

FAO - NUTRITION COUNTRY PROFILES

VANUATU



FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

Note for the reader

The objective of the Nutrition Country Profiles (NCP) is to provide concise analytical summaries describing the food and nutrition situation in individual countries with background statistics on food-related factors. The profiles present consistent and comparable statistics in a standard format. This pre-defined format combines a set of graphics, tables and maps each supported by a short explanatory text. Information regarding the agricultural production, demography and socio-economic level of the country are also presented.

In general, data presented in the NCP are derived from national sources as well as from international databases (FAO, WHO...).

Technical notes giving detailed information on the definition and use of the indicators provided in the profile can be obtained from ESNA upon request. An information note describing the objectives of the NCP is also available.

Useful suggestions or observations to improve the quality of this product are welcome.

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- General Map of Vanuatu

Graphs, tables and maps can be visualised by clicking on the words in bold and underline, only in the “Full profile” pdf file.

SUMMARY

Vanuatu is situated in the south west Pacific Ocean. While the rural population follows a predominantly subsistence lifestyle, the urban population has adopted a more westernised lifestyle. Vanuatu's traditional staple foods are root crops, such as yam and taro, although starchy fruits such as plantain and breadfruit are also seasonally important. The consumption of traditional foods was highest in the rural and lowest in the urban areas. Consumption of imports such as rice, fat/oils, canned and fresh meat/fish, milk and bread was highest in the urban and lowest in the rural areas. The rise in non-communicable diseases has been attributed, in part, to this transition away from traditional foods in favour of imported ones. This also has an impact on agricultural production, food security and self-sufficiency in food production (Carlot-Tary et al., 2000).

When comparing the results of the 1983 and 1996 National Nutrition Survey, the nutritional status of children has improved over the years, but children in the second year of life are still at the greatest risk of nutritional insufficiency. In 1983, there was a high prevalence of underweight among children under five years but by 1996, it dropped to a medium prevalence range (**Table 5a**). In 1983, children in their second year of life had a very high prevalence of underweight, but in 1996, it dropped to a medium prevalence. The number of stunted children under five years increased from a low prevalence in 1983 to a medium prevalence in 1996. Children in their second year of life were the most vulnerable with a high prevalence of stunting found in both studies. Wasting had a medium prevalence, reported in 1996, for all age groups under five years, but again the highest prevalence was among children in their second year of life. Regional differences are difficult to determine, as all studies investigating nutritional status in Vanuatu have involved small sample sizes (Hung, 1983; Carlot-Tary et al., 1996).

Infant feeding practices immediately after birth are encouraging with almost all mothers breast-feeding their babies within the first day of birth. There are no significant differences between urban and rural practices. The length of breast-feeding and abrupt weaning practices however, are of concern, with one-quarter of infants under two months of age receiving complementary foods. The high prevalence of stunting in the second year of life may be attributed to these practices (Carlot-Tary et al., 1996).

Adult malnutrition is in the form of over nutrition, with an increasing prevalence of overweight, obesity, type II diabetes and cardiovascular diseases. In 1996, one-third of the urban and rural women (15 to 49 years) surveyed were either overweight or obese, and more than half of females in the 40 to 49 year age group were overweight or obese (**Table 5b**). The 1998 survey results showed that the prevalence of overweight and obesity increased to 52% among women older than 20 years (Carlot-Tary et al., 1996; 2000).

Cardiovascular diseases have been the leading cause of mortality for the past decade. Hypertension and diabetes are also of concern. Much effort is recommended to implement health awareness programmes to inform the population of these diseases and how to manage or control them.

Other than iron deficiency anaemia, very little has been studied regarding micronutrient deficiencies... In 1991, vitamin A deficiency was investigated and no clinical cases of xerophthalmia were reported. Iodine deficiency disease has not been investigated, although some evidence of goitre exists, and even cretinism, in islands with active volcanoes. Iron deficiency anaemia is well documented, and appears to be decreasing since the introduction of ventilated improved pit toilets and a reduction in malaria incidence. In 1983, the majority of pregnant and lactating women were anaemic but by 1996, the prevalence had reduced to just over half (**Table 6**). Still, more research and awareness programmes need to be implemented to provide a better analysis of Vanuatu's health status and to encourage a healthy lifestyle, especially in the urban community (Hung, 1983; Carlot-Tary et al., 1996).

TABLE 1: GENERAL STATISTICS OF VANUATU

Last updated: 07/07/2003

Indicator (\$)	Year	Unit	Indicator (\$)	Year	Unit		
A. Land in use for agriculture			G. Average Food Supply				
1. Agricultural land	2000	ha per person	0.736				
2. Arable and permanent crop land	2000	ha per person	0.609				
B. Livestock			1. Dietary Energy Supply (DES) 1998-2000 kcal/caput/day 2757				
1. Cattle	1998-2000	thousands	151	<p>Percentage of DES by major food groups</p> <ul style="list-style-type: none"> Cereals (excl. beer): 25.5% Starchy roots: 28.1% Pulses, nuts, oilcrops: 16.7% Meat & offals: 8.8% Fruits & Vegetables: 6.1% Sweeteners: 4.6% Vegetable oils: 2.0% Animal Fats: 1.5% Fish & seafood: 1.5% Milk & Eggs: 1.5% <p>Note: Value not indicated if below 1%</p>			
2. Sheep & goats	1998-2000	thousands	12				
3. Pigs	1998-2000	thousands	62				
4. Chickens	1998-2000	millions	0				
C. Population							
1. Total population	2000	thousands	190				
2. 0-4 years	2000	% of total pop.	15.2				
3. 5-14 years	2000	% of total pop.	26.8				
4. 15-24 years	2000	% of total pop.	19.3				
5. >= 60 years	2000	% of total pop.	4.9				
6. Rural population	2000	% of total pop.	80.0				
7. Annual population growth rate, Total	2000-2005	% of total pop.	2.4				
8. Annual population growth rate, Rural	2000-2005	% of rural pop.	1.9				
9. Projected total population in 2030	2030	thousands	342				
10. Agricultural population	2000	% of total pop.	NA				
11. Population density	2000	pop. per km ²	16.2				
D. Level of Development							
1. GNP per capita, Atlas Method	1998	current US\$	1 260				
2. Human Development Index rating (new)	1999	min[0] - max[1]	0.719				
3. Incidence of poverty, Total	NA	% of population	NA				
4. Incidence of poverty, Rural	NA	% of population	NA				
5. Life expectancy at birth (both sexes)	2000-2005	years	68.8				
6. Under-five mortality rate	2000	per 1,000 live births	44				
E. Food Trade							
1. Food Imports (US \$)	1998-2000	% of total imports	15.5				
2. Food Exports (US \$)	1998-2000	% of total exports	75.5				
3. Cereal Food Aid (100 t)	1998-2000	% of cereals imports	0.0				
F. Indices of Food Production							
1. Food Production Index	1998-2000	1989-91=100	118.4				
2. Food Production Index Per Capita	1998-2000	1989-91=100	93.5				
			H. Food Inadequacy				
			1. Total population "undernourished"	1997-99	millions	NA	
			2. % population "undernourished"	1997-99	% of total pop.	NA	
			% Energy from: 2. Protein 1998-2000 % of total energy 8.9 3. Fat 1998-2000 % of total energy 27.6 4. Proteins 1998-2000 g/caput/day 60 5. Vegetable products 1998-2000 % of total proteins 65.7 6. Animal products 1998-2000 % of total proteins 34.3				
			NA Data not determined. § see References for data sources used See Technical Notes for definitions used.				

VANUATU

I. OVERVIEW

1. Geography

The archipelago of Vanuatu is situated in the south west Pacific Ocean approximately 2300 km off the east coast of Australia, between New Caledonia, the Solomon Islands and Fiji. It is comprised of some 80 islands and islets extending over 800 km. The total land mass area measures 12 189 km², with an exclusive marine economic zone of 71 000 km². The largest two islands are Espiritu Santo (4248 km²) and Malekula (2053 km²) (ADB, 1996). The administrative capital and commercial centre is Port Vila, located on Efate. The majority of the islands of Vanuatu are mountainous due to their volcanic origin, and there are five active volcanoes. The country is divided into six administrative provinces, based on geographical localities: from north to south, these are Torba, Sanma, Penama, Malampa, Shefa and Tafea (**General map**).

The climate is tropical, with a regularly warm and wet equatorial climate. In Port Vila, the average year round humidity is 83% and the rainfall is 2300 mm. Cyclones occur regularly in Vanuatu (November-April), with severe ones affecting parts of the country every three to five years (NSO, 2001).

2. Population

In 2000, Vanuatu's population was estimated to be 190 000, the population grew at an annual rate of 2.4% and is estimated to reach 342 000 inhabitants by the year 2030. The under five mortality rate in 2001 was of 42 per 1000 live births and the life expectancy at birth from 1995–2000 was of 68.8 years. The infant mortality rate was 34 per 1000 live births in 2000 (UNICEF, 2003).

From 1996 to 1999, the number of people living in the urban municipalities of Port Vila and Luganville on Santo Island increased from 19% to 22% of the total population. The growth rates of these two urban areas are significantly higher than the national growth rate. Population density in regions such as Paama and Shepherds has resulted in a negative growth of -0.6% and -1.1% as people migrate from these areas to Port Vila. This accounts for the difference between national and urban population figures. Espiritu Santo has the lowest population density, despite the presence of the municipality of Luganville. The population of Middle Bush Santo in Espiritu Santo has not been visited by health teams because it is so remote (NSO, 2001).

The proportion of children under 14 years is very high (42%) and only 19% of people are between the ages of 15 to 24 years. Five percent of the population is older than 60 years (UN, 2001).

As for ethnicity, 99% of the population are Ni-Vanuatu (Melanesian race) and the remaining 1% is made up of different ethnic groups (Vietnamese, Chinese, European, Micronesian, Polynesian, Part Ni-Vanuatu and other Melanesians). There are three officially recognised languages (English, French and Bislama; a mixture of Pidgin English and French).

There are also 110 regional languages, the majority of which have little similarity to the other (Van Trease, 1987).

The urban population has adopted a more westernised lifestyle and the rural population follows a predominantly subsistence existence, which is scattered throughout the island group.

3. Level of development: poverty, education and health

Urban poverty is linked to land ownership. The majority of the migrants to the capital live in squatter or shanty settlements because they do not have rights to the land¹ and they do not have a sufficient income to lease land. In the rural areas, where more than 80% of the population live, material wealth is negligible, but due to land ownership, few families are unable to provide for themselves. There is a national minimum wage of 16 000 vatu/month (US\$125/month) set in 1995, which is a marked increase from the 7000 vatu/month (US\$55/month) set in 1985. In the 1996 National Nutrition Survey, 42% of mothers came from households where at least one adult was employed for a cash income. As expected, this was higher in urban areas (90 %) than in rural areas (36 %). In the majority of households (59 %), the husband was the main income earner. However, almost one in five mothers (18 %) interviewed were also employed (Carlot-Tary et al., 1996). The Gross National Product (GNP) per capita per year in Vanuatu was US\$1260 in 1998 (WB, 2001) and the Human Development Index was 0.719 in 1999 (UNDP, 1999) (**Table 1**).

In 1999, the census showed that 82% of the female population and 85% of the male population aged five and over were or had attended school. However, children in the rural villages had a sporadic attendance to school (NSO, 2000). The female literacy rate in 1995–1999 was only 60% (UNICEF, 2002).

In 1994, the Ministry of Health reported respiratory infection and skin diseases to be the leading cause of morbidity, followed by infectious/parasitic, malaria, eye/ear disease, and injuries (ADB, 1996). Between 1993 and 1994 reports of malaria and diarrhoea doubled as a cause of morbidity in children under four years. Cases of malaria rose from 6415 to 13 029 and cases of diarrhoea rose from 2753 to 5224. Neonatal conditions were the leading cause of death among children (53 %), then respiratory infections (15 %) and malnutrition (4 %) and malaria (4%) (ADB, 1996).

The improvement of the nutritional status of children under five years is likely to be the result of several health programmes implemented since the beginning of the 1980s. In 1982, two years after independence, the rural sanitation project started to build ventilated improved pit (VIP) toilets. Now, one hundred percent of the population has adequate sanitation facilities (UNICEF, 2003).

One hundred percent of EPI (expanded programme on immunization) vaccines were financed by the government in 2001. The percentages of children under one year immunized for TB, DPT, polio, measles and HepB3 were of 90%, 93%, 87%, 94% and 64%, respectively (UNICEF, 2003). Seventy eight percent of pregnant women were immunized against tetanus in 1997–1999 (UNICEF, 2002). The distribution of chloroquine tablets to antenatal women resulted in the proportion of low birth weight babies falling from 9% of all live hospital births in 1992 to 3% in 1996 (UNICEF, 2002). In Vanuatu, from 1995 to 2001, 85% of deliveries were assisted by skilled attendants (UNICEF, 2003).

¹ Only men with blood origins directly to the land can be land owners. Women and rural immigrants have no rights to the land.

4. Agricultural production, land use and food security

The National Statistics Office and the Reserve Bank estimated that agriculture accounted for 15% of GNP in 1996, despite the fact that 80% of the population was living a subsistent lifestyle (ADB, 1996). The main agricultural products in Vanuatu are copra, cocoa, coconut and beef. The total production of fruits in Vanuatu has reached 20 000 t/year in 2001, with banana production being 13 000 t/year. The production of coconut, which was 260 000 t/year from 1990–95 increased to 364 000 t/year in 2001. From 1990–98, the production of beef and veal increased by 30% and reached 4 million t/year in 2001 (FAOSTAT, 2002).

Agricultural land in 2000 was 0.736 ha per person and arable and permanent crop land was 0.609 ha per person (FAOSTAT, 2002) (**Table 1**). In the rural areas, the populations are skilled in traditional gardening and subsistence farming, plus, households have gardens which provide a wide range of traditional root, vegetable and fruit crops. In the 1996 National Nutrition Survey (NNS), 96% of 2122 mothers interviewed came from households with a garden (Carlot-Tary et al., 1996). Even in the urban households, 79% of mothers reported having a garden. In 1999, 93% of households had food gardens, both in the rural and urban areas. Sixty nine percent of household food gardens were purely for subsistence living, 23% were for both subsistence and for sale and under 1% of these food gardens were for sale purposes only (NSO, 2000). In Vila, these gardens were usually in back yards or in the peri-urban locations, such as Black Sands or Teouma. Every rural village and peri-urban area has chickens, and most households have at least one pig, since they are a traditional sign of affluence. Livestock are banned from the municipalities by law. It was estimated that between 1998–2000 there were 62 000 pigs in Vanuatu compared to 151 000 cattle which, unlike pigs, are mostly owned by larger plantations rather than subsistence farmers (NSO, 2000; FAOSTAT, 2002) (**Table 1**).

According to the 1999 census, in order to qualify as a cash crop, the household had to have at least 10 coconut trees, coffee or cocoa. Cava, on the other hand, is a cash crop even if the numbers of plants are under 10. The proportion of households that grew cash crops was 24%, 50%, 2% and 69% for cocoa, cava, coffee and coconuts, respectively (NSO, 2000).

5. Economy

Political instability since the early 1990s has led to a lack of confidence from overseas investors. Since 1996, there have been seven changes in government, one bloodless coup, and one national state of emergency, which was precipitated by riots on the streets of Port Vila after repeated reports of political corruption.

The export economy is driven by agriculture, with agricultural products dominating the narrow range of export commodities. In fact, between 1998 and 2000, 76% of total exports were food related (**Table 1**).

II. THE FOOD AND NUTRITION SITUATION

1. Trends in energy requirements and energy supplies

Per caput energy requirement in 1965 to 2000 remained stable at 2112 kcal/day and 2135 kcal/day and is expected to increase by only 57 kcal/day by 2030 (**Table 2**). In the year 2000 the energy requirement in rural areas was 2057 kcal/day and in urban areas it was 2152 kcal/day. Trends in energy requirements reflect the changes in population structure and in particular the urban-rural distribution. While in 1965 only 11% of the population lived in urban areas, the percentage of the urban population increased to 20% in 2000 and is expected to reach 37% in 2030 (**Table 2**). The total population increased from 75 000 in 1965 to 190 000 in 2000 and is expected to reach 342 000 in 2030. In 1965 and 2000, the dietary energy supply (DES) greatly exceeded energy requirements (FAOSTAT, 2002).

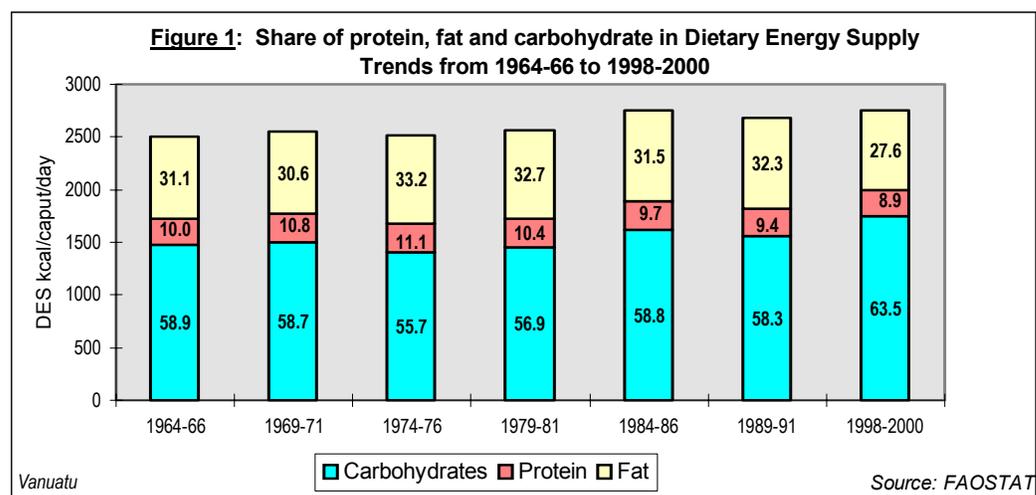
Table 2: Total population, urbanization, energy requirements and dietary energy supplies (DES) per person and per day in 1965, 2000 and 2030

Year	1965	2000	2030
Total population (<i>thousands</i>)	75	190	342
Percentage urban (%)	10.9	20.0	36.7
Per caput energy requirements (<i>kcal/day</i>)	2112	2135	2192
Per caput DES (<i>kcal/day</i>) *	2498	2757	—

Source: James & Schofield, 1990; FAOSTAT, 2002

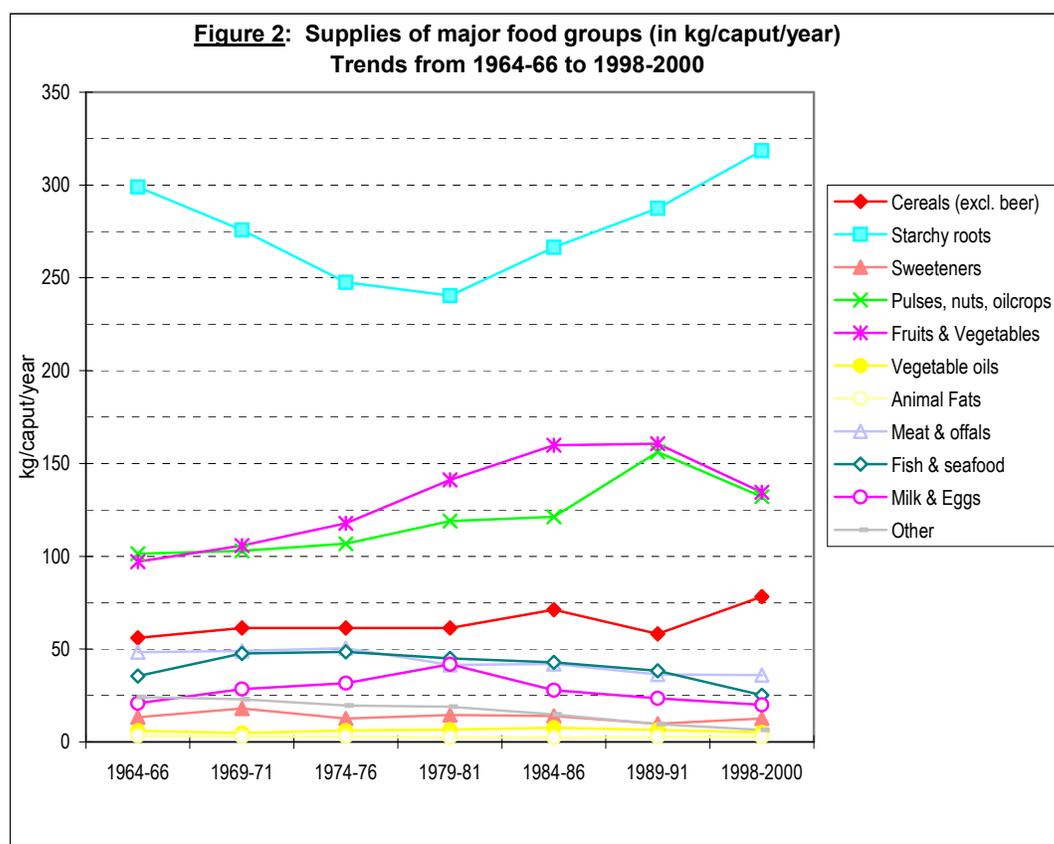
*The DES is expressed for an average-person of the country

The increase in DES can be mainly attributed to the higher share of carbohydrates from 1472 to 1750 kcal/caput/day of total DES over the 36 year period (**Figure 1**). It is interesting to note that the percentage of fat coming from animal products decreased by 10% of total DES (FAOSTAT, 2002).



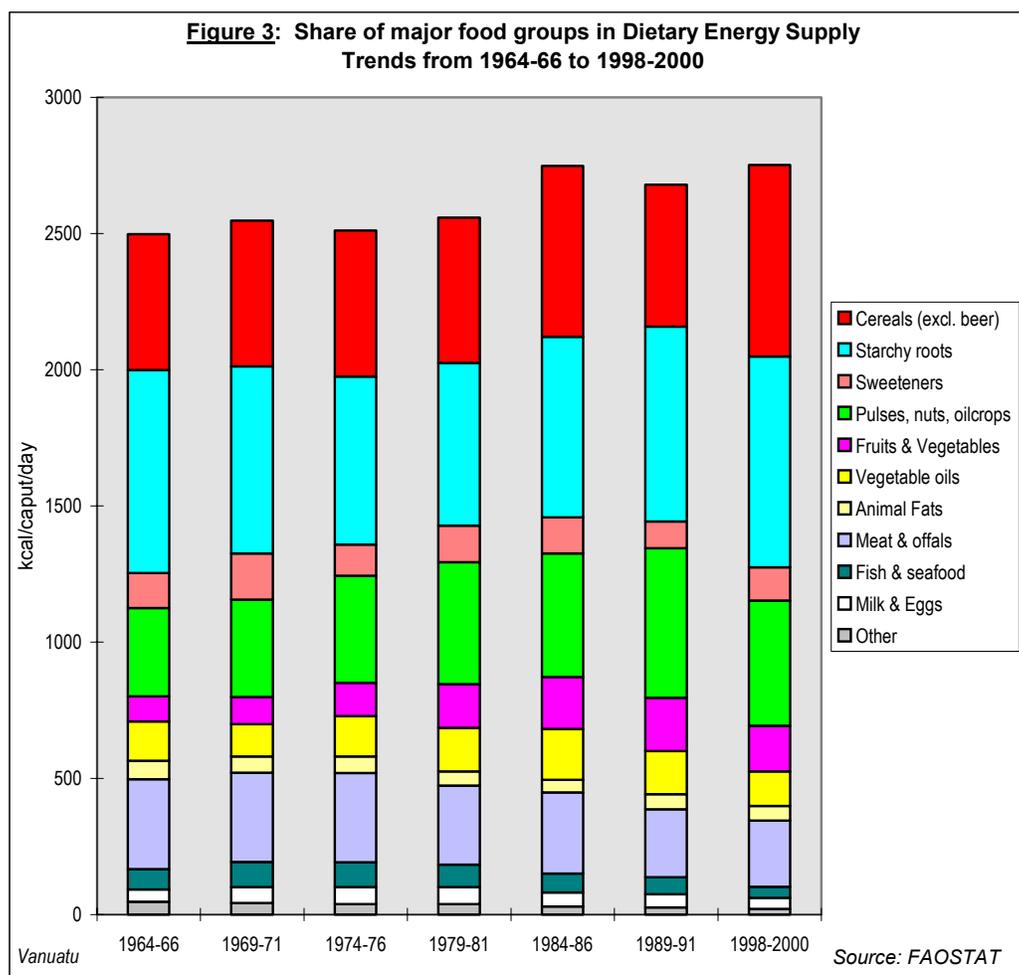
2. Trends in food supplies

Quantity – The per capita availability of food is a function of population and food production, with adjustments made for exports, imports, food aid, wastage and livestock feed. In 1964–66 the per caput availability of starchy roots was 299 kg, which fell to 240 kg in 1979–81 and steadily increased to 318 kg in 1998–2000. This increase is partly due to the increased import rate in 1998–2000. The supply of fruits and vegetables increased from 97 kg/caput/year to 135 kg/caput/year in 1964–66 and 1998–2000, even though it experienced a drop from 1989–91 to 1998–2000 (**Figure 2**). The availability of pulses, nuts and oil crops has increased over the 36 year period : from 102 kg/caput/year in 1964-66, to 121 kg/caput/year in 1984–86 and 156 kg/caput/year in 1989-91. It then dropped to 132 kg/caput/year in 1998–2000. Cereals increased from 56 kg/caput/year to 78 kg/caput/year over the 36 year period and showed some fluctuation since the mid 80s. The supply of meat and offals and of fish and sea foods fell from 49 kg/caput/year to 36 kg/caput/year and from 36 kg/caput/year to 25 kg/caput/year from 1964-66 to 1998–2000, respectively. Supply of food in the other groups remained relatively stable over the 36 year period, although supply of sweeteners decreased from 18 kg/caput/year from 1969–71 to 13 kg/caput/year in 1998–2000 (FAOSTAT, 2002).



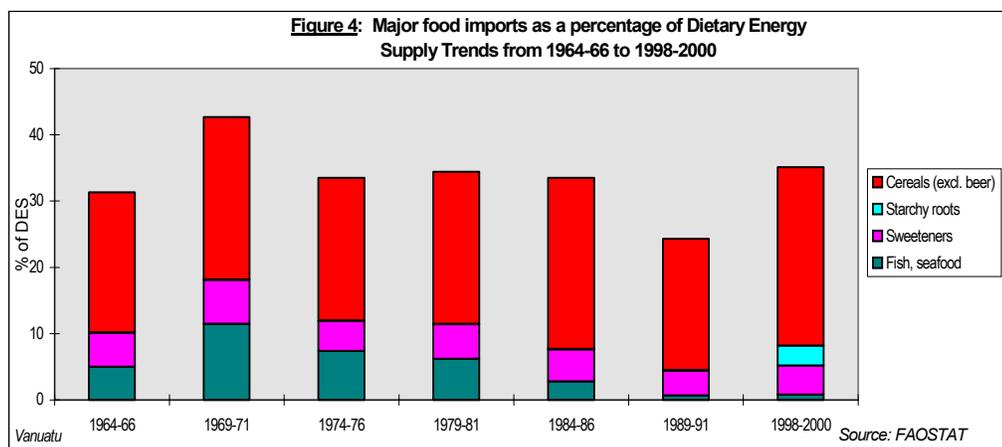
Energy – Starchy roots continue to be the main source of energy in Vanuatu, despite the reduction in the 70s and 80s, providing 28% of the total DES in 1998–2000 (**Figure 3**). Cereals are an important source of energy providing 26% of DES. Pulses, nuts and oil crops have increased from 13% to 17% of DES over the 36 years. Fruits and vegetables have also increased from 4% to 6% of DES for the same time period. According to FAOSTAT, the main source of total DES in Vanuatu is based on vegetable products (86%) which provide 66% and 65% of total protein and total fat supplies, respectively.

In the last 36 years the DES of meat and offals, fish and seafood and animal fats have decreased by 25%, 29% and 21%, respectively. The DES of sweeteners decreased by 20% over the 36 years and in 1998–2000 represented only 4% of total DES (FAOSTAT, 2002) (**Figure 3**).

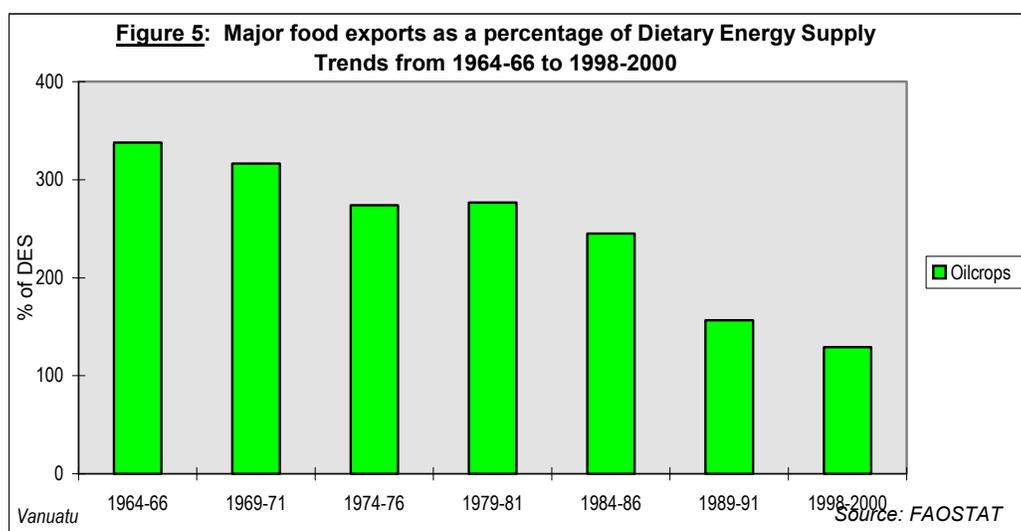


Major food imports – Cereals remain the principal food import to Vanuatu and in 1998–2000 represented 27% of the total DES. In 1995–2000, the amount of rice and wheat flour imported increased by 31% and 30%, respectively (NSO, 2001). Over the 36 year time period, imports of sweeteners decreased from 5% to 4% of total DES and that of starchy roots increased from under 1% to 3% of total DES.

Vanuatu continues to import fish mainly in the form of tinned fish, although amounts have declined in recent years from a high of 12% of total DES in 1969–71 to under 1% in 1998–2000. Even in coastal rural villages, tinned tuna is readily available in the stores as an easy alternative to catching fish (**Figure 4**).



Major food exports – Copra remains Vanuatu’s most valuable export crop (oil crops), even though there have been fluctuations over the last two decades (**Figure 5**). The slump in the world market, and therefore decrease in export, can be linked, in part, to the nutrition reports stating that dietary coconut and palm oils increase an individual’s risk of coronary heart disease (Carlot-Tary et al., 2000).



3. Food consumption

The 1998 Vanuatu Non-Communicable Disease (NCD) survey reported vast differences between urban and rural populations regarding the different food types consumed. In particular, urban residents consumed oils, fats and other fatty foods more regularly (44%) than rural residents (7%). Twenty nine percent of the urban population consumed canned meat or fish where as only 5% of the rural population consumed these foods. Milk and dairy products were consumed by 29% and 4% of the urban and rural population, respectively. Local staple foods consumed on a daily basis were 43% and 10% for the rural and urban population, respectively (Carlot-Tary et al., 2000).

The report showed that 68% of males in Vanuatu ate local root crops at least once a day compared to 69% of females. The figures also indicate that rice or bread was consumed by 54% and 59% of males and females respectively. The results clearly indicate that daily

consumers of food containing fat from non-traditional sources were twice as likely to be overweight or obese and to have diabetes or impaired glucose tolerance than those who did not consume such non-traditional food sources (Carlot-Tary et al., 2000).

The high consumption of imported staples has important consequences for Vanuatu. The rise in NCDs has been attributed, in part, to the transition away from traditional foods in favour of imported ones. It also has an impact on agriculture production, food security, national balance of payments as well as self-sufficiency in food production (Carlot-Tary et al., 2000).

Fruits such as mangoes, nuts, papaya and citrus grow abundantly in the bush and are mostly eaten as a snack between meals, rather than at meals. The Ni-Vanuatu in the rural areas generally consume two meals a day with snacks of fruits or nuts, while those in towns have three meals a day (Carlot-Tary et al., 2000).

Cava consumption is especially high among males. Rural male residents and older rural females aged 50 and above drank cava more than their urban counterparts. Additionally, the size of the cava drinking shell was larger and it was cheaper in the rural areas. Cava consumption has increased dramatically among rural and urban females since the 80s (Carlot-Tary et al., 2000).

4. Infant feeding practices

Infant feeding practices in Vanuatu are adequate immediately after birth. In line with WHO/UNICEF recommendations (WHO/UNICEF, 1989), in 1996, it was reported that 75% of 1407 mothers breast-feed their babies within the first hour of delivery, and 96% were fed within the first 24 hours. There was no significant difference in practice between rural and urban mothers. However, the length of breast-feeding and manner of weaning remains of concern. The 1996 study found that 27% of infants at two months of age, and 50% of infants between three and four months were given complementary foods. By six months, only 10% of infants were still being exclusively breast-fed. In Vanuatu weaning is an abrupt process. The grandmother will often take the infant to prevent further feeding, or the mother may rub chilli on her nipples to discourage the child from nursing (Carlot-Tary et al., 2000). Bottle-feeding is not a common practice in Vanuatu. The main reason for cessation of breast-feeding was that the baby was big enough, and only 2% of mothers declared that they ceased breast-feeding to return to work (Carlot-Tary et al., 1996).

5. Anthropometric data

The nutritional status of children under five years is commonly assessed using three indices: weight-for-height which reflects acute growth disturbances, height-for-age which reflects long-term growth faltering and weight-for-age which is a composite indicator of both long and short term effects. Weights and heights of children are compared with the reference standards (WHO, 1983).

Two National Nutrition Surveys (NNS) have been carried out in Vanuatu, in 1983 and 1996 (Hung, 1983; Carlot-Tary et al., 1996). These surveys collected data on women of child-bearing age and their children under five years, throughout the country. In both surveys, clusters were studied in all six provinces, and generally, a cluster of 30 women along with their children were brought to health centres or aid posts in the villages. This resulted in some survey samples (SS) being small, particularly when comparing the different age groups of children.

In 1983, 20% of children under five years and 38% of children in their second year of life were underweight (**Table 5a**). Small sample studies (200–900 individuals) were carried

out in several islands in the following years, namely Malekula in 1986, South Efate in 1988 and Paama in 1990 and confirmed that one quarter of children studied were underweight (Marks et al., 1993). The high prevalence of underweight children encouraged the Department of Health to build a “nutrition fare”² at each hospital as a food, nutrition and garden demonstration centre. Here mothers or carers of malnourished children could:

- 1) be educated about the benefits of traditional foods
- 2) be taught how to grow a garden around a house on minimal land
- 3) learn how to prepare meals that provide optimum nutrition.

Since these fares were set up in the early 1990s, referral to them has reduced as the number of underweight children admitted to the children’s wards has declined.

Results of the 1996 study show a decrease in underweight among children under five years (to 12%) and especially among children in their second year of life (to 17%), when compared to the 1983 study (Carlot-Tary et al., 1996). Therefore, the high prevalence of underweight among children under five years, reported in 1983, dropped to a medium prevalence range by 1996. Children in their second year of life, the most vulnerable group, dropped from a very high prevalence of underweight in 1983 to a medium prevalence in 1996 (**Table 5a**).

The prevalence of stunting, however, rose slightly between the two surveys. For children in their second year of life the prevalence was highest (31%). This high prevalence of stunting in the second year is probably due to a combination of factors, such as the early introduction of complementary foods and the abrupt weaning practices adopted by the majority of mothers (Carlot-Tary et al., 1996) (**Table 5a**).

The 1996 study shows a national prevalence of wasting of 6% among children under five years, with the highest prevalence among children in their second year of life (8%). Using WHO classification, wasting is considered to have a medium prevalence for all age groups (**Table 5a**).

² “Fare”, pronounced faray, is a traditional meeting house for village women

Table 5a: Anthropometric data on children

Source/ Year of survey	Location	Sample			Percentage of malnutrition						
		Size Number	Sex	Age Years	Underweight		Stunting		Wasting		Overweight
					% Weight/Age < -3SD	< -2SD*	% Height/Age < -3SD	< -2SD*	% Weight/Height < -3SD	< -2SD*	% Weight/Height > +2SD
Hung, 1983	National	1194	M/F	0-4.99	NA	19.7	NA	19.1	NA	NA	NA
NNS, 1983		146	M/F	0-0.49	NA	1.1	NA	2.1	NA	NA	NA
		170	M/F	0.5-0.99	NA	12.7	NA	9.8	NA	NA	NA
		269	M/F	1	NA	37.8	NA	30.5	NA	NA	NA
		233	M/F	2	NA	22.7	NA	28.4	NA	NA	NA
		229	M/F	3	NA	15.9	NA	17.4	NA	NA	NA
		147	M/F	4	NA	14.5	NA	14.0	NA	NA	NA
Carlot-Tary et al., 1996	National	1297	M/F	0-4.99	NA	12.0	NA	20.1	NA	5.5	NA
NNS 1996		466	M/F	0-0.99	NA	4.0	NA	9.0	NA	5.0	NA
		305	M/F	1	NA	17.0	NA	31.0	NA	8.0	NA
		416	M/F	2-3.99	NA	16.0	NA	24.0	NA	4.0	NA
		110	M/F	3-4.99	NA	16.0	NA	23.0	NA	7.0	NA

Notes: NA Data not available. Each index is expressed in terms of the number of standard deviations (SD) units from the median of the NCHS/CDC/WHO international reference population.* Includes children who are below -3 SD.

The nutritional status of adults is usually assessed using the body mass index (BMI) calculated as weight (kg) over height squared (m^2). For classifying individuals according to their nutritional status, cut-off levels of BMI have been proposed. Adults with a BMI under 18.5 kg/m^2 are considered to suffer from chronic energy deficiency (CED). A BMI of over 25.0 kg/m^2 indicates overweight while obesity is defined as a $\text{BMI} > 30.0 \text{ kg/m}^2$.

The 1996 NNS showed that 35% of the women (15–49 years) surveyed were either overweight or obese. The proportion of women classified as overweight or obese increased with age, from 21% among the 15–19 year old age group to 57% among the 40–49 year old age group (**Table 5b**). The urban population is five times more likely to be obese or overweight than those in rural areas (Carlot-Tary et al, 1996).

Additionally, the 1998 survey showed that females (20–60 years) had a high prevalence of obesity (20%). The report also stated that over half of the females (52%) were overweight or obese. The highest prevalence of overweight was among women between the age of 30 to 49 years (35%) and obesity peaked between the ages of 40 to 49 years (30%) (Carlot-Tary et al. 2000) (**Table 5b**).

Table 5b: Anthropometric data on adults

Source/ Year of survey	Location	Sample			Anthropometric status and Percentage of malnutrition								
		Size Number	Sex	Age Years	Body Mass Index (kg/m ²)			Chronic Energy Deficiency % BMI			Overweight % BMI	Obesity % BMI	
					mean	SD	median	<16.0	16.0-16.9	17.0-<18.5			25.0 - 29.9
Carlot-Tary et al., 1996	National	1860	F	15-49	NA	NA	NA	NA	NA	2.0	26.0	9.0	
NNS 1996													
		292	F	15-19	NA	NA	NA	NA	NA	NA	19.0	2.0	
		378	F	20-24	NA	NA	NA	NA	NA	NA	23.0	3.0	
		318	F	25-29	NA	NA	NA	NA	NA	NA	25.0	9.0	
		266	F	30-34	NA	NA	NA	NA	NA	NA	33.0	15.0	
		173	F	35-39	NA	NA	NA	NA	NA	NA	33.0	18.0	
		218	F	40-49	NA	NA	NA	NA	NA	NA	38.0	19.0	
Carlot-Tary et al., 2000	National	800	F	20-60+	NA	NA	NA	NA	NA	2.9	32.3	19.6	
NCD 1998		273	F	20-29	NA	NA	NA	NA	NA	1.1	29.7	11.0	
		221	F	30-39	NA	NA	NA	NA	NA	2.7	35.3	22.6	
		158	F	40-49	NA	NA	NA	NA	NA	2.5	35.4	29.7	
		78	F	50-59	NA	NA	NA	NA	NA	3.8	26.9	26.9	
		70	F	>=60	NA	NA	NA	NA	NA	10.0	12.9	12.9	

Note: NA Data not determined.

The 1998 NCD survey report showed that people who were overweight, obese, or diabetic were at high risk of developing hypertension. Urbanisation was not found to be a significant influencing factor even though more hypertensive people lived in the urban areas (Carlot-Tary et al., 2000).

6. Micronutrient deficiencies

Iodine deficiency disorders

Iodine deficiency disorders (IDD) include the clinical and sub-clinical manifestations of iodine deficiency. Iodine deficiency in pregnant women may cause irreversible brain damage in the developing foetus, whereas in infants and young children it may cause psychomotor retardation and intellectual impairment.

Studies of IDD have not been carried out in Vanuatu. However, the volcanic geography of the country and the incidence of IDD in the neighbouring countries of Fiji and Papua New Guinea suggest that Vanuatu may not be free from IDD. Medical practitioners who have travelled to rural areas in Vanuatu indicate that there may be cases of cretinism in some islands, and nutritionists in the country reported central Tanna as a possible area for this. The prevalence of cretinism may indicate that children, particularly in the in-land rural areas may be at risk of reduced mental ability as a result of a lack of iodine in the soil, and therefore the diet. Iodised salt is imported but there is no legislation to control iodine levels, or to prohibit the import of non-iodised salt, which is also readily available (Crossland, 1999).

Vitamin A deficiency

Vitamin A is an essential micronutrient required for normal health and survival. It is involved in several critical functions in the body including vision, the immune system, reproduction, growth and development. Children under five years are most susceptible to vitamin A deficiency (VAD). The consequences of VAD include night blindness, irreversible blindness,

growth retardation and increased susceptibility to infections. Pregnant women are also prone to VAD and their children are likely to become deficient.

The xerophthalmia³ survey examined 1870 children between the ages of six months and six years (VITAL, 1991). Subjects were examined for clinical signs of VAD in peri-urban Port Vila, and rural areas in North Malekula, Banks, and Tores islands. Only one case of xerophthalmia was found, although this does not rule out sub-clinical deficiency. No surveys have been done since to confirm or reject the existence of sub-clinical deficiency in Vanuatu. However, in the 1985 Vanuatu Dietary Survey, the mean intake of vitamin A in adults was calculated, and it was found that the intake was well above the recommended daily intake (RDI) of 750 µg (Badcock et al., 1985). The lowest intake was among urban lactating women who consumed a mean of 889 mg/day (RDI = 1200 µg). Among the urban and rural population, 75% and 97% of vitamin A was consumed from local foods. In Port Vila and Luganville, the prices of fresh fruit and vegetables in the daily market are high and therefore beyond the reach of a large percentage of the urban population. This may account for the lower intake of vitamin A in the urban areas. Aelan kabis⁴, which is eaten most days by the majority of the rural population, supplies approximately 915 µg of retinol (derived from beta-carotene) per 100 g. The rural children consume fruit picked from the bush, and when in season, beta-carotene rich fruit such as papaya and mango (Badcock et al., 1985).

Iron Deficiency Anaemia

The consequences of iron deficiency anaemia (IDA) include reduced physical work capacity and productivity, impaired cognitive functions and brain metabolism, and reduced immunocompetence. The causes of IDA include low dietary intake in relation to the recommended dietary allowances (RDA), poor bio-availability of iron in the diet, malaria and a high prevalence of parasitic infestations.

The NNS conducted in 1983 showed that 86% of pregnant women (15 to 49 years) had haemoglobin (Hb) levels below 11 g/dL, and 32% of pregnant women (15 to 49 years) were suffering from severe anaemia with Hb levels below 8 g/dL (Hung, 1983). The same survey showed that 93% of lactating women (15 to 49 years) were anaemic with Hb levels below 12 g/dL and 37% were severely anaemic with Hb levels below 9 g/dL. Although the survey samples were small, anaemia was recognised as a major public health and programmes were developed to address this. In 1996, 57% of pregnant women and 59% of lactating women between the ages of 15 to 49 years were anaemic (**Table 6**). In both the 1983 and 1996 studies, the haemoglobin status of women was measured using portable haemoglobinometers, rather than collecting samples of blood that could later be tested in a laboratory. To improve accuracy of the readings, only one enumerator in each team was responsible for taking blood samples and reading the metre.

Many factors, including maternal diet, may have contributed to the drop in anaemia prevalence since 1983. The hospital information service (HIS) indicates that the rate of malarial infection has declined steadily over the years as a result of distribution of impregnated bed nets, and associated information campaigns. This, together with a widespread building programme of ventilated improved pit (VIP) toilets which may have reduced the spread of intestinal worms, is likely to be a major factor in the reduction of anaemia in the 1990s (Carlot-Tary et al. 2000).

³ Xerophthalmia: clinically evident ocular manifestation of VAD. These include night blindness, corneal ulcers, keratomalacia, etc.

⁴ Aelan kabis, or island cabbage, is an edible hibiscus leaf.

Table 6: Micronutrient deficiency

Source/ Year of survey	Deficiency	Location	Sample			Percentage
			Size Number	Sex	Age Years	
Hung, 1983 NNS, 1983	Iron	National				
	Hb<11.0 g/dL		110	F*	15-49	86.3
	8.1<Hb<10.9 g/dL		110	F*	15-49	54.5
	Hb<8.0 g/dL		110	F*	15-49	31.8
	Hb < 12.0 g/L		142	F#	15-49	93.0
	Hb<9.0 g/dL	382	F#	15-49	37.0	
Carlot-Tary et al., 1996 NNS 1996	Hb < 12.0 g/dL	National	1056	F	15-49	50.0
			491	F	15-25	52.0
			289	F	26-35	50.0
			276	F	36-49	48.0
	Hb < 11.0 g/dL	National	234	F*	15-49	57.0
			134	F*	15-25	55.0
			81	F*	26-35	62.0
			19	F*	36-49	52.0
	Hb < 12.0 g/dL	National	629	F#	15-49	59.0
			263	F#	15-25	63.0
			297	F#	26-35	56.0
			69	F#	36-49	58.0

Note: F: Non-pregnant and non-lactating; F*: Pregnant women (5 months and above); F# Lactating women

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References of data presented in Table 1, unless otherwise stated:

<i>Source:</i>	<i>Indicator:</i>
FAOSTAT. 2002	<i>A.1 and 2, B, C.10 and 11, E.1 to 3, F, G</i>
UN. 1999/2000.	<i>C.1 to 9, D.5</i>
World Bank. 2001.	<i>D.1</i>
UNDP. 1999.	<i>D.2</i>
N/A	<i>D.3 and 4</i>
UNICEF. 2002.	<i>D.6</i>
FAO/WFS. 2002.	<i>H</i>

**NCP of VANUATU
MAPS**

- General map of Vanuatu.