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**MATERNAL AND INFANT NUTRITION REVIEWS**

**PAPUA NEW GUINEA**

*A Guide to the Literature*

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## INTRODUCTION

### MATERNAL AND INFANT NUTRITION REVIEWS: A RESOURCE FOR NUTRITION PLANNERS AND EDUCATORS

The MATERNAL AND INFANT NUTRITION REVIEWS (MINR) profile existing data on nutritional status and nutrition-related beliefs and practices of mothers and children in developing countries. MINRs also contain information on current nutrition policies and programs of governments, the United States Agency for International Development, and other bilateral, international agencies and Private Voluntary Organizations (PVO). There are thirty-five MINRs in all, profiling forty-four different countries. (See list on next page.)

Maternal and Infant Nutrition Reviews summarize important information obtained from available literature, government documents, consultant reports, and personal correspondence. The data is presented in bulleted form under six major headings: nutrition and health status, dietary beliefs, dietary practices, nutrition status correlations, nutrition and health policies and programs, and commentaries. A bibliography at the back of each monograph describes the listed documents in terms of type of study, methodology, sample characteristics and location, and a summary.

Nutrition planners and policy makers can use MINRs to help identify a given country's data base. For example, the information contained in each review enables the reader to identify key planning factors such as problem areas of malnutrition, prevailing beliefs about breast feeding, the extent of bottle feeding, types of weaning foods, the government's inter-agency five-year nutrition plan, the amount of donated food being distributed at MCH centers, and major PVOs involved in administering food and nutrition programs.

MINRs can be used as background documents for consultants going into the field and for program developers in-country. They can provide a frame of reference for an in-country workshop aimed at developing a national nutrition strategy. Technical assistance in organizing a workshop of this kind is available through the International Nutrition Communication Service. MINRs can also be used as a resource document in the development of journal articles and textbooks.

MINR data is stored on a computerized word processing system that allows for updates and individualized literature searches on specific topics. Patterns in a particular country or group of countries can be analyzed in accordance with user needs. A nutrition information retrieval service is available free to those working in developing countries and for a small fee to all others. Orders, inquiries, and comments should be addressed to:

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Philippines  
South Pacific\*  
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Thailand

LATIN AMERICA AND CARIBBEAN:

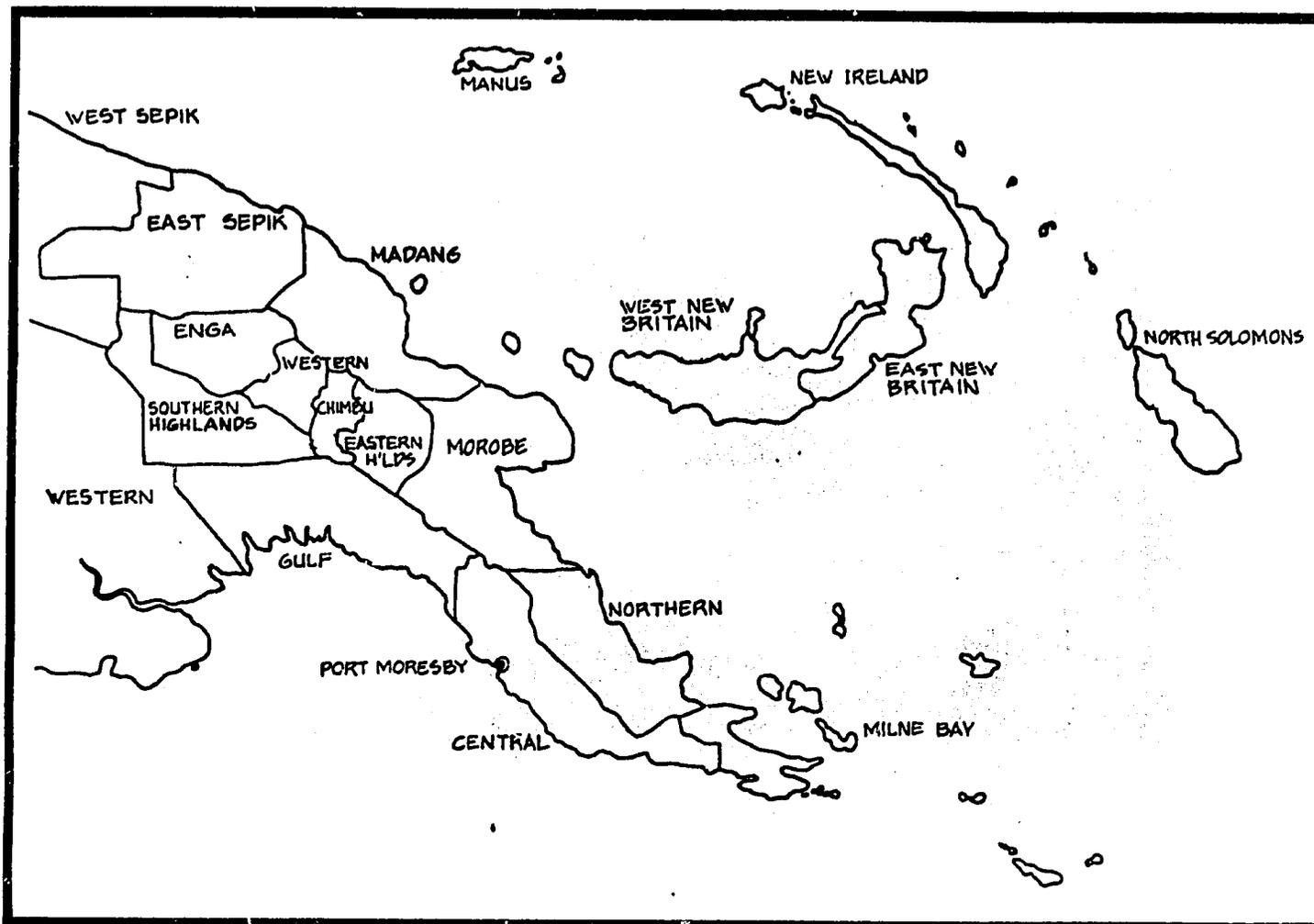
Bolivia  
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Dominican Republic  
Ecuador  
Haiti  
Honduras  
Jamaica  
Panama  
Peru

\*South Pacific Region includes the nations of Cook Islands, Fiji, Kiribati, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa

# MATERNAL AND INFANT NUTRITION REVIEWS

## CLASSIFICATION SYSTEM

1. Nutrition and Health Status
  - 1.1 General
  - 1.2 Women, Pregnant
  - 1.3 Women, Lactating
  - 1.4 Infants 0-6 Months
  - 1.5 Infants 6-24 Months
2. Dietary Beliefs
  - 2.1 General
  - 2.2 About Pregnancy
  - 2.3 About Lactation
  - 2.4 About Breast Milk Substitutes (including bottle feeding)
  - 2.5 About Weaning
3. Dietary Practices
  - 3.1 General
  - 3.2 Women
    - 3.2.1 During Pregnancy
    - 3.2.2 During Lactation
  - 3.3 Infants 0-24 Months
    - 3.3.1 Breast feeding
    - 3.3.2 Weaning
    - 3.3.3 After Weaning
  - 3.4 Health and Medicine
4. Nutrition Status Correlations
5. Nutrition and Health Policies and Programs
  - 5.1 Policies
  - 5.2 Programs
6. Commentaries



	Bareta, 1980	Biddulph, 1980a	Binns, 1976	Buchbinder, 1977	Butler, 1979	Butler, 1982	Cannon-Bonventre, 1977	Clark, 1978	Connor, 1981	Cordon, 1979	Coynes, 1981	Cox, 1980	Dignan, 1982	Earland, 1982	Eng, 1979	Gallagher, 1981	Harvey & Heywood, 1983	Kakaree, 1980	Kripps, 1981	Lambert, 1979	Lambert, 1980a	Lambert, 1982	Lambert, 1983	Nanai, 1981	Nanai, 1982	Nutrition & Development, 1981	Nutrition & Development, 1982	Singleton, 1981	Urijasek, 1980	Watt, 1981	
Bougainville								x																							
Central		x						x												x					x						
Chimbu								x								x					x										
Eastern Highlands				x	x			x		x				x						x								x			
East New Britain								x																					x		
East Sepik								x				x			x					x	x				x	x					
Enga			x					x		x					x	x					x				x	x					
Gulf	x											x						x	x	x				x						x	
Karkar Island							x																								
Madang							x	x		x																					
Manus								x	x						x																
Milne Bay								x																							
Morobe								x							x																
National Capital								x																							
New Ireland								x					x		x							x				x					
Northern								x							x																
North Solomons															x													x			
Oro																															x
Simbai Maring			x																												
Southern Highlands								x													x										
Western								x													x										
Western Highlands								x	x						x						x										
West New Britain								x							x						x								x		
West Sepik								x							x																

## HIGHLIGHTS

1. **NUTRITION AND HEALTH STATUS:** Malnutrition exists in every province in Papua New Guinea; protein energy malnutrition is the most important nutritional problem. The results of a National Nutrition Survey done in 1978 show that approximately 185,000 children under age 5 suffer from malnutrition. However, there are considerable differences in the malnutrition rate within the country ranging from a rate of 22% overall in East New Britain Province to 61% in Gulf Province.

Vitamin and mineral deficiencies, with the exception of iron-deficiency anemia, are not considered major nutritional problems. Anemia is common in the Kiunga area, as is protein-energy malnutrition. Endemic goiter was once common in the highlands, but public health measures have helped correct this problem.

Malaria is the most serious health problem in the country, being widespread below 1800 meters. The incidence is apparently increasing. Diabetes is present; it is more common to find young, non-obese, non-ketotic diabetes tolerating high blood glucose here than in other Pacific Islands. Hypertension is a common complication of this diabetes.

2. **DIETARY BELIEFS:** With variations from region to region, there are many foods that are forbidden to children under five. For instance, in Maprik District, they are not allowed to eat pig meat, yams, and green leaves because the latter will cause choking; in Bogia District they cannot eat cuscus, snake, and fish. In Port Moresby, however, the following foods are believed to be good for children: eggs, fish, green leaves, milk, pumpkin, and rice.

In many districts, there are dietary and food preparation restrictions placed on menstruating women. In East Sepik they cannot cook food for men during this period; they are also not allowed to eat meat, freshwater fish, and breadfruit. In Morobe, women are also not to go into the garden but must stay in the home until their period has passed. Maring custom forbids widows and close female relatives of a deceased person from working in their gardens for several weeks after the death.

It is a commonly held belief in Papua New Guinea that a woman who eats too much during a pregnancy will have a baby that is large, and she will, therefore, suffer a difficult delivery. In Maprik, pregnant women are forbidden to eat green leaves; in addition, salt and sugar cane are forbidden because they are believed to make a baby fat. In the East Highlands, strong food, such as taro, tapioca, and cooking banana, are avoided because they supposedly cause a difficult labor. Maring women in Tuguma believe that if they eat too much in the last months of pregnancy, the baby will be squashed.

In many parts of Papua New Guinea, women abstain from sexual intercourse while breastfeeding. It is also commonly held that when a mother is pregnant, she should not breastfeed another child, as her milk will be bad. In Hagama village, parents will be criticized or scolded if a baby is weaned too early. In Enga, babies are often weaned when the mother becomes pregnant again. There are many food restrictions for lactating women; in Samarai District, for example, mothers are not permitted to eat fish, meat, eggs, or shellfish until the child is between 3 months and 2 years of age.

3. **DIETARY PRACTICES:** Staples in Papua New Guinea are diverse, including several kinds of sweet potato, sago, cassava, yam, taro, and bananas. In addition to these, other foods eaten include pulses, beans and peas, green vegetables. Little fruit, however, is eaten. The vitamin and mineral content

of the diets appears to be sufficient, especially for vitamins C and A, calcium, and iron. Greens, beans, and a variety of fruits are the three most important items missing in the daily diet of most people. Urban diets, more so than rural ones, are higher in sucrose, salt, carbohydrates, protein, cholesterol, and fat. Consumption of "junk food" has helped aggravate certain nutritional problems. Factors having a negative effect on food supply are: land pressures, declining level of hunting, competition with cash crops, and certain natural disasters.

Of all food consumed by Papua New Guinea nationals in 1976, approximately 53% came from subsistence production. About 25% of the country's food is imported. Studies show a severe calorie deficit in certain districts; the supply of available calories in 1977 was 2,268 calories per person per day, about 85% of the FAO amount considered necessary to meet requirements.

In many areas of Papua New Guinea, families eat together. However, in some districts, such as Wabag, Saidor, and Lae, women eat separately from or after their husbands. Foods are usually prepared by baking, roasting, mumuing, boiling, or frying. The number of meals eaten during the day varies; at times, such as the hungry period (March to June) in Maprik District, people eat only one meal per day.

In some areas, such as Masa villages, women who have given birth are not allowed to cook or work in the gardens. The initiation of and length of breastfeeding varies. In Aipipaka villave and Hangan village, women usually begin breastfeeding right after birth, whereas in Kairuku, colostrum is often discarded, while in Sakita and Morobe, colostrum is given to the infant. Some common first foods given to the weaning age child are: bananas, sweet potato, pawpaw, and soup. Foods are often masticated or mashed before being given to the child. Weaning is often done abruptly, and mothers in many areas do so by rubbing chillies or tobacco leaves on the nipples.

**4. NUTRITION STATUS CORRELATIONS:** The incidence of malnutrition is closely correlated with the childhood mortality rates in the National Health Plan. Two of the major causes of mortality, especially for malnourished children, are acute respiratory disease and gastrointestinal disease. A survey conducted after enactment of the Baby Feed Supplies (Control) Law showed that 88% of children under 2 were being breastfed, as compared to 65% in 1975-76. 69% of the children weighed at least 80% of the standard weight for age, as compared to 59% in 1975-76.

**5. NUTRITION AND HEALTH POLICIES AND PROGRAMS:** The Papua New Guinea government has placed special emphasis on maternal and child health care, health education, improved nutrition, and family planning. There exists a National Food and Nutrition Policy which focuses on improving subsistence agriculture and nutritional status. To do this, efforts are being made to use techniques to produce more nutritious subsistence foods, and groups are helped to secure land for commercial gardening purposes. A Nutrition Education Program is operating through teachers, agriculture extension agents, and health workers. Messages have been disseminated through radio, T-shirts, posters, handouts, plays, and badges. Foods of low nutritional value are banned for sale at school shops. This educational effort has led to a reduction in prevalence of clinical malnutrition among school children.

In 1977, the Baby Feed Supplies (Control) Act was passed to promote breastfeeding; advertising of milks for bottle feeding is banned. In relation to maternity and lactation legislation, pregnant women are entitled to six weeks leave, with full salary, before and after the birth of the child. They

are also entitled to two 30-minute nursing breaks a day. No supplementary feeding programs are undertaken, to encourage self-reliance.

Immunization programs have been expanded. Projects are underway to control malaria, as well as to improve rural water supplies and sanitation. Health services are delivered through provincial hospitals, health centers and subcenters, as well as aid posts.

## 1. NUTRITION AND HEALTH STATUS

### 1.1 NUTRITION AND HEALTH STATUS, GENERAL

**MALNUTRITION--PREVALENCE AND EFFECTS:** Malnutrition exists in every province and in every major town in Papua New Guinea. The Department of Health has estimated that the population receives on the average about 80% of its food energy requirements. It is thought to be a major factor in many infant and child deaths, and in the low level of learning ability of many school children. (Lambert, 1979)

**NUTRITIONAL DEFICIENCIES:** Protein-calorie malnutrition is widespread, but is apparently not a major and general problem. Anemia is prominent. Goiter, formerly highly prevalent and with endemic cretinism, has been decreased through salt iodization enforced on a national level. (Licross, 1979)

**NUTRITIONAL DEFICIENCIES:** Vitamin and mineral deficiencies, with the exception of iron-deficiency anemia, are not considered to be major nutritional problems in Papua New Guinea. Endemic goiter, once common in the highlands, is no longer a significant problem. (Lambert, 1980a)

**PROTEIN DEFICIENCY:** There does not appear to be evidence of protein deficiency except among a few pre-school age children. (Coyne, 1981)

**SCURVY:** Severe cases of scurvy exist in Papua New Guinea, in spite of the widespread availability of fruits and vegetables containing vitamin A. It seems to be primarily a problem among prison inmates because of the diet they are fed in prison, which consists almost exclusively of rice, wheat, and canned fish. (Barber, 1982)

**MALNUTRITION IN RESETTLEMENTS:** Resettlement schemes promoted in order to increase production of rubber and red palm oil have posed particular nutritional problems. The rate of malnutrition in a red palm oil resettlement scheme was three times greater than in surrounding villages where oil palms were grown on traditional land. The settlers had food gardens, but a large proportion of the produce was sold in urban markets, and the income spent on non-food items. (Lambert, 1980a)

**MALARIA:** Malaria is by far the most prominent health problem in the country, hyperendemic, severe, and widespread below 1800 meters with no effective control and incidence apparently increasing. For the moment, it is less of a problem in New Britain and New Ireland. (Licross, 1979)

**COMMON HEALTH PROBLEMS:** Health problems include: acute respiratory illnesses; typhoid fever; bacillary dysentery; hepatitis; tuberculosis (particularly in Port Moresby); leprosy, especially in the eastern part of the country (Sepik, Highlands, Western Gulf); skin infections, including scabies; sexually transmitted diseases; various forms of arthritis; measles ("widespread but remarkably benign"); and venomous snakes. No rabies. (Licross, 1979)

**HEALTH PROBLEMS--HIGHLANDS:** Health problems particular to the highlands include sweeping epidemics of influenza with high fatality rates and

## 1.1 NUTRITION AND HEALTH STATUS, GENERAL (Cont.)

pigbel, a necrosis of the intestine which occurs as epidemics in children. Kuru is now rare among the Fore people and is localized in adults. (Licross, 1979)

DIABETES: The prevalence of diabetes mellitus is 0.8% in rural areas where the traditional diet is eaten; in urban areas, the rate is 15.4%. (Coyne, 1981)

MELANESIANS AND DIABETES: Melanesians in Papua New Guinea are reported to show a slightly different picture of diabetes than other Pacific Island groups. The presence of young, non-obese, non-ketotic diabetics who tolerate high blood glucose for a long time is more common in Papua New Guinea than in other countries. (Coyne, 1981)

COMPLICATIONS OF DIABETES: Myocardial ischemia and strokes were rarely seen, and it would seem that at present in Papua New Guinea there is no increase in arteriosclerotic large vessel disease in diabetics, but microangiographic and metabolic complications occur frequently. (Coyne, 1981)

HYPERTENSION AND DIABETES: Hypertension is now a common complication accompanying diabetes in Papua New Guinea. Of 106 diabetic patients reviewed, 32% of men and 43% of women had systolic blood pressure measurements above 140 mm hg. (Coyne, 1981)

CORONARY HEART DISEASE AND OBESITY: Coronary heart disease and obesity seem to be absent in rural Papua New Guinea. dietary intakes of total energy, fat, and salt are also quite low. (Coyne, 1981)

PIG-BEL: Necrotizing enteritis ("pig-bel") is a disease that follows the consumption of pig, hence the name. It causes hundreds of deaths each year in the highlands of Papua New Guinea. It is characterized by patchy necrosis of the jejunum caused by the beta toxin of Clostridium welchii type C. A vaccine was successfully introduced, and "pig-bel" is now preventable by immunization. Nearly all those affected are malnourished. (Biddulph, 1980b)

### CHIMBU

WEIGHT GAIN: Preliminary analysis of the results of a province-wide, cross-sectional survey of the growth of children indicates that by five years of age, children were 2 kg heavier in 1981 than they were in 1956. (unpublished observations) (Harvey and Heywood, 1983)

### EAST SEPIK

NUTRITION STATUS: Nutrition surveys in the Gavien resettlement scheme (rubber project area) of East Sepik Province showed that the nutritional status of settlers is considerably worse than that of people in the surrounding towns and villages. However, food crop extension and health and nutrition education work is being done in the area, and it is hoped that the situation will improve. (Lambert, 1979)

## EASTERN HIGHLANDS

**MEN'S HEALTH STATUS:** Men studied in rural areas had high hemoglobin levels, low blood pressure, low serum cholesterol levels, and muscular body build. (Coyne, 1981)

## ENGA

**CARDIOVASCULAR DISEASE:** A thorough study of cardiovascular disease among isolated tribes in the Lagaip district found a virtual absence of arteriosclerosis, namely ischemic heart disease, peripheral vascular disease, and cerebrovascular accident. (Coyne, 1981)

## GULF

**CHILD MORTALITY RATE:** The Department of Health estimated the total child mortality rate (0-4.99 years) was 202 per 1000 in 1973 (Papua New Guinea, Dept. of Health, 1974) (Lambert, 1983)

## MADANG

**HYPERTENSION--KARKAR ISLAND:** Boyce (1978) found that the inhabitants of Karkar Island had very low mean systolic and diastolic blood pressure readings. (Coyne, 1981)

## WESTERN

**NUTRITION STATUS:** The OK Tedi nutrition survey was carried out in February and March 1978, in the Star Mountains (Kiunga District), in order to assess the impact of a proposed mining development project on the health and nutritional status of the population. Anthropometric measurements were taken, ages were recorded or estimated, hemoglobin levels were determined, and information about food intake, infant feeding practices, food taboos, and other socioeconomic indicators was collected. The results of the study showed that high rates of malnutrition existed in the Kiunga area, primarily protein energy malnutrition. Anemia was also common. The researchers concluded that the impact of the proposed mining project would be unlikely to improve the nutritional status of the local population unless positive steps were taken to address nutritional problems. (Lambert, 1979)

**STUNTING:** A significant degree of stunting was found among the population in Kiunga. It was particularly marked in adults aged 30 to 35. (Lambert, 1979)

**ANEMIA:** The mean hemoglobin levels were low in both Kiunga and Tabubil. This was due in part to dietary deficiency and in part to the high incidence of malaria, hookworm, and chronic tuberculosis. In both populations, the women appeared to be worse off than the men. (Lambert, 1979)

## 1.1 NUTRITION AND HEALTH STATUS, GENERAL (Cont.)

### SIMBAI MARING

**HEIGHT:** The Maring are a small people. This may be in part genetic, but a large component is believed to be due to nutritional stunting. This is corroborated by the dietary deficits observed, which could easily result in stunted growth and poor protein utilization. (Buchbinder, 1977)

**NUTRITION STATUS:** The northwestern Maring groups (Tuguma: Tsembaga, Gai, and Singanai) are shorter in stature than the southeastern groups (Nimbra, Tsangamp, and Gunt's) and are characterized by lower weight, lower hemoglobin values, and a higher incidence of hypohaptoglobinemia. A few cases of kwashiorkor and marasmus were also found. The differences between the most extreme groups were significant at  $.05 < p < .01$ . The fertility rates of the northwestern groups are lower, and their mortality rates higher than the southeastern groups. They were also harder hit by the effects of introduced disease, and their population decline was greater than that of other groups. It was still declining in 1974 when other groups had already begun to recover. (Buchbinder, 1977)

**WEIGHT:** Among the Maring, body weight and amounts of subcutaneous fat peak in the early twenties, then decrease. (Buchbinder, 1977)

**NUTRITION AND POPULATION:** Between 1968 and 1974, northwestern Maring women had an average of 3.5 pregnancies, compared to 4.5 for southeastern Maring women. Seventy-five percent of the northwestern and 85% of the southwestern children survived to adulthood. These differences appear to be related to health and nutritional status. (Buchbinder, 1977)

**MALNUTRITION AND MORTALITY:** During the 1960s, the Maring people of the New Guinea Highlands experienced a significant decline in population due to infectious diseases, particularly influenza and other respiratory diseases followed by pneumonia. The severity of the epidemics varied from group to group. Population size continued to decrease until 1974. Observed differences in response to stress are believed to be related to nutritional status. (Buchbinder, 1977)

**INFECTION, MALNUTRITION, AND SOCIAL DISRUPTION:** During the epidemic of infectious diseases in the 1960s, the level of anxiety among the Maring was acute, especially among groups where population decline was most rapid. Social disruption resulted. Accusations of sorcery became common, and young unmarried men in particular were reluctant to offer assistance to sick parents and relatives. Consequently neglect further contributed to the number of deaths that occurred. Young women were reluctant to marry into high mortality groups, and young men left villages in large numbers to seek work on the coast. It is likely that these behavior patterns aggravated existing malnutrition and the disease fatality. (Buchbinder, 1977)

**GOITER:** The Maring suffered an epidemic of endemic goitrous cretinism during the 1960s when their highly iodized indigenous salt supply was replaced by uniodized salt. The groups most affected by the iodine deficiency were also the ones who suffered the most from protein deficiency. Public health measures introduced in 1968 corrected the iodine deficiency problem. (Buchbinder, 1977)

- 1.2 NUTRITION AND HEALTH STATUS, WOMEN, PREGNANT
- 1.3 NUTRITION AND HEALTH STATUS, WOMEN, LACTATING
- 1.4 NUTRITION AND HEALTH STATUS, INFANTS 0-6 MONTHS

#### WESTERN

**MORTALITY RATE:** 91 babies out of 807 births (11.3%) in Kiunga died before the age of one. (Lambert, 1979)

**WEIGHTS AND HEIGHTS:** The mean weights and heights of children aged 0 to 5 months were 5.1 kg. and 58.8 cm. respectively in Kiunga, compared to 5.8 kg. and 60.3 cm. in Tabubil. (Lambert, 1979)

**WEIGHT FOR AGE:** In the 0-5 months age group, 48% of the children in Kiunga were below 80% of the standard weight for age, compared to zero in Tabubil. In addition, almost 10% of the malnourished children from Kiunga were below 60% of the standard weight for age. (Lambert, 1979)

**WEIGHT FOR HEIGHT:** In the 0-5 month age group, 5% of the children from Kiunga were below 80% of the standard weight for height, but none in Tabubil. (Lambert, 1979)

#### 1.5 NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS

**CHILD MORTALITY RATE:** In 1979, the mortality rate among children age 1 to 4 years was 16 per 1000; in 1960, the rate had been 29 per 1000. (World Bank, 1981)

**MALNUTRITION AND MORTALITY:** 10% of all children born in Papua New Guinea die before the age of 5, and one-third of all young children suffer from malnutrition. (Biddulph, 1980b)

**MALNUTRITION:** Based on the results of the National Nutrition Survey, an estimated 185,000 children under 5 suffer from malnutrition in Papua New Guinea. (Lambert, 1979)

**MALNUTRITION:** Many children in Papua New Guinea suffer from a sub-clinical form of malnutrition that can go virtually unnoticed by parents and health workers. The children are just "a little bit skinny" and have pale, thin hair and a protruding abdomen. They can look reasonably healthy and still be at a very high risk of developing severe malnutrition or dying of infections, compared to well-nourished children. (Korte, 1975)

**HIDDEN MALNUTRITION:** Severe cases of malnutrition are rarely seen in Papua New Guinea because the children are too sick to walk and are often hidden at home. It is not limited to the under five age group. Since older children are better able to express their needs, it is assumed that malnutrition in this group is due to the general unavailability of food, rather than faulty feeding practices. (Korte, 1975)

## 1.5 NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS (Cont.)

**WEIGHT FOR AGE:** The overall percentages of children under 5 below 80% of the standard weight for age in Papua New Guinea were 43% in 1975 and 38% in 1978. (Lambert, 1979)

**WEIGHT FOR AGE:** The results of a national nutrition survey carried out in 1978 showed that 38% of the children attending maternal and child health clinics were below 80% of the standard weight for age. It also showed that there were considerable differences within the country, both within and between provinces. The rate of malnutrition varied from 22% overall in East New Britain Province to 61% in Gulf Province. Protein energy malnutrition is the most important nutritional problem. (Lambert, 1980a)

**MODERATE UNDERWEIGHT FOR AGE BY PROVINCE:** The provinces of Papua New Guinea, ranked in order of increasing percentages of children under 5 below 80% of the standard weight for age are as follows: East New Britain, 23% in 1975 and 22% in 1978; Manus, 34% and 23%; North Solomons, 28% and 25%; National Capital, 36% and 28%; Simbu, 55% and 28%; Western Highlands, 29% and 29%; Enga, 52% and 31%; Morobe, 40% and 32%; Eastern Highlands, 26% and 32%; West New Britain, 36% and 36%; Southern Highlands, 47% and 37%; Madang, 52% and 38%; Northern Province, 44% and 40%; New Ireland, 32% and 41%; East Sepik, 46% and 44%; Central, 38% and 46%; Western, 40% and 53%; Milne Bay, 54% and 54%; West Sepik, 62% and 59%; and Gulf Province, 45% and 61%. (Lambert, 1979)

**SEVERE UNDERWEIGHT FOR AGE BY PROVINCE:** The provinces of Papua New Guinea, ranked in order of increasing percentages of children under 5 below 60% of the standard weight for age in 1978 are as follows: Simbu, 0.9%; National Capital, Enga, and Manus, 1.0%; Western Highlands, 1.1%; Southern Highlands and Eastern Highlands, 1.5%; Morobe and West New Britain, 1.7%; New Ireland, 2.2%; Madang, 2.3%; Northern, 2.4%; East Sepik and North Solomons, 2.6%; East New Britain, 3.0%; Western, 5%; West Sepik, 5.3%; Central, 5.6%; Milne Bay, 6.6%; and Gulf, 11.8%. (Lambert, 1979)

**MALNUTRITION--GEOGRAPHIC VARIATIONS:** There is considerable variation in nutritional status, within districts. In Hoskins District (West New Britain), 15% of 942 children in the village were malnourished, compared to 51% of 974 children from the oil palm settlements. In the Kerema District (Gulf Province), 83% of the children seen around Konabea were below 80% of the standard weight for age, and 25% below 60%, while only 50% of children in the town of Kerema suffered from any degree of malnutrition. (Lambert, 1979)

**MALNUTRITION AND HOSPITALS:** About 5% of hospital deaths of children under five can be attributed directly to malnutrition. Malnutrition is also thought to be a major contributing factor in another 50% of those deaths. Children sometimes require hospitalization for diseases that could have been treated at home, or would have required a shorter stay in the hospital, in the absence of malnutrition. (Lambert, 1979)

#### EAST NEW BRITAIN

**MALNUTRITION:** The 1978 National Nutrition Survey reported that 55% of the children attending MCH clinics in the Duke of York Islands weighed less than 80% of the standard weight for age. This was more than double the overall provincial average. A follow-up survey conducted in October 1978 came up with a figure of 37%, a rate lower than that shown by the National Nutrition Survey but still high. (Singleton, 1981)

#### EASTERN HIGHLANDS

**MALNUTRITION:** 30% of the children suffer from serious malnutrition. (Butler, 1979)

#### ENGA

**MALNUTRITION DECREASE:** Dramatic improvement in nutritional status occurred in Enga Province, where observed malnutrition declined from 52% in 1975 to 31% in 1978. (Lambert, 1982)

#### GULF

**MALNUTRITION:** The anthropometric survey revealed a high incidence of subclinical malnutrition or undernutrition among both Wabo and Ihu populations. Among pre-school children approximately 35% of the children in both areas were under 80% of the standard weight for age. (Lambert, 1983)

**ANEMIA:** Mean hemoglobin levels showed very low blood hemoglobins for the Wabo children below the age of 10. This anemia probably results from malaria and high incidence of hookworm rather than a dietary deficiency alone. (Lambert, 1983)

#### MADANG

**MORTALITY RATE:** The mortality rate of liveborn children under 5 is about 130 deaths per 1,000 live births. (Cannon-Bonventre, 1977)

#### NEW IRELAND

**MALNUTRITION INCREASE:** A dramatic deterioration in nutritional status occurred in New Ireland Province, where the rate of malnutrition increased from 32% in 1975 to 41% in 1978. New Ireland Province had not Provincial Nutrition Program and had recently suffered a drought and a plague of rats. (Lambert, 1982)

#### WEST NEW BRITAIN

**MALNUTRITION:** 27% of children under 5 suffer from malnutrition in Kandrian area villages practicing Cargo cult. (Lambert, 1979)

## 1.5 NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS (Cont.)

### WESTERN

**MALNUTRITION:** 53% of the children seen at Maternal and Child Health Clinics in the Western Province in the first three months of 1978 were malnourished, the fourth highest figure in the country. 60% of the children under five (1314/2190) were below 80% of the standard weight for age. (Lambert, 1979)

**WEIGHT FOR AGE:** Using weight for age criteria, 16% of the non-Kuni children under 5 were shown to be below 80% of the standard, compared to 60% of the Kuni children sampled. Most children have birth records and/or clinic books. (Connor, 1981)

**WEIGHT FOR HEIGHT:** Using weight for height criteria, 79% of the non-Kuni children under 5 were classified as normal, 21% were stunted, and none were wasted, or stunted and wasted. In the Kuni village, only 40% were of normal weight and height, and 60% were stunted, although none were wasted, or stunted and wasted. (Connor, 1981)

**WEIGHTS AND HEIGHTS:** The mean weights and heights of children aged 6 to 11 months were 6.5 kg. and 67.5 cm. respectively in Kiunga and 7.9 kg. and 73.9 cm. in Tabubil. (Lambert, 1979)

**WEIGHTS AND HEIGHTS:** The mean weights and heights of children aged 12 to 23 months were 8.7 kg. and 75.5 cm. respectively in Kiunga and 7.9 kg. and 73.9 cm. in Tabubil. (Lambert, 1979)

**WEIGHTS AND HEIGHTS:** In the 6 to 11 month age group, 30% of the children from Kiunga were below 80% of the standard weight for height, compared to 25% from Tabubil. (Lambert, 1979)

**WEIGHTS AND HEIGHTS:** In the 12 to 23 month age group, 9% of the children from Kiunga were below 80% of the standard weight for height, compared to 33% from Tabubil. (Lambert, 1979)

**WEIGHT FOR AGE:** In the 6 to 11 month age group, 60% of the children in Kiunga and 17% of the children in Tabubil were below 80% of the standard weight for age. (Lambert, 1979)

**WEIGHT FOR AGE:** In the 12 to 23 month age group, 68% of the children in Kiunga and 66% of the children in Tabubil were below 80% of the standard weight for age. (Lambert, 1979)

**ANEMIA:** The mean blood hemoglobin levels for children aged 0-5 years were 8.8 mg. in Kiunga and in Tabubil, below the WHO criteria for anemia. (Lambert, 1979)

**SKINFOLD:** The mean triceps skinfold thickness for children aged 1-5 years was 5.6 mm. in Kiunga and 5.0 mm. in Tabubil. (Lambert, 1979)

**ARM CIRCUMFERENCE:** The mean mid-upper-arm circumference for children aged 6-11 months was 12.3 cm. in Kiunga compared to 14.0 in Tabubil. (Lambert, 1979)

ARM CIRCUMFERENCE: The mean mid-upper-arm circumference for children aged 12-23 months was 13.4 cm. in Kiunga compared to 13.2 in Tabubil. (Lambert, 1979)

ARM CIRCUMFERENCE: The mean mid-upper-arm circumference for children aged 0-5 years was 12.2 cm. in Kiunga and 13.4 in Tabubil. (Lambert, 1979)

## 2. DIETARY BELIEFS

### 2.1 DIETARY BELIEFS, GENERAL

**FRUIT:** With a few exceptions, men in Papua New Guinea do not eat fruit, because they think it is children's food. (Clark, 1978)

**FOOD HANDLING AND MENSTRUATION:** In many districts, women are forbidden to cook or handle food for the family if they are menstruating or have recently delivered. (Clark, 1978)

**OBJECTIONS TO MASHED FOOD:** Adults, especially in the highlands, do not like mashed food or food that is cut into small pieces. Some people think that mashed food looks like feces. (Clark, 1978)

#### BOUGAINVILLE

**FORBIDDEN FOODS:** Children under five in Buin District are forbidden to eat meat and fish or certain yams and bananas that are thought to cause deformities. Spices are also forbidden unless permission has been given by the medicine man. (Clark, 1978)

#### CENTRAL

**FORBIDDEN FOODS:** Children under five in Gailala District are not allowed to eat pigs and cows belonging to the family. Certain yams are thought to cause tooth decay in children under two. Two year old children are forbidden to eat taro because it is believed to cause ear discharge. (Clark, 1978)

**FORBIDDEN FOODS:** Children under five in Kairuku District are forbidden to eat fish and meat because people fear they will like them too much and not want to eat rice, banana, or sweet potato. Fish and meat are also believed to cause abdominal pains, diarrhea, and worms. (Clark, 1978)

#### CHIMBU

**FORBIDDEN FOODS:** Children in Kundiawa District are not allowed to eat pork, pandanus nuts, or foods left over from the previous day. Some people believe that pitpit gives children worms. (Clark, 1978)

**FOODS FORBIDDEN AFTER PUBERTY:** In Kundiawa District, once children reach puberty, they are no longer allowed to eat pawpaw and cucumber. (Clark, 1978)

**CONSTRAINTS DURING MENSTRUATION:** In Kundiawa District, menstruating women are forbidden to eat sugar cane, maretta, green leaves, wet foods, and foods that have blood. (Clark, 1978)

**PANDANUS:** In Kundiawa District, the first fruit of the pandanus is not eaten because it is thought to cause madness. (Clark, 1978)

## 2.1 DIETARY BELIEFS, GENERAL (Cont.)

### EAST NEW BRITAIN

**MEN'S FOOD:** In Rabul District, women are forbidden to eat "food from the men's secret place." If women eat these foods, it is thought that they will develop male parts. (Clark, 1978)

**FORBIDDEN FOODS:** In Rabul District, children under five are forbidden to eat tinned fish, pig, aibika, taro, and seafood from the corals. The application of these taboos depends in part on the birth order of the child. The last two children born to a family are only forbidden to eat pig. Pork is forbidden because the meat is considered to be too greasy for small children. (Clark, 1978)

### EAST SEPIK

**TOTEMS:** In Angoram and Ambunti Districts, family members are forbidden to eat the family's totem animal. (Clark, 1978)

**RESTRICTIONS ON CHILDREN'S DIETS:** Young children in Hagama village are not allowed to eat pig meat, cucus meat, and certain fish. People believe that children who eat cucus meat will not obey their parents. (Eng, 1979)

**CONSTRAINTS ON WOMEN:** In Maprik District, there are a number of beliefs concerning food that affect women. They are sometimes not allowed to eat meat; they are not allowed to cook for men while menstruating; they are not allowed to eat first fruits and vegetables (only old men and children may eat these); they are not allowed to eat before working in the taro garden; only old men and women are allowed to eat fish in some villages; menstruating women are not allowed to eat meat, freshwater fish, and breadfruit; women are not allowed to eat certain birds and large fish; ceremonies must be performed before yams can be eaten; foods from the "Haus Tambaran" can only be eaten by men; and certain yams can only be eaten by women and children. (Clark, 1978)

**FORBIDDEN FOODS:** In Maprik District, children under five are not allowed to eat yams, cucumbers, coconuts, and pig meat. In addition, green leaves are forbidden because the long fibres are believed to cause choking, and bananas are forbidden because they are believed to interfere with learning to talk. (Clark, 1978)

**FORBIDDEN FOODS:** In Wewak District, children under five are forbidden to eat fish that has been caught in the place where evil spirits live, large yams, certain bananas, and bush meat (until most of the milk teeth have erupted). (Clark, 1978)

### EAST HIGHLANDS

**BANANAS AND SUGAR:** Children under five in Goroka District are not allowed to eat hard bananas or sugar cane because they cannot chew them. (Clark, 1978)

PANDANUS: Girls under 10 in Goroka District are not allowed to eat mareta (red pandanus fruit) because it is believed to cause the onset of menstrual periods. (Clark, 1978)

FUNERALS: In Goroka District, the deceased's peers are not allowed to eat the feast food at the funeral feast. This applies to adults and children of all ages. (Clark, 1978)

BANANAS: Children under 5 in Okapa District are forbidden to eat bananas because they slow the eruption of the teeth. (Clark, 1978)

## ENGA

FORBIDDEN FOODS: In Lagaip District, people do not eat food that has been jumped over or stepped on, because it is believed to be bad. (Clark, 1978)

CONSTRAINTS DURING MENSTRUATION: In Lagaip District, menstruating women are forbidden to handle food to be eaten by other people. During these times they usually stay in a small hut apart from the family. (Clark, 1978)

FORBIDDEN FOODS: Children under five in Wabag District are forbidden to eat large amounts of corn because it is believed to cause diarrhea. In general, too much food is thought to slow down growth. Red pandanus is also forbidden because it causes discoloration of the mouth and teeth. (Clark, 1978)

CONSTRAINTS DURING MENSTRUATION: Menstruating women in Wabag District may only eat sweet potatoes. They are not allowed to touch foods to be eaten by the rest of the family or to look at men. During that time they must remain in their own huts. (Clark, 1978)

## MADANG

FORBIDDEN FOODS: Children under five in Bogia District are forbidden to eat cuscus, snake, and fish (because of the bones). (Clark, 1978)

FORBIDDEN FOODS: Children under five in Madang District are not allowed to eat crab, wallaby, sago, white cuscus, large fish, deep sea eel, fresh water fish, snakes, or turtles. Wallaby is believed to affect the legs and lungs; sago will cause constipation; and even the sight or smell of white cuscus will cause children to become thin, yellow, and die "unless helped by an older man." (Clark, 1978)

FORBIDDEN FOODS: Women in Madang District are forbidden to eat bandicoot and eel. (Clark, 1978)

DEATH AND FOOD GROWING: In Madang District food growing is not permitted when there has been a recent death in the family. (Clark, 1978)

FOOD PREPARATION: In Madang District it is believed that when several foods are cooked together, they will be useless unless they are also cooked with green leaves. (Clark, 1978)

## 2.1 DIETARY BELIEFS, GENERAL (Cont.)

### MANUS

**FORBIDDEN FOODS:** Children under five are forbidden to eat ripe bananas or pawpaw because they are believed to impede motor development. (Clark, 1978)

### MILNE BAY

**FORBIDDEN FOODS:** Children under five years of age in Alotau District are not permitted to eat pitpit, crab, crayfish, shellfish, turtle, octopus, cuscus, bandicoot, and hornbill. In general, babies cannot eat meat and fish because their stomachs are considered to be too young. In addition to that, pitpit is thought to cause sores, crab to cause a stomach ache, and bandicoot and hornbill to cause yellow eyes, shortness of breath, convulsions, and bad breath. (Clark, 1978)

**FORBIDDEN FOODS:** Children under five years of age in Esa'Ala District are forbidden to eat fish, crab, cuscus, lizards, and flying fox. People believe that if young children eat these animals, they will begin to adopt their behavior. (Clark, 1978)

**FORBIDDEN FOODS:** In Misima District, there are several foods that are forbidden to children under five years of age. Crayfish is believed to cause a child's backbone to become stiff; eating flying fox will cause the young child to feel cold when it rains; breadfruit is thought to cause tuberculosis; certain bananas will cause children to become fat and breathless while running. Dog is also forbidden. (Clark, 1978)

**FORBIDDEN FOODS:** In Rabaraba District, children under five are forbidden to eat chestnut because it might cause them to become disobedient. (Clark, 1978)

**FORBIDDEN FOODS:** Children under five years of age in Samarai District are forbidden to eat fish, crabs, and shellfish because they are believed to cause worms. (Clark, 1978)

### MOROBE

**SHELLFISH:** In Finschhafen District, children under five are forbidden to eat shellfish. (Clark, 1978)

**FORBIDDEN FOODS:** In Kaiapit District, children under five are forbidden to eat pork. Cassava, taro, and aibika leaves are forbidden until the child can walk. Pumpkin and sweet potato are forbidden until the child can crawl. (Clark, 1978)

**SAGO:** In Lae District, children under five are forbidden to eat sago because it is thought to cause sores around the mouth. (Clark, 1978)

**FOOD HANDLING AND MENSTRUATION:** In Masa village, women are not allowed to cook for men and children while they are having their monthly periods. They are not allowed to go into the garden either but must remain in the home until the period has ceased. Chronic cough is believed to occur

when a woman has not cleaned herself properly after her monthly period before preparing food for the family. (Eng, 1979)

#### NATIONAL CAPITAL

**FOODS GOOD FOR CHILDREN:** In Port Moresby, the following foods are believed to be good for children under five: English potatoes, eggs, fish, green leaves, ice cream, fresh meat, fresh milk, pawpaw, pumpkin, rice, and sweet potatoes. (Clark, 1978)

**FOODS BAD FOR CHILDREN:** "Uneducated parents" in Port Moresby believe that fish, meat, eggs, and chicken are bad for young children. (Clark, 1978)

#### NEW IRELAND

**FORBIDDEN FOODS:** In Kavieng District, children under five are not allowed to eat snake and turtle because they may cause sickness. (Clark, 1978)

**CHILDREN'S DIETS:** Children in Umbukul are not allowed to eat stone fish or the top of the sugar cane. Children with asthma are not allowed to eat red coconut or pork. Eating these foods is believed to cause stunted growth. (Eng, 1979)

#### NORTHERN

**LIZARDS AND EELS:** Young children are not allowed to eat goanas (lizards) or eels. Eels are thought to make hair gray prematurely, and goanas are thought to retard growth. When parents eat goanas and eels, they are supposed to tell the children what they are eating and reassure them that they too will be able to eat it when they are older. If they don't, children may get very sick. This procedure of telling the children is called "Onje Pejari" in Orokaiva. (Eng, 1979)

**FORBIDDEN FOODS:** In Ponpondetta District, children are forbidden to eat certain fish because they are believed to cause scabies; shark is believed to cause skin diseases. (Clark, 1978)

**FORBIDDEN FOODS:** In Tufi District, children under five are not permitted to eat shellfish from the mangrove swamps because it will affect the child's knees and prevent him from learning to walk properly. Pig and short bananas, sharks, cuscus, and bandicoots are also forbidden because they are believed to cause sickness and skin allergies. (Clark, 1978)

#### NORTH SOLOMONS

**FISH AND EGGS:** Children aged 1 to 6 years in Hangan village are not allowed to eat red fish and eggs. People believe that if they do, they will have boils. (Eng, 1979)

## 2.1 DIETARY BELIEFS, GENERAL (Cont.)

### SIMBAI MARING

**GARDENING:** Maring custom forbids widows and close female relatives of a deceased person from entering their gardens for several weeks after the death. The effect of this prohibition on food production in a relatively stable population is not known, although if a large number of deaths occurred (due for instance to intertribal warfare or an epidemic) food production would probably fall. (Buchbinder, 1977)

### SOUTHERN HIGHLANDS

**FOOD PREPARATION AND MENSTRUATION:** In Ialibu District, menstruating women are not allowed to prepare food for the family. They live and eat alone until their period is finished. (Clark, 1978)

### WEST NEW BRITAIN

**FORBIDDEN FOODS:** In Talasea District, children under five are forbidden to eat big fish which, in large quantities, might make them sick; they are also forbidden to eat certain sea weeds that are believed to cause coughing. (Clark, 1978)

### WEST SEPIK

**FORBIDDEN FOODS:** In Amanab District, there are several beliefs regarding food that affect children under five. Pandanus nuts are forbidden because they might cause a child's mother's brother to die; bush animals are thought to cause sores; wild fowl's eggs and large bananas are thought to retard growth. Cockatoo and hornbill are also forbidden. (Clark, 1978)

**FOOD CONSTRAINTS:** In Lumi District, there are several beliefs regarding food that affect women and children. Certain women are not allowed to eat hen's eggs; women and children are not allowed to eat food from other villages; menstruating women are not allowed to cook food for the family; and taro is thought to cause edema. (Clark, 1978)

**FORBIDDEN FOODS:** In Lumi District, there are several beliefs regarding food that affect children under five. Young children are not allowed to eat large yams, taro, pawpaw, coconut, and certain bananas. Cassowary and other birds are not given until the child is two years old; foods associated with spirits, hunting, or planting rituals are not given to children until they can talk; green leaves are not given to children until they can go to the toilet alone. (Clark, 1978)

**SAGO:** Sago is the only food that is believed to be good to give children before they learn to talk. (Clark, 1978)

**FORBIDDEN FOODS:** In Telefomin District, children under five are forbidden to eat the following foods: possum, wild birds and their eggs, snake, eggs, some kinds of sugar cane, certain bananas, maretta, wild mushroom, taro, food that has been offered to spirits, cassowary, wild pig, and certain kinds of beans. (Clark, 1978)

## WESTERN

**CONSTRAINTS ON CLANS:** In Kiunga District, each clan has an animal name. After a death, the whole family is forbidden to eat the clan animal for an undetermined period of time. (Clark, 1978)

## WESTERN HIGHLANDS

**FORBIDDEN FOODS:** In Jimi District, children under five are forbidden to eat eggs because they are believed to stop children from talking. Marettia pandanus is also forbidden because it stains the feces red. (Clark, 1978)

**FORBIDDEN FOODS:** In Minj District, children under five are forbidden to eat fresh fish because it is believed that it would cause them to become as dumb as fish. Certain bananas are also forbidden because they are thought to be harmful to the teeth. (Clark, 1978)

## 2.2 DIETARY BELIEFS, ABOUT PREGNANCY (Cont.)

### NATIONAL

**LIMITS ON INTAKE:** It is commonly believed that if a woman eats a lot during pregnancy, the baby will be too big, and she will have a difficult delivery. (Nanai, 1982)

### BOUGAINVILLE

**PORK FORBIDDEN:** Pregnant women in Kieta District are forbidden to eat pig meat. (Clark, 1978)

### CENTRAL

**CONSTRAINTS:** Pregnant women in Goilala District are forbidden to eat food from another village or neighboring party, because of the fear of sorcery. (Clark, 1978)

**FORBIDDEN FOODS:** Traditionally, pregnant women in Kairuku District were not allowed to eat wallaby or shell-fish because they believed it might harm the baby. However, they have begun noticing that this is not the case. (Clark, 1978)

### CHIMBU

**FORBIDDEN AND RECOMMENDED FOODS:** Pregnant and young girls in Kundiawa District are forbidden to eat short bananas; pork, pandanus nuts, and excessive amounts of beans or bananas. Green leaves are thought to be good to eat. (Clark, 1978)

### EAST NEW BRITAIN

**FORBIDDEN FOODS:** In Rabaul District, pregnant women are forbidden to eat two fruits that are stuck together for fear of having twins. Certain kinds of meat might cause the baby to be born too small, and octopus will

## 2.2 DIETARY BELIEFS, ABOUT PREGNANCY (Cont.)

cause the baby to have sores or scabies. Crabs, tinned fish, dogs, and certain kinds of bananas are also forbidden. (Clark, 1978)

### EAST SEPIK

**RESTRICTED FOODS:** People in Hagama village believe that if pig meat and ceremonial yams are eaten during pregnancy, the mother will have a difficult delivery, and the newborn will cry a lot and eat a lot. (Eng, 1979)

**FORBIDDEN FOODS:** In Angoram District, pregnant women are forbidden to eat cassowary, crowned pigeon, crocodile, and certain sago grubs. (Clark, 1978)

**FORBIDDEN FOODS:** In Maprik District, pregnant women are forbidden to eat too many green leaves, food from a new garden, snake, possum, and cassowary. In addition, salt and sugar cane are forbidden because it is believed that the baby will be too fat, and certain yams are forbidden because they are believed to cause the death of the fetus. (Clark, 1978)

**FORBIDDEN FOODS:** In Wewak District, pregnant women are not allowed to eat certain game because they are believed to cause stillbirth or premature birth. (Clark, 1978)

**SOUP:** In Maprik District, banana soup is thought to be good for women to eat during pregnancy. (Clark, 1978)

### EAST HIGHLANDS

**FORBIDDEN FOODS:** Eleven of the 63 mothers interviewed at the Goroka Base Hospital (17.5%) reported specific food avoidances during pregnancy and/or lactation. Pregnant women should not eat food cooked by people outside their families or food brought in from different areas. Women in their first pregnancy should not eat food brought by an enemy, because it could cause the death of the first child. Strong foods such as taro, tapioca, and cooking banana should also be avoided because they could cause a difficult labor. (Earland, 1982)

**FORBIDDEN FOODS:** Pregnant women in Henganofi District are not allowed to eat rice and fish because they are believed to make the baby's skin dirty. Old corn is also forbidden because it is thought to make the delivery very difficult. (Clark, 1978)

**FORBIDDEN AND RECOMMENDED FOODS:** Women in Okapa District are forbidden to eat sugar cane during the first pregnancy because it is believed to cause a difficult labor. On the other hand, they are encouraged to eat karana leaves, flowers and fruit, in order to bear stronger and healthier children. These foods are also believed to make men strong. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Kainantu District are forbidden to eat certain "long nosed" fish because they might cause the child to have a long nose. (Clark, 1978)

## ENGA

**SALT FORBIDDEN:** Pregnant women in Wabag District are forbidden to eat salt because it is thought to cause birth marks. (Clark, 1978)

**GREEN LEAVES:** Pregnant women in Wabag District are encouraged to eat green leaves so that their babies will be healthier. (Clark, 1978)

## MADANG

**FORBIDDEN FOODS:** Pregnant women in Bogia District are forbidden to eat leftover sago, cassowary, and pig that has been killed by a dog, during the first pregnancy. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Madang District are forbidden to eat flying foxes, cassowaries, lizards, or big fish because these animals will block the birth canal. Certain fish, shellfish, and crabs are also forbidden. Bandicoot is thought to cause a difficult labor, and burnt or roasted foods are forbidden during pregnancy and after delivery until the baby is weaned. Only boiled food is allowed during pregnancy. (Clark, 1978)

**BANDICOOT FORBIDDEN:** Pregnant women in Saidor District are forbidden to eat bandicoot because it is believed to cause miscarriages. (Clark, 1978)

## MANUS

**FORBIDDEN FOODS:** Pregnant women in Manus Province are forbidden to eat big fish, turtle, and crab, because they might cause the baby to have deformed limbs. (Clark, 1978)

## MILNE BAY

**FORBIDDEN FOODS:** Pregnant women in Alotau District are not allowed to eat the following foods: crayfish, cuttlefish, tortoise, turtle, bandicoot, cuscus, hornbill, octopus, red fish, crab, tuna, and flying fish. Flying fish are thought to cause a hard labor and deformities in the child; crab is thought to cause stomach ache; and tuna is forbidden because it has a lot of blood. Greasy food of any kind is also forbidden because it is thought that the baby will have too much grease on its body. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Eas'Ala District are not allowed to eat crabs, fish, snakes, cuscus, or crocodile because if they do, the fetus will turn into one of these animals. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Losuia District are not allowed to eat pawpaw, ripe bananas, mangoes, oranges, pineapples, sugar cane, and coconut. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Samarai District are forbidden to eat certain foods. Aibika leaves are believed to cause hemorrhaging at birth; certain other green leaves are believed to cause prolonged labor; flying fox will cause "imperforate anus" in the baby; consumption of

## 2.2 DIETARY BELIEFS, ABOUT PREGNANCY (Cont.)

octopus will cause the placenta to be retained; prawns will cause spina bifida in the baby; and sago, burnt food, and certain fish and meat will cause the baby to be unhealthy and deformed. (Clark, 1978)

### MOROBE

**MEAT FORBIDDEN:** In Finschhafen District, pregnant women are forbidden to eat meat. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Kaiapit District are forbidden to eat cassava, salt, and ginger. (Clark, 1978)

**RECOMMENDED FOODS:** In Kaiapit District, the following foods are believed to be good for pregnant women: bananas, pumpkins, sweet potatoes, pawpaw, green leaves, and coconut. (Clark, 1978)

**FORBIDDEN FOODS:** Pregnant women in Lae District are forbidden to eat big fish such as sharks, turtles, or crabs because they are thought to cause deformities in the child. (Clark, 1978)

### NATIONAL CAPITAL

**RECOMMENDED FOODS:** In Port Moresby, the following foods are believed to be good for pregnant women: bananas, fresh fruit, green leaves, mangoes, taro, and yams. (Clark, 1978)

### NEW IRELAND

**FORBIDDEN FOODS:** In Kavieng District, pregnant women are not permitted to eat certain kinds of fish because they may make the baby sick. They are also not permitted to eat octopus, snake, or turtle. (Clark, 1978)

**FOODS FORBIDDEN DURING FIRST PREGNANCY:** In Namatanai District, women undergoing their first pregnancy are not allowed to eat fish, crab, and octopus, because if they do, the baby will be born with a rash and sores. (Clark, 1978)

### NORTHERN

**FORBIDDEN FOODS:** In Popondetta District, pregnant women are forbidden to eat big fish, shark, turtle, certain taro, and certain bananas. Taro is believed to cause the baby to be born with an extra limb. Certain bananas may cause the women to have enlarged breasts. (Clark, 1978)

**FOOD HANDLING:** In Ponpondetta District, people who are sick or have sores must not eat food handled by a pregnant woman because it will cause the sores to become infected. When a child is sick, the mother must not eat big fish. (Clark, 1978)

**FORBIDDEN FOODS:** In Tufi District, pregnant women are forbidden to eat crayfish, cuttlefish, turtle, cuscus, red fish, hornbill, and bandicoot because they are believed to cause difficult labor. (Clark, 1978)

## **SIMBAI MARING**

**LIMITS ON INTAKE:** Maring women in Tuguma believe that if they eat too much during the last months of pregnancy, the fetus will be squashed, because the body does not have enough room for both. (Buchbinder, 1977)

## **SOUTHERN HIGHLANDS**

**CASSOWARY:** In Mendi District, pregnant women (and fathers-to-be) are not allowed to eat cassowary because it is believed that it would cause the baby to be born blind. (Clark, 1978)

**CASSOWARY:** In Nipa District, pregnant women are forbidden to eat cassowary because it is believed that the baby will be born with the same kind of eyes. (Clark, 1978)

## **WEST NEW BRITAIN**

**FORBIDDEN FOODS:** Pregnant women in Talasea District are forbidden to eat animal food because it will make the baby large, causing the birth to be difficult. They are also forbidden to eat certain sea weeds or two bananas growing together. In the the case of the first-born child, foods cooked in coconut cream are also forbidden because they will make the baby's body dirty at birth. (Clark, 1978)

## **WEST SEPIK**

**FORBIDDEN FOODS:** In Amanab District, there are several beliefs regarding food that affect pregnant women. Consumption of bandicoot and wild bird will cause the baby to be born thin or not at all; women are not allowed to eat food from a garden where evil spirits live until after the baby crawls or walks; bush animals are forbidden because of the magical substances used in hunting; and tortoise is not allowed because the shell is thought to prevent the birth. Eel, lizard, cassowary (bird and eggs), flying fox, certain snakes, and coconuts are also forbidden. (Clark, 1978)

**FORBIDDEN FOODS:** In Lumi District, pregnant women are not allowed to eat big yams, all meat (except flying fox and pig), yams, cassowary, opossum, and taro. (Clark, 1978)

**FORBIDDEN FOODS:** In Telefomin District, pregnant women are forbidden to eat flying fox, snake, wild mushrooms, wild horn, rats' legs, and possums. (Clark, 1978)

## **WESTERN**

**FORBIDDEN FOODS:** In Kiunga District, pregnant women are forbidden to eat red pepper, hot tea, and ginger because they are considered to be too strong and they might therefore endanger the life of the baby. (Clark, 1978)

## 2.2 DIETARY BELIEFS, ABOUT PREGNANCY (Cont.)

### WESTERN HIGHLANDS

**FORBIDDEN FOODS:** In Minj District, pregnant women are forbidden to eat fat drippings and consume extra fluids because they are thought to be harmful to the baby. (Clark, 1978)

## 2.3 DIETARY BELIEFS, ABOUT LACTATION (Cont.)

### NATIONAL

**BREAST FEEDING AND PREGNANCY:** People in many parts of Papua New Guinea believe that a mother should not breast feed one child if she is pregnant with another, because her milk will have gone bad. (Nanai, 1982)

### BOUGAINVILLE

**FORBIDDEN FOODS:** Lactating women in Kieta District are forbidden to eat fish and to drink coconut milk because they believe that to do so might give the baby a cough. (Clark, 1978)

### CENTRAL

**NO MEAT:** Lactating women in Goilala District are not allowed to eat fresh meat until the infant is 4 months old, because it is thought to be harmful to the child. (Clark, 1978)

**CONSTRAINTS:** Lactating women in Kairuku District are confined to their homes for one month after the birth of the first child and for three weeks after the birth of the second child. The period of confinement decreases with each successive child. Lactating women are not allowed to eat meat during the period of confinement to the home. They are allowed to eat only yam and banana cooked in coconut cream. Once the period of confinement is over, they are allowed to eat kuku crabs and shellfish. However, they are not allowed to eat mangrove crabs, red meat, or stingray fish until the child can walk. Eating crabs could cause the child to have chest infections; red meat could cause the child to hemorrhage, pass bloody stools, or develop a fever; and stingray fish could delay the onset of sitting, crawling, and walking. Sugar cane is also forbidden to the mother because it might break her teeth. (Clark, 1978)

**FORBIDDEN FOODS:** Lactating women in Kairuku District are not allowed to eat meat, shellfish, fish, crabs, pig, and wallaby for three days after the birth of the baby. After three days, all of these foods except crabs are permitted unless the baby cries. If the baby cries, the mother must not eat any of these foods until the baby has calmed down. (Clark, 1978)

**POSTPARTUM ACTIVITY RESTRICTION:** People in the Kairuku area believe that the placenta is dirty. As a result of this, mothers who have just delivered their first baby are not allowed to cook or wash plates for two months. Another person must always be with them. For subsequent births, this special period only lasts one month. (Eng, 1979)

**FOOD PREPARATION:** Lactating women in Kairuku District are not allowed to cook or handle food for three months after delivery because their hands are dirty from holding and cutting the umbilical cord. (Clark, 1978)

**NO INTERCOURSE:** In the Kairuku area, women abstain from sexual intercourse as long as their children are breast feeding. (Eng, 1979)

**FORBIDDEN FOODS:** Lactating women in Rigo District are forbidden to eat meat immediately after giving birth because the uterus still has blood in it. (Clark, 1978)

**BLOOD:** In the Rigo District people believe that nursing mothers should not eat foods that have blood in them. (Nanai, 1982)

#### CHIMBU

**GOOD AND BAD FOODS:** Lactating women are not allowed to eat pork or pandanus nuts. Sugar cane is thought to insure a good milk supply. (Clark, 1978)

#### EAST SEPIK

**FORBIDDEN FOODS:** In Angoram District, lactating women are forbidden to eat cassowary, crowned pigeon, crocodile, and certain sago grubs until the baby is 2 to 3 months old. (Clark, 1978)

**FORBIDDEN FOODS:** In Maprik District, lactating women are forbidden to eat salt, breadfruit, meat, fish, and coconut for one week after the birth of the child. In some villages, women are forbidden to eat and drink for one whole week after childbirth. They are also forbidden to eat fish, chicken, aibika leaves, water snakes, flying fox, food cooked in the fire (until the child's first tooth has erupted), cold foods (until the baby is one month old), and cassowary. (Clark, 1978)

**FORBIDDEN AND RECOMMENDED FOODS:** In the Maprik District, people believe that eating green leaves during pregnancy will harm the fetus. Banana soup, however, is thought to be good for pregnant and lactating women. (Nanai, 1982)

**CONSTRAINTS:** In Wewak District, lactating women are not allowed to eat any food until 24 hours after the birth of the child. In addition, coconut, bush meat, and fish are not allowed until the child is one month old; large fish, large bananas, and some greens are not allowed because they may cause the child to be malformed; certain game is forbidden because it may cause sickness in the child, and only hot water may be drunk. (Clark, 1978)

**RESTRICTIONS:** Breast feeding mothers in Hagama village are not allowed to eat pig meat, cuscus meat, and certain fish. (Eng, 1979)

**ENCOURAGING MILK PRODUCTION:** People in Hagama village believe that if a mother drinks plenty of soup, prepared with a variety of ingredients, she will have no trouble breast feeding. (Eng, 1979)

### 2.3 DIETARY BELIEFS, ABOUT LACTATION (Cont.)

**INTERCOURSE:** In Hagama village, abstinence is practiced while a mother is breast feeding, and the couple will be teased, criticized, or scolded in public if the baby is weaned too early. Breast feeding usually ceases when the mother becomes pregnant, or if the child loses interest. (Eng, 1979)

#### EASTERN HIGHLANDS

**CONSTRAINTS:** Lactating women in Goroka District are not allowed to eat at the celebration feasts held after childbirth. They are not allowed to eat mumued food until the baby is three months old. (Clark, 1978)

**BREAST FEEDING AND PREGNANCY:** One-third of the 63 mothers interviewed at the Goroka Base Hospital reported that they would not continue breast feeding if they became pregnant again, even if the child was only 1 to 1 1/2 years of age. They believed that their children would get diarrhea from drinking stale breast milk. (Earland, 1982)

**FORBIDDEN FOODS:** Lactating women in Kairuku District are forbidden to eat cold food or to drink cold water, because these could upset the mother and make the baby sick. They are not allowed to eat pig until the baby is 6 months old. (Clark, 1978)

#### ENGA

**PREGNANCY AND BREAST FEEDING:** In Aipipaka, abstinence is practiced as long as a child is breast feeding. Babies are weaned when the mother become pregnant again. (Eng, 1979)

#### MADANG

**FORBIDDEN FOODS:** Lactating women in Bogia District are forbidden to eat bananas, beans, and taro from a new garden until the baby's skin goes dark. (Clark, 1978)

**PREGNANCY:** Babies on Karkar Island are weaned when the mother becomes pregnant again, because people believe that a pregnant woman's milk turns sour. Children often get sick shortly after they are weaned. (Eng, 1979)

**FORBIDDEN FOODS:** Lactating women in Madang District are forbidden to eat the following foods: crayfish, prawns, burnt and roasted foods, sugar cane (until the baby's teeth have erupted), yam that is growing, the first fruit of the pitpit, white cuscus (even looking at it or smelling it may cause death, unless an older man intervenes to prevent it), eggs, wallaby, and betel nut. (Clark, 1978)

#### MANUS

**NO INTERCOURSE:** In Kari village, abstinence is practiced during lactation. It is considered shameful to sleep with a woman who is breast feeding. (Eng, 1979)

VARIATIONS IN AVOIDANCE; On Los Negros Island, food avoidances for lactating women vary from clan to clan. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Manus Province are not allowed to eat big fish, crabs, or betel nut, because they might cause the baby to have diarrhea. (Clark, 1978)

#### MILNE BAY

FORBIDDEN FOODS: Lactating women in Alotau District are forbidden to eat crab, watermelon, and coconut. Crab is thought to cause stomach ache to both the mother and the child. Watermelon is forbidden because it is thought to make the child too heavy to crawl and walk at the proper age, and coconut eaten by the mother may cause the child to develop an enlarged spleen. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Esa'Ala District are not allowed to eat green vegetables because if they do, the child will get thrush in the mouth. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Losuia District are not allowed to eat pawpaw, ripe bananas, mangoes, oranges, pineapples, sugar cane, or coconut until the baby is six months old. Also forbidden are "cold" foods that would make the milk cold and upset the baby's stomach, foods cooked in coconut cream that would make the milk too fatty, and foods that would change the taste of the milk, such as shellfish, crabs, fish, pork, and chicken. Eggs are also forbidden because they cause boils on the baby. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Misima District are forbidden to eat certain foods. Red fish is believed to cause scabies; certain ocean fish will make the child sick; crab is thought to cause impetigo; fish and pig give the mother a stomach ache; food from a new garden is thought to cause an enlarged spleen; and betel nut is also thought to cause a child sickness. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Rabaraba District are not allowed to eat food cooked with coconut milk, salt, or fish until the baby is 2 to 3 weeks old. (Clark, 1978)

FORBIDDEN FOODS: Lactating women in Samarai District are forbidden to eat food cooked in coconut milk, bread, sago, and fish. These foods are believed to cause the baby's appearance to change or to make the baby unhealthy or constipated. Mothers are also forbidden to eat coconut until the baby is one month old, and fish, meat, eggs, shellfish, and crab are also forbidden until the child is between 3 months and 2 years of age. The duration of the taboo depends on the strictness of the family. (Clark, 1978)

#### MOROBE

FORBIDDEN FOODS: Lactating women in Kaiapit District are forbidden to eat the following: salt, yams, pumpkin leaves, ginger, tulip leaves, green mangoes, large pigs with tusks, cassava, and bananas cooked in the

## 2.3 DIETARY BELIEFS, ABOUT LACTATION (Cont.)

fire. This restriction holds until the child's first tooth has erupted. (Clark, 1978)

**RECOMMENDED FOODS:** In Kaiapit District, the following foods are believed to be good for lactating women: taro, sweet potato, banana, coconut cream, leaves, and pawpaw. (Clark, 1978)

**FORBIDDEN FOODS:** Lactating women in Lae District are forbidden to eat the following foods: bandicoot, seafood, pig, chicken, large fish, shellfish, vegetables with small thorns (such as pumpkin tops), foods mixed with coconut oil, stringy foods (green mangoes, ripe pawpaw, and coconut meat), turtle, crab, and betel nut. Bandicoot is thought to cause diseases in the child; seafood may cause the baby's skin to burn in the sun; and turtles, crabs, and betel nut are thought to cause diarrhea. (Clark, 1978)

### NATIONAL CAPITAL

**FORBIDDEN FOODS:** Lactating women in Port Moresby are not supposed to eat pig, large fish, or too much rice. (Clark, 1978)

**RECOMMENDED FOODS:** In Port Moresby, the following foods are believed to be good for lactating women: corn, eggs, fresh fish, green coconut soup, fresh meat, melon, milk, peanut butter, pumpkin, rice, sweet potato, taro, tomatoes, traditional vegetables, and yam. However, they should eat only banana and coconut until one week after the baby is born. (Clark, 1978)

### NEW IRELAND

**FORBIDDEN FOODS:** In Namatanai District, lactating women are forbidden to eat fish, crab, and octopus until the child is one year old. (Clark, 1978)

**ASTHMA:** Mothers in Umbukul who have asthma are not allowed to breast feed, because if they do, it is believed that the children will also catch the disease. (Eng, 1979)

### NORTH SOLOMONS

**INCREASING MILK SUPPLY:** In Hangan village, mothers are encouraged to drink soup mixed with coconut grease in order to produce more milk. (Eng, 1979)

**NO INTERCOURSE:** Breast feeding mothers in Hangan village are not allowed to have sexual intercourse with their husbands until their babies are weaned. (Eng, 1979)

### NORTHERN

**FORBIDDEN FOODS:** In Tufi District, lactating women are forbidden to eat large fish because this will cause the baby to pass watery stools. Baked fish is also forbidden because it might cause the baby to develop a large spleen. In addition, new mothers must not eat pig meat. (Clark, 1978)

## SOUTHERN HIGHLANDS

**FORBIDDEN FOODS:** In Kagua District, lactating women are not allowed to eat sago and sago grubs because they are believed to make the child sick or to grow hair like a grub. (Clark, 1978)

## WEST SEPIK

**FORBIDDEN FOODS:** In Amanab District, there are several beliefs regarding food that affect lactating women. Pawpaw is forbidden until the first child walks; cassowary is not allowed while the mother is still feeding her first child. Cooking bananas, certain coconuts, and crocodiles are also forbidden. (Clark, 1978)

**FOOD CONSTRAINTS:** In Lumi District, there are several beliefs regarding food that affect lactating women. Yams, cassowary, and possum are thought to poison the mother's milk; pandanus fruit is thought to cause breast abscesses. Givia pigeon, large fish, taro, large foods, and wild pig are also forbidden. During the first month following childbirth, all foods except sago and green leaves are forbidden. (Clark, 1978)

## WESTERN HIGHLANDS

**NO FORBIDDEN FOODS:** In Minj District, lactating women are encouraged to eat plenty of everything. (Clark, 1978)

### 2.4 DIETARY BELIEFS ABOUT BREAST MILK SUBSTITUTES (INCLUDING BOTTLE FEEDING)

### 2.5 DIETARY BELIEFS ABOUT WEANING

## MADANG

**FORBIDDEN FOODS:** Children aged 6 months to 2 years in Madang District are not allowed to eat food cooked with coconut cream because they may get diarrhea, cough, or a sore throat. (Clark, 1978)

### 2.6 DIETARY BELIEFS ABOUT ILLNESS AND CURE (Cont.)

## CHIMBU

**FOOD AS CURES AND CAUSES OF ILLNESS:** People in Kundiawa District believe that mareta is good for the blood, but that too much causes fever; they also believe that taro and cassava may prevent sleep unless eaten together with sweet potato, that eggs are good for coughs, that frogs make men weak and are therefore women's food, that bananas are good for diarrhea, and that store-bought foods are desirable. (Clark, 1978)

## NATIONAL CAPITAL

**RECOMMENDED FOODS:** In the town of Port Moresby, the following foods are thought to be good for sick people: apples, bananas, biscuits (navy bread), bread, cassava, coffee, eggs, expensive and different foods, fish, fruit, pumpkin, rice, sweet potato, tea, tinned pineapple, and yam.

## 2.6 DIETARY BELIEFS ABOUT ILLNESS AND CURE (Cont.)

In the village, only coconut and sugar cane are thought to be good for sick people. (Clark, 1978)

### NEW IRELAND

**FASTING:** In Kavieng District, it is believed that people who are sick should fast. Pork especially is forbidden to people who are sick. (Clark, 1978)

### 3. DIETARY PRACTICES

#### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**STAPLES:** Staples are many and diverse, including 450 kinds of sweet potatoes, sago (as starch from the palm tree) in coastal regions and swampy areas, cassava (tapioca), yam, taro (both common and Chinese) in coastal areas, and a large variety of bananas. Rice is consumed in towns and is produced in West Sepik. Bread is consumed in cities, but wheat is not acceptable as a substitute in most areas. Irish potatoes are popular in the highlands. (Licross, 1979)

**DIET:** In addition to staples, other foods are: a variety of pulses, including beans (wingbeans in the highlands), peas (cowpeas), and peanuts; green vegetables, including leaves of tulip, amaranth, "aibika" (the most consumed), "kangkong," tapioca, and pumpkin tops. Little fruit is eaten, except bananas and coconut. Meat is chicken and pork (for feasts) and wild game (mainly opossum). In the coastal and river areas (Sepik), fish is used. Fresh milk is not consumed, but use of canned milk with tea and sugar is spreading, even in rural areas. (Licross, 1979)

**DIET:** The staple food in the highland is the sweet potato (kaukau). Kaukau, taro, plantains, cassava, or maize are either cooked in the ashes of the fire, boiled in a tin, or baked in a stone oven. Other foods include ferns, garden leaves such as amaranth, hibiscus (aibika), and crop leaves such as sweet potato, pumpkins, peanuts, soyabeans. All animals are considered edible, including spiders, beetles, grasshoppers, praying mantis, crickets, ants, grubs, mice, rats, opossums, birds, lizards, and green snakes. Sometimes fish are caught in mountain rivers. Pigs are slaughtered only on ceremonial occasions, and hence contribute very little to the daily diet of most individuals. (Corden, 1979)

**TRADITIONAL DIET:** The traditional diet is predominantly based on a small number of staple crops. The main starchy crops in the lowlands are sago and banana. Sweet potato, taro, and yam are the main staples in the highlands. (Coyne, 1981)

**TRADITIONAL DIET—VITAMINS AND MINERALS:** The vitamin and mineral composition of the diets are usually sufficient. Ascorbid acid (vitamin C), carotene (for vitamin A), calcium, and iron are almost always adequate. Iodine, and perhaps sodium, is in short supply in some areas. Thiamin deficiency has been reported in some communities that are exclusively sago eaters. (Coyne, 1981)

**CARBOHYDRATE INTAKE:** The proportion of energy which is provided by carbohydrates in the traditional diet tends to be relatively high, particularly for inland volcanic island dwellers. The form in which the carbohydrates are eaten may be more important than the amount. (Coyne, 1981)

**URBAN DIFFERENCES:** Compared with the traditional rural diet, urban diets are higher in sucrose (table sugar), salt, carbohydrates, protein, calories, cholesterol, and fat. The principal foods consumed were bread, polished rice, and tinned goods. (Coyne, 1981)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**HIBISCUS:** Aibika (hibiscus manihot) is a plant with edible dark green leaves that are high in vitamins and minerals, particularly vitamins A, C, and iron. It grows well in loose, well-drained soils. About 45 different types are known to Papua New Guinea, of which 39 grow in the lowlands. (Nutrition and Development, 1982)

**TARO:** Taro (Calocasia) grows on almost every island of the South Pacific. A plant takes 5 to 7 months to mature in the lowlands of Papua New Guinea. Taro leaves are especially rich in vitamins A, C, and B<sub>2</sub> (riboflavin). All parts of the plant are edible and nutritious. It is also an excellent source of calories, fiber, calcium, and iron. (Nutrition and Development, 1982b)

**FISH:** Monthly production of salt fish (solpis) in East Sepik and West Sepik Provinces is about 2 tons (despite other reports that estimate it at 600 tons), of which 1.5 tons are exported to the Highlands Provinces. (Lambert, 1979)

**GAME--DECREASE:** The amount of food available from hunting has declined because of population pressure and the introduction of shotguns. (Lambert, 1980a)

**DIET DEFICIENCIES:** Greens, beans, and a variety of fruits are the three most important items missing in the daily diet of people in Papua New Guinea. (Cox, 1980)

**JUNK FOOD:** The introduction of western-type food and the growth in consumption of "junk-food" has contributed to the aggravation of nutritional problems. (Lambert, 1980a)

**PROCESSED FOODS:** Very little food processing is actually done in Papua New Guinea. A few exceptions are some foods of low nutritional quality such as white bread, beer, ice cream, soft drinks, cakes, biscuits, and snack foods. (Lambert, 1979)

**TYPICAL MEAL--SEPIK:** A typical meal in the middle Sepik region (low lying area) may consist of some of the following: sago fried into pancakes or boiled into porridge, greens boiled in water, shrimps cooked in a clay frying pan, fish baked in the fire, binatang (Mayflies) cooked in a clay frying pan, and a boiled root vegetable, such as yam, taro, or cassava. (Corden, 1979)

**FOOD SOURCES:** Of all food consumed by Papua New Guinea nationals in 1976, an estimated 53% came from subsistence production, 24% from marketed domestic production, and 23% from imports. (Lambert, 1979)

**FOOD IMPORTS:** About 25% of Papua New Guinea's food is imported. (Lambert, 1980a)

**FOOD SUPPLY:** Factors that have a negative effect on the food supply include: land pressures, declining hunting and gathering, competition with cash crops, and periodic disasters (taim hangri). Male migration to other areas also reduces the amount of labor available for subsistence production. (Lambert, 1979)

**FOOD PRODUCTION:** In 1977-79, food production per capita was 106% of the 1969-71 level. (World Bank 1981)

**CASH CROPS:** A study carried out in 1975 showed that income earned from the sale of cash crops was often spent on non-food items or items low in nutritional value. (Lambert, 1980a)

**AGRICULTURE:** In 1979, 82% of the labor force was engaged in agriculture, as 89% had been in 1960. (World Bank 1981)

**LAND PRESSURES:** Land pressure has become an increasing problem in areas where cash crops are prevalent. (Lambert, 1980a)

**CALORIE SUPPLY:** The supply of available calories in 1977, 2,268 calories per person per day, was 85% of the amount estimated by FAO as necessary to meet requirements. (World Bank 1981)

**CALORIE INTAKE DEFICITS:** Studies carried out in 1973 showed that there is a severe calorie deficit in certain districts. The average daily caloric intake was 78% adequate in the Enga Districts and 60% adequate in the Sepik Districts. These data suggest insufficient food production and availability, despite import expenditures on food. Almost 24% of the total caloric requirement of Papua New Guinea is met by imports, a remarkably high percentage for a predominantly agricultural economy. (Corden, 1979)

**VARIED DIET:** The staple food of the inhabitants of Unia Island (Vitu Group) is taro, but they are able to supplement it with maize, pitpit, sugar cane, bananas, pawpaws, edible greens (including taro and fern leaves), and some coconuts. This is similar to the diet of peoples from the coastal or lower foothill area (up to about 300 m. above sea level) of Papua New Guinea. (Cordon, 1979)

**EATING PATTERNS:** It did not appear as if there were regular eating patterns in Telope. On some days, one meal a day was brought to the researcher for weighing. On other occasions people ate a variety of snacks, including breadfruit kernels, coconut, cucumbers, and pineapples at almost two-hour intervals. Energy intakes for one individual ranged from 3500 one day to 7200 kilojoules (825 and 1714 cal.) on another day. Another individual observed consumed 4500 kJ (1060 cal.) one day and 15,050 kJ (3580 cal.) another day, primarily from sago, breadfruit kernels, beans, pumpkin leaves, and cucumber, with a few small pieces of steak. (Cordon, 1979)

**YAMS:** In the Trobriand Islands, yam is a significant contributor of food energy (together with sweet potatoes and taro), but it is also of great cultural significance, because it symbolizes a man's agricultural ability and wealth. It is also the only staple of Papua New Guinea that will last for 2 to 3 months in storage. (Cordon, 1979)

## **BOUGAINVILLE**

**FOODS EATEN:** The following foods are eaten in Bougainville Province. In Buin District: banana, sweet potato, taro, yam, chicken, egg, fish,

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

grubs, peanuts, prawns, pigs, possum, wild birds, coconut, sago, aibika, cabbage, green leaves, pumpkin, pumpkin tops, and pawpaw. Foods available in season are: breadfruit, bow nuts, galip nuts, and mango. Biscuits, rice, sugar, tea, and tinned fish are available in the local stores. In Kieta District: banana, cassava, sweet potato, taro, coconut, Chinese taro, beans, cabbage, corn, cucumber, pumpkin tops, spinach, tomato, taro leaves, lemons, pawpaw, and pineapple. Yams are also eaten occasionally. Seasonal foods are breadfruit, Galip nuts, and mango. Rice, tinned meat, and tinned fish are available in stores. (Clark, 1978)

**FOOD PREPARATION:** In Bougainville Province, there are two principal methods of cooking: boiling and mumuing. Mumuing is usually used for cooking animal foods at feasts. (Clark, 1978)

#### CENTRAL

**FOODS EATEN:** Foods eaten in Goilala District are: banana, English potato, sweet potato, birds, chicken, eggs (chicken and bush fowl), fish, pig, possum, shellfish, cassava, sugar cane, taro, yam, beans, bush asparagus, cabbage, corn, ferns, pumpkin, pumpkin tops, tomato, pawpaw. Foods available in season are: beans, Chinese cabbage, cucumber, green leaves, melons, nuts (galip and pandanus), taro, and yam. (Clark, 1978)

**FOOD PREPARATION:** In Goilala District, foods are either baked, broiled, mumued, or roasted. Meat is usually baked in hot ashes or mumued. In some villages in this district, people dislike boiling because they believe it is wasteful. (Clark, 1978)

**MEALS:** In Goilala District the morning meal is usually a sweet potato baked in ashes. Family members usually eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Kairuku District are: banana, sweet potato, yams, grabs, fish, pig, wallaby, cassava, sago, taro, aibika, bread fruit, corn, pumpkin, and pumpkin tops. Flour and rice can be purchased in the local store. (Clark, 1978)

**FOOD PRODUCTION:** People depend mostly on hunting and gardening for food. Men in the Kairuku area are responsible for providing the family with meat from hunting and helping with the gardening. Women do most of the gardening, collect firewood, cook, do laundry, and feed pigs. Boys frequently do not work. People depend primarily on firewood for cooking. (Eng, 1979)

**FOOD PREPARATION:** Foods in Kairuku District are either baked or boiled. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Port Moresby District are: banana, cassava, sweet potato, taro, yam, crab, deer, fish, pig, shellfish, wallaby, coconut, and sago. Bread and rice can be purchased in stores. (Clark, 1978)

**FOOD PREPARATION:** In Port Moresby District foods are usually boiled or roasted, though in some villages they are also cooked in the sun. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Rigo District are: banana, cassava, sweet potato, yam, chicken, crabs, fish, shellfish, wild bird eggs, coconut, sugar cane, taro, cabbage, corn, pumpkin, pumpkin tops, sweet potato tops, tomatoes, and pineapples. Pawpaw, pig, and sago are also eaten occasionally. Breadfruit, certain kinds of greens, mango, nuts, and yam are available in season. There is also a store where biscuits, bread, butter, flour, margarine, rice, sugar, tea, tinned fish, and tinned meat can be purchased. (Clark, 1978)

**FOOD PREPARATION:** In Rigo District, foods are usually baked, boiled, or mumued. Yams, banana, fish, and cabbage are cooked in coconut cream. Coconut cream and salt are always added to food. (Clark, 1978)

**MEALS:** In Rigo District, meals are usually eaten twice a day. The main meal is usually fish or chicken with taro, yam, banana, or sweet potato cooked either in coconut cream or with curry and salt. (Clark, 1978)

## CHIMBU

**DECREASED INTAKE:** In some areas food production has been adversely affected by a government program to increase cash crop production, initiated in response to increased demand for income earning opportunities in the mid-1950s. A weighed-food intake showed that in 1975 overall food intake was 30% lower than in 1955 in the villages studied. The diet was also more heavily dependent on sweet potatoes than it had been prior to the introduction of cash crops. (Lambert, 1980a)

**INCREASED INTAKE:** Intakes of both energy and protein are much higher than those of 1975. In 1981, the energy and protein intakes of lactating women were similar to those of women who were not pregnant or lactating. (Harvey and Heywood, 1983)

**FOODS EATEN:** Foods eaten in Gembogl District are: sweet potato, banana, English potato, sugar cane, taro, beans, cabbage, green leaves, onion, pumpkin, and occasionally pig. (Clark, 1978)

**FOOD PREPARATION:** In Gembogl District, foods are either baked or mumued. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Gumine District are: sweet potato, banana, sugar cane, yam, beans, green leaves, and occasionally pig. In addition, pandanus nuts are available in season, and tinned meat and fish can be bought from the store. (Clark, 1978)

**FOODS EATEN:** Foods eaten regularly in Kundiawa District are: sweet potato, birds, grubs, mice, peanuts, rats, spiders, banana, sugar cane, taro, yam, cabbage, corn, cucumber, green leaves, pitpit, tomatoes, and passionfruit. Eggs are not eaten. Foods occasionally eaten are: beans, birds, cassava, cassowary, chicken, lizards, opossum, pawpaw, pig, snake, fat, and pig liver. Nuts and pandanus are available in season. Rice, tinned fish and tinned meat are available in the local store. (Clark, 1978)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**PROTEIN AND ENERGY INTAKES:** The contribution of the traditional staple, sweet potato, to the intake of energy and protein has decreased, while that of store-bought foods, particularly cereals and fish, has increased markedly. It appears that economic development and involvement in the cash economy have resulted in an improvement in protein and energy intakes, but that these same changes are leading to dependency on imported foods. (Harvey and Heywood, 1983)

**FOOD PREPARATION:** In Kundiawa District, foods are either baked, roasted, or mumued, using store bought pots or tins with wire handles, and enamel bowls, spoons, knives, bamboo tubes, and gourds. (Clark, 1978)

**MEALS:** People in Kundiawa District usually eat two meals a day with snacks in between. Breakfast is a baked sweet potato. Snacks usually consist of sweet potato, sugar cane, corn, pandanus nut, or pitpit. Dinner consists of sweet potato, greens, and any other food available. (Clark, 1978)

#### EAST NEW BRITAIN

**FOODS EATEN:** Foods eaten in Pomio District are: taro, cassava, coconut, and sweet potato. (Clark, 1978)

**FOOD PREPARATION:** In Pomio District, foods are either baked or mumued. (Clark, 1978)

**MEALS:** In Pomio District, family members generally eat together. When there is a shortage of food, people eat coconuts. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Rabaul District are: banana, sweet potato, Chinese taro, birds, chicken, crabs, eggs (including wild birds' eggs), fish, galip nuts, meat, pig, peanuts, seafood, cassava, coconut, English potato, sweet potato, sugar cane, taro, yam, aibika, long, short, and snake beans, Chinese cabbage, carrot, corn, cucumber, greens, lettuce, melon, lemon, mango, orange, pawpaw, pineapple, onion, pumpkin, and tomato. Certain varieties of bananas, breadfruit, lemon, laulan (Malay apples), Chinese taro, and tomatoes are available in season. Biscuits, bread, butter, flour, carbonated beverages, jam, condensed milk, rice, sugar, tea, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Rabaul District, foods can be boiled (meat and vegetables together, for example), baked in hot ashes (bananas, Chinese taro, and sweet potatoes), or mumued, using a traditional mumu pit, or a mumu drum. Utensils used are: iron or aluminum pots, saucepans, enamel plates, cutlery, and leaves for wrapping food. Curry powder is used for flavoring. (Clark, 1978)

**SHARING FOOD:** In Rabaul District, family members usually eat together. When there is a shortage of food, it is shared equally among members of the family. (Clark, 1978)

**MEALS:** People in Rabaul District usually eat two or three meals a day. The early morning meal usually consists of bread, tea with sugar, and

bananas. The midday meal (skipped in some villages) may consist of young coconut, pawpaw, or pineapple, or in other villages, a soup with vegetables, tinned meat, and rice. The evening meal may consist of boiled or baked banana or rice eaten alone, or with meat and soup, or rice with fresh fish cooked in coconut milk with tomatoes, onion, and curry, or tinned meat eaten with taro, rice, and bananas. (Clark, 1978)

#### EAST SEPIK

**FOODS EATEN:** In Ambunti District, foods eaten are: sago, fish, peanuts, banana, cassava, coconut, sugar cane, sweet potato, taro, yam, beans, breadfruit, cucumber, fern, mushrooms, pumpkin, pumpkin tops, spinach, swamp cabbage, tomato, tulip leaves, guava, pawpaw, pineapple, water melon. Chestnut, figs, laulan (Malay apple), mango, nuts, and pitpit are available in season. Biscuits, rice, salt, sugar, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Ambunti District, foods can be baked, boiled, or smoked. Utensils used are baskets made from linibum, wooden bowls, clay pots, store pots, and enamel bowls. Salt is used for flavoring. (Clark, 1978)

**FOOD PREPARATION AND MENSTRUATION:** In Ambunti District, menstruating women are not allowed to prepare food for the family. During this period, food is prepared by either the father or the eldest child. (Clark, 1978)

**MEALS:** In Ambunti District, family members usually eat together. The morning meal consists of baked or boiled tubers. Snacks are eaten during the day. The main meal is in the evening. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Angoram District are: sago, birds, cats, eggs, fish, lizards, peanuts, pig, sago grubs, shrimps, banana, cassava, coconut, sugar cane, sweet potato, taro, yam, green leaves, mushrooms, mangoes, melons, pawpaw, and pineapple. Lotus seeds and chestnut are occasionally eaten. (Clark, 1978)

**FOOD PREPARATION:** In Angoram District, foods can be baked (especially sweet potatoes, yam, and taro), boiled (especially sago with coconut and fish, to make soup), fried (sago), or cooked in an oven, using clay plates. (Clark, 1978)

**MEALS:** In Angoram District, family members generally eat together. It is customary to eat two regular meals a day, with snacks in between. (Clark, 1978)

**STAPLES:** The staple foods in Hagama village, Maprik District, are yams, taro, and banana. Yams grow seasonally, whereas taro and banana are available at any time. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Maprik District are: bananas, taro, yams, crocodile, fish, turtle, coconut, sago, sugar cane, breadfruit, corn, cucumber, ferns, greens, mushrooms, pumpkin, pumpkin tops, snake beans, spring onions, banana, pawpaw, pineapple, watermelon, sweet potato tops,

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

tulip leaves, and winged beans. Bush animals, fish, birds, pig, and chicken are occasionally eaten. Chestnut, custard apple, grapefruit, laulan (Malay apple), mango, nuts, pandanus nuts, pitpit, and wild fig are available in season. Biscuits, "dripping," rice, salt, sugar, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD SOURCES:** Hagama village is located in a rainforest area, with a few patches of savanna. People fish and hunt for wild animals such as wild pigs and bandicoots for food. (Eng, 1979)

**ANIMAL FOODS:** Wild animals hunted for food in Maprik District are: birds, bandicoots, cuscus, fish, and river prawns. (Eng, 1979)

**SOUPS:** Several kinds of soup are eaten in Maprik District. White soup is made with yam, banana, or taro boiled with coconut flesh. Green soup is made with sago, yam, or banana boiled with water and green leaves. Sago soup is made with green leaves and a paste of sago and water. (Clark, 1978)

**FOOD PREPARATION:** In Maprik District, foods can be baked (especially root vegetables, bananas, breadfruit, and sago balls), boiled (sago made into soup with green leaves), mumued, smoked (pig and fish), or wrapped in leaves and baked (fish, rats, and birds). Utensils used are: clay pots, store pots, metal bowls, mugs, spoons, and knives. Salt is used for flavoring. (Clark, 1978)

**FOOD PREPARATION:** Women in Hagama village normally prepare food twice a day (breakfast and dinner). People sometimes skip lunch or eat bananas, pawpaw, or watermelon. Men also help prepare food on the occasion of a ceremony or feast. Usually on these occasions, women peel yams, and men kill pigs and prepare them for cooking in one of three traditional methods: mumu, boiling, or roasting. (Eng, 1979)

**MEALS:** In Maprik District, family members generally eat together. In the morning people generally eat a small meal baked on the open fire. Snacks are eaten during the day. The main meal is the evening meal, which consists of soup. During the hungry period from March to June, people eat only one meal a day. (Clark, 1978)

**CROPS:** Men in Hagama village are primarily subsistence farmers, although they do practice some cash cropping. Women also garden, partly for subsistence and partly for cash. (Eng, 1979)

**CASH CROPS:** When women from Hagama village go to town to sell vegetables, they usually buy tinned fish, tinned meat, soap, clothes, cooking utensils, and gardening utensils. (Eng, 1979)

**LIVESTOCK:** Domesticated animals raised for food in Hagama village are pigs, cattle, and poultry. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Wewak District are: sago, bandicoot, birds, cassowary, chicken, crabs, cuscus, eels, fish (fresh- and salt-water), flying fox, lizards, peanuts, pig, prawns, shark, shellfish, turtle eggs, banana, cassava, coconut, sugar cane, sweet potato, yams, taro, beans,

breadfruit, Chinese cabbage, corn, cucumber, green leaves, pumpkin, pumpkin tops, snake beans, spring onion, tomatoes, tulip leaves, winged beans, banana, laulan (Malay apple), oranges, pineapples, and wild figs. Carambola, chestnuts, guavas, mangoes, pandanus nuts, pawpaw, and pitpit are available in season. Biscuits, "dripping," rice, salt, sugar, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Wewak District, foods can be baked (sweet potatoes, yams, banana, cassava, taro), boiled (root vegetables, sago, and sago and coconut balls), mumued, wrapped in leaves (sago and scraped coconut), or smoked. Utensils used are clay pots, sauce pans, and frying pans. Salt is used for flavoring. (Clark, 1978)

**SAGO PREPARATION:** There are several ways of preparing sago. It can be boiled to make soup, baked to make biscuits, or made into pancakes and covered with other food. (Clark, 1978)

**MEALS:** In Wewak District, it is customary to eat two meals a day, with snacks in between. The lighter meal is eaten in the morning, and the main one in the evening. (Clark, 1978)

## **EASTERN HIGHLANDS**

**FOODS GROWN:** Foods grown locally include: local greens, winged beans, peanuts, pumpkin, kaukau, corn, cooking bananas, and cash crops, such as tomatoes, carrots, and peas. (Butler, 1982)

**MEN'S INTAKE:** Men consumed an average of 1.5 kilos of sweet potatoes per day; the average caloric intake was 2814 calories per day, 91% of which came from carbohydrates, 6% from protein, and 3% from fat. (Coyne, 1981)

**FOODS EATEN:** Foods eaten in Goroka District are: banana, cassava, sweet potato, birds, beans (soya and winged), chicken, egg, goat, peanuts, pig, opossum, turkey, English potato, sugar cane, beet root, cabbage, carrot, corn, green leaves, peas, pumpkin, shallots (spring onions), tomatoes, citrus fruit, passionfruit, and pineapple. Winged beans, cucumbers, pandanus, peanuts, taro, and yam are available in season. Rice, tinned fish, and tinned meat are available in the local store. Ginger is commonly used for flavoring. (Clark, 1978)

**FOOD PREPARATION:** In Goroka District foods are usually baked (especially sweet potatoes), boiled, occasionally mumued, or cooked in a bamboo tube stuffed with green leaves, over hot ashes. (Clark, 1978)

**CHILDREN'S MEALS:** Many mothers in Goroka District reported feeding their children three times a day, although they probably did not give them a balanced meal. The 24-hour diet recall showed that people ate primarily staples, such as kaukau, with only a little bit of kumu and other protein foods. (Earland, 1982)

**WOMEN'S DIETS:** 57% of the 63 mothers interviewed at Goroka Base Hospital recalled having had at least 3 meals in the 24-hour period preceding the interview. The remainder had had only two meals. Most meals consisted

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

of a staple food only, such as bread, or hard biscuit with butter and tea in the town, or kaukau in the village. (Earland, 1982)

WOMEN'S DIETS; Women in Goroka, asked to recall what foods they had eaten during the 24-hour period preceding the interview, responded as follows: kaukau, 91%; rice, 44%; bread, 27%; kumu, 76%; eggs, 5%; milk, 2%; corn, 6%; banana, 11%; peanuts, 12%; fresh chicken or fish, 19%; canned meat or fish, 30%. (Earland, 1982)

DIET COMPOSITION: The 24-hour dietary recalls showed that 3% of the families in Goroka had had energy foods only, 7% had had energy and protein foods, 32% had had energy and protective foods, and 57% had had energy, protein, and protective foods. (Earland, 1982)

WOMEN'S PROTEIN INTAKE: 33% of the mothers attending the clinic at Goroka Hospital who reported eating three meals a day had not had any protein foods in their meals in the 24 hours prior to the interview. (Earland, 1982)

KUMU: Kumu is the major protective food eaten. Many mothers ate it once or twice a day. (Earland, 1982)

GARDENS: Mothers in Goroka District with gardens in the village grow primarily kaukau, corn, peanuts, taro, and banana. Some of the mothers who live in town have backyards where they grow kaukau, corn, beans, peanuts, and banana. (Earland, 1982)

CASH CROPS: 36% of the mothers interviewed in Goroka sold vegetables in the market for cash. (Earland, 1982)

FOODS EATEN: Foods eaten in Henganofi District are sweet potato, winged beans, pandanus nuts, peanuts, bananas, English potatoes, taro, yams, cabbage, corn, cucumber, green leaves, peas, pitpit, pumpkin, and shallots. Winged beans, pandanus nuts, taro, and yams are available in season. Rice and tinned fish can be purchased at the local store. (Clark, 1978)

FOOD PREPARATION: In Henganofi District, foods are usually baked or boiled, and occasionally mumed. (Clark, 1978)

FOODS EATEN: Foods eaten in Kairantu District are banana, cassava, English potato, sweet potato, taro, yams, winged beans, chicken, cows, eggs, fish, peanuts, sugar cane, aibika, beans, cabbage, Chinese cabbage, corn, lettuce, onion, pumpkin tops, peanut leaves, and pitpit. Pigs are eaten occasionally at feasts. Winged beans, mareta pandanus, and taro are available in season. Tinned meat and fish can be purchased at the local store. (Clark, 1978)

FOOD PREPARATION: In Kainantu District, foods are usually baked, boiled, mumed, or cooked in a bamboo tube with green vegetables over hot ashes. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Lufa District are banana, sweet potato, cassava, sugar cane, cucumbers, green leaves, and, occasionally, pig. (Clark, 1978)

**FOOD PREPARATION:** In Lufa District foods are usually baked or mumued. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Okapa District are: bananas, sweet potatoes, taro, yams, birds, cassowaries, frogs, insects, apanuts (Finischia ferriniflora), pandanus nuts, peanuts, opossums, rats, mice, spiders, beans, cabbage, corn, ferns, green leaves, kaia fruit, karana (leaves, flowers, and fruit), onion, peas, pitpit, pumpkin, tomatoes, and tree ferns. Pigs are occasionally eaten, and pandanus nuts and winged beans are also available in season. In addition, women and children eat beetles, caterpillars, grubs, lizards, and lizard eggs. (Clark, 1978)

**FOOD PREPARATION:** In Okapa District, foods are boiled, mumued (about once a week), or cooked in a bamboo tube. Store-bought pots, utensils left by the army, and traditional platters are used. Ginger root is used for flavoring. (Clark, 1978)

**MEALS:** In Okapa District, people usually eat two meals a day. The evening meal is the most important one. It usually consists of greens, pitpit, taro, banana, beans, and meat or fungus cooked together in a bamboo tube and eaten with sweet potatoes or another staple food. Families usually eat together, although men sometimes prepare their own food and eat it by themselves. (Clark, 1978)

## ENGA

**FOODS DAMAGED BY FROST:** The main crops affected by the November 1980 frost in Kandep District were sweet potato, corn, and sugar cane. Cabbage, Irish potatoes, onions, beans, and local greens proved more resistant. (Gallagher, 1981)

**SEASONAL FOOD SHORTAGES:** Food shortages are most severe 4 or 5 months after a frost, when the immature crop damaged by the frost would have come to maturity. (Gallagher, 1981)

**STAPLE FOOD—ENGA:** Sweet potato dominates the diet of the Highlander and the Enga people in the Lai and Lagaip river valleys. It provides about 63-90% of their food intake. (Binns, 1976)

**FOODS EATEN:** Foods eaten in Lagaip District are sweet potato, cow, cuscus, pig, English potato, sugar cane, beans, cabbage, carrots, corn, green leaves, lettuce, peas, pitpit, pumpkin, and bananas. Chickens are also occasionally eaten. Pandanus, peanuts, and mareta are available in season. Biscuit, "dripping," flour, rice, tinned fish, and tinned meat can be purchased in local stores. (Clark, 1978)

**FOOD PREPARATION AND MEALS:** In Lagaip District, foods are either boiled, baked (especially sweet potatoes), or mumued. Usually people eat 2 meals a day if food is scarce. The evening meal is the most important one.

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

Snacks, such as sweet potatoes, peanuts, or corn may be eaten when food is plentiful. (Clark, 1978)

**COOKING METHODS:** The traditional method of cooking in Aipipaka, Lagaip District, involves using ashes for kaukau, and greens for mumuing. Saucepans, frying pans, spoons, cups, and plates were recently introduced, and people occasionally use these utensils for cooking imported as well as local foods. (Eng, 1979)

**FOOD PRODUCTION:** Men in Aipipaka are responsible for fencing the house and gardens, transporting firewood, and helping with the early stages of gardening. Women are responsible for harvesting the crops, cooking, and feeding the pigs. Children help with weeding the garden, fetching water, and looking after the pigs. (Eng, 1979)

**FARMING CONDITIONS:** Aipipaka village in the Lagaip District is located at the foot of a mountain. It rains all year round, even in the dry season (July to September). Frosts occur if the dry season is extended by two or more weeks. The frost kills food crops and other plants. Most of the people are subsistence farmers. (Eng, 1979)

**CROPS:** Foods grown in Aipipaka are kaukau, peas, beans, cabbage, Irish potatoes, New Guinea highlands pitpit, sugar cane, local greens, and corn. (Eng, 1979)

**LIVESTOCK:** Most families own 6 to 8 pigs and a dog or cat. Pigs are kept for ceremonial purposes, such as payment of the bride price, or for prestige. They are seldom eaten. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Wabag District are sweet potato, chicken, opossum, tree frog, English potato, sugar cane, taro, winged bean tubers, beans, cabbage, carrots, corn, green leaves, lettuce, peas, pitpit, pumpkin, tomatoes, and bananas. Pigs, cassowary, cucumber, red mushrooms, "old type of bean," and onions are occasionally eaten. Beans, cassava, corn, pandanus nuts, taro, tomatoes, and yams are available in season. Biscuits, "dripping," rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Wabag District, foods are boiled, baked (especially sweet potatoes), mumued (more common in some villages than others), or roasted (especially pandanus nuts). (Clark, 1978)

**MEALS:** In Wabag District, during times when food is scarce, men and women receive the largest portion and children the smallest. Family members usually do not eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Wapenamanda District are sweet potatoes, chicken, pig, peanuts, wild birds, sugar cane, taro, cabbage, green leaves, pumpkin, tomatoes, bananas, and passionfruit. Pigs are occasionally eaten. Pandanus nuts are available in season. Biscuits, rice, tinned meat, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Wapenamanda District, foods are usually baked, boiled, or mumued. (Clark, 1978)

## **GULF**

**SAGO CULTIVATION:** Village people recognize 17 different varieties of sago palm. Only 6 of these are commonly cultivated. There is high variability in starch yields among trees, although it is always highest just before flowering. Sago is available all year round, will grow in swampy areas where good soil for gardening is scarce, and once planted, requires very little effort to grow. (Cox, 1980)

**SAGO--PROTEIN VALUE:** Sago taken by itself is a poor source of nutrients, but when eaten with grubs, it is an excellent combination of protein and energy. (Ulijasek, 1980)

**MEALS--SAGO:** Sago is eaten at almost every meal, either as a main course, or on the side. For breakfast it is wrapped in young nypa leaves and baked on the fire. It is also a major part of the evening meal and can also be eaten as baked sticks, in the same way that bread is used in a western meal. (Ulijasek, 1980)

**SEAFOOD:** Fish, shellfish, crabs, and prawns are available seasonally from the sea and the tidal waterways, but fish stocks are being depleted by indiscriminate fishing in the Gulf waters by the Japanese fleet. (Ulijasek, 1980)

**FOODS EATEN:** The majority of the people surveyed consumed a diet consisting mainly of sago. They ate very little fish, and intakes of fresh fruit and vegetables were very low. No legumes were reported as being consumed by 1175 people surveyed, and none were seen growing. (Lambert, 1983)

**FOODS EATEN:** Foods eaten in Kerema District are sago, crabs, crayfish, fish (smoked and fresh), nuts, shellfish, banana, cassava, coconut, sugar cane, sweet potatoes, taro, corn, breadfruit, green leaves, Papua cabbage, pumpkin, lemons, mandarins, oranges, pawpaw, pineapple, and watermelon. Rice and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Kerema District, there are several methods of preparing food. Sago is usually baked in sago leaves. Root vegetables and sago are usually boiled to make soup. Wheat flour pancakes are fried. Breadfruit is roasted. Mumuing is a technique used by the Kukukuku people, and fish are smoked. Store pots, clay pots, metal cutlery, and wooden and coconut eating utensils are available. (Clark, 1978)

**MEALS:** People in Kerema District usually eat three meals a day. In the morning, the meal consists of sago baked in a sago leaf. At midday, people consume leftover cold sago sticks. In the evening they eat boiled Papuan cabbage with sago, coconut cream, and fish or shellfish if available, or boiled root vegetables with any combination of breadfruit, banana, rice, sago sticks, fish, tinned meat (if available), and coconut

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

cream or sago. Another alternative is rice boiled with coconut cream or grated coconut. Family members usually eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Kikori District are sago, birds, chicken, crabs, crocodile, cuscus, duck, fish (fresh and salt water), lizards, nuts, pigs (wild and domestic), prawns, sago grubs, shark, shellfish, shrimp, turtle and turtle eggs, wallaby, banana, cassava, coconut, sweet potato, sugar cane, yam, taro, breadfruit, corn, green leaves, nipa palm fruit, Papua cabbage, pumpkin, tulip fruit, orange, pawpaw, pineapple, sipara and lemons, and watermelon. Seafood and crocodile are occasionally eaten. Cabbage, chestnut, corn, cucumber, grapefruit, mango, peanut, pitpit, and watermelon are available in season. Biscuits, butter, "dripping," flour, yam, condensed milk, rice, sugar, tea, tinned meat, tinned sausages, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Kikori District, foods are baked, boiled, mumued, roasted, dried, wrapped in leaves, smoked, or cooked in a bamboo tube, using store pots or clay pots. Curry powder and salt are used for flavoring. Family members usually eat together. (Clark, 1978)

#### MADANG

**FOODS EATEN:** Foods eaten in Bogia District are sago, chicken, fish, pig, sweet potato, taro, yam, green leaves, pumpkin, and pawpaw. Flour, rice, and salt can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Bogia District, food is either baked or boiled. Salt is used for flavoring. Men often eat apart from the family. (Clark, 1978)

**FOOD PRODUCTION:** The people who live on Karkar Island are mostly subsistence farmers, although some of them work on cocoa and coconut plantations. Women are responsible for the garden, child care, and household tasks. (Cannon-Bonventre, 1977)

**PROTEIN FOODS:** People on Karkar Island used to hunt wild animals and fish from the sea to obtain protein foods. However, the Wild Life Department recently placed restrictions on hunting and fishing. People go without protein foods because they can not afford to buy frozen chicken or fish from the store. Pigs are killed only on special occasions. (Eng, 1978)

**UTENSILS:** On Karkar Island, both aluminum and clay pots are used for cooking. Usually clay pots are used for special occasions, and aluminum pots for everyday cooking. (Eng, 1978)

**MEALS:** On Karkar Island, meals are prepared only once a day unless there is a special event in the village. People customarily go to their gardens around 6 A.M. and do not return until 5 P.M. There is just enough time to prepare one meal before going to bed. (Eng, 1978)

**FOODS EATEN:** Foods eaten in Madang District are banana, sago, sweet potato, taro, Chinese taro, yam, chicken, cuscus, bandicoot, birds, eels,

eggs, fish, nuts (galip, okari, and tabis), peanuts, prawns, sago grubs, shellfish, cassava, coconut, aibika, beans and bean leaves, cabbage, pumpkin, pawpaw, pumpkin tops, and tulip leaves. Pig and Kuniak (juice from a mustard-like plant) are occasionally eaten. Breadfruit, corn, cucumber, galip nut, Malay apple (laulan), mango, peanut, pineapple, and watermelon are available in season. Biscuits, flour, rice, salt, sugar, tea, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Madang District can be baked, boiled, mumued, roasted, or smoked, using store pots, clay pots, wooden bowls, shell scrapers, and metal cutlery. Salt is used for flavoring. (Clark, 1978)

**MEALS:** The typical meal in Madang District consists of banana, yam, taro, beans, and green leaves, and fish or meat cooked together. Soup is served with the food. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Ramu District are: banana (dry season), sweet potato (wet season), fish, meat, nuts, coconut, sugar cane, taro, yam, beans, corn, cucumber, ferns, green leaves, and watermelon. In addition, children also eat: frogs, insects, small animals, and spiders. Pigs, rats, mice, birds, and eggs are occasionally eaten. Beans, cucumber, pandanus, and tomatoes are available in season. Rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Ramu District, foods can be either baked (especially sweet potatoes), boiled (sweet potatoes, green leaves, and other foods), or mumued (on special occasions), using billy cans and tins, store pots, and enamel plates. (Clark, 1978)

**MEALS:** People in Ramu District usually eat 2 meals a day: a root vegetable in the morning and a vegetable stew in the evening. Children are given food whenever they ask for it. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Saidor District are: banana, taro, sweet potato, and yam. They are either baked or boiled. (Clark, 1978)

**MENSTRUATION AND FOOD PREPARATION:** Women in Saidor District are not allowed to prepare food during their menstrual periods, because of fear of contamination. During that time, a woman and her young children live apart from the rest of the family. (Clark, 1978)

**MOTHERS EAT LAST:** In Saidor District, mothers usually eat after everyone else has eaten. (Clark, 1978)

## MANUS

**CHANGES IN DIET:** When Copra plantations were started in Manus, cultivation of "swamp taro" also began, because other relatively nutritious varieties of taro could no longer be grown. The only other available foods were coconuts, breadfruit, sago, and reef fish. Given this diet, it is not surprising that people are lethargic and dispirited, and that women either could not, or would not, have children. (Cordon, 1979)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**STAPLES:** Sago is a staple food in Kari village. People prefer it to kaukau and other foods. (Eng, 1979)

**CROPS:** People in Kari village grow taro, kaukau (sweet potato), banana, Singapore taro, aibika (greens), and pumpkin in their gardens. (Eng, 1979)

**ANIMAL FOODS:** People in Kari village hunt opossum and wild pigs for food. Meat is rarely sold for cash, although women will barter it for fish on the coast. (Eng, 1979)

**LIVESTOCK:** People in Kari village raise pigs, dogs, and chickens. A family might have 2 to 3 dogs. They are kept mainly for hunting and guarding the house and are seldom eaten. Pigs are kept in a fenced area away from the village, in order to prevent them from damaging other people's property. Poultry is more scarce. Eggs are not normally eaten but are left to hatch. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Manus Province are banana, sago, sweet potato, taro, birds, crabs, cuscus, eels, eggs, fish, peanuts, possum, wild pig, prawns, shellfish, soyabeans, turtles, cassava, coconut, yams, corn, pumpkin tops, aibika, fern leaves, taro leaves, pumpkin, pawpaw, and tomato. Chicken and pig are occasionally eaten. Banana, breadfruit, mani (a type of yam), mango, pineapple, store fruit, and galip nuts are available in season. Rice, tinned fish, tinned meat, biscuits, flour, bread, and butter can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Manus Province, foods can be baked, boiled, mumued, fried in homemade coconut oil, or smoked, using suacepans, frying pans, clay pots, clay bowls, and coconut shell bowls. Coconut milk, coconut oil, and salt are used for flavoring. (Clark, 1978)

**MEALS:** In Manus Province, people eat 2 or 3 meals a day. Family members are usually together for breakfast and dinner. Lunch is sometimes skipped because of work commitments away from home. (Clark, 1978)

#### MOROBE

**FOODS EATEN:** Foods eaten in Finschhafen District are: taro, chicken, crab, egg, fish, meat, peanuts, pig, shellfish, banana, coconut, sweet potato, yam, beans, cucumbers, green leaves, and pumpkin. Breadfruit, corn, mango, galip nuts, and sago are available in season. Rice, tinned meat, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Finschhafen District, foods can be baked in hot ashes, boiled, mumued, or cooked with a Primus stove, using clay or store bought pots. Salt is used for flavoring. (Clark, 1978)

**MEALS:** In Finschhafen District, family members generally eat together. If there is a shortage of food, children eat first, then parents. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Kaiapit District are: banana, sweet potato, winged beans, rat, pig, peanuts, snakes, cassava, coconut, sugar cane,

taro, Chinese taro, yam, breadfruit, Chinese cabbage, cucumber, onion, pitpit, pumpkin, tomatoes, and pawpaw. (Clark, 1978)

**FOOD PREPARATION:** In Kaiapit District, foods can be baked (sweet potatoes, yams, pitpit), boiled (staple food with green leaves and coconut cream), or roasted (whole breadfruit). The only utensils used are clay pots and coconut shell scrapers. (Clark, 1978)

**MEALS:** In Kaiapit District, men and visitors are served first at meals. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Lae District are: taro, Chinese taro, bandicoot, birds, chicken, fish, lizards, rats, pigs, peanuts, possums, snakes, banana, cassava, coconut, English potato, sago, sweet potato, sugar cane, yams, beans, corn, cucumber, green leaves, pitpit, pumpkin, tomato, Laulan (Malay apple), and mango. Crabs, shellfish, and fungi (Agaricus sp.) are occasionally eaten. pandanus nuts are available in season. Bread, flour, rice, cigar, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Lae District, foods can be baked (corn and bananas), boiled (green bananas, green leaves, taro, and shellfish), cooked in a bamboo tube, mumued, roasted (pitpit), or made into dumplings (sago). Water in which green leaves have been cooked is saved and used for soup. The following cooking utensils are used: store pots, clay pots, bamboo tubes, plates and basins, forks, mugs, wooden plates, shell and coconut shell scrapers. Salt is used for flavoring. (Clark, 1978)

**MEN EAT FIRST:** In Lae District, men usually eat first, then women and children. (Clark, 1978)

**STAPLES:** In Masa village, the staple foods are taro, kaukau, and yams. Banana, pandanus, bread fruits, orange trees, mangoes, laulau trees, and pawpaw are also grown. (Eng, 1979)

**COOKING:** In Masa village, foods are most often boiled in a pot or cooked directly over a fire. Sometimes they are also cooked in bamboo. Modern cooking and eating utensils have also been introduced. (Eng, 1979)

**FOOD PRODUCTION:** Men in Masa village farm and hunt. Women keep house and gather. (Eng, 1979)

**LIVESTOCK:** Every family in Masa has 2 to 5 pigs, 1 to 2 dogs, and a few chickens. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Wau District are: sweet potato, chicken, caw, eels, eggs, pig, possum, soyabean, wild birds, banana, coconut, cassava, sago, sugar cane, taro, Chinese taro, yam, aibika, Chinese cabbage, beans, corn, carrot, choko tops, green leaves, lettuce, pumpkin, spinach, and tomato. Beans, cabbage, cucumber, English potato, peanuts, pineapple, and yams are available in season. Biscuit, jam, peanut paste, rice, salt, sugar, tinned fish, tinned meat, and tinned pineapple can be purchased at the local store. (Clark, 1978)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

FOOD PREPARATION: In Wau District, foods can be either boiled or mumued. Family members generally eat together. (Clark, 1978)

#### MILNE BAY

FOOD PREPARATION: In Alotau District, food is usually boiled in a clay pot with green leaves and coconut oil. Family members usually eat together. (Clark, 1978)

FOODS EATEN: Foods eaten in Esa'Ala District are: yam, chicken, bandicoot, cuscus, fish, pig, possum, wild birds and eggs, banana, cassava, coconut, sago, sweet potato, taro, yam, breadfruit, and green leaves. Tinned meat and fish can be purchased at the local store. (Clark, 1978)

FOOD PREPARATION: In Esa'Ala District, foods are either boiled or mumued, using clay pots, saucepans, and either wooden or store bought spoons and forks. (Clark, 1978)

MEALS: Families in Esa'Ala District eat three meals a day, usually together. The morning and midday meals are usually small. The main meal is the evening meal, which consists of yam, taro, banana, green leaves, and fish or tinned meat. If rice is prepared, tea is also drunk. (Clark, 1978)

FOODS EATEN: Foods eaten in Losuia District are: yam, taro, bananas, crab, fish, nuts, shellfish, banana, cassava, coconut, sweet potato, taro, breadfruit, corn, green leaves, green pawpaw, pumpkin, aigaru (tulip), Nziber minor (wild ziginger flower), mango, and pawpaw. Flour, rice, tinned fish, tinned meat, and bread are available at the local store. (Clark, 1978)

FOOD PREPARATION: In Losuia District, foods are either baked or boiled in a clay pot with leaves. The cooking water is used for soup. (Clark, 1978)

FOODS EATEN: Foods eaten in Misima District are: sweet potato, taro, chicken, crayfish, fish, flying fox, prawns, pig, shellfish, banana, cassava, coconut, sago, yam, breadfruit, cabbage, corn, green leaves, pumpkin, bush fruits, and pawpaw. Foods available in season are: mango, orange, pawpaw, and pineapple. Beans, English potato, flour, peas, rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

FOOD PREPARATION: In Misima District, foods are either baked, boiled, mumued, roasted, or--in the case of certain seasonal foods--eaten raw. Clay pots are used for cooking. Family members generally eat together. (Clark, 1978)

FOODS EATEN: Foods eaten in Rabaraba District are: cassava, sweet potato, taro, yam, fish, banana, coconut, corn, green leaves, pineapple, banana, and pawpaw. Rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Rabaraba District, foods are either baked, boiled, mumued, or cooked with a Primus stove. Family members ususally eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Samarai District are: banana, cassava, sago, sweet potato, taro, chicken, crab, cuscus, eggs, fish, pig, shellfish, wild birds, coconut, corn, green leaves, pumpkin, tomatoes, guava, mangoes, and aigaru (tulip). Asparagus and yam are available in season. Cheese, "dripping." flour, milk, rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Samarai District, foods are either boiled or smoked, using clay pots. Fish may be smoked before being cooked with vegetables. (Clark, 1978)

**MEALS:** In Samarai District, family members generally eat together, although if there is a shortage of food, it is the mother who goes without. (Clark, 1978)

#### **NATIONAL CAPITAL**

**FOODS EATEN:** Foods eaten in Port Moresby District are: rice, bread, crabs, eggs, fish, meat, shellfish, banana, cassava, coconut, sago, sweet potato, sugar cane, taro, yam, aibika, Chinese cabbage, cucumber, peas, pumpkin, apples, mango, oranges, and pineapple. Pig and fresh vegetables are occasionally eaten. Mangoes are available in season. A wide variety of foods are available in the local store. Those most often purchased and consumed are: bacon, biscuit, bread, butter, cake, cheese flavored snacks, carbonated beverages, flour, jam, meat pies, condensed and powdered milk, rice, sausages, sugar, tea, tinned fish, tinned meat, and Vegemite. (Clark, 1978)

**FOOD PREPARATION:** In Port Moresby, foods may be either boiled or mumued. Utensils used for cooking are saucepans and store pots, cutlery, plates, mugs, and other things. Salt, curry powder, and other sauces are used for flavoring. Family members usually eat together. (Clark, 1978)

#### **NEW IRELAND**

**FOODS EATEN:** Foods eaten in Kavieng District are: banana, cassava, sago, sweet potato, taro, yam, chicken, crayfish, eggs, fish, galip and breadfruit nuts, pig, shellfish, turtle, coconut, aibika, breadfruit, cabbage, green leaves, Laulan, and mango. Breadfruit and mango are available in season. Bread, rice, and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Kavieng District, there are several methods of preparing food. In general, foods may be baked, boiled, mumued, cooked in a bamboo tube filled with food, sealed with leaves and placed over hot ashes, or smoked. Fish and pork are often smoked. When breadfruit is baked in the fire, both seeds and flesh are eaten. When it is boiled, only the seeds are eaten. Coconut cream is added to both boiled and mumued food. Kerosene stoves are also used for cooking. (Clark, 1978)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**FOODS EATEN:** Foods eaten in Namatanai District are: sweet potato, yam, chicken, fish, meat, pig, banana, sago, taro, aibika, cabbage, ferns, taro leaf, and fruit. (Clark, 1978)

**MEALS AND FOOD PREPARATION:** In Namatanai District, foods can be baked, boiled, or mumued. Family members generally eat together. (Clark, 1978)

**STAPLES:** Foods grown in Umbukul village, New Hanover Island, are taro, banana, aibika, kaukau, and other vegetables. (Eng, 1979)

**UTENSILS:** People in Umbukul village cook using modern pots and pans bought from shops. (Eng, 1979)

**FISHING:** Some people in Umbukul fish, using nets, to supplement the food they get from their gardens. (Eng, 1979)

**LIVESTOCK:** Some people in Umbukul village keep chickens and pigs. The average number of pigs is 3 to 5. (Eng, 1979)

#### NORTH SOLOMONS

**FOOD RESOURCES:** Men in Hangan village, Buku Island, grown cash crops. Women work in the garden growing food for the family, because since taverns were introduced on Buku Island, many fathers sell their crops and cocoa and spend the money on beer instead of using it to support their families. (Eng, 1979)

**CASH CROPS:** Most families in Hangan village earn a living growing cash crops such as copra and cocoa. (Eng, 1979)

#### NORTHERN

**FOODS EATEN:** Foods eaten in Kokoda District are: banana, potato, taro, yam, bandicoot, bird, fish, pig, sugar cane, breadfruit, cabbage, and pumpkin. Flour, rice, salt, sugar, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Kokoda District, foods can be boiled or baked, using clay pots or store bought pots. Salt is used for flavoring. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Popondetta District are: sago (when there is no taro), sweet potato, taro, bandicoot, chicken, crab, cuscus, fish, pig, shellfish, banana, cassava, coconut, sugar cane, yam, beans, cabbage, corn, green leaves, pumpkin, apples, oranges, pawpaw, pineapple, watermelon, and occasionally rice. Crabs, fish, sago, and taro are available in season. Rice can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Popondetta District, foods can be baked (bananas), boiled (the preferred method), mumued, roasted (fish), or wrapped in leaves and roasted in the fire. Utensils used are clay pots, sotre pots and saucepans, and an iron strip for peeling vegetables. Coconut is always added to food for flavoring. (Clark, 1978)

**MEALS AND FOOD PREPARATION:** In Popondetta District, people generally eat 3 meals a day. Breakfast consists of taro, sweet potato, pig, or fish. Lunch consists of pineapple, watermelon, or sugar cane. The evening meal consists of taro, sweet potato, cabbage, fish, or shellfish. Coconut cream is added to cooking. The cooking liquid is eaten with the meal. Protein foods are generally consumed 3 or 4 times a week. (Clark, 1978)

**FOOD SOURCES:** Gardening provides people in Sakita with more than enough vegetables to eat. However, protein food is scarce because the wild animal population is small. Canned protein foods are available in shops, but the cost is prohibitive to most people. (Eng, 1979)

**AGRICULTURE:** Traditionally, people in Sakita village practiced subsistence farming. Cash-cropping has also been introduced. Members of the younger generation, however, have begun seeking employment in nearby towns, and farm labor is becoming more scarce. (Eng, 1979)

**FOOD PRODUCTION:** Women are responsible for the garden, the home, and the children. Men are responsible for cash-cropping, hunting, and helping their wives with the garden, as required. Children help either parent whenever necessary. (Eng, 1979)

**UTENSILS:** Since the introduction of cash crops, people have begun spending their income on modern cooking vessels and utensils. Traditional tools are no longer used. (Eng, 1979)

**PORK:** The pig population in Sakita has recently doubled. There are now up to 5 pigs per family. (Eng, 1979)

**FOODS EATEN:** Foods eaten in Tufi District are: banana, sweet potato, taro, bird, fish, pig, shellfish, cassava, coconut, sago, sugar cane, yam, aibika, breadfruit leaves, corn, green leaves, pumpkin, pumpkin tops, and taro leaves. (Clark, 1978)

**FOOD PREPARATION:** In Tufi District, foods can be baked, boiled, or mumued, using clay pots. (Clark, 1978)

**MEALS:** In Tufi District, important people and men eat before women and children. (Clark, 1978)

ORO

**STAPLES:** Yam or taro cooked on a fire or sugar cane are eaten for breakfast in a Musa village. Sometimes children gather passion fruit and pawpaw. (Nutrition and Development, 1982)

**CHILDREN'S MEALS:** Children in Musa frequently snack on bits of sugarcane, fruit, baked yam, or taro. At meals they eat substantial amounts of yam and taro. What is left of the baked food may also be eaten later as a bedtime snack. (Nutrition and Development, 1982)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

#### SIMBAI

**STAPLES:** Marings consistently stated a preference for taro and yams over sweet potatoes and manioc. Sweet potatoes become more important from July to September, when taro is scarce. (Buchbinder, 1977)

**INTAKE VARIATIONS:** There is considerable variation in food consumption in Tuguma, a relatively small-scale homogeneous egalitarian population. Some of this variation can be explained on the basis of age and activity level. The lowest intakes were observed among people who were either single or in mourning. Maring mourning customs prescribe avoidance of the deceased's favorite food or cooking method for up to 2 years. People who complained of fever, backaches, colds, or other vague physical symptoms also had low food intake. Elderly persons occasionally announce that they have lived long enough and stop eating. Anorexia also often accompanies physical or emotional stress. (Buchbinder, 1977)

**FOODS EATEN:** The Maring diet was determined by weighing all food brought into the household, determining the intended allocation, and weighing the portions of individual family members. In addition, the number of pigs killed per year was determined, and staple crops were analyzed for their protein content. The average composition of the diet was computed over a 7-month period as follows: sweet potato, 14%; taro (*xanthosoma*), 4.7%; taro (*colocasia*), 12.1%; manioc, 2%; yams, 10%; banana, 3.6%; other fruit, 2.5%; miscellaneous vegetables, 4.7%; *marita pandanus*, 6.7%; leaves, 10.7%; grasses, 8.7%; sugarcane, 8.2%; animal food, .022%. (Buchbinder, 1977)

**TUBERS AND SEASON:** The percentage of tubers in Maring diets ranged from 33.9% to 77.1%, depending on the seasonal availability of *marita pandanus* and sugar cane. (Buchbinder, 1977)

**PROTEIN FOODS INTAKE:** During a protein-consumption survey among the northwestern Simbai Maring, people were asked to recall meat they had eaten during the previous week. Many had eaten none at all. Those who had eaten meat mentioned insects, birds, lizards, and rodents. Portions eaten at one time could not have exceeded one ounce. In the southeastern part of the territory, people consistently reported consumption of some animal food during the week prior to the survey. Small game appears to have been fairly abundant in this area. On the forest-edge, cassowaries and feral pits are also found. (Buchbinder, 1977)

**PROTEIN AND SEASON:** The Maring diet appears to be richer in vegetable protein during the wet months because of the increased consumption of greens with *marita* and taro, which is higher in protein content than sweet potato. Animal protein, from game, is more widely available during the dry season. (Buchbinder, 1977)

**PROTEIN VARIATION:** The protein content of root crops grown in various Simbai Maring locations deviates from published values, and the amount of the variation in the protein content between locations is considerable. It is lower in the northwest than in the southeast. This difference might be enough to make the difference between a diet that is adequate and one that is deficient in protein. (Buchbinder, 1977)

**CROPS:** The principal crops grown by the Maring are taro, sweet potato, yams, and manioc. Other crops include sugar cane, bananas, a variety of greens, and marita pandanus, a tree that provides the major source of fat in their diet. (Buchbinder, 1977)

**MARING AGRICULTURE:** The Maring are swidden horticulturalists who live in Simbai Valley (Bismark Mountains) on the northern fringe of the central New Guinea highlands. They also practice hunting and gathering. Each year they establish new gardens which yield crops for a 14 to 26 month period and are then left to fallow for 8 to 40 or more years. The principal crops grown are taro, sweet potato, yams, and manioc. (Buchbinder, 1977)

**AGRICULTURE:** The southeastern Simbai Maring groups have more land available and practice longer periods of fallow between cropping than northeastern groups. Since longer fallows return more fertility to the soil, this may account for the observed difference in protein content of similar foods grown in the two locations. (Buchbinder, 1977)

**DOMESTIC ANIMALS:** The Maring raise pigs, chickens, and hunting dogs. They also keep cassowaries, hornbills, and cockatoos. Pigs and chickens were traditionally only killed and eaten on ceremonial occasions. (Buchbinder, 1977)

**FISH:** The rivers and streams in Maring territory provide eels in the dry season and occasionally catfish. (Buchbinder, 1977)

**PORK:** Domestic pork only constitutes a small part of the Simbai Maring diet. They are usually killed for affinal payments, or to placate the ancestral spirits of persons who are seriously ill, although in some places they are also killed for domestic celebrations or because people stated they were hungry for pork. (Buchbinder, 1977)

**DIETARY DEFICIENCIES:** The largely vegetarian diet (95% vegetables) of the Maring make them vulnerable to protein malnutrition and deficiencies in iodine and other trace elements. (Buchbinder, 1977)

**DIETARY DEFICIENCIES:** The health and nutritional status of the Simbai Maring were evaluated using three methods: a clinical examination, anthropometric surveys, and blood tests to determine hemoglobin and haptoglobin values. Western groups consistently showed a higher incidence of PCM and iodine deficiency, a lower incidence of malaria and hemoglobin concentrations that averaged 2 gm lower than eastern groups. The differences were statistically significant at  $p < .01$ . Hyperhaptoglobinemia was also prevalent. (Buchbinder, 1977)

**PROTEIN INTAKE:** The diet in Tuguma provides adequate amounts of protein for non-pregnant, non-lactating adult women and children aged 7 to 9, but is below the recommended intake for all other groups. (Buchbinder, 1977)

**CALORIES:** The Maring diet in Tuguma was found to be adequate but was below FAO/WHO recommended energy intakes for all other age and sex categories. (Buchbinder, 1977)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

#### SOUTHERN HIGHLANDS

**FOODS EATEN:** The following foods are eaten in Ialibu District: sweet potato, chicken, peanuts, pigs, wild birds, cassava, English potato, sugar cane, beans, corn, green leaves, pumpkin, and banana. Pigs are occasionally eaten. Pandanus nuts and pitpit are available in season. Rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Ialibu District, foods are baked or mumued. Utensils used are: tin cans, store pots, enamel plates and mugs, knives, and spoons. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Kagua District are sweet potato, wild birds, cassowary, pig, snake, wallaby, white grubs, banana, sago, sugar cane, taro, yams, beans, bamboo shoots, corn, cucumber, green leaves, pumpkin, tomatoes, pawpaw, and pineapple. Pig is occasionally eaten. Pandanus nuts are available in season. Tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Kagua District, foods can be baked, boiled or mumued. Ginger is used for flavoring. Family members do not usually eat together. (Clark, 1978)

**FOODS EATEN:** The following foods are eaten in Mendi District: sweet potato, birds, cuscus, chicken, grubs, pig, wallaby, banana, English potato, sugar cane, taro, aibika, bamboo shoots, beans, cabbages, corn, cucumber, green leaves, mushrooms, and pitpit. Pig is eaten occasionally. Mushrooms, pandanus nuts, winged beans (flowers, leaves, and beans) are available in season. Biscuits, "dripping," flour, rice, sugar, tea, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Mendi District, foods can be baked, boiled, mumued, or cooked in bamboo tubes. Ginger is used for flavoring. (Clark, 1978)

**MEALS:** In Mendi District, people generally do not eat together except at a mumu. Men eat in the men's house; women and children eat in the women's house. It is customary to eat two meals a day, with snacks in between. The morning meal consists of leftover sweet potato. The evening meal consists of sweet potato and sometimes a variety of other foods boiled together. Men eat first, then women. Children get the leftovers. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Nipa District are sweet potato, bananas, sugar cane, beans, corn, cucumber, green leaves, and pumpkin. Pig and cassowary are occasionally eaten. Pandanus nuts are available in season. Rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Nipa District, foods can be baked, or mumued at feast. Family members only eat together at feasts. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Pangia District are sweet potato, chickens, cassowary, fish, grubs, nuts, peanuts, pigs, English potato, sugar cane, beans, corn, cucumbers, ferns, green leaves, mushrooms, pumpkin, tomatoes, and bananas. Pig is occasionally eaten. Pandanus nuts, pitpit, and winged beans are available in season. Biscuits, rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Pangia District, foods can be baked, boiled, or mumued using tin cans or store pots. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Tari District are sweet potato, chicken, eggs, fish, nuts, pig, banana, sugar cane, taro, bamboo shoots, beans, cabbage, corn, green leaves, pitpit, pumpkin, water melon, and pineapple. Pineapple is occasionally eaten. Pandanus nuts are available in season. Rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Tari District, foods can be baked, boiled, or mumued. Utensils used are store pots, enamel plates and mugs, knives and spoons. Family members usually eat together. (Clark, 1978)

#### WEST NEW BRITAIN

**FOODS EATEN:** Foods eaten in Talasea District are cassava, sweet potato, taro, Chinese taro, birds, chicken, crayfish, eel, fish, pig, possum, shellfish, wallaby, cassava, coconut, English potato, sugar cane, sago, breadfruit, and green leaves. Breadfruit nuts, galip nuts, Laulan (Malay apple), and mango are available in season. (Clark, 1978)

**FOOD PREPARATION:** In Talasea District, foods can be baked (sago, breadfruits, and taro), boiled (with coconut cream added), or mumued, using store pots or clay pots. Salt and small bush fruits are added for flavoring. (Clark, 1978)

**MEALS:** In Talasea District, women and children eat together, and men eat in the men's house. (Clark, 1978)

#### WEST SEPIK

**FOODS EATEN:** Foods eaten in Aitape District are: sago, fish, meat, banana, coconut, sweet potato, taro, green leaves, pitpit, pumpkin, banana, and pawpaw. (Clark, 1978)

**FOOD PREPARATION:** In Aitape District, foods can be either baked or boiled. Family members generally eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Amanab District are: banana, taro, birds, wild birds eggs, fish, lizards, nuts, peanuts, pigs, sago grubs, small bush animals, cassava, sago, sugar cane, sweet potato, yam, aibika, bamboo shoots, beans, breadfruit, banana, pawpaw, pineapple, watermelon, cucumber, corn, fern, green leaves, mushrooms, pumpkin, pumpkin tops, sago shoots, snake beans, tomato, tulip leaves, wild vegetables and fruit. and winged beans. Chestnuts, mangoes, Laulan (Malay apple), pandanus nuts, and wild figs are available in season. Biscuits, milk

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

powder, rice, salt, sugar, sweets (lollies), tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Amanab District, foods can be baked, boiled (sago), mumued (leaves), or wrapped in leaves. Utensils used are: limbum baskets, tin cans, and enamel bowls. Salt is used for flavoring. (Clark, 1978)

**NO REGULAR MEALS:** An Amanab District, there are no regular meals. People eat snacks all day long. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Lumi District are: banana, sago, taro, birds, flying fox, sago grubs, coconut, sugar cane, yams, beans, breadfruit, corn, cucumber, ferns, green leaves, mushrooms, pumpkin, pumpkin tops, snake beans, orange, pawpaw, pineapple, watermelon, spring onions, swamp cabbage, sweet potato tops, tulip leaves, winged beans, mushrooms, and pig. Chestnut, mango, Laulan (Malay apple), pitpit, and wild fig and available in season. Biscuits, "dripping," rice, salt, sugar, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Lumi District, foods can be baked (bananas, breadfruit), boiled (sago porridge and maretta [pandanus] sauce, sago bals), roasted (sago grubs), or cooked in bamboo tubes. Utensils used are: clay pots, store pots, metal bowls and mugs, spoons, and knives. Second lemon grass, hot chillies, and maretta sauce are used for flavoring. (Clark, 1978)

**MEALS:** In Lumi District, people generally eat two meals a day, or one large meal, with several snacks. Snacks generally consist of sago and greens. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Telefomin District are: sweet potato, taro, nuts, sugar cane, aibika, beans, Chinese cabbage, chokoes, corn, cucumber, ferns, green leaves, mushrooms, pitpit, pumpkin, pumpkin tops, spring onions, taro leaves, tomatoes, and bananas. Pandanus fruit (maretta) and pandanus nuts are available in season. Biscuits, "dripping," powdered milk, rice, salt, sugar, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Telefomin District, food is either baked or (less often) boiled. Almost no utensils are used, except tin cans. (Clark, 1978)

**MEALS:** In Telefomin District, men and boys usually eat their meals in one house, and the women in another. It is customary to eat two meals a day, with snacks in between. (Clark, 1978)

#### WESTERN

**FOODS EATEN:** Foods eaten in Balimo District are: banana, sago, cassowary, duck, fish, pig, turtle, wallaby, sweet potato, coconut, pawpaw, and pineapple. (Clark, 1978)

**FOOD PREPARATION:** In Balimo District, foods can be baked or boiled using store pot, or wrapped in leaves (usually sago). Family members usually eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Daru District are: sago, taro, yam, bird's eggs, crabs, cuscus, fish goomas, shellfish, turtle, wallaby, wild birds, bananas, cassava, coconut, sweet potato, sugar cane, cabbage, corn, pineapple, and watermelon. Birds, chicken, and pig are occasionally eaten. Breadfruit and yam are available in season. Bread, butter, flour, rice, jam, sugar, tea, tinned fish, tinned meat, and Vegemite can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Daru District, foods can be baked or boiled using clay pots, mumued, or wrapped in leaves (especially fish and sago), then cooked over ashes. (Clark, 1978)

**MEAL PATTERNS:** In Daru District, family members generally eat together. A typical meal consists of vegetables cooked in coconut oil and served with green leaves, fish, or shellfish. (Clark, 1978)

**STAPLES:** Sago, cassava, and banana are not consumed at all by 7% of the population in Kiunga, and 86% of the population in Tabubil. In Kiunga, 9% consume them once a day, 24% twice, and 60% three times per day. In Tabubil, 6% consume them once, and 8% twice a day. (Lambert, 1979)

**FOODS EATEN:** Foods eaten in Kiunga District are: sago, bush hens, cassowary, cuscus, crocodile, ducks, fish, geese, wallaby, coconut, sugar cane, taro, yam, bamboo shoots, breadfruit, and mangoes. (Clark, 1978)

**DIET AND DEFICITS:** More than 50% of the Kiunga population eats three meals a day, but their diet is probably lacking in protein and energy because of their reliance on sago. (Lambert, 1979)

**MEAT:** Meat and fish are not consumed at all by 69% of the population in Kiunga, and 11% of the population in Tabubil. In Kiunga, 28% consume them once, 7% twice, and 5% three times a day. In Tabubil, 65% consume them once, 6% twice, and 18% three times a day. (Lambert, 1979)

**FATS AND SUGARS:** Fat and sugar are not consumed at all by 80% of the population in Kiunga, and 45% of the population in Tabubil. In Kiunga, 13% consume them once a day, 5% twice, and 2% three times a day. In Tabubil, 41% consume them once, 14% twice a day. (Lambert, 1979)

**TUBERS:** Taro, sweet potato, and yams are not consumed at all by 80% of the population in Kiunga, and 15% of the population in Tabubil. In Kiunga, 9% consume these foods once a day, 4% twice, and 7% three times a day. In Tabubil, 4% consume them once, 8% twice, and 73% thrice a day. (Lambert, 1979)

**VEGETABLES:** Vegetables are not consumed at all by 80% of the population in Kiunga and 98% in Tabubil. In Kiunga, 15% consume vegetables once a day, 4% twice, and 1% thrice a day. In Tabubil, only 2% of the population consume them even once a day. (Lambert, 1979)

### 3.1 DIETARY PRACTICES, GENERAL (Cont.)

**BEANS AND NUTS:** Beans and nuts are not consumed at all by 83% of the population in Kiunga, and 94% of the population in Tabubil. In Kiunga, 15% consume them once, and 2% twice a day. In Tabubil, only 6% consume them even once a day. (Lambert, 1979)

**RICE AND BREAD:** Rice and bread are not consumed at all by 85% of the people in Kiunga, and 82% of the people in Tabubil. In Kiunga, 8% consume them once a day, 5% twice, and 2% thrice a day. In Tabubil, 2% consume them twice, and 16% thrice a day. (Lambert, 1979)

**FRUIT:** Fruits are not consumed at all by 88% of the population in Kiunga, and 100% of the population in Tabubil. In Kiunga, only 8% of the population consumes them once a day, 2% twice, and 2% thrice a day. (Lambert, 1979)

**IMPORTED FOODS:** There is a heavy reliance on imported foods in Tabubil because of the long working hours of the company labor force, the fact that school children spend long hours at school, and the fact that mothers are confined to their homes because of the absence of members of the extended family to look after young children. Consequently there is little time for collecting fruits and vegetables. (Lambert, 1979)

**FOOD PREPARATION:** In Kiunga District, foods can be baked, boiled, or smoked. Ginger is used for flavoring. Family members usually eat together. (Clark, 1978)

#### WESTERN HIGHLANDS

**FOODS EATEN:** Foods eaten in Hagen District are: sweet potato, pork, peanuts, cassava, English potato, sugar cane, taro, beans, cabbage, carrots, corn, cucumber, green leaves (Runjia Clossi), pitpit, pumpkin, pumpkin tops, tomatoes, banana, pawpaw, and pineapple. Cow, chicken, and pig are occasionally eaten. Pandanus nuts, maretta pandanus (red variety), winged beans )leaves, tubers, and beans), and pitpit are available in season. Biscuits, bread, flour, "dripping," rice, sugar, tea, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Hagen District, foods can be boiled, baked (sweet potato), sometimes mumed, or smoked (pandanus nuts). Utensils used are: store pots, enamel bowls and plates, knives and spoons. Ginger is used for flavoring. (Clark, 1978)

**MEALS:** In Hagen District, family members generally do not eat together. It is customary to have two meals a day, with snacks at any time if food is plentiful. The morning meal consists of sweet potato. The main meal is in the evening. Sweet potato is always eaten; other foods are eaten whenever they are available. Women do not go to the garden on wet days. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Jimi District are sweet potato, birds, pig, sugar cane, taro, yam, cabbage, green leaves, ptipit, pumpkin, bananas, and pawpaw. Pandanus nuts are available in season. Rice and tinned fish can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Jimi District, foods can be baked (sweet potato) or cooked in a bamboo tube on an open fire. Utensils used are store pots, old tin cans, and bamboo tubes. Family members generally do not eat together. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Minj District are sweet potato, chicken, cow, peanuts, banana, cassava, English potato, sugar cane, taro, beans, cabbage, corn, cucumber, green leaves, pumpkin. Pig is occasionally eaten. Pandanus nuts and winged beans (leaves, flowers, fruit, and tubes) are available in season. Biscuits, "dripping," rice, tinned fish, and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Minj District, foods can be baked (usually sweet potatoes), boiled, or mumued. Utensils used are store pots, enamel plates, bowls and mugs, knives, and spoons. (Clark, 1978)

**MEALS:** In Minj District, family members sometimes eat together, and sometimes men eat apart from women and children. In times of food shortage, food is shared among all members of the family. (Clark, 1978)

**FOODS EATEN:** Foods eaten in Muglamp District are sweet potato, peanuts, pig, soyabeans, banana, cassava, sugar cane, taro, yam, beans, breadfruit, cabbage, corn, cucumber, green leaves, peas, pitpit, pumpkin, tomatoes, passionfruit, pawpaw, and pineapple. Pandanus nuts are available in season. Tinned fish and tinned meat can be purchased at the local store. (Clark, 1978)

**FOOD PREPARATION:** In Muglamp District, foods can be baked, boiled, or mumued. Utensils used are: store pots, enamel plates and mugs, knives and spoons. Family members generally eat together. (Clark, 1978)

## 3.2 DIETARY PRACTICES, WOMEN

### 3.2.1 DIETARY PRACTICES, WOMEN DURING PREGNANCY

#### NEW IRELAND

**PREGNANCY AND LACTATION:** Some mothers in Umbukul stop breast feeding if they become pregnant again. (Eng, 1979)

#### NORTH SOLOMONS

**FORBIDDEN FOODS:** Lactating women are not allowed to eat fish, shell-fish, greasy food, and boiled food. They are allowed to eat only roasted kaukau, taro, and "greens wrapped up in leaves." (Eng, 1979)

### 3.2.2 DIETARY PRACTICES, WOMEN DURING LACTATION

#### MADANG

**NO INTERCOURSE:** On Karkar island, abstinence is practiced as long as a mother is breast feeding a child. The father and any older children sleep in a room apart from the mother and baby. (Eng, 1979)

### 3.2.2 DIETARY PRACTICES, WOMEN DURING LACTATION (Cont.)

#### MOROBE

**REMEDIES:** If a woman in Masa village has problems producing breast milk, she is encouraged to drink a lot of water and is given soup cooked with green vegetables such as aibaika, pumpkin tops, choko, and kaukau. This special hot soup is also given to mothers who have just given birth. (Eng, 1979)

**RESTRICTIONS ON ACTIVITIES:** In Masa village, women who have given birth are not allowed to cook, go to the garden, or perform other household duties for 3 to 4 weeks after delivery. (Eng, 1979)

**NO INTERCOURSE:** In Masa village, men live in "men's houses" while their wives are breast feeding and are not allowed to have sexual relations with them. (Eng, 1979)

#### NEW IRELAND

**REMEDIES:** If a mother in Umbukul village has trouble breast feeding the first time, some of the women in the village make a medicine from a tree called miringu that is found in the bush. The medicine is mixed with water and given to the mother to drink. (Eng, 1979)

#### WESTERN

**FORBIDDEN FOODS:** In Balimo (Clark, 1978), lactating women are forbidden to eat coconut and pig meat for two weeks after the birth of the baby. (Clark, 1978)

**NO FOOD PREPARATION:** In Kiunga District, a woman who has just given birth is forbidden to prepare food for her husband for one month after the birth of the baby. (Clark, 1978)

### 3.3 DIETARY PRACTICES, INFANTS 0-24 MONTHS OLD

#### 3.3.1 DIETARY PRACTICES, INFANTS 0-24 MONTHS OLD, BREAST FEEDING

#### CENTRAL

**INITIATION AND DURATION:** Mothers in the Kairuku area normally delay breast feeding for 12 to 24 hours after delivery. The colostrum is squeezed out and discarded. Babies are usually breast fed for about 7 or 8 months, until the first teeth appear. (Eng, 1979)

#### EAST SEPIK

**INITIATION AND DURATION:** The initiation of breast feeding varies in Hagama village. Some mothers feed their babies colostrum, and some do not. Village women usually continue breast feeding one child until they conceive another. (Eng, 1979)

## EASTERN HIGHLANDS

**DURATION:** Many mothers in Goroka District continue breast feeding until the child is 2 to 3 years of age. (Nutrition and Development, 1982)

## ENGA

**INITIATION AND DURATION:** In Aipipaka village, it is customary for women to initiate breast feeding right after the umbilical cord is cut and to breast feed their children whenever they cry. Mothers usually feed their babies the colostrum, although some are suspicious of it because of its color. Babies are breast fed until the mother becomes pregnant again. (Eng, 1979)

**WET NURSING:** Orphans in Aipipaka are given to lactating relatives to nurse. (Eng, 1979)

**WET NURSING:** If a mother in Aipipaka is very sick, the baby is given to a lactating relative from the husband's family to nurse. (Eng, 1979)

## GULF

**BREASTFEEDING:** Breastfeeding appeared to be the norm; all children below 2 years of age in the Wabo sample were still being breastfed, as were 71% of the Ihu children. (Lambert, 1983)

## MADANG

**COLOSTRUM:** After delivery, babies on Karkar Island are not breast fed until they start crying, or until the local midwife suggests that they be fed. The delay is approximately 1/2 hour to 1 hour, depending on the baby. The colostrum is considered to be very good. Midwives and experienced mothers always advise new mothers to feed it to their babies. (Eng, 1979)

**DURATION:** Women on Karkar Island practice prolonged breast feeding. Effective means of contraception--mechanical or biochemical--are not known. The average family has 4 or 5 children. (Cannon-Bonventre, 1977)

**DURATION:** Women on Karkar Island breast feed their children for as long as possible, sometimes up to 3-4 years, and in some instances even 5 years if there are no other children. (Eng, 1979)

## MANUS

**INITIATION AND DURATION:** Babies in Kari village normally begin breast feeding on the day of delivery. They are always given the colostrum unless the mother is very sick. If the mother is sick, the child is given to another lactating woman or taken to a hospital to be looked after. Children normally receive only breast milk until the first teeth appear, but continue to breast feed until they are able to run on their own. (Eng, 1979)

### 3.3.1 DIETARY PRACTICES, INFANTS 0-24 MONTHS OLD, BREAST FEEDING (Cont.)

#### MOROBE

**INITIATION AND DURATION:** Babies begin breast feeding on the first day and are always given colostrum. Breast feeding continues for 2-3 years, until the child gradually discontinues by itself. (Eng, 1979)

**WET NURSING:** Orphans in Masa village are usually given to another lactating relative to breast feed. (Eng, 1979)

#### NEW IRELAND

**INITIATION AND DURATION:** Babies in Umbukul village are breast fed starting the day of birth. People believe that babies will die if they are not breast fed from the very first day. Breast feeding continues for 2-2.5 years. (Eng, 1979)

#### NORTHERN

**COLOSTRUM:** Babies in Sakita begin breast feeding on the day of birth and are given the colostrum (Eng, 1979)

**DURATION:** Babies in Sakita may continue breast feeding as long as they like, provided the mother is not pregnant. If the mother becomes pregnant again, she will wean the child if it has teeth. If the child is too young, she will wait until mid-pregnancy to stop breast feeding, in order to insure that the child has enough time to become accustomed to solid food. (Eng, 1979)

**WET NURSING:** If a mother in Sakita does not produce enough breast milk, her lactating relatives will help her out. (Eng, 1979)

#### NORTH SOLOMONS

**INITIATION AND DURATION:** In Hangan village, breast feeding begins right after birth. Breast feeding continues for 2-3 years. (Eng, 1979)

#### WESTERN

**PREVALENCE AND DURATION:** Over 40% of the children aged less than 5 in Kiunga were breast fed, compared to 12% in Tabubil. The duration of breast feeding was estimated to be 2 to 3 years. (Lambert, 1979)

#### WESTERN HIGHLANDS

**INITIATION:** In Jimi District, newborn babies are first given breast milk expressed onto a taro leaf. After that, the baby is given breast milk normally. (Clark, 1978)

### 3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING

#### BOUGAINVILLE

**FIRST FOODS:** In Buin District the first foods given to infants are: egg yolk, pawpaw, ripe banana, and sweet potato. They are usually served mashed. (Clark, 1978)

FIRST FOODS: In Kieta District food is first introduced when the infant is 3 to 5 months old. First foods given are: banana, soup, sweet potato, and fruit juice. Food is usually served mashed. (Clark, 1978)

FIRST FOODS: In Goilala District solid food is usually first introduced when the infant is 6 months old. First foods given are pawpaw, pumpkin, banana, and sweet potato, served whole. (Clark, 1978)

FIRST FOODS: In Kairuku District, solid food is first introduced when the child is one year old. First foods given are: pawpaw, ripe banana, potato, vegetables, yam, and fish. It is usually served mashed. (Clark, 1978)

## CENTRAL

FOODS: Weaning foods in the Kairuku area are: mashed kaukau in coconut cream, or coconut water and pawpaw, given once a day. Vegetables are not introduced until the baby is about 1 year old. (Eng, 1979)

ABRUPT WEANING: Weaning is done abruptly in the Kairuku area by rubbing chillies on the nipples. (Eng, 1979)

FIRST FOODS: In Rigo District, solid food is first introduced when the child is 2 years old. First foods given are pawpaw, ripe bananas, sweet potato, and yams. They are usually served mashed; ripe bananas are cooked first. (Clark, 1978)

## CHIMBU

FIRST FOODS: In Gumine and Gembogl Districts solid food is first introduced when a child is 8 to 9 months old. First foods given are sugar cane, ripe banana, and sweet potato. Food is served whole, rather than mashed. (Clark, 1978)

FIRST FOODS: In Kundiawa District, food is first introduced when a child is 4 months (urban) to 8 months (village) old. First foods given are whole pitpit, sweet potato, or banana. Food is served whole, rather than mashed. (Clark, 1978)

## EAST NEW BRITAIN

FIRST FOODS: In Pomio District, solid food is first introduced when the child is one year old. First foods given are: banana, sweet potato, taro, and yam. The mother usually mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Rabaul District, solid food is usually first introduced when the child is 3 months old. First foods given are: pawpaw, pumpkin, ripe banana, sweet potato, Chinese taro and soup, sweet potato and soup. The mother usually mashes food for her child or boils it to make soup. Food is usually given whole when the child is 8 to 10 months old. (Clark, 1978)

### 3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING (Cont.)

#### EAST SEPIK

**FIRST FOODS:** In Ambunti District, solid food is usually first introduced when the child's first tooth erupts, at about 6 to 7 months of age. First foods given are: banana, breadfruit seeds, fish, sago, sweet potato, taro, and yam. The mother usually chews the food, or mashes it before giving it to her child. (Clark, 1978)

**FIRST FOODS:** In Angoram District, solid food is usually first introduced when the child is 2 to 4 weeks old. First foods given are: sago paste and pancakes, bananas, taro, yam, sweet potato, greens, and fish. The mother usually mashes the food or gives it to her child whole. (Clark, 1978)

**FIRST FOODS:** In Hagama village, solid foods are introduced when the child has started growing its first teeth, between 6 months and 1 year of age. In general, the child is given soft foods such as ripe banana or a piece of ripe pawpaw. (Eng, 1979)

**FIRST FOODS:** In Maprik District, solid food is usually first introduced when the child has about four teeth. First foods given are: banana, pawpaw, yam, pitpit. The mother usually gives the food to her child whole. (Clark, 1978)

**FIRST FOODS:** In Wewak District, solid food is first introduced when the child has 4 teeth, at about 10 to 12 months of age. The first food given is whole pawpaw. (Clark, 1978)

**FAMILY FOODS:** Once solid food is introduced, babies share meal times with the rest of the family. There are no special ways of preparing food for children, although the mother may mash the food before giving it to the baby. (Eng, 1979)

**ABRUPT WEANING:** Mothers in Hagama village wean their children by rubbing chili or young tobacco leaves of their breasts. (Eng, 1979)

#### EASTERN HIGHLANDS

**FIRST FOODS:** The 1981 survey in Goroka District found that food is introduced into a child's diet as early as the third week of life and as late as 11 months of age, although it is most frequently introduced when the child is 6 to 9 months of age. (Earland, 1982)

**FIRST FOODS:** In Goroka District, solid food is first introduced when the child is 8 to 9 months old and the first teeth have erupted. First foods given are: pawpaw, ripe banana, and sweet potato. Sweet potato is usually pre-masticated; other foods are served whole. (Clark, 1978)

**FIRST FOODS:** In Henganofi District, salt is given to children at birth. Sweet potatoes are introduced once the first teeth have erupted. Food is sometimes served mashed or broken into small pieces. (Clark, 1978)

**FIRST FOODS:** In Kainantu District, solid food is first introduced when the child is between 7 and 18 months of age. First foods given are:

pumpkin, soup, sweet potato, taro, yams, and fish. They are usually served mashed. (Clark, 1978)

**FIRST FOODS:** In Lufa District solid food is first introduced when the child is one year old. The first food given is sweet potato, served whole. (Clark, 1978)

**FIRST FOODS:** In Okapa District, food is first introduced when the infant is between 6 months and one year of age. The first foods given are: banana, sweet potato, yams, taro, green leaves, and sugar cane. They are usually served either pre-masticated or mashed. (Clark, 1978)

## ENGA

**FOODS:** Mothers in Aipipaka do not cook especially for their babies, but frequently give them sweet potatoes or other foods after they have chewed them. (Eng, 1979)

**ABRUPT WEANING:** Mothers in Aipipaka wean their babies abruptly by rubbing tobacco on their breasts. There are no special weaning foods. Mothers will give their children anything they like, provided that it is available, after chewing it first. (Eng, 1979)

**WEANING---HIGHLANDS:** The median age for the introduction of solid foods into the child's diet was 39 months. The first food given is generally the sweet potato, followed by green leaves, beans, bananas, and other root crops. Infrequently, pig meat and canned fish may be eaten. (Binns, 1976)

**FIRST FOODS:** In Lagaip District, solid food is first introduced when the child's first teeth have erupted. The first foods given to children are sweet potato and sugar cane. Sometimes the food is served mashed, but it is more commonly given to the child whole. (Clark, 1978)

**FIRST FOODS:** In Wabag District, solid food is usually introduced once the first teeth have erupted. First foods given are: sweet potato, pork, sugar cane, and rice. Food may be served mashed if utensils are available. Otherwise it is pre-masticated or served whole. (Clark, 1978)

**FIRST FOODS:** In Wapenamauda District, solid foods are first introduced when the child's first tooth has erupted. The first food given is sweet potato, served whole. (Clark, 1978)

## GULF

**FIRST FOODS:** In Kikori District, solid food is usually introduced when the child is 2 to 5 months old. First foods given are: sago, ripe banana, potato, and pumpkin. In some areas, breast milk only is given until the first teeth erupt. Sago rolls wrapped in pandanus leaves are given when the child has two teeth; coconut water and flesh are given when 4 teeth have erupted; and sweet potato, banana, fish, shellfish, and crab when 7 to 9 teeth are present. In other areas, coconut is the last food to be introduced. Food is usually served mashed. (Clark, 1978)

### 3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING (Cont.)

**NUMBER OF MEALS:** Nearly 20% of the Wabo pre-school children got only 1 meal a day, while less than 20% got three meals a day, the minimum requirement for a child of this age. For both populations the majority of families only consumed 2 meals per day. (Lambert, 1983)

#### MADANG

**FIRST FOODS:** In Bogia District, food is usually first introduced when the child is 6 months or older, although some mothers give their children pre-masticated sago from the age of 3 weeks on. First foods given are: sago, pawpaw and banana, coconut, and yam. Food is usually served mashed. (Clark, 1978)

**FIRST FOODS:** On Karkar Island, solid foods are first introduced when a child is still breast feeding. At 12 months they are expected to share the family diet, but they usually get a larger share than older children. First foods are commonly pumpkin or sweet potato. (Eng, 1979)

**ABRUPT WEANING:** Mothers on Karkar Island rub chillies on their breasts to stop children from breast feeding. (Eng, 1979)

**FIRST FOODS:** In Madang District, solid food is first introduced when the child is between 6 months and 1 year of age. First foods given are: pawpaw, pumpkin, ripe banana, vegetable soup, sweet potato, and taro. Food is usually served pre-masticated or mashed. (Clark, 1978)

**FIRST FOODS:** In Ramu District, solid food is first introduced when the first tooth erupts. First foods given are: sweet potato, sugar cane, banana, and pitpit. Food is usually given mashed at first, then whole. (Clark, 1978)

**FIRST FOODS:** In Saidor District, solid food is first introduced when the child is 3 months old. Usually the mother chews the food before giving it to the child. (Clark, 1978)

#### MANUS

**WEANING STRATEGIES:** When a mother in Kari village decides to wean her child, she may breast feed it once a day or simply leave it at home the whole day while she is at the garden. Sometimes mothers rub their breasts with chili. (Eng, 1979)

**WEANING FOODS:** When it is time to introduce solid foods, mothers either mash it and mix it with soup or chew it until it is soft and then feed it to the baby. Children receive the same food as the rest of the family. (Eng, 1979)

**FIRST FOODS:** In Manus Province, solid food is first introduced when the child's first tooth erupts. The mother either mashes the food by hand or chews it before giving it to the child. (Clark, 1978)

## MILNE BAY

FIRST FOODS: In Alotau District, solid food is first introduced when the child is 9 to 12 months old. First foods given are: pawpaw, sweet potato, pumpkin, soup, and egg. The mother usually mashes it before giving it to her child. (Clark, 1978)

FIRST FOODS: In Eas'Ala District, solid food is usually first introduced when the child is 8 to 12 months old. The first foods given are: sweet potato, cassava, yam, and pawpaw. The mother usually either chews the food or mashes it before giving it to her child. (Clark, 1978)

FIRST FOODS: In Losuia District, solid food is first introduced when the child is 12 to 18 months old. The first foods given are taro, and later coconut. (Clark, 1978)

FIRST FOODS: In Misima District, solid food is first introduced when the child is 8 months old. First foods given are: taro, sweet potatoes, yams, and sago. The mother usually chews or mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Rabaraba District, solid food is usually first introduced when the child stops breast feeding. First foods given are vegetable soup, vegetables, and fruit. The mother usually mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Samarai District, solid food is usually first introduced once the child's first tooth has erupted, at approximately 6 months of age. First foods given are: pumpkin, sweet potato, taro, and banana. The mother usually mashes the food before giving it to her child. (Clark, 1978)

## MOROBE

FIRST FOODS: Solid food is introduced when the mother decides that the child is ready for it, usually when the child has more than two teeth. First foods given are: mashed kaukau, pawpaw, ripe banana, and pumpkin. Meat is never given until the child has teeth. Breast feeding goes on until the child discontinues by itself. (Eng, 1979)

FIRST FOODS: In Finschhafen District, solid food is usually first introduced when the child is 2 to 3 months of age. First foods given are: banana, soup, sweet potato, and fruit juice. The mother usually mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Kaiapit District, solid food is usually introduced when the child is 3 weeks old, although breast feeding continues until the child is 12 to 18 months old. First foods given are taro (given at 3 weeks), then pawpaw, banana, sweet potato (when the child can crawl), and finally coconut (last). Usually the mother chews the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Lae District, solid food is usually first introduced when the child is 12 to 18 months old. First foods given are: egg,

### 3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING (Cont.)

pawpaw, pumpkin, banana, potato, fruit juice, and taro. Mothers usually chew taro before giving it to their children. Other foods are mashed, and some are given whole. (Clark, 1978)

**FIRST FOODS:** In Wau District, solid food is usually introduced when the child's first teeth erupt. First foods given are pawpaw, pumpkin, banana, and sweet potato. The mother usually mashes the food before giving it to her child. (Clark, 1978)

#### NATIONAL CAPITAL

**FIRST FOODS:** In Port Moresby, solid food is usually first introduced when the child is 6 to 12 months old. The first foods given are: banana, cornflakes, egg, English potato, orange juice, pawpaw, pineapple, rice, sweet potato, tinned baby food, tinned milk, tinned fruit juice, and yam. The mother usually mashes the food before giving it to her child. (Clark, 1978)

#### NEW IRELAND

**FIRST FOODS:** In Namatanai District, solid food is usually first introduced when the child is 6 months old. First foods given are ripe banana, sweet potato, and fruit juice. The mother usually mashes the food before giving it to her child. (Clark, 1978)

**BREAST MILK SUBSTITUTES:** In Umbukul, orphans and babies whose mothers do not have enough breast milk are given young coconut juice. (Eng, 1979)

**FIRST FOODS:** In Umbukul village, solid food is first introduced when the child is about one year of age and has teeth. First foods given are: taro, kaukau, crabs, and fresh fish. Traditionally mothers chew the food before giving it to their babies to eat. Babies continue to breast feed up to 2-2.5 years of age. (Eng, 1979)

**FOODS USED:** Weaning foods used in Umbukul are: taro, kaukau, crabs, and fresh fish, a diet similar to that when the child was one year old. (Eng, 1979)

**EXTRA FOODS:** Most children in Umbukul apparently do not lose weight when they are weaned, because mothers are reportedly careful to ensure that they receive enough extra food. (Eng, 1979)

#### NORTHERN

**INTRODUCTION OF FOODS:** In Sakita, solid food is normally introduced at the age of 5 or 6 months. usually the first food is mashed akukau and pumpkin with mashed fish or meat. (Eng, 1979)

**EARLY WEANING:** Sometimes babies in Sakita are weaned early if the mother is sick. Mothers do not know how to prepare breast milk substitutes. (Eng, 1979)

**FIRST FOODS:** In Tufi District, solid food is first introduced when the child is between 7 and 12 months of age. First foods given are: ripe

banana, pawpaw, sweet potato, taro, sago, pumpkin, and boiled egg. The mother usually chews the food, mashes it, or gives it to her child in the form of soup. (Clark, 1978)

#### NORTH SOLOMONS

**FORBIDDEN FOODS:** The same avoidances that apply to lactating women also apply to children up to the age of 4 months. They are not allowed to eat fish, shellfish, greasy food, or boiled foods. (Eng, 1979)

**FIRST FOODS:** In Hangan village, solid food is introduced at 4 months of age. The first food to be introduced is kaukau, chopped into small pieces and boiled until it is easy to mash. (Eng, 1979)

#### SOUTHERN HIGHLANDS

**FIRST FOODS:** In Ialibu District, solid food is first introduced when the child's first teeth have erupted. First foods given are ripe banana and sweet potato. The mother usually gives the food to her child whole. (Clark, 1978)

**FIRST FOODS:** In Kagua District, solid food is first introduced when the child is nine months old. First foods given are: sweet potato, yams, banana, and green leaves. The mother may chew the food first or give it to her child whole. (Clark, 1978)

**FIRST FOODS:** In Mendi District, solid food is first introduced when the child has 4 teeth. First foods given are: pig to suck, sweet potato, taro, pumpkin, and ripe banana. The mother generally gives the food to her child whole. (Clark, 1978)

**FIRST FOODS:** In Nipa District, solid food is first introduced when the child is 8 to 9 months old. First foods given are: sweet potato, greens, banana, and cucumber. The mother usually cooks the food well and gives it to her child whole. (Clark, 1978)

**FIRST FOODS:** In Pangia District, solid food is first introduced when the child's first teeth erupt. Sweet potato is the first food given. The mother usually gives it to her child whole. (Clark, 1978)

**NO MASHED FOODS:** In Pangia District, children under five are generally not given mixtures of mashed food to eat because it is thought to look like feces. (Clark, 1978)

**FIRST FOODS:** In Tari District, solid food is first introduced when the child is three months old. First foods given are: pumpkin, choko, sweet potato, egg, and tomato. The mother usually gives the food to her child whole. (Clark, 1978)

#### WEST NEW BRITAIN

**FIRST FOODS:** In Talasea District, solid food is first introduced when the child is two months old, although babies four weeks old may already be given sweet potato. First foods given are: egg yolk, banana, sweet

### 3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING (Cont.)

potato, soup, spinach, and vegetables with fish, bananas, and coconut cream. There are several methods of food preparation. Bananas are boiled, and spinach is mumued. The mother may scrape the food with a shell, mash it with a fork, or, in the case of sweet potato, she may chew it before giving it to her child. (Clark, 1978)

#### WEST SEPIK

FIRST FOODS: In Aitape District, solid food is first introduced when the child is 2 months old. First foods given are: pawpaw, banana, pumpkin, and sweet potato. The mother usually mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Amanab District, solid food is first introduced when the child is about 1 year old. First foods given are: sago, ripe bananas, taro, and sweet potato. The mother usually chews the food, breaks it up, mashes it, or gives it to her child whole. (Clark, 1978)

FIRST FOODS: In Lumi District, solid food is first introduced when the child is 1 to 2 weeks old. First foods given are sago and ripe banana. The mother usually chews the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Telefomin District, solid food is first introduced when the child's first teeth erupt. First foods given are: ripe bananas, sweet potato, pumpkin, and taro. The mother usually chews the food before giving it to her child. Otherwise, she gives it to the child whole. (Clark, 1978)

#### WESTERN

FIRST FOODS: In Balimo District, solid food is first introduced when the child is 10 months old. First foods given are: sago, fish, banana, and pawpaw. The mother usually breaks it up before giving it to her child. (Clark, 1978)

FIRST FOODS: In Daru District, solid food is first introduced when the child is 1 year old. First foods given are: bananas, pawpaw, and vegetables with fish soup. The mother usually mashes the food before giving it to her child. (Clark, 1978)

FIRST FOODS: In Kiunga District, solid food is first introduced when the child's first teeth have erupted. First foods given are: uncooked sago mixed with breast milk, ripe bananas, pawpaw, fish, and meat (at about one year of age). The mother usually mashes the food before giving it to her child. (Clark, 1978)

#### WESTERN HIGHLANDS

FIRST FOODS: In Hagen District, solid food is first introduced when the child's first teeth erupt. First foods given are: ripe banana, sweet potato, pawpaw, pumpkin, and green vegetables. The mother usually mashes the food, except for banana and sweet potato which are given whole. (Clark, 1978)

**FIRST FOODS:** In Jimi District, solid food is first introduced when the child is one year old. First foods given are: pitpit, pawpaw, ripe banana, and cabbage. The mother usually mashes the food before giving it to her child. (Clark, 1978)

**FIRST FOODS:** In Minj District, solid food is first introduced when the child is 1 to 2 years old. First foods given are: pig fat to suck on, banana, sweet potato, and ptipit. The mother usually gives the food to her child whole. (Clark, 1978)

**FIRST FOODS:** In Muglamp District, solid food is first introduced when the child is 4 to 5 months old. First foods given are: banana, pawpaw, and sweet potato. The mother usually mashes the food before giving it to her child. (Clark, 1978)

### 3.3.3 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING

#### CENTRAL

**FAMILY FOODS:** After being taken off the breast, children in the Kairuku area are expected to eat from the family pot, but the food is initially mashed up and mixed with liquid from the soup to make it softer. (Eng, 1979)

#### EAST SEPIK

**MEAT:** In Angoram District, young children are allowed to eat bush meat only after most of their milk teeth have erupted. (Clark, 1978)

#### NORTHERN

**MEALS:** In Sakita, food for babies is prepared together with the family meal and then mashed separately. Young children are fed first so that they do not disturb the family meal. Once they are able to eat by themselves, they eat with the rest of the family, but are usually given preference in serving. (Eng, 1979)

#### WESTERN

**MEALS:** 4% of children aged 0 to 5 years in Kiunga ate only one meal per day, whereas 19% ate two meals per day, and 77% ate three. In Tabubil, 33% of the children in this age group ate two meals, and 67% ate three meals per day. (Lambert, 1979)

### 3.4 DIETARY PRACTICES, HEALTH AND MEDICINE

#### BOUGAINVILLE

**MEDICINE MEN:** Medicine men in Buin District have the power to decide which foods should be prohibited to whom. People believe that breaking the medicine man's taboo will cause headaches, swelling of the neck glands, and possibly death. Some people are not allowed to eat white pigs; others are not allowed to eat black pigs or ginger-haired pigs. Medicine men can signal permission to eat a forbidden food by putting a red powder on it. (Clark, 1978)

### 3.4 DIETARY PRACTICES, HEALTH AND MEDICINE (Cont.)

#### CENTRAL

HERBAL REMEDIES: Traditionally, if a child was very ill in the Kairuku area, mothers went to a witch doctor with money, betel-nuts, or a fowl. The witch doctor would collect some herbs and advise the mother how to use them. Sometimes they were to be boiled and drunk, and sometimes they were to be used for washing. Since the introduction of hospitals, there have been some changes. (Eng, 1979)

#### MANDANG

REMEDIES: On Karkar island, if a child is sick, the mother prepares a kind of soup with aibika, fresh fish, and a lot of salt. Chili and ginger are sometimes added to stimulate the child's appetite. (Eng, 1979)

#### 4. NUTRITION STATUS CORRELATIONS

**MALNUTRITION AND MORTALITY:** Community Health Clinic data from the 1975 malnutrition survey showed that the incidence of malnutrition is closely correlated with the childhood mortality rates published in the National Health Plan. These figures were therefore used to determine the health status of children under five. (Lambert, 1979)

**MORBIDITY AND MALNUTRITION--HIGHLANDS:** The difference in mortality between normal and malnourished children was significant for the two major causes of mortality, acute respiratory disease and gastrointestinal disease. In the one to four age group, 50% of deaths were from gastrointestinal diseases and 42% from respiratory disease. (Binns, 1976)

**MALNUTRITION AND BOTTLE FEEDING:** A survey conducted in December 1975 and January 1976, before the introduction of bottle-related legislation, showed that one-third of all children under 2 were being bottle fed; 69% of those being bottle fed were malnourished (less than 80% of the standard weight for age), compared to 26% of the breast fed children. This difference was statistically significant. (Biddulph, 1980a)

**MALNUTRITION, BOTTLE FEEDING, AND LEGISLATION:** A survey conducted 20 months after the Baby Feed Supplies (Control) Act had become law showed that 88% of children under 2 were being breast fed, compared to 65% in 1975/76. 69% of the children weighed at least 80% of the standard weight for age, compared to 59% in 1975/76. 27% weighed between 60% and 70% of the standard, compared to 30% in 1975/76, and 4% weighed less than 60% of the standard, compared to 11% in 1975/76. (Biddulph, 1980a)

**MALNUTRITION AND TYPE OF FEEDING:** The 1979 survey on method of infant feeding and its relationship to nutritional status showed that 29.1% of breast fed infants were below 80% of the standard weight for age, compared to 35.3% of the artificially fed babies; 3.1% of the breast fed babies were below 60% of the standard weight for age, compared to 11.7% of the artificially fed babies. (Lambert, 1980b)

**BOTTLE FEEDING, LOW BIRTH WEIGHT, AND MORTALITY:** A follow-up study of 15 low birth weight infants who were being bottle fed at the time of discharge from the hospital showed that after one year all but one of them had died. (Lambert, 1980b)

#### KARKAR ISLAND

**NUTRITION STATUS AND FAMILY SIZE:** Trends emerging from the Karkar data (after eliminating the data for first-born children) supported the hypothesis that family size and family building rate are inversely related to the nutritional status of the children. This is also consistent with the hypothesis that the amount of maternal attention received by a child is related to its nutritional status. (Cannon-Bonventre, 1977)

**ILLNESS AND CRAWLING:** Health officials on Karkar Island reported a greater incidence of morbidity among children after the onset of crawling, due to increased risk of exposure to disease agents. (Cannon-Bonventre, 1977)

#### 4. NUTRITION STATUS CORRELATIONS (Cont.)

**BIRTH ORDER AND DEVELOPMENT:** The two-way analysis of variance showed that first born children of either sex were significantly different from higher birth order children. Their unique characteristics might conceivably be due to the age and inexperience of their mothers. They were almost always below the expected weight for age at the onset of sitting, crawling, and walking than children with older siblings and appeared to be at greater risk of nutritional deficiency. (Cannon-Bonventre, 1977)

#### WESTERN

**MALNUTRITION AND CULTURE:** Cultural practices have significant impact on nutritional status and health in the Lake Murray area. Children from the Kuni villages looked thin and had protruding bellies and scrawny arms and legs. By contrast, children from non-Kuni villages, who live on the shores of the same lake and have similar fertile, swampy soil, appear strong, roundish, and smooth, healthy skins. (Connor, 1981)

**NUTRITION STATUS AND SANITATION:** Adults and children living at the Tabubil camp site, with good sanitation health services and treated water, showed great improvement in their nutritional status. A large proportion of these families also had adequate cooking facilities. (Lambert, 1979)

## 5. NUTRITION AND HEALTH POLICIES AND PROGRAMS

### 5.1 NUTRITION AND HEALTH POLICIES AND PROGRAMS, POLICIES

**GOVERNMENT PRIORITIES:** The government of Papua New Guinea is placing special emphasis on maternal and child health care, family planning, health education, improved nutrition, expanded immunizations, malaria control, basic sanitation, and a plentiful, safe water supply. (Biddulph, 1980b)

**DEVELOPMENT GOALS:** One of the main aims of the National Development Strategy is to increase domestic food production and improve the nutritional status of the population, while reducing dependency on imported foreign foods. (Lambert, 1980a)

**NATIONAL FOOD AND NUTRITION ACT:** Papua New Guinea has a National Food and Nutrition Policy. The emphasis of its activities is on increasing and improving subsistence agriculture, and improving the nutritional status of the area. The May 1981 issue of New Nation Magazine was devoted to Nutrition Education, and subsequently nutrition/malnutrition essay competitions were held. A National Nutrition Conference was held in June 1982. (Vassallo, 1981)

**BABY FEED SUPPLIES CONTROL ACT:** The passage of the Baby Feed Supplies (Control) Act of 1977 preceeded the adoption of the WHO/UNICEF code by the World Health Assembly. The Act makes bottles and supplies available only by prescription, prescribes penalties for the abuse of prescriptions, and limits advertisements of breast milk substitutes. (APHA, 1983)

**BABY FEED SUPPLIES CONTROL ACT:** In July 1977, Papua New Guinea passed the Baby Feed Supplies (Control) Act, legislation designed to promote breast feeding. Under this Act, advertising of milks for bottle feeding is banned, and the sale of "feeding bottles, teat and dummies" is restricted. They can be obtained only from a registered pharmacist, with a prescription signed by a health worker. Health workers are allowed to prescribe them only after determining that it is in the best interests of the child to be bottle fed. They can be fined for violations. If they do prescribe bottle feeding, they are required to ensure that the mother or guardian knows how to clean the bottles properly, prepare the formula correctly, and store it, if it is not going to be used immediately. (Biddulph, 1980a)

**MATERNITY AND LACTATION LAWS:** Pregnant women are entitled to 6 weeks of leave before and after the birth of the child. They are entitled to their full salary during leave. In addition, they are entitled to two 30-minute nursing breaks a day after the child is born, which count as time worked. (APHA, 1983)

**MATERNITY LEGISLATION:** Papua New Guinea subscribes to the Maternity Protection Convention. The Native Employment Act of 1958/67 stipulates that mothers breast feeding their babies are entitled to two periods of at least half an hour each during the working day, so that they may breast feed their babies. (Benjamin and Biddulph, 1980)

## 5.1 NUTRITION AND HEALTH POLICIES AND PROGRAMS, POLICIES (Cont.)

**FOOD PRODUCTION GOALS:** Food production and nutrition targets for the 10-year period 1976-86 have been set as follows: food production should increase at a rate such that food imports will remain constant; subsistence production will be maintained at the present level; and per capita consumption of food will increase from 80% to at least 90% of the recommended food energy requirements. In order to achieve these targets, marketed domestic food production will have to increase by approximately 165% over the 10-year period. (Lambert, 1979)

**SELF-SUFFICIENCY:** National nutrition policy is in favor of promoting self-sufficiency in food crops. Following frosts and droughts in several Highland and Central Provinces in October and November 1980 and March 1981, investigations were undertaken to determine the seriousness of food shortages and their geographical extent so that the information could be used to request assistance from the United Nations and the World Food Program. (Nanai, 1981)

**FOOD MARKETING:** The Department of Commerce, the Office of Transport, the Department of Primary Industry, and the Department of Labour and Industry are responsible for implementing projects aimed at the development of food marketing, processing, storage, transport, wholesaling, and retailing capabilities. (Lambert, 1979)

**FOOD PRODUCTION POLICIES:** The Department of Primary Industry was charged with the responsibility for developing policies to promote the cost effective production of nutritious foods. An effort is being made to adopt techniques better adapted than subsistence techniques to market production, because of the need to supply more food for urban areas in the future. Emphasis will also be placed on helping motivated individuals and groups to secure land for gardening and assist them in starting up commercial gardening. (Lambert, 1979)

**FOOD MARKETING CORPORATION:** The Food Marketing Corporation was charged with the responsibility for ensuring that local and imported foods are kept in reasonable balance. (Lambert, 1979)

**FOOD MARKETING STRATEGIES:** A strategy to increase the supply of domestic food to Port Moresby included: encouraging semi-intensive food production by nearby producers, permitting non-nationals to produce staple foods, giving the Food Marketing Corporation the responsibility for balancing local and imported supplies of fresh food, and, when feasible, increasing urban and rural subsistence food production. (Lambert, 1979)

**GOVERNMENT EXPENDITURES:** In 1978, central government expenditures per person were: health, U.S. \$12 (1975 dollars); education, \$26; and defense, \$6. (World Bank, 1981)

## 5.2 NUTRITION AND HEALTH POLICIES AND PROGRAMS, PROGRAMS

**NUTRITION PROGRAMS AND EFFECTS:** The National Nutrition Survey (December 1977-March 1978) revealed that 38% of all children under five suffer from malnutrition. These results indicated that malnutrition had declined by an average of 17% since 1975 in the seven provinces where Nutrition

Programmes had been established that year and had not declined at all in the twelve provinces not covered by the program. (Lambert, 1979)

**NATIONAL NUTRITION SURVEY:** The 1977 National Nutrition Survey was conducted as follows: in November 1977 a circular letter was sent by the Secretary for Health to all Provincial Health Officers, Nursing Supervisors, and nutrition staff. Nurses were instructed to record the weights of children seen at clinics over the specified period of time. Weight charts based on the Harvard Standard and summary sheets were provided. Charts and summary sheets were checked by either the Provincial Nutritionist or the Nutrition Section in Port Moresby, to minimize errors. Reminder letters were also sent out to maximize coverage. (Lambert, 1978)

**NATIONAL NUTRITION WORKSHOP:** A National Nutrition Workshop was held at the College of Allied Health Sciences in January 1982, in order to assess past achievements, present developments, and future directions of nutrition research, training, and service in Papua New Guinea, and to foster increased intersectoral cooperation in problems of food and nutrition. The workshop was sponsored by the World Health Organization, Western Pacific Region. National Nutrition Conferences are also held annually, as a forum for Nutritionists working in the country. (Nutrition and Development, 1982)

**MATERNAL AND INFANT NUTRITION:** An action plan for improving maternal and infant nutrition was proposed for Papua New Guinea. Priorities are to collect more data on maternal nutrition at the household, community, and national levels, carry out a national nutrition survey in 1982 to collect more accurate nutritional data; improve breast feeding practices through mass media, legislation, and health education campaigns; train nutrition workers; use nutrition rehabilitation units for training of health personnel, cooking demonstrations, and to assist mothers of sick children in preparing food; encourage backyard gardening; and obtain assistance in purchasing vehicles for the Nutrition Rehabilitation Units and scales for the pediatric clinics. (Jelliffe and Jelliff, 1981)

**FOOD AND NUTRITION PROGRAM--PURPOSES:** The basic objective of the Food and Nutrition Program in Papua New Guinea is to improve the nutritional status of the population through an increase in domestic marketed production, maintenance of existing levels of subsistence production, and an increase in per capita consumption of food, to at least 90% of recommended food requirements. In order to achieve this, emphasis has been placed on the cost effective production of nutritious foods, and the adoption of new production techniques. In addition, assistance will be provided to individuals in setting up commercial gardening, and non-nationals will be permitted to produce food in case of shortfall. Intersectoral cooperation will be stressed. Priority will be given to increasing food supplies for Port Moresby, through the measures outlined above. Nutrition planning will become a part of the agenda of the National Planning Committee. A nutrition education program will be implemented, and national nutrition surveys will be undertaken regularly. The program was approved by the Cabinet in February 1978. (U.S.A.I.D., 1979)

## 5.2 NUTRITION AND HEALTH POLICIES AND PROGRAMS, PROGRAMS (Cont.)

**FOOD AND NUTRITION PROGRAM—AGENCIES:** The following agencies and departments are involved in the Food and Nutrition Programme: the Departments of Education, Primary Industry, Health, Natural Resources, Transport Works and Supply; the National Planning Office; the Office of Business Development; the Office of Information; the National Investment and Development Authority; the Development Bank; the Food Marketing Corporation; the Bureau of Statistics; the Central Provincial Government; the Port Moresby City Council; the Local Government Councils (Central Province); Members of Parliament (Central Province); food retailers and importers; churches; and community groups. (Lambert, 1979)

**NUTRITIONISTS:** Provincial nutritionists were working in 12 provinces in 1978. The target was to have all provinces covered by 1980. (Lambert, 1979)

**NUTRITION EDUCATION PROGRAMME:** The Nutrition Education Programme is the most important component of the Nutrition Improvement Programme. It operates mainly through school teachers, agricultural extension workers, and health workers. Basic messages have been developed and disseminated by radio, in plays, on T-shirts and badges, posters, leaflets, and handouts. In addition, a national school lunch program was started. (Lambert, 1980a)

**NATIONAL NUTRITION EDUCATION PROGRAMME:** National and provincial agencies concerned with health, primary industry and education, and several other media agencies of the government are responsible for the immediate implementation of the National Nutrition Education Programme. (Lambert, 1979)

**NUTRITION EDUCATION:** There has been increasing emphasis within the Nutrition Programme on the needs of pregnant and lactating women, which until recently were overshadowed by efforts at improving the feeding practices of young children. Nutrition education posters have been produced that reflect this new emphasis, and a new chapter on pregnancy and lactation was added to the revised edition of the manual "Nutrition for Papua New Guinea." Work is also being undertaken to develop measures for assessing women's progress during pregnancy in ante-natal clinics. (Nanai, 1982)

**NUTRITION EDUCATION—RADIO:** A number of nutrition messages (60 and 30 seconds) have been broadcast on national radio, as part of the National Nutrition Education Programme of the National Food and Nutrition Programme. Plans were made to extend these messages to provincial radio stations at a later date. (Lambert, 1979)

**MASS MEDIA:** Activities planned by the Food and Nutrition Board for 1981 were: a film entitled "Green, yellow, white--that's right" to be made available to the theatres, schools, and field workers, nutrition stamps of 4 different denominations, each with a message; and a postmark to go with the stamps. (Nutrition and Development, 1980)

**SCHOOL NUTRITION:** Instructions issued by the Secretary for Education prohibit the sale of foods of low nutritional value at school shops. (Lambert, 1980a)

**NUTRITION IN SCHOOLS:** A survey carried out before and after a 6-month nutrition campaign showed a 30% reduction in the prevalence of subclinical malnutrition among school children. Teachers reported improved attendance and better concentration in class. (Lambert, 1980a)

**HEALTH DEPARTMENT NUTRITION PROGRAMS:** The Health Department is responsible for identifying areas with nutritional problems and developing specific programs to fit those needs. Examples of nutrition messages are: breast feed your child until he or she is two years old; do not have another child until the youngest is at least three years old; give your child mashed food when he or she is four months old; give your children food at least three times every day; eat many different kinds of food every day; take your child to a clinic every month; and do not give sick children less food. (Lambert, 1979)

**NUTRITION EDUCATION:** The Health Department conducts nutrition education programs and has established Nutrition Rehabilitation Units at hospitals and Health Centers throughout the country. Emphasis is placed on the use of cheap, locally produced food. (Lambert, 1980a)

**HEALTH DEPARTMENT NUTRITION MESSAGES:** The Health Department developed specific messages for certain groups. Mothers of school children were told to feed their children before school, to provide the children with lunch, and not to give children foods of low nutritional value. (Lambert, 1979)

**NUTRITION EDUCATION:** Nutrition courses are offered at the College of Allied Health Sciences in Port Moresby, as well as a number of agricultural colleges, teacher training colleges, and other institutions. Post graduate training is not offered in Papua New Guinea. (Lambert, 1979)

**SCHOOL FEEDING:** The Education Department has banned the sale of "rubbish foods" at school "tuck shops." Other retail outlets for these products have also been reduced. The companies producing "Cheeze Pops" and "Twisties" have agreed to work with food technologists on producing new, more nutritious snacks, such as roasted peanuts and dried fruit. (Lambert, 1979)

**PRIVATE VOLUNTARY ORGANIZATIONS:** Organizations involved in community development include the YMCA, the YWCA, women's organizations, and church groups. (Nutrition and Development, 1981)

**SUPPLEMENTARY FEEDING:** No supplementary feeding programs have been undertaken, in order to encourage self-reliance. (APHA, 1983)

**EFFECTS OF BOTTLE REGULATION:** Until 1977, 10% of hospital admissions for gastroenteritis occurred in infants under 6 months of age. After introduction of the bottle feeding legislation, children in this age group accounted for only 6% of the total admissions for gastroenteritis. There has been a parallel decline in the proportion of deaths from gastroenteritis, from 30% in 1975, to 22% in 1976, 13% in 1977, and none in 1978 and 1979. (Biddulph, 1980a)

## 5.2 NUTRITION AND HEALTH POLICIES AND PROGRAMS, PROGRAMS (Cont.)

**EFFECTS OF BOTTLE REGULATIONS:** The 1979 survey showed that only 1 out of 17 mothers had acquired baby bottles illegally. (Biddulph, 1980a)

**REHABILITATION:** Malnourished children are treated either in small residential Nutrition Rehabilitation Units attached to hospitals and health centers, or in hospital and health center wards. The numbers that can be treated in this way are very small, in some cases only 4 a month, and the results were not very encouraging. Children on average stayed over 20 days in the treatment units, but only just over half of them gained any weight at all. (Singleton, 1981)

**PROVINCIAL NUTRITION COMMITTEES:** There are Provincial Nutrition Committees in many provinces of Papua New Guinea. Committee members are Health Staff, government employees, church groups, women's groups, and youth groups. (Dignan, 1982)

**FOOD RESEARCH:** The Government is committed to furthering research into appropriate methods of food handling, processing, and marketing. Rice-shaped dehydrated sweet potato pellets, smoked and sun-dried fish, and dried banana are some of the products that have already been developed. (Lambert, 1980a)

**AGRICULTURAL RESEARCH:** The Department of Agriculture has begun research into the problems of subsistence agriculture. Particular emphasis has been placed on land use and the value of traditional crops. Seed multiplication sites have also been established, and suitable seeds and seedlings have been distributed to schools and other institutions. Agricultural extension workers have been promoting increased production of food crops for consumption as well as cash crops for export. (Lambert, 1980a)

**EXTENSION PROGRAMS:** Agricultural and nutrition extension work is now being aimed at settler families. Resettlement schemes have been modified to provide sufficient land for food-crop production until cash incomes are assured. (Lambert, 1980a)

**APPROPRIATE TECHNOLOGY:** The South Pacific Appropriate Technology Foundation (SPATF) in Boroko (Papua New Guinea) was established in 1977 by the Office of Village Development, a government agency responsible for coordinating government action on appropriate technology. The major objective is to deliver technologies to people all over Papua New Guinea through distribution of published information; response to specific inquiries; selection, testing, and modification of technologies; supply of appropriate materials to villagers; development of small enterprises to produce tools; and promotion of appropriate technologies. Specific technologies covered by SPATF include: food processing, gardening, energy, health and sanitation, water supply, charcoal-burning stoves, bush knives, sustained agriculture, and housing. (INCS, 1981)

**APPROPRIATE TECHNOLOGY:** The Appropriate Technology Development Institute is a project that was inaugurated in 1980 at the University of Technology in Lei (Papua New Guinea), sponsored by the South Pacific Technology Foundation (SPATF), the Papua New Guinea University of Technology (Wietech), and the Lik Lik Buk Information Center of the Melanesian

Council of Churches. The objective is to assist people in developing technologies that utilize local skills and resources to improve health, create employment, and foster self-sufficiency and the maintenance of a stable cultural identity. ATDI has been involved in a variety of activities: training people to manufacture stoves, developing environmentally sound intensive gardening techniques, improving basic water supplies, teaching simple food processing techniques, maintaining a library on small scale technology, and others. The project has not been in operation long enough for its performance to have been assessed. (INCS, 1981)

**FOOD IMPORT CONSTRAINTS:** Import quotas have been set for rice, and there is an absolute prohibition on the importation of cabbage. (Lambert, 1980a)

**HEALTH CARE DELIVERY:** Health care is decentralized, at the level of the 19 provinces, although policy is established by the national Health Department. Public health services and church missions work in close cooperation. Services are delivered through provincial hospitals, health centers and subcenters (serving 5,000 to 20,000 people), and aid posts. Traditional medicine is widespread and is used concurrently with primary health care in rural areas. (Licross, 1979)

**HEALTH CENTERS:** There are seven health centers in East Sepik, and eight in West Sepik. The malnutrition problem in these provinces is aggravated by the high incidence of tuberculosis and malaria. About 50% of the population in these two provinces also suffer from anemia. (Lambert, 1979)

**MEDICAL CARE AT BIRTH:** Only one quarter of the 130,000 children born in Papua New Guinea in 1979 received any form of medical care at the time of birth. (Biddulph, 1980b)

**MALARIA CONTROL:** Projects are presently being carried out to control malaria through DDT spraying and chemoprophylaxis for children, and to improve rural water supplies and sanitation. (Biddulph, 1980b)

**IMMUNIZATION:** Immunization programs are being expanded in Papua New Guinea. Poliomyelitis vaccine is now available in rural areas, as well as necrotizing enterocolitis vaccine ("Pig-bel"). Measles vaccine should be available too. (Biddulph, 1980b)

## **CENTRAL**

**NUTRITION ACTIVITIES:** There is no Provincial Nutrition Committee in the Central Province, but a Provincial Nutrition Educator visited some of the health centers, both urban and rural, showed MCH nurses how to use weight charts, weighed 1000 children at Kangere and Kila-Kila Community Schools, and participated in the diabetes survey at Karo village, Jula, and Koko settlement. (Lambert, 1979)

**EFFECTS OF BOTTLE REGULATIONS:** The 1979 survey showed a significant increase in breast feeding, a decrease in malnutrition, and a significant

## 5.2 NUTRITION AND HEALTH POLICIES AND PROGRAMS, PROGRAMS (Cont.)

decrease in the number of children under 6 months of age admitted to Port Moresby Hospital with gastroenteritis, compared to 1977. (Biddulph, 1980a)

### EAST SEPIK

**NUTRITION EDUCATION—ESDP:** Education is one of seven sub-projects of the East Sepik Rural Development Project (ESRDP), a national development program financed by the Asian Development Bank. Its purpose is to develop better practical agriculture and nutrition education for schools throughout the country. Ideas found to be appropriate and effective will be written into school curricula. (Cox, 1980)

**ESRDP:** Teachers for the ESPDP Agriculture and Nutrition Education Project are given a 4 to 6 week in-service training course in applied agriculture and nutrition. In the community, they are encouraged to set up school lunch programs, teach children about balanced meals, and improve production of food in school gardens, for school lunches. Teachers also check on school hygiene and are encouraged to set up a compost, a solar drier, a fruit tree nursery, and a community agriculture/nutrition extension program. Under this project, ESRDP provides each school with manual gardening tools, basic cooking equipment, reference materials, seeds, and planting materials. (Cox, 1980)

**NUTRITION EDUCATION:** A snack-food campaign was conducted in East Sepik Province. Over a one-week period, retailers in Wewak prominently displayed and promoted locally produced, nutritious snack foods, while relegating soft-drinks and junk food to the back of their shops. (Lambert, 1980a)

**AGRICULTURAL EXTENSION:** Nutrition/subsistence agriculture patrols were carried out in East Sepik Province in 1980 by DPI and the Departments of Health and Education. During patrols, a variety of activities are carried out in schools, health centers, village development centers, and DPI extension villages. The aim of these patrols was to show village people different ways of preparing food, involve them in these activities, and encourage them to grow a wide variety of local foods in their gardens, particularly winged beans. Cooking demonstrations were followed by distribution of the food to mothers and children and talks on infant feeding practices, hygiene, and cleanliness. In addition, sores were dressed, winged bean designs printed on T-shirts and "laplaps," and winged bean seeds distributed. In some locations, slides were shown. (Nutrition and Development, 1981)

### EASTERN HIGHLANDS

**NUTRITION EDUCATION:** The Raun Raun Theatre Company mounted a Nutrition Education program, performing nutrition plays in the villages over a period of three weeks. The plays were well attended, but the extent to which messages were put into practice is not known. Nutrition shirts, posters, and badges were also distributed. (Lambert, 1979)

## ENGA

**FOOD SHORTAGES:** Frost and subsequent food shortages are a recurrent problem. Efforts were made to encourage replanting of damaged crops immediately after the frost in Mandep district in 1980, together with some faster growing crops and staples, in order to alleviate the most severe food shortages that typically occur 4 to 5 months after the frost. Unfortunately, however, there was no officially sponsored or directed program of research into agricultural systems and frost. Provincial workers drew up contingency plans, but so far they have not been backed by National or Provincial Governments. (Nanai, 1981)

**FOOD SHORTAGES:** Operation Mekim Save was an effort undertaken by the National Government of Papua New Guinea and the Provincial Government of Enga Province to stop tribal fighting (27 episodes in 3 months) which brought about the burning of hundreds of houses and the destruction of coffee trees and food gardens, resulting in food shortages and malnutrition. It was the first operation of this kind in Papua New Guinea. (Nutrition and Development, 1982)

**EMERGENCY FOOD AID:** Supplementary rations began to be given out in Kandep District in December 1980 on account of the October-November frost that destroyed immature crops. Individuals in Kandep were given half a tin of fish and a tin can of rice twice weekly in exchange for work on roads in the district. However, this food was supplied before it was required, since the most severe shortages occur about 4 to 5 months after the frost. It was also inadequate in quantity. (Gallagher, 1981)

## GULF

**NUTRITION PROGRAMS:** The malnutrition rate is as high as 80% in some districts. A Provincial Nutritionist recently arrived and has started a nutrition radio program, and a health staff in-service training program, and has established a Nutrition Rehabilitation Unit at Kerema Hospital. (Lambert, 1979)

**YOUTH NUTRITION CORPS:** The first contingent of the Gulf Youth Nutrition Corps was composed of about 70 grade 10 students from the Coronation High School in Gulf Province in July 1981. Senior level high school students were taught basic nutrition principles and how to overcome problems of malnutrition and infection, and were provided with educational materials for distribution in their home villages during the term break. The aims of the project were to improve the nutritional status of the rural population, foster inter-generational communication, and increase the Primary Health Care awareness of village residents. Following an evaluation of the project, based on students' written reports, a similar project is expected to be initiated at Malalaua High School, the other secondary school in Gulf Province. (Kripps, 1981)

**MASS MEDIA:** The Gulf Province is known to have a very high rate of malnutrition. The local radio station, Radio Gulf, has been active in trying to increase awareness of the problem in the province. Sometimes they broadcast short messages or radio plays, and sometimes Agriculture

## 5.2 NUTRITION AND HEALTH POLICIES AND PROGRAMS, PROGRAMS (Cont.)

and Education officials give talks about gardens or school lunch programs. (Kakarere, 1980)

**SCHOOL NUTRITION:** Every Wednesday is Nutrition Day at Ubuo's Community School. Parents come to the school with greens and other food. The program starts with a lesson for women from 1-2 p.m., incorporating both theory and practice. Community activities for the whole school take place from 2-3 p.m., followed by the men's lesson and sports afterwards. (Bareta, 1980)

### EAST SEPIK AND SOUTHERN HIGHLANDS

**RURAL DEVELOPMENT:** The Integrated Rural Development Programmes in the Southern Highlands and East Sepik Provinces include both a nutrition component and a subsistence food production component. (Lambert, 1979)

### MADANG

**SCHOOL LUNCH:** School lunch programs have been started in six schools in Madang Province. (Lambert, 1979)

### MOROBE

**NUTRITION EDUCATION:** Two radio talks on nutrition, family planning, and agriculture are broadcast in Pidgin each week in Morobe Province. A Pidgin cook book with nutrition messages was in the preparation stage at the time of this report. (Lambert, 1979)

**NUTRITION EDUCATION:** Over 500 people visited the nutrition teaching unit in Lae in 1977. Most of them were women's groups and school children. (Lambert, 1979)

### NEW IRELAND

**PROMOTION OF FRUIT CONSUMPTION:** A project began in New Ireland Province in May 1981 to promote consumption of fruit, make more varieties of it available throughout the province, and to promote awareness and improvement of nutritional status in the community. Activities planned include the following: playing of a specially composed fruit song on the radio, production of T-shirts with fruit logos, a fruit poster competition to take place in the schools, showing of fruit slides/tape sets throughout the province, a fortnightly radio program on fruit, and distribution of fruit tree seedlings by health patrols. Evaluation of the project will be carried out by means of a survey of fruit consumption, and knowledge and attitudes concerning fruit, before and after the promotion campaign. (Nutrition and Development, 1981)

**NUTRITION COMMITTEE PROJECT:** The second project carried out by the provincial Nutrition Committee was a greens or Kumu project. The goal was to make people aware of the need to eat kumu daily, and to encourage individuals and schools to plant it in gardens. In order to achieve this goal, a song about kumu was composed and played on Radio New Ireland. District Office and Nutrition Staff gave radio talks, and a kumu Garden

Competition took place in Kavieng District. Radio advertisements for the competition were broadcast and prizes awarded. (Dignan, 1982)

#### **NORTHERN ORO**

**NUTRITION INTERVENTIONS:** The Oil Palm scheme at Popondetta, financed by the World Bank and controlled by the Commonwealth Development Corporation attracted an influx of new settlers to the province. Present health services are inadequate for settlers' needs. Some cases of malnutrition were reported to the Maternal Child health sisters, but in some cases follow-up was not good, due to lack of parental cooperation. A Welfare Development Officer has organized women's groups, nutrition demonstration gardens, talks on health and nutrition in schools, and other welfare duties. (Watt, 1981)

**AGRICULTURAL EXTENSION:** A workshop in applied nutrition and agriculture was carried out at Itokama Community School in 1981. The instructors planted a demonstration garden with several varieties of beans, corn, and cabbage, built a new kind of stove with sand and clay, and prepared meals with local foods, such as pigeon peas, cowpeas, and jack beans. The emphasis was on improving the traditional diet, without upsetting local food customs. (Nutrition and Development, 1982)

#### **WEST NEW BRITAIN**

**NUTRITION AND HEALTH CARE:** The MCH reporting system and health staff supervision are poor. The Nutrition Committee formed in 1976 is inactive. (Lambert, 1979)

**REHABILITATION:** A survey in the Duke of York Islands showed that the main reasons for malnutrition were inadequate diet, poor spacing of children, and malaria. Based on these results, the community government decided to set up a nutrition program involving education and monthly home visits by a nutrition aide, rather than admission to a residential treatment unit. The new program began in August 1979. A short-term evaluation carried out in May 1980 showed encouraging results. 150 children from 18 villages had been enrolled in the program for an average of 10 months each. Over half of them showed improved nutritional status after that time. Some advantages are that more children can be treated for a smaller outlay of resources, and improvements are likely to be due to changes in family dietary habits rather than food given at the unit. (Singleton, 1981)

#### **WESTERN HIGHLANDS**

**HEALTH CENTER MALNUTRITION UNITS:** There are six malnutrition units in Health Centers in the Jimi Area, staffed by nurse aids. Lack of adequate supervision of Health Centers is one of the major problems. (Lambert, 1979)

#### **WEWAK**

**SCHOOL FEEDING:** A successful school garden has been established at the Banak Community School (near Wewak). A wide range of nutritious crops are grown, and lunches are prepared daily. (Lambert, 1979)

## 6. COMMENTARIES

### NATIONAL

**CAUSES OF MALNUTRITION:** Factors cited as causes of protein energy malnutrition in the national food and nutrition policy are: unequal distribution of food within the family, sale of foodstuffs for cash, and the diversion of income from crops to non-food items. (Lambert, 1980a)

**NEED FOR NUTRITION EDUCATION:** The problem of protein energy malnutrition is considered to be largely an educational problem for the majority of the population, because there is still sufficient land for the cultivation of food crops, except in some cash crop areas. Land is usually held on a clan basis and is allotted to individuals according to need. Urban minimum wages are relatively high, and second-generation urban residents frequently retain rights to land in the village. (Lambert, 1980a)

**HYPERTENSION—LIFE STYLE:** The virtual absence of any systemic rise in blood pressure with age within a traditional subsistence economy supports the view that the rise of blood pressure with age, which is the norm in western countries, is related to life style rather than an inevitable part of the aging process. (Coyne, 1981)

### RURAL

**CAUSES OF MALNUTRITION:** Significant levels of malnutrition exist in rural areas where there are adequate supplies of food and where people have sufficient cash incomes to enable them to buy nutritious foods. This indicates that in rural areas poor dietary habits and inappropriate beliefs are operating to cause malnutrition, including poor allocation of food within the family and a lack of understanding of nutritional problems. (Lambert, 1979)

### URBAN

**CAUSES OF MALNUTRITION:** In urban areas, the primary causes of malnutrition are: poverty, poor budgeting of family incomes, and purchases of food low in nutritional quality. (Lambert, 1979)

**FOOD SUPPLY--PORT MORESBY:** Port Moresby accounts for about 25% of all food imports. The city and its surrounding villages and settlements show significant levels of malnutrition. Domestic production of food for the city will have to more than quadruple over the next ten years, even if food imports remain constant. One drawback is that the area has relatively few intensive producers, and the soil and climate are not suited to increases in food production without changes in production techniques. (Lambert, 1979)

### MANUS

**MALNUTRITION:** Malnutrition is prevalent in Kari village. Many of the children have large bellies. Many people do not realize that this is a problem. They believe that is the normal way for children to grow up.

6. COMMENTARIES (Cont.)

Often mothers do not supervise what their children eat. The children may be outside playing and will come home to grab a piece of sago or taro when they are hungry. Kari village is rather isolated, and government services are poor. (Eng, 1979)

## BIBLIOGRAPHY

Barber, S. G.

- 1982 An Outbreak of Scurvy in Papua New Guinea. Nutrition and Development 4(3):15-16.

The author, a physician, describes an outbreak of "florid" scurvy in a prison population which had been eating only rice, wheat, and fish. An absence of vitamin C in the urine was found in all prisoners except one who had been detained for two weeks. Prison authorities were advised to take advantage of local markets.

Bareta, R.

- 1980 A Teacher's report on Nutrition Teaching, Ubuo'o Community School, Gulf Province. Nutrition and Development 3(2):18-19.

This community nutrition education program, operated through the local school, involved parents in food preparation and nutrition lessons, provided food supplements, and monitored the nutrition status of participating children.

Benjamin, A. and Biddulph, J.

- 1980 Port Moresby infant feeding survey, 1979. Papua New Guinea Medical Journal 23(2):92-96.

### Original data

Method: A survey was carried out in Port Moresby in March 1979 to assess the impact of the bottle feeding legislation enacted in 1977, which was aimed at restricting the sale of feeding bottles. Sampling techniques and questionnaires were similar to those used in the 1976 survey by Lambert and Basford. Pretested questions were asked in English, Motu, or Pidgin, depending on the language of the respondent. Sample: 149 children under 2 years of age whose ages were known or could be determined within one month. Location: Port Moresby, capital of Papua New Guinea.

The results showed that 88% of the children were breast fed, compared to 65% in the 1976 survey. The difference was significant at  $p < 0.01$ . Furthermore, the percentage of children with weights for age below 80% of the standard had declined from 41% in 1976 to 32% in 1979. The increase in the prevalence of breast feeding was considered to be highly significant.

Biddulph,

- 1980a Nutrition and Development

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Biddulph, J.

- 1980 The impact of legislation restricting the availability of feeding bottles in P.N.G. New Internationalist, October.

Biddulph, J.

- 1980b News from the Regions—Newsletter from Papua New Guinea. Journal of Tropical Pediatrics 26():127-129.

Biddulph, J.

- 1979 Country Report from Papua New Guinea, pp. 34-35 in Valyasevi, A. and Baker, J., Proceedings of the Workshop on Breastfeeding and Supplementary Foods. Bangkok, Thailand: Ramathibodi Hospital, Mahidol University.

Biddulph, J.

- 1976 Child Health For Health Extension Workers and Nurses in Papua New Guinea. Fourth Edition.

Binns, C. W.

- 1976 Food, sickness and death in children of the Highlands of Papua New Guinea. J. Trop Med. Environ. Child Health 22:9-11.

### Original data

Method: Measurements taken of weight and height (beam balance and Salter scales). Clan leaders and mothers were interviewed on births, deaths, and health of children. Information on birth weight collected from 696 hospital births.

Sample: Approximately 10,000 people selected for demographic study. Clan leaders (48) were interviewed once a month. Sample of 630 children aged 1-4 were weighed and their mothers interviewed.

Location: Wapenamanda sub-province.

A survey on health and nutrition was carried out and demonstrated the interaction of malnutrition with infection. There was a higher incidence of gastrointestinal diseases and respiratory infection in malnourished children, resulting in the high mortality found in the 1-4 age group.

Bollard

- 1980 Coke, Custom, and Coconuts: Food Self-Sufficiency and Food Dependency in the Pacific. Paris: Organization for Economic Cooperation and Development (OECD), No. CD/R(80)1122.

This study investigates systems of food production in the South Pacific region with special emphasis on the effect of westernization on food consumption and production. Statistical summaries of population, land, density, and national economic indicators are provided, as are overviews of the different physical environments, sociocultural systems and food production techniques of this diverse area.

Buchbinder, G.

- 1977 Nutritional Stress and Postcontact Population Decline among the Maring of New Guinea. In L. S. Greene, Ed. Malnutrition, Behavior, and Social Organization. New York: Academic Press, pp. 109-141.

This study documents the consequences of contact with introduced infectious diseases following culture contact among the Maring, a previously isolated New Guinea population. The study shows that the consequences varied according to the nutritional status of the local populations. It is based on demographic data from censuses taken by the government, the author, and other anthropologists, supplemented by other reproductive histories and genealogies; direct evaluation of the nutritional status of the population through clinical examinations, anthropometric surveys, measurement of hemoglobin and haptoglobin values of each individual, and food intake studies of selected households. The results of these studies show that the local populations suffering from the greatest degree of chronic malnutrition also had the highest mortality rate from infectious disease, and that the amount of social disruption among the groups most affected acted to reduce further the food supply, aggravating both malnutrition and mortality.

Butler, R. E.

- 1982 World Food Day-EHP (Eastern Highlands Province). Nutrition and Development 4(4):8-11.

This article describes the nutrition situation in this province and local activities conducted in recognition of World Food Day, October 16, 1981.

Cannon-Bonventre, K.

- 1977 Nutritional Status of Papua New Guinea Children at Three Motor Milestones in Relation to Family Size and Birth Interval. Cambridge Mass.: American Institutes for Research; to be presented at NICHHD International Conference on Nutrition and Human Reproduction, February 1977.

Original data

Method: The study was designed to test the hypothesis that the family size at birth of a new child and the family-building rate affect nutritional status and motor development. The separate and joint effects of live birth order and previous live birth interval were analyzed using one- and two-way analysis of variance. Linear regressions were calculated for the ages and weights at which each child sat, crawled, and walked. Data for boys and girls were analyzed separately.

Sample: 179 children, for whom sex, birth order, and age and weight at which sitting, crawling, and walking first occurred were known.

Location: Karkar Island.

## BIBLIOGRAPHY (Cont.)

The results showed that there were noticeable differences between boys and girls. Boys were more variable than girls in both weight and age at which they started sitting, crawling, and walking, although girls generally started younger than boys. First-born children were below the mean expected weight for age at each motor milestone more often than children of higher birth order, indicating that they were at greater risk of nutritional deficiency. However, in some cases, children of intermediate birth order also suffered, particularly when the previous birth interval was long. The results confirmed the hypothesis that live birth order and previous live birth interval vary inversely with nutritional status.

Cast, M. and Paderes, O.

1978 An Education in Nutrition. Dialogue Summer/Fall 1978, pp. 12-17.

Clark, D. J.

1978 Food Habits of the People of Papua New Guinea: A Hand Book for Field Workers. Konedobu, Papua New Guinea: Nutrition Section, Public Health Department.

This handbook is the result of a survey designed to collect information about the food habits, cooking practices, and beliefs of the people of Papua New Guinea, particularly those that pertain to pregnant women, lactating women, and young children. The book is divided into sections on each province, and each province is subdivided into its component districts. For each district, there are separate lists of staple foods, other foods, protein foods, energy foods, protective foods, foods eaten occasionally, seasonal foods, and store-bought foods eaten by people of that district. In addition, it lists: cooking methods, utensils used, flavor foods, meal patterns, weaning practices, weaning foods, methods on infant food preparation, customs and beliefs related to children under five, children over five, adults in general, pregnant women, nursing women, and any others. In some cases where information of a particular district was unavailable, blank pages have been left, to be filled in by individual field workers.

Connor, T.

1981 Cultural Differences of Lake Murray, Western Province. Nutrition and Development 4(2):10-12.

Original data

Method: Height, weight, and arm circumferences of children under 5 years were taken at local health centers.

Sample: 19 non-Kuni children under 5 and 20 Kuni.

Location: 3 villages in the Lake Murray area of Western Province.

Villages around the lake have been settled by groups which use the local resources in very different ways. The Kuni do not garden or make full use of the abundant fresh water in the area, whereas the non-Kuni, more recently arrived in the area, grow a great variety of

foods to supplement the staple, sago. The effects of these differences in food were evident in the general health conditions of the population (e.g., skin conditions) and in the rates of malnutrition among the young children of the area. Kuni children were far more likely to be underweight or stunted. Nutrition education is difficult to conduct, because Kuni children rarely attend school and advice given out at the health center is seen as 'scolding' and precipitates refusal to continue using the health services. Change must be brought about through consideration of Kuni traditions and sensibilities.

Corden, M. W.

- 1979 Subsistence diet patterns in Papua New Guinea. Food and Nutrition Notes and Reviews (Australian Commonwealth Department of Health, Canberra) 36(2):48-51.

Counts, Dorothy Ayers.

- 1982 Infant Care and Feeding in Kailai, West New Britain, PNG. Paper presented at the Association for Social Anthropology in Oceania Conference, 3-7 March 1982, Hilton Head Island, South Carolina.

Cox, E.

- 1980 Applied Agriculture and Nutrition in the East Sepik. Nutrition and Development 3(2):9-12.

The East Sepik Rural Development Project (ESRDP) includes seven sub-projects, two of which, the Saramundi Research Station and the Sepik Agricultural College, serve the nation. The five regional projects include an education component, which is described in detail in this article. The main aim of the education component is to promote better village-level food production and consumption through existing educational institutions.

Coyne, T.

- 1981 The Effect of Urbanization and Western Diet on the Health of Pacific Island Populations (Suva, Fiji, 7-16 December 1981). Noumea Cedex, New Caledonia: South Pacific Commission.

This report is an interim report to the U.N. Development Programme, part of a project authorized in 1978 and begun in 1981 to "bring about improved food utilization and better nutrition by helping communities to be aware of changes taking place." This report "examines existing statistics, surveys, and reports and attempts to delineate the effect of Western lifestyle and diets on health status and identify areas in which knowledge is incomplete."

(Dieticians' Refresher Course)

Major Nutrition Activities in Papua New Guinea--An Outline.

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Dignan, C.

- 1982 Working together to Improve Nutrition. Nutrition and Development 4(3):12-14.

The Provincial Nutrition Committee in New Ireland Province has conducted a vigorous outreach nutrition education program, involving local radio broadcasts, local showing of slide tapes, poster competitions, provision of seedlings, and demonstration gardens.

Earland, J.

- 1982 Ante-Natal Survey, Done at Goroka Base Hospital. Nutrition and Development 4(3):4-9.

Original data

Method: Directed interview and 24-hour recall of family intake.

Sample: 63 patients at prenatal clinic. Half were in their first pregnancies, and most were between the ages of 18 and 30.

Location: Goroka Hospital, Eastern Highlands Province.

The survey was designed to determine what pregnant and lactating mothers knew and believed about nutrition. In the past the clinic had focused on young children, and this represented a new focus on mothers. The findings were to be used as the basis of nutrition counseling and education in the clinic. The survey form is provided.

Eng, J.

- 1979 Infant Feeding Practices. College of Allied Sciences, Papua New Guinea.

This report is a collection of short papers by students at the College of Allied Health Sciences. The students were asked to write about their villages, touching on the following points: location of the village, climate, occupation of family members, family size, birth intervals, cooking facilities, foods grown, availability of water, wild animals and livestock, initiation of breast feeding, attitudes about colostrum, duration of breast feeding, introduction of solid foods, baby food preparation, sexual relations during lactation, weaning practices, arrangements for orphans, food avoidances relative to young children, feeding practices during illness, use of herbal medicines, local food classifications, and the presence or absence of locally produced breast milk substitutes. Nine villages in nine provinces of Papua New Guinea are covered.

Food Enrichment in Papua New Guinea

- 1980 Food and Nutrition 6(1):36-37.

Gallagher, C.

1981 Frost in Enga Province - 1981. Nutrition and Development 4(2):5-7.

This article presents a summary of observations of conditions in the Kandep and Lagaip districts of Enga Province, where frost was reported in November 1980, causing failure of recently-planted crops and precipitating food shortages several months later, when these crops would have been harvested. Areas most seriously affected by the frosts were the same ones most severely affected in 1972, and precautions recommended at that time (mulching, etc.) had not been taken.

Harvey, P. W. and Heywood, P.

1983 Twenty-five years of dietary change in Simbu Province, Papua New Guinea. Ecology of Food and Nutrition, vol. 13.

Original data

Method: A dietary study of the Simbu area of the highlands in Papua New Guinea was carried out in 1981 and compared to the findings of two earlier studies to assess the dietary changes. 12 of 22 households in a village were included, in terms of their willingness to participate and their age and sex structure, yielding a total of 67 individuals. Assistants observed each household for 5-6 days and individual consumption and asking about other foods eaten.

Sample: 67 individuals

Location: Simbu area of the highlands.

Results indicated that intakes of energy and protein were much higher than in the 1975 survey, and protein intakes were higher than in 1965 for all age groups. Cereals and grains contributed to a larger proportion of protein intake, as opposed to the traditional sweet potato.

Heywood, P., Miles, S., Cogill, B., and Clark, L.

n.d. Growth patterns of Highland children and some possible implications for assessment of nutritional status. Manuscript submitted to Papua New Guinea Medical Journal.

Heywood, P. F.

1979 Nutrition problems of children in developing countries: Their wider significance. Proc. Nutr. Soc. Aust. 4:12-18.

INCS (International Nutrition Communication Service)

1981 Proceedings: First Asian Household Appropriate Technology Conference; Colombo, Sri Lanka, July 12-17, 1981. Sponsored by: Ministry of Colombo Hospitals and Family Health, International Union of Nutritional Sciences (IUNS), United States Agency for International Development (USAID), United Nations Children's Fund (UNICEF), and INCS. Newton, Mass.: INCS, Education Development Center.

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The First Asian Household Nutrition Appropriate Technology Conference sprang from the realization by some that the problem of malnutrition cannot be solved in a laboratory or hospital clinic, that policies and programs seeking to alleviate the problem must take into consideration the significant role that women play in it, and the disproportionate share of the burden of malnutrition is borne by them and by their children. The report contains the proceedings and recommendations of the Technology Exchange Groups, profiles of projects currently being undertaken in several Asian countries, technical papers, and an appendix on curriculum design for training.

Independent State of Papua New Guinea

Baby Feed Supplies (Control) Act. No. 21 of 1977.

Jelliffe, D. B. and Jelliffe, E. F. P.

- 1981 Consultant Report for the South Pacific, May 12-15, 1981; A Description of the First South Pacific Regional Mother and Infant Nutrition Seminar. Newton, MA: International Nutrition Communication Service, Education Development Center.

The International Nutrition Communication Service provided consultant support for the First South Pacific Regional Mother and Infant Nutrition Seminar. The purpose of the conference was to promote improved breast feeding and infant nutrition practices. Health service officials from the governments of nine South Pacific countries attended. Topics of discussion were: the collection of data on nutritional status, feeding practices, and radios; programs for the improvement of maternal nutrition, breast feeding, and the development of weaning foods, and coordination among countries in the immediate future, the near future, and the long-term. The appendices contain an attendance list, the seminar agenda, country papers with information on nutritional problems and infant feeding practices, country actions programs, and papers describing the content of a home economics course taught in Fiji, the decline of breast feeding in Fiji, and satellite communications systems in the South Pacific.

Kakarere, S.

- 1980 Combating the Problem of Malnutrition through Radio. Nutrition and Development 3(2):16-17.

Calling for more cooperation between radio promotion of nutrition and other agencies' activities, the author describes the content and goals or the local radio station's efforts to combat malnutrition in Gulf Province, and notes that it would be more effective if it promoted activities of the various nutrition agents of the Divisions of Education, Health, and Primary Industry.

Korte, R.

- 1975 Food and Nutrition in Papua New Guinea. Unpublished mimeograph.  
Konedobu, PNG: Department of Public Health.

This article provides a concise summary of major nutritional problems found in Papua New Guinea. Tables are used to demonstrate such statistics as infant mortality, percentage of undernourished children, leading causes of hospital admissions and death. The author also discusses factors causing malnutrition in this country, providing some recommendations for alleviating the problems.

Kripps, R.

- 1982 The National Nutrition Workshop 1982. Nutrition and Development 5(1):4-8.

This 3-day workshop was held at the College of Allied Health Sciences, sponsored by WHO and the national Nutrition Planning Advisory Group. This report briefly outlines the workshop activities and focuses on presenting its recommendations and comments regarding national nutrition needs in the areas of planning, research, goal-setting, and higher education.

Kripps, R.

- 1981 Gulf Youth Nutrition Corps. Nutrition and Development 4(2):13-14.

High School students were trained in nutrition, provided with seeds, posters, and printed materials, and assigned to implement practical nutrition extension work in their local communities. Students will be expected to report on their activities and accomplishments later in the school year.

Lambert, J. N.

- 1983 Nutritional Study of the People of the Wabo and Ihu Areas, Gulf Province in The Pwari-Tropical Environment of a High Rainfall River Basin, Petr, T. (ed.), Dr. W. Junk Publishers, The Hague.

Original data

Method: Anthropometric information including height, weight, mid-upper arm circumference, triceps skinfold thickness. Blood hemoglobin levels determined with A.O. hemoglobinometer. 24-hour food intake recalls taken.

Sample: 213 Wabo; 962 people in coastal area out of total population of 10,000

The nutritional status of the Wabo and Ihu populations was assessed using 24-hour food intake recall and anthropometric measures. Results indicated a high level of clinical and subclinical protein energy malnutrition in both populations, as well as a number of other vitamin and mineral deficiencies. A number of tables are included.

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Lambert, J.

- 1980a Papua New Guinea's national food and nutrition policy. Food and Nutrition 6(1):28-33.

This report outlines the history of agricultural, food production, and nutrition policies followed by the Government of Papua New Guinea prior to the mid-1970s and the new strategies followed since Independence in 1975. Renewed emphasis was placed on increasing domestic food production and improving the nutritional status of the population. New working groups were established, and a national nutrition survey was carried out in 1978. The survey pointed to the following nutritional problems: the prevalence of protein-energy malnutrition, the unequal distribution of food within the family, the sale of foodstuffs for cash and diversion of income to non-food items, population pressure, the introduction of western-type "junk food" especially in urban areas, iron deficiency anemia, (endemic goiter has been brought largely under control), and the particular nutritional problems posed by resettlement schemes. The new national nutrition policy attempts to address itself to these problems through research into methods of food handling, processing, and marketing; the establishment of seed multiplication sites; research on the problems of subsistence agriculture; limitations on the growth of food imports; a national nutrition education campaign; the establishment of Nutrition Rehabilitation units; legislation restricting the sale of feeding bottles and teats; and the establishment of a code of ethics for manufacturers, importers, advertisers, and retailers of "junk foods."

Lambert, J.

- 1980b Bottle-Feeding Legislation in Papua New Guinea. Journal of Human Nutrition 34:23-25.

The article summarizes the history of government legislation aimed at promoting breast feeding and discouraging bottle feeding. Government legislation aimed at prohibiting distribution of milk products at hospitals and at facilitating breast feeding by working mothers already existed, but these did not appear to have a real impact on the problem. Finally, in 1977 legislation was introduced to restrict the sale of bottles. In 1979 a survey was carried out to assess the impact of the two-year old legislation. The results showed that there was a highly significant decline ( $p < 0.001$ ) in the prevalence of artificial feeding. In terms of nutritional status, there was a significant improvement in the status of artificially fed children, and no significant change in the status of breast fed children. An addendum to the paper further points out that following introduction of the legislation, there was a significant decline in hospital admissions for diarrhea, which paralleled the decline in the prevalence of artificial feeding.

Lambert, J. N.

- 1979 A Case History of Nutrition Planning in Papua New Guinea. New York: The Foundation for the Peoples of the South Pacific, Inc.

This case study includes a yearly review and three quarterly reports of nutrition planning in Papua New Guinea, a summary of the 1978 Food and Nutrition Policy, the results of the 1978 National Nutrition Survey, the results of the OK Tedi Nutrition Survey (February-March 1978--Kiuna District, Western Province), appendices showing flipcharts used in presenting the National Nutrition Plan to the Cabinet, extracts from the National Development Strategy and the National Public Expenditure Plan, and a feature article on nutrition published in the daily paper in May 1978.

Lepowsky, M.

- 1982 Infant Feeding and Cultural Adaptation on Vanatinai (Sudest Island), Papua New Guinea. Paper presented at the Association for Social Anthropology in Oceania Conference, 3-7 March 1982, Hilton Head Island, South Carolina.

Licross (Licross/Voltags Steering Committee for Disasters)

- 1979 Medico-Nutritional Information on Disaster Prone Countries and Glossary of Common Illnesses. Brussels: International Research Center on Disasters Epidemiology, Unit of Epidemiology, School of Public Health, University of Louvain. September.

This series of over 100 1- or 2-page "country fact sheets" was prepared by the Steering Committee to aid in prompt and appropriate responses to disasters; the accompanying glossary was designed to aid non-medical administrators. Each section describes a country's diet, nutritional deficiencies, medical supplies, health services, capacity for handling refrigerated drugs, and common illnesses. Regional and rural-urban distinctions are included where possible.

Marshall, L.

- 1982 Infant Feeding Practices Among Urban Clinic Staff in Port Moresby. Paper presented at the Association for Social Anthropology in Oceania Conference, 3-7 March 1982, Hilton Head Island, South Carolina.

McKay, S. R.

- 1960 Growth and nutrition of infants in the Western Highlands of New Guinea. Medical Journal of Australia :452-459.

Morgan, M.

- 1981 Frost in Southern Highlands Province - 1981. Nutrition and Development 4(2):8-9.

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The author critically examines the effects of the brief frost and the appropriateness of the proposed provision of food aid. He concludes that the local deterioration of food supplies and nutrition status has more complex roots, including decreased fertility of the soil, which demand more complex interventions. In addition, he points out the local leaders' concerns and felt needs, and the threat of food aid to established social and tribal aid links.

Nanai,

1982 Editorial, Nutrition and Development 4(3)

Nanai,

1981 Editorial, Nutrition and Development 4(2)

Nutrition and Development

1982 Aibika. Nutrition and Development 4(4):30-31.

This article presents information on the crop aibika, or Hibiscus manihot, including cultivation and nutritive value.

Nutrition and Development

1982b Nutrition and Development 4(3)

Nutrition and Development is a quarterly newsletter and journal produced by the Nutrition Section of the Department of Health of Papua New Guinea. Its purpose is to keep people informed about what is happening in the field of nutrition and to serve as a forum for the exchange of ideas and information useful to people working in nutrition. It contains editorials, articles, and news items. Its emphasis is predominantly local, although from time to time events occurring elsewhere are also reported.

Nutrition and Development

1981 Who says malnutrition is not a problem in Papua New Guinea? Nutrition and Development 4(1):20-22.

This brief, illustrated report presents case findings of a "Patrol" of field work. Most malnourished children were apparently referred to hospital care, even if this necessitated relocating the family for several weeks.

Nutrition and Development

1981b Nutrition and Development 4(2)

Obrist, B.

- 1982 Who are They to Teach Us How to Feed Our Babies? Paper presented at the Association for Social Anthropology in Oceania Conference, 3-7 March 1982, Hilton Head Island, South Carolina.

Riordan, B.M.

- 1981 Regional Maternal and Infant Nutrition Program-South Pacific. New York: Foundation for the Peoples of the South Pacific; grant AID/DSAN-0263.

Part I of this document is a progress report on the South Pacific Regional Maternal and Infant Nutrition Program for the period September 1-December 31, 1980. Activities under review for the period included recruitment of a Regional Nutrition Coordinator/Planner (RNC), establishment of the RNC base in Fiji, and development of plans for the Senior Health Personnel Seminar. Part II is an information circular outlining the role played in the program by the Foundation for the Peoples of the South Pacific, through a grant from USAID.

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This Nutrition Unit, in West New Britain Province, has identified the principal causes of local malnutrition to be inadequate diet, malaria, and poor spacing of child births. Families of malnourished children are counseled about all three aspects, as necessary, and cooking and gardening demonstrations are provided. More children can be treated than in a traditional inpatient facility, and the results are at least as good; a controlled study is proposed, in order to determine the system's appropriateness for adoption by Units in other heavily populated areas.

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This article outlines the cultivation and cooking of sago palm, a staple of the Gulf Province.

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This document is a report of the meeting held in Suva, Fiji (December 7-16, 1981) on the effects of urbanization and western diet on Pacific Island populations. The objectives of the meeting were: to describe the changes in dietary patterns, health, and nutrition taking place as a result of increasing urbanization and a decline in food production in the South Pacific region; to identify the problems, their solutions, and the implications of each; and to make recommendations for the formulation of successful food and nutrition policies in the region.

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The author describes local activities held on the occasion of World Food Day in 1981. She cites other nation's activities, nutrition activities planned for Papua New Guinea during the coming year, and outlines what schools can do on a local level to promote nutrition awareness, including a recipe competition.

### Watt, K.

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This agricultural project in Northern Province has attracted a great influx of population, stressing local services. The author outlines the accommodations which have been made in health services and other aspects of local infrastructure, and the problems of treating malnutrition under such circumstances.

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