CONDESSA
Consultores en Nutrición
y Desarrollo S.A.

FINAL EVALUATION OF THE TITLE II MULTI-YEAR ASSISTANCE PROGRAM "SEGAMAYA"

FINAL REPORT

Guatemala, November 2011

PARTICIPANTS

Survey Coordinator	Marlon Motha
Field Supervisor	Verónica Morales
Survey Takers / Anthropometrists	Toribia Ramos Evelyn Méndez Alberta Gonzalez Ana Lissete Barrera Laura Ramazzini Brenda Marlene Dorotea Alvarado Mayra Ochoa Sonia Hernández
Sample size calculation	Lic Jorge Matute
Data processing and analysis	Lic. Humberto Méndez
Final Evaluation Report	Licda. Mireya Palmieri Ing. Agr. Columba Sagastume Dr. Hernán Delgado
Caritas Diocesana Verapaz	Edgar Raúl Hernández Mario Arévalo Nestor Flores
Caritas Diocesana San Marcos	Ronel Ramirez Carrillo Jorge Armando Rodas
Catholic Relief Services	Roberto De Paz Mónica Rodríguez Gustavo Chew Maribel Quintanilla William Vásquez Oscar Ixquiac Catalino Miculax Victor Hugo Lemus Regina Incer Rosario Sarmiento

TABLE OF CONTENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The final evaluation of the Title II Multi-Year Assistance Program titled SEGAMAYA[1], funded by USAID and implemented by Catholic Relief Services – Guatemala Program and local partners Caritas San Marcos and Caritas Baja Verapaz covers the period from mid 2007 to mid 2011.

Both the 2007 baseline and the 2011 end line surveys collected data in comparable sample households which provides sufficient statistical evidence to estimate differences between the findings of both studies and to make valid statistical inferences for comparable groups.

Both studies used almost identical tools which were administered by trained survey takers (with experience in conducting surveys in households at community level) and the same statistical software for comparative analysis and classification criteria of results.

This report documents the changes that occurred in the different SEGAMAYA program indicators, including positive changes that reveal the appropriateness and effectiveness of the set of interventions carried out with participating families.

Based on the results of both baseline and end line surveys, we can draw the following conclusions that provide recommendations for future similar health and nutrition programs implemented at community level:

- Stunting among children 6-59 months reduced more than 12 percentage points (from a baseline 79.1% in 2007 to 66.4% in 2011), which represents a reduction of over three percentage points per year in a four year period.

- Both baseline and end line surveys reveal that stunting is first found somewhere between the 6th-12th month of age, which confirms significant maternal nutrition deficiencies before and during pregnancy found in other relevant available studies.

- Collected data reveal positive changes in the impact and results indicators that refer to the four pillars of food security and nutrition underlying the design of the SEGAMAYA program.

- Mothers have shown some progress in improving key health and critical feeding behaviors to care for themselves and their children.

- The food ration contributed to significantly increase dietary diversity and adequacy of food for participating families.

- Results also showed an increased number of mothers adopting improved feeding practices such as adequate age for introducing solid foods, frequency, quantity and consistency of food.

- Results imply that the SEGAMAYA program was successful in increasing mothers' identification of significant health problems and risks that may affect their health and that of their children and the importance of seeking health services in a timely fashion.

[1] Food Security Program for the Mam and Achi peoples

- The SEGAMAYA Program worked with preventive health, child feeding and nutrition interventions with pregnant and lactating women to improve the adoption of key nutrition and health practices, which are part of the elements of the 1,000 days strategy; a recent collective global commitment to improve food security and nutrition and consequently contribute to accomplish the Millennium Development Goals.

- Survey results indicate a 17 percentage point food production deterioration between 2007 and 2011, which could mean that household food provisioning did not improve due to increased farmers' production, but to an increase of the food ration being distributed by the Title II program as explained in more detail in the conclusions section of this report. As reported by 74% of households in 2011, farmers´ production was affected by two major natural disasters including drought in 2009 and Tropical Storm Agatha in 2010 (see table 2.17).

- Although the adoption of improved agriculture/livestock production and marketing practices does not seem as significant as food consumption and utilization results, the 2011 end line results show an increased number of farmers adopting these improved practices.

- Findings validate the effectiveness of integrated and sustainable interventions of the SEGAMAYA Program that led to changes in difficult to impact indicators such as the height for age indicator among children under the age of five.

I. Background

Guatemala has one of the highest chronic malnutrition rates in Latin America and the Caribbean among children under the age of five (49.8%), which places it on the list of countries with very high levels of chronic malnutrition ($\geq$ 40%) according to the World Health Organization.[2] The chronic malnutrition rate is even higher among rural and indigenous populations and among families with little to no education or with a family size larger than average. High levels of chronic malnutrition are persistent and although an analysis of the past 45 years indicate 0.5 reduction of chronic malnutrition per year, this improvement is relatively lower than that of other countries in Central America.

To respond to the challenges faced by Guatemala, especially in remote rural areas with high poverty rates, the United States Agency for International Development -USAID- funded a Title II Multi-Year Assistance Program from 2007-2011 titled SEGAMAYA to be implemented by CRS[3] and implementing partners Caritas San Marcos and Caritas Verapaz in three municipalities in the San Marcos department and three municipalities in the Baja Verapaz department. The goal of this program is to improve the food security of 12,000 families located in the most vulnerable and marginalized geographic zones.

SEGAMAYA´s results framework include the following goal and strategic objectives:

[2] Physical Status: The use and interpretation of anthropometry, Report of a WHO Expert Committee, 1995.

[3] This programa was designed under the Food for Peace strategy (FFP/USAID) for 2004-2008 and the Country Plan USAID/Guatemala 2006-2010 whose goal is to "*Improve the Food Security of Guatemalan Rural Families*". the

***Goal*:** Improved food security of the most vulnerable rural households in San Marcos and Baja Verapaz by 2011

Strategic Objective 1: Improved agricultural productivity and sustainable use of natural resources (food access and availability)

Strategic Objective 2: Increased resilience of family livelihood capacities (access)

Strategic Objective 3: Improved health and nutritional status of children 0-36 months and pregnant/lactating women (food utilization and consumption)

A. National Context

Guatemala is among the countries with some of the worst social development indicators in Latin America and the Caribbean. This is related in part to the lack of government´s ability to invest enough resources and efforts to develop and implement strategies to solve historical problems and emerging issues that occur as a result of demographic, nutritional and epidemiological changes that further exacerbate existing problems.

There is another crisis that threatens the possibilities of good governance in Guatemala – The inefficient use of public funds, ineffective government measures to address the needs of the population and government corruption that have caused the reduction of public funds that together with population growth has increased the demand for public services.

Unequal distribution of public and private investment in Guatemala throughout the years has contributed to have either privileged or relegated zones in the country, with employment opportunities and public services unequally distributed across the nation. There are regions and departments that present higher levels of social, economical and political exclusion which is revealed through structural limitations to access resources and an income, barriers in exercising citizens´ human rights and for the establishment of social relations that respect differences in people's religious beliefs, ethnicity and gender[4].

CRS chose to implement the SEGAMAYA Program in San Marcos and Baja Verapaz, two of the departments presenting some of the worst social economical conditions at national level as revealed by its high chronic malnutrition rate and anemia among children and women. These departments present different challenges and possibilities for improving people's level of wellbeing. For example, according to the Food Insecurity Vulnerability Index (table I.1), 31% of total municipalities in the San Marcos department are classified with high vulnerability to food insecurity, 15.8% with medium vulnerability and 17.2% with low vulnerability while the municipalities in the Baja Verapaz department are equally distributed (25%) in the four vulnerability levels.[5]

[4] UNDP, 2000

[5] Priority Municipalities identified by the National Counsel of Food Security and Nutrition (*Consejo Nacional de Seguridad Alimentaria y Nutricional* – CONASAN-) to implement Food Security and Nutrition Interventions in Guatemala, July 2011.

Table I.1
Classification of the Vulnerability Level in San Marcos and Baja Verapaz departments and their Municipalities according to the Food Insecurity Vulnerability Index

Geographic Area	Food Insecurity Vulnerability Level			
	Very High	High	Medium	Low
San Marcos	31%	31%	20.7%	17.2%
Baja Verapaz	25%	25%	25%	25%

	Municipality	Food Insecurity Vulnerability Index	Food Insecurity Vulnerability Level
San Marcos	Tajumulco	0.997053	Very high
	Sibinal	0.943539	Very high
	Tacaná	0.937667	Very high
Baja Verapaz	Cubulco	0.88716	Very high
	Rabinal	0.53134	High
	San Miguel Chicaj	0.361678	High

B. Program Description

CRS and partners developed the SEGAMAYA Program based upon the lessons learned and successful practices from the implementation of past Title II programs as well as on the new guidelines emerging from recognized national and international organizations working to improve food security and nutrition. The evaluation team had access to program documentation which served to identify key activities proposed by CRS to achieve the program objectives. The following table includes a summary of these activities:

Table I.2
Major Activities of the SEGAMAYA Program [6]

Strategic Objective	Expected Intermediate Result	Activities
Improved agricultural productivity and sustainable use of natural resources	Farmers using improved cultivation and post-harvest management techniques	Train 525 community volunteers with emphasis on improved and sustainable agricultural production
		Promoters replicate trainings (received from CRS and partners) to group of farmers using five modules (Improved production and post-harvest management, production and management of small-scale livestock production, agro forestry, fish culture and conservation techniques).
	Communities organized and engaged in natural resource management.	Development of 14 micro-watershed plans
		Reforestation of 2,400 hectares in communal and privately owned land
		Soil conservation structures in 1,200 hectares of land (communal and private)
	Communities use early warning systems to monitor climatic shocks	Development of early warning systems to monitor climatic shocks, especially flooding and droughts in target communities
Increased family	Rural families are	Development of 14 market studies

[6] This information was extracted from the Multi-Year Assistance Program (MYAP) FY2007-FY 2011 developed by CRS and approved by USAID.

Strategic Objective	Expected Intermediate Result	Activities
livelihood capacities	engaged in profitable commercial activities	Formation, organization and support to 14 legally-recognized farmer and non-agricultural associations
		Support 14 farmer associations with seed capital and training to improve their productive capacity.
		Establish formal alliances with organizations that are able to provide specific technical support to CRS/GT, partner staff and participants based on identified needs
		Train and follow-up of 700 participants on non- agriculture basic small business management.
Improved health and nutritional status of children 0-36 months and pregnant/lactating women	Families adopt improved health and nutrition practices and behaviors based on AIEPI/AINM-C	Train 600 health promoters in AIEPI/AINM-C[7] themes: childhood illnesses management, monthly growth monitoring/promotion for children under 3 years of age, recognition of danger signs (prenatal, during delivery, postpartum and in the newborn), hygiene and health practices, household management of diarrhea (without dehydration) and respiratory infections, as well as family planning (e.g. counseling on spacing between pregnancies, natural birth control methods).
		Design an effective information, education and communication (IEC) strategy based on the ProPAN (Process to Promote Child Feeding) methodology[8].
		Education and promotion of key messages as defined by the AIEPI/AINM-C described above to 12,000 participating mothers
		Monthly growth promotion and monitoring of children of 12,000 families
		Promotion of complementary feeding practices including selection and preparation of food, hygiene and proper food storage and management
		Promotion of family gardens and small-scale livestock production
		Establishment of situation rooms in participating communities
	Families have access to and use improved water and sanitation systems	Construction and/or improvement of 35 community water systems
		Construction of latrines and gray water disposal systems for 1,400 households
		Creation of community water committees
		Promotion of the solar water disinfection method SODIS as part of the health and nutrition training activities

The purpose of this evaluation was not to assess staff performance or review internal reports, but to review the annual monitoring information with the level of progress in achieving proposed goals and outputs, thus providing the grounds to assess the results of program interventions.

[7] Guatemala program of Integrated Management of Childhood Illness and Health Care for Children and Women in the Community focusing on adult education and behavior change for mothers in order to reduce maternal and infant mortality.
[8] Pachón, E. *Proceso para la Promoción de la Alimentación del Niño*: Methodology, software and examples of how ProPAN has been used to improve feeding of children under the age of two, Quito, Ecuador, October 2006.

Final Evaluation Objectives:

The purpose of the SEGAMAYA Program evaluation was to measure the effects and impact of the different interventions implemented in target areas. The objectives of this evaluation are:

1. Provide a quantitative assessment of the impact indicators (from baseline to end line) that relate to the achievement of the program strategic objectives in the 2007-2011 period.
2. Document the level of progress in achieving program Indicators in light of the baseline and end line results as a basis for drawing conclusions and making recommendations to future similar projects.

II. METHODOLOGY[9]

A. Survey Study Design

The design of the end line survey conducted to evaluate the impact of the SEGAMAYA Program included pre and post measurements without a control group for comparison purposes. This study will serve to identify changes in main proposed indicators in target areas. The survey sample included direct beneficiaries of the SEGAMAYA program and non-beneficiaries. Based on recommendation by the Food and Nutrition Technical Assistance Project (FANTA), the survey used stratified sampling and three levels: 1) by each of the three PVOs with Title II Programs (including CRS); 2) by municipalities in target areas; and, 3) by communities (this was disaggregated by communities with SEGAMAYA´s agricultural interventions and communities without agricultural activities. For the third level, cluster sampling was selected and the survey was conducted in three stages, as follows: 1) first, selection of communities; second, selection of households within these communities; and third, selection of families (in case there were more than one family within a household).

A total of 860 homes were visited to obtain a sample size of 768 children under the age of five. 32 clusters were selected for this sample size with an average of 22 households to be visited in each cluster. At the end, 686 questionnaires from households with children under the age of five were completed. The following table shows the total number of households visited during the end-line survey.

[9] The main aspects of the methodology used by the evaluation of this MYAP can be found in the "Template for a short paper describing CRS Guatemala Final Evaluation Plan, developed by CRS Guatemala.

Table II.1

Location of communities selected for SEGAMAYA program end line survey

Department	Municipality	Micro-watershed	Community	Total Number of Households in the Community	Total Number of Questionnaires Completed
San Marcos	Tacana	Saquipaque	Caserío Holanda	47	24
San Marcos	Tacana	Saquipaque	Aldea Tojcheche	160	23
San Marcos	Tacana	Chanjule	Cantón Sn Antonio la Laguna	83	25
San Marcos	Tacana	Las Molinas	Cantón la Ciénaga	77	21
San Marcos	Tacana	Chochilaja	Cantón Nueva Reforma Caserío Plan Grande	57	21
San Marcos	Tacana	Chemealon	Cantón Toninchicalaj	115	25
San Marcos	Tacana	Chanjule	Cantón la Esperanza	127	24
San Marcos	Tacana	Toninpich	Cantón Tojchoc Grande	665	24
San Marcos	Tacana	Chemealon	Cantón Cua	155	27
San Marcos	Sibinal	Sibinal	Cantón Tohaman	187	24
San Marcos	Sibinal	Sibinal	Aldea San Andrés Cheoj	34	21
San Marcos	Tajumulco	Cutzulchima	Caserio la Libertad	193	19
San Marcos	Tajumulco	Cutzulchima	Aldea Chanchicupe	244	27
San Marcos	Sibinal	Suchiate medio	Aldea Maria Cecilia	111	18
San Marcos	Sibinal	Suchiate medio	Caserío 20 de Noviembre	79	13
San Marcos	Tajumulco	Petacalapa	Caserío Tajumulquito	85	20
San Marcos	Tajumulco	Petacalapa	Aldea Pueblo Nuevo	258	19
San Marcos	Tajumulco	Cutzulchima	Aldea Chana	220	21
Baja Verapaz	Cubulco	El Xun	Chiul La Laguna	109	25
Baja Verapaz	Cubulco	El Xun	Colonia el Naranjo	200	19
Baja Verapaz	Cubulco	El Xun	La Laguna II	125	24
Baja Verapaz	Cubulco	Canchel	Choven	145	19
Baja Verapaz	Rabinal	Canchel	Las Ventanas	88	20
Baja Verapaz	Rabinal	Chococ	Chuaperol	296	20
Baja Verapaz	Rabinal	San Rafael	Chisaliya	244	24
Baja Verapaz	Rabinal	San Rafael	Chiticoy-Pamaliche	246	17
Baja Verapaz	Cubulco	Chixoy	Pajales II	113	25
Baja Verapaz	San Miguel	San Miguel	Dolores	240	20
Baja Verapaz	Rabinal	San Rafael	San Rafael	174	17
Baja Verapaz	San Miguel	San Gabriel	Chixolop	457	27
Baja Verapaz	Cubulco	Chitanil	Los Encuentros	42	16
Baja Verapaz	San Miguel	San Miguel	San Rafael	52	17
Total				**5,428**	**686**

B. Final Evaluation Plan for CRS Multi-Year Assistance Program

1. Design of survey tools

Data collected responds to program strategic objectives that refer to the pillars of food security and nutrition. The study researched the food availability, access, consumption and utilization by families that live in communities targeted by this Title II program.

The questionnaire used had open and closed questions linked to impact Indicators that responded to the following research topics suggested by CRS programmatic staff: agriculture (food availability and access); health, nutrition, water and sanitation (food consumption and utilization).

The end line survey used the same tools used in the baseline study based on FANTA guidelines in order to measure the indicators required by Food for Peace. The tool used in the baseline survey was only modified to divide the sample (list of communities) in two strata: One with communities with SEGAMAYA agricultural activities and another with communities not benefiting by agricultural activities, but benefitted by maternal child health interventions.

2. Training the survey team

The team was composed of a Field Coordinator, a Field Supervisor and nine survey takers with extensive experience in taking anthropometric measurements and collecting data at the household level. The staff was trained by CRS to assure the accurate weighing and measurement of children as well as their understanding of each question and the information that they needed to collect. This training also included practical exercises where survey takers conducted interviews in pairs.

The evaluation and survey teams had the support from the technical staff from CRS and partners Caritas San Marcos and Caritas Verapaz with extensive experience working in Baja Verapaz and San Marcos. Consultancy firm *Consultores en Nutrición y Desarrollo, S.A.* (*CONDESSA*) and CRS' M&E unit supervised survey activities in the field and helped make necessary adjustments to assure optimum quality of the final evaluation process.

3. Logistics for data collection and quality control

After selecting the communities for the survey, a plan to visit each community was developed and communities were assigned to survey teams taking into account access to communities and the number of questionnaires to be administered per day.

A total of 686 survey questionnaires from households with children under the age of five were completed in August and September 2011, which collected different information (e.g. composition of the family within the household, health, nutrition and small livestock production). Teams were organized in order to complete the survey within 30 days. There were two supervisors that oversaw and distributed the workload to a total of nine survey takers, which included collecting the information through interviews and taking anthropometric measurement of children. This evaluation placed special emphasis in the revision of the questionnaires being filled out on a daily basis to correct possible errors in a timely manner. This revision was done at all levels (survey takers,

supervisors and the Field Coordinator). CRS M&E staff also reviewed some questionnaires randomly selected.

4. Data processing, analysis of indicators and final reporting

The questionnaires were reviewed, coded (identify which questions responded to each indicator) and entered into the Epi-Info program twice to minimize data entry errors. Children´s nutritional improvement (weight and height data) was processed through WHO Anthro software using WHO 2006 anthropometric standards. The team of consultants analyzed and interpreted the change in impact and results indicators between the 2007 baseline and the 2011 end line survey period and prepared and submitted the present report.

III. RESULTS PER STRATEGIC OBJECTIVE

A. Impact indicator Results from Baseline Survey in 2007 and End Line Survey in 2011

The following table shows the accomplishment of impact and results indicators revealed by this final evaluation. Some of the highlights include the achievement in the reduction of the chronic malnutrition indicator, exceeding the proposed target of 73.0% by 6.6 percentage points to 66.4% or an overall reduction from the 2007 baseline (79.1%) of 12.7 percentage points and the improvement of household dietary diversity score. The only planned target not achieved was the weight-for-age indicator while the adoption of formal marketing practices was lower than expected.

Impact Indicators	Base Line Survey	Goal	End Line Survey
Program Goal			
Percentage of children 0-59.99 months with weight for age below -2.0 SD	22.0%	17.0%	24.9%
Percentage of children 6-59.99 months with height for age below -2.0 SD	79.1%	73.0%	66.4 %
Strategic Objective 1: Improved agricultural productivity and sustainable use of natural resources (food access and availability)			
Number of months (average) of adequate household food provisioning	10.8 months	12 months	11.4 months
Household Dietary Diversity Score (average)	5.5 groups of food	6 food groups	6.8 groups
Percentage of farmers adopting at least two improved agriculture practices	53.9%	65.0%	80.2%
Percentage of farmers adopting at least two improved animal production practices	13.7%	30.0%	39.9%
Strategic Objective 2: Increased family livelihood capacities (food access)			

Impact Indicators	Base Line Survey	Goal	End Line Survey
Percentage of participating producers adopting at least two formal marketing practices	29.3%	50.0%	42.4%
Strategic Objective 3: Improved health and nutritional status of children 0 – 36 months and pregnant/lactating women (food utilization and consumption).			
Percentage of infants 0-5.99 months who have received exclusive breastfeeding during the past 24 hours	62.2%	70.0%	74.9%
Percentage of mothers and care givers with children 0-35.99 months who recognize at least two childhood illness signs that indicate need of seeking health care services	39.7%	60.0%	69.8%
Percentage of mothers with children 0-35.99 months that recognize at least two pregnancy danger signs that indicate need of seeking health care services	10.2%	30.0%	83.2%
Percentage of mothers with children 0-35.99 months able to report at least two signs of danger of the newborn (≤28 days) that indicate need of seeking health services	11.6%	32.0%	71.4

B. Changes in impact and results indicators during the 2007-2011 period

1. Program goal: effects on nutritional status

The physical growth of a child under the age of five is an important parameter to evaluate his/her nutritional status. The two universally accepted measures of physical growth are height and weight. When comparing children's weight and height according to their age and gender against universally recommended growth standards, it is possible to estimate three anthropometric indices: weight for age, height for age and weight for height used for different purposes. The height for age measurement is used as a sign of chronic malnutrition accumulated since birth while weight for height measurements is a sign to determine acute malnutrition**.** The weight for age standard is used to determine global malnutrition and cannot distinguish between chronic and acute malnutrition.

Statistically, when there is a normal distribution of children´s weight and height measurements (age and gender), it is possible to estimate stunting and indirectly indentify the magnitude of malnutrition as the proportion of children that fall below certain value within that distribution or as the average Z score of a population being studied. According to the new growth standards launched by the World Health Organization in 2006, 2.3 % of children fall below minus 2 standard deviation for weight for age, height for age and weight for height indicators.

The most recent information available – the *Mother-Child Health National Survey 2008-2009* with anthropometric data among children under the age of five (table 1.1) for national and departmental levels for Baja Verapaz and San Marcos, indicate that chronic malnutrition affects almost half of the children under the age of five while acute malnutrition is below 2%, with children's height 20 times lower than the expected height indicated by WHO growth standards. At departmental level for both Baja Verapaz and San Marcos, the prevalence is even higher than the national average for the three indicators mentioned above.

Table 1.1
Prevalence of global, chronic and acute malnutrition of children 0-59 months at national level and in the departments of Baja Verapaz and San Marcos according to the Mother-Child Health National Survey (ENSMI 2008/2009)

Anthropometric Indicator (<-2 SD)	Percentage at Departmental Level		
	National Level (N = 9,713)	Baja Verapaz (N = 426)	San Marcos (N = 472)
Weight for age	13.1	14.9	14.4
Height for age	49.8	59.4	53.5
Weight for height	1.4	1.6	2.9

Based on the above information, the following are the results of the anthropometric baseline survey conducted in 2007 and the anthropometric end line survey carried out in 2011 after four years of program implementation. The sample size was selected to get a representation of the population targeted by this Title II program and to assure sufficient statistical evidence to identify changes in the two anthropometric indicators, especially in the height for age indicator and if these were above two percentage points per year during the period of 2007-2011.

In order to measure changes in the anthropometric indices (weight for age, height for age and weight for height), the survey used the proportion of children under the age of five falling below minus two standard deviations from the median of the WHO child growth standards and average Z score. Confidence intervals were also used for these estimations. In order to evaluate consistency of results, the information was analyzed by age group, sex and geographic area. The analysis of the program effects is estimated through the comparison of the prevalence of stunting and Z score average before and after program implementation (2007 and 2011) since the survey does not have a control group for comparison purposes.

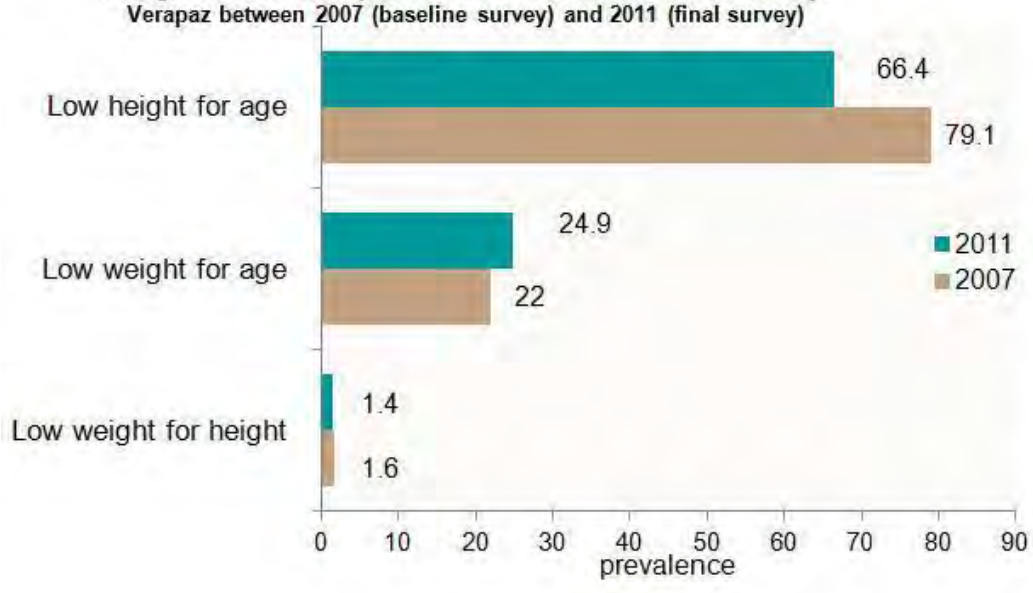
Table 1.2 and Chart 1 show the changes detected from the baseline study conducted in 2007 and the end line study carried out in 2011 for the three anthropometric Indicators mentioned above. Although the results of both studies show a prevalence of global and chronic malnutrition above the prevalence at national level (Mother-Child Health National Survey (ENSMI 2008/2009) and departmental level in Baja Verapaz and San Marcos, when comparing the baseline with the end line survey results, the later reveals that chronic malnutrition in target communities was reduced by 12 percentage points (from a baseline 79.1% in 2007 to 66.4% in 2011), which is statistically significant. There were no significant changes in the prevalence of global and acute malnutrition. The analysis of data disaggregated by gender revealed a reduction of chronic malnutrition prevalence in both sexes, with a statistically significant reduction among girls from 2007 to 2011. However, there were no significant statistically differences between the improvement between girls and boys during this four-year period.

Table 1.2

Change to the prevalence of global, chronic and acute malnutrition of children 6-59 months between the baseline survey in 2007 and the end line survey in 2011

Anthropometric Indicator (<-2 SD)	2007 Baseline Survey			2011 End Line Survey		
	Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Weight for age	1286	22.0	17.9-26.0	1043	24.9	19.6-30.2
Height for age	1124	79.1	75.4-84.8	925	66.4	59.5-73.2
Weight for height	1133	1.6	0.4-2.7	926	1.4	0.1-2.7
Boys						
Weight for age	654	23.0	17.9-28.2	556	26.2	20.8-31.5
Height for age	574	81.0	74.8-87.3	489	70.2	61.3-79.1
Weight for height	581	2.1	0.2-4.0	489	2.42	0.0-5.1
Girls						
Weight for age	632	20.8	16.1-25.6	487	23.6	17.2-30.0
Height for age	550	77.0	71.1-83.0	436	60.3	54.8-69.8
Weight for height	552	1.0	0.0-2.0	437	0.3	0.0-0.8

Chart 1
Changes in three anthropometric indicators in San Marcos and Baja Verapaz between 2007 (baseline survey) and 2011 (final survey)



Tables from 1.3 to 1.5, from 1.6 to 1.8 and from 1.9 to 1.11 show results by geographic area, sex and age group in order to evaluate consistency of changes revealed by survey results.

These analyses confirm the reduction of chronic malnutrition in target areas, with results slightly better in the Baja Verapaz department with no statistically significant differences among the groups disaggregated by geographic area, sex and age. The differences in the prevalence of global and acute malnutrition are not statistically significant.

Table 1.3
Prevalence of global* malnutrition per geographic area among children 6-59 months in the baseline and end line surveys

Geographic area	2007 Baseline Survey			2011 End line survey		
	Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	519	21.9	16.4	381	21.0	12.2-29.9
San Marcos	767	22.0	17.5-26.4	662	28.0	21.3-34.6

*prevalence of global malnutrition: weight for age <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.4
Prevalence of chronic* malnutrition per geographic area among children 6-59 months in the baseline and end line surveys

Geographic area	2007 Baseline Survey			2011 End line survey		
	Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	449	67.9	59.3-76.4	336	57.1	44.7-69.2
San Marcos	675	80.2	74.1-86.2	589	73.7	65.2-82.1

*prevalence of chronic malnutrition: height for age <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.5
Prevalence of acute malnutrition * per geographic area among children 6-59 months in the baseline and end line surveys

Geographic area	2007 Baseline Survey			2011 End line Survey		
	Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	453	1.3	0.0-2.8	336	2.1	0.0-4.9
San Marcos	680	1.6	0.3-2.9	590	0.8	0.1-1.6

*prevalence of acute malnutrition: weight for height <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.6
Prevalence of global malnutrition* per geographic area and sex among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line Survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	boys	248	21.1	13.1-29.1	196	24.4	14.5-34.3
	girls	271	22.5	16.6-28.5	185	17.8	7.7-27.9
San Marcos	boys	406	23.2	17.7-28.8	360	27.4	21.4-33.4
	girls	361	20.6	15.4-25.9	302	28.7	19.8-37.5

*prevalence of chronic malnutrition: height for age <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.7
Prevalence of chronic* malnutrition per geographic area and sex among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	boys	215	69.2	57.3-81.1	172	63.9	45.6-82.2
	girls	234	66.7	57.8-75.5	164	50.5	39.9-61.1
San Marcos	boys	359	82.1	75.4-88.8	317	74.8	66.1-83.5
	girls	316	78.1	71.7-84.5	272	72.4	62.2-82.6

*prevalence of chronic malnutrition: height for age <-2.00 Z score from the median of the 2005 WHO child growth standards.

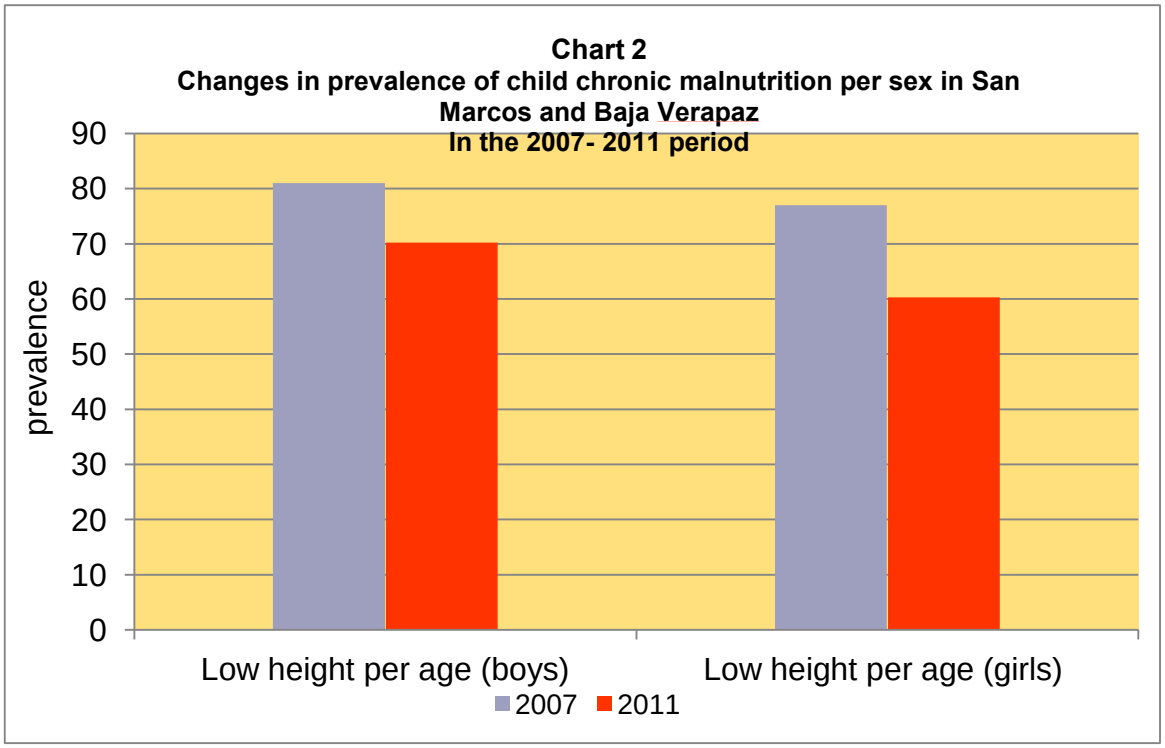


Table 1.8

Prevalence of acute* malnutrition per geographic area and sex among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line Survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	boys	218	2.4	0.0-5.1	172	4.3	0.0-10.6
	girls	235	0.3	0.0-0.8	164	0.0	0.0-0.0
San Marcos	boys	363	2.0	0.0-4.1	317	1.1	0.0-2.4
	girls	317	1.1	0.0-2.4	273	0.6	0.0-1.4

*prevalence of acute malnutrition: weight for height <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.9
Prevalence of global* malnutrition per geographic area and age group among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line Survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	0-35	348	22.0	15.4-28.5	245	20.5	14.2-26.9
	36-59	171	21.6	15.0-28.3	136	21.9	6.6-37.3
San Marcos	0-35	522	20.4	15.0-25.8	421	26.4	19.3-33.6
	36-59	245	25.5	17.7-33.3	241	30.9	20.4-41.4

*prevalence of chronic malnutrition: height for age <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.10
Prevalence of chronic* malnutrition per geographic area and age group among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line Survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	0-35	281	65.6	55.4-75.9	200	56.1	44.0-68.3
	36-59	168	71.8	63.1-80.5	136	58.4	43.7-73.2
San Marcos	0-35	434	76.9	70.1-83.7	352	72.6	63.6-81.5
	36-59	241	86.3	80.5-92.0	237	75.4	64.3-86.4

*prevalence of chronic malnutrition: height for age <-2.00 SD Z score from the median of the WHO child growth standards, 2005.

Table 1.11
Prevalence of acute* malnutrition per geographic area and age group among children 6-59 months in the baseline and end line surveys

Geographic Area	Sex	2007 Baseline Survey			2011 End line Survey		
		Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
Baja Verapaz	0-35	284	1.1	0.0-2.5	200	3.5	0.0-8.2
	36-59	169	1.5	0.0-4.0	136	0.0	0.0-0.1
San Marcos	0-35	438	2.0	0.0-3.9	353	0.6	0.0-1.5
	36-59	242	0.9	0.0-2.2	237	1.2	0.0-2.9

*prevalence of acute malnutrition: weight for height <-2.00 Z score from the median of the 2005 WHO child growth standards.

Table 1.12 presents the combined analysis of three anthropometric Indicators for both the 2007 baseline and the 2011 end line surveys. For this, the information of each child was classified into

two categories: low and normal (low = <-2.00 Z score; normal = >-2.00 Z score) in the weight for age, height for age and weight for height indicators.

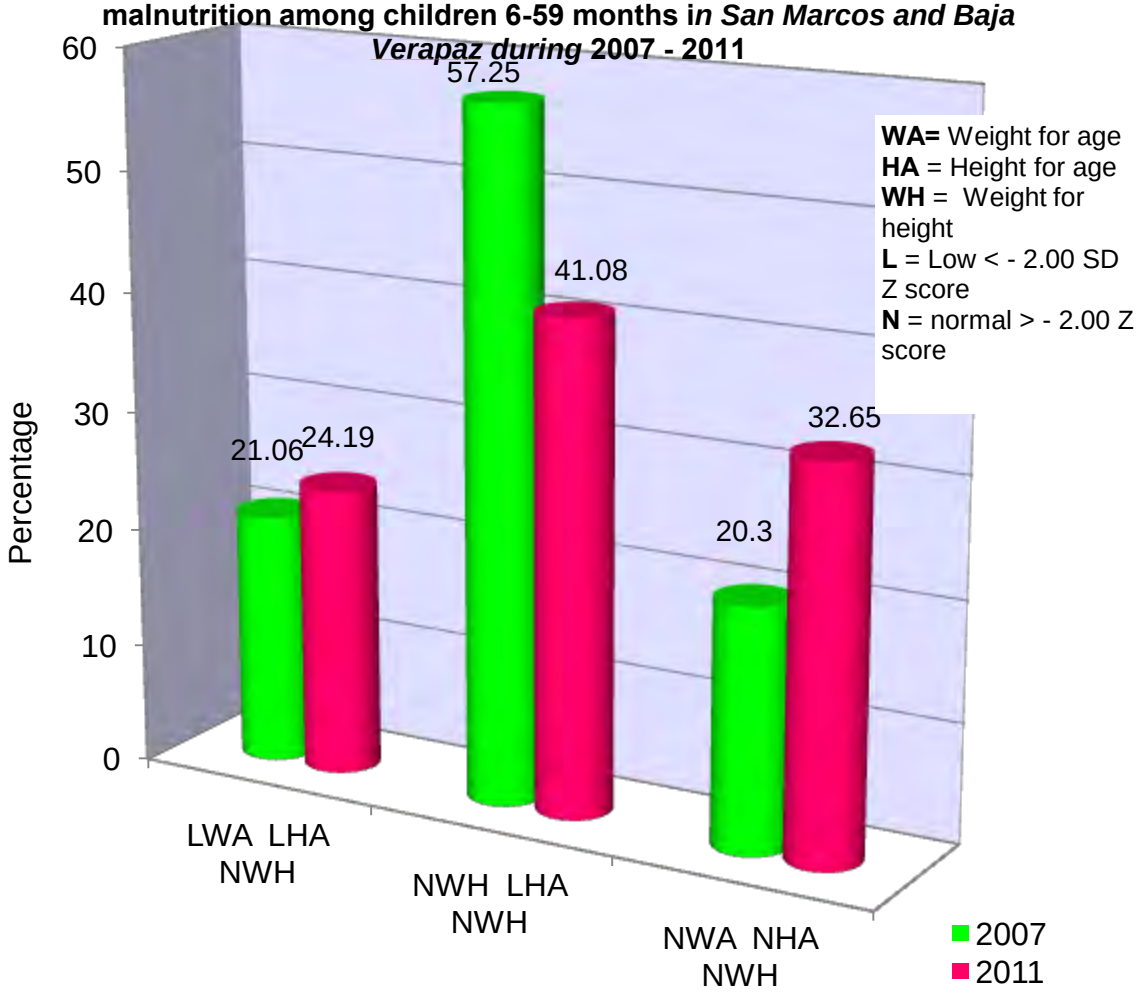
Table 1.12 and Chart 3 indicate the groups found more frequently as follows: children with stunting, children within the normal range in the three indicators (weight for age, height for age and weight for height) and children with both low weight and height but with a normal weight-height relation. The proportion of children presenting stunting reduced significantly between 2007 and 2011 while the percentage of children within the normal range of the three indicators increased significantly. The proportion of children with both low weight and height but with a normal weight-height relation increased but not significantly.

Table 1.12
Indicators combining global, chronic and acute malnutrition among children 6-59 months in the baseline and end line surveys

Indicators	2007 Baseline Survey			2011 End line Survey		
	Number of Children	Percentage	Confidence Intervals	Number of Children	Percentage	Confidence Intervals
LWA LHA LWH	8	0.68	0.06-1.30	8	1.11	0.00-2.40
LWA LHA NWH	227	21.06	17.48-24.64	204	24.19	20.72-27.66
LWA NHA LWH	4	0.44	0.00-1.00	2	0.14	0.00-0.37
LWA NHA NWH	4	0.17	0.00-0.38	2	0.68	0.00-1.88
NWA LHA NWH	589	57.25	52.96-61.53	392	41.08	37.14-45.02
NWA NHA WHM	2	0.10	0.00-0.28	1	0.15	0.00-0.44
NWA NHA NWH	287	20.30	17.02-23.58	314	32.65	28.92-36.39

WA= weight-for-age; HA: height for age; WH = weight for height; WHM: Weight-for-age malnourished
L = low < -2.00 Z score
N = normal >-2.00 Z score

Chart 3
Changes in indicators combining global, chronic and acute malnutrition among children 6-59 months i*n San Marcos and Baja Verapaz during* 2007 - 2011



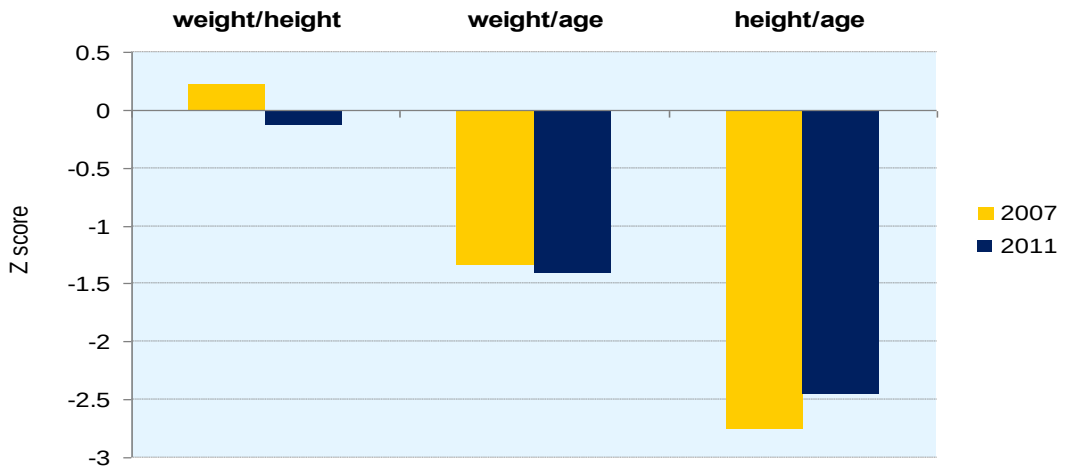
Baseline and end line survey anthropometric data was examined by using an estimated Z score average in relation to the growth pattern. Table 1.13 and chart 4 present the average values and confidence intervals of Z score for the weight-for-age, height for age and weight for height indices found in the 2007 baseline and the 2011 end line surveys. As shown in the table, the height for age Z score in the end line survey is 0.30 less than what was reported in the 2007 baseline, which confirms increased height among children measured in 2011 in comparison to those weighed in 2007. The table also shows the statistically significant loss in the weight-for-height average Z score, which indicates that the children measured in 2011 are taller but thinner than those measured in 2007.

Table 1.13

Average Z score for anthropometric indexes in the 2007 baseline survey and the 2011 end line survey among children 6-59 months

Anthropometric Index	Age (months)	2007 Baseline Survey			2011 End line Survey		
		Number of Children Measured /Weighed	X	Confidence Intervals	Number of Children Measured/ weighed	X	Confidence Intervals
Weight for height	0-59	1286	-1.34	-1.44, -1.23	1043	-1.41	-1.54, -1.27
Height for age	6-59	1124	-2.75	-2.91, -2.58	925	-2.45	-2.63, -2.26

Chart 4
Average Z score for Anthropometric Indices among children 6-59 months in San Marcos and Baja Verapaz 2007 - 2011



Tables from 1.14 to 1.16 present the average Z score for weight-for-age, height-for-age and weight-for-height indicators per age (in months) for the baseline and end line surveys. As shown in Table 1.15 and chart 5, the average Z score of height for age is consistently lower, which is an indication of a better height in children's age (every six months) after the first year of implementation in the end-line survey in comparison to baseline results. The average Z score of height-for-age is below -2.00 from an early age (from 6th-12 month), which suggests growth deficiencies since conception but it presents itself during the first year of life (Chart 5).

Table 1.14
Weight-for-age average Z score per group age (every six months) in the 2007 baseline survey and 2011 end line survey

Age (months)	2007 Baseline Survey			2011 End line Survey		
	N	X	IC	N	X	IC
6-11	146	-0.82	-0.95, -0.69	117	-1.23	-1.53, -0.93
12-17	154	-1.36	-1.55, -1.18	97	-1.44	-1.71, -1.17
18-23	141	-1.45	-1.70, -1.20	114	-1.57	-1.90, -1.23
24-29	138	-1.47	-1.73, -1.20	103	-1.44	-1.62, -1.26
30-35	145	-1.53	-1.79, -1.28	123	-1.54	-1.77, -1.30
36-41	127	-1.50	-1.69, -1.31	115	-1.49	-1.72, -1.26
42-47	118	-1.53	-1.71, -1.36	90	-1.68	-1.91, -1.46
48-53	78	-1.62	-1.89, -1.36	86	-1.64	-1.89, -1.40
54-59	93	-1.64	-1.78, -1.50	86	-1.47	-1.68, -1.26

Table 1.15
Height-for-age average Z score per group age (in months) in the 2007 baseline survey and 2011 end line survey

Ages (in months)	2007 Baseline Survey			2011 End line Survey		
	Number of Children Measured /Weighed	X	Confidence Intervals	Number of Children Measured/ weighed	X	Confidence Intervals
6-11	145	-2.03	-2.18, -1.87	116	-2.04	-2.40, -1.68
12-17	151	-2.54	-2.99, -2.09	97	-2.36	-2.74, -1.98
18-23	139	-3.12	-3.31, -2.93	114	-2.73	-3.15, -2.31
24-29	138	-2.90	-3.12, -2.69	103	-2.43	-2.81, -2.05
30-35	142	-3.05	-3.32, -2.78	122	-2.60	-2.81, -2.40
36-41	125	-2.84	-3.08, -2.59	115	-2.47	-2.74, -2.20
42-47	114	-2.75	-2.94, -2.55	90	-2.60	-2.92, -2.28
48-53	77	-3.01	-3.28, -2.73	85	-2.56	-2.76, -2.35
54-59	93	-2.80	-3.04, -2.55	83	-2.33	-2.58, -2.07

Chart 5
Height-for-age Average Z Score per age (months) among children in Baja Verapaz and San Marcos in 2007 Baseline and 2011 End Line Surveys

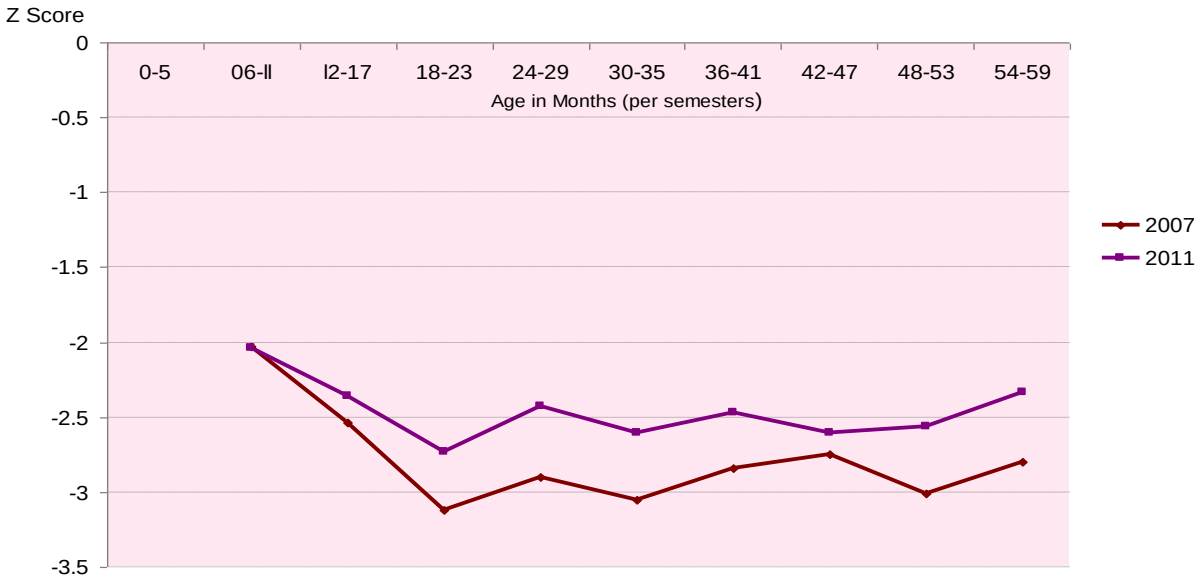


Table 1.16 shows a consistent Z score lower in all ages in the end line survey, showing the lowest values between the 12th and 23rd months of age. In order to carry out a more in-depth analysis of the 2011 end line survey, this final evaluation explored the relationship between the prevalence of anthropometric indicators with a series of independent variables related to mothers' schooling level, family composition, mothers' response after recognizing danger signs (during delivery, neonatal and childhood illnesses), feeding, food provisioning and food consumption. Analysis results presented in tables 1.17 and 1.18 indicate a very low prevalence in the weight for height indicator.

Table 1.16

Weight-for-height average Z score per age (in months) in 2007 baseline and 2011 end line surveys

Age (months)	2007 Baseline Survey			2011 End line Survey		
	Number of Children Measured /Weighed	X	Number of Children Measured /Weighed	X	Number of Children Measured /Weighed	X
6-11	146	0.48	0.28, 0.67	116	-0.05	-0.36. 0.27
12-17	152	-0.23	-0.39, -0.07	97	-0.37	-0.54, -0.21
18-23	141	0.18	-0.09, 0.46	114	-0.27	-0.52, -0.01
24-29	138	0.16	-0.12, 0.45	103	-0.18	-0.35, -0.01
30-35	145	0.40	-0.00, 0.72	123	-0.03	-0.19, -0.13
36-41	126	0.32	0.18, 0.46	115	-0.06	-0.22, 0.09
42-47	117	0.21	0.04, 0.38	88	-0.06	-0.24, 0.12
48-53	76	0.34	0.06, 0.63	86	-0.10	-0.49, 0.29
54-59	92	0.29	-0.10, 0.69	84	-0.00	-0.19, 0.18

Table 1.17
Relation of weight for age, height for age and weight for height indices with mothers' schooling level, family size and mothers response when they recognize danger signs in the 2011 end line survey

Description	Weight for Age			Height for Age			Weight for Height		
	Number of Mothers	%	Confidence Intervals	Number of Mothers	%	Confidence Intervals	Number of Mothers	%	Confidence Intervals
Mother's Schooling Level									
None	458	27.7	23.1 - 32.3	402	74.0	67.0 – 81.0	404	1.4	0.1 – 2.7
1st – 3rd grade	323	22.4	15.8 - 29.0	294	66.2	53.6 – 78.8	294	0.3	0.0 – 0.7
4th- 6th grade	206	24.8	10.9 - 38.7	179	53.4	42.5 – 62.2	178	3.2	0.0 -8.7
7th grade and above	47	14.2	1.7 - 26.6	41	57.0	33.6 – 80.5	41	0.0	---- ----
Family composition									
1-4	155	19.9	13.3 – 26.6	135	58.7	44.6 – 72.8	135	0.0	---- ----
5-6	293	25.4	16.2 – 34.5	269	63.8	53.2 – 74.4	268	2.6	0.0 – 6.6
7-8	282	26.3	19.0 – 33.6	248	68.7	60.9 – 76.6	250	0.5	0.0 – 1.4
9 or more	313	26.7	16.2 – 37.2	273	72.6	63.5 – 81.7	273	1.8	0.0 – 3.6
Recognition of pregnancy danger signs that lead the mother to seek health services									
No	57	26.4	14.3 – 38.6	48	75.2	54.4 – 96.0	49	0.0	---- ----
Yes	201	25.3	17.3 – 33.2	180	61.4	51.2 – 71.7	179	1.2	0.0 – 3.2
Recognition of neonatal danger signs that lead the mother to seek health services									
No	38	38.3	23.4 – 53.3	30	91.9	82.2 – 100.0	31	0.0	---- ----
Yes	129	19.7	10.6 – 28.9	114	51.7	40.1 -63.2	113	2.3	0.0 – 6.5
Recognition of danger signs in childhood that lead the mother to seek health services									
No	45	37.5	14.7 – 60.3	42	75.1	49.6 – 100.0	43	0.0	---- ----
Yes	566	25.8	17.3 – 34.3	513	66.5	59.3 – 73.0	511	2.1	0.0 – 4.4

Table 1.18
Relation of weight for age, height for age and weight for height indices with feeding and food consumption indicators in the 2011 end line survey

Description	Weight for Age			Height for Age			Weight for Height		
	Number	%	Confidence Intervals	Number	%	Confidence Intervals	Number	%	Number of Mothers
Dietary Diversity									
No	45	37.5	14.7 – 60.3	42	75.1	49.6 -100.0	43	0.0	---- ----
Yes	566	25.8	17.3 – 34.3	513	66.1	59.3 – 73.0	511	2.1	0.0 – 4.4
Dietary Diversity: food groups									
Low	457	24.8	18.1 – 31.5	402	69.2	61.5 – 76.9	404	1.0	0.0 – 1.9
Medium	200	27.0	15.3 – 40.6	179	70.3	58.8 – 81.7	179	2.9	0.0 – 8.6
High	386	23.3	15.7 – 30.9	344	60.8	53.1 – 68.6	343	1.0	0.0 – 2.4
Adequate Food Provisioning									
Low	258	18.7	18.7 – 37.7	227	74.5	61.3 -87.8	228	0.7	0.0 – 1.9
Medium	779	18.5	18.5 - 29.1	693	63.8	57.1 – 70.5	692	1.6	0.0 – 3.3
Frequency of meals per day									
Adequate	71	23.1	6.1 – 40.1	70	51.6	33.4 – 69.8	71	----	---- ----
Inadequate	5	22.0	0.0 – 66.0	5	74.0	17.0 – 100.0	5	----	---- ----
Number of meals per day given to 9-11 month children									
Adequate	77	28.5	9.0 – 48.0	76	57.4	35.4 – 79.3	76	6.6	0.0 – 17.4
Inadequate	27	13.5	0.1 – 26.8	24	47.3	19.7 – 75.0	24	6.3	0.0 – 16.4
Number of meals per day given to 12-23 month children									
Adequate	69	33.6	17.8 – 49.5	68	71.1	58.3 – 84.0	68	----	---- ----
Inadequate	261	23.8	18.1 – 29.6	254	70.5	60.3 – 80.8	254	----	---- ----

2. Strategic Objective 1: improved productivity and sustainable use of natural resources (food access and availability).

2.1 Effects on food supply and dietary diversity

As shown in tables 2.1 and 2.2 and chart 6, survey results show a decrease of families with low food provisioning. In 2011, over three fourths of families interviewed were classified with a high level of food provisioning. There was also a minor increase of the average number of months with adequate household food provisioning (table 2.3).

Table 2.1
Adequate food provisioning (per tercile) in the baseline and end line surveys

Tercile	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Low	141	32.7	133	36.6	274	32.8	99	25.3	61	22.7	160	24.0
Medium	42	8.8	42	11.6	84	9.1	----	----	----	----	----	----
High	269	58.8	155	51.7	424	58.1	292	74.6	212	77.2	504	75.9

Table 2.2
Average number of months of adequate food provisioning in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number	Average	Number	Average	Number	Average
Base line survey	452	10.86	330	10.68	782	10.84
End line survey	391	11.25	273	11.48	664	11.36

Chart 6
Adequate food provisioning in households in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line survey

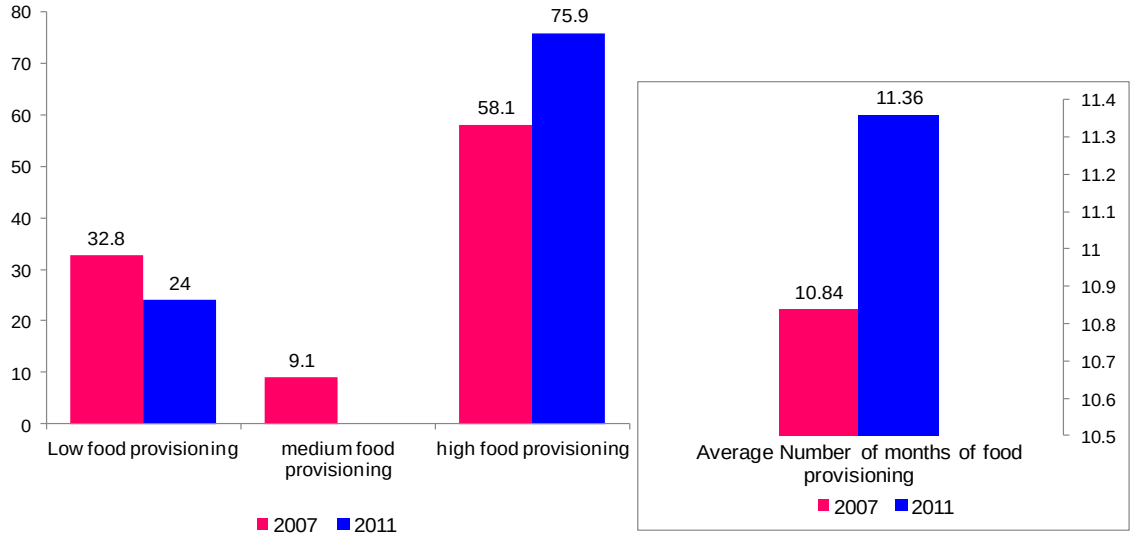


Table 2.3
Average number of months of adequate food provisioning (per tercile) in the baseline and end line survey

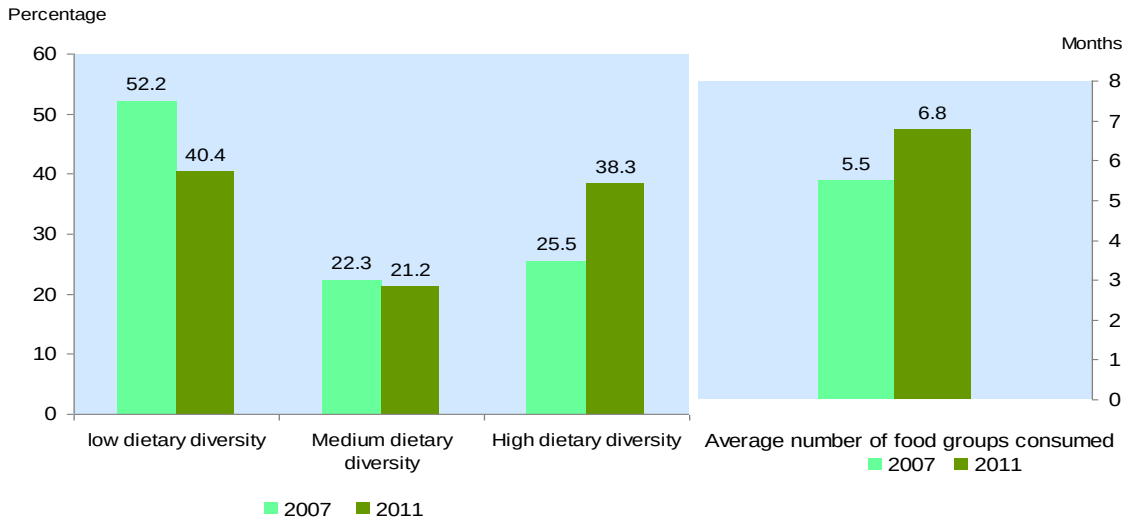
Tercile	2007 Baseline Survey		2011 End line Survey	
	Number	Average	Number	Average
Low	274	8.7	160	9.4
Medium	84	11.0	----	----
High	424	12.0	504	12.0

As shown in table 2.4 and chart 7, the percentage of households with low dietary diversity level reduced and the number of households with high level of food provisioning in 2011 end line survey increased. This is confirmed by the increased average of food groups consumed between 2007 and 2011 as shown in tables 2.5 and 2.6.

Table 2.4
Percentage of households dietary diversity (per tercile) in the baseline and end line surveys

Tercile	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	248	52.8	168	46.4	416	52.2	198	50.5	80	30.1	278	40.4
Medium	91	22.2	68	23.4	159	22.3	71	18.0	60	24.4	131	21.2

Chart 7
Dietary diversity in households in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line survey



When analyzing the average number of food groups being consumed in households in 2007 and 2011 (tables 2.5 and 2.6) food diversity improved more in Baja Verapaz than in San Marcos. This positive change was also bigger in households classified under the high and medium level of dietary diversity.

Table 2.5

Average of food groups consumed in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number	Average	Number	Average	Number	Average
Baseline survey	457	5.4	342	5.7	799	5.5
End line survey	394	6.3	273	7.2	667	6.8

Table 2.6
Average of food groups consumed (per tercile) of dietary diversity in the baseline and end line surveys

Tercile	2007 Baseline Survey		2011 End line Survey	
	Number	Average	Number	Average
Low	416	4.2	278	4.9
Medium	159	6.0	131	7.0
High	224	7.6	258	8.7

As to the food groups consumed by all family members, table 2.7 indicates an increased number of families that consumed vegetables and fruit that are rich in Vitamin A, eggs, beans and other legumes, dairy products, oil, sugar and honey.

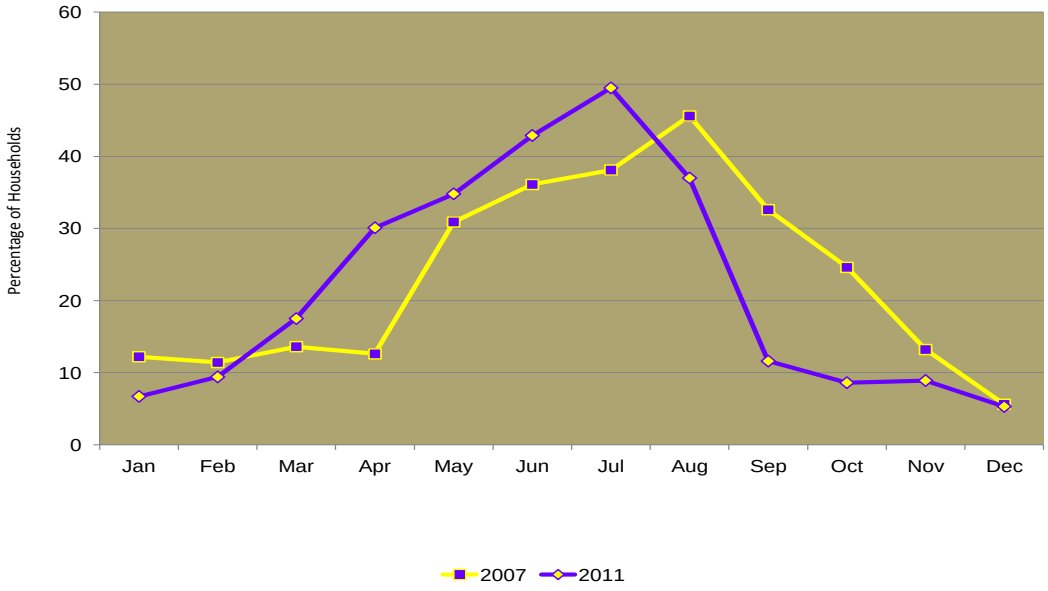
Table 2.7
Food groups consumed in household the previous day during baseline and end line surveys

Food Groups	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Whole Grains	457	100.0	341	99.5	798	99.9	390	99.1	272	99.5	662	99.3
Root vegetables	172	41.5	81	24.5	253	39.8	146	43.1	94	27.4	240	35.3
Vegetables and fruit Rich in Vitamin A	271	64.9	191	57.4	462	64.1	254	67.1	165	58.4	419	62.8
Other vegetables and fruit	204	43.1	120	36.9	324	42.5	252	62.4	213	79.4	465	70.8
Meat and viscera	120	25.0	76	20.8	196	24.6	100	20.9	88	26.2	188	23.6
Egg	192	39.8	182	52.5	374	41.1	180	43.1	164	54.8	344	48.9
Seafood	1	0.1	2	0.7	3	0.2	7	3.0	10	5.3	17	4.2
Legumes and nuts	302	65.0	272	82.8	574	66.8	273	71.3	224	86.4	497	78.8
Milk and dairy products	42	10.4	121	30.5	163	12.4	33	8.2	102	37.8	135	22.9
Oil and fats	240	48.8	196	55.2	436	49.4	253	62.0	191	69.4	444	65.7
Sugar and honey	355	75.6	243	73.3	598	75.4	324	81.3	254	92.5	578	86.8
Other foods	132	30.1	108	33.7	240	30.5	310	76.6	234	86.4	544	81.5

Table 2.8
Months of food shortages during the past year in the baseline and end line surveys

Food shortage	San Marcos		Baja Verapaz		Total	
	Number	%	Number	%	Number	%
Baseline survey	184	41.2	175	46.5	359	41.7
End line survey	99	25.1	61	22.7	160	23.9

Chart 8
Months with food shortages in households in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys



In comparison with the 2007 baseline survey, there were fewer people that reported experiencing food shortages in 2011 (table 2.8) especially in Baja Verapaz. However, when analyzing collected data per month (table 2.9 and Chart 8), the end line survey indicates more households with food shortages between March and July and there were less food shortages between August and December.

Table 2.9
Months of food shortages in baseline and end line surveys

Month	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
January	17	12.9	14	6.6	31	12.2	8	11.0	2	2.0	10	6.7
February	15	11.6	22	10.0	37	11.4	13	17.9	0	0.0	13	9.4
March	16	13.0	35	18.2	51	13.6	20	22.5	5	11.9	25	17.5
April	16	11.4	39	22.1	55	12.6	25	30.7	13	29.4	38	30.1
May	63	32.5	39	18.6	102	30.9	34	41.5	16	27.3	50	34.8
June	84	36.5	61	32.7	145	36.1	45	45.9	23	39.5	68	42.9
July	80	36.3	96	52.5	176	38.1	43	32.9	40	68.0	83	49.5
August	86	43.9	106	59.1	192	45.6	38	33.7	24	40.8	62	37.0
September	61	32.8	50	31.0	111	32.6	17	15.6	3	7.2	20	11.6
October	36	26.1	22	12.3	58	24.6	14	16.2	1	0.08	15	8.6
November	19	14.3	9	4.3	28	13.2	12	16.8	1	0.08	13	8.9
December	11	5.6	10	4.9	21	5.6	8	10.1	0	0.0	8	5.3

As shown in table 2.10, the end line survey indicated a decreased number of households reporting food shortages of maize, beans and rice, but there were an increased number of households reporting shortage of sugar and meat.

Table 2.10
Food shortage in households during months of food shortages in the baseline and end line surveys

Food	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Maize	128	70.6	136	77.1	264	71.3	53	55.1	39	62.8	92	58.7
Beans	131	72.1	136	77.2	267	72.6	56	55.0	31	47.5	87	51.5
Vegetables	26	12.6	15	10.7	41	12.4	30	26.9	10	19.8	40	23.6
Leafy vegetables	18	10.5	11	5.9	29	10.0	13	11.6	5	8.6	18	10.2
Sugar	68	37.4	44	22.3	112	35.8	48	43.7	40	64.5	88	53.5
Oil	27	10.8	37	19.8	64	11.8	12	10.6	9	15.3	21	12.8
Rice	85	43.0	66	34.8	151	42.1	42	38.4	13	19.3	55	29.4
Eggs	12	6.6	11	4.3	23	6.4	11	14.0	6	9.8	17	12.0
Meat	24	9.1	14	7.2	38	8.9	18	20.6	21	40.2	39	29.9
Other	33	20.5	36	18.7	69	20.3	20	13.3	16	29.2	36	20.8

The majority of the interviewees indicated that the lack of money was one of the causes that there was food shortage in the previous year. This number increased from 2007 to 2011. Another cause mentioned was the lack of employment (see table 2.11).

Table 2.11
Causes of food shortages in household in the 2007 baseline and 2011 end line surveys

Cause	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lack of money	121	65.2	105	58.8	226	64.5	84	80.0	53	89.5	137	84.4
Lack of employment	55	21.8	41	18.6	96	21.4	26	20.5	30	49.7	56	34.3
Large family size	8	5.0	11	5.6	19	5.0	1	1.1	0	0.0	1	0.6
Market / store located far away	5	1.2	1	0.4	6	1.1	2	1.7	0	0.0	2	0.9
There was no harvest	14	10.9	24	13.0	38	11.1	11	11.9	9	16.1	20	13.9
Harvest loss	13	10.1	14	8.5	27	10.0	17	19.7	2	3.6	19	12.1
Expensive food	26	13.1	22	10.5	48	12.8	17	16.6	8	8.0	25	12.6

2.2 Effects on food availability, adoption of agricultural and animal production practices and sustainable use of natural resources

Both the baseline and end line surveys suggest that during the four-year period between both studies, the number of farmers that adopted two new improved agricultural/livestock production practices increased as shown in tables 2.12 and 2.13 and chart 9.

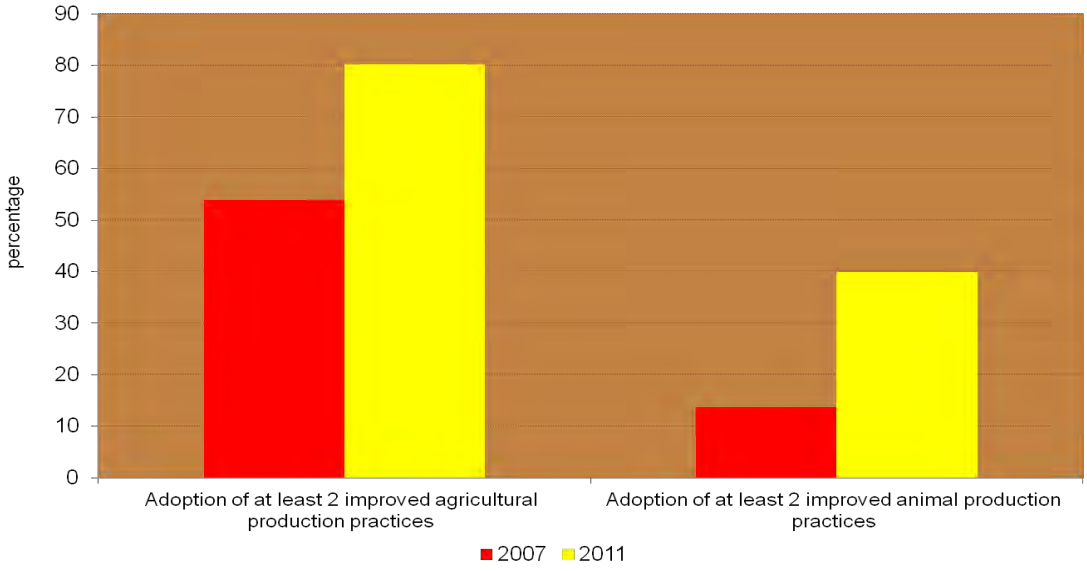
Table 2.12
Producers adopting at least two improved agriculture practices in the 2007 baseline and 2011 end line surveys

Response	2007 Baseline Survey		2011 End line Survey	
	No.	%	No.	%
Yes	315	53.9	499	80.2
No	384	46.1	129	19.8
total	**699**	**100.0**	**628**	**100.0**

Table 2.13
Producers adopting at least two improved animal production practices in the baseline and end line surveys

Response	2007 Baseline Survey		2011 End line Survey	
	No.	%	No.	%
Yes	94	13.7	200	39.9
No	573	86.3	395	60.1
Total	**667**	**100.0**	**595**	**100.0**

Chart 9
Farmers that adopt at least two improved agricultural and animal production practices in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys



As to the adequate household food provisioning, global results and per month indicate that families expressed having more food production deficits in 2011 than in 2007 (See table 2.14).

Table 2.14
Food production deficit in 2007 baseline and 2011 end line surveys

Response	2007 Baseline Survey		2011 End line Survey	
	No.	%	No.	%
Yes	437	47.8	429	64.8
No	354	51.5	238	35.2
total	**791**	**100.0**	**667**	**100.0**

Table 2.15 suggests a deterioration of household food production as there were fewer families classified under high level of adequate food production in 2011 in comparison to 2007 baseline results.

Table 2.15
Months with adequate food production (per tercile) in the 2007 baseline and 2011 end line surveys

Tercile	2007 Baseline survey		2011 End line survey	
	No.	%	No.	%
Low	255	27.0	197	29.0
Medium	182	21.2	232	35.8
High	354	51.8	238	35.2
total	**791**	**100.0**	**470**	**100.0**

Food production levels vary depending on the season and month of the agricultural cycle. In both the 2007 baseline and the 2011 end line surveys, the percentage of households reporting food production problems occurred in the "food shortage period."[10] However, it is important to note that a considerable reduced number of families report limitations in food production during March-April in the 2011 end line survey. It seems as if the length of the food shortage period among interviewed families reduced from the 2007 baseline to the 2011 end line survey. (Table 2.16)

Table 2.16
Months with no food production in the baseline and end line surveys

	Total Basal		Total Final	
	No.	%	No.	%
January	54	4.6	52	12.0
February	63	5.4	40	11.0
March	76	5.9	53	14.6
April	88	7.1	70	19.2
May	135	14.7	115	28.7
June	193	17.7	155	35.5
July	236	21.5	184	43.6
August	260	26.2	175	40.8
September	151	17.2	106	24.4
October	98	13.7	107	23.1
November	59	9.2	85	17.5
December	53	6.0	83	17.9

[10] MFEWS/USAID. Perspectiva de Seguridad Alimentaria; boletín semestral. Guatemala, en www.fews.net/guatemala

In 2007, nearly half of interviewees reported that the main cause of food shortage was the lack of money, while in 2011, 74% of households indicated food shortages after a natural disaster (table 2.17).

Table 2.17
Causes of food production deficits reported by farmers in the 2007 baseline and 2011 end line surveys

Cause	Base line survey		End line survey	
	No.	%	No.	%
Lack of money	209	48.8	49	12.4
Natural disasters	56	16.0	326	74.4
Low agriculture production	195	46.4	213	49.6
Low animal production	1	0.1	3	0.7
Other causes	164	30.5	6	1.6

Table 2.18 presents collected information about coping strategies used by families to overcome low food production. There were no changes during the 2007-2011 period except that in 2011 more households reported a family member leaving his/her community to find work, which was the coping strategy more commonly used, followed by the sale of small animals and taking up a loan.

Table 2.18
Coping strategies to access food during months of food shortage in the 2007 baseline and 2011 end line surveys

Coping Strategy	2007 Baseline survey		2011 End line survey	
	No.	%	No.	%
Selling of assets	12	1.9	3	0.1
Selling of animals	96	14.6	65	14.6
Selling of land	3	0.7	0	0
Taking up a loan	75	11.8	47	10.6
Child labor	7	1.2	1	0.1
Family member had to leave community to find work	274	69.8	366	86.6
Other	95	19.7	25	6.4

Both the 2007 and 2011 studies show that almost every head of family was engaged in agriculture (Table 2.19). Results also show that 9 out of 10 heads of households cultivated native maize (*maíz criollo*). Farmers´ use of improved seed from 2007 to 2011 decreased in numbers but increased in percentage (table 2.20).

Table 2.19
Heads of households engaged in agriculture in the 2007 baseline and 2011 end line surveys

Response	2007 Baseline Survey		2011 End line Survey	
	Number	%	Number	%
Yes	699	88.5	628	93.9

Table 2.20
Maize production per the baseline and end line surveys

Description	2007 Baseline Survey		2011 End line Survey	
	No.	%	No.	%
Producers engaged in maize production	637	91.3	568	92.3
Type of seed used				
Native (criolla)	559	95.9	524	91.5
Improved	64	3.4	38	7.0
Both native and improved	14	0.7	6	1.5

As to planting techniques, results indicated an important increase of 26 percentage points of the number of farmers that place from 0-3 grains per hole as shown in table 2.21.

Table 2.21
Final number of grains per hole in the baseline and end line surveys

Number of grains per hole	Base line survey		End line survey	
	Number	%	Number	%
1-3	221	15.0	202	41.1
4 or more	416	85.0	366	58.9
total	**637**	**100.0**	**568**	**100.0**

Data in table 2.22 reflect only a minor increase in the number of producers engaged in bean production between 2007 and 2011, which confirms the trend at national level that fewer producers are growing beans.

Table 2.22
Production of beans in the 2007 baseline and 2011 end line surveys

Description	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Producers that cultivate beans	518	79.9	501	82.8
Type of seed used				
Native *(Criolla)*	483	95.4	479	94.0
Improved	20	1.5	16	4.7
Native and improved	13	2.7	5	1.2

Table 2.23 presents a slight improvement of the percentage of farmers that used certified maize and bean seed in 2011 in comparison to 2007 results.

Table 2.23

Farmers that use certified maize and/or bean seed in the 2007 baseline and 2011 end line surveys

Response	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Yes	72	3.9	43	8.1
No	578	96.1	535	91.9
total	**650**	**100.0**	**578**	**100.0**

Nine out of ten producers store their basic grains using different techniques (table 2.24). One of the most important changes is the adoption of the metallic silo and improved granaries from 2007 to 2011 (11 percentage points) and how farmers are gradually reducing the use of the *tapanco* and sacks to store their grains.

Table 2.24
Producers that report storing basic grains per method in the baseline and end line survey

Characteristic	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Families that store basic grains	644	93.1	585	93.3
Method used				
Silos	94	11.0	125	22.5
Traditional granary	73	5.8	79	16.8
Improved granary	2	0.1	12	2.5
Barrel (54 gallons)	56	2.9	51	7.0
Tapanco	143	40.9	107	17.5
Sacks	309	62.3	322	55.3
Mancuerna	22	2.7	21	2.9
Other	146	9.8	52	7.9

Table 2.25 shows that the number of producers that have begun to use improved structures for basic grains storage has progressively increased.

Table 2.25
Producers that use improved structures to store basic grains in the baseline and end line surveys

	Base line survey		End line survey	
	No.	%.	No.	%
Yes	96	11.1	137	25.1
No	548	88.9	448	74.9
Total	**644**	**100.0**	**585**	**100.0**

Tables 2.26, 2.27, 2.28 and 2.29 show increased agricultural diversification with vegetables and leafy greens between 2007 and 2011. Production of native plants increased by 34 percentage points among farmers that are growing three or more plants during the 2007-2011 period.

Table 2.26
Producers who grow native plants for household consumption in the baseline and end line surveys

Description	Base line survey		End line survey	
	Number	%	Number	%
Producers that grow native plants	346	48.8	528	86.2
Number of native plants				
1-2	249	78.9	256	45.3
3-4	89	17.8	208	42.2
5 or more	8	3.3	64	12.5

Table 2.27
Types of native plants grown by producers in the 2011 end line survey

Native Plants	End Line Survey	
	No.	%
Hierbamora or *macuy*	320	60.2
Amaranth	106	21.7
Chipilín	123	25.9
Watercress	30	5.7
Colinabo	187	37.1
Cabbage	26	5.9
Chayote	110	20.6
Cucurbitaceae	137	29.5
Malanga	2	0.5
Sweet potato	17	2.2
Jicama	0	0.0
Coriander	258	48.3
Mint	64	12.8
Other plants	86	12.5

Comparison between the baseline and end-line surveys presents nearly 23 percentage points of the number of farmers that are growing three vegetables or more as detailed in table 2.28.

Table 2.28
Producers that report growing vegetables in the baseline and end line surveys

Description	Base line survey		End line survey	
	No.	%	No.	%
Farmers that grow vegetables for household consumption	242	45.5	454	75.8
Number of vegetables being grown				
1-2	145	57.7	157	35.1
3-4	75	32.6	204	44.6
5 or more	22	9.7	93	20.3
Farmers that grow three or more plants and 3 or more vegetables	29	11.4	75	29.6

Table 2.29
Producers that grow commercial vegetables in the end line survey

Type of vegetables	2011 End Line Survey	
	No.	%
Radish	341	73.9
Lettuce	29	6.1
Cabbage	158	33.6
Carrot	222	49.7
Beet	96	20.3
Parsley	1	0.3
Onion	115	27.0
Garlic	2	0.6
Broccoli	54	8.9
Cauliflower	84	18.1
Tomato	8	1.7
Pepper	6	1.2
Chard	150	32.6
Cucumber	13	3.6
Spinach	57	12.6
Turnip	73	14.8
Celery	28	5.9
Potato	49	11.7
Leek	1	0.1
Other vegetables	34	6.0

Results also show an increased number of farmers adopting soil conservation practices and the number of practices being adopted. The soil conservation practices most commonly used in 2011 are: live barriers (56.2%), ditches (37.3%), dead barriers (25.2%) and individual terraces (21.6%) as shown in table 2.30.

Table 2.30

Producers that report implementing soil conservation practices in the baseline and end line surveys

Description	Base line survey		End line survey	
	Number	%	Number	%
Farmers that implement soil conservation practices	309	50.9	462	73.5
Type of soil conservation practices				
Live barriers	129	42.5	253	56.2
Dead barriers	94	19.8	106	25.2
Ditches	40	16.8	171	37.3
Contour farming	12	2.2	20	4.7
Cover crops	8	6.0	7	1.4
Individual terraces	54	19.5	101	21.6
Other practices	29	8.2	9	1.5

Table 2.31 presents a slight increase in the number of producers that use fertilizer or compost to cultivate. The number of farmers using organic compost and manure increased considerably.

Table 2.31

Producers that report use of fertilizers or compost in the 2007 baseline and 2011 end line surveys

Description	Base line survey		End line survey	
	No.	%	No.	%
Producers that use fertilizer or compost	642	92.1	599	96.3
Types of Practices				
Composting	13	0.9	105	16.1
Chemical fertilization	545	81.9	446	77.2
Leaf extracts	7	1.0	13	1.6
Green manure	19	4.0	11	1.5
manure	193	47.7	313	51.9
Worm composting	5	0.7	6	0.9
Other	----	----	7	1.4
Organic fertilization	213	50.3	394	63.0

Table 2.32 shows an increased number of producers that reported having fruit trees and there is also an increase of improved practices such as clearing the land.

Table 2.32

Percentage of producers that report having fruit trees in the 2007 baseline and 2011 end line surveys

Description	Base line survey		End line survey	
	No.	%	No.	%
Farmers that have fruit trees	395	50.9	538	84.5
Farmers that implement practices for the management of fruit trees	237	97.6	419	97.3
Farmers that implement practices for the care of fruit trees	254	59.3	428	80.8
Types of Practices				
Pruning	33	18.1	87	17.4
Clearing	113	32.4	204	50.1
Fertilization	135	59.5	265	59.7
Whitewash applied to fruit trees (to prevent sun scalding)	20	12.6	61	14.3
Plant renovation	3	2.3	3	1.1
Other	36	5.8	31	7.6

Table 2.33 shows an increased percentage of producers who reported having crop problems (diseases, pests and more exposure to climatic events such as heavy rains).

Table 2.33

Producers that report having crop problems during the past year in the baseline and end line surveys

Description	2007 Base line survey		2011 End line survey	
	Number	%	Number	%
Farmers that reported having crop problems	355	46.0	500	79.7
Type of problems				
Diseases	38	9.2	72	15.6
Pest	117	23.0	194	43.7
Lack of agricultural input	18	2.9	14	3.0
Frost	21	9.5	49	10.4
Little rain or drought	38	4.3	45	10.2
Excess precipitation	58	18.6	346	66.1
Lack of seed	1	0.1	0	0.0
Post harvest loss	14	6.0	6	1.7
Lack of land	11	1.5	9	1.3
Increased rent	1	0.1	2	0.1
Other problems	128	45.0	87	12.5

The use of chemicals for pest control also increased by 21 percentage points between 2007 and 2011 as indicated in table 2.34.

Table 2.34

Producers that use chemicals to control pests in the baseline and final surveys

	Base line survey		End line survey	
	No.	**%**	**No.**	**%**
Yes	331	35.9	332	56.7
No	369	64.1	296	43.3
Total	**700**	**100.0**	**628**	**100.0**

Table 2.35 shows a slight increase in the number of households that in 2011 were engaged in animal production (especially poultry) in comparison to the 2007 baseline data. On the other hand, the number of farmers raising pigs and sheep decreased by 15 and 10 percentage points, respectively.

Table 2.35

Producers that report being engaged in raising animals in the baseline and end line surveys

Description	**2007 Base line survey**		**2011 End line survey**	
	No.	**%**	**No.**	**%**
Farmers engaged in animal production	667	83.8	595	87.1
Species being raised				
Poultry	610	89.1	570	96.2
Pigs	359	59.8	283	44.8
Rabbits	18	3.8	19	3.6
Sheep	122	36.4	138	26.6
Goats	31	4.2	13	4.5
Fish	5	0.3	2	0.5
Cow	136	17.3	110	18.9
Other	69	10.8	36	6.4

Table 2.36 shows an important increase (nearly 36%) of the producers that administer vaccines to their poultry.

Table 2.36
Producers that report animal care methods in the baseline and end line surveys

Description	**Base line survey**		**End line survey**	
	No.	**%**	**No.**	**%**
Poultry vaccination	288	39.7	411	75.4
De-worming of goats	7	8.2	9	69.1
Vitamins for goats	5	5.5	5	1.2
Vitamins for fish	2	23.2	2	0.5

The 2011 end line survey results (Table 2.37) show an increased percentage of farmers that obtain products from their animal production.

Table 2.37
Producers that report obtaining products from their animal production in the baseline and end line surveys

Product	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Meat	580	86.5	554	93.5
Egg	576	85.7	550	93.6
Goat milk	5	0.2	10	3.0
Cow milk	79	12.2	79	14.0
Wool	36	11.1	24	6.2
Manure	105	21.2	253	44.0
Other	23	3.7	81	12.4

The 2011 end line survey results (table 2.38) present a slight increase in consumption of meat, eggs and cow milk while table 2.39 shows a reduction in the sale of their animal products.

Table 2.38
Producers that report consuming products from their animal production in the baseline and end line surveys

Product	2007 Base line survey		2011 End line survey	
	Number	%	Number	%
Meat	600	91.1	554	94.1
Eggs	573	85.3	546	93.6
Goat milk	7	0.3	10	2.9
Cow milk	80	11.8	79	14.5
Other	18	2.9	0	0.0

Table 2.39
Producers that report selling their animal products in the baseline and end line surveys

Product	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Meat	163	19.9	37	6.2
Eggs	189	26.6	79	13.0
Goat milk	4	0.2	1	0.1
Cow milk	28	6.7	21	3.7
Wool	29	8.7	9	1.8
Manure	2	0.9	1	0.2
Other	308	45.4	0	0.0

Table 2.40 shows an increased percentage of interviewees that reported having experienced problems with their animal production. Most of the problems reported were related to diseases and the presence of predators.

Table 2.40
Producers that report animal production problems in the baseline and end line surveys

Problem Description	2007 Base line survey		2011 End line survey	
	Number	%	Number	%
Farmers that have had animal production problems	402	58.7	414	71.9
Type of problem				
Diseases	351	87.6	384	93.4
Lack of funds	6	0.3	2	0.3
Lack of food	16	2.3	19	4.3
Robbery	21	6.2	24	5.0
Lack of space	9	1.1	20	5.2
Climatic conditions	10	5.5	26	5.1
Natural predators	40	6.2	93	19.8
Parasitic diseases	15	1.4	7	2.0
Other	7	4.1	5	1.5

As shown in Table 2.41 there was a significant increase in the number of producers that participated in agriculture trainings in 2011, especially in training sessions addressed to improve their production.

Table 2.41
Producers that report having received agriculture training during the past month in the baseline and end line surveys

Description	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Received training	56	4.9	297	45.0
Subjects covered				
How to improve production	54	91.6	289	97.4
How to improve their small business	0	0.0	1	0.1
Orientation on how to generate more income	4	16.5	1	0.5
How to improve animal production	----	----	28	10.1
Actors who give training or advice				
Organizations that support agriculture production	77	66.7	75	25.2
Organizations that support marketing processes	0	0.0	3	0.7
Family members	3	1.6	2	0.5
Radio station	0	0.0	0	0.0
Printed media	0	0.0	0	0.0

Television	0	0.0	0	0.0
Megaphone	0	0.0	0	0.0
Other organizations	15	31.2	7	1.9
Technical staff	----	----	50	14.3
Volunteer promoter	----	----	231	79.1

2.3 Strategic Objective 2: Increased family livelihood capacities (food Access)

The SEGAMAYA Program implemented different activities to train small-scale farmers in basic entrepreneurial concepts (production costs, registration of expenses, sales records and profit). This included strengthening local organization, support with seed capital and revolving funds to improve farmers´ production ability, and the establishment of alliances for specific technical assistance.

The baseline and end-line survey results allow us to infer a slight increase in the percentage of producers adopting at least two improved formal marketing practices (table 3.1 and chart 10) while the number of producers that had a business between 2007 and 2011 didn't change much. Table 3.2 suggests that the majority of the producers who have their own business run it as a family business and nearly 27% of businesses are agriculture-related.

Table 3.1
Producers adopting at least two improved formal marketing practices in the baseline and end line surveys

	2007 Base line survey		2011 End line survey	
	No.	**%**	**No.**	**%**
Yes	36	29.3	76	42.4
No	119	70.7	113	57.6
total	**155**	**100.0**	**189**	**100.0**

Chart 10
Producers that adopt at least two improved formal marketing practices in San Marcos and Baja Verapaz during 2007 - 2011

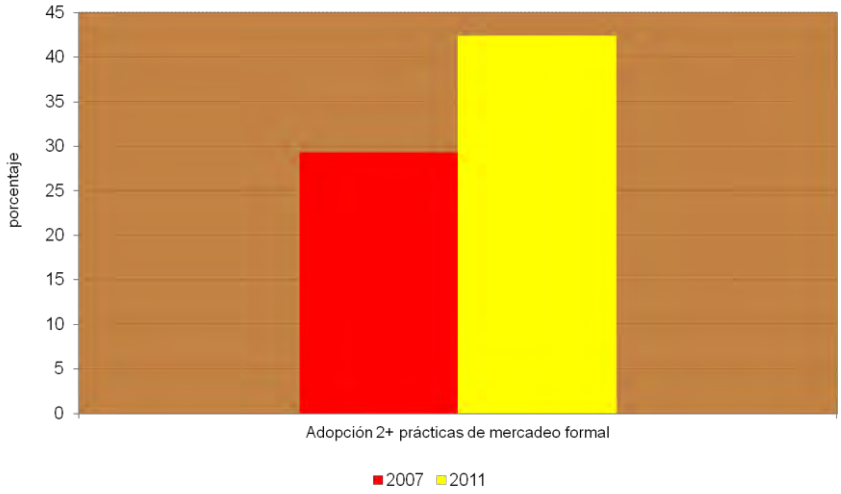


Table 3.2
Producers with a small business in the baseline and end line surveys

Description	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Producers with a small business	160	21.9	191	22.1
Type of business				
Agriculture	27	18.4	51	26.9
Small-livestock	24	18.3	11	6.3
Handicrafts	10	1.8	23	11.6
Forestry	0	0.0	1	1.1
Family business	74	43.2	104	53.1
Agro-industrial	14	3.0	0	0.0
Other business	24	19.4	7	4.3
Purchase and sell	----	----	11	5.8

There was a slight reduction of producers that calculate their business expenses as shown in table 3.3.

Table 3.3
Producers that report calculating their business expenses in the baseline and end line surveys

Response	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Yes	112	77.6	130	68.7
No	48	22.4	61	31.3
total	**160**	**100.0**	**191**	**100.0**

A slight decrease in the percentage of producers that calculate their business expenses and profit (table 3.4).

Table 3.4
Producers adopting formal marketing practices in the baseline and end line surveys

Type of Practice	Base line survey		End line survey	
	No.	%	No.	%
Producers that calculate their business expenses	112	77,6	130	68,7
Producers that calculate their business profit	110	75,5	129	67,9
Producers that have a notebook to write down their calculations in a notebook	23	27,0	39	33,6

Table 3.5 reveals that only a third of the interviewees do their calculations in a notebook.

Table 3.5
Producers that report having a notebook to write down calculations in the baseline and end line surveys

Response	Base line survey		End line survey	
	No.	%	No.	%
Yes	23	27.0	39	33.6
No	87	73.0	90	66.4
total	**110**	**100.0**	**129**	**100.0**

Table 3.6 shows that of those producers that have their own business, in 2007 26.8% expressed having problems that affected their business while this percentage increased to 37.8% in 2011. The end line study shows an increased number of producers who indicated having problems related to the lack of market.

Table 3.6
Producers that identify problems that affect the business in the baseline and end line surveys

Problem Description	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Producers who have had problems that affect their business	49	26.8	77	37.8
Type of problem				
Lack of market	10	21.8	49	65.3
Lack of funds	15	32.4	21	27.3
Lack of registration of business operations	2	2.9	0	0.0
Lack of technical assistance	8	23.3	8	11.8
Lack of input (raw material)	1	1.0	4	2.7
Lack of organization	1	0.5	0	0.0
Other	17	22.4	10	13.8

Based on table 3.7 the percentage of producers that reported having a plan to improve their business nearly doubled.

Table 3.7
Producers that have a plan to improve their businesses in the baseline and end line surveys

	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Yes	17	15.7	56	31.0
No	143	84.3	135	69.0
total	**160**	**100.0**	**191**	**100.0**

Only a fourth of the producers that own a business have actually developed a marketing plan for it as shown in table 3.8.

Table 3.8
Producers that have marketing plans for their businesses in the end line survey

Response	2011 End line survey	
	No.	%
Yes	47	24.5
No	144	75.5
Total	**191**	**100.0**

Data in table 3.9 reveal that the majority of producers sell their products in communal markets, which increased from 59.2% in 2007 to 73.4% in 2011 while only a fourth of the interviewees reported selling in the municipal market.

Table 3.9
Producers that report a place to sell their products in the baseline and end line surveys

Selling place	2007 Base line survey		2011 End line survey	
	No.	%	No.	%
Communal market	83	59.2	132	73.4
Municipal market	52	27.6	54	26.8
Regional market	2	4.5	11	2.8
Large-scale market	2	0.7	0	0.0
Through intermediaries	6	1.2	13	5.5
Export market	0	0.0	4	3.5
Other	40	18.2	1	0.1

Of the interviewed producers that received support from the SEGAMAYA program, only one reported receiving support from another organization as indicated in table 3.10.

Table 3.10
Producers that report receiving institutional support for their business in the baseline and end line surveys

Description	Total Basal		Total Final	
	No.	%	No.	%
Producers that report receiving institutional support for their business	10	3.6	11	6.2
Name of the organization (other than CRS) that provides institutional support				
AGIL	----	----	1	8.3
Other	10	100.0	7	100.0

3. Strategic Objective 3: Improved health and nutritional status of children 0-36 months and pregnant/lactating women (food utilization and consumption)

3.1 Effects on breastfeeding and childhood feeding

During the 2007-2011 period, survey results for total target region reveals a 12.7 percentage point increase of exclusive breastfeeding, equivalent to approximately a 20% increase. The change was more evident in San Marcos than in Baja Verapaz as shown in tables 4.1, 4.2 and charts 11 and 12. As expected, exclusive breastfeeding decreases as the child grows. The breastfeeding practice consistently increased from the 2007 baseline to the 2011 end line survey especially among five-month children.

Table 4.1
Exclusive breastfeeding in children 0–6 months in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	43	61.9	38	65.0	81	62.2
2011 End Line Survey	46	75.6	27	74.0	73	74.9

Table 4.2
Exclusive breastfeeding in children 0-6 months per age group in the baseline and end line surveys

	Grupos de edad (en meses)							
	<1		1-2		3-4		5	
	n	%	n	%	n	%	n	%
2007 Baseline Survey	11	72.4	31	68.8	34	66.8	5	32.6
2011 End Line Survey	14	81.5	29	73.0	19	70.4	11	72.0

Chart 11
Exclusive breastfeeding in children 0-6 months inSan Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys

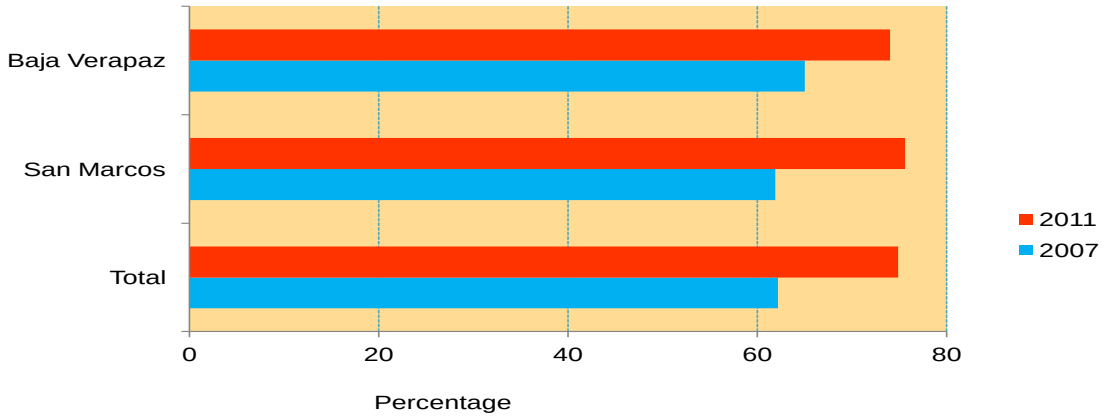
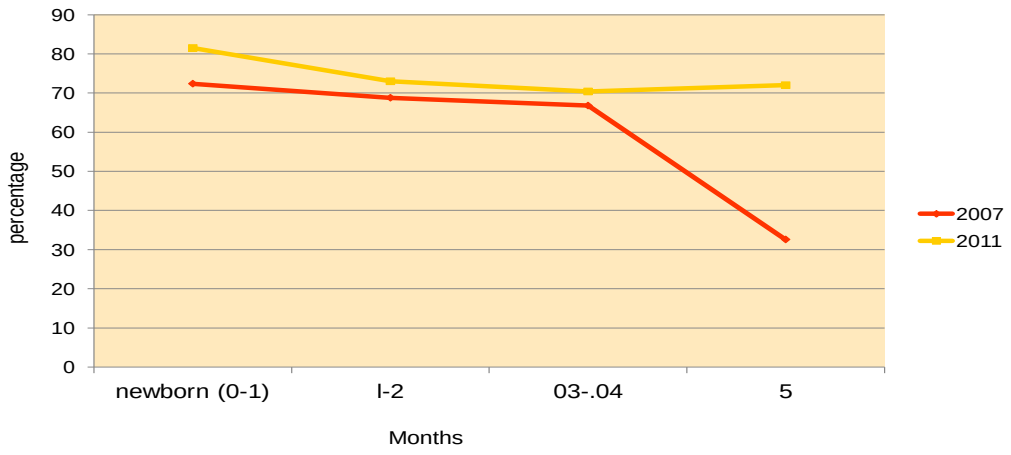


Chart 12
Exclusive Breastfeeding in children 0-6 months in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys



Even when the number of children in each age group (table 4.2) are small including those from 0-months, we can conclude that there was a slight decrease of the number of children that consume liquids other than breast milk as shown in table 4.3.

Table 4.3
Liquids other than breast milk consumed by children <6 months on the previous day in the baseline and end line surveys

Description of Practice	Base line survey			End line survey		
	San Marcos	Baja Verapaz	Total	San Marcos	Baja Verapaz	Total
	%	%	%	%	%	%
Did you give your baby any milk (other than breast milk) ?	10.8	7.7	10.4	1.9	11.2	5.9
Liquids prepared at home (*Agüitas*)	18.7	17.1	18.7	20.2	12.0	16.6
Juices	0.0	0.0	0.0	0.0	0.0	0.0
Coffee or tea	2.4	2.5	2.5	2.3	1.8	2.2
A*tole*	13.0	15.5	4.4	1.0	3.5	2.1
Soda pop	0.0	0.0	0.0	0.0	0.7	0.3

Table 4.4 confirms that breastfeeding is universal at any point among 6-23 month babies.

Table 4.4
Breastfeeding at any point in time from 6-23 months in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number	%	Number	%	Number	%
2007 Baseline Survey	222	99.5	135	99.6	357	99.5
2011 End line Survey	185	99.3	125	97.9	310	98.6

Prolonged breastfeeding among 6-23 month children indicated a small reduction between 2007 and 2011 as shown in table 4.5, especially in the 12-23 month babies, with better results in the San Marcos department (table 4.6).

Table 4.5
Mothers currently providing breastfeeding to children 6-23 months in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Base line survey	186	82.6	118	88.9	304	83.1
2011 End line survey	132	76.0	108	85.5	240	80.5

Table 4.6
Mothers currently breastfeeding a child 6-23 months per age group in the baseline and end line surveys

San Marcos	Age Group (in months)					
	6-8		9-11		12-23	
	No.	%	No.	%	No.	%
2007 Base line survey	50	96.7	39	100.0	104	69.4
2011 End line survey	26	100.0	25	99.4	61	59.3
Baja Verapaz	**Age Group (in months)**					
	6-8		9-11		12-23	
	No.	%	No.	%	No.	%
2007 Baseline survey	23	96.0	22	100.0	76	83.2
2011 End line survey	9	100.0	13	93.4	72	78.7
Total	**Age Group (in months)**					
	6-8		9-11		12-23	
	No.	%	No.	%	No.	%
2007 Baseline survey	73	96.7	61	100.0	180	70.5
2011 End line survey	38	100.0	33	99.6	61	59.3

Table 4.7 shows that the percentage of mothers that gave *"aguitas*[11]*"* and atoles to their babies increased during the 2007-2011 period.

Table 4.7
Liquids other than breast milk consumed by children 6-23 months in the baseline and end line surveys

Description of Practice	Base lines survey						End line survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Did you give your baby any milk (other than breast milk)?	9	5.8	3	3.3	12	5.6	8	6.4	5	5.4	13	5.9
Liquids prepared at home (*Agüitas*)	60	22.9	48	36.0	108	24.0	48	32.1	59	52.0	107	42.0
Juices	5	6.9	4	4.0	9	6.6	3	1.5	9	7.9	12	4.7
Coffee or tea?	83	43.5	64	49.9	147	44.1	42	33.8	51	41.1	93	37.5
A*tole?*	127	66.5	94	79.6	221	67.6	105	86.8	95	90.4	200	88.6
Soda pop?	7	4.1	3	3.1	10	4.0	4	0.5	2	5.0	6	2.7

[11] Tea fushions and other liquids prepared at home.

Survey results as shown in table 4.8 indicate that children began feeding at an earlier age in 2011 (0.80 months earlier).

Table 4.8
Average age in which the child 6-23 months began feeding in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number	Median	Number	Median	Number	Median
2007 Baseline survey	366	7.39	277	6.53	643	7.30
2011 End line survey	173	6.61	123	6.58	296	6.50

Table 4.9 presents a reduced percentage of children 6-23 months that begin to be fed after the eighth month of birth, especially in San Marcos.

Table 4.9
Average age of introduction of food in children 6-23 months in the baseline and end line surveys

Age (in months)	Baseline survey						End line survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
6-8	135	79.4	105	92.2	240	80.4	142	93.6	109	94.7	251	94.1
9-11	22	9.9	5	4.8	27	9.5	7	7	7	4.0	14	3.8
12-23	17	10.7	4	2.9	21	10.1	5	5	4	1.3	9	2.1

Table 4.10 and chart 13 show the introduction of solid foods at an older age found in the 2007 baseline survey while the 2011 end line survey shows a considerable increase in the percentage of children that began eating solid foods during the 6th month, especially in San Marcos.

Table 4.10
Age in which children 6-23 months start eating solid foods in the baseline and end line surveys

Age (months)	Baseline survey						End line survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<6	48	16.5	24	17.2	72	16.6	19	6.4	3	2.7	22	4.6
6	58	25.9	73	50.5	131	27.8	85	50.6	73	62.0	158	56.0
>6	116	50.7	41	26.7	157	48.8	69	37.2	47	32.1	116	34.8

Do not eat solid foods yet	17	7.0	8	5.7	25	6.9	12	5.8	4	3.3	16	4.6
Total	239	100.0	146	100.0	385	100.0	185	100.0	127	100.0	312	100.0

Chart 13
Age of introduction of solid foods in children 6 -23 months in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys

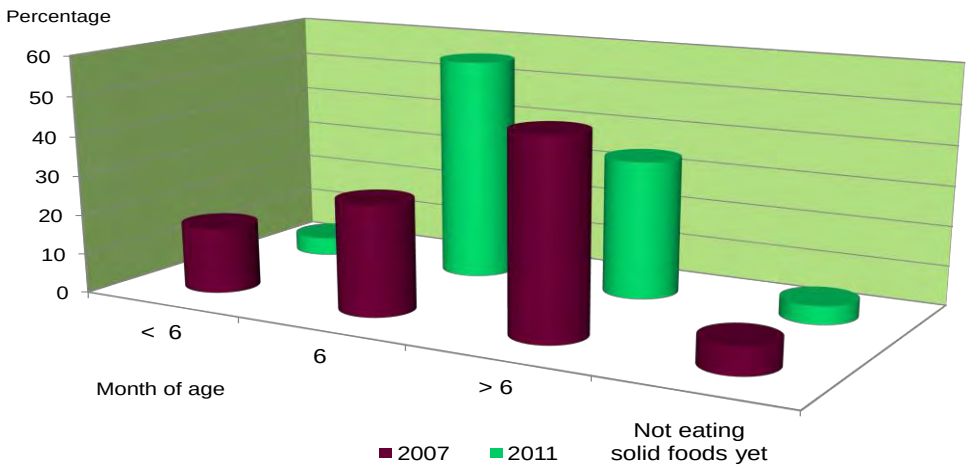
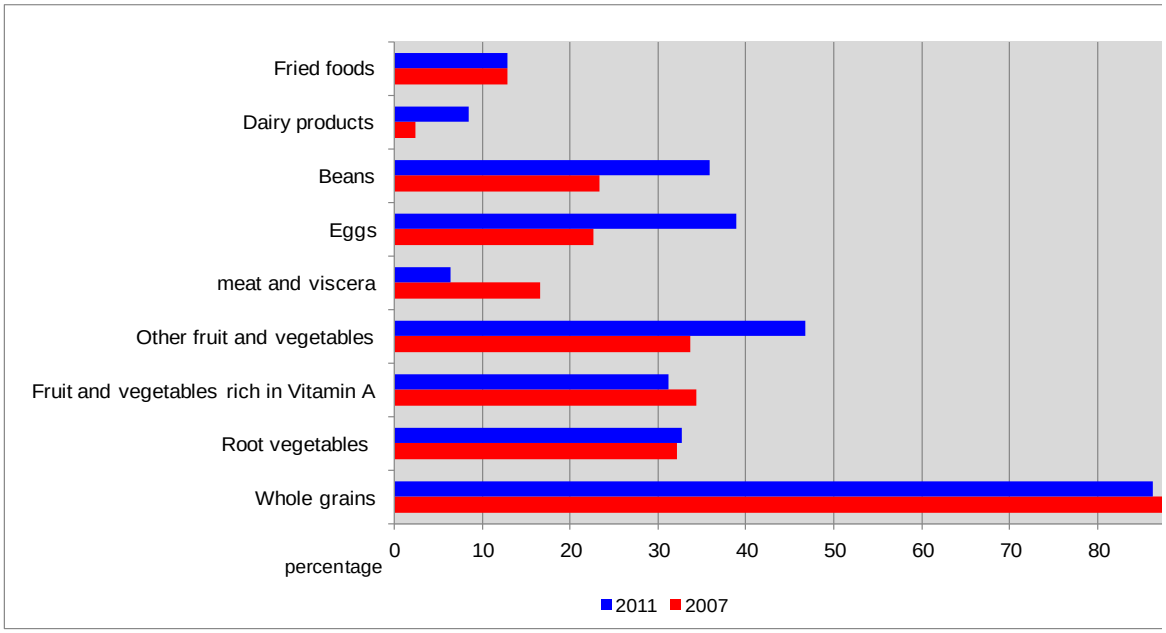


Table 4.11 and chart 14 show that the percentage of children 6-23 months that consumed fruit groups, vegetables and other foods such as eggs, beans and dairy increased from 2007 to 2011.

Table 4.11
Food groups consumed the previous day by children 6-23 months in the baseline and end line surveys

Food groups	2007 Baseline survey		2011 End line survey	
	No.	%	No.	%
Whole Grains	332	90.2	195	86.3
Root vegetables	94	32.1	77	32.7
Vegetables and fruit	117	34.3	68	31.2
Other fruit	112	33.6	104	46.7
Meat and viscera	49	16.5	20	6.4
Eggs	113	22.6	90	38.9
Beans	115	23.3	75	35.8
Dairy	38	2.3	21	8.4
Fried foods	65	12.8	29	12.9

Chart 14
Food groups consumed by 6-23 month children the day previous to the survey in San Marcos and Baja Verapaz, 2007 - 2011



Tables 4.12 and 4.13 indicate an increased number of mothers that fed their children (> 8 months) more than three times per day. During the four studied years of the program, there was an increased percentage of children with adequate feeding frequency according to their age (chart 15). However, it is still necessary to stress educational messages with mothers of children over 12 months of age.

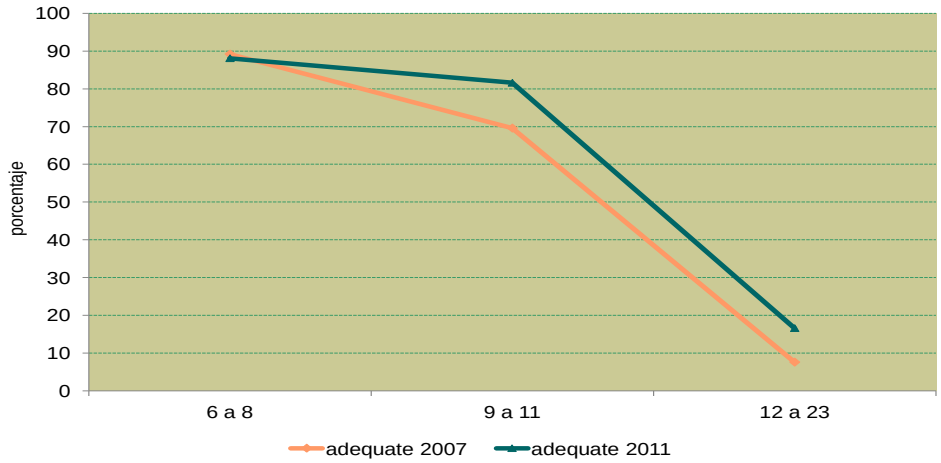
Table 4.12
Frequency of feeding the previous day for children 6-23 months in the baseline and end line surveys

Age group (in months)	Frequency	2007 Baseline survey		2011 End line survey	
		Number	%	Number	%
6- 8	Did not feed the child	1	8.0	3	2.0
	One time a day	3	2.9	1	1.3
	Two times a day	21	23.9	18	14.5
	Three times a day	31	65.2	59	63.1
	Four or more times a day	0	0.0	8	15.7
9-11	Did not feed the child	2	5.6	0	0.0
	One time a day	1	3.8	0	0.0
	Two times a day	12	21.0	7	11.5
	Three times a day	38	57.6	58	71.4
	Four or more times a day	3	12.0	12	13.2
12-23	Did not feed the child	6	2.5	0	0.0
	One time a day	4	2.4	0	0.0
	Two times a day	36	18.7	2	3.2
	Three times a day	182	68.7	39	80.7
	Four or more times a day	20	7.6	6	11.3

Table 4.13
Frequency of feeding the previous day to children 6-23 months in the baseline and end line surveys

2007 Base line survey		San Marcos		Baja Verapaz		Total	
		No.	%	No.	%	No.	%
6-8	Adequate	34	88.9	18	92.6	52	89.2
	Inadequate	3	11.1	1	7.4	4	10.8
9-11	Adequate	24	68.6	17	83.7	41	69.6
	Inadequate	12	31.4	3	16.3	15	30.4
12- 23	Adequate	8	7.4	12	9.8	20	7.6
	Inadequate	141	92.6	87	90.2	228	92.4
2011 end Line Survey		**San Marcos**		**Baja Verapaz**		**Total**	
		No.	**%**	**No.**	**%**	**No.**	**%**
6-8	Adequate	14	82.3	76	100.0	20	88.1
	Inadequate	2	17.7	0	0.0	2	11.9
9-11	Adequate	19	84.6	8	77.9	27	81.6
	Inadequate	6	15.4	4	22.1	10	18.4
12- 23	Adequate	13	23.9	14	10.9	27	16.6
	Inadequate	48	76.1	58	89.1	106	83.4

Chart 15
Frequency of feeding the previous day to children 6-23 months in San Marcos And Baja Verapaz in 2007 baseline and 2011 end line surveys



Tables 4.14 and 4.15 show the 2011 end line survey results for the number of tablespoons fed to the 6-23 month children which shows that mothers have improved this practice especially in the group of children under 12 months with better results in the department of San Marcos.

Table 4.14
Number of tablespoons fed to the 6-23 month child the previous day in 2011 end line survey

Number of tablespoons	San Marcos						Baja Verapaz						Total					
	6-8		9-11		12-23		6-8		9-11		12-23		6-8		9-11		12-23	
	n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
1	3	15.2	0	0.0	0	0.0	0	0.0	1	2.2	2	3.3	3	10.3	1	1.0	2	1.8

2	6	53.8	8	28.0	7	7.7	3	41.2	0	0.0	9	12.9	9	49.7	8	15.4	16	10.6
3	3	11.3	8	45.7	7	11.1	2	38.2	5	33.6	15	21.5	5	20.0	13	40.3	22	16.9
4	3	18.6	4	17.4	18	39.7	1	20.6	3	44.4	9	18.1	4	19.2	7	29.5	27	27.6
5+	1	1.1	4	8.9	29	41.4	0	0.0	3	19.8	37	44.3	1	0.7	7	13.8	66	43.0

Table 4.15
Number of tablespoons fed to children 6-23 months the previous day in the end line survey in comparison to recommended standards

Classification based on recommended Standards	San Marcos						Baja Verapaz						Total					
	6-8		9-11		12-23		6-8		9-11		12-23		6-8		9-11		12-23	
	n	%	n	%	n	%	N	%	n	%	n	%	n	%	n	%	n	%
Adequate	13	84.8	16	71.4	47	81.2	6	100.0	11	97.8	46	62.3	19	89.7	27	83.2	93	70.6
Inadequate	3	15.2	9	28.6	14	18.8	0	0.0	1	2.2	26	37.7	3	10.3	10	16.8	40	29.4

Chart 16
Way to prepare food for 6-23 month children the previous day in 2007 baseline and 2011 end line surveys

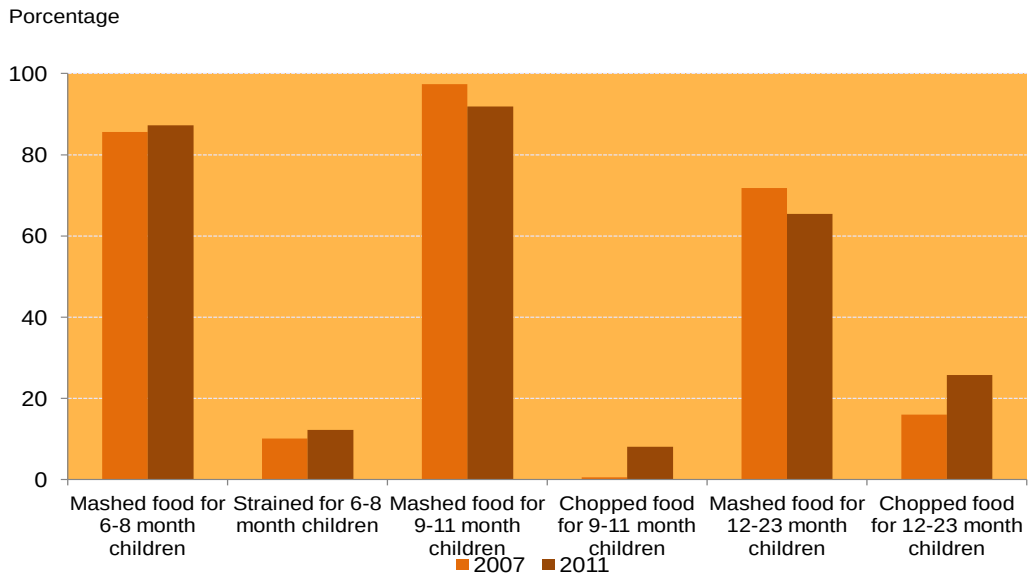


Table 4.16 and chart 16 present a minor decrease in the proportion of children 9- 11 months that were fed mashed food (from 97.4% to 91.9%) and an increase in the number of children who received chopped food from 2007 to 2011 (from 1% to 5%). The table also shows a decrease in the number of children 12-23 months that were fed mashed food (from 71.08% to 65.4%) and an increase of ten percentage points in the children who were fed chopped food.

Table 4.16
Way to prepare food for the 6-23 month child the previous day in the 2007 baseline and 2011 end line surveys

2007 Baseline survey		San Marcos		Baja Verapaz		Total	
Age in months	**Preparation**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-8 months	Mashed	27	85.3	16	89.0	43	85.6
	Chopped	2	3.8	2	7.9	4	4.1
	Same preparation than rest of family	0	0.0	1	3.0	1	0.2
	Strained	7	10.9	0	0.0	7	10.1
9-11 months	Mashed	33	98.3	17	86.0	50	97.4
	Chopped	0	0.0	1	7.0	1	0.5
	Same preparation than rest of family	1	1.7	2	7.0	3	2.1
	Strained	0	0.0	0	0.0	0	0.0
12-23 months	Mashed	116	73.9	46	48.7	162	71.8
	Chopped	15	14.6	31	31.2	46	16.0
	Same preparation than rest of family	15	10.3	19	20.1	34	11.1
	Strained	2	1.2	0	0.0	2	1.1
2011 End Line Survey		**San Marcos**		**Baja Verapaz**		**Total**	
		No.	%	No.	%	No.	%
6-8 months	Mashed	14	90.3	15	80.9	19	87.2
	Chopped	1	0.9	0	0.0	1	0.6
	Same preparation than rest of family	0	0.0	0	0.0	0	0.0
	Strained	1	8.8	1	19.1	2	12.2
9-11 months	Mashed	23	95.2	8	87.8	31	91.9
	Chopped	1	4.8	4	12.2	5	8.1
	Same preparation than rest of family	0	0.0	0	0.0	0	0.0
	Strained	0	0.0	0	0.0	0	0.0
12-23 months	Mashed	43	65.4	44	65.4	87	65.4
	Chopped	11	24.4	22	26.7	33	25.7
	Same preparation than rest of family	5	6.3	5	5.8	10	6.9
	Strained	2	3.8	1	2.1	3	2.9

3.2 Effects on health-care seeking patterns

Knowing danger signs that r
indicate an early warning
problems in the mother and ch
health is important to preve
complications during pregnancy
newborn and older children. T
4.17 and chart 17 show an incre
percentage of women able
recognize pregnancy danger s
such as bleeding, headache
stomachache.

Chart 17
Mothers that recognize at least two pregnancy danger signs in San Marcos and Baja Verapaz in 2007 baseline and 2011 en line surveys

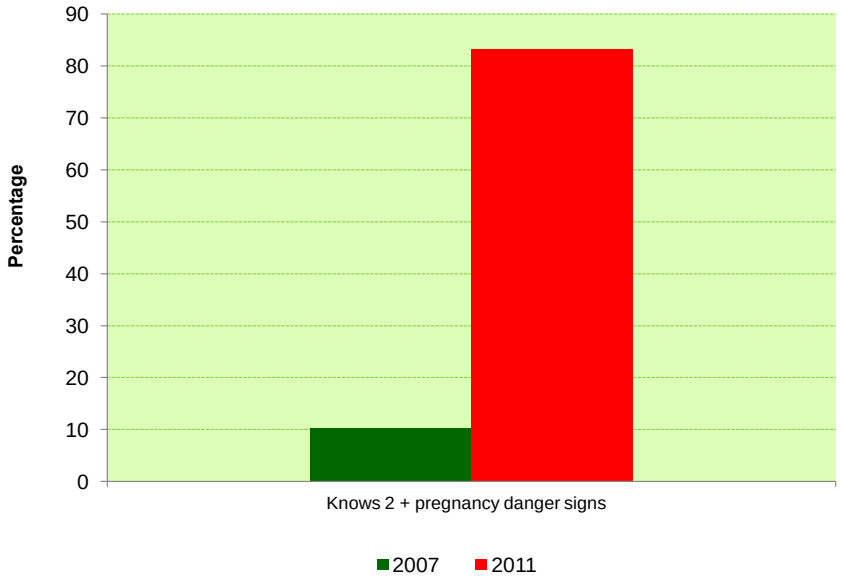


Table 4.17

Number of women that recogniz

	No.	%	No.	%	No.	
2007 Baseline Survey	39	9.0	75	21.9	114	10.2
End Line Survey	275	89.0	171	76.8	446	83.2

Table 4.18 and chart 18 show a significant increase in the percentage of women who recognize neonatal danger signs

Table 4.18
Number of mothers who recognize two or more neo-natal danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	36	10.9	53	18.8	89	11.6
2011End Line Survey	252	83.5	129	57.3	381	71.4

Chart 18
Mothers who recognize at least two neonatal danger signs in 2007 baseline and 2011 en line surveys

Table 4.19 and chart 19 reveals an increased percentage of mothers who recognize dangers signs in children in 2011. For example, in the 2007 baseline, 40% of mothers could recognize danger signs in children while in the 2011 end-line survey, 7 out of 10 mothers were able to recognize at least two danger signs.

Chart 19
Mothers who recognize at least two childhood illnesses danger signs in San Marcos and Baja Verapaz in 2007 baseline and 2011 end-line surveys

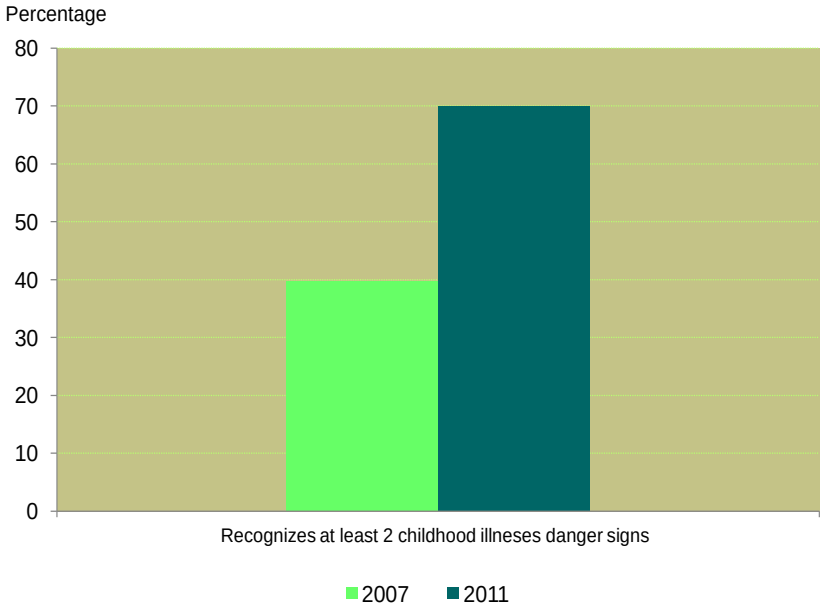


Table 4.19
Number of mothers that recognize two or more childhood illness signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	161	38.4	155	53.1	316	39.7
2011 End Line Survey	227	75.2	136	64.0	363	69.8

Table 4.20 indicates an increased percentage of mothers ,,capacity to recognize pregnancy danger signs from 2007 to 2011.

Table 4.20
Number of women that recognize pregnancy danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	130	29.3	148	40.4	278	30.4
2011 End Line Survey	350	92.1	241	84.3	591	88.2

Table 4.21 and chart 20 confirms that in the 2011 end line survey, there was an increased percentage of mothers who were able to recognize danger signs such as bleeding, headache, stomachache and fever, while tables 4.24 and 4.25 show an increased percentage of mothers who sought advice and health care after recognizing a warning sign, especially at the community level using community services.

Table 4.21
Pregnancy danger signs that are recognized by women in the baseline and en line surveys

Danger sign	Basal						Final					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bleeding	87	69.3	99	62.9	186	68.4	293	83.3	197	81.8	490	82.6
Strong headache	30	24.9	74	50.0	104	28.3	283	84.6	186	78.4	469	81.6
Blurry vision	11	6.5	12	7.5	23	6.6	67	18.4	24	11.7	91	15.2
Strong pain in the pit of the stomach	38	25.1	49	30.7	87	25.9	235	71.6	109	45.8	344	59.3
Difficulty breathing	1	0.5	2	1.7	3	0.7	38	13.0	36	18.4	74	15.6
Fever	7	5.2	26	17.3	33	6.8	132	36.6	101	39.7	233	38.1
Swollen hands, face or body	6	5.7	14	9.0	20	6.1	125	38.7	68	27.3	193	33.3
Baby in transverse position or bottom first position	----	----	----	----	----	----	48	16.1	26	12.5	74	14.4
Clear watery fluid from vagina	----	----	----	----	----	----	52	14.5	41	20.5	93	17.4

Table 4.22 show the type and number of pregnancy danger signs recognized by mothers. The number of mothers who recognized warning signs increased in 2011 to three or more signs (from 2%

in 2007 to 48.9% in the 2011 end line survey), which was also the average number of warning signs recognized as shown in table 4.23 and chart 21.

Table 4.22
Number of pregnancy danger signs recognized by women in the baseline and end line surveys

2007 Baseline Survey						
Number of signs recognized	San Marcos		Baja Verapaz		Total	
	Number of women	%	Number of women	%	Number of women	%
0	293	74.2	155	60.0	448	72.8
1-2	99	24.5	92	31.6	191	25.1
3-4	3	1.4	27	8.0	30	2.0
5+	0	0.0	1	0.4	1	0.3
2011 End-line Survey						
Number of signs recognized	San Marcos		Baja Verapaz		Total	
	Number of women	%	Number of women		Number of women	%
0	24	6.6	19	10.4	43	8.4
1-2	76	21.4	73	34.5	149	27.6
3-4	167	53.6	100	43.8	267	48.9
5+	56	18.4	22	11.3	78	15.0

Table 4.23
Average of pregnancy danger signs recognized by women in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number of Women	Average number of signs recognized	Number of Women	Average number of signs recognized	Number of Women	Average number of signs recognized
2007 Baseline Survey	238	0.35	143	0.83	381	0.39
2011 End Line Survey	323	3.56	214	3.04	537	3.31

Table 4.24
Percentage of women who sought health services after recognizing pregnancy danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	32	53.8	32	68.2	64	55.4
2011 End Line Survey	66	68.6	71	87.9	137	78.5

Table 4.25
Place where mothers/women sought health services after recognizing pregnancy danger signs in the baseline and end line surveys

Place / Person	2007 Baseline Survey						2011 End Line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Hospital	13	11.6	11	25.9	24	13.2	16	13.0	19	17.8	35	15.5
Health Center	11	25.2	17	35.1	28	26.3	29	33.1	38	51.0	67	42.3
Health post	4	9.1	2	4.2	6	8.6	19	21.3	12	14.2	31	17.7
Private clinic	5	8.5	8	15.8	13	9.4	4	3.5	4	7.0	8	5.3
Convergence Center (from the Integral System of Health Care known as *SIAS*)	1	0.7	2	5.9	3	1.2	1	1.4	2	1.8	3	1.6
Health promoter	---	---	---	---	---	---	3	4.3	1	1.4	4	2.8
Midwife	---	---	---	---	---	---	14	19.0	5	6.0	19	12.3
Other	---	---	---	---	---	---	1	1.4	1	1.4	2	1.4
Did not seek advice of treatment	---	---	---	---	---	---	9	10.5	5	5.7	14	8.0

Chart 20
Women s Knowledge and behaviors related to the recognition of pregnancy warning signs in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys

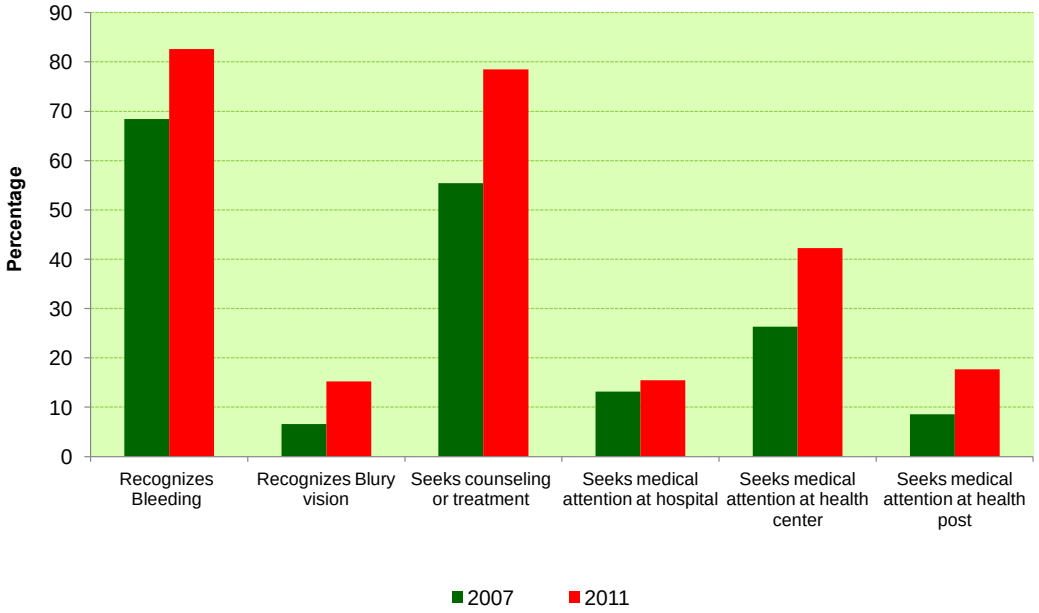


Chart 21
Average number of pregnancy danger signs recognized by women in San Marcos and Baja Verapaz in 2007 baseline and 2011 end line surveys

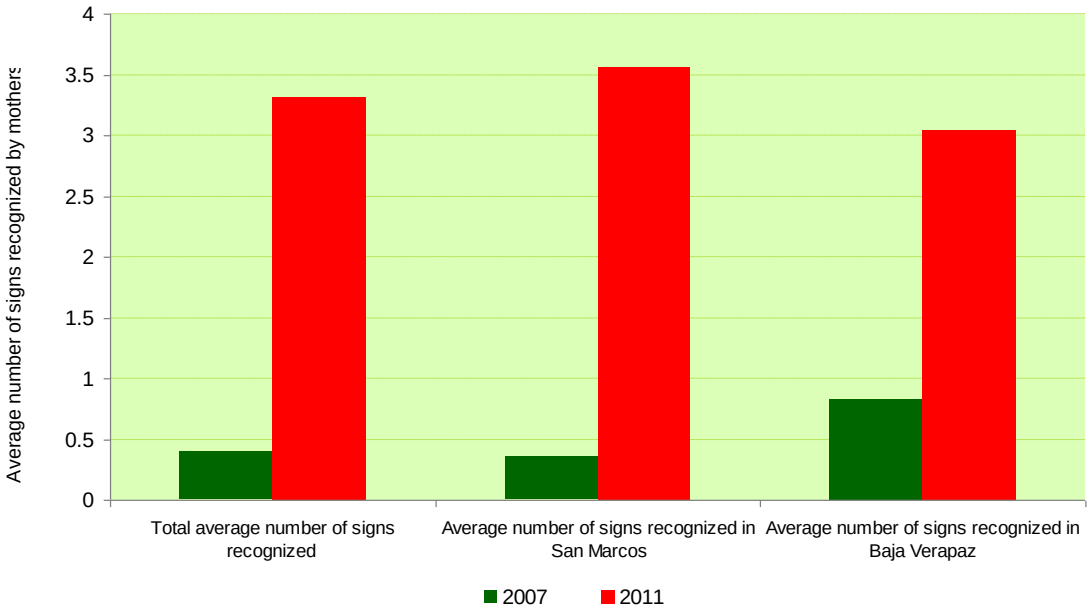


Table 4.26 shows a slight improvement in a mother's capacity to recognize neo-natal danger signs from 70.7% in the 2007 baseline to 77.8% in the 2011 end line survey.

Table 4.26

Number of mothers that recognize neo-natal danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	**%**	**No.**	**%**	**No.**	**%**
2007 Baseline Survey	320	69.8	273	78.9	593	70.7
2011 End Line Survey	332	88.5	202	67.0	534	77.8

Table 4.27 and chart 22 indicate an increased percentage of mothers able to recognize neo-natal danger signs from the 2007 baseline to the 2011 end line results. Some of the warning signs recognized include difficulty breathing, premature birth and baby´s belly button turning red. The percentage of mothers who sought medical attention also increased, especially at the community level using community services.

Table 4.27
Neo-natal danger signs recognized by mothers (per sign) in the baseline and end line surveys

Danger signs	**2007 Baseline Survey**						**2011 End-Line Survey**					
	San Marcos		**Baja Verapaz**		**Total**		**San Marcos**		**Baja Verapaz**		**Total**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Difficulty breathing (turning purple)	22	10.9	35	15.5	57	11.6	224	70.6	104	51.2	328	62.3
Premature baby	16	11.2	18	9.0	34	10.9	150	47.8	53	30.9	203	40.6
Baby is cold to touch	6	3.7	12	6.8	18	4.2	89	30.0	38	21.6	127	26.4
Fever	86	62.7	92	57.0	178	61.9	184	48.9	106	54.0	290	51.1
Not able to take breastfeed	50	35.8	69	33.9	119	35.6	169	54.6	128	61.2	297	57.5
Baby´s belly button turning red	3	0.8	15	7.2	18	1.7	106	35.5	33	15.9	139	27.1
Red eye with discharge	6	2.4	4	2.4	10	2.4	33	10.5	20	11.5	53	11.0

Table 4.28 indicates mothers´ increased ability to recognize danger signs (especially three or more) in 2011. Table 4.29 and chart 23 show an increase in the average number of signs recognized by mothers (2), with better results in the San Marcos department.

Table 4.28
Number of neo-natal danger signs recognized by mothers in the baseline and end line surveys

2007 Baseline Survey						
Number of signs recognized	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
0	220	63.7	97	43.6	317	61.9
1-2	122	36.1	122	52.9	244	37.6
3-4	1	0.2	12	3.5	13	0.5
5+	0	0.0	0	0.0	0	0.0
2011 End-line Survey						
Number of signs recognized	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
0	41	9.4	41	23.8	82	16.1
1-2	101	31.4	96	44.0	197	37.3
3-4	159	50.8	62	26.5	221	39.5
5+	22	8.5	8	5.6	30	7.1

Table 4.29
Average number of neo-natal danger signs recognized by mothers in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	Number of mothers	Average	Number of mothers	Average	Number of mothers	Average
2007 Baseline Survey	343	0.47	231	0.79	574	0.50
2011 End Line Survey	323	2.73	207	1.88	530	2.33

Tables 4.30 and 4.31 indicate an increased percentage of mothers who sought advice and treatment after recognizing newborn danger signs and more visits to primary and secondary level health services.

Table 4.30
Percentage of mothers that sought health services after recognizing neo-natal danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	56	63.9	70	80.1	126	66.2
2011 End Line Survey	51	60.5	43	90.2	94	73.7

Table 4.31
Place where the mother sought health services after recognizing neo-natal danger signs in the baseline and end line surveys

Health Provider/Person	2007 Baseline Survey						2011 End Line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Hospital	14	13.6	20	25.3	34	15.3	8	8.2	15	32.0	23	18.7
Health Center	20	24.2	37	42.5	57	26.8	25	30.4	18	36.7	43	33.2
Health post	8	9.1	11	13.0	19	9.7	9	10.0	10	19.0	19	14.0
Private clinic	19	21.0	12	8.8	31	19.3	14	14.3	4	16.3	18	15.2
Convergence Center (from the Integral System of Health Care known as *SIAS*)	2	1.3	5	6.6	7	2.1	0	0.0	1	0.7	1	0.3
Health promoter	----	----	----	----	----	----	6	11.1	0	0.0	6	6.1
Midwife	----	----	----	----	----	----	3	4.7	1	1.4	4	3.2
Did not seek advice or treatment	----	----	----	----	----	----	5	12.2	2	7.0	7	9.9

Chart 22
Knowledge and behaviors related to the recognition of newborn danger signs by mothers in San Marcos and Baja Verapaz in baseline 2007 and 2011 end-line surveys

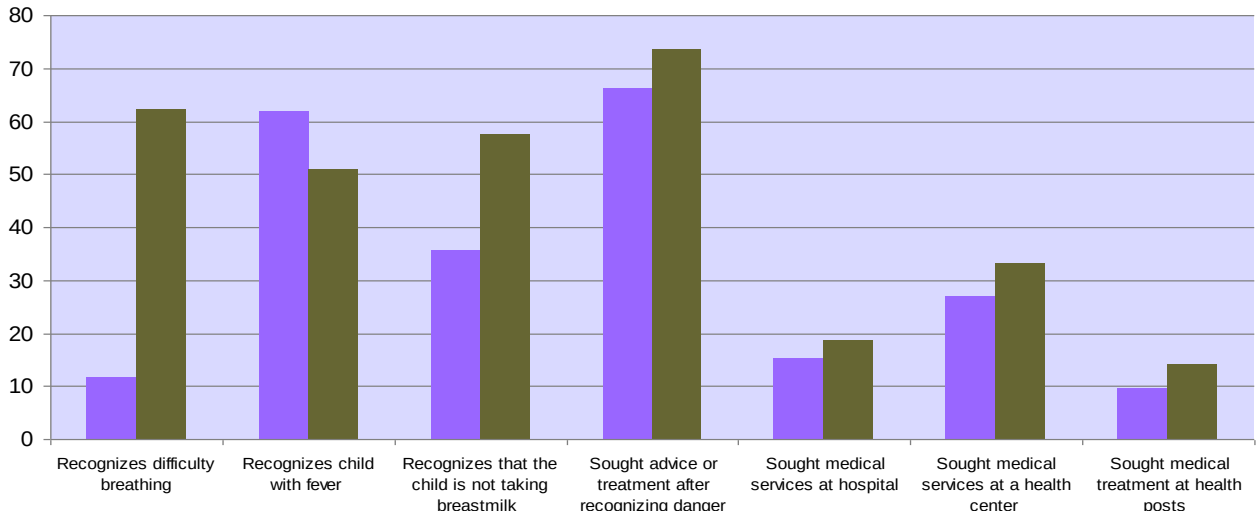


Chart 23
Average number of newborn danger signs recognized by mothers in San Marcos and Baja Verapaz in 2007 baseline and 2011 end-line surveys

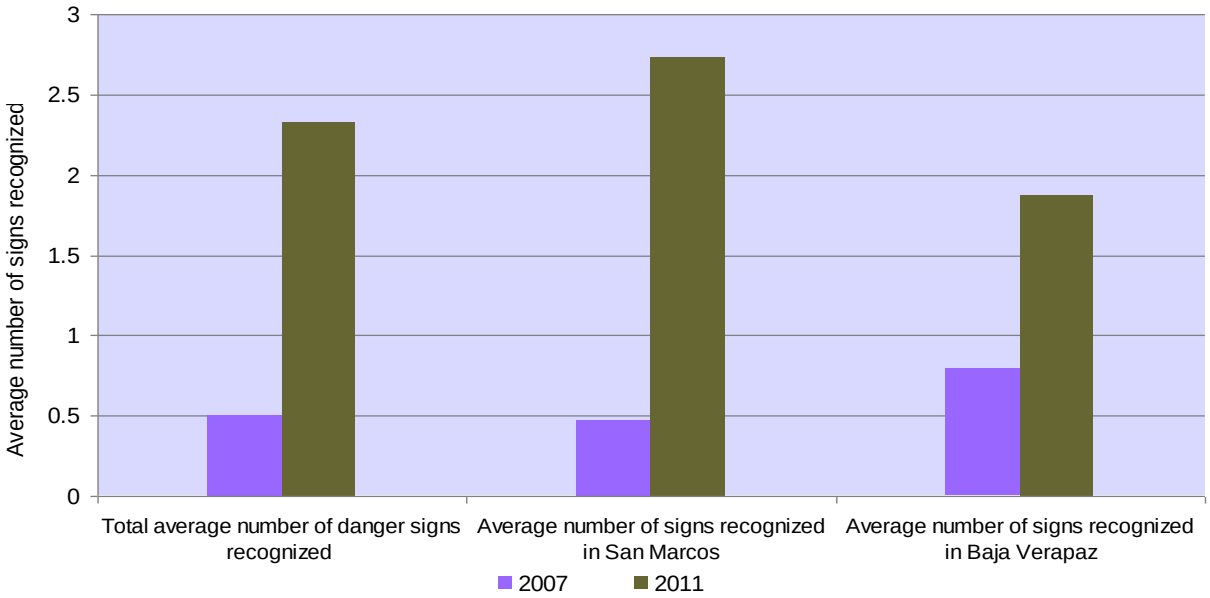


Table 4.32 indicates an increased number of mothers who were able to recognize childhood illness danger signs from 70.7% in the 2007 baseline to 94.6% in the 2011 end-line line survey, especially in the San Marcos department.

Table 4.32
Number of mothers that recognize childhood illness danger signs in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	320	69.8	273	78.9	593	70.7
2011 End Line Survey	361	95.1	256	94.0	617	94.6

Table 4.33 and chart 24 indicate an important increase in the percentage of mothers who recognize childhood illness danger signs in 2011. For example in 2011 more mothers were able to recognize "vomiting" as a warning sign; however, mothers still need to learn to recognize other signs such as "weakness, not eating or drinking liquids." The percentage of mothers who sought medical attention at health centers and posts also increased in 2011.

Table 4.33
Childhood illness danger signs recognized by mothers (per sign) in the baseline and end line surveys

Danger Sign	2007 Baseline Survey						2011 End line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The child does not look good or does not play	96	25.6	87	32.4	183	26.4	64	15.9	64	24.8	128	20.3
The child does not eat nor drink liquids	157	45.0	142	52.3	299	45.8	123	36.4	107	45.3	230	40.8
Weakness or has difficulty waking up	89	24.8	100	39.4	189	26.4	66	19.7	33	15.6	99	17.7
High fever	156	47.3	142	51.3	298	47.8	257	69.8	178	67.8	435	68.8
Panting	2	0.3	15	5.8	17	0.9	41	12.7	21	8.0	62	10.4
Vomiting	78	28.6	44	13.6	122	26.9	200	56.7	103	39.5	303	48.2
Seizures	0	0.0	3	1.0	3	0.1	42	15.0	8	2.8	50	9.0

Table 4.34 indicates an increased number of mothers able to recognize more childhood illness danger signs in the 2011 end line survey compared to the 2007 baseline results, with an average of two danger signs recognized, but it also shows that mothers were better at recognizing pregnancy and newborn danger signs than at recognizing childhood illness danger signs.

Table 4.34
Number of childhood illness danger signs recognized by mothers in the baseline and end line surveys

2007 Baseline Survey						
Number of danger signs recognized	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
0	134	34.4	67	24.0	201	33.4
1-2	211	53.3	156	53.4	367	53.3
3-4	58	12.3	62	22.6	120	13.3

5+	0	0.0	0	0.0	0	0.0
End-line Survey						
Number of danger signs recognized	**San Marcos**		**Baja Verapaz**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**
0	24	5.2	14	5.6	38	5.4
1-2	200	62.0	154	68.2	354	65.0
3-4	94	30.8	50	25.1	144	28.1
5+	5	2.1	2	1.0	7	1.6

Table 4.35
Average number of childhood illness danger signs recognized by mothers in the baseline and end line surveys

	San Marcos		**Baja Verapaz**		**Total**	
	No.	**Average**	**No.**	**Average**	**No.**	**Average**
2007 Baseline survey	239	1.24	146	1.56	385	1.27
2011 End-line Survey	323	2.15	220	1.90	543	2.03

Tables 4.36 and 4.37 and chart 24 show improvements in patterns of medical-care seeking after recognizing childhood illness danger signs, with more mothers seeking medical services in the 2011 end line survey compared to the 2007 baseline results, especially at the community level, using community services.

Table 4.36
Percentage of mothers that sought health services after recognizing childhood illness danger signs in the baseline and end line surveys

	San Marcos		**Baja Verapaz**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**
2007 Baseline Survey	188	85.3	179	86.2	367	85.4
2011 End Line Survey	216	96.8	174	98.7	390	97.8

Table 4.37
Place where the mother sought health services after recognizing childhood illness danger signs in the baseline and end line surveys

Health Provider/Person	**2007 Baseline survey**						**2011 End-line Survey**					
	San Marcos		**Baja Verapaz**		**Total**		**San Marcos**		**Baja Verapaz**		**Total**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Hospital	21	7.9	38	22.4	59	9.7	15	3.9	21	12.8	36	8.7
Health Center	79	39.1	96	47.2	175	40.1	83	43.1	105	60.5	188	52.4
Health post	37	13.7	35	15.6	72	13.9	77	34.5	38	16.6	115	25.0
Private clinic	65	29.6	36	14.0	101	27.7	36	11.9	19	14.7	55	13.4
Integral System of Health Care (*SIAS*) Convergence Center	3	2.5	15	7.2	18	3.1	2	1.5	6	3.5	8	4.8

Health Provider/Person	2007 Baseline survey						2011 End-line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Health promoter	---	---	---	---	---	---	17	10.8	3	1.4	20	5.8
Midwife	---	---	---	---	---	---	1	0.3	0	0.0	1	0.1
Did not seek advice or treatment	---	---	---	---	---	---	1	0.3	0	0.0	1	0.1

Chart 24
Knowledge and behavior related to mothers 'recognition of danger signs in children in San Marcos and Baja Verapaz 2007 - 2011

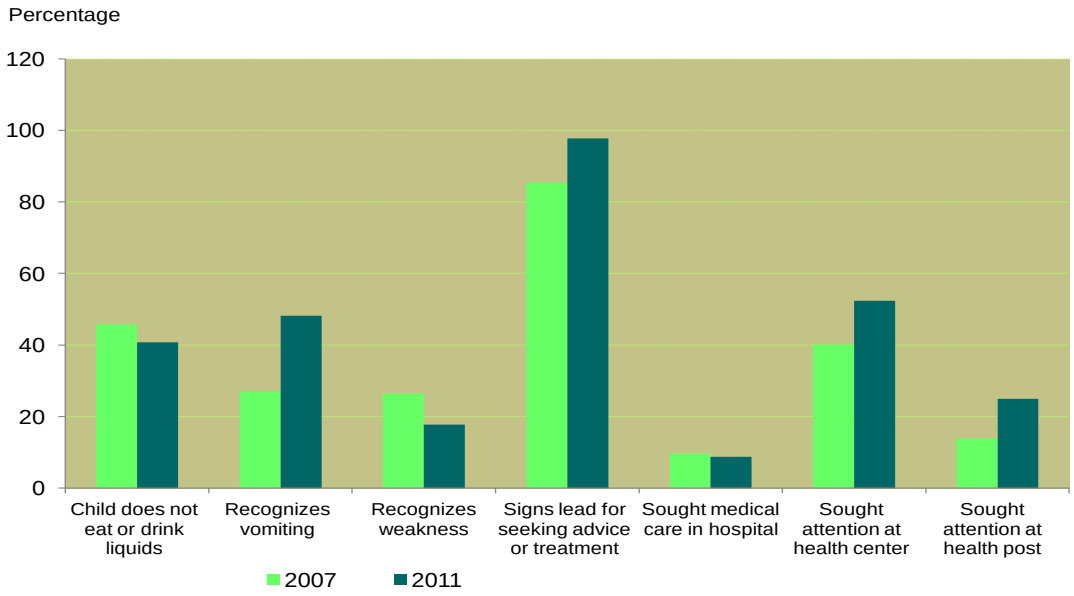
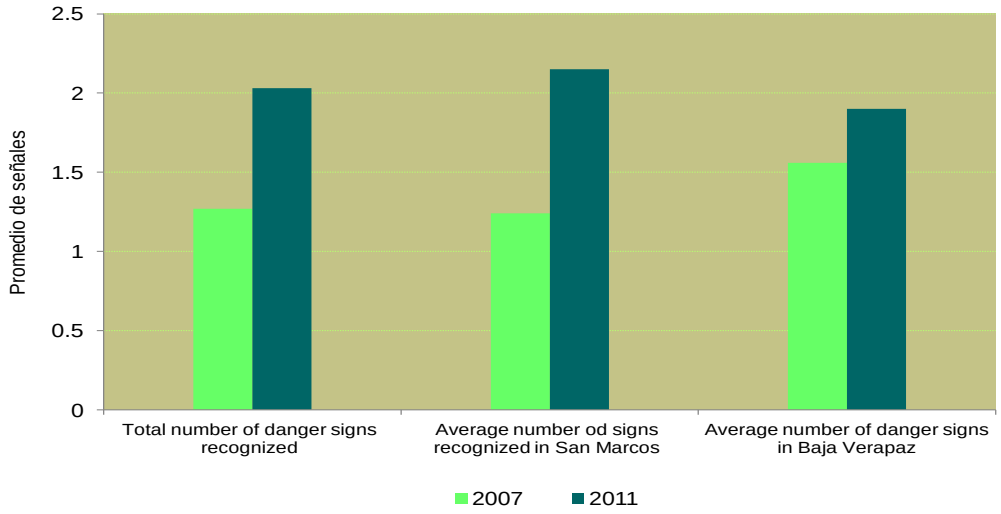


Chart 25
Average number of danger signs in children recognized by mothers in San Marcos and Baja Verapaz
2007 - 2011



Although chart 4.38 shows families' generalized use of a water treatment method in the 2007 baseline results, table 4.39 shows that nearly all families were using the boiling method in 2007 while 2011 results show a minor increase of the number of families that also use chlorination for water purification.

Table 4.38
Percentage of households that use a method for purifying drinking water in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	451	99.2	327	94.9	778	98.8
2011 End Line Survey	390	97.6	269	98.4	659	98.0

Table 4.39
Percentage of households that use a method for purifying drinking water per method in the baseline and end line surveys

Water Treatment Method	2007 Baseline Survey						2011 End-line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Boiling	443	98.4	321	98.5	764	98.4	371	96.7	256	97.5	627	97.1
Chlorination	32	6.0	15	3.2	47	5.8	71	18.4	24	4.0	95	11.2
Solar disinfection (Sodis)	6	1.7	2	0.1	8	1.1	13	3.5	4	0.8	17	2.2
Filter	0	0.0	1	0.4	1	0.0	4	0.4	4	0.9	8	0.6
Use two or more water purification methods	451	99.2	326	94.8	777	98.7	390	97.6	269	98.4	659	98.0

Tables 4.40, 4.41 and 4.42 reveal that educational activities carried out in the month prior to the 2011 end line survey increased by four times than what farmers reported a month prior to the 2007 baseline study. The number of mothers that participated in educational sessions and received counseling increased mainly due to the implementation of more activities designed to convey key messages to improve feeding and nutrition practices and the health of pregnant women and the newborn. Interviewees also reported more involvement of food security staff at the community level and increased use of printed materials during educational sessions in 2011.

Table 4.40
Percentage of households that received counseling on health and nutrition in the past month in the baseline and end line surveys

	San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%
2007 Baseline Survey	95	16.5	143	37.8	238	18.6
2011 End Line Survey	314	83.9	223	81.8	537	82.9

Table 4.41
Percentage of household that received training/counseling on health and nutrition per theme in the baseline & end line surveys

Theme	2007 Baseline Survey						2011 End-line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Child's health	38	41.2	64	43.7	102	41.7	123	39.0	70	37.7	193	38.3
Pregnant woman health	3	1.7	3	1.4	6	1.6	70	21.5	56	22.8	126	22.1
Newborn health	2	1.3	2	0.9	4	1.2	79	27.7	25	9.7	104	18.9
Nutrition and feeding	40	44.1	55	41.3	95	43.6	142	40.3	121	57.1	263	48.5
Household hygiene	44	55.1	81	56.3	136	55.4	117	32.4	66	28.7	183	30.6
Water purification methods	20	23.6	10	7.4	30	20.3	40	12.9	20	9.7	60	11.3

Table 4.42
Percentage of households that received training/counseling on health and nutrition in the past month per source in the baseline and end line surveys

Health Provider/Person	2007 Baseline Survey						2011 End-line Survey					
	San Marcos		Baja Verapaz		Total		San Marcos		Baja Verapaz		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Staff From Ministry of Health	66	66.7	71	53.0	137	64.0	75	19.4	49	20.5	124	19.9
Food security volunteer staff		30.9	72	49.5	98	34.6	281	92.7	201	88.5	482	90.8
Family members	1	0.9	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0
Neighbors	1	0.9	2	1.3	3	1.0	0	0.0	0	0.0	0	0.0
Radio stations	1	0.9	0	0.0	1	0.7	1	0.4	0	0.0	1	0.2
Printed materials	0	0.0	0	0.0	0	0.0	47	14.2	68	32.0	115	22.9
Television	1	0.9	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0
Megaphone	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

IV. CONCLUSIONS AND RECOMMENDATIONS

This section presents main program successes and challenges for future similar programs to be implemented by either Catholic Relief Services or other organizations.

A. Program achievements judging by changes documented by this final evaluation:

1. Improved Nutritional status of children 6-59 months

   a. The prevalence of stunting among 6-59-month children decreased significantly from a baseline 79.1% in 2007 to 66.4% in 2011 - 12 percentage points in four years, which represents a reduction of over three percentage points per year.

   b. Both baseline and end line surveys indicate that stunting is present somewhere between the 6th-12th month of age, which confirms results from other relevant studies that indicate significant maternal nutrition deficiencies before and during pregnancy.

   c. The weight-for-height average Z score in the 2007-2011 period decreased, but this did not affect the prevalence of acute malnutrition found in both studies.

2. Variables associated with the four pillars of food security and nutrition

   a. Collected data reveals consistent and significant positive changes in the impact and results indicators that relate to the four pillars of food security and nutrition underlying the design of the SEGAMAYA program.

   b. Highlights include verifiable progress in improving mothers key health and feeding behaviors to care for themselves and their families (e.g. feeding practices recommended for children depending on their age, recognition of danger signs during pregnancy, with newborn and children, seeking advice or medical attention in a timely manner and the adoption of measures to improve the quality of water at household level).

   c. As informed by CRS staff, in 2010, the Title II program increased the food ration being distributed for a period of six months to alleviate the effects caused by a severe drought in 2009 and tropical storm Agatha in 2010. This helped increase the percentage of recommended daily dietary allowance covered by this ration from 15% to 23.3%. A Food Consumption Survey conducted by CRS in[12] 2010 revealed that participating families had an average energy availability of 1,833 kcal per person per day, which represents 92.2% of energy adequacy (household diet and ration) and that the food ration represented 20.1% adequacy. Hence, the ration distributed by the Title II program contributed to improve

[12] Medición de la Escala de Inseguridad Alimentaria y Consumo Aparente de Alimentos; programa SEGAMAYA - CRS, Cáritas Verapaz, Cáritas San Marcos, December 2010

household food provisioning significantly. Consequently, families also benefitted from more diversity and dietary adequacy.

d. As indicated above, the nutritional status of children under the age of five improved substantially between 2007 and 2011. It is assumed that this improvement is due to the interaction of the different decisive factors that contributed to food availability, access, consumption and utilization. On the other hand, collected data indicates that food production deteriorated 17 percentage points in the studied period. However, this could be due to natural disasters reported by 74% of households in 2011 as a cause of food shortages (table 2.17). Hence, it seems as if food availability expressed as household food provisioning did not improve due to agricultural production of small-scale farmers, but to the increase of the food ration distributed by the SEGAMAYA program.

e. Results indicators linked to mothers' breastfeeding and child feeding practices also showed improvements as presented in the tables included in the narrative. Although the number of children under six months was low, there was a tangible improvement of exclusive breastfeeding as well as other practices such as adequate age for introducing solid foods, feeding quantity, consistency and frequency manifested by improved food intake by 6-23 month children.

f. Collected data related to mother's health behavior and seeking health services imply that the SEGAMAYA program was successful at increasing mothers´ recognition of significant health problems and risks that may affect her health and that of her children and the importance of seeking health services in a timely manner.

g. Mothers' adoption of improved feeding and sanitation practices promoted by the program suggest the implementation of effective educational activities. Changes to improve the information, education, communication of key messages and adult learning methodology made throughout program implementation had positive results. These changes included the development of methodology guides for technical staff from implementing partners. These were also adapted for promoters who received an educational package to support their training sessions with mothers. After the SEGAMAYA mid-term evaluation, the group size of mothers participating in educational sessions was reduced to 15-20 mothers per group in order to be more effective. This along with staggered hours for training groups of mothers helped improve attendance to educational sessions. As a result of the introduction of popularized culturally appropriate educational materials in 2009 (based on AIEPI-AINM-C strategy) and the use of an adult education approach for conveying key messages, this helped increase the effectiveness of conveying key messages which resulted in mothers´ increased adoption of improved behaviors and practices.

h. The SEGAMAYA Program worked with preventive health and nutrition interventions with pregnant and lactating women to improve the adoption of key nutrition and health practices such as exclusive breastfeeding and appropriate age to introduce solid foods to children and conducted monthly growth monitoring to determine if a child was growing well and provided counseling and follow up to mothers on how to improve the child's nutrition. These actions are some of those included in the 1,000 days global strategy to improve child nutrition.

i. Although the adoption of improved agriculture/livestock production and marketing practices were not as significant as food consumption and utilization results, they reflect an increased number of farmers adopting improved practices. Some of these practices include use of 1-3 grains per hole, use of metallic silos for grain storage; vegetable and plant diversification; adoption of soil conservation techniques such as live and dead barriers, ditches and use of compost. Livestock management practice results also revealed a considerable increase of poultry vaccination. Marketing practices more relevant are those that relate to running a business, with a slight increase in the number of family and agriculture businesses and the incorporation of a notebook to calculate expenses and profit.

j. Although changes in agriculture and livestock practices have been less significant than health-related changes, this was due probably to two structural problems - lack of land and water supply that affect farmers' subsistence capacity and the late introduction of agricultural material specifically designed for the use of promoters and farmers, using easy to understand materials and the ERCA (Experience Reflection, Knowledge and Action) approach for adult education.

k. Evidence collected for measurement of activities for monitoring and evaluation of this program confirms the effectiveness of integrated and sustainable interventions of the SEGAMAYA Program that led to changes in difficult to impact indicators such as the height for age indicator among children under the age of five.

B. Challenges and Recommendations:

a. In spite of the changes demonstrated at improving feeding behaviors to prevent malnutrition of children under the age of two, it is crucial to intensify the efforts and place more emphasis on adjusting existing national guidelines related to feeding and develop simple methodologies to make it easier for mothers to choose to adhere and adopt recommended practices.

b. It is recommended to re-organize the formal marketing component of the program. This includes modifying strategies, approaches and activities based on an in-depth assessment of potential beneficiaries as proposed in the final report of the „Estudio

Cualitativo para Medir los Avances en los Procesos de Comercialización de Productos[13], attached to this Final Evaluation Report.

c. Given the positive results of this Title II program, it is important that CRS Guatemala use this experience in future programs so that the effective model and strategies used for the SEGAMAYA program in 2007-2011 for the provision of technical assistance, education, communication and food distribution continue to be implemented.

d. It is suggested to adjust the methodology to monitor results and impact indicators[14], especially in terms of the frequency of this measurement based on the changes to some of these indicators.

[13] Qualitative Study to Measure Progress in Product Marketing Process
[14] See CRS Performance Indicator Tracking Table.