Chapter 1. Analyzing food security in Guatemala

1.1 Introduction

The basic-need nature of food is undeniable. Not surprisingly, the achievement of food security and adequate nutrition has been an important development objective worldwide over time. However, it has been only until relatively recent times that global – or international discourse became a leading aspect of development efforts and standards started being adopted as framework for exploring and assessing performance at this regard at the country level.

An example of this is the adoption of the Millennium Development Goals (MDGs). The Millennium Declaration presented in the year 2000 proposed a set of development targets for the achievement of a better world. With it, the participant nations committed themselves to individual and collective efforts for the achievement of peace, prosperity and justice under the principles of human dignity, equality and equity (UN, 2000).

In 2005, a set of 8 development goals were incorporated in the action plan outlined for the accomplishment of the intended development. The 8 MDGs are composed by 21 targets, for which 60 specific indicators delineate the progress to be attained by 2015 (UN, 2005)[2].

The Goal 1 focuses on the eradication of extreme poverty and hunger. As it can be easily recognized, poverty reduction is also a key development issue. Over time, poverty, as a multidimensional condition, has received considerable (if not the most) attention in the related research, policy, and development initiatives and aid. In consequence, numerous contributions have become available with respect to improved and expanded analytical methods, published materials, country case analyses, development of poverty assessment tools, and specialized training opportunities. One recent example of these contributions is the creation of poverty maps.

[2]Updated information can be found at the United Nation's website:
http://www.un.org/millenniumgoals/bkgd.shtml

Since the early 2000's poverty maps have gained popularity for the identification of the poor based on their location and for the exploration of the spatial patterns of poverty. Most often, the estimates to be mapped are calculated using a method specifically developed for the purpose ("micro-level estimation"), which combines household survey and census data for the production of estimates at low aggregation levels. The poverty map profiles aim to display the spatial location and variation of different poverty measures within a country. As such, the maps have been used as tools for spatially based decision making.

However, data constraints resulting due to the nature of the estimation method may pose difficulties for the estimation. As well, as indicated by Davis (2003), practitioners involved in the creation and/or use of poverty maps are very often unaware of the variability of the mapping results in terms of statistical errors and potential bias, and in the variability of the estimates and poverty rankings under alternative poverty measures, modelling decisions, and levels of aggregation. Given the relatively large acceptance of poverty maps for policy making and targeting purposes, it is surprising that up to date, no consistent efforts (in terms of published work) have been done for exploring the performance of the estimation in relation to the adequacy of the mapping results and in the properties of the estimates.

While Goal 1, through its Target 3 "*Halve, between 1990 and 2015, the proportion of people who suffer from hunger*" addresses an issue directly related to food and nutrition security, comparatively less attention has been directed to this topic. The Target considers 2 indicators, namely the prevalence of underweight children under 5 years of age and the proportion of the population below the minimum level of dietary energy consumption, as instruments to measure and assess progress.

In spite of some improvements, the progress has not been fast enough. It has been observed that between 1995-1997 and 2001-2003 the number of people going hungry increased (UN, 2006). The understanding that investments in child nutrition have positive consequences in educational outcomes, productivity, and health (which in turn contribute to reduce poverty) through out the life cycle and across generations, has motivated the development of initiatives that seek to support this specific age group. In order to maximize effectiveness, the global "Ending Child Hunger and Undernutrition Initiative" has as strategic approach the focus on the areas with greatest need (WFP and UNICEF, 2006). Hence, the availability of disaggregated estimates of food security and nutritional status is a key component of the

support process. At present, the few efforts done as regards food and nutrition security mapping have been mainly focused to the creation of child undernutrition (stunting) maps.

Theoretical and empirical evidence have demonstrated that the modelling (via either exploratory or causal models) of food security/nutritional indicators is a complex task that requires data concerning a wide range of factors including, among others, availability, access and intake of food, health, sanitation, and care. The results obtained in several estimation attempts have revealed that if such data is not available, the model performance is compromised. Thus, food/nutrition security mapping efforts have the double challenge of i) building a theoretically adequate model given potential data constraints imposed by the estimation method and the available data sources, and ii) achieving estimates with a low level of error

This research project represents an attempt to address these challenges, taking the analysis of food security in Guatemala as study case. The objective of this chapter is to provide an introduction to the concept of food security and to the reality of Guatemala with the aim of situating the reader on the overall topic, to present the research questions and objectives, and to delineate the structure of the analysis and of the present work.

Research questions and objectives

Due to the characteristics of different aspects related to food security and the potential variation in results across modelling exercises, it is perceived as critical to have an understanding on the underlying patterns present in the food security related data and on the expression of the phenomenon itself in the country. Under this perspective, the exploration of issues related to the general food context in Guatemala and to the households' situation and observed outcomes represent a fundamental part in the analysis.

This background information can support the development of a more informed and objective perspective which can be particularly valuable for the assessment of the modelling results, for the improvement of the model specification in order to account for specific trends or structures, and for the development of realistic map displays. It is only at this point, when a map profile can be useful for assisting decision making processes.

Following this line of thought, three main research objectives are established:

- To provide a description of the general food situation in Guatemala.

- To explore and predict the food security situation of the Guatemalan households and their vulnerability to it, in consideration of the characteristics of the underlying food system, the social and physical context in which households live, and the consumption and spatial patterns observed.
- To construct disaggregated estimates of food insecurity, with a low level of error, and which display a spatial distribution consistent with the observed or known patterns.

Accordingly, several research questions outline the analysis. They are organized in 3 main subtopics.

About the general food context

- How are food supply, access, and utilization occurring in the country?
- In which context do they operate?
    - What are the social, economic, cultural, and natural/environmental characteristics of this context? Do they show (geographic) patterns?
- Can the characteristics of the context be linked to the food behaviours, preferences, habits, and outcomes in the population?

For the purpose of this research, the terms "context" and "local" refer to the Municipio (3rd administrative level) geographic space.

About the households' situation

- What is the status of the Guatemalan households as regards food security indicators?
- What is the extent of food security – insecurity in the country?
    - Which types of households are food insecure?
    - Where is food insecurity more prevalent?
- Is there a geographic pattern in the distribution of food insecurity?
    - Is this pattern consistent with the geographic patterns observed in the food context?
- Can the households' vulnerability to become food insecure be predicted?
- Which types of households are more vulnerable?
    - Is there a geographic pattern in the distribution of vulnerability to food insecurity?

- Is this pattern consistent with the patterns observed in the food context and the households' food insecurity status?

- What could be done in order to improve and/or protect the households' food security situation?

About methodological issues

- Is it possible to construct a disaggregated (Municipio level) profile of food insecurity using current methods for poverty mapping?
  - Is the estimation reliable? That is, are the errors of the food insecurity estimates low?
  - Is the map display consistent with the general trends observed in the general contextual information?
- What are the limitations for the use this estimation method for food insecurity mapping?

The thesis aims to contribute to the literature of food security in Guatemala by providing a broad and updated description on the general food situation of the population and on its vulnerability to become food insecure. Also, the incorporation of geographic information supports research efforts on population-environment relationships where the determinant role of space is recognized. As well, the results will contribute to the limited work available worldwide on food insecurity mapping and will represent the first food security mapping exercise for Guatemala based on household level food consumption data.

1.2 Food security: introduction to the topic

1.2.1 *Definition*

The concept of food security has evolved with time. During the last 30 years it shifted from notions on the levels and the reliability of aggregate food supplies (1970's), to the focus on the households and individuals' access to food, vulnerabilities, and entitlements (1980's). The level of analysis also changed going from the national and international levels to the focus on households and individuals (Maxwell and Frankenberger, 1992). During the late 1980's and early 1990's, the concept further developed to incorporate concerns on time, nutritional balance, food safety, and food preferences (Clay, 2002).

An important outcome of the World Food Summit in Italy in 1996 was the establishment of a unifying concept. According to the Rome Declaration **"***food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life***"** (FAO, 1996). This concept was accepted and adopted worldwide and it is still widely used in the present days. As well, food security became an objective at the individual, household, regional, national, and global levels (FAO, 1996).

In 2001, one further element was added, namely the social access to food. This element was introduced in the State of the Food Insecurity in the World (FAO, 2001) and incorporates notions on the households' ability of acquiring acceptable foods in socially acceptable ways (Palmer-Keenan et al, 2001).

A simpler definition of household food security (i.e. the access to enough food at all times) is constantly used in a variety of contexts. Although this statement provides an indication of what it is meant by food security, it leaves aside elements that become especially relevant when assessing and measuring food security or its contrary, food insecurity.

Food safety, the nutritional value of food, food preferences, and the pursuit of meeting dietary needs for an active and healthy life go far beyond the notion of having enough to eat at all times. As Latham (1997, pp. 19) points out, "*having adequate overall food supplies in households is a necessary but insufficient condition for ensuring nutritionally adequate consumption*".

Food should be safe and of nutritional quality. This relates to food management and storage, cooking practices, and food hygiene. Among others, these issues will be related to the facilities and the households' environment, such as the availability of refrigeration and of drinking water (Latham, 1997).

In addition, food preferences and dietary needs call for attention as regards the cultural and social preferences for certain foods, and for the special needs of different household members (i.e. growing children and pregnant or lactating women). At this respect, Uauy (2005) remarks that a variety of food combinations can provide nutritionally adequate diets and that the set of foods consumed in a given population is dependent on the particular settings. As a consequence, the knowledge of the local food consumption patterns is relevant for making accurate conclusions about the population.

The incorporation of these elements in the analysis of food security provides a better understanding on the multiple factors that may contribute to or undermine it, and on the potential actions needed to support it.

1.2.2 *Dimensions of food security*

Five main dimensions of food security have been identified, namely:

i. Food availability
ii. Food access
iii. Food utilization
iv. Stability
v. Risk

Food availability, access and utilization have a hierarchical relationship. Availability is necessary but it does not assure household food access, as well, access is necessary but does not suffice for adequate utilization (Webb and Rogers, 2003). While the FAO[3] (2006) emphasizes these 3 dimensions, especially when focusing on household level analyses, it has been recognized that aspects related to stability and risk are also relevant since they can have effects on the other dimensions (Webb and Rogers, 2003).

Maxwell and Frankenberger (1992) identified a set of core elements that are present in most definitions food security. These elements (food sufficiency, access, security, and time) help to integrate the different dimension of food security in a more concrete way when analyzing household food security.

The following paragraphs briefly describe the five dimensions as proposed by FAO (2006) and Webb and Rogers (2003).

i. Food availability

It refers to the availability of sufficient food, supplied through domestic production or imports, including food aid (FAO, 2006). According to the USAID[4] framework, the domestic agricultural production should ideally occur through the sustainable use of the natural

[3]Food and Agriculture Organization
[4]United States Agency for International Development

resources (Webb and Rogers, 2003).This dimension focuses on food availability of food at the regional, national and international scales.

ii. Food access

It refers to the "*ability of households to secure food in the marketplace or from other sources*" (Webb and Rogers, 2003, pp. 5). This ability is determined by the entitlements that individuals possess[5].

iii. Utilization

Utilization implies the use "*of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met*" (FAO, 2006, pp. 1). An adequate diet is observed when enough food for meeting the nutritional needs of the individuals (Maxwell and Frankenberger, 1992) is available (food sufficiency).

Two main components of this dimension have been identified[6]. In one side, the food consumption itself is considered. It refers to the households' preferences for allocating, managing, preparing, and consuming foods; which are determined by their cultural setting, feeding practices and (nutrition) education (Guardiola et al, 2006).

On the other side, the biologic assimilation of food by the body is taken into account (Osmani, 1998). It refers to the nutritional status attained after the conversion of food by the body, in interaction with health and care factors (Webb and Rogers, 2003).

This differentiation is appropriate since both components do not necessarily occur together. As mentioned earlier, having a secure food situation does not imply having a good nutritional status. This will be further determined by the past nutritional history; and care, health and environmental factors around the household members.

iv. Stability

It means the access to adequate food at all times. Most of the time is considered to relate to both the food availability and the food access (FAO, 2006). However, stability in adequate food utilization is also desired since it contributes to the achievement of good nutritional status in the long term.

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[5]Entitlements are the "*set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces*" (Adger, 2006, pp. 270 after Sen, 1984).
[6]Webb and Rogers, 2003; Guardiola et al, 2006.

v. Risk

The inclusion of risk factors in the study of food security makes evident the uncertainties that may arise and provides an understanding on the causes of food insecurity. In this line, Maxwell and Frankenberger's (1992) "security" element recognizes the risks and vulnerabilities[7] that affect the household's secure entitlement of food. These can be of natural origin, or market, state, community, health, or conflict related. Households manage their risk by considering their present and the potential future situation, and based on this, they take choices upon their consumption and asset use.

1.2.3 *Food insecurity*

Food insecurity arises when the households or individuals can not achieve or maintain a condition of food security.

Food insecurity can be chronic, temporal, or cyclical (Osmani, 1998):

- Chronic food insecurity occurs when the households are constantly unable to meet their food requirements.
- Temporal food insecurity appears when the food consumption is pushed below needs due to the occurrence of a certain shock in a given time.
- Cyclical food insecurity is observed when its occurrence follows a clear seasonal pattern (i.e. dry vs. wet season).

According to Barrett and Sahn (2001) the reasons behind each type of food insecurity vary, and therefore, the policy measures needed for addressing them differ as well.

There are other concepts that are closely related to the notion of food insecurity and that are commonly used for referring to it. These are undernutrition and hunger.

- **Undernutrition**

Undernutrition is considered as the outcome state of the combination of inadequate food intake and care, and unfavorable physical conditions due to disease or an unhealthy environment, conflict, and unstable environments (Gibney et al, 2009).

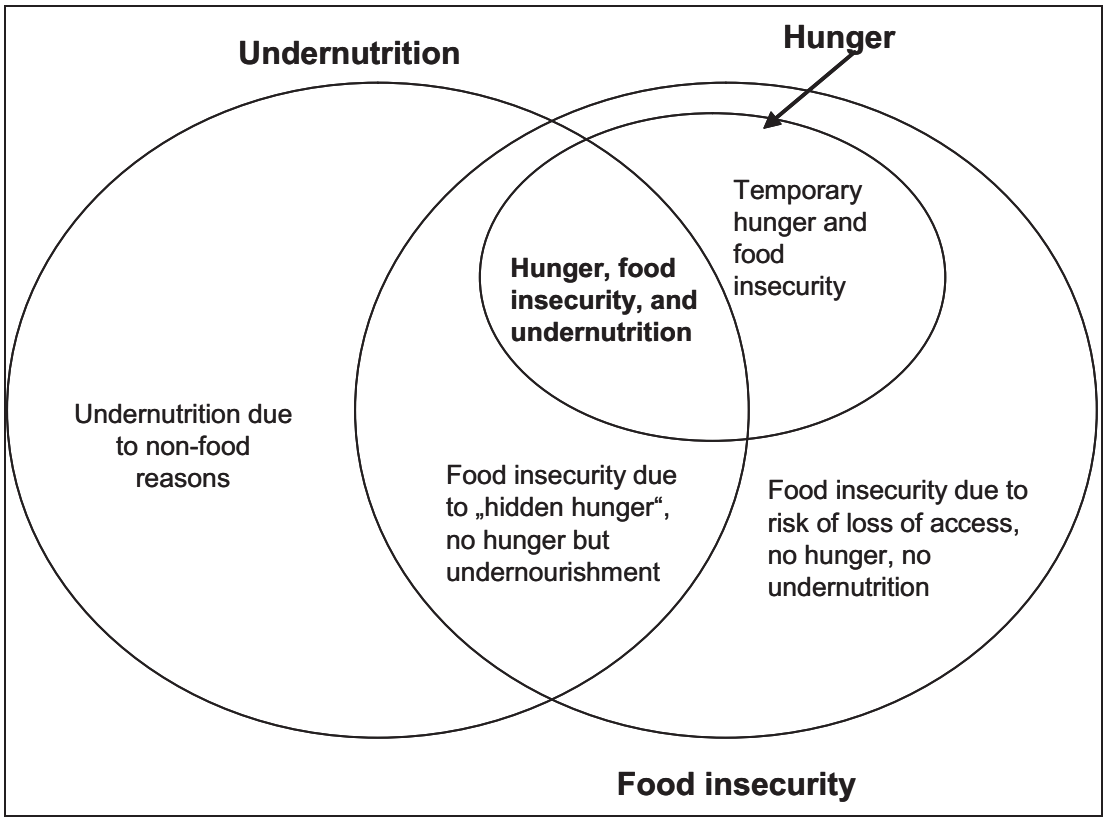
[7]Vulnerability is defined in Chapter 5.

- **Hunger**

It is conceived as the painful sensation caused by the involuntary lack of access to food and in the long term, it contributes to malnutrition (Bickel et al, 2000).

Figure 1.1 presents the relationships between the concepts of food insecurity, undernutrition, and hunger. As Cromwell and Kyegombe (2003, after Haddad, 2003) show, a distinction can be made between actual and potential food insecurity, temporary states, and undernourishment due to food or non-food reasons. According to the figure, the most severe state is represented by the overlapping area of all 3 conditions.

Figure 1.1 Relationship between food insecurity, undernutrition, and hunger



Source: Cromwell and Kyegombe (2003, after Haddad, 2003).

Malnutrition is another aspect which is gaining attention in developing and transition countries. While the term is most often used interchangeably with undernutrition in the international health terminology (Schroeder, 2008 in Semba and Bloem, 2008), it covers both the notions of undernutrition and overnutrition (Gibney et al, 2009).

In summary, food insecurity embraces not only suffering from hunger or from impaired access to food, but also from the deficiency of micronutrients (the so-called "hidden hunger") which in turn contributes to undernutrition.

As it can be clearly appreciated, the interrelationships between the concepts and actual states are complex and the focus on one element may cause neglect on the other equally important elements for a given situation. Therefore, it is important to keep in mind the underlying differences of these concepts at the moment of making definite statements and conclusions about the food security status of the population under study.

Food insecurity and poverty

Poverty and food insecurity are closely related, but they do not totally overlap. According to the World Bank (2005, pp. 8) "*poverty is pronounced deprivation of well-being*". Lack of well-being incorporates notions of food, shelter, education, health and resources' deprivation; therefore, food insecurity constitutes only one of the many dimensions of poverty (Stamoulis and Zezza, 2003).

As well, the concept of vulnerability introduced previously has effects not only on the households' entitlement to food, but also in other aspects of life. It has been observed that, in the face of shocks, households will change their behaviours and use of assets in a way to ensure their present and/or future consumption (World Bank, 2005). These actions will pass from relatively simple changes on consumption practices or activities, to drastic changes in consumption, disposal of assets, and break up of the household. Furthermore, these changes will have either short or long term effects on the households' general situation and on their resource endowment (Maxwell, 1995)[8].

In this line, Davies stresses (1992, in Maxwell and Frankenberger, 1992) the importance of studying food security with a broader view and that attention should be also directed towards the understanding of how people feed themselves and not only on how they fail to do so. This remark is relevant since the analysis of the factors that influence the households and individuals' access and utilization of food can provide useful information to policy makers

[8]Following Davies (1993), Maxwell (1995) differentiates between coping and adaptative strategies. While coping strategies reflect the short term actions/changes performed by the households in consideration of their current entitlements and characteristics; adaptative strategies reflect those actions/changes that imply a change in the households' entitlements and characteristics over time.

and development agencies as regards the potential interventions and support needed to guarantee food security.

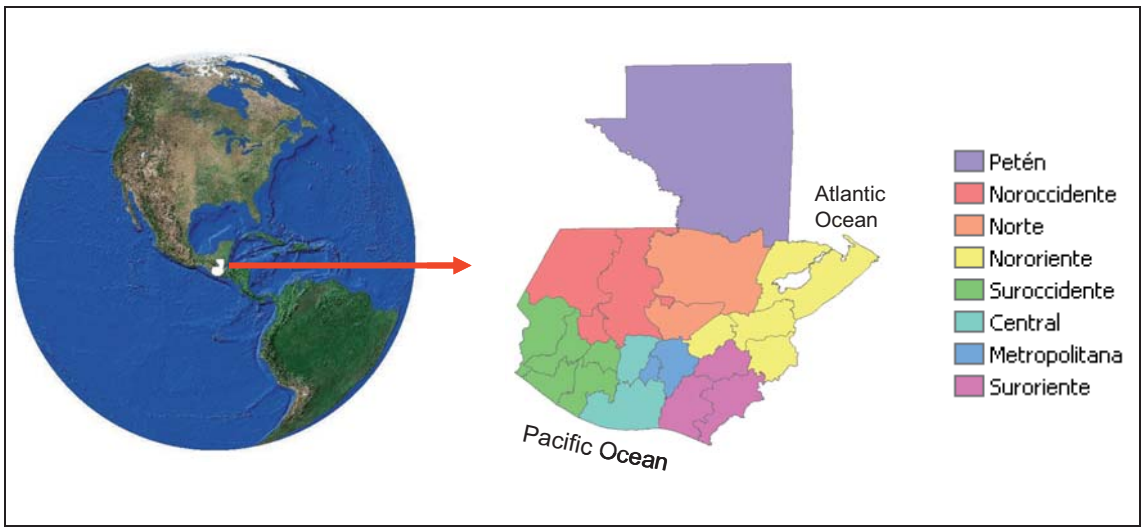
1.3 Guatemala

1.3.1 *Country general development background*

Geopolitically, Guatemala belongs to the Central American regional block and presents a large diversity in terms of its social and geographic characteristics. Administratively, it is divided in 8 Regiones (regions), 22 Departamentos (departments), and 331 Municipios (municipalities)[9]. The 8 Regiones are: Petén, Noroccidente, Norte, Nororiente, Suroccidente, Metropolitana, Central and Suroriente[10].

Due to its location and topography the country has a wide array of ecological zones, ranging from coastal areas (Atlantic and Pacific) up to the highlands with about 4200 meters above the sea level. Earthquakes, hurricanes, tropical storms, and volcanic activity are occasional (FAO, 2003). Figure 1.2 presents the country location and its division across main regions.

Figure 1.2 Country location and regional division



[9]From here on, Regiones will be considered as first administrative level, and Departamentos and Municipios, second and third levels, respectively.

[10]The English translation of the region names would be: Peten, Northwest, North, Northeast, Southwest, Metropolitan, Central, and Southeast. In order to avoid confusion, the original (Spanish) names will be used throughout the document when referring to the specific administrative regions. When referring to the location of a certain attribute in the map, the conventional location indications will be used (i.e. the "north" of the country, or the "south-east" area).