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Food and Nutrition Security in Transforming Ghana

A Descriptive Analysis of National Trends and Regional Patterns

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Contents

Tables

Figures

ABSTRACT

In recent decades, Ghana has experienced high economic growth and transformation, which contributed to the nation achieving the Millennium Development Goal targets on reducing extreme poverty and hunger. Against this background and in view of achieving the food and nutrition security targets of the Sustainable Development Goals, Ghana started a process of reviewing its food security and nutrition strategies and policies, including the overarching Zero Hunger Strategy. This discussion paper aims to contribute to this process by providing an update on the state of Ghana's food and nutrition security. In addition to providing an overview of long-term historical trends at the national level, this analysis provides an overview of regional patterns of food and nutrition insecurity and recent changes across Ghana's 10 administrative regions. Finally, the analysis identifies regional "hot spots" of food and nutrition insecurity.

This paper confirms that Ghana has achieved substantial improvements in food and nutrition security overall, especially over the past decade. Nationwide, progress has been made in improving households' economic access to food by reducing poverty and extreme poverty and in reducing chronic and acute child undernutrition. However, progress in reducing micronutrient malnutrition—particularly anemia and especially among young children—has been more modest. Across Ghana, large rural-urban gaps and regional differences—mainly between the north and the south—remain for most dimensions of food and nutrition security. In addition, Ghana is increasingly facing new nutrition-related public health problems that result from overnutrition and diets too rich in calories. Overweight and obesity among adults are rising rapidly in both urban and rural areas, leading to an increase in the risk of noncommunicable diseases. The rising double burden of malnutrition—that is, the coexistence of overnutrition and undernutrition, including micronutrient deficiencies—constitutes a challenge to public health and social protection policy. These new nutritional realities may make some existing food and nutrition security policies obsolete or even detrimental to nutrition security.

Keywords: food security, nutrition, economic transformation, policies, Ghana, Africa

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1. INTRODUCTION

After initiating a fundamental economic reform process in the 1980s, Ghana has experienced high economic growth. Between 1985 and 2015, national gross domestic product (GDP) grew at an annual rate of 5.4 percent, or 2.8 percent on a per capita basis (World Bank 2017). Ghana's economic growth accelerated further in the 2000s; between 2000 and 2015, annual GDP growth averaged 6.4 percent, or 3.8 percent on a per capita basis. This recent growth acceleration resulted from structural change, characterized by labor moving from low-productivity, traditional sectors, such as subsistence-oriented agriculture, to high-productivity, modern sectors of the economy, including manufacturing and, much more so, services (Kuznets 1966; McMillan, Rodrik, and Verduzco-Gallo 2014; Jedwad and Osei 2012). The recovery and transformation of the Ghanaian economy over the past three decades was accompanied by rapid urbanization. Today, more Ghanaians live in urban areas than rural areas. The urban population grew at an estimated annual rate of 4.2 percent between 1985 and 2015, and the share of the total population increased from about 33 percent in 1985 to 54 percent 2015 (World Bank 2017).

High economic growth and associated economic transformation, together with improvements in social protection programs, contributed to Ghana's great progress in achieving the Millennium Development Goals and particularly toward achieving the targets of the first goal of eradicating extreme poverty and hunger (NDPC and UNDP 2015). As one of the first countries in Africa ahead of the 2015 deadline, Ghana halved both extreme poverty and the prevalence of children underweight between 1990 and 2015. Despite this notable success, food insecurity and malnutrition—especially micronutrient deficiencies—remain widespread nationwide. The human and economic costs of malnutrition are high (IFPRI 2014, 2015). For example, 45 percent of under-five mortality worldwide is attributable to undernutrition (Black et al. 2013), and underweight children are the number one contributor to the burden of disease in Africa south of the Sahara (Lim et al. 2012). Further, GDP totals in Africa are less than 90 percent of what they would be in the absence of undernutrition (IFPRI 2014).

Against this background and in view of achieving the food security and nutrition targets of the Sustainable Development Goals, Ghana started a process of reviewing its Zero Hunger Strategy under the leadership of the John A. Kufuor Foundation. As a product of IFPRI's Ghana Strategy Support Program, this discussion paper aims to contribute to this process and other ongoing food and nutrition policy reforms by providing an update on the state of food and nutrition security in Ghana and related changes over time. The analysis goes beyond the national level to highlight regional patterns of food and nutrition security and their changes in recent years, which appear to have received insufficient attention thus far. A regional analysis is critical for at least two reasons: First, in Ghana, there are large differences in economic conditions and people's living standards not only between urban and rural areas but also across Ghana's regions (Coulombe and Wodon 2012; Ghana Statistical Service 2014; Kolavalli et al. 2012). Economic growth and transformation progress at different paces across Ghana; hence, their implications for food consumption and nutritional outcomes are likely to vary substantially at the regional level (Ecker and Fang 2016; Eledi and Kuusaana 2014). Second, agricultural production conditions and, thus, local diets—and possibly nutrient intakes and deficiencies—are different in the tropical south and the savannah north (Ecker and Fang 2016). Accordingly, the purpose of the regional analysis is to identify "hot spots" of food and nutrition insecurity—that is, regions that have been lagging behind others in improving food security and reducing malnutrition. These regions may deserve attention in Ghana's Zero Hunger Strategy and related food security and nutrition policies and programs.

The analysis is based on various data sources. National time series data are taken from the World Development Indicator (WDI) database of the World Bank (World Bank 2017), the Food Balance Sheets (FBS) database of the Statistics Division of the Food and Agriculture Organization of the United Nations (FAOSTAT 2017, and the Demographic and Health Survey (DHS) Program database (ICF Intl. 2017). Household- and individual-level data to construct food and nutrition security indicators are obtained from the fifth and sixth rounds of the Ghana Household Living Standard Survey (GLSS; Ghana Statistical Service 2006, 2013, conducted in 2005–2006 and 2012–2013, and from the 2008 and 2014 Ghana DHS (Ghana Statistical Service, Ghana Health Service, and ICF Macro 2009, 2015). Population data for

calculating numbers of food-insecure and malnourished people are taken from the 2010 Ghana Population and Housing Census (PHC; IPUMS International 2015).

The paper proceeds as follows: Section 2 provides an overview of food security and nutrition indicator types and introduces the indicators used in the analysis. Section 3 presents national trends in food and nutrition security indicators. Section 4 describes regional patterns of food and nutrition insecurity and their changes in recent years. Section 5 identifies regional hot spots of food and nutrition insecurity. Section 6 concludes the analysis. For readers who are less familiar with the concept of food and nutrition security and its complexity, Appendix A presents definitions of food and nutrition security and related concepts, and Appendix B presents a conceptual framework of food and nutrition security.

2. OVERVIEW OF FOOD AND NUTRITION SECURITY INDICATORS

There are many food and nutrition security indicators. The following overview presents the most common household food security and nutrition indicator types and focuses on those indicators that can be estimated for Ghana or areas within Ghana from available data sources. The rationale and principal methodology underlying the measurements are outlined in detail for the indicators used in the analysis in the following sections. These indicators are derived from data sources designed to be representative at the national level and partly at the regional level.

Household Food Security Indicators

Household food security refers to issues of food security at the household level. Households are the unit of measurement for this group of indicators, whereas derived estimates for a population are typically expressed on a per capita basis. It is implicitly assumed that each household member is equally affected—being either food secure or food insecure. Household food security indicators can be classified into *quantitative*, *monetary*, *dietary diversity*, and *perceptional* indicators (Headey and Ecker 2013).

Calorie availability/deprivation, one of the most used quantitative indicators of household food insecurity, measures the availability of dietary energy—usually expressed in calories—to or within households for human consumption. The available or consumed number of calories is compared with a minimum level of caloric requirement to determine whether the household is sufficiently or deficiently supplied with dietary energy. The human body obtains energy from digesting macronutrients, including carbohydrates, proteins, and fats. Carbohydrates, which are the main source of dietary energy, are mostly obtained from the consumption of staple foods. Because of the perceived immediate feeling of weakness and discomfort caused by a lack of sufficient dietary energy (that is, hunger), people tend to first satisfy their basic calorie needs before diversifying their diets into higher-value, high-quality protein-rich and micronutrient-rich foods (Headey and Ecker 2013). Therefore, calorie availability indicators tend to be closely correlated with absolute food quantities consumed and, thus, are indictors of minimal food security.

Estimates of calorie availability/deprivation can be obtained at the national level from the national FBS—as done by the Food and Agriculture Organization (FAO)—or at the household level from detailed food consumption quantity data available in some household budget surveys. The FAO calculates a country's per capita supply of food that is available for human consumption as the residual of the total quantity of foodstuffs produced and imported minus the total quantity exported, used for livestock feed and seed, put to manufacture for food and nonfood uses, and lost during storage and transportation. The total quantity of foodstuffs is then adjusted for any changes in stocks. Quantities of available per capita food are converted into levels of calorie (or protein and fat) availability by applying appropriate food composition factors for all primary and processed products (FAO, IFAD, and WFP 2014). The FAO estimates the prevalence of undernourishment in a country population by assuming a probability distribution of the per capita calorie availability across the population and relating it to a cut-off level for minimum dietary energy requirement that takes into consideration the sex and age composition of that population.

Estimates of calorie availability at the national level are available for Ghana and most other countries on a yearly basis. Estimates of the prevalence of undernourishment are available for every three years. Household calorie consumption and deficiency estimates derived from household budget surveys tend to be more reliable than the FAO estimates, because the former uses more detailed data of the actual consumption of individual households and allows for a more accurate approximation of the minimum dietary energy requirements by considering the actual age and sex composition of individual households.[1] However, many household budget surveys, including at least the fifth and sixth rounds of the GLSS (Ghana Statistical Service 2006, 2013), do not record consumed food quantities consistently, which makes estimating reliable calorie consumption amounts impossible.

[1] For a detailed review of the limitations of the FAO's approach, see Gabbert and Weikard (2001), Nubé (2001), Smith (1998), and Svedberg (1999, 2002).

Monetary consumption/poverty indicators are more indirect indicators of household food security, as compared with indicators based on food quantity, such as calorie availability/deprivation indicators. Nevertheless, they may be viewed as theoretically superior because they factor in potential substitution effects between food and nonfood consumption and, within food consumption, between different foods having different nutritious values (Headey and Ecker 2013). Monetary consumption/poverty estimates are derived from consumption data of household budget surveys. Unlike estimating calorie consumption, estimating monetary consumption/poverty indicators does not require quantitative information of consumed food items; instead, it requires household expenditure information for purchased food items in markets and interviewee-estimated market values for consumed food items obtained from own production. Most household budget surveys, including GLSS5 and GLSS6, provide such data, as they are usually designed for poverty estimations.

Two poverty prevalence indicators are typically estimated: the *poverty rate* and the *extreme poverty* or *food poverty rate*. The cut-off level for identifying extreme poor households is the costs of a minimum food consumption basket for satisfying basic food needs. For estimating poverty rates, this basket is extended to include basic nonfood items and services. The cut-off levels are known as the *poverty line* and the *extreme poverty* or *food poverty line*.

Detailed household food consumption data (such as from household budget surveys) can be used to estimate the composition of household food consumption in either monetary or quantitative terms, providing insights into the diversity of household food consumption. Commonly used estimates include the shares of main food groups (such as staple foods, animal-source foods, vegetables and fruits, and pulses and nuts) on total food consumption or—if adequate food quantity data are available—the proportion of protein (or calories) from animal-source foods (or staple foods) on total protein (or calories) from all foods. The rationale for these measures is well-founded in consumer demand theory, as well as in psychological theories such as Maslow's hierarchy of needs (Maslow 1943). The theories suggest that individuals will only diversify into higher-value, high-quality protein-rich and micronutrient-rich foods

(such as meats, fish, eggs, dairy products, and, to a lesser extent, fruits and vegetables) when they have satisfied their basic calorie needs (see earlier discussion).

Dietary diversity is the most common indicator of dietary quality. The Household Dietary Diversity Score (HDDS)—developed by the Food and Nutrition Technical Assistance (FANTA) project of the United States Agency for International Development (USAID)—is widely used to measure household-level dietary diversity (Swindale and Bilinsky 2006). Another similar measure is the Household Food Variety Score (HFVS). Both scores are simple frequency scores. The HDDS is a count of the number of 12 predefined food groups,[2] and the HFVS is a count of the number of different food items that a household consumes over a given period. The recommended recall period for the HDDS is 24 hours. Although an HDDS based on longer recall periods can be used, the validity of the HDDS declines because the score estimates converge to the maximum and the variation across a population declines.[3] Data for constructing the HDDS are usually collected by a special household survey module, though they can also be constructed using the food consumption data of a standard household budget survey if the recall period is not too long. Because the recall period of GLSS5 is three days and for GLSS6, five days, it is not possible to compare dietary diversity between these two survey rounds.

More recently, the HDDS methodology has been further refined to develop dietary diversity measures for individuals with high nutritional needs—mainly, women of reproductive age and young children. In combination with the HDDS, these individual dietary diversity indicators can provide insights into the intrahousehold allocation of food. A commonly used measure is the Minimum Dietary Diversity—Women (MDD-W) score, which was developed by FAO and FANTA (FAO and FHI360 2016). The standard MDD-W score has a 14-food group scale and can be expanded to incorporate food

[2] The 12 HDDS food groups are cereals and grains; roots and tubers; legumes, nuts, and pulses; milk and dairy products; eggs; meat and poultry; fish and seafood; vegetables; fruits; oils and fats; sugar, honey, sweets and snacks; and miscellaneous (Swindale and Bilinsky 2006).

[3] This limitation may be less problematic for the HFVS because it has a larger number of categories and tends to have a wider distribution across households.

groups that are important in the local context.[4] Data for constructing the MDD-W score are collected using a special survey module.

Thus far, no universal cut-off levels have been established for these simple food frequency scores. Rather, it has been argued in the literature that such cut-off levels should be determined at a country or regional level based on the characteristics of the local diet and present nutritional needs (see, for example, Ruel, Harris, and Cunningham 2013).

The Food Consumption Score (FCS) of the World Food Programme (WFP) is a frequency-weighted household dietary diversity score calculated from a special seven-day household food consumption recall module, included in WFP's Comprehensive Food Security and Vulnerability Analysis (CFSVA) surveys. The FCS is based on a scale of nine food groups and attaches greater importance to foods deemed most important for nutritional purposes (WFP 2008).[5] Households are classified according to their FCS as severely food insecure, moderately food insecure, or food secure households. A CFSVA survey was conducted at the district level only in the three administrative regions of northern Ghana in 2012 (WFP, Ministry of Food and Agriculture, and Ghana Statistical Service 2012). Estimates from this survey are not presented in the analysis in the following sections because the regional focus of the surveys does not allow for comparisons across Ghana.

Perceptional food insecurity is increasingly measured by the Household Food Insecurity Access Scale (HFIAS), developed by FANTA (Coates, Swindale, and Bilinsky 2007). The HFIAS is constructed based on a special module included in some household surveys. Scores are assigned to a set of nine questions based on the frequency of occurrence over the past four weeks. The sum of these responses is the household score. A complex tabulation plan classifies households as food secure, mildly food insecure, moderately food insecure, or severely food insecure. The HFIAS is an expansion of FANTA's

[4] The food groups of the MDD-W score are foods made from grains; white roots and tubers and plantains; pulses (beans, peas, and lentils); nuts and seeds; milk and milk products; organ meat; meat and poultry; fish and seafood; eggs; dark green leafy vegetables; vitamin A–rich vegetables, roots, and tubers; vitamin A–rich fruits; other vegetables; and other fruits (FAO and FHI360 2016).

[5] The highest weights are attached to meat and fish (4) and milk (4), followed by pulses (3), main staples (2), vegetables (1), fruits (1), sugar (0.5) and oil (0.5); condiments are not considered (WFP 2008).

Household Hunger Scale, which is constructed based on a survey module using three of the nine HFIAS questions (Ballard et al. 2011). A baseline survey for USAID's Monitoring, Evaluation, and Technical Support Services project was conducted in the project's zone of influence, which includes parts of the Brong-Ahafo, Northern, Upper East, and Upper West regions (Zereyesus et al. 2014). Estimates from this survey are not presented in the analysis in the following sections because they also lack representativeness at the national and regional levels.

Nutrition Indicators

Nutrition indicators are individual-level indicators. Nutritional assessments—especially in the context of development—often focus on the nutritional status of young children (under five years of age) and mothers or women of reproductive age (usually defined as 15–49 years of age). The nutritional status of young children and women is indicative of social and economic development, because these population groups typically have the highest prevalence rates of nutritional deficiencies, their nutritional well-being is most crucial for future generations' prosperity, and targeted nutrition interventions have been found to be most cost-effective during the period from pregnancy to when a child is 24 months of age—often referred to as the 1,000-days window of opportunity (Bryce et al. 2008; Engle et al. 2007; Horton et al. 2010).

Nutritional assessment methods include *anthropometry*, *biochemical assessment*, *clinical assessment*, and *dietary intake* methods (Gibson 2005). Anthropometry and biochemical assessment are most commonly used in population-based studies in developing countries to determine individuals' nutritional status.[6]

[6] Clinical methods use physical examination and medical history analyses to detect clinical symptoms and anatomic signs associated with malnutrition. An example is eye examination for the detection of xerophthalmia, which results from severe vitamin A deficiency. Dietary intake methods record the actual food intake of an individual in detail. Examples include repeated 24-hour food intake recalls (with itemization by meal) and food weighing records that allow accurate calculations of nutrient intake and absorption.

Anthropometric indicators are the most commonly used indicators of nutritional status. They are measurements of physical dimensions and cross composition of the human body. The rationale for using anthropometric measurement is based on the fact that prolonged and severe nutrient depletion leads to growth retardation in children and to loss of or failure to accumulate muscle mass and fat tissue in both children and adults. However, nutrient loss or insufficient absorption of nutrients can also be caused by parasitic infections, chronic inflammation, and inherited disorders. Therefore, the nutritional status of a person—and, in particular, the stature of a child—alone does not indicate the cause of this status. Anthropometric indicators for children are regularly surveyed in most developing countries by the USAID-funded DHS or the Multiple Indicator Cluster Survey of UNICEF. Estimates from the DHS are publicly available for Ghana on a five-yearly basis since 1988.

The most commonly used child anthropometric indicators are height-for-age z-score (HAZ), weight-for-height z-score (WHZ), and weight-for-age z-score (WAZ) of children age 0–59 months (or 6–59 months). The measurements can be performed easily, quickly, and reliably using portable equipment (a weighing scale and height-measuring boards). Children are classified as stunted (too short relative to their age) if their HAZs are below –2; they are classified as wasted (too light relative to their height) if their WHZs are below –2; and they are classified as underweight if their WAZs are below –2. These three measures capture different dimensions of undernutrition: Stunting indicates chronic undernutrition, wasting indicates acute undernutrition, and underweight reflects both chronic and acute undernutrition. Stunting is mostly caused by prolonged nutritional deficiencies and parasitic infections. Sudden, extreme food shortages, such as famines, typically lead to lower WHZs and higher wasting rates but may not show up in HAZs and stunting rates in the short term. Thus, HAZ is a long-term nutrition indicator, and WHZ is a short-term nutrition indicator. Children's WAZs and underweight rates alone are suboptimal measures of undernutrition, because they do not provide information on the form of undernutrition given the composite nature of the indicator. For Ghana, child anthropometric measurements are available from DHSs since 1988.

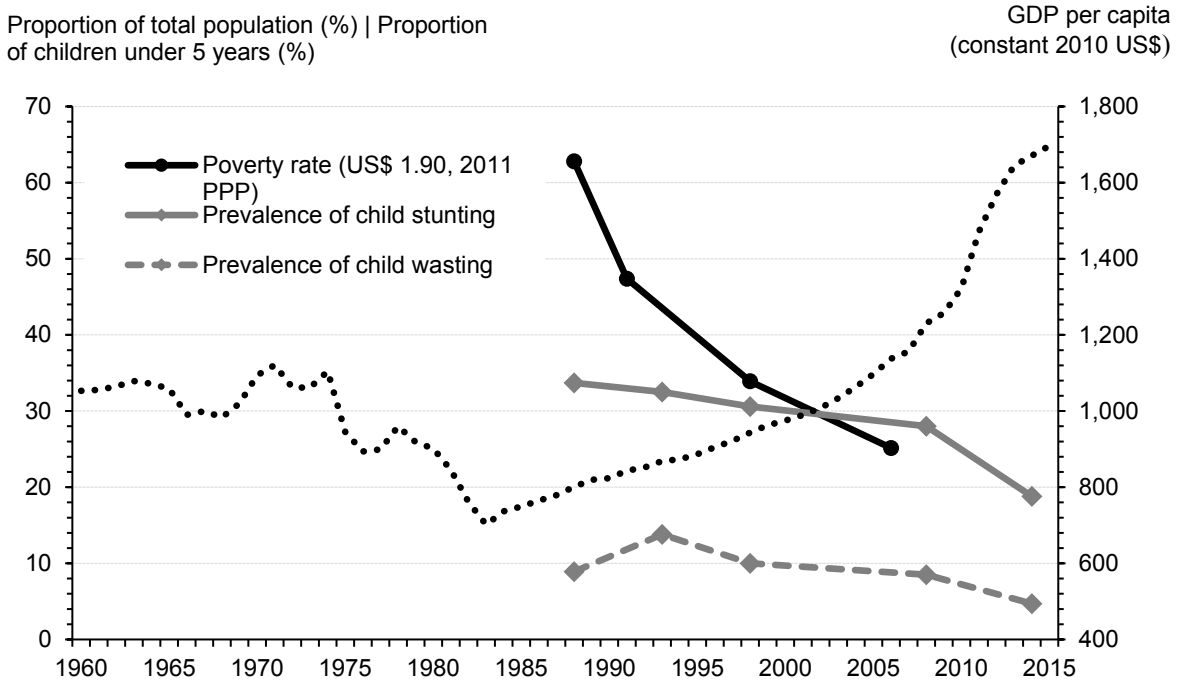
The most commonly used anthropometric measurement for adults is the body mass index (BMI). Adults are classified as thin if their BMIs are less than 18.5, normal weight if their BMIs are between 18.5 and 25, overweight if their BMIs are 25 or larger, and obese if their BMIs are 30 or larger. For Ghana, BMI-based estimates for women are publicly available from the DHSs since 1993. Thinness among adults is not a major public health problem in Ghana, with prevalence rates of thinness among women age 15–49 years of 6.2 percent nationwide (Ghana Statistical Service, Ghana Health Service, and ICF Macro 2015); therefore, it is omitted from the analysis in the following sections.

A *biochemical indicator* increasingly used in population-based studies in developing countries is hemoglobin concentration in blood. Hemoglobin is the iron-containing protein in the red blood cells that carries oxygen from the respiratory organs to the rest of the body. Hence, low hemoglobin levels reduce humans' physical and cognitive performance and development. Anemia is a condition in which the amount of red blood cells or hemoglobin is insufficient to meet physiological needs. Globally, anemia is mostly caused by dietary iron deficiency. Other causes include dietary folate, vitamin B12, and vitamin A deficiencies; parasitic infections; chronic inflammation; and inherited disorders (WHO 2016). In addition to (and often combined with) dietary iron deficiency, malaria and helminthiasis are the main causes of anemia in many parts of the developing world. In practice, anemia is usually detected by the hemoglobin level in a drop of blood collected using a portable hemoglobinometer. Anemia is generally defined as having hemoglobin concentrations less than 12 grams per deciliter (g/dl) of blood in nonpregnant women and 11 g/dl in pregnant women and children. Moderate anemia in all women and children is defined as having hemoglobin concentrations of between 7 g/dl and 10 g/dl, and severe anemia is defined as having hemoglobin concentrations of less than 7 g/dl (according to the DHS classification). For Ghana, hemoglobin concentration and anemia estimates for young children and women of reproductive age are available from the DHSs since 2003.

3. TRENDS OF FOOD AND NUTRITION INSECURITY AT THE NATIONAL LEVEL

After the postcolonial state-led path to development contributed to a long-lasting economic recession in the 1970s (Figure 3.1), Ghana launched an economic recovery program and adopted a market-oriented approach in 1983. Since then, Ghana has been experiencing high and steady economic growth, which has accelerated more recently. Between 1985 and 2015, Ghana's GDP grew at an annual rate of 5.4 percent, or 2.8 percent on a per capita basis (World Bank 2017). Over the last of this 30-year period, annual GDP growth averaged 7.1 percent, or 4.5 percent on a per capita basis. Even the lowest annual GDP growth during the past three decades—in 1990—was positive and moderately high, with a total growth rate of 3.3 percent and a per capita growth rate of 0.5 percent. The GDP per capita (at constant 2010 US dollars) grew almost 2.3-fold from US$749 in 1985 to US$1,697 in 2015.

Figure 3.1 Trends in national GDP and prevalence of poverty and child undernutrition



Source: Authors' calculation, based on WDI data (World Bank 2017) and DHS Program data (ICF International 2017).
Note: PPP = purchasing price parity.

Poverty

Ghana's economic growth trickled down to the poor and contributed to a large reduction in poverty. By the international poverty line—set at US$1.90 a day per person in 2011 purchasing power parity (PPP)—poverty dropped from 62.8 percent in 1988 to 25.2 percent in 2006 (Figure 3.1). This equals an annual average reduction of 2.1 percentage points, or 5.0 percent. Although somewhat less rapidly, poverty reduction continued at high rates in more recent years. Using the national poverty line (which has a higher cutoff level than the international poverty line), nationwide, poverty dropped from 31.9 percent in 2006 to 24.2 percent in 2013 (Table 3.1). This equals an annual average reduction of 1.1 percentage points, or 3.9 percent. In absolute terms, the largest share of this reduction occurred in rural areas, where an estimated 51.3 percent of the total population lived in 2006 (World Bank 2016). Poverty in rural areas dropped by an average of 0.8 percentage points per year between 2006 and 2013, compared with 0.3 percentage points in urban areas (Table 3.1). Nevertheless, poverty remains highly prevalent in rural Ghana. The poverty rate in rural areas in both 2006 and 2013 was more than 3.5-fold the rate in urban areas. In relative terms, poverty declined slightly more slowly in rural areas than urban areas, at an annual average rate of 2.0 percent over this seven-year period, compared with 2.2 percent in urban areas.

The rural-urban gap is even more pronounced for extreme poverty, which persists almost only in Ghana's rural areas. In 2013, 15.0 percent of the population in rural areas lived in extreme poverty, compared with 1.9 percent in urban areas (Table 3.1). In 2006, extreme poverty was prevalent among 23.3 percent of the rural population and 5.1 percent of the urban population. Hence, the extreme poverty rate in rural areas was 8.0 times the rate in urban areas in 2013 and 4.6 times the rate in urban areas in 2006. Extreme poverty declined much more slowly in rural areas than in urban areas. The annual average rate of extreme poverty reduction was 6.1 percent in rural areas, compared to 13.3 percent in urban areas.

Table 3.1 Prevalence of poverty and extreme poverty (%) and relative change over time

	National			Rural			Urban		
	2006	**2013**	***Annual average percentage change***	**2006**	**2013**	***Annual average percentage change***	**2006**	**2013**	***Annual average percentage change***
Poverty	31.9	24.2	*–3.9*	43.7	37.9	*–2.0*	12.4	10.6	*–2.2*
Extreme poverty	16.4	8.4	*–9.1*	23.3	15.0	*–6.1*	5.1	1.9	*–13.3*

Source: Authors' estimation, based on GLSS5 and GLSS6 data (Ghana Statistical Service 2006, 2013).

Child Nutrition

Ghana also achieved major progress in reducing undernutrition among children under five years of age. Between 1988 and 2008, the national prevalence rate of child stunting (indicating chronic child undernutrition) declined by an annual average rate of 0.3 percentage points, or 0.9 percent (Figure 3.1). During that same period, the national prevalence rate of child wasting (indicating acute undernutrition) declined by an annual average rate of 0.2 percentage points, or 0.2 percent. Hence, the average annual reduction in the prevalence rates of both child undernutrition indicators between 1988 and 2006 is considerably lower than in the poverty rate in both absolute and relative terms. A slower relative (and absolute) reduction in child undernutrition than in poverty is consistent with evidence from most other developing countries around the world. Nonetheless, Ghana's progress in reducing child undernutrition is clearly above average internationally (World Bank 2017).

In more recent years, Ghana boosted improvements in child nutrition. Per the latest estimates, both chronic and acute child undernutrition declined at a faster average annual rate than poverty in both rural and urban areas (Tables 3.1 and 3.2). Acute child undernutrition declined at an even faster rate than extreme poverty nationwide and in both rural and urban areas. The national prevalence of child stunting dropped from 28.1 percent in 2008 to 18.4 percent in 2014 (Table 3.1). This equals an average annual reduction of 6.8 percent over this six-year period. The national prevalence of child wasting dropped from 9.2 percent in 2008 to 4.8 percent in 2014, at an average annual reduction of 10.5 percent. Over the same period, the national poverty rate declined by 3.9 percent per year, and the national extreme poverty rate declined by 9.1 percent per year. Similar to rural-urban poverty dynamics, the prevalence of both child undernutrition indicators declined much more slowly in rural areas than in urban areas. The rural-urban gaps for the prevalence of chronic and acute child undernutrition are much less pronounced than they are for poverty and extreme poverty. In 2014, child stunting and child wasting in rural areas were about 1.6–1.7 times more prevalent than in urban areas. The progress achieved in reducing acute and chronic child undernutrition points to significant improvements in food availability and nutrient intake of young children and their mothers during pregnancy and lactation, in addition to improvements in women's and children's health conditions.

Global comparisons confirm that Ghana is making good progress in improving nutrition (IFPRI 2015; WHO 2014): When applying the global World Health Assembly nutrition targets (to be achieved by 2025) to Ghana, the country is on course to achieve four of the five applicable targets consistently on a country-by-country basis, out of six total targets. All four targets for which Ghana is on course relate to child nutrition, whereas the target for which Ghana is off course relates to micronutrient malnutrition as measured among women (IFPRI 2015; WHO 2014). Ghana is on course to achieve the targets on stunting (to achieve a 40 percent reduction in the number of children under five who are stunted), wasting (to reduce and maintain childhood wasting to less than 5 percent), breastfeeding (to increase the rate of exclusive breastfeeding in the first six months up to at least 50 percent), and childhood overweight (to ensure there is no increase in childhood overweight). Ghana is off course to achieve the anemia target (to achieve a 50 percent reduction of anemia in women of reproductive age) (IFPRI 2015; WHO 2014).

Anemia

In 2014, anemia affected 42.4 percent of all Ghanaian women of reproductive age, and its moderate or severe form was prevalent among 10.2 percent of women (Table 3.2). Anemia rates have been even higher among young children—two out of three Ghanaian children under five years were anemic in 2014, and almost 40 percent suffered from moderate or severe anemia. In 2014, the prevalence of anemia and its moderate or severe form among women was roughly similar in rural and urban areas, whereas any anemia and moderate or severe anemia among children was more prevalent in rural areas than in urban areas. Although Ghana is off course in reducing anemia (IFPRI 2015), some encouraging progress has been made; the prevalence of anemia did decline among women and children nationwide and in both urban and rural areas between 2008 and 2014 (Table 3.2). And the prevalence of the moderate or severe form of anemia, which is more likely to have serious health effects, declined faster than the prevalence of any anemia both nationwide and in rural and urban areas. However, the prevalence of any anemia and its moderate or severe form decline much less rapidly among children than among women, at about half the rate, in urban and rural Ghana.

Table 3.2 Prevalence of malnutrition among young children and women (%) and relative change over time

	National			Rural			Urban		
	2008	**2014**	***Annual average percentage change***	**2008**	**2014**	***Annual average percentage change***	**2008**	**2014**	***Annual average percentage change***
Child undernutrition									
Stunting	28.1	18.4	*–6.8*	32.4	22.6	*–5.8*	21.2	13.4	*–7.4*
Wasting	9.2	4.8	*–10.5*	9.8	5.7	*–8.6*	11.0	3.6	*–17.0*
Underweight	14.3	10.6	*–4.8*	16.2	12.2	*–4.6*	16.2	8.6	*–10.0*
Women's overnutrition									
Overweight	20.7	24.9	*3.2*	15.6	20.8	*5.0*	26.1	28.3	*1.4*
Obesity	10.9	15.5	*6.0*	6.5	8.6	*4.6*	15.6	21.3	*5.4*
Anemia									
… among children									
Anemia	78.4	66.8	*–2.6*	84.8	73.0	*–2.5*	67.6	59.5	*–2.1*
Moderate & severe anemia	55.8	39.8	*–5.5*	63.2	47.7	*–4.6*	43.3	30.5	*–5.7*
… among women									
Anemia	58.7	42.4	*–5.3*	61.9	43.0	*–5.9*	55.3	41.8	*–4.6*
Moderate & severe anemia	20.0	10.2	*–10.6*	21.2	10.7	*–10.7*	18.7	9.7	*–10.4*

Source: Authors' estimation, based on DHS data (ICF International 2017).

Nutrition Transition and the Double Burden of Malnutrition

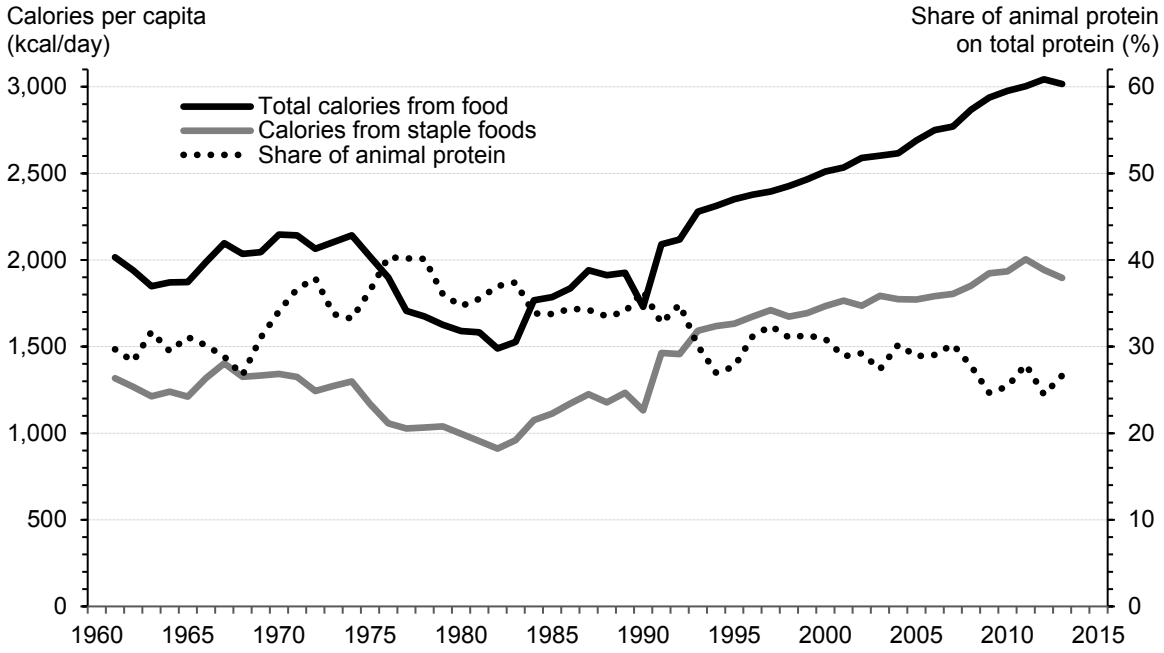
Although Ghana has been making notable progress in reducing household food insecurity and child undernutrition, new nutrition-related public health problems are on the rise. Along with continuing, rapid economic growth and transformation, Ghana—like several other developing countries—is likely to face a rapid "nutrition transition" (Popkin 1998, 1999, 2002). This general phenomenon describes the shifts in physical activity levels and dietary patterns that go along with improvements in people's living standards and changes in their livelihood activities and lifestyle (Popkin 1993, 1994). In transforming economies, a growing share of the population moves out of agriculture and engages in physically less-demanding employment and more sedentary activities. Further, leisure becomes part of the lives of more people, which reduces people's dietary energy requirements. Food sourcing increasingly shifts from own production for home consumption to market purchases, and the share of refined foods and animal-source foods in people's diets tends to grow (Popkin 2001; Popkin and Du 2003; Speedy 2003). A rising proportion of the population has diets that are overly rich in calories and dense in saturated and trans fats. Consequently, overweight and obesity and related noncommunicable diseases (NCDs), such as type two diabetes, coronary heart disease, stroke, and hypertension, rise in prevalence. Overnutrition typically increases faster than declines in undernutrition, including micronutrient deficiencies, leading to a situation in which overnutrition and undernutrition coexist. This coexistence is often referred to as the "double burden of malnutrition." Addressing this double burden of malnutrition constitutes new challenges to public health and social protection policy, as decision makers must simultaneously deal with the coexistence and partial overlap of opposite nutritional realities (Ecker and Fang 2016; Prentice 2006; Schmidhuber and Shetty 2005; Shrimpton and Rokx 2012).

Today, many developing countries, including Ghana, are increasingly confronted with this new nutritional reality. Evidence from cross-country comparisons suggests that the described shifts in physical activity levels and dietary patterns are occurring at greater speed and at earlier stages of countries' economic and social development today than they occurred in the past (Popkin and Du, 2003). Deaths related to NCDs are projected to increase worldwide by 15 percent between 2010 and 2020, with the

largest increases expected to exceed 20 percent in Africa south of the Sahara, Southeast Asia, and the Middle East and North Africa (WHO 2011). Thus, overnutrition-related private and public healthcare costs are likely to increase rapidly, as are productivity losses to the individual and society (Finkelstein, Fiebelkorn, and Wang 2003; Finkelstein, Ruhm, and Kosa 2005; Popkin et al. 2006; Trogdon et al. 2008).

In Ghana, per capita availability of calories from food has continuously improved since the early 1980s, apart from a drop in 1990 (after a process of gradual devaluation of the Ghanaian cedi and the adoption of a free-floating exchange system in 1990; Figure 3.2). Calorie availability per capita doubled between 1982 and 2010, which has essentially contributed to improvements in household food security. Since 2010, calorie availability seems to have reached a plateau at 3,000 kcal per capita per day, which is well above the dietary energy requirement of an average Ghanaian. The increase in total per capita calorie availability was almost exclusively driven by an increase in the availability of calories from staple foods. The share of protein from animal-source foods on total protein has not increased since the early 1970s. In fact, there has been an overall trend toward slightly decreasing shares of animal protein over the four decades from 1973 to 2013. These trends suggest that the average Ghanaian diet has become richer in calories but—thus far—has not become denser in high-quality protein, which is mainly obtained from animal-source foods. This implies that, on average, Ghanaians have consumed more calorie-rich (staple) foods without diversifying their diet into higher-value and high-quality protein-rich (and micronutrient-rich) foods. Because animal-source foods are important sources of high-quality protein and bioavailable micronutrients, increasing their consumption among food insecure households is essential to reduce protein and micronutrient deficiencies—especially, iron deficiency anemia. On the other end, increasing consumption of animal-source foods among households who already consume an overly rich diet further raises the risk of NCDs.

Figure 3.2 Trends in calorie availability and share of animal protein



Source: Authors' estimation, based on FBS data (FAOSTAT 2017).

Economic growth and transformation—and, thus, the nutrition transition—do not take off from the same levels and do not progress at the same pace across Ghana. Consistent with Engel's law, the average shares of food in total household consumption have been lower in the wealthier south than in the north of Ghana and lower in urban areas than in rural areas (Table 3.3).[7] The urban-rural and south-north wealth gaps are also evident in average consumption shares of staple foods and—to a much lesser extent—of animal-source foods. The average share of staple foods in total food consumption has been lowest in the urban south, followed by the urban north and the rural south; it was highest in the rural north. Both the fifth and sixth round of the GLSS suggest that there have been virtually no rural-urban differences in the consumption shares of animal-source foods in the south, accounting for around 30 percent of food consumption in urban and rural areas. The animal-source food consumption shares have been much lower in the north and especially in rural areas: 23.5 percent in the urban north and 17.5 percent in the rural north in 2013.

[7] South Ghana includes the seven southern administrative regions: Western, Central, Greater Accra, Volta, Eastern, Ashanti, and Brong-Ahafo. North Ghana includes the three northern administrative regions: Northern, Upper East, and Upper West.

Table 3.3 Food and food group consumption shares (%) and changes over time (percentage point (pp.)

	Total				Rural				Urban			
	2006	2013	Change		2006	2013	Change		2006	2013	Change	
National												
Food	*52.5*	*49.4*	*–3.1*	***	*59.9*	*56.5*	*–3.4*	***	*42.1*	*40.6*	*–1.6*	***
Staple foods	39.6	37.2	–2.4	***	43.0	40.8	–2.2	***	34.7	32.7	–2.0	***
Animal-source foods	26.3	26.2	–0.1		24.3	24.1	–0.2		29.0	28.8	–0.2	
South												
Food	*48.7*	*45.8*	*–2.9*	***	*56.6*	*53.7*	*–2.9*	***	*41.0*	*39.2*	*–1.8*	***
Staple foods	37.4	35.5	–1.9	***	41.1	39.9	–1.2	***	33.7	31.8	–1.9	***
Animal-source foods	30.0	29.9	–0.1		30.2	29.8	–0.4		29.8	30.0	0.2	
North												
Food	*61.7*	*56.3*	*–5.4*	***	*64.8*	*59.7*	*–5.0*	***	*49.0*	*46.2*	*–2.8*	***
Staple foods	44.9	40.6	–4.3	***	45.9	41.9	–4.0	***	40.9	36.7	–4.2	***
Animal-source foods	17.3	19.0	1.7	***	15.7	17.5	1.8	***	23.9	23.5	–0.4	

Source: Authors' estimation, based on GLSS5 and GLSS6 data (Ghana Statistical Service 2006, 2013).
Note: Household consumption is measured in monetary value terms and expressed in units of per adult equivalent. Food consumption includes foods from market purchases, own production, and in-kind transfers consumed at home. The consumption shares are means of the unweighted survey sample populations, and the changes are mean differences. The significance levels for the changes were obtained from t-tests on the equality of means (for unequal variance of the samples).
***, **, * Change is statistically significant at the 1 percent, 5 percent, and 10 percent level, respectively.

Along with improvements in household food security, the average share of staple foods in total food consumption declined across Ghana between 2006 and 2013 (Table 3.3). It declined faster in the poorer north than in the south but slower in poorer, rural areas than in urban areas. In relative terms, over the seven-year period, the average consumption share of staple foods declined by 2.9 percent (or 1.2 percentage points) in the rural south, 5.8 percent (or 1.9 percentage points) in the urban south, 8.7 percent (or 4.0 percentage points) in the rural north, and 10.3 percent (or 4.2 percentage points) in the urban north. In contrast, the consumption shares of animal-source foods did not change significantly, except for the rural north (Table 3.3). Between 2006 and 2013, the animal-source food consumption share increased by 1.8 percentage points, or 11.4 percent, in the rural north—though, this was up from a very low level.

Overall, the historical long-term trends in calorie availability and share of animal protein at the national level and the observed recent changes in average household food consumption shares for staple foods and animal-source foods at the subnational level suggest rather modest shifts in dietary patterns in Ghana. The analysis does not provide evidence for a rapid, widespread increase in the risks of nutrition-related NCDs due to a diet that has become overly rich in animal-source foods. On the contrary, among the rural poor, increasing consumption of meat and fish products, which are rich sources of readily absorbable iron, may help bring down high rates of anemia. However, it is important to note that the average food consumption patterns presented here provide no information on food consumption at different household income levels, such as among the rich and the poor, or on the likely trends in food consumption patterns beyond 2013, after which household incomes continued to grow.

Moreover, the observed trend of increasing calorie availability without much food consumption diversification also raises concerns of a growing double burden of malnutrition. Overweight and obesity among adults have been increasing rapidly, while progress in reducing micronutrient malnutrition—notably, anemia—has been insufficient (see earlier discussion). In 2014, one out of four Ghanaian women of reproductive age was overweight, and more than 15 percent were obese (Table 3.2). It is alarming that the prevalence of women's obesity (the more extreme form of overnutrition) increased nationwide at a faster rate between 2008 and 2014 than the prevalence of women's overweight. The increase in obesity

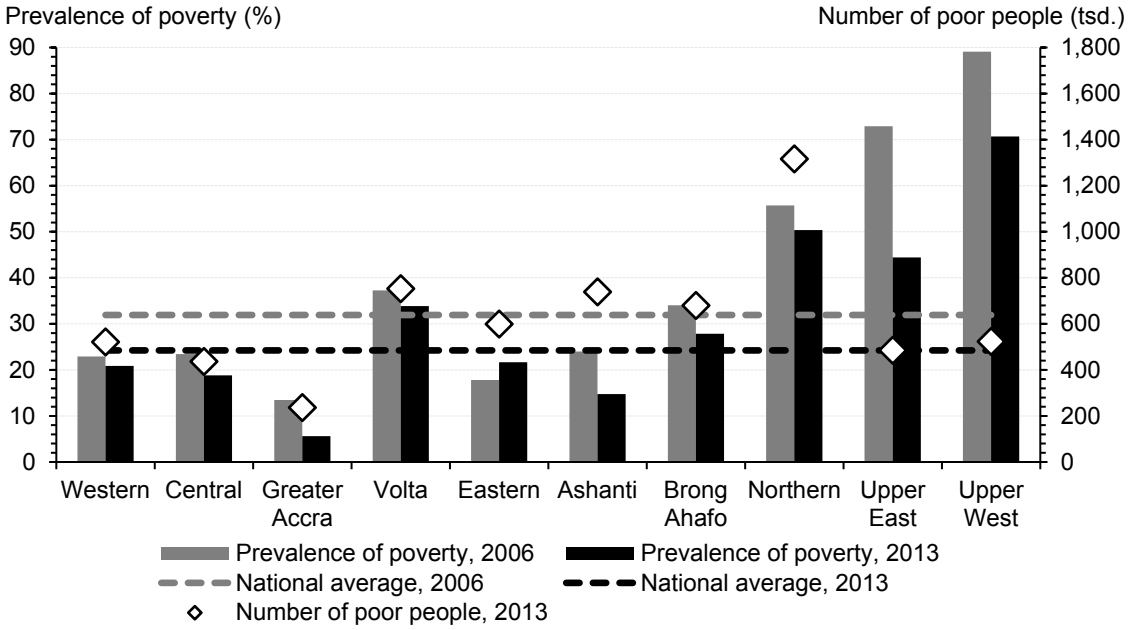
was faster in urban areas than in rural areas, while overweight and obesity were also more prevalent in urban areas than in rural areas. However, even in rural areas, overweight and obesity among women increased rapidly, and overweight increased at an even faster rate than in urban areas, narrowing the gap.

4. PATTERNS OF FOOD AND NUTRITION INSECURITY AT THE REGIONAL LEVEL

Food and nutrition insecurity and the nutritional consequences—in particular, micronutrient malnutrition—remain the most pressing nutrition-related problems in Ghana, although overnutrition is rising rapidly. The following analysis explores patterns in household food insecurity and different forms of undernutrition among children and women across Ghana's 10 administrative regions. The indicators are poverty and extreme poverty, child stunting and wasting, and anemia in children and women. In addition to prevalence rates for these indicators, the analysis presents estimates of the number of affected individuals. The reason for presenting these population estimates is that the Ghanaian government, development partners, and implementing organizations may prioritize the areas for intervention based on the highest prevalence of food and nutrition insecurity or the highest number of affected people or a combination of both. To explore recent changes in food and nutrition security, the analysis uses the two most recent rounds of the GLSS and DHS.

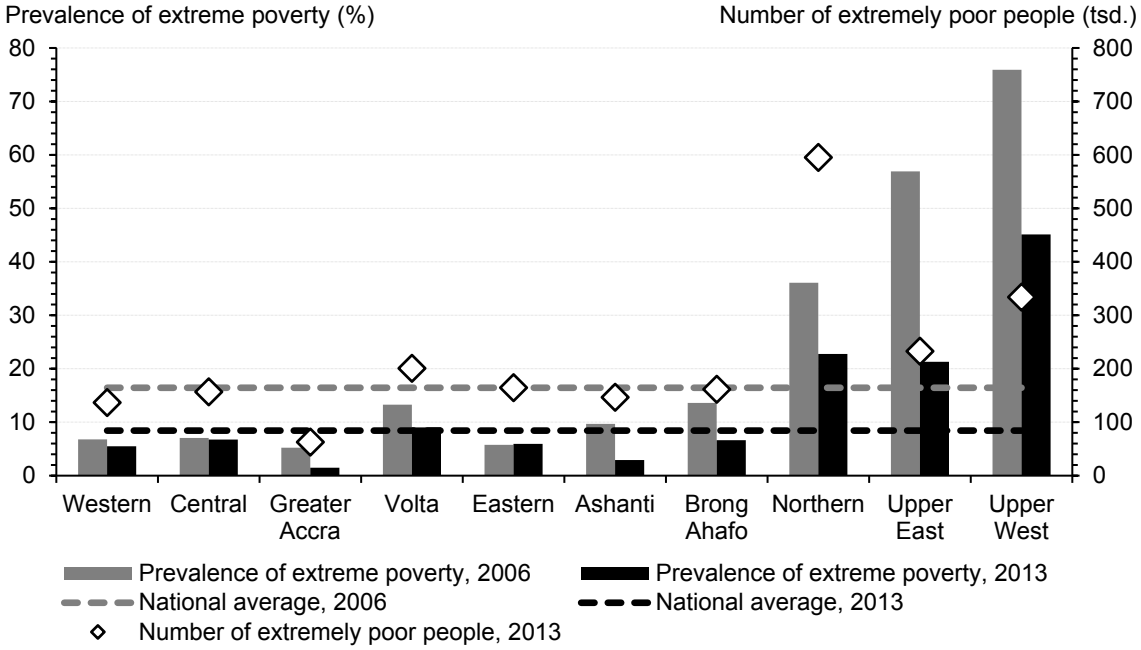
The largest regional differences in the severity of poverty and, even more so, of extreme poverty occur between the north and south (Figures 4.1 and 4.2). The poverty and extreme poverty rates in all three regions in the north—Northern, Upper East, and Upper West—were far above the national averages in 2006 and 2013. Except for Volta and Brong-Ahafo, all regions in the south had poverty and extreme poverty rates below the national averages in 2006 and 2013. Between 2006 and 2013, the prevalence of poverty and extreme poverty markedly declined across all regions, except for the Eastern region in the south, where poverty became more prevalent and extreme poverty did not change considerably. The prevalence of poverty and extreme poverty dropped the most in the Upper East and Upper West regions in the north. Although extreme poverty became much less prevalent in the Northern region, by far, most poor and extremely poor Ghanaians lived in that region in 2013. The Upper West and the Upper East regions had the next highest numbers of extremely poor people. However, because both regions have relatively small populations, they were not even close to the total number of extremely poor people in the northern region.

Figure 4.1 Regional patterns of poverty in 2006 and 2013



Source: Authors' representation, based on GLSS5 and GLSS6 data (Ghana Statistical Service 2006, 2013) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

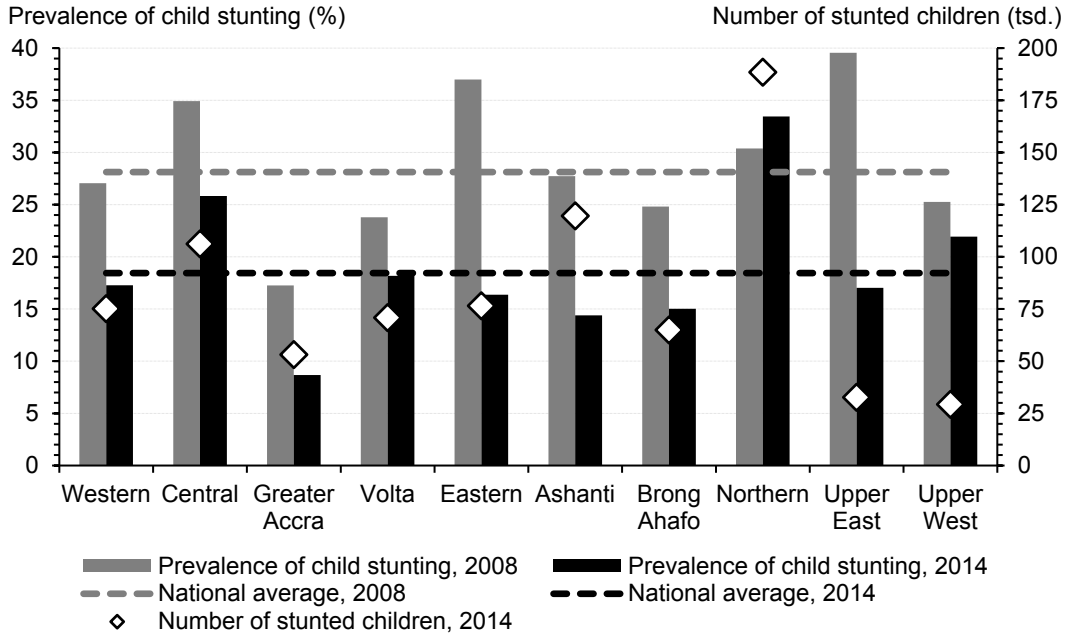
Figure 4.2 Regional patterns of extreme poverty in 2006 and 2013



Source: Authors' representation, based on GLSS5 and GLSS6 data (Ghana Statistical Service 2006, 2013) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

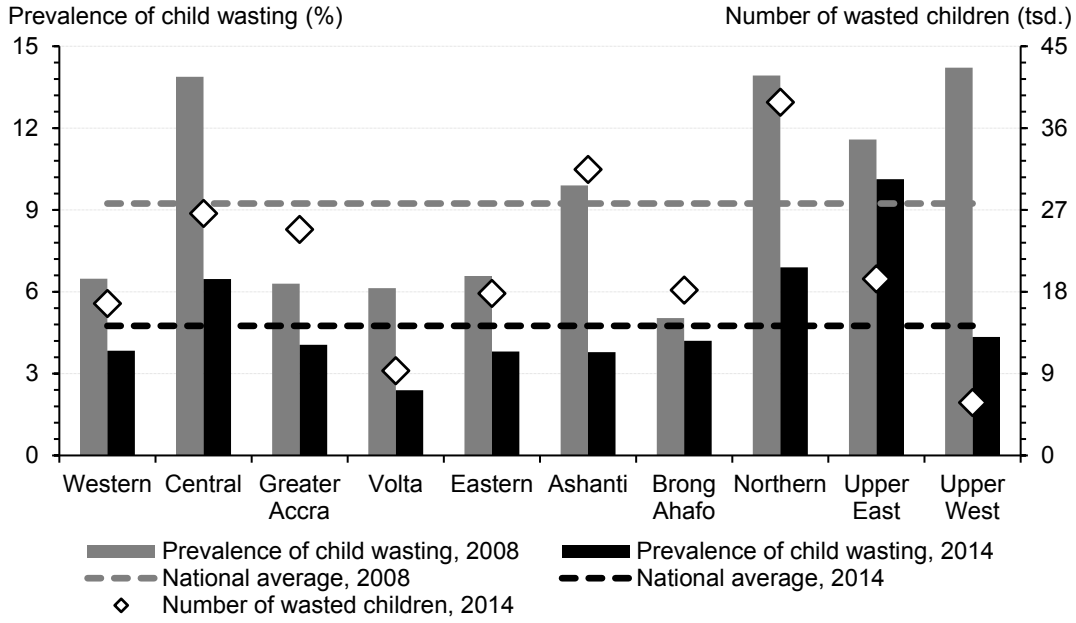
Unlike for the prevalence of poverty and extreme poverty, there is no clear south-north divide in the prevalence of chronic and acute child undernutrition (Figures 4.3 and 4.4). The Northern region and the Central region in the south had prevalence rates of both child stunting and child wasting above the national averages in 2008 and 2014. In addition, the Upper West region (in the north) had child stunting rates above the 2008 and 2014 national averages, and the Upper East region (in the north) had child wasting rates above the 2008 and 2014 national averages. In 2014, the prevalence rate of child stunting was highest in the Northern region, followed by the Central region and the Upper West. The prevalence rate of child wasting in 2014 was highest in the Upper East, followed by the Northern region and the Central region. In the Northern region, the child wasting rate dropped by about half between 2008 and 2014; however, the child stunting rate somewhat increased. In the Central and Upper West regions, the child wasting rate dropped by more than half over the six-year period, though declines in child stunting rates were much smaller. On the contrary, in the Upper East region, the child stunting rate dropped by more than half over the six-year period, whereas the child wasting rate declined by only 1.5 percentage points. Other regions that achieved considerable progress in reducing the prevalence of child stunting between 2008 and 2014 include the Eastern and Ashanti regions in the south; the Ashanti region also substantially reduced the prevalence of child wasting. Nevertheless, the largest numbers of stunted children and wasted children in 2014 lived in the Northern region, followed by Ashanti and the Central regions.

Figure 4.3 Regional patterns of chronic child undernutrition in 2008 and 2014



Source: Authors' representation, based on DHS data (ICF International 2017) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

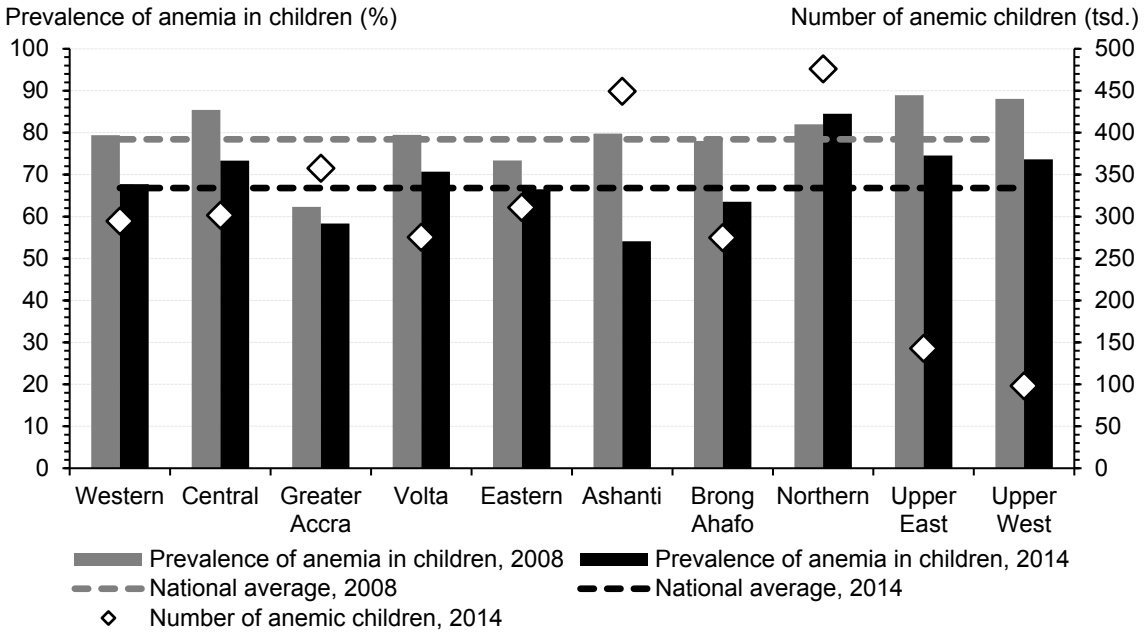
Figure 4.4 Regional patterns of acute child undernutrition in 2008 and 2014



Source: Authors' representation, based on DHS data (ICF International 2017) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

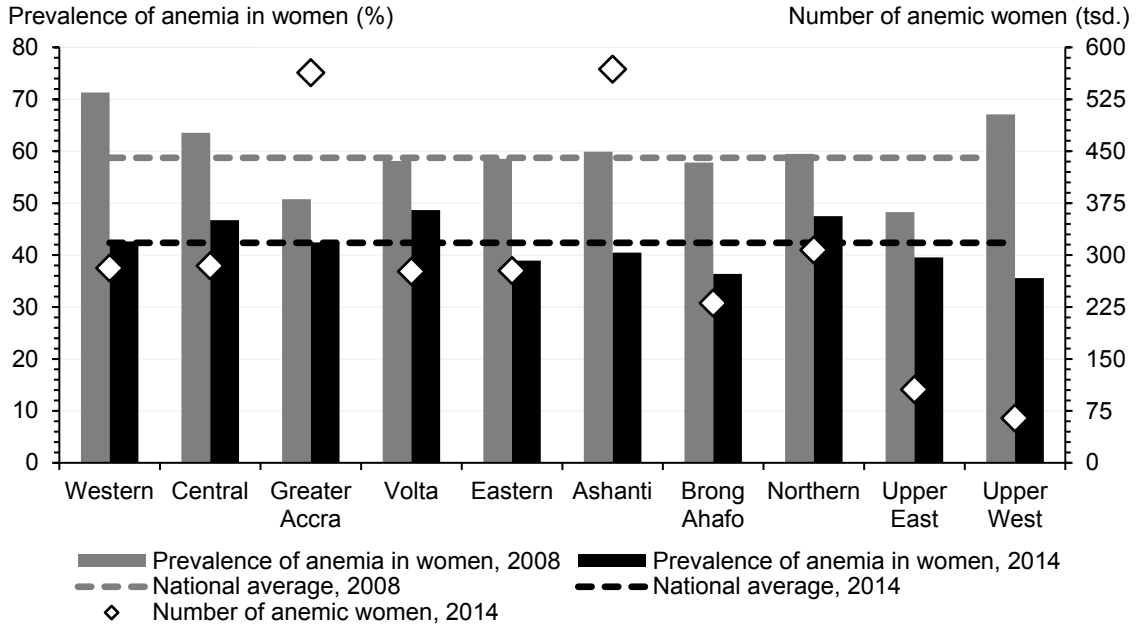
Compared with poverty and child undernutrition, there are fewer regional differences in the prevalence of anemia among both young children and women of reproductive age (Figures 4.5 and 4.6). Anemia is highly prevalent across Ghana, with more than half of all children under five years of age and more than one-third of all women age 15–49 being anemic in any region in 2014. Six out of Ghana's 10 regions (Northern, Upper East, and Upper West in the north and Central, Western, and Volta in the south) had childhood anemia rates above the national averages in both 2008 and 2014 (Figure 4.5). Anemia among children in 2014 was highest in the Northern region, followed by the Upper East, Upper West, and Central regions, all with similar prevalence rates. The prevalence of anemia among children declined in all regions between 2008 and 2014, except for in the Northern region. Hence, the increase in the prevalence of stunting among children under five years in this region was associated with—and likely related to—an increase in the prevalence of anemia in that population group. The increases in chronic child undernutrition and children's micronutrient malnutrition in the Northern region are particularly concerning, as the prevalence rates were already above the national averages in 2008.

Figure 4.5 Regional patterns of anemia among young children in 2008 and 2014



Source: Authors' representation, based on DHS data (ICF International 2017) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

Figure 4.6 Regional patterns of anemia among women of reproductive age in 2008 and 2014



Source: Authors' representation, based on DHS data (ICF International 2017) and 2010 PHC data (IPUMS International 2010).
Note: tsd. = thousands

In the Northern, Volta, Central, and Western regions, the prevalence rates of anemia among women of reproductive age were above or close to the national average in both 2008 and 2014 (Figure 4.6). In 2014, anemia among women was similarly prevalent in the Northern, Volta, and Central regions, where almost half of all women were anemic. The prevalence of anemia among women markedly declined in all regions between 2008 and 2014, declining most in the Upper West, Western, Brong-Ahafo, Eastern, and Ashanti regions. Ashanti also experienced the largest decline in the prevalence of anemia among children between 2008 and 2014 (Figure 4.6). Nevertheless, in 2014, Ashanti was home to most anemic women, followed by the Greater Accra region, and to the second most anemic children, behind the Northern region (Figures 4.5 and 4.6).

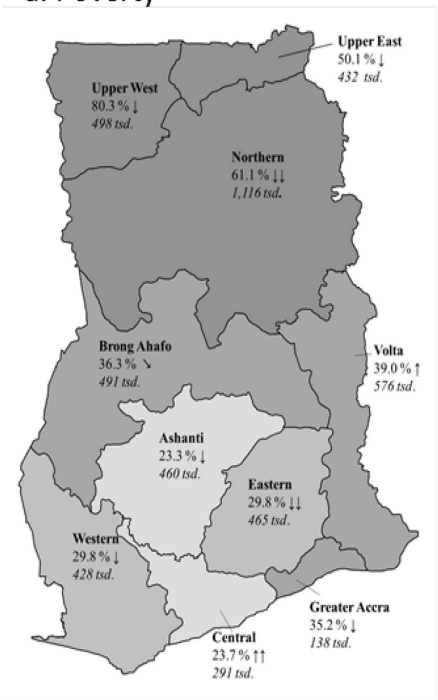
5. REGIONAL HOT SPOTS OF FOOD AND NUTRITION INSECURITY IN RURAL GHANA

The analysis in the previous two sections showed that food and nutrition insecurity in Ghana is more prevalent and severe in rural areas than urban areas. It also revealed often large differences among Ghana's administrative regions for most food and nutrition security indicators. This section turns to a spatial analysis of regional hot spots of rural food and nutrition insecurity. Each map in Figure 5.1 illustrates four measures of the six food and nutrition security indicators used in the previous section (poverty, extreme poverty, child stunting, child wasting, anemia in children, anemia in women). The coloring of the regions indicates the deviation of the regional prevalence rates from the national average in percentage points (pp.), using the most recent survey data from 2013 and 2014. Each map also reports the most recent regional prevalence rate as a percentage (%), its annual relative change from the previous round of data collection of the same survey source (from 2006 and 2008) in percent (pc.), and the number of affected people per the most recent data. The categories of deviations and changes are standardized across the different food and nutrition indicators (maps) for comparability purposes. All measures refer to the population living in rural areas only.

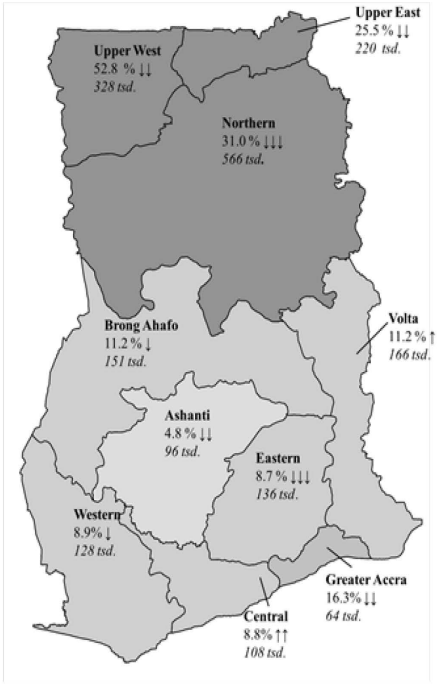
The maps suggest that the Northern region requires attention in national food and nutrition security strategies and policies and should be given priority in food and nutrition security programs (Figure 5.1). This holds true when using either prevalence rates or number of affected individuals as targeting criterion. Rural areas in the Northern region lagged the most behind rural areas in all other regions in 2013/2014, especially for chronic child undernutrition and micronutrient malnutrition indicators. The number of affected rural individuals in the Northern region exceeds by far the number of affected rural individuals in each of the other regions. In fact, in 2014, 22.8 percent of all rural poor people in Ghana lived in the Northern region. The Northern region also had 28.9 percent of all rural extreme poor people, 27.8 percent of all rural stunted children, 18.7 percent of all rural wasted children, 20.0 percent of all rural anemic children, and 16.1 percent of all rural anemic women.

Figure 5.1 Regional hot spots of food and nutrition insecurity in rural Ghana

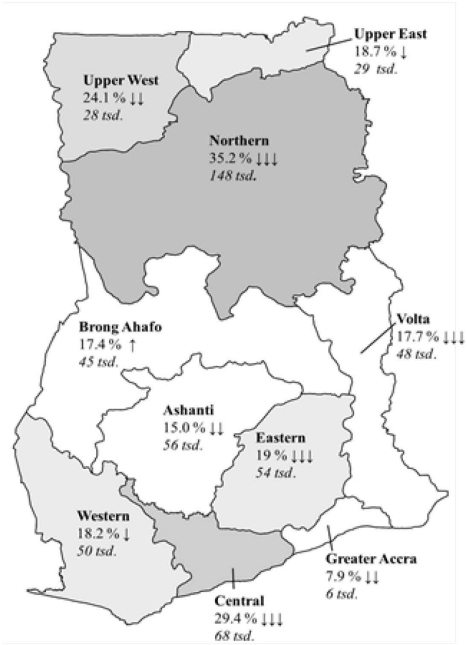
a. Poverty



b. Extreme Poverty



c. Child Stunting



d. Child Wasting

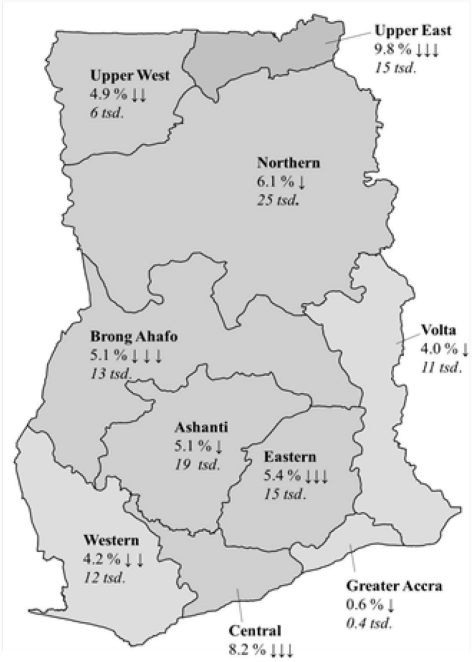
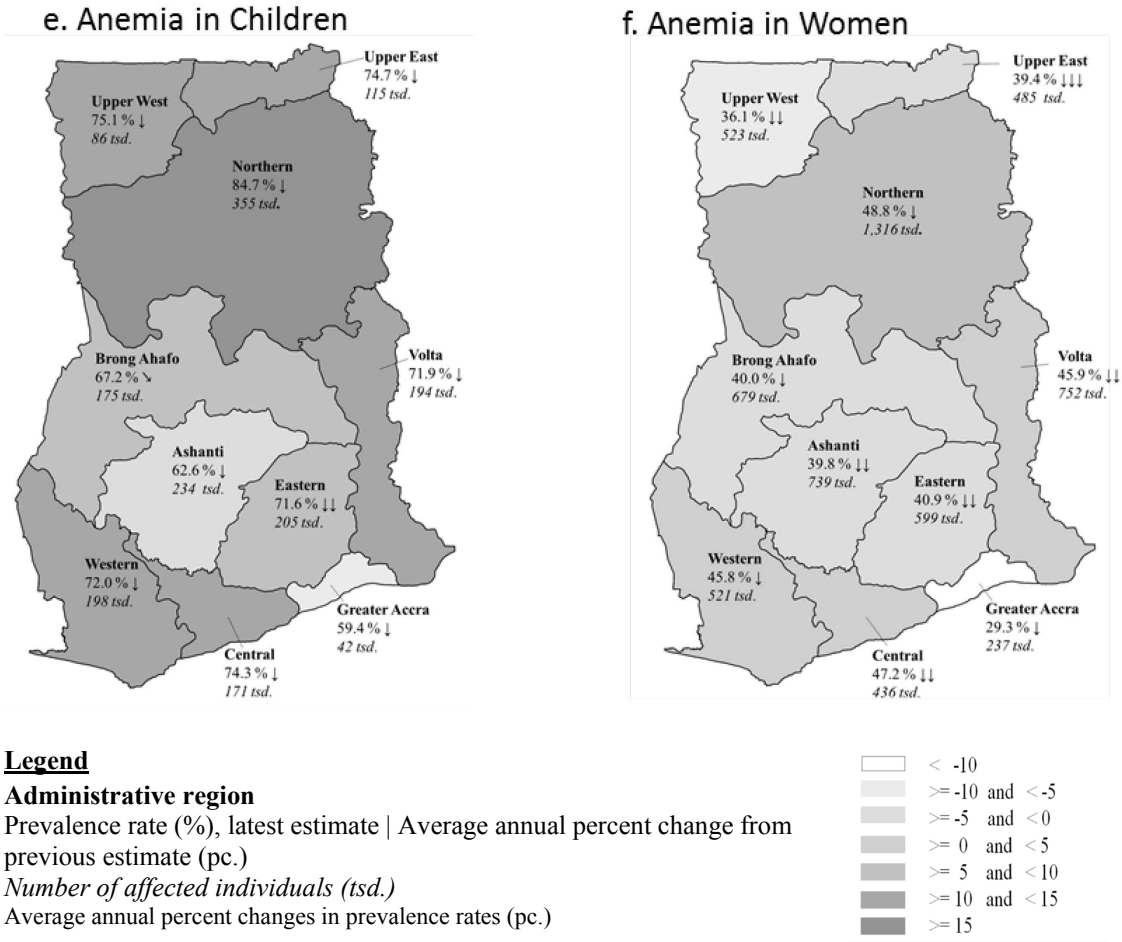


Figure 5.1 Continued



Legend

Administrative region

Prevalence rate (%), latest estimate | Average annual percent change from previous estimate (pc.)

Number of affected individuals (tsd.)

Average annual percent changes in prevalence rates (pc.)

< -10
>= -10 and < -5
>= -5 and < 0
>= 0 and < 5
>= 5 and < 10
>= 10 and < 15
>= 15

Source: Authors' representation, based on GLSS5 and GLSS6 data (Ghana Statistical Service 2006, 2013), DHS data (ICF International 2017), and 2010 PHC data (IPUMS International 2015).

The maps also identify regional hot spots of specific food and nutrition security problems, which may be particularly useful for specific interventions. For example, the prevalence of extreme poverty and acute malnutrition was particularly high in rural areas of the Upper East region in 2014 (Figures 5.1b and 5.1d). This finding suggests that household access to staple food is still a critical food security problem for the rural poor of that region, causing calorie deprivation. Food availability and nutrition among these households are likely to be highly vulnerable to agricultural seasonality and economic shocks like high food prices and weather-related crop losses. Thus, increasing rural incomes, improving agricultural yields, and reducing market failures among poor (smallholder farm) households are likely to be key components for food and nutrition security interventions to be effective in this region.

6. CONCLUSION

As Ghana has experienced high economic growth and economic transformation and has made good progress in reducing food insecurity and malnutrition in recent decades, the government has started a process of reviewing its food security and nutrition strategies and policies, including the overarching national Zero Hunger Strategy. This discussion paper aims to contribute to this process by providing an update of the state of food and nutrition security in Ghana and related changes in recent years. In addition to providing an overview of historical, long-term trends at the national level, the analysis describes regional patterns of food and nutrition insecurity and recent changes across Ghana's 10 administrative regions. Finally, the analysis identifies regional hot spots of food and nutrition security.

The key findings of the analysis can be summarized as follows:

1. Ghana did achieve substantial improvements in overall food and nutrition security at the national level, especially over the past decade.
2. Good progress has been made in improving households' economic access to food—that is, reducing poverty and extreme poverty—and reducing chronic and acute child undernutrition. Progress in reducing micronutrient malnutrition—in particular, anemia and especially among young children—has been insufficient, however, and prevalence rates of anemia among children and women remain high.
3. Food and nutrition security has improved in most regions, but large rural-urban and regional gaps still exist for most indicators. Food and nutrition insecurity is still predominantly a rural phenomenon; it is more prevalent and affects more individuals in the north than in the south. The food and nutrition security problem is, by far, most severe in the Northern region in terms of both prevalence and number of affected individuals. It is also the only region that experienced an increase in malnutrition, as chronic undernutrition and anemia became more prevalent among children under five years between 2008 and 2014.
4. Ghana is increasingly facing new nutrition-related public health problems that result from overnutrition—in particular, diets too rich in calories. Overweight and obesity among adults are rising rapidly in both urban and rural areas. Increases in overnutrition are usually accompanied by an increase in risk of related NCDs, such as type 2 diabetes, coronary heart disease, stroke, and hypertension.

5. The double burden of malnutrition constitutes a particular challenge to public health and social protection policy. Existing food and nutrition security policies may become ineffective under the new nutritional realities and may now have adverse nutritional effects on one side of the nutrition spectrum. For example, some traditional food security policies and programs, such as food (and some agricultural) subsidies, food voucher programs, and income transfer programs, may incentivize consumption of calorie-rich, poorly diversified diets. If the interventions are poorly targeted, they may contribute to increasing overweight and obesity. At the same time, however, abolishing such policies may hurt the food insecure and malnourished segments of the population.

The analysis in this discussion paper should be understood as an initial stocktaking exercise that provides a broad overview of the food and nutrition security situation in Ghana and that encourages further in-depth analyses. The analysis is by no means complete and is limited by the available data.

Overcoming key data limitations will be critical for future work. A major limitation of the available nationally (and regionally) representative household surveys—notably, the DHS and GLSS—is that a household's food security situation and an individual's nutritional status cannot be linked to household incomes and food prices. However, it is critical to estimate, for example, the effects of economic policies or economic shocks on food security and nutrition. The data limitation results from the DHS, which is a rich source of nutrition indicators (and some individual-level dietary indicators) but which does not collect any household income, consumption, or price-related data. While an anthropometric module—for application to at least children under five years—is a standard module of the Living Standard Measurement Study (LSMS) surveys, promoted by the World Bank, the GLSS does not include modules for anthropometric measurements or for blood hemoglobin concentration tests. In addition, the GLSS lacks modules to construct common food security indicators such as the HFIAS or the FCS. Moreover, unlike in typical LSMS surveys, the GLSS does not consistently collect quantities of consumed food items. Therefore, reliable calorie and nutrient intakes cannot be calculated from this data source. Revising the GLSS to address these limitations could greatly benefit food and nutrition security assessments in Ghana.

Further, to analyze the causes of changes in the household food security situation and ideally in individuals' nutritional status, the sampling of the GLSS could be modified to track the same households and, at best, even the same individuals (or at least subsamples thereof) over time. The LSMS Integrated Surveys on Agriculture adopted a partial household panel approach in which a subsample of households of a regular LSMS-style household survey is followed up with several survey rounds and at a higher frequency of data collection than the regular household living standard survey. The availability of such datasets would allow for a variety of policy-relevant food security and nutrition studies. Important topics include how economic transformation changes local food systems in Ghana; how these changes affect household income, food security, and nutrition among smallholder farmers; and how these changes affect the diets and nutritional status of urban and peri-urban consumers. Such studies may provide crucial information for developing a comprehensive, long-term national food and nutrition security strategy.

Finally, any substantial policy reform or large-scale intervention program should be informed by research-based evidence, and its implementation should be accompanied by rigorous impact evaluation. Such an impact evaluation can demonstrate what works and how effective each evaluated component is. This evidence is critical for sound decision making on various issues, including policy/program scaling-up and modification and overall budget allocation. Following such an evidence-based approach in the review and reform processes of Ghana's food security and nutrition strategies and policies will also contribute to rigorously identifying and understanding the possible drivers of achieving future food security and nutrition targets.

APPENDIX A: DEFINING FOOD AND NUTRITION SECURITY AND RELATED CONCEPTS

Food and nutrition security: "Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life" (FAO 2012, para. 33). Whereas the definition of *food security* embodies key determinants of good nutrition, the term *food security and nutrition* is used to combine the concepts of food security and nutrition and to acknowledge the importance of key nutrition concerns, such as care and feeding practices and public health and sanitation issues (FAO 2012).

Food security: "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996, para. 1). "The four pillars of food security are availability, access, utilization and stability" (FAO 2009, fn. 1).

Nutrition: "Nutrition is the consequence of the intake of food and the utilization of nutrients by the body. Good nutrition produces a healthy physical and physiological condition. It is secured when food intake, absorption and utilization provide all essential nutrients in required amounts. Poor nutrition produces an unhealthy physiological condition and is caused by lack of physical, economic, social or physiological access to the right amounts of dietary energy and nutrients. Consequences of poor nutrition can be impaired physical and mental development, reduced immunity, increased susceptibility to disease, decreased ability to do work and reduced productivity. Since parasites, poor hygiene and diseases can compromise a person's ability to absorb and biologically utilize the nutrients consumed, a safe food supply, clean drinking water, a sanitary environment, adequate health, education and care are essential for good nutrition, along with a balanced diet. Optimal nutrition supports development to obtain each individual's full genetic potential" (FAO 2012, 9).

***Malnutrition*:** Malnutrition is a chronic condition caused by under- or overconsumption of any or several essential macro- or micronutrients or by adverse health conditions affecting nutrient absorption or storage in the human body. There are four forms of malnutrition: (1) protein-energy undernutrition (caused by dietary deficiencies in carbohydrates and/or proteins), (2) micronutrient malnutrition (caused by dietary mineral and vitamin deficiencies), (3) overnutrition (mostly resulting from overconsumption of carbohydrates), and (4) secondary malnutrition (under- or overnutrition primarily caused by illness or disease) (Mayer 1976).

Hunger: Hunger is a feeling of weakness or discomfort caused by lack of food or the desire to eat. The main reason for chronic hunger is prolonged shortage of staple foods, which are rich sources of carbohydrates that provide dietary energy, measured in calories (or joules). Hunger is not synonymous with protein-energy undernutrition, but they are sometimes used as such in the nonexpert community (FAO 2012).[8]

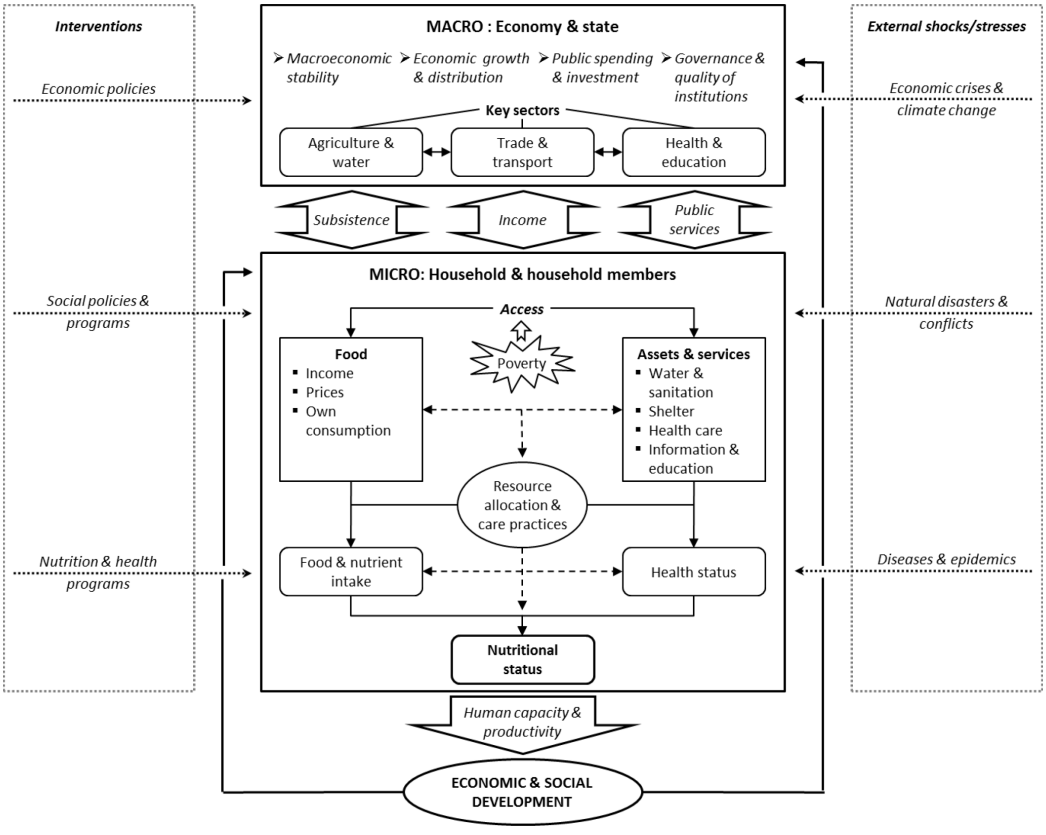
Balanced diet: "A balanced diet is a diet that provides energy and all essential nutrients for growth and a healthy and active life. Since few foods contain all the nutrients required to permit the normal growth, maintenance and functioning of the human body, a variety of food is needed to cover a person's macro- and micronutrient needs. Any combination of foods that provides the correct amount of dietary energy and all essential nutrients in optimal amounts and proportions is a balanced diet" (FAO 2012, 10).
Poverty: "Poverty is pronounced deprivation in well-being. … It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity" (World Bank 2012, adapted from Haughton and Khandker 2009).

[8] When micronutrient malnutrition occurs in individuals who are of a normal weight or who are overweight or obese, it is sometimes referred to as *hidden hunger*. Lack of essential minerals and vitamins often has no visible warning signs, leaving sufferers unaware of their dietary deficiency and its potentially adverse impact on their health.

APPENDIX B: CONCEPTUAL FRAMEWORK: THE FOOD AND NUTRITION SECURITY SYSTEM[9]

Figure A.1 shows the conceptual framework of the food and nutrition security (FNS) system. The framework follows the definitions presented in Appendix I and integrates them into a systems-based approach. The framework adopts a country perspective and looks at factors of FNS at different levels. The framework builds on the well-known UNICEF framework on the "causes of malnutrition and death in children and women" (UNICEF 1990) and extends it to include additional factors of FNS. Specifically, it incorporates (1) the macro dimension of FNS and (2) the FNS system's responsiveness to external shocks and stresses, including global economic crises, natural disasters, conflict, and climate change, on the one hand, and protecting and mitigating interventions in the form of policies and programs, on the other hand. The framework distinguishes between the macro dimension and the micro dimension of FNS.

Figure A.1 The food and nutrition security system



Source: Ecker and Breisinger (2012).

[9] This section is derived from Ecker and Breisinger (2012).

Macro dimension: The macro dimension comprises FNS issues at the national level and the supranational level. Governments have focused on achieving food security by concentrating on issues on the supply side of the food equation—in particular, on their country's ability to provide enough food to meet the needs and demands of their population either through domestic production or food imports (Pinstrup-Andersen 2009). The macro dimension of FNS, however, goes beyond issues of agricultural production and international trade: Outputs in nonfood sectors and macro and nonagricultural economic policies greatly influence food supply because of strong linkages between the agriculture sector and the rest of the economy (Timmer 2000, 2005). Crucial factors for FNS at the macro level include macroeconomic stability, economic growth and its distribution, public spending, and governance and quality of institutions. Thus, key economic sectors for achieving FNS include agriculture (including fishery), water, and trade and transport. In addition, the public services of the social sectors—primarily, health and education—are critical for achieving nutrition security, especially for the prevention and treatment of malnutrition.

Micro dimension: The micro dimension relates to issues of FNS at the household and individual levels. Household FNS refers to the ability of a household to produce and/or purchase the food needed by all household members to meet their dietary requirements and food preferences, as well as the assets and services necessary to achieve and maintain an optimal nutritional status. The nutritional status of all members of a household is subject both to the household's economic and physical access to food and to basic household assets and public services that affect individual health conditions. In most cases, limited access to food and high-quality health services is due to limited financial resources, which perpetuates the vicious cycle of poverty, malnutrition, and illness. A major determinant of food access is, hence, household real income and, in subsistence farm households, the assets necessary to produce enough food for own consumption. Poverty does not only limit access to sufficient quantity and quality of food; it also increases vulnerability to food price spikes and other shocks and stresses. This increases the volatility of nutrient supply (Barrett 2002). High food prices force the poor to adjust their dietary choice or budget allocation to other basic goods and services that might translate into a deterioration of nutrition among the

most vulnerable household members. Young children's nutritional statuses tend to be the most affected by deteriorating living conditions and particularly vulnerable to food shortages and diseases, due to their high physiological nutrient requirements for growth, special dietary needs, often more direct exposure to adverse health conditions, and dependency on adults (ACC/SCN 2000; Walker et al. 2007). Also, pregnant women are at an elevated risk of malnutrition due to their amplified nutrient requirements for reproduction.

Individual food access and adequate food and nutrient intake is contingent upon intrahousehold food distribution and the care given to meet individual dietary needs, both of which, in turn, depend on a set of characteristics of the household decision maker and the person responsible for meal preparation and child feeding (Ruel and Menon 2002; Smith et al. 2003; Thomas 1990). Formal education and nutritional knowledge of parents, especially mothers (Behrman and Wolfe 1984; Glewwe 1999; Semba et al. 2008), and gender equality in decision making on household resource allocation (Behrman and Deolalikar 1990; Kennedy and Peters 1992; Thomas 1994) are crucial factors affecting the nutritional status of young children. Children's nutritional statuses are also directly determined by the mother's nutritional and health status through the physiological and social mother-child relationship. Since mothers are also typically entrusted to feed their children and to prepare meals for other household members, the physical, mental, educational, and social status of women and girls is most critical for the nutrition situation in families and populations and, therefore, for the development potential of societies (Smith et al. 2003).

Finally, a person's nutritional status is determined by her or his individual health status (and vice versa), influencing physiological nutrient requirements and interacting with the use of nutrients from food. For example, parasitic and diarrheal diseases cause nutrient losses through blood and stool and reduce nutrient absorption, necessitating higher nutrient intake and thus more food to cover the losses, if such compensation is possible at all (Katona and Katona-Apte 2008; Stephenson, Latham, and Ottesen 2000). At the same time, poor nutrition weakens the human immune system and therefore increases the risk of disease and illness (Black, Morris, and Bryce 2003). Thus, access to clean drinking water, hygienic sanitation, proper shelter, basic healthcare for disease and illness treatment and prevention (including

immunization), and related information and education campaigns all determine people's nutritional status indirectly through their link with health (Fay et al. 2005; Frongillo, de Onis, and Hanson 1997; Smith, Ruel, and Ndiaye 2005).

Development effects of (mal)nutrition: Good nutrition is fundamental for individuals to realize both their physical and intellectual potential. It is the basis for individual and family well-being and human capital formation; as such, it is key to economic and social development (Horton et al. 2010; Victoria et al. 2008). Malnutrition has serious consequences at the micro and macro levels in the current generation and, even more so, for future generations. At the micro level, undernutrition reduces an individual's income generation potential; lowers children's schooling performances; increases the risk of disability, morbidity, and mortality; and thus contributes to the intergenerational transmission of poverty and illness (Black et al. 2008; Grantham-McGregor et al. 2007). At the macro level, malnutrition slows economic growth and deepens poverty through three main routes: (1) direct losses in productivity from poor physical and mental performance (or death) of the workforce, (2) indirect losses from reduced working and cognitive capacity of the working population at present and in the future, and (3) losses in resources due to increased healthcare costs (World Bank 2006).

External shocks/stresses and interventions: The FNS system can be compromised by various external shocks and stresses at the macro and micro level. Examples of major macroeconomic shocks in recent years include the global food price spikes in 2008 and 2010/2011. Examples of shocks at the micro level include civil conflicts and natural disasters, such as floods and droughts, which are often localized and therefore affect only parts of the population directly through loss of household assets and food access, among others. Examples of external shocks that directly impair individual health are diseases and epidemics, which can also have serious consequences for the nutrition of other household members, particularly if the main income earner or care taker is affected. Tools of governments and development agencies to respond to external shocks and stresses—and, more broadly, to improve FNS—comprise economic policies, social policies and programs, and targeted nutrition and health programs.

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