NUTRITION COUNTRY PROFILE
REPUBLIC OF GHANA

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Food Insecurity and Vulnerability Information and Mapping Systems

Acknowledgments

The Nutrition Profile for the Republic of Ghana was prepared by Mrs Rosanna Agble, former Head, Nutrition Unit, Ghana Health Service**,** in collaboration with Estelle Bader, Amelie Solal-Céligny and Giulia Palma, Consultants, and Marie Claude Dop, Nutrition Officer, Nutrient requirements and assessment group, Nutrition and Consumer Protection Division, Food and Agriculture Organization of the United Nations.

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Summary

Ghana is a small coastal country of West Africa well endowed with natural resources. The population is young and a high proportion is urban. Agriculture, which is still predominantly traditional, plays an important role in the country's economy and remains the main sector of employment. Over the last years, Ghana has registered robust economic growth. While poverty still has a firm grip on the North, there has been a substantial decline in poverty at national level and the country is on track to achieve the first Millennium Development Goal if the current economic growth rate is sustained.

With regard to health indicators, infant and under-five mortality rates are stagnating. Low access to health services and to safe water and sanitation, high incidence of malaria and malnutrition as an underlying factor are among the main causes of mortality. Childhood immunization coverage still needs to be increased. Inadequate antenatal care coverage and unsupervised deliveries entail a high level of maternal mortality.

The Ghanaian diet largely relies on starchy roots (cassava, yams), fruit (plantain) and cereals (maize, rice). Starchy roots and cereals still supply almost three quarters of the dietary energy and diversity of the diet remains low. The dietary supply meets population energy requirements, but the share of protein and of lipids in the dietary energy supply is lower than recommendations. Rapid urbanization has modified food consumption patterns in urban areas, with an increasing demand for imported food, especially wheat and rice. Over the last decade, prevalence of undernourishment has decreased considerably. However, food insecurity persists, mainly due to unstable production, insufficient purchasing power and problems of physical access due to a lack of road infrastructure in the northern part of the country.

Breastfeeding is a common practice and, thanks to efficient promotion programmes, early initiation of breastfeeding is becoming more widely practiced. However, only half of children under 6 months are exclusively breastfed and complementary feeding practices are inadequate. These feeding practices combined with food insecurity of households and low access to health services are among the main causes of malnutrition among young children. Nearly a quarter of preschool children are stunted (i.e. affected by chronic malnutrition). Based on this prevalence rate, the severity of malnutrition is defined as "medium" at national level. However, regional disparities are marked; prevalence of chronic and acute malnutrition (i.e. stunting and wasting, respectively) is higher in the Northern and Upper East regions. Nevertheless overall prevalence of underweight is declining. Meanwhile the country is undergoing a nutrition transition. Among adult women, the prevalence of overweight and obesity is high, especially among those living in urban areas, while undernutrition persists, particularly in the Upper East region.

Undernutrition is associated with widespread micronutrient deficiencies. Although recent data are not available, iodine deficiency disorders may be still prevalent. The proportion of households using adequately iodized salt remains unacceptably low. The national programme of salt iodization needs to be evaluated. There is a lack of recent and nationally representative surveys on vitamin A deficiency (VAD) among young children. Vitamin A supplementation programmes have been implemented throughout the country but coverage needs to be extended among both children and women, and especially among women living in the Eastern and Northern regions. Anemia affects more than three quarters of young children and almost half of women of childbearing age. Food-based approaches and iron and folic supplementation programmes have been implemented to combat iron deficiency anemia but impact has not been measured.

Ghana has made steady progress towards achieving the Millennium Development Goals. However, the nutrition, health and mortality situation of young children and women, as well as persistent regional disparities need to be addressed.

Summary Table

Basic Indicators				Year
Population				
Total population		21.9	million	2005
Rural population		55	%	2005
Population under 15 years of age		39	%	2005
Annual population growth rate		2	%	2000-2005
Life expectancy at birth		57	years	2000-2005
Agriculture				
Agricultural area		65	%	2003
Arable and permanent cropland per agricultural inhabitant		<1	Ha	2003
Level of development				
Human development and poverty				
Human development index		0.553	[0-1]	2005
Proportion of population living with less than 1$ a day (PPP)	***MDG1***	45	%	1990-2005
Proportion of living below the national poverty line	***MDG1***	29	%	2005-2006
Education				
Net primary enrolment ratio	***MDG2***	72	%	2007
Youth literacy rate (15-24 years)	***MDG2***	71	%	2000-2004
Ratio of girls to boys in primary education	***MDG3***	0.97	girl per 1 boy	2007
Health				
Infant mortality rate	***MDG4***	71	‰	2006
Under-five mortality rate	***MDG4***	111	‰	2006
Maternal mortality ratio (adjusted)	***MDG5***	540	per 100 000 live births	2000
Malaria-related mortality rate in under-fives	***MDG6***	448	per 100 000 deaths in under-fives	2000
Percentage of children aged 12-23 months immunized against measles	***MDG4***	85	%	2006
Environment				
Sustainable access to an improved water source in rural area	***MDG7***	69	% of population	2006

Nutrition indicators				Year
Energy requirements				
Population energy requirements		2118	kcal per capita/day	2000
Food supply				
Dietary Energy Supply (DES)		2690	kcal per capita/day	2003-2005
Prevalence of undernourishment	***MDG1***	9	%	2003-2005
Share of protein in DES		9	%	2001-2003
Share of lipids in DES		12	%	2001-2003
Food diversification index		28	%	2001-2003
Food consumption				
Average energy intake (per capita or per adult)		n.a.		
Percent of energy from protein		n.a.		
Percent of energy from lipids		n.a.		
Infant and young child feeding	**Age**			
Exclusive breastfeeding rate	<6 months	53	%	2003
Timely complementary feeding rate	6-9 months	62	%	2003
Bottle-feeding rate	0-11 months	11	%	2003
Continued breastfeeding rate at 2 years of age		67	%	2003
Nutritional anthropometry				
Prevalence of stunting in children under 5 years		22	%	2006
Prevalence of wasting in children under 5 years		5	%	2006
Prevalence of underweight in children under 5 years	***MDG1***	18	%	2006
Percentage of women with BMI<18.5 kg/m²		9	%	2003
Micronutrient deficiencies				
Prevalence of goitre in school-age children		n.a.		
Percentage of households consuming adequately iodized salt		35	%	2006
Prevalence of clinical vitamin A deficiency in preschool children		n.a.		
Vitamin A supplementation coverage in children		60	%	2006
Vitamin A supplementation coverage in mothers		55	%	2006
Prevalence of anemia in women		45	%	2003
Iron supplementation coverage in mothers		69	%	2003

MDG: Millennium Development Goal; n.a.: not available

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Acronyms	
BCG	Bacille Calmette-Guérin
BMI	Body Mass Index
CED	Chronic energy deficiency
CRS	Catholic Relief Service
DES	Dietary Energy Supply
DHA	United Nations Department of Humanitarian Affairs
DPT3	Diphtheria, Pertussis (whooping cough) and Tetanus vaccine – three doses
ECOWAS	Economic Community Of West African States
ESP	Education Strategy Plan
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Databases
FIVIMS	Food Insecurity and Vulnerability Information and Mapping Systems
GAIN	Global Alliance for Improved Nutrition
GDHS	Ghana Demographic and Health Survey
GDP	Gross domestic product
GHS	Ghana Health Service
GIEWS	Global Information and Early Warning System
GLSS	Ghana Living Standard Surveys
GNP	Gross national product
GOG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GSFP	Ghana School Feeding Programme
GSS	Ghana Statistical Service
HDI	Human development index
HIV/AIDS	Human immunodeficiency virus / acquired immunodeficiency syndrome
HPI-1	Human poverty index
IDA	Iron deficiency anemia
IDA	International Development Association
IDD	Iodine Deficiency Disorders
ILO	International Labour Office
IPTp	Intermittent preventive treatment for pregnant women
ITU	International Telecommunication Union
IUGR	Intra-uterine growth retardation
LBW	Low birth weight
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
NEPAD	New Partnership for Africa's Development
NPAN	National Plan of Action on Nutrition
ORT	Oral rehydration therapy
PPP	Purchase Power Parity
SFP	School Feeding Programme
SRID	Statistics, Research and Information Directorate
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNPD	United Nations Population Division
UNSTAT	United Nations Statistics Division
USAID	United States Agency for International Development
VAD	Vitamin A deficiency
VAST	Vitamin A Supplementation Trials Study
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization

Part I: Overview and basic indicators

I.1 Context

The Republic of Ghana is situated in West Africa along the coast of the Gulf of Guinea. It shares borders with Côte d'Ivoire to the West, Burkina Faso to the North and Togo to the East. It has a coastline of more than 565 km and a total land area of 238 538 km^2. Ghana is divided into 10 administrative regions[1] and 138 districts.

Ghana is a lowland country, except for a range of hills that lies on the Eastern border. The Volta River Basin dominates the country's drainage system (FAO, Forestry Division).

There are three distinguishable ecological zones: the sandy coastline backed by a coastal plain crossed by several rivers and streams; the middle belt and Western parts of the country, densely forested with many streams and rivers; and the savannah in the North that is drained mainly by the Black and White Volta Rivers.

The climate in Ghana is tropical, determined by the *harmattan* wind, which brings hot, dry air from the Sahara, and the monsoon, which brings relatively cool, wet air from the South Atlantic. Temperatures and rainfall vary by distance from the coast and elevation. The average annual temperature is about 26°C, although temperatures can reach the 40's during dry months. Mean annual rainfall ranges from 800 mm in the coastal zone to 2 200 mm in the rain forest. In the Northern savannah zone of the country the driest months are generally November to March and the peak wet months are August and September. In the Southern forest the two rainy seasons are April-July and September-November. The tropical Eastern coastal belt is warm and comparatively dry, the South-west corner is hot and humid, and the North is hot and dry (GSS et al., 2004).

Several ethnic groups are present in Ghana: Akans (Twi and Fante) constitute the largest ethnic group (49%) followed by Mole-Dagbon (17%), Ewe (13%), and Ga/Daangme (8%). Each ethnic group has its own language. Moreover, various smaller ethnic groups live in several parts of the country. The main religions are Christianity (63% of the population), indigenous beliefs (21%) and Islam (16%) (GSS et al., 2004).

I.2 Population

Population indicators

In 2005 the population was estimated at about 21.9 million. The population density has dramatically increased from 36 inhabitants/km^2 in 1970 to 93 in 2005. The population of Ghana is young with 39% of the population under 15 years, and only 6% of elderly. The urban population increased significantly from 29% in 1970 to 45% in 2005. Life expectancy has been slowly increasing, particularly for women (from 54 years in 1984 to 60 years in 2000) (UNPD; GSS et al., 2004).

Ghana's economy is divided into North and South. Since independence, the Southern part has been far richer and more dynamic. To a certain extent the development gap between the two parts can be explained by the geographic and climatic advantages of the South (most of Ghana's natural resources located in the south, more abundant rainfall, direct access to the Gulf of Guinea and Lake Volta). Moreover, development projects and programmes have been concentrated in the South and have neglected the North, but the division is slowly narrowing (Wolter, 2008). The North-South flow of migration is characteristic of these inequalities (Asante and Gyimah-Boadi, 2005). These disparities, as well as the attraction of urban centres, help explain the never ceasing flow of migrants from poorer regions to better off regions, and from rural areas to urban centres (UNDP, 2007).

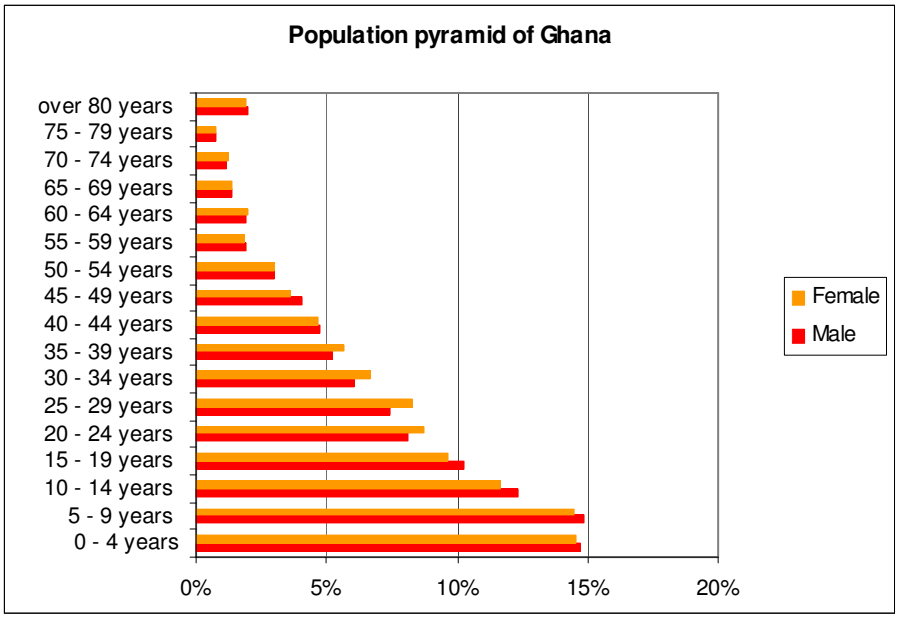
[1] The Northern part consists of three regions (Northern, Upper East and Upper West) and the remaining seven regions form the Southern part.

With more than 35 000 refugees and asylum-seekers on its territory at the end of 2007, Ghana hosts the largest refugee population in West Africa. Most of the refugees come from Liberia (27 000 refugees) and Togo (7 200 refugees) (UNHCR, 2007).

Table 1: Population indicators

Indicator	Estimate	Unit	Reference period	Source
Total population	21.9	million	2005	UNPD
Annual population growth rate	2.14	%	2000-2005	UNPD
Crude birth rate	32.1	‰	2000-2005	UNPD
Population distribution by age:				UNPD
0-4 years	14	%	2005	
5-14 years	25	%	2005	
15-24 years	21	%	2005	
60 and over	6	%	2005	
Rural population	55	%	2005	UNPD
Agricultural population	55	%	2004	FAOSTAT
Population density	93	inhabitants per km^2	2005	UNPD
Median age	20	years	2005	UNPD
Life expectancy at birth	57	years	2000-2005	UNPD
Population sex ratio	102.5	males per 100 female	2005	UNPD
Net migration rate	0.1	‰	2000-2005	UNPD
Total dependency rate	74	%	2005	UNPD

Population pyramid



Source: GSS, Population Census 2000.

I.3 Agriculture

Agriculture is the most important sector of Ghana in terms of contribution to the GDP. It accounts for about 39% of GDP in 2005 and for about 40% of export earnings (WB; Apullah, 2003); in 2004, the agricultural population was estimated at 55% (FAO, Faostat-Population).

Agriculture is mainly traditional rain-fed intercropping[2] practiced by smallholder farmers. There is little mechanized farming, and bullock farming is practiced in most areas. Mono-cropping is mostly associated with larger-scale commercial farms. About 65% of the total land area is suitable for agricultural production (FAO, Faostat-Land use). However, in 2003, only 28% of the total land area was cultivated (arable lands and permanent crops) and irrigation was not very developed (FAO, Faostat-Land use).

Farming systems and crops vary by major agro-ecological zones. In the two forest zones, tree crops are significant with cocoa, oil-palm, coffee and rubber being of particular importance. Food crop production is important in all the agro-ecological zones. Maize is an important cereal in the South and middle belts, but progressively gives way northwards to sorghum and millet. Yam and grain legumes are important crops in the middle belt and towards the North (FAO, AQUASTAT). Ghana's major export crop is cocoa. In the 2005-2006 production year, Ghana was the world's second-largest producer of cocoa beans (Wolter, 2008).

Although Ghana's natural potential for agriculture is high, the country is not self-sufficient in terms of food production (FAO, AQUASTAT; Wolter, 2008). There are various reasons why Ghana's food crop production remains below potential, including uncertain rainfall pattern, low level of use of fertilizers and pesticides, as well as low use of high yielding seed varieties or irrigation technology, and public underinvestment (FAO, AQUASTAT; Wolter, 2008). Other relevant constraints are degraded soils, weeds, incidence of diseases and pests (Apullah, 2003).

Land use and irrigation statistics

Table 2: Land use and irrigation

Type of area	Estimate	Unit	Reference period	Source
Total land area	22 754	1000 Ha	2003	FAOSTAT
Agricultural area	65	%	2003	FAOSTAT
Arable lands & permanent crops	28	%	2003	FAOSTAT
Permanent crops	10	%	2003	FAOSTAT
Permanent pasture	37	%	2003	FAOSTAT
Forested land areas	24	%	2005	UNSTAT
Irrigated agricultural land	<1	%	2003	FAOSTAT
Arable & permanent cropland in Ha per agricultural inhabitant	<1	Ha	2003	FAOSTAT

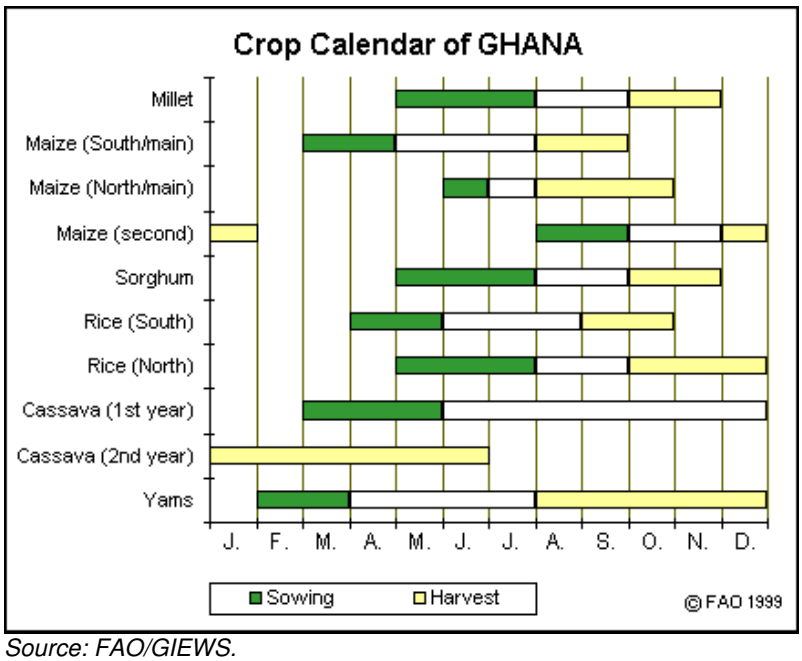
N.B. Percents are calculated on the total land area.

Main crops, agricultural calendar, seasonal food shortage

According to FAO statistics, the 5 major food and agricultural commodities produced in Ghana in 2005 were cassava, yams, plantains, taro and maize (FAO, Statistics Division, Major food and agricultural commodities and producers). All these food commodities were mainly destined to local human consumption (FAO, Faostat).

Cassava is grown throughout Ghana, although roughly 78% of the total production comes from the South and middle belts of the country (Al-Hassan, 1991). The production of plantain, an important staple, has been declining for more than a decade. This downward trend in production is attributed to several factors including pests, diseases, poor management practices and above all, lack of improved production technology for plantain. Cocoyam is cultivated throughout the forest belt as a shade crop for young cocoa seedlings. Cocoyam plays an important role in poverty alleviation and food security.

[2] Intercropping is the growing of two or more crops in proximity in the same field during a growing season to promote interaction between them.



Source: FAO/GIEWS.

Seasonal food shortages occur particularly in the Northern part of the country, at the end of the dry season, from March to June.

Livestock production and fishery

The dominant livestock are cattle, sheep, goats and poultry. Livestock production contributes to meet the food needs while providing cash income, particularly for farmers in the Northern part of the country. The majority of rural households keep some sort of livestock, often together with crop farming. Poultry predominates in the South, while cattle production is concentrated in the Northern savannah zones. Sheep and goat production is widespread throughout the country (FAO, 2001; Asante, 2004). Nevertheless productivity in the livestock sector is very low. Production of livestock represents only about 4% of the agricultural GDP. Ghana imports live animals to supplement the domestic production (Asante, 2004)

Concerning the local fish production, about 80% is provided by marine captures, mainly through small-scale traditional fisheries. Inland aquaculture potential is largely unexploited. Fish and fish products are mainly destined to local human consumption and are an important source of high quality protein in the Ghanaian diet (FAO, 2004a).

Table 3: Livestock and fishery statistics

Livestock production and fishery	Estimate	Unit	Reference period	Source
Cattle	1 385 000	number of heads	2005	FAOSTAT
Sheep and goats	6 842 700	number of heads	2005	FAOSTAT
Poultry birds	30 000	thousands	2005	FAOSTAT
Fish catch and aquaculture	451 287	tonnes	2001	FAOSTAT

I.4 Economy

Ghana's economy is dominated by agriculture, mining, logging, and retail trade, in order of importance. A significant part of the active population is engaged in the informal sector. The services sector comprises mainly trade and public services. Financial services have improved in recent years with the introduction of several financial institutions. Tourism is expanding and has a good potential as foreign exchange earner (GSS et al., 2004).

Ghana is currently one of the best-performing economies in Africa (IDA, 2007). GDP annual growth has averaged 4.5% from 1983 through 2000 and then increased progressively to reach 6% in 2005 (WB; IDA, 2007). Recent GDP growth has been driven by the strong performance of cocoa and gold exports (WB, Country brief). Accelerated economic growth is also supported by the good performance in the mining sector, high public sector expenditure, and strong public and private sector investment activity (WB, Country brief).

Rising inflation has recently become a concern. The 2007 end-year consumer price index (CPI) rose to 12.7%, up from an average 10.5% in 2006, as a result of external developments (e.g. imported food price inflation, higher crude oil prices) and domestic sources (e.g. higher food prices following the drought and floods in Northern Ghana), as well a buoyant domestic demand (WB, Country brief).

About 52% of the labour force is engaged in agriculture, 29% in services and 19% in industry (SRID, 2001).

Table 4: Basic economic indicators

Indicator	Estimate	Unit	Reference period	Source
Gross Domestic Product per capita	2 238	PPP US $	2003	UNDP
GDP annual growth	6	%	2005	WB
Gross National Income per capita	450	$	2005	WB
Industry as % of GDP	25	%	2005	WB
Agriculture as % of GDP	39	%	2005	WB
Services as % of GDP	37	%	2005	WB
Paved roads as % of total roads	18	%	2003	WB
Internet users	17	per 1 000 people	2004	WB
Total debt service as % of GDP	6	%	2003	UNDP
Military public expenditure	0.7	% of GDP	2003	UNDP

The main non-food export commodities of Ghana include diamonds, gold, manganese and timber, while the main imports include intermediate goods, machinery, tobacco, consumer goods, chemical products and crude oil.

I.5 Social indicators

Health indicators

Infant and under-five mortality rates remain high. In 2006, the infant mortality rate was 71‰ and under-five mortality rate was 111‰ (GSS et al., 2007). Recent trends in infant and under-five mortality rates cannot be assessed because methods for estimation of childhood mortality rates differ between the MICS 2006 and Ghana Demographic and Health Surveys (GDHS). Nevertheless, estimates from the 2003 GDHS show that both infant and under-five mortality rates have remained more or less constant over the 15-year period preceding the 2003 survey (infant mortality rate about 64‰; under-five mortality rate between 104 and 111‰) (GSS et al., 2004).

In 2000-2003, among children under five, the main causes of death were malaria (33%), neonatal causes (28%), pneumonia (15%) and diarrhoeal diseases (12%) (WHO, 2006). Malnutrition is an important underlying cause of mortality. Malaria continues to be a major public health concern. It is one of the leading causes of morbidity and mortality, especially among young children and pregnant women in Ghana (GSS et al., 2007).

In 2006, only 64% of Ghanaian children were fully immunized (BCG, measles, and three doses of DPT and polio vaccine) before the age of 12 months. This is very far from the goal of 90% coverage that was expected. At 12-23 months of age, 73% of children have all the required vaccinations (GSS et al., 2007). Although still insufficient, vaccination coverage has improved slightly as the percentage of children aged 12-23 months considered fully immunized increased from 69% in 2003 to 73% in 2006 (GSS et al., 2007; GSS et al., 2004).

Although maternal mortality ratio (adjusted) declined from 740 per 100 000 live births in 1990 to 540 in 2000, maternal mortality remains high, with wide geographical disparities, due to inadequate antenatal care coverage and unsupervised deliveries, among other factors (WHO, 2006; GSS et al., 2007; GSS, 2005). Although the percentage of deliveries assisted by health professionals (doctors, nurses and midwifes) is increasing, the situation remains critical, especially in rural areas where the proportion of assisted births is less than half that of urban areas (GSS, 2005; GSS et al., 2007).

Table 5: Health indicators

Indicator	Estimate	Unit	Reference period	Source
Mortality:				
Infant mortality rate	71	‰	2006	MICS
Under-five mortality rate	111	‰	2006	MICS
Maternal mortality ratio:				
reported	210	per 100 000 live births	1990-2004	UNICEF
adjusted	540	per 100 000 live births	2000	UNICEF
Morbidity:				
Malaria-related mortality rate in under-fives	448	per 100 000 deaths in under-fives	2000	UNSTAT
Percentage of under-fives sleeping under a treated bed net	22	%	2006	MICS
Prevalence of diarrhoea in the last 2 weeks in under-fives	15	%	2006	MICS
Percentage of under-fives with diarrhoea in the last 2 weeks who receive oral rehydration therapy (ORT)[1]	63	%	2003	GDHS
Percentage of under-fives with acute respiratory infections in the last 2 weeks	5	%	2006	MICS
Tuberculosis prevalence	369	per 100 000 people	2003	GDHS
AIDS/HIV:				
Prevalence in adults[2]	2	%	2003	GDHS
Percentage of women (15-24) who know that a person can protect herself from HIV infection by consistent condom use	77	%	2003	GDHS
Immunization:				
Percent of children aged 12-23 months immunized against tuberculosis	94	%	2006	MICS
Percent of children aged 12-23 months with DPT3 immunization	84	%	2006	MICS
Percent of children aged 12-23 months immunized against measles	85	%	2006	MICS
Percent of pregnant women immunized against tetanus[3]	64	%	2006	MICS

[1] *Proportion of children under 5 years of age ill with diarrhoea at any time during the two weeks preceding the survey who received oral rehydration therapy (ORT). ORT includes solution prepared from oral rehydration salt (ORS) packets, recommended home fluids, or increased fluids.*

[2] *15-49 years.*

[3] *Received at least 2 doses during last pregnancy.*

Water and sanitation

Access to an improved water source is problematic, especially for the rural population, among which the proportion of people with access to potable water is much lower than in the urban areas. In urban areas, 83% of the population has access to improved sanitation while in rural areas less than half (45%) of the population has access (GSS et al., 2007). The heavy disparity between the rural and the urban areas is a serious concern which puts the rural population at risk of diarrhoeal and other water borne diseases.

Guinea worm, a parasitic infection largely attributable to drinking unsafe water, continues to plague Ghana which is one of the countries that reported the highest number of cases in 2004 (UNICEF, Information by country).

Table 6: Access to safe water and sanitation

Indicator	Estimate	Unit	Reference period	Source
Sustainable access to an improved water source:				
Urban	91	% of population	2006	MICS
Rural	69	% of population	2006	MICS
Access to improved sanitation:				
Combined urban/rural	61	% of population	2006	MICS

Access to health services

Although there has been a significant improvement in overall access to health facilities from 1997 to 2003, with an increase from 37% to 58% of the population living within 30 minutes of a health facility, there are still great disparities between urban and rural areas: only 27% of the rural population lives within 30 minutes of a health facility (GSS, 2005). In the three Northern regions (Northern, Upper East and Upper West) access to health facilities is particularly low (GOG and UNICEF, 2000).

Table 7: Access to health services

Indicator	Estimate	Unit	Reference period	Source
Health personnel: number of physicians	15	per 100 000 people	2000-2004	UNDP
Percentage of children under-fives with fever (in the last two weeks) receiving anti-malarial drugs	61	%	2006	MICS
Percent of births attended by skilled health personnel	50	%	2006	MICS
Public expenditure on health	2.8	% of GDP	2004	UNDP

Education

In Ghana, the adult literacy rate remains low (58% in 2000-2004), with large disparities between males (literacy rate of 66%) and females (literacy rate of 50%) (UNESCO, 2006).

The Government of Ghana is implementing various policy guidelines and interventions such as the Education Strategy Plan (ESP) for 2003-2015, with the goal of achieving Universal Primary Education (Adamu-Issah et al., 2007). These measures have led to improvements in various key education indicators and considerable progress has been made towards increasing the number of children attending primary school. In 1999, the net primary enrolment ratio was only 57% (58% for boys and 55% for girls). In 2007, it reached 72% (73% for boys and 71% for girls) (UNESCO, 2008). The abolition of school fees in all basic schools in 2005 has had a direct effect on both boys' and girls' enrolment rates (Adamu-Issah et al., 2007).

However, the education sector still faces major challenges, including shortage of qualified teachers and insufficient school infrastructure in the geographically isolated parts of the country (Adamu-Issah et al., 2007). The low quality of education adversely affects retention and primary school completion (USAID,

2007). Some economic and socio-cultural factors are also an obstacle to enrolment, particularly of girls. Children are often expected to contribute to farming, herding, and other income generating activities, resulting in their not being able to go to school (Adamu-Issah et al., 2007).

Concerning nutrition and school feeding, Ghana has initiated the Ghana School Feeding Programme (GSFP). The pilot phase of the GSFP was launched in 2005 under the NEPAD "Home Grown" School Feeding Programme concept, which aims to contribute not only to the improvement of the education service delivery but also to agricultural development and to the reduction of malnutrition among school-age children. Local food will be produced to feed school children, school gardens will be established and nutrition information will be incorporated in the school curricula.

School feeding programmes initiated by the World Food Programme (WFP) and Catholic Relief Service (CRS) that specifically target girls in poor performing areas, such as the Upper East and Upper West, have succeeded in narrowing the gap between girls' and boys' enrolment rates in these areas (Adamu-Issah et al., 2007).

Table 8: Education

Indicator	Estimate	Unit	Reference period	Source
Adult literacy rate (age 15 and over)	58	%	2000-2004	UNESCO
Adult literacy rate: females as % of males	73	%	2000-2004	UNESCO
Youth literacy rate (15-24 years)	71	%	2000-2004	UNESCO
Net primary enrolment ratio	72	%	2007	UNESCO
Grade 5 completion rate	63	%	2002-2003	UNESCO
Ratio of girls to boys in primary education	0.97	number of girls per 1 boy	2007	UNESCO
Public expenditure on education	3.2	% of GDP	1990	UNDP

Level of development, poverty

In 2005, Ghana ranked 135 out of 177 countries on the United Nations' Human Development Index which is a combined measure of life expectancy, education (adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratios) and per capita income (UNDP, 2007/2008).

According to the Ghana Living Standard Surveys (GLSS), the proportion of population below the national poverty line (overall poverty line[3]) was 29% in 2005-2006, falling from 40% in 1998-99. The proportion of population below the food poverty line declined from 27% in 1998-99 to 18% in 2005-2006. The decline in poverty recorded at national level was the result of substantial poverty reduction in both urban and rural areas. In urban areas, the proportion of population below the national poverty line was 11% in 2005-2006 (19% in 1998-99); in rural areas, this proportion was 39% in 2005-2006 (50% in 1998-99) (ECOWAS and UN Statistics Division, 2008; GSS, 2007). Thus the country is on track to achieve the first Millennium Development Goal[4] if the current GDP annual growth rate is sustained. The general decline in poverty can be attributed to the high growth rates achieved during the period of implementation of the Ghana Poverty Reduction Strategy (GPRS1). The growth is attributable to a substantial increase in cocoa production due to government intervention and a favourable international market (UNDP, 2007).

Poverty in Ghana is mostly rural. Interregional disparities are large and the incidence of poverty is extremely high in the Northern parts of the country: in 2005-2006, in Upper West region, the incidence of poverty reached 88% and 70% in Upper East region. Poverty is particularly evident in two sectors in Ghana: agriculture and the informal sector. The agricultural sector is most affected. Poverty incidence in female-headed households is lower than in male-headed households (19% and 31% respectively in 2005-2006) (UNDP, 2007; GSS, 2007).

[3] The overall poverty line is an aggregate of the food poverty line and the non-food expenditure.
[4] Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day (for monitoring country poverty trends, indicators based on national poverty lines should be used, where available)

Table 9: Human development and poverty

Indicator	Estimate	Unit	Reference period	Source
Human development index (HDI)	0.553	value between 0-1	2005	UNDP
Proportion of population living with less than 1$ a day (PPP)	45	%	1990-2005	UNDP
Population living below the national poverty line	29	%	2005-2006	GLSS 2005-2006
Human poverty index (HPI-1)	32	%	2005	UNDP

Other social indicators

Women and men in Ghana have distinctly different roles, activities and social constraints. Women make up roughly 85% of the wholesale and retail trading workforce and about two-thirds of the manufacturing one, mostly in the informal sector. In agriculture, women usually grow food for household consumption while men grow cash crops. Women bear primary responsibility for child-rearing, cooking, washing, and collecting fuel-wood and water. Relatively few women work in modern or formal sector activities (GSS et al., 2004).

Child labour remains widespread in Ghana. It is estimated that between 1999 and 2006, 34% of children between 5 and 14 years old were involved in child labour activities (UNICEF, Information by country). Activities include domestic help and working as “head potters” (person who carries goods on the head in the market place). Cases have been reported of Ghanaian children “sold” for domestic labour and prostitution.

Table 10: Other social indicators

Indicator	Estimate	Unit	Reference period	Source
Gender related development index (GDI)	0.549	value between 0-1	2005	UNDP
Women’s wage employment in non-agricultural sector as % of total non agricultural employees	57	%	1990	UNSTAT
Ratification of ILO Convention 182 on The Worst Forms of Child Labour	ratified		2000	ILO

Part II: Food and nutrition situation

II.1 Qualitative aspects of the diet and food security

Food consumption patterns

The main foods consumed in Ghana are cereals, starchy roots and plantain. The major staples are rice, yam, maize, cocoyam, cassava, plantain, millet and sorghum. They are accompanied by thick, well seasoned sauces, the most popular being *okra*, fish, bean leaf, groundnuts and *palava* sauce (made from cocoyam leaves and melon seed).

Popular cassava products are *fufu (*pounded cassava with plantain, cocoyam or yam)*, gari (*fermented cassava flour)*, agbelima* (cassava dough), *agbelikaklo* (fried grated fermented cassava) and *yakeyake* (steamed grated cassava). Popular maize dishes are *ampsei*, *kenkey* (fermented maize dough dumplings) and *koko* (porridge from sorghum/millet/fermented maize dough). These dishes are served mainly at lunch and dinner. *Gari* is the most common commercially available staple because of a long shelf-life (Al-Hassan, 1991*).* Yams can be stored for two months in a dark and cool place. They can also be dried and turned into flour for longer storage.

Generally, three meals are consumed daily, each one comprising one main course. Breakfast is usually quite substantial.

The Ghanaian diet varies according to regions and between the urban and rural sector. In the North, millet, sorghum and yam are the main staples, while in the South and West, cassava, maize, plantain and cocoyam are common. In the dry south-eastern region the most common staples are maize and cassava. Rice is a staple throughout the country, especially in urban areas; a long-shelf life and relative ease of preparation of rice explain the current increase in consumption. With rapid urbanization, the demand for imported foods has increased, especially for wheat and rice, causing a shift in consumption patterns of the urban population. The consumption of poultry meat, wheat and ready-made meals is much higher in urban areas than in rural areas. Rural inhabitants consume more starchy roots, pulses and nuts than their counterparts in urban areas. In terms of micronutrient intake, the rural diet is poorer than the urban one.

Christmas and Ramadan are the main religious celebrations in Ghana, during which meat is consumed, in particular chicken, goat and lamb.

Various types of food are avoided by pregnant women because of taboos and superstitions.

Food security situation[5]

Food security in Ghana continues to be threatened by high food prices and inflation, low household income, persistent high levels of unemployment and the additional negative effects of variations in domestic production (FAO, 2003). The rapidly growing population poses another dimension to the question of food security in the country (FAO, AQUASTAT).

Concerning domestic production, in addition to the seasonal pattern of production, there is considerable fluctuation in annual food production levels (FAO, 2003). Ghana is not self-sufficient in food production (FAO, AQUASTAT). The country is self-sufficient in cassava, yam, cocoyam, plantain, millet and sorghum. The self-sufficiency in rice, a staple throughout the country, increased in the late 1990s, but the country still has to import large amounts. The self-sufficiency in maize is usually close to 100% and only small volumes of maize are imported (FAO, 2003). Due to a poor road system, rural and urban areas are badly connected and it is difficult to ensure food availability in sufficient quantities all year round all over the country; the food supply can be overabundant in rural areas while there is a shortage of food in urban

[5] Food security is defined as "A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FIVIMS). Food insecurity may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity may be chronic, seasonal or transitory.

areas (FAO, AQUASTAT). Furthermore about 20-30% of the production is lost because of poor traditional post harvest management of food crops (Asante, 2004).

Throughout the country, poverty is the main limitation to food access and fluctuations in prices are a major constraint. Adequate access to meat and fish is restricted to the medium and high income groups. The situation is aggravated by growing and poorly managed urbanization, with the development of slums and the spread of unemployment.

The population vulnerable to food insecurity is mainly located in the Northern and the rural coastal regions. In the North, the distance from the ports makes imported food very expensive in comparison with local staples. Marine fish (local and imported) is generally transferred from the coastal regions to the north. Surpluses of maize, fruit and starchy staples from the Middle belt are transferred to the Northern regions. Due to the poor road infrastructure, the price of foods transferred from production regions to the North, which are distributed by a multiplicity of small scale merchants, are very expensive, more so during periods of food scarcity in the North (Asante, 2004).

II.2 National food supplies data

Supply of major food groups

Table 11: Trends in per capita supply of major foods groups (in g/per day)

Major food groups	Supply for human consumption in g/day					
	1966-68	1973-75	1980-82	1987-89	1994-96	2001-2003
Starchy roots	937	827	588	743	1000	1107
Fruit and vegetables	325	454	269	279	346	407
Cereals (excl. beer)	186	185	152	186	238	249
Fish, seafood	46	91	57	70	65	80
Other	53	78	55	56	74	61
Pulses, nuts, oilcrops	55	67	64	39	35	39
Meat and offal	28	27	31	28	28	29
Sweeteners	23	21	4	20	17	19
Milk and eggs	27	23	8	11	9	23
Vegetable oils	15	17	14	19	16	16
Animal fats	1	1	1	1	0	1

Source: FAOSTAT

The three major food groups in terms of supply for human consumption are starchy roots, fruit and vegetables, and cereals.

During the period 1966-68 to 2001-2003, per capita supply of the three major food groups has increased overall. However, fluctuations in the per capita supply of starchy roots, fruit/vegetables, and cereals were observed with an important reduction during the 1980s due to a period of drought and a series of bush fires (FAO, Faostat; DHA, 1984). Nevertheless data should be interpreted with caution as yields of these foods are difficult to assess accurately. Moreover availability for human consumption (i.e. the definition of food supply) must not be confused with actual intake.

The per capita supply of starchy roots is high. This food group is principally composed of cassava and yams, both locally produced (FAO, Faostat).

The per capita supply of fruit/vegetables is relatively high. Fruit and vegetables are principally composed of plantain, and, to a much lesser extent, pineapples, oranges, banana, assorted green leafy vegetables, *okra* and tomatoes (FAO, Faostat).

The per capita supply of cereals is relatively limited compared to that of starchy roots. Cereals are mainly composed of maize, rice, millet and sorghum. Maize, millet and sorghum are locally produced (only small amounts of maize are imported irregularly). Production of rice is rising in Ghana but due to increasing

consumption in urban centres, the country has to import increasing amounts to satisfy the demand (FAO, Faostat).

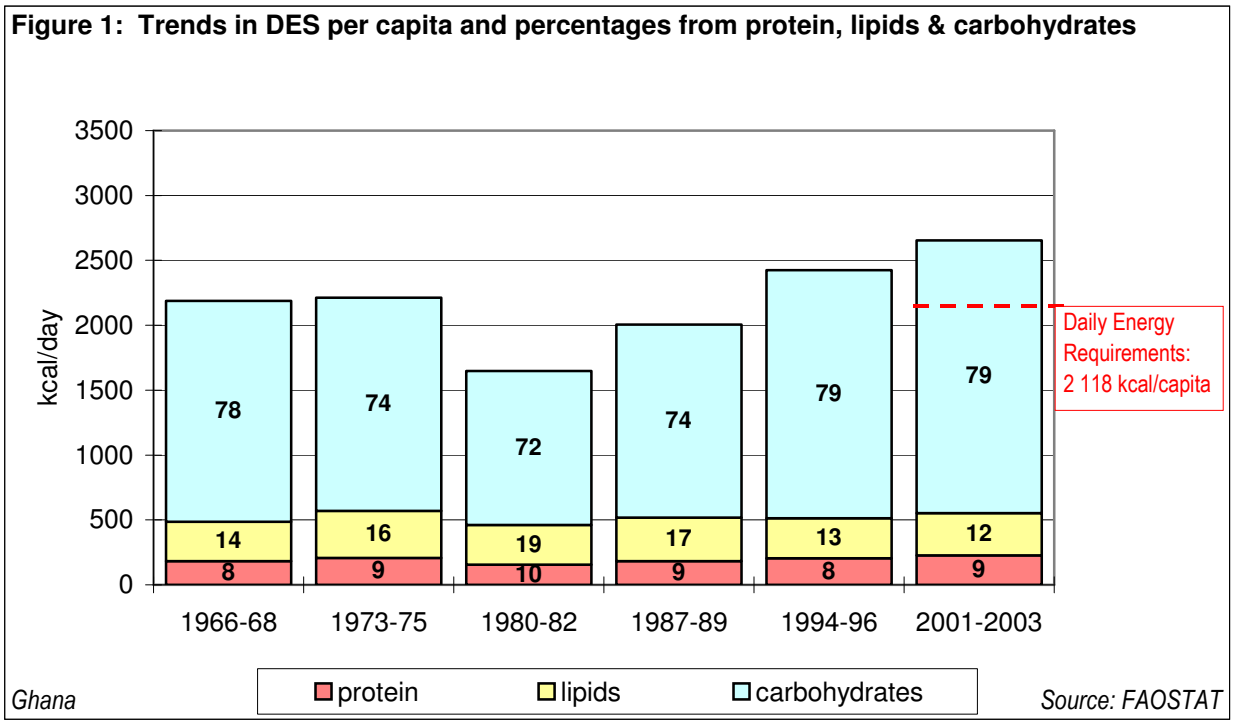
Despite fluctuations during the whole period, the country has a relatively high per capita supply of fish and seafood (about 80 g per capita/day). A large part of the fish supply is provided by imports. The per capita supply of other food groups of animal origin (meat and offals, milk and eggs, animal fats) remains low (FAO, Faostat).

The per capita supply of vegetable oil, mainly composed of palm oil and groundnut oil, has remained stable at a low level over the whole period. Palm oil is both locally produced and imported while groundnut oil is locally produced (FAO, Faostat).

The per capita supply of pulses, nuts and oilcrops, principally composed of coconuts and groundnuts has declined since the early 1980s (FAO, Faostat).

Dietary energy supply, distribution by macronutrient and diversity of the food supplies:

Figure 1: Dietary energy supply (DES), trends and distribution by macronutrient



In 2003-2005, the Dietary Energy Supply (DES) of 2690 kcal/capita/day was sufficient to satisfy the per capita energy requirement of 2118 kcal/day[6] (FAO, 2008; FAO, 2004b). During the 1980's the DES declined to a very low level due to persistent drought that caused extensive bush fires. Thereafter there has been a regular increase to the current level (DHA, 1984).

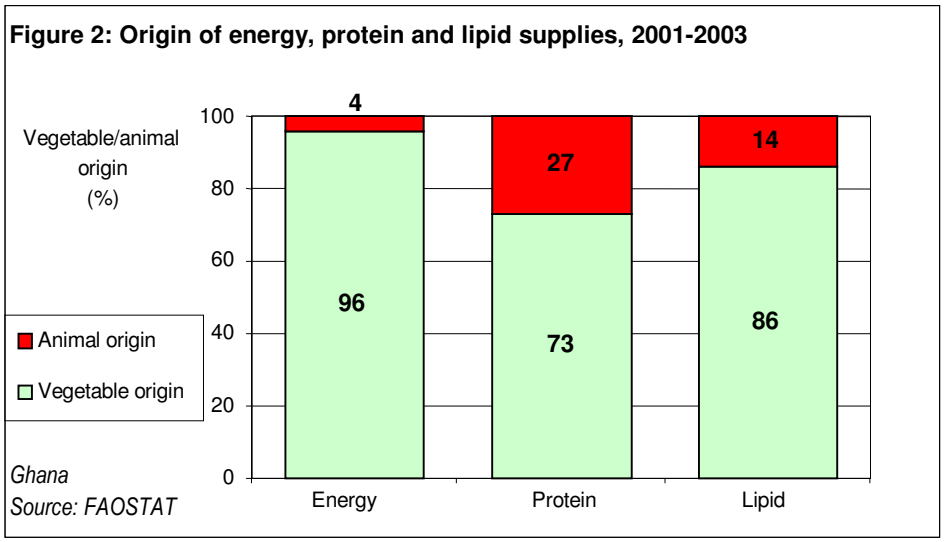
According to *"The State of Food Insecurity in the World 2008*", the prevalence of undernourishment is 9% (latest estimate relating to the period 2003-2005). This represents a considerable decrease in prevalence since 1990-92 when 34% of the population was undernourished (FAO, 2008).

The contribution of carbohydrates to the DES has increased slightly from 72% in 1980-82 to 79% in 2001-2003, while that of lipids has decreased slightly in parallel and is now lower than the recommended level of 15-30% of energy from fat (WHO/FAO, 2003). Except in 1980-82 when it reached 10%, the share of energy from protein has remained below recommendations (10-15% of energy from protein) (FAO, Faostat; WHO/FAO, 2003). The large share of carbohydrates in DES is due to the importance of starchy roots and cereals in the Ghanaian diet.

[6] Energy requirements are for a healthy and active lifestyle calculated using the FAO software (FAO, 2004b). Software default values attribute to 90 % of the urban adult population a light physical activity level (PAL=1.55) and greater than light activity to the remaining 10% (PAL=1.85), and to 50% of the rural adult population a light activity (PAL=1.65) and greater than light physical activity (PAL=1.95) to the other 50%.

Vegetable/animal origin of macronutrients

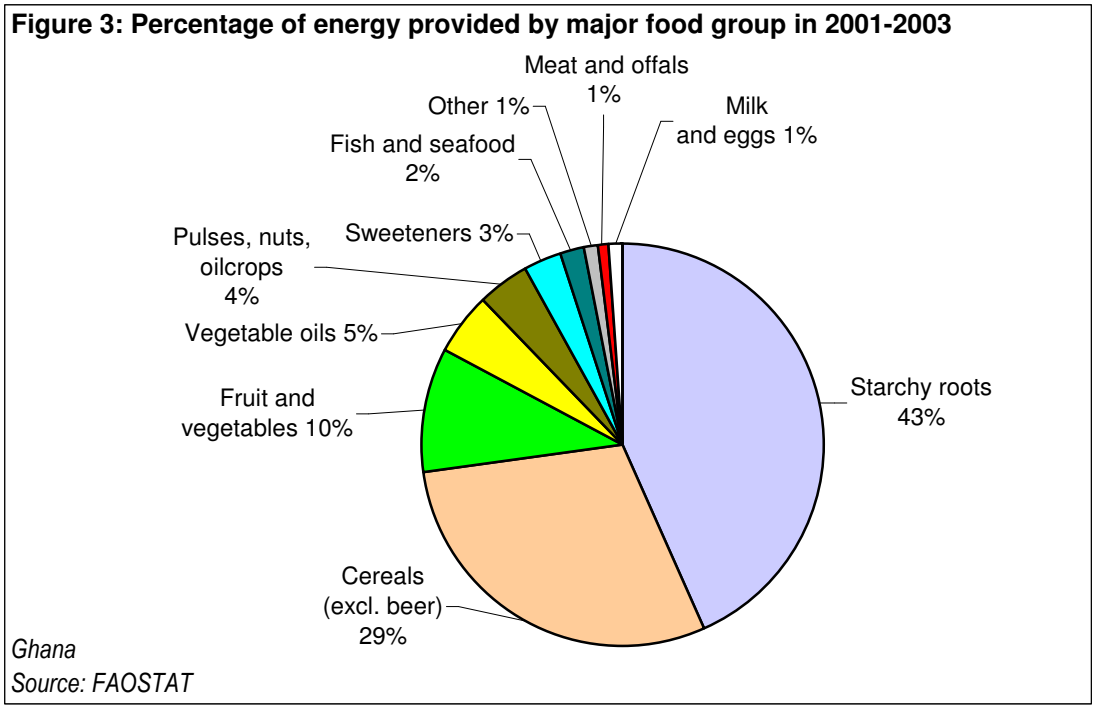
Figure 2: Vegetable/animal origin of energy, protein and lipid supplies



The share of energy, protein and lipid supplies of vegetable origin is very high. Animal foods contribute only to a very small share of energy and lipids (FAO, Faostat). The low supply of foods of animal origin may entail a low intake and/or bioavailability of micronutrients in the diet, especially vitamin A, iron and calcium.

Dietary energy supply by food group

Figure 3: Dietary energy supply by food group



The Ghanaian diet is essentially composed of starchy foods. Starchy roots and cereals together represent almost three-quarters (72%) of the DES. The percentage of DES provided by fruit and vegetable is relatively high (10%), but the percentage provided by foods of animal origin is particularly low (4%) (FAO, Faostat). The low contribution of animal products in the diet may entail various micronutrient deficiencies.

Table 12: Share of the main food groups in the Dietary Energy Supply (DES), trends

Food groups	% of DES					
	1966-68	1973-75	1980-82	1987-89	1994-96	2001-2003
Starchy roots	43	37	37	38	43	43
Cereals (excl. beer)	26	25	28	28	30	29
Fruit and vegetables	10	13	11	10	10	10
Vegetable oils	6	6	7	8	6	5
Pulses, nuts, oilcrops	5	7	9	6	4	4
Sweeteners	4	3	1	4	3	3
Fish, seafood	2	3	3	3	2	2
Meat and offal	2	2	3	2	2	1
Other	1	2	2	2	2	1
Milk and eggs	1	1	0	0	0	1
Animal fats	0	0	0	0	0	0

Source: FAOSTAT

Since 1966-68, the dietary diversification index, i.e. the contribution of food groups other than cereals and starchy roots to the DES, has remained very low, at around 28%. There has been no major change in the contribution of the main food groups to DES over the period (FAO, Faostat).

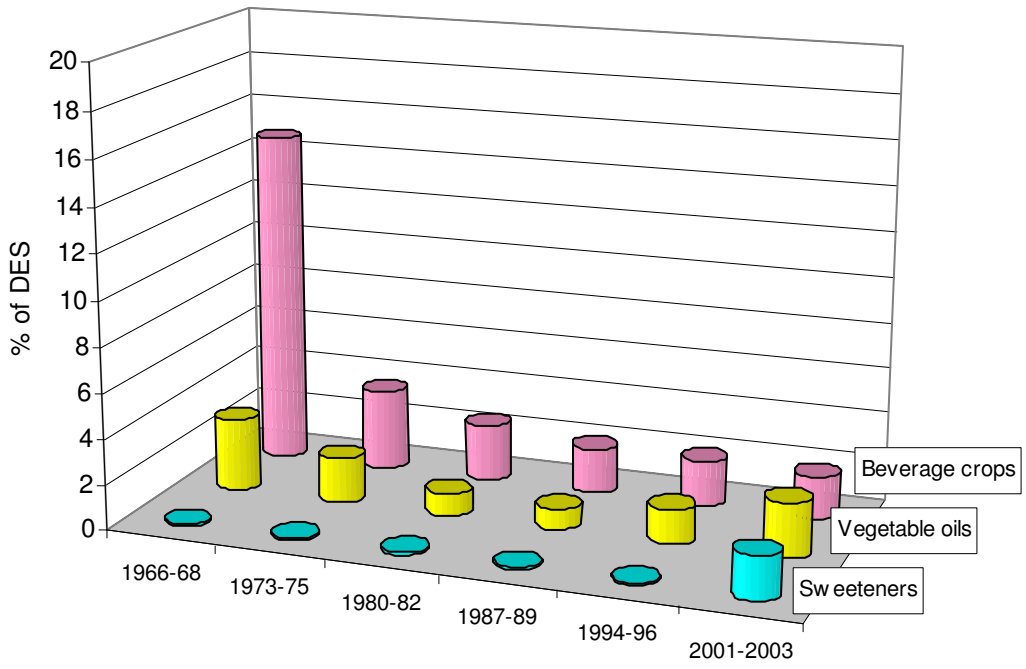
Food imports and exports expressed as percentage of DES

The major food exports (expressed as percentage of DES) in Ghana are beverage crops, vegetable oils and sweeteners.

Export of beverage crops (principally cocoa) decreased sharply from the period 1966-68 to 2001-2003 because of price fluctuations on the world commodity market. Exports of vegetable oils (mainly palm oil) decreased in the 1980s and then increased in 1994-96 (FAO, Faostat).

Figure 4: Major food exports as percentage of Dietary Energy Supply (DES), trends
Note that only the 3 most important food groups are shown.

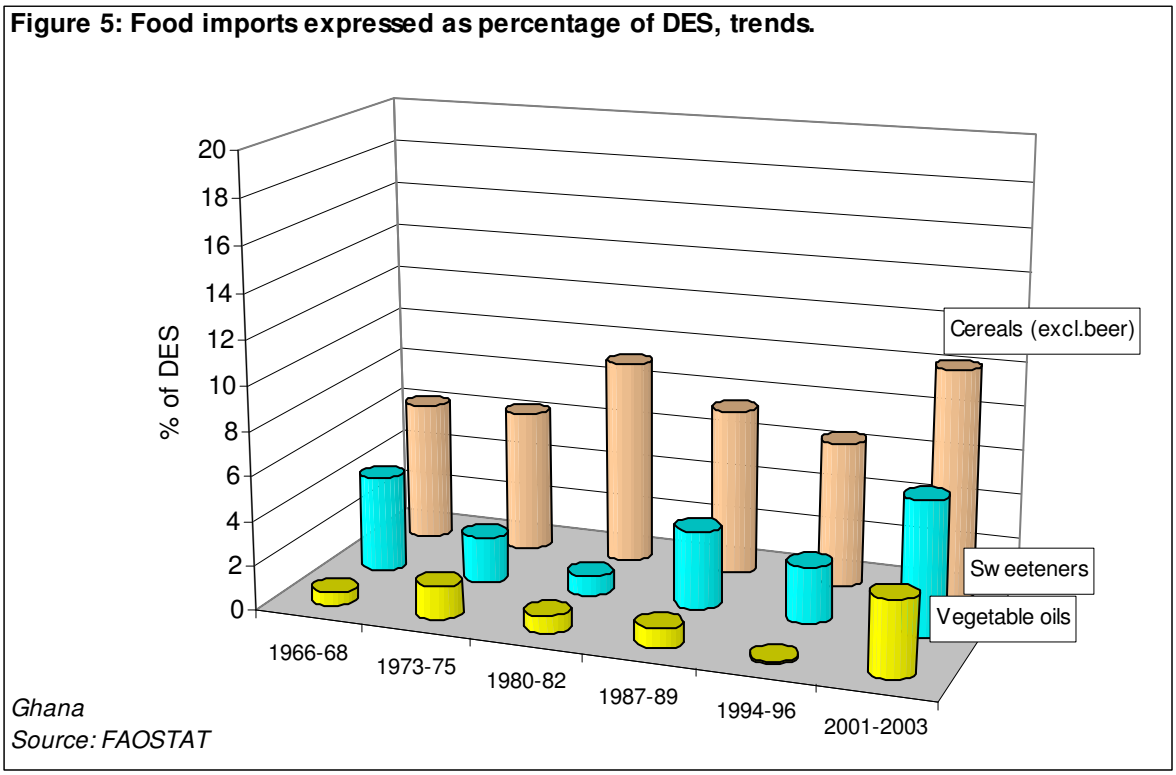
Figure 4: Food exports expressed as percentage of DES, trends.



Ghana
Source: FAOSTAT

The domestic shortfall of food production is compensated by commercial food imports and food aid mainly in cereals, meat, fish, sugar, oil and milk (Asante, 2004). Total food imports (commercial and food aid) have been fluctuating over the years but have increased since the mid-1990's (Asante, 2004). Ghana's dependence on cereal imports (rice and wheat) has been high throughout the period. While imports of sweeteners decreased to a low level in 1980-82, they increased in 2001-2003. Vegetable oil imports also increased in 2001-2003 (FAO, Faostat).

Figure 5: Major food imports as percentage of Dietary Energy Supply (DES), trends
Note that only the 3 most important food groups are shown.



Food aid

Between the early 1990s and 1998-2002, the volume of food aid imports has decreased by approximately 50%. The share of food aid (converted in kilocalories) in the DES has decreased from 4% in 1990-92 to 1% in 2001-2003 (FAO, Statistics Division, Food Security Statistics).

In 2005, Ghana received a total of 59 685 t of food aid. Of these, 57 190 t were cereals (comprised of 59% of wheat and wheat flour, 33% of blended and fortified foods, 5% of coarse grains and 2% of rice) and 2 495 t were non-cereals food commodities (comprised of 67% of oils and fats and 24% of pulses) (WFP, 2006).

About 93% of food aid was provided as project[7] food aid, mainly to support poverty reduction activities and malnutrition reduction activities (particularly for pregnant and lactating women, and children under five), and for school feeding. WFP has supported a Supplementary Feeding and Health and Nutrition Education Project for the past ten years in Ghana. The aim of the project was to contribute to the reduction of maternal and child health mortality through the life cycle approach (GOG and WFP, not dated). Activities included provision of food, strengthening nutrition capacity at the regional and district level, support to basic education through on-site school feeding in primary schools for boys and girls and take-home rations for girls in the most deprived districts in five regions (GOG and WFP, not dated).

[7] *Emergency* food aid is destined to victims of natural or man-made disasters; *Project* food aid aims at supporting specific poverty-alleviation (e.g. school-feeding) and disaster-prevention activities; *Programme* food aid is usually supplied as a resource transfer for balance of payments or budgetary support activities. Unlike most of the food aid provided for project or emergency purposes, it is not targeted to specific beneficiary groups. It is sold on the open market, and provided either as a grant, or as a loan.

About 7% of the food aid was delivered as emergency food aid (WFP, 2006). Emergency food aid became necessary as a result of the influx of refugees from other countries escaping from the Liberian war, the Ivory Coast conflict of 2002 and from the political crisis in Togo of 2005 (WFP, not dated).

II.3 Food consumption

National level surveys

Presently, no national data are available on food consumption. The National Household Income and Expenditure survey of 2000 documents expenditure on food and not actual amount of food consumed by households (GSS, 2000)

Patterns of food acquisition are somewhat similar in terms of food groups in the urban and rural sectors, but rural households consume more roots and tubers, pulses and nuts than their urban counterparts. Among rural households, a large share of consumption comes from own production.

Overall, regarding food purchases, the most important groups in terms of expenditure are roots and tubers (22% of total expenditures on food), fish (16%), cereals and cereal products (15%), vegetables (9%), and meat (5%). Ready-to-eat meals represent 11% of total expenditures on food among urban households.

Regarding home consumption of own production, roots and tubers account for about 60% of the total value of home consumption. The other food subgroups, which feature prominently in home consumption, are cereals and cereal products (14%), vegetables (7%), and pulses and nuts (5%).

Expenditure on fruit is generally low in all areas but especially in the rural savannah. Meat, poultry and poultry products form a small part of the diet in the rural coastal zone (GSS, 2000).

II.4 Infant and young child feeding practices

Over the last 10 years, three national surveys have been conducted in Ghana to assess infant and young child feeding practices: the Ghana Demographic and Health Survey (GDHS) 1998, GDHS 2003, and Ghana Multiple Indicator Cluster Survey 2006 (MICS3) (GSS and Macro Int., 1999; GSS et al., 2004; GSS et al., 2007).

According to the 2003 GDHS, breastfeeding is a universal practice in Ghana, as 97% of children born in the five years preceding the survey have been breastfed. There were no marked differences in the percentage of children everbreastfed by background characteristics (Table 13) (GSS et al., 2004).

Although as many as 75% of infants were put to the breast within 24 hours of birth, only 46% were put to the breast within the first hour of birth as recommended under the Breastfeeding Hospital Initiative and the Lactation Management and Growth Promotion programmes being implemented in the country (GSS et al., 2004). By region, there were substantial differences in the percentage of children whose mother practiced early initiation (within one hour of birth), ranging from 14% in the Central region to 86% in the Upper East region. There were no substantial variations by other background characteristics (GSS et al., 2004).

Results from MICS3 2006 indicated that 35% of women with a birth in the two years preceding the survey started breastfeeding within one hour of birth and 73% started breastfeeding within one day of birth (GSS et al., 2007).

There has been marked improvement in the practice of early initiation of breastfeeding since 1998; the proportion of children being put to the breast within one hour of birth increased from 25% in 1998 to 46% in 2003 (GSS and Macro Int., 1999; GSS et al., 2004). In 2006, the percentage was lower than that reported in 2003, indicating a possible decline in the practice (GSS et al., 2007; GSS et al., 2004).

However, sampling differences (children born in the two years preceding the survey in MICS 2006 and children born in the five years preceding the survey in GDHS 2003) may account for this discrepancy.

In 2003, the median duration of breastfeeding was estimated at 23 months (GSS et al., 2004). According to the two GDHS of 1998 and 2003 median duration of breastfeeding has progressed by one month (GSS and Macro Int., 1999; GSS et al., 2004).

Table 13: Initiation and duration of breastfeeding

Survey name/date (Reference)	Background characteristics	Sample size (all children under five years)*	Percentage of children under five years ever-breastfed	Number of children under five years ever breastfed	Among children everbreastfed, percentage breastfed within one hour of birth	Among children everbreastfed, percentage breastfed within 24 hours of birth[1]	Number of children under three years	Median duration of breastfeeding in children under three years (in months)
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Total**	3639	97.0	3532	46.3	75.2	2175	22.5
	Sex							
	M	1841	96.9	1784	46.8	76.0	1090	22.8
	F	1798	97.2	1748	45.8	74.4	1085	22.3
	Residence							
	Urban	1204	97.8	1178	47.2	76.7	732	20.4
	Rural	2435	96.7	2354	45.9	74.5	1442	23.3
	Region							
	Western	367	96.9	356	35.7	66.9	215	20.2
	Central	304	97.9	298	14.2	82.6	184	21.3
	Greater Accra	390	96.7	377	45.7	68.1	229	19.3
	Volta	298	97.9	292	47.1	79.3	184	22.9
	Eastern	362	97.0	351	39.9	76.2	220	21.2
	Ashanti	685	95.6	655	51.8	74.6	407	20.6
	Brong Ahafo	401	96.9	388	54.3	79.3	240	22.6
	Northern	500	97.9	489	54.1	70.5	297	28.2
	Upper East	215	98.4	212	86.3	92.9	129	26.4
	Upper West	118	97.1	114	17.9	69.7	70	27.4
	Mother's education							
	No education	1466	97.7	1433	48.3	72.7	863	25.3
	Primary	843	95.2	803	44.2	74.3	511	21.6
	Secondary or higher	1330	97.4	1295	45.5	78.6	800	20.3

* Based on all births in the five years preceding the survey, whether the children are living or dead at the time of interview.
[1] Includes children who started breastfeeding within one hour of birth

Data from GDHS 2003 (Table 14) and from MICS3 2006 indicated that about 53% of infants under 6 months were exclusively breastfed (GSS et al., 2004; GSS et al., 2007). According to GDHS 2003, about 60% of infants up to 3 months were exclusively breastfed. This proportion then dropped to 39% among infants aged 4-5 months. The duration of paid maternity leave in Ghana is 12 weeks; hence, a majority of women return to work when their children are 3 months old. This may account for the sharp decline in exclusive breastfeeding rates between 2-3 months and 4-5 months (GSS et al., 2004).

The rate of exclusive breastfeeding has increased since 1998 when only 31% of children under 6 months of age were exclusively breastfed (GSS and Macro Int., 1999). However, more efforts are needed to improve this practice.

Virtually all children (96%) are breastfed for at least one year and 67% are still breastfed at 2 years of age (GSS et al., 2004). Data from MICS3 2006 shows a slight decline in the percentage of children still breastfed at 2 years of age (56%) (GSS et al., 2007).

Bottle-feeding remains frequent in Ghana: among children aged 0-11 months, 11% were bottle-fed (GSS et al., 2004). Although still high, the bottle-feeding rate was halved, from 22% in 1998 to 11% in 2003 (GSS and Macro Int., 1999; GSS et al., 2004). This could be the result of the implementation since May 2000 of the Breastfeeding Promotion Regulation 2000 (L.I.1667) which prevents the aggressive marketing of breastmilk substitutes, hence protecting breastfeeding practices.

Infant formula can easily get contaminated by bacteria, particularly where access to safe water is limited, which is often the case in Ghana (in rural areas). Moreover formula is often over-diluted leading to undernutrition of young children.

Table 14: Type of infant and young child feeding

Survey name/date (Reference)	Type of feeding in the 24 hours preceding the survey		
	Indicator by age	Sample size	Percentage of children
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Exclusive breastfeeding rate**		
	0-1 month	92	62.4
	2-3 months	88	64.9
	4-5 months	127	38.9
	<6 months	308	53.4
	Timely complementary feeding rate		
	6-9 months	239	62.2
	Bottle-feeding rate		
	0-11 months	688	11.1
	Continued breastfeeding rate		
	12-15 months (1 year)	258	95.8
	20-23 months (2 years)	191	66.7

WHO recommends the introduction of complementary foods around the age of 6 months because by that age breastmilk alone is no longer sufficient to support optimal growth. However, in Ghana, more than a third (38%) of children aged 6-9 months does not receive complementary foods, a percentage similar to that reported in MICS3 2006 (41%) (GSS et al., 2004; GSS et al., 2007).

In Ghana, the introduction of liquids other than breastmilk, solid or semi-solid food can take place earlier than the recommended age of about 6 months. Under 6 months of age, 16% of breastfed infants were already given complementary foods (GSS et al., 2004). Thus, both inappropriate practices exist in Ghana, early and late introduction of complementary feeding.

Complementary foods are often made from cereals - maize, millet and sorghum. On average, children aged 6 to 9 months are given complementary foods only once a day, and children aged 2 years twice a day, instead of the respectively 3 and 5 times a day recommended by WHO (GSS et al., 2004; WHO, 2002a).

Among breastfed children aged 6-11 months, less than a third were given fruit and vegetables rich in vitamin A and about one quarter received meat, fish or eggs in the 24 hours preceding the survey. Only 15% of children 6-11 months were given animal milk and dairy products and 11% were given foods with oil, fat or butter (GSS et al., 2004).

Consumption of fruit and vegetables rich in vitamin A and of meat/fish/eggs was more common among older children (24-35 months). However, even among children aged 24-35 months, a third did not receive meat/fish/eggs and about 40% did not receive fruit and vegetables rich in vitamin A in the 24 hours preceding the survey (GSS et al., 2004).

Table 15: Consumption of complementary foods by breastfeeding status and age

Survey name/date (Reference)	Age (months)	Breast-feeding status*	Number of children	Foods consumed by children in the 24 hours preceding the survey					
				Percent of children having consumed the following foods					
				Infant formula	Other milk and dairy products	Pulses	Meat/ fish/ eggs	Foods with oil/ fat/butter	Fruit and vegetables rich in vit. A
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	6-11	BF	367	9.6	15.1	11.2	27.8	11.3	31.3
	12-23	BF	560	5.8	15.2	22.3	58.3	22.3	50.2
	24-35	BF + NBF	507	4.2	16.9	26.5	67.7	27.7	59.2

* Breastfed children (BF) or non breastfed children (NBF) or breastfed and non breastfed taken together.

In conclusion, several inappropriate infant and young child feeding practices persist and are proximal causes of malnutrition and high infant mortality rate among young Ghanaian children. Hence, efforts are still necessary to improve these practices.

II.5 Nutritional anthropometry

Low birth weight
(Less than 2 500 g)

According to MICS3 2006, among children born in the two years preceding the survey and whose birth weight was recorded, the prevalence of low birth weight was 9%. However, only 36% of newborns were weighed at birth. This is due to the low proportion of births taking place in a health facility (46% in 2003) (GSS et al., 2004). Therefore, newborns who are weighed at birth are not representative of all births because they are born in a generally more privileged environment (urban area, mother with higher education level, etc.) (GSS et al., 2007). Due to the low proportion of newborns weighed at birth and the lack of representativity of recorded birth weights, the prevalence of low birth weight must be interpreted with caution and could be underestimated.

Trends in the prevalence of low birth weight cannot be assessed as data from previous surveys (GHDS) are not comparable with those from MICS3 2006.

Low birth weight (LBW) results from preterm birth and/or intra-uterine growth retardation (IUGR). The major attributable causes of IUGR include poor nutritional and health status of the mother, notably low weight gain during pregnancy, low body mass index (BMI), short stature and malaria. LBW is closely associated with neonatal mortality and morbidity, stunted growth and low cognitive development, and the occurrence of chronic diseases later in life (UNICEF and WHO, 2004; WHO, 2002b).

Anthropometry of preschool children

Over the past decade, three national surveys have been conducted in order to assess the nutritional status of preschool children: the Ghana Demographic and Health Surveys of 1998 and 2003, and the MICS3 survey of 2006 (GSS and Macro Int., 1999; GSS et al., 2004; GSS et al., 2007).

In 2006, the prevalence of stunting among children under five years was 22%, the prevalence of wasting was 5% and that of underweight was estimated at 18% (GSS et al., 2007). Based on these prevalence rates, the severity of malnutrition in Ghana is defined as “medium” according to WHO criteria (WHO, 1995).

Stunting is an indicator of chronic malnutrition, meaning long-term or accumulated nutritional deficiency resulting from lack of adequate dietary intake over a long period of time and/or recurrent illnesses. At national level in 2006, nearly a quarter of preschool children was stunted and 7% were severely stunted (Table 16). There were no differences in prevalence by gender. The prevalence of stunting increased

steeply with age. Among infants aged 0-6 months 5% were stunted, probably as a consequence of intrauterine growth retardation and/or prematurity. After the first year of life, the prevalence of stunting increased considerably to reach 28% among children aged 24-35 months and remained high after the age of three years (GSS et al., 2007). Deterioration of the nutritional status after the age of 6 months can be related to inappropriate complementary feeding practices, combined with cumulative effects of recurrent illnesses and inadequate health care.

The prevalence of stunting was significantly higher in rural areas (28%) than in urban areas (13%). Differences in the prevalence of stunting by region were also marked: in the Northern region, nearly a third of children were stunted and 12% were severely stunted (GSS et al., 2007). The high prevalence of stunting in this region could be related to long-term cumulative effects of seasonal food shortages and lower access to health services compared to the rest of the country.

Mothers' level of education was strongly associated with stunting: prevalence among children of mothers with no education was much higher (30%) than among children of mothers with secondary or higher education (17%) (GSS et al., 2007). This observation should not automatically be interpreted as a direct effect of mother's education but more as the result of the impact of the economic status of the family on the prevalence of stunting.

At national level, in 2006 the prevalence of wasting among preschool children was 5% and that of severe wasting 1% (GSS et al., 2007). Acute malnutrition (wasting) reflects the nutritional situation at the time of the survey and hence can be strongly influenced by the period during which data collection took place. Data collection for MICS3 2006 took place between August and October 2006, outside of the period of food shortage which generally extends from March to June.

There were no significant differences in the prevalence of wasting by gender. Prevalence increased during the first two years of life, from 4% among infants aged 0-6 months to 11% among children aged 12-23 months. After this age, the prevalence of wasting decreased and among children aged 36-59 months, it was 2%, a statistically insignificant percentage. In contrast with the prevalence of stunting which was much higher in rural areas than in urban areas, the prevalence of wasting did not vary by sector. There were large regional differences in the prevalence of wasting, ranging from 3% in Greater Accra and Brong Ahafo regions to 12% in the Upper East region. The prevalence of wasting appears to be associated with mothers' level of education (GSS et al., 2007).

At national level, the prevalence of underweight among underfives was 18% and the prevalence of severe underweight was 3% in 2006.

Overall, prevalences of stunting, wasting and underweight were higher in the Upper East and Northern regions (GSS et al., 2007).

Overweight is not a problem among young children in Ghana (GSS et al., 2007).

Trends in child nutritional status can be observed by comparing data collected in the 2006 MICS3 with data from the 2003 and 1998 GDHS. The comparison shows that prevalence of stunting initially increased from 26% in 1998 to 30% in 2003 but then decreased to 22% in 2006. Between 2003 and 2006, the prevalence of stunting decreased similarly in both urban and rural areas. These differences in prevalence of stunting are difficult to interpret. It is not certain whether these fluctuations correspond to real changes in prevalence.

At national level, the prevalence of wasting has decreased steadily, from 10% in 1998, 7% in 2003 to 5% in 2006. It should be noted that the three surveys were conducted outside of the season of food shortage, thus the comparison of prevalence of wasting is valid. A similar trend can be observed with the prevalence of underweight which has decreased from 25% in 1998 to 22% in 2003 and 18% in 2006 (GSS and Macro Int., 1999; GSS et al., 2004; GSS et al., 2007).

In Ghana, although the nutritional status of preschool children has improved, malnutrition persists. Many factors still have a negative impact on the nutritional status of young children, among which inadequate infant feeding practices, high morbidity and poor access to health care services. Although declining, poverty still affects a large proportion of the population and food insecurity persists. These factors are among the main causes of malnutrition among young Ghanaian children.

Although trends in the nutritional status of preschool children are encouraging more efforts in addressing malnutrition are needed.

Table 16: Anthropometry of preschool children

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Prevalence of malnutrition						
					Percentage of children with						
					Stunting Height-for-age		Wasting Weight-for-height		Underweight Weight-for-age		Overweight Weight-for-height
					< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	> +2 Z-scores
Ghana Multiple Indicator Cluster Survey 2006 (Aug. – Oct. 2006) (GSS et al., 2007)	**Total**	0-4.99	M/F	3166	7.3	22.4	0.9	5.4	3.1	17.8	1.3
	Sex										
		0-4.99	M	1642	7.4	23.0	1.0	5.6	3.4	18.3	1.0
		0-4.99	F	1523	7.2	21.7	0.7	5.1	2.8	17.1	1.7
	Age										
		0-0.49	M/F	361	1.6	5.0	0.1	3.9	0.7	2.4	5.5
		0.5-0.99	M/F	322	2.7	8.6	1.6	8.7	3.8	18.2	1.2
		1-1.99	M/F	667	8.0	27.6	1.3	11.1	4.3	28.1	1.2
		2-2.99	M/F	632	10.0	28.1	1.2	4.1	5.3	22.1	0.3
		3-3.99	M/F	629	8.9	25.2	0.7	2.4	2.6	15.7	0.3
		4-4.99	M/F	554	8.2	26.0	0.2	2.3	1.2	12.5	1.2
	Residence										
	Urban	0-4.99	M/F	1159	3.4	13.2	1.0	4.9	1.8	11.5	1.7
	Rural	0-4.99	M/F	2006	9.6	27.8	0.8	5.7	3.9	21.4	1.1
	Region										
	Western	0-4.99	M/F	326	5.5	20.7	0.5	6.5	1.1	14.6	0.9
	Central	0-4.99	M/F	267	4.6	26.4	0.0	3.7	1.6	16.3	1.6
	Greater Accra	0-4.99	M/F	406	2.7	9.8	1.1	3.1	1.7	7.7	1.3
	Volta	0-4.99	M/F	231	8.1	20.9	2.1	4.8	5.4	20.3	0.4
	Eastern	0-4.99	M/F	430	9.1	22.0	0.3	4.4	3.3	17.8	0.7
	Ashanti	0-4.99	M/F	468	6.8	22.6	0.8	5.9	2.6	17.3	1.5
	Brong Ahafo	0-4.99	M/F	288	4.9	22.2	0.5	3.1	1.7	13.3	3.5
	Northern	0-4.99	M/F	529	12.4	30.5	1.1	7.1	5.9	26.8	1.1
	Upper East	0-4.99	M/F	127	12.4	28.4	2.8	11.6	5.9	29.1	1.6
	Upper West	0-4.99	M/F	(94)	(6.0)	(22.5)	(0.3)	(7.7)	(2.6)	(19.1)	(1.4)
	Mother's education										
	No education	0-4.99	M/F	1210	11.3	29.9	1.1	6.2	4.8	23.2	1.1
	Primary	0-4.99	M/F	693	6.0	20.1	1.1	6.1	2.8	16.7	0.8
	Middle, secondary or higher	0-4.99	M/F	1263	4.4	16.5	0.5	4.2	1.8	13.0	1.9

* Category <-2 Z-scores includes <-3 Z-scores

Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Table 16: Anthropometry of preschool children (cont.)

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Prevalence of malnutrition					
					Percentage of children with					
					Stunting Height-for-age		Wasting Weight-for-height		Underweight Weight-for-age	
					< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*
Ghana Demographic and Health Survey 2003 (July – Oct. 2003) (GSS et al., 2004)	**Total**	0-4.99	M/F	3183	10.8	29.9	1.3	7.1	4.7	22.1
	Sex									
		0-4.99	M	1588	12.5	32.8	1.7	7.2	4.9	22.6
		0-4.99	F	1595	9.2	27.0	1.0	7.1	4.5	21.6
	Age									
		0-0.49	M/F	248	1.0	6.3	2.0	5.9	0.0	2.4
		0.5-0.99	M/F	343	3.2	15.2	3.4	10.0	5.0	21.0
		1-1.99	M/F	636	12.3	35.2	1.7	12.6	7.9	30.8
		2-2.99	M/F	636	12.8	32.5	1	5.5	7.0	26.4
		3-3.99	M/F	710	13.3	35.0	0.8	3.8	4.1	21.3
		4-4.99	M/F	611	12.5	33.4	0.7	3.4	1.6	18.2
	Residence									
	Urban	0-4.99	M/F	1050	6.8	20.5	1.9	6.6	3.2	15.4
	Rural	0-4.99	M/F	2132	12.8	34.5	1.1	7.4	5.4	25.4
	Region									
	Western	0-4.99	M/F	333	8.0	28.4	1.1	5.3	2.2	16.5
	Central	0-4.99	M/F	284	12.5	31.6	0.0	3.0	4.0	22.0
	Greater Accra	0-4.99	M/F	337	5.5	13.9	2.7	7.2	2.1	11.5
	Volta	0-4.99	M/F	259	7.8	23.3	3.1	13.9	4.9	25.7
	Eastern	0-4.99	M/F	333	6.2	27.4	0.7	6.2	3.7	17.3
	Ashanti	0-4.99	M/F	613	10.2	29.1	0.8	6.7	4.1	20.8
	Brong Ahafo	0-4.99	M/F	356	10.7	29.4	1.3	5.7	5.5	20.4
	Northern	0-4.99	M/F	415	21.8	48.8	1.0	6.6	8.7	35.5
	Upper East	0-4.99	M/F	156	12.2	31.7	2.4	12.9	7.8	32.4
	Upper West	0-4.99	M/F	(95)	(12.6)	(34.1)	(2.6)	(11.0)	(6.0)	(25.9)
	Mother's education									
	No education	0-4.99	M/F	1177	14.7	38.2	1.4	7.5	6.8	27.5
	Primary	0-4.99	M/F	661	8.2	24.1	1.0	7.8	3.3	18.6
	Secondary or higher	0-4.99	M/F	1108	7.3	23.6	1.6	6.3	2.8	17.9

* Category <-2 Z-scores includes <-3 Z-scores

Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Table 16: Anthropometry of preschool children (cont.)

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Prevalence of malnutrition					
					Percentage of children with					
					Stunting Height-for-age		Wasting Weight-for-height		Underweight Weight-for-age	
					< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*	< -3 Z-scores	< -2 Z-scores*
Ghana Demographic and Health Survey 1998 (Nov. 1998-Feb. 1999) (GSS and Macro Int., 1999)	**Total**	0-4.99	M/F	2570	9.3	25.9	1.4	9.5	5.2	24.9
	Sex									
		0-4.99	M	1262	9.5	28.1	1.5	10.4	5.1	25.4
		0-4.99	F	1308	9.2	23.8	1.3	8.7	5.3	24.3
	Age									
		0-0.49	M/F	259	0.5	2.9	0.9	3.3	0.1	0.5
		0.5-0.99	M/F	300	2.4	8.8	2.4	16.1	4.9	18.7
		1-1.99	M/F	591	7.5	27.0	2.9	20.1	8.2	38.0
		2-2.99	M/F	488	8.9	27.5	0.7	7.4	6.1	25.7
		3-3.99	M/F	484	16.8	37.3	0.7	3.2	4.3	23.2
		4-4.99	M/F	448	13.8	35.1	0.5	4.0	4.5	26.6
	Residence									
	Urban	0-4.99	M/F	638	4.8	14.3	0.7	6.5	2.6	15.6
	Rural	0-4.99	M/F	1932	10.8	29.7	1.6	10.5	6.1	27.9
	Region									
	Western	0-4.99	M/F	335	8.9	29.4	1.4	9.2	4.4	25.6
	Central	0-4.99	M/F	277	12.1	26.8	0.4	10.3	6.7	26.3
	Greater Accra	0-4.99	M/F	278	2.9	11.3	1.3	5.5	1.7	12.2
	Volta	0-4.99	M/F	293	9.5	25.1	1.2	15.2	4.9	24.7
	Eastern	0-4.99	M/F	360	6.0	23.6	1.0	8.7	2.4	22.3
	Ashanti	0-4.99	M/F	420	9.8	27.6	1.9	9.2	5.6	24.7
	Brong Ahafo	0-4.99	M/F	201	3.4	17.8	1.7	8.1	5.2	24.1
	Northern	0-4.99	M/F	168	19.0	39.6	2.0	12.7	12.7	38.1
	Upper East	0-4.99	M/F	171	16.1	35.9	2.1	8.2	7.0	34.0
	Upper West	0-4.99	M/F	(68)	(16.8)	(34.6)	(1.5)	(7.1)	(9.1)	(28.4)
	Mother's education									
	No education	0-4.99	M/F	958	13.1	32.1	1.9	11.1	8.1	30.4
	Primary	0-4.99	M/F	513	8.7	27.5	1.3	9.5	5.2	26.7
	Secondary or higher	0-4.99	M/F	1099	6.3	19.7	1.0	8.2	2.7	19.2

* Category <-2 Z-scores includes <-3 Z-scores

Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Anthropometry of school-age children

There is currently no data available on anthropometry of school-age children.

Anthropometry of adolescents

There is currently no data available on anthropometry of adolescents.

Anthropometry of adult women

Over the past decade, two national surveys have been conducted to assess anthropometry of women of childbearing age in Ghana: the 1998 GDHS and the 2003 GDHS (GSS and Macro Int., 1999; GSS et al., 2004).

In 2003, women's mean height was 159 cm and only 1% (a percentage statistically insignificant) measured less than 145 cm, a cutoff below which risk of difficult delivery and of giving birth to a low birth weight baby is higher due to intrauterine growth retardation (GSS et al., 2004). Mean body mass index (BMI) was 23 kg/m² and 9% of women of childbearing age were affected by chronic energy deficiency (CED) (BMI<18.5 kg/m²) while 25% were overweight or obese (BMI ≥ 25.0 kg/m²) (GSS et al., 2004).

The prevalence of CED was higher among young women (15-19 years) and among women with lower educational level (Table 17). In rural areas, prevalence was twice that of urban areas. Regional differences in prevalence were substantial, ranging from a prevalence of 4% in Greater Accra to 23% in Upper East region (GSS et al., 2004). The data reveal that CED persists among women especially in areas where food insecurity is prevalent. CED constitutes a risk in terms of pregnancy outcome and maternal mortality, and is also a contributing factor to malnutrition among young children.

At national level in 2003, a quarter of women of childbearing age were overweight or obese. The prevalence of overweight and obesity increased with age and with increasing educational level. In urban areas, the prevalence was 35% while in rural areas it was 16%. In Greater Accra region, the level of prevalence was alarming with almost half of all women being overweight or obese (GSS et al., 2004).

Interpretation of trends in women's nutritional status is complicated by differences in sample selection between the two national surveys: in the 1998 GDHS only mothers of children underfive years were measured while in 2003, the data refer to all women age 15-49 years. A comparison, restricting the 2003 data to mothers of children under five, shows that there has been little change in mean BMI over the past years. However, a slight decline in prevalence of CED was observed, from 11% in 1998 to 9% in 2003 (GSS et al., 2004). Prevalence of overweight and obesity is not documented in the 1998 GDHS.

Ghana is undergoing a nutrition transition; at national level in 2003, the prevalence of overweight and obesity among women of childbearing age was significantly higher than the prevalence of CED. Obesity and overweight are more prevalent in urban areas but the problem is also emerging in rural areas. In adolescent women (15-19 years of age) and in certain regions however, the prevalence of CED is still higher than that of overweight and obesity.

Table 17: Anthropometry of adult women

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Anthropometry of adult women								
			Height			Body Mass Index[1] (kg/m²) (BMI)					
								Percentage of women with BMI			
			Sample size	Mean (cm)	% of women with height < 1.45 m	Sample size	Mean (kg/m²)	<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
Ghana Demographic and Health Survey 2003 (July – Oct. 2003) (GSS et al., 2004)	**Total**	15-49	5387	158.8	1.2	4835	23.1	9.3	65.4	17.2	8.1
	Age										
		15-19	1075	157.7	2.0	1002	21.1	15.2	76.8	6.9	1.1
		20-24	952	158.4	1.5	830	22.4	7.5	75.6	14.7	2.2
		25-29	909	159.2	0.8	771	23.0	8.3	66.4	18.8	6.4
		30-34	762	159.5	1.1	668	24.1	7.1	59.5	21.7	11.7
		35-39	692	159.5	0.7	611	24.4	7.0	55.2	23.9	13.9
		40-44	545	159.1	0.9	515	24.8	7.1	53.2	23.0	16.7
		45-49	451	159.2	0.3	439	24.1	9.7	56.3	20.0	14.0
	Residence										
	Urban	15-49	2556	159.2	1.1	2378	24.2	6.4	58.4	22.4	12.7
	Rural	15-49	2831	158.5	1.2	2457	22.0	12.0	72.2	12.2	3.6
	Region										
	Western	15-49	542	158.5	1.8	498	22.9	11.2	63.0	18.8	6.9
	Central	15-49	423	157.8	2.3	380	23.2	6.7	67.1	20.5	5.7
	Greater Accra	15-49	898	159.6	0.7	848	25.3	4.3	49.4	28.8	17.4
	Volta	15-49	475	157.6	2.4	439	22.6	9.7	71.5	12.4	6.4
	Eastern	15-49	577	158.6	0.7	530	23.3	8.9	66.2	17.0	7.8
	Ashanti	15-49	1030	158.7	1.3	917	23.2	9.6	64.3	17.3	8.7
	Brong Ahafo	15-49	553	159.1	0.7	485	22.7	7.2	73.0	13.7	6.0
	Northern	15-49	465	159.3	0.5	375	21.1	12.8	79.7	6.4	1.1
	Upper East	15-49	280	159.3	0.4	239	20.5	23.1	69.5	6.9	0.6
	Upper West	15-49	142	160.2	0.0	126	21.4	11.3	82.2	5.1	1.4
	Education's level										
	No education	15-49	1526	158.7	0.8	1297	22.1	12.1	71.5	11.8	4.6
	Primary	15-49	1096	158.1	2.0	983	23.0	10.3	65.4	17.4	6.9
	Secondary or higher	15-49	2766	159.2	1.0	2555	23.7	7.5	62.4	19.9	10.2

[1] excludes pregnant women and women with a birth in the 2 preceding months.

Note: the sample represents all women age 15-49.

Table 17: Anthropometry of adult women (cont.)

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Anthropometry of adult women								
			Height			Body Mass Index[1] (kg/m²) (BMI)					
								Percentage of women with BMI			
			Sample size	Mean (cm)	% of women with height < 1.45 m	Sample size	Mean (kg/m²)	<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
Ghana Demographic and Health Survey 1998 (Nov. 1998-Feb. 1999) (GSS and Macro Int., 1999)	**Total**	15-49	2257	158.7	0.7	1945	22.1	11.3	n.a.	n.a.	n.a.
	Age										
		15-19	105	157.2	2.7	99	20.7	15.8	n.a.	n.a.	n.a.
		20-24	502	158.2	0.9	419	21.6	13.8	n.a.	n.a.	n.a.
		25-29	587	158.6	0.8	504	22.2	8.8	n.a.	n.a.	n.a.
		30-34	418	159.0	0.5	359	22.3	11.5	n.a.	n.a.	n.a.
		35-49	644	159.2	0.3	565	22.4	10.7	n.a.	n.a.	n.a.
	Residence										
	Urban	15-49	586	159.1	1.0	521	23.8	5.4	n.a.	n.a.	n.a.
	Rural	15-49	1671	158.6	0.7	1425	21.5	13.4	n.a.	n.a.	n.a.
	Region										
	Western	15-49	282	157.6	1.2	246	21.5	15.8	n.a.	n.a.	n.a.
	Central	15-49	252	157.5	0.5	222	22.1	10.0	n.a.	n.a.	n.a.
	Greater Accra	15-49	248	159.7	0.5	214	24.6	6.0	n.a.	n.a.	n.a.
	Volta	15-49	254	159.5	0.5	219	21.7	9.2	n.a.	n.a.	n.a.
	Eastern	15-49	314	158.6	0.0	261	22.2	12.8	n.a.	n.a.	n.a.
	Ashanti	15-49	360	157.7	2.2	321	22.3	9.5	n.a.	n.a.	n.a.
	Brong Ahafo	15-49	184	159.4	0.0	150	21.8	13.0	n.a.	n.a.	n.a.
	Northern	15-49	147	159.0	0.5	121	21.0	12.5	n.a.	n.a.	n.a.
	Upper East	15-49	151	160.5	0.4	133	20.9	14.8	n.a.	n.a.	n.a.
	Upper West	15-49	(64)	(160.5)	(0.5)	(58)	(20.9)	(12.0)	n.a.	n.a.	n.a.
	Education's level										
	No education	15-49	826	158.7	0.7	714	21.3	12.7	n.a.	n.a.	n.a.
	Primary	15-49	460	157.9	1.4	404	22.1	11.2	n.a.	n.a.	n.a.
	Secondary or higher	15-49	971	159.0	0.5	827	22.8	10.0	n.a.	n.a.	n.a.

[1] excludes pregnant women and women with a birth in the 2 preceding months

Note: the sample represents mothers with a birth in the five years preceding the survey

n.a.: not available

Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Anthropometry of adult men

There is currently no data available on anthropometry of adult men at national level.

In 2002, a cross-sectional descriptive study was conducted on adults (males and females) to determine the socio-demographic characteristics associated with obesity in Ghana. Two urban (high-class and low-class suburbs) and a rural community were purposely selected in Greater Accra. A stratified two-stage cluster sampling technique was used. In total, 4731 adults (1857 males, 2874 females) aged 25 years and above took part in the study (Amoah, 2003).

Among adult men, the prevalence of CED was 9% in 2002 while prevalence of overweight and obesity were 18% and 5% respectively. The prevalence of overweight and obesity was significantly higher among men living in the urban areas (29%) than among those living in the rural area (9%) (Amoah, 2003). Several factors contributed to these differences: higher income, cultural habits associated with social status, and changing food habits among the urban sample. On the other hand, the prevalence of CED was higher in the rural area, 17%, vs. 5% in the urban samples.

Since the sample is not representative, prevalence cannot be inferred to the national level.

II.6 Micronutrient deficiencies

Iodine deficiency disorders (IDD)

Prevalence of goitre and urinary iodine level

A survey assessing the prevalence of Iodine Deficiency Disorders (IDD) was conducted in 1994 with the aim of instituting an appropriate national control programme in Ghana (Asibey-Berko and Orraca-Tetteh, 1995). The target groups were school children and adolescents (10-19 years) and women of childbearing age (15-45 years). Systematic random sampling was used to select 27 districts out of 110, covering every fourth district in all regions of Ghana; three additional districts were selected on the basis of reported high prevalence of IDD. Casual urine samples were collected from a sub-sample of 10% of subjects[8].

The results showed that prevalence of total goitre was 20% or more in 15 of the 27 surveyed districts. Two of these districts had a prevalence over 50%, situated respectively in the Upper East and Upper West regions (Bongo and Jirapa Lambussie, respectively) (Asibey-Berko and Orraca-Tetteh, 1995).

Regarding urinary iodine levels, only mean values by district were reported, while median values are the standardized indicator that should be used for determining the level of the deficiency. Nevertheless for the purpose of this profile mean values are used in place of medians. Out of the 21 districts with data for this indicator, one district was classified as having severe iodine deficiency (mean urinary iodine <20 µg/L), eight as having moderate iodine deficiency (mean urinary iodine 20-49 µg/L), ten as having mild iodine deficiency (mean urinary iodine 50-99 µg/L) while two showed an optimal iodine concentration (Asibey-Berko and Orraca Tetteh, 1995; WHO et al., 2001).

High levels of IDD in Ghana might be related to poor availability of iodine in the soil which influences the iodine levels of the food crops grown in the country. Moreover, some varieties of cassava, a staple in Ghana, contain goitrogenic substances that may aggravate IDD. The supply of fish and seafood, iodine-rich foods, is relatively high in Ghana but consumption of these iodine-rich foods is low in areas far away from the sea.

More recent data are urgently needed to evaluate the current magnitude of IDD throughout the country.

[8] Sample size not available

Iodization of salt at household level

In Ghana, salt iodization started in 1995 with the approval of the Food and Drug Law by parliament.

The 2006 MICS and the 2003 GDHS, surveys that provide representative data at national level, document iodization of salt at household level (GSS et al., 2007; GSS et al., 2004). According to MICS 2006, cooking salt used was tested in 92% of the households interviewed as part of the survey. Only 35% of households consumed adequately iodized salt (salt containing at least 15 ppm of iodine). In urban areas, the percentage of households consuming adequately iodized salt was twice as high as that in rural areas (Table 18). Use of adequately iodized salt was lowest in Northern, Volta, and Upper East regions (GSS et al., 2007).

The proportion of households using adequately iodized salt increased slightly between 2003 (28% of households) and 2006 (35%) (GSS et al., 2004; GSS et al., 2007). However, it remains unacceptably low. Although Ghana has a salt iodisation law, there is need for more stringent enforcement and monitoring.

Table 18: Iodization of salt at household level

Survey name/date (Reference)	Background characteristics	Total number of households	Percentage of households tested	Iodine level of household salt		
				None (0 ppm)	Inadequate (<15 ppm)	Adequate (≥15 ppm)
Ghana Multiple Indicator Cluster Survey 2006 (GSS et al., 2007)	**Total**	5939	91.5	45.0	19.9	35.1
	Residence					
	Urban	2692	88.2	29.8	20.1	50.1
	Rural	3247	94.3	56.8	19.8	23.4
	Region					
	Western	617	89.9	43.6	12.7	43.7
	Central	576	88.3	54.4	26.9	18.8
	Greater Accra	1004	88.9	21.4	23.7	55.0
	Volta	486	93.5	82.9	4.3	12.8
	Eastern	758	93.5	62.4	17.5	20.1
	Ashanti	988	89.3	25.6	21.5	52.9
	Brong Ahafo	552	91.9	19.1	24.0	56.9
	Northern	630	97.3	73.0	15.2	11.7
	Upper East	202	94.8	64.6	22.5	12.9
	Upper West	126	97.8	18.4	60.3	21.2
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Total**	6251	89.9	58.5	13.2	28.3
	Residence					
	Urban	2870	85.7	43.9	12.4	43.7
	Rural	3381	93.4	69.9	13.9	16.2
	Region					
	Western	612	88.9	45.5	15.5	39.1
	Central	587	92.1	81.1	3.7	15.1
	Greater Accra	890	82.2	47.0	3.1	49.9
	Volta	538	91.2	78.6	6.7	14.7
	Eastern	732	88.7	73.7	7.7	18.5
	Ashanti	1313	90.7	37.0	26.0	36.9
	Brong Ahafo	665	92.3	43.0	21.9	35.1
	Northern	487	94.9	87.7	6.5	5.8
	Upper East	280	92.5	89.7	4.4	5.9
	Upper West	147	93.2	36.8	35.1	28.1

Note: ppm = parts per million

Vitamin A deficiency (VAD)

Prevalence of sub-clinical and clinical vitamin A deficiency

The Vitamin A Supplementation Trials Study (VAST) conducted over the period 1988-92 in the savannah zone of the country showed high prevalence of vitamin A deficiency among children aged 6-59 months (65% of subjects had a serum retinol level below 20 µg/dL) (Ross et al., 1993)

Another survey was carried out in 1997. The aim was to assess the magnitude and distribution of vitamin A deficiency in the Southern part of the country. The survey was designed as an independent cross sectional study in each of the seven regions of the South of the country. A multi-stage sampling procedure was used. Twenty-eight districts were randomly selected from the seven regions. In all, 6560 children 6-59 months of age living in 280 villages were studied. A 30% sub-sample of the selected children in each region was taken for determination of serum retinol (MOH and UNICEF, 1998).

Xerophtalmia was rarely observed. Less than 1% of night blindness was reported in all the regions. Results of the serum retinol assays are shown in Table 19. The prevalence of sub-clinical vitamin A deficiency was very high (74% for the children between 24 and 59 months). Moreover 35% of the children in this age group had severe vitamin A deficiency (serum retinol <10 µg/dL) (MOH and UNICEF, 1998). Prevalence was particularly high in the age group 12-24 months. Surprisingly prevalence was similar in the urban and rural sectors.

Updated and nationally representative data are urgently needed to assess to current magnitude of VAD in Ghana.

Table 19: Prevalence of clinical and sub-clinical vitamin A deficiency in children from 2 to 5 years

Survey name/date (Reference)	Background characteristics	Age (months)	Sex	**Prevalence of low level of serum retinol**		**Clinical signs of xerophthalmia**		
				Sample size	Percentage with serum retinol <20 µg/dL or 0.70 µmol/L	Sample size	Type of sign	Percentage
Proceedings of workshop on findings of vitamin A deficiency and anaemia prevalence surveys (results of the 1997 survey) (MOH and UNICEF, 1998)	**Total**	24-59	M/F	716	74.4	n.a.	n.a.	n.a.

n.a.: not available

The 2003 GDHS documented clinical signs of VAD (night blindness) among mothers during their last pregnancy (GSS et al., 2004). Prevalence of night blindness adjusted for day-time blindness was 2%, which is lower than the WHO cutoff (5%) indicating that vitamin A deficiency is a public health problem (GSS et al., 2004; WHO, 1996).

However, there were large regional differences (Table 20), and in the Volta region, the prevalence of night blindness (adjusted) was equal to the WHO cutoff of 5% (GSS et al., 2004; WHO, 1996).

Sub-clinical VAD among mothers (based on retinol in breastmilk) is not currently documented.

Table 20: Prevalence of clinical and sub-clinical vitamin A deficiency in mothers during their last pregnancy and in breastfeeding mothers

Survey name/date (Reference)	Background characteristics	Prevalence of night blindness during pregnancy[1]			Prevalence of low level of retinol in breastmilk	
		Number of mothers	Percentage non adjusted	Percentage adjusted for daytime blindness	Number of breastfeeding mothers	Percentage with retinol in breastmilk ≤1.05 µmol/L
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Total**	2645	7.7	1.9	n.a.	n.a.
	Residence					
	Urban	946	5.9	2.0	n.a.	n.a.
	Rural	1699	8.6	1.9	n.a.	n.a.
	Region					
	Western	246	7.0	2.3	n.a.	n.a.
	Central	211	4.6	1.3	n.a.	n.a.
	Greater Accra	303	7.1	2.0	n.a.	n.a.
	Volta	220	12.0	5.0	n.a.	n.a.
	Eastern	266	6.5	0.5	n.a.	n.a.
	Ashanti	507	4.0	0.8	n.a.	n.a.
	Brong Ahafo	297	6.7	0.4	n.a.	n.a.
	Northern	346	12.8	3.7	n.a.	n.a.
	Upper East	166	9.7	0.6	n.a.	n.a.
	Upper West	(83)	(12.0)	(5.6)	n.a.	n.a.
	Mother's education					
	No education	1025	11.0	2.4	n.a.	n.a.
	Primary	589	5.5	1.4	n.a.	n.a.
	Secondary or higher	1032	5.6	1.7	n.a.	n.a.

[1] During the last pregnancy of women with a live birth in the 5 years preceding the survey
Results in parenthesis are based on small samples and therefore must be interpreted with caution.
n.a.: not available

The main causes of VAD in Ghana are very low availability and intake of foods of animal origin (meat and offals, eggs, dairy products) which contain high amounts of preformed retinol, and low intake of tubers, fruit, and vegetables rich in carotenoids.

The Ghanaian diet is mainly based on starchy roots (principally cassava and yam), most starchy roots containing only negligible amounts of beta-carotene with the exception of orange-flesh varieties of sweet potato and yam (FAO, Faostat; FAO, 1990). Even though the per capita supply of fruit and vegetables is relatively high in Ghana (see Table 11), it is mostly comprised of plantain which contains very little beta-carotene (FAO, Faostat; FAO, 1990).

Moreover, the share of lipids in the DES is low (12% in 2001-2003, lower than the recommended level of 15-30% of energy from fat, see Figure 1), and effective utilization of vitamin A requires adequate share of lipids in the diet.

In a small survey conducted in Kintampo district in 1994 informal interviews indicated that red palm oil although widely available was expensive and was usually not bought in quantity and only about half of households had red palm oil in their home at the time of the survey. A seven day food frequency survey showed that all the villages surveyed had insufficient consumption of both plant and animal sources of vitamin A (MOH, 1995).

Results from the 2003 GDHS showed that only 41% of children under three who lived with their mothers had consumed fruit and vegetables rich in vitamin A[9] in the seven days preceding the survey. The proportion of children who had consumed this food group was lowest in Northern and Upper East regions (27% and 24% of children respectively) (GSS et al., 2004).

[9] Includes pumpkin, red or yellow yam and squash, carrots, orange sweet potatoes, green leafy vegetables, mango, papaya, and other fruit and vegetables rich in vitamin A.

Vitamin A supplementation

Although clinical VAD is rare, sub-clinical VAD is common among young children. Children with marginal retinol stores can fall into acute deficiency following infectious episodes such as measles. The Ministry of Health therefore developed a four point programme of action for the control of vitamin A deficiency in Ghana in 1995. The programme includes: systematic vitamin A supplementation as part of the treatment of measles, periodic supplementation with vitamin A in the savannah regions, food based strategies and assessment of the vitamin A situation in the forest and coastal regions in Southern Ghana (MOH, 1995).

The vitamin A supplementation programme includes the administration of high-dose vitamin A capsules to children aged 6-59 months and to mothers within two months after delivery. Strategies used for children 6-59 months include home visits, use of static health delivery points and child-to-child-approaches. The child-to-child approach entails identification of eligible children by pupils at appointed campaign times, compilation of registers based on this information by teachers, and capsule distribution to identified children to be administered under parent control (MOH, 1995).

The 2006 MICS and the 2003 GDHS provide nationally representative data on vitamin A supplementation of children and mothers (GSS et al., 2007; GSS et al., 2004).

According to the MICS survey, in 2006, 60% of children aged 6-59 months had received vitamin A supplement in the 6 months preceding the survey. There were no differences by gender (Table 21). Surprisingly, children living in rural areas were more likely to have received vitamin A supplements in the 6 months preceding the survey (63%) than children living in urban areas (55%). Regional variations in supplementation were marked, coverage ranging from 33% in Greater Accra region to 76% in Brong Ahafo region (GSS et al., 2007).

Supplementation to post-partum mothers is implemented at health facility level, although this practice is not yet implemented in all health facilities. In 2006, among mothers with a birth in the two years preceding the survey, 55% had been provided vitamin A supplements within 2 months postpartum. Contrary to what was observed among children, vitamin A supplementation coverage of mothers was significantly higher in urban areas than in rural areas. Women living in Eastern and Northern regions were less likely to have received vitamin A supplements (GSS et al., 2007).

Vitamin A supplementation coverage of children and mothers needs to be extended.

Comparison with data collected in the 2003 GDHS indicates that the percentage of children who received vitamin A supplements decreased from 78% in 2003 to 60% in 2006. On the contrary, the percentage of mothers who received vitamin A supplements within 2 months postpartum increased from 43% in 2003 (mothers with a birth in the five years preceding the survey) to 55% in 2006 (mothers with a birth in the two years preceding the survey) (GSS et al., 2004; GSS et al., 2007). Reasons for the decrease in vitamin A supplementation coverage of young children are not clear.

Since 1997 no data have been collected on vitamin A status of young children. A new national survey is urgently needed to assess whether the interventions implemented have reduced the prevalence of sub-clinical vitamin A deficiency.

Table 21: Vitamin A supplementation of children and mothers

Survey name/date (Reference)	Background characteristics	Children				Mothers		
		Age (months)	Sex	Number of children	Percent of children who received vit. A supplements in the 6 months preceding the survey	Age (years)	Number of mothers[1]	Percent of mothers who received vit. A supplements within 2 months postpartum
Ghana Multiple Indicator Cluster Survey 2006 (GSS et al., 2007)	**Total**	6-59	M/F	3084	60.2	15-49	1365	54.5
	Sex							
		6-59	M	1587	59.5			
		6-59	F	1496	60.8			
	Residence							
	Urban	6-59	M/F	1088	55.1	15-49	468	64.9
	Rural	6-59	M/F	1996	62.9	15-49	897	49.1
	Region							
	Western	6-59	M/F	301	63.2	15-49	144	66.3
	Central	6-59	M/F	265	53.5	15-49	105	49.1
	Greater Accra	6-59	M/F	396	33.4	15-49	167	64.7
	Volta	6-59	M/F	237	62.7	15-49	(97)	(64.6)
	Eastern	6-59	M/F	422	63.0	15-49	182	36.4
	Ashanti	6-59	M/F	452	70.7	15-49	207	67.9
	Brong Ahafo	6-59	M/F	273	75.9	15-49	107	60.8
	Northern	6-59	M/F	512	60.8	15-49	260	38.0
	Upper East	6-59	M/F	133	58.1	15-49	(58)	(56.3)
	Upper West	6-59	M/F	(93)	(66.8)	15-49	-	-

[1] Women with a birth in the **2 years** preceding the survey. For women with two or more births during that period, data refer to the most recent birth.
Results in parenthesis are based on small samples and therefore must be interpreted with caution.
Note: Among mothers, results for Upper West region are not shown as the sample size is smaller than 50.

Table 21: Vitamin A supplementation of children and mothers (cont.)

Survey name/date (Reference)	Background characteristics	Children				Mothers		
		Age (months)	Sex	Number of children	Percent of children who received vit. A supplements in the 6 months preceding the survey	Age (years)	Number of mothers[1]	Percent of mothers who received vit. A supplements within 2 months postpartum
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Total**	6-59	M/F	3026	78.4	15-49	2645	43.0
	Sex							
		6-59	M	1515	79.8			
		6-59	F	1511	76.9			
	Residence							
	Urban	6-59	M/F	1017	80.6	15-49	946	49.7
	Rural	6-59	M/F	2009	77.2	15-49	1699	39.3
	Region							
	Western	6-59	M/F	297	80.1	15-49	246	20.5
	Central	6-59	M/F	259	66.8	15-49	211	39.7
	Greater Accra	6-59	M/F	339	74.3	15-49	303	40.5
	Volta	6-59	M/F	242	82.2	15-49	220	24.1
	Eastern	6-59	M/F	313	78.4	15-49	266	34.3
	Ashanti	6-59	M/F	563	82.0	15-49	507	50.7
	Brong Ahafo	6-59	M/F	328	75.1	15-49	297	53.2
	Northern	6-59	M/F	409	78.3	15-49	346	46.8
	Upper East	6-59	M/F	186	85.5	15-49	166	72.9
	Upper West	6-59	M/F	(91)	(84.8)	15-49	(83)	(47.7)

[1] Women with a birth in the **5 years** preceding the survey. For women with two or more births during that period, data refer to the most recent birth.
Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Iron deficiency anemia (IDA)

Prevalence of IDA

Two nationally representative surveys document the prevalence of anemia among preschool children and women of childbearing age: a survey conducted in 1995 by the Nutrition Unit of the Ghana Health Services, which also documents the prevalence of anemia among school-age children, and the 2003 GDHS (MOH and UNICEF, 1998; GHS, 1995; GSS et al., 2004).

The aim of the survey conducted in 1995 at national level by the Nutrition Unit of the Ghana Health Services was to determine the magnitude, severity, distribution and possible causes of anemia and identify intervention strategies. Twenty enumeration areas (EA) were selected from the three main ecological zones namely Northern savannah zone, the forest zone and the coastal savannah zone. Target groups for the study were preschool children 6-59 months, school aged children 6-10 years old, pregnant women carrying their first babies and lactating women. From each of the twenty EAs, twenty subjects were selected within each age group (MOH and UNICEF, 1998). The survey results showed that 84% of preschool children, 71% of school-age children, 65% of pregnant women and 59% of lactating mothers were anemic[10] (MOH and UNICEF, 1998). Prevalence of anemia was above the 40% threshold defined by WHO as representing a severe public health problem among the population (WHO, 2001). Among preschool children, the prevalence of severe anemia (hemoglobin <7.0 g/dL) was also very high, at 10%. For all population groups (preschool children, school-age children, pregnant and lactating women), the prevalence of anemia was higher in rural areas than in urban areas. Among preschool children, the prevalence of anemia was high in all regions (MOH and UNICEF, 1998).

In 2003, according to the GDHS survey, the prevalence of anemia among children aged 6-59 months was 76% and that of severe anemia was 6% (Table 22). Prevalence of anemia (any anemia) was significantly higher in rural areas (80%) than in urban areas (68%). By region, there were substantial disparities, ranging from a prevalence of 61% in Greater Accra region to 83% in Northern region (GSS et al., 2004).

The comparison of the 1995 and 2003 surveys shows that prevalence of anemia among preschool children decreased only slightly over the decade (MOH and UNICEF, 1998; GSS et al. 2004).

[10] Anemia is defined as a hemoglobin <11.0 g/dL for as preschool children and pregnant women; hemoglobin <12.0 g/dL for school-age children and lactating women.

Table 22: Prevalence of anemia in preschool children

Survey name/date (Reference)	Background characteristics	Age (months)	Sex	Sample size	Percentage of children with	
					Any anemia (Hb<11.0 g/dL)	Severe anemia (Hb<7.0 g/dL)
Ghana Demographic and Healh Survey 2003 (GSS et al., 2004)	**Total**	6-59	M/F	2992	76.1	5.8
	Sex					
		6-59	M	1481	76.2	5.8
		6-59	F	1511	75.9	5.7
	Age					
		6-9	M/F	227	74.5	8.4
		10-11	M/F	121	85.7	13.0
		12-23	M/F	661	83.5	10.1
		24-35	M/F	635	76.4	5.0
		36-47	M/F	716	73.5	3.2
		48-59	M/F	632	69.5	2.5
	Residence					
	Urban	6-59	M/F	984	67.8	4.0
	Rural	6-59	M/F	2008	80.1	6.7
	Region					
	Western	6-59	M/F	293	80.4	9.0
	Central	6-59	M/F	267	76.8	5.9
	Greater Accra	6-59	M/F	324	61.3	4.1
	Volta	6-59	M/F	255	72.7	1.8
	Eastern	6-59	M/F	292	74.4	3.7
	Ashanti	6-59	M/F	553	79.0	7.4
	Brong Ahafo	6-59	M/F	333	74.9	6.6
	Northern	6-59	M/F	403	82.5	5.7
	Upper East	6-59	M/F	186	79.1	7.5
	Upper West	6-59	M/F	(86)	(78.3)	(2.5)

Hb: Hemoglobin
Results in parenthesis are based on small samples and therefore must be interpreted with caution.

In 1995, at national level, the prevalence of anemia among children aged 6-10 years was 71% and that of severe anemia was 2% (Table 23). Disparities in prevalence by place of residence and ecological zones were observed: in urban areas, 62% of school-age children were affected by anemia versus 78% in rural areas. Forest belt and coastal savannah were the most affected zones with a prevalence of anemia reaching 75% and 73% respectively (MOH and UNICEF, 1998). More recent data are not available for this age group.

Table 23: Prevalence of anemia in school-age children

Survey name/date (Reference)	Background characteristics	Age* (years)	Sex	Sample size	Percentage of children with	
					Any anemia (Hb<12.0 g/dL)	Severe anemia (Hb<7.0 g/dL)
Proceedings of a Workshop on Dissemination of Vitamin A Deficiency and Anaemia Prevalence Surveys (results from the 1995 survey) (MOH and UNICEF, 1998)	**Total**	6-10	M/F	926	71.3	1.7
	Residence					
	Urban	6-10	M/F	371	61.5	n.a.
	Rural	6-10	M/F	555	78.2	n.a.
	Ecological zone					
	Northern savannah	6-10	M/F	154	55.8	n.a.
	Forest belt	6-10	M/F	534	75.3	n.a.
	Coastal savannah	6-10	M/F	213	72.8	n.a.

Age*: 6-14 years or other non-standard ages
Hb: Hemoglobin
n.a.: not available

Among women of childbearing age, according to the GDHS survey conducted in 2003, the prevalence of anemia was 45% and severe anemia affected less than 1% of women (Table 24) (GSS et al., 2004).

Pregnant and lactating women were more likely to be anemic than non-pregnant and non-lactating women (GSS et al., 2004). During pregnancy, iron deficiency is associated with multiple adverse outcomes for both mother and infant, including an increased risk of haemorrhage, maternal mortality, perinatal mortality and giving birth to a low birth weight baby (WHO, 2001).

Overall, the prevalence of anemia (any anemia) was higher in rural areas than in urban areas and disparities across regions were marked, ranging from 34% in Brong Ahafo region to 51% in Upper East region (GSS et al., 2004).

Table 24: Prevalence of anemia in women of childbearing age

Survey name/date (Reference)	Background characteristics	Age (years)	Sample size	Percentage of women with	
				Any anemia (pregnant women Hb<11.0 g/dL; non pregnant women Hb<12.0 g/dL)	Severe anemia (all women Hb<7.0 g/dL)
Ghana Demographic and Health survey 2003 (GSS et al., 2004)	**Total**	15-49	5272	44.7	0.8
	Age				
		15-19	1060	45.8	0.7
		20-24	939	45.0	0.7
		25-29	893	42.5	0.2
		30-34	729	43.8	0.8
		35-39	669	47.5	1.6
		40-44	529	43.9	0.6
		45-49	454	44.5	1.6
	Pregnancy/Breastfeeding status				
	Pregnant	15-49	400	64.9	1.2
	Breastfeeding	15-49	1262	47.9	0.5
	Non-pregnant/ Non-breastfeeding	15-49	3610	41.4	0.9
	Residence				
	Urban	15-49	2524	41.6	1.1
	Rural	15-49	2748	47.6	0.6
	Region				
	Western	15-49	531	39.1	0.8
	Central	15-49	414	38.0	1.1
	Greater Accra	15-49	861	47.0	0.7
	Volta	15-49	468	48.5	0.3
	Eastern	15-49	524	48.4	1.0
	Ashanti	15-49	1078	46.2	1.4
	Brong Ahafo	15-49	544	33.5	0.2
	Northern	15-49	445	49.8	0.6
	Upper East	15-49	272	51.0	0.6
	Upper West	15-49	136	49.7	0.3

Hb: Hemoglobin

No data are currently available on prevalence of anemia among adult men.

High levels of anemia in Ghana can be attributed to poor bioavailability of iron in the diet due to low intake of foods that enhance absorption of iron such as meat and vitamin C-rich foods, as well as to malaria and parasitic diseases such as hookworm and schistosomiasis.

Anemia remains a major public health problem in Ghana and more effort is needed to combat IDA.

Interventions to combat IDA

The National Reproductive Health Service Policy states that every pregnant woman should be given 60 mg iron and 400 µg folic acid daily during pregnancy and for six weeks following delivery. The control of malaria and helminth infestation during pregnancy is also included in the programme (GHS et al., 2003). The Ghana Health Service developed an integrated strategy for the control of anemia which includes food-based approaches such as production of iron-rich foods by households and school gardens; promotion of consumption of iron rich foods and enhancers of iron absorption (such as vitamin C-rich foods), and fortification of centrally processed foods (i.e. wheat flour and vegetable oils).

The GDHS of 2003 documents iron supplementation of mothers during pregnancy (GSS et al., 2004). At national level, 69% of women took iron tablets/syrups during pregnancy. The supplementation coverage in urban areas was significantly higher than in rural areas (Table 25). Regional disparities in supplementation were marked, coverage ranging from 46% in Northern region to 83% in Central region (GSS et al., 2004).

Iron supplementation coverage in pregnant women is relatively large at national level but more efforts are needed to reduce geographical disparities. Moreover, high prevalence of anemia among pregnant women can be attributed partly to the ineffectiveness of the iron and folic acid supplementation programme, an issue addressed by the Integrated Anemia Control Strategy (GHS et al., 2003).

Table 25: Percentage of mothers who took iron tablets/syrups during pregnancy

Survey name/date (Reference)	Background characteristics	Number of mothers with a birth in the 5 years preceding the survey	Percent who took iron tablets/syrups during pregnancy
Ghana Demographic and Health Survey 2003 (GSS et al., 2004)	**Total**	2645	69.4
	Residence		
	Urban	946	74.4
	Rural	1699	66.6
	Region		
	Western	246	65.7
	Central	211	82.6
	Greater Accra	303	70.9
	Volta	220	79.4
	Eastern	266	70.9
	Ashanti	507	82.2
	Brong Ahafo	297	64.3
	Northern	346	46.1
	Upper East	166	70.1
	Upper West	(83)	(46.5)

Results in parenthesis are based on small samples and therefore must be interpreted with caution.

Adverse effects of malaria infection during pregnancy may include maternal anemia, low birth weight baby and maternal death. The current WHO recommended strategies for controlling malaria in pregnancy include both curative and preventive (insecticide treated nets and preventive chemotherapy) measures. The recommended preventive chemotherapy is intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) for pregnant women living in areas with high malaria transmission where the risks of malaria in pregnancy are greatest (WHO, 2007).

According to MICS 2006, just over a quarter (28%) of women with a birth in the two years preceding the survey reported having received two or more doses of SP during their last pregnancy (GSS et al., 2007).

Other micronutrient deficiencies

Apart from iodine, vitamin A and iron deficiencies, no other micronutrient deficiency has yet been investigated in the country.

II.7 Policies and programmes aiming to improve nutrition and food security

In Ghana, a number of national development policies and strategies have set out objectives to improve nutrition of women and children. The Ghana Poverty Reduction Strategy (2002-2004), which is currently being reviewed in line with the Millennium Development Goals and the New Partnership for Africa's Development (NEPAD), recognises that hunger and malnutrition play an important role in human survival, health and development, and therefore focuses on strategies for improving nutrition and food security.

Ghana's National Plan of Action on Nutrition (NPAN, 1995-2000) set out to achieve the following objectives (GOG, 1995):

- Ensure adequate intake of food, micronutrients and other nutrients by individuals
- Improve household food security
- Strengthen preventive measures against nutrition related diseases
- Increase adoption of appropriate breastfeeding and complementary feeding practices
- Enhance participatory approaches in interventions in food/nutrition projects
- Improve national capacity to deliver food and nutrition education and services through capacity-building and sensitization of policy makers to nutrition related issues.

The Imagine Ghana Free of Malnutrition Strategy (2007-2011) replaces the NPAN starting from 2007. A number of programmes emanating from the NPAN are currently being implemented, and will be integrated into the Imagine Ghana Free of Malnutrition Strategy.

Regarding interventions to improve infant and young child feeding, the following programmes emanating from both NPAN and Imagine Ghana Free of Malnutrition Strategy are being implemented:

- Baby–Friendly Health Facility Initiative
- Community based nutrition behaviour change communication (BCC) strategy
- Mother-to-mother support groups for promoting optimal breastfeeding and complementary feeding practices
- Community-based growth promotion projects.

Child malnutrition in deprived communities is being fought through nutrition rehabilitation services and the Supplementary Feeding and Health and Nutrition Education Programme.

A school feeding programme based on locally grown food has been introduced by the government. The long term objective is to create the foundation for community based development in Ghana to eliminate hunger and poverty. It also aims at facilitating entry points for community based strategies to reduce short-term hunger and malnutrition and improve school enrolment, attendance and performance and also strengthen food production systems. The first phase of the programme is being implemented over a five year period (2006-2010) (GOG, 2005). WFP gives additional support to the government through its school feeding programme for 290,000 primary school children and by providing 42,000 girls in upper primary and junior secondary school with take-home rations.

Micronutrient deficiencies are addressed through the following initiatives (GHS, 2005):

- Universal salt iodization
- Supplementation with vitamin A for preschool children and women within eight weeks after delivery and with iron and folic acid for pregnant and lactating women
- Fortification of selected foods with iron, vitamin A, folic acid, zinc and various B vitamins
- Deworming of school age children
- Promotion of increased production and consumption of micronutrient-rich foods
- Promotion of school and house gardening
- Promotion of behavioural change

In October 2007, Ghana launched its national food fortification programme that will fortify vegetable oil with vitamin A, and wheat flour with vitamins A and B, iron and folic acid to improve public health and nutrition, in particular of children and women. The program is set to produce 40,000 t of fortified vegetable oil, and 481,000 t of fortified wheat flour in five year's time. These are projected to be consumed by 17 million for oil and 19 million people for wheat flour, of whom 7 million and 13 million people respectively are considered to be vulnerable to malnutrition (GAIN, not dated).

Concerning anemia, Ghana developed an anemia control strategy in 2003 involving many stakeholders. The strategy includes an integrated cross-sectoral approach through the following initiatives:

- Revision and strengthening of iron/folate protocols for pregnant and lactating women. These protocols are provided to health workers for the implementation of iron/folate supplementation
- Strengthening of counselling during antenatal care
- Introduction of intermittent preventive treatment of malaria (IPT)
- Use of insecticide treated bednets and deworming to fight parasitic diseases causing or aggravating anemia
- Advocacy for sustained commitment from parliamentarians, national and district-level policy makers, professional groups and the media
- Communication strategy to create awareness on the effects of anemia among policy makers at all levels
- Strengthening of supportive supervision of antenatal care providers
- Strengthening of the logistics and ensuring availability of pharmaceutical supplies both in health facilities and in communities (GHS et al., 2003).

With increasing prevalence of overweight, obesity and other diet-related diseases, the Ghana Health Service is introducing a new health policy and programme of work. Emphasis is now being put on preventive health, focusing more on nutrition, appropriate lifestyle, physical exercise and health promotion.

A community based nutrition and food security programme, focused mainly on under five children and pregnant and lactating mothers, was launched in 2001. The programme covered 40 communities in four districts and included: monthly growth monitoring, community and backyard gardening, local initiative funding and socio-economic and infrastructure funding. An assessment of programme impact conducted in 2005 and reported in the World Bank Implementation Completion report in 2006 indicated that, overall, underweight was reduced as a result of the programme (WB, not dated).

Moreover, nutrition education activities such as promotion of breastfeeding, timely and appropriate complementary feeding and adequate nutritional habits for various age groups are undertaken in health facilities and at community level (GHS, 2005).

Nevertheless, for most of the strategies, coverage is not high (e.g. for iodine and vitamin A) or the degree of implementation of the strategies and programmes is not documented.

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