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TECHNICAL REPORT

Basis for Addressing the Situation of Chronic Malnutrition in Guatemala

OCTOBER 2010

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Hernan L. Delgado, University Research Co., LLC

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ACRONYMS

AECID	Spanish Agency for International Development Cooperation (*Agencia Española de Cooperación Internacional para el Desarrollo*)
AINM-C	Integrated Health Care for Women and Children at the Community Level (*Atención Integral a la Niñez y la Mujer en la Comunidad)*
BMI	Body mass index
CCT	Conditional Cash Transfers
CONASAN	National Council for Food and Nutrition Security *(Consejo Nacional de Seguridad Alimentaria y Nutricional)*
DHS	Demographic and Health Survey
ENSMI	National Maternal and Infant Health Survey (*Encuesta Nacional de Salud Materno Infantil*)
FAO	UN Food and Agriculture Organization
IDB	Inter-American Development Bank
INCAP	Institute of Nutrition in Central America and Panama (*Instituto de Nutrición de Centro América y Panamá*)
INFOM	Municipal Development Institute *(Instituto de Fomento Municipal)*
MAGA	Ministry of Agriculture, Livestock, and Food (*Ministerio de Agricultura y Ganadería*)
MICIVI	Ministry of Communications, Infrastructure and Housing *(Ministerio de Comunicaciones, Infraestructura y Vivienda)*
MINEDUC	Ministry of Education
MSPAS	Ministry of Public Health and Social Assistance (*Ministerio de Salud Pública y Asistencia Social*)
MUAC	Middle upper arm circumference
NCHS	National Center for Health Statistics
PAHO	Pan-American Health Organization
PRESANCA	*(Programa Regional de Seguridad Alimentaria y Nutritional para Centroamérica)*
RUTF	Ready-to-use therapeutic food
SAM	Severe Acute Malnutrition
SCEP	Secretariat for the Executive Coordination of the Presidency *(Secretaría de Coordinación Ejecutiva de la Presidencia*)
SEGEPLAN	Secretariat of Planning and Programming of the Presidency (*Secretaría General de Programación y Planificación*)
SEPREM	Presidential Secretariat of Women's Affairs (*Secretaría Presidencial de la Mujer*)
SESAN	Secretariat for Food Security and Nutrition (*Secretaría de Seguridad Alimentaria y*

	Nutricional)
SIGSA	Health Management Information System *(Sistema de Información Gerencial en Salud)*
SINASAN	National System for Food and Nutrition Security (*Sistema Nacional de la Seguridad Alimentaria y Nutricional)*
SOSEP	Presidential Wife's Office for Social Work *(Secretaría de Obras Sociales de la Esposa del Presidente)*
UNDP	United Nations Development Program
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIFEM	United Nations Development Fund for Women
URC	University Research Co., LLC
USAID	United States Agency for International Development
WB	The World Bank
WFP	World Food Program
WHO	World Health Organization

EXECUTIVE SUMMARY

Periodic surveys of children in Guatemala collect anthropometric and height census data from school children and provide an overview of the country's nutritional status. These surveys and censuses enable identification of the nature, magnitude, distribution, and determinants of the current nutritional situation in addition to changes that have occurred over the last 50 years. Available information reveals that nutritional problems in the Guatemalan population are long-standing, with well-established structural, underlying, and proximate causes, including poverty and exclusion. This poor nutritional situation is periodically exacerbated by crises such as the recent ones associated with increased food and energy prices, the global financial crisis, and climate changes responsible for the droughts of 2009 and floods of 2010.

Among countries in the Americas, Guatemala has the highest prevalence of chronic malnutrition. According to information from 2008 - 2009, 43 percent of preschool children and 46 percent of children in their first year of public primary education were affected by malnutrition. Although chronic malnutrition is widespread, there are marked differences in its distribution, with groups of families, communities, municipalities, and departments having prevalence rates significantly higher or lower than the national average. With regard to chronic malnutrition among preschool children, the departments most affected include Totonicapán, Quiché, Huehuetenango, Sololá, Chiquimula, Baja Verapaz, Chimaltenango, Alta Verapaz, San Marcos, Jalapa, and Sacatepéquez (from highest to lowest prevalence).

Besides chronic malnutrition, according to a 2002 survey, iron-deficiency anemia affects more than 20 percent of women of reproductive age and nearly 40 percent of preschool children. This report does not analyze overweight and obesity in depth, but their prevalence is increasing, especially among children less than one year old and among women of reproductive age. The coexistence of these conditions – chronic malnutrition among children and overweight or obesity in their mothers – is a problem affecting approximately one in five families at the national level.

The situation of continuous nutritional deprivation contrasts with the wealth of information, scientific knowledge, and evidence generated globally and in Guatemala regarding nutrition problems and the efficacy and effectiveness of solutions. If this knowledge were duly applied within the context of national programs, it could contribute to a sustainable solution to the problems. However, this will only be possible by focusing activities on the most-affected populations, optimizing public investments by implementing evidence-based interventions, and promoting integrated actions that contribute to food and nutritional security. Interventions must address not only the immediate causes of malnutrition, but also, as much as possible, its basic and underlying causes.

This document presents an analysis of chronic malnutrition in Guatemala, especially in the departments or health areas receiving technical and financial assistance from the United States Agency for International Development (USAID). In addition to reviewing published documents on the topic, we conducted a secondary analysis of the databases of censuses of school children. Departmental information on chronic malnutrition from censuses conducted in 1986, 2001, and 2008 shows that the departments with a prevalence of chronic malnutrition higher than the national average (51.1, 49.7, and 45.6 percent, respectively) are Chimaltenango, Sololá, Totonicapán, Quetzaltenango, San Marcos, Huehuetenango, Quiché, Alta Verapaz, and Jalapa. Only Jalapa falls outside USAID's area of influence and cooperation. The analyses at the municipal level allow 115 of the 165 municipalities included in these areas (70 percent) to be more closely examined, as the prevalence of chronic malnutrition among their school children exceeds 50 percent. The data also allow targeting within these municipalities.

This report reviews current scientific and technical knowledge as well as evidence from programs that have been proven effective. For each level of the causes of malnutrition – structural, underlying, and proximate – actions can be identified that will reduce growth retardation. Activities that address the proximate causes are effective in the short term, while those that address the underlying and structural causes take longer to have an impact. Many of the short-term measures are primarily the responsibility of the health sector: changing behavior; providing supplementary micronutrients to children from 6 months to 5 years old, as well as to pregnant women; optimal breastfeeding; providing complementary foods for children from 6 to 23 months old; hygiene; water and environmental clean-up; and managing the ambulatory and clinical care of severe acute malnutrition.

Another section of this document analyzes programs currently being implemented in Guatemala. The general conclusions drawn from our analysis emphasize the need for more and better coordination and optimization of the numerous activities already underway. This need applies to activities of the health sector and other sectors as well, through coordination, and in many cases integration, especially at the primary care level. Joint work and cooperation between the health sector and the environmental, agricultural, educational, and employment sectors, among others, should be emphasized in local, regional, and national nutrition and food security initiatives.

Three principles derived from other fields are recommended for addressing the problem of malnutrition: an agreed-upon framework for action that provides a base for coordinating the work among all the sectors, a national authority with a wide multi-sectoral mandate, and a single monitoring and evaluation (surveillance) system. We also propose the use of differentiated packages of programs, depending on the magnitude and duration of the malnutrition problem. Finally, it is worth noting that a definitive solution to complex and chronic problems such as malnutrition will take time, and will require human, material, and financial resources of quality and in quantities commensurate with the magnitude of the problem.

I. INTRODUCTION

For a long time, information about the nutrition and food situation of the Guatemalan people has been available at the national level, as well as for urban and rural populations, with high reliability and validity, and is representative of these populations.

Many reports have noted the existence of nutritional problems in Guatemala, such as variations occurring in food patterns, from before the Spanish conquest until the present (Sáenz de Tejada, 1988). Documents published in the late 19th and early 20th centuries mention the scarcity of food, its low nutritional value, and the monotony of the rural, indigenous diet consisting mainly of corn, beans, and peppers. Those documents also related the deficient diet to changes in anthropometry, or the physical measurements of the population, such as "the narrow frontal-parietal area, the cephalic index that is lower than normal, and size and weight that are less than other races" (Batres Jáuregui, 1894; Asturias, 1923).

Information about the clinical aspects of childhood nutrition problems, as identified in the pediatric departments of national hospitals, is found in reports by renowned pediatricians and researchers from the end of the 1930s, which describe clinical and metabolic characteristics of the "general deficiency syndrome in children" (Cofiño and Arguedas, 1938; Flores, 1944). In 1956, at the Third Central American Pediatric Congress, researchers from the *Instituto de Nutrición de Centro América y Panamá* (Institute of Nutrition of Central America and Panama, or INCAP) summarized seven years of research on the subject, including studies of clinical characteristics, biochemical and pathological findings, case management, and epidemiological and preventive aspects of Kwashiorkor(Behar et al., 1956). Even when no valid and reliable data were found relating to the magnitude, distribution, and determinants of this illness, it was associated with the environment; the researchers recommended increased attention to improving diet and preventing the most prevalent infectious diseases, especially among preschool infants and children.

Studies in pediatric departments, metabolic clinics, and laboratories continued for several decades, but in 1965 researchers obtained the first representative, valid, and reliable epidemiological data at the national level through a national survey conducted by the Government of Guatemala, with the technical assistance and collaboration of INCAP (INCAP, National Institutes of Health, and MSPAS, 1969). This survey documented the magnitude, distribution, and factors associated with food and nutrition problems that especially affected Guatemalan children. Major findings of this national survey were the detection of Vitamin A, riboflavin, and iron deficiencies among children, as well as the low intake of protein and energy sources, which accounted for the children's low weight and height. By identifying the causes of these deficiencies, the study highlighted the factors affecting the availability of foods at the national level, the distribution and consumption of foods by different population groups, and the environmental factors that interfere with the biological utilization of foods.

Since the initial 1965 survey, additional national surveys were carried out in 1987, 1995, 1998–1999, 2000, 2002, and 2008–2009. Among these household-based surveys are those on maternal and child health (ENSMI), which include demographic factors and provide information on the nutritional health of children and mothers with both regional and national- level information, with the most recent survey (2008–2009) including departmental representation. National surveys have also been conducted on specific topics such as micronutrients, while other surveys have focused on specific regional levels. Finally, national height censuses in 1986, 2001, and 2008 measured the heights of all first-grade students attending public schools.

All of this information not only allows us to estimate the magnitude and distribution of nutrition problems in various groups of interest (geographic, economic, social, and cultural or ethnic), but also to show trends in nutritional indicators – particularly the anthropometric measurements of preschool children from the 1960s to 2008–2009, and of children who first entered school between 1987 and

2008. The main conclusion reached after reviewing this information is that growth retardation among preschool and school-age children, an indicator of chronic malnutrition, is the most prevalent nutrition problem in Guatemala.

With the purpose of achieving a better understanding of the nutrition problem and its consequences, and of providing scientific and technical evidence leading to a solution, INCAP began conducting epidemiological field studies in the 1960s. Their efforts included longitudinal studies in Santa María Cauque, El Progreso, and Pacific coastal communities such as Patulul, among others (INCAP annual reports, various years). These studies identified food intake and infectious diseases as the most immediate determinants of inadequate growth and development among infants and preschool children. Nutritional supplementation among mothers and children from birth to 24 or 36 months of age was found to significantly improve growth and development; growth differences encountered between ethnic groups were basically attributable to differences in socioeconomic status; and early childhood nutrition was shown to affect school performance and the physical capacity of adult workers. All of these studies, which have provided valuable information for prioritizing activities, have been widely shared and used at the global level to guide programs addressing nutrition problems, especially in developing countries.

Guatemala has thus acquired sufficient reliable, representative, and valid data on the main nutrition problems found in its population, as well as sufficient knowledge about the groups most affected and where they live. The country also has the necessary capacity and scientific and technical information to attend to these problems.

This report represents the principal outcome of a consultation whose aim was to conduct an analysis of the nutrition situation and the nutrition programs in the health areas of Guatemala that receive technical cooperation from USAID, particularly from the USAID Health Care Improvement Project.

II. ORGANIZATION OF THE REPORT

To establish a base and direction that will optimize activities and facilitate a more effective and rapid resolution of the chronic malnutrition problems, especially those affecting the most marginalized groups in Guatemala, this report presents the results of a critical review of the following:

a. The nutrition situation and trends at the national, departmental, and municipal levels, emphasizing the health areas of Alta Verapaz, Chimaltenango, Huehuetenango, Quetzaltenango, Quiché, San Marcos, Totonicapán, and Sololá, which receive technical and financial assistance from USAID; in addition to reviewing the documents published on this subject, original secondary analyses of existing databases were conducted specifically for this report.
b. Technical scientific evidence that would guide selection of the most effective programs, differentiated for various degrees of magnitude and distribution of the problem;
c. Programs already being implemented in Guatemala, particularly in the health areas listed in a), above, including appraisals of how these programs are being put into operation on the ground.

Finally, we offer recommendations on how best to address these problems from the health sector as well as from other sectors.

III. CURRENT SITUATION AND TRENDS

A. National Level

Information on the food and nutrition situation in Guatemala comes from national surveys conducted on seven occasions between 1965–1967 and 2008–2009, from both the Height Censuses of First-grade School Children and from special studies (see Table 1).

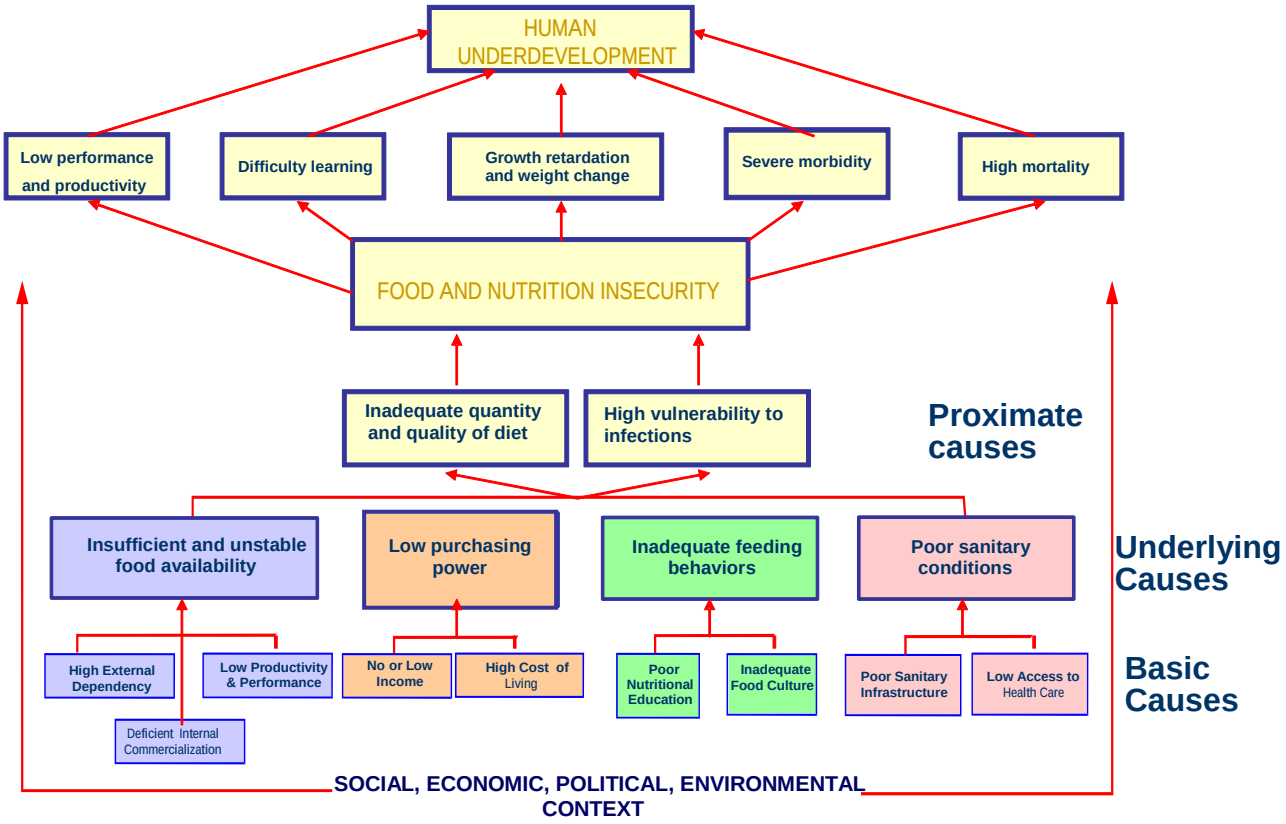
Table 1: Surveys on the food and nutrition situation in Guatemala by year

SURVEYS		
REGIONAL		
1965	INCAP-OIR	INCAP/OIR/MS. Nutritional evaluation of the population of Central America and Panama. *Instituto de Nutrición de Centro América y Panamá* (INCAP), *Oficina de Investigación Internacional* (OIR); INCAP publication, Guatemala, Guatemala. 1969.
GUATEMALA		
1987	ENSMI	MSPAS, INCAP and the Institute for Resource Development/Westinghouse. National Maternal and Infant Health Survey 1987; Guatemala, Guatemala, C.A., 1989.
1995	ENSMI	*Instituto Nacional de Estadística* (INE), MSPAS, USAID, UNICEF, DHS. National Maternal and Infant Health Survey 1995. Guatemala, Guatemala, C.A., 1996.
1998	ENSMI	INE, MSPAS, USAID, UNICEF, DHS, UNFPA. National Maternal and Infant Health Survey 1998–1999. Guatemala, Guatemala, C.A., 1999.
2000	LSMS	INE. National Survey of Living Conditions (ENCOVI 2000). Guatemala, Guatemala, C.A.
2002	ENSMI	INE, MSPAS, USAID, UNICEF, DHS, UNFPA, UNIVERSIDAD DEL VALLE DE GUATEMALA (UVG), CDC, APRESAL/UE, UNDP, POLICY II Project, CARE, Guatemala. National Maternal and Infant Health Survey 2002. Guatemala, Guatemala, C.A., 2003.
2008	ENSMI	MSPAS, et al. Fifth National Maternal and Infant Health Survey 2008–2009. Guatemala, Guatemala, C.A., 2009.
HEIGHT CENSUSES		
1986	CENSUS	MINEDUC, et al. First National Height Census of First-Grade School children. Guatemala, Guatemala, C.A, 1986.
2001	CENSUS	MINEDUC, et al. Second National Height Census of First-Grade School children. Guatemala, Guatemala, C.A, 2001.
2008	CENSUS	MINEDUC, et al. Third National Height Census of First-Grade School children. Guatemala, Guatemala, C.A, 2008.
SPECIAL STUDIES		
1985–1987	STUDY	Sentinel Surveillance 1985–1987
2009	STUDY	Surveys in the dry corridor 2009

Samples for all of the maternal and child health surveys (ENSMI) were nationally representative. Since 1987, the surveys have also been representative of the seven or eight political administrative regions of the country; in addition, the 2008–2009 survey was representative at the departmental level. For each of these studies, anthropometric information was collected on preschool children (under five years of age) and in some cases on women of reproductive age.

Anthropometric measurements are technically acceptable as an expression of the physical growth of children, and constitute a valid and reliable indicator of nutritional state. As presented in the diagram below, physical growth is a sign of nutrition and reliable food supplies which, in turn, depend on proximate determinants such as food consumption and illnesses that limit biological utilization of the food consumed, as well as underlying variables such as availability, accessibility, consumption, and biological utilization of the foods. Basic or structural factors including land tenure, employment, education, environmental and economic factors, and health services, among others, are also determinants of nutrition and reliable food supplies and, in turn, relate to development models of a country or region.

Figure 1: Food and nutrition insecurity problem tree



Measurements of weight, height, age, and sex obtained in these surveys and censuses were used to calculate the height-for-age, weight-for-height, and weight-for-age indices for children under age 5, standardized as z-scores. The prevalence of past or chronic malnutrition indicated by height -for-age, present or acute malnutrition indicated by weight-for-height, and global malnutrition indicated by weight-for-age was estimated as the percentage of cases two standard deviations below the median value of each index. Estimates of the children's nutritional status were based on the World Health Organization's growth standards (WHO 2006). Overweight and obesity in children were defined as weights more than two standard deviations above the median, based on weight-for-height. Among adult women, overweight and obesity were defined by a body mass index (BMI) equal to or greater than 25 kg/m^2.

The most recent national survey for 2008–2009 shows that weight-for-height retardation, considered an indicator of acute malnutrition, is low among children under age five (about 1 percent) and significantly higher in the first six months of life compared to later stages. Meanwhile, height-for-age retardation, an indicator of chronic malnutrition, is very high, greater than 40 percent. Finally, weight-for-age retardation, indicative of global malnutrition, showed intermediate values, occurring in about 19 percent of children surveyed at the national level.

Another source of information on chronic malnutrition is the School Height Censuses based on the measurements of first-grade children. The use of height censuses is justified, given that the height of seven-year-olds is largely a result of their growth from conception through the following two to three

years. The first census was conducted in 1986, the next in 2001, and the most recent in 2008. Growth retardation among school children, a sign of chronic or past malnutrition experienced from conception to school age, was estimated at 51.1 percent in 1986 and 49.7 percent in 2001. The most recent measurement, in 2008, showed that 45.6 percent of the nearly 460,000 children measured suffer from chronic malnutrition. Given that the height census of school children involves data collection from all children attending first grade at all public primary schools, it is possible to compile data by facility, town, departmental, regional, and national levels.

Finally, special studies have been conducted in Guatemala to collect national anthropometric nutrition data. The studies most relevant to this report relate to the surveillance system conducted in sentinel communities from 1985 to 1987, and to more recent ones conducted in the dry corridor in late 2009. For the sentinel communities, five communities of about 1,000 inhabitants each, were randomly selected from each of the 24 health areas existing at the time. Four rounds of information collection (such as censuses) were conducted to acquire, among others, anthropometric measurements from children under the age of five years. Studies among the populations of Guatemala's dry corridor were cross-sectional surveys conducted to determine how the drought associated with the *El Niño* phenomenon of 2009 affected the prevalence of acute severe malnutrition among children under age five.

Furthermore, the most recent nutritional information involving vitamins and minerals show that iodine deficiency is highly prevalent, as seen in the low levels of urinary iodine: less than 100 micrograms per liter. This result is consistent with reports monitoring iodized salt consumption, which found that fewer than 80 percent of homes consume salt containing iodine in the recommended concentration. With regard to vitamin A deficiency, the most recent information is from 1995, at which time almost 16 percent of children had serum retinol levels below 20 micrograms per liter. Results from the national micronutrient survey conducted in 2009 are forthcoming. With regard to iron, the 2002 survey reported that 39.7 percent of children and 20.2 percent of women of reproductive age had iron-deficiency anemia.

Finally, the 2002 survey shows that 5.6 percent of children under age five and 38.9 percent of women of reproductive age are overweight or obese. The double burden of family nutritional problems, such as the coexistence of overweight and obesity in women and height retardation among children in the same family, affects almost 19 percent of the population – almost one in five families nationwide.

The following table presents a summary of indicators at the national level.

Table 2: Summary of national-level nutrition indicators in Guatemala, 2009

Indicator	Percentage of population	Source
Weight-for-height retardation in preschool children (acute malnutrition)	0.9	ENSMI 2008–09
Height-for-age retardation (chronic malnutrition)	43.4	ENSMI 2008–09
Weight-for-age retardation (global malnutrition)	19.3	ENSMI 2008–09
Height retardation among school children	45.6	Height Census of School children, 2008
Homes that consume iodized salt	<80	Pretell and Grajeda 2009
Children with vitamin A deficiency (serum retinol < 20 micrograms per liter)	16	Micronutrient Survey, 2002
Children with anemia due to iron deficiency	39.7	Micronutrient Survey, 2002
Women of reproductive age with anemia due to iron deficiency	20.2	Micronutrient Survey, 2002

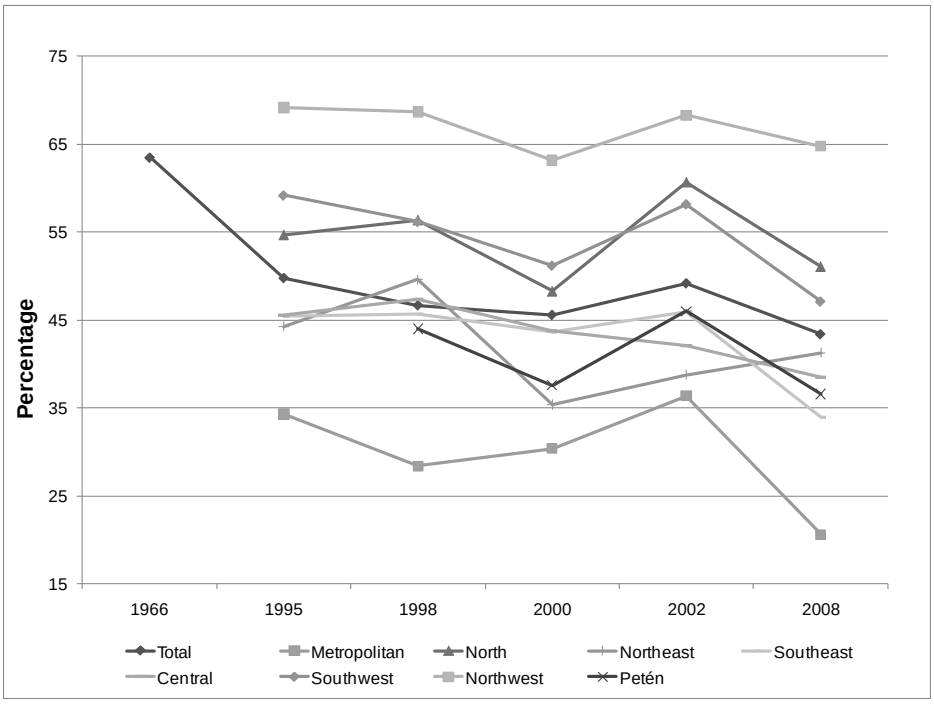
B. Regional Level

Health and nutrition surveys conducted since 1965 are representative probability samplings at the

national level for urban and rural populations; surveys conducted since 1986 are also representative of the political-administrative regions of Guatemala. The most recent survey (2008–2009) provides information at the departmental level as well; the height census of first-grade children allows for data aggregation at the regional level. This information makes it possible to know the distribution of chronic, acute, and global malnutrition among the political-administrative regions of Guatemala and, as of the last survey, among departments.

In the Maternal and Child Health Surveys (ENSMI) at the household level, information has been obtained from six political-administrative regions and from the metropolitan area. Figures 2–4 present the prevalence of chronic malnutrition (low height-for-age), general malnutrition (low weight-for-age), and acute malnutrition (low weight-for-height), respectively, among children under age five for each year of the survey. The information is grouped by political-administrative regions: Central (the departments of Chimaltenango, Sacatepéquez, and Escuintla), Metropolitan (Guatemala City and the department of Guatemala), Southwest (Sololá, Totonicapán, Quetzaltenango, Suchitepéquez, Retalhuleu, and San Marcos), North (Alta Verapaz and Baja Verapaz), Northwest (Huehuetenango and Quiché), Northeast (El Progreso, Izabal, Zacapa, and Chiquimula), and Southeast (Santa Rosa, Jalapa, and Jutiapa). Beginning with the 1998 survey, information from the department of Petén is also included.

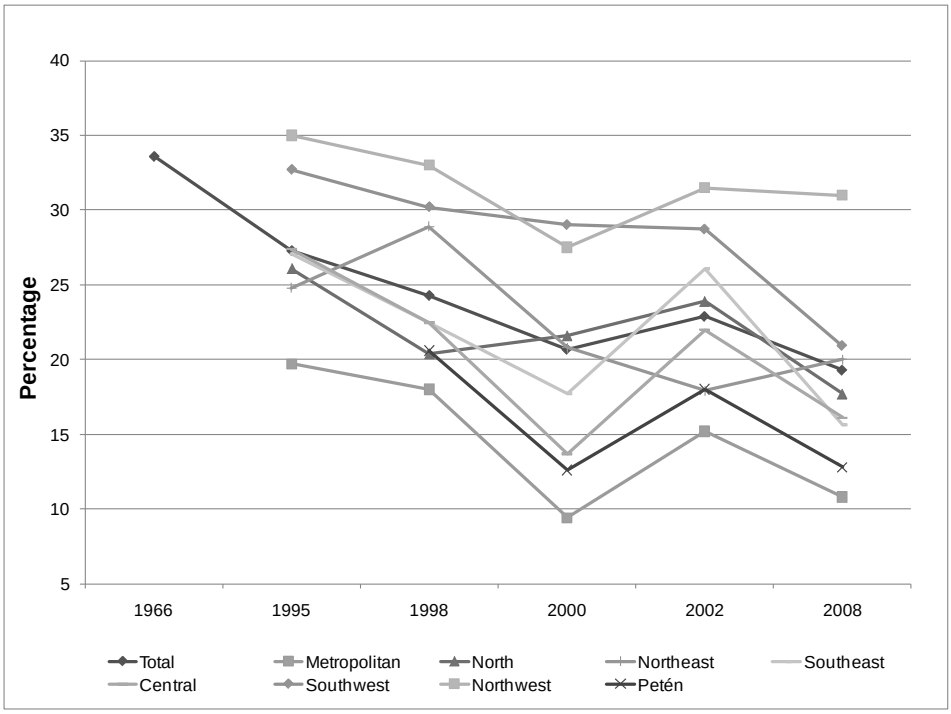
Figure 2: Changes in the prevalence of low height-for-age in children under 5-years old in Guatemala; total and by region, NCHS Standards, 1966–2008



With regard to low height-for-age, Figure 2 shows a downward trend in the prevalence of low height at the national level and in all the regions studied. However, it is evident that this decline is significantly greater in the metropolitan region than in more rural regions such as the north, northeast, and northwest of the country. In addition, from 2000 to 2002 an increase in the prevalence of growth retardation was detected as compared to previous years, probably due to the drought and coffee crisis (low prices and little work available) of those years.

The change in prevalence of low weight-for-age, shown in Figure 3, is similar to that of low height-for-age, especially in view of the deterioration in the nutritional situation from 2000 to 2002. The regions most affected by general malnutrition are the northwest and southwest, followed by the north.

Figure 3: Changes in the prevalence of low weight-for-age in children under 5-years old in Guatemala; total and by region, NCHS Standards, 1966–2008



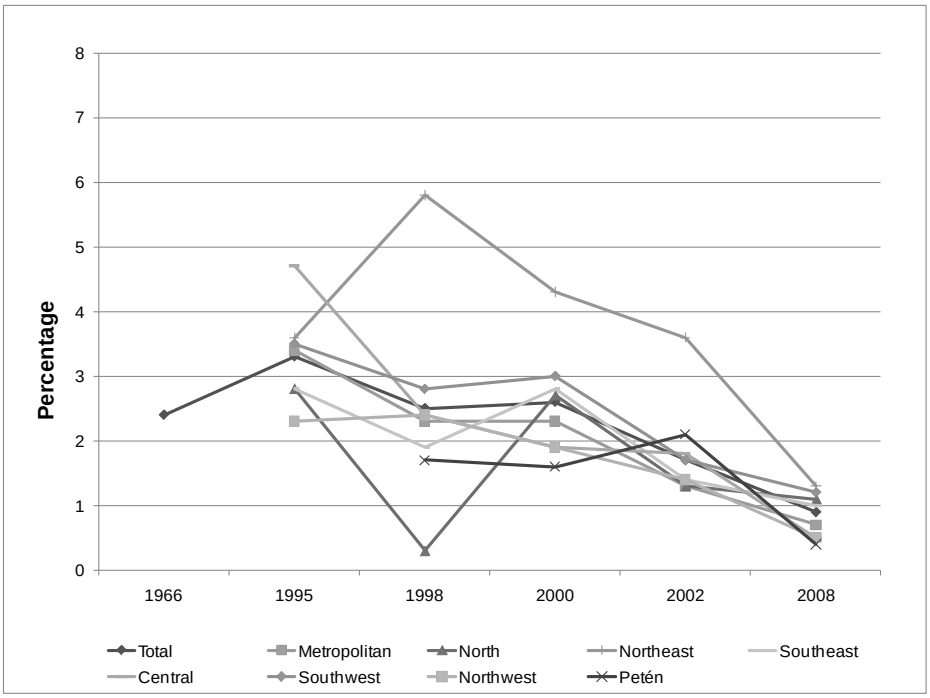
Regarding low weight-for-height, Figure 4 shows that the prevalence of acute malnutrition is low, and more variable than the other indicators. The general trend is downward; however, the decline is not linear but rather shows a deteriorating nutritional situation from 1987 to 1995 and from 1998 to 2002. National and regional malnutrition prevalence levels declined during the intervening periods. The first surveys, 1987 to 1998, noted higher prevalence in the southwestern and central regions. Data from the northeast differ from the other regions, with initial intermediate values in 1987, significant increases occurring during intermediate surveys, and finally reached values near baseline in 2008.

Furthermore, overweight and obesity among children under age five – data not shown in these graphs – are more prevalent than severe malnutrition in all of the surveys. These situations predominate in urban areas, with the exception of the surveys of 1966 and 1995, in which the rural preschool population was more severely affected. Regions with the highest prevalence of overweight and obesity include the metropolitan, northwest, and northern regions.

C. Departmental Level

Surveys of maternal and child health and of households were conducted in representative samples at the national level and in the political-administrative regions previously listed. The 2008–2009 survey presents information representative of the 22 departments in the country. With regard to chronic malnutrition (43.4 percent at the national level, preliminary report based on NCHS reference population), extreme values in the distribution are found in the department of Guatemala, the lowest at 20.6 percent, and in Totonicapán, the highest at 74.2 percent. It is worth noting that these levels are between 8 and almost 30 times the prevalence expected in a healthy and well-nourished population, in which approximately 2.5 percent of individuals fall more than two standard deviations below the median height-for-age. Prevalence above the national average is found in 11 departments, namely (from greater to lesser prevalence): Totonicapán, Quiché, Huehuetenango, Sololá, Chiquimula, Baja Verapaz, Chimaltenango, Alta Verapaz, San Marcos, Jalapa, and Sacatepéquez. USAID provides technical and financial assistance in each of these departments, with the exception of Quetzaltenango.

Figure 4: Changes in the prevalence of low weight-for-height in children under 5-years old in Guatemala; total and by region, NCHS Standards, 1966–2008



Regarding acute malnutrition (0.9 percent nationally), the nine departments with higher than average rates were El Progreso, Santa Rosa, Quetzaltenango, San Marcos, Suchitepéquez, Retalhuleu, Baja Verapaz, Izabal, and Jutiapa. San Marcos and Baja Verapaz had high prevalence of both chronic and acute malnutrition at the time of this survey.

Departmental information on chronic malnutrition from the School Height Censuses, conducted in 1986, 2001, and 2008, shows that the departments with chronic malnutrition above the national average (51.1, 49.7, and 45.6 percent, respectively) in the three censuses are Chimaltenango, Sololá, Totonicapán, Quetzaltenango, San Marcos, Huehuetenango, Quiché, Alta Verapaz, and Jalapa. With the exception of Jalapa, the departments mentioned receive technical and financial assistance from USAID. Baja Verapaz, Sacatepéquez, and Suchitepéquez had above average prevalence in the first two censuses but were below the average in the most recent census, while Jalapa was included in the list of those most affected after the last two censuses.

Given that growth retardation among first-grade children is directly associated with the age of the children attending first grade, and that changes in the age composition could confound the analysis, upon analyzing the trends we opted to consider changes in prevalence among seven-year-old children, the largest group in all the censuses. Information on growth retardation specifically among seven-year-old children supported the findings above, and added Chiquimula to the list of departments with greater-than-average prevalence in the 2008 census.

For this report we also examined information from the Sentinel Surveillance System, developed in Guatemala from 1985 to 1987. This system involves the longitudinal follow-up of communities of about 1,000 inhabitants in marginalized rural areas, randomly selected from all of Guatemala's departments. Five communities were selected per department to ensure reliable information at the departmental level. The communities were prospectively studied as a unit and from that database we analyzed the prevalence of growth retardation among children under three years old. Adding the information from the departmental level, the results of this analysis confirm that the prevalence of growth retardation

among preschool children exceeds 50 percent in the same departments detected in the height censuses. These include communities corresponding to the northwestern and southwestern regions, as well as Baja Verapaz and Jalapa, which belong to the so-called "dry corridor" of the country, and Sacatepéquez, Retalhuleu, and Suchitepéquez.

D. Municipal Level

The prevalence of height retardation in young children in developing countries, like Guatemala, is a valid and accurate indicator of health and nutritional status. Stunting in preschool and school children, as well as in adulthood, reflects inadequate nutrition from conception through 24 to 36 months; the greatest length growth occurs during the first 16 to 20 weeks of life. As shown in this report, height retardation in school children is highly prevalent in the highlands of Guatemala, predominantly in the Mayan population, reflecting poor socioeconomic conditions and marginalization. Prevalence of height retardation of school children is also reflective of the coverage of the public education system (low enrolment is likely to underestimate the extent of stunting). Given that coverage has significantly increased in Guatemala during the last 22 years and is high, the school height censuses constitute a reliable and valid tool for small-area targeting of nutritional interventions. Furthermore, the mean stature of women in Guatemala is 148 cm and about 145.6 cm in the highlands; small adult body size is detrimental to the health of women, and the health and nutrition of the fetus and infant, which without well-targeted and determined interventions can continue to perpetuate the vicious cycle of malnutrition.

The height census of school children helps to identify municipalities with the greatest damage and those most vulnerable to chronic malnutrition. It also enables us to examine trends from 1986 to the present. Data from the 2008 Height Census show that, of 333 surveyed municipalities, 206 (61.9 percent) have a prevalence of chronic malnutrition below 50 percent. The remaining 127 municipalities (38.1 percent) have a prevalence of growth retardation of 50 percent or greater, 20 or more times the 2.5 percent prevalence expected in a healthy and well-nourished population. When the locations of the most affected municipalities are analyzed, it is clear that about 91 percent of the municipalities with chronic malnutrition of 50 percent or more lie in the eight departments in USAID's area of influence. The following table shows the percentage of municipalities affected in those departments, from most to least affected. Overall, of 165 municipalities in the areas receiving USAID assistance, 115 (70 percent) have prevalence rates of chronic malnutrition above 50 percent among school children.

Table 3: Percentage of municipalities per department, in USAID areas of influence, with a prevalence of chronic malnutrition exceeding 50 percent, Guatemala Height Census of First-grade School Children, 2008

Department	Number of municipalities	Number of municipalities affected	Percent of municipalities affected
Totonicapán	8	8	100
Quiché	21	18	86
Huehuetenango	32	27	84
Sololá	19	15	79
Alta Verapaz	16	12	75
San Marcos	29	16	55
Chimaltenango	16	8	50
Quetzaltenango	24	11	46

The municipalities affected in other departments include four in Chiquimula (San Juan La Ermita, Jocotán, Camotán, Olopa), three in Jalapa (Jalapa, San Pedro Pinula, San Carlos Alzatate), two in Suchitepéquez (San Antonio Suchitepéquez, San Miguel Panam), and one each in the departments of Sacatepéquez (Santa María de Jesús), Zacapa (La Unión), and Baja Verapaz (Purulhá).

E. Trends

Information from the height censuses of school children in each department also allows for the analysis of trends in the prevalence of growth retardation during two time periods over the past 22 years – 1986 to 2001 and 2001 to 2008. The average national change during these time periods, expressed as percentage points per year, shows a decline in chronic malnutrition of 0.09 during the first period and 0.59 for the second period. Thus, the reduction in the prevalence of chronic malnutrition was six times greater per year during the second more recent period than during the first period.

For the specific group of seven-year-old first-grade students, the average reduction in growth retardation, expressed as percentage points per year, was 0.07 and 0.54 for the first and second periods, respectively. The departments whose reduction in prevalence of growth retardation during the first period was less than the national average were Totonicapán, San Marcos, Huehuetenango, Quiché, Alta Verapaz, Baja Verapaz, Petén, Izabal, Chiquimula, and Zacapa. For the second period, the departments that improved the least were Quiché, Alta Verapaz, Izabal, and Chiquimula.

From 1986 to 2008, the nationwide decline in prevalence of chronic malnutrition among seven-year-old children was 4.8 percentage points. The smallest declines were found in Huehuetenango, Quiché, Alta Verapaz, Izabal, Jalapa, and Chiquimula. The latter department showed an increase in chronic malnutrition from 1986 to 2008.

The changes that occurred between height censuses can be analyzed by municipality by applying the same approach used in the departmental analysis. Changes in the prevalence of growth retardation for both periods – 1986–2001 and 2001–2008 – were estimated by municipality, and four categories of municipalities were identified: 1) those that showed improvement in both time periods, 2) those that demonstrated sustained deterioration during both time periods, 3) those that worsened in the first period but improved in the second period, and 4) those that improved in the first period but worsened in the second. Table 4 summarizes the performance of municipalities at the national level and Table 5 shows the specific analysis of the municipalities in the eight departments of the western region, of interest to USAID.

Table 4: Change in the prevalence of chronic malnutrition among first-grade school children during two time periods (1986–2001 and 2001–2008) in 323 municipalities nationwide. Guatemala Height Censuses of First-grade School Children

		2001-2008			
		Deterioration		**Improvement**	
		n	%	n	%
1986-2001	**Deterioration**	16	5.0	92	28.5
	Improvement	23	7.1	192	59.4

Table 5: Change in the prevalence of chronic malnutrition among first-grade school children during two time periods (1986–2001 and 2001–2008) in 154 municipalities in eight departments in areas of USAID influence. Guatemala Height Censuses of First-grade School Children

		2001-2008			
		Deterioration		**Improvement**	
		n	%	n	%
1986-2001	**Deterioration**	13	8.4	63	40.9
	Improvement	15	9.7	63	40.9

As can be observed, the nutritional status of children generally improved, especially during the second time period studied. Nevertheless, over the past 22 years, the trend for decreasing growth retardation is weaker in the municipalities of departments in the western region as compared with the overall trend

for all of the municipalities of the country. Of 16 municipalities in which growth retardation continually worsened in both time periods, 13 (81 percent) are in the eight western departments. Likewise, of the 39 municipalities that worsened during the recent time period, 28 (72 percent) are in departments in the western region. Finally, 82 percent of the municipalities in the eight areas under USAID influence showed improvement in the second period compared to 88 percent at the national level.

Appendix 1 lists the municipalities with the greatest damage and vulnerability in the eight USAID priority areas. One criterion used for defining municipalities with minimal changes in the prevalence of chronic malnutrition, was the percentage change expected per year in moderately efficient programs. In such cases, national programs have reduced chronic malnutrition 0.5 to 1.0 percent per year.

The School Height Census of 2008 shows that the departments in which more than half the school children suffer from chronic malnutrition (a level 20 times higher than expected in a population with healthy, well-nourished children, according to WHO growth standards) are Chimaltenango, Sololá, Totonicapán, San Marcos, Huehuetenango, Quiché, Alta Verapaz, and Chiquimula. Within these and other departments, municipalities are found with a high prevalence of chronic malnutrition, so that in 26 of the 332 municipalities for which there was information in 2008, more than half of the children suffer from chronic malnutrition. The municipality of Guastatoya in the department of El Progreso had the lowest prevalence, with 10.2 percent chronic malnutrition; while the highest prevalence, 91.4 percent, was found in the municipality of San Juan Atitán in the department of Huehuetenango. As indicated previously, since chronic malnutrition is defined by a normalized scale based on the WHO Child Growth Standards, one would expect approximately 2.5 percent of children to fall more than two standard deviations below the median. Thus, Guastatoya would have four times more growth retardation than expected, while the rate in San Juan Atitán is nearly 40 times more than expected in a population of normally developing children.

In conclusion, there is valid and reliable data on the situation and trends regarding chronic malnutrition and food insecurity in Guatemala, allowing us to identify the most affected departments and municipalities as well as the most vulnerable populations. What is lacking, however, is information required to implement the type of targeted interventions needed in emerging situations resulting from environmental and financial crises, as well as from food prices, which severely affect the most vulnerable population.

F. Special Studies

Not all national surveys have comparable regional data, so the ability to estimate trends at sub-national levels is limited. In addition, the low height-for-age (chronic malnutrition) and low weight-for-age (global malnutrition) indicators are adequately estimated in cross-sectional surveys because they measure prevalence; however, the incidence of low weight-for-height – an indicator of acute malnutrition – is underestimated in cross-sectional studies like health and nutrition surveys. It is precisely those changes in the low weight-for-height index, obtained prospectively, that would provide us with a valid early warning of crisis situations. Even so, the available information enables us only to identify regions of the country where chronic and global malnutrition were greater at the time of the survey and to locate the populations at risk, as well as those at risk of nutritional harm.

The Guatemalan population has recently been affected by crises such as the price of food and energy, and by financial and environmental crises. Thus, in 2009, various surveys and specific nutritional censuses were conducted, especially in the areas and among the groups at greatest risk. These included residents in the so-called "dry corridor," where agricultural production had suffered the greatest losses, and in geographic areas historically identified as at risk. The studies were conducted by international and nongovernmental organizations with participation by official national institutions.

Information on the current situation of severe acute malnutrition (SAM) among children in Guatemala

was obtained in October 2009 by a survey conducted in departments along the dry corridor, made up of Alta Verapaz, Baja Verapaz, El Progreso, Zacapa, Chiquimula, Jutiapa, Santa Rosa, Jalapa, and Quiché. The nutritional evaluation, which measured the middle upper arm circumference (MUAC), found an estimated 5 percent of cases studied had severe acute malnutrition (MUAC < 11.5 cm.). The greatest incidence of SAM cases was found in the southern region of Quiché; a second concentration in the southern region of Izabal, Zacapa, Chiquimula, and northeastern Jalapa; and a third concentration in the northern region of Santa Rosa (Red Humanitaria, 2009).

In addition, in late 2009, another survey of the departments of Chiquimula, Jalapa, El Progreso, Zacapa, and Jutiapa also employed MUAC to estimate SAM. According to this survey, the average incidence of SAM in the region studied was 2.7 percent, with significantly higher occurrence in Jalapa (9.3 percent) and in San Luis Jilotepeque (6.6 percent). During this period, an estimated 58 percent of the first corn harvest and 70 percent of the first and second bean harvests had been lost (Action Against Hunger, 2009).

G. Variable and Multivariate Level Analyses

With chronic malnutrition being the most prevalent nutrition problem in Guatemala, particularly in the highland departments, this report analyzed information related to factors influencing growth retardation in children. In order to acquire information for both the departmental and municipal levels, the analyses by department used the prevalence of growth retardation in preschool and first-grade school children (total and seven-year-olds) as the dependent variable. These data were obtained from the last ENSMI (2008–2009) and from the School Height Census (2008) for 22 departments. The dependent variable used for analysis at the municipal level was prevalence of growth retardation in first-grade school children (total and seven-year-olds) in 165 municipalities in the eight departments in USAID's area of influence. Independent variables included in the analyses were demographic and socioeconomic indicators, education, ethnic group, occupation, access to services, sanitation, and access to land. The information was obtained from various sources at the municipal and departmental levels.

Tables 6 and 7 present values for the correlation coefficient and the statistical significance of associations among the dependent and independent variables for the 22 departments, and for the 165 municipalities within the eight departments in USAID's area of influence. Results of these bivariate analyses confirm that a series factors related to demographic and socioeconomic factors – as well as those related to education, land tenure, access to health services, household goods and services, population density and overcrowding, and to indexes of human development, job insecurity, and marginalization – are directly associated with the prevalence of chronic malnutrition in departments and municipalities, both nationally and in the areas of USAID influence. Table 6 shows statistically significant correlations at the departmental level, demonstrating the expected relationship between the prevalence of growth retardation in preschool and school children and variables related to the following:

- access to and use of health services (prevalence of use of family planning methods and prenatal, delivery and postpartum care, and infant mortality rates)
- poverty and extreme poverty rates
- possession of and access to household goods and services (sanitation)
- the father's and mother's occupation (independent of land ownership, agricultural work is associated with greater prevalence of chronic malnutrition)
- density of small farms (possibly because less stable work is available on small farms than on large plots of land)
- parents' education level (an inverse relation, which could be interpreted as educated families' greater ability to access public services, information, employment, etc.)

Table 6: Factors associated with the prevalence of growth retardation among preschool, first-grade school children, and 7-year-old school children in 22 departments of Guatemala

Variables	Growth retardation		
	Preschool	School	7-years old
Access to and use of health services			
Use of contraceptive methods	-0.88***	-0.86***	-0.86***
Infant mortality	NS	0.44*	0.46*
Prenatal care	-0.86***	-0.82***	-0.82***
Deliveries at health establishments	-0.91***	-0.90***	-0.91***
Type of delivery (cesarean)	-0.75***	-0.72***	-0.75***
Deliveries attended by medical personnel	-0.91***	-0.90***	-0.90***
Postpartum checkup	-0.48*	-0.51*	-0.50*
Family violence			
Sexual violence	-0.44*	-0.50*	-0.49*
Verbal aggression	-0.50*	NS	NS
Demographic information			
Women	0.44*	0.48*	0.47*
Indigenous	0.80***	0.85***	0.86***
Population in poverty			
Total poverty	0.66***	0.71***	0.71***
Extreme poverty	0.61***	0.67***	0.67***
Female-headed household	NS	NS	-0.42*
Access to basic services			
Connected to a sewer system	-0.50*	-0.51*	-0.52*
Connected to an electrical grid	-0.44*	-0.46*	-0.46*
Crowding, means of cooking, and way of eliminating waste			
Crowding	0.60**	0.68***	0.68***
Means of cooking: wood	0.68**	0.71***	0.72***
Throws garbage anywhere	0.65**	0.64**	0.63**
Occupational category			
Unpaid family member	0.65**	0.67***	0.66***
Land tenure			
Small farms	0.46*	0.58**	0.58**
Sub-family farms	-0.43*	-0.54**	-0.55**
Large multi-family farms	-0.44*	-0.49*	-0.48*
Illiteracy			
Illiteracy	0.76***	0.74***	0.74***
Rural illiteracy	0.75***	0.72***	0.73***
Illiteracy among women	0.80***	0.81***	0.81***
Incomplete primary education	0.64**	0.61**	0.61**
Socioeconomic level			
Homes with dirt floors	0.57**	0.55**	0.55**
Index of occupational precariousness	-0.61**	-0.60**	-0.60**
Index of marginalization	0.54*	0.53*	0.53*
Average number of children born live	0.63**	0.68***	0.68***
Rate of demographic dependence	0.59**	0.60**	0.60**

* p <.05; **p <.001; ***p<.0001; NS No significant correlation

Table 7: Factors associated with the prevalence of growth retardation among first-grade school children and 7-year-old school children in 165 municipalities in eight departments under USAID influence, in the high plateau of Guatemala

Variables	School children	School children age 7
Demographic information		
Rural population	0.34***	0.30***
Indigenous population	0.64***	0.67***
Average age	-0.63***	-0.59***
Percentage of women	0.25**	0.26**
Percentage of indigenous women	0.64***	0.67***
Population in poverty		
Total poverty	0.73***	0.68***
Extreme poverty	0.64***	0.60***
Index of human development	-0.67***	-0.63***
Access to basic home services		
Female head [of household]		
No sewer service	0.31***	0.26***
Connected to a sewer system	-0.41***	0.38***
Connected to an electrical grid	-0.29***	0.27***
Connected to a water service	-0.24**	-0.21***
Crowding, means of cooking, and way of eliminating garbage		
Crowding	0.62***	0.58***
Means of cooking: electricity	NS	NS
Means of cooking: wood	0.63***	0.61***
Municipal garbage service	-0.35***	-0.31***
Disposes of garbage anywhere	0.51***	0.46***
Economically active population		
Economically active men	-0.16*	NS
Economically active women	-0.25**	-0.22**
Occupational category		
Unpaid family member	0.41***	0.42***
Agriculture	0.35***	0.30***
Land tenure		
Small farms	NS	0.17*
Sub-family farms	NS	NS
Family members	-0.20*	-0.20*
Medium-sized multi-family	-0.34***	-0.36***
Large multi-family	-0.34***	-0.34***
Average surface area of the farms (Ha)		
Small farms	0.19*	0.16*
Sub-family farms	-0.24**	0.27**
All farms	-0.44***	-0.47***
Illiteracy		
Illiteracy	0.64***	0.60***
Rural illiteracy	0.59***	0.56***
Female illiteracy	0.68***	0.65***
Socioeconomic level		
Index of occupational precariousness	-0.60***	-0.56***
Average number of children born live	0.60***	0.58***

*p<.05; **p <.001; ***p<.0001

- indigenous population (due to the adverse socioeconomic situation in which they live). A strong direct relationship has also been reported in Guatemala between altitude and chronic malnutrition. This suggests that those living at higher altitudes, where land is generally less productive and services and means of communication are less available, have a higher prevalence of malnutrition (Pebley and Goldman, 1995). Much of Guatemala's indigenous population lives at high altitudes.
- family size and rate of dependency (ratio of dependents – children under age 15 and dependent older adults – to the economically active). When resources are limited, these relationships indicate how the number of mouths to feed affects nutritional state.

Although the information on the independent variables is not exactly the same for the municipalities in the eight selected departments (see Table 7), these data resemble the associations and significance observed at the departmental level.

Finally, to determine the dependence of chronic malnutrition on a series of independent variables, multivariate analyses were conducted using information available at the municipal level in areas of USAID influence. Results for all school children, and for seven-year-olds, are shown in Table 8. The multiple regression analysis included independent variables shown to be strongly associated with chronic malnutrition in previous analyses. Dependent variables were the two indicators for growth retardation in first-grade school children: the prevalence of growth retardation among all first-graders, and prevalence among seven-year-old first-graders. Results of the regression analyses show that models including the above-mentioned independent variables explain about 80 percent of the variability in growth retardation among school children in general and among seven-year-old school children. Growth retardation among school children is associated with a high level of poverty, a low human development index, lack of running water in the household, high level of crowding, wood fire as main cooking source, density of small farms and unpaid family work, a high percentage of illiteracy among women, a high level of job insecurity, and more live births. The prevalence of chronic malnutrition also appears to be directly associated with the percentage of indigenous population in the municipalities. This relationship reflects the degree of exclusion suffered by the indigenous population.

These findings confirm that the nutritional status of preschool children is influenced by many factors operating both at the basic or structural level as well as at an underlying or community level and a proximate or intermediary level. As shown previously in the conceptual framework, the most immediate determinants of nutritional status are food intake and biological utilization of food. Thus, food consumption and infections are the proximate or intermediary determinants through which underlying causes (food availability, income, sanitary conditions and behaviors) and basic causes (social, economic, political, and environmental) of chronic malnutrition exert their influence.

Based on this and other studies conducted in Guatemala, we can say that factors indicative of insecure life conditions are among the main causes of chronic malnutrition. These factors include poverty, low level of education (especially of the mother), lack of basic services (including health), and unhealthy environmental conditions. Other variables found to be significantly associated with growth retardation in the analyses presented here are also determinants in a network of causality in which they intervene at three levels – structural, underlying, and proximate.

IV. TECHNICAL AND SCIENTIFIC EVIDENCE

At each level – structural, underlying, and proximate – we can identify actions that lead to a decline in growth retardation. Some actions have an effect in the short term while others will take longer to achieve an impact. The sustainability of effects also varies, with some proposed measures designed to help alleviate a current problem while others of a more preventive nature address underlying conditions. Addressing structural or basic constraints requires more time to have an impact, and these interventions are considered promotional. Table 9 summarizes these guidelines.

Table 8: Multiple regression: Determinants of growth retardation among school children in municipalities in areas of USAID influence

A. All school children

Source	DF	Sum of squares	Mean square	F-ratio	Pr > F
Model	13	26252	2019.37	45.70	<.001
Error	149	6573.70	44.18		
Corrected total	162	32863			

R Squared	Coefficient of variation	Root MSE	Dependent Mean
0.78	11.67	6.64	56.95

Parameter	Estimate	Standard error	t-value	Pr > t
Intercept	-6.87	28.07		
Indigenous population	0.13	0.02	5.48	<.0001
Poverty	0.31	0.08	3.89	0.0001
Human Development Index	25.90	12.47	-2.08	0.0395
Drainage network	0.12	0.04	2.68	0.0083
Crowding	0.30	0.08	3.63	0.0004
Unpaid family member	0.08	0.04	1.83	0.0693
Small farms	0.21	0.03	8.17	<0.0001

Other independent variables included in the multiple regression model were: rural population, average age, cooking with wood, illiteracy, precarious employment index, and average number of live children.

B. School children age 7

Source	DF	Sum of squares	Mean square	F-ratio	Pr > F
Model	13	22990	2153.11	42.11	<.0001
Error	149	7619.29	51.14		
Corrected total	162	35610			

R Squared	Coefficient of variation	Root MSE	Dependent Mean
0.77	13.46	7.15	53.12

Parameter	Estimate	Standard error	t-Value	Pr > t
Intercept	-34.28	30.19	-1.14	0.26
Indigenous population	0.16	0.02	6.39	<0.0001
Poverty	0.25	0.09	2.87	0.0047
Human Development Index				
Drainage network	0.13	0.05	2.73	0.0070
Crowding	0.32	0.09	3.68	0.0003
Unpaid family member	0.11	0.04	2.39	0.0182
Small farms	0.22	0.03	8.12	<0.0001

Other independent variables included in the multiple regression model were: rural population, median age, human development index, cooking with wood, women's illiteracy, precarious employment index, and number of children.

Table 9: Guidelines for managing the signs and determinants of nutritional problems

Lines of action to address	Activities	Effects over time	Sustainability
Signs/immediate causes	Temporary provision of goods and services	Short to medium term	Low
Underlying causes	Development of integrated programs	Medium to long term	Medium
Basic causes	Rule of law, empowerment of society and equitable growth	Long to very long term	High

A. Short- to Medium-term Measures

These measures, which are helping to reduce chronic malnutrition and micronutrient deficiencies, as well as to improve infant, child, and maternal nutrition, were recently reviewed in a series in the journal *Lancet* on Maternal and Childhood Malnutrition (2008) and in a report by the Copenhagen Consensus on Malnutrition and Hunger (2002, 2004). These interventions, many of which could be implemented both at the local and central levels, have proven effective in fighting malnutrition. They include:

- **Behavior change** including the promotion of exclusive breastfeeding in the first six months of life; the timely introduction of adequate and appropriate complementary feeding; and adequate hygiene, especially hand washing.
- **Micronutrient supplementation** for children aged six months to five years and for pregnant women. Recommended micronutrients include vitamin A, iron, and zinc, as needed; therapeutic supplementation with zinc in cases of diarrhea; use of powdered micronutrients with multiple vitamins and minerals, such as the popular nutritional "sprinkles." Iron and folic acid supplements are recommended for pregnant women. Another measure for consideration is to fortify staple foods, such as adding iodine to salt, vitamin A to sugar, and iron and folic acid to flour and rice.
- **Complementary foods** fortified with micronutrients for children six to 23 months old.
- **Environmental hygiene and sanitation** to ensure access to safe water, safe disposal of wastewater and garbage, and promotion of personal and collective hygiene.
- **Clinical management of severe acute malnutrition** following protocols that promote proper recovery, reduce the risk of death, facilitate rehabilitation and reduce care time, and promote the prevention or treatment of moderate malnutrition.

These measures, which are the primary responsibility of health services, can be implemented within the context of community programs, primary care, or social protection networks or programs, such as conditional cash-transfer programs. Based on the current scientific and technical evidence, if this limited group of interventions were implemented to cover 100 percent of the target population, focusing on pregnant and nursing women, as well as children up to age two, the burden of mortality and illness associated with malnutrition could be reduced by as much as 25 percent while concurrently promoting proper growth and development among children.

B. Medium- to Long-term Measures

These measures include a series of multi-sector interventions promoting food and nutrition security for families and communities, such as interventions focused on availability of and access to food. Additional interventions would focus on consumption and optimal use of the consumed foods (World Bank, 2006; Pridmore and Carr Hill, 2009). The following measures have been proposed and proven effective:

- **Increasing production and consumption of nutritious foods**. These measures promote initiatives relating to bio-fortification, horticulture, and family gardens. Besides having direct effects on the availability of foods and nutrients at the household level, these interventions have contributed to empowering women and communities, giving them confidence in their productive capacity.
- **Increasing purchasing power**. These measures include the promotion of income-generating initiatives. The limited production of foods at the family level makes it necessary for the family to be productive and generate resources that allow them to purchase foods available in the marketplace.
- **Improving the quality of care provided to young children.** This effort includes aspects of childcare related to a woman's self esteem, education level, and status in the home. Specific interventions include behavior change for men/fathers in providing child-care support, improving children's environments, early stimulation and affection, and forming community and family support networks. This concept also involves promotion of a woman's sexual and reproductive health rights, including optimal birth spacing, which promotes infant feeding and care, and the use of family-planning methods.
- **Strengthening promotional, preventive, and medical care systems.** Ministries of health, education, environment, agriculture, and labor, among others, should promote the implementation of integrated programs at the local level with full and organized participation of the community.

C. Longer-term Measures

Measures that address the structural causes of malnutrition are the most difficult to implement because of their relationships with the reigning political, economic, cultural, and religious systems as well as with institutional structures that govern society, influence women's status, and control the availability of human, economic, and organizational resources of the State (World Bank, 2006; Pridmore and Carr Hill, 2009). Some longer-term measures that could reduce malnutrition are the following:

- **Strengthening democratic governance** would support the creation of an environment that facilitates just distribution of power and financial and other resources in society.
- **Increasing national per capita income** would mean promoting equity through the fair management of resources, giving more to those who need more.
- **Promoting the active and organized participation of the community** should involve participatory and organized activities, so the community can influence decision making and monitor the actions that affect them.
- **Raising the status of women** can draw from the literature on this subject, which presents successful case studies of women-led microfinance projects, providing conditional cash transfers to women, promoting women in legislative bodies, and providing support for women in their reproductive role. An intervention that is promising in the long-term is the education of girls.
- **Social protection policies** initially include social protection that targets marginalized households through conditional cash transfers and other interventions, as appropriate. Examples of such interventions would be food assistance and subsidies, pensions for older adults, and support for school children with the goal of protecting them from the negative effects of crises and reducing their level of vulnerability while strengthening their resilience and creating assets. Secondly, these policies should strive to create standardized, integrated programs that promote job, sanitary, food and nutrition, environmental, and human security.
- **Reforms of macroeconomic policies** are undertaken to stimulate economic growth and

reduce poverty and social exclusion. Policies that have proven successful in some countries include anti-poverty policies, agricultural reform, liberalization of markets and prices, public investment in agriculture, and the open-door economic policy.

- **Guaranteeing human rights** is a longer-term measure for which solid scientific evidence is currently lacking. However, promoting and guaranteeing human rights, particularly the right to food and nutrition security, should have a positive long-term impact.

V. NATIONAL PROGRAMS AND INTERNATIONAL COOPERATION

As the following section describes, Guatemala enjoys a favorable legal framework for addressing food and nutrition insecurity. However, considering the complexity of the subject, its multi-sector nature, and the institutional cooperation it requires, the creation and implementation of new programs is not an easy task.

A. Governmental Efforts

In the late 1990s, after recognizing the need to organize and optimize work in this area, the Government of Guatemala established the basis for creating the National Council for Food and Nutrition Security (*Consejo Nacional de Seguridad Alimentaria y Nutricional*, or CONASAN) and the Action Plan for Food and Nutrition to address severe and chronic problems of nutrition and food insecurity. As a result of the efforts of CONASAN and the National Front against Hunger (*Frente Nacional Contra el Hambre*), the law establishing the National System for Food and Nutrition Security [*Ley del Sistema Nacional de Seguridad Alimentaria y Nutricional*, Congressional Decree 32-2005) was passed in 2005. Based on this legislation, the National System for Food and Nutrition Security (*Sistema Nacional de la Seguridad Alimentaria y Nutricional*, or SINASAN) was established and the Office for Food and Nutrition Security (*Secretaría de Seguridad Alimentaria y Nutricional*, or SESAN) was designated the governing entity for national food security and nutrition. The organizational responsibilities regarding food and nutrition security comprise three levels: CONASAN oversees the overall direction and policy decisions; SESAN is responsible for technical coordination and planning; and implementing activities is the responsibility of institutions working on food and nutrition security at all levels.

This law gives nutrition and food security the status of State-level policy with an integrated and broad focus within the framework of general policies for development and poverty reduction. Thus, the national policy should be understood as a step closer to the concept of the right of all people to have food and nutritional security. This right would be guaranteed by supporting the basic pillars of nutritional and food security – availability, access, consumption, and biological utilization of foods – all of which are related to the underlying causes of the nutritional well-being of the population

SINASAN is coordinated by CONASAN and SESAN. It comprises the vice presidency and eight ministries [Ministry of Agriculture, Livestock, and Food (MAGA); Ministry of the Environment and Natural Resources (MARN); Ministry of Communications, Infrastructure, and Housing (MICIVI); Ministry of the Economy; Ministry of Education (MINEDUC); Ministry of Public Finance; Ministry of Public Health and Social Assistance (MSPAS); and the Ministry of Labor], two secretariats [Secretariat for the Executive Coordination of the Presidency (SCEP) and the Presidential Wife's Office for Social Work (SOSEP)], and other State entities in charge of specific aspects of food and nutrition security. There is also a level of consultation that involves civil society, (INCOPAS) and the Group of Supporting Institutions (GIA), which includes other government agencies and agencies for international cooperation.

For each of the pillars of food and nutrition security – availability, access, intake, and biological utilization of food – there are clearly defined responsibilities that correspond to specialized government offices (Danish Agricultural Advisory Service, 2009).

MAGA has traditionally given the most attention to the issue of food availability. Its main programs in

this area attend to the needs of resource-poor peasants and farmers who have high rates of poverty, food and nutrition insecurity, and environmental vulnerability. MAGA's three main programs address:

- Basic inputs
- Basic grains and post-harvest, and
- Promotion of productive and commercial development of agriculture through the financial and technical cooperation program, technical support for productive re-training development of the fruit and agricultural industries, as well as promotion and organization of fishing activities and sustainable use of hydrobiological resources, among other efforts.

The Vice Ministry for Food Security and Nutrition was created as a specialized office of MAGA to contribute to efforts to make Guatemala's agriculture industry competitive. The programs involve increased investment and technological innovation in commercial agriculture chains and in developing rural agriculture, with an emphasis on subsistence and semi-subsistence farming, protecting natural resources, and strengthening public and private institutions of the agricultural sector. Finally, with the aim of additional strengthening assistance for overlooked families in rural areas, the PRORURAL program was established. Forty-five municipalities were covered initially, through productive projects related to corn, crafts, coffee, tourism, vegetables, energy, and livestock. The program is expected to grow to cover the 125 poorest municipalities in the country.

The pillar of food accessibility encompasses all actions aimed at improving the population's capacity to acquire foods available in the markets. Included in this category are all activities aimed at improving salaries, creating employment opportunities, and fighting poverty. This also includes programs that provide direct assistance to various populations; among these are preschool or school-age children, working women, and families suffering social exclusion in rural areas. The main programs being implemented are those that provide food and goods. Stand-out programs are the food for school children program led by MINEDUC, the food-for-work program of the Vice Ministry for Food Security and Nutrition and FONAPAZ, and the programs for community homes and care centers and community development, run by SOSEP.

A recently established program (April 2008), which is rapidly expanding, is My Family is Making Progress (*Mi Familia Progresa*, or Mifapro), from the Council for Social Cohesion (*Consejo de Cohesión Social*). This program includes conditional cash transfers (CCT) and delivery of "*bolsas solidarias*" ("solidarity bags" of groceries) to marginalized populations. Many of these programs are social assistance programs, but some also try to promote productive projects and income opportunities among the beneficiaries.

The pillar of food consumption is determined by educational, behavioral, cultural, socioeconomic, and market factors, among others. A series of programs managed by various government agencies carries out interventions related to food consumption. Examples include MSPAS' promotion of breastfeeding and the Mifapro and *Mi Familia Aprende* (My Family Learns) programs of the Ministry of Education, SOSEP's own programs, the promotion of food quality and agricultural health, and the Information, Education, and Communication strategy, for which the Office of Social Communication of the Presidency (*Secretaría de Comunicación Social de la Presidencia*) and SESAN are responsible.

Finally, the pillar of biological utilization of foods is mainly the realm of MSPAS, which is responsible for controlling illnesses, complementary feeding, micronutrient fortification and supplementation, food and nutrition education and hygiene, nutrition surveillance, and issues relating to water and environmental clean-up. The health sector has paid particular attention to interventions included in the National Strategy for the Reduction of Chronic Malnutrition (*Estrategia Nacional de Reducción de la Desnutrición Crónica*, or ENRDC). Established in 2006, the strategy proposes to halve the 2002 rate of chronic malnutrition. Activities related to this ambitious plan include direct components involving health and nutrition, and indirect components involving environmental, family economics, and community organization programs. Initially proposed for 83 prioritized municipalities, expansion was suggested in

2009 to reach other municipalities identified as high risk for chronic malnutrition. A fundamental program component is Vitacereal, a maize-soy nutritional supplement fortified with vitamins and minerals lacking in the local diet.

Another important consideration in biological utilization of food is clean drinking water and environmental sanitation. To achieve these, the MSPAS has set up agreements with SOSEP, MAGA, and the municipalities, among other entities. In March 2010, with participation of the *Instituto de Fomento Municipal* (Municipal Development Institute, or INFOM) and the Council for Social Cohesion, the MSPAS began its national campaign to chlorinate water in all municipalities.

B. Programs in Action

In recent years, various groups have initiated efforts to systematically identify and update the main public and private interventions aimed at food and nutrition care in Guatemala for children under the age of 3 and their mothers. In 2005 the Regional Program for Food and Nutrition Security of Central America (*Programa Regional de Seguridad Alimentaria y Nutricional para Centroamérica*, or PRESANCA), in collaboration with INCAP (PRESANCA and INCAP, 2007), drafted a first technical document containing an inventory of food and nutrition programs. This initial assessment identified 17 programs and projects implemented by governmental entities, nongovernmental organizations, and a mixture of both. Of the public programs, three were implemented by MSPAS, one by MINEDUC, two by the President's Office for Social Welfare (*Secretaría de Bienestar Social*), and two by SOSEP.

This information base was updated in 2009 by the Nutrition Component of the Mesoamerican Initiative for Public Health (*Iniciativa Mesoamericana de Salud Pública*) and more recently by the World Food Programme as part of its study titled "Nutritional Dimension of the Social Safety Nets in Central America and the Dominican Republic" (WFP, 2010). The study provides an analysis of secondary sources, reviews the latest national food and nutrition surveys, and includes newly collected information from an integrated survey and interviews with key informants. For Guatemala, information was obtained on 13 programs and plans related to conditional cash transfers, maternal and child nutrition, maternal and child health, food-based programs, nutritional recovery, micronutrient supplementation, bio-fortification, and integrated care programs for children and adolescents.

As part of this consultancy, a site visit was made to Alta Verapaz to obtain information about the strengths and weaknesses of programs in operation, as well as existing opportunities to strengthen them. This on-site assessment was complemented by another visit by the consultant to the department of Huehuetenango, where working meetings were held with local authorities, health professionals and technicians from the health and other sectors, as well as with families in rural communities.

The following conclusions can be drawn from analysis of the documents, site visits, and studies of programs and plans related to health, food, and nutrition:

- Guatemala is politically committed at the highest levels of government to placing the eradication of child and maternal malnutrition at the core of human and economic development within the national agenda.
- SESAN has enabled the creation of a favorable legal framework and areas of high-level multi-sector coordination where entities involved in improving food and nutrition security can come together. Decentralized levels, such as departments and municipalities, also appreciate SESAN's leadership and ability to gather stakeholders.
- The theoretical and technical content of nutrition programs has been correctly identified by professionals: growth monitoring, nutritional surveillance, micronutrient supplementation, zinc in cases of diarrhea, complementary feeding in cases of acute malnutrition, and case management in centers for nutritional recovery. Nonetheless, efforts to translate this content into practice are frequently inadequate due to a lack of training, personnel, supplies, and equipment.

- Despite scientific and technical evidence confirming the "window of opportunity" for successful clinical and preventive nutrition programs, at an operational level, not all programs prioritize the care of women of reproductive age, especially pregnant mothers, and children under 2 years old,
- The effectiveness of assistance and preventive programs is lessened by their failure to properly target the population groups at greatest risk.
- There is a lack of timely and reliable information on program implementation and actual coverage. Programs in the health sector are not properly integrated, which impedes synergy among their activities. There is also little evidence of coordination between regular programs and programs that extend coverage.
- In the area of human resources, not enough personnel are trained in nutrition and program management to meet the need. In addition, many governmental and nongovernmental personnel in the sector face job insecurity, and report that their monthly salary is not received on time.
- The availability of resources, inputs, and foods is not guaranteed and most programs are considered insufficient. There are obstacles to the logistics required to guarantee the timely delivery of products to the target population.
- Programs with food distribution components show a low level of integration.
- Data quality varies and many inconsistencies exist in data reported to and by the Health Management Information System (*Sistema de Información Gerencial en Salud*, or SIGSA). Technical personnel in the field are confused about which measurements, indices, and indicators are most appropriate.
- Monitoring and evaluation is a weak component of all the programs studied, especially due to the lack of roadways and transportation. Early warning, early detection, and management of urgent cases are not adequately emphasized.
- Programs are increasingly using a human rights approach (related to principles of universality, interdependence, nondiscrimination, participation, and accountability) and taking into account relationships between cultures, community participation, and a gender approach.
- Despite the political and technical emphasis placed on food and nutrition security, public social investment continues to be very low relative to the need.

Generally speaking, these studies on food and nutrition security programs reach the same conclusions. They emphasize the need for greater and better organization and for optimizing the many activities being implemented. This need applies as much to activities in the health sector as to other sectors. There is a need to coordinate and, in many cases, to integrate social programs, especially at the first level of care. Promotion of the joint work of health, environment, agriculture, education, and employment sectors, among others, should emphasize the local, regional, and national initiatives in food and nutrition security.

C. Bilateral and International Cooperation

SESAN recently presented the results of information gathering that mapped sources of external technical and financial assistance for programs on food and nutrition security, as well as a description and location of these resources. The following partners stood out:

- The European Union and its food facility budget assistance projects, which focus on food availability, and local rural development
- The U.S. Agency for International Development (USAID) and its projects for maternal and child health, the integration of child health with family planning, improving the quality of maternal and

child health and nutrition, strengthening livelihoods, increasing capacity for natural resource management and emergency preparation, and distributing ready-to-use therapeutic foods (RUTF) for emergency programs

- The World Bank with its projects to strengthen the network of maternal and child nutrition services, and those concerning health communications, monitoring and evaluation, and institutional strengthening
- The Inter-American Development Bank (IDB) and its project on institutional strengthening and support for pre-investment in business development
- The United Nations system comprising the technical and financial cooperation of agencies in specific technical fields such the FAO, PAHO, WFP, UNICEF; joint programs of FAO, PAHO, WFP, UNICEF, UNFPA, and *Volontaire des Nations Unies* (VNU) to reduce chronic malnutrition; and joint programs of FAO, PAHO, WFP, and UNICEF for the *Ventana de Infancia y Seguridad Alimentaria y Nutricional* (Food and Nutrition Security Program for Children) being implemented in Totonicapán
- Many nongovernmental organizations (Mercy Corps, Plan International, and World Vision are the largest) collaborating on specific activities such as nutritional surveillance, nutritional recovery, complementary feeding, supplementary feeding, food fortification, food and nutrition studies and research, and technical assistance and training
- Initiatives being developed, or in initial stages of implementation, including the interagency project on climate change and food security funded by KfW and the debt-cancellation project for adapting to and mitigating climate change.

Table 10 presents recommendations for evidence-based interventions to improve food and nutrition security, programs already being implemented, and some limitations of these programs.

Table 10: Recommended interventions for improving the food and nutrition situations in Guatemala, programs already being implemented (2009), and their limitations.

Interventions	Current Programs	Limitations
Short- and medium-term		
Promotion of behavior change	MSPAS, SESAN, cooperation of USAID, WB, IDB	Not included in the basic health package, lack of coordination, emphasis on biological utilization but limited use in the other pillars of food and nutrition security
Micronutrient supplementation	MSPAS, UNICEF	Flaws in supply of micronutrients and counseling causes gaps in fulfillment of this intervention and its use
Complementary foods	MSPAS, WFP with Vitacereal	Lack of monitoring and evaluation of the effects and impact on nutrition
Hygiene and sanitation	MSPAS, municipalities	2010 water chlorination campaign has begun in only some municipalities and does not take into consideration small rural villages in these same municipalities. High costs.
Ambulatory and clinical management of severe acute malnutrition	MSPAS, USAID cooperation with ready-to-use therapeutic food (RUTF)	Lack of precise information to identify children with severe acute malnutrition, failures to properly detect cases, case management depends on resources, not using WHO protocol
Medium- to long-term effect		
Increased production and consumption of	MAGA, FAO, European Union, German Agency for Technical	Limitations on agricultural extension support, supplies, and credits

Interventions	Current Programs	Limitations
nutritious foods	Cooperation (GTZ), AECID	
Increasing purchasing power of the people	USAID, UNIFEM, European Union, UNDP, AGEXPORT	Few projects developed locally with income-generation components
Improvement in the quality of care for small children	MSPAS – family planning programs with cooperation of USAID, UNFPA, UNICEF, PLAN, World Vision	Little attention has been given to counseling, early stimulation and monitoring of child development, and self-efficacy of mothers
Strengthening of health promotion, prevention and primary care systems, and surveillance	MSPAS – improving the quality of care with the cooperation of USAID, WB, and IDB	
Long-term effect		
Strengthening of democratic governance	Cooperation of USAID, UNDP, UN, Presidency of SEGEPLAN, Citizens' Action (*Acción Ciudadana*), civil society, legal bodies, legislative branch	
Increasing national per capita income	Cooperation with USAID, Economic Cabinet (*Gabinete Económico*), private sector, Social Cabinet (*Gabinete Social*)	
Active and organized participation of the community	The municipal code and decentralization laws and laws on the Advisory System for Urban and Rural Development protect community organization and participation	Political cronyism, emphasis on assistance, lack of coordination
Raise women's status	SESAN, UNIFEM,UNFPA, PAHO/WHO, SEPREM, UNDP	
Social protection policies	Social Cohesion, Mifapro, SOSEP, MITRAB, UNDP, IDB, WB	The program is mostly assistance-oriented. There are no data on progress and impact; lack of integration with MSPAS, MAGA, and MINEDUC
Reform of macroeconomic policy	Presidency, Economic Cabinet, UNDP, International Monetary Fund, WB, IDB	
Guaranteeing human rights and the right to food	SESAN, Office of the Attorney for Human Rights (PDH), FAO, UNICEF, UNDP	

VI. RECOMMENDATIONS

The food and nutrition problem in Guatemala is chronic and has changed little since the 1960s (although malnutrition among preschool and school-age children has declined at a more rapid annual rate during the last decade than during the previous 15 years). This situation intensifies periodically because of climate change and variability, crises in food and energy prices, and the world financial crisis, among other causes, which in recent years have affected Guatemala and particularly its most vulnerable populations. As a result of this situation of chronic malnutrition, which periodically intensifies, programs have tended toward assistance, reducing their ability to effectively and sustainably address the basic and underlying causes of this problem.

While the fight against HIV/AIDS used the principles of the "Three Ones" (UNAIDS, 2005) to achieve the most effective and efficient use of resources at the national level and to ensure rapid action and results-based management, nothing similar has been tried for chronic malnutrition. To address chronic malnutrition, the following three principles should be applied:

- One agreed-upon action framework that provides the basis for coordinating the work of all sectors
- One national authority with a broad-based multi-sector mandate
- One monitoring and evaluation (surveillance) system.

Given the principles above, it is essential that multi-sector and interdisciplinary groups comprising technical experts, politicians, and representatives of civil society critically analyze the situation together, in order to propose a framework for action and the most suitable and sustainable short-, medium-, and long-term solutions.

To promote program integration and cooperation among sectors and government institutions, nongovernmental organizations, the private sector, and international aid, it is recommended that SESAN's governing role be strengthened at both the local and national levels, and that coordination with the councils for development (*Consejos de Desarrollo*) also be strengthened at each level.

It is absolutely necessary that a multi-sector food and nutrition surveillance system be put into effect with the purpose of collecting, analyzing, and reporting on the health and nutrition situation and its determinants, guiding integrated decisions in the different sectors.

A. General Recommendations

1. Prospective Multi-sectoral Information

Existing information can provide a general overview of nutrition and food security and allows us to identify populations and geographic areas that must be prioritized. However, due to emergent situations, this information is inadequate for creating, implementing, and evaluating preventive actions and focusing assistance programs. On the other hand, information from periodic surveys is often not directly comparable, which limits the possibility of measuring damaging trends over time. Finally, occasional cross-sectional studies are not useful for determining the impact of health and nutrition problems – information that could serve as an early warning for emergent problems such as acute food and nutrition insecurity. Therefore, it is essential to have valid, reliable, and timely information about the situation at the community, municipal, departmental, and national levels. This information should be broken down by population groups, specific geographic areas, and other relevant variables.

It is advisable to promote the development of systems and processes at various levels to facilitate the collection and processing of data, as well as its analysis and interpretation; such systems and processes would aid in timely decision making related to assistance, prevention, and promotion. Prior experience has demonstrated the wisdom of launching a sentinel surveillance system, which could collect, analyze, and provide information about the health and nutrition situation and its determining factors, thereby guiding integrated decisions in the various sectors. Sentinel surveillance systems can vary to incorporate different communities and variables, and should provide information about how programs are working in the areas of health, environment and sanitation, agriculture, food and nutrition, education, labor, and other areas in order to identify emerging problems and suggest solutions.

2. Multisectoral Analysis

Beginning with valid and reliable prospective multi-sector information, it is advisable to establish "*salas situacionales y observatorios*" (situation rooms and observatories). Existing sector and multi-sectorinformation would provide a forum for analyzing and reflecting on possible courses of action

based on the evidence and the available human, financial, and material resources. This participatory process, involving the public and private sectors as well as organized civil society, will contribute to a better understanding of the problems and will assess the practicality of the proposed solutions – which will not necessarily be the same for all families, communities, municipalities, or departments.

Sentinel surveillance information may serve as a basis for creating these situation rooms at different levels in the areas of food and nutrition security. These "spaces" for multi-sector analysis and reflection should be used to examine the options for meeting existing needs and to propose alternative solutions, offering varied strategies for changing environmental, agriculture and livestock, sanitation, and food and nutrition situations as they relate to current behavior and vulnerabilities. It is also important to analyze how these strategies help strengthen the ability to confront new threats to food and nutrition security.

3. Multisectoral Action

Confronting a multi-sector problem such as food and nutrition security in a sustainable fashion and with short-, medium-, and long-term actions is very complex. Each sector involved is, in itself, a complex system with multiple stakeholders, different responsibilities, and diverse components. However, these sectors must align and work together based on their common purposes, objectives, and indicators. A careful and periodic analysis of the various sectors, including a social audit, is needed to determine existing capacities. It is also important to identify and promote possible synergies among programs developed by different public entities, the private sector, and civil society, and to promote the exchange of information and success stories among groups in order to be ready to confront present and future problems.

B. Specific Recommendations

As shown in the analyses above, nutritional problems are heterogeneous in their nature, magnitude, distribution, and contributing factors. Populations also vary in their levels of resiliency and survival strategies. For that reason, even though it is adequate to propose a minimum package of general measures based on current technical and scientific evidence, such as those previously suggested, these measures must consider the local characteristics and must be supplemented by more specific operational and cultural measures that are better-suited to local needs.

In making decisions about appropriate interventions in nutrition and food security, the implementation process should not be neglected. The health systems package must include general measures such as promoting health and nutrition counseling; emphasizing support for breastfeeding and appropriate complementary feeding practices; vitamin A supplementation; the use of powder micronutrients; therapeutic zinc supplementation; encouraging hand washing; improving water quality, environmental sanitation, and hygiene; and family planning. However, depending on the situation of a particular community or municipality, some of those measures may receive greater or lesser emphasis, or new measures could be proposed.

At the same time, services must target the most needy populations, guarantee adequate coverage by the programs, ensure the quality of services and products, promote the demand for and proper use of services, and also establish an effective system for program monitoring and evaluation.

1. Tailored Strategies

Analysis of the height of school children permitted the identification of three categories of municipalities: 1) those with a sustained decline in their nutritional status between 1986 and 2008; 2) those with a decline in their nutritional status during the most recent period studied, from 2001 to 2008; and 3) those without variation in their nutritional status between 1986 and 2008. In addition, acute malnutrition coexists with chronic malnutrition in some municipalities. ·Each type of municipality will require a different strategy, while also recognizing the need to identify which communities within those municipalities are the most severely affected.

i. Communities with a sustained decline in nutritional status (chronic malnutrition)

In municipalities showing a sustained decline in their nutritional status over the past 22 years, as in the case of 13 municipalities identified in the departments of Alta Verapaz, Huehuetenango, Quiché, and San Marcos (see Appendix 1), the recommendation is to rapidly assess the situation to identify which communities and populations (and even which families) are most affected in each municipality in order to target them with integrated programs. Programs must include the most complete health package, such as Integrated Health Care for Women and Children at the Community Level (AINM-C). The programs must strengthen community participation and incorporate a safe water and environmental sanitation component, as well as supplemental nutrition for the community and the families when needed. These programs should also contain a strong information, education, and communication component regarding health and food, one that is theory-based and culturally sensitive, in order to achieve behavior changes and strengthen the self-confidence and self-esteem of mothers as well as the involvement of fathers. Reproductive health and family planning components should also be part of the program.

Additionally, local authorities, public service providers, nongovernmental organizations that provide health and other services, and civil society in affected municipalities and communities must be brought together to review the appropriateness and feasibility of integrated programs that will strengthen the agricultural and food chain at the primary level, in order to ensure the availability, access, proper consumption, and optimum biological utilization of food. Knowing that agricultural activities by themselves are insufficient to promote good nutritional status in families with limited access to fertile land, options should be studied and identified to generate income through agricultural production chains (chains differ from subsistence agriculture, by allowing people to produce, transform, and sell, thus moving from subsistence agriculture to market production) or a different type of option, depending on feasibility and decent employment opportunities.

ii. Communities with a recent decline in their nutritional status

Given that the height of seven-year-old students is in large part the result of their growth from conception through the following two to three years, the decline in students' height observed between 2001 and 2008 would be associated with crises at the beginning of the decade, such as the drought and the fall in the international price of coffee. Thus, it would be necessary to assess the distribution of the problem among the 15 municipalities (see Appendix 1), as well as its causes, and whether this situation has been overcome or deterioration is continuing. The outcome of this assessment would shape the decision about which of the proposed intervention packages would be most appropriate, targeting implementation or establishing universal programs, depending on the need. Some cases may benefit from the same measures recommended for communities with acute malnutrition.

iii. Communities without improvement in their nutritional status

Based on international information about the impact of national programs in health and other sectors we can say that, for moderately effective programs, an acceptable reduction in chronic malnutrition would be one to two percentage points per year. Under this model, 38 municipalities in the area of influence of USAID cooperation (see Appendix 1) were identified as having a change in chronic malnutrition less than or equal to 5 percentage points over the past 22 years: less than 0.25 percentage points per year. Thus, there are populations in these municipalities who are not benefiting from effective programs, are living in substandard conditions, and are probably using basic survival strategies that are mostly ineffective.

Considering the multiple causes (basic, underlying, and proximate) responsible for malnutrition, it would be appropriate to strengthen resiliency in these populations (the ability to confront and overcome life adversities) among families and target groups. This effort would entail improving the quality of health

services along with safe water and sanitation programs, complementary feeding, and integrated development – which in turn would prevent acute malnutrition. In these cases it is advisable to conduct on-site assessments to facilitate an understanding of the causes of the problem and the degree to which it is generalized. If some families in these communities are in a better position than the rest, programs for behavior change could be based on positive deviance: applying the lessons from those who, despite living in the same environment, display better nutritional status than the majority.

iv. Communities with acute malnutrition (emerging problem)

In communities where chronic and acute malnutrition coexist, this phenomenon would occur as a result of the current crises: the 2009 drought and loss of the harvest, the flooding of 2010, the decline in remittances, unemployment, and the increase in the cost of the basic food basket. In such places, it is justified to supplement the basic health package previously indicated by preventive distribution of food, food supplements with specific micronutrients, or by integrating the health package with broader social services programs (such as conditional cash transfers) that would further increase the availability of and access to food. Undeniably, these packages have different costs, levels of effectiveness, and impacts, which must be considered. On the other hand, other programs that are even more costly but also more sustainable in the long term would include programs ensuring provision of safe water and environmental sanitation, promoting decent employment, and establishing income-generation programs at family and community levels, among others.

VII. REFERENCES

1. Action Against Hunger. Situación Alimentaria y Nutricional en el Corredor Seco de Centroamérica. Análisis de casos en Guatemala, Honduras and Nicaragua. 2009.
2. Asturias, MA. Sociología Guatemalteca. El problema social del indio. Tesis de Licenciatura 1923. Editorial Universitaria. Universidad de San Carlos de Guatemala. Guatemala, 2008.
3. Batres Jauregui, A. Los Indios, su Historia y su Civilización Imprenta La Unión; Guatemala, 1894.
4. World Bank. Revalorización del papel fundamental de la nutrición para el desarrollo. Estrategia para una intervención en gran escala. Panorama General. World Bank, USA, 2006.
5. Behar, M., Arroyave, G., Tejada, C., Viteri, F. and Scrimshaw, N. Desnutrición severa en la infancia. Revista del Colegio Médico. Guatemala, 7:221–278; 1956.
6. Danish Agricultural Advisory Service (Centro Nacional del Servicio Danés de Asesoramiento Agrícola). Diagnostico de la situación actual de la Política Nacional de Seguridad Alimentaria y Nutricional y su Plan Estratégico (PESAN) Guatemala. European Commission Delegation. Guatemala, 2009.
7. Cofiño, E. and Arguedas, G. Contribución al estudio de ciertos edemas de la infancia (Síndrome debido a carencia alimentaria múltiple). Report presented at the V Congreso Medico Centroamericano y de Panamá. San Salvador, El Salvador, 1938.
8. Flores, RN. Carencias nutritivas (Síndrome de policarencial en la infancia). Tesis de grado. Facultad de Medicina. Universidad de San Carlos de Guatemala. Guatemala, 1944.
9. Gobierno de Guatemala. Política Nacional de Seguridad Alimentaria y Nutricional. Ley del Sistema Nacional de Seguridad Alimentaria y Nutricional. Reglamento de la Ley del Sistema Nacional de Seguridad Alimentaria y Nutricional. SESAN, Guatemala, 2008.
10. Horton, S., Alderman, H. and Rivera, JA. Copenhagen Consensus Challenge paper: Hunger and malnutrition. Copenhagen Consensus Center. Frederiksberg, Denmark, 2008.
11. INCAP, Office of International Research of the US National Institutes of Health and the MSPAS of Guatemala. Evaluación nutricional de la población de Centroamérica y Panamá. INCAP, Guatemala, 1969.
12. INCAP. Informe Anual de Labores. Varios anos. INCAP, Guatemala.
13. Lancet. Maternal and child undernutrition study group. Special focus on undernutrition, articles by various authors of the Maternal and Child Undernutrition Study Group. Lancet 371(9612); 2008.
14. MSPAS and collaborators. V National Maternal and Child Health Survey 2008–2009. Preliminary Report ENSMI 2008–2009. Guatemala, 2009.
15. MINEDUC and SESAN. Tercer Censo nacional de talla en escolares del Primer grado de Educación Primaria de Guatemala. Guatemala, 2009.
16. Pebley, A. and Goldman, N. Social inequality in children's growth in Guatemala. Health Transition Review 5:1–20; 1995.
17. Pretell, E. and Grajeda, R. Iodine nutrition in Latin America. IDD Newsletter 31(1): 1–5; 2009.
18. Pridmore, P. and Carr Hill, R. "Addressing the underlying and basic causes of child undernutrition in developing countries: what works and why?" Evaluation Study 2009/2. DANIDA. Ministry of Foreign Affairs of Denmark. Denmark, 2009.
19. Programa Regional de Seguridad Alimentaria y Nutricional para Centroamérica – PRESANCA and

INCAP. Inventario de Programas Alimentario Nutricionales. Guatemala, 2007.

20. World Food Programme. Estudio sobre la dimensión nutricional de las Redes de Protección Social en Centroamérica y la Republica Dominicana. Panamá, 2010.
21. Red Humanitaria. Informe: Resultados de la valoración de Inseguridad Alimentaria y Nutricional en los departamentos del Corredor Seco del oriente de Guatemala, Quiche e Izabal. Guatemala, 2009.
22. Sáenz de Tejada, E. Descripción analítica de los patrones alimentarios en Mesoamérica desde los tiempos prehistóricos hasta el presente, con especial atención a la triada. Tesis. Facultad de Ciencias Sociales. Universidad del Valle de Guatemala, 1988.

VIII. APPENDIX

Table 1: Municipalities with the greatest damage and vulnerability in eight selected areas of Guatemala – Height Censuses of School children

	Chronic Decline 1986–2008	Recent Decline 2001–2008	No improvement
Alta Verapaz	• Tactic • San Miguel Tucurú • Panzós • Senahú • San Pedro Carchá • Chahal	• Santa Cruz Verapaz • Lanquín • Chisec	• San Cristóbal Verapaz • San Juan Chamelco • Fray Bartolomé de las Casas
Chimaltenango		• Santa Apolonia • Tecpán	• San José Poaquil • Patzún
Huehuetenango	• San Juan Atitán • Santa Eulalia • Santiago Chimaltenango	• San Sebastián • San Juan Ixcoy • San Rafael Petzal	• Todos los Santos Cuchumatanes • Colotenango • Tectitán • San Sebastián Coatán • San Mateo Ixtatán • Santa Cruz Barillas • Aguacatán • San Ildefonso Ixtahuacan
Quetzaltenango		• Sibilia	• Cabricán • Concepción Chiquirichapa • Palestina de los Altos • Huitán
Quiché	• Chiché • San Miguel Uspantán • Chicamán	• Santa Cruz del Quiché • San Bartolomé Jocotenango • Chinique	• Chajul • Santo Tomás Chichicastenango • Cunén • San Juan Cotzal • Sacapulas • Patzité • Nebaj

	Chronic Decline 1986–2008	Recent Decline 2001–2008	No improvement
San Marcos	• Concepción Tutuapa		• San Antonio Sacatepéquez • Comitancillo • Tacaná • Sipacapa • La Reforma • San Miguel Ixtahuacan • Tejutla • Tajumulco • Ixchiguán • San José Ojetenam
Sololá		• Panajachel • Concepción	• San José Chacayá • Santa Cruz La Laguna
Totonicapán		• San Bartolo Aguas Calientes	• San Francisco El Alto • Santa María Chiquimula

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