The Status of Food Security and Vulnerability in Egypt, 2009

December 2011

ACKNOWLEDGEMENTS

The Status of Food Security and Vulnerability in Egypt for 2009 is Part I of the food security and vulnerability assessment reports for Egypt. It draws on household data collected for the national Household Income, Expenditure and Consumption Survey (HIECS) for Egypt during 2009 that was produced by the Central Agency for Public Mobilization and Statistics (CAPMAS), and presents for the first time an assessment of the prevalence of food insecurity in Egypt, across all governorates.

The World Food Programme (WFP) and CAPMAS entered into a partnership agreement in 2010, and included additional questions on food security and nutrition as part of 2011 HIECS. Using data from HIECS 2011, Part II of the food security and vulnerability reports for Egypt is expected by end of 2012.

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ACRONYMS

CAPMAS	Central Agency for Public Mobilization and Statistics
CBE	Central Bank of Egypt
CPI	Consumer Price Index
DEC	Dietary Energy Consumption
DDS	Dietary Diversity Score
DHS	Demographic and Health Survey
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
GoE	Government of Egypt
HH	Household
HIECS	Household Income, Expenditure and Consumption Survey
IMF	International Monetary Fund
MDER	Minimum Dietary Energy Requirement
MDGs	Millennium Development Goals
SSR	Self Sufficiency Ratio
UNU	United Nations University
WFP	World Food Programme
WFS	World Food Summit
WHO	World Health Organization

EXECUTIVE SUMMARY

This report is produced by the World Food Programme (WFP) in Egypt, in partnership with the Central Agency for Public Mobilization and Statistics (CAPMAS), and it represents Part I of the *Food Security and Vulnerability Assessment Report for Egypt*. The objectives of the study were to: a) define food-insecure or vulnerable individuals in Egypt; b) identify how many are vulnerable or food-insecure; c) identify where they live; and d) identify the underlying causes and repercussions of food insecurity and vulnerability. The main sources of data for the study were the Household Income, Expenditure and Consumption Survey (HIECS 2009); and the Demographic and Health Survey for Egypt (DHS 2008).

The report is divided into six chapters. Chapter One provides a contextual introduction to the study, including an introduction to the Food and Nutrition Security Conceptual Framework. Chapter Two provides a brief overview of food availability at the macro-level, including domestic production of essential foods, self sufficiency ratios and the ability to sustain food imports. It demonstrates that Egypt is highly dependent on imported foods, particularly food commodities that feature heavily in the regular diets of the poor (wheat, cereals, vegetable oil and sugar), and the availability of imported food is highly sensitive to external shocks in the balance of payments. Moreover, Egypt's potentials for expanding domestic food production are constrained by a variety of economic, social, and environmental factors. Food availability in Egypt is seen as vulnerable mainly to international food price shocks on the one hand and shocks to balance of payments on the other. The focus on securing foreign inflows while increasing net domestic production is currently needed, especially with the recent deterioration in balance of payments since January 2011 and the drop in net foreign reserves.

Chapter Three provides an analysis of household access to food by focusing on the quantity and diversity of household food consumption. The quantitative sufficiency of food intake is indicated by caloric intake as compared to the recommended intake for the household. Estimates of daily per capita caloric intake show that the national average for Egypt (2,783 calories) is close to the global average in 2009 (2,800 calories), however, disparities exist between governorates and, as expected, the average per capita caloric intake in most of the governorates in Upper Egypt is actually below the national average. Dietary diversity is examined using the number of consumed items within each food group. Food consumption data derived from HIECS indicates that seventeen million persons or one-fifth of Egyptians suffer caloric deprivation i.e. they receive less than 80 percent of their required caloric intake. The prevalence of caloric deprivation (the proportion of people whose dietary energy consumption falls below the minimum energy requirement) was 20.4 percent of the total population. Disparities in caloric deprivation between governorates and regions, and between urban and rural areas are large. Generally, governorates in Upper Egypt have higher rates of caloric deprivation compared to other regions, and according to most of the deprivation indices, Upper Rural Egypt is the most deprived region. Also, within each governorate the prevalence of caloric deprivation is higher in its rural areas compared to its urban counterparts. Caloric deprivation is highly correlated with monetary and non-monetary poverty. Nine persons out of 10 multi-dimensional poor are food-deprived and half of the income-poor are also deprived from their minimum caloric needs. The education level of the household head is negatively correlated with caloric deprivation but to a lesser extent. Moreover, one household out of every four households whose head is in casual employment is likely to experience caloric deprivation. Households that have multiple income sources are less likely to experience caloric deprivation compared to those with a single source (19.9 percent as opposed to 23.6 percent, respectively). However, households that have sufficient access to their caloric needs do not necessarily have access to a nutritious and balanced dietary intake. The data shows that there are significant differences in mean dietary diversity score among governorates and between urban and rural areas within each governorate.

Both the income poor and the multidimensional poor suffer from poor dietary diversity, and low income levels are not the only correlate to poor dietary intake. Lack of awareness of what constitutes an appropriate and nourishing diet is also an important factor affecting dietary balance at the

household level. Generally, governorates in Upper Egypt have a higher prevalence of poor dietary diversity compared to other regions, and as reflected by most of deprivation indices, Rural Upper Egypt is the most deprived region.

An overall assessment of household access to food is provided using a) an overlay analysis technique; and b) cross tabulation of data on caloric deprivation, poor dietary diversity and income poverty. The cross tabulation results show that 16.3 percent of the total population demonstrates poor food consumption and at the same time suffer income poverty (mainly in Upper Egypt, Beheira and Menoufia), while 26.1 percent are non-income poor demonstrating poor food consumption. Those that are income poor but have adequate food consumption represent a mere 5.3 percent of the population while 52.3 percent of the population are neither poor nor suffering poor food consumption. Upper Egypt, Beheira and Menoufia require programs that focus on income generation, sufficient food intake and nutritional awareness, while the focus in Frontier governorates and the rest of Lower Egypt should be on nutritional awareness programs. The study indicates that economic access to food continues to be the most significant food security concern complicated by food price increases and a drastic reduction of livelihoods.

Chapter Four provides a brief review of malnutrition indicators for children (under-five years of age) and youth (10 to 19 years f age) in 2008, and compares the results to the status of food security in all regions. A malnutrition index for under-fives is developed that combines the indicators of severe stunting, wasting and underweight, while a second index for malnutrition among youth is developed combining the indicators of underweight and overweight. Malnutrition indicators for children (under-five years of age) and youth show that the most pressing and prevalent form of malnutrition among children in Egypt is severe stunting (14 percent) while overweight is the most prevalent form of malnutrition among youth (17.2 percent). The incidence of both chronic and short-term malnutrition among Egyptian children under the age of 5 has increased over time. The prevalence of malnutrition for children below five years of age across governorates and regions suggests that the nutritional status of children in Egypt is not directly related to food access indicators and it is not significantly related to the socioeconomic characteristics of the household and is possibly explained by other factors, such as the availability of health services, clean water and sanitation. The results do not conform to common knowledge of regions/districts in Egypt and show that Upper Egyptian governorates performed better than urban governorates and Lower Egypt. The governorates demonstrating the worst utilization of food are located in Lower Egypt. The utilization of food amongst children (under-five years of age) is not significantly correlated to the economic status of the household, or to educational level of mothers. There is no significant difference in food utilization between under-fives in urban areas compared to those in rural areas, however, male children are more likely to suffer from stunting than female children. Further in-depth investigation of the prevalence and causes of malnutrition among children is still needed as EDHS 2008 did not empirically explain causal factors of malnutrition among children. Malnutrition among youth appears more related to the socioeconomic characteristics of the household and is more consistent with food access indicators. While malnutrition levels are for the most part equivalent, female youth are more likely to suffer from the risks of overweight and obesity than male youth; youth in the wealthiest quintile are most likely to suffer from obesity; and the percent of overweight and obese youth increased in proportion to the educational level of the mother. Marked discrepancies are observed in the nutritional status of youth between governorates.

One of the most significant threats to household access to food is persistent inflation in domestic prices of food. Chapter Five provides a vulnerability analysis that initially reviews income and multi-dimensional poverty, as they are both likely to affect the vulnerability of households to food insecurity. This is followed by in-depth analysis of the probability/risk of being food insecure using two approaches. The first approach studies the probability of suffering caloric deprivation and this is expressed as a function of various household characteristics using logistic regression. The results are used to show the percent of population at risk of caloric deprivation. The second approach studies the relationship among variables that are believed to be strongly correlated to food insecurity using principal component analysis, and uses the estimated weights for each variable to calculate the vulnerability score for all households. The scores

are then distributed into quintiles and households are classified according to their scores into “very high”, “high”, “medium”, “low” or “very low” vulnerability classes. The vulnerability index for 2009 shows that households facing “very high” levels of vulnerability to food insecurity make up 20 percent of the population. Governorates in Upper Egypt have the greatest risk to higher food insecurity and Assiut has an alarming level of vulnerability, since 59 percent of the population living in Assiut are classified among the “highest vulnerability” category. Also, the estimated probability of caloric deficiency across governorates indicates that 9.4 percent of the total population are at high risk of becoming caloric deficient, 28.1 percent are at moderate risk, while 62.5 percent are at low risk; and rural residents have a greater risk of becoming caloric deficient (10.5 percent are at high risk and 30.6 percent are at moderate risk) than urban residents (7.8 percent are at high risk and 24.5 percent are at moderate risk). HIECS 2009 data reveals that vulnerability to food insecurity is associated with harmful coping strategies such as child labour and low school enrolment.

Chapter Six provides a summary of the main conclusions, and recommendations. The recommendations include revisiting the targeting of food insecure and vulnerable populations based on a careful assessment of the attributes and determinants of food insecurity across all regions. Given the cumulative deterioration in key sources of foreign exchange since February 2011, food availability in Egypt is a point of concern. Accordingly, the focus on securing foreign inflows while increasing net domestic production is required.

Upper Egypt, Beheira and Menoufia require programs that focus on income generation, sufficient food intake and nutritional awareness, while the focus in Frontier governorates and the rest of Lower Egypt should be on nutritional awareness programs. Since malnutrition is an area of main concern in Egypt that deserves wider attention and further analysis, the report recommends a more in-depth investigation to explore and explain the higher prevalence of child malnutrition in Lower Egypt, as well as the sudden structural change in prevalence rates between 2005 and 2008. Furthermore, since price stabilization of essential food items is vital for the poor, an in-depth study of market structure, market integration and the price chain of essential foods are both required and highly recommended. Finally, growing recognition that reducing vulnerability means increasing access to productive and decent employment supports the recommendation that policies aiming at reducing risks to food insecurity should be concerned about creating more stable and sustainable jobs, and providing social assistance to those who are unable to work.

CHAPTER ONE:
INTRODUCTION AND BACKGROUND

Key Messages:

- Inflation in Egypt has remained at double digit levels since 2008.
- The Egyptian economy is highly vulnerable to any global food price shocks.
- The GoE has implemented several measures to reduce the adverse impact of price increases on the living standards of the population in general and the poor in particular.
- The Food subsidy system is a part of a broader consumer welfare program subsidizing transport, housing, and energy.

1 INTRODUCTION

1.1 BACKGROUND: WHAT IS FOOD SECURITY?

Reflecting a growing realization of the importance of nutrition to health, and health to economic growth, the United Nations Food and Agriculture Organization (FAO) organized the World Food Summit (WFS) in Rome in 1996. One of the key documents resulting from the WFS is the Rome Declaration on World Food Security, which set the goals of reducing the number of chronically undernourished people in the world by half by the year 2015; achieving food security for all; and supporting "an on-going effort to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015" (FAO, 1996). Four years later in 2000, The Millennium Summit integrated hunger and poverty reduction into the first of the Millennium Development Goals (MDGs). Recently, the United Nations Development Assistance Framework (UNDAF) for 2013-2017 in Egypt has acknowledged the food security and nutrition problems as a priority area that requires direct intervention.

Food Security

When all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life

Over the years, national governments and multilateral development organizations have come to recognize that beyond hunger and famine, there is the more complex concept of Food Security, which is defined as existing: "When all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life." [1]

There is no single measure to analyse the level of food security of a population, a community or an individual. Food security is determined by a range of interrelated agro-environmental, socio-economic and biological factors, all of which must be addressed to ascertain whether or not food security exists. Food Insecurity, on the other hand, is defined as existing:

> *"When people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development, and an active and healthy life. Food insecurity may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level."*[2]

Identifying how many people are food-insecure, how many are vulnerable to the risk of food insecurity, where they live, their socio-economic profiles and the main risks they face are all fundamental factors required for the design of an effective national food security strategy. Accordingly, the World Food Programme (WFP) in Egypt has embarked on this study, which represents Part I of the *Food Security and Vulnerability Assessment Report for Egypt*. The objectives of this study are to: a) define food-insecure and vulnerable individuals in Egypt; b) identify how many are vulnerable and food-insecure; c) identify where they live; and d) identify the underlying causes and repercussions of food insecurity and vulnerability.

Main Pillars of Food Security Analysis

Food Availability: The food that is physically present in the area of study, encompassing all forms of domestic production, commercial imports and food aid. This may be aggregated at the regional, national, district or community level.

Food Access: A household's ability to regularly acquire adequate amounts of food, through a combination of its own home production and stocks, purchases, barter, gifts, borrowing or food subsidies.

Food Utilization: A household's use of the food to which it has access, and an individual's ability to absorb and metabolize the nutrients, i.e. the conversion efficiency of the body.

[1] Glossary of Monitoring and Evaluation Terms, United Nations World Food Programme, Office of Evaluation & Monitoring, p.9. http://documents.wfp.org/stellent/groups/public/documents/ko/mekb_glossary.pdf

[2] Ibid.

The report is divided into six chapters. The first chapter represents the introduction to the study and the report. The second chapter provides a brief overview of food availability at the macro-level, including domestic production of essential food items, self sufficiency ratios and the ability to sustain food imports. The third chapter provides an analysis of household access to food by focusing on the quantity and diversity of household food consumption. The quantitative sufficiency of food intake is indicated by caloric intake as compared to the recommended intake for the household. Dietary diversity is examined using the number of consumed items within each food group, and finally, an overall assessment of the food security situation is provided through an overlay analysis technique and cross tabulation of data on caloric deprivation, poor dietary diversity and income poverty. Furthermore, the impact of increases in food prices on different income groups is addressed by examining the changes in prices of the different commodity baskets consumed by each group.

The fourth chapter of the report provides a brief review of malnutrition indicators for children (under-five years of age) and youth (10 to 19 years of age) in 2008, and compares the results to the status of food security in all regions. A malnutrition index for under-fives is developed that combines the indicators of stunting, wasting and underweight, while a second index for malnutrition among youth is developed combining the indicators of underweight and overweight. The fifth chapter provides a vulnerability analysis that initially reviews income and multi-dimensional poverty, as they are both likely to affect the vulnerability of households to food insecurity. This is followed by in-depth analysis of the risk of being food insecure using two approaches. The first approach studies the probability of suffering caloric deprivation and this is expressed as a function of various household characteristics using logistic regression. The results are used to show the percent of population at risk of caloric deprivation. The second approach studies the relationship among variables that are believed to be strongly correlated to food insecurity using principal component analysis, and uses the estimated weights for each variable to calculate the vulnerability score for all households. The scores are then distributed into quintiles and households are classified according to their scores into "very high", "high", "medium", "low" or "very low" vulnerability classes. The sixth and final chapter provides concluding remarks and a summary of the main findings of the report.

1.2 SOURCES OF DATA

This study mainly relies on two types of nationally representative surveys: the Household Income, Expenditure and Consumption Survey (HIECS 2009); and the Demographic and Health Survey for Egypt (EDHS 2008), which are implemented by the Central Agency for Public Mobilization and Statistics (CAPMAS) and by El-Zanaty and Associates on behalf of the Ministry of Health, respectively.

HIECS 2009 follows a multi-stage stratified cluster sampling technique, covering 46.8 thousand households (nearly 220 thousand individuals) across all governorates over a twelve month period, from April 2008 to March 2009. The sample is divided proportional to size between urban areas (47.2 percent) and rural areas (52.8 percent), distributed among 2,526 area segments. The survey includes three main questionnaires; on consumption and expenditure and on income, in addition to diary questions for consumption and expenditure that show actual household consumption and expenditure during the reference period (last 15 days).

EDHS 2008 also follows a multi-stage stratified cluster sampling technique covering 18.9 thousand households and it involves three main questionnaires: household questionnaire, ever-married woman questionnaire and a health issues questionnaire. The survey also includes biomarkers, including anthropometric measurements.

1.3 THE FOOD AND NUTRITION SECURITY CONCEPTUAL FRAMEWORK

The Food and Nutrition Security Conceptual Framework considers three distinct, but also highly interrelated dimensions: a) food availability; b) food access; and c) food utilization as core elements of food security, and links them to household asset endowments, livelihood strategies, and the political, social, institutional, and economic environments. While the Food and Nutrition Security Conceptual

Framework considers malnutrition and mortality to be the final outcome or manifestation of insufficient food intake and/or disease at the individual level, this study builds its analysis mainly on data from the national "Household Income, Expenditure and Consumption Survey" (HIECS) for 2009 which lacks any direct reference to nutrition indicators. Therefore, in this study we focus on food deprivation at the household level, in addition to a brief review of nutrition indicators for children (under 5) and youth (10-19 years) developed by another separate survey "Egypt Demographic and Health Survey" (EDHS) for 2008.

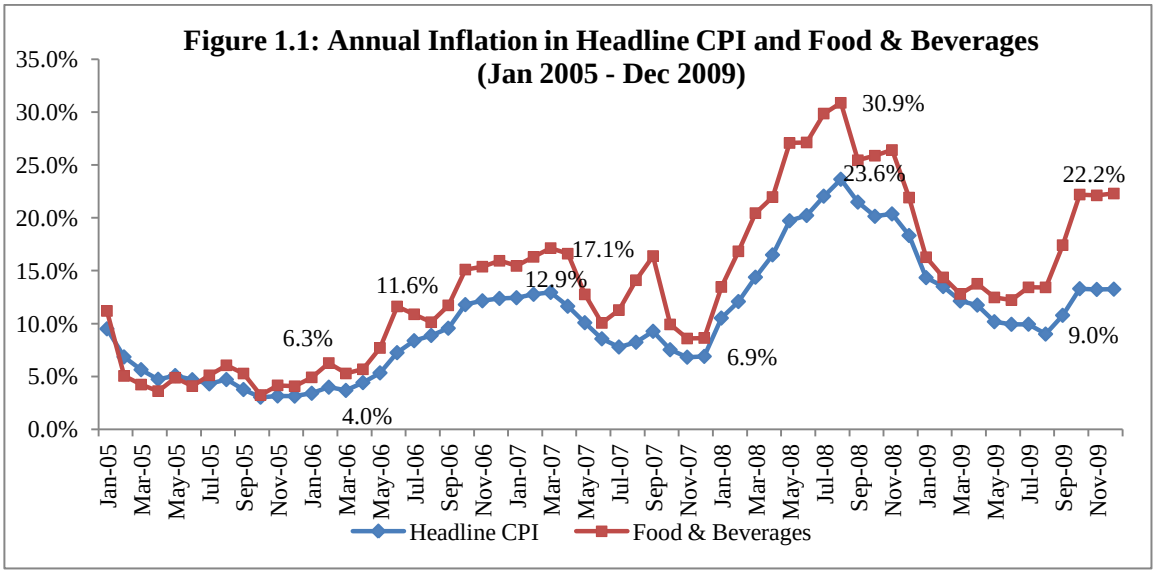
1.4 EGYPT'S MACROECONOMIC CONTEXT

The macroeconomic context in Egypt has both direct and indirect impacts on the status of food security in Egypt. In 2005 Egypt began actively implementing a macroeconomic structural reform program designed to move Egypt towards a more market-oriented economy. The reforms have targeted fiscal/monetary policies, privatization and new business legislation, improved management of the exchange rate, reductions in the fiscal deficit and public debt, the enhancement of public financial management, improvements to the investment climate and trade reforms to enhance economic competitiveness (ENCC, 2009).

Inflation has remained at double digit levels since 2008.

At the macro-level, the economy achieved high levels of real GDP growth during 2005-2008 that was accompanied by increasing investment inflows, improving balance of payments, a decline in fiscal deficit to GDP and domestic debt ratios and stability in foreign exchange market, however little change has trickled down to lower income groups, poverty rates remained high and persistent inflation in consumer prices continued to threaten the real purchasing power of the lowest income deciles.

In spite of the economic growth achieved, little structural change was felt, and inflation in food prices became a point of major concern. The Central Bank of Egypt (CBE) followed a tighter monetary policy and announced price stability as the principal target of the monetary policy in Egypt; nevertheless, ***inflation has remained at double digit levels since 2008.*** CPI inflation for urban areas reached a peak of 23.6 percent in August 2008, driven by inflation in the food and beverages index, which recorded 30.9 percent during the same month. Although prices started to decelerate afterwards for almost one year, inflation started picking up again in September 2009, but this time from a higher base value than that in 2008. Food prices, the main driver of domestic inflation in consumer prices, widely fluctuated, and for some food groups like vegetables' inflation recorded 88 percent. Figure 1.1 below demonstrates the fluctuations in Egypt's Consumer Price Index and Food Price Index during the period from January 2005 to December 2009. The figures also reflect the rigidity in domestic prices that never returned back to their base values and thus, every inflationary wave had a compounded impact on consumers. It should be noted that although food subsidies are a significant component of the Poor's dietary intake, households in Egypt (even in rural areas) are net food buyers, and consumption of home-grown food represents only 9 percent of total food consumption (1.9 percent in urban areas and 17 percent in rural areas). Therefore, households are highly sensitive to inflation in food prices.



Source: Calculated using monthly price indices from Central Agency of Public Mobilization and Statistics in Egypt (CAPMAS).

The Egyptian Economy is highly vulnerable to global food price shocks.

The impact of fluctuations in world food prices on inflation and the cost of living in Egypt is strong. The country is a net food importer and relies heavily on costly consumer food subsidies.[3] According to International Monetary Fund (IMF) estimates, changes in world commodity prices account for approximately 43 percent of the variation in headline inflation in Egypt, with world food prices playing a much larger role at 39.8 percent than fuel prices at 3.3 percent (IMF 2009b). Accordingly, ***the Egyptian economy is highly vulnerable to global food price shocks***.

Egypt has been hit by such shocks twice in the last 5-year period. The global food and fuel crises of 2007–2008 led to a spike in inflation rates, deterioration in current account balances, and increases in government deficits. The global financial crisis affected macroeconomic performance through a decline in direct foreign investment (after several years of steady and steep growth) as well as revenues from the Suez Canal, tourism, and remittances (which represent the country's second biggest source of foreign revenue after tourism, accounting for almost 6 percent of GDP in 2007). Growth rates in other economic sectors were also significantly reduced. ***The GoE has implemented several measures to reduce the adverse impact of price increases on the living standards of the population in general and the poor in particular*** (see Box 1.1. below). Many of these measures are related to improvements to the existing food subsidy system.

The Food subsidy system is a part of a broader consumer welfare program subsidizing transport, housing, and energy. By providing citizens with their minimum level of food requirements at subsidized prices, the GoE aims to protect them from malnutrition and help them cope with individual and household food insecurity. There are two Food Subsidy programs: 1) subsidised baladi bread, which is the largest component of food subsidies, is available to all Egyptians; and 2) ration cards, which cover over two-thirds of Egyptians and provide fixed monthly quotas of cooking oil, sugar, rice and tea to households holding these cards.

[3] "Egypt is the world's largest wheat importer with an estimated import requirement of 10 million tonnes for the current 2010/11 marketing year, and a total cereal import requirement of 15.6 million tonnes" FAO/GIEWS Global Watch, 11 March 2011 North Africa Brief, p2 http://www.fao.org/giews/english/shortnews/nafria110311.pdf

The fiscal cost of food subsidies reached about 2 percent of GDP in 2008/09 (LE 21.1 billion, or US$ 3.8 billion) after stabilizing at around 0.9 percent of GDP between fiscal years 1996/97 and 2000/01. The rising cost of food subsidies can be explained by increased international commodity prices, exchange rate depreciation, increased numbers and/or quantities of subsidized food items, and expanding coverage of ration cards. Unfortunately, in the absence of well-designed targeted programmes, a significant amount of the recently increased resources are still leaked, and a significant number of the poor remain unreached.

Food prices continue to remain a challenge to overall food security in Egypt in 2011. Events challenging the status of food security in Egypt include not only the ongoing socio-economic impacts of the 25th January Revolution in Egypt, but also the repercussions of the Libyan Revolution. According to FAO/GIEWS Global Watch, 11 March 2011 North Africa Brief, "The large influx of people from Libyan Arab Jamahiriya [to Egypt] since 19 February 2011, currently estimated at 90306, has increased the need for food, and other emergency supplies." The report also highlights the potential impacts of spiking food product prices (particularly wheat and rice) on the cost of the GoE's food subsidy program, and the impact on rising inflation.

Box 1.1 GoE Responses to the Food Crisis

GoE measures to deal with the food crisis:

- **Fiscal measures** include raising the level of subsidies allocated for food items from L.E. 12 billion to LE 21.4 billion (ration card subsidies were increased from L.E. 4.2 billion to L.E. 5.4 billion; while the baladi bread subsidy jumped from L.E. 7.8 billion to L.E. 16 billion);
- **Administrative measures** have been instituted to separate the bread production and distribution processes;
- **Trade policy measures** were introduced; and
- **Targeting mechanisms** have been revised and households are now allowed to apply for new ration cards.

Since 2005, there have been changes in the eligibility criteria, the number and prices of ration card food items, and the production and distribution of baladi bread. But, the system is still costly, accounting for almost 2 percent of GDP and suffering from large leakages.

CHAPTER TWO:
THE MACRO AVAILABILITY OF FOOD IN EGYPT

Key Messages:

- Despite the fact that Egypt is generally vulnerable to shocks in the balance of payments, it actually became less vulnerable in the period from 2000 to 2007.
- Egypt is highly dependent on imported foods, particularly food commodities that feature heavily in the regular diets of the poor (wheat, cereals, vegetable oil and sugar).
- There is no significant variation in Egypt's SSR in the period between 2000 and 2007
- The focus on securing foreign inflows while increasing net domestic production is currently needed, especially with the recent deterioration in balance of payments since January 2011 and the drop in net foreign reserves.

2 THE MACRO AVAILABILITY OF FOOD IN EGYPT

From a macroeconomic perspective, the availability of food mainly depends on domestic production of food and the ability of a country to finance its food imports. Analysis of food availability is especially important for countries like Egypt that are highly dependent on food imports. In that respect, it is important to note that secure availability of food is conceptually different from self-sufficiency in food production. A country that is highly dependent on food imports can be food secure if it exports enough goods and services to finance its food imports. Generally, the ability to finance food imports depends on a number of factors, including the balance of payments position, exports of goods and services, and sufficiency of foreign exchange reserves.

This section followed WFP food security analysis guidelines[4], and used several food availability related indicators to help assess the underlying risks to food availability in Egypt. These indicators include: the food trade balance (ratio of total exports to food imports); the agricultural potential; per capita food production; and self-sufficiency ratio.

2.1 FOOD IMPORTS AND DOMESTIC SUPPLIES

The ratio of total exports to total food imports is an indicator of a nation's ability to finance its food imports from its total export revenues. Some analysts argue that as long as the relation between exports (agricultural and non-agricultural) and food imports is within a certain range, (that is, the country exports enough to afford food imports) the country is then considered to have secure availability of food.[5]

Measuring the access to world food supply by an individual country is a more relevant indicator for food security analysis than the net food trade position (food exports minus food imports). The latter only provides information on whether a country is a net food importer or exporter, but does not reflect the relative cost of access to food for that country, and therefore, how vulnerable it may be to changes in food prices and international food availability. A country that is a net food exporter but whose total food bill takes a large percentage of total exports is likely to be more vulnerable than a country that is a substantial net food importer but whose food bill takes only a small percentage of its total exports.

The ratio of food import costs to total exports also presents a broader and more complete picture of the role of trade, and the potential impact of trade policies, on food security. Focusing exclusively on the costs of importing food (whether gross or net) does not take into account the broader contribution of trade to food security, which includes both the availability of food in world markets and the generation of the export revenue required to finance imports. A country whose food import bill increases may not be more vulnerable than in the past if its total exports have increased proportionately. Conversely, a country may become more vulnerable even as its food import bills are decreasing, if its export revenues have also decreased. Therefore, in the context of trade policies, the important issue is whether these policies encourage total exports to increase faster than food import costs.

Using the latest available food balance sheets for Egypt prepared by the Food and Agriculture Organization (FAO), we find that despite the fact that Egypt is highly vulnerable to shocks in the balance of payments, it actually became less vulnerable in the period from 2000 to 2007. Food availability, as measured by the trade indicator discussed above, was low in Egypt over the period from 2000 to 2007, classifying Egypt as highly dependent on food imports. Egypt is highly

[4] "Comprehensive Food Security and Vulnerability Analysis Guidelines", World Food Programme, January 2009
[5] Diaz Bonilla et al. 2002 and Yu et al., 2009

dependent on imported foods, particularly food commodities that feature heavily in the regular diets of the poor (wheat, cereals, vegetable oil and sugar). Table 2.1, below, provides data on Egyptian food imports versus food exports for the period from 2000 to 2007.

Table 2.1: Imports versus Domestic supplies

	2000	2001	2002	2003	2004	2005	2006	2007
Wheat	44.11	37.16	47.56	35.33	36.57	44.13	44.23	44.72
Cereals	36.99	35.05	37.91	30.30	25.21	36.87	34.87	36.81
Fruits	1.42	1.92	1.07	0.97	1.09	1.41	1.44	1.51
Oils	36.36	33.54	34.04	38.14	25.52	44.43	43.88	63.62
Pulses	34.92	43.58	48.26	47.73	53.23	61.76	66.52	56.00
Spices	12.03	12.57	14.16	12.27	19.12	20.32	28.25	20.29
Starchy Roots	3.52	1.80	2.69	3.19	1.00	2.33	2.67	2.58
Sugar & Sweeteners	20.29	26.76	22.27	17.48	15.64	27.92	20.16	21.04
Vegetable Oils	90.99	71.44	46.82	36.01	79.95	83.74	86.50	71.15
Vegetables	0.05	0.07	0.10	0.06	0.11	0.10	0.19	0.13

Source: FAO website database

With regards to locally produced agricultural crops, there are many challenges that currently limit the potentials for increasing crop production. These include land fragmentation and agricultural land being lost to urbanization. In "old lands", land fragmentation is the main problem that hinders cultivation of strategic staple crops such as wheat. For these small farms, cultivation has a subsistence nature, to satisfy the family's basic needs in cereals and fodder for the animals. Plot sizes are larger in 'new lands'. Large farms on these lands are more market-oriented and specialize in cash crops such as vegetables and fruits (as well as fodder crops and livestock), in great part for exports."[6]

There are also numerous environmental factors that entail risks to food production, including increasing desertification, increasing soil salinity (partially due to water logging which resulted from the construction of the High Dam in Aswan); limited and irregular supply of irrigation water; and reduced natural fresh water resources other than the Nile, which is the only perennial water source. Climate change impacts include decreases in the total fresh-water supply, which has a direct impact on availability of irrigation water, and rises in sea level (which in addition to increasing soil salinity, and increasing the salinity of groundwater used for agricultural irrigation has also led to the erosion of amount of arable land available). Finally, rising temperatures have had an increasing impact on the growth cycles of various crops, with cereal yields expected to decrease.

2.2 SELF-SUFFICIENCY FOR SELECTED FOOD ITEMS

Table 2.2, below, provides the Self-Sufficiency Ratio (SSR) for selected crops.[7] Results show that over the seven year period, food import costs were approximately 11.5 percent lower than export earnings, (international average), indicating that non-food expenditures are excessively high, leaving little room for food imports. Accordingly, the availability of imported food is highly sensitive to external shocks in the balance of payments. However, there has been a steady

[6] Agnès Dhur "Secondary data analysis of the food security situation in Egypt", World Food Programme, May 2011.

[7] The self-sufficiency ratio expresses the magnitude of production in relation to domestic utilization. It is defined as:

$$SSR = \frac{Production}{Production + imports - exports} \times 100$$

Food Balance Sheets: A Handbook, FAO, Rome 2001, http://www.fao.org/docrep/003/x9892e/x9892e00.htm

improvement in the ratio of food imports to export earnings between 2000 and 2007, indicating that Egypt's ability to finance its food imports improved over this period. At end of 2007, the self-sufficiency ratio in food production was estimated to reach 58 percent[8].

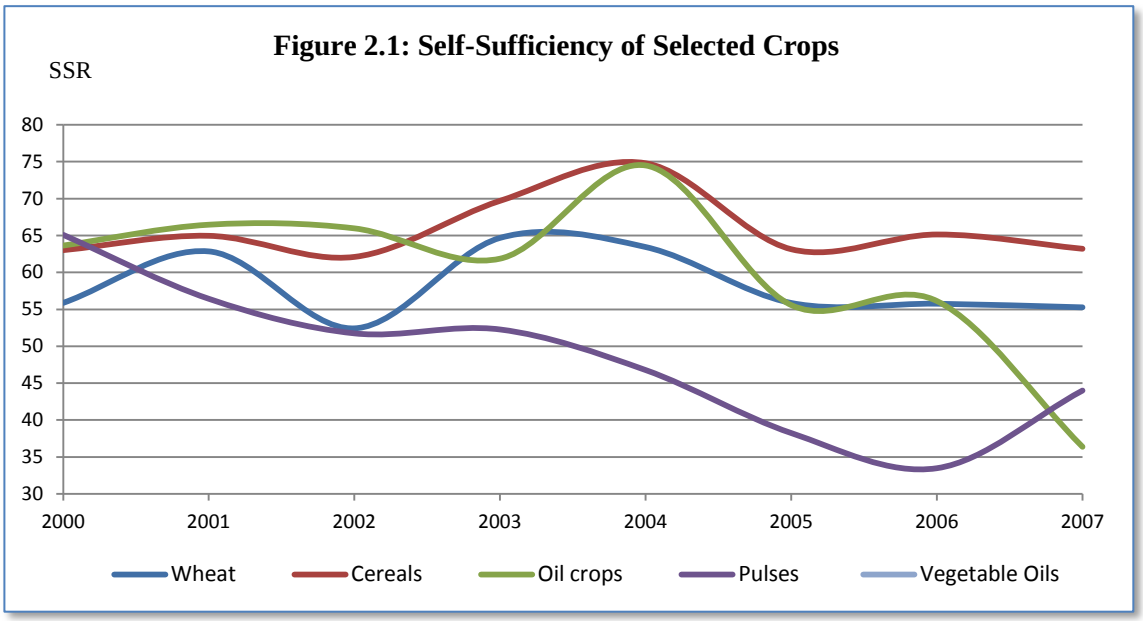
Table 2.2: Self Sufficiency Ratio for Selected Crops

	2000	2001	2002	2003	2004	2005	2006	2007
Wheat	58.67	52.23	56.37	59.49	60.00	62.08	62.70	55.73
Cereals	69.07	62.75	66.53	68.75	69.03	68.84	72.50	67.32
Fruits	100.72	102.90	102.00	103.38	105.06	105.10	104.07	105.04
Oils	69.70	70.97	64.88	59.56	75.34	59.02	59.14	48.26
Pulses	56.23	60.67	57.35	51.76	50.76	42.26	38.94	52.53
Spices	110.57	98.91	96.80	97.51	93.58	89.37	84.58	95.89
Starchy Roots	104.48	106.84	107.87	109.51	115.01	110.53	114.12	112.70
Sugar & Sweeteners	70.03	70.35	69.97	74.30	77.66	77.81	85.51	91.86
Sugar crops	100.02	100.02	100.02	100.02	100.02	100.00	100.00	100.01
Vegetable Oils	17.47	21.67	23.81	22.73	13.37	16.63	13.68	30.66
Vegetables	101.63	102.14	103.01	103.12	103.27	103.13	102.74	102.60

Source: FAO website database.

Figure 2.1, below, provides a graphic representation of the SSR of selected crops. Vegetable oil, followed by wheat, pulses, oil crops and other cereals are crops with the lowest self-sufficiency. The average share of imports in total domestic consumption of wheat in 2000 reached 44.11 percent, fluctuated between 2001 and 2004 and stabilized at a rate above 44 percent between 2005 and 2007. Egypt consumes over 14 million tons of wheat every year and grows nearly 7 million tons. This means Egypt imports at least 7 million tons per year (Baker and Maitra 2008). The country has one of the world's highest per capita wheat consumption rates, with an average of 196 kilograms in 2008 (FAPRI 2009).

Figure 2.1: Self-Sufficiency of Selected Crops



Source: FAO website database.

[8] Government of Egypt, FAO, WFP, World Bank, IFAD and NEPAD, "Increasing Productivity in the Agricultural Sector", Working Paper No. 3, Inter-Agency Assessment Mission (17 November – 4 December 2008).

Figures 2.2 and 2.3 below highlight the ratio of import to production between 2000 and 2007 for cereal and wheat, respectively.

Figure 2.2: Cereal Imports and Production

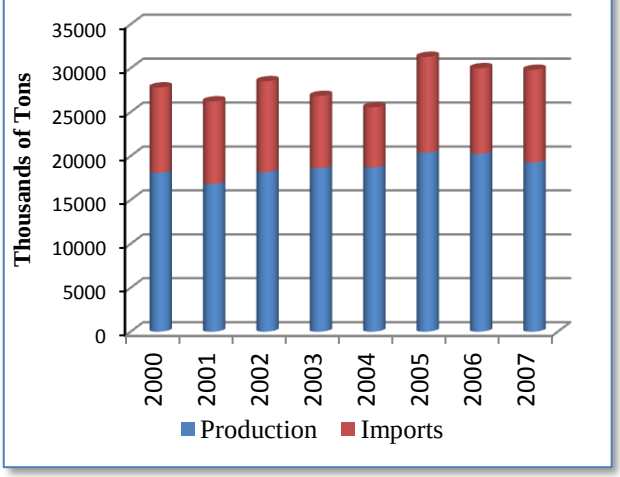
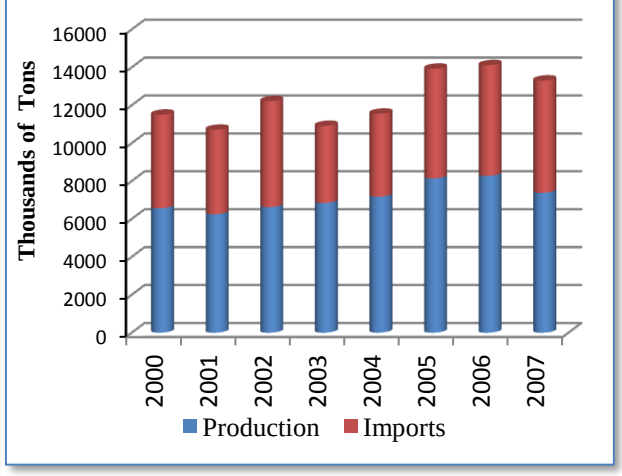


Figure 2.3: Wheat Imports and Production



Source: FAO website database.

There is no significant variation in Egypt's SSR in the period between 2000 and 2007, as the volume of per capita net production of wheat changed from 100.7 Kg per person per year in 2000 to 97.5 Kg in 2007 (Table 2.3), while total production increased from 6.6 million tons in 2000 to 7.4 million tons in 2007 (see Figure 2.2 above). Imports also increased from 4.9 million tons in 2000 to 5.9 million tons in 2007. Therefore, the SSR for wheat declined by approximately 3 percent (from 58.7 to 55.7 percent) between 2000 and 2007. However, as many Egyptian analysts point out, there is reason to believe that the actual SSR is lower by 5 to 6 percent due to overestimation of the domestic production (see SSR in figure 2.1). This is corroborated by the fact that in 2008, even after the implementation of major price reforms to the advantage of wheat farmers, only 2.5 million tons of wheat were delivered to the Government.

Table 2.3: Per Capita Production in Kg.

	2000	2001	2002	2003	2004	2005	2006	2007	Average Annual Growth
Wheat	100.74	93.95	97.39	98.48	101.08	112.22	111.66	97.51	1.00
Cereals	277.90	252.66	266.99	267.98	263.46	280.82	273.33	254.70	0.99
Fruits	106.91	110.47	113.29	111.61	115.56	114.24	125.76	123.63	1.02
Oil crops	13.27	15.86	14.03	11.34	14.85	12.89	11.95	12.08	0.99
Pulses	6.52	7.75	7.23	6.13	5.82	5.03	4.51	5.18	0.97
Starches	31.70	34.04	33.63	35.36	41.37	49.92	37.70	43.16	1.05

Source FAO Website Database

Despite the market availability of food, its sufficiency is very much determined by fluctuations in international prices and the availability of foreign exchange. Therefore, food availability in Egypt is seen as vulnerable mainly to international food price shocks on the one hand and shocks to balance of payments on the other. ***The focus on securing foreign inflows while increasing net domestic production is currently needed, especially with the recent deterioration in balance of payments since January 2011 and the drop in net foreign reserves.***

CHAPTER THREE:
ACCESS TO FOOD

Key Messages:

- Economic access to food continues to be the most significant food security concern complicated by food price increases and a drastic reduction of livelihoods. The coexistence of income poverty, caloric deprivation and poor dietary diversity is highest in Upper Egypt, followed by Beheira and Menoufia in Lower Egypt.
- Significant disparities exist in caloric deprivation between governorates and between urban and rural areas.
- Caloric deprivation is highly correlated with monetary and non-monetary poverty.
- Both the income poor and the multidimensional poor suffer from poor dietary diversity.
- Governorates in Upper Egypt have a higher prevalence of poor dietary diversity compared to other regions, and Rural Upper Egypt is the most deprived region.
- People living in rural areas consume an undiversified diet and are at higher risk of micronutrient deficiencies than people in urban areas.

3 ACCESS TO FOOD

Economic access to food continues to be the most significant food security concern complicated by food price increases and a drastic reduction of livelihoods. Reduced cash incomes and low consumer purchasing power should be considered as forms of "market-induced shock" for vulnerable households.

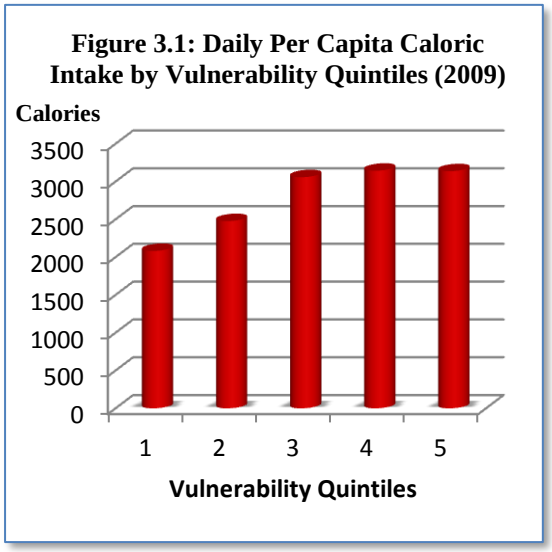
Household food consumption is a reflection of both food availability in markets as well as the ability of households to access food. Therefore, food consumption is used as one of the main proxy indicators of the food security situation in 2009. Together, dietary diversity and frequency of food intake of various food types, according to WFP's standard methodology, are considered to be reliable proxy indicators of the accessibility of households to food. Three principal approaches are used in analysing adequacy of food consumption at the household level:

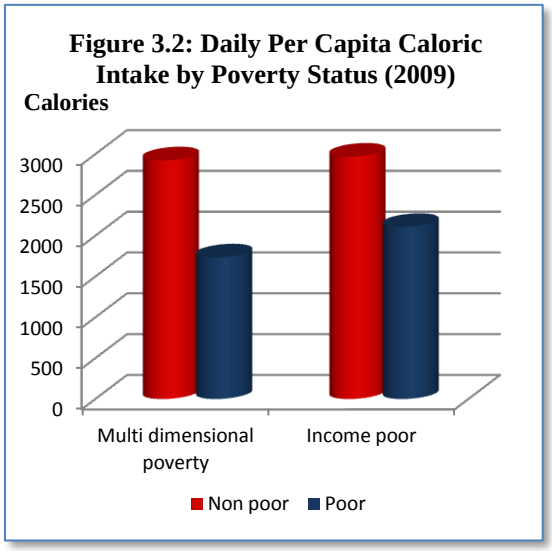
1. **The first** approach is per capita caloric intake and the share of each food group in total generated calories, also compared to the recommended intake for every age group.

2. **The second** assesses the consumption of calories relative to calorie requirements and thus focuses on the sufficient consumption of food in quantitative terms. This approach is usually applied by FAO and relies on data from food balance sheets, that are typically related to an average calorie requirement (for example, 2,100 kcal per capita per day). Alternatively, per capita calorie consumption can be estimated from detailed household expenditure surveys. Furthermore, data on household age and gender composition can be used to calculate household-specific calorie requirements per capita using standard requirement levels as suggested by the World Health Organization (FAO-WHO-UNU 2001). The calorie deprivation status is then determined by relating calorie consumption amounts to calorie requirements.

3. **The third** approach looks at the nutritional composition of diets and thus it considers aspects of dietary quality. This approach is used by the WFP to calculate the Food Consumption Score, which is based on the frequency of consumption of specific food groups. These frequencies are weighted according to their nutritional importance. Adequacy of food consumption is then typically identified by using a universal cut off benchmark. However, data from HIECS 2009 does not include information on the daily frequency of household food intake of a specific food group, it rather provides information on the total quantity of food items consumed by the household during the reference period (15 days) and this is carried out for all governorates throughout the whole year. Therefore, in this study the quantitative analysis of food consumption is complemented with a brief analysis of dietary diversity of food intake at household level.

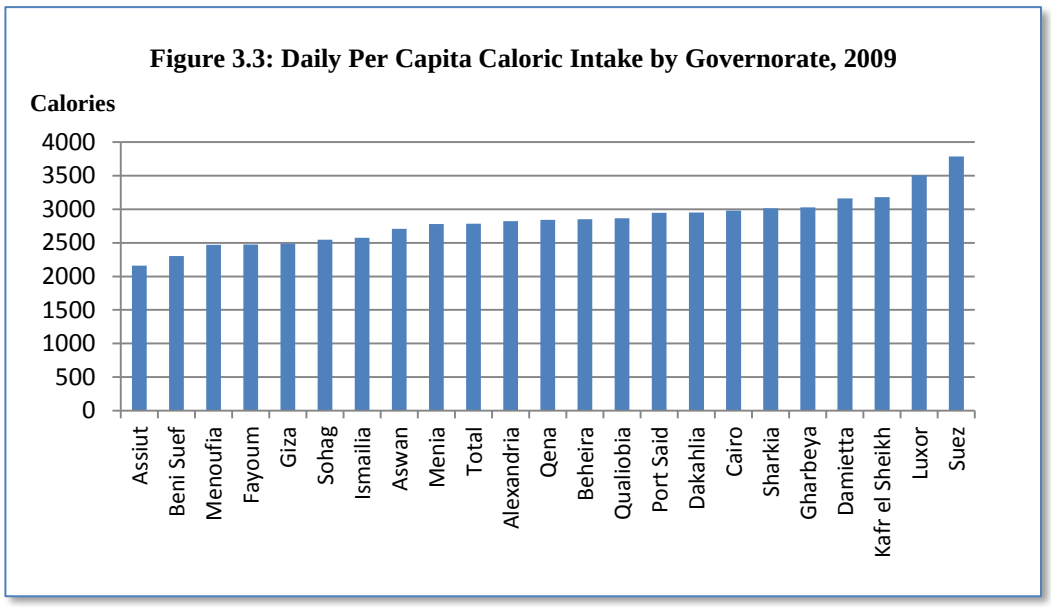
HIECS surveys provide information on household purchases of 195 food items and information on household food consumption over the questionnaire reference period (the last 15 days). In order to express food consumption as a monetary value, the unit value of the purchased items is used. The collected information on household food purchases includes monetary value, quantity, unit of measurement and location of purchase. Estimates of daily per capita caloric intake show that the national average for Egypt (2,783 calories) is close to the global average in 2009 (2,800 calories), however, disparities exist between governorates and, as expected, the average per capita caloric intake in most of the governorates in Upper Egypt is actually below the national average. Table 3.1 in the following section provides data on caloric deprivation by governorate in 2009.





Source: Calculated using HIECS 2009.

Figure 3.3, below, highlights caloric intake by governorate. The data demonstrates that the energy consumption per person per day is lowest in the governorate of Assiut, followed by Beni Suef and Menoufia. There are 10 governorates that experienced a high daily per capita caloric intake of over 3,000 calories, while there are only 5 governorates whose average daily per capita caloric intake was less than 2,500 calories. In general, with the exception of Luxor, governorates in Upper Egypt are either below the national average of daily per capita caloric intake (2,783 calories) or close to the border line. Menoufia was the only governorate in Lower Egypt with a below average per capita caloric intake. As shown in Figure 3.1, above, individuals in the lowest vulnerability quintile had an average per capita intake of 2,081 calories per day, representing only two-thirds of the highest quintile caloric intake (3,136 calories per person per day). The correlations between per capita calorie intake and other deprivation dimensions are also apparent. The average per capita caloric intake of an income-poor individual represents 71 percent of that of the non–poor (See Figure 3.2, above). The correlation with multi-dimensional poverty is also significant, where per capita caloric intake for someone defined as multi-dimensionally poor is 59 percent of the non-poor.



Source: Calculated using HIECS 2009.

The simple measurement of average daily caloric intake per person across governorates provides information on governorates with the least caloric intake and a rough measurement of the intensity of the

deprivation incidence when compared to average required intake and when compared to other governorates. However, daily per capita caloric intake fails to: a) provide an estimate of the prevalence of this incidence (i.e. what is the percent of population suffering this deprivation in each governorate and which nutrient elements are most needed to bring their diet to a healthy and acceptable balance); and b) identify how far the deprived population is from both the mean intake and the recommended intake. Accordingly, the following sections examine three main aspects: 1) prevalence of caloric deprivation across governorates; 2) dietary diversity of food intake within each food group as an indicator for food diversity; and 3) sufficiency of nutrient/energy intake per household as an indicator of sufficient and balanced food intake.

3.1 PREVALENCE OF CALORIC DEPRIVATION[9]

Caloric deprivation is based on a standard and implicit assumption: a person in a household is considered calorie deficient if the surveyed household reports (at the household-level) calorie consumption below the sum of standard individual calorie intake requirements for all household members, otherwise a person is considered as sufficiently supplied with calories. The main data limitation of this approach is that the true intra-household distribution of food cannot be determined. Empirical evidence suggests that in some countries (with male-dominated societies), females and young children in particular are disadvantaged. This is one reason for the use of child anthropometrics to analyze the nutritional status of children.

The prevalence of food deprivation (caloric deficiency) based on the FAO methodology depends on two components: 1)the amount of dietary energy contained in the food consumed and, 2) the minimum energy requirement for performing a minimum acceptable level of light physical activity for different groups of age and sex. The weighted overall minimum dietary energy requirement (MDER) is used as the cut-off point of the distribution function of dietary energy consumption for estimating the prevalence of food deprivation or the proportion of the population consuming less energy than the MDER.

The Dietary Energy Consumption (DEC), per person per day refers to dietary energy from food acquired for consumption by (or available to) the sampled households rather than from actual food consumption or intake of the individual household members. Calories generated for each food item were calculated using tables from "Food Consumption Tables for Near East", (2000) that list calories generated from the edible part of 100 grams of purchased food and also calories for food as purchased. The HIECS contains food data as purchased weight or volume. The dietary energy value is multiplied by the quantity of acquired food on the purchased weight basis.

Average household kilocalorie unit price is used for estimating the dietary energy values of food items when household food data are only available in terms of monetary value (such as for food eaten outside of the home). The dietary energy values are obtained by dividing the monetary value by the kilocalorie unit price at the household level. In other words,

$$\textit{HH DEC from food eaten away from home} = \frac{\textit{HH monetary value of food eaten away from home}}{\textit{HH kilocalorie unit price.}}$$

The total household dietary energy consumption is obtained by adding up calories generated from all commodities, either eaten at home or outside. The total household DEC and per person per day caloric intake is calculated taking into account the sampling weights. Total caloric consumption is compared to total caloric requirements for each household, and if caloric consumption is less than 80 percent of caloric requirements, all household members are considered food deprived, i.e., consume insufficient calories (caloric deficiency), otherwise all members are non-deprived; i.e., consume sufficient calories. Food consumption data derived from HIECS indicates that seventeen million persons or one-fifth of Egyptians suffer caloric deprivation i.e. they receive less than 80 percent of their required caloric intake. The prevalence of caloric deprivation (the proportion of people whose dietary energy consumption falls below

[9] Food deprivation refers to individuals suffering from caloric deficiency.

the minimum energy requirement) was 20.4 percent in total population. Table 3.1, below, demonstrates that caloric deprivation is more widespread in rural areas than in urban areas (22 percent in rural areas as compared with 17 percent in urban areas).

Table 3.1: Caloric Deprivation by Governorate, 2009

Governorates	Prevalence of Caloric Deprivation, %			Daily Per Capita Caloric Intake		
	Urban	Rural	Total	Urban	Rural	Total
Urban Governrates	15.32		15.32	3013		3013
Cairo	20.09		20.09	2980		2980
Alexandria	17.32		17.32	2824		2824
Port Said	0.19		0.19	2945		2945
Suez	0.00		0.00	3784		3784
Lower Egypt	11.62	13.84	13.36	3000	2869	2907
Damietta	0.38	0.26	0.31	3152	3166	3160
Dakahlia	5.33	12.23	10.34	3065	2910	2952
Sharkia	8.08	6.79	7.08	2932	3035	3011
Qualiobia	18.79	8.75	12.87	3149	2670	2867
Kafr el Sheikh	6.26	9.13	8.55	3389	3124	3177
Gharbeya	15.92	12.66	13.60	2939	3062	3027
Menoufia	20.44	37.51	34.31	2644	2428	2468
Beheira	20.55	20.10	20.19	2928	2834	2851
Ismailia	0.00	1.07	0.61	2723	2458	2572
Upper Egypt	24.80	31.18	29.25	2608	2528	2552
Giza	31.37	46.57	37.91	2591	2350	2487
Beni Suef	31.44	41.81	39.28	2405	2273	2305
Fayoum	17.68	30.86	28.10	2479	2475	2476
Menia	15.19	19.46	18.78	2972	2744	2780
Assiut	33.02	54.12	48.96	2332	2106	2162
Sohag	21.52	26.78	25.69	2549	2548	2548
Qena	21.11	17.97	18.62	2659	2892	2843
Aswan	5.53	4.87	5.14	2717	2701	2708
Luxor	2.53	13.90	8.26	3403	3602	3504
Frontier Governorates*	3.17	5.10	4.80	2983	3000	2987
Total	17.93	22.03	20.35	2876	2718	2783

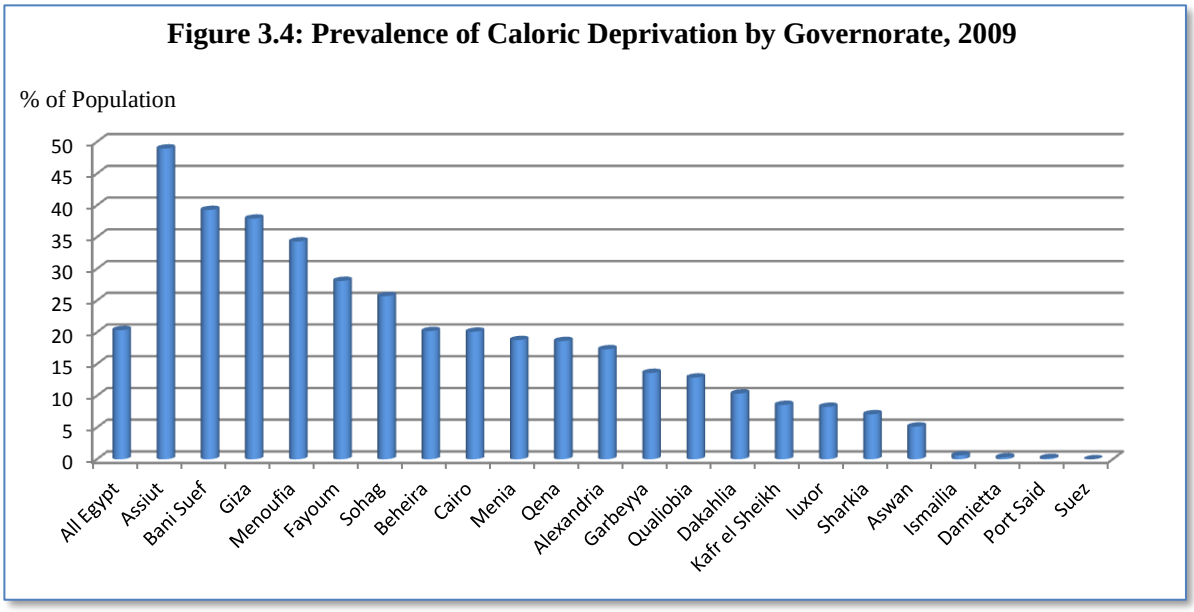
Source: Calculated by authors using HIECS 2009.

* HIECS coverage of frontier governorates in 2009 is not sufficiently representative, and calculations based on HIECS data for these governorates require further validation. Therefore, all indicators used for these governorates must be regarded with great caution.

Disparities in caloric deprivation between governorates and between urban and rural areas are large, reaching an alarming level in Assiut. Table 3.1, above, demonstrates that the prevalence of caloric deprivation strongly varies between governorates and between urban and rural areas within each governorate, and is alarmingly high in Assiut. One in two persons was found to suffer from caloric deprivation in the rural areas of Assiut; followed by Giza and Beni Suef. The data also reveal large differences in the spread of caloric deprivation across regions. Assiut is also the most deprived governorate in terms of both income poverty and multi-dimensional poverty. Generally, governorates in Upper Egypt (with the exception of Aswan and Luxor) have a higher rate of caloric deprivation compared to other regions, and according to most of the deprivation indices, Upper *Rural* Egypt is the most deprived region, nevertheless, Beheira, Menoufia and Cairo all have a high prevalence of caloric deprivation. Also,

within each governorate the prevalence of caloric deprivation is higher in its rural areas compared to its urban counterparts.

Figure 3.4: Prevalence of Caloric Deprivation by Governorate, 2009



Source: Calculated using HIECS 2009.

As demonstrated in Figure 3.4, above, caloric deprivation rates indicate that governorates suffering from the lowest average per capita caloric intake are also suffering from the highest prevalence rates of caloric deprivation among their populations (Assiut, Beni Suef, Giza, Menoufia, Fayoum, and Sohag). Table 3.2, below, provides caloric requirements by age, sex and location.

Table 3.2: Caloric Requirements by Age, Sex and Location

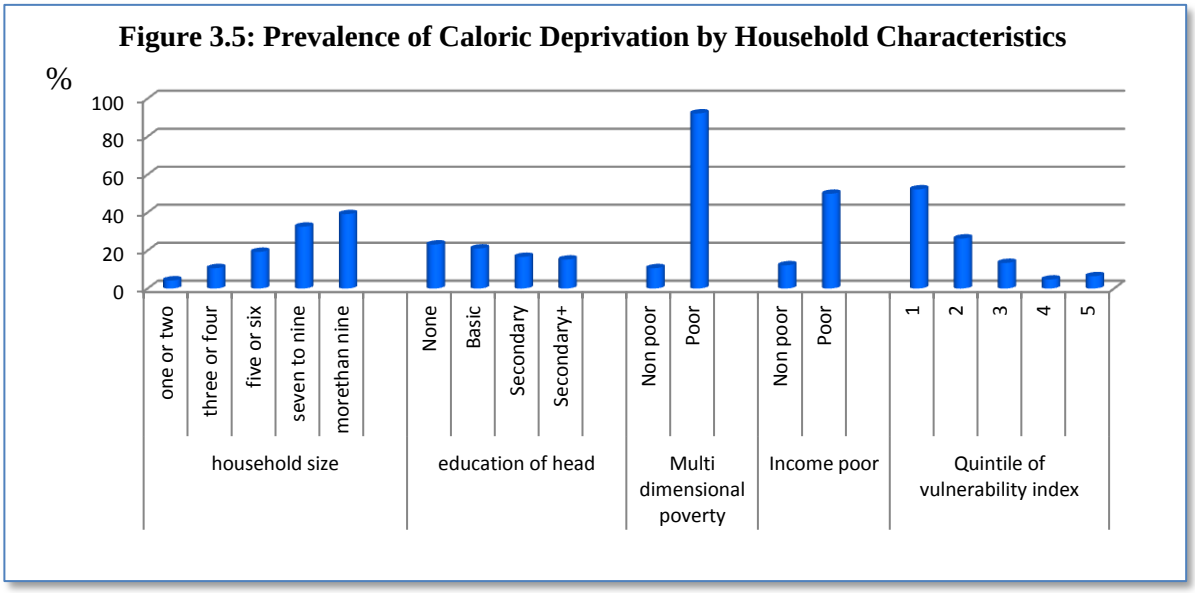
	Urban		Rural	
Age Group	**Males**	**Females**	**Males**	**Females**
<1	820	820	820	820
1—2	1150	1150	1150	1150
2—3	1350	1350	1350	1350
3—5	1550	1550	1550	1550
5—7	1850	1750	1850	1750
7—10	2100	1800	2100	1800
10—12	2200	1950	2200	1950
12—14	2400	2100	2400	2100
14—16	2600	2150	2600	2150
16—18	2850	2150	2850	2150
18—30	3150	2500	3500	2750
30—60	3050	2500	3400	2750
>60	2600	2200	2850	2450

The following discussion highlights the most prominent factors found to be significantly associated with households challenged by caloric deprivation. This does not, however, purport to provide any conclusive evidence of causal relationships among these factors. Rather, it offers indications and tendencies, which could be used as targeting criteria for interventions.

As Figure 3.5 below shows; ***caloric deprivation is highly correlated with monetary and non-monetary poverty***. Nine persons out of 10 multi-dimensional poor are calorie-deprived and half of the income-poor are also deprived from their minimum caloric needs. The education level of the household head is negatively correlated with caloric deprivation but to a lesser extent. ***Moreover, male-headed households are more likely to suffer from caloric deprivation than female-headed households (17 percent versus 9***

percent, respectively), and one household out of every four households whose head is in casual employment is likely to experience caloric deprivation. Households that have multiple income sources are less likely to experience caloric deprivation compared to those with a single source (19.9 percent as opposed to 23.6 percent, respectively).

Figure 3.5: Prevalence of Caloric Deprivation by Household Characteristics



Source: Calculated using data from HIECS 2009.

It is noteworthy that the investigation of food insecurity using caloric deprivation indicators is likely to underestimate the intensity and spread of the phenomenon; the most vulnerable and highly insecure people tend to increase their consumption of cheaper foods which in the case of Egypt happen to be key staples and subsidized foods which have a high caloric content (baladi bread, rice, oil and sugar). Therefore, households that have sufficient access to their caloric needs do not necessarily have access to a nutritious and balanced dietary intake.

3.2 DIETARY DIVERSITY WITHIN FOOD GROUPS

Even if people are found to have sufficient access to dietary energy, they may not necessarily have sufficient access to *nutritious* food. Evidence from other studies has demonstrated that a diet adequate in terms of energy is not necessarily sufficiently diversified and healthy. Therefore, households that have secure access to foods that satisfy their basic caloric needs may indeed consume diets lacking in sufficient amounts of essential micronutrients such as iron, iodine, Vitamin A, zinc, and Folate.

The Food Consumption Score (FCS) is the standard tool used by WFP to reflect dietary diversity as well as frequency of consumption and it is generally one of the most commonly used food consumption indicators. This proxy indicator reflects dietary diversity, energy, and macro and micro (content) value of the food people eat. The calculation of the FCS takes into consideration the number of food groups consumed by a household over a reference period of seven days (dietary diversity); the number of days, a particular food group is consumed (food frequency); and the relative nutritional importance of different food groups. Each food group is allocated a score (weight) based on its nutrient density[10] (see Table 3.3, below). The maximum possible FCS is 112. The higher the FCS, the more diverse and nutritional is the diet.

Although the FCS is a simple tool that provides essential information on people's current dietary intake, it has many shortcomings that prevent in-depth analysis of food consumption patterns:

[10] Animal proteins, milk and eggs in the diet receive the highest score of 4; pulses receive a score of 3; cereals and bread receive a score of 2; vegetables and fruits a score of 1; and, sugar/oils/fat/butter receive a score of 0.5. Sweets and beverages are excluded.

- It is based on a seven-day recall period only. This is insufficient for a full analysis of food consumption over longer periods, which is likely to vary according to season, for example.
- It provides no indication of the quantity of each foodstuff consumed.
- It does not give information on intra-household food consumption, such as who eats first and last.
- It does not show how food consumption has changed as a result of the crisis, unless previous food consumption scores for the same types of households are available.

In addition, data provided by HIECS 2009 cannot be used for calculating the FCS as defined by the WFP, as according to WFP CSFVA Guidelines (2009), FCS requires reporting the frequency of daily consumption for commodity groups over seven days. This information is not available in HIECS surveys, which record total consumption of 195 food items over 15 days. Therefore, relying on the FCS as a proxy indicator of access to food is not attainable using HIECS 2009.

Instead of using the FCS, the study of caloric deprivation was complemented with an investigation of dietary diversity within food groups. Various empirical findings support the underlying argument that diversity within and across food groups is correlated to per capita expenditure on food on one side and per capita nutrient adequacy on the other. (Megan A McCrory et al. (1999), John Hoddinott & Yisehac Yohannes (2002); LE Torheim et al (2004); Parvin Mirmiran et al (2006)).

This study used the number of food items that belong to a certain group and consumed during the 7 days recall period as a proxy for diet diversification. The assumption behind this is that the number consumed from each commodity group during 7 days reflects the frequency of daily consumption of this group, as households are likely to consume few items from each commodity group daily (e.g. oranges and apples). This index has been termed "Dietary Diversity within Food Groups". In other words, the number of commodities consumed by a household within each commodity group is counted, and then the weighted sum of these numbers is caluculated; these weights are tabulated in Table 3.3, below. The assigned weights are in line with WFP methodology and guidelines for the calculation of the food consumption score.

Table 3.3: Food Groups and Weights Used to Construct an Index for "Dietary Diversity Within Food Groups"

Food Item	Food Group	Weight
Maize, Rice, Sorghum, Millet, Bread and Other Cereals	Cereals, Tubers, and Roots	2
Cassava, Potatoes, and Sweet Potatoes		
Beans, Peas, Groundnuts, and Cashew Nuts	Pulses	3
Vegetables, Relish, and Leaves	Vegetables	1
Fruits	Fruit	1
Beef, Goat, Poultry, Pork, Eggs, and Fish	Meat and fish	4
Milk, Yoghurt, and Other Dairy	Milk	4
Sugar and Sugar Products	Sugar	0.5
Oils, Fats, and Butter	Oil	0.5

Source: Comprehensive Food Security and Vulnerability Analysis Guidelines WFP (2009)

Table 3.4 below, provides a number of statistics on food consumption and dietary diversity by governorate, in urban and rural areas. Households were classified according to their dietary diversity score (DDS) into three categories; poor, moderate, or high. The table shows that 33.3 percent of individuals (27 million people) suffer poor dietary diversity, 59 percent are on border line and 7.7 percent have high diversity in their food intake. The data shows that there are significant differences, in mean dietary diversity score

among governorates and between urban and rural areas within each governorate, where Sohag and Assiut had the lowest scores in both urban and rural areas while Alexandria had the highest score.

Table 3.4: Dietary Diversity by Governorate (Percent of Population), 2009

Governorates	Urban			Rural			Total		
	Poor	Moderate	High	Poor	Moderate	High	Poor	Moderate	High
Urban Governorates	16.16	64.07	19.73				16.16	64.07	19.73
Cairo	22.60	64.50	12.80				22.60	64.50	12.80
Alexandria	6.50	66.60	26.90				6.50	66.60	26.90
Port Said	15.80	55.10	29.10				15.80	55.10	29.10
Suez	10.60	63.50	25.90				10.60	63.50	25.90
Lower Egypt	23.07	69.00	7.94	24.96	70.10	6.95	24.39	69.90	5.70
Damietta	13.30	57.50	29.30	24.20	62.60	13.20	20.00	60.60	19.40
Dakahlia	19.60	71.90	8.50	13.20	77.70	9.20	14.90	76.10	9.00
Sharkia	18.40	78.40	3.20	19.50	74.70	5.80	19.20	75.60	5.20
Qualiobia	23.00	72.00	5.00	31.90	64.40	3.70	28.30	67.50	4.20
Kafr el Sheikh	28.20	65.00	6.80	24.70	73.70	1.60	25.40	72.00	2.60
Gharbeya	13.80	77.70	8.50	17.70	74.30	8.00	16.60	75.30	8.10
Menoufia	44.00	55.00	1.00	41.90	56.60	1.50	42.30	56.30	1.40
Beheira	40.00	59.00	1.00	31.70	67.70	0.50	33.30	66.10	0.60
Ismailia	15.50	63.70	20.80	18.60	72.00	9.40	17.30	68.40	14.30
Upper Egypt	48.82	45.69	5.48	51.04	43.61	5.34	50.36	31.71	5.41
Giza	50.60	44.60	4.80	68.90	26.70	4.40	58.50	36.90	4.60
Beni Suef	48.10	49.90	2.00	49.40	49.90	0.70	49.10	49.90	1.00
Fayoum	24.20	67.90	7.80	25.70	72.10	2.20	25.40	71.20	3.40
Menia	22.20	55.10	22.70	20.90	60.40	18.70	21.10	59.50	19.40
Assiut	64.30	34.80	0.80	82.10	17.70	0.20	77.70	21.90	0.40
Sohag	63.30	36.70	0.00	64.10	35.50	0.40	63.90	35.70	0.40
Qena	47.30	46.60	6.20	54.40	41.60	4.00	52.90	42.60	4.50
Aswan	54.70	41.20	4.10	51.90	45.00	3.10	53.10	43.40	3.50
Luxor	54.30	44.20	1.50	60.80	38.40	0.80	57.50	41.30	1.20
Frontier Governorates*	37.94	52.49	9.54	43.05	53.62	3.37	39.16	53.17	7.66
All Egypt	28.10	60.50	11.50	37.00	58.00	5.00	33.30	59.00	7.70

Source: Calculated by authors using HIECS 2009.

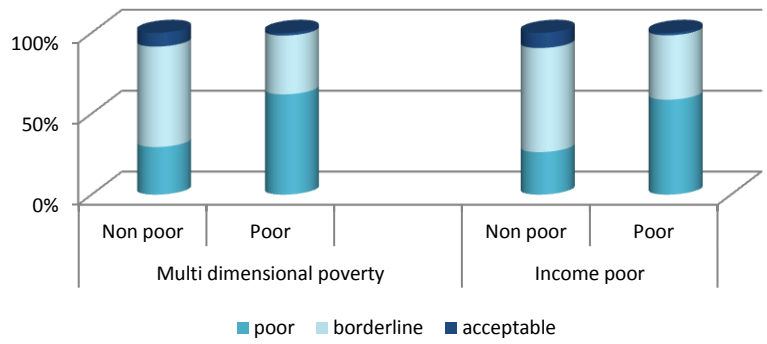
* Frontier governorates. HIECS coverage of frontier governorates in 2008/2009 is not sufficiently representative, and calculations based on HIECS data for these governorates require further validation. Therefore, all indicators used for these governorates must be regarded with high caution.

Disparities exist between urban and rural residents, where poor dietary diversity is far more widespread in rural areas (37 percent of the population in rural areas suffer poor dietary diversity compared to 28.1 percent in urban areas). Estimates reveal an urban-rural divide in dietary diversity, with a strong tendency toward a considerably higher prevalence in rural areas; however, rural areas of both Dakahlia and Kafr El Sheikh had lower prevalence of poor dietary diversity compared to their urban counterparts. Moreover, while 11.5 percent of the population in urban areas have sufficiently high diversity in their food intake, only 5 percent enjoy this diversity in rural areas.

Both the income poor and the multidimensional poor suffer from poor dietary diversity (Figure 3.6). As expected, income-poor households are the largest proportion of those classified as having

poor dietary diversity (58.7 percent), and they have the lowest percent of those with high diversity levels (1.5 percent).

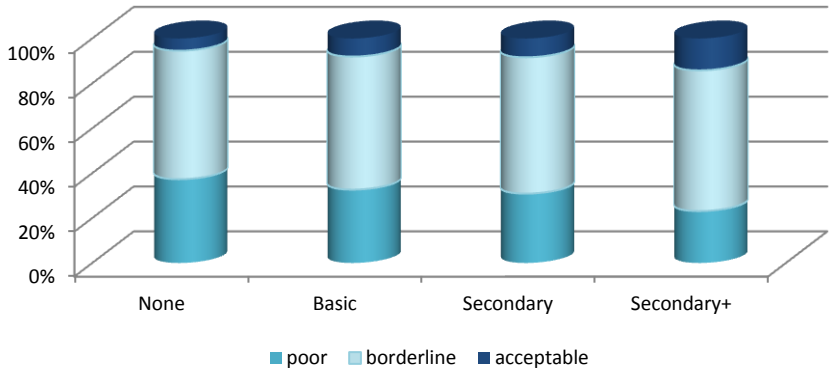
Figure 3.6: Dietary Diversity Classification by Poverty Status



Source: Calculated using data from HIECS 2009.

Surprisingly, 23 percent of non-poor households suffer poor dietary diversity as well. Also, ***60 percent of the most vulnerable persons suffer poor dietary diversity,*** as opposed to 18.6 percent of the least vulnerable. These results suggest that low income levels are not the only correlate to poor dietary intake. Lack of awareness of what constitutes an appropriate and nourishing diet is also an important factor affecting dietary balance at the household level. As Figure 3.7 demonstrates, ***poor dietary diversity is more prevalent in households whose heads have not received any education (37.3%).***

Figure 3.7: Dietary Diversity Classification by Education of HH Head



Source: Calculated using data from HIECS 2009.

Table 3.5 below demonstrates that household size is consistently positively correlated with the level of caloric deprivation. While the prevalence rate is only 4 percent for households with one or two members; it increases as household size increases to reach 32.6 percent for households with seven to nine members, and 39 percent for households with more than nine members. However, as the size of the household increases, dietary diversity of the household improves; nearly half of households with 1 to 2 members have poor dietary diversity while less than 30 percent of households with more than 9 members have poor dietary diversity. Male headed households tend to diversify their food consumption more than female headed households as 33 percent of male headed households have poor DDS versus 44.4 percent for female headed households. Households whose head is out of labour force have lower likelihood to diversify their food, as 41 percent are classified in poor DDS category, so as

households whose head is casual worker. Also, ***households with only one income source are poorer in terms of dietary diversity score.***

Table 3.5: Food Access Indicators by Household Characteristics, 2009

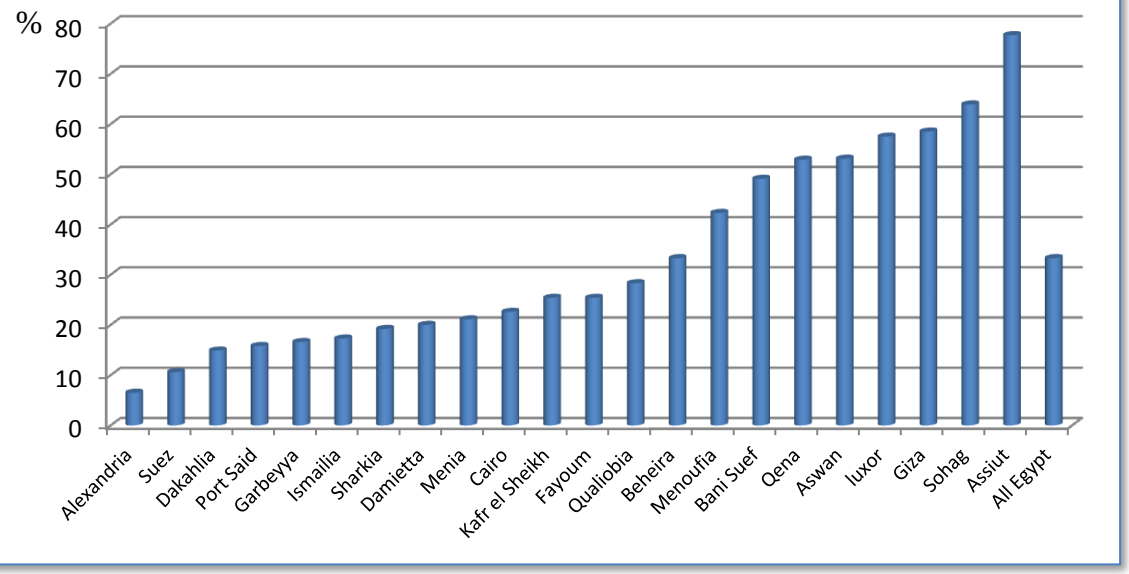
Category	Prevalence of Caloric Deprivation, %	Daily per capita Caloric Intake	Share of DDS Categories		
			Poor	Moderate	High
Gender of the Household Head					
Male	17.47	2730	33.51	58.78	7.70
Female	9.07	3177	44.44	50.45	5.11
Household Size					
1 to 2	4.25	4292	47.65	47.99	4.36
3 to 4	10.73	3093	33.22	58.73	8.05
5 to 6	19.31	2677	31.28	60.68	8.05
7 to 9	32.56	2390	34.98	57.98	7.03
Over 9	39.19	2209	29.06	62.39	8.55
Education of Household Head					
None	23.18	2763	37.35	57.23	5.43
Primary-Preparatory	21.08	2729	32.70	59.26	8.04
Secondary	16.65	2735	30.92	60.73	8.35
Secondary +	15.25	2956	23.14	62.68	14.18
Employment Status of Household Head					
Wage Earner	18.09	2665	34.93	57.37	7.70
Employer	15.37	2827	28.06	63.84	8.10
Self-employed	14.92	2765	38.03	56.27	5.71
Unpaid Worker[11]	11.86	2842	33.33	65.00	1.67
Unemployed	18.46	2785	39.53	53.49	6.98
Out of Labour Force[12]	12.81	3084	41.64	51.91	6.44
Work Stability of Household Head					
Permanent	16.18	2751	31.98	60.08	7.94
Temporary	17.26	2644	38.51	54.71	6.78
Seasonal	7.86	2711	38.57	58.57	2.86
Casual	24.63	2487	48.87	47.71	3.43
Economic Activity of Household Head					
Non Agriculture	16.01	3084	34.82	57.17	8.01
Agriculture	16.28	2725	37.13	58.21	4.65
Multi-Dimensional Poverty					
Non poor	10.71	2924	29.45	62.07	8.48
Poor	92.21	1734	62.01	36.35	1.65
Income Poverty					
Non poor	12.23	2969	26.32	64.31	9.38
Poor	49.88	2107	58.69	39.82	1.49
Quintile of Vulnerability Index					
1	52.21	2082	60.15	38.39	1.46
2	26.31	2477	38.62	57.39	3.99
3	13.48	3058	30.53	63.22	6.25
4	4.73	3144	22.08	67.09	10.83
5	6.47	3137	18.61	67.80	13.59
All Egypt	20.35	2783	33.30	59.03	7.68
Income Diversity					
Single Income Source	23.55		29.26	59.71	11.50
Multiple Income Sources	19.99		33.76	58.95	7.25

Source: Calculated by using HIECS 2009

[11] Unpaid workers are those who work without any return, like interns and those working in family business.
[12] Individuals out of labour force are those who belong to the age group of the labour force but willingly decide not to work.

Generally, governorates in Upper Egypt have a higher prevalence of poor dietary diversity compared to other regions, and as reflected by most of deprivation indices, Rural Upper Egypt is the most deprived region. At the governorate level, and as indicated by Figure 3.8, below, more than three quarters of Assiut's residents suffer poor dietary diversity. Assiut is followed by Sohag and Giza, also Menoufia and Beheira have a high prevalence of poor dietary diversity, whereas Alexandria and Suez have the lowest prevalence of poor dietary diversity among their residents.

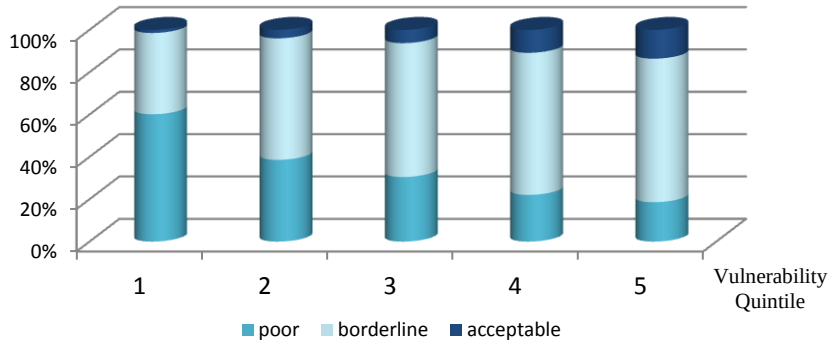
Figure 3.8: Percent of Population with Poor Dietary Diversity in 2009 (Using Results from Dietary Diversity Score)



Source: Calculated using data from HIECS 2009.

Figure 3.9, below, depicts the dietary diversity classification by vulnerability quintiles. Similar to results from classification by income poverty, the first quintile (the most vulnerable population) has the widest prevalence of poor dietary diversity.

Figure 3.9: Dietary Diversity Classification by Vulnerability Quintiles



Source: Calculated using data from HIECS 2009.

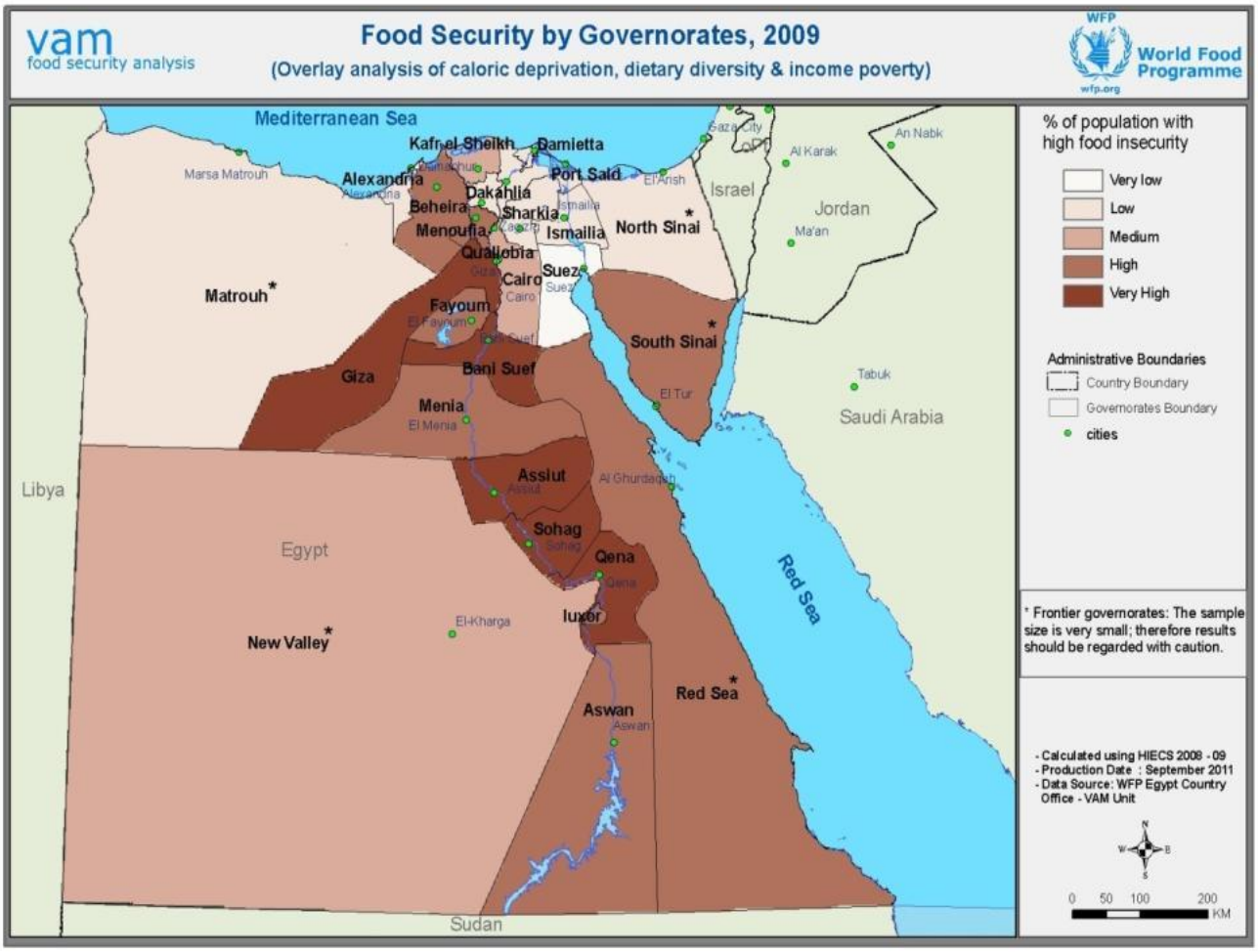
3.3 Overall Assessment of Access to Food

Food Security assessments usually rely on proxy indicators of food consumption, studied against other socioeconomic indicators that reflect the purchasing power of households before they can classify the population into food security groups. Typically, the FCS is used by WFP as proxy indicator for food consumption and in many cases indicators of income/poverty levels are used to reflect the purchasing power

of households. An overall assessment of the prevalence of high food insecurity across governorates was developed in Map 1, below, using the overlay analysis technique.

Overlay analysis is the most common GIS technique used in urban and regional studies to derive new information from two or more layers (maps) of data covering the same areas. The different layers are combined by being 'layered' over each to form a new map that provides new information using the attributes of input maps. Overlay analysis ranks attribute values and then adds them to produce an overall rank for each location. Map 1, below, overlays poor dietary diversity with high caloric deprivation and income poverty, reflecting the distribution of population with high levels of food insecurity across Egypt's governorates.

Map 1: The Prevalence of High Food Insecurity in Egypt, 2009



Map 1 classifies governorates according to five categories of food insecurity (Very Low, Low, Medium, High and Very High), showing the prevalence of high levels of food insecurity across governorates. The map demonstrates that the highly insecure population is concentrated in Upper Egypt, most critically in Assiut, Sohag, Qena, Beni Suef and Giza. There are however, other governorates from Lower Egypt (Beheira and Menoufia) that also have a significant prevalence of high food insecurity among their populations and are classified in the second category of high food insecurity. It should be noted that South Sinai, which is a relatively rich governorate, is classified as highly insecure (i.e. placed in the second category), because of poor food consumption patterns practiced by the Bedouins in South Sinai, clearly reflected in their caloric deprivation rates, poor dietary diversity and insufficient access to sources of iron and Vitamin A. Cairo, which includes a mix of affluent areas, poor slums, middle-income neighbourhoods, and accommodates a high percentage of internal migrants is classified as moderately food insecure, all other urban governorates are classified as having low food insecurity (Suez, Port Said and Alexandria).

The cross tabulation of income poverty, caloric deprivation and dietary diversity shows that 42.4 percent of the total population demonstrates poor food consumption, of which 16.3 percent are income poor and 26.1 percent are non-income poor. The coexistence of income poverty together with poor food consumption is highest in governorates of Upper Egypt (58.2 percent in Assuit, 39.2 percent in Sohag and 36.1 percent in Bani Suef) followed by Beheira and Menoufia in Lower Egypt, and lowest in Damietta, Suez and Port Said. On the other hand, the percent of non-income poor demonstrating poor food consumption is highest in Menoufia (45 percent), Giza (44.8 percent), Luxor (43.4 percent) and the Frontier Governorates (33.9 percent). Those that are income poor but have adequate food consumption represent a mere 5.3 percent of the population while 52.3 percent of the population are neither poor nor suffering poor food consumption.

The results in Table 3.6 below indicate that Upper Egypt as a whole (and particularly Assiut, Sohag and Beni Suef) together with Beheira and Menoufia require programs that focus on income generation, sufficient food intake and nutritional awareness, while the focus in Frontier governorates and the rest of Lower Egypt should be on nutritional awareness programs. A district level analysis would yield more comprehensive results that would allow for sub-governorate interventions, and a more accurate assessment of the food insecure.

Table 3.6: Cross Tabulation of Income Poverty and Food Consumption

Governorate	Income Poor with Poor Food Consumption	Non-Poor with Poor Food Consumption	Income Poor, with Adequate Food Consumption	Non-Poor, with Adequate Food Consumption
Cairo	6.62	28.00	1.00	64.38
Alexandria	4.01	17.32	2.40	76.27
Port Said	2.78	13.01	1.63	82.58
Suez	1.07	9.62	0.85	88.46
Damietta	0.87	19.11	0.23	79.79
Dakahlia	5.78	18.14	3.52	72.56
Sharkia	9.02	14.20	10.14	66.64
Qualiobia	6.37	29.31	4.96	59.37
Kafr el Sheikh	7.28	22.97	3.92	65.83
Gharbeya	5.16	21.76	2.48	70.61
Menoufia	16.13	44.99	1.80	37.08
Beheira	16.14	28.28	7.37	48.21
Ismailia	7.64	10.26	11.23	70.87
Giza	21.33	44.77	1.64	32.26
Beni Suef	36.06	25.57	5.38	32.99
Fayoum	19.69	23.79	9.01	47.51
Menia	18.80	15.11	12.12	53.96
Assiut	58.17	26.90	2.80	12.13
Sohag	39.19	29.82	8.36	22.63
Qena	28.78	29.17	10.24	31.81
Aswan	26.69	26.92	14.24	32.16
Luxor	15.18	43.42	3.20	38.20
Frontier Governorates	5.95	33.91	5.14	55.00
All Egypt	**16.31**	**26.13**	**5.25**	**52.31**

Source: Calculated by authors using HIECS 2009.

3.4 SOURCES OF ENERGY AND AVAILABILITY OF DIETARY NUTRIENTS

This section complements the previous section on dietary diversity and presents an indicative analysis of the main sources of dietary energy and essential nutrient elements as calculated from household consumption data using the food composition tables for Egypt (National Nutrition Institute, May 2006) and compared to international recommended nutrient intake guidelines (Dietary Guidelines for Americans, 2010). The results provide a rough estimate of the ***available sources*** of energy and nutrients at the household level, however, they do ***not assess or reflect the actual nutritional status of the population being surveyed, i.e. results do not indicate the degree of iron deficiency anaemia or other macro or micronutrient deficiencies that might be present within the surveyed households.***

3.4.1 Sources of Energy

Food types were classified into the following groups based on their nutrient density: cereals and bread; legumes; vegetables; fruits; animal proteins; milk and eggs; and sugar and oils. The share of energy generated by each food group was subsequently calculated. Based on this classification, study results indicate that ***people living in rural areas consume an undiversified diet and are at higher risk of micronutrient deficiencies than people in urban areas.*** In addition to lower dietary energy content, diets in rural areas are considerably less diversified than diets in urban areas, exposing consumers to a much higher risk of micronutrient deficiencies. Residents of rural areas are more vulnerable to dietary energy shortages, and accordingly, their diet is geared more towards satisfying their calorie needs. Rural diets therefore contain more staple products and fewer vitamin- and mineral-rich foods such as vegetables and fruits, meat, fish, and dairy products.

Table 3.7.a: Share of Food Groups to Total Energy Intake in Urban Areas, 2009

Governorates	Cereals	Tubers	Pulses	Vegetables	Fruit	Meat & Fish	Milk	Sugar	Oil
Urban Governorates	46.03	1.73	1.41	3.15	3.13	10.68	5.86	9.85	18.16
Cairo	46.28	1.75	1.49	3.03	2.95	10.35	4.99	9.94	19.22
Alexandria	45.58	1.65	1.15	3.63	3.73	11.79	7.23	8.87	16.36
Port Said	46.29	1.34	1.11	2.56	2.94	11.59	6.69	9.99	17.49
Suez	45.74	2.21	2.05	3.04	2.52	8.31	5.61	12.06	18.46
Lower Egypt	50.91	2.06	1.33	3.39	3.17	8.32	4.73	10.05	16.04
Damietta	54.55	1.39	2.06	2.63	3.29	9.43	5.83	8.57	12.25
Dakahlia	54.25	1.96	1.82	3.26	2.91	8.20	3.83	9.39	14.38
Sharkia	52.18	2.42	1.34	3.73	2.76	7.34	2.73	11.60	15.90
Qualiobia	48.24	2.02	1.02	3.39	3.25	9.70	3.74	9.31	19.32
Kafr el Sheikh	52.40	1.86	1.68	2.87	3.18	7.97	11.35	7.59	11.11
Gharbeya	45.64	2.07	1.46	3.85	4.03	9.27	4.10	10.95	18.64
Menoufia	52.96	2.09	0.96	3.50	2.97	8.84	3.20	9.62	15.86
Beheira	50.63	2.08	0.60	3.22	3.29	6.80	5.96	10.94	16.48
Ismailia	48.43	2.13	1.98	3.52	2.83	8.60	3.88	11.23	17.40
Upper Egypt	52.13	1.76	1.86	3.09	2.70	7.14	3.46	11.59	16.27
Giza	49.41	1.82	1.36	3.25	2.59	9.47	4.58	9.77	17.75
Beni Suef	53.14	1.63	1.13	3.12	2.03	8.88	3.61	11.20	15.25
Fayoum	55.69	1.65	1.72	3.09	2.94	6.55	2.87	10.05	15.44
Menia	47.85	1.72	1.94	3.03	3.21	6.96	3.27	13.22	18.81
Assiut	54.55	2.18	1.73	3.18	2.66	6.72	2.88	12.07	14.01
Sohag	56.82	1.37	1.77	3.06	2.79	5.54	2.75	12.05	13.84
Qena	52.42	1.86	3.24	3.07	2.51	5.70	3.45	12.79	14.95
Aswan	51.02	1.74	2.74	2.38	2.38	4.79	3.63	12.02	19.31
Luxor	49.69	2.18	1.65	3.62	3.31	6.28	2.78	14.70	15.78
Frontier Governorates	49.02	1.96	2.70	3.52	4.35	8.48	4.23	10.61	15.13

Source: Calculated by authors using HIECS 2009.

The data shows that over half of the average diet (in caloric intake terms) in rural areas consists of calorie-dense cereal products, with sugars and sweets comprising approximately 10 percent of the total calories consumed in the average rural diet (and even slightly higher in the urban diet). A main reason for the high percentage is the frequent consumption of sweetened tea. The average Egyptian diet, especially in rural areas, is poorly balanced across food groups and is lacking in considerable quantities of vegetables and fruit. Tables 3.7.a and 3.7.b also demonstrate that taken together, vegetables and fruit; milk and dairy; and meat and fish, account for a much smaller share of the average urban /rural energy intake (about 18 percent) while cereals provide almost half of total energy intake and oil together with sugar provide about 26 percent of total energy intake. The high dependency on cereals, sugar and oil is easily explained by the components of the food subsidy system which focuses on providing those three food types.

Table 3.7.b: Share of Food Groups to Total Energy Intake in Rural Areas, 2009

Governorates	Cereals	Tubers	Pulses	Vegetables	Fruit	Meat & Fish	Milk	Sugar	Oil
Lower Egypt	54.10	2.09	1.59	3.35	2.80	7.40	3.57	9.94	15.17
Damietta	55.94	1.54	2.11	2.44	3.25	8.96	5.28	7.98	12.50
Dakahlia	54.80	2.05	1.91	3.36	2.75	7.79	3.52	9.35	14.46
Sharkia	53.00	2.30	2.04	3.41	2.27	6.52	2.80	11.40	16.26
Qualiobia	55.36	1.92	1.06	3.32	2.67	6.95	2.21	9.91	16.61
Kafr el Sheikh	59.26	1.91	1.99	3.07	3.18	7.46	4.23	7.71	11.18
Gharbeya	50.52	2.08	1.65	3.53	3.16	7.42	4.07	9.74	17.84
Menoufia	52.17	2.38	1.09	3.54	2.76	8.27	3.04	10.01	16.73
Beheira	54.92	2.08	0.92	3.34	2.98	6.85	4.56	10.84	13.50
Ismailia	49.38	2.05	2.53	3.54	2.50	9.39	3.93	10.73	15.94
Upper Egypt	55.77	1.54	2.03	2.89	2.35	6.02	2.96	11.41	15.02
Giza	56.76	1.58	0.94	3.05	2.27	6.97	2.85	9.21	16.36
Beni Suef	55.03	1.45	1.41	3.00	2.16	8.11	1.99	11.45	15.40
Fayoum	59.50	1.56	1.00	2.90	2.41	6.09	3.10	9.04	14.39
Menia	53.52	1.56	2.26	2.76	2.64	6.04	3.66	11.88	15.68
Assiut	54.93	1.95	2.74	3.26	2.54	5.74	2.24	12.30	14.31
Sohag	59.02	1.15	1.97	2.82	2.42	5.15	2.59	11.36	13.52
Qena	53.02	1.48	3.56	2.69	2.01	5.30	3.59	14.06	14.29
Aswan	53.95	1.60	2.55	2.30	1.80	4.33	3.72	12.11	17.63
Luxor	52.43	2.28	1.69	3.61	2.73	6.39	3.17	13.22	14.48
Frontier Governorates	55.04	1.67	3.01	2.84	2.99	7.23	3.45	9.40	14.38

Source: Calculated by authors using HIECS 2009.

It is noteworthy that people derive most of their energy intake from cereals and much less from tubers (1.9 percent) and pulses (1.7 percent) which are also rich in carbohydrates. Also, access to animal sources of protein is relatively expensive and many tend to consume less protein than required. Taking into consideration that pulses are rich in both proteins and carbohydrates, increasing household intake of pulses could increase household access to proteins without sacrificing energy intake. The GoE could support increased dietary diversity for a significant percentage of the population by revising the food subsidy component to include pulses as one of the commodities covered by the Food Ration Card. This suggestion has previously been made by the WFP (WFP Vam 2008, WFP Consumer Profile Study 2009).

3.4.2 Indications of Deficiency in Key Nutrient Elements

The sufficiency of essential nutrient elements in household dietary intake refers to the main nutritious elements in the foods available for consumption at the household level. The term 'Nutrient Deficiency' indicates that the amount of nutrient elements in the foods consumed at the household level is below the recommended level. Nutrient deficiency was estimated using the Dietary Guidelines for Americans (2010) which provides the nutrient needs that should be met primarily through food consumption, and the Food Composition Tables for Egypt (2006). The result is referred to as the "deficiency" in nutrient elements, which differs from deficiency rates that are derived from individual health/nutritional tests. Household needs are estimated according to household age and gender composition, while the household intake of macronutrients (protein, carbohydrates), minerals (iron, zinc) and vitamin A, is calculated based on the quantity of food available for consumption and the food composition of each food item. Households that do not meet their requirements from macronutrients, minerals and vitamin A are said to have a "deficiency" in that nutrient item, i.e., an insufficient supply for dietary intake of that nutrient at the household level. Protein deficiency, carbohydrate deficiency, iron deficiency, zinc deficiency and vitamin A deficiency were all estimated using food quantity data from HIECS 2009 (Table 3.8).

Table 3.8: Percent of Population Suffering Nutrient Deficiency, 2009

Governorates	Protein Deficiency	Carbohydrate Deficiency	Iron Deficiency	Zinc Deficiency	Vitamin A Deficiency
Urban Governorates	5.80	6.52	21.42	25.61	16.05
Cairo	8.85	9.10	28.82	34.75	21.85
Alexandria	4.22	6.30	22.33	26.56	14.83
Port Said	0.19	0.19	1.58	0.91	4.97
Suez	0.09	0.05	0.24	0.09	0.47
Lower Egypt	2.15	0.79	13.68	14.98	20.85
Damietta	0.51	0.15	3.32	2.55	13.84
Dakahlia	1.51	0.00	13.91	14.23	32.07
Sharkia	0.90	0.28	10.04	13.36	11.94
Qualiobia	5.95	2.30	22.49	28.46	19.10
Kafr el Sheikh	0.79	0.15	10.92	8.24	24.87
Gharbeya	1.88	0.50	9.78	11.13	13.74
Menoufia	4.41	2.65	23.32	23.94	31.07
Beheira	1.16	0.55	14.36	13.77	25.15
Ismailia	0.24	0.00	1.73	2.60	2.70
Upper Egypt	10.67	10.09	28.06	29.24	36.44
Giza	22.64	22.99	46.45	49.87	40.30
Beni Suef	8.29	9.54	28.69	32.50	30.11
Fayoum	3.15	5.70	22.89	18.34	35.54
Menia	6.88	5.81	22.39	27.18	20.70
Assiut	17.29	16.44	39.95	41.09	59.12
Sohag	7.60	4.27	21.92	16.95	44.25
Qena	3.02	1.03	17.33	9.48	35.80
Aswan	2.36	1.26	17.33	15.69	16.99
Luxor	2.35	0.97	12.78	12.61	19.47
Frontier Governorates	0.69	1.93	6.88	7.51	10.40
Total	6.24	5.58	21.63	23.03	26.50

* HIECS 2009 coverage of frontier governorates is not sufficiently representative. Calculations based on HIECS data for these governorates requires further validation. Therefore, all indicators used for these governorates must be regarded with high caution.

The results indicate that at the national level, 6.2 percent of the population do not have sufficient access to protein, and 5.6 percent are deficient in carbohydrates. The corresponding rates for iron, zinc and vitamin A are 21.6 percent, 23 percent, and 26.5 percent respectively. However, wide disparities exist between regions and governorates (see maps in Annex 3).

Governorates in Upper Egypt have a higher prevalence of nutrient deficiencies in general, most notably in Giza and Assiut. Nearly one half of Giza's population have insufficient access to sources of iron and zinc, 40 percent lack sufficient access to vitamin A and nearly 23 percent lack sufficient access to sources of protein and carbohydrates. The situation in Assiut is not very different from Giza, except for deficiency in vitamin A, which reached 59 percent in Assiut. Also, a significant percentage of residents in Cairo, Qualiobia and Alexandria have insufficient access to sources of iron, zinc and vitamin A. On the other hand, Canal governorates of Suez, Port Said and Ismailia have the lowest rate of nutrient deficiency among their populations.

Table 3.9: Nutrient Deficiency Rate by HH Characteristics, 2009

Gender of the Household Head	Nutrient Deficiency Rate				
	Protein	Carbohydrate	Iron	Zinc	Vitamin A
Male	5.55	4.99	18.89	21.31	22.58
Female	4.14	2.88	14.22	13.06	14.87
Size of Household					
1 to 2	3.28	1.28	5.38	8.19	7.81
3 to 4	3.55	3.21	14.07	15.56	13.96
5 to 6	5.98	5.91	22.17	24.96	24.93
7 to 9	9.68	8.47	30.02	30.12	41.26
Over 9	9.98	7.20	32.23	29.02	48.94
Educational Status of Household of Head					
None	6.06	4.45	18.67	20.69	25.71
Primary-Preparatory	6.33	5.66	21.14	23.70	21.68
Secondary	4.18	4.31	17.40	18.34	16.83
Secondary+	3.87	4.97	15.37	17.31	13.49
Economic Activity of Household Head					
Non-Agriculture	5.94	5.27	19.79	22.17	20.55
Agriculture	3.06	2.37	12.12	11.97	23.96

As demonstrated in Table 3.9, household size is consistently positively correlated with all nutrient deficiency indicators. For instance, the protein deficiency rate is only 3 percent for households with one or two members; it increases as household size increases to reach almost 10 percent for households with seven or more members. Furthermore, the educational attainment level of the head of household is negatively correlated with nutrient deficiencies, but to a lesser extent.

The data also demonstrates that ***male-headed households are more likely to suffer from nutrient deficiencies than female-headed households*** (for example, the vitamin A deficiency rate is 22.6 percent for male-headed households compared to 14.9 percent among female-headed households). ***Contrary to poverty measures, households whose head works in agriculture are less likely to experience nutrient deficiencies compared to other households, with the exception of vitamin A deficiency.***

Table 3.10, below, demonstrates that ***nutrient deficiency is highly correlated with both monetary and non-monetary poverty***. At 28.8 percent, the protein deficiency rate for the ultra poor is approximately 5 times the national rate, and 7 times the rate for the non-poor (4.6 percent). Similarly, the prevalence rate for protein deficiency among the multi-dimensional poor is nine times that of the non poor (28 percent versus 3 percent, respectively).

Table 3.10: Nutrient Deficiency Rate by Different Deprivation Indicators

	Protein	Carbohydrate	Iron	Zinc	Vitamin A
Multi Dimensional Poverty					
Non Poor	3.32	2.72	16.59	17.63	20.79
Poor	28.02	26.90	59.22	63.25	69.06
Income Poor					
Non Poor	3.17	3.27	15.05	16.80	17.35
Poor	17.43	14.00	45.57	45.69	59.79
Extreme Income Poor					
Non Poor	4.61	4.49	18.61	20.28	22.72
Poor	28.81	20.70	63.34	61.02	78.72
DDS					
Poor	14.55	12.39	36.61	37.93	43.05
Moderate	2.32	2.36	15.15	16.56	19.84
High	0.33	0.82	6.44	8.09	5.94
Caloric Deprivation					
Don't Suffer	2.32	1.60	13.35	14.05	17.38
Suffer	21.59	21.18	54.03	58.16	62.21
All Egypt	6.24	5.58	21.63	23.03	26.50

Furthermore, as Table 3.10 demonstrates, food security indicators are highly correlated to each other, individuals suffering from poor dietary diversity and high caloric deprivation are the most likely to suffer nutrient deficiency and the poor are clearly more deprived in terms food security indicators than the non poor.

Economic access to food continues to be the most significant food security concern. At the regional level, indicators used to assess the status of food insecurity are consistent in showing a biased divide towards rural areas and Upper Egypt. The quantitative deficiency in caloric intake is notable (20 percent of the total population) however, the deficiency in dietary diversity is even more compelling (33 percent of the total population). At the governorate level, Assiut demonstrates the worst standards in terms of both the sufficiency and diversity of dietary intake and is estimated to be the second most deprived governorate in sources of iron, zinc and protein, and the most deprived in vitamin A.

The analysis indicates that there is a strong positive correlation between proxy indicators of food insecurity and both monetary and non-monetary poverty levels; as well as between food insecurity indicators and household size. At the same time, multiple sources of income and educational level are negatively correlated to indicators of food insecurity. Results show that casual labourers are more exposed to the risks of food insecurity than others, and workers in the agricultural sector are slightly more inclined to be food insecure than others.

One of the most significant threats to household access to food is persistent inflation in domestic prices of food. In fact, food prices largely explain the food consumption patterns for the poor and near poor in Egypt. In section 5 we present a brief review of the impact of price shocks on the consumption patterns of the poor between 2008 and 2009.

CHAPTER FOUR:
MALNUTRITION AMONG CHILDREN AND YOUTH

Key Messages:

- Malnutrition indicators for children under 5 and youth show that the most pressing and prevalent form of malnutrition among children in Egypt is stunting while overweight is the most prevalent form of malnutrition among youth.
- The prevalence of malnutrition for children below five years of age across governorates and regions suggests that the nutritional status of children in Egypt is not directly related to food access indicators and it is not significantly correlated to the socioeconomic characteristics of the household and is possibly explained by other factors, such as the availability of health services, clean water and sanitation.
- Malnutrition among youth appears more related to the socioeconomic characteristics of the household and is more consistent with food access indicators.
- The incidence of both chronic and short-term malnutrition among Egyptian children under the age of 5 has increased over time.
- There is no significant difference in food utilization between under-fives in urban areas compared to those in rural areas.
- Male children are more likely to suffer from stunting than female children.
- The utilization of food amongst children under five years of age is not significantly correlated to the economic status of the household, or to maternal educational level.
- Further in-depth investigation of the prevalence and causes of malnutrition among children is still needed as the EDHS 2008 did not empirically explain causal factors of malnutrition among children.
- The percent of overweight and obese youth increased in proportion to the educational level of the mother.
- While malnutrition levels are for the most part equivalent, female youth are more likely to suffer from the risks of overweight and obesity than male youth, and youth in the wealthiest quintile are most likely to suffer from obesity.

4 MALNUTRITION AMONG CHILDREN AND YOUTH

The third essential pillar of food security analysis is 'utilization', which refers to household use of the food it has access to, as well as the individual's ability to absorb and metabolize nutrients. This type of analysis also addresses the ways in which foods are stored and processed; feeding practices; food sharing within the household; and the health status of household members, reflected in nutrition indicators (EFSA Guidelines, WFP 2009).

Data from HIECS 2009 lacks direct information on malnutrition; therefore, this study uses data from Egypt DHS 2008 for nutrition indicators related to children below the age of five and youth between 10 to 19 years of age[13]. Given that this section builds its analysis on a sample that is different from that of HIECS 2009, it is not possible to use nutrition data from DHS 2008 in assessing the causality between malnutrition indicators and household profiles or other access indicators of the household. Accordingly, this review only compares the main nutritional outcomes to the assessed status of food security across regions and governorates.

The prevalence of malnutrition for children below five years of age across governorates and regions suggests that the nutritional status of children in Egypt is not directly related to food access indicators and it is not significantly related to the socioeconomic characteristics of the household and is possibly explained by other factors, such as the availability of health services, clean water and sanitation. Nevertheless, the Egypt DHS 2008 report suggests that the general deterioration in child nutrition may be related to "the abrupt disruption in the supplies of poultry and eggs that followed the culling of millions of chickens and other poultry in response to the avian influenza outbreak Egypt experienced in 2006". ***Malnutrition among youth, on the other hand, seems more related to the socioeconomic characteristics of the household*** and is therefore more consistent with food access indicators. Generally, the deterioration in malnutrition in Egypt is a critical issue that has not been adequately explained to date. Further investigation is required, especially in Frontier governorates, for which the data sample was excessively small.

4.1 THE NUTRITIONAL STATUS OF CHILDREN UNDER 5 YEARS OF AGE

To acknowledge the important role of children in societal and economic development, account for their high vulnerability to food shortages and adverse health conditions, and focus attention on the population group most in need of care and potential intervention, this study complements the analysis of food intake and household economic access to food with the analysis of the nutritional status of infants and young children. Analyzing child nutrition may also yield critical information about intra-household food distribution and the risk of food insecurity among other vulnerable household members, considering that - according to the food security definition given earlier - a household is food secure only when all its members are secure.

Nutritional status is a primary determinant of health and well-being for both children and youth. Malnutrition and stunting in early childhood can lead to life-long learning difficulties and poor health which affect both educational attainment and the potential for future development. Poor nutrition occurs both in developing and developed countries. Not only are as many as 800 million persons worldwide are affected by malnutrition, but also more than half of all childhood deaths in developing countries are related to malnutrition. Malnutrition is not only caused by lack of food, but also may occur as a result of illness, and young children who experience diarrhoea or dysentery are liable to lose weight in the short term. Malnutrition caused by lack of food or ill health, is unequivocally linked to poverty (Osmani 1992; Svedberg 2000). Thus malnutrition may be the outcome of many risk factors for children: it can be the consequence of income poverty, lack of food or of food that is contaminated, poor living conditions, inadequate health services, water and sanitation deprivation, or a combination of these elements.

[13] Results from Egypt DHS 2008 demonstrate a standard error of between 3-5 % for regional data. The Standard Error increases at the governorate level, however ir remains with the acceptable range.

4.1.1 Measuring Children's Nutritional Status

The anthropometric measurements obtained in the EDHS 2008 for children less than five years of age were used to construct the three standard indices of physical growth: stunting, wasting and underweight.

Low height for age indicates stunting (insufficient height relative to age) and implies long-term malnutrition and poor health. Stunting reflects a process of failure to reach linear growth potential as a result of suboptimal nutritional conditions, health conditions, or both. However, this indicator fails to differentiate between a deficit associated with a past event and one associated with a long-term, continuing process. Low weight for height describes wasting and implies recent or continuing current severe weight loss. Wasting which means gaining insufficient weight relative to height or losing weight, is usually a consequence of acute starvation, severe disease, or both (WHO 1995).

Standard Indices of Physical Growth

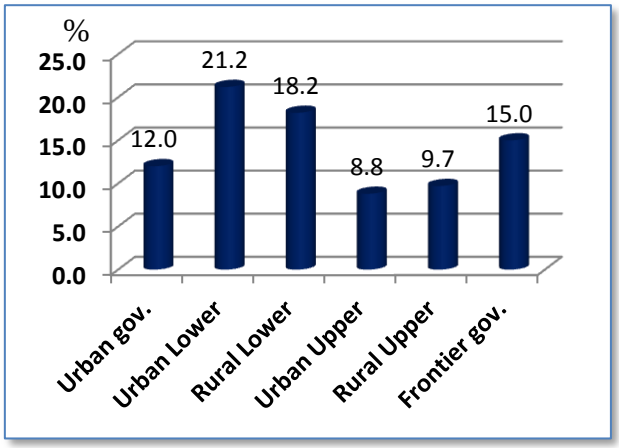
Stunting: the height for age index, and it is a result of a failure to receive adequate nutrition over a long period of time or the effect of chronic illness.

Wasting: the weight for height index, and it is the result of a failure to receive adequate nutrition during the period immediately before the survey or acute food shortage.

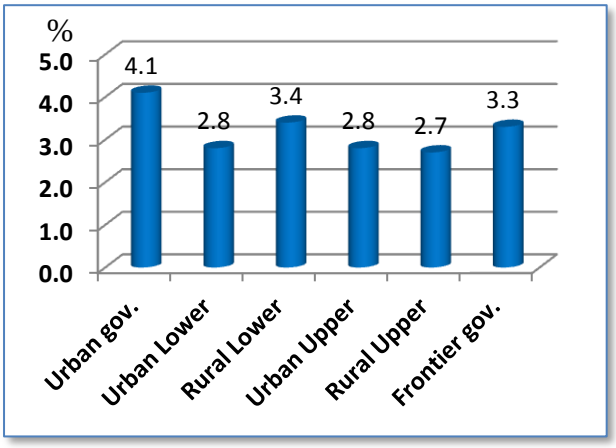
Underweight: the weight for age index, and it is a composite index of stunting and wasting.

Figure 4.1: Malnutrition in Children (Under 5 years of Age), by Region, 2008

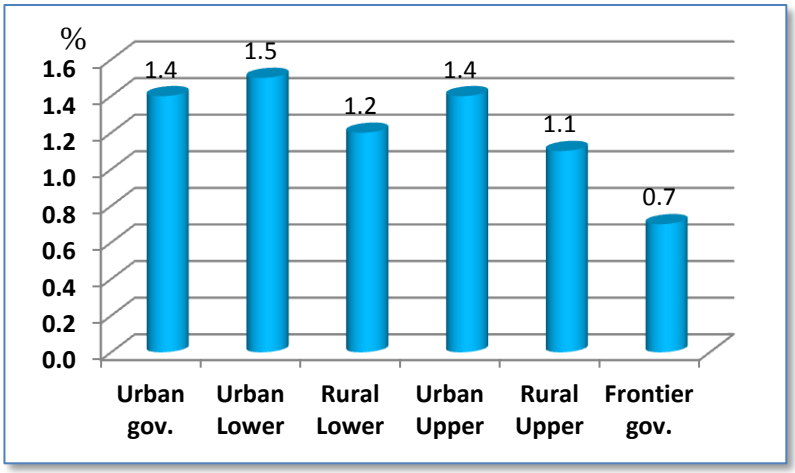
a. Percentage of Severe Stunting in Children



b. Percentage of Severe Wasting in Children



c. Percentage of Severe Underweight in Children

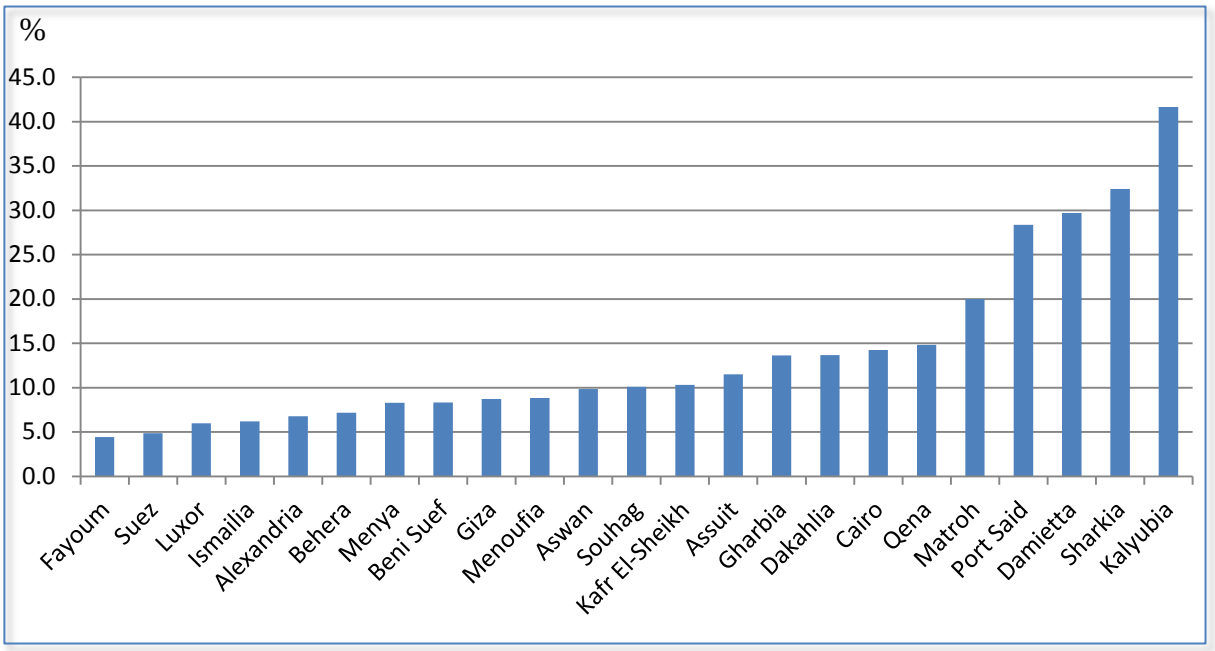


Source: Calculated using data from EDHS 2008.

Children whose measures (height for age, weight for height and weight for age) are below minus three standard deviations (-3 SD) from the median of the reference population are considered severely stunted or severely wasted or severely underweight, respectively. EDHS 2008 data shows that 14 percent of children less than 5 years of age are severely stunted, and 3.2 percent are severely wasted, while 1.3 percent are severely underweight. Looking at the variation with children's characteristics, the data shows that there are no significant differences between children living in urban and rural areas. However, great disparities are observed between regions, where children in the urban areas of Lower Egypt were most likely to suffer from chronic malnutrition (21.2 percent are severely stunted) compared to those in urban Upper Egypt (9 percent). The prevalence of wasting and underweight are far less worrying, and the data shows that children in urban governorates suffer the most from short term malnutrition (4.1 percent are severely wasted) as shown in Figure 4.1.

Results indicate that male children are more likely to suffer from stunting than female children (16 percent stunting for males, as opposed to 12 percent stunting for females). ***Considering the wealth status*** of children and its effect on their nutritional level, EDHS 2008 data shows that no great differences are observed according to wealth status. However, the wealthiest children are somewhat more likely to suffer from chronic malnutrition, where 15 percent of children less than 5 years of age in the wealthiest quintile are stunted children, compared to 13 percent among those in the first quintile. These figures reached 3 percent and 4 percent respectively for wasted children. Surprisingly, the educational attainment level of mothers has no significant impact on the nutritional status of children.

Figure 4.2: Severe Stunting Rates for Children (Under 5 years of age) by Governorate, 2008



Source: Calculated using data from EDHS 2008.

Figure 4.2 and Table 4.1 demonstrate that Qualiobia (Kalyubia) has the highest rate of severe stunting, while Fayoum has the lowest. Investigating the differences between governorates, the results show that Fayoum governorate has lowest rate of stunted children (4.4 percent) followed by Suez and Luxor. Alternatively, the governorates with the highest stunting rate are those in Lower Egypt (Qualiobia, Sharkia and Damietta). It is noteworthy that despite the fact that Fayoum has the lowest rate of stunting for children, it demonstrates a high rate of wasting in children. Finally, the majority of governorates in Lower Egypt demonstrate low rates of wasting in children and high rates of stunting.

Table 4.1: Percentage of Children (Under 5 years of age) Suffering from Severe Stunting, Wasting or Underweight in 2008

Governorates	Severe Stunting (Height for Age)	Severe Wasting (Weight for Height)	Severe Underweight (Weight for Age)
Urban Governorates	**12.0**	**4.1**	**1.4**
Cairo	14.2	5.8	1.6
Alexandria	6.8	1.2	0.8
Port Said	28.4	3.0	1.5
Suez	4.9	3.7	0.0
Lower Egypt	**18.8**	**3.2**	**1.3**
Damietta	29.7	1.4	0.7
Dakahlia	13.7	0.5	0.5
Sharkia	32.4	1.4	1.1
Qualiobia	41.6	0.2	0.0
Kafr El-Sheikh	10.3	11.2	5.7
Gharbeya	13.6	0.0	0.2
Menoufia	8.8	0.2	0.0
Beheira	7.2	11.9	3.2
Ismailia	6.2	2.3	0.0
Upper Egypt	**9.5**	**2.8**	**1.2**
Giza	8.7	1.5	2.0
Beni Suef	8.3	0.8	0.3
Fayoum	4.4	8.9	0.6
Menia	8.3	4.0	2.0
Assiut	11.5	2.2	1.0
Sohag	10.1	0.9	0.6
Qena	14.8	2.5	0.6
Aswan	9.9	4.2	2.1
Luxor	6.0	0.0	0.0
Frontier Governorates	**15.0**	**3.3**	**0.7**
Total	**14.0**	**3.2**	**1.3**

Source: Calculated by authors using EDHS 2008.

The incidence of both chronic and short-term malnutrition among Egyptian children under the age of 5 has increased over time. Data on the nutritional status of young children presented in the 2005 and 2008 EDHS show chronic malnutrition is notably prevalent amongst Egyptian children, while other indicators of short-term malnutrition are less worrying. The prevalence of stunting in children increased from 6 percent in 2005 to 14 percent in 2008[14].

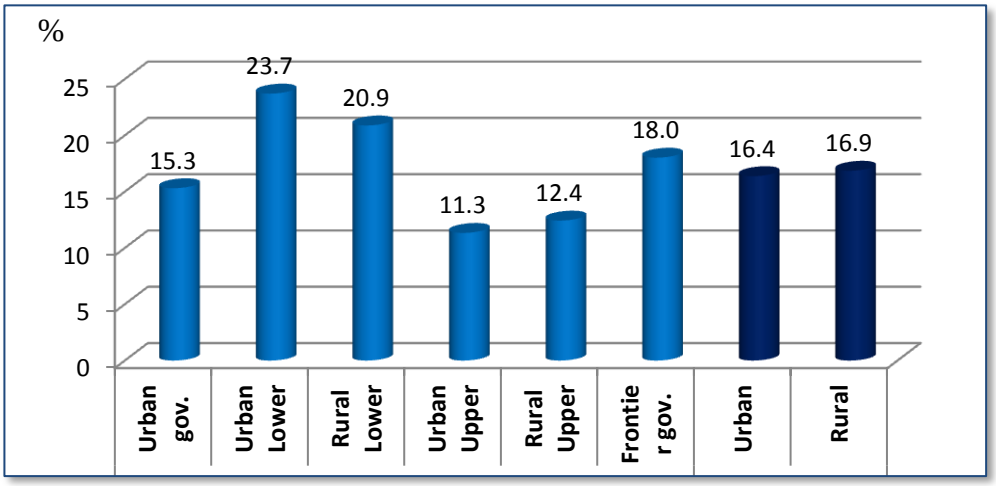
4.1.2 The Malnutrition Index for Children (Under 5 years of age) in 2008

In order to develop a Malnutrition Index representing the utilization of food among children less than five years of age, data on the nutritional status (severe stunting, severe wasting and underweight rates) of these children is combined. This index identifies whether children suffer from any kind of chronic or short-term malnutrition, or both; or stunting, wasting, or being underweight. Using this index, ***the data demonstrates no significant difference in food utilization between under-fives in urban areas compared to those in rural areas, as the average percentage of malnourished children is approximately 17 percent for both areas. The***

[14] Egypt DHS used the new growth curves developed by WHO for 2008; this partially explains the significant change in nutrition indicators between 2005 and 2008.

***governorates demonstrating the worst utilization of food are located in* Lower Egypt**, as shown in Figure 4.3, below. While malnutrition is the least in both urban and rural Upper Egypt, Figure 4.3 shows that nearly one quarter of children under five in urban Lower Egypt (24 percent) suffered from malnutrition, compared to only 11 percent among children in urban Upper Egypt.

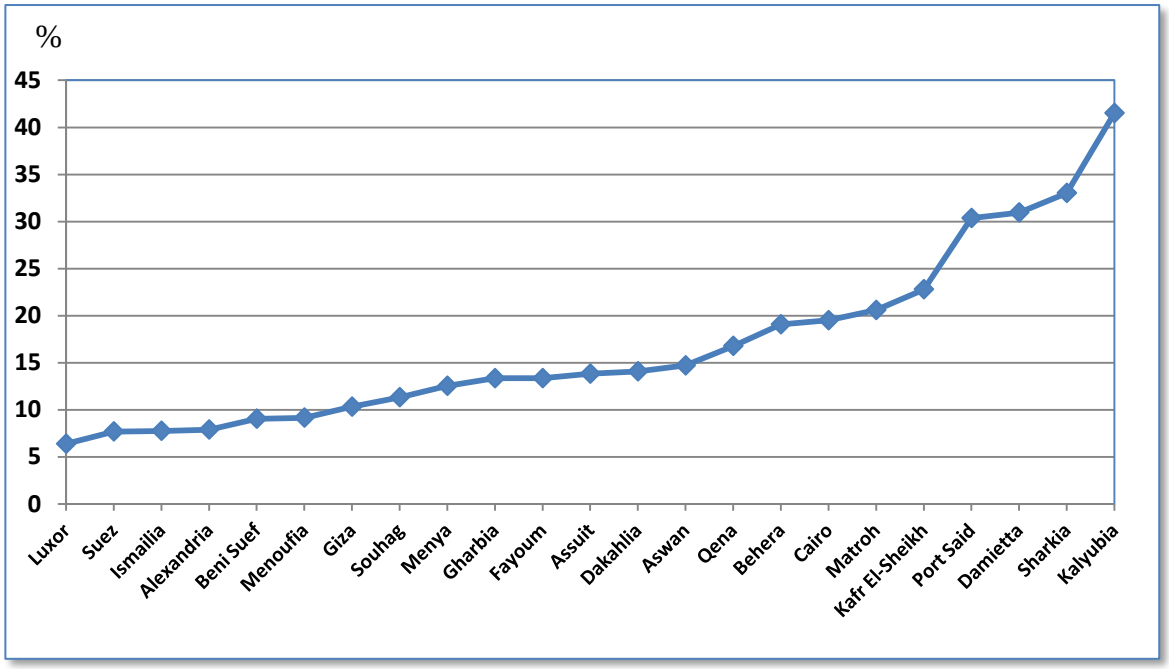
Figure 4.3: Malnutrition Index Results: Percentage of Children Under 5 Suffering from Malnutrition (Severe Stunting, Wasting or Underweight), 2008



Source: Calculated using data from EDHS 2008.

With regards to disparities between governorates, the results of the malnutrition index for 2008 show that the governorates of Luxor and Suez ***demonstrate the best utilization of food among children in 2008***, followed by Ismailia and Alexandria (see Figure 4.4, below). This result is not surprising, given that these governorates also demonstrate the lowest stunting rates in children under five years of age, as well as the lowest rates of wasting and underweight. Table 4.2 provides the Malnutrition Index for Children Under 5, by region.

Figure 4.4: Malnutrition Index Values: Percentage of Children (Under-5 Years of Age) Suffering from Severe Stunting, Wasting or Underweight, by Governorate, 2008



Source: Calculated using data from EDHS 2008.
Note: The sample size for the Frontier governorates was very small, accordingly, their results are not taken as conclusive.

On the other hand, Damietta, Sharkia, Qualiobia, and Port Said have the highest malnutrition scores, and demonstrate the worst utilization of food among children in 2008. ***Against expectations, Upper Egypt governorates performed better than urban governorates and Lower Egypt,*** Table 4.3 shows that Beni Suef, Giza, Sohag, Menia, Fayoum and Assiut demonstrate lower malnutrition scores than governorates in Lower Egypt and Cairo. These results highly contradict the results of income poverty and food consumption indicators; we therefore recommend further investigation of stunting rates in children (under 5), which will be measured in Phase II of this study using anthropometric data collected in HIECS 2011.

Table 4.2: Malnutrition Index for Children Under 5 Years, by Region, 2008

Region	Malnutrition Scores*
Urban Governorates	15.3
Urban Lower	23.7
Rural Lower	20.9
Urban Upper	11.3
Rural Upper	12.4
Frontier governorates	18.0
Total Egypt	16.7

Source: Calculated by authors using EDHS 2008. *The utilization score reflects the gap in nutritional status among children, thus higher scores indicate higher levels of malnutrition among children.

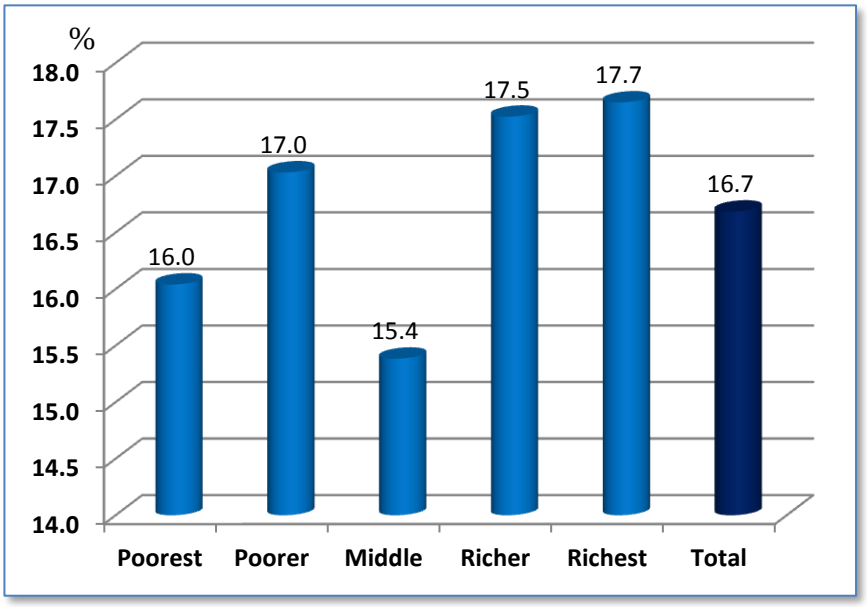
Table 4.3 Governorates Ranked by their Malnutrition Index for Children (Under 5 Years), 2008

Governorate	Rank in 2008
Cairo	17
Alexandria	3
Port Said	19
Suez	1
Damietta	20
Dakahlia	12
Sharkia	21
Qualiobia	22
Kafr El-Sheikh	18
Gharbeya	9
Menoufia	5
Beheira	16
Ismailia	2
Giza	6
Beni Suef	4
Fayoum	10
Menia	8
Assiut	11
Sohag	7
Qena	14
Aswan	13
Frontier Governorates	15

Source: Calculated by authors using EDHS 2008.

The utilization of food amongst children less than five years of age is not significantly related to the economic status of the household (see Figure 4.5, below). Although malnutrition is slightly lower among the poorest quintiles than the richest quintiles, it is lowest for the middle quintile. Data presented in Figure 4.5 shows that the percentage of children who suffered from severe stunting or wasting or underweight in the poorest quintile reached 16 percent, which is less than the average, while this percentage increased to almost 18 percent amongst those in the highest quintiles, while the middle quintile recorded 15.4 percent.

Figure 4.5: Children's Malnutrition Index: Children (Under 5) Suffering Severe Stunting, Wasting or Underweight by Economic Status, 2008



Source: Calculated using data from EDHS 2008.

The maternal educational level does not affect the utilization of food among children under five years of age, with the data demonstrating that regardless of the mother's educational level, the percentage of malnourished children is around the national level. Household size also does not appear to have any impact on the utilization of food among children.

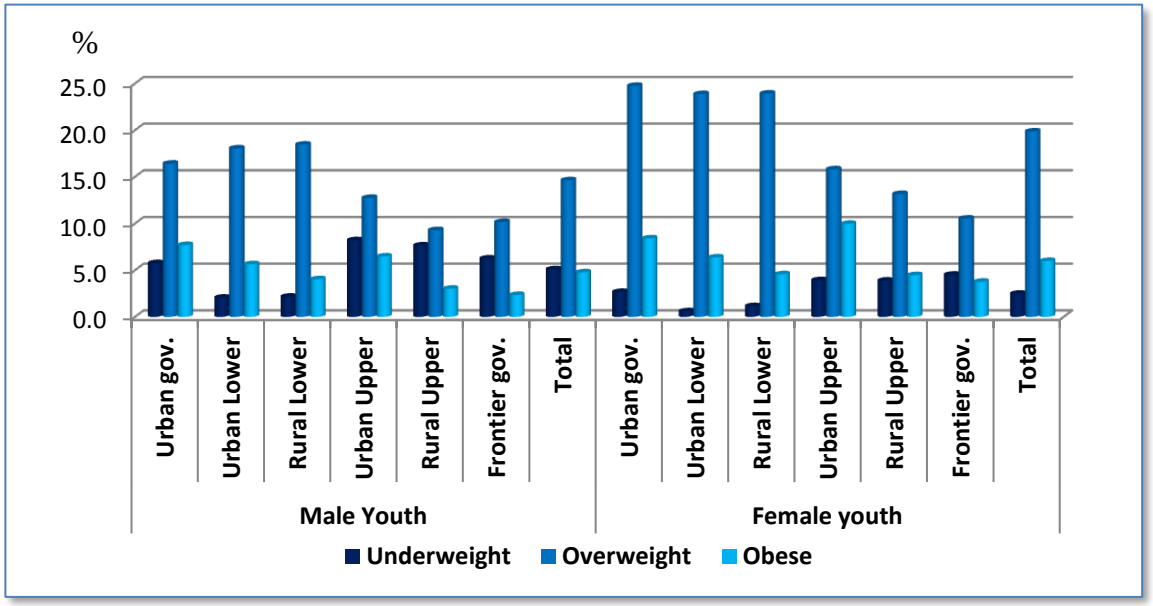
4.2 THE NUTRITIONAL STATUS OF YOUTH (10 TO 19 YEARS OF AGE)

Data on height and weight measurements for male and female youth between the ages of 10 and 19 were collected by EDHS 2008. The Body Mass Index (BMI) was then calculated using these measurements, and the results were evaluated using the age and sex-specific BMI growth charts. Youth whose BMI values are between the 85th and 95th percentile are at risk for overweight; those above the 95th percentile are overweight or obese; and those whose values are below the 5th percentile are underweight.

Table 4.4 shows that the most prevalent form of malnutrition among youth is overweight (17.2 percent) while the prevalence of obesity and underweight are of less concern (5.4 percent and 3.8 percent respectively). From a gender-sensitive perspective, female youth are more likely to suffer from the risks of overweight and obesity than male youth, and are less likely to suffer from underweight. Data from the EDHS 2008 shows that 20 percent of female youth aged between 10 and 19 suffer from the risk of overweight, while this percentage decreased to 15 percent among male youth. On the other hand, 2.5 percent of female youth suffered from underweight, while this percentage increased to 5 percent among male youth.

Figure 4.6, below, shows that male youth in both the urban and rural areas of Upper Egypt and Frontier governorates are more likely to suffer from underweight than those in other regions. On the other hand, the prevalence of overweight reached its highest value among male youth in Lower Egypt and urban governorates. ***The prevalence of malnutrition among female youth mirrors their male counterparts***.

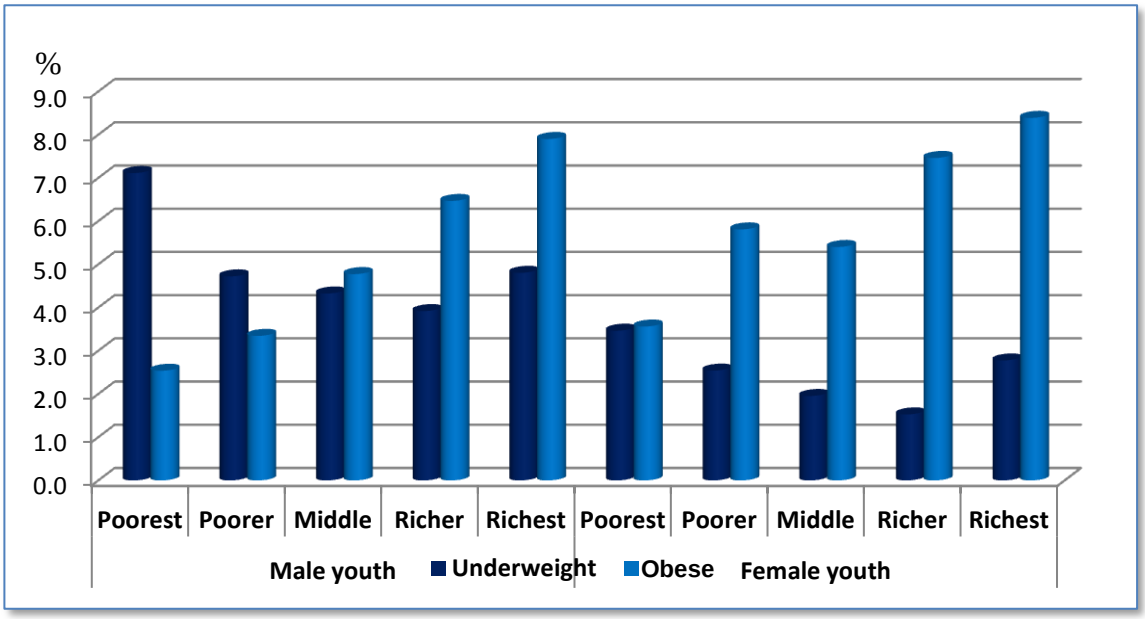
Figure 4.6: Percent of Underweight, Those at Risk of Overweight and Obese Youth by Region, 2008



Source: Calculated using data from EDHS 2008.

Regarding the impact of economic status on nutritional status of youth, the data demonstrates that youth in the wealthiest quintile are most likely to suffer from obesity. Figure 4.7 shows that the percentage of male youth classified in the overweight category (obese) reached 8 percent among the richest quintile, while this percentage decreased to 2.4 percent among those in the first (poorest) quintile. The same pattern is observed among female youth. The pattern is completely reversed when the category of underweight is considered, where youth in the poorest quintile are most likely to suffer from underweight. Accordingly, underweight is poverty characteristic among youth, while obesity is welfare characteristic among the same age category.

Figure 4.7: Percent of Male and Female Youth Suffering from Underweight and Obesity, by Economic status, 2008



Source: Calculated using data from EDHS 2008.

The percent of overweight and obese youth increased in proportion to the educational level of the mother. Youth with highly educated mothers are more likely to be at risk of overweight. Conversely, the mother's educational status has no impact on the prevalence of underweight among youth.

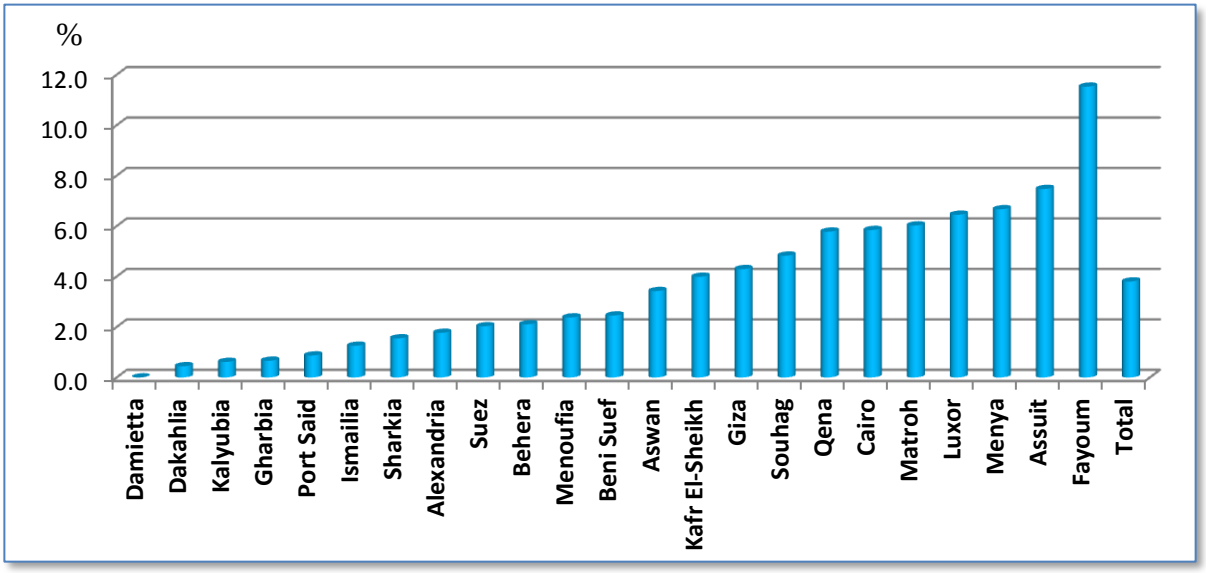
Marked discrepancies are observed in the nutritional status of youth between governorates. Table 4.4, and Figures 4.8 and 4.9 below show that underweight represents less than 2 percent of youth in Lower Egypt, moving up to almost 6 percent in Upper Egypt, and peaking at 11.5 percent in Fayoum.

Table 4.4: Percent of Underweight, at Risk of Overweight and Obese Youth by Governorate, 2008

Governorate	Underweight	Overweight	Obese
Urban Governorates	**4.2**	**20.5**	**8.1**
Cairo	5.8	20.7	8.2
Alexandria	1.8	15.3	7.9
Port Said	0.9	43.5	13.9
Suez	2.0	31.8	2.7
Lower Egypt	**1.6**	**21.1**	**4.8**
Damietta	0.0	46.3	12.7
Dakahlia	0.4	21.9	6.6
Sharkia	1.5	23.9	2.6
Qualiobia	0.6	20.6	4.1
Kafr El-Sheikh	4.0	17.6	3.5
Gharbeya	0.7	27.1	5.0
Menoufia	2.4	13.9	6.0
Beheira	2.1	18.2	4.4
Ismailia	1.3	13.4	4.2
Upper Egypt	**5.9**	**12.1**	**5.0**
Giza	4.3	15.7	8.7
Beni Suef	2.5	12.4	4.3
Fayoum	11.5	6.7	1.6
Menia	6.7	10.4	3.0
Assiut	7.5	9.6	5.4
Sohag	4.8	11.8	4.2
Qena	5.8	13.3	5.4
Aswan	3.4	18.5	4.8
Luxor	6.5	11.8	3.2
Frontier Governorates	**5.4**	**10.3**	**3.1**
Total	**3.8**	**17.2**	**5.4**

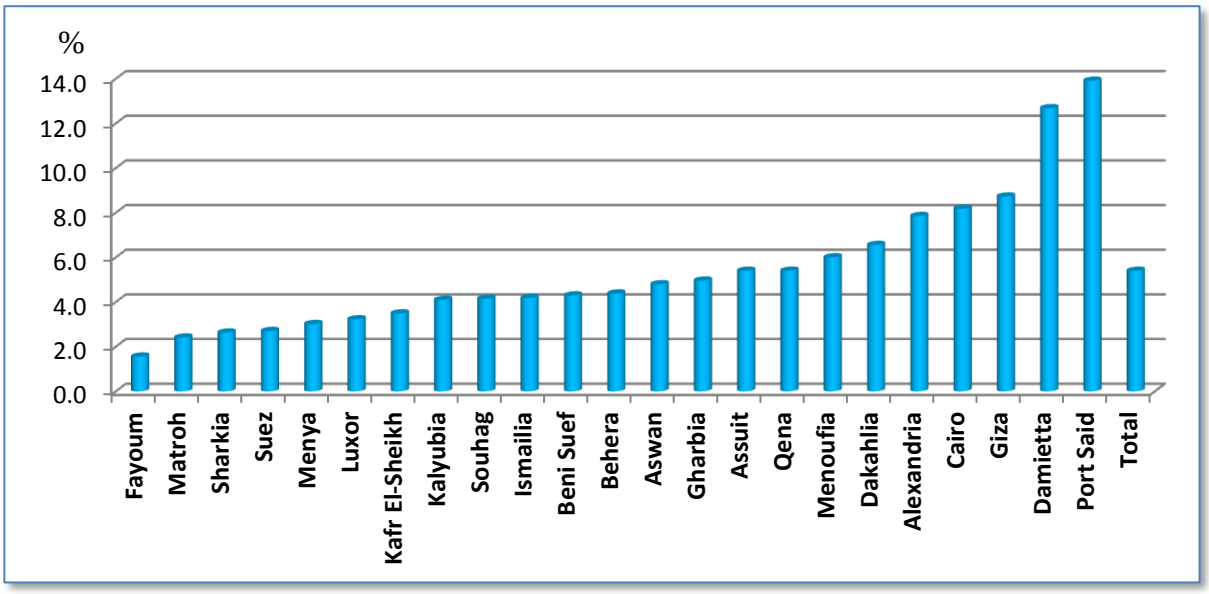
Source: Calculated using data from EDHS 2008.

Figure 4.8: Percent of Underweight Youth by Governorate, 2008



Source: Calculated using data from EDHS 2008.

Figure 4.9: Percent of Obese Youth by Governorate, 2008



Source: Calculated using data from EDHS 2008.

Regarding trends in the nutritional status of youth between 2005 and 2008, the ***EDHS data shows that there is a slight improvement in the numbers of youth at risk of overweight or obesity between 2005 and 2008.*** Almost 19 percent of youth were at risk of overweight in 2005, while this percentage decreased to 17 percent among youth in 2008. These percentages reached 7 percent and 5 percent respectively for the risk of obesity. However, the percentage of underweight among youth increased by slightly more than one percentage point during the observed period.

4.2.1 Development of the Malnutrition Index for Youth

In order to develop a Malnutrition Index representing the utilization of food among youth between 10 and 19 years of age, data on the malnutrition status (i.e., underweight, risk of overweight and obesity) of youth was combined. Table 4.5, below, shows that the prevalence of malnutrition among youth is highest in Damietta and Port Said, followed by Suez and Cairo. On the other hand, malnutrition among youth was the lowest in Ismailia, Beni Suef and Fayoum.

Table 4.5: Percent of Malnourished Youth (Underweight, at Risk of Overweight or Obesity), by Governorate, 2008

Governorate	Malnutrition Index
Cairo	34.8
Alexandria	24.8
Port Said	57.9
Suez	36.9
Damietta	59.0
Dakahlia	28.9
Sharkia	28.1
Qualiobia	25.3
Kafr El-Sheikh	25.1
Gharbia	32.7
Menoufia	22.3
Beheira	24.7
Ismailia	18.8
Giza	28.7
Beni Suef	19.2
Fayoum	19.8
Menia	20.1
Assiut	22.5
Sohag	20.8
Qena	24.5
Aswan	27.0
Luxor	21.5
Frontier Governorates	18.5
Total	**26.4**

Source: Calculated using data from EDHS 2008.

Malnutrition indicators for children under 5 and youth show that the most pressing and prevalent form of malnutrition among children in Egypt is stunting while overweight is the most prevalent form of malnutrition among youth. The prevalence of stunting is not specific to certain governorates or regions, however stunting among children is more prevalent in Lower Egypt (Qualiobia, Damietta and Sharkia). As for overweight, it is more prevalent among youth in Lower Egypt and Urban Governorates, where poverty rates, food insecurity and caloric deprivation are generally lower.

Various studies that investigate the underlying causes of malnutrition among children (under five years) in Egypt confirm a non-significant correlation between the prevalence of malnutrition (and specifically stunting) among children and the area of residence or other socioeconomic variables. However, they suggest a positive relation between the height of the mother, sex of child, young age of mother, overweight/underweight of mother, antenatal visits and prevalence of diarrhoea. This means that other – non socioeconomic- factors are possibly related to the wide prevalence of stunting among children like environmental factors, availability of health facilities, unhealthy feeding habits and lack of awareness on proper dietary diversity (N.D. Doodoo 2011, UNICEF 2011, Khalid Khatab 2010 and Zottarelli et al 2007). Generally, most of the studies are based on data from EDHS 2008 and the results do not conform to common knowledge of the situation in the studied regions/governorates in Egypt. Further in-depth investigation of the prevalence and causes of malnutrition among children is still needed as the EDHS 2008 did not empirically explain causal factors of malnutrition among children. At the same time, malnutrition indicators for youth appear more consistent with the status of food insecurity and poverty across regions and governorates.

Generally, malnutrition is an area of major concern in Egypt that deserves wider attention. The GoE has structured a National Nutrition Strategy (2007-2017) that was translated into an operational plan during 2010. WFP has been working with the GoE in various projects related to the operational plan, mainly the fortification of subsidized balady bread with iron and folic acid, and fortification of subsidized cooking oil with vitamin A and vitamin D. Nevertheless, concerted and intensified efforts to implement the national operational plan are needed.

CHAPTER FIVE:
VULNERABILITY AND ITS CORRELATES

Key Messages:

- Rural areas in all regions have higher poverty measures than their urban counterparts, and poverty measures in Rural Upper Egypt are above the national average.
- The likelihood of experiencing income poverty increases as household size increases.
- The gender of the household head alone does not result in significant differences in poverty rates.
- The data indicates that approximately 11.8 percent of the population in Egypt is in extreme multi-dimensional poverty, i.e., deprived in at least three out of the eight dimensions of deprivation, regardless of which dimensions were identified.
- The ability of households to withstand shocks declines as they expand in size.
- Data from HIECS 2009 reveals that vulnerability is associated with harmful coping strategies such as child labour and low school enrolment.

5 VULNERABILITY AND ITS CORRELATES

Vulnerability is a forward-looking concept aimed at assessing community and household exposure and sensitivity to future shocks. Ultimately, the vulnerability of a household or community is determined by its ability to cope with various types of risks such as droughts, floods, crop blight or infestation, economic fluctuations, and political conflicts. The ability to withstand these shocks is largely determined by the characteristics of households and their communities; such as their poverty level, ownership of assets, type of livelihood, stability of main sources of income, educational and skill level as well as the frequency and intensity of previous shocks. While an understanding of how households cope is important, knowing how resilient they are in the face of future shocks is even more important.

This section is divided into two parts: 1) the study of poverty and its determinants, and 2) an assessment of vulnerability to food insecurity at the governorate level. In order to assess vulnerability to food insecurity it is essential to study poverty, whether income poverty or multi-dimensional poverty because as chapter two of the report demonstrates, household access to food remains the most significant food security concern, and the purchasing power of households is a key determinant of food security in Egypt. Accordingly, the ability of households to cope with risks and shocks is believed to be highly correlated with their poverty levels.

The second part provides an assessment of vulnerability to food insecurity in all governorates. This is carried out using two methods; the first applies logistic regression in estimating the probability of a household being at high risk of caloric deprivation, as a proxy indicator of food insecurity. The second method combines various dimensions (indicators) that are associated with food insecurity using principal component analysis, and uses the results to calculate vulnerability scores for households which are then distributed into quintiles that classify them into very high, moderate, low or very low vulnerability groups.

5.1 THE STATE OF POVERTY

There is no uniform approach to defining, identifying or measuring poverty. The poverty debate is concerned with the different potential causes of poverty, and the various ways by which poverty can be measured and compared, nationally and internationally.

The monetary approach is the most traditional and widely used approach in identifying and measuring poverty. It defines poverty based on individual income and consumption levels, makes use of a standardized poverty line, and reduces poverty reduction strategies to increasing individual income levels (Vandemoortele, 2000).

Box 5.1: Aggregate Poverty Measurements

Three aggregate poverty measures are commonly used: incidence, depth, and severity. These are captured by the standard three Foster-Greer-Thorbecke (1984) decomposable poverty measurements: P0, P1, and P2.

1. The head count index (P0), which measures the prevalence of poverty, denotes the percentage of population that is poor - as defined by the poverty line - as a proportion of total population. This measure is insensitive to the distribution of the poor below the poverty line.
2. The poverty gap index (P1), which measures the depth of poverty, indicates the gap between the observed expenditure levels of poor households and the poverty line. Assuming perfect targeting of transfers, this poverty gap index reflects the minimum amount of consumption that need to be transferred to pull all the poor up to the poverty line.
3. The poverty severity index (P2) measures the degree of inequality in distribution below the poverty line, giving greater weight to households at the bottom of the expenditure (or income) distribution.

Standard monetary approaches to poverty which focus on increasing the individual income level ignore the fact that some household members are discriminated against and may not be given a proportional share of household income. For instance, when children work, a family's income often rises above the poverty line, however these children have no decision-making power regarding how this money is spent. Despite the fact that these children are deprived, according to the traditional income approach, they would not be considered poor.

Furthermore, the monetary approach neglects to note that human well-being also depends on non-market-based goods. Access to basic services and a safe environment for play are generally more dependent on the level of local provision than on household income. Thus, individuals cannot purchase these goods even if they have sufficient income.

Over time, several development organizations and scholars have argued that poverty is a phenomenon that cannot be defined solely in monetary terms. They recognize that poverty is multifaceted and cannot be measured and resolved through purely monetary means. In particular, organizations working in human development view poverty as a problem that requires comprehensive strategies in order to effectively address its many features. These recent developments augment the monetary approach to measuring poverty by considering other non-monetary factors, including household structure, gender, and age. This approach considers the social context as a whole, including the distribution of power and resources.

The monetary and non-monetary approaches to defining poverty should be seen as complementary approaches that, used together, provide a richer range of information than either approach alone. Therefore, in the following section, the report reviews both income and multidimensional poverty in and across all governorates.

5.1.1 Income Poverty

The income approach views poverty as income (or consumption) deprivation. Hence, poverty is caused because some people have low income levels that cannot satisfy their minimum basic needs as defined by the poverty line. The poverty line is the cost of basic food and non-food needs that reflect the consumption patterns of the poor. The consumption-based measure is produced according to internationally accepted standards and is based on data collected in HIECS. The focus is placed on consumption – rather than income – because it is much easier to measure. Both food and non-food items are included, but public services are not addressed.

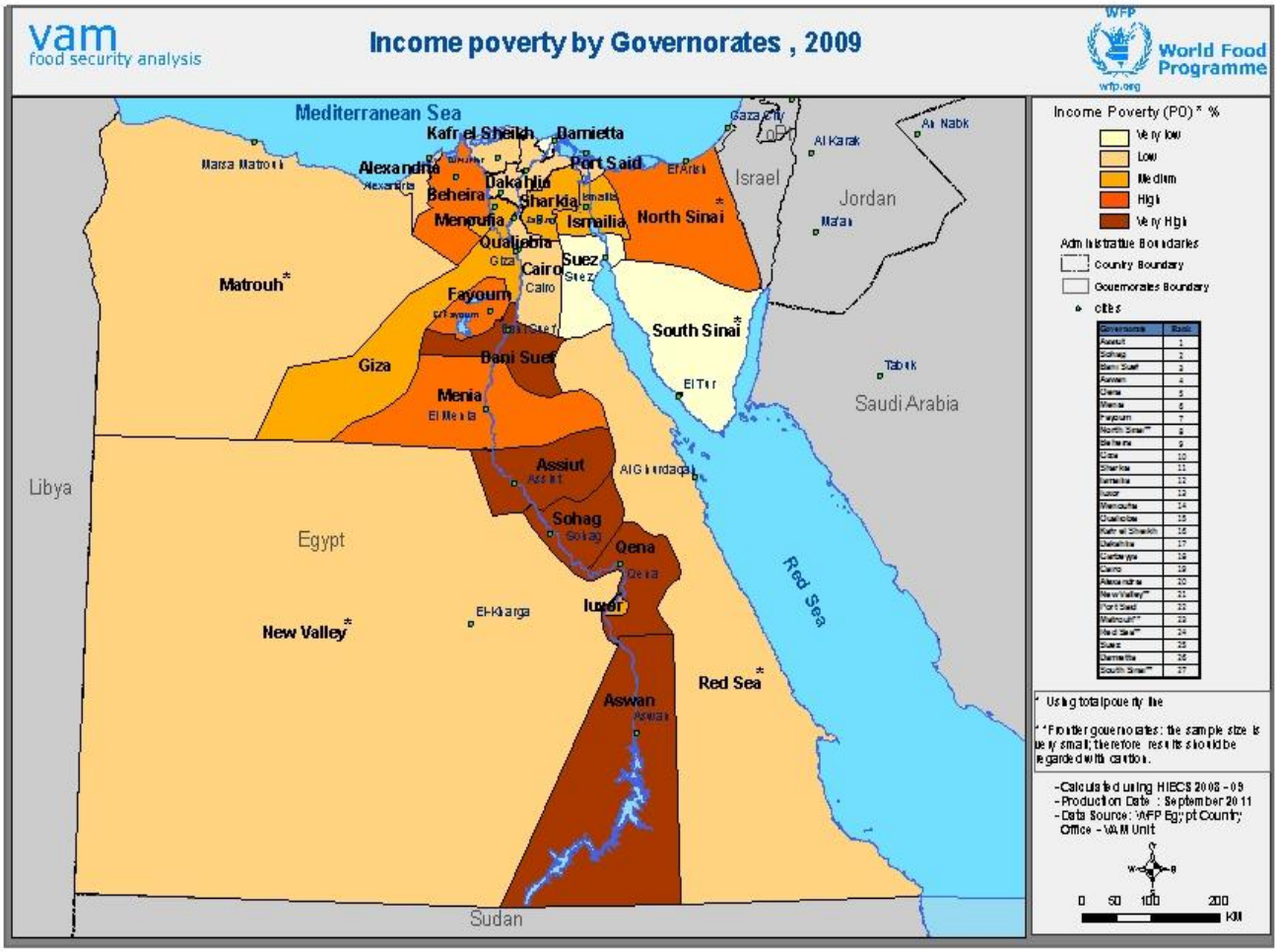
The poverty line in Egypt is constructed using the 'cost of basic needs' methodology. This methodology yields household-specific, regionally consistent, and unbiased absolute poverty lines (World Bank, 2007). Two poverty lines were constructed to measure poverty in Egypt. One is based on the cost of a minimum diet, called the food poverty line and individuals who live in households below this line are considered extremely poor. The second poverty line constructed combines the cost of food with essential non-food expenditures. This is referred to as the total poverty line and individuals in households that spend less than this amount are considered poor (see Annex 1).

In 2009, an individual who spent less than LE 2,223 per year (LE 185 per month) in Egypt was defined as poor, while an individual who spent less than LE 1,648 per year (LE 137 per month) was defined as extremely poor. There are various poverty lines estimated for various household sizes, the age of household members, and regional differences in relative prices. Data from HIECS 2009 shows that there are 16.3 million people who live in households that spend less than the minimum level needed to meet basic needs, representing 21.6 percent of the population.

Overall poverty masks differences in welfare among regions and among governorates. The incidence of poverty is highest in rural Upper Egypt where 43.7 percent of the population is

classified as poor. However, poverty in the urban counterpart of Upper Egypt declines to 21.3 percent and it declines to further to 6.9 percent in Metropolitan Governorates, see Map 2, below.

Map 2: Income Poverty in Egypt, 2009.



Differences in poverty measures across regions are statistically significant. The ranking of regions remains unchanged for other measures of poverty, indicating that not only do poor households in Rural Upper Egypt represent large proportions of the population in that region, but also that their expenditure levels are far below the poverty line. In general, ***rural areas in all regions have higher poverty measures than their urban counterparts***, and the highest prevalence of income poverty is found in the rural areas of Assiut (68.2 percent).

The likelihood of experiencing income poverty increases as household size increases. Households with seven or more members have the highest poverty rate, at nearly 45.5 percent. The risk of poverty is high among households with three or more children, where risk to poverty is as high as 40.7 percent. Poor persons living in households with three or more children comprised nearly one third of the overall poor. The educational level of the household head is inversely correlated with poverty, regardless of household type (having children or not). Household heads who have not completed a primary education are three times more likely to be poor than household heads who have at least a secondary education.

The gender of the household head alone does not result in significant differences in poverty rates. Poverty rates of female-headed households (18.5 percent) are only slightly lower than male-headed households (21.9 percent). Female-headed households with more than three children however, were twice as likely to be poor in both urban and rural areas (36 percent and 37percent, respectively).

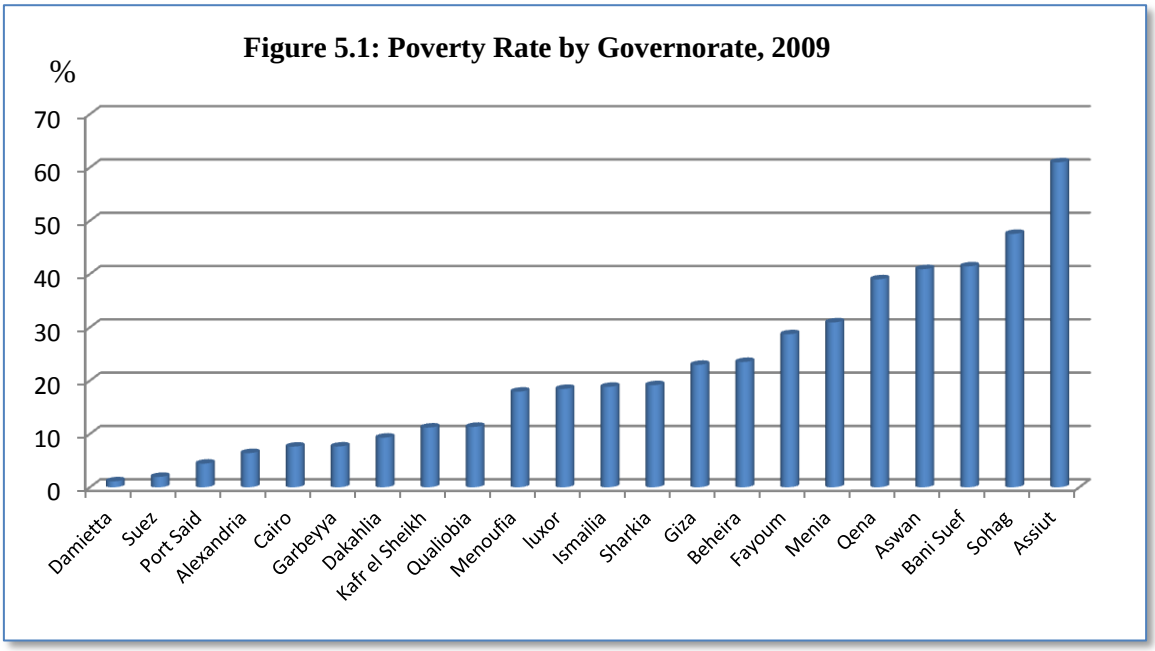
Regional poverty measures mask significant differences across governorates. The incidence, depth and severity of poverty vary considerably within each region. Table 5.1 and Figure 5.1 represent show poverty measures for regions and governorates in urban and rural areas.

Table 5.1: Estimated Average Per Capita Food and Total Poverty Line (LE per year), and Corresponding Poverty Measures by Region, 2009

Region	Food Poverty Line: LE/person/year	Total Poverty Line: LE/person/year	Food Poverty Line			Total Poverty Line		
			Poverty Rate: P0	Poverty Gap Index: P1	Severity of Poverty Index: P2	Poverty Rate: P0	Poverty Gap Index: P1	Severity of Poverty Index: P2
Metropolitan	1,715	2,284	1.46	0.22	0.06	6.88	1.14	0.31
Lower Urban	1,613	2,177	0.79	0.09	0.02	7.30	0.94	0.20
Lower Rural	1,687	2,278	2.50	0.26	0.05	16.67	2.33	0.52
Upper Urban	1,581	2,158	6.28	1.03	0.26	21.29	4.34	1.32
Upper Rural	1,602	2,170	15.55	2.54	0.67	43.67	9.48	3.02
Egypt	1,648	2,223	6.05	0.93	0.24	21.56	4.10	1.20

Source: Calculated using HIECS 2009.

Figure 5.1: Poverty Rate by Governorate, 2009



Source: Calculated using data from HIECS 2009.

Table 5.2, below, shows poverty measures among governorates in both rural and urban areas. Rural areas in Assiut are characterized by the highest poverty rate (68.2 percent), followed by the rural areas of Sohag (51.3 percent), Aswan (49.6 percent) and Beni Suef (44 percent). The table also demonstrates that, with the exception of Luxor, poverty indices for Upper Egypt exceed the corresponding indices at the national level. Across urban areas, urban Assiut is the poorest (38.7 percent), followed by Qena (34.8 percent) and Beni Suef (33.4 percent), where one person out of three is poor. The same pattern holds for the poverty gap and severity indices. Among Lower Egypt, the poverty rate is highest in Beheira (23.5 percent of its population are poor) and Sharkia (19.5 percent), also, the severity of the poverty incidence is highest in Beheira, followed by Ismailia and Sharkia.

Table 5.2: Poverty Rate by Governorate; 2009

Governorates	P0			P1			P2		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Urban Governorates	6.39		6.39	1.07		1.07	0.29		0.29
Cairo	7.62		7.62	1.27		1.27	0.34		0.34
Alexandria	6.41		6.41	1.02		1.02	0.27		0.27
Port Said	4.43		4.43	0.93		0.93	0.31		0.31
Suez	1.94		1.94	0.28		0.28	0.08		0.08
Lower Egypt	7.55	16.65	14.16	0.99	2.33	1.97	0.21	0.52	0.44
Damietta	1.20	1.05	1.11	0.23	0.11	0.16	0.06	0.02	0.03
Dakahlia	4.82	10.99	9.30	0.66	1.28	1.11	0.13	0.25	0.22
Sharkia	10.76	21.61	19.15	1.16	2.84	2.46	0.18	0.59	0.50
Qualiobia	3.43	16.83	11.33	0.46	2.52	1.68	0.11	0.59	0.40
Kafr el Sheikh	5.56	12.61	11.20	0.63	1.99	1.72	0.08	0.48	0.40
Gharbeya	5.24	8.60	7.64	0.54	1.02	0.88	0.09	0.20	0.17
Menoufia	9.39	19.90	17.93	1.26	2.91	2.60	0.27	0.66	0.59
Beheira	17.64	24.87	23.51	2.60	3.56	3.38	0.66	0.80	0.77
Ismailia	12.14	23.90	18.84	1.76	4.06	3.07	0.39	1.06	0.77
Upper Egypt	21.49	43.73	37.02	4.39	9.49	7.95	1.34	3.02	2.51
Giza	11.84	37.69	22.97	2.17	8.26	4.79	0.61	2.63	1.48
Beni Suef	33.44	44.03	41.45	5.66	8.07	7.48	1.42	2.22	2.03
Fayoum	15.85	32.12	28.71	2.20	5.48	4.79	0.50	1.36	1.18
Menia	16.13	33.73	30.93	2.89	5.97	5.48	0.71	1.58	1.44
Assiut	38.65	68.21	60.97	9.09	19.16	16.70	3.08	7.14	6.15
Sohag	32.99	51.34	47.54	7.91	11.53	10.78	2.62	3.73	3.50
Qena	34.82	40.12	39.02	7.80	8.08	8.03	2.48	2.53	2.52
Aswan	28.72	49.60	40.92	6.21	11.03	9.03	2.04	3.44	2.85
Luxor	8.39	28.33	18.44	1.22	5.31	3.28	0.25	1.74	1.00
Frontier Governorates	4.32	26.15	10.67	0.81	5.08	2.03	0.21	1.29	0.52
Total	10.98	28.94	21.56	1.97	5.58	4.10	0.56	1.66	1.20

Source: Calculated using HIECS 2009.

The above analysis is very important if geographical targeting of the poor is adopted. The data shows that both urban and rural areas in Upper Egypt (particularly the governorates of Assiut, Sohag and Beni Suef) as well as Beheira in Lower Egypt are the best candidates for targeting the poor. Further desegregation of poverty measures to the district level is needed and will be carried out in Phase II of the study.

5.1.2 Consumption Patterns and Consumer Prices for the Poorest Quintiles

The average expenditure on consumption of persons in the poorest decile is LE 1,466; less than half of the national average, and only 15 percent of the consumption of persons in the richest decile. Food is the dominant item in total expenditure for every decile, in both urban and rural areas (see Table 5.3, below). Expenditure on food represents 44.2 percent of total expenditure for the whole population, however the share of food expenditure increases to 52.6 for the poorest decile, as opposed to 33 percent for the richest decile.

Table 5.3: Consumption Patterns by Decile, 2009

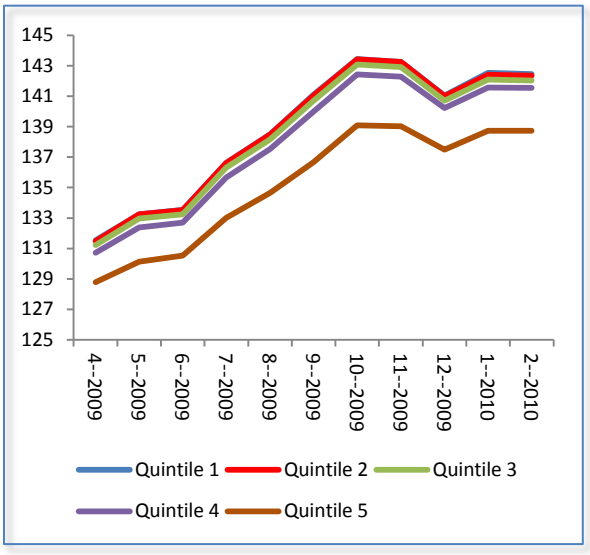
Commodity Group	Deciles										Total
	1	2	3	4	5	6	7	8	9	10	
Food and Beverages	52.6	52.0	51.3	50.6	49.9	48.7	47.7	46.3	44.0	33.0	44.2
Alcoholic Beverages & Cigarettes	3.1	2.9	3.0	2.9	3.1	2.9	2.9	2.7	2.3	1.5	2.5
Clothing, Footwear & Textiles	6.6	6.6	6.5	6.3	6.2	6.2	6.1	6.0	5.8	4.9	5.8
Housing and its Accessories	16.7	16.8	17.0	17.2	17.2	17.3	17.4	17.3	17.3	19.7	17.9
Furniture, House equipment, & Regular Home Maintenance	3.3	3.2	3.2	3.2	3.2	3.2	3.3	3.4	3.6	4.2	3.6
Health Care and Services	3.9	4.3	4.5	4.6	4.9	5.3	5.7	6.0	7.2	9.1	6.5
Transportation	2.3	2.6	2.7	2.9	3.2	3.2	3.4	3.7	4.2	7.6	4.5
Telecommunications	1.3	1.5	1.7	1.9	2.0	2.2	2.4	2.6	3.0	3.6	2.6
Culture and Entertainment	0.9	1.0	1.0	1.2	1.3	1.4	1.5	1.8	1.9	4.1	2.1
Education	1.5	1.9	2.0	2.2	2.3	2.6	2.6	3.0	3.7	5.5	3.4
Restaurants and Hotels	4.8	4.4	4.3	4.1	4.1	4.1	4.1	4.2	4.3	3.9	4.1
Miscellaneous Services and Commodities	3.0	2.9	2.8	2.8	2.7	2.8	2.9	2.9	3.0	2.9	2.9
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Calculated by authors using HIECS 2009 and CPI database, CAPMAS.

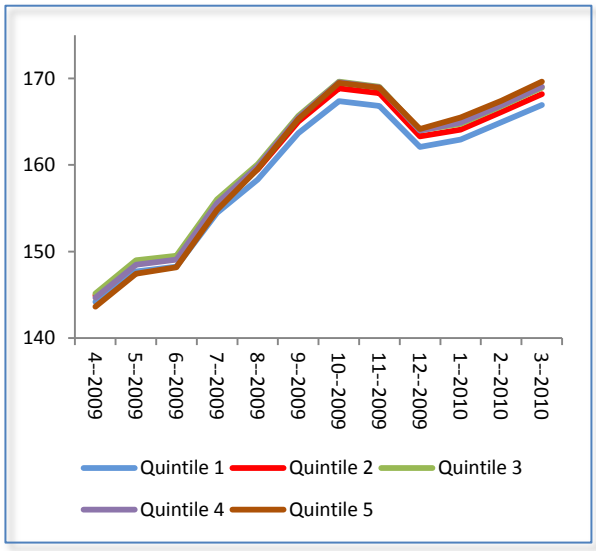
Domestic consumer prices are generally characterized by the following: first; prices are rigid, meaning that with every inflationary wave there is a step up in domestic prices and therefore every wave bears a compounded impact on consumers. Second, inflationary waves – specifically in food prices- have become more frequent, and third; domestic prices have become highly correlated with global prices, meaning that the pass-through of global inflation in food prices to domestic prices is high. Naturally, persistent inflation in consumer prices is likely to have a more adverse impact on the poor. In the following discussion we investigate inflation in consumer prices of commodities purchased by the poor compared to the non-poor, and we find that inflation in the consumer basket of the poorest quintile is higher than that for the richest quintile. The CPI for each expenditure quintile was constructed, using the actual commodity basket consumed by each quintile. Thus, price changes reported by CAPMAS in its monthly bulletin were weighted by the commodity basket of each quintile and the CPI for each quintile was calculated (see Figure 5.2 below).

Figure 5.2: CPI and Food Price Index by Quintiles

1- Overall CPI



2- Food Price Index



Source: Calculated using data from CAPMAS.

The results show that the poorest deciles experienced a faster decline in their living standards as a result of price hikes. For example, in March 2010, CPI inflation for the bottom quintile was approximately 43.5 percent, while the richest quintile experienced lower inflation of 39 percent. Generally, CPI for the poorest two quintiles was the highest and their indices were almost identical, CPI for third and fourth quintiles showed milder increases than the first two quintiles and CPI for the richest (fifth) quintile showed the least inflation rate. However, the food price index shows that inflation in food prices was almost the same for all five quintiles.

We conclude that inflation in consumer prices is a greater threat for the poor not only because of their limited resources but also due to the tendency of their consumer baskets to experience higher increases than the richer quintiles. It is important in that respect to monitor inflation in consumer prices of baskets consumed by the lower quintiles, rather than national or regional price indices, and target price stability of key commodities consumed by the poor. Deeper investigation of markets, trade flows and consumer preferences is needed to explain why CPI for the poorest quintiles has been experiencing higher inflation than richer quintiles.

5.1.3 Multi-Dimensional Poverty

One of the leading non-monetary approaches currently being used is the Multidimensional Poverty Index (MPI), developed by the Oxford Poverty and Human Development Initiative in coordination with the United Nations Development Programme (UNDP) in 2010. The MPI addresses health, education and standard of living, and measures the level of deprivation in these dimensions using ten different weighted indicators.[15]

The MPI was introduced in the Global Human Development Report (HDR) of 2010. It is a simple and policy relevant index that complements monetary-based methods by taking a broader approach, identifying overlapping deprivations at the household level across the same three dimensions as the HDI and shows the average number of people who are poor (suffering a given number of deprivations) and the number of deprivations with which poor households typically contend. It can be deconstructed by region, ethnicity and other groupings as well (see Box 5.2 for more details).

The MPI is grounded in the "capability" approach. It includes an array of dimensions from participatory exercises among poor communities and an emerging international consensus. However, because the measure requires that all data pertain to the same household, the options of dimensions for the measure were limited. Egypt has an advantage in this respect since HIECS collects the information necessary to assess other important dimensions of living standards; on work, empowerment, education, food security and consumption. It is the product of the multidimensional poverty headcount (the share of people who are multi-dimensionally poor) and the average number of deprivations each multi-dimensionally poor household experiences (the intensity of their poverty).

Calculating the MPI requires household level data on all variables included in it. Each household is classified as deprived or not in every dimension (eight), and then the number of dimensions in which a household is deprived is counted. A household is multi-dimensionally poor if it is deprived in at least three out of ten indicators (the cut-off depends on the weight of the specific indicator in the overall measure). The thresholds of cut-offs within each dimension reflect acute deprivations, and are mostly linked to MDGs. Given that HIECS does not provide any information about child mortality and malnutrition, therefore the MPI was constructed without measuring deprivation in those two indicators.

[15] Oxford Poverty and Human Development Initiative, University of Oxford, http://www.ophi.org.uk/policy/multidimensional-poverty-index/

Box 5.2 Calculating the Multidimensional Poverty Index

The MPI uses micro data from household surveys, and all the indicators needed to construct the measure must come from the same survey. Each person in a given household is classified as poor or non-poor depending on the number of deprivations his or her household experiences. These data are then aggregated into the national measure of poverty. A household is identified as multidimensional-poor if, and only if, it is deprived in some combination of 10 indicators (also called dimensions and denoted by $\boldsymbol{d}$) whose weighted sum exceeds a cut-off $\boldsymbol{k} = 3$ or 30 percent of deprivations. The dimensions and their pertinent weights in the **MPI** are:

1. Health (each indicator is weighted equally)
    a. Child Mortality: If child of any age has died in the family
    b. Nutrition: If any adult or child in the family is malnourished.
2. Education (each indicator is weighted equally)
    a. Years of Schooling; if no household member has completed 5 years of schooling
    b. Child Enrolment; if any school-aged child is out of school in years 1 to 8.
3. Standard of Living (each of the six indicators weighted equally)
    a. Electricity; no electricity is poor
    b. Drinking water; MDG definitions
    c. Sanitation; MDG definitions, including that toilet is not shared
    d. Flooring; dirt/sand/dung are poor
    e. Cooking Fuel; wood/charcoal/dung are poor
    f. Assets; poor if do not own more than one of: radio, TV, telephone, bike, motorbike

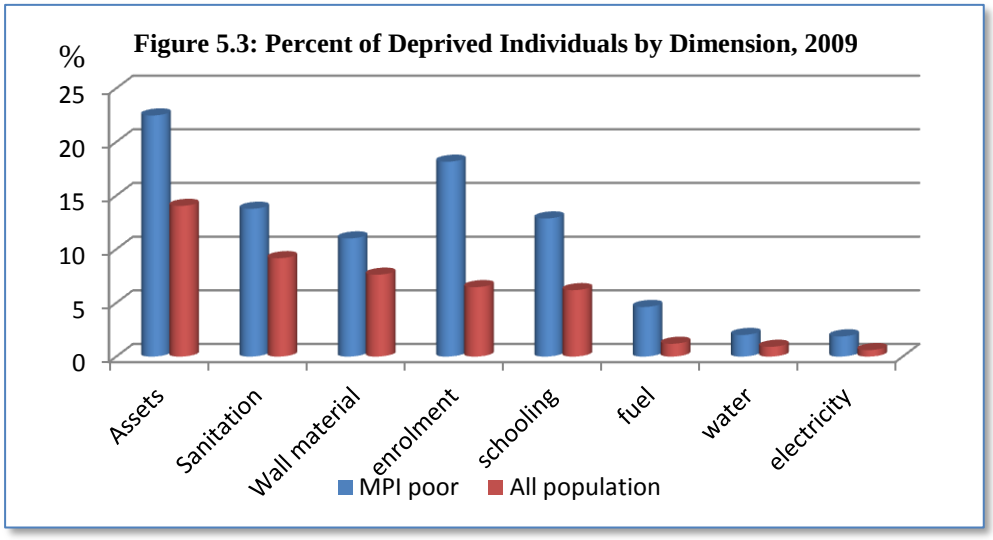
Each person is assigned a score according to his or her household's deprivations in each of the 10 component indicators, ($\boldsymbol{d}$). The maximum score is 10, with each dimension equally weighted (thus the maximum score in each dimension is 3⅓). The health and education dimensions have two indicators each, so each component is worth 5/3 (or 1.67). The standard of living dimension has six indicators, so each component is worth 5/9 (or 0.56). The sum of the weights adds up to the number of dimensions and the MPI is calculated as the product of two numbers: the headcount $\boldsymbol{H}$ or proportion of people who are multidimensional-poor, and the average intensity of multidimensional-deprivation $\boldsymbol{A}$ – which reflects the proportion of dimensions in which households are deprived.: $\boldsymbol{MPI = H \times A}$

The headcount ratio is $\boldsymbol{H = q/n}$, where $\boldsymbol{q}$ is the number of multidimensional-poor people in the population, and $\boldsymbol{n}$ represents the incidence of multidimensional-poverty. As such the MPI defines the proportion of the multidimensional-poor adjusted by the intensity of their poverty and thus satisfies many desirable properties, including monotonicity, transfer, focus, etc. Moreover, the MPI can be at most equal to the headcount ratio, $\boldsymbol{H}$, when all households that are deprived in $\boldsymbol{k}$ or more dimensions are indeed deprived in $\boldsymbol{d}$ dimensions, thus making the average intensity reach the maximum of 1.

To identify the multi-dimensionally poor, the deprivation scores for each household are summed to obtain the household deprivation, $\boldsymbol{c}$. A cut-off of 3, which is the equivalent of one third of the indicators, is used to distinguish between the poor and non-poor. If $\boldsymbol{c}$ is 3 or greater, that household (and everyone in it) is multi-dimensionally poor. Households with a deprivation count between 2 and 3 are vulnerable to or at risk of becoming multi-dimensionally poor.

5.1.4 Multidimensional Poverty in Egypt

The data indicates that approximately 11.8 percent of the population in Egypt is in extreme multi-dimensional poverty, i.e., deprived in at least three out of the eight dimensions of deprivation, regardless of which dimensions were identified. Figure 5.3, below, shows that deprivation in assets is the most widespread dimension (14 percent), followed by the proportion of people who lack sanitation facilities (9.1 percent). Furthermore, 6.5 percent of Egyptians live in families with at least one child not enrolled in basic education, and 6.2 percent live in households whose members have no basic or higher education. These rates rise considerably if we refine our analysis to capture the poor alone, where 22 percent are deprived of assets, 14 percent are deprived of sanitation facilities, 18 percent live in households where at least one child is not enrolled in basic education, and 13 percent live in households where the head of household is uneducated. Accordingly, utilising the MPI clearly depicts the deteriorated standard of living of the poor.



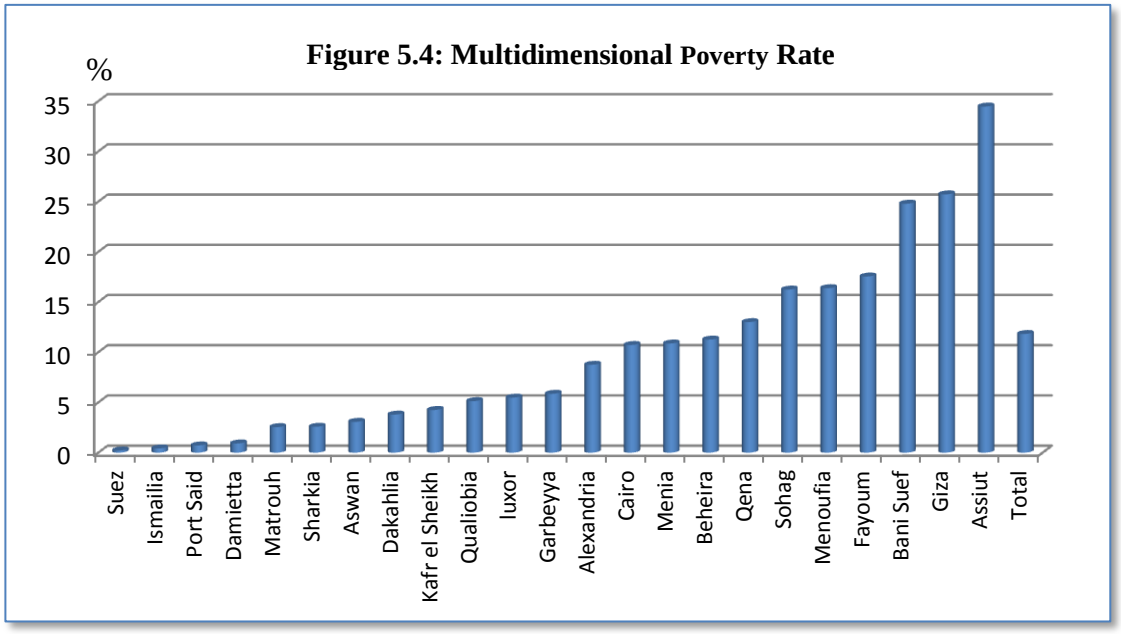
Source: Calculated using data from HIECS 2009.

The attributes and levels of multidimensional poverty differ by Governorate. Table 5.4, and Figure 5.4, below, both show that there is a wide gap in human development indicators and standard of living between governorates.

Table 5.4: Percent of Multidimensional Poor by Governorate, 2009

Governorates	Urban	Rural	All
Urban Governorates	8.12		8.12
Cairo	10.72		10.72
Alexandria	8.75		8.75
Port Said	0.72		0.72
Suez	0.21		0.21
Lower Egypt	5.11	6.46	6.15
Damietta	0.67	1.08	0.92
Dakahlia	1.88	4.52	3.79
Sharkia	4.04	2.15	2.58
Qualiobia	7.36	3.58	5.13
Kafr el Sheikh	3.44	4.45	4.25
Gharbeya	8.42	4.84	5.86
Menoufia	7.39	18.45	16.38
Beheira	9.16	11.74	11.26
Ismailia	0.05	0.70	0.42
Upper Egypt	15.02	21.07	19.24
Giza	19.62	33.79	25.72
Beni Suef	18.70	26.75	24.79
Fayoum	10.31	19.45	17.54
Menia	5.55	11.88	10.87
Assiut	18.64	39.59	34.46
Sohag	12.61	17.19	16.24
Qena	15.68	12.30	13.00
Aswan	3.60	2.68	3.07
Luxor	3.38	7.55	5.48
Frontier Governorates	1.53	6.61	3.60
Total	9.68	13.31	11.82

Source: Calculated using HIECS 2009



Source: Calculated using data from HIECS 2009.

Assiut has the highest prevalence of multidimensional poverty (34.5 percent of the population) where the proportion of those deprived of school enrolment, education and sanitation dimensions is high. Assiut is followed by Giza (25.7 percent) and Beni Suef (24.8 percent) and at the lowest end Suez had the least prevalence of multidimensional poverty among its population (0.21 percent). As was the case with income poverty within governorates, multidimensional poverty is generally more prevalent in rural areas than in urban ones. Both income poverty and multi-dimensional poverty threaten the ability of households to cope with risks to food insecurity, therefore in the next section the relation between those two aspects and vulnerability of households will be thoroughly analyzed.

5.2 VULNERABILITY AND VULNERABILITY PROFILES

Vulnerability to food insecurity defines the possibility of becoming or remaining materially food insecure in the future. The concept of vulnerability emphasizes the uncertainty a household faces about its future well-being, and thus, it refers to a state of insufficient access to economic, social and human assets that provide the basis for generating income and production, either now or in the future. Unlike food security – which is a static view of food availability, accessibility and utilization of food- vulnerability analysis provides dynamic and forward-looking analysis of the impact of shocks on household access to food and the impact on the nutritional status of household members.

The objective of this section is to distinguish between vulnerable and non-vulnerable households and to define the criteria for targeting the highly vulnerable population, in addition to highlighting the key factors contributing to increased vulnerability among households. According to WFP, vulnerability analysis is used to predict the likely impact of a specific shock on the status of food security in different areas, on different livelihoods, and so forth. This study focuses on the likely deterioration in the food security situation of households based on their characteristics, rather than relating the analysis to a specific shock. This is achieved using two methods: one reflects risks to one of the food security indicators (caloric deprivation), and the other combines the key characteristics associated with vulnerability into one index, all weighted according to their relative explanatory power.

5.2.1 Risks of Caloric Deprivation

This section estimates the probability of a household being at high risk to caloric deprivation as a proxy indicator of food insecurity. Using logistic regression, the risk that caloric deprivation will occur in households that are not currently deprived is estimated by fitting caloric deprivation as a function of

household size, main economic activity, employment status, sex of head of household as well as household expenditure level and access to ration cards and baladi bread.

Box 5.3 provides greater detail on the use of logistic regression to estimatee the probability of caloric deprivation. The estimated model has a satisfactory forecasting power in identifying individuals with high risk to caloric deprivation.

Box 5.3 Using Logistic Regression in Estimating the Probability of Caloric Deprivation

Logistic regression is a generalized linear model used for prediction of the probability of the occurrence of a binary variable. Logistic models are useful in estimating the impact of a number of independent variables on the binary variable expressed using probability of occurrence. The coefficients of the independent variables reflect the magnitude of the risk factor born by each independent variable and the sign shows the direction of the relation between the independent variable and the binary variable.

Logistic function: $f(z) = \frac{e^z}{e^z + 1} = \frac{1}{1 + e^{-z}}$

Logistic regression: $z = \beta_o + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots$.

The z variable is shows the probability of particular outcome that is measured by the total contribution of the independent variables used ($x_1, x_2, \ldots$).

The results in Table 5.5, below, show that 72.4 percent of caloric deficient individuals were also identified by the model as caloric deficient. However, the model has a less satisfactory (though acceptable) result in forecasting non-deficiency in caloric intake, which implies higher homogeneity in the characteristics of the caloric deprived population.

Table 5.5: Percent of Correct Classification for Logistic Regression

Observed Caloric Deficiency		Predicted Caloric Deficiency		
		No	Yes	Percentage Correct
	No	119595	54655	68.6
	Yes	12273	32236	72.4
Overall Percentage				69.4

Source: Calculated using HIECS 2009.

One of the benefits of this type of analysis is the ability to assess the impact a change in a particular factor would have on the probability of an individual being caloric-deficient, if all other factors are kept constant. The results of the logistic models are given in Table 5.6, below, including the estimated coefficients, the odds ratio, and marginal effects for explanatory variables included in the model.

Table 5.6: Logistic Regression Results

	B	S.E.	Wald	df	Sig.	Exp(B)
Gender of Household Head	0.421	0.023	344.483	1	0	1.524
Purchases Subsidized Bread	-.578-	0.014	1593.067	1	0	0.561
Holds Ration Card	-.468-	0.014	1180.606	1	0	0.626
Household Head Unemployed	0.385	0.015	666.485	1	0	1.269
Per Capita Expenditure	-2.227-	0.017	17452.98	1	0	0.108
Household Size	0.103	0.002	1964.634	1	0	1.109
Household Head Employed in Agriculture	0.235	0.019	152.99	1	0	1.265
Urban/Rural	0.362	0.014	668.305	1	0	1.436
Single Source of Income	-.295-	0.021	198.547	1	0	7.45E-01
Constant	16.264	0.141	13369.47	1	0	1.16E+07

Source: Calculated using HIECS 2009.

The logistic coefficient could be interpreted as the change in log odds associated with one unit change in the explanatory variable. While the odds ratio has a simpler interpretation in the case of a categorical explanatory variable with two categories, in this case it is just the odds ratio for one category compared to the other. As Table 5.6 indicates, the odds of caloric deficiency for a household with a ration card holder is about half that of a household without a ration card. Similarly, the purchase of subsidized bread has a positive impact on caloric

intake. The more that household livelihood depends on agricultural production and agricultural labour, the higher the probability it will suffer from caloric deficiency. The "risk management aspect" is shown by the fact that (all other factors being equal) households with only a single source of cash income are more likely to be caloric deficient compared to households with several cash sources. The odds ratio increases with household size, and naturally decreases with expenditure (one percent change in expenditure reduces the odds ratio by 2.2 percent).

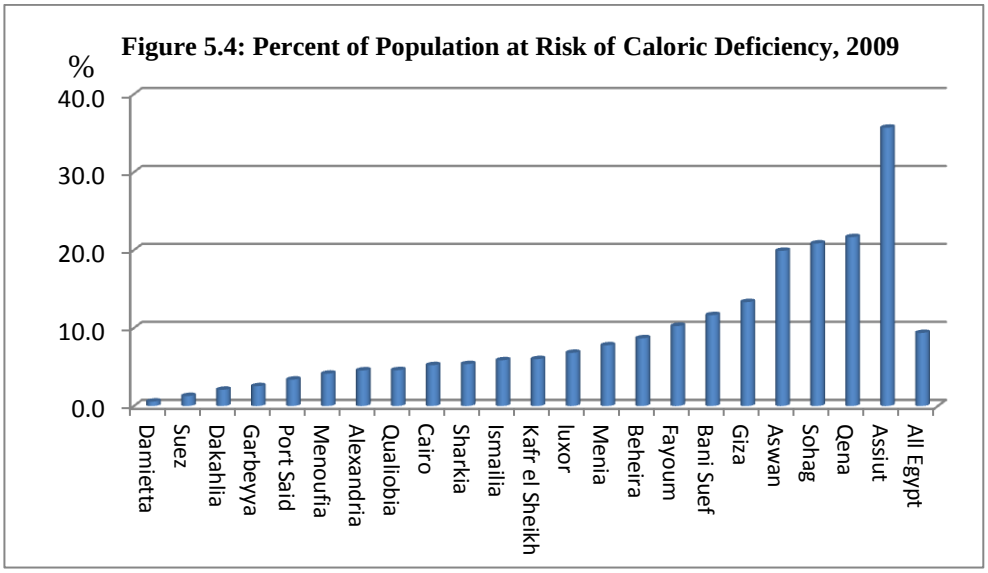
The results of the logistic regression were used to estimate the probability of being caloric deficient, and to identify households at risk of caloric deprivation. Households scoring 50 percent or more are considered at high risk, and households scoring less than 20 percent are classified as having no risk. Households lying between these two categories are considered to have moderate risk to caloric deprivation. As shown in Table 5.7, below, 9.4 percent of the total population are at high risk of becoming caloric deficient, 28.1 percent are at moderate risk, while 62.5 percent are at low risk. Rural residents have a greater risk of becoming caloric deficient (10.5 percent are at high risk and 30.6 percent are at moderate risk) than urban residents (7.8 percent are at high risk and 24.5 percent are at moderate risk)

Table 5.7 Risk to Caloric Deficiency by Governorate, 2009

Governorates	Urban			Rural			All Egypt		
	No Risk of Caloric Deficiency	Moderate Risk of Caloric Deficiency	High Risk of Caloric Deficiency	No Risk of Caloric Deficiency	Moderate Risk of Caloric Deficiency)	High Risk of Caloric Deficiency	No Risk of Caloric Deficiency	Moderate Risk of Caloric Deficiency	High Risk of Caloric Deficiency
Urban Governorates	**77.35**	**18.18**	**4.47**				**77.35**	**18.18**	**4.47**
Cairo	75.59	19.17	5.24				75.59	19.17	5.24
Alexandria	74.24	21.20	4.56				74.24	21.20	4.56
Port Said	82.40	14.22	3.39				82.40	14.22	3.39
Suez	90.31	8.40	1.28				90.31	8.40	1.28
Lower Egypt	**71.34**	**23.86**	**4.80**	**69.99**	**25.34**	**4.67**	**70.47**	**24.86**	**4.68**
Damietta	90.63	7.89	1.47	94.97	5.03	0.00	93.30	6.13	0.57
Dakahlia	77.00	19.93	3.07	81.80	16.49	1.71	80.48	17.43	2.09
Sharkia	59.29	33.42	7.29	64.29	30.89	4.82	63.16	31.46	5.38
Qualiobia	77.89	19.54	2.57	62.87	31.12	6.01	69.04	26.37	4.60
Kafr el Sheikh	76.17	21.92	1.91	68.95	24.00	7.05	70.40	23.58	6.02
Gharbeya	76.82	19.02	4.16	79.30	18.80	1.90	78.59	18.86	2.55
Menoufia	66.59	27.26	6.15	68.93	27.38	3.69	68.49	27.36	4.15
Beheira	49.21	39.52	11.27	61.45	30.45	8.10	59.15	32.16	8.69
Ismailia	71.27	23.27	5.46	61.41	32.40	6.19	65.65	28.47	5.87
Upper Egypt	**50.74**	**33.44**	**15.82**	**45.80**	**36.85**	**17.35**	**47.29**	**35.82**	**16.89**
Giza	60.84	28.56	10.60	48.95	34.09	16.95	55.72	30.94	13.34
Beni Suef	43.66	42.85	13.49	47.49	41.44	11.07	46.56	41.78	11.66
Fayoum	59.64	32.12	8.24	55.77	33.43	10.79	56.58	33.16	10.26
Menia	58.51	31.87	9.62	59.66	32.91	7.44	59.47	32.74	7.79
Assiut	35.23	36.55	28.23	23.94	37.93	38.12	26.71	37.59	35.70
Sohag	35.36	39.35	25.28	39.17	41.14	19.69	38.38	40.77	20.85
Qena	35.14	32.82	32.03	41.17	39.88	18.95	39.91	38.42	21.67
Aswan	38.47	41.07	20.47	43.02	37.46	19.51	41.13	38.96	19.91
Luxor	55.86	40.92	3.23	59.03	30.60	10.37	57.46	35.72	6.82
Frontier Governorates	**72.24**	**14.32**	**8.29**	**57.08**	**33.30**	**9.62**	**67.70**	**26.16**	**6.15**
All Egypt	67.62	24.54	7.84	58.95	30.60	10.45	62.51	28.11	9.38

Source: Calculated by authors using HIECS 2009

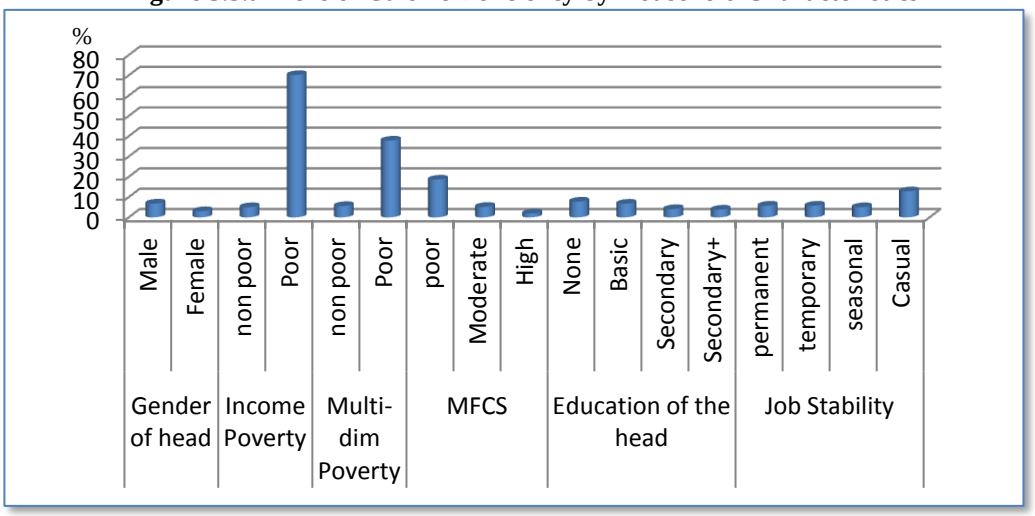
The results above depict wide disparities between governorates. As demonstrated in Figure 5.4 below, residents in Assiut, Sohag, Qena and Aswan are the most vulnerable to caloric deprivation, having highest prevalence of individuals with high risk to caloric deprivation. On the other hand, Damietta and Suez have the lowest prevalence of risks to caloric deprivation among their populations.



Source: Calculated using data from HIECS 2009.

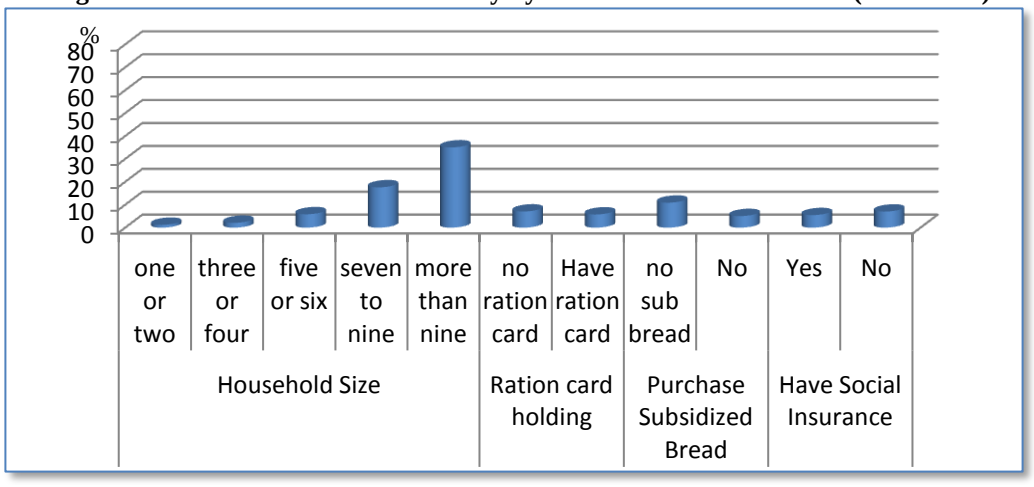
Figure 5.5 a and b demonstrate the risks of caloric deprivation by household characteristics, based on the tabulations of risk levels according to household characteristics, provided in Table 5.8.

Figure 5.5.a Risks of Caloric Deficiency by Household Characteristics



Source: Calculated using data from HIECS 2009.

Figure 5.5.b Risks of Caloric Deficiency by Household Characteristics (Continued)



Source: Calculated using data from HIECS 2009.

Table 5.8: Risk of Caloric Deficiency, by Various Characteristics

	No Risk of Caloric Deficiency	Moderate Risk of Caloric Deficiency	High Risk of Caloric Deficiency	All
Gender of Head				
Male	68.03	25.17	6.80	100
Female	85.14	11.84	3.02	100
Extreme Income Poverty				
Non-Poor	66.97	28.04	4.98	100
Poor	0.89	29.02	70.09	100
Income Poverty				
Non-Poor	76.97	21.59	1.44	100
Poor	9.91	51.84	38.24	100
Multidimensional Poverty				
Non-Poor	68.21	26.22	5.56	100
Poor	20.00	42.19	37.81	100
DDS				
Poor	45.16	36.25	18.59	100
Moderate	69.26	25.58	5.16	100
High	85.92	12.21	1.87	100
Educational Status of Household Head				
None	67.02	25.23	7.74	100
Primary-Preparatory	67.51	25.77	6.72	100
Secondary	76.10	19.83	4.07	100
Secondary+	77.90	18.32	3.78	100
Employment Status of Household Head				
Wage Earner	65.92	26.91	7.18	100
Employer	73.87	21.03	5.10	100
Self-Employed	73.22	21.56	5.22	100
Unpaid Worker	75.00	20.00	5.00	100
Unemployed	76.15	16.15	7.69	100
Out of Labour Force	77.74	16.82	5.45	100
Job Stability				
Permanent Employment	70.88	23.39	5.73	100
Temporary Employment	64.33	29.92	5.75	100
Seasonal Employment	65.00	30.00	5.00	100
Casual Employment	52.11	35.08	12.81	100
Household Size				
1 to 2 Members	93.80	4.96	1.23	100
3 to 4 Members	80.64	17.25	2.12	100
5 to 6 Members	66.56	27.60	5.84	100
7 to 9 Members	39.80	42.59	17.61	100
Over 9 Members	21.45	43.52	35.03	100
Ration Card				
No Ration Card	67.20	25.76	7.04	100
Ration Card	72.63	21.62	5.75	100
Subsidized Bread				
Doesn't Purchase Subsidized Bread	62.01	27.10	10.89	100
Purchases Subsidized Bread	72.95	21.99	5.06	100
Social Insurance				
Yes	73.41	21.12	5.48	100
No	67.73	25.25	7.02	100
Health Insurance				
Yes	70.49	23.50	6.01	100
No	71.10	22.63	6.26	100
All Egypt	70.87	22.96	6.17	100

Source: Calculated using HIECS 2009

Table 5.8, above, shows that male-headed households have a higher risk of caloric deprivation than female-headed households; likewise households whose head is uneducated are at higher risk than households whose head is educated. While there does not appear to be any clear causal relationship between the employment status of the household head and vulnerability to caloric deprivation, nevertheless, the stability of the head's job is highly correlated to the forecasted risk, where 12.8 percent of casual workers are estimated to have high risks of caloric deprivation, opposed by only 5.7 percent of those with a permanent job. The risk increases with larger households and higher poverty levels; 70 percent of the extreme income poor are highly vulnerable to risks of caloric deprivation and 38 percent of the poor are at high risk to caloric deprivation. Similarly, the ***multi-dimensional poor have higher risk to caloric deprivation but to a lesser extent;*** 37.8 percent of the multi-dimensional poor are highly vulnerable. Finally, vulnerability ***is also higher among households with poor DDS (18.6 percent)***.

5.2.2 Constructing the Vulnerability Index

The second method of defining vulnerability combines various dimensions (indicators) that are associated with food insecurity and are therefore chosen to indicate the vulnerability of households to risks of food insecurity. These indicators are combined using principal component analysis into factors that have different variances; the factor with the highest variance best explains the relation between chosen indicators and is therefore used to estimate the weights to be assigned to each of the indicators. The estimated weights are used to calculate the vulnerability score for each household and all scores are then distributed into quintiles that classify households into very high, moderate, low or very low vulnerability groups.

Vulnerability is by definition a multidimensional concept, therefore it is useful to incorporate multiple dimensions and indicators into the analysis, which will expand and enrich the number of vulnerability dimensions. Thus, constructing the index requires:

1. Identifying the underlying dimensions of vulnerability and investigating the interrelationships between different aspects of each dimension;
2. Choosing the most relevant indicators or variables that reflect those dimensions of human development; and
3. Combining these variables in a smaller number of composite indices, preferably one.

This type of analysis always contains a level of subjectivity, whether in selecting the dimensions of vulnerability, or the set of variables that measure each dimension or even the way these variables are combined. Nevertheless, it reflects the capacity of households to manage (prevent, mitigate, and cope) with shocks, which often depends on the use of more "resistant" strategies, alternative sources of income, reserves, savings, social networks, etc.

Box 5.4: Principal Component Analysis

Principal component analysis PCA is used to reduce the complexity of the data set for exploratory purposes. It uses a factor extraction method to form uncorrelated linear combinations of the observed variables. The first component explains maximum variance. Successive components explain progressively smaller portions of the variance and are all uncorrelated with each other.

PCA is one technique of multivariate analysis that applies to continuous variables. The objective of PCA is twofold: to identify and describe the underlying relationships among the variables by creating new indicators (called "factors" or "principal components") that capture the essence of the associations between variables; and to reduce the complexity of the data, saving a limited number of these new variables that is sufficient to keep the most relevant aspects of the description with a minimal loss of detail.

PCA yields as many principal components as there are initial variables. However, the contribution of each principal component to explaining the total variance found among all variables will progressively decrease from the first principal component to the last. As a result, a limited set of principal components explains the majority of the matrix variability, and principal components with little explanatory power can be removed from the analysis. The result is data reduction with relatively little loss of information.

It is recommended to use the rotated solution in most circumstances. Rotation of the result will give a new solution: the new factors explain the same variance and can be much better interpreted as the underlying dimensions. The analyst can understand the "meaning" of each dimension and then decide which of the uncovered dimensions he wants to use in subsequent analyses.

In the Vulnerability Index (VI), weighting is used to linearly combine selected variables into a smaller number of indices. Weights may be arbitrarily chosen as equal or, they may be determined through multivariate statistical techniques such as the Principal Component Analysis (PCA). Principal Component Analysis is commonly used to obtain the appropriate weights for the different variables of the proposed index. The first extracted principal component is the factor that explains the largest percentage of total variance (see Box 5.4, above, on Principal Component Analysis).

Variables in the new vulnerability index include: Food share; Poverty rate and gap; Extreme poverty rate; Multi-dimensional poverty rate; and Absence of health or social insurance. These variables were included in the index by their raw values at the household level. The first principal factor extracted from the PCA was used as the vulnerability index, and it explained 69 percent of the total variation of the included variables. Households were then classified according to their vulnerability index score into 5 quintiles, where each quintile represents 20 percent of the households in the sample, weighted by household size. The first quintile represents the highest vulnerability category, while the last quintile represents the least vulnerable category.

Table 5.9: Distribution of Vulnerability by Governorate, 2009

Governorate	Very High	High	Medium	Low	Very Low
Urban Governorates	6.12	10.97	14.68	20.70	47.55
Cairo	7.19	11.48	14.39	23.15	43.80
Alexandria	6.24	12.45	16.91	18.92	45.48
Port Said	4.41	10.88	12.58	17.11	55.02
Suez	1.92	4.21	11.90	16.61	65.36
Lower Egypt	12.04	19.70	16.23	20.50	27.92
Damietta	1.20	6.79	18.34	42.61	31.06
Dakahlia	7.55	16.33	17.24	23.72	35.16
Sharkia	15.78	24.75	17.08	17.03	2.36
Qualiobia	9.49	17.83	14.33	17.32	41.03
Kafr el Sheikh	9.67	18.95	18.22	29.07	24.09
Gharbeya	5.96	14.97	13.40	21.96	43.71
Menoufia	15.74	22.61	17.10	12.88	31.67
Beheira	20.92	25.72	17.45	17.80	18.11
Ismailia	16.25	19.60	12.06	15.52	36.57
Upper Egypt	35.46	24.16	13.43	10.84	16.11
Giza	22.14	20.00	14.78	17.32	25.77
Beni Suef	39.55	27.33	12.78	7.88	12.46
Fayoum	27.24	30.50	15.55	10.30	16.41
Menia	29.69	27.58	16.10	11.78	14.85
Assiut	59.37	17.57	7.01	5.77	10.28
Sohag	45.62	23.83	12.22	8.22	10.11
Qena	36.98	27.09	14.93	9.54	11.46
Aswan	37.76	24.54	10.57	7.98	19.15
Luxor	17.69	20.47	17.69	12.38	31.76
Frontier Governorates	10.27	16.46	17.75	15.32	40.20
All Egypt	20.00	20.00	15.03	16.85	28.12

Source: Calculated using HIECS 2009

Table 5.9, and Map 3 demonstrates that governorates in Upper Egypt have the greatest risk of high food insecurity. The population of Assiut has an alarming level of vulnerability, with 59 percent classified among the highest vulnerability category, and only 10 percent classified among the least vulnerable category. Conversely, people living in Damietta and Suez are the least vulnerable to risks of food insecurity, with only 1.2 percent and 1.9 percent, respectively, classified within the highest vulnerability category. Although urban governorates like Cairo and Alexandria show a low prevalence of highly vulnerable categories, nevertheless they encompass very poor neighbourhoods and slum areas that can best be identified through a district level analysis, rather than a governorate level analysis.

Map 3: Distribution of Population with "Very High" Vulnerability, 2009

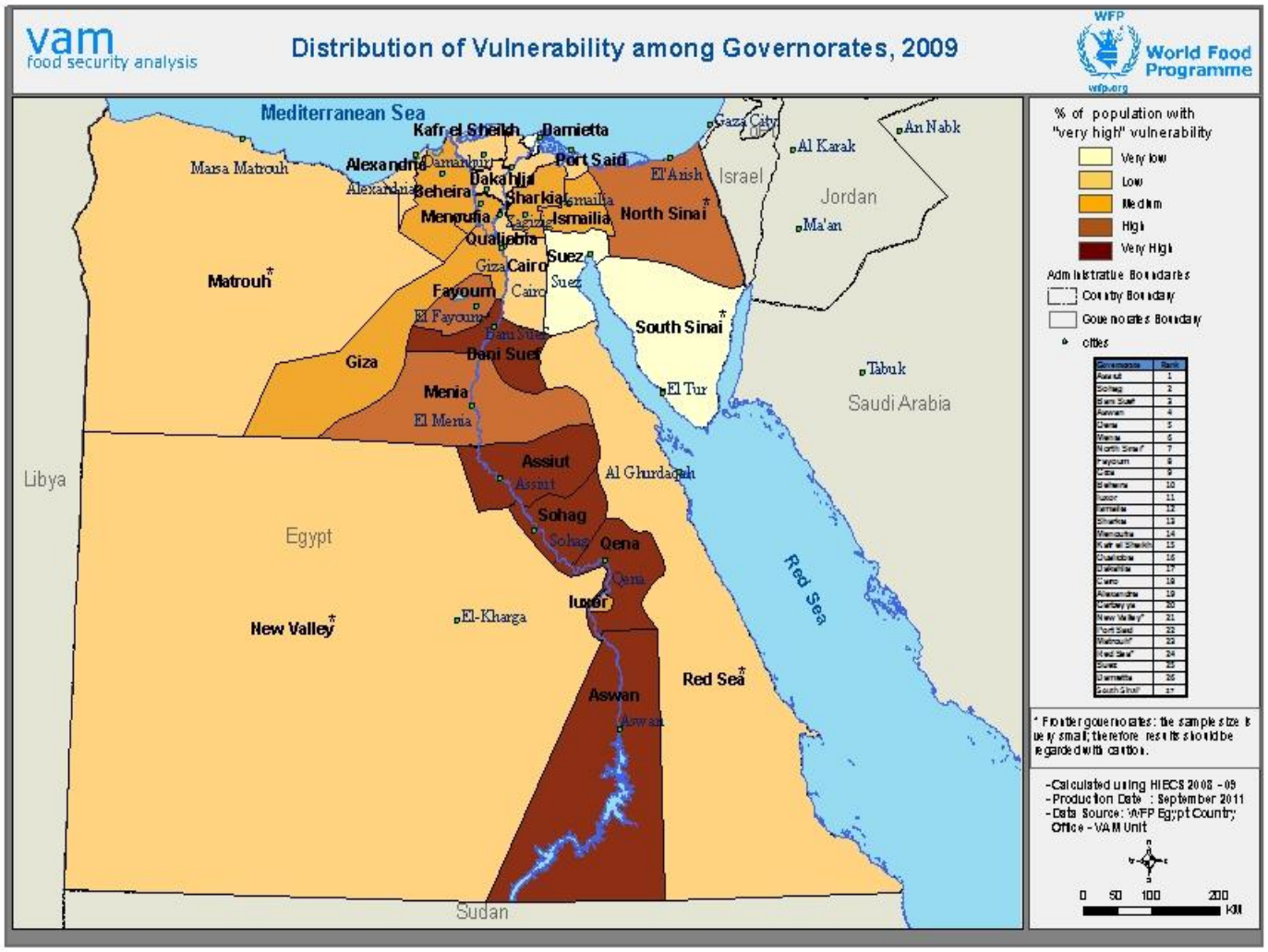
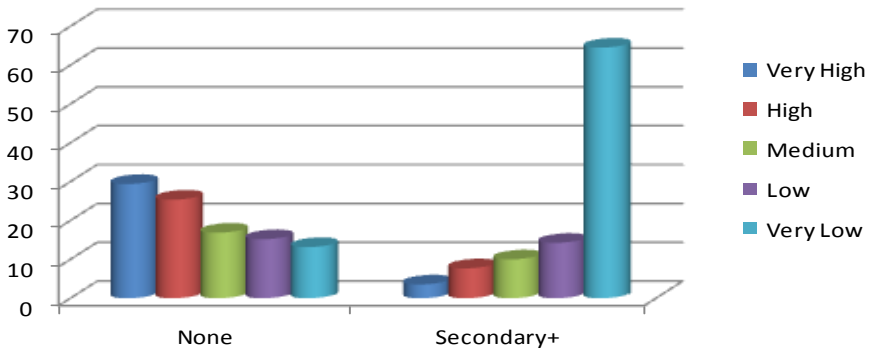


Figure 5.6: Educational Status of Persons in Vulnerability Groups



Source: Calculated using data from HIECS 2009.

Table 5.10, below, displays various characteristics associated with different categories of vulnerability. The results indicate that the ability of households to withstand shocks declines as they expand in size; in general highly vulnerable households have the largest number of individuals (6.55 persons on average). The data also indicates a link between human capital assets (including education and skills) and vulnerability; there is high correlation between the education of household head and vulnerability (Figure 5.6); more than half of the households with illiterate heads are classified as highly vulnerable to risks of food insecurity.

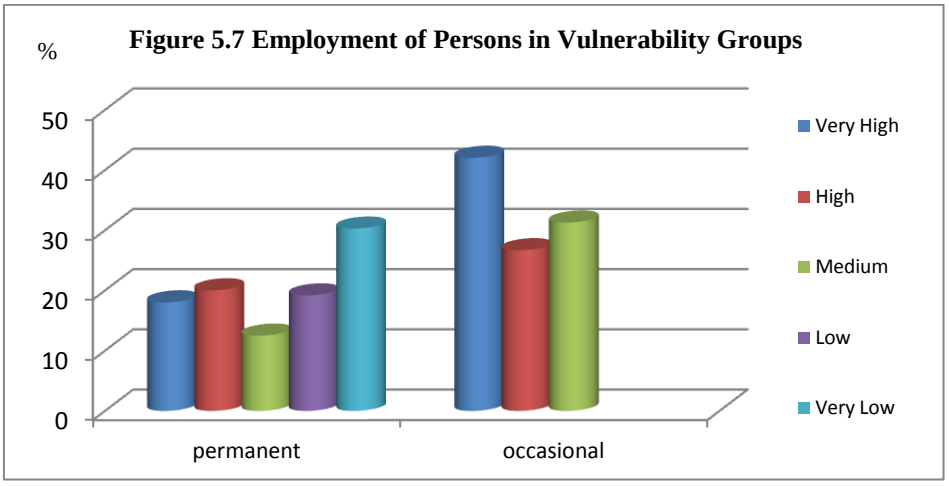
Table 5.10: Vulnerability Group Characteristics

Characteristics	Very High	High	Medium	Low	Very Low
Average Household Size	6.55	5.47	3.69	4.25	4.21
Prevalence of Food Deprivation (%)	52.21	26.31	13.48	4.73	6.47
Share of DDS Categories					
Poor	36.10	23.20	13.80	11.20	15.70
Moderate	13.00	19.40	16.10	19.20	32.30
High	3.80	10.40	12.20	23.80	49.80
Gender of Head of Household					
Male	20.40	20.34	14.49	16.07	28.70
Female	17.03	17.51	18.95	22.66	23.85
Educational Status of Household Head					
None	29.41	25.37	16.87	15.19	13.16
Primary-Preparatory	15.05	20.13	15.34	21.04	28.44
Secondary	11.12	15.54	13.95	20.72	38.67
Secondary+	3.55	7.69	10.00	14.25	64.51
Job Stability of Household Head					
Permanent	18.029	20.020	12.497	19.176	30.277
Temporary	20.678	21.260	58.062		
Seasonal	32.444	32.296	35.259		
Casual	42.040	26.680	31.280		
Employment Status of Household Head					
Wage Earner	14.40	16.95	16.45	13.08	39.12
Self-employed with Employees	16.81	21.55	19.11	26.32	16.21
Self employed Working Alone	14.39	18.76	21.98	29.83	15.04
Unpaid Worker	18.33	16.67	31.67	23.33	10.00
Unemployed	14.62	10.00	14.62	43.08	17.69
Out of Labour Force	11.34	12.12	22.91	16.43	37.21
Source of Income					
Income from Wages and Salaries	14.50	17.05	16.48	13.15	38.81
Income from Private Business in Agriculture	20.09	23.73	21.20	19.83	15.14
Income from Non-Agricultural Activities	10.26	14.95	15.68	28.72	30.41
Participation Rate in Labour Force	44.86	47.82	49.51	45.86	43.75

Source: Calculated using HIECS 2009.

In Egypt, as in many other developing countries, labour is the primary asset of many households, on which they depend for a living. Whether they are able to use this asset to decrease their exposure to risks depends on how successful they are in finding work, and how much they are able to earn. Therefore, even when households revert to a coping strategy that improves their access to other resources such as land and capital, the process of reducing vulnerability does not depend on the creation of an entitlement to rent or annuity for those households but on the enhancement of their opportunity to be employed more intensively, productively and remuneratively.

HIECS data reveals that job stability for the household head is a strong determinant of household exposure to risk; nearly 69 percent of casual labourers are classified as being highly vulnerability to food insecurity, while none are classified among the lowest vulnerability classes. This link between work stability of the household head and vulnerability is confirmed by data in Table 5.10, as well as by Figure 5.7, below.



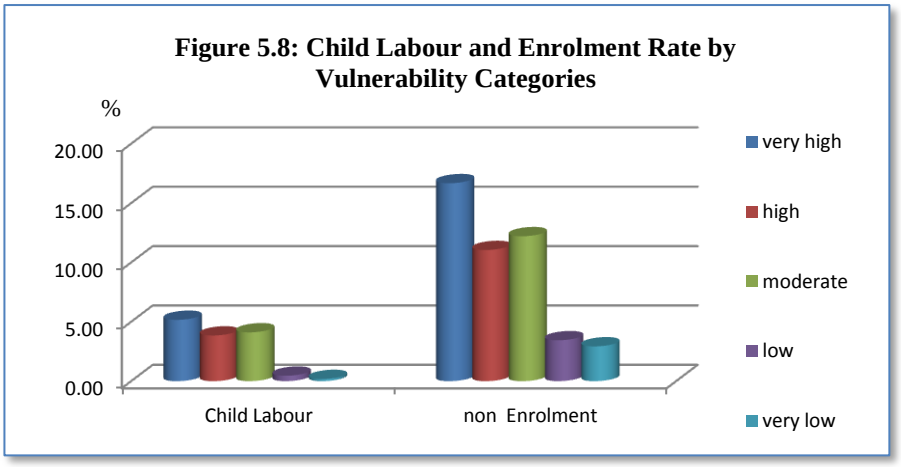
Source: Calculated using data from HIECS 2009.

Given that food insecurity in Egypt is in principal an issue of accessibility and lack of sufficient purchasing power, unemployment and underemployment become a serious threat to food security, and therefore directly affect the vulnerability status of households. It has been increasingly acknowledged worldwide that reducing vulnerability means increasing access to productive and decent employment. However, the highly vulnerable have limited access to jobs. The lack of ability to participate in income-generating activities by households members is a driver of vulnerability. Thus policies aiming at reducing risks to food insecurity should be concerned about creating more stable and sustainable jobs, and providing social assistance to those who are unable to work.

Vulnerability Category	Child Labour	School Enrolment
Very High	5.17	83.32
High	3.85	88.95
Moderate	4.11	87.79
Low	0.46	96.55
Very Low	0.18	97.07
All	2.70	90.79

Source: Calculated using HIECS 2009

HIECS data also reveals that vulnerability is associated with harmful coping strategies such as child labour and low school enrolment. As suggested by Table 5.11 and Figure 5.8, below, children in highly vulnerable households have a higher risk of work and a lower probability of school enrolment. The probability of work for the most vulnerable children is 5.17 percent, reduced to a negligible percentage for children in the least vulnerable households. Moreover, basic school enrolment is almost universal for the least vulnerable households, while the enrolment rate for the very high vulnerable households is 83 percent, lower by 14 percentage point than the least vulnerable.



Source: Calculated using data from HIECS 2009.

CHAPTER SIX:
CONCLUSIONS AND MAIN RECOMMENDATIONS

Key Recommendations:

- The targeting of food insecure and vulnerable populations must be revisited based on a careful assessment of the attributes and determinants of food insecurity across all regions.

- Given the cumulative deterioration in key sources of foreign exchange since February 2011, food availability in Egypt is a point of concern. Accordingly, the focus on securing foreign inflows while increasing net domestic production is required.

- Upper Egypt, Beheira and Menoufia require programs that focus on income generation, sufficient food intake and nutritional awareness, while the focus in Frontier governorates and the rest of Lower Egypt should be on nutritional awareness programs.

- A more in-depth investigation is needed to justify the higher prevalence of child malnutrition in Lower Egypt as well as the sudden structural change in prevalence rates between 2005 and 2008. Malnutrition is an area of main concern in Egypt that deserves wider attention and further analysis.

- Since price stabilization of essential food items is vital for the poor, an in-depth study of market structure, market integration and the price chain of essential foods is both required and highly recommended.

- It has been increasingly acknowledged worldwide that reducing vulnerability means increasing access to productive and decent employment. Accordingly, policies aiming at reducing risks to food insecurity should be concerned about creating more stable and sustainable jobs, and providing social assistance to those who are unable to work.

6 CONCLUSIONS & MAIN RECOMMENDATIONS

Although Egypt is a middle-income country that placed itself on a high growth track speared by economic reform during 2005-2010, nevertheless, income poverty, food insecurity and multi-dimensional poverty are widely prevalent, most severely in the rural areas of Upper Egypt.

The macroeconomic context in Egypt has both direct and indirect impacts on the status of food security in Egypt. In 2005 Egypt began actively implementing a macroeconomic structural reform program designed to move Egypt towards a more market-oriented economy. At the macro-level, the economy achieved high levels of real GDP growth during 2005-2008 that was accompanied by increasing investment inflows, improving balance of payments, a decline in fiscal deficit to GDP and domestic debt ratios and stability in foreign exchange market, however little change has trickled down to lower income groups. Poverty rates remained high and persistent inflation in consumer prices continued to threaten the real purchasing power of the lowest income deciles.

The results of the study show that although poverty and food insecurity are strongly correlated in Egypt, not all the poor are food insecure. Therefore, the targeting of food insecure and vulnerable populations must be revisited based on a careful assessment of the attributes and determinants of food insecurity across all regions.

In-depth analysis of the main pillars of food insecurity analysis shows that economic access to food continues to be the most significant food security concern in Egypt, however food availability – which is currently secured- is highly sensitive to fluctuations in international prices and the availability of foreign exchange. Furthermore, Egypt is highly dependent on imported foods, particularly food commodities that feature heavily in the regular diets of the poor (wheat, cereals, vegetable oil and sugar). Despite the market availability of food, its sufficiency is very much determined by fluctuations in international prices and the availability of foreign exchange. Therefore, food availability in Egypt is seen as vulnerable mainly to international food price shocks on the one hand and shocks to balance of payments on the other. The focus on securing foreign inflows while increasing net domestic production is currently needed, especially with the recent deterioration in balance of payments since February 2011 and the drop in net foreign reserves. Accordingly, the focus on securing foreign inflows while increasing net domestic production is currently needed. However, a variety of factors continue to constrain Egypt's potential for increasing domestic food production. These include land fragmentation and agricultural land being lost to urbanization. In "old lands", land fragmentation is the main problem that hinders cultivation of strategic staple crops such as wheat. There are also numerous environmental factors that entail risks to food production, including increasing desertification, increasing soil salinity; reduced natural fresh water resources; and rising temperatures have had an increasing impact on the growth cycles of various crops, with cereal yields expected to decrease.

The food security assessment involved close investigation of caloric deprivation, dietary diversity, deficiency in essential nutrient elements and income poverty. The results show that the prevalence of caloric deprivation is notable (20 percent of the total population) however, the deficiency in dietary diversity is even more compelling (33 percent of the total population), while income poverty represents 21.6 percent of the population.

The cross tabulation of caloric deprivation, dietary diversity and income poverty shows that 16.3 percent of the population is suffering income poverty and poor food consumption while 26.1 percent of the population is non-poor yet suffering poor food consumption. The coexistence of income poverty together with poor food consumption is highest in the governorates of Upper Egypt (58.2 percent in Assiut, 39.2 percent in Sohag and 36.1 percent in Beni Suef) followed by Beheira and Menoufia in Lower Egypt. On the other hand, the percent of non-income poor having poor food consumption is highest in Menoufia (45 percent), Giza (44.8 percent), Luxor (43.4 percent) and Frontier Governorates (33.9 percent).

There is a strong positive correlation between proxy indicators of food insecurity and both monetary and non-monetary poverty levels; as well as between food insecurity indicators and household size. At the same time, multiple sources of income and educational level are negatively correlated to indicators of food insecurity. Results show that casual labour are more exposed to the risks of food insecurity than others, and workers in the agricultural sector are slightly more inclined to be food insecure than others.

The results indicate that Upper Egypt and partially Beheira and Menoufia require programs that focus on income generation, sufficient food intake and nutritional awareness, while the focus in Frontier governorates and the rest of Lower Egypt will be on nutritional awareness programs. District level analysis is expected to yield more comprehensive results that will allow for sub-governorate interventions and a more accurate assessment of food insecurity.

As for indicators of food utilization; the prevalence of malnutrition for children below five years of age across governorates and regions suggests that the nutritional status of children in Egypt is not directly related to food access indicators and it is not significantly related to socioeconomic characteristics of the household and is possibly explained by other factors, such as the availability of health services, clean water and sanitation. Further in-depth investigation of the prevalence and causes of malnutrition among children is still needed as the EDHS 2008 did not empirically explain causal factors of malnutrition among children and did not explain the reasons for higher prevalence of child malnutrition in Lower Egypt as well as the sudden structural change in prevalence rates between 2005 and 2008. On the other hand, malnutrition indicators for youth (10-19) seem more consistent with the status of food insecurity and poverty in Egypt. Generally, malnutrition is an area of main concern in Egypt that deserves wider attention and further analysis.

A close look at income poverty and multi-dimensional poverty shows that there are 16.3 million people who live in households that spend less than the minimum level needed to meet basic needs, representing 21.6 percent of the population. The incidence of poverty is highest in rural Upper Egypt where 43.7 percent of the population is classified as poor. Also, the data indicates that approximately 11.8 percent of the population in Egypt is in extreme multi-dimensional poverty, i.e., deprived in at least 3 out of eight dimensions of deprivation, regardless of which dimensions were identified. Deprivation in assets is the most widespread dimension (14 percent), followed by the proportion of people who lack sanitation facilities (9.1 percent). Furthermore, 6.5 percent of Egyptians live in families with at least one child not enrolled in basic education, and 6.2 percent live in households whose members have no basic or higher education. These rates rise considerably if we refine our analysis to capture the poor alone, where 22 percent are deprived of assets, 14 percent deprived of sanitation facilities, 18 percent live in households where at least one child is not enrolled in basic education and 13 percent live in households that have uneducated heads. In general, ***both income poverty and multi-dimensional poverty threaten the ability of households to cope with risks to food insecurity***.

The vulnerability index for 2009 shows that households facing "very high" levels of vulnerability to food insecurity make up 20 percent of the population. Governorates in Upper Egypt have the greatest risk to higher food insecurity and Assiut has an alarming level of vulnerability, since 59 percent of its population are classified among the highest vulnerability" category. Conversely, people living in Damietta and Suez are the least vulnerable to risks of food insecurity, 1.2 percent in Damietta and 1.9 percent in Suez are classified within the highest vulnerability category. Although urban governorates like Cairo and Alexandria show low prevalence of highly vulnerable categories, nevertheless they encompass very poor neighbourhoods and slum areas that can be more clearly illuminated through a district level analysis rather than a governorate level analysis.

Also, the estimated probability of caloric deficiency across governorates indicates that 9.4 percent of the total population are at high risk of becoming caloric deficient, 28.1 percent are at moderate risk, while 62.5 percent are at low risk; and rural residents have a greater risk of becoming caloric deficient

(10.5 percent are at high risk and 30.6 percent are at moderate risk) than urban residents (7.8 percent are at high risk and 24.5 percent are at moderate risk).

One of the most significant threats to household access to food is persistent inflation in domestic prices of food. In fact, food prices largely explain the food consumption patterns for the poor and near poor in Egypt. Price stabilization of essential food items is vital for the poor, thus in-depth study of market structure, market integration and the price chain of essential foods is both required and highly recommended.

Given that food insecurity in Egypt is in principal an issue of accessibility and lack of sufficient purchasing power, unemployment and underemployment become a serious threat to food security, and it therefore affects the vulnerability status of households. It has been increasingly acknowledged worldwide that reducing vulnerability means increasing access to productive and decent employment. However, the highly vulnerable have limited access to jobs. The lack of ability to participate in income-generating activities by household members is a driver of vulnerability. Thus policies aiming at reducing risks to food insecurity should be concerned about creating more stable and sustainable jobs, and providing social assistance to those who are unable to work.

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ANNEXES

ANNEX 1: CALCULATION OF FOOD POVERTY LINE AND TOTAL POVERTY LINE

a) The Food Poverty Line (FPL)/Extreme Poverty Line. The first step is to choose a food bundle that reaches the predetermined calorie requirements, with a composition that is consistent with the consumption behaviour of the poor. This bundle was defined for individuals in different age brackets, gender, and activity levels (using tables from the World Health Organization). Then, FPLs were set at the cost of the required calories, by how they are actually obtained in the sample (on average) by the second quintile. This food basket of the second quintile is thus priced using the differing prices for the food in each region and at each date16. Thus the relative quantities observed in the diet of the poor (proxied by the second quintile), and the prices they face, were maintained in constructing the FPL for each household in the sample. Households whose expenditure is below the FPL are referred to as the "extreme poor".

b)The Total Poverty Line (TPL). When the FPL is augmented by an allowance for expenditure on essential non-food goods, it defines the total poverty line in terms of those households who have to displace food consumption to allow for non-food expenditures, deemed a minimum indispensable level of non-food requirements. Following Engel's Law, the non-food allowance can be estimated by identifying the share of non-food expenditure for households whose total expenditure was equivalent to the food poverty line (See Box 5.1 for more details on P0 and other poverty measurements). Any household that spends less than the TPL is considered poor. Therefore, the extreme poor are just a sub group of the poor.

ANNEX 2: MULTIDIMENSIONAL POVERTY

As stated in the global HDR 2010:Equity and the human development are systematically related: countries that do well on the human development tend to be more equitable. This result is consistent with research that shows how reducing inequality—both in the population as a whole and across gender and other groups—can improve overall outcomes in health and education, as well as economic growth. Multi-dimensional poverty is concerned about measuring deprivations in several dimensions of well-being.

Comparisons between human development and multi-dimensional poverty are two different methods to assess development. One of these methods is the “overall perspective” which concentrates on progress aspects achieved by the society as a whole, poor and rich. An alternative point of view to this method is the “deprivation perspective” by which development is judged based on the poor and underprivileged way of life in society. Any considerable progress – of any size – achieved by the rich in a society which will increase the human development index for the whole society but it does not necessarily signify an improvement in reducing deprivation amongst the underprivileged categories.

At the macro level, the focus is on the life and success of the whole population. It would be wrong – in our understanding of the development process – not to fully grasp the gains and losses of those more fortunate than others. That will be in contradiction with the right of each citizen to be taken into account; it also contradicts with the overall considerations of public ethics. Nonetheless, the general concern in the progress achieved by any country should focus specifically on the status of underprivileged categories”.

[16] The food baskets represent a balanced diet of calories, proteins, fats, and carbohydrates for various groups of individuals: Food basket includes 273 foods and ensures 2470 daily calories intake, 43.4 percent of which come from cereals (200 gm), 10.4 percent from oil and butter (30 gm), and 6.6 percent from sugar (40 gm). The basket includes also small amounts of fresh fish (20 gm), meat and poultry (40 gm), eggs (180gm), milk and milk products (60 gm) and a range of local vegetables (170 gm) and fruits (70 gm).

Over the last two decades there has been widespread acceptance of the view that poverty is more than a lack of material resources; material resources are necessary but not sufficient to escape poverty. In the word of Amartya Sen (1999) 'income is only a means to reduce poverty and not the end of it'.

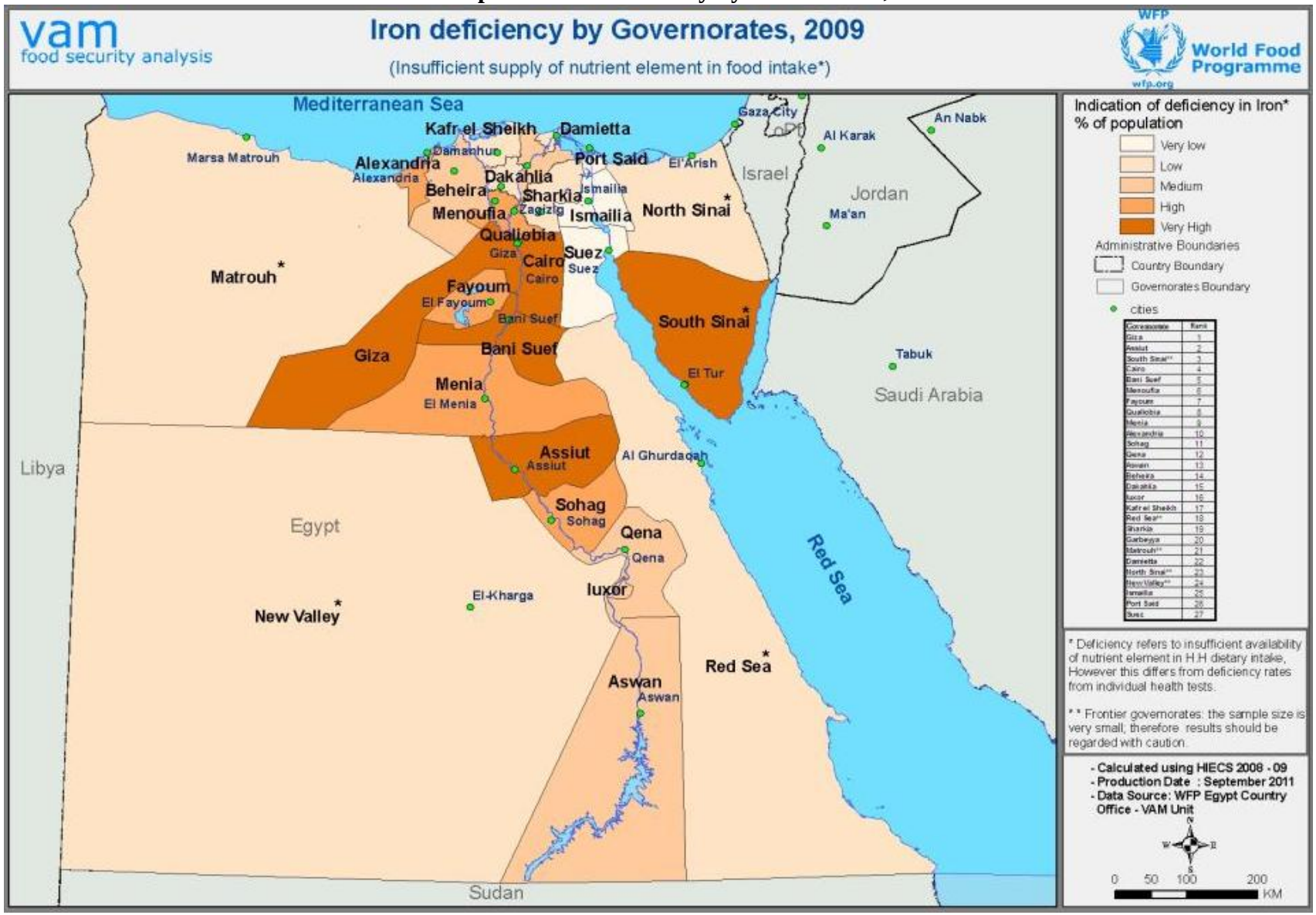
Well-being is also a reflection of individual's rights and responsibilities. Individual **well-being can be thought as the realization of these rights, whilst individual deprivation, or poverty, results from the denial of these rights.**

Like development, poverty is multidimensional. The Multi-dimensional Poverty Index (MPI) complements money-based measures by considering multiple deprivations and their overlap. The index identifies deprivations three dimensions; Education, health and living standards, and shows the number of people who are poor (suffering a given number of deprivations) and the number of deprivations with which poor households typically contend. It can be deconstructed by region, ethnicity and other groupings as well as by dimension, making it an apt tool for policymakers.

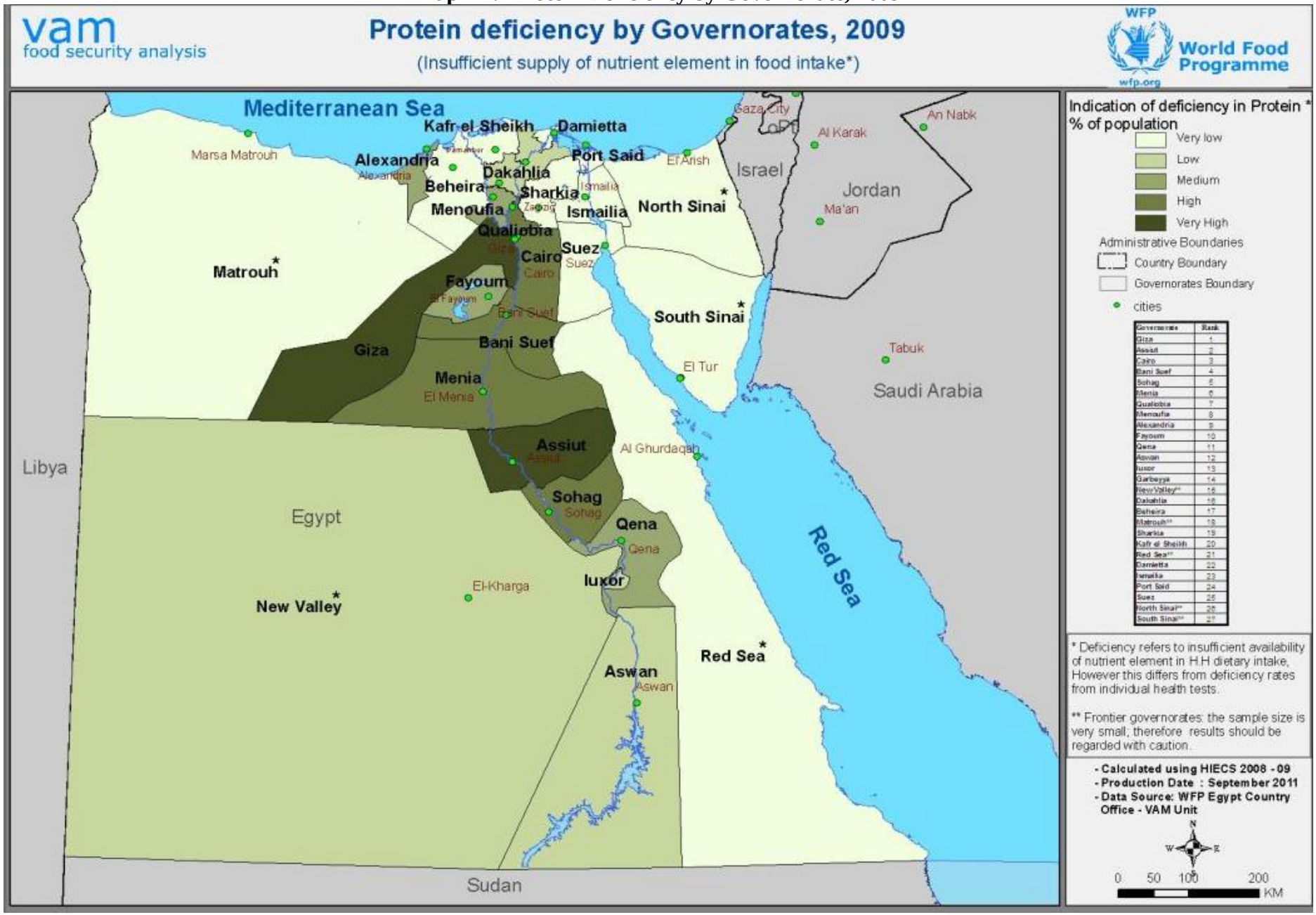
Identifying poverty as a multidimensional phenomenon is the main key issue in improving living standards. The multi dimensional approach of welfare emphasizes that deprivation can be seen as a state of lacking assets; economic, social and human assets. Economic and physical assets include land, livestock, housing, skills, good health, labour and other sorts of financial capital that provide basis of generating income and production, either now or in the future. Human assets also include skills and talents. So people's ability to attack poverty can be strengthened by education and training that opens a wider range of opportunities. People without formal education have many skills–traditional knowledge and other physical and intellectual skills–that can be tapped to fight poverty. People's ability to draw on relationship with other people on the basis of trust is a social asset. People borrow from one another to meet immediate needs for food or faced with an illness, women in poor neighbourhoods may share cooking and childcare. Such relationships of trust can be the basis of community organizations to take collective social and political action. However, all these assets are linked. Social assets can reinforce economic assets. The community solidarity that leads to collective political action to negotiate for better schools can improve economic assets by increasing the chances of employment. People, households and communities use their assets to develop strategies to attack poverty. The more assets they have, the less their vulnerability and the greater their ability to cope with poverty. But any erosion of these assets increases their vulnerability and insecurity. Building on and reinforcing the assets of poor people helps them fight poverty themselves.

ANNEX 3: MAPS OF DEFICIENCY IN NUTRIENT ELEMENTS AVAILABLE FOR HOUSEHOLD INTAKE

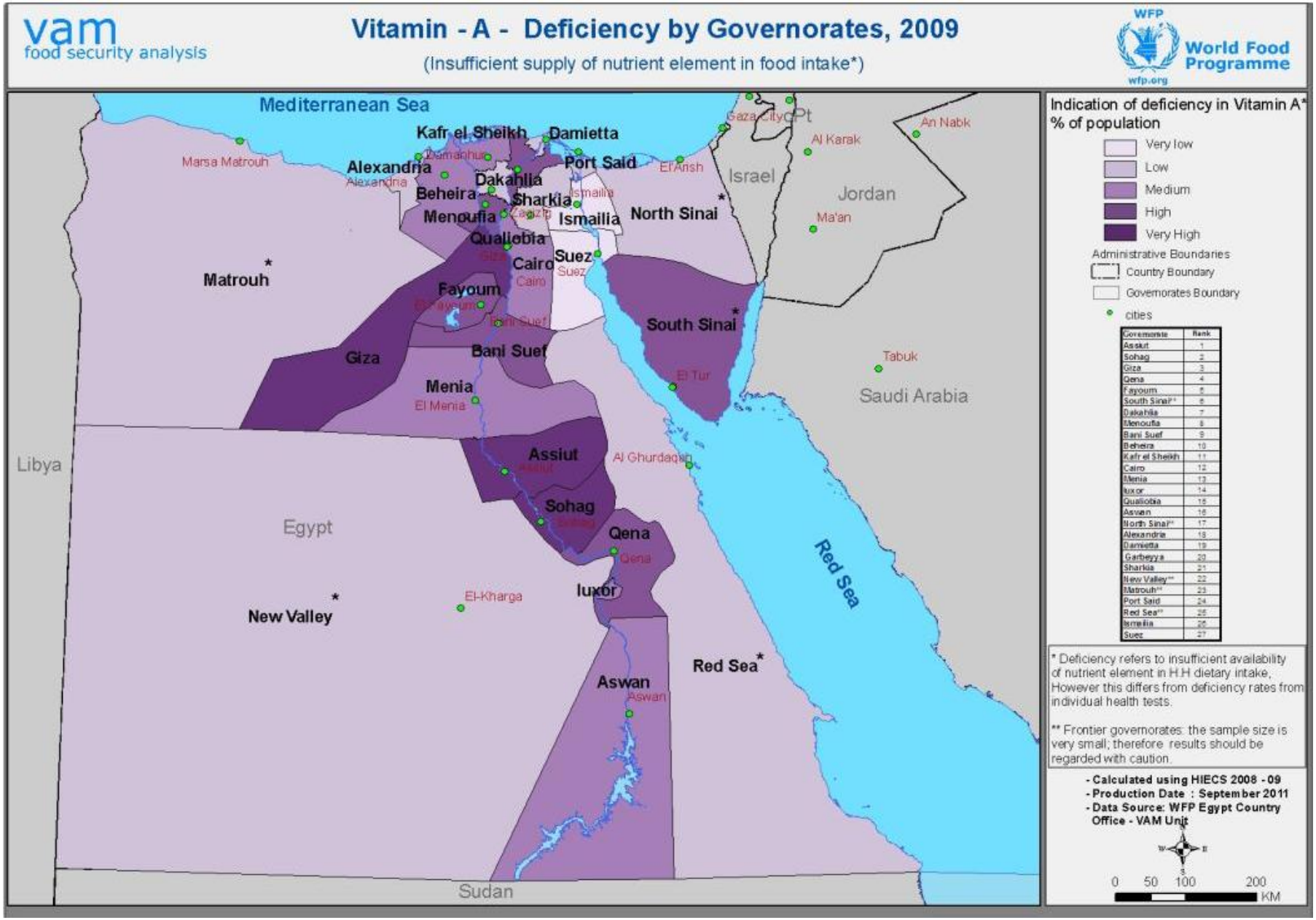
Map A1: Iron Deficiency by Governorate, 2009



Map A2: Protein Deficiency by Governorate, 2009



Map A3: Vitamin -A- Deficiency by Governorate, 2009



Map A4: Zinc Deficiency by Governorate, 2009