during the mid-morning or mid-afternoon break. The programme also aims at creating opportunities for formal/informal nutrition and health education to the children as well as providing informal community education on health and nutrition. The Programme currently benefits more than half million primary school children mainly from the lower socio-economic group. The *school milk programme* is the second feeding programme implemented by the Ministry to improve the nutritional status of school children. From 1985, the Programme covers the entire country except Sabah which has its own milk programme under the Sabah Foundation

Funds.

In an effort to ensure that foods sold in school canteens are safe and of certain nutritional quality, the Ministry of Education and the Ministry of Health jointly developed and implemented the *"school canteen guideline"*. School canteens are recognized as important avenues for the provision of nutritious meals to children as well as for inculcating good food habits among these young population groups at a very impressionable age.

Several programmes and activities of the *Community Development (KEMAS) Division of the Ministry of Rural Development* have contributed to the nutritional improvement of communities in the country. One early activity was the implementation of a nationwide programme on nutrition education for rural women through its *Home Economics Programme* since 1963. In 1970, the *pre-school guidance programme (TABIKA)* for children between the ages of 4 to 6 years was implemented to uplift the health and nutritional status of rural children who were far behind that of the urban children. A food supplement is also given to the children at the TABIKA to increase their nutrient intake. With the introduction of the programme for the eradication of "the very poor" in 1990, the Government further intervened by providing essential food items through the TABIKA or the nurseries for children below 4 years of age. For those children not covered by these two activities, food was provided through the *"community kitchen" project.*

National Plan of Action on Nutrition

Malaysia participated in the International Conference on Nutrition jointly organised by the FAO and WHO in December 1992. A country paper was prepared for the Conference, describing the nature and dimensions of nutrition and diet-related problems in the country, providing a description and analysis of factors affecting the nutritional status, and highlighting the current policies, programmes and interventions carried out to overcome the nutritional problems (Tee and Cavalli-Sforza, 1993). As a follow-up to the Conference, a National Coordinating Committee on Nutrition was formed and headed by the Divisin of Primary Health Care and Family Health, Ministry of Health Malaysia. The Committee comprised representatives from some 20 departments and agencies related directly or indirectly to the promotion of the nutritional wellbeing of Malaysians. Through this inter-sectoral collaborative effort, a National Plan of Action on Nutrition (NPAN) for Malaysia is being drafted. The draft NPAN shall be discussed in a workshop to be held from 21-23 December 1994.

AGRICULTURAL POLICIES AND FOOD SUPPLIES

Background of Malaysian agriculture

In 1950, agriculture accounted for about 59% of the total national output and it declined to about 32% in 1960 and further declined to 22.8% in 1980 and 18.7% in 1990 (Figure 18). The share of agriculture in total export earnings has likewise declined from 52.0% in 1960 to 43% in 1980 and 23.3% in 1990. These trends clearly indicate the

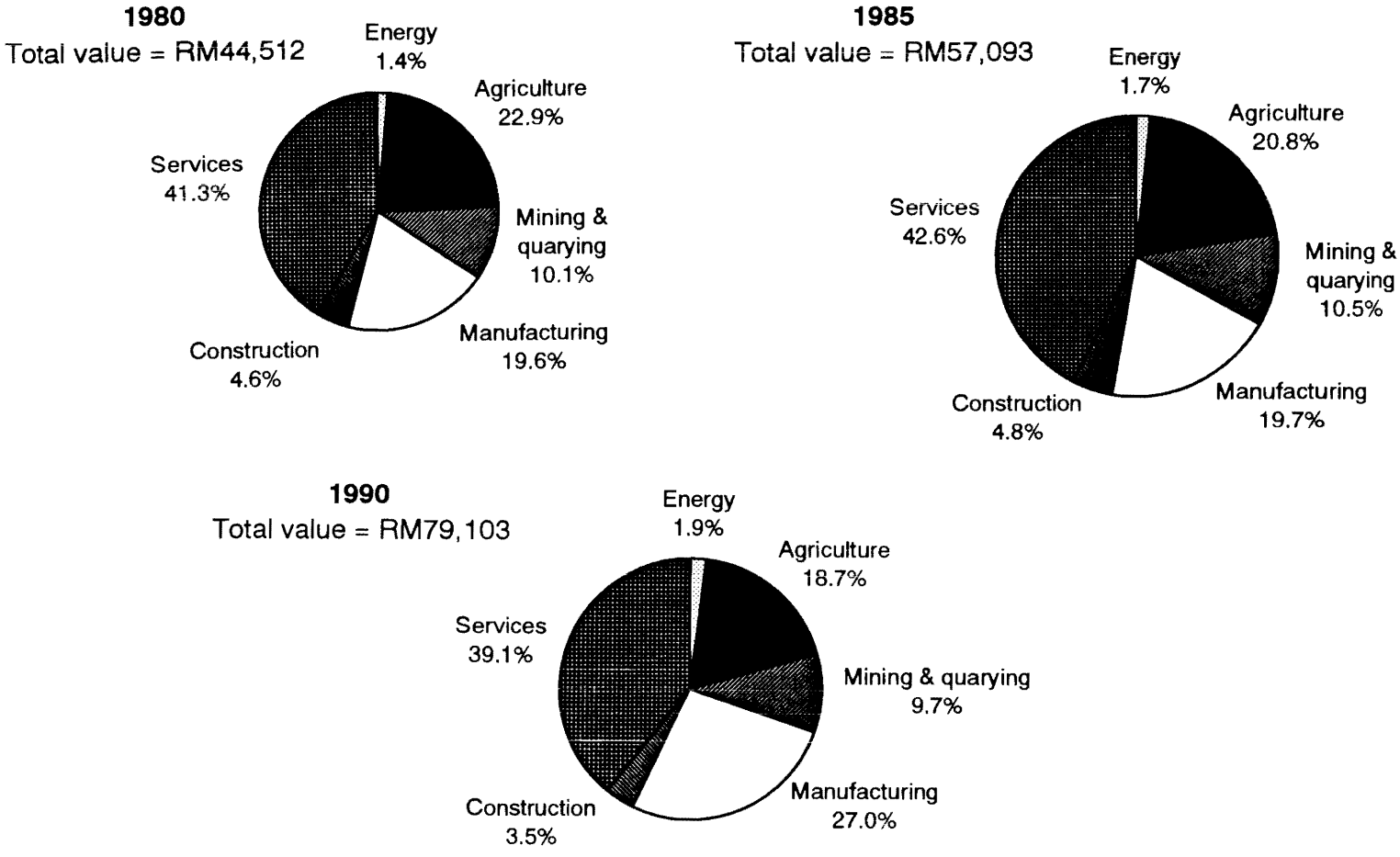

Figure 18. Composition of GDP by kind of economic activity (1980-1990) (RM million)

Source: Government of Malaysia (1986, 1991)

declining role of agriculture, whose position as the engine of growth has effectively been taken over by the manufacturing sector particularly from 1987. While the lower growth of the agricultural sector relative to the other sectors and as such the further reduction in its share can be taken as expected over time, certain constraints found in the agriculture sector have given rise to concern about its capacity and resilience in the future. The situation which was realized in the late 1970's and early 1980's had led to the idea of evolving an Agricultural Policy to formulate steps and measures to sustain the rate of growth of agriculture. Hence, the National Agriculture Policy (NAP) introduced in 1984 adopted the strategy of modernizing and revitalizing the agriculture sector as its main theme (Mohd Ibrahim, 1993).

Food production policy

Although no specific "food policy" has been formulated for the country, various policy statements in the National Agricultural Policy (NAP) indicate that Malaysia does place emphasis on the production of several essential food items, especially as sources of protein and calories. The basis for the production of these foods is, however, on several other grounds especially as sources of income, to meet increasing demands and in response to government's deliberate policies (for rice especially), besides their economic viabilities. The thrust of the present NAP is to increase agricultural productivity, efficiency and competitiveness in the development of new resources as well as in the fuller utilization of existing resources.

The nation does not possess a comparative advantage in the production of food items like beef and mutton but excels in others like poultry, eggs and pork. Thus, bearing in mind the resource cost to the economy and the likely effect on prices and budget, only some levels of production will be pursued for certain food items. The country would thus have to rely on imports to fulfill her food needs. Gross food import of the country was around RM2.5 billion to RM3.0 billion from 1981-1987. However, with the increasing level of exports, the net food import bill declined from RM1.5 billion in 1981 to about RM0.5 billion in 1987 (Mohd Ibrahim, 1993).

Since Malaysia adopts a liberal foreign exchange policy and trade regime, food is imported quite freely and import tariffs whenever applied are not punitive. Thus, even though it is not able to produce all the food it needs, the purchasing power accrued from surpluses of other sector of exports enabled it to import most of the food needed by the population. Hence, Malaysia does not face any major food supply crisis. This, however, should not be interpreted to mean that Malaysia intends to continue relying on imports for its food supply. All efforts are being geared to achieve a higher level of food self-sufficiency but as mentioned earlier, emphasis will only be given on those crops that are both technically and economically viable to be produced in the country.

Food-price based indicator

Food prices in Malaysia generally do not suffer great fluctuations. The price of rice is strictly controlled and its availability continuously ensured. Similarly, the prices of

other essential food items are also being regulated and to certain extent strictly enforced. The price of fish and vegetables, however, do show considerable variations due to seasonal production fluctuations, as can be seen from an analysis of the consumer price index (CPI) for Peninsular Malaysia between 1981 and 1990.

Following the preliminary results of the Household Expenditure Survey 1990, there was a revision of the CPI with a new base year of 1990 and new weights. The weightage for food has been reduced from 36.9% to 33.7%. This change is felt to be more consistent with the increase in the level of development and income in the economy. Within the food sub-index, the weightage for food at home was reduced to 27.0% from 31.4%, while that for food-away-from-home increased to 6.7%. This change is more reflective of the changing lifestyles of Malaysians who are dining out more.

Food prices and consumer spending behaviour on foods are being constantly monitored by the government to ensure food price stability and to check the inflationary trends. The CPI for 1987-1992 are tabulated in Table 16. A high increase in food index can be seen for 1992, compared with the previous year. With the food index, the sub-index for fish and vegetables and fruits showed greater increases compared with other foods. These increases may be attributed to reduced supplies as a result of poor weather conditions and other difficulties in increasing production. Particularly for fruits and vegetables, the increase in price need to be checked as these foods are important sources of important nutrients to the communities.

Supporting infrastructure/incentives

To encourage food production, various forms of government support services and incentives especially in the fields of research and development, extension services, the provision of infrastructural facilities such as farm roads, drainage and irrigation, storage, grading and marketing network and other post-harvest pre-requisites are provided. Incentives, generally in the form of tax incentives, are also being reviewed to make them more attractive. In an effort to raise hygienic standard of slaughtering and to control environmental pollution, facilities such as abattoirs have been provided and improved. Quarantine and diagnostic facilities are being given due emphasis to ensure the supply of safe and high quality food for the public. Some subsidies are also provided for the food sub-sector (Mohd Ibrahim, 1993).

The new National Agricultural Policy (1992-2010)

The government recently reviewed the National Agricultural Policy (NAP), in view of the overall changes that have taken place in the economy and developments in international trade. It has been shown that the agricultural sector was facing several emerging and persistent constraints that hinder its present and future development. The revised NAP, which is to cover the period 1992 to 2010, is founded on the vision for the creation of a market-led, commercialised, efficient, competitive and dynamic agricultural sector in the context of sustainable development (Ministry of Agriculture, 1993). The structural transformation and rationalisation of activities in the sub-sector will be the

Table 16. Consumer price index for Malaysia (for sub-groups of foods)

Year	*Total Food*	*Food at home*										*Food away from home*
		Sub-total	*Rice, bread & other cereals*	*Meat*	*Fish*	*Milk and eggs*	*Oils and fats*	*Fruits & vegetables*	*Sugar*	*Coffee and tea*	*Other foods*	
Weight	33.7	27.0	6.2	4.2	5.2	2.4	0.8	5.2	0.8	0.9	1.3	6.7
1987	89.2	88.5	94.1	89.9	83.4	75.5	88.5	89.8	91.4	93.9	90.3	92.5
1988	92.5	92.5	95.0	94.8	89.2	83.2	99.2	93.1	92.1	94.7	95.5	92.6
1989	95.9	96.3	97.8	100.2	93.6	93.5	100.6	93.5	93.2	98.2	100.6	94.3
1991	104.8	105.2	100.2	99.6	112.6	100.8	106.0	110.8	100.6	101.2	107.9	103.4
1992	111.7	112.6	101.1	105.4	129.8	101.4	110.4	124.3	100.6	102.4	111.4	107.9

(1990 = 100)

Source: Department of Statistics (1993)

main mechanisms for change. The process of change will allow it to contribute to and benefit from the growth and development of the economy as the latter moves to an industralised state.

The overriding objective of the NAP is the maximisation of income through optimal utilisation of resources. Its specific aims include the achievement of a balanced development between the agriculture and manufacturing sectors, enhancement of the integration of the sector with the rest of the economy and in particular, the manufacturing sector and the achievement of a higher level and greater depth of food industry development. Agricultural development efforts will be implemented on the basis of sustainability.

The NAP highlighted the importance of several important food crops to household consumption, including rice, meat, fruits and vegetables. It recognised that ready local availability and accessibility are important to ensure food security for the communities. However, as the nation does not possess comparative advantage in the production of these foods, only some level of local production is proposed, bearing in mind resource cost to the economy, likely effects on prices and other implications on government budget. Hence the Policy will be aimed at the gradual and phased increase in the production levels of important food items. The NAP has outlined the food production plans or commodity policies for several major food items including rice, fisheries, livestock, vegetables and fruits, and several industrial crops.

CONCLUSIONS

Food consumption data at the individual and household levels when compared with recommended requirements provide information on the nutritional adequacy of intakes. Periodic assessment of the food consumption pattern of communities is important in providing information on the trends of health and nutritional status of populations and serve as predictors of probable nutritional problems. These data are important in guiding planners and policy makers involved in providing food supplies, including the agriculture and trade sectors. Food consumption surveys require the availability of a good organisational structure to provide logistic support for the collection as well as the analysis of large amounts of data. For the former, well-trained personnel are required whereas the latter requires the availability of a good food composition database and preferably a computer programme to calculate nutrient intake. We will continue to work towards building up the required capabilities.

In order to obtain updated data on the nutritional problems in the country, extensive studies of various functional groups are being carried out from 1992 to 1995 in a joint programme of the Institute for Medical Research and the Universiti Pertanian Malaysia. The nutritional status of various agricultural groups have been studied including padi farmers, coconut growers, rubber small holders, fishermen and estate workers. Data on various urban groups will be collected in the coming year. In additional to the various nutritional status parameters, data on household food consumption patterns are also being collected. In the absence of a national food consumption survey, these data shall serve as important sources of information on the food consumption

patterns of various communities.

The country will continue to advance rapidly into the year 2000 and beyond. The nutritionist will be faced with numerous issues and challenges. The nutritionist will have to be equipped to face these challenges, in order to contribute towards safegurading the health of the population of a nation that is rapidly developing.

One of these challenges will be the continuous change in the dietary habits and patterns of communities, as a part of the changing lifestyle. The change towards an "affluent" diet of the developed industralised countries has been associated with an increased prevalence of diet-related chronic diseases such as obesity, diabetes mellitus, cardiovascular diseases and cancers. Such a diet is characterised by an excess of energy-dense foods rich in fat and free sugars, but a deficiency of complex carbohydrate foods (the main source of dietary fibre). The challenge to nutritionists and other health workers is to ensure communities maintain the traditional Asian diet which is balanced and with more variety.

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