

# *Maternal and Infant Nutrition Reviews*



**GHANA**

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*International Nutrition Communication Service publication*

CONTENTS

Introduction. . . . .	i
MINR Classification System. . . . .	iii
Map . . . . .	iv
Table I: Locations Studied . . . . .	v
Review Highlights . . . . .	vii
Review. . . . .	1
Bibliography. . . . .	87

## INTRODUCTION

This monograph reviews the available literature on maternal and infant nutritional status, beliefs, and practices in Ghana. It also lists current government, USAID, international agency, and private voluntary organization nutrition-related programs and policies.

This is not an all-inclusive listing, but it should provide enough information to enable the health/nutrition planner (our primary target audience) to ascertain quickly what is known (and what needs to be studied) about this subject. The information is chronicled according to a Maternal and Infant Nutrition Review (MINR) system outlined on page iii.

The map on page iv and Table 1 on page v show the extent to which various regions and specific locations have been surveyed. Pages vii and viii present the highlights of our findings. Pages 1 to 86 contain the data categorized according to the MINR classification system with boldface titles within each category to describe specific listings.

Pages 87 to 107 contain an annotated bibliography with each entry described in terms of type of study (original data or literature review), with methodology, sample characteristics, and location, where relevant, and a summary.

These reviews are limited to documents available to us in the United States working under time constraints. We hope that we will be able to obtain further information and to update the reviews.

Special thanks are extended to Dr. Peter Lamptey for providing materials for review and for commenting on a preliminary draft of this report.

Ron Israel  
INCS Project Manager

MATERNAL AND INFANT NUTRITION REVIEWS

GHANA

*A Guide to the Literature*

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# 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
- 2.6 About Illness and Cure

### 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 Breastfeeding
  - 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

### Bibliography

Administrative Map of Ghana

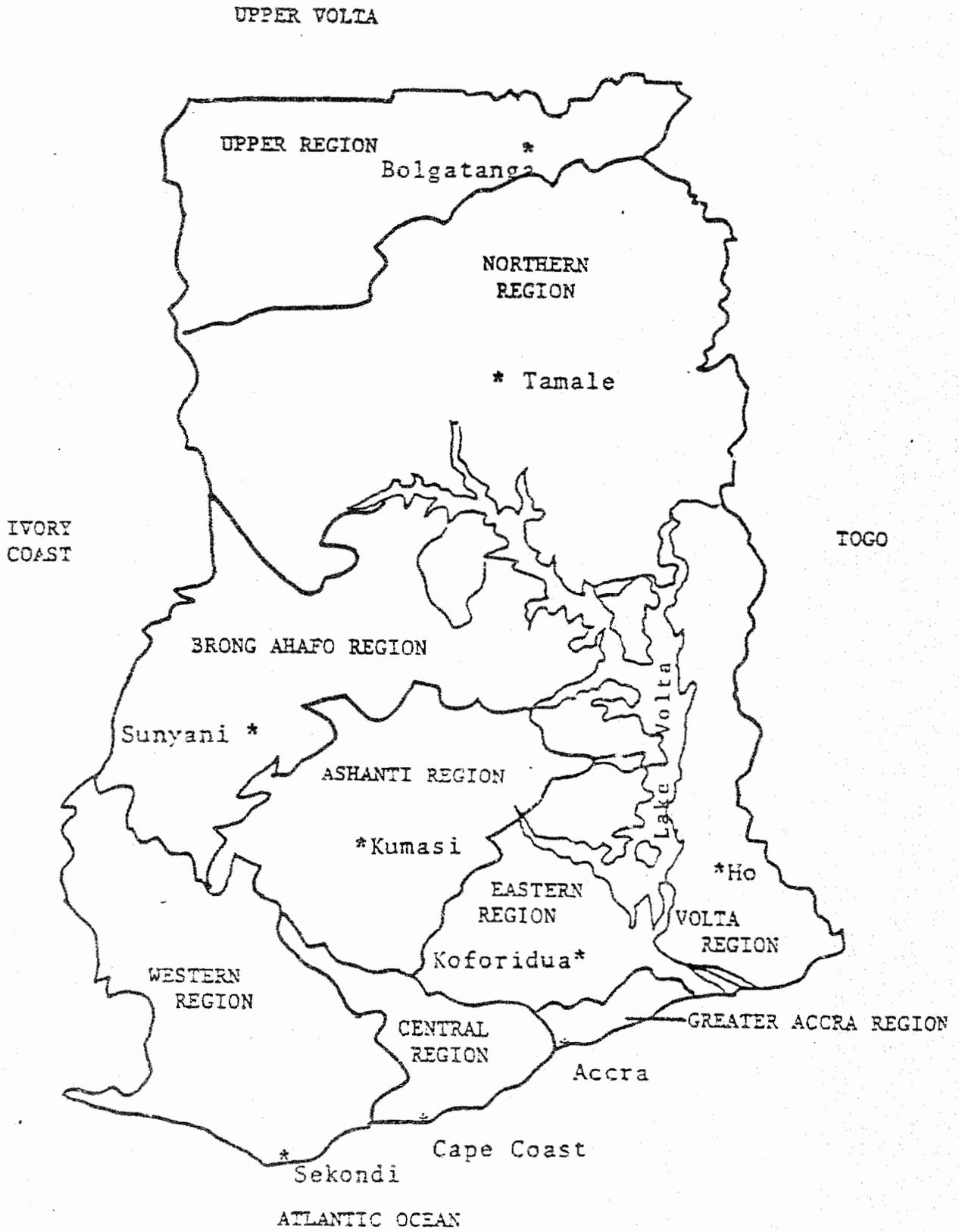


TABLE I  
LOCATIONS STUDIED

	Austin 1981	Becher 1976	Benneh 1973	Bleek 1976	Bruce-Tagos 1977	Dako 1974	Davey 1974	Davey 1961a	Davey 1961b	Davey 1961c	den Hartog 1970	Davlo 1968	Engberg 1974	FAO 1979a	FAO 1979b	Gaisie 1975	Gordon 1977	Gordon 1974	Grant 1965	Neumann 1979	Nicholas 1976	Nyanteng 1972	Ofous-Amaah 1979	Ottaca-Tetteh 1976	Tripp 1981	Vermeer 1971	Woolfe 1977	Wuarapa 1976	Wuarapa 1975
NATIONAL							X	X	X	X						X						X							
REGIONAL																													
Eastern Region															X														
Upper Region, Navrongo District																									X				
Volta Region																										X			
RURAL																													
Danfa Project Area	X				X																X	X					X	X	
Manga Bawku		X																											
Bawku																	X	X											
Rural town in the Kwahu Plateau				X																									
Baafi Village, Brong-Ahafo Region						X																	X						
Pantang, Coastal Savannah Village											X																		
Medina, 10 mi. North of Accra												X																	
Rural Villages of Aeyduase, Dome, Mampong																			X										
URBAN																													
Accra											X																X		
Accra plus Langbensí, a northern town														X															
Nine circles throughout the country	X																												
UNSPECIFIED																				X									

## HIGHLIGHTS

1. **NUTRITION AND HEALTH STATUS:** Nutrition problems include kwashiorkor, which affects children between the ages of one and four years; marasmus occurring in all age groups, especially infants below one year of age due to inadequate breast or bottle feeding; and protein calorie malnutrition, which occurs among all age groups, including adults during periodic food shortages and in time of crop failure. Adult men and women lose up to 5 pounds during the hungry season. Goiter is prevalent in the northern and upper regions of the country, affecting 5 to 33% of the population, with the highest rate among adolescent and young women. In rural areas women 15 to 39 years old report about 50% more illness than comparable males. Pregnancy related deaths represent at least 4% of all deaths in Ghana. The maternal mortality rate is between 5 and 17 deaths per 1000 live births. Lowest rates are found in urban areas with good maternity services. The primary causes of maternal mortality are hemorrhage, infection and toxemia. Weight gain in pregnancy is lower in the age groups 16-19 years and 41-49 years than during the middle reproductive years. In the Volta Region 50 to 60% of pregnant women were found to be anemic. The infant mortality rate is about 120 deaths per 1000 live births. Among medically certified infant deaths, 55.3% are less than one month old. One third of the children under two who attend clinics are malnourished at the time of their first visit. 50% of all recorded deaths occur among children under five years old. Nutritional disorders account for 64 per 1000 registered deaths. The prevalence of malnutrition is greatest from July to September. In urban areas malnutrition frequently occurs 6 to 12 weeks after an attack of measles.

2. **DIETARY BELIEFS:** People believe that as long as they eat something and they are not unduly hungry, the problem of eating is solved, so many, including infants, do not get a well balanced diet. Having many children is considered a sign of blessing and prosperity. Many pregnant women consciously restrict intake as they are aware that the baby will be smaller and hope thereby to have an easier delivery. However, it is commonly believed that lactating women require extra food. Rural working mothers indicate that they would prefer to breast feed their children for at least 12 months if given a choice. A child's starting to walk tends to be a signal for the cessation of breast feeding. Many Ghanaians believe that high quality protein foods are bad for children. Many women believe supplemental feeding should not start until after 9 months of age. Religious avoidance of pork has increased with the spread of Islam.

3. **DIETARY PRACTICES:** Food consumption is in general poorer in quantity and quality than it was a decade ago. Food distribution throughout the year is greatly skewed. Soon after harvest, the local markets are flooded with a commodity; a month or so later, supply diminishes; and just before harvest there may be nothing. The total amount of protein available for human consumption is not sufficient to supply the estimated requirements. There is a seasonal supply of fish, with supplies tending to fall off in November and December. Poor roads make certain areas inaccessible and foods cannot be removed from food surplus areas where they are left to rot in the fields. Farmers producing cash crops are able to earn higher return on investments than farmers growing food crops. Women and their children are responsible for preparation of food. Because food preparation is so time consuming women generally cook enough each time to last for several meals, with a consequent

## HIGHLIGHTS (Cont.)

risk of contamination in the absence of a refrigerator. Green vegetables and rice may be washed several times and the water discarded prior to cooking and consumption. This practice causes substantial amounts of vitamins to be lost. Serving of food begins with the husband, followed by the mother and then each of the children in age order. The youngest tends to get what is left at the bottom of the pot. Usually women are responsible for distribution of the food within the household. Women also have responsibility for food crops. Outmigration of males has occurred due to scarcity of cocoa land and declining cocoa prices. Between 40 to 50% (depending on household size) of total household expenditures go to food. Lactating women are given extra food rich in fats and protein. Breast feeding is universal in the first month of life. A majority of working mothers are aware of the economic and health advantages of breast feeding, and yet the average duration of breast feeding is 9 weeks. Time spent breast feeding is 48 minutes per day in urban Accra and 41 minutes per day in a rural village. Output of milk by the mother falls steadily. By the end of one year only 25% of the amount produced at the peak period is available. During the weaning period children are not given sufficient supplementary foods and are given very little animal protein. In rural areas supplemental foods tend to be introduced late instead of at the recommended five months. Once children become too heavy to carry on their backs, women are forced to leave them in the care of someone else; the subsequent long time interval between meals tends to depress the child's appetite. For the average Ghanaian family, two years of breast feeding, rather than artificial feeding, is likely to save between \$600 and \$730 in goods and time costs, plus any savings that may result from the avoidance of disease or malnutrition caused by artificial feeding.

**4. NUTRITION STATUS CORRELATIONS:** Infant mortality rates are higher in rural areas than in the towns. The urban rate is little more than half the rural rate—36 as compared to 94 deaths per 1000 live births. In areas with the highest consumption of starchy roots and plantain, average child weights were lowest. Sewage system and clean water supply were found to be significant determinants of children's nutritional status. Early weaning from the breast was found to be the most significant factor correlating with incidence of disease among children. A study of health centers which distributed supplementary food found little effectiveness for the food component. Nutrition status is correlated with child morbidity, good water source, birth interval, clinic attendance, age and weight for age at first clinic visit, DPT, BCG and measles vaccinations and mother's education. Mothers who scored high in tests of nutrition knowledge are younger, taller and better educated, have better jobs, fewer children and fewer child deaths, are married to husbands with better jobs, and live in higher quality housing with more electrical appliances. Duration of breast feeding decreases with increased education of parents. Urbanization and the influx of a money economy result in a shortening of the duration of breast feeding and use of supplementary weaning foods at an earlier age. From 7 to 12 months heights and weights of boys receiving breast milk with a supplement are greater than boys receiving breast milk alone. The numbers of child illnesses and deaths are higher in homes where the husband's authority is strong and lower in households where differentiation, as measured by household possessions, is high.

**5. NUTRITION AND HEALTH POLICIES AND PROGRAMS:** A National Food and Nutrition

Conference in 1974 recommended that regular surveillance of nutritional status should be carried out over the next five years. It also recommended that a Nutrition Planning Sector be constituted within the Ministry of Economic Planning; that all development programs have nutrition goals; that the importance of nutrition should be emphasized in training programs for agriculture and health; that development for small farmers should take nutritional objectives into account; and that development in the health sector should emphasize breast feeding and weaning, immunization and integrated health, nutrition and family planning programs. The Ministry of Health has a division responsible for human nutrition with a staff of 188 people. 30% of the government's health budget is spent on curative services. The health service budget breaks down to \$.02-.03 U.S. per capita. The government pays for three months of maternity leave, and the law requires that private firms give the same amount. Provision also is made by law for two half-hour nursing breaks. The integrated nutrition and primary health care program reaches only 6% of all preschoolers. 28,828,000 pounds of PL-480 Title II food (soy-fortified sorghum, vegetable oil and wheat soy blend), worth \$5,211,800 is planned for distribution in FY '82. Catholic Relief Services distributed PL-480 foods to 130,000 preschoolers. 16 voluntary agencies run projects in health and/or nutrition. About 50% of the rural population has no access to preventive or curative health care. There is a nutrition rehabilitation center in Accra which admits children with nutritional diseases, especially PEM.

# 1. NUTRITION AND HEALTH STATUS

## 1.1 NUTRITION AND HEALTH STATUS, GENERAL

### NATIONAL

**NUTRITION PROBLEMS:** Nutrition problems include kwashiorkor, which affects children between the ages of one and four years; marasmus occurring in all age groups, especially infants below one year of age due to inadequate breast or bottle feeding; and protein calorie malnutrition, which occurs among all age groups, including school-age children and adults during periodic food shortages and in times of crop failure. Anemia is next in importance and is caused by deficiencies of iron, folic acid and vitamin B<sub>12</sub>. Deficiencies of vitamin A, riboflavin, niacin, calcium, vitamins C and D, and iodine occur in some areas of the country. (Abudu, 1975)

**SEASONAL WEIGHT LOSS:** Adult men and women were found to lose up to 5 pounds during the hungry season. (Sai, 1971)

**VITAMIN A DEFICIENCY:** Vitamin A deficiency, as evidenced by defective night vision, is common. Almost all the vitamin A in diets in the northern savannah comes from green vegetables, which are seasonal. (Sai, 1971)

**ANEMIA:** Hemoglobin values in the rural areas were comparable to urban values. Urban women had slightly higher hemoglobin through age 30. (Bruce-Tagoe et al., 1977)

**GOITER:** Goiter due to iodine deficiency is found in the Brong-Ahafo Region, Mampong Ashanti and in the Axim. There is a belt of iodine deficiency which runs across the West African Savannah and in Ghana most cases of goiter come from the Upper Region in Nandom, Sandem and Bawku. (Baddoo, 1974)

### REGIONAL

**NUTRITION PROBLEMS IN THE WESTERN REGION:** Nutrition problems in the western region are more severe among the urban dwellers than those who live in the country because of the frequent difficulty of bringing food to market, rising prices, and deterioration of beneficial customs such as prolonged breast feeding. (National Food and Nutrition Conference, 1974)

**MALNUTRITION - NORTH:** In the northern region of Ghana 52% to 72% of women examined showed various signs of malnutrition. These signs showed seasonal variation rising during the hungry months, and falling at harvest. (Orraca-Tetteh, 1972b)

**SEASONAL WEIGHT LOSS - FOREST:** In the forest belt there is seasonal weight loss of 1 to 2 pounds in adults during the pre-harvest period. (Sai, 1971)

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

**GOITER:** Goiter is prevalent in the northern and upper regions, affecting 5% to 33% of the population, with the highest rate among adolescent and young adult women. (Sai, 1978)

**SEASONAL MORBIDITY IN BRONG-AHAFO:** During the rainy season, gastroenteritis and malaria are more prevalent; during the dry season, respiratory diseases and measles complicate chronic food shortage. (National Food and Nutrition Conference, 1974)

### RURAL

**ANEMIA:** 11.3% of women 15-29 years old had moderate anemia, with hemoglobins below 10gm%. (Bruce-Tagoe et al., 1977)

**WOMEN'S HEMOGLOBIN:** 48% of the 103 adult women in Baafi village had a satisfactory hemoglobin of 12 grams per 100 ml. or better indicative of adequate iron nutriture; 47% had borderline hemoglobin between 10.1 and 12 grams per 100 ml., indicating possible iron deficiency; and 5% fell below 10 grams per 100 ml., indicating iron deficiency. (Orraca-Tetteh and Watson, 1976)

**WOMEN'S HEMOGLOBIN:** Among 61 adult women in Baafi, 41% had hemoglobins of 12 g/100ml or above, 41% were between 10.1 and 12 g/100ml and the remainder fell below 10 g/100 ml. (Dako and Watson, 1974)

**WOMEN'S HEMATOCRIT:** Among 98 adult females in Baafi village, 53% had a hematocrit of 36 or above; 29% fell between 33 and 35.9; 14% fell between 30 and 32.9 and 4% had a hematocrit below 30, severe anemia. (Orraca-Tetteh and Watson, 1976)

**WOMEN'S WEIGHT FOR HEIGHT:** Among 53 women in Baafi village, 18% were below 90% of standard weight for height, 22% were 90 to 94% of standard, 30% were 95 to 99% of standard, and 20% were at or above standard weight for height. (Dako and Watson, 1974)

**MORBIDITY:** Women 15 to 39 years old reported about 50% more illness than comparable males. The sex differential persisted even after a small number of conditions related to pregnancy and gynecology were excluded from the analysis. Rates of illness ranged from 300 to 400 per 1000 respondents in this age group. (Belcher et al., 1976)

### URBAN

**OVERWEIGHT:** 40% of female traders in the capital city of Accra were found to be overweight. (Davey, 1961b)

## 1.2 NUTRITION AND HEALTH STATUS, WOMEN, PREGNANT

### NATIONAL

**MATERNAL MORTALITY:** Pregnancy-related deaths represent at least 4% of all deaths in Ghana. The maternal mortality rate is 5-15 per 1000 live

births; 65% are due to hemorrhage, 7% to infection, and 15% to toxemia. (Ofosu-Amaah and Neumann, 1979)

**MATERNAL MORTALITY:** The maternal mortality rate was between 5 and 17 deaths per 1000 live births. (North et al., 1975)

**MATERNAL MORTALITY:** Maternal mortality was 6 to 30 per 1000 live births. Lowest rates are found in urban areas with good maternity services. (Sai, 1971)

**CAUSES OF MATERNAL MORTALITY:** The primary causes of maternal mortality are hemorrhage, infection, and toxemia. At present the majority of pregnant women receive no scientific medical attention during their pregnancies. (North et al., 1975)

**WEIGHT GAIN:** Average weight gain of pregnant women in Northern Ghana was 6.7 pounds. In Southern Ghana, the average gain was 4.0 pounds. (Davey, 1961b)

**CLINICAL SIGNS OF MALNUTRITION:** 50% more pregnant women were affected by signs of malnutrition than non-pregnant women. Signs seen included Bitot spots, cheilosis, swollen or shrunken gums, fissures of the tongue, smooth tongue, dry skin, peeling and cracking of the skin, follicular hyperkeratosis, and ulcers of skin, both sub-acute and chronic. (Davey, 1961b)

**CLINICAL SIGNS OF MALNUTRITION:** In the north, 68% of pregnant women and 45% of non-pregnant women showed some clinical signs of malnutrition. In the south about 40% of pregnant women and 28 of non-pregnant women showed such signs. No fresh cases of scurvy or beriberi were found. (Davey, 1961b)

**ANEMIA:** Mean hemoglobin of pregnant women ranged from 52% to 55%. Among non-pregnant women the range was 63% to 65%, by the Sahli method (in which 100% = 14.8 gm hgb/100 ml; 67% = 10 gm hgb/100 ml), suggesting a greater degree of anemia in pregnant women. (Davey, 1961b)

**HEMATOCRIT:** Among 9 pregnant women in Baafi, 11% had a hematocrit between 27 and 29.9, and 89% were 30 or above. (Orraca-Tetteh and Watson, 1976)

**HEMOGLOBIN:** Among 9 pregnant women in Baafi village, 78% had a hemoglobin of 10 gms/100 ml or better, indicative of adequate iron nutriture; 22% had hemoglobins between 8.1 and 10 grams/100 ml. indicating borderline iron status. (Orraca-Tetteh and Watson, 1976)

**RIBOFLAVIN DEFICIENCY:** Ariboflavinosis, evidenced by angular stomatitis and cheilosis, is more frequently seen in pregnant and lactating women and preschoolers than in the rest of the population. (Sai, 1971)

**GOITER:** 25% of mothers at a clinic at Zebilla had goiter. The most common pattern was that the goiter started with the first pregnancy,

## 1.2 NUTRITION AND HEALTH STATUS, WOMEN, PREGNANT (Cont.)

receded between the pregnancies and recurred during the subsequent pregnancies. (Baddoo, 1974)

**PREVALENCE OF PREGNANCY:** One in four Ghanaian females is pregnant each year, not taking into account pregnancies which result in miscarriage, abortion, or stillbirth. (North et al., 1975)

**LOW WEIGHT GAIN:** Weight gain in pregnancy was lower in the age groups 16-19 years (average gain 3.1 pounds) and 41-49 years (average gain 3.3 pounds) than during the middle reproductive years, when average weight gains ranged from 4.7 pounds at 20-24 years to 5.4 pounds at 30 to 39 years. (Davey, 1961b)

**LOW WEIGHT GAIN:** Weight of pregnant women was 4.5 pounds more than weight of non-pregnant women. This was half the optimal average gain of 9 to 10 pounds for women in all trimesters of pregnancy. (Davey, 1961b)

**LOW WEIGHT GAIN:** Average weight gain of women age 20-24 years during their first pregnancy was 10.3 pounds. This was the only age group showing desired weight gain in pregnancy. All other age groups, whether primiparae or multiparae, were below desired weight gain. (Davey, 1961b)

**NUTRIENT INTAKE:** Average intake among pregnant women was 1,861 calories per day, 24.1 grams of protein, 4.5 to 9.0 grams of iron, 1,305 mcg. of vitamin A and 1.33 mg. of riboflavin. (Abudu, 1975)

### REGIONAL

**ANEMIA:** In the Volta Region, 50 to 60% of pregnant women were anemic. (National Food and Nutrition Conference, 1974)

### RURAL

**STILLBIRTHS AND MISCARRIAGES:** When asked about their last pregnancy, 1-3% of the women reported stillbirths and 6-8% reported miscarriages. (Ofosu-Amaah and Neumann, 1979)

**PRENATAL CARE:** 87% of mothers in Area I of the Danfa Health Area said they had received some prenatal care. The number who sought care in the first trimester increased from 32% in 1972 to 41% in 1977. (Ofosu-Amaah and Neumann, 1979)

**BIRTH AT HOME:** The majority of women reported that their most recent delivery occurred in their own home. (Ofosu-Amaah and Neumann, 1979)

### URBAN

**WEIGHT OF PREGNANT WOMEN:** Average weight of pregnant women in Accra was .8 pounds less than non-pregnant. Considering only women over 25 years, the weight of pregnant women was 5.2 pounds less than non-pregnant. The author feels that this difference might be due to the fact that obese women have trouble conceiving and have increased the weight average in

the non-pregnant group. Weight of non-pregnant women in urban areas is much higher than non-pregnant women in rural areas. (Davey, 1961b)

### 1.3 NUTRITION AND HEALTH STATUS, WOMEN, LACTATING

#### NATIONAL

NUTRIENT INTAKE: Average intake among lactating women was 1,530 calories per day, 16.6 grams of protein, 5.2 to 10.4 grams of iron, 888 mcg. of vitamin A and 1.14 mg. of riboflavin. (Abudu, 1975)

#### RURAL

HEMOGLOBIN: Among 27 pregnant and lactating women in Baafi village, 11% had deficient MCHC (mean corpuscular hemoglobin concentration) values; 63% were borderline; and 26% were satisfactory. (Orraca-Tetteh and Watson, 1976)

### 1.4 NUTRITION AND HEALTH STATUS, INFANTS 0-6 MONTHS

#### NATIONAL

INFANT MORTALITY RATES: The infant mortality rate was 60 deaths per 1000 live births when measured by a system of registration of vital events, and 80 per 1000 as measured by a survey. (Gaisie, 1975)

INFANT MORTALITY RATE: The infant mortality rate was 106/1000. (Fisher, 1979)

INFANT MORTALITY RATE: The infant mortality rate was 133/1000 live births; 145 for male infants, 121 for female infants. (North et al., 1975)

INFANT MORTALITY RATE: Infant mortality was 122 to 160 per 1000 live births. (Beamer and Gangloff, 1974)

INFANT MORTALITY: In 1960 the infant mortality rate was between 100 and 160/1000. 11,498 deaths were medically certified in 1967; of these, 5,976 (52%) were deaths of children under 5 years. (Sai, 1971)

MORTALITY: The mortality rate among children birth to one year of age was 133 deaths per 1000 live births. (Abudu, 1975)

MORTALITY: The infant mortality rate is about 120 deaths per 1000 live births. (Osei-Boateng, 1979)

MORTALITY: 12% of children born alive die before their first birthday. (Davey, 1974)

INFANT MORTALITY RATES BY SEX: Mortality for infant girls was 57 deaths per 1000 live births, and for boys, 62 per 1000 when measured by a system

## 1.4 NUTRITION AND HEALTH STATUS, INFANTS 0-6 MONTHS

of registration of vital events. Rates were 79 for girls and 80 for boys according to survey findings. (Gaisie, 1975)

**INFANT MORTALITY BY AGE:** Among medically certified infant deaths, about 55.3% of the dead were less than one month old. The proportion of infant deaths drops rapidly after the first month, rises between the fourth and the eighth months, and then falls again toward the end of the first year. (Gaisie, 1975)

**PROTEIN CALORIE MALNUTRITION (PCM) AND AGE:** Less than 10% of PCM in rural areas and 10% to 20% of PCM in urban areas occurs in infants under six months. (FAO, 1979b)

**BIRTH WEIGHT:** Average birth weight is between 6 and 7 pounds; length at birth is about 19 inches. (Sai, 1971)

**UNDERWEIGHT:** One third of children under 2 years of age were malnourished (below 80% of Harvard Standard weight for age) at their first clinic visit. (Fisher, 1979)

**GROWTH:** Most babies are entirely breast fed from birth. Up to age 4-6 months, growth is very satisfactory. Birth weight is doubled between the third and fourth month. (Sai, 1971)

### REGIONAL

**INFANT MORTALITY RATES BY REGION:** Infant mortality rates ranged from 30 deaths per 1000 live births in Accra Capital District to 98 in Brong-Ahafo Region and 107 in Central Region. The lowest and highest rates reported by the registration system were 30 in Accra and 92 in Brong-Ahafo. (Gaisie, 1975)

### RURAL

**INFANT MORTALITY RATES:** The infant mortality rate in rural areas averaged 148 per 1000 live births. The rate was 106 per 1000 in Accra and 208 per 1000 in the Upper Region. (Abudu, 1975)

**BIRTH WEIGHT:** Mean birth weight of infants delivered at or near term at the Danfa Health Center was 3.3 kg (6.5 pounds). Only 6% were small for gestational age. (Ofosu-Amaah and Neumann, 1979)

### URBAN

**INFANT MORTALITY RATES:** The infant mortality rate in urban areas was 98 deaths per 1000 live births. It was lowest in Accra, 53 per 1000, and highest in the Northern Region, 129 per 1000. (Abudu, 1975)

**INFANT MORTALITY RATES:** The infant mortality rates for males and females are 93 and 87 deaths per 1000 live births respectively in the areas of the country where registration is compulsory. (Gaisie, 1975)

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

### NATIONAL

**MORTALITY RATE:** The mortality rate for children 1-4 years old was 115 deaths per 1000 live births. (Fisher, 1979)

**MORTALITY RATES:** The mortality rate among children birth to one year of age was 133 deaths per 1000 live births and among children 1 to 4 years of age, 20 per 1000. (Abudu, 1975)

**MORTALITY RATES:** The death rates among children 1-4 years old were 72 per 1000 girls and 95 per 1000 boys. (North et al., 1975)

**MORTALITY RATES:** The death rate of children 1-4 years was 8 times higher than for children 5-14 years. 22% of the deaths of children under 5 were due to neonatal conditions, 14% to respiratory tract infection, 12% to malaria, 10% diarrheal disease, 10% measles, and 13% malnutrition. (Sai, 1971)

**MORTALITY RATES:** The death rate of children in the first year of life was 15% of all live births, and in the second year a further 14% of all live births. (Davey, 1961a)

**MORTALITY:** 50% of all recorded deaths occur among children under five years of age. The infant mortality rate is about 120 deaths per 1000 live births. (Osei-Boateng, 1979)

**MORTALITY:** 12% of children born alive die before their first birthday, and a further 7 or 8% before the second. About 40% of all children born alive fail to reach adulthood. (Davey, 1974)

**CHILD MORTALITY AND AGE:** 34 to 36% of all deaths in the 1 to 4 year age group occur in the age group 1 to 2 years. (Gaisie, 1975)

**MORTALITY - URBAN VS. RURAL:** Infant mortality rates range from about 70 per 1000 in major urban centers to about 150 to 200 per 1000 in rural areas. (Sai, 1978)

**MORTALITY - URBAN VS. RURAL:** In 1968-69 the urban mortality rate was 98 per 1000 live births; the rural rate was 161 per 1000. (FAO, 1979b)

**MORTALITY AND MALNUTRITION:** Nutritional disorders accounted for 64 per 1000 registered deaths, primarily in children under age 5. (North et al., 1975)

**MORTALITY AND GASTROENTERITIS:** Gastroenteritis accounted for 61 of each 1000 registered deaths in 1967, 88% of which occurred in children under the age of 5. (North et al., 1975)

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

**MORTALITY AND INFECTION:** Respiratory infection accounted for 124 of each 1000 registered deaths, the majority of which were children below age 5. (North et al., 1975)

**MORTALITY AND MALARIA:** Malaria causes an estimated 10 to 15% of all deaths in children. (Beamer and Gangloff, 1974)

**MORTALITY AND MEASLES:** Measles caused 51 of every 1000 registered deaths in 1967, primarily among children age 0-5 years. Other common infectious diseases include chicken pox, rabies, yaws, pertussis (whooping cough), and infectious hepatitis. (North et al., 1975)

**MORTALITY:** Children under 5 years make up 20% of the population but account for 50% of deaths. Most deaths in this group are due to infectious and parasitic diseases and diseases of the newborn. (Sai, 1971)

**KWASHIORKOR:** 0.3% of children examined in the south of the country were suffering from kwashiorkor. Among 309 children examined in the northern half of the country, 3 cases of marasmus and two cases of marasmic type of kwashiorkor were seen. (Davey, 1961c)

**KWASHIORKOR:** Health personnel in a number of areas concur that cases of frank kwashiorkor are now only rarely seen in clinic. The author reports that according to Ababio (1977) nutrition education concerning the cause of kwashiorkor has had an impact over the past 20 years. (Fisher, 1979)

**CLINICAL SIGNS OF PCM:** From 2 to 9% of children, mainly in the forest belt, and in the coastal savannah exhibit overt signs of protein calorie malnutrition. (Sai, 1978)

**CLINICAL SIGNS OF MALNUTRITION:** 18% of children below four years of age showed one or more clinical signs of malnutrition. (Davey, 1961c)

**AGE AND SIGNS OF MALNUTRITION:** 11% of children birth to 11 months old showed clinical signs of malnutrition; and 18% of children 12 to 23 months old showed clinical signs of malnutrition. (Davey, 1961c)

**PEM AND BIRTH ORDER:** Among 348 children with PCM, first-born children accounted for 24.71% of cases; second born for 18.39%; and third born for 16.09%. (Sai, 1971)

**PEM AND URBANIZATION:** In Accra, children from peri-urban families are represented disproportionately among cases of PEM. (Sai, 1978)

**MALNUTRITION AND SEASON:** The peak period for admission to hospitals in the north appears to be the first quarter of the year. In 1972, in Bawku Hospital, there were 20 deaths from malnutrition in the period January to March; 11 from April to June; 6 from July to September; and 13 from October to December. The first quarter is the dry harmattan period when

food production is at low ebb and sources of water may have dried up. It is also the season in some years for outbreaks of cerebrospinal meningitis. (Baddoo, 1974)

**UNDERWEIGHT:** 30% to 40% of Ghanaian children under 5 years of age deviate from the accepted weight norms by significant amounts. (Sai, 1978)

**UNDERWEIGHT:** A study in clinics in the upper region of Ghana found that 12% of boys and 27% of girls were underweight for age. The author concludes that boys were given preferential treatment in both feeding and medical care. (North et al., 1975)

**UNDERWEIGHT:** At two years of age, 57% of boys and 52% of girls were underweight, as measured by weight to height ratio. (Orraca-Tetteh, 1972)

**UNDERWEIGHT:** 57% of boys two years of age were underweight (below 25 pounds) and 52% of girls two years of age were underweight (below 23.4 pounds). (Davey, 1961c)

**WEIGHT AND HEIGHT:** Weights and heights of both boys and girls were greater for children from southern Ghana than in northern Ghana at 24 months of age (all measures statistically significant except the difference in height for boys). (Davey, 1961a)

**WEIGHT AND AGE:** Among 1706 preschool children attending clinics conducted by the Catholic Relief Services in 1973-74, approximately one third of all children under two years of age at their first clinic visit were found to be malnourished when first weighed. Older children, 2 to 4 years of age at first visit, were better nourished; fewer than one fourth fell below 80% of the Harvard Standard for weight for age. (Austin et al., 1981)

**WEIGHT AND WEANING:** The age at which the percentage of children with acceptable body weights was lowest was at the time of weaning. (CRS, 1974)

**GROWTH RATES:** Good gains are obtained in both weight and height up to 7 or 8 months of age; then gains are small through 12 months. From 12 to 24 months gains are regular but less than the desirable amounts. (Davey, 1961a)

**GROWTH AND SUPPLEMENTATION:** From 6 to 9 months of age the rate of growth slows and by the end of the first year children enter the slowest growth period. It is at this time that supplementary feeding and weaning are undertaken. (Sai, 1971)

**ANTHROPOMETRY AND FEEDING METHOD:** Among boys and girls 12 to 18 months old, heights and weights were greater for completely weaned children than for children receiving breast milk plus supplemental foods. (Davey, 1961a)

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

**THIAMINE DEFICIENCY:** Among 10 children studied in 1973 with mild to moderate malnutrition (60 to 80% of Harvard standard for weight for age), 30% had normal thiamine status (percentage of thiamine pyrophosphate (TPP) effect was 0 to 14%); 60% were marginally deficient in thiamine (TPP 15 to 24%) and 10% were severely deficient (TPP  $\geq$  25%). Among 22 well-nourished children (80% or more of Harvard standard weight for age), 18.2% had normal thiamine status; 40.9% were marginally deficient and 40.9% were severely deficient. (Neumann et al., 1979)

**THIAMINE DEFICIENCY:** 28 children with severe PCM (below 60% of standard weight for age) were studied for thiamine pyrophosphate effect in 1972. 57% had normal thiamine status (TPP effect 0-14%); 25% had marginal deficiency (TPP effect 15-24%) and 17.9% had severe deficiency (TPP effect  $\geq$  25%). Among 29 children with mild to moderate PCM (61 to 80% of Harvard standard weight for age), 35.7% had normal thiamine status, 35.7% had marginal deficiency, and 28.5% had severe deficiency. Among 35 well-nourished children (80% or more of standard for weight for age), 45.7% had normal thiamine status, 20% had marginal deficiency and 34.3% had severe deficiency. (Neumann et al., 1979)

**THIAMINE DEFICIENCY AND NUTRITION THERAPY:** 23 severely malnourished children (below 60% of Harvard standard for weight for age) were studied in 1973. 56.5% had normal thiamine status (thiamine pyrophosphate effect (TPP) of 0-14%); 13% were marginally deficient (TPP 15-24%); and 30.4% were severely deficient (TPP  $\geq$  25%). After two weeks of nutrition therapy, 95% had normal thiamine status; 5% were marginally deficient; and none were severely deficient. (Neumann et al., 1979)

**THIAMINE DEFICIENCY:** No clinical signs of thiamine deficiency were noted in any children in the sample. (Neumann et al., 1979)

**MEASLES:** 50% of children had had measles by age 18 months and 75% by two years. (Blankson, 1975)

**MEASLES MORTALITY:** The average mortality rate from measles was 3.5 per 1000. The rate was 0.2 per 1000 in Sweden in 1968 and in the United States no deaths were recorded. (Blankson, 1975)

**MEASLES, SEX AND AGE:** The highest incidence of measles occurs in the age group between 7 months and 18 months of age, with the median at about 12 months. There was no significant difference in incidence of measles between the sexes. (Blankson, 1975)

**NUTRIENT INTAKE:** Average daily intake of calories among children 1 to 5 years of age ranged from 328 to 732, protein 11.5 to 16.4 grams, iron 1.6 to 3.3 grams, vitamin A 318 mcg. and riboflavin 0.74 to 1.60 mg. (Abudu, 1975)

**CAUSES OF DEATH:** In 1967, the causes of death of children under five years of age were prematurity, 10.2%; other neonatal conditions, 14.4%; bronchopneumonia, 14.1%; gastroenteritis, 10.3%; measles, 9.6%; marasmus,

9.3%; kwashiorkor, 3.8%; malaria, 11.8%; other infections, 9.1%; and others, ill-defined, 7.4%. (Ofosu-Amaah, 1974a)

## REGIONAL

**NUTRITION STATUS IN THE ASHANTI REGION:** Protein calorie malnutrition was widespread and serious. Nutrition of preschool children was grossly unsatisfactory and 50% of children were underweight and not growing well. Kwashiorkor had a very high death rate and was in part responsible for many deaths of preschool children. (Baffour-Senkyire, 1974)

**NUTRITION PROBLEMS IN THE CENTRAL REGION:** Kwashiorkor is the most common clinically recognized nutritional deficiency in the Central region, followed by marasmus, vitamin A deficiency, goiter and scurvy. (National Food and Nutrition Conference, 1974)

**NUTRITION PROBLEMS IN THE NORTHERN REGION:** The most common nutritional problems observed clinically are kwashiorkor, marasmus, angular stomatitis and anemia. These are seen in approximately 20 to 40% of the young child population. During the lean season, starvation symptoms are frequently seen in infants and young children. Pneumonia and measles, commonly associated with malnutrition, and specific deficiency diseases account for 50% of all deaths among children. (National Food and Nutrition Conference, 1974)

**MALNUTRITION:** The Eastern Region appears to have average nutrition. 60 to 70% of families have inadequate intakes, with 30 to 40% so low that clinical signs of malnutrition appear in infants and young children. Other than PEM, no nutritional deficiencies are reported. (National Food and Nutrition Conference, 1974)

**REGION AND TYPE OF MALNUTRITION:** In the forest and southern areas, kwashiorkor is the most common type of malnutrition; in the Northern and Upper Regions, marasmus is more prevalent. (Baddoo, 1974)

**ECOLOGICAL ZONE AND MALNUTRITION:** In the mountain savannah of the Brong Ahafo region, marasmus is more common because of a longer period of seasonal food shortage; in the forest area where people live on plantain and tuber, kwashiorkor is more prevalent. Vitamin A and C deficiencies are not reported. (National Food and Nutrition Conference, 1974)

**SEASON AND KWASHIORKOR:** Kwashiorkor is frequently reported in the Ashanti Region, but more commonly during the lean season of May, June and July. (National Food and Nutrition Conference, 1974)

**KWASHIORKOR AND AGE:** Incidence of kwashiorkor in the Ashanti Region was highest among children one to two years of age. There was a sharp decline after four years of age. (Baffour-Senkyire, 1974)

**CLINICAL SIGNS OF MALNUTRITION:** 37% of children in the north and 12% of children in the south showed one or more signs of malnutrition upon examination. (Davey, 1961c)

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

**ADMISSION TO HOSPITAL FOR MALNUTRITION:** At the hospital in the Eastern Region, the peak period for malnutrition admissions is the third quarter of the year. 18 cases were admitted for malnutrition in the period January to March, 23 from April to June, 72 from July to September, and 21 in October to December. (Baddoo, 1974)

**UNDERWEIGHT:** Approximately 35% of children birth to three years old in the Bawku district were significantly underweight (below 80% of the Harvard Standard). (Gordon, 1974)

**VITAMIN A DEFICIENCY:** Clinical signs and dietary intake data indicate vitamin A deficiency in the North, especially in the Upper Region. (Davey, 1961c)

**HEIGHT AND REGION:** Average heights of children 1 and 2 years of age were greater in the south than in the north. At one year of age, boys in the north averaged 27.3 inches and in the south, 28.7 inches. Girls at one year averaged 27.1 inches in the north and 28.1 inches in the south. At two years, boys in the north averaged 30.9 inches, and in the south, 32.5 inches. Girls at two years of age averaged 30.5 inches in the north and 31.7 inches in the south. (Davey, 1961c)

**WEIGHT AND REGION:** Average weights of children 1 and 2 years of age were higher in the south than in the north. Average weights of boys one year of age in the north were 18.2 pounds, and at two years, 22.3 pounds. In the south, average weights were 18.8 pounds at one year and 24.2 pounds at two years. Average weights of girls were 17.8 pounds at one year in the north and 21.3 pounds at 2 years. In the south, girls averaged 18.7 pounds at one year, and 23.6 pounds at two years. (Davey, 1961c)

**CAUSES OF CHILD MORTALITY:** In the Ashanti Region, malaria, respiratory diseases, diarrhea and measles are the major causes of death among children. (National Food and Nutrition Conference, 1974)

### RURAL

**MORTALITY RATES:** The infant mortality rate was 54/1000 and the preschool mortality rate was 16/1000. At least 12% of all children born died before age five. (Ofosu-Amaah and Neumann, 1979)

**MORTALITY:** 40.6% of mothers reported children who had died; for 30.1%, the child was under one year of age at the time of death. (Engberg, 1974)

**MORTALITY AND FAMILY STRUCTURE:** Engberg's study in Medina found that families in which the husband's authority was strongest were those with the lowest health scores (based on number of children who had died). (North et al., 1975)

**CLINICAL SIGNS OF MALNUTRITION:** 13% of children below four years of age in farming villages and 8% of fishing villages showed clinical signs of malnutrition. (Davey, 1961c)

**MARASMUS:** In Baafi village in 1976, no children were found to be marasmic or emaciated. In a 1972 survey, there had been 2 marasmic and 16 emaciated children. In 1976, 10 children showed signs of hair changes indicative of malnutrition; in 1972, 36 children had shown hair changes. (Orraca-Tetteh and Watson, 1976)

**GOMEZ CLASSIFICATION:** Among children in Baafi village, 65% had first degree malnutrition (75 to 90% of standard weight for age), and 15% had second degree malnutrition (60 to 74% of standard weight for age). Only about 20% of children were adequately nourished, but none had third degree malnutrition. (Dako and Watson, 1974)

**WEIGHT FOR AGE:** 33% of children 5 to 35 months had weights below 80% of standard weight for their ages. (Ofosu-Amaah and Neumann, 1979)

**WEIGHT FOR AGE:** Among children birth to 11 months of age, 24% were above 90% of standard weight for age; 35% were between 81 and 90% of standard; 24% fell between 71 and 80%; 12% were between 61 and 70%; and 6% fell below 60% of standard weight for age. Among children 12 to 23 months of age, 20%, 30%, 40%, 10% and 0% fell in each respective category for weight for age. (Orraca-Tetteh and Watson, 1976)

**WEIGHT FOR AGE:** 15% of infants under one year of age in Baafi were grossly underweight. In the one to five year old group, 17% had satisfactory weight (90% of standard weight for age or above), 45% were borderline (81 to 90% of standard weight for age), and 38% were underweight (about 75% of standard). (Dako and Watson, 1974)

**WEIGHT FOR AGE:** 50% of children under 5 years of age in farming villages and 37% in fishing villages were underweight. (Davey, 1961c)

**WEIGHT FOR HEIGHT:** Among children in Baafi village birth to 11 months of age, 29% were above 90% of standard weight for height; 24% were between 81 and 90% of standard; 41% were between 71 and 80% of standard; and 6% were between 61 and 70% of standard. Among children 12 to 23 months of age, 50%, 30%, 20%, and 0% fell in each respective category. (Orraca-Tetteh and Watson, 1976)

**HEIGHT FOR AGE:** Among children birth to 11 months of age in Baafi village, 94% were above 90% of standard height for age and 6% were between 81 and 90% of standard. Among children 12 to 23 months of age, 80% were above 90% of standard height for age, and 20% were between 81 and 90% of standard. (Orraca-Tetteh and Watson, 1976)

**GROWTH RATES:** For one sample, median weight for age was 79% of Harvard standards; median height for age was 91% of standard, and median weight for height was 92% standard. The children grew at a rate comparable to

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

North American children (Harvard Standard) in the first few months of life, followed by a rapid decline in the growth rate. (Tripp, 1981)

**GROWTH RATES:** Mean weight for age and height for age dropped relative to standards from age 12 to 35 months in males and from age 18 to 35 months in females. (Ofosu-Amaah and Neumann, 1979)

**ARM CIRCUMFERENCE:** Among children one to five years old in Baafi village, 46% had arm circumferences below 14 centimeters, an index of potential malnutrition. (Dako and Watson, 1974)

**ARM CIRCUMFERENCE:** 35% of children 1 to 5 years had arm circumference measures below 14 cm. (Ofosu-Amaah and Neumann, 1979)

**PCM AT DANFA:** PCM was not common in the Danfa project area. About 59 cases a year were seen in the clinic, an incidence of about 21 cases per 1000 children. (Ofosu-Amaah and Neumann, 1979)

**ANEMIA:** Mean hemoglobin of children birth to 4 years was 10.3 gm in Area I of the Danfa project. (Ofosu-Amaah and Neumann, 1979)

**ANEMIA:** Moderate anemia (below 10 gm%) was found in 25% of children 0-4 years old. (Bruce-Tagoe et al., 1976)

**HEMOGLOBIN:** Mean hemoglobin for males 1 to 5 years of age was 10.8 grams per 100 ml. and for females, 10.7 grams per 100 ml. The WHO standard for children 0.5 to 4 years of age is 10.8 grams per 100 ml. (Orraca-Tetteh and Watson, 1976)

**HEMATOCRIT:** Among 63 children 6 months to 4 years of age in Baafi village, 16% had a hematocrit of 26 to 28.9, 32% had a hematocrit of 29 to 31.9 and 52% were 32 or above. (Orraca-Tetteh and Watson, 1976)

**MORBIDITY:** The preschool illness rate of only 200 per 1000 children was unexpectedly low, probably due to under reporting. (Belcher et al., 1976)

**INFECTIOUS DISEASES:** Infectious diseases of most concern were malaria, measles, pertussis, gastroenteritis, respiratory infection, helminths, poliomyelitis, tuberculosis, schistosomiasis, guinea worm, tetanus, and skin infections. (Ofosu-Amaah and Neumann, 1979)

**DIARRHEA FREQUENCY:** Among preschoolers attending Danfa Rural Health Center in 1973, diarrhea was second only to malaria as the chief complaint. (Wuarapa et al., 1976)

**DIARRHEA:** About 2.5% of children 0-4 years studied during the dry season had had diarrhea in the preceding 24 hours. (Wuarapa et al., 1976)

**DIARRHEA FREQUENCY:** Diarrhea accounted for 21% of the complaints recorded for children under 5 at one health center. (Ofosu-Amaah and Neumann, 1979)

ASCARIS: 23% of infants under one year tested positive for ascaris infection; 40% at 1 year; and 50% at 2 years. (Wuarapa et al., 1975)

HOOKWORM: 20% of children 0-4 years had hookworm. (Bruce-Tagoe et al., 1977)

HOOKWORM: Less than 20% of 0-3 year olds had hookworm. (Wuarapa et al., 1975)

MALARIA: 6.6% of children 0-4 years had positive malaria films. (Wuarapa et al., 1975)

#### URBAN

PCM AND MEASLES: Among children with PCM treated in Accra in 1962-63, 30% had had measles in the previous few weeks. (Sraha, 1971)

CLINICAL SIGNS OF MALNUTRITION: 11% of urban children below four years of age showed clinical signs of malnutrition. (Davey, 1961c)

MALNUTRITION AND MEASLES: Malnutrition frequently occurs 6 to 12 weeks after an attack of measles. Over 50% of admissions to Princess Marie Louise Hospital, a Nutrition Rehabilitation Center, gave a history of having had measles 6 to 12 weeks prior to admission. (Blankson, 1975)

MEASLES, WEIGHT, AND MORTALITY: Over 96% of children over one year of age admitted to Korle Bu Teaching Hospital for measles and who died were well below the average mean weight for age. (Blankson, 1975)

UNDERWEIGHT: 35% of children under five years of age in Accra-Kumasi and 3% in urban areas were underweight. (Davey, 1961c)

## 2. DIETARY BELIEFS

### 2.1 DIETARY BELIEFS, GENERAL

#### NATIONAL

**FOOD FOR PEACE COMMODITIES:** In one village the Wheat Soy Blend and Soy Fortified Sorghum Grits supplied by the Food for Peace program were considered "unsuitable" for men and older boys and were saved for the preschool children and women. (Jones et al., 1981)

**FOOD AVOIDANCE:** Eggs are avoided by women and first sons in the north, while in other areas taboos include poultry and groundnuts, especially for pregnant women. (May, 1965)

**PRESTIGE FOODS:** In all communities there was a distinct tendency to give children the more expensive prestige types of foods such as yam in the south, and plantain and cassava in the north. The greater use of groundnuts and pulses in the south probably falls in the prestige food category also. (Davey, 1961a)

**GOAT'S MILK:** There was a deep prejudice against milking goats and drinking the milk. Some professionals even shuddered when the topic was discussed. There were many goats in the country although most were smaller breeds not well developed for milk production. (Jones et al., 1981)

**TOUGH MEAT:** The chewing of meat or fish adds to the pleasure of eating. Meat products which are not chewable are not popular, so people prefer the scavenger types of animals and chickens to those produced with improved livestock management. (Idusogie, 1974)

**PROTEIN FOODS:** Traditional customs prevented children from consuming eggs, fish and meat because it was believed that these delicious foods would induce children to steal them when they are not provided regularly. (Idusogie, 1974)

**PORK:** Religious avoidance of pork has increased with the spread of spiritual churches. Church members and Moslems are unwilling to buy meat where pork is also for sale. Religious factors have also made pork unsuitable for use in institutional feeding. (Ababio, 1974)

**MOURNING AND FOOD PRODUCTION:** Traditional customs demand that wives and other near relatives of the deceased fast and mourn for several days or weeks. In communities where wives are fully engaged in agricultural food production, this practice could lead to inadequate production and consumption of foods, particularly if the period of fasting and mourning coincides unfavorably with cropping or harvesting season. (Idusogie, 1974)

#### REGIONAL

**FOOD AVOIDANCE:** In the north, there are food customs influencing diet. Women at marriage adopt the husband's customs; abstinence from Indian

## 2.1 DIETARY BELIEFS, GENERAL (Cont.)

corn, palm wine and certain berries on certain days are among the customs. Another avoidance relates to certain totemized animals, varying by tribal group, including leopards, monkeys, white fowls, crocodiles, antelopes, snails. (May, 1965)

**BALANCED DIET:** In the Ashanti region, people feel that as long as they eat something and they are not unduly hungry, the problem of eating is solved, so many, including infants, do not get a well-balanced diet. People tend to eat more of one type of food than they should. (Baffour-Senkyire, 1974)

**CATTLE:** In the Northern Savannah, cattle herds which could provide meat to replace imports were used as status symbols or capital. A revolution in traditional attitudes will be needed to enable them to be utilized efficiently as a source of meat. (Ofosu-Amaah, 1974b)

### RURAL

**CHICKEN AND EGGS:** In many rural areas, eating eggs and chicken was taboo for women and children. Although in many places the taboo itself has lost strength, the habit may remain. (Ababio, 1974)

**EGGS AND FRUIT:** Some people associate duck eggs with eggs of a snake. Fruit is more regarded as a refreshment than as a snack. Consumption of both foods is low. (den Hartog, 1970)

**FRUIT PREFERENCES:** Most people preferred oranges among the fruits, followed by pineapple, pawpaw, mango, and banana. (den Hartog, 1970)

### URBAN

**MANY CHILDREN:** Even if the care of them was inadequate, having many children was always a sign of blessing and prosperity. On the arrival of the tenth child, there was a lot of fuss over the mother with special ceremonies of congratulation. (Otoo, 1973)

## 2.2 DIETARY BELIEFS ABOUT PREGNANCY

### NATIONAL

**AMOUNTS OF FOOD:** Twumasi explained the failure of pregnant women to consume more as resulting from a belief that the developing fetus is looked after by "the gods" and the only thing a woman could do to ensure the successful outcome of a pregnancy was to keep to the norms of the society. She would not expect nor receive additional amounts of food though she might be allowed to eat unusual foods which she craved. (North et al., 1975)

**NO EXTRA FOOD:** In general, there appears to be complete ignorance of the fact that pregnant women require more food. In consequence, pregnant women show a much lower nutritional status than other women of the same

age, as shown by relative loss of weight and increased clinical signs of malnutrition. (Davey, 1974)

**FOOD RESTRICTIONS:** It has been suggested that women consciously restrict intake as they are aware that the baby will be smaller and hope thereby to have an easier delivery. Certainly there is much pressure on women to have easy deliveries; difficulties in childbirth are traditionally taken as a sign that a woman has committed adultery. Death in childbirth is considered a great misfortune which could affect the whole community. (North et al., 1975)

**SNAILS:** Pregnant women did not eat snails because of the belief that their babies would have excessive saliva. (Idusogie, 1974)

**POSTPARTUM SEXUAL RELATIONS:** Among the rural Ga people, a woman who goes to her husband too soon after delivery is accused of wanting to kill her child. The Ga associate kwashiorkor with early pregnancy of either the biological or social mother. A woman who conceives without menstruating after her last delivery is considered to be bewitched. (Sai, 1971)

## RURAL

**AVOIDANCE OF FOODS:** Women avoided certain foods because they contained too much starch, made the mother vomit or made her heart beat faster. Other foods were believed to cause miscarriage, or problems with the child such as weakness, bowel trouble (mango), sliminess (snails), or resembling a monkey (monkey meat). (den Hartog, 1970)

**NO RESTRICTION IN PREGNANCY:** None of the women studied restricted their diet during pregnancy because of taboos or traditional religious beliefs. (Grant, 1956)

## URBAN

**SPECIAL MEALS:** Where there was irregular vaginal bleeding, indicating threatened abortion in the early stages of pregnancy, a common treatment was a special meal. This meal was prepared with seven palm nuts, very dry fish which was swallowed with the bones, certain herbs, condiments and fufu made of green dwarf plantain. This was prepared by the woman herself and eaten before speaking to anyone each morning. (Otoo, 1973)

**PUBERTY RITES:** A girl had to go through puberty rites including special meals, or risk having problems later during pregnancy. One meal included mashed yam mixed with spiced palm oil and boiled egg. At another meal, the girl had palm soup with chicken and plantain fufu. For a period, the girl was confined to a room eating and drinking soft drinks made from maize. The novice emerged very plump after this customary period of restriction and feeding. (Otoo, 1973)

## 2.3 DIETARY BELIEFS ABOUT LACTATION

### NATIONAL

EXTRA FOOD: It is commonly believed that lactating women require extra food. (Davey, 1974)

### RURAL

DURATION OF BREAST FEEDING: 46% of mothers said that babies should be breast fed for more than one year. (den Hartog, 1970)

WORKING MOTHERS AND BREAST FEEDING: Working mothers indicated that they would prefer to breast feed their children for at least 12 months if given a choice. (Pappoe, 1979)

ADVICE ON BREAST FEEDING: 29% of traditional birth attendants gave advice on infant feeding in the first week (other than advising breast feeding), usually recommending sugar water, coconut water, or diluted milk as supplement. (Nicholas et al., 1976)

DISADVANTAGES OF BREAST FEEDING: Working mothers felt the disadvantages of breast feeding were exposure of breasts, drooping or flabby breasts, and disturbance of rest periods for mother. (Pappoe, 1979)

MANGO AND ILLNESS: Some women said mango may not be eaten during lactation because it gives the infant fever or diarrhea. (den Hartog, 1970)

## 2.4 DIETARY BELIEFS ABOUT BREAST MILK SUBSTITUTES

## 2.5 DIETARY BELIEFS ABOUT WEANING

### NATIONAL

CESSATION OF BREAST FEEDING: A child's starting to walk tended to be a signal for the cessation of breast feeding. (North et al., 1975)

PROTEIN FOODS: Many Ghanaians believe that high quality protein foods are bad for children. Among reasons cited are that they will make the children sick or give them worms, or that the children will get such a taste for them that they will become thieves and steal more than their share from the kitchen. (North et al., 1975)

EGGS: Eggs are considered a symbol of life and are sometimes prohibited for pregnant women and young children. In one village eggs were given a "magic" power to cure kwashiorkor and were fed to children in spite of the traditional taboo. (Jones et al., 1981)

FISH: In many areas, people do not give fish to young children because it is believed that they will get diarrhea or worms or become thieves. (Ababio, 1974)

**FISH AND KWASHIORKOR:** There seems to be more kwashiorkor along the coast where fish is abundant than in the interior. The taboo against fish consumption by young children may contribute to this condition. (National Food and Nutrition Conference, 1974)

**MEAT AND FISH CAUSE WORMS:** The special needs of the child during the weaning period are not understood. There is a belief that giving meat and fish to young children causes intestinal worms, so these foods are largely withheld. (Davey, 1974)

## **REGIONAL**

**SHARING FOOD:** It is contrary to Ghanaian culture to give special food to only one child. Parents would certainly feel that this would bring misfortune on the child from jealous siblings. Therefore, food supplementation programs must consider all the children in the family when considering amounts to distribute. (Gordon, 1974)

**PORK AND SNAILS:** In the northern region, meat and fish are rarely eaten among the low income groups, although no taboos were reported about them, except pork and snails. (National Food and Nutrition Conference, 1974)

## **RURAL**

**BELIEFS ABOUT KWASHIORKOR:** Some women believe that there is an injurious emanation from the mother's body after the onset of pregnancy and this affects the child as it sleeps in her arms. Fanti women feel that certain women must carry the sickness in their wombs, otherwise there would be no explanation for the fact that certain children develop it while others do not. (Grant, 1956)

**BELIEFS ABOUT KWASHIORKOR:** Women are aware that children often become seriously ill at the time of weaning or soon after, recognizing many of the symptoms of kwashiorkor. Women regard the illness as psychological, and feel the child's spirit is crushed by the unborn child the mother carries. Some believe that the ill child is adversely affected by heat from the pregnant mother's body. The Fanti believe that the disease is connected with the fact that some women continue to nurse their children after they have become pregnant. (Grant, 1956)

**PROTEIN FOODS:** About half of the women interviewed in Pantang said fruit, fish or meat can be given to children at 9 to 11 months of age. In practice very few women do so. (den Hartog, 1970)

**REASONS FOR NOT GIVING PROTEIN FOODS:** Mothers who did not give their infants below one year of age any protein-rich foods gave the following reasons for not doing so: the foods were too heavy for the child, the child was unable to chew these foods, the mother did not want to get the child used to meat and fish due to their scarcity, or the mother disliked milk. (Orraca-Tetteh and Watson, 1976)

## 2.5 DIETARY BELIEFS ABOUT WEANING (Cont.)

**FISH AND WORMS:** Fish is withheld from many preschool children as it is believed to cause worms. (National Food and Nutrition Conference, 1974)

**GROUNDNUTS:** 26.7% of mothers believed that children should start taking groundnuts at 6-8 months. 46.7% felt that groundnuts should be started at 9-11 months. (den Hartog, 1970)

**CASSAVA:** 55.4% of women interviewed felt cassava should be introduced to the child's diet at 9 to 11 months of age. (den Hartog, 1970)

### URBAN

**PROTEIN FOODS:** There is a tendency to withhold meat and fish from children, but in accounting for this few mothers mentioned taboos. A number gave what may be described as health reasons--the belief that such foods would cause various illnesses. Most gave no reasons. (Dovlo, 1968)

**PROTEIN FOODS:** Very few parents reported that they withheld meat, fish, and eggs because of taboos. (Dovlo, 1968)

## 2.6 DIETARY BELIEFS ABOUT ILLNESS AND CURE

### NATIONAL

**IMPORTANCE OF FOOD AND SANITATION:** In a study carried out in four communities ranging from urban to small rural community, only 9.1% of persons interviewed mentioned food as important to keeping well, as compared to 47.9% who mentioned sanitation. (North et al., 1975)

**MODERN AND TRADITIONAL MEDICINE:** Acute attacks of fever were most likely to be treated by modern methods. Longstanding conditions, such as barrenness, impotence, or madness, which made it impossible for persons to perform their social roles, but did not make them physically weak, were more likely to be explained by supernatural forces, and treatment was accordingly in the province of herbalists and fetish priests. (North et al., 1975)

**ILLNESS BELIEFS:** There is a strong element of fate involved in the daily lives of the people. Things do not happen by chance; accidents, sickness and death are the result of spirit influences. The prescribed moral code must be closely observed for fear of angering spirits and bringing about misfortunes. Witch doctors and herbalists are consulted to determine the cause of illness and the steps to be taken to alleviate it. Good health can be granted by gods who are favorably disposed, ill health and death can be the result of bad will of gods or humans who bear ill will. (Beamer and Gangloff, 1974)

**ILLNESS BELIEFS:** Many Ghanaians will resort to both traditional and scientific medicine to overcome illness. Some groups forbid the use of medicines in the healing process. The Muslim groups, primarily in the north, have their own set of rules for diet, dress, treatment of disease.

and family structure. They do not readily accept immunization and aggravate the risk, through their dispersion and attitudes, of the spread of communicable diseases. (Beamer and Gangloff, 1974)

**HEALTH BELIEFS:** The majority of the population probably still relies most heavily on traditional treatment due to inaccessibility of modern medicine and faith in traditional methods. When medical help is sought, the practitioner is often expected to provide medicine, an injection, or some other visible form of treatment, so the patient believes healing will take place. (Beamer and Gangloff, 1974)

**NATIVE HEALTH PRACTITIONERS:** Traditional practitioners are believed to possess powers which will counter the supernatural forces causing illness. Cures include the use of potions, burning of incense, and display of fetishes or amulets. Bleeding is common practice, as well as rubbing herbs into wounds or sores. The infection or pain which may result is considered essential to the cures. (Beamer and Gangloff, 1974)

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### 3. DIETARY PRACTICES

#### 3.1 DIETARY PRACTICES, GENERAL

##### NATIONAL

**DETERIORATING NUTRITION SITUATION:** Results of recent nutrition surveys in selected areas indicate that the food and nutrition situation is getting worse. Food consumption is in general poorer in quantity and quality than it was a decade ago. (Abudu, 1975)

**SEASONAL FOOD AVAILABILITY:** Food distribution throughout the year is greatly skewed. Soon after harvest, the local markets are flooded with a commodity; a month or so later, supply diminishes; and just before harvest, there may be nothing. After harvesting, prices are lowest, reaching peak prices before next harvest. The difference between the two prices may be as great as 100%. (Nyanteng, 1972)

**COSTS OF FOOD:** The minimum wage for a laborer was 12 cedis per day in 1981, and corn, peanuts and sorghum were selling for 12 cedis per pound. Prices of animal products ranged from 20 to 30 cedis per pound so that even professionals used them in small quantities for flavoring. Food prices were even higher in the Upper Region. In some areas barter had replaced the local currency. (Jones et al., 1981)

**HUNGRY SEASON:** In the northern half of the country, there is an overall shortage of all foods in the months before the harvest. Undernutrition affects the whole population at this time every year. (Davey, 1974)

**RESISTANCE TO NEW FOODS:** High-yielding yellow maize, nutritionally superior to local white maize, has encountered resistance. This resistance has stemmed from the fact that its yellow color and gluten content result in differences in traditional foods. Powdered fish has also encountered resistance. When it is properly ground and sieved, parents are willing to give it to infants in akasa (a porridge), and recognize its value in infant feeding. These same parents will not eat fish flour themselves, although they are willing to eat imported fish fingers. (Nicholas, 1974)

**RESISTANCE TO POWDERED ROOT PRODUCTS:** The sale of powdered fufu ingredients has been met with resistance. Powdered cassava, plantain, cocoyam and yam are available in clean, neat, plastic bags, but most people prefer the freshly pounded fufu with all the work involved. (Nicholas, 1974)

**FAMINE:** There is famine in cycles of about five years when the rains do not develop in the northern savannah area. (Beamer and Gangloff, 1974)

**FOODS USED:** In the coastal belt the major staple is maize, with cassava and some plantain as supporting staples. Other foods include tomatoes, okra, green leafy vegetables, and pulses. In the forest belt, tubers and starchy fruits such as cassava, plantain and yams and cocoyams constitute the major staples, and maize is rarely grown. In the savannah, millet, sorghum and yams constitute the major staples. Supplementary food

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

production is poor, even though a variety of wild green leafy vegetables are included in the diet. Fruits such as oranges, limes, mangoes, and pawpaw grow well in coastal and forest areas. (Sai, 1978)

**FOODS USED:** The diets of the southern savannah and the major cities are more mixed than other regions. They include both starchy fruits and roots as well as cereals, and provide more animal protein in the form of meat and fish. A variety of vegetables is consumed. (Sai, 1971)

**DECREASED CEREAL PRODUCTION:** Local production of cereals fell from 835,000 metric tons in 1970 to 765,000 tons in 1973; imports increased during that period from 136,000 metric tons to 156,000 tons. At the same time, production of tubers rose from 6,245,000 metric tons to 6,681,000 tons. Imports of tubers also rose, from 583 to 685 metric tons. (Abudu, 1975)

**FOOD IMPORTS:** Food imports in Ghana accounted for 15 to 21% of the total value of imports during the years 1968 through 1973. Rice, sugar and meat were major import items. Almost as much as rice was imported in 1970 as was produced in country. (Hume, 1974)

**STAPLE FOODS - CASSAVA:** Cassava is dried in the sun and ground into a flour, "konkonte" or "gari." Grinding is essential to liberate the toxic cyanide that may be left after peeling. When the root is boiled it produces a puree called "ampesi" or "fufu." The dish may be prepared from a mixture of cassava, yams, and plantain. (May, 1965)

**STAPLE DISH - GARI:** To prepare gari, fresh, peeled cassava is grated and allowed to ferment. The juice is squeezed out, and the fermented product is then roasted, with or without oil. It is eaten dry or mixed with water. (Woolfe et al., 1977)

**STAPLE DISH - AMPESI:** To prepare ampesi, cassava, yam, cocoyam, or plantain is peeled and boiled. (Woolfe et al., 1977)

**STAPLE DISH - FUFU:** To prepare fufu, boiled cassava, cocoyam, yam, or plantain is pounded in a wooden mortar until soft and smooth. (Woolfe et al., 1977)

**MAIZE DISHES - EKUEGBENE:** To prepare ekuegbene, maize is broken up by pounding and then boiled to make a porridge. (Woolfe et al., 1977)

**MAIZE DISHES - TUO ZAAFI:** Tuo zaafi is a stiff porridge made by stirring millet or maize flour into boiling water. (Woolfe et al., 1977)

**MAIZE DISHES - KENKEY:** To prepare kenkey, thick maize porridge is shaped into balls and steamed. In some areas, the dough is fermented before cooking. (Woolfe et al., 1977)

**MAIZE DISHES - BANKU AND AKPLE:** To prepare banku, soaked maize is fermented, boiled, and shaped into balls for eating. Akple is a form of banku made from maize and cassava. (Woolfe et al., 1977)

**SOUPS:** Two kinds of soup are commonly prepared: vegetable, and soup with small amounts of meat or fish. Both contain liberal amounts of pepper. Chances of a child under 2 years receiving any meat or fish from these soups were small. (Davey, 1961a)

**IMPORTED PROTEIN FOOD:** Between 1971 and 1974, a greater proportion of dairy products, fish, meat, and other protein foods were imported to supplement local production. This adds to the relatively high cost of protein foods. The higher prices for imports reflect general worldwide inflation. (Abudu, 1975)

**PROTEIN SUPPLY DEFICIENCY:** The total amount of protein available for human consumption is not sufficient to supply the estimated requirements, according to food balance sheets, data on imports of foodstuffs, and food consumption studies. (Ababio, 1974)

**ANIMAL PROTEIN AND INCOME:** A high proportion of animal protein foods is consumed by the highest income group and poor families are unable to purchase amounts of protein sufficient to meet their needs. (Ababio, 1974)

**PROTEIN FOOD PREFERENCES:** Fulani pastoralists drink milk. Beef, mutton, and goat meat were preferred by most consumers interviewed by Jollans in 1959 except for pork among the Ashanti and certain southern tribes. Goat is preferred to beef in the Ashanti area. All parts of the animal are eaten when available. (May, 1965)

**PROTEIN FOODS:** Beans, cowpeas, and groundnuts feature prominently in the diets of the people of various regions of Ghana, especially in the Volta region, northern and upper regions, and in the coastal belt. Dishes prepared from beans are rice and beans, gari and beans, bean stew, maize and groundnut mixture, bean cakes, bambara porridge, grated coconut cakes, and groundnut cakes. (Orraca-Tetteh, 1975)

**USES OF GROUNDNUTS:** Groundnuts serve both for the preparation of oil and as the delicacy "kuli-kuli," made from the fried residual paste, after oil has been squeezed out by pounding. (May, 1965)

**ANIMAL FOODS:** Animal foods common in the diet of Ghana are fish, meat, snails, crabs, game, eggs, and local cheeses. In certain seasons, especially from June through August, fish, snails, and crabs are obtained in very large quantity; because of a glut on the market, prices are within reach of every section of the community. (Orraca-Tetteh, 1975)

**FISH:** Fish is the most common source of protein in the Ghanaian diet. (North et al., 1975)

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

FISH AVAILABILITY: Although estimates vary, about 35-45 pounds of fish is available per person per year nationwide. (Beamer and Gangloff, 1974)

FISH: Marine fishing provides about 36 pounds of fish per person per year. (Ababio, 1974)

FISH: Fish consumption is about 15 kg. per capita per year. (Adjetey, 1974)

FISH CONSUMPTION: In the last ten years, consumption of fish has more than doubled. The price of protein from smoked fish is usually the lowest of the animal protein foods even in remote towns and villages. (Ababio, 1974)

FISH SUPPLIES: Local supplies of fish were 197,000 metric tons in 1970, 220,300 tons in 1971, 281,400 in 1972, 195,200 in 1973, and 221,100 in 1974. Imports of fish in the same years were 30,180, 31,530, 76,110, 111,000, and 85,000 metric tons respectively. (Abudu, 1975)

SEASON AND FISH SUPPLIES: There is a seasonal shortage of fish. Even in good fishing years, fish are in abundance in Ghana from June onwards, but supplies tend to fall off in November and December. To overcome these shortages, fish are sometimes planted in the lakes created behind dams. (Nicholas et al., 1974)

SEASON AND FISH SUPPLY: Most fish is caught between July and October each year when large shoals of fish appear along the coast. Most of the catch is Sardinella aurita, with some Spanish mackerel also caught. (Adjetey, 1974)

SEASON AND FISH PRESERVATION: During the herring season, July through October, fish cannot be smoked fast enough to prevent deterioration and waste. Smoking units can handle limited supplies of fish, and their capacities are small. Processing time is one to two days, depending on the oven and the quantity of fish to be smoked. Improved types of smoking ovens are gradually being introduced into the system. (Adjetey, 1974)

FISH PRESERVATION: 60% of the fish catch is smoked, 25% is frozen, 13% is consumed fresh, and 2% is salted. (Adjetey, 1974)

BEEF: Ghana imports about 3 1/2 pounds of beef per person per year. Local beef supplies about 1/2 pound per person per year. Most cattle were imported from Upper Volta, but the recent droughts have drastically reduced the herds in these areas. (Ababio, 1974)

CHICKEN: In the last few years, large-scale poultry farms have been established which supply well-to-do people in towns with poultry. In the villages, people prefer the taste of the small, ill-fed local fowl and make little or no effort to care for the birds. (Ababio, 1974)

**SHEEP AND GOATS:** Most sheep and goats killed for human consumption are killed for festivals and not for sale. Meat that could be available daily in small quantities is eaten occasionally in large quantities. Unfortunately, the protein cannot be stored. (Ababio, 1974)

**MILK:** Consumption of fresh milk is restricted to the small population of Fulani herdsmen in the north and to the elite urban class. (FAO, 1979b)

**MILKS AVAILABLE:** All the milk consumed in Pantang comes from Accra and is mainly tinned (evaporated) milk used in tea or coffee. Tinned milk can be bought locally in Pantang. In Accra four kinds of milk are available: evaporated, sweetened condensed, powdered, and "fan milk," which is reconstituted milk made in Accra and sold in tetra-packed cartons throughout the town by vendors on bicycles. Evaporated milk is preferred. (den Hartog, 1970)

**BEANS, NUTS, AND SEEDS:** In the last ten years, the production of beans, groundnuts, and oilseeds has not increased, and has in fact probably declined. Amounts of cowpeas and groundnuts available in the market and the amounts consumed in the homes seem to have decreased. (Ababio, 1974)

**BEANS:** In the past, a high proportion of beans used in Ghana was imported from Togo and Nigeria. They were often sold as already prepared foods by traders from these countries. These traditional bean foods (watse, akla, yake, or aboboi), which are now more difficult to find, were a traditional breakfast food for many children. (Ababio, 1974)

**BEANS IN TRADITIONAL DISHES:** Beans are used in traditional stews and groundnut soups and to thicken light soups. (Ababio, 1974)

**OIL:** Ghanaian traditional cooking uses palm oil and shea butter--the tree Butyrospermum parkii bears fruits with an edible pericarp and the nut, shea nut, from which a whitish fat is extracted and used for cosmetics and cooking. (Woolfe et al., 1977)

**PROCESSING AND DISTRIBUTING FOOD:** Poor roads make certain areas inaccessible and foods cannot be removed from food surplus areas where they are left to rot in the fields. Haulage facilities between food production and consumption centers are very inadequate. Wholesale markets are not well organized. The absence of small-scale food processing plants in the food production areas to process foods into more varied and easily stored items contributes to seasonal fluctuations in prices and scarcity of food between harvests. Further, food processing facilities often exist in towns where they do not have sufficient access to raw materials. (Abudu, 1975)

**WOMEN AND THE FOOD SUPPLY:** In the north the husband will typically give each wife a weekly supply of staples from the family store. The wife is then responsible for procuring additions to the staple in food production to prepare soup: salt, smoked fish, and vegetables. She gets cash for these purchases by selling produce from her own small plot, processed food in the market, or pito, the local beer. (North et al., 1975)

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

**WOMEN COOK:** Women and their children are responsible for preparation of food. In rural areas this entails carrying water, growing and purchasing food, and providing fuel. (North et al., 1975)

**FOOD PREPARATION:** Preparation of staples in the Ghanaian diet may take several hours or even days. For example, fufu, which is eaten in most of the southern parts of Ghana, requires not only that the yam, cassava, or plantain used in its preparation be peeled and boiled, but it is then finished off by pounding for an hour or more with a heavy wooden pounder. (North et al., 1975)

**FOOD PREPARATION:** Preparation is time consuming as women generally must first process the basic ingredients such as palm nuts or groundnuts and then begin the cooking. (North et al., 1975)

**FOOD PREPARATION:** Because food preparation is so time consuming women generally cook enough each time to last for several meals, with a consequent risk of contamination in the absence of refrigeration. (North et al., 1975)

**FOOD PREPARATION - CHANGES:** Considerable time is involved in processing food by traditional methods, but mechanization is now being introduced. Small gasoline-operated corn grinding mills are seen in many villages. Cassava graters are owned and operated by men. These innovations are used to reduce the size of the original produce. Other processes such as peeling, roasting, fermenting, pounding, and mixing are still done by women. (North et al., 1975)

**FOOD PREPARATION AND NUTRITIONAL CONTENT:** Green vegetables and rice may be washed several times and the water discarded prior to cooking and consumption. This practice causes substantial amounts of vitamins to be lost. The customary practice of overcooking red palm oil to a colorless state also leads to the destruction of the provitamin A which is naturally present in large quantity in red palm oil. (Idusogie, 1974)

**GROUP COOKING:** Preparation of some foods such as kenkey, a fermented corn product, and gari, a cassava product, are so difficult and time consuming that they are rarely made in the home, but groups of women, and sometimes nearly all women in certain villages, are involved in the preparation of these foods, which are collected by sellers and taken to the markets. This process could be simplified but it would have to be a gradual process as it would eliminate some positions in preparation of the products. (North et al., 1975)

**MEN FIRST:** Serving of food begins with the husband, followed by the mother, and then each of the children in age order. The youngest tends to get only what is left at the bottom of the pot. (North et al., 1975)

**MEN FIRST:** Family members rarely eat together and the father is given the first and best portion of the meal. The separation of family members at mealtime may contribute to the poor health of the children; it is

possible that men would not take so much for themselves if they actually saw the meager portions served to the children and the resulting hunger. (North et al., 1975)

**INTRAFAMILY FOOD DISTRIBUTION:** There was a belief that the husband or adult male needed more food of better quality than other members of the family so that he would be best able to fulfill all his obligations of getting food for the family, protecting them, and attending them when ill. The adult male head of the family got the largest share of family food. (Idusogie, 1974)

**INTRAFAMILY FOOD DISTRIBUTION:** The usual pattern is for the males to eat what they require and then the children are fed by the women. As the last in line, the women receive what is left over. (Beamer and Gangloff, 1974)

**INTRAFAMILY FOOD DISTRIBUTION AND RITUAL:** When animals were killed or sacrificed to entertain distinguished visitors or in the performance of naming, burial, and medico-religious rites, the male adults in the family traditionally got the best portions of the meat. Children were, by custom, entitled only to the feet, bones, and skin of animals available to the family. The feet and skin of animals have poor protein quality. (Idusogie, 1974)

**INTRAFAMILY DISTRIBUTION OF PROTEIN:** Distribution of protein within the family is not related to need. Growing children and pregnant women may not receive their requirements even when the total amount of protein available to the family is adequate. (Ababio, 1974)

**INCOME AND FOOD EXPENDITURE:** The average person spends more than 50% of total income on food. (Abudu, 1975)

**INCREASED FOOD PRICES AND NUTRITION:** Food prices have risen 60 to 100% since 1968; however, the impact on nutrition is not known, as there is no data on family income. (National Food and Nutrition Conference, 1974)

**NUTRIENT SUPPLIES AND INTAKES:** Estimated requirements for Ghana are about 2200 calories per capita per day. Information from food consumption studies and agricultural production statistics both suggest the actual intake is about 1730 calories per capita per day. Import figures showed that as much as 210 calories per person are derived from imported foods. The situation with protein is even more serious: the available supply meets only 80% of the estimated requirements, and a very high proportion of the animal protein, both meat and fish, is imported. (Ofosu-Amaah, 1974b)

**NUTRIENT INTAKE - WOMEN:** Average intake among adult women was 1914 calories per day, 24.1 grams of protein, 6.3 to 12.6 mg. of iron, 1,402 mcg. of vitamin A and 0.83 mg. of riboflavin. (Abudu, 1975)

**CALORIE AND PROTEIN SUPPLY:** In 1976, there were 2014 calories and 46 grams of protein available per day per person. The country ranked 120 in

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

per person calorie supply and 118 in per person protein supply among the world's nations. (Sivard, 1979)

**CALORIES AND PROTEIN:** Food balance sheets indicate that 90 to 105% of the calorie requirements of the population can be met by current production, as well as 90% of the protein requirements. (Sai, 1978)

**ADEQUACY OF DIET:** An unpublished survey conducted in 1961-62 showed that in the adult population calorie intake provided from 67% to 90% of requirements, calcium intakes met 53% to 70% of requirements, and riboflavin intakes met from 39% to 77% of requirements. (Orraca-Tetteh, 1972b)

**CALORIE INTAKE:** Intake was estimated to be 1800 calories per person per day. (Sraha, 1971)

**CALORIE INTAKE:** Daily intakes are 2900 calories along the coast and 2800 calories in the forest zones. In the north, these figures fall to 1600 calories in July, 1400 in December, and 1100 in February. Monthly averages may reach 2065 calories per day and may drop to 675 calories per day. (May, 1965)

**CALORIES IN THE RAINY SEASON:** During the hungry season, consumption of calories by adults falls as low as 50-60% of the average requirement. (Sraha, 1971)

**HOUSEHOLD AND CHILD INTAKES:** Adults in homes studied got 100% or more of calorie requirements, but children 1 to 4 years got 60% to 85% of the requirements for their ages. (Orraca-Tetteh, 1972b)

**HOUSEHOLD AND CHILD INTAKE:** Adults received 60% to 80% of their protein requirements, but children received 36% to 80% of theirs. (Sai, 1971)

**RIBOFLAVIN INTAKE:** Riboflavin intake was inadequate. (Davey, 1974)

#### REGIONAL

**DIET IN THE COASTAL ZONE:** In the Coastal Zone, maize is the staple and cattle are kept. Fish from nearby fishing villages and palm and coconut oil are used. There is some seasonal shortage of maize between April and August, but it does not affect the population as severely as shortages in the Forest or Northern Zone. (Davey, 1974)

**DIET IN THE EASTERN REGION:** Maize, cassava, plantain, and yam are the principal food crops. Groundnuts and fish are the most important sources of good quality protein among the low income groups of this region. The staple foods are garri, kenkey and fufu. Diet is similar in rural and urban areas, although urban people may eat some rice and wheat products. (National Food and Nutrition Conference, 1974)

**DIET IN FISHING VILLAGES:** In fishing villages, the diet consists of maize, cassava, vegetables, and a lot of fish. There are two fishing

seasons: a main one from June to October and another one from December to February. Providing these seasons are good, the nutritional status of the villagers is also good. Very little farming is done in the fishing villages. (Davey, 1974)

**DIET IN THE FOREST ZONE:** The main crops are plantain, cassava and cocoyam. Tomatoes, onions, peppers, garden-egg and okra are the major vegetables. Sheep, goats and chickens are kept, but seldom eaten, being regarded as a capital investment. Maize and beans are grown in small amounts. Palm nuts are used extensively. In the southwest corner, covering most of the Western Region, rice is also grown. The diet is generally low in protein. Small amounts of protein are obtained through small quantities of meat and smoked fish. (Davey, 1974)

**DIET IN THE NORTHERN REGION:** Shifting cultivation is practiced, with a single harvest of each crop around the end of the rainy season. The main crops in the Northern Region are maize and yams, with subsidiary crops of millet, guinea corn and rice. Cattle and small domestic animals are kept. Tomatoes, onions, pepper and okra are grown. Since there are few cash crops, little money is available. Much of the expenditure on food goes to smoked fish which is brought up from the coast. (Davey, 1974)

**DIET IN THE UPPER REGION:** In the upper region, the main crop is millet. Yams, guinea corn, rice and groundnuts are subsidiary crops. Diet reflects these production patterns. (Davey, 1974)

**BASIC FOODS IN THE ASHANTI REGION:** Staple foods are plantain, cassava, cocoyams and yams. Also grown are maize, beans, tomatoes, onion, eggplant, pepper, okra, garden-egg and palm nuts. Fruits include citrus fruits, mangoes, pears, pineapples and pawpaw. Cattle are rarely kept. Sheep, goats, pigs, and poultry are kept, but they are used sparingly as food. (Baffour-Senkyire, 1974)

**FOODS IN BRONG-AHAFO:** Principal crops of the forest zone are cocoa, plantain, cocoyam and maize. Vegetables are rarely grown in the forest. In the derived savannah, cocoa, yams, maize, cocoyams, and plantain are grown. In the savannah, yams, groundnuts, rice, maize, and guinea corn are grown. (National Food and Nutrition Conference, 1974)

**FOOD SUPPLY IN THE FOREST AREA:** In the forest area (Ashanti and Brong-Ahafo), the staple foods are starchy roots and tubers. These foods are low in protein and since both animal and vegetable protein foods are in short supply, protein intake is quite low. The growth of children is retarded, and there is a high incidence of kwashiorkor. Calorie intake is low because the meal pattern is to have one main meal each day. Calorie production is adequate. (Ofosu-Amaah, 1974b)

**FOODS IN THE FOREST BELT:** In the forest belt there is high consumption of starchy roots and fruits such as cassava, plantain, and cocoyam. Maize is the main cereal but intake is very low. A wide variety of vegetables is consumed. Intake of meat, though low, is greater than in northern areas. (Sai, 1971)

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

**FOODS IN THE FOREST BELT:** In the forest areas of the south, food crops include: yam, cocoyam, plantain, cassava, beans, maize, pepper, garden eggs, tomatoes, okra, palm oil, and pawpaw. Women's personal plots are often devoted to crops such as tomatoes, pepper, okra, and garden eggs. (North et al., 1975)

**FOOD AVAILABILITY - FOREST ZONE:** The small-scale forest zone farmer generally has food available year round and there is no hungry season as there is in the north. Cassava can be stored in the ground, i.e. not harvested for up to a year; yams and cocoyams can also be left in the ground until needed. Plantain cannot be stored, and must be eaten within a week after the stalk is cut down. (North et al., 1975)

**STAPLE FOODS OF THE NORTHERN REGION:** Staple foods include corn, millet, guinea corn, cassava, groundnuts and vegetables, reflecting the crops grown in the region. Meat and fish are rarely eaten among the low income groups. (National Food and Nutrition Conference, 1974)

**FOOD IN THE NORTHEAST REGION:** Millet is the staple, with groundnuts, cowpeas, and bambara beans as the main cash crops. Women grow okra and various species of leaves around the compound. Many foods are gathered from the bush, for example, shea nuts to make shea butter, fermented locust beans to make dawadawa and various leaves and sepals from trees. These are all important soap ingredients. Salt, pepper and fish are the only items purchased from the market in many households. Fowls, goats, and sheep are kept by many families, and cows by the rich. These animals serve as a capital reserve and are slaughtered only on special occasions. (Gordon, 1977)

**FOODS IN THE SAVANNAH:** Foods produced in the savannah zone include rice, maize, millet, sorghum, groundnuts, bambara nuts, cowpeas, peas, beans, cassava, yam, sweet potatoes, pawpaw, pineapples, shea butter, mangoes, cashews, tomatoes, onion, and shallots. Animals raised include cattle, sheep, goats, pigs, and poultry. (Sraha, 1971)

**FOODS IN THE NORTHERN SAVANNAH:** In the northern savannah, millet, sorghum, and yams are the staples. Meat, groundnuts, and leafy vegetables are subsidiary items in the diet. (Orraca-Tetteh, 1972b)

**FOODS IN THE NORTHERN SAVANNAH:** Diets in the northern savannah consist mainly of cereals (millet, sorghum, maize), green vegetables in season, and small amounts of oilseeds and fruits. Little meat or fish is used. There is a hungry season during the rains. (Sai, 1971)

**FOODS IN THE NORTHERN SAVANNAH:** In the savannah land of northern Ghana food crops include millet, yams, guinea corn, rice, legumes such as groundnuts and vegetables. Millet is the preferred food crop for home consumption. Rice is eaten at feasts and festivals and is regarded as a luxury food. Guinea corn is used for brewing pito, the local beer. (North et al., 1975)

**FOOD SUPPLY IN THE NORTHERN SAVANNAH:** In the Northern Savannah every year there is a period of severe food shortage due to inadequate food production aggravated by farmers selling food for cash after the harvest, and by spoilage in storage. Calorie intake is low throughout the year, and reaches near-famine levels in the lean season. Because cereals, beans, and groundnuts are important in the diet, there is a satisfactory intake of protein. (Ofosu-Ansah, 1974b)

**HUNGRY SEASON:** The end of the dry season is a time when stored food has run out and nothing is growing—it is the hungry season, particularly in the famine-prone areas of the extreme northeast and northwest in the Upper Region. (North et al., 1975)

**FOOD ADEQUACY:** In the Northern Region, the majority of small farmers do not have plots large enough to grow sufficient food, store it, feed their large families, and sell some for cash to buy salt, clothes, etc. Lack of information is also a factor in poor feeding, especially in the case of young children. (National Food and Nutrition Conference, 1974)

**VARIETY IN DIET:** In the Southern half of the country, a much wider variety of foods was used in large towns and main road villages. Of the forty items surveyed, all but three were recorded in Accra. In contrast, Konko, a small village off the main road, had 19 items for which there was no record of use. (Davey, 1961c)

**FOOD SUPPLY AND SEASON:** The Upper Region produces only one food crop per year, and recurrent natural disasters deplete food stocks set aside for the lean season. Marasmus (starvation) is seen during this period. (National Food and Nutrition Conference, 1974)

**SEASON AND FOOD AVAILABILITY:** In the Brong Ahafo region, the period from mid-February to mid-August is the season of scarcity and August through March is the season of plenty. (National Food and Nutrition Conference, 1974)

**LEAN SEASON AND FOOD INTAKE:** The lean season is especially difficult in the North, where food intake, which is already below requirements, drops about 60 to 70% below average. (National Food and Nutrition Conference, 1974)

**SEASONAL HUNGER:** In the coastal zone and fishing villages, nutrition is at its best. Even here, however, and certainly also in the forest zone, there is some shortage of staple foods, plantain and maize, from April to July. (Davey, 1974)

**ANIMAL PROTEIN:** Animal protein was in short supply in the Ashanti region. (Baffour-Senkyire, 1974)

**PROTEIN DEFICIENCY:** Protein has been in short supply in the Ashanti Region, and this deficiency accounts for the high prevalence of kwashiorkor and high infant mortality. (Baffour-Senkyire, 1974)

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

**PROTEIN SHORTAGE:** In the forest zone, there is a shortage of protein throughout the year. This causes kwashiorkor in young children and is responsible for many deaths. (Davey, 1974)

**PROTEIN INTAKE IN THE FOREST REGION:** Total protein intake in the forest region is below the estimated requirement. The staple foods are starchy roots, tubers and plantains, which provide small amounts of low-quality protein. To make this diet adequate, it is necessary to add a considerable amount of protein from high-quality protein sources such as beans and animal products. (Ababio, 1974)

**PROTEIN INTAKE IN THE NORTHERN SAVANNAH:** In the northern savannah, cereals are the staple food and the diet is adequate in protein. As much as 50 grams of protein per person per day may come from cereals. When the staple food contains so much protein it is necessary to add only small amounts of high-protein foods to obtain adequate protein. (Ababio, 1974)

**REGIONAL PREFERENCES IN ANIMAL PRODUCTS:** There are regional differences in the consumption of animal products. Pork is relatively popular in southern Ghana, but not in the North, which has a large Moslem population. Among the Ashanti, goat was preferred to mutton and beef. Among Southerners, goat was slightly less popular than mutton; beef was very popular. People preferred meat with little or no fat. They would prefer to chew their meat rather than "drink" it. This habit is associated with the practice of killing mature cattle, sheep, goats, and chickens rather than young ones. (Idusogie, 1974)

**USE OF CATTLE:** Cattle farmers in the north regard their cattle as their bank accounts. They do not manage herds by removing some each year to leave a healthy herd of the same size. Since this is connected with traditional marriage customs, changing it will be difficult. (Ababio, 1974)

**FISH IN THE CENTRAL REGION:** High quality smoking and drying facilities are absent in this region. Most fish processing is done at the cottage level, and keeping quality of the product is poor. (National Food and Nutrition Conference, 1974)

**FISH - VOLTA REGION:** In the Volta region, the impact of fish consumption on nutrition is significant; in coastal towns, it is the major source of protein. Storage of fish is grossly inadequate, resulting in large, seasonal fluctuations in the price of fish. (National Food and Nutrition Conference, 1974)

**COST OF EGGS:** In the Ashanti region, animal feeds are very expensive and poultry feeds are no exception. One result is that a dozen eggs sell for a price equivalent to the average wage for a laborer for the day. (Baffour-Senkyire, 1974)

**PATTERNS OF LAND OWNERSHIP AND FOOD PRODUCTION:** In the Ashanti Region, traditionally the land was communal property and no single person could

be regarded as having permanent ownership. This resulted in intense fragmentation of the holdings into scattered and uneconomic units averaging three to four acres. This fragmentation has prohibited mechanization of agriculture, although it also insures that fertile land is distributed widely instead of becoming the monopoly of a few. (Baffour-Sankyire, 1974)

**METHODS OF AGRICULTURAL PRODUCTION:** In the Danfa region, the bush is slashed and burned in July and August. Vegetables are planted in September and October. Maize is sown in March and April and is later intercropped with cassava. It is believed that yields could be doubled through improved agricultural practices. Cleared land is often left fallow after a couple of years rather than adding fertilizer. Implements used are mainly the cutlass and hoe. Post-harvest losses average 12% for cereals and 19% for cassava. (Opare, 1974)

**FOOD PRODUCTION IN THE ASHANTI REGION:** The principal food crops in the Ashanti Region are maize, yams, cassava and plantains. These are grown on small farms averaging about 4.5 acres. Poultry raising is the most important animal culture activity. (National Food and Nutrition Conference, 1974)

**FOOD PRODUCTION:** The problem of producing enough food was acute in the Savannah areas. All the food requirements of the family have to be grown in the one growing season and stored for use until the next harvest. This situation is aggravated by inadequate storage systems and the destruction of stored products by pests. Northern Ghana has had seasonal shortages of food for decades, and the situation does not seem to have improved appreciably, even with more than 50 years of agricultural extension services. (Ofosu-Amaah, 1974b)

**FOOD CROP PRODUCTION IN THE UPPER REGION:** Because cash crops are not appropriate to this region, and because of the regular shortages of food, 80% of the agricultural credit is devoted to food crops--90% of this has gone to rice. Rice is not a staple among Upper Region people; most of it is sent to the south. Guinea corn and millet are the regional staples. The region also produces 64.2% of the nation's groundnut supply, most of which is exported to the south. (National Food and Nutrition Conference, 1974)

**FOOD PRODUCTION AND ECONOMICS:** Farmers producing cash crops are able to earn higher returns on investments than farmers growing food crops. Farm prices for foods fluctuate widely, and since on-farm storage is minimal, few farmers can take advantage of off season high prices. (National Food and Nutrition Conference, 1974)

**CONSTRAINTS ON FOOD PRODUCTION:** Gross food production appears to be declining in the Western Region with the introduction of cash crops such as oil palm, coconut and rubber. Credit incentives also promote the trend away from food crops. Small farmers (10 acres or less) comprise 70% of the farm population; most of these small holdings are supporting several families. Bottlenecks to production and distribution common to

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

other regions are found here: credit, farm implements (particularly cutlasses), storage, market roads and low technology except on cash crops. Labor is also in short supply, since most field hands work on cash crops. This forces the small farmer to plant no more than he and his family can manage. (National Food and Nutrition Conference, 1974)

**MEAL PATTERN IN THE NORTHEAST:** The diet consists of a main meal of millet dough with a soup of vegetables and dawadawa (fermented locust beans), with fish and legumes when available. Food is generally cooked in the evening and the leftovers are eaten for breakfast on the following morning. The midday meal is often missed. (Gordon, 1977)

**MEAL PATTERN IN THE NORTHERN REGION:** Most people, including young children, eat two meals a day. (National Food and Nutrition Conference, 1974)

**FOOD STORES AND FOOD INTAKE:** Among families with sufficient food stores to last until the next harvest, 16% of the households reported in 24 hour recalls that they ate 1 or 2 meals daily; 60% reported eating beans, groundnuts or neri; 16% had inadequate calorie intakes (less than 60% of the recommended allowance); and 8% ate only flour at midday. Among families with insufficient food to last until the next harvest, 26% ate one or two meals daily; 52% reported eating beans, groundnuts or neri; 48% had inadequate calorie intake and 18% ate only flour at midday. (Gordon, 1974)

**FOOD STORES:** By the end of June 1973, 55% of compounds in the Bawku district had sufficient food to last until the harvest, 21% had some, but not enough to last, and 24% had no food in their granaries. The rains had been less than normal in 1972, and this was a particularly difficult lean season. (Gordon, 1974)

**FOOD STORES AND AGRICULTURAL METHODS:** During the 1973 hungry season, 51% of the compounds in Bawku district with adequate food used bullock ploughs, compared to 28% of those with insufficient or no food. (Gordon, 1974)

**SOURCES OF PROTEIN:** In the Danfa areas in 1967, 34.7% of protein was provided by cereal; 8%, starchy roots; 1%, legumes and pulses; 2.2%, fruits and vegetables; 5.8%, meats; 0.2%, eggs; 47.5%, fish; and 0.2%, milk. (Opere, 1974)

**SOURCES OF CALORIES:** In the Danfa area in 1967, 50% of calories were provided by cereals; 31.2%, starchy roots; 1.2%, sugars; 2.5%, legumes and pulses; 2%, vegetables and fruits; 1.2%, meats; 2%, eggs; 8.3%, fish; 0.2%, milk; and 3.2%, fats and oils. (Opere, 1974)

**IRON INTAKE:** A survey of food consumption indicated that 75% of inhabitants of forest villages and 25% of inhabitants of coastal villages reached 80% of their recommended intakes for iron. In Northern and Upper

Ghana, although the calculated intake appears satisfactory, the presence of phytic acid in millet prevents the absorption of iron and may lead to anemia. (Baddoo, 1974)

**VITAMIN A - REGIONAL SOURCES:** In Ghana as a whole, the major source of vitamin A is palm oil. It is widely consumed in the forest and coastal areas, but in Northern Ghana, oil palm is hardly grown and the main source of fat is shea butter. Consumption of vitamin A exceeded 150% of estimated requirements in southern Ghana, while in Northern and Upper Regions, intakes ranged from 16 to 51% of requirements. (Baddoo, 1974)

**VITAMIN A:** In the northern region, there is a chronic shortage of vitamin A, causing various eye diseases and increasing the incidence of blindness. (Davey, 1974)

**WOMEN'S WORK:** Women have heavy household duties, including walking considerable distances. They provide the ingredients for soup, collect firewood, fetch water, farm, shop, process bush foods, and cook over a fire of millet stalks or wood. (Gordon, 1977)

## RURAL

**GEOPHAGY:** 46.4% of females admitted consumption of clay regularly and for long periods of time. Average consumption was 30 g/day and ranged from one to 300 grams per day. (Vermeer, 1971)

**INCREASED CULTIVATION OF CASSAVA:** Outmigration of males has occurred due to scarcity of cocoa land and declining cocoa prices. Women were left behind in the village with responsibility for the food crop farms. Yams, the traditional food crop, were grown by the men. Women switched to cassava because cassava yields more starch (calories) per labor hour than yams. Cassava can be planted at almost any time during the year, needs little weeding, and can remain in the ground for up to two years. It has inferior nutritional value and cannot be inter-cropped with vegetables and legumes, as it depletes soil. (PAG, 1977)

**INCREASED PRODUCTION OF CASH CROPS:** The 1976 survey of Baafi village found a large increase in production of groundnuts compared to production in 1972. Production of beans had decreased. This increased production of groundnuts was a part of increased production of cash crops. There had been increases in production of tobacco and cotton as well as groundnuts during the four-year period. (Orraca-Tetteh and Watson, 1976)

**VEGETABLE PROTEIN FOODS:** Use of groundnuts, beans, and greens were reported by more families in the 1976 survey than in 1973. (Ofosu-Amaash and Neumann, 1979)

**MEAT AND FISH:** Nearly all the fish and meat consumed in Pantang has to be purchased, so nutritional well-being depends on purchasing power. Sheep, goats and chickens are consumed only at special ceremonies and occasions; those animals might be developed as sources of protein. (den Hartog, 1970)

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

**BUSH MEAT:** Men hunt during the slack period of the dry season when they have more free time. The dry season is also the period when grass is dry enough to set fire to it to flush out game and kill them. Bush meat is eaten in the homes or sold in the market. (Opare, 1974)

**NUMBER OF MEALS:** In Baafi village, most people ate two or three meals each day with occasional snacks. (Orraca-Tetteh and Watson, 1976)

**DECREASED INTAKE:** The village of Baafi was surveyed in 1972 and again in 1976. The 1976 survey found decreased energy intake in most age and sex categories except for adult females, including pregnant and lactating women. During 1976, rainfall was low, and the yam and maize crops were smaller than normal. Some of the decreased intake could be attributed to low production. (Orraca-Tetteh and Watson, 1976)

**FOOD DISTRIBUTION:** In the village of Baafi, the majority of households ate alone, and the children also ate separately. Women were responsible for the distribution of food within the household. Food distribution tended to be unequal. (Dako and Watson, 1974)

**DISTRIBUTION OF FOOD:** Usually, women were responsible for distribution of food within the household. Among 54 households, food distribution was the responsibility of the female household head in 13 households, the wife in 30 households, the daughter in 6 households, a niece or sister in 3 households, and a friend's wife in one household. In one of the fifty-four households, a son was responsible for food distribution. (Orraca-Tetteh and Watson, 1976)

**EATING GROUPS:** In Baafi village, the groups of household members who ate together varied. In 12 households, the husband ate alone; in 23 households, adult males ate together. There was one case each of all the males eating together, the male adults eating with friends and the son eating alone. In seven households, male children ate together. In three households, the wife ate alone; in 12, all the female adults ate together; and in 23, the wife and children ate together. In one household, all the female children ate together, and in 4, all the females ate together. In two cases, the grandmother ate with her grandchildren. In 11 cases, all the children ate together. In 3 households, everyone ate together, and 4 households were comprised of only one person. (Orraca-Tetteh and Watson, 1976)

**NUMBER OF MEALS:** In the fishing villages it is usual to take two meals a day. Three meals per day are more common in farming villages. (Davey, 1961a)

**MEAL PATTERNS:** The main meal is cooked in the evening; leftovers are eaten the following morning. A common afternoon meal is simply flour mixed with water. After drinking the water, the wet flour is eaten using a bit of calabash as a spoon. (Tripp, 1981)

**MEAL PATTERNS:** The mid-day meal consists mostly of maize dishes and the evening meal of cassava. (den Hartog, 1970)

**CHILDREN EAT SEPARATELY:** The number of persons eating from the same cooking pot may range from 1 to 15; the average is 7.1. The food is distributed by those who have prepared it. Generally adult men and women eat separately, and the children eat together. Only the very young children eat with their mother. (den Hartog, 1970)

**FOOD PROCESSING:** Most farm products are processed in the following ways: maize is processed into maize dough and maize drink; cassava is processed into garri, kokonte, starch and tapioca; oil is extracted from coconuts, groundnuts and palm fruits; and pepper is dried for storage. (Opare, 1974)

**COOKING UTENSILS:** Cooking is done in the open courtyard of the compound on an open fireplace or portable iron stove. Firewood and charcoal are the fuels used. Foods are cooked in cast iron pots, enamel or aluminum sauce pans, or pots made of clay. A wooden mortar is used to pound boiled roots for making fufu. (den Hartog, 1970)

**COOKING:** About half of the women interviewed cook three times a day, the rest once or twice a day. Most cooking is done in the afternoon and at mid-day. Usually women cook alone but some of them are assisted by their children, a sister or rival (co-wife). (den Hartog, 1970)

**RURAL FOOD PREPARATION:** The main dish of the people of the village studied was saab, prepared from either millet or guinea corn flour. The flour was cooked in water into a paste and eaten with stew. Other kinds of food eaten included Walsa which is also prepared from millet flour and normally taken with only salt and pepper; Ben-issi, a meal prepared from bean leaves and millet flour; and tubani, a bean cake. Pito, a beer brewed from guinea corn, was widely taken, particularly in dry season. (Benneh, 1973)

**PREPARED FOODS:** Prepared food bought from food sellers, including rice and beans, bread with tea and banku or kenkey, was often used for breakfast. (den Hartog, 1970)

**FOOD EXPENDITURES:** Expenditure on animal foods rose with total expenditure. There was increased expenditure on staple foods in the Forest and Coastal Zones from April to August (the hungry season) and less expenditure on animal food. (Davey, 1974)

**FOOD EXPENDITURES:** In the rural areas of the Eastern Region, the average household spent 8.60 new cedis per person per month in 1967/68, of which 4.90 were spent for food, including .36 new cedis for cereals, .99 for tubers, .81 for pulses, .31 for vegetables, .09 for fruits, .39 for meat, .94 for fish, .08 for oils, .14 for prepared meals, .24 for imported foods, .42 for drinks and tobacco, and .13 for miscellaneous. (FAO, 1979a)

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

**FOOD EXPENDITURES AND HOUSEHOLD SIZE:** In households of one to five persons, 41.8% of total expenditures went to food; in households of 6 to 10 persons, 43%; and in households of 11 or more persons, 47.8% went for foods. (Orraca-Tetteh and Watson, 1976)

**FOOD AND INFLATION:** In 1976 in Baafi village, in 33 households food was the item of highest monthly expenditure; in 14 households, miscellaneous items were the category of highest expenditure; and in four households, it was clothing. In 1972, only one household had food as the highest monthly expenditure. Because of inflation, an increased share of total expenditure did not reflect more goods bought. (Orraca-Tetteh and Watson, 1976)

**FOOD PRICES AND INCOME:** A laborer who receives the average minimum wage makes \$0.75 (U.S.) a day, which is not enough to feed a family, as food prices are high. (Sraha, 1971)

**CONSUMPTION AND HOUSEHOLD SIZE:** In households of 3 people in Jamestown, daily per capita consumption was 2,193 calories and 69.3 grams of protein. In households of seven people per capita, intake was 1562 calories and 49.4 grams of protein. Intake in households of three people included 367 grams of cereal, 170 grams of starchy roots and fruits, 11 grams of legumes and 120 grams of fish. In households of seven people, intake included 239 grams of cereals, 149 grams of starchy roots and fruits, 42 grams of legumes and other seeds, and 58 grams of fish. (Idusogie, 1974)

**POOR TRANSPORTATION AND FOOD DISTRIBUTION:** Poor quality roads inhibit food marketing by most small farmers and produce rots on the farm. Road conditions contribute to high costs to the consumer. For example, in September 1973, a bag of maize, 22 pounds, sold for 11.00 cedis at Tardwa, while at Axim, 45 miles away, it sold for 23.33 cedis. The situation is very severe in the Upper Region; when the rains come during the lean times, shortages are even more acute because of impassable roads to markets. (National Food and Nutrition Conference, 1974)

**WOMEN AND THE FOOD SUPPLY:** In the forest zones where men are primarily concerned with cash crops, wives cultivate the food farm and will harvest their own staples as well as providing for supplements to the menu. Women's sources of income are: sale of surplus agricultural produce from garden plots; sale of processed food in the market; or petty trading. (North et al., 1975)

**WOMEN AND THE FOOD SUPPLY:** In rural areas, men provide the staple in the diet (assisted by their wives' farms) but the women are generally expected to provide ingredients for the soups, either by growing them themselves or by purchasing them with money they earn other ways. Because the soups provide dietary elements such as proteins and vitamins, the women's contributions are major elements in family health and welfare. (North et al., 1975)

**WOMEN'S NUTRIENT INTAKES:** Among Brong women in Baafi village, average per capita intakes met 126% of the FAO recommended allowance for calories, 98.5% for protein, 56% for calcium, 95% for iron, 15% for vitamin A, 135% for thiamine, 52% for riboflavin, 91% for niacin, and 353% for vitamin C. (Orraca-Tetteh and Watson, 1976)

**CALORIE INTAKE:** The average daily per capita intake was 2469 calories. Calorie intake inevitably falls during the lean season when farmers have exhausted their food supplies. (Beaneh, 1973)

## URBAN

**COST OF FOOD:** In peri urban areas, workers paid the minimum wage seldom had enough money to buy all the foods their families needed. They generally did not have access to land and they also did not have the time or energy for raising foods to supplement the family diet. Health professionals working in clinics serving the urban poor estimated that their clients were as malnourished as many of the worst cases in the rural areas. (Jones et al., 1981)

**FOOD EXPENDITURE:** In the urban areas of the Eastern region, the average household spent 9.16 new cedis per person per month in 1967/68, of which 4.58 were spent for food, including .42 new cedis for cereals, .96 for tubers and starchy roots, .36 for pulses and nuts, .40 for vegetables, .06 for fruit, .34 for meat, .90 for fish, .10 for oils, .22 for prepared food, .29 for imported foods, .35 for drinks and tobacco, and .17 for miscellaneous. (FAO, 1979a)

## 3.2 DIETARY PRACTICES, WOMEN

### 3.2.1 DIETARY PRACTICES, WOMEN DURING PREGNANCY

#### NATIONAL

**SAME DIET IN PREGNANCY:** Qualitatively, the diets of pregnant women did not show any difference from non-pregnant; women ate the same foods with the same frequency whether they were pregnant or not. (Davey, 1961b)

**CALORIES AND PROTEIN:** Both pregnant and non-pregnant women were found to consume about 2000 calories and about 60 grams protein per day. (Davey, 1961b)

**IRON:** Average diets of pregnant women contained 12-25 mg iron per day, which should be adequate. (Davey, 1961b)

#### RURAL

**SUPPLEMENTS AND PREGNANCY:** Less than 25% of pregnant women attended antenatal programs where iron and folic acid supplements were available. (Bruce-Tagoe et al., 1977)

**FOOD AVOIDED IN PREGNANCY:** 14 out of 45 women interviewed mentioned specific foods they avoided during pregnancy. Ghanaian women included cassava, fufu, gari, plantain, ground hot pepper, mango, sugar, toffee,

### 3.2.1 DIETARY PRACTICES, WOMEN DURING PREGNANCY (Cont.)

sugarcane, smoked fish, snails, monkey meat. Akple and fufu were mentioned by Ewe mothers. (den Hartog, 1970)

**GEOPHAGY AND PREGNANCY:** Eating clay is directly associated with the term of pregnancy by 63.1% of Ewe females admitting geophagy. Consumption occurs primarily during the early months of pregnancy. (Vermeer, 1971)

**DEFICIENT INTAKES:** Among pregnant women in Baafi village, average intakes of calories, protein, calcium, vitamin A, and riboflavin were less than 80% of the FAO recommended allowances. (Orraca-Tetteh and Watson, 1976)

**PROTEIN AND ENERGY:** The pregnant and lactating women of Baafi village did not satisfy their requirements for energy and protein. The effects of this deficiency may be seen in their infants: about 68% of infants were below 90% of the standard weight for age. (Dako and Watson, 1974)

### 3.2.2 DIETARY PRACTICES, WOMEN DURING LACTATION

#### NATIONAL

**EXTRA FOOD:** In the early stages of breastfeeding, women were given considerable amounts of extra food, rich in fats and protein. (North et al., 1975)

**EXTRA FOOD:** Lactating women are given extra food. In the early stages of breast feeding, considerable amounts of extra food, rich in protein and fat, are given to the new mother, and she quickly regains the weight she lost during pregnancy and produces large amounts of milk for the newborn child. (Davey, 1974)

**CALORIES AND PROTEIN:** Lactating women were eating no more than other women and therefore were meeting only a part of their dietary requirements. The proportion of calorie requirement met among lactating women went from 84% to 50%; the proportion of protein requirement dropped from 64% to 45%. (North et al., 1975)

**NUTRIENT INTAKES:** Diets of 5 lactating Brong women in Baafi village were reported. Average intakes met 91% of the FAO recommended allowance for calories, 68% for protein, 32% for calcium, 38% for iron, 8% for vitamin A, 152% for thiamine, 45% for riboflavin, 93% for niacin, and 403% for vitamin C. (Orraca-Tetteh and Watson, 1976)

**DEFICIENT NUTRIENTS:** Among lactating women in Baafi village, average intakes of protein, calcium, vitamin A and riboflavin were less than 80% of the FAO recommended allowances. (Orraca-Tetteh and Watson, 1976)

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

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

##### NATIONAL

PREVALENCE: 96% of children were exclusively breast fed at one month, 75% at for months, 56% at six months, 22% at 12 months, and 6% at eighteen months. (Davey, 1961a)

PREVALENCE: 47% of children in Accra still received some breast milk at 12 months, as did 53% of children living in towns, 73% of those in fishing villages, and 74% of those in farming villages. (Davey, 1961a)

DURATION OF BREAST FEEDING: Breast feeding is universal in the first months of life. At eight months, 96% of children are still receiving breast milk. 67% still receive some breast milk at 12 months, 43% at 18 months, and 7% at 24 months. (Davey, 1961a)

DURATION OF BREAST FEEDING: In the north there is a tendency to continue to permit the child to suckle the breast, until the mother becomes pregnant again. There are examples in the north of breastfeeding up to five years. (Davey, 1961a)

DURATION AND WORKING MOTHERS: A majority of working mothers were aware of the economic and health advantages of breast feeding, and yet the average duration of breast feeding was 9 weeks, even though they had an average of 3 1/2 months with the child before resuming work. (Pappoe, 1979)

REASONS FOR SHORT DURATION: Reasons for short duration of breast feeding given by working mothers were: return to gainful employment, insufficient milk, and child refusing breast. (Pappoe, 1979)

AGE AT WEANING: A review of 10 studies showed the median age at weaning ranged from 10.2 months to 22.6 months. (FAO, 1979b)

AGE AT WEANING: Generally, weaning is completed earlier in the south. At 12 months, 36% of southern children have completed weaning, compared to 13% of northern children. (Davey, 1961a)

AGE AT WEANING: 6% of children are not breast fed at all at age 6 months, 14% at nine months, 33% at 12 months, 57% at 18 months, and 93% at 24 months. (Davey, 1961a)

WEANING AGE AND NEEDS: Walking is understood to be the signal to stop breast feeding. On average, this occurs at 19 months of age. Since early efforts at walking impose extra calorie requirements on the child, this is a particularly inappropriate time to withdraw breast milk. (Davey, 1974)

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

**MATERNAL DEATHS AND BREAST FEEDING:** The small percentage of children not breast feeding up to four months of age was probably accounted for by maternal deaths, the surviving child being bottle fed. (Davey, 1961a)

**MILK QUANTITY:** Output of milk by mother fell steadily. By the end of one year only 25% of the amount produced at the peak period was available. (Sai, 1971)

**TIME SPENT BREAST FEEDING:** Time spent breastfeeding was 48 minutes per day in urban Accra and 40 minutes per day in a rural village. For exclusively breast fed infants, times are 79 minutes a day in Accra and 50 minutes a day in a rural village. (FAO, 1979b)

**TIME SPENT BREAST FEEDING:** The time required daily to breastfeed a child and perform the activities associated with breastfeeding (mother's extra food, care of nipples, health care, education for breastfeeding, etc.) is estimated to be 51 minutes. (FAO, 1979b)

**COST OF BREAST FEEDING:** Estimated cost of supplementing the diet of a breastfeeding mother with fofou with peanut sauce is \$.14 per day or \$100 for two years. If the supplement is rice instead of fofou the cost is \$.07 per day or \$51 for two years. (FAO, 1979b)

**TIME COST OF BREAST FEEDING:** Cost of time spent in breastfeeding is \$.27 per day for rural women and \$.34 per day for urban women. Overall time cost of breastfeeding in Ghana is \$.29 per day or \$210 for two years per infant. (FAO, 1979b)

#### REGIONAL

**BREAST FEEDING IN THE ASHANTI REGION:** Breast feeding patterns are similar to other regions, with an average length of about 11 months. Urban women and middle and upper class women tend to breast feed less than others. (Ofosu-Amaah, 1974b)

#### RURAL

**FREQUENT BREAST FEEDING:** All babies are fed on a self-demand schedule. Babies were observed at the breast three or four times during intervals of from 1 to 1.5 hours. Nursing periods were short, often lasting no more than 5 minutes. Mothers reported nursing three or four times during the night. (Grant, 1956)

**PROLONGED, UNIVERSAL LACTATION:** In Kwahu, lactation was universally practiced, generally until the child was about 1 1/2 years old. (Bleek, 1976)

**DURATION OF BREAST FEEDING:** Women breast fed an average of 16 months in the Danfa project area. (Ofosu-Amaah and Neumann, 1979)

**DURATION:** Children are breast fed for two years or more. (Tripp, 1981)

DURATION: Breast feeding is continued for an average of 15 months. (Bruce-Tagoe et al., 1977)

DURATION: In Agogo breast feeding was continued for 18 months for 86% of the children in the sample and for two years for 30%, after which it dropped rapidly to almost zero by age 3 years. (North et al., 1975)

DURATION: 85% of women interviewed said they breast fed their child more than one year. (den Hartog, 1970)

DURATION: Breast feeding is estimated to continue through 18 months for as many as 30% of rural women. (National Food and Nutrition Conference, 1974)

DURATION: Babies in Pantang were breast fed longer than the period which their mothers had stated was desirable. (den Hartog, 1970)

DURATION: Children in Baafi were breast fed to the age of about two years. (Dako and Watson, 1974)

AGE OF STOPPING BREAST FEEDING: 3.5% of mothers in Baafi village stopped breast feeding at one year; 36.8% at 1 1/2 years; 36.8% at 2 years and 22.8% at 2 1/2 years. (Orraca-Tetteh and Watson, 1976)

BREAST FEEDING AND OTHER ACTIVITIES: Out of 28 breast feeding sessions directly observed and recorded in rural Ghana, 32% took place when the mother was sitting or reclining, 14% while she was working, and 54% while involved in both. Therefore, breast feeding is not an exclusive activity; a mother can continue with some other occupations. (Greiner, 1977)

#### URBAN

DURATION: By 18 months, nearly all urban women have stopped breast feeding. (National Food and Nutrition Conference, 1974)

TERMINATION OF BREAST FEEDING: A study carried out in Accra in 1971 by Ofoosu-Amaah showed that 61% of the mothers were supplementing breastfeeds with formula, and the mean age of stopping breast feeding was 16 months. (North et al., 1975)

WEANING AGE AND EDUCATION OF PARENTS: Duration of breast feeding decreased with increased education of parents. The mean duration of breast feeding was 5.8 months in families with highly educated mothers and fathers; 12 months in families where both parents had received some education; 14.1 months in families where only the father had received some education; and 17.8 months in families where neither parent had received any education. (Dovlo, 1968)

UNIVERSAL BREAST FEEDING: Nearly all babies are breast fed at first. Only one woman in a survey of 399 stated that she had not breast fed her baby at all. (Dovlo, 1968)

NATIONAL

**INSUFFICIENT SUPPLEMENTARY FOODS:** During the weaning period, children are not given sufficient supplementary foods and are given very little animal protein food. The special needs of this group are not understood. Meat and fish are largely withheld. (Davey, 1974)

**SUPPLEMENTARY FOODS INTRODUCED LATE:** Supplementary foods are introduced late, at nine or ten months of age, instead of at the recommended five months. As a result, the child given only breast milk is badly undernourished for four or five months and gains very little weight during that time. (Davey, 1974)

**WEANING FOODS:** In preparing weaning food in the southern region of Ghana, white maize is soaked in water for three days and ground into flour. The flour is fermented for three days. The fermented dough is stirred into boiling water to make a porridge, sugar is added to taste. In the northern region weaning meal is made of sorghum flour which is stirred into boiling water until cooked and a slab of shea butter is added. (Orraca-Tetteh, 1975)

**AGE AT SUPPLEMENTATION:** A review of four studies showed the median age of supplementation in Ghana ranged from 2.6 months to 10 months. (FAO, 1979b)

**AGE AT SUPPLEMENTATION:** In the north of Ghana, at 12 months 61% of children received breast milk plus a supplement. In the south, at 12 months, 15% were exclusively breast fed, and 49% received breast milk plus supplements. The reasons for these differences include: tribal customs; varying rates of development and urbanization; and greater reliance on subsistence economy in the north. In the south, mothers want to wean and not take child to work. (Davey, 1961a)

**ARTIFICIAL FEEDING:** Among 28 working mothers, artificial feeding was introduced early, within the first three weeks of delivery by 23 mothers. A major reason given for this was to get the baby used to the bottle before mothers resumed work. (Pappoe, 1979)

**COSTS OF BOTTLE FEEDING:** Every mother has the potential of producing 247 liters of breast milk in the first year and a total of about 375 liters in 24 months. The total potential national production of breast milk is about 98 million liters for the first year. The replacement cost of breast milk by powdered cow's milk is about 100 million cedis for the first year of life, or 150 million for two years. (Ofosu-Amaah, 1974a)

**INTRODUCTION OF SOLIDS:** By four months 25% of children are receiving breast milk plus a supplement; by six months, 38% are on this mixed diet; at 12 months, 45%. (Davey, 1961a)

**SOLID FOOD:** The first solid foods were invariably cereal, usually in the form of koko with sugar added. As the child got older plantain and starchy roots, then soups and fats and oils were added. When weaning was

complete, the frequency of use of cereals and sugar markedly decreased, and the use of starchy foods with soup markedly increased. The child was being given the adult foods but the child's food pattern showed greater frequency of use of fats and oils, pulses and groundnuts, and fruits, than adults. Animal protein was little used except in fishing villages. (Davey, 1961a)

**SOLID FOOD:** One fourth of children's diets are supplemented with solid foods at 4 months. 60% begin supplements between 8 and 12 months. (Davey, 1961a)

**SOFT FOODS:** Children not yet completely weaned are more often given "soft" foods. Thus they get plantain more than cassava, koko more than kenkey. They also get bread more often than adults and it may be due to the softness of the bread. (Davey, 1961a)

**CEREALS:** In the southern region, weaning food is prepared from maize; in the northern region weaning meal is made of sorghum flour. In general, the supplementary foods used in weaning are gruels and porridges prepared from maize, guinea corn and millet. (Orraca-Tetteh, 1975)

**POWDERED FISH:** Powdered fish, a new product, has encountered resistance. When it is properly ground and sieved, parents are willing to give it to infants in akasa (a porridge), and recognize its value in infant feeding. These same parents will not eat fish flour themselves, although they are willing to eat imported fish fingers. (Nicholas, 1974)

**NO SPECIAL FOODS:** Traditionally, no special diets are prepared for toddlers and children. (Orraca-Tetteh, 1975)

**CHILDREN'S DIETS:** Faults in diets of the children included lack of animal foods, the change from cereals to starchy roots when weaning is complete, and the excessive use of pepper soups and stews. Positive factors in child feeding patterns included high frequency of use of pulses or groundnuts, extensive use of fish when it is available and cheap, and the fact that thought and care and no doubt some financial sacrifice go into preparation of children's diets. (Davey, 1961a)

**CHILD'S MEALS:** Once children become too heavy to carry on their backs, rural women are forced to leave them behind in the care of someone else, often an older child, when they go to farm or trade. The infant is fed in the morning, and may then receive some cold porridge which the mother left behind at midday--which the baby possibly refuses to take--and does not receive anything more until the mother returns in the evening. The long time interval between meals tends to depress the child's appetite and he may take less food than offered. (North et al., 1975)

**STARCHY ROOTS AFTER WEANING:** After ten months, children who are completely weaned were more likely to receive foods from the plantain and starchy root group. Children still on the breast were more likely to receive cereal. For example, at 10-11 months, among children still on the breast, 79% of mothers gave cereal, 27% gave starchy roots. If the

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

child was off the breast. 54% got cereal, 64% got plantain and starchy roots. (Davey, 1961a)

**FISHING VILLAGES:** Feeding patterns in fishing villages were different from the rest of the country. Fish was in greater supply, plantain and starchy roots less available, and greater use was made of cereal. Fats and oils were less available, and therefore less frequently used. Vegetables were also in shorter supply and less use was made of soups. (Davey, 1961c)

**PRESTIGE FOODS:** In all communities there was a distinct tendency to give children the more expensive prestige types of foods such as yam in the south, and plantain and cassava in the north. The greater use of groundnuts and pulses in the south probably falls in the prestige food category also. (Davey, 1961a)

**PROTEIN:** Up to one year of age the percentage of children receiving high protein foods such as milk, eggs, fish or groundnuts was very low. The amount of fish added increased thereafter; up to 15% of children were receiving fish by two years; 75% of children got soup made with meat or fish by two years of age. (North et al., 1975)

**PROTEIN QUALITY:** The values of NDPCal% of traditional Ghanaian weaning foods were 4.5% for sorghum gruel and 3.8% for maize porridge. An NDPCal% of 8 is recommended for proper growth. (Orraca-Tetteh, 1975)

**CALORIES:** Mean calorie intake of children in an orphanage setting was 26 calories/kg per meal; intake in a village setting was somewhat lower. The range of values was quite wide, ranging from 12.7 to 24.3 g/kg per meal in village children. Many children also received snacks. (Woolfe, 1977)

**AMOUNT EATEN:** Children's intake at single meals averaged about 30 g/kg but included many values in the range of 60-70 kg. (Woolfe, 1977)

**AMOUNT AT BREAKFAST:** Amounts of food consumed at breakfast by village children were considerably less than at later meals. A mean of 15.5 g/kg was consumed at breakfast; later meals had mean values as high as 70 g/kg of body weight per meal. (Woolfe, 1977)

**COST OF BOTTLÉ FEEDING:** For the average Ghanaian family, two years of breast feeding rather than artificial feeding is likely to save between US\$600 and \$730 in goods and time costs, plus any savings that might result from the avoidance of disease or malnutrition caused by artificial feeding. (FAO, 1979b)

**COST OF BOTTLÉ FEEDING:** Cost of artificial feeding is estimated at \$.53 per day, or \$390 for two years, using low-solute infant formula for 24 months. The cost is \$.42 per day, or \$310 for two years, using full cream powdered milk after 4 months. (FAO, 1979b)

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**TIME COST OF BOTTLE FEEDING:** Time spent by urban mothers on preparing the feedings and washing and sterilizing utensils was 270 minutes per week. The practices observed did not ensure safe food for the infant. To prepare foods and wash utensils in such a way as to avoid gastroenteritis and other diseases, 90 minutes a day would be needed by the urban Ghanaian of average socioeconomic status. In rural areas with fewer facilities it would take about 135 minutes. (FAO, 1979b)

**TIME COST OF BOTTLE FEEDING:** Time cost of artificial feeding of an infant in Ghana was 132 minutes in an urban area and 198 minutes in a rural area. The daily cost of this time was estimated at \$0.64 in urban areas and \$0.90 in rural areas. (FAO, 1979b)

**URBANIZATION:** At 12 months of age, 33% of urban children received both breast milk plus a supplement. 58 to 63% of rural children received this mixed diet. Many urban children were already weaned from the breast, while supplements may be delayed in rural areas. (Davey, 1961a)

**URBANIZATION:** In cities and large towns, more use is made of infant cereals than in farming communities. (Davey, 1961a)

**WEANING AND WEIGHT:** The age at which the percentage of children with acceptable body weights was lowest was at the time of weaning. (CRS, 1974)

## REGIONAL

**SUPPLEMENTARY FEEDING - ASHANTI:** In the Ashanti region, supplementary feeding begins after six months of age. Supplementary feeding is often inadequate in this region because families cannot afford the extra food. (Baffour-Senkyire, 1974)

**WEANING FOODS IN THE ASHANTI REGION:** Weaning foods are starchy: akasa, fufu, and rice cooked in oil. Few fruits and vegetables are used. Even upper income groups give children too many starchy foods during the weaning period. (National Food and Nutrition Conference, 1974)

**SUPPLEMENTARY FEEDING IN THE BRONG-AHAFO REGION:** Supplementary foods are introduced at about 6 months to one year for most children, and younger for infants of working mothers. Weaning foods are corndough porridge, ote (boiled and mashed yam) and cooked mashed rice. (National Food and Nutrition Conference, 1974)

**SUPPLEMENTS WITHHELD IN NORTH:** Women in the Northern Region breast feed their children until at least 12 months of age. Supplemental feeding, however, is not usually practiced and after about six months weight gains do not keep pace with standards. (National Food and Nutrition Conference, 1974)

**PROTEIN FOODS:** When asked about weaning foods, the interviewed women did not mention fish and meat. Some fish or meat may appear in stew or soup.

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

Only two mothers introduced eggs and some others also gave milk, mostly powdered milk, to their children. (den Hartog, 1970)

**PROTEIN FOODS:** 40% of mothers waited until after the child was 12 months old before giving high-protein foods. (Ofosu-Amaah and Neumann, 1979)

**IRON DEFICIENT FOODS:** Supplementary feedings of maize and cassava were started in late infancy and continued for 1 to 2 years. These staples have 1-3 mg. iron per 100 g. Children receive very little animal food and vegetable iron alone is poorly absorbed, so iron is probably deficient. (Bruce-Tagoe et al., 1976)

**LOSS OF APPETITE:** Loss of appetite is common at the times of weaning and this may continue for several months. (Grant, 1956)

#### RURAL

**BOTTLE USE:** Very few mothers in Pantang used feeding bottles. (den Hartog, 1970)

**WEANING IN BAAFI:** Weaning occurred between 12 and 24 months. The main weaning foods included maize, porridge, yams, cocoyams, or cassava ampesi and rice. Proprietary foods were not used due to their high price. The most common protein-rich food used was groundnut or other legume. Generally, mothers did not prepare special diets for infants. (Dako and Watson, 1974)

**BEGINNING WEANING:** Mothers in the Danfa Project area began weaning with porridge in 76% of cases. 46% start a protein food by eight months; 20% have not started adequate weaning by 12 months. (Ofosu-Amaah and Neumann, 1979)

**GRADUAL WEANING:** Children are gradually introduced to the adult diet. (Tripp, 1981)

**INTRODUCTION OF SOLIDS:** The addition of weaning foods, usually maize porridge, commonly started between 3 and 5 months. A high protein food (legumes, meat, fish) was usually added between 6 and 12 months. (Ofosu-Amaah and Neumann, 1979)

**INTRODUCTION OF SOLIDS:** Mothers in the Danfa Project area began solids with porridge in 76% of cases. 46% start a protein food by eight months; 20% have not started adequate weaning by 12 months. (Ofosu-Amaah and Neumann, 1979)

**INTRODUCTION OF SOLIDS:** Few children received solid foods before three months. By 3-5 months, 45% were eating solids. At 8 months 75% were eating solids. Only 4%-5% of children were given eggs or commercial milk products. (Ofosu-Amaah and Neumann, 1979)

**FIRST FOODS:** Akasa, maize porridge, was the first weaning food given to children. About half of them received this weaning food when they were 3

to 5 months of age, some of them together with milk. The remainder received it at 6-8 months of age, when more solid foods were introduced such as mashed yam with soup or stew, rice and beans, and bread. Feeding was sometimes done with a spoon, but when the foods were more solid, only the hand was used. (den Hartog, 1970)

**NO WEANING FOODS:** There are no special weaning foods, although women may prepare thin papa that are easier for children to take than the family's thick porridge. (Tripp, 1981)

**WEANING FOODS:** 20.4% of mothers used maize porridge for weaning, 31.6% used yam or cocoyam ampesi, 12.2% used cassava ampesi, 12.7% used rice, 5% used plantain, 3.2% used bread, and the remainder used maize porridge and milk, kokonte, tea with milk, proprietary infant food, milo and milk, millet, sorghum or Quaker oats. (Orraca-Tetteh and Watson, 1976)

**REASON FOR WEANING:** 10% to 28% of mothers reported that they stopped breast feeding because they were pregnant. (Ofosu-Amash and Neumann, 1979)

**PROTEIN FOODS:** In Baafi village, 171 mothers of children under one year of age gave their infant some type of protein-rich food: eggs, meat, fish, beans, groundnuts or milk. An unspecified number of mothers gave none of these foods to their infants under one year of age. (Orraca-Tetteh and Watson, 1976)

**REASONS FOR NOT GIVING PROTEIN-RICH FOODS:** Some of the reasons mothers gave for not feeding infants protein-rich foods were that foods were not available or were too expensive. Other factors were an ignorance about the nutritive value of foods; occurrence of diarrhea when children were given beans and groundnuts; infants do not like such foods; or some children may develop such a strong appetite for them later in life that they may steal them from the kitchen. (Dako and Watson, 1974)

**NUTRIENT INTAKES:** Among Brong children 1 to 5 years of age in Baafi village, average per capita intakes met 73% of the FAO recommended allowance for calories, 75.5% for protein, 27.5% for calcium, 131% for iron, 19% for vitamin A, 166% for thiamine, 49% for riboflavin, 95% for niacin, and 253% for ascorbic acid (vitamin C). (Orraca-Tetteh and Watson, 1976)

**DEFICIENT NUTRIENT INTAKES:** Among preschool children in Baafi village, average intakes of calories, protein, calcium, vitamin A and riboflavin were less than 80% of the FAO recommended values. (Orraca-Tetteh and Watson, 1976)

**PROTEIN FOODS:** When asked about weaning foods, the interviewed women did not mention fish and meat. Some fish or meat may appear in stew or soup. Only two mothers introduced eggs and some mothers also gave milk, mostly powdered milk, to their children. (den Hartog, 1970)

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

**PROTEIN:** 40% of mothers waited until after the child was 12 months old before giving high protein foods. (Ofosu-Amaah and Neumann, 1979)

**IRON DEFICIENT FOODS:** Supplementary feedings of maize and cassava were started in late infancy and continued for 1-2 years. These staples have 1-2 mg iron/100 g. Children receive very little animal food and vegetable iron alone is poorly absorbed, so iron is probably deficient. (Bruce-Yagoo et al., 1977)

**CHILDREN'S MEALS:** Women try to cook something for their children in the afternoon, but constraints of time and resources mean that this is not always possible. The evening meal is sometimes not ready until late at night, when a small child may already be asleep. (Tripp, 1981)

**SNACKS:** A child may be given a snack of groundnuts or raw millet to tide him over to mealtime. (Tripp, 1981)

**EATING NOT ENCOURAGED:** Rural village mothers did not encourage the child to eat, and did not offer second helpings. Sometimes the plate of food was placed on the ground by the child who was left to feed himself; smaller children were fed by their mothers. (Woolfe, 1977)

**ANOREXIA:** Anorexia is common at the times of weaning and this may continue for several months. (Grant, 1956)

#### URBAN

**LATE INTRODUCTION OF SOLIDS:** In the Accra study by Ofosu-Amaah and Neumann, the mean age for introducing a weaning diet was nine months. (North et al., 1975)

**INTRODUCTION OF SOLIDS:** 5.4 months was the mean age at which children received supplementary foods for the first time. (Dovlo, 1968)

**FIRST FOOD:** The traditional first supplementary food is akasa, a pap or gruel made from fermented maize dough. It is usually introduced when the child is two or three months old. (Dovlo, 1968)

**MAIZE-BASED WEANING FOODS:** 55% of mothers gave their children preparations of maize other than akasa, usually kenkey or banku, two forms of stiff porridge made from fermented maize dough. Maize is one of the chief staples in the Accra areas and these are the two commonest forms in which it is prepared. (Dovlo, 1968)

**EDUCATED MOTHER'S PRACTICES:** Educated mothers were more likely to give their children imported foods such as baby milk and cereal preparations; they were also more likely to give their children eggs. (Dovlo, 1968)

**SPECIAL FOODS AND EDUCATION:** While the child was breast feeding 100% of highly educated mothers prepared separate foods for the infant; only 80% of mothers did so in families where neither parent was educated. After stopping breast feeding only 50% of highly educated mothers prepared

separate foods for their infants. 20% of women from families where neither parent had received education prepared these special foods. (Dovlo, 1968)

**PROTEIN FOODS:** Very few parents reported that they withheld meat, fish, and eggs because of taboos. (Dovlo, 1968)

**PROTEIN FOODS AND EDUCATION:** 10% of highly educated parents gave their children fish or meat; 9% of educated parents; 6% of parents where only father was educated; and 8% of parents where neither parent was educated. (Dovlo, 1968)

**PROTEIN FOODS AND EDUCATION:** The percentage of mothers who said they gave fish or meat to their children was not appreciably larger among educated mothers. Educated mothers included beans (legumes) in the list of foods they gave to their children much more often than the uneducated mothers, but the proportion of educated women who gave beans was still less than one in five. (Dovlo, 1968)

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

#### NATIONAL

**CHILDREN'S DIETS:** Faults in diets of the children included lack of animal foods, the change from cereals to starchy roots when weaning is complete, and the excessive use of pepper soups and stews. Positive factors in child feeding patterns included high frequency use of pulses or groundnuts, use of fish when it is available and cheap, and the fact that thought and care and no doubt some financial sacrifice go into preparation of children's diets. (Davey, 1961a)

**NO SPECIAL FOODS:** Traditionally, no special diets are prepared for toddlers and children. (Orraca-Tetteh, 1975)

**ADULT DIET:** On termination of breast feeding, the child is placed on an adult diet, but meat and fish are still given rarely (except in fishing villages). Thus, the child loses the protein from breast milk and from the predominantly cereal weaning diet, and goes onto an all-starchy diet. This is the time when any extra strain, such as an attack of measles, can cause kwashiorkor. (Davey, 1974)

**SOLID FOOD:** When weaning was complete, the frequency of use of cereals and sugar markedly decreased, and the use of starchy foods with soup markedly increased. The child was being given the adult foods, but the child's food pattern showed greater frequency of use of fats and oils, pulses and ground nuts, and fruits, than adults'. Animal protein was little used except in fishing villages. (Davey, 1961a)

**PRESTIGE FOODS:** In all communities there was a distinct tendency to give children the more expensive prestige types of foods such as yam in the south and plantain and cassava in the north. The greater use of

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

groundnuts and pulses in the south probably falls in the prestige food category. (Davey, 1961a)

**CHILDREN'S MEALS:** Once children become too heavy to carry on their backs, rural women are forced to leave them behind in the care of someone else, often an older child, when they go to farm or trade. The infant is fed in the morning, and may then receive some cold porridge which the mother left behind at midday--which the baby possibly refuses to take--and does not receive anything more until the mother returns in the evening. The long time interval between meals tends to depress the child's appetite and he may take less food than offered. (North et al., 1975)

**FISHING VILLAGES:** Feeding patterns in fishing villages were different from the rest of the country. Fish was in greater supply, plantain and starchy roots less available, and greater use was made of cereal. Fats and oils were less available, and therefore less frequently used. Vegetables were also in shorter supply and less use was made of soups. (Davey, 1961a)

**CEREAL:** At twelve months of age, koko is still the commonest form of cereal, though it now shows up in feeding less than 1/2 the children. In the north, millet makes up most of the remainder, with small amounts of rice. In the south, kenkey is used for feeding 1/5 of the children, being used more in fishing villages than elsewhere. Rice is used for 1/4 of the children in all communities, bread in less than 1/4, used least in fishing villages. The remainder is made up of small amounts of imported foods, Quaker oats, corn flour and in large urban areas, corn flakes are recorded occasionally. (Davey, 1961a)

**STARCHY ROOTS AFTER WEANING:** After ten months, children who were completely weaned were more likely to receive foods from the plantain and starchy root group. Children still on the breast were more likely to receive cereal. For example, at 10-11 months, among children still on the breast, 79% of mothers gave cereal, 27% gave starchy roots. If the child was off the breast, 54% got cereal and 64% got plantain and starchy roots. (Davey, 1961a)

**SOUPS:** Two kinds of soup are commonly prepared: vegetable, and soup with small amounts of meat or fish. Both contain liberal amounts of pepper. Chances of a child under 2 years receiving any meat or fish from these soups are small. (Davey, 1961a)

**AMOUNTS EATEN:** Children's intake at single meals averaged about 30 g/kg but included many values in the range of 60-70 kg. (Woolfe, 1977)

**AMOUNT OF BREAKFAST:** Amounts of food consumed at breakfast by village children were considerably less than at later meals. A mean of 15.5 g/kg was consumed at breakfast; later meals had mean values as high as 70 g/kg of body weight per meal. (Woolfe, 1977)

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HOUSEHOLD AND CHILD CALORIE INTAKES: Adults in homes studied got 100% or more of calorie requirements, but children 1 to 4 years old got 60 to 85% of the requirements for their ages. (Orraca-Tetteh, 1972b)

CALORIE INTAKES: Mean calorie intake of children in an orphanage setting was 26 calories/kg per meal; intake in a village setting was somewhat lower. The range of values was quite wide, ranging from 12.7 to 24.3 g/kg per meal in village children. Many children also received snacks. (Woolfe, 1977)

HOUSEHOLD AND CHILD PROTEIN INTAKES: Adults received 60 to 80% of their protein requirements but children received 36% to 80% of theirs. (Sai, 1971)

PROTEIN: Diets given to children after being taken off breast feeding contain less protein than those given during weaning. (Davey, 1961a)

PROTEIN: Up to one year of age, the percentage of children receiving high protein foods such as milk, eggs, fish or groundnuts was very low. The amount of fish added increased thereafter; up to 15% of children were receiving fish by two years; 75% of children got soup made with meat or fish by 2 years of age. (North et al., 1975)

## REGIONAL

DIETS IN BOLGATANGA: Diets of children 1 to 4 years of age in Bolgatanga were inadequate in calories, protein, calcium, and riboflavin, adequate for vitamin C and vitamin A for children over two years of age, and adequate for all age groups for iron. (Davey, 1961a)

CHILDREN'S DIET - BRONG AHAFO: Between one and six years, children in the Brong Ahafo region eat mostly boiled plantain, mashed kontomire sauce and fufu. (National Food and Nutrition Conference, 1974)

DIETS IN THE FOREST AREA: Diets of children 1 to 4 years of age in the forest area were inadequate in calories, protein, calcium, iron, riboflavin and thiamine. The diets were adequate for vitamins A and C. (Davey, 1961c)

MEETING PROTEIN REQUIREMENTS: In the Forest Zone, adults receive just about sufficient protein, but children lack about 30% of their requirements. Very young children lack 50%. (Davey, 1974)

## RURAL

EATING NOT ENCOURAGED: Rural village mothers did not encourage the child to eat, and did not offer second helpings. Sometimes the plate of food was placed on the ground by the child who was left to feed himself; smaller children were fed by mother. (Woolfe, 1977)

GRADUAL CHANGE: Children are gradually introduced to the adult diet. (Tripp, 1981)

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

CHILDREN'S MEALS: Women try to cook something for their children in the afternoon, but constraints of time and resources mean that this is not always possible. The evening meal is sometimes not ready until late at night, when a small child may already be asleep. (Tripp, 1978)

SNACKS: A child may be given a snack of groundnuts or raw meat to tide him over to mealtime. (Tripp, 1981)

#### URBAN

SPECIAL FOODS AND MOTHERS' EDUCATION: While the child was breast feeding, 100% of highly educated mothers prepared separate foods for the infant; only 80% of mothers did so in families where neither parent was educated. After stopping breast feeding, only 50% of highly educated mothers prepared separate foods for their infants; 20% of women from families where neither parent had received education prepared these special foods. (Dovlo, 1968)

PROTEIN FOODS AND EDUCATION: The percentage of mothers who said they gave fish or meat to their children was not appreciably larger among educated mothers. The educated mothers included beans (legumes) in the list of foods they gave to their children much oftener than the uneducated mothers, but the proportion of educated women who gave beans was still less than one in five. (Dovlo, 1968)

PROTEIN FOODS AND EDUCATION: 10% of highly educated parents gave their children fish or meat; 9% of educated parents, 6% of parents where only father was educated, and 8% of parents where neither was educated. (Dovlo, 1968)

### 3.4 DIETARY PRACTICES, HEALTH AND MEDICINE

#### NATIONAL

FREQUENT CLINIC ATTENDANCE: Mothers attended clinic regularly if they could get there easily, as indicated by shorter travel time. They appeared to be more motivated to attend because of fear of losing the child because one or more previous infants had died; because of the presence of more preschoolers in the family demanding more health care; and because of the availability of free commodities. Earlier than normal weaning may have resulted from frequent clinic attendance and would also have made the children vulnerable episodes of illness that required more frequent attendance. (Austin et al., 1981)

REASONS TODDLERS DON'T USE CLINICS: Some of the reasons mothers don't bring their children to the clinic after the age of one year are: a new pregnancy, too far to travel, having to carry older children on their backs, children unable to walk as far as the clinic, mother has had to take a job, or people run out of new clothes and stop coming to the clinic when they have finished showing off their new clothes. (Ofosu-Amaah, 1974b)

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**AVAILABILITY OF HEALTH SERVICES:** Health services were provided through a network of government and mission facilities. 47% of the doctors and a fourth of the hospital beds were located in and around the capital city of Accra, serving only about 10% of the population. In 1977 there were 111 hospitals, 50 health centers, 78 health posts and 68 clinics operating throughout the country. (Austin et al., 1981)

**WORLD NEIGHBORS:** World Neighbors, Inc. provides funds to the Lake Bosomtwi Methodist Clinic for a program which serves the health needs of villagers in the area. A motor boat is used to reach inaccessible villages and a landrover ambulance is used to bring serious cases to the clinic. Preventive health is emphasized in child welfare clinics, which include vaccination for children, and education for mothers in nutrition, sanitation, and family health. (TAICH, 1976)

**PRESCHOOL HEALTH SERVICES:** About 6% of the pre-school population was reached by health services. (Austin et al., 1981)

**HEALTH WORKERS:** In 1973 13,140 persons were engaged in providing health services, including 951 doctors, 30 dentists, 538 pharmacists, 6153 nurses, 4932 midwives, 276 laboratory technicians, and 260 sanitarians. (North et al., 1975)

**HEALTH WORKERS:** Only 35% of all doctors, 61% of midwives, and 58% of nurses worked in areas of less than 20,000 population. (North et al., 1975)

**URBANIZATION AND HEALTH ATTENDANTS:** 61% of all births were attended by a doctor or midwife in the urban areas and 15.9% in the rural areas, giving a national average of 29%. Most birth attendants were relatives of the pregnant women. (North et al., 1975)

**UNATTENDED DELIVERIES:** 75% of all deliveries are unattended or attended by untrained personnel. In rural areas this percentage is higher. (Nichols et al., 1976)

**MEDICATION:** Three-fourths of the traditional birth attendants did not routinely prescribe medicine for infants. Of those who did, half prescribed herbs; the rest, castor oil or non-toxic substances such as glucose. (Nicholas et al., 1976)

**MIDWIVES AS HERBALISTS:** Among male midwives, 79% were herbalists as well as midwives; only 11% of female traditional birth attendants were herbalists as well as midwives. Only herbalists provided prenatal care; midwives were called only when labor had begun. (Nicholas et al., 1976)

**HOME BIRTHS:** 82.5% of rural women give birth at home. (North et al., 1975)

**PART-TIME MIDWIVES:** Male traditional birth attendants averaged 8.5 deliveries per year; female traditional birth attendants averaged 6.4

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

deliveries per year. Midwifery is traditionally viewed as a part-time occupation. (Nicholas et al., 1970)

#### URBAN

**TRADITIONAL PRACTITIONERS:** The traditional practitioner was used for prenatal care from early pregnancy until confinement. He was summoned to treat various aches and pains or other complaints such as constipation, bleeding and other complications of pregnancy. Treatment often involved infusions of herbs, roots and pepper taken in large amounts several times each day. (Otoo, 1973)

**HOME BIRTHS:** 87.4% of urban women gave birth at home. (North et al., 1975)

**DELAYED LABOR:** Treatments for arrested labor included drinks of okra, noted for its sliminess; prepared herbs applied to the abdomen; brushing the mother with a broom to sweep away evil; tampons and emollient medications inserted into the vagina; pressing against the wall as the mother bore down; and commanding or cajoling the baby to emerge. (Otoo, 1973)

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#### 4. NUTRITION STATUS CORRELATIONS

##### NATIONAL

**INFANT MORTALITY AND LOCATION:** Infant mortality rates are higher in rural areas than in the towns. The urban rate is little more than half the rural rate--46 as compared to 94 deaths per 1000 live births. (Gaisie, 1975)

**CHILD MORTALITY, LOCATION AND SEX:** The child mortality rate is greater in the countryside than in the cities and towns, and the survival rates are higher among females than among males. (Gaisie, 1975)

**CHILD MORTALITY CORRELATES:** Families that had experienced more preschool deaths were more likely to be regular in clinic attendance, to be urban, and to have weaned the child early from the breast. They were less likely to have educated mothers, or mothers that could read the growth chart. These families also were less likely to live in high-quality housing or have fathers with a high occupational category. (Austin et al., 1981)

**MORTALITY AND FATHER'S WORK:** The highest proportion of deaths occurred among children whose fathers had semi-professional jobs. (North et al., 1975)

**BIRTH WEIGHT AND BIRTH ORDER:** Birth weight was found to increase with birth order. (Austin et al., 1981)

**URBANIZATION AND BREAST FEEDING:** Urbanization and the influx of a money economy result in a shortening of the duration of breast feeding and use of supplementary weaning foods at an earlier age. (Davey, 1961a)

**PEM AND FAMILY:** Among 348 children with protein calorie malnutrition, 40.7% had either a younger sibling on the breast or a pregnant mother. (Sai, 1971)

**MALNUTRITION AND SEASON:** Prevalence of malnutrition is greatest from July to September. The harvest period falls in this quarter, but poor nutrition status builds up in the weeks and months before the harvest. Infection may also contribute to this prevalence, since during the rainy season infection tends to be high. (Baddoo, 1974)

**CLINICAL SIGNS, WEIGHT AND DIET:** Among children one to two years of age, all children showing their hair changes (a clinical sign of malnutrition) were underweight. All of them were having breast milk only, with no supplementation, or their diets consisted only of starchy roots or plantain and vegetable soup or stew. Three quarters of normal weight children one to two years of age had diets which included rice or corn. (Davey, 1961a)

**THIAMINE DEFICIENCY AND FOLATE DEFICIENCY:** A significant but weak association was found between deficient serum folic acid levels and elevated percentage of TPP effect (thiamine deficiency). (Neumann et al., 1979)

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

**HEIGHT AND FEEDING METHOD:** From 7 to 12 months of age, heights of boys receiving breast milk with a supplement are greater than boys receiving breast milk only. Among girls from seven to 12 months old, heights of breast fed (exclusively) girls were greater than heights of girls receiving the breast plus a supplement. (Davey, 1961a)

**WEIGHT AND FEEDING METHOD:** From five to twelve months of age, both boys and girls who received only breast milk had lower weights than boys and girls who received breast milk plus supplemental foods. Children on breast only are more likely to be from the north where breast feeding (exclusive) continues longer, and weights in the north are lower. Second, mothers tend to keep smaller children solely on breast milk for a longer period. (Davey, 1961a)

**CORRELATION WITH HIGHER WEIGHT FOR AGE:** Correlation analysis indicates that children with high outcome weight for age had mothers that were taller, heavier, better educated, and more frequently urban. They were from families of higher socioeconomic status in terms of fathers' occupations, housing structure, electrical appliances, water supply and sewage facilities. They were less likely to have been seriously ill during the preceding six months, came from families that had fewer preschool deaths, their mothers were more likely to believe in giving protein supplements and these infants were more likely to have been female. (Austin et al., 1981)

**WEIGHT AND DIET:** In areas with the highest consumption of cereals, the average weight of children was 39 1/2 pounds. In the areas with the lowest consumption of cereals, average weights were 35 1/2 pounds. Children weighed 39 1/2 pounds in areas of low consumption. (Davey, 1961c)

**WEIGHT AND CONSUMPTION OF STARCHY ROOTS AND PLANTAIN:** In areas with the highest consumption of starchy roots and plantain, average child weights were lowest. For example, in the six study sites with the highest consumption of plantain and starchy roots, average child weight was 34 1/2 pounds. In the six sites reporting the lowest consumption of these foods, the average weight of children was 36 1/4 pounds. (Davey, 1961c)

**WEIGHT AND COLLECTION OF RELIEF FOODS:** There was no significant difference in nutrition status as measured by weight for age in children whose mothers came to collect relief foods once, twice or three times compared to those who did not collect foods. (Baddoo, 1974)

**WEIGHT FOR AGE AND CLINIC USE:** Participation in clinic activities was scored on two separate variables, length of participation and intensity or proportion of participation. Proportion of participation had a straightforward positive correlation with outcome weight for age. (Austin et al., 1981)

**WEIGHT FOR AGE AND WATER SUPPLY:** Mothers with a good water supply had infants who had significantly higher outcome weight for age although

mothers scored significantly below average on all measures of nutrition knowledge. (Austin et al., 1981)

**WEIGHT FOR AGE AND CLEAN WATER SUPPLY:** Sewage system and clean water supply were found to be determinants of weight for age even before most infants started to receive supplements in addition to breast milk. (Austin et al., 1981)

**FACTORS DETERMINING NUTRITIONAL STATUS:** Water supply and sanitation were shown to be significant determinants of children's nutritional outcome when many other factors, including rural/urban location, quality of housing, size of housing unit, land ownership, father's occupation and mother's education were not found to be significant by multiple regression analysis. (Austin et al., 1981)

**FACTORS AFFECTING NUTRITIONAL STATUS:** Among 58 malnourished infants (below 85% of standard weight for age at first clinic visit) six variables explained 21% of the variance in nutritional status: teaching the use of protein supplements, child morbidity, good source of water, birth interval, mother's height and age at first clinic visit. (Austin et al., 1981)

**FACTORS AFFECTING NUTRITION STATUS:** Among 101 young children attending integrated nutrition and primary health care programs who fell below 80% of expected weight for age at some point in the course of the study, seven variables explained 21% of the variance in nutritional status. These variables were: child morbidity, good water source, birth interval, clinic attendance, age and weight for age at first clinic visit and mother's education. (Austin et al., 1981)

**NUTRITION STATUS CORRELATES:** Among 77 well-nourished infants (above 90% of standard weight for age at first clinic visit) regression of many factors on nutritional outcome found only four significant variables which explained less than 8% of the variation in nutritional status. The four factors were: teaching the use of protein supplements to mother, child morbidity, mother's height, and her weight at the first clinic visit. (Austin et al., 1981)

**NUTRITIONAL STATUS AND SUPPLEMENTARY FOOD:** A study of health centers which distributed supplementary food found little effectiveness for the food component. None of the relationships tested between food distribution and nutritional status showed even low levels of significance. (Austin et al., 1981)

**NUTRITIONAL STATUS AND VACCINES:** Total number of DPT and BCG plus measles vaccinations were found to be highly significant predictors of nutritional status in the sample as a whole. (Austin et al., 1981)

**NUTRITIONAL STATUS AND INCOME:** Nutritional status improved with increasing income. People participating in the money economy had better nutritional status than those in the subsistence economy. (Davey, 1974)

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

**NUTRITIONAL STATUS AND FAMILY PLANNING:** In an evaluation of health clinics offering nutrition and primary health care, the presence of family planning services was significantly linked to high nutrition status outcome. Birth interval was an important determinant of nutritional status outcome in all regressions involving initially malnourished infants. (Austin et al., 1981)

**BEGINNING SUPPLEMENTARY FEEDING AND NUTRITION EDUCATION:** Among 196 mothers who received nutrition education, 41% suggested that the child should receive supplementary feeding at 0 to 5 months, 29% said 6 to 8 months, and 30% said to start after 9 months of age. Among 104 mothers who did not receive nutrition education, 21% said the child's diet should be supplemented between 0 and 5 months, 25% said 6 to 8 months and 54% suggested starting after 9 months of age. (Gordon, 1977)

**SUPPLEMENTAL FOOD AND NUTRITION EDUCATION:** Food collection at health centers offering supplementary food was not positively associated with attendance at nutrition education group lectures; neither these lectures nor amounts of food collected were correlated with improved levels of nutrition knowledge as measured by the study. (Austin et al., 1981)

**FOOD AVAILABILITY AND HOUSEHOLD SIZE:** As family size increased, ability to meet calorie and protein requirements decreased. In households of 1, 101% of calorie and 153% of protein requirements were met; in a household of 14, 73% of calorie, and 72% of protein requirements were met. (Orraca-Tetteh, 1975)

**FOOD AVAILABILITY AND FAMILY SIZE:** Studies conducted in Accra and Danfa show that nutrient intake per capita in a family is inversely related to size of family. The larger the number of young children in the family, the poorer the nutrient intake per capita. This was the case in both urban Accra and rural Danfa. In extremely large families this rule did not seem to apply, possibly because large families had more contributing adults than medium size families. (Sai, 1978)

**NUTRIENT INTAKE AND FAMILY SIZE:** Urban families with less than 3 persons consumed an average of 2,193 calories and 69.3 gms protein per person per day. Families with 7 persons consumed 1562 calories and 49.9 gms protein per person per day. Families of 12 or more consumed 1740 calories and 60.8 gms protein per person per day. (Sai, 1971)

**LEAN SEASON AND FOOD INTAKE:** The lean season is especially difficult in the North, where food intake, which is already below requirements, drops about 60 to 70% below average. (National Food and Nutrition Conference, 1974)

**SEASON AND FOOD INTAKE:** In northern Ghana, there is a dry season from November to May. There is a hungry season each year, which may reach famine proportions if the rains are late or inadequate. At this time, the diet may be reduced to one meal a day, of a small amount of millet with leaves. (Gordon, 1977)

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**CORRELATES OF NUTRITION KNOWLEDGE:** Mothers who scored high in tests of nutrition knowledge were younger, taller, and better educated; had better jobs, fewer children and fewer child deaths, were married to husbands with better jobs; and lived in higher quality housing with more electrical appliances but with worse water supply. These mothers were less likely to have collected free food and more likely to have had their children immunized. (Austin et al., 1981)

**ILLNESS CORRELATES:** Regression analysis of causes of illness found the most significant factor to be early weaning from the breast, followed by short birth interval and high birth order. (Austin et al., 1981)

**CORRELATES OF MOTHER'S HEIGHT:** Taller mothers were heavier, better educated, and had better jobs and husbands with better jobs. They lived in housing of superior construction, had more rooms and more electrical appliances. They had more children and a better diet. They had attended more nutrition education classes and their children had had more immunizations. The taller mothers were more aware of the need to give liquids during episodes of diarrheal infection, and were better able to read growth charts. Their infants had higher birth weight, higher weight for age at the first clinic visit, and higher outcome weight for age. (Austin et al., 1981)

**CORRELATES OF MOTHER'S EDUCATION:** More highly educated mothers had fewer children and fewer preschoolers; they had experienced fewer child deaths. Their infants had had more immunizations. These mothers scored high on all nutrition education measures. Their children had high outcome weight for age although their birth weights had been on the low side. (Austin et al., 1981)

**MOTHER'S EDUCATION AND NUTRITION EDUCATION:** Mother's formal education and her score on a nutrition education questionnaire were highly correlated. The regression analysis indicated that it was not her educational level, but whether she mastered the nutrition education information that determined the nutritional status of her infant. (Austin et al., 1981)

**CORRELATES OF FATHER'S OCCUPATION:** Women whose husbands had modern-sector or professional occupations were likely to have fewer children. These mothers scored high on understanding the growth charts and their own children's weight charts, and on their knowledge of the need to give protein supplements. Their infants had higher weights on the first clinic visits and higher weight for age at the end of the study. (Austin et al., 1981)

**ADEQUATE SEWAGE CORRELATES:** Women with adequate sewage facilities were urban, well-educated, had high occupational status and were married to husbands of similarly high status. These women had infants who weighed more at first clinic visits and had high outcome weight for age. These mothers collected more supplemental food at the clinic, attended fewer nutrition education classes, and had fewer preschoolers. (Austin et al., 1981)

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

**CHILD ILLNESS CORRELATES:** Children who were severely ill during the six months prior to the interview had lower weight for age at first clinic visit and lower weight for age at final weighing. They came from families that had experienced more child deaths, that had more preschoolers in the family, and that were of larger total family size. Mothers of these children had attended a larger total number of nutrition education classes and were more likely to know that children with diarrhea should be given liquids. (Austin et al., 1981)

**SEASON, REGION, AND MEASLES:** Incidence of measles peaks in March, April and May. There is also wide regional variation in incidence of measles, but this may be in large part due to completeness of notification. (Blankson, 1975)

**NUTRITIONAL STATUS OF ADULTS AND EMPLOYMENT:** Wage earners and self-employed men, and petty traders and other self-employed women, had the best nutritional status. Farmers, both men and women, had the worst status. The unemployed were a little better. Fishermen and housewives were only slightly lower than the best. (Davey, 1974)

**ADULT WEIGHT AND SOCIOECONOMIC FACTORS:** In the Forest Zone, town dwellers have a better nutritional status than village people. This is partly because there are more opportunities to earn money in town and because there is a wider range of foods to buy. In general, adults in towns weigh 3 or 4 pounds more than adults in villages. Wage earners and self-employed men and women have better nutritional status than farmers. Villagers living in main road villages weigh more than those living off main roads. Villages on main roads have a better supply of fish and greater access to food in the hungry season. (Davey, 1974)

**CORRELATES WITH REGULAR CLINIC ATTENDANCE:** Mothers who attend clinic regularly each month had shorter travel time, had had more preschool deaths in the family, had more children aged 1 to 5 years, and were more likely to live in rented houses and not to own land, although they were not more likely to be urban. They were more likely to wean their children from the breast before the end of the first year, to introduce liquids early to the child and to give the children protein supplements. These mothers attended clinics with higher annual costs and collected more free food. (Austin et al., 1981)

**WEIGHT CHARTS USE AND MOTHERS' EDUCATION:** Ability to read the weight chart was highly related to educational level. However, many more women could interpret the weight chart than had higher levels of education. Two-thirds of the women were able to interpret test weight charts correctly on two successive trials and also to identify the weight of their own child on two successive weighings, although only 53% of the total had had more than two years of schooling. (Austin et al., 1981)

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## REGIONAL

**CORRELATES OF MALNUTRITION - BAWKU, UPPER REGION:** In a study in the Bawku district of the Upper Region, findings suggested that urban malnutrition was more severe than rural; large families suffered more than small; diarrhea with fever, respiratory diseases and measles were present in most protein calorie malnutrition cases; intra-family distribution contributed to depletion of young children; and breast feeding was more common for longer periods in rural than urban areas. (Ofosu-Amaah, 1974b)

**PEM AND PONDS - UPPER REGION:** Villages around dams and ponds have a lower incidence of protein energy malnutrition (PEM) than other areas of the Upper Region. (Ofosu-Amaah, 1974b)

**CHILD NUTRITION STATUS AND INCOME - NORTHEAST:** The nutritional status of children in high income compounds was significantly better than that of the children in low income compounds in the Northeast Region. (Gordon, 1977)

**NUTRITIONAL STATUS AND FOOD STORES - NORTHEAST:** No clear relationship was found between nutritional status of young children and family food stores in the Northeast Region. (Gordon, 1974)

**NUTRITIONAL STATUS AND RELIEF FOODS - NORTHEAST:** In the Northeast Region, there was no significant difference in nutritional status as measured by weight for age in children whose mothers came to collect relief foods once, twice or three times, and those who did not collect the foods. (Gordon, 1974)

**WEIGHT AND VILLAGE LOCATION - SOUTH:** Weights of children living in southern farming villages situated on a main road were consistently higher than weights of children living in southern farming villages off the main road. There were no significant differences in heights. (Davey, 1961c)

**WEIGHT AND VILLAGE LOCATION - SOUTH:** Weights of children living in southern farming villages situated on the coastal plain were consistently higher than weights of children living in southern farming villages located in the forest. Significant differences in heights were not found. (Davey, 1961c)

**SEASON AND FOOD PRICES IN THE EASTERN REGION:** The lean months are the rainy season, March, April and May, until the cassava harvest begins in July. Prices for staple foods increase 30 to 90% between seasons. In general, food prices have risen 60 to 100% since 1968; however, the impact on nutrition is not known as there is no data on family income. (National Food and Nutrition Conference, 1974)

**CONSUMPTION AND HOUSEHOLD SIZE - DANFA:** In households of two people in 1968 in the Danfa area, daily per person consumption was 2455 calories and 84.5 grams of protein; in households of seven people, intake was 1527

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

calories and 51.4 grams of protein. Daily per capita intake in households of two people included 484 grams of cereals, 366 grams of starchy roots and fruits, 33 grams of legumes and other seeds and 72 grams of fish. In households of seven people, intake included 186 grams of cereal, 455 grams of starchy roots and fruits, 11 grams of legumes and 49 grams of fish. (Idusogie, 1974)

#### RURAL

**CHILD MORTALITY AND FATHER'S EDUCATION:** The highest proportion of deaths occurred among children whose fathers were either uneducated or had secondary education or higher. (North et al., 1975)

**MORTALITY AND FATHER'S OCCUPATION:** The highest rate of deaths among children was found in families where the husband's occupation was semi-professional or professional. (Engberg, 1974)

**CHILD ILLNESS AND DEATH, AUTHORITY, AND DIFFERENTIATION:** The numbers of child illnesses and deaths were higher in homes where the husband's authority was strong and lower in households where differentiation, as measured by household possessions, was high. (Engberg, 1974)

**NUTRITION STATUS AND MOTHER'S WORK:** Of all variables tested, the trading activity of the mother is the one most significantly associated ( $p < .001$ ) with the nutritional status of the child. The small amount of money that a female trader earned was applied directly to the nutritional benefit of her children. (Tripp, 1981)

**WEIGHT FOR AGE AND PARENT'S TRADING:** 83.3% of children were above median weight for age in families where father and mother engaged in trading activities. 73.3% of children were above median weight for age if only mother traded. 57.9% of children were above median weight for age if only father traded. 34.5% of children were above median weight for age in families where neither parent traded. (Tripp, 1981)

**WEIGHT FOR AGE AND FARM SIZE:** Children achieving 75% or more of the Harvard Standard for weight for age came from farm units working two or more bush farms significantly more often than from smaller farms. (Tripp, 1981)

**HEALTH AND SEASONS:** Rains are present from March to October and malaria incidence increases. November to February are dry, and eye and respiratory infections increase. (Ofosu-Amaah and Neumann, 1979)

**FOOD EXPENDITURE AND ALCOHOL:** Expenditure on items such as drinks and clothes varied at different times of the year, according to income, but expenditure on alcoholic drink was always second only to food. (Davey, 1974)

**CLINIC USE AND EDUCATION:** Among adult women, clinics were used more often by educated females (29.2%) than uneducated females (19.8%). (Belcher et al., 1976)

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HYGIENE: 90% of children under 6 years defecated near the home in areas likely to be frequented by others. (Ofosu-Amaah and Neumann, 1979)

## URBAN

CHILD MORTALITY AND PARENT'S EDUCATION: Reports of number of children dying were inversely related to degree of education of parents. Among highly educated mothers, 9% of the children had died; 10% among educated parents; 12% among couples where only the father was educated; and 17% in families where neither parent was educated. (Dovlo, 1968)

BREAST FEEDING AND PARENT'S EDUCATION: There was a marked tendency for children of educated parents to be taken from the breast earlier than those of uneducated parents. 6 of 137 educated mothers had taken the child from the breast by three months or earlier. One out of 156 uneducated mothers married to educated men had done so. Long duration of breast feeding was the rule among 106 families in which both parents were uneducated. In only one case was the child taken from the breast at eight months, this being the earliest case. This correlation may be an artifact or the effects of education on income, which in turn may influence feeding behavior. (Dovlo, 1968)

SUPPLEMENTATION AND PARENT'S EDUCATION: Supplementary feeding tends to start earlier among educated women. The mean age when the first supplementary food given was 3.4 months in highly educated families, 5.4 months in families where both parents had had some education, 6.8 months in families where only the father was educated, and 6.0 months in families where neither parent had been educated. (Dovlo, 1968)

WEANING AGE AND EDUCATION OF PARENTS: Duration of breast feeding decreased with increased education of parents. The mean duration of breast feeding was 5.8 months in families with highly educated mothers and fathers; 12 months in families where both parents had received some education; 14.1 months in families where only the father had received some education; and 17.8 months in families where neither parent had received any education. (Dovlo, 1968)

EDUCATED MOTHERS' PRACTICES: Educated mothers were more likely to give their children imported foods such as baby milk and cereal preparations; they were also more likely to give their children eggs. (Dovlo, 1968)

SPECIAL FOODS AND EDUCATION: While the child was breast feeding 100% of highly educated mothers prepared separate foods for the infant; only 80% of mothers did so in families where neither parent was educated. After stopping breast feeding only 50% of highly educated mothers prepared separate foods for their infants. 20% of women from families where neither parent had received education prepared these special foods. (Dovlo, 1968)

PROTEIN FOODS: Very few parents reported that they withheld meat, fish, and eggs because of taboos. (Dovlo, 1968)

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

PROTEIN FOODS AND EDUCATION: 10% of highly educated parents gave their children fish or meat; 9% of educated parents; 6% of parents where only father was educated; and 8% of parents where neither parent was educated. (Dovlo, 1968)

PROTEIN FOODS AND EDUCATION: The percentage of mothers who said they gave fish or meat to their children was not appreciably larger among educated mothers. Educated mothers included beans (legumes) in the list of foods they gave to their children much more often than the uneducated mothers, but the proportion of educated women who gave beans was still less than one in five. (Dovlo, 1968)

NUTRITION REHABILITATION CENTER CLIENTS: Most of the children admitted to the nutrition rehabilitation center in Accra had mothers who were in polygamous marriages and the children were younger siblings in large families. (Osei-Boateng, 1979)

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## 5. NUTRITION AND HEALTH POLICIES AND PROGRAMS

### 5.1 NUTRITION AND HEALTH POLICIES

#### NATIONAL

**GOVERNMENT PRIORITIES:** The government's priority budget areas are agriculture, fisheries, forestry, roads, rural water facilities, and low cost housing. Of prime concern are agricultural improvement to reduce flow of migrants to the cities; cutting food imports; raising exports and exchange earnings; and improving nutrition. (Beamer and Gangloff, 1974)

**HUMAN NUTRITION:** The Ministry of Health included a division responsible for human nutrition with a staff of 188. (Sai, 1978)

**PLANNING ASSISTANCE:** Kaiser Foundation International provided technical services to assist the Ministry of Health in establishing a management and planning unit and in the preparation of the health sector portion of the five year plan for development. (TAICH, 1976)

**RECOMMENDATIONS CONCERNING CHILD FEEDING:** At the National Food and Nutrition Conference, participants recommended that regular surveillance of nutritional status should be carried out over the next five years; Morley weight charts should be used at child welfare clinics; toddler scales should be provided to all child welfare clinics; all children should be vaccinated for measles; use of local foods for weaning should be improved; and advertising of artificial milk should be prohibited. (Ofosu-Amaah, 1974b)

**RECOMMENDATIONS FOR NUTRITION PLANNING:** The 1974 conference on Nutrition and Development in Ghana recommended that a Nutrition Planning Sector should be constituted within the Ministry of Economic Planning; that all development programs have nutrition goals; that the importance of nutrition should be emphasized in training programs for agriculture and health; that development for small farmers take nutritional objectives into account; and that development in the health sector should emphasize breast feeding and weaning, immunization and integrated health, nutrition and family planning programs. (Ofosu-Amaah, 1974b)

**HEALTH BUDGET:** The government budget for health services was \$.02-.03 per capita. The recurrent health budget rose from \$15 million to almost \$93 million between 1967 and 1975. 80% was spent on curative services. (Sai, 1978)

**HEALTH CENTER BUDGET:** In the 1970-71 budget there was a capital investment allocation of 1.747 million new cedis for health center and rural health posts. This allocation is almost four times the previous year's allocation. (Beamer and Gangloff, 1974)

**POPULATION POLICY:** The Ghanaian government proclaimed an official policy on population in 1969. The government pledged that it would provide services to couples who wished voluntarily to limit their families and the Ghana National Family Planning Program was created to provide those services. (North et al., 1975)

## 5.1 NUTRITION AND HEALTH POLICIES (Cont.)

**COST OF IMPORTED FOODS:** Local food prices have skyrocketed while prices for many imported foods, including baby foods and milk products, are officially controlled--though infant formula even at controlled prices would be available to few Ghanaian mothers. (FAO, 1979b)

**MATERNITY LEGISLATION:** Ghanaian legislation provides for paid maternity leave during the early months, when exclusive breast feeding requires the mother to be with the baby continually, as well as two half-hour nursery breaks per working day thereafter. (FAO, 1979b)

**MATERNITY LEGISLATION:** Legally the pregnant female worker is granted leave 6 weeks before and 6 weeks after confinement. A woman may also make use of her annual leave entitlement during the maternity period, so that the working woman may have a maximum of three months at home to nurse her baby. (Pappoe, 1979)

**MATERNITY LEAVE:** The government pays for three months of maternity leave. Private firms must give the same amount, on at least half pay, applying annual leave if required. Because women are generally dependent upon their own earnings and pregnancy is very frequent, employers often believe women are expensive to employ and that staffing continuity in a job is further complicated by the hiring of women. (North et al., 1975)

**NURSERY BREAKS:** Provision is made by law for 2 half-hour nursing breaks with no age limit. It is not specified whether breaks are to be remunerated, nor whether this applies only to government employees. (Richardson, 1975)

## 5.2 NUTRITION AND HEALTH PROGRAMS

### NATIONAL

**PROGRAM COVERAGE:** The integrated nutrition and primary health care program reaches only 6% of all preschoolers. If the Government of Ghana decided to expand the integrated preschool program to reach the remaining 94% of children currently lacking services, they would need 16 times the amount of donated foods currently coming into Ghana. This would seriously strain local administrative capacity. (Austin et al., 1981)

**NUTRITIONAL STATUS AND USE OF CLINICS:** Regression analysis indicates that clinic service has less impact on the initially well-nourished child, so the strategy of enrolling plump and healthy children later than thin ones is rational. (Austin et al., 1981)

**HEALTH CENTERS:** In addition to government and private hospitals and clinics there are about 40 rural health centers spread throughout the nine administrative regions of the country. (Beamer and Gangloff, 1974)

**CLINICS HAVE POSITIVE EFFECT ON NUTRITION:** The integrated nutrition and primary health care program has the greatest impact on infants who are initially malnourished, despite some tendency for malnourished infants to

improve in status over time (regression toward the mean) even without treatment. (Austin et al., 1981)

**EFFECTIVE PROGRAM:** Variables which were effective in an integrated nutrition and primary health care program as measured by final weighing were: teaching the use of protein supplements and oral rehydration, and other variables related to the prevention and treatment of infection. (Austin et al., 1981)

**NUTRITION EDUCATION DURING CHILD WEIGHING:** Nutrition education appears from the regression results to have a high payoff in nutrition status outcome. It appears that learning of the weight and dietary advice occurred most effectively during the individual weighing sessions where the mother saw the weight chart procedure modeled using her own child and received dietary advice suited to her child's age and condition. The health worker can and should talk to the mother while she is actually weighing and examining the child. (Austin et al., 1981)

**CLINICS AFFECT NUTRITION STATUS:** Regression analysis suggests that socioeconomic variables were of secondary importance to program component variables and to biological variables in determining nutritional status of young children. This is a credit to the clinics of Ghana. (Austin et al., 1981)

**NUTRITION REHABILITATION CENTERS:** Nutrition rehabilitation began in Ghana in 1970. There are now centers in the regions of Brong Ahafo, Central, Upper, and Greater Accra, and Ashanti. (Boohene, 1974)

**NUTRITION EDUCATION CLASSES:** Mothers who attended nutrition education classes were taller, heavier, rural, younger women with husbands in higher occupational categories, and who owned land. These women had shorter travel time to reach the clinics, fewer children of higher birth weight who had more immunizations. These mothers were less likely to be economically active but were more likely to have weaned the child from the breast at the time of the first interview. They did not score higher on measures of nutrition knowledge. The profile suggests an economically better-off rural woman living near the clinic for whom nutrition education classes function as a social event. (Austin et al., 1981)

**SUPPLEMENTARY FOOD AND CLINIC ATTENDANCE:** In health centers offering supplementary food, food collection was positively associated with attendance. However, the fourth largest clinic in terms of numbers of recipient visits gave out a negligible amount of food, but ranked second in outcome nutrition status. (Austin et al., 1981)

**COSTS OF SUPPLEMENTAL FOOD:** A study of health centers which distributed supplementary food found little effectiveness for the supplemental food component, which represented 67% of total costs and 91% of variable costs. (Austin et al., 1981)

**NUTRITION AND HEALTH COSTS:** In clinics which offered integrated nutrition and primary health care programs as well as supplementary food,

total annual costs per recipient visit ranged from \$1.37 to \$3.70. The mean cost was \$2.50. Without food, however, the annual cost dropped dramatically to an average of \$0.78 per recipient visit. (Austin et al., 1981)

VILLAGE LEVEL WORKERS: Village level workers could use the growth chart effectively to provide nutrition surveillance, nutrition education, and referral to health facilities. (Austin et al., 1981)

EXTENSION WORKERS: The Government of Ghana had 77 female extension workers operating in five regions. Their annual work program included two months of focusing on nutrition in relation to food production and diet improvement. (North et al., 1975)

FEMALE AGRICULTURAL ASSISTANTS: The Ministry of Agriculture started a country-wide program in which female agricultural assistants advised farmers' wives in the rural areas to grow more legumes (groundnuts, beans, and peas) to supplement the starchy roots which are the dietary staples. (Sraha, 1971)

EDUCATION IN NUTRITION: Women have access to 90% of non-formal education in nutrition, and 100% of non-formal education in home economics. (North et al., 1975)

PL 480 TITLE II FOODS: 28,828,000 pounds of food (soy-fortified sorghum, vegetable oil and wheat soy blend) worth \$5,211,800 is planned for distribution in FY 1982 and through maternal-child feeding, school feeding and food-for-work programs. (Food for Peace, 1981)

NUTRITION EDUCATION AND PL 480: An evaluation of PL-480 food distribution noted that the nutrition education component of the program was done very well. Nearly every distribution point observed during the evaluation offered nutrition education classes with food demonstrations. Classes were conducted in local languages; concepts were explained in "plain language" and jargon was avoided. Mothers listened attentively. Personnel in the program were Ghanaian people so that knowledge and teaching skills would remain in the country. (Jones et al., 1981)

FOOD ASSISTANCE PROGRAMS: Three major sources of food assistance have been the United States through Food for Peace, the United Nations through the World Food Program and the European Economic Community. Many other nations have helped with food; in 1981 these included the Netherlands, Canada, France, Switzerland, Germany, the Peoples Republic of China and Italy. (Jones et al., 1981)

CATHOLIC RELIEF SERVICES: U.S. Title II foods were distributed to about 130,000 preschoolers by CRS in 1977. Foods distributed were sorghum flour, wheat soy blend, non fat dry milk and oil. (Austin et al., 1981)

CATHOLIC RELIEF SERVICES: CRS runs a preschool program which includes the following activities: monthly weighing; interpretation of the weight to the mother; examination of the child by a nurse; cooking

demonstrations and group education concerning health, nutrition and hygiene; and distribution of PL-480 foods. (CRS, 1974)

**CRS PRESCHOOL PROGRAM EVALUATION:** In 1973, an evaluation of the preschool program was carried out by Frødericka Jacob, based on information extracted from the Morley weight charts used in the program. Improvement in growth rate was linked to attendance. There was an increase in the percentage of children with acceptable body weights, especially among children attending the program for at least 12 months. Improvement in nutrition status, as measured by percentage of children with acceptable weight, was smaller in the south than in the north. (CRS, 1974)

**CATHOLIC RELIEF SERVICES:** CRS under U.S. PL480 runs an extensive food distribution program. The preschool program consists of weight assessment using Morley charts, interpretation of weight to the mother, examination of the child by a nurse, and group education about cooking, child care, and nutrition. Foods distributed include bulgur wheat and corn-soya-milk mix. (Sai, 1978)

**EFFECTS OF DONATED FOODS:** Donated foods distributed in clinics were not found to be effective either in improving nutritional status of young children or in increasing nutritional knowledge of the mothers. (Austin et al., 1981)

**FAMILIES WHO RECEIVE FREE FOOD:** Free food appeared to go to lower income families with large numbers of preschoolers. The mothers were older, less educated, lived in poorer quality housing, weighed less and had experienced more children dying. They had high rates of participation, but children had received relatively fewer immunizations. These mothers had not attended more nutrition education classes and did not rate high in nutritional knowledge. Thus there is a question whether the food was serving the function of motivating nutrition education as intended by CRS policy. (Austin et al., 1981)

**MCH CENTERS:** There has been very little development of maternal and child health services outside the main towns. The major thrust has been to attract the women and children to come to static clinics, although it is well known that they cannot travel the long distances frequently. (Sai, 1978)

**YOUNG CHILD HEALTH CARE:** Young children are heavy users of health services. Infants were taken to clinic for 58.7% of their care but use of the Danfa Project clinic declined with increasing age. (North et al., 1975)

**CHILD HEALTH CARE:** Children under 5 accounted for 25% of all patients in a Ministry of Health survey. (North et al., 1975)

REGIONAL

**NUTRITION PROGRAMS IN THE ASHANTI REGION:** There are several nutrition programs: a nutrition education program, malnutrition clinics serving about 1500 children, a nutrition rehabilitation center in Kumasi Hospital serving 1000 children per year, the child supplementary feeding program serving about 700 through the NRC in Kumasi, and a group of about 1000 children served in a preschool nutrition program. (National Food and Nutrition Conference, 1974)

**NUTRITION PROGRAMS IN THE BRONG AHAFO REGION:** Nutrition programs included: several nutrition education programs aimed at mothers; malnutrition clinics serving about 700 children; child welfare clinics serving about 10,000 children; the nutrition rehabilitation center serving about 100 children; 1908 children in 32 day care centers, some of which received UNICEF foods, and the prenatal program serving about 5,000 pregnant women. (Ofosu-Amaah, 1974b)

**NUTRITION PROGRAMS IN THE CENTRAL REGION:** There is a day care nutrition rehabilitation center with an average enrollment of 20 patients and a Catholic Relief Services program of preschool feeding which reaches about 45,000 children from one month to six years of age. Nutrition education is an important activity of the nutritionists, but the targets of the programs and their focuses are not clear. (National Food and Nutrition Conference, 1974)

**NUTRITION PROGRAMS IN THE EASTERN REGION:** Nutrition programs include nutrition education with classes given to women's groups in private homes and schools. In the Ministry of Agriculture, three technical officers devote much of their time to development of backyard gardens in three villages. All staff involved in nutrition are restricted in their mobility because of poor transportation resources. (National Food and Nutrition Conference, 1974)

**USE OF RELIEF FOODS - NORTHEAST:** In the Northeast Region among mothers from compounds with sufficient foods to last until the next harvest, 33% collected relief foods, 40% said these foods were eaten only by children, 14% reported that foods were consumed by mother and children, and 46% said the whole family ate relief foods. Among families with insufficient foods to last until the next harvest, 26% of the mothers collected relief foods, 31% said these foods were consumed by children only, 15% by children and mother, and 54% by the whole family. (Gordon, 1974)

**NUTRITION EDUCATION AND SUPPLEMENTRY FEEDING - NORTHEAST:** In the Northeast Region among 196 mothers who received nutrition education, 41% suggested that the child should receive supplementary feeding at 0 to 5 months, 29% said 6 to 8 months, and 30% said to start after 9 months of age. Among 104 mothers who did not receive nutrition education, 21% said the child should be supplemented between 0 and 5 months, 25% said 6 to 8 months, and 54% suggested starting after 9 months of age. (Gordon, 1977)

**NUTRITION PROGRAMS IN THE NORTHERN REGION:** In the Northern Region, extensive and active nutrition programs are run by the malnutrition wards, well baby clinics and Catholic Relief Services. These programs reach several thousand children, but this is only a fraction of those in need of assistance. All programs combine food supplements with nutrition education. 68 officers of the Ministry of Health are engaged, at least part time, in nutrition education. Because contact is intensive with individuals and groups, the numbers reached are not great. The Ministry of Social Welfare and Community Development also conducts some nutrition education during literacy courses. (National Food and Nutrition Conference, 1974)

**APPLIED NUTRITION PROGRAMS - SOUTHERN REGION:** The Applied Nutrition Program in Baafi village in the Southern Region combines agriculture, nutrition, and health. Extension Officers in the area visit at regular intervals to teach the farmers better methods of cultivation, particularly for food crops. A program of disease prevention and health education involved weighing preschoolers and using the Road to Health Charts to monitor growth; giving immunization and malaria prophylaxis; and teaching environmental hygiene. Each month a health talk was given to mothers (and some fathers) and a nutrition talk with a cooking demonstration was included. (Orraca-Tetteh and Watson, 1976)

**NUTRITION PROGRAMS IN THE VOLTA REGION:** In this region, nutrition education reaches 3000 people each month. Some individuals receive CRS supplementary foods, but these seem to be passed out on an irregular basis to whoever needs them, including adults. The supply is irregular and the food is often of poor quality, but there is no acceptability problem. (National Food and Nutrition Conference, 1974)

**NUTRITION PROGRAMS IN THE WESTERN REGION:** Nutrition programs include the Catholic Relief Services preschool feeding program which reaches 800 to 900 children per year. There are no reported acceptability problems with CRS foods, but the irregular and unbalanced supply is detrimental to the program. Malnutrition clinics in the region serve an average of 400 children per month. Nutrition education programs are an important activity of the local officials of the Department of Social Welfare and Community Development. (National Food and Nutrition Conference, 1974)

## RURAL

**PRIVATE VOLUNTARY ORGANIZATIONS:** 16 voluntary organizations run projects in health and/or nutrition, operating medical facilities, clinics, dispensaries, MCH centers, hospitals and other programs; donating drugs and medical supplies; and teaching hygiene, nutrition, sanitation, gardening, and poultry raising. (TAICH, 1976)

**MEDICAL MISSION SISTERS:** The Medical Mission Sisters operated a hospital at Berekum with education programs in nursing and midwifery, 9 satellite clinics, and medical supervision of 2 health and maternity centers. Health education and hygiene classes, and a demonstration vegetable garden were provided for those attending the nutrition and under-5

## 5.2 NUTRITION AND HEALTH PROGRAMS (Cont.)

clinic. Another hospital at Techiman includes prenatal clinics, nutrition clinics, an under-5 clinic, and health teaching. (TAICH, 1976)

**CATHOLIC RELIEF SERVICES:** The Catholic Relief Services (CRS) in fiscal year 1975 included administration of the U.S. Government Food for Health and Development Program, donating food to 75,000 mother and children in maternal and child health centers. CRS imported and distributed clothing, medicine, and education materials, and ran a preschool nutrition education program in 80 centers. (TAICH, 1976)

**NO HEALTH CARE:** About 50% of the rural population has no access to preventive or curative health care. (Ofosu-Amaah and Neumann, 1979)

**CLINIC USE AND CHILD'S AGE:** There is a decline in clinic use with increasing age. Clinics are used most frequently by preschool children. (Belcher et al., 1976)

**CLINICS AND MEDICAL EXPENDITURE:** Young children were generally taken to government clinics where treatment was free so that their major medical cost was for transportation. (Belcher et al., 1976)

**USE OF DRUG SELLERS:** Use of drug sellers was widespread, but only about half as frequent as clinics. In survey areas where clinics were least accessible, drug sellers served a higher proportion of the ill population. (Belcher et al., 1976)

**DANFA HEALTH CENTERS:** The Danfa Health Center offers maternal and child health services, nutrition education, and child weighing programs. (Ofosu-Amaah and Neumann, 1979)

**MIDWIVES IN DANFA:** 92% of women in the Danfa area attend antenatal clinics staffed by professional midwives. Only 33% are delivered by trained personnel; 30% are delivered by traditional birth attendants. 20% are delivered by relatives, and 17% deliver themselves. (Nicholas et al., 1976)

**DISTANCE TO HEALTH CARE:** A comprehensive study of the clinic at Danfa found that 75% of preschool children came from within 2 km. of the clinic and that coverage beyond this distance was poor. (Austin et al., 1981)

**HEALTH/NUTRITION KNOWLEDGE:** Traditional birth attendants were asked why children become malnourished after 6 months of age. The most frequent answers were: insufficient food, insufficient breast milk, fever, teething, and malaria. (Nicholas et al., 1976)

**NUTRITION ADVICE:** Only a few traditional birth attendants reported that they gave nutritional advice during pregnancy. (Nichols et al., 1976)

**NUTRITION ADVICE:** Most traditional birth attendants did not care for the child after the first week of life, although 15% occasionally gave some advice. (Nicholas et al., 1976)

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**NUTRITION ADVICE:** The typical traditional birth attendant advised mothers to supplement infants' diets at 4 months and to breast feed for 12 months. Two-thirds said the child should be eating an adult diet by about one year of age. (Nicholas et al., 1976)

#### URBAN

**NUTRITION REHABILITATION CENTERS:** The main objectives of the nutrition rehabilitation centers are: educating mothers of malnourished children to use their small food budgets to buy and use less expensive, nutritious foods in preparing meals for their children; instructing mothers in improved feeding practices and child care; and helping to rehabilitate children discharged from the hospital after treatment for malnutrition. (Osei-Boateng, 1979)

**NUTRITION REHABILITATION CENTER IN ACCRA:** The nutrition rehabilitation center in Accra admits children with nutritional diseases, especially PEM. The center is run on an ambulatory basis five days a week. The average length of stay is six to twelve weeks. Two meals and a snack are served daily and, after discharge, children receive food supplements. Children are admitted on the condition that mother will attend with them daily. Mothers are educated concerning health and nutrition and are supervised in buying food, cooking, and feeding their own children. After discharge, children and mothers are visited at home. Parents can receive vocational training if unemployment interferes with buying their children adequate food. (Osei-Boateng, 1979)

**NUTRITION REHABILITATION CENTER IN ACCRA:** The Nutrition Rehabilitation Center in Accra cares for malnourished children, educates their mothers through demonstrations of food preparation and child feeding, detects malnourished children and treats them on an outpatient basis when possible and does nutrition education. (Boohene, 1974)

## NATIONAL

**NUTRITION PROBLEMS:** The National Nutrition Survey of 1962 found that most people receive about 70% of the recommended intake for calories and about 60% for protein. The problem seems to be getting worse due to factors including the decline of real income, population growth, the slow and irregular growth of the agricultural sector, and the effects of world wide inflation. (Abudu, 1975)

**NUTRITION PROBLEMS:** The nutrition problem in the country is affected by factors including seasonality in the production of highly perishable foodstuffs, poor storage and distribution resulting in seasonal gluts, and food shortages, which are especially marked with protein foods, fruits and vegetables. These problems result in PEM, undernutrition, and hungry seasons. (Abudu, 1975)

**RATES OF MALNUTRITION:** It was the opinion of professionals that the previously published figures on disease, malnutrition and mortality have changed little for the country as a whole. Some decreases were cited for the urban areas but in many rural zones (the Upper, Western and Brong Ahafo Regions) some increases had been experienced. (Jones et al., 1981)

**NATIONAL NUTRITION IMPROVEMENT PROGRAM:** A national nutrition program has been proposed by a member of the National Economic Planning Council. It provides a framework for long-term improvement in nutrition. Its policy measures include improvement of food production and marketing, family planning, and hygiene. Regulatory control of food production and imports are considered. Development of nutrition education for planners, health workers, teachers, administrators and other influential groups is planned. Training of field workers, increased food production, community activities, fortification and supplementation of foods, distribution and marketing are discussed. A government administrative structure and a complete budget are included in the plan. (Abudu, 1975)

**CAUSES OF MALNUTRITION AND UNDERNUTRITION:** Malnutrition and undernutrition are caused by insufficient supply and consumption of protein foods, vegetables and fruits; high prices of food; food taboos; frequent pregnancies; inadequate health care; lack of knowledge of the relationship between poor diet and ill health, and increased nutritional need caused by illness. Socioeconomic factors also influence diet of poor people in rural areas through low family income, local ecological deficiencies, distribution problems, and food waste due to inadequate transportation and storage. (Abudu, 1975)

**MALNUTRITION AND MIGRATION:** Migration of active workers from farms into the urban, industrial and mining areas in search of higher paid jobs and perhaps a better social situation has resulted in a burden of caring for large numbers of dependents for those left in the village. This preponderance of dependents is, in part, responsible for the inability to satisfy the nutrient requirements in the poorer and larger families. (Baffour-Senkyire, 1974)

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**PRESCHOOL CHILDREN'S PROBLEMS:** The extra needs of rapid growth continue beyond the weaning age into the preschool years. Children in this age group must try and overcome the severe setbacks received during the weaning period. Protein and calorie deficiencies continue to be about 30 to 40% below requirements. Clinical signs of malnutrition actually increase, but weight gain improves during this period. The effect of seasonal shortages is important as weight gain virtually stops from April to August. (Davey, 1974)

**IMPROVING NUTRITION:** In order to improve nutrition status in Ghana, it is necessary to increase food production and introduce foods rich in vitamin A in the Coastal zone; in the forest zone, to increase the supply of protein foods; in the coastal zone, to increase food production. Nationwide, it is important to promote understanding of the special needs of vulnerable groups, to feed school children properly and to promote economic development. (Davey, 1974)

**IMPROVING YOUNG CHILD FEEDING:** Mothers should be educated to introduce supplementary foods to children between four and five months of age. They should be informed of the necessity of giving more food to children during weaning. Use of eggs, milk, fish, meat and legumes should be stressed. The use of cereals, maize, millet, rice and bread should be encouraged in preference to starchy foods such as plantain, cassava, and cocoyam. (Davey, 1961c)

**SUPPORT FOR BREAST FEEDING:** When working women were asked for suggestions for institutional support for adequate breastfeeding suggestions included that mothers be allowed to work half day during the first year of a child's life and longer maternity leave. (Pappoe, 1979)

**EFFECTS OF BREAST FEEDING POLICY:** The author interviewed personnel officers and managers in the public and private sector who had very negative feelings toward female employees due to frequent maternity leaves, disruption of work, remuneration for work not done, and inexcusable absenteeism. (Pappoe, 1979)

**HAZARDS OF BOTTLE FEEDING:** Among impoverished families, bottle feeding may lead to infant death through diarrhea caused by contamination of the bottle or its contents. Children from poor families may be given very diluted formula because of the expense of bottle feeding and become malnourished. (Ofosu-Amaah, 1974a)

**EXTEND HEALTH CARE:** The most important priority appears to be to extend the benefits of the present Ghana preschool program to the remainder of the population by use of lay workers recompensed by the community. Such a policy would be in keeping with a longstanding self-help tradition in Ghana, which has resulted in the construction and staffing of a large number of rural primary schools. (Austin et al., 1981)

**INDIVIDUAL NUTRITION EDUCATION:** Much nutrition information is best taught in one-on-one sessions with the mother at the time her own infant is weighed and when she can see the weight dot entered on the chart.

Dietary advice may be best absorbed when related directly to one's own infant. (Austin et al., 1981)

**ADULT NUTRITION EDUCATION - KWASHIORKOR:** Intensive education in the causes of kwashiorkor should be given in adult education classes. The true cause of kwashiorkor, lack of protein in the diet, is not fully understood. (Davey, 1961c)

**WEANING FOOD:** There is no high-protein traditional weaning food, and the incidence of protein-calorie malnutrition is high. There is an urgent need for the introduction of a low cost, high protein weaning food made from locally available foods. (Abudu, 1975)

**TARGET SUPPLEMENTARY FOODS:** Supplementary foods should be targeted specifically to those requiring the supplements. Analysis of integrated nutrition and primary health care programs shows that the package of clinic services as a whole was at least three times more effective in improving nutritional status of infants who were less well-nourished at the time of enrollment than children who were well-nourished when they entered the clinic program. The program of integrated nutrition and primary health care accomplished comparatively little for the initially well-nourished group. (Austin et al., 1981)

**COST OF SUPPLEMENTARY FOOD:** Providing supplementary food to all clinic attenders in integrated nutrition and primary health care programs is not generally very effective and is a very expensive process relative to all other components of the program. (Austin et al., 1981)

**NEED FOR EDUCATION:** The problems of the vulnerable groups are, in part at least, due to ignorance and lack of understanding of their special nutritional needs for each group. (Davey, 1974)

**TEACHING HEALTH WORKERS NUTRITION.** There are very few medical schools in Africa where the students are taught nutrition. Africa is producing doctors who know little about nutrition and all the nutrition which they learn, they learn from the drug houses and drug firms, especially the artificial feeding companies. This situation is not right, and doctors should be taught nutrition. Nurses must also be taught nutrition in order to teach mothers about nutrition. (Ofosu-Amaah, 1974b)

**MAINTENANCE OF WEIGHING SCALES:** There are hundreds of scales both for infants and toddlers in almost all of the regions. Once out of order, these scales cannot be maintained, so that asking for more toddlers' scales will probably involve the Government in more expenditure. (Ofosu-Amaah, 1974b)

**NATIVE HEALERS:** The native doctors are people of considerable prestige and status in the community. Any attempt to extend modern health services should include an evaluation of current and potential roles of these native healers with a view to utilizing their prestige and status to the greatest extent possible. (Beamer and Gangloff, 1974)

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**STAPLE FOODS AND INCREASING PRICES:** Staple foods are available in increasing quantities, but retail prices also continue to increase. The reasons for this include waste at the farm level, poorly developed distribution, marketing and storage facilities, and leakage out of the country into neighboring countries. People have changed their eating habits and changed the composition of their diets under the changing economic conditions. (Abudu, 1975)

**USE OF EGGS:** Villagers are often criticized for selling eggs rather than giving them to their children. At the present price of eggs, they may be wise to use the money to buy fish for the whole family. (Ababio, 1974)

**EFFECTS OF URBANIZATION:** The process of urbanization has drawn school-leavers from the agricultural areas to the cities, swelling the number of people dependent on market food supplies. A relatively smaller and aging population is left in the agricultural areas without any improved technology to produce food to feed an increasingly large urban population. (Abudu, 1975)

**ROLE OF WOMEN:** The working party on nutritional self-sufficiency for Ghana suggested that greater stress should be put on the role of the small near-subsistence farmers, especially women farmers, in food production. Their importance in food production is recognized in words, but not in the resulting policies. Credit facilities and agricultural inputs must be made available to small farmers through every available channel. (Ofosu-Ameah, 1974b)

## REGIONAL

**NUTRITION EDUCATION FOR MOTHERS - ASHANTI:** Education of mothers in basic nutrition is imperative. This education should be a continuous process to change their eating habits and the unsanitary methods of feeding infants. The education should be designed to reach illiterate people by using terms, language and figures of speech which they will understand. (Baffour-Senkyire, 1974)

**NUTRITION STATUS AND LOCATION - ASHANTI:** People living in the towns of the Ashanti Region had better nutrition status than people living in villages. People in towns have opportunities to earn extra money and the town markets have a wider range of foodstuffs. Similarly, people living in villages situated on the main truck roads had better nutrition status than people in villages off the main roads. (Baffour-Senkyire, 1974)

**EFFECTS OF DEFICIENCY OF B VITAMINS AND MINERALS - ASHANTI:** Deficiencies of B vitamins and minerals in the diet of the Ashanti region have contributed to ill health, low productivity and the slow rate of development in the region. (Baffour-Senkyire, 1974)

**WEIGHT OF CHILDREN AND SEASON OF BIRTH - UPPER REGION:** A significantly higher percentage of children aged 6 months during the hungry season have acceptable weights for their age than those who are six months old in the harvest season. A child who is 6 months in July, the hungry season, will have been born in January, a time of plenty. The mother will have eaten well in the last trimester of pregnancy, when foods were plentiful. This

will affect her weight gain and the birth weight of the child. She will also eat well in the first three months of lactation and have more breast milk than the mother who delivers in the hungry season. Birth weights of children born in the hungry season are likely to be lower, and with poorer lactation, the child will be smaller at six months, even in the harvest time, than the child who is 6 months old in the hungry season. (Gordon, 1974)

**FISH TABOO QUESTIONS:** In several regions, the fish taboo for young children is mentioned, yet typical diets, and presumably for children as well, include fish dishes. The following questions remain unanswered: How common is the fish taboo? Is there any basis in the fact that fish cause worms? How do you increase consumption? (National Food and Nutrition Conference, 1974)

**BREAST FEEDING IN THE CENTRAL REGION:** Breast feeding follows a pattern common to other regions: weaning at 6 to 12 months in the urban areas and 18 to 20 months in the country. The necessity of work for women and the impossibility of taking along the infant results in termination of breast feeding as early as 6 months for some urban women. Bottle feeding may be left to a sister, mother, or maid who does not understand the importance of sterile conditions for feeding infants. This suggests that the target of nutrition education ought to be the person caring for the baby, not necessarily the mother. (National Food and Nutrition Conference, 1974)

**FOOD PRODUCTION IN THE ASHANTI REGION:** Food crop farmers do not seem able to earn the same high returns on investments as cash crops. Farm gate prices in food fluctuate widely, and since on-farm storage is minimal, few farmers can take advantage of off-season high prices. (National Food and Nutrition Conference, 1974)

**FOOD DISTRIBUTION - UPPER REGION:** Food distribution at separate food clinics is not an effective way of selecting those who need relief foods. Those with insufficient food may not receive information about the distribution day or may not have the time or energy to come for food. In most families, all the children, if not the whole family, will eat the foods. It would be more realistic to give enough food for at least all the preschool children in a compound. (Gordon, 1974)

**MEDICAL CARE - ASHANTI:** A large part of the child mortality was due to late or unavailable medical care. Good medical facilities were found to be non-existent in rural areas. (Baffour-Senkyire, 1974)

## **RURAL**

**INCOME AND FOOD CONSUMPTION:** Because their cash income is very small, most farmers prefer to sell foods they have grown on their farms, although nutritionists have taught them to include such essential foods in their diet. Until the cash income of these people increases, they will probably continue to sell some of the foods they grow rather than consume them. (Opare, 1974)

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Ababio, S.

- 1974 How to Close the Protein Gap. In Nutrition and the Development of Ghana Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10 1974) ed. S. Ofoosu-Amaah, pp. 425-433, 1974.

This paper explores the problems of protein shortage and maldistribution. Increased production and decreased storage loss of protein foods are examined as well as the development and distribution of an infant weaning food.

Abudu, A.O.

- 1975 National Nutrition Improvement Programme. Accra: National Economic Planning Council, Parliament House. Unpublished draft. 19 December, 1975.

This document reviews the nutrition situation in the country and then proposes a national nutrition program. The program would integrate nutrition, health, education, agriculture and research. The proposal suggests government structures to administer the program and a budget for research and for recruiting and training the necessary personnel to carry out the project, as well as costs of all materials.

Adjetey, J.N.N.

- 1974 The Problems and Prospects of the Fishing Industry in Ghana in Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10, 1974) ed. S. Ofoosu-Amaah, pp. 381-385, 1974.

This article describes the methods, problems and plans for the future of the fishing industry in Ghana. Fish preservation and consumption are also described.

Austin, J.E., Belding, T.K., Brooks, R., Cash, R., Fisher, J., Morrow, R., Pielemeier, N., Pyle, D., Wray, J.D., and Zeitlin, M.F.

- 1981 Nutrition Intervention in Developing Countries. Study VII: Integrated Nutrition and Primary Health Care Programs. Prepared by the Harvard Institute for International Development for U.S. A.I.D. Cambridge, Ma.: Oelgeschlager, Gunn and Hain, 1981.

Original data.

Method: Longitudinal case study of nutrition programs selected to give a variety of geographical settings and nutritional education activities. Data was collected on anthropometry, socioeconomic status, water supply, and mothers' knowledge about child weight and nutrition.

Sample: 2000 mother-child pairs receiving nutrition education plus food supplements; 265 mothers with infants from 6 to 24 months old

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were included in the cost effectiveness survey.

Geography: 9 cities of Fijai, Adidome, Kotobabi, Adim Oda, Berekum, Damango, Kumasi, Navrango, and Assin Foso.

This study of integrated nutrition and health care programs was done to provide guidance to planners in developing countries and international development agencies on the nature and design of these nutrition interventions. It provides information about intervention design, costs, and effectiveness. Case studies of integrated programs are presented from Ghana and Lesotho.

Baddoo, M.A.

- 1974 The Pattern of Malnutrition in Ghana. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra Ghana April 8-10 1974 ed. S. Ofosu-Amaah, pp. 65-81, 1974.

Nutrition studies are reviewed to describe the patterns and prevalence of malnutrition existing in Ghana.

Baffour-Senkyire, J.K.

- 1974 The Magnitude of the Incidence of Kwashiorkor in the Ashanti Region. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10, 1974) pp. 327-334 ed. S. Ofosu-Amaah, 1974.

This article summarizes a study which was carried out in the Ashanti Region to determine the magnitude of the incidence of kwashiorkor, the rate of mortality, the state of nutrition, and the socioeconomic background of preschool children in the region. Kwashiorkor was found to be widespread and an important cause of child mortality. Most vulnerable were children one to five years old. Protein was in short supply, particularly in the diets of young children, and intake of B vitamins and minerals needed improvement.

Beamer, G. and Gangloff, L.J.

- 1974 Syncrisis: The dynamics of health. An analytic series on the interactions of health and socioeconomic development. X: Ghana. Rockville, MD: Public Health Service, Office of International Health. DHEW/Pub/OS-74-50006, June 1974

This report concludes from existing information that Ghana has seven major health problems: 1) low life expectancy, high infant and child mortality; 2) poor nutrition, especially for young children; 3) high incidence of communicable disease; 4) poor sanitation; 5) shortage of health facilities and health manpower, also poor distribution of personnel and facilities; 6) emphasis on curative, not preventive medicine; 7) low level of resources allocated to health. Agricultural productivity also needs improvement, especially protein-rich crops.

Emphasis in preventive medicine should be put on vaccination and potable water supplies, health education, maternal and child health and nutrition programs.

Belcher, S.W., Wurapa, F.K., Neumann, A.K., and Lourie, I.M.

1976 A household morbidity survey in rural Africa. Intern. Journal of Epidemiology 5(2):113-120, 1976.

Original data.

Method: Baseline morbidity questionnaire.

Sample: 500 households in each of 4 areas (2000 total) randomly selected and stratified for village size and household size.

Geography: The Danfa Project area of southern Ghana, including 310 villages covering 250 square miles.

A household morbidity interview survey is reported for a two week recall period. 20.8% of people reported some illness, injury, or disability. Adults averaged 0.5 days lost from work (an estimated annual loss of 13.4 days). Reported illness peaks in middle-aged adults and in females in their reproductive years. Clinic services were particularly sought for preschool children. Use of drug sellers was about half that of clinic attendance and increased in areas where clinics were not available.

Benneh, G.

1973 Population, food production and nutrition in a northern savannah village of Ghana. Food and nutrition in Africa, (12):34-43, July 1973.

Original data.

Method: Field survey of land; interview with farmers to discuss cropping sequence; household data collected through questionnaires; detailed dietary survey carried out in three compounds.

Sample: 557 people living in 50 dispersed compound houses ranging in size from 5 to 47 people.

Geography: Manga Bawku, a rural village in northeastern Ghana.

The aim of this study was to describe the land use pattern and techniques of farming, to assess the dietary habits of the farmers, and to determine the extent to which their food requirements were satisfied by the produce of their fields.

Blankson, J.M.

1975 Measles and its Problems as Seen in Ghana. Journal of Tropical Pediatrics and Environmental Child Health, pp. 51-54, February 1975.

This article describes the incidence of measles, and its regional and seasonal variation, clinical picture, correlation with malnutrition, and extent of measles vaccination.

**Best Available Copy**

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Blaek, W.

- 1976 Spacing of children, sexual abstinence and breast-feeding in rural Ghana. Soc. Sci. Med. 10(5):225-30, May 1976.

Original data.

Method: Interviews with women in clinics. Lineage members were interviewed and their actions were observed during the year the author stayed with them.

Sample: 100 males, 179 females, and 42 members of an extended family. All respondents lived in the same town. Women were interviewed when using a child welfare clinic.

Location: Rural town on the Kwahu Plateau located about 100 miles north of Accra.

Information collected from respondents in a rural town suggests that although people strongly favor the spacing of children, actual spacing is not the intentional result of birth control or sexual abstinence, but rather a coincidental result of a long period of postpartum anemorrhhea caused by prolonged lactation.

Boohene, E.S.

- 1974 Nutrition Rehabilitation in Accra, Ghana. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10 1974) ed. S. Ofosu-Amah, pp. 408-412, 1974.

Six nutrition rehabilitation centers have been established by the government in various regions of the country; the center in Accra is described in some detail.

Bruce-Tagoe, A.A., Belcher, D.W., Wuarapa, F.K., Turkson, P., Nicholas, D.D., and Ofosu-Amaah, S.

- 1977 Haematological Values in a Rural Ghanaian Population. Trop. Geog. Med., 29:237-244, 1977.

Original data.

Method: A survey conducted between January and March in 1973 was part of a series of village health surveys conducted every two years.

Sample: 20 villages randomly selected from 256 clusters in the Danfa Project. 97.5% of 3,745 eligible residents participated. 30% or 184 preschool children gave blood samples. 1078 persons using an urban hospital hematology lab were included.

Location: Danfa Comprehensive rural health and family planning area.

Residents were studied to determine the prevalence of anemia. Moderate anemia was fairly common in children and young women but severe anemia was rare. Malarial infection and diets low in iron content were major factors affecting hemoglobin values.

CRS (Catholic Relief Services)

- 1974 The Nutrition Work of Catholic Relief Services in Ghana. In Nutrition and the Development of Ghana Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10 1974). ed. S. Ofosu-Amaah, pp. 397-407, 1974.

This article describes the history and the current work of the Catholic Relief Services, including the preschool nutrition program, the school feeding program, food for work, and small locally initiated development programs.

Dako, D.T., and Watson, J.D.

- 1974 Baafi - a case study in the assessment of nutritional status. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra Ghana (April 8-10, 1974), ed. S. Ofosu-Amaah, pp. 297-319.

Method: A nutrition status survey conducted in 1972. Method not specified for measures of intake and anthropometry.

Sample: Total population, 379 people, 176 males and 203 females.

Location: Baafi, a small village in the Brong-Ahafo Region.

Few children in the village were adequately nourished when evaluated by anthropometric methods. Intakes of pregnant women were found to be inadequate generally. Weaning foods were starchy and animal foods were not usually used in weaning diets.

Davey, P.L.H.

- 1974 A summary of conclusions and recommendations of the National Nutrition Surveys of 1961 and 1962. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana April 8-10, 1974, ed. S. Ofosu-Amaah, pp. 203-221, 1974.

Original data.

Method: Dietary surveys of kinds and amounts of foods eaten, anthropometry, and medical examinations.

Sample: In 1961, 43,000 men, women, and children of all ages in 71 towns and villages in all regions of the country. In 1962, two places in each region were selected and 400 people in each place chosen for more intensive studies.

Geography: National.

This paper summarizes the conclusions of the national nutrition survey conducted in 1961 and 1962. Nutrition problems varied by region and included vitamin A deficiency, kwashiorkor, and deficiency of B

## BIBLIOGRAPHY (Cont.)

vitamins. Nutrition was best in the coastal zone and in fishing villages, but even there staples were in short supply from April to July.

Davey, P.L.H.

- 1961a Breastfeeding and the nutrition of children from birth to two years of age. National Food and Nutrition Board of Ghana, unpublished mimeographed report.

Original data.

Method: Random sampling, based on examination of whole communities in case of villages, cross-sectional in case of towns. 24 hour recall done by mother; heights and weights, of children.

Sample: 2463 children up to 24 months old.

Geographic location: National.

This paper describes breastfeeding and weaning throughout Ghana, and its effect on the growth of infants and young children from birth to two years of age. Breastfeeding is maintained longer in the north than the south, especially in Accra and Kumasi. Growth is up to standards to about eight months, after which it slows. From five months to one year children on supplementary feeds are heavier than those on breast milk only. Children completely weaned are heavier than those still on breast milk. First foods are usually cereals. After the child is taken from the breast, amounts of cassava and other less nourishing foods increase. The author makes a number of recommendations, including increased use of cereal, milk, fruit, eggs, fish, and meat, and decreased use of starchy foods and pepper.

Davey, P.L.H.

- 1961b The nutrition of pregnant women. National Nutrition Survey, 1961-62, National Food and Nutrition Board of Ghana, unpublished.

Original data.

Method: Cross-sectional random sample. Questionnaire and clinical examination.

Sample: Analysis based on information for 953 pregnant women. 228 pregnant women and 1500 non-pregnant women were examined. Hemoglobin values were determined for 510 pregnant women and 2000 non-pregnant women. 5-day consumption records were obtained for 8 pregnant women and 100 non-pregnant women.

Geographic location: National.

This report concerns nutrition of pregnant women. Fifty percent more pregnant women have signs of malnutrition than non-pregnant women in the same age groups. Weight gains are only 1/2 of the desirable amount in pregnancy. Pregnant women do not appear to eat more food than non-pregnant women. The author recommends that nutrition education focus on urging pregnant women to eat more, especially fats, oils and protein foods.

Davey, P.L.H.

1966 National Nutrition Survey: Nutrition of Children 1-4 years of Age.  
National Food and Nutrition board. Unpublished mimeo.

Original data.

Method: Heights and weights were measured. Clinical exams were carried out. Dietary intake was obtained through food frequency interviews and direct observation of meals.

Sample: 1748 boys and 2007 girls 1 to 4 years of age.

Location: National.

Information obtained by the national nutrition survey indicated that the nutrition of children 1 to 4 years of age was very unsatisfactory. 40 to 50% of children were underweight, and 18% had clinical signs of malnutrition. Inadequate intake of calories and protein occurred throughout the country, with vitamin A deficiency in the North and B vitamins and calcium deficiency in the south. Children in the forest area, where the staples were starchy roots, did not grow as well as children in the coastal areas who eat more cereals and greater amounts of meat and fish. Kwashiorkor affected children in this age group. 20,000 children may die from kwashiorkor each year.

den Hartog, A.P.

1970 Some Aspects of Food Habits in Pantang (a Farming Community in the Coastal Savannah of Ghana). Rome: Joint FAO/WHO/OAU(STRC) Regional Food and Nutrition Commission of Africa, Accra, Ghana, Sept. 1970.

Original data.

Method: Not available.

Sample: Information not available.

Geographic location: Pantang, a farming community in the coastal savannah with 353 residents.

Only a few pages of this report were available to the reviewers. The author reports on food habits and preferences of adults and children. Most children are breastfed to one year or more. Bottle feeding is rare. Solids are first given between 3 and 8 months. Mothers were also asked about their beliefs about child feeding.

Dovlo, F.E.

1968 A study of infant feeding practices in Accra. FRI Research Bulletin (1):32-46.

Original data.

Method: Cross-sectional. Non-random; surveyed only users of health services. Personal interviews were conducted by technical assistants from the FRI using a questionnaire.

Subjects: Mothers who had brought small children to clinics or the

## BIBLIOGRAPHY (Cont.)

outpatient departments of hospitals; 399 questionnaires plus 10 educated mothers who filled out questionnaires themselves.  
Geography: Princess Marie-Louise Children's Hospital, Jamestown Clinic and the Osu Clinic in Accra.

The influence of parent education, economic factors, and the role of restrictive practices in child feeding in Accra were studied. Data presented indicate few differences among mothers in the patterns of child feeding, although there was a general tendency for educated mothers to feed their children more imported proprietary baby foods and special foods such as eggs. Also noted was a general tendency to withhold important protein-source foods such as meat and fish from children because these foods were thought to cause various "illnesses." There was no indication that taboos constituted a serious threat to child nutrition in the city.

Engberg, I.E.

- 1974 Household Differentiation and Integration as Predictors of Child Welfare in a Ghanaian Community. Journal of Marriage and the Family, pp. 389-99, May 1974.

Original data.

Method: Interviews and observations carried out by 5 students of social work who lived in the community for 6 weeks.

Sample: 133 mothers whose first-born was between 12 and 15 years old at the time of the interview.

Location: Madina, 10 miles north of Accra.

This research was carried out to increase understanding of the relationships between family variables and measures of child welfare. The concept of differentiation was measured by ten household and nine individual indicators. The concept of integration was measured by 12 indicators. These variables were factor-analyzed and the significant measures in each set were used for multiple regression analysis with four measures of child welfare. Child welfare was not explained by the use of individual measures on their own; integration was important to consider along with differentiation and the wife's level of differentiation had a significant independent effect.

FAO (Food and Agriculture Organization)

- 1979a Review of Food Consumption Surveys 1977 Vol. 2: Africa, Latin America, Near East, Far East. FAO Food and Nutrition Paper. Rome: Food and Agriculture Organization of the United Nations, 1979.

Original data.

Method: Three-stage stratified sample design; questionnaire; longitudinal study of seasonal consumption carried out by the Institute of Statistical, Social and Economic Research.

Sample: 364 rural and 358 urban households.

Geography: Eastern Region.

This volume reviews food consumption and expenditure surveys conducted between 1963 and 1976 in Africa, Latin America, the Near East, and the Far East.

FAO

- 1979b The Economic Value of Breast Feeding. (Based on the work of S. Almroth and T. Greiner.) Rome: FAO Food and Nutrition Paper No. 11, 1979.

Original data.

Method: Estimate based on small non-random sample.

Sample: 6 mother-infant pairs in rural village; 15 pairs in Accra.

Geography: Langbensi, a northern village, and Accra.

The object of this study was to calculate the relative costs of breast feeding and artificial (bottle) feeding. The authors considered actual (economic) cost, time cost and disease costs. Breast feeding was found to be considerably less expensive. Data used included estimates drawn from existing economic information.

Fisher, J.W.

- 1979 African nutrition interventions: a Brief Evaluation of Preschool Nutrition Programs in Lesotho and Ghana. Harvard Institute for International Development, Nutrition Intervention Project, April 1979.

This paper evaluates the preschool clinics in Ghana and Lesotho. It compares costs in the two countries as well as the range of services offered by various clinics. The author compares clinic users with other children and concludes that the clinics can avert malnutrition but does not take into account the possibility that the clinic sample comprises mothers who are more conscientious or competent than mothers who do not use the clinic.

Food for Peace

- 1981 Fiscal Year 1982 Public Law 489 Title II ISC Approved Quantities Voluntary Agencies/WFP. Unpublished computer printout. Washington, D.C.: U.S.A.I.D. Food for Peace, 1981.

This document projects foods to be donated in FY 1982 under PL-480 Title II. Information is available by country and by region, and lists: program sponsor, type of program, number of recipients, type of commodity, weight of commodity and dollar value.

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Gaisie, S.K.

- 1975 Levels and patterns of infant and child mortality in Ghana. Demography 12(1):21-34, 1975.

Original data.

Method: Interviews with questionnaires and a registration system in sample areas to collect information on vital events providing independent means of assessing reliability.

Sample: About 166,000 people, representing about 2% of the estimated 1968 population of 8.3 million.

Geography: National.

This paper measures infant and child mortality levels and determines their structure by using the results of the 1968-69 National Demographic Sample Survey. Rates ranged from 56 per 1000 live births in Accra to 192 in the Upper Region. The urban rate is lower than the rural rate: 98 as compared to 166 per 1000 live births. A large proportion of deaths in children 0 to 4 years occur in the second year of life, deaths in this age group account for the bulk of deaths in the age group 1 to 4 years.

Gordon, G.

- 1977 Evaluation of a Nutrition Program in Northern Ghana. In Getting the Most out of Food: The Twelfth in a series of Studies on the Modern Approach to Feeding and Nutrition. Burgess Hill, U.K.: Van den Burghs and Jurgens, pp. 9-38, 1977.

Original data.

Method: Interviews with mothers of young children. Data was collected on nutrition knowledge, dietary practices, and child morbidity and mortality.

Sample: 301 mothers in 136 compounds with 498 children under five years of age. Some mothers had received nutrition education; those in the control group had not.

Geography: Bawku, a market town in the northeast.

This document describes the evaluation of a nutrition education program in northern Ghana to improve the nutritional status of young children. Nutrition education clinics and visiting social workers encouraged increased consumption of protein-rich foods and earlier supplementary feeding. Although nutrition knowledge generally improved after education, low income mothers did not have the resources to implement it. The nutritional status of the sick children of mothers exposed to nutrition education was actually worse than that of the sick children of uneducated mothers; reasons included the bacterial contamination of the suggested food supplements and the diminished supply of mothers' milk because of earlier weaning. In addition, the recommended porridge contained less iron than traditional first food, thus exacerbating anemia caused by diarrhea.

Consequently, infant and child morbidity and mortality were greater in children of mothers receiving nutrition education.

Gordon, G.

- 1974 Report on the Distribution of Relief Foods during the Hungry Season (May, June, July) 1973 in the Bawku District. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10, 1974), ed. S. Ofoosu-Amaah, pp. 273-96, 1974.

Original data.

Method: Field workers visited compounds in 7 villages and interviewed with questionnaires concerning household composition, food stores, use of relief foods, 24 hour recalls of intake, use of health services, and sources of income. Nutritional status of children was obtained by weighing and arm circumference measurement. Data was also taken from weight charts.

Sample: 530 compounds in seven villages in Bawku district. Data from 2763 weight charts.

Location: Bawku district.

A study into the extent of food shortage in Bawku district, when the rains in 1972 were less than normal, investigated the extent of food shortage and the use of relief foods and the effects on the growth of preschool children. Results indicated that food distribution at separate clinics is not an effective way of selecting those who need relief foods and that the program did not reach the most needy children.

Grant, F.W.

- 1956 Nutrition and Health of Gold Coast children. J. of American Dietetic Association 31(1):694-702, 1956.

Original data.

Method: Cross-sectional, interview.

Sample: 51 children in 11 households and their mothers.

Geography: Rural villages: Ayeduase, Dome, Mampong.

This paper describes the practices of mothers in traditional villages and some of their beliefs about food and health. Physical status of their children was assessed.

Grenier, T.

- 1977 Breast Feeding in Decline: Perspectives on the Causes. In Jelliffe, Jelliffe, Sai, and Senanayake (eds.) Lactation, Fertility, and the Working Women. Proceedings of the joint IPPF/IUNS Conference held in Bellagio, Italy, 5-12 July 1977. London, England: International Planned Parenthood Federation.

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The author summarizes and reviews some of the reasons for the decline of breastfeeding and the rise of bottle feeding as discussed at the conference.

Hume, D.J.

- 1974 Food Importation into Ghana. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10 1974). ed. S. Ofosu-Amaah, pp. 348-355, 1974.

This article reviews available statistics on food imports into Ghana for the years 1968 through 1973. The main food imports were sugar, fish, wheat, dairy products, live animals, rice and meat.

Idusogie, E.O.

- 1974 Traditional Customs, Social and Food Habits Related to Malnutrition in Ghana. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference Accra, Ghana (April 8-10 1974). ed. S. Ofosu-Amaah, pp. 97-124, 1974.

This paper describes the food and agricultural system of Ghana from biblical times to the present. Some current food beliefs are discussed in light of this historical framework. The effects of urbanization and modernization are discussed, and suggestions are made for improvement of the usual diet.

Jones, E., Berkowitz, S. and Roussel, R.

- 1981 Ghana Food for Peace (Title II) Evaluation. Prepared for A.I.D. by Development Associates, Inc., San Francisco, California. Unpublished draft.

This document described an evaluation of the Food for Peace Program in Ghana including MCH, School Feeding and Food for Work programs. Material on the nutritional status and dietary practices of the population was reviewed.

May, J.M.

- 1965 The Ecology of malnutrition in Middle Africa. New York: Hafner Publishing Company, 1965.

The author reviews studies of population, agriculture, food production, and calorie and protein availability to draw a picture of the factors exacerbating malnutrition.

National Food and Nutrition Conference

- 1974 Summaries of Regional Reports. Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10, 1974), ed. S. Ofosu-Amaah, pp. 222-272, 1974.

This article contains abstracts of the regional reports which served as background documents for the conference. Food production, demography and nutritional status are discussed by region.

Neumann, C.G., Swendseid, M.E., Jacob, M., Stiehm, E.R., and Dirige, O.V.

- 1979 Biochemical Evidence of Thiamin Deficiency in Young Ghanaian Children. Am. J. Clin. Nutr. 32(1):99-104, January 1979.

Original data.

Method: Children were studied in cross sectional fashion in 1972; in early 1973 the severely malnourished group was studied before and after dietary treatment. Blood samples were collected and analyzed for transketolase activity.

Sample: 146 children, 6 months to 6 years of age. This sample included severely malnourished, mildly malnourished and apparently healthy well-nourished children.

Location: Unspecified.

Elevated transketolase pyrophosphate effects indicative of thiamine deficiency were found in both well-nourished and malnourished young children. Nutritional therapy of the severely malnourished group resulted in normalization of transketolase pyrophosphate effect. There were no obvious clinical signs of thiamine deficiency. Many children with biochemical evidence of thiamin deficiency also had serum folic acid deficiency. Further study would be necessary to determine whether the problem is inadequate thiamine intake, destruction of thiamine by thiaminases or food preparation methods, or malabsorption of thiamine.

Nicholas, D.D., Ampofo, D.A., Ofosu-Amaah, S. Asante, R.O. and Neumann, A.K.

- 1976 Attitudes and practices of traditional birth attendants in rural Ghana: implications for training in Africa. Bull. World Health Organ. 54:343-348, 1976.

Original data.

Method: Interviews carried out in the local language by public health nurses familiar with the area. Cross-sectional study.

Sample: 82 of 263 traditional birth attendants registered in Danfa district.

Geography: The Danfa Project, an eight-year training, research and demonstration project, located 29 kilometers north of Accra in a rural area.

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A survey of the characteristics, attitudes, and practices of traditional birth attendants (TBAs) showed that the typical TBA was an elderly, illiterate housewife or farmer practicing midwifery part-time. 48% were men. TBA's usually gave correct or harmless advice.

Nicholas, M.S.O.

- 1974 The Agricultural Sector and Human Nutrition. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House, Accra, Ghana, April 8-10 1974, ed. S. Ofosu-Amaah, pp. 82-96, 1974.

This paper examines some of the steps which the agricultural sector can take in improving nutrition in Ghana.

North, J., Fuchs-Carsch, M., Bryson, J. and Blumenfeld, S.

- 1975 Development Assistance Program FY 1976-FY 1980, Ghana, Vol. VI, Annex F - Women in National Development in Ghana, a Study and Annotated Bibliography. USAID, Office of Women in Development, April 1975.

This is a review of studies of the role of women in several aspects of Ghanaian national development, including agriculture, health, nutrition, and education, and an analysis of the data for effects on development. Annotated bibliography included.

Nyanteng, V.K.

- 1972 The storage of Food stuffs in Ghana. Technical Publication Series No. 18, Institute of Statistical, Social, and Economic Research, University of Ghana, Legon, 1972.

Original data.

Method: Between October 1970 and October 1971 farmers and agricultural officers were interviewed.

Sample: 316 people; 236 farmers and 80 agricultural officers.

Geography: National.

A study was carried out to identify the different types of storage facilities, methods and practices being used by farmers, to ascertain the causes of defects in them and to assess how best to improve on them.

Ofosu-Amaah, S. and Neumann, A.K.

- 1979 Danfa Project Final Report, The Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Final Report. The University of Ghana Medical School, Department of Community Health, Accra, Ghana, and UCLA School of Public Health, Division of Population Family and International Health, University of California, Los Angeles, California, 1979.

Original data.

Method: Randomized cluster sample of households used to survey knowledge, attitudes, and practices about health; clinic records examined; informal observations; and national statistics.

Sample: Rural Ghanaians living in Danfa district.

Geography: Rural Danfa district near Accra.

The Danfa Rural Health and Family Planning Project, a service, research, and training project, was designed to help identify and find solutions to health problems and to demonstrate feasible methods of delivering effective health and family planning services in rural Ghana.

Ofosu-Amaah, S.

1974a The Effect of Malnutrition on the Community. In Nutrition and the Development of Ghana: Nutrition Conference at the State House Accra Ghana April 8-10, 1974, ed. S. Ofosu-Amaah, pp. 320-326.

This article reviews the causes of malnutrition and the effects of malnutrition on the population of Ghana. It reviews the needs and the problems of mothers, infants and children in Ghana.

Ofosu-Amaah, S.

1974b Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra Ghana April 8-10 1974. Organized by the Ministries of Agriculture, Economic Planning, Education, Health, and Social Welfare and Community Development; The food Research Institute (CSIR) and the University of Ghana Medical School. Sponsored by U.S.A.I.D. Ghana, 1974.

A conference on nutrition and national development took place in Accra in 1974. This record of the proceedings includes recommendations, a proposal for integrating nutrition planning into many sectors (agriculture, health, economics, education, transportation, and distribution), descriptions of ongoing nutrition programs; and summaries of nutrition research conducted in Ghana.

Opare, K.D.

1974 Nutrition and Agricultural Extension Services within a Comprehensive Rural Health Care System. In Nutrition and the Development of Ghana: Proceedings of the National Food and Nutrition Conference at the State House Accra, Ghana (April 8-10 1974), ed. Ofosu-Amaah, 1974.

This article reviews agricultural extension work being carried out in the context of the nutritional needs of the Danfa Rural Health Project region. The author believes that improved agricultural practices would provide more food and improve the nutritional status of the region.

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Orraca-Tetteh, R., and Watson, J.D.

- 1976 A Re-assessment of the Nutritional Status of the Population of Baafi (August, 1976) After the Initiation of a Modest Applied Nutrition Programme. Legon: Department of Nutrition and Food Science, University of Ghana, 1976.

Original data.

Method: Restudy of village where baseline data was collected in 1972, including anthropometric measures, dietary survey through observation of meals, and collection of socioeconomic and agricultural data.

Sample: All residents of Baafi village (392 persons: 192 males, 195 females, remainder unspecified); sample includes local Brong people plus Northern immigrants.

Location: Baafi village, in the Southern Region of country.

This document reports on a nutrition survey carried out in 1976 after 2 1/2 years of an applied nutrition program which combined agriculture, health, and nutrition. The authors recommend that the program be continued even though they could not clearly conclude that the program had been helpful due to uncontrolled factors such as severe inflation during the period under consideration and poor rainfall in 1976, which decreased maize production.

Orraca-Tetteh, R.

- 1975 Protein Rich Foods in Ghana. Unpublished mimeograph, 1975.

The author reviews the general diet of Ghana and the difficulties of feeding of young children. He believes their protein intake is too low, and proposes they be fed a weaning porridge of bambara beans, which are locally available, cheap, and familiar to mothers.

Orraca-Tetteh, R.

- 1973 Effects of rapid population growth in Ghana on nutritional needs. In Symposium on implications of population trends for policy measures in West Africa, Ghana Population Studies. No. 3. Eds. N.O. Addo et al., Legon, p. 57068, 1971, from Benneh 1973.

The author reviews studies of food production and food imports and relates them to increases in population. He notes local production is not growing while population is expanding and imports are increasing. Nutritional status of country is reviewed.

Orraca-Tetteh, R.

- 1972a Evaluation of the Protein Values of Traditional Weaning Foods and Children's diets in Ghana. Ghana J. Science 12(2):73-78, 1972.

Original data.

Method: Traditional weaning foods were prepared and fed to rats to measure net protein utilization.

The protein values of the infant weaning foods studied were considerably lower than the recommended values for good growth of infants. The protein values of diets of children were also found to be low. The high incidence of protein-calorie malnutrition and consequent poor growth in Ghanaian children was attributed to the poor protein values of their diets.

Orraca-Tetteh, R.

- 1972b The need for a nutrition policy in national development. Universitas 1(3):46-47, 1972.

The author reviews Ghanaian nutrition studies and speculates on the importance of these findings for nutrition needs of Ghana.

Osei-Boateng, M.

- 1979 Nutrition Rehabilitation in the Promotion of Child Health in Ghana. Int. Nurs. Rev. 26(5):133-136, 1979.

This article describes Maamobi Polyclinic in Accra, one of the six nutrition rehabilitation centers in the country. Child feeding, maternal education, follow up, health care and food production are all part of the program.

Otoo, S.N.

- 1973 The Traditional Management of Puberty and Childbirth Among the Ga People, Ghana. Trop. Geogr. Med. 25:88-94, 1973.

This paper describes the customs of the Ga people of Accra concerning puberty and childbirth. At puberty, girls are required to go through certain rites which include special foods, celebration and bathing. Failure to go through these rites is believed to have an adverse effect on subsequent pregnancy. During pregnancy, women are treated by traditional practitioners of medicine as well as by midwives.

Pappoe, M.E.

- 1979 "Ghana" in Jelliffe, Jelliffe, Sai, and Senanayake (eds.) Lactation, Fertility, and the Working Women. Proceedings of the Joint IPPF/IUNS Conference held in Bellagio, Italy, 5-12 July, 1977. London, England: International Planned Parenthood Federation, 1979.

The author reviews the extent of breast feeding in Ghana and identifies a trend downwards, particularly in the urban areas and among educated and working mothers. The paper also discusses the effects of lactation on fertility.

PAG (Protein-Calorie Advisory Group of the United Nations System)

- 1977 Women in Food Production, Food Handling and Nutrition with Special Emphasis on Africa: Final Report. Unpublished, June 1977.

This review stresses the importance of considering women as major producers of food when assessing the situation in Africa. The authors stress that the African woman may be "the" person in subsistence agriculture, providing food for her family while her husband is working on cash crops. Added to this are her responsibilities in caring for her house and children, cooking and preparing food, harvesting foods, and obtaining water and fuel. Until the burden of these many responsibilities is recognized, it will be difficult to plan appropriate nutrition and development programs.

Richardson, J.L.

- 1975 Review of International Legislation Establishing Nursing Breaks. J. Trop. Pediatr. 21(5) 249-258, Oct. 1975.

The purpose of this paper was to ascertain what legislation exists in various countries to protect the nursing relationship.

Sai, F.T.

- 1978 Nutrition in Ghana. In Nutrition and National Policy, ed. B. Winikoff. Cambridge: MIT Press, pp. 81-107, 123, 1978.

The author reviews the history of nutrition planning in Ghana and summarizes studies of health and nutrition status, adding his own observations, conclusions, and recommendations regarding nutrition and health planning.

Sai, F.T.

- 1971 Family Size in Relation to Family Health and Welfare Micro-Case Study: Ghana. African Population Conference, Accra, Ghana, December 1971.

The author reviews studies of factors such as education, urbanization, food and nutrition, and growth and development and their relationship to family size.

Sivard, R.L.

- 1979 World Military and Social Expenditures 1979. Leesburg, Virginia: World Priorities, 1979.

This document summarizes the world situation in 1976 in statistics concerning military development and expenditures and juxtaposes these with figures on social underdevelopment concerning poverty, employment, food, health and education. Extensive statistical tables with figures for every country make up the core of this document.

Sraha, J.W.

- 1971 Agricultural and Medical Nutrition Problems in Ghana in 1971 Dag Hammarskjold Seminar on Nutrition as a Priority in African Development. Country reports presented by seminar participants. Sponsored by the Dag Hammarskjold Foundation, Uppsala, Sweden, November 1971.

Review of nutrition, population and agricultural data; describes some intervention programs.

TAICH

- 1976 TAICH Country Report: Ghana, American Council of Voluntary Agencies for Foreign Service, Inc. Technical Assistance Information Clearing House, June 1976.

This report describes the assistance programs for Ghana of 48 U.S. organizations. It includes voluntary agencies, missions and other nonprofit organizations providing the people of Ghana with material aid and assistance in programs of medicine, public health, education, and food production.

Tripp, R.E.

- 1981 Farmers and Traders: Some Economic Determinants of Nutritional Status in Northern Ghana. Journal of Tropical Pediatrics 27:15-22, February 1981.

Original data.

Method: Data were collected through participant observation and extensive interviewing. Anthropometric measurements, heights and weights were taken.

Sample: anthropometry was collected on 196 children 4 to 60 months of age. Economic and sociological data were taken from a sample of 50 contiguous houses which formed one section of the settlement.

Location: Navrongo District in the Upper Region.

An anthropological study examined the relationship between socioeconomic factors and anthropometry. Results indicated that nutritional status of young children was significantly better in

families where the mother worked as a trader. Women were free to use income from trading as they wished and often mothers used the money earned in trading to buy extra food for their children.

Vermeer, D.E.

1971 Geophagy among the Ewe of Ghana. Ethnology 10:56-72, 1971.

Original data.

Method: Interviews with outpatients at Ghanaian government health posts.

Sample: 1391 informants; 1248 female, 143 male.

Geography: Rural, the Volta region of Ghana, where the Ewe tribe lives.

This study examined the various kinds of clays mined and sold by the Ewe in Ghana. Clay eating was found to be quite wide-spread. Although clay eating was most closely associated with women in pregnancy, men and children also ate clay to a limited extent. They reported that they used it for pleasure, especially for its appealing smell. It is considered a food and is shaped like eggs.

Woolfe, J., Wheeler, E., Van dyke, W. and Orraca-Tetteh, R.

1977 The value of the Ghanaian traditional diet in relation to the energy needs of young children. Ecol. Food Nutr. 6:175-181, 1977.

Method: Children were observed eating meals. Foods were weighed. Observations occurred in two months, March and July.

Sample: In March, 17 orphans and 7 village children; in July, 7 orphans and 6 village children. In the village all children had mothers who attended an informal homemaker's class.

Geographic location: An orphanage in Accra, and a rural village 15 miles from Accra, selected to represent the middle stratum of Ghanaian villages.

The energy intakes at individual meals, and the energy densities of traditional foods, consumed by Ghanaian children of 1-3 years were studied. At both locations a wide range of food intake and food energy densities was found, and there were children who consumed more than the FAO estimated energy requirement. The maximum weight of food consumed at a meal was about 70 g/kg. It was concluded that the traditional diet can adequately satisfy a healthy child's energy needs without milk or other Western foods, although children at the orphanage received milk and fruit in addition to the traditional foods eaten by village children.

Wuarapa, F.K., Belcher, D.W., Afoakwa, S.N., Mingle, J.A. and Keleman, G.

1976 Gastro intestinal infections in preschool children in the Danfa Project area. Ghana Medical J. p. 158-162, Sept. 1976.

Original data.

Method: Interviews with random households, conducted during the dry season. Cross-sectional study to provide baseline data.

Sample: 294 children 0-4 years old.

Geography: 20 villages in Danfa Rural Health Project area, 20 miles north of Accra.

The results of a 1973 village survey to determine baseline prevalence of diarrhea were described. Some epidemiologic factors are discussed in relation to planning interventions. The findings are compared with previous studies in Ghana.

Wuarapa, F.K., Derban, L.K.A., Belcher, D.W., Asante, R.O., and Chinery, W.A.

1975 A survey of parasitic infections in the Danfa Project Area. Ghana Medical Journal, pp. 282-288, December 1975.

Original data.

Method: Cross sectional baseline data: physical examination.

Sample: 3653 subjects in 20 villages were given physical examinations. 25% of the sample was used to collect blood, stools, urine. (Sample selected from a population of 60,000 in 310 villages.)

Geography: Danfa area. Rural.

Patterns of distribution of malaria, ascariasis, hookworm and schistosomiasis in the Danfa Project areas as determined in a baseline survey are described. Implications for control programs are discussed.