

The Final Evaluation of the FY2002-2008 Bolivia Title II Development Assistance Program

A Report prepared for the four Bolivia Title II Cooperating Sponsors:

**Adventist Development Relief Agency (ADRA)
CARE
Food for the Hungry International (FHI)
Save the Children (SC)**

By:

**Roberta van Haften
Jeffery Bentley
Alfredo Fernandez
Judiann McNulty**

**April 2009
Revised**

List of Acronyms

ADRA	Adventist Development Relief Agency
AIEPI-NUT	Spanish acronym for Integrated Management of Childhood Illness, with a focus on nutrition
AFI	<i>Asesor de Fortalecimiento Institucional</i> (Advisor for Institutional Strengthening)
AIN-C	<i>Atención Integral al Niño</i> (Community Integrated Child Attention)
ARI	Acute Respiratory Infection
ARISSET	<i>Asociación de Riego y Servicios Tomoyo</i> (Tomoyo Irrigation and Services Association)
ASOHABA	Association of Hababean Producers
BCC	Behavior Change and Communication
CAI	<i>Comité de Análisis de Información</i> (Committee for Information Analysis)
CAPYS	<i>Comité de Agua Potable y Saneamiento</i> (Potable Water and Sanitation Committee)
CBO	Community Based Organizations
CCPF	<i>Centro Comunitario para Promoción Familiar</i> (Community Family Promotion Center)
CHV	Community Health Volunteer
CLUP	Community Land Use Plan
COMAN	Municipal Food and Nutrition Council
CORDECH	<i>Corporación de Desarrollo de Chuquisaca</i> (Municipal Development Corporation of Chuquisaca)
CMAMRN	Municipal Environment and Natural Resources Management Commissions
CS	Cooperating Sponsor
CSR4	Cooperating Sponsor Results Report and Resource Request
DAP	Development Assistance Program
DHS	Demographic and Health Survey
DILOS	<i>Directorio Local de Salud</i> (Local Health Directorate)
DPT	Diphtheria, Polio, Tetanus Vaccine
EIA	Environmental Impact Assessment
FDTA	Bolivian Foundation for the Development of Agricultural Technologies
FE	Final Evaluation
FFS	Farmer Field School
FFP	Food for Peace
FFW	Food for Work
FHI	Food for the Hungry International
FPS	<i>Fondo de Inversión Social y Productiva</i> (Fund for Social and Productive Investment)
FUD	<i>Ficha Familiar Único de Datos Única</i> (Family Data Form)
GIS	Geographical Information System
GOB	Government of Bolivia
IEC	Information, Education and Communication
IEE	Initial Environmental Examination

IMCI	Integrated Management of Childhood Illness
IMCI-N	Integrated Management of Childhood Illness, with a focus on nutrition
IMR	Infant Mortality Rate
INE	<i>Instituto Nacional de Estadística</i> (National Statistics Institute)
IPM	Integrated Pest Management
IPTT	Indicator Performance Tracking Table
IWM	Integrated Watershed Management
KAP	Knowledge, Attitude and Practice
LOA	Length of Activity
LOP	Life of Project
MAPA	Market Access and Poverty Alleviation
MCH	Maternal and Child Health
MCH/N	Maternal and Child Health and Nutrition
M&E	Monitoring and Evaluation
MOH	Ministry of Health
MT	Metric Ton
MTE	Mid-term Evaluation
MWM	Micro Watershed Management
MTOU	Municipal-Territorial Organization Unit
MYAP	Multi-Year Assistance Program
NGO	Non-Governmental Organization
NRM	Natural Resource Management
O&M	Operation and Maintenance
ORS	<i>Oficina Regional de Semillas</i> (Regional Seed Office)
OTB	<i>Organizaciones Territoriales de Base</i>
PASACH	<i>Programa de Apoyo al Sector Agropecuario de Chuquisaca</i> (Program to Aid the Agricultural Sector in Chuquisaca)
PCC	<i>Promoción Comunitaria de Crecimiento</i> (Community Growth Promotion)
PCP	Participatory Community Plan
PDI	Positive Deviance Inquiry
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
POA	<i>Plan Anual de Operación</i> (Annual Operating Plan)
POP	<i>Planes de Ordenamiento Predial</i> (Land Use Plans)
PPM-PASA	<i>Programa de Prevención y Mitigación - Plan de Aplicación y Seguimiento Ambiental</i> (Prevention and Mitigation Program - Environmental Application and Follow-up Plan)
PROAGUAS	<i>Programa de Saneamiento Básico para Pequeños Municipios</i> (Basic Sanitation Program for Small Municipalities)
PVO	Private Voluntary Organization
PRA	Participatory Rural Appraisal
PROMIC	<i>Programa Manejo Integrado de Cuencas</i> (Integrated Watershed Management Program)
PROSIN	<i>Programa Nacional de Salud Integral</i> (Integrated National Health Program)
PVC	Polyvinyl Chloride
PVO	Private Voluntary Organization

SANTOLIC	<i>Saneamiento Total Liderado por la Comunidad</i> (Community-led Total Sanitation)
SC	Save the Children
SEAS	<i>Seguridad Alimentaria Sostenible</i> (Sustainable Food Security)
SECI	<i>Sistema Epidemiológico Comunitario de Información</i> (Community Epidemiological Information System)
SERNAP	Bolivian National Park Service
SIMA	<i>Servicio Informativo de Mercadeos Agropecuarios</i> (Agricultural Marketing Information System)
SISAB	<i>Superintendencia de Servicios Básicos</i> (Superintendent of Basic Services)
SIVAS	<i>Sistema de Vigilancia en Agua y Saneamiento</i> (Water and Sanitation Surveillance System)
SIVICS	<i>Sistema de Vigilancia Comunitaria en Salud</i> (Community Health Surveillance System)
SNIS	<i>Sistema Nacional de Información en Salud</i> (National Health Information System)
SODIS	Solar Disinfection of Water
SUMI	Seguro Universal Materno-Infantil (Universal Maternal and Child Health Insurance)
SWC	Soil and water conservation
TAG	Technical Assistance Group
UMSS	<i>Universidad Mayor de San Simon</i> (University of San Simon)
UNI	Integrated Nutrition Unit
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WARMI	Aymara word for women, also name used for a community participatory planning method
W&S	Water and Sanitation
ZM	<i>Desnutrición Cero</i> (Zero Malnutrition)

Table of Contents

<i>EXECUTIVE SUMMARY</i>	<i>viii</i>
1 Background on the Bolivian Title II Program	1
1.1 Brief History of the Title II Program in Bolivia	1
1.2 Overview of the Final Development Assistance Programs (DAPs)	1
1.2.1 Program Goals and Objectives	2
1.2.2 Program Components and Cross-cutting Activities.....	5
1.2.3 Resources.....	5
1.2.4 Beneficiaries	8
1.3 Brief Descriptions of the Four Programs	9
1.3.1 Adventist Development and Relief Agency (ADRA).....	9
1.3.2 CARE	9
1.3.3 Food for the Hungry International (FHI).....	10
1.3.4 Save the Children (SC).....	10
1.4 Sustainability	11
2 The Final Evaluation (FE)	13
2.1 Purpose of the FE	13
2.2 Methodology	14
2.2.1 What Took Place	14
2.2.2 Some Effects of the Shortened Time Frame	15
3 Findings: Maternal Child Health and Nutrition (MCH/N)	18
3.1 Program Objectives	18
3.2 Background	18
3.2.1 Health and Nutrition Situation in Bolivia	18
3.2.2 The GOB Nutrition Strategy.....	19
3.3 Overall Strategy and Approaches	20
3.3.1 Community-based Growth Promotion (PCC).....	20
3.3.2 Title II Program Support for the Government Strategy	21
3.3.3 Improving Health Service Delivery.....	21
3.3.4 Behavior Change Strategy	22
3.3.5 Cookbooks.....	24
3.3.6 ADRA and CARE Breastfeeding Support Groups	25
3.3.7 Emergency Medical Transport Plans.....	25
3.3.8 Early Childhood Stimulation	25
3.3.9 Use of Title II Food in the MCH/N Program.....	26
3.3.10 Sustainability Strategies and Potential for Sustainability.....	27
3.4 Results Achieved	28
3.4.1 Quantitative Results.....	28
3.4.2 Unexpected or Unanticipated Results.....	30
3.5 Monitoring and Evaluation	30
3.6 Findings for the Individual Programs	31
3.6.1 Adventist Development and Relief Agency (ADRA).....	31
3.6.2 CARE	39
3.6.3 Food for the Hungry (FHI)	48

3.6.4.	Save the Children (SC).....	54
4	<i>Water and Sanitation (W&S)</i>	62
4.1	Program Objectives	62
4.2	Background	62
4.3	Overall Strategy and Approaches	63
4.3.1	Construction of the W&S Infrastructure.....	63
4.3.2	Capacity Building	66
4.3.3	Sustainability Strategies.....	69
4.4	Results Achieved	69
4.4.1	Quantitative Results.....	70
4.4.2	Qualitative Results.....	70
4.5	Constraints to Future Development	72
4.6	Lessons Learned	73
4.7	Recommendations	74
4.8	Monitoring and Evaluation	76
4.9	Findings for the Individual Programs	78
4.9.1	Adventist Development and Relief Agency (ADRA).....	78
4.9.2	CARE	80
4.9.3	Food for the Hungry International (FHI).....	83
4.9.4	Save the Children (SC).....	86
5	<i>Findings: Income Generation (IG)</i>	90
5.1	Program Objectives	90
5.2	Background	90
5.3	Overall Strategy and Approaches	92
5.3.1	Pre-MTE.....	92
5.3.2	Market Focus	92
5.3.3	Value Chains.....	97
5.3.4	Agricultural Technology Transfer	100
5.3.5	Economic Analysis and Entrepreneurship	101
5.3.6	Credit	102
5.3.7	Capacity Building	103
5.3.8	Sustainability Strategies and Sustainability	106
5.4	Results Achieved	107
5.4.1	Quantitative Results.....	107
5.4.2	Qualitative Results.....	110
5.5	Constraints to Further Development	111
5.6	Lessons Learned	112
5.7	Recommendations	112
5.8	Monitoring and Evaluation	113
5.9	Findings for the Individual Programs	115
5.9.1	Adventist Development and Relief Agency (ADRA).....	115
5.9.2	CARE	124
5.9.3	Food for the Hungry International (FHI).....	131

5.9.4	Save the Children Bolivia (SC)	139
6	<i>Findings: Productive Infrastructure</i>	149
6.1	Program Background and Objectives	149
6.2	Overall Strategies and Approaches	149
6.3	Roads	150
6.3.1	Program Performance	150
6.3.2	Program Approaches	151
6.3.3	Sustainability Strategies and Potential for Sustainability	153
6.3.4	Lessons Learned	154
6.3.5	Findings for the Individual Programs	155
6.4	Irrigation and Land Reclamation	162
6.4.1	Program Performance	162
6.4.2	Program Approaches	163
6.4.3	Sustainability Strategies and Potential for Sustainability	166
6.4.4	Lessons Learned	167
6.4.5	Recommendations	168
6.4.6	Findings for the Individual Programs	169
6.5	Water Harvesting	176
6.6	Constraints to Future Development	178
6.7	Recommendations	178
7	<i>Findings: Natural Resource Management (NRM)</i>	179
7.1	Program Objectives	179
7.2	Background	179
7.3	Overall Strategy and Approaches	181
7.3.1	Conservation Areas.....	181
7.3.2	Soil Conservation	182
7.3.3	Integrated Watershed Management (IWM).....	185
7.3.4	Strengthening Community and Municipal Leadership	185
7.3.5	Rules and Plans.....	187
7.4	Results Achieved	187
7.4.1	Quantitative Results.....	187
7.4.2	Qualitative results	189
7.5	Constraints to Future Development	190
7.6	Lessons Learned	190
7.7	Recommendations	191
7.8	Monitoring and Evaluation	192
7.9	Findings for the Individual Programs	194
7.9.1	Adventist Development and Relief Agency (ADRA).....	194
7.9.2	CARE	213
7.9.3	Food for the Hungry International (FHI).....	224
7.9.4	Save the Children (SC).....	236
8	<i>Findings: Urban Temporary Employment Generation Programs</i>	249
8.1	Program Background and Objectives	249

8.2	Overall Strategies and Approaches	249
8.2.1	Types and Quantities of Infrastructure Constructed	249
8.2.2	Collaboration with the Municipalities	249
8.2.3	Use of Food	251
8.2.4	Environmental Compliance and Mitigation.....	251
8.2.5	Complementary Activities	251
8.3	Sustainability and Sustainability Strategies	251
8.4	Results Achieved	252
8.5	Lessons Learned.....	252
8.6	Findings for the Individual Program	254
8.6.1	Food for the Hungry International (FHI).....	254
8.6.2	Save the Children (SC).....	255
9	<i>Findings: Environmental Assessment -- Regulation 216 Compliance.....</i>	256
9.1	Introduction.....	256
9.2	General Recommendations for the Program.....	256
9.3	Findings for the Individual Programs.....	256
9.3.1	Adventist Development and Relief Agency (ADRA).....	256
9.3.2	CARE	258
9.3.3	Food for the Hungry International (FHI).....	262
9.3.4	Save the Children (SC).....	264
	<i>References</i>	270
	<i>Annexes</i>	272
	<i>ANNEX A: Terms of Reference for the Final Evaluation.....</i>	273
	<i>ANNEX B: CS Indicator Performance Tracking Tables (IPTTs).....</i>	278
	<i>ANNEX C: Indicator Validations</i>	326

EXECUTIVE SUMMARY

The purpose of the Final Evaluation (FE) was to review the programs of the four Title II cooperating sponsors (CSs) in Bolivia to determine the extent to which these programs had a positive impact on their target populations who live in some of the most food insecure areas of rural Bolivia. The focus of the evaluation, in other words, was on the results of the programs, and included an assessment of whether each of the programs had a measurable impact on their major impacts indicators. Since these were to be the last Title II development programs in Bolivia, the FE team also aimed to (1) identify successful implementation strategies, (2) assess the potential for sustainability and (3) draw lessons learned that could be shared within USAID, with the Government of Bolivia (GOB) and other CSs, both within and outside Bolivia.

The evaluation, which took place in the fall of 2008, included a review of each of the major program components: (1) maternal and child health and nutrition (MCH/N) (which also included a water and sanitation (W&S) dimension, (2) income generation (IG) and (3) natural resources management (NRM).¹ The FE team was multidisciplinary and included three expatriates – an agricultural and marketing specialist who also served as team leader, a maternal and child health and nutrition specialist, and a natural resource management and environment specialist. A Bolivian engineer was also contracted to focus on the infrastructure dimensions of the program. The Bolivian programs are difficult to assess due to their programmatic complexities and dispersed locations, and the delays and the reduction in the amount of time available for the field work added to the difficulties.

Overall Program Quality

The FE team was very impressed with the overall quality of the four CS programs and the results that had been achieved. All four had become “true development” programs, which was one of the objectives that the Bolivia USAID and the four CSs had aspired to at the beginning of these DAPs. The results for the two major impact indicators – a reduction in child malnutrition and increases in household incomes – were particularly impressive (See following section on the MCH/N and IG programs).

These DAPs were only the second set of food security-oriented DAPs to be implemented in Bolivia. The programs had been retargeted on the most food insecure during the first round of food security-oriented DAPs. The Mid-Term Evaluation (MTE) was an important milestone in the development of these DAPs, with CARE and SC reducing the geographical scope of their programs post MTE, for example, and re-orienting their IG programs to make them more market driven. All four of the CSs, in fact, made important changes post-MTE that improved the quality and effectiveness of a broad range of activities across all their program components.

The Bolivian programs provide proof that Title II CSs can successfully implement complex food security programs, if they have the right vision and strategy and are willing and able to assemble the necessary technical capacity. The FE team was particularly impressed with the

¹ The analytical framework for the program can be found on e page XX in Section 1.

quality of the CS staff, the vast majority of whom were still as dedicated as ever but during these programs also had much more technical knowledge and experience to offer the CS's clients and beneficiaries.

Maternal and Child Health and Nutrition (MCH/N)

The results that the four CSs were able to achieve in terms improving health behaviors (exclusive breast feeding, use of ORT to treat diarrhea, adequate hand washing) and reducing stunting were impressive, far exceeding those usually achieved by Title II programs. Stunting was reduced by an average of 16 percentage points over the life of the project or 3.8 percentage points for each year. The potential is also good that the community-based growth promotion and other specific community health activities will be sustained.

Table 1: Reductions in Chronic Malnutrition (Stunting) among Children 3-36 Months of Age
(Percent of children 3-36 months of age stunted)

	Baseline 2002	MTE 2004	Final 2008
ADRA	47	41	27
CARE	46	39	34
FHI	59	40	31
SC	37	37	23

To achieve these results, the CSs worked in partnership with local and district health services to strengthen both service delivery and community-level interventions

in accord with the Bolivian Government's strategy known as Zero Malnutrition. Multiple training events provided for 790 government health workers improved their technical capacity in nutrition and enhanced their skills in community outreach and information management. The CSs trained nearly 3,000 community health volunteers in growth promotion, Community Integrated Management of Childhood Illness (C-IMCI), data collection and use, community education and mobilization. The CSs applied a variety of globally recognized best practices for enhancing maternal and child health at the community level, including breastfeeding support groups, C-IMCI, birth planning, community emergency transport plans, early childhood stimulation, and solar disinfection of drinking water. In particular, the shift after the Mid-Term Evaluation (MTE) to monitoring expected weight gain and providing counseling to the mother related to that measure appears to have been particularly effective in improving nutritional status outcomes for three of the four CSs.

Water and Sanitation (W&S)

All four of the CSs implemented some combination of hardware (installation of community and family water systems, showers, sewerage systems and latrines), and software (capacity building and hygiene education). According to their results indicators, all four had significant successes in increasing the percentage of households in their work areas with access to safe water and latrine. The field visits verified these results, confirming the increased availability of and easier access to safe water, improvement in water treatment, increased knowledge of appropriate hygiene behaviors and improvements in health.

To achieve these results, the four CS constructed a total of over 190 W&S projects using Title II resources in combination with a significant amount of additional resources that the CSs were able to leverage from the municipalities, the communities and beneficiary families in cash, materials and labor. The FE team was impressed with the quality of the projects

visited, the responsiveness of the CS to the MTE recommendations and the close coordination between the MCH/N and W&S staffs, on hygiene education in particular. The potential for sustainability also seems promising by the end of the programs, with all four CSs reporting that over 90 percent of the water supply systems they had constructed were being adequately operated and maintained by the community water users committees (CAPYS) that they had helped organize and train.

Income Generation

The results of the IG programs were also impressive, especially in terms of the increases in the value of sales achieved and increases in household incomes. All four programs had a measurable and significant impact on their key impact indicator – *increase in the average annual income of the Title II assisted households* – with results that ranged from a doubling of household real incomes between 2002 and 2008 to a quadrupling of household incomes.² Major changes were also apparent during the field trips in the knowledge and attitude of the CS's clients, with many of the participants interviewed much more market oriented and entrepreneurial and having a better understanding of profitability and the costs and returns of activities. Project participants also talked about the positive impact that the IG programs had had on their lives, enabling them to improve their diets and housing and keep their children in school and, in some cases, to be able to send them out of the community to high school.

All four of the CSs had implemented a variety of activities under this component, including agricultural technology transfer, improved market information and market linkages, the development of productive infrastructure and individual and organization capacity building. All four programs had increased their technical capacities over time. However, it was the strong market orientation, which the CSs adopted/strengthened as a result of the MTE, which gave the programs more coherence and made them more attractive to their client farmers. And, it is this market orientation and the results that were achieved as a result of its adoption that make the Bolivian Title II programs noteworthy and potentially important as a model for IG programs in other countries.

Lessons learned from these IG programs are that income generation programs are more successful if they are market oriented; market oriented programs can be designed so that Title II clients can participate successfully (even in a country like Bolivia where the Title II clients were dispersed geographically and often fairly isolated); small resource poor farmers respond positively to economic incentives and facilitating market contacts and sales early on in a project helps spur interest, increases farmers' participation and can improve technology adoption rates; the value chain model is a useful way to conceptualize and organize IG activities, but the chains need to be market driven and not production driven.

Productive Infrastructure

The development of productive infrastructure, which was also an important dimension of the Bolivia Title II programs, became better integrated into the IG programs over time. Road improvements made with Title II resources, for example, played a key role in enabling

² These estimates are reported in constant US dollars, in order to take inflation into account, and are significantly greater over time when reported in constant dollars.

some communities to access more promising markets. Title II resources were also used to improve/expand farmers' access to irrigation, including by introducing sprinkler irrigation, which is a more cost effective and environmentally friendly technique in many of the areas where the Title II clients live than gravity irrigation. The technical quality of these programs improved over time, particularly after the MTE, as the CSs added technical staff to their infrastructure programs and made adjustments in their organizational structures that enabled them to put more emphasis on environmental compliance and mitigation measures. Another lesson learned, which has relevance beyond Bolivia, is that increasing incomes in the absence of expanding farmers' access to irrigation may be difficult if not possible in many of the resource poor communities in which the Title II development programs operate.

Natural Resource Management (NRM)

The objective of the NRM components was to reduce the unsustainable exploitation of natural resources, especially soil erosion, deforestation and the degradation of native grasslands. The CS programs focused on the creation of community conservation areas (mainly forests) and the application of soil conservation measures, especially through the integrated watershed management (IWM) approach. The programs strengthened community and municipal leadership (including municipal technical units). The programs helped rural communities and municipalities draft rules and plans for NRM. The NRM components were highly successful, well integrated internally and with IG and other program components. The CSs accepted the mid-term recommendations and tried to implement them in good faith. The beneficiaries appreciated the program, which earned goodwill for USAID and the CSs. The targets for the verifiable indicators were usually achieved and often surpassed.

Urban Temporary Employment

The FHI and SC programs were modified part way through their DAPs to add urban temporary employment generation activities in El Alto (SC) and Potosi and Sucre (FHI). SC added this program to its DAP in 2005, initially using resources (primarily commodities) that had become available as a result of its decision post MTE to consolidate its rural activities into a smaller number of communities. FHI transferred some of the rations from its rural programs in FY2006 to start up its urban public works program in Sucre, and in 2007, FHI received an additional \$250 thousand in water and sanitation funds from the USAID for public works programs in both cities. All three cities had been growing rapidly, El Alto in particular, and these job creation programs helped these municipalities cope with the increasing lack of job opportunities for the newly arrived rural migrants and the growing demand for basic services.

SC measured program performance in terms of projects completed and jobs generated, exceeding its LOA target in the first case but falling short in the second case due to a number of logistics problems. FHI measured its performance in terms of access to safe water and latrines, exceeding both LOA targets. FHI concentrated on water, storm drain and sewerage projects, and SC also implemented many street improvement projects and excavations for natural gas networks. The quality of the projects observed was good. Food rations were used to pay for the unskilled labor, but both FHI and SC worked closely with and were able to leverage considerable additional funds from the municipal governments which were used to help pay for non-local materials and skilled labor. Both FHI and SC helped strengthen

the technical, managerial and financial capacities of the local neighborhood boards and municipal governments. The infrastructure that was built helped improve the quality of life for the residents in the neighborhoods affected. The workers, who were primarily women, gained additional skills and confidence which improved their employment opportunities. The municipal government of Sucre is using the organizational structure that FHI developed in its own temporary employment department, and the municipal government of El Alto decided to use its own resources to continue the FFW program starting in 2009.

Environmental Compliance and Mitigation

The CSs Title II programs were generally in compliance with Environmental Regulation 216 and Bolivian environmental legislation, although future USAID programs in Bolivia need to make provisions for proper management of cultural resources (archaeology). The CSs rigorously applied the recommendations of the MTE, including creating separate environment units within their organizations, a step that FHI had already taken at the time of the MTE. This led to a dramatic improvement in compliance by the end of the project. All of the CSs have the documents required by the Government of Bolivia, e.g. the *fichas ambientales*. On a scale of I to IV, all of the program's projects were classified as III or IV (i.e. the lowest potential for negative environmental impact). Mitigation of negative impacts was generally appropriate.

Recommendations

Since these were the last of the Title II Development programs, the FE team paid more attention to lessons learned than to recommendations for future programs. Some recommendations can be found in the individual sections, however. One of the most important recommendations, and one that was identified in several of the program areas, relates to the need to assess, systematize and disseminate information on some of the more important best practices that were developed under these programs. The following is a recommendation taken from the IG section, but similar statements can be made about many of the other approaches and practices that were being successfully implemented in the Bolivia Title II programs. CS headquarters are also urged to facilitate and support the development and dissemination of these types of materials.

USAID – USAID Bolivia, the LAC Bureau and FFP -- should encourage and facilitate the transfer of the Bolivian Title II experience to other programs/countries. For example, USAID could support and work with the CSs to develop case studies and handbooks of selected value chains and the lessons learned about the development and implementation of these chains.

Lessons Learned

The individual sections also contain many lessons learned. Many that were identified are relevant to the individual program areas. Several, however, apply to the programs as a whole. The lessons learned listed below were identified by the CSs and the evaluation has confirmed their importance:

- ***Benefits of program integration*** – The CSs were unanimous about the benefits of program integration and how integration helped increase program effectiveness and enhanced program impact.

-
- ***Importance of working with municipalities*** – The CSs were also unanimous about the importance of working with the municipalities. The municipalities were an important source of additional funds for the CS programs, and all four are relying on the municipalities that they worked with to play a major role in helping insure the sustainability of many of their program activities and results. CARE put major emphasis on working closely with its municipalities from the beginning of its DAP and ADRA, FHI and SC put an increasing emphasis on the development and strengthening of these relationships over the life of their programs.
 - ***Need to focus on sustainability from the beginning*** – Although the CSs were concerned with issues related to program sustainability from the beginning, they did not really begin to seriously emphasize sustainability until the last several years of their programs. The development of sustainability strategies in 2007 did help them focus more specifically on the concrete steps that needed to be taken before the end of their projects to enhance the likelihood of sustainability, and all four were unanimous in their belief that they should have begun this process much earlier.

1 Background on the Bolivian Title II Program

1.1 *Brief History of the Title II Program in Bolivia*

Bolivia had been a recipient of Title II food assistance since the inception of the program in 1954. However, it was not until the mid-1990s that the program took on a food security orientation as the Office of Food for Peace (FFP) made major changes in the Title II program, the development program in particular, in response to the issuance of a major new USAID policy on “Food Aid and Food Security” in 1995.³ The main focus in the early years of the Title II programs was on food distribution. Even during the late 1980s and early 1990s, most of the Title II resources that were made available to Bolivia were used as food in school feeding and urban food for work programs. This latter program, which was active in eight major cities and 22 smaller towns country-wide, was initially designed in 1986 in response to the economic emergency and related stabilization and structural adjustment programs in order to provide a “safety-net” to protect the poor against the consequences of structural adjustment.

The USAID Mission played an active role together with FFP and the LAC Bureau in reorienting the program to the more food insecure areas of the country and to the achievement of food security objectives. This included hosting a several day seminar in 1995 to review the “Food Aid and Food Security Policy Paper” with current and potential cooperating sponsors (CSs) and commissioning the development of a map of Bolivia which identified the most food insecure provinces in the country. The transition to a more food security oriented program was not an easy one, with the First Lady of Bolivia intervening to support an extension of the school feeding program and women that had been participating in the urban food for work program demonstrating in front of the U.S. Embassy in La Paz over the loss of their jobs.

1.2 *Overview of the Final Development Assistance Programs (DAPs)*

The Development Assistance Programs (DAPs), which were the subject of this evaluation, were originally approved in 2001 to run for five years (2002-2006). They were only the second food security oriented programs to be implemented in Bolivia. Seven organizations submitted proposals, but only four were selected: the Adventist Development and Relief Agency (ADRA), CARE, Food for the Hungry International (FHI)⁴ and Save the Children (SC).

³ The 1990 Farm Bill made major changes in the PL480 food assistance program, starting with the designation of improved security in the developing world as the program’s over-riding objective. In 1992, USAID issued Policy Determination 19 which defined food security and described the three elements essential to achieving food security – food availability, food access and food utilization. But it was not until the publication of the “Food Aid and Food Security Policy Paper” in 1995 that these changes in policy began to be reflected in the Title II programs in the field.

⁴ Food for the Hungry International is in the process of changing its acronym from FHI to FH. Since the organization was known as FHI during the life of this DAP, the FHI acronym is the one that will be used in this report.

At the time the programs were approved, expectations were that Bolivia would be eligible for another five year Title II development assistance program beginning in 2007. However, Bolivia no longer qualifies under the Office of Food for Peace's (FFP) new system as one of the most food insecure countries.⁵ So the Title II programs are being ended. To facilitate the phase out and in recognition of the political and economic uncertainties in Bolivia with the election of the new Government in 2005, all four programs were given several extensions (through the end of December 2007, December 2008 and April 2009).

These programs were managed by a Food Security Unit in USAID/Bolivia, which played a proactive role throughout the life of the program in providing oversight and in trying to help strengthen the program and enhance program performance and impact. Although the Unit was located within the Economic Opportunities Team managerially, its responsibilities included coordinating and collaborating with the other relevant Mission technical offices, the Economic, Health and Environment teams in particular, and working to insure that the Title II programs were integrated with and contributed to the Mission's overall development strategy.

The Mid-Term Evaluation (MTE), which was undertaken in 2004-2006,⁶ was an important milestone in the development of these programs, with CARE and SC reducing the geographical scope of their programs post MTE, for example, and re-orienting their IG programs to make them more market driven. All four of the CSs, in fact, made important changes post-MTE, which are discussed in more detail in the sections that follow, that improved the quality and effectiveness of a broad range of activities across all their program components.

These programs did not operate in isolation. What the CSs were able to do and the results that they were able to achieve were influenced by what happened in the overall Bolivian economy and society. In fact, major changes did occur during the years that these programs were being implemented. Changes occurred in governments and in the philosophy of governing. The overall economy boomed during these years, in response to the increases in prices for some of Bolivia's key commodity exports and then declined as these prices began to decline. The country, including the Title II areas, was also adversely affected during these years by the droughts, floods, hail and frosts occasioned by the El Nino phenomenon.

1.2.1 Program Goals and Objectives

The overall Title II program had four interrelated objectives, all of which were expected to contribute to the goal of reducing the high levels of food insecurity and poverty in rural Bolivia. These objectives were to:

⁵ As part of its 2006-2010 Strategy, the Food for Peace (FFP) Office decided to focus its development programs on 15 of the most food insecure countries in an effort to enhance the impact of its programs and to reduce its management burden. Countries were selected based on how they scored with respect to three indicators of food insecurity – malnutrition (stunting), poverty and undernourishment.

⁶ Roberta van Haften, Monica Woldt, Scott Solberg, Wilson Castaneda, Humberto Caceres, and Fernando Castellon, "Mid-Term Evaluation for the FY 2002-2006 Bolivia Title II Development Assistance Program," A report prepared for USAID Bolivia, March 2005.

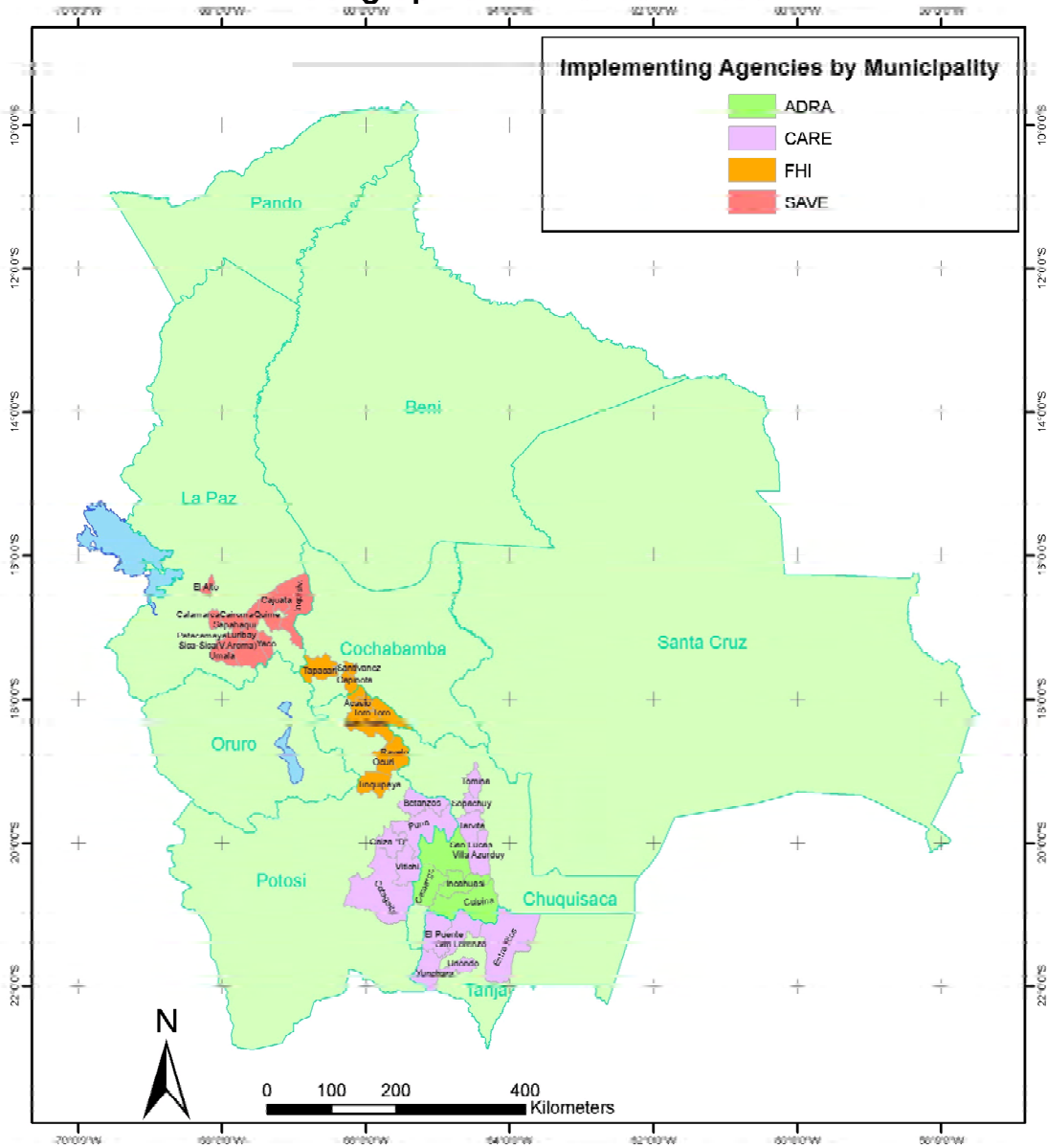
-
- Improve the availability of food at the household level through increases in agricultural productivity.
 - Increase incomes and enhance access to food through improved marketing links.
 - Reduce chronic child malnutrition and improve the biological utilization of food through integrated health, education, water and sanitation interventions, and
 - Increase food availability and access by conserving and rehabilitating the natural resource base which is basic to maintaining agricultural productivity in the most food insecure areas of the country.

These programs were also characterized by their:

- ***Focus on the Food Insecure.*** The programs were located in the most food insecure provinces in five departments of the country: La Paz (SCB), Chuquisaca (ADRA and CARE), Potosi (CARE and FHI), Cochabamba (FHI) and Tarija (CARE). These areas were selected based on a study of food insecurity commissioned by the Mission in FY2001, which gave each province in Bolivia a food security rating (low, moderate, high and extreme) using existing socio-economic data. The areas that the four CSs worked in were rated as having high or extreme levels of food insecurity (See map on next page).
- ***Development Orientation.*** The USAID Mission and the CSs aspired to make the Title II programs in Bolivia true “development programs,” with food and local currency resources used to support individual, community and municipal constraints and enhance household food security. CS efforts were focused on creating opportunities so that households would be able to achieve sustainable improvements in real incomes. Although activities such as the Maternal and Child Health and Nutrition (MCH/N) programs distributed food rations to vulnerable individuals, food resources were used primarily in conjunction with training and technical assistance activities that helped build a foundation for sustainability.
- ***Support to the Mission’s Program.*** All four of the CSs designed their programs to be consistent with and support several of the USAID/Bolivia’s strategic objectives and intermediate results. This included SO2, which focused on increased incomes for Bolivia’s poor, and SO3, which focused on the improvement of the health of the Bolivian population.



Food Security Unit Geographic Intervention Areas



prepared by werra@usaid.gov 4/15/2008

1.2.2 Program Components and Cross-cutting Activities

Each CS program included three major components with distinct objectives and activities. These objectives were to:

- ***Improve maternal and child health and nutrition*** – This component included two types of activities. The first set focused on increasing the demand for and improving the delivery of health and nutrition services, with the latter including immunization campaigns, the detection and treatment of diarrheal diseases and acute respiratory infection and the provision of basic medical services; growth monitoring and promotion for children below the age of three; and nutrition and health education. The second set focused on improving access to potable water and sanitation and included the construction of basic infrastructure (community and family water systems, sewage systems, latrines and showers), helping communities organize to operate and maintain this infrastructure and the provision of hygiene education.
- ***Increase rural incomes*** -- This component included activities designed to transfer improved agricultural technologies, improve farmers access to market information and strengthen market linkages, improve farm family infrastructure (including silos, chicken houses and stables for cattle and sheep), and improve community productive infrastructure (including micro-irrigation and rural access roads).
- ***Improve natural resource management*** – This component included training communities in natural resource management (NRM), promoting soil conservation practices and adapting irrigation methods to topographic conditions in the intervention areas; and improving forage through the introduction of improved species and or propagation and protection of desirable native species.

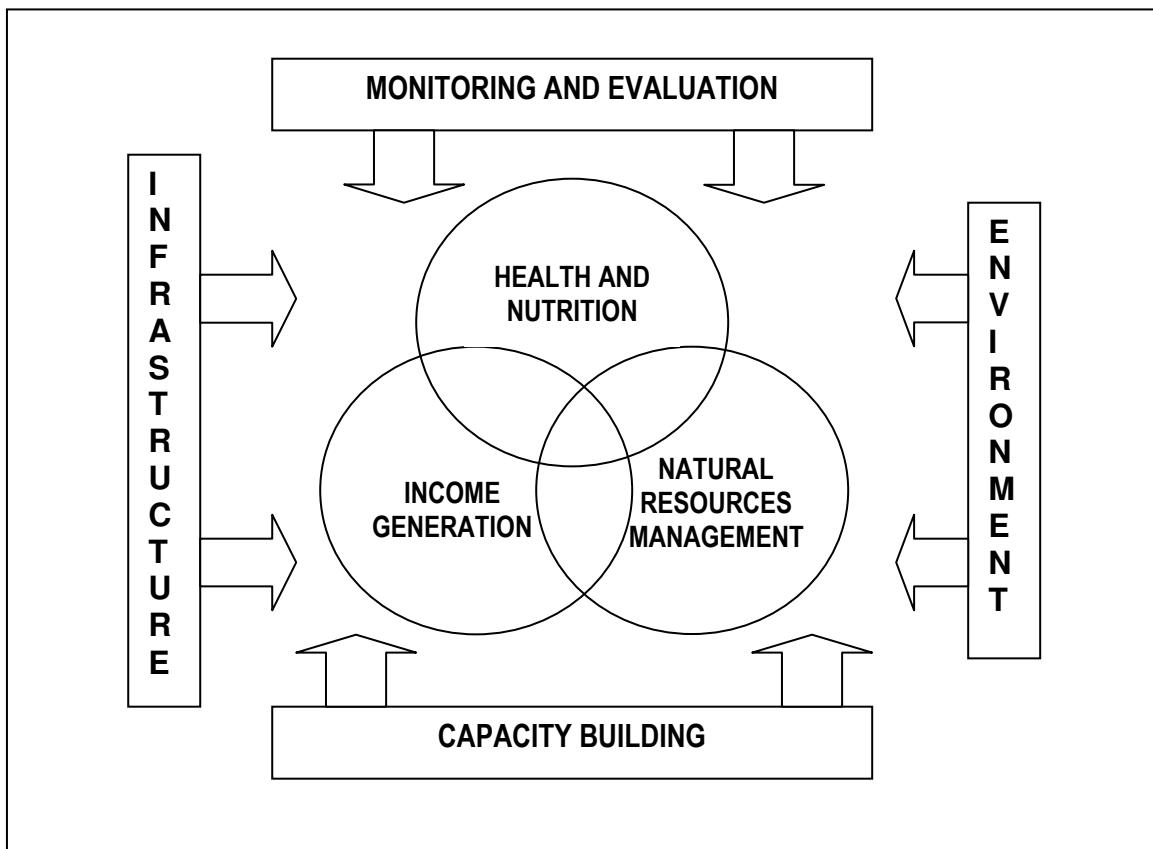
Program integration was also a major emphasis, with all four CSs working to integrate these components at the community level to take advantage of synergies and enhance impact. All four programs also included a number of cross-cutting type activities, i.e., activities that affected how these three components were designed and implemented and contributed to their objectives. These included activities related to the development of infrastructure, environmental mitigation and compliance, capacity building and monitoring and evaluation. (See Box 1.1 on the following page for a graphic representation of the analytical framework for the Bolivia Title II Program).

1.2.3 Resources

1.2.3.1 Title II Development Assistance

The amount of resources provided through the Title II program were considerable, averaging \$20 million per year for a total of over \$130 million between 2002 and 2008.

Box 1.1. Analytical Framework for the Bolivia Title II Program



All four CSs used these Title II resources to improve food access, availability and utilization in some of the most food insecure areas of Bolivia. All four used food directly to supplement the diets of young children and pregnant women and in food for work (FFW) programs, which provided food to vulnerable families in exchange for work on local public infrastructure. All four programs also monetized food in order to get the cash resources they needed to support basic health services, nutrition education, agricultural extension and training and local capacity building.

The CARE and FHI programs were the largest in terms of metric tons of food used and cash spent on program activities. FHI had the highest percentage of monetization and SCB the lowest, a result due in part to the large urban food-for-work program that it ran in the city of El Alto beginning in 2005.

Table 1.1: Estimate of USG Resources Available to the Bolivia Title II Program by Cooperating Sponsors over the Life of the Program, 2002-2008

A. Food Resources

	ADRA	CARE	FHI	SCB	Total
Metric Tons	47.0	65.2	54.1	52.6	218.9
% Monetized	61.5	66.5	85.1	57.1	67.8

**B. Cash Resources
(US\$ 000)**

	ADRA	CARE	FHI	SCB	Total
Value Monetized Food	10.80	16.10	17.10	11.00	55.00
C&F	24.7	33.9	28.5	28.6	115.7
202(e)	3.3	2.3	4.7	4.5	14.8
ITSH	0.2	0.2	0	0	0.4
Total Cash	39.00	52.50	50.30	44.10	185.90

1.2.3.2 Counterpart Funds from Bolivian Municipalities

The four CSs were also extremely successful in getting the municipal governments in the areas where they worked to contribute a significant amount of their own resources to support the Title II work. These resources were considerable, adding up to over \$10 million over the life of the program (LOP), according to CS estimates. In the beginning of the program, municipalities were most comfortable contributing to productive infrastructure projects, but over time they became more interested in supporting a variety of health, income generation and natural resource-related activities.

The CSs efforts to get financial support from the municipalities were made possible by the passage of the Popular Participation Law (PPL) in 1994, which decentralized some responsibilities and resources from the central Government to the municipalities. The PPL also provided a mechanism that enabled local communities to participate in municipal decision making. This is the OTB (*Organizaciones Territorial de Base*), which is a legally recognized grass roots organization that local communities can work with and through to develop and promote the inclusion of local initiatives in municipal development plans, annual operating plans (POAs) and municipal budgets. The relationships between the CSs, the relevant municipal governments and the local communities were formalized in an “Inter-Institutional Agreement.” Municipal counterpart funds were included in the annual operating plan (POA) that each municipality has to develop. By working through the municipalities and obtaining counterpart contributions, the CSs also hoped that the municipalities would continue to support similar types of activities after the Title II programs ended.

Table 1.2: Estimate of Municipal Counterpart Funds Made Available to the Bolivia Title II Cooperating Sponsors between 2002 and 2008 (US\$000)

	ADRA	CARE	FHI	SCB	TOTAL
Income Generation	221.5	1,875.0	520.4	410.6	3,027.5
Health, Water and Sanitation	154.3	1,139.7	566.9	270.5	2,131.4
Natural Resources Management	366.8	348.4	27.6	39.7	782.5
Temporary Employment Generation				4,102.6	4,102.6
Total	742.6	3,363.1	1,114.9	4,823.4	10,044.0

1.2.4 Beneficiaries

Over 600 thousand people in the most food insecure areas in rural Bolivia benefited directly from the Title II activities under these DAPs and another almost 500 thousand people benefited from the urban food-for-work program that SCB implemented in El Alto. These are estimates of direct beneficiaries. If one took into account the other family members that benefited from the income generation activities that the head of households participated in, for example, or the community members that benefited from the road improvements, these numbers would be much larger.

Table 1.3: Number of Beneficiaries by Program Area by CS Cumulative Over the Life of Project (2002-2008)
(000)

	ADRA	CARE	FHI	SCB	TOTAL
Income Generation	8.8	34.4	39.2	28.5	110.8
Health and Nutrition	19.7	122.6	38.7	29.3	210.3
Water and Sanitation	3.3	26.3	154.3	8.5	192.5
Natural Resources Management	22.2	21.7	43.4	28.3	115.6
Total	53.9	205.0	275.6	94.7	629.1
Temporary Employment Generation				485.8	485.8

Table 1.4: Distribution of Beneficiaries by Program Area by CS Percent (2002-2008)

	ADRA	CARE*	FHI	SCB	TOTAL
Income Generation	16.2	16.8	14.2	30.1	17.6
Health and Nutrition	36.5	59.8	14.0	31.0	33.4
Water and Sanitation	6.2	12.8	56.0	9.0	30.6
Natural Resources Management	41.1	10.6	15.8	29.9	18.4
Total	100.0	100.0	100.0	100.0	100.0

*This reflects the distribution of beneficiaries in the program after the MTE.

1.3 Brief Descriptions of the Four Programs

1.3.1 Adventist Development and Relief Agency (ADRA)

ADRA has been operating in Bolivia since 1976. Under this DAP, ADRA worked with rural communities in the Department of Chuquisaca, in the provinces of Sud Cinti and Nor Cinti. ADRA selected these areas because they met the food insecurity criteria established by the Mission, and because they had been working in them during the previous Title II program. ADRA estimated that its program reached almost 54 thousand direct beneficiaries during the DAP, over 36 percent in its MCH/N component, 6 percent in its W&S component, 16 percent in IG and 41 percent in NRM.

Table 1.5: Basic Data on the ADRA Program*

Departments	Provinces	Municipalities	Communities	Population (000)
Chuquisaca	North Cinti	Camargo	37	8.3
		San Lucas	49	18.5
		Incahuasi	31	9.7
	South Cinti	Culpina	30	14.1
Totals: 1	2	4	147	50.6

* Data is for 2008.

1.3.2 CARE

CARE has provided development assistance and humanitarian relief in Bolivia since 1976. CARE's first Title II Development Program was approved in 1999, and it began working in January 2000 in six municipalities in the Departments of Potosi and Tarija. Under this DAP,

Table 1.6: Basic Data on the CARE Program

Departments	Municipalities	Communities		Population (000)	
		2002-04	2005-08	2002-04	2005-08
Chuquisaca	Azurduy	24	24	12.2	86.0
	El Villar	15	15	4.6	49.9
	Sopachuy	18	21	8.3	46.2
	Tarvita	36	33	17.5	108.8
	Tomina	23	23	10.4	67.7
Potosí	Cotagaita	108	55	24.5	211.5
	Vitichi	72	38	10.5	132.0
Tarija	Entre Rios	34	31	20.9	93.0
	Uriondo	36	27	12.3	75.2
	Yunchara	32	13	5.5	46.2
Totals: 3	10	398	280	126.7	916.4

CARE expanded its activities to 16 municipalities in three Departments – Potosi, Tarija and Chuquisaca. One of the MTE conclusions, however, was that CARE was too ambitious and needed to refocus its programs more geographically and technically on activities that had a higher probability of making significant contributions to its key objectives. So CARE reduced its program post-MTE to ten municipalities. CARE estimated that its program reached over 200 thousand direct beneficiaries during this DAP, 60 percent in its MCH/N component, over 12 percent in its W&S component, almost 17 percent in IG and over 10 percent in NRM.⁷

1.3.3 Food for the Hungry International (FHI)

FHI has been operating in Bolivia with a Title II program since 1983. Under this DAP, FHI worked in approximately 240 rural communities located in seven municipalities in the Departments of Cochabamba (provinces of Capinota and Tapacari) and Potosi (provinces of Chayanta, Charcas and Bilbao). FHI expanded its operations in these departments under this program and phased out of the Departments of Oruro and La Paz, where it had also been working during its previous Title II program. In 2007, FHI received \$250 thousand in water and sanitation funds from USAID Bolivia to use in an urban public works program in Potosi and Sucre to increase families' access to water. Community members are primarily of Quechua or Aymara descent. FHI estimated that it reached over 275 thousand direct beneficiaries during this DAP, 14 percent in its MCH/N component, over 56 percent in its W&S component, 14 percent in IG and almost 16 percent in NRM. FHI also estimated that if you added the approximately 400 thousand indirect beneficiaries to the direct beneficiaries, it could have reached about five percent of Bolivia's population under this DAP.

Table 1.7: Basic Data on the FHI Program

Departments	Municipalities	Communities	Population (000)
Cochabamba	Capinota	18	5.6
	Tapacari	89	13.7
Potosí	Torotoro	39	6.2
	Ocuri	27	5.4
	Ravelo	53	15.3
	Potosi	1	84.9
Sucre	Sucre	1	69.3
Totals: 3	7	226	200.4

1.3.4 Save the Children (SC)

SC has been operating in Bolivia since 1986, but this was its first Title II program. At the beginning of the program, SC was working in 246 communities in 11 municipalities in three

⁷ This does not take into account some possible overlap among the beneficiaries in the different programs.

rural provinces -- Inquisivi, Loayza and Aroma -- in the Department of La Paz. The MTE concluded in 2004 that SCB, like many new programs, was trying to do too much in too many places and needed to focus its program more geographically and programmatically on those activities and interventions that seem to be the most effective and with the highest potential. So SC consolidated its rural program post-MTE into seven municipalities in just two provinces – Loayza and Aroma. The target communities are located to the south and east of La Paz, the capital city, in both the Altiplano and adjacent valleys. Community members were primarily of Aymara descent with some three percent of Quechua origin. In 2005, after the MTE, SC also initiated an urban food-for-work program in El Alto, a city which is immediately adjacent to La Paz, in the province of Murillo. SC estimates that its rural program reached over 90 thousand beneficiaries during this DAO, and its urban temporary employment generation program reached over 480 thousand beneficiaries. Beneficiaries in its rural program were distributed as follows: 31 percent in its MCH/N component, over 9 percent in its W&S component, 30 percent in IG and almost 30 percent in NRM.

Table 1.8: Basic Data on the SC Program

Departments	Provinces	Municipalities	Communities	Population (000)
La Paz	Aroma	Calamarca	28	11.8
		Patacamaya	40	15.4
	Loayza	Sica Sica	32	9.6
		Cairoma	35	9.4
		Luribay	35	6.4
		Sapahaqui	37	6.8
		Yaco	20	5.1
Totals: 1	2	7	227	64.6

1.4 Sustainability

The USAID Mission and the CSs were concerned about the sustainability of their efforts from the beginning of the DAPs, with the concept of sustainability including the degree to which their Title II program interventions would be able to establish a basis for continuing progress and actions after the end of the program. Building the knowledge and capacity of individual participants and stakeholders at the community and municipality level was a key part of the sustainability strategies of all four CSs. In other words, the core philosophy of the Title II program was to try to involve and get the support of the beneficiaries, local communities and municipalities in the development and implementation of their activities, in the belief that if these various groups had a stake in these activities they would be more likely to continue with them after the program ended. All four CSs also recognized that active and continued participation was essential to sustainability. As a result, all activities also included a strong training component and a high degree of local control.

Box 1.2: Strategic Objectives of the Four Title II Cooperating Sponsors in Bolivia

ADRA

STRATEGIC OBJECTIVES:

- Increased productivity of marketable produce by targeted households
- Increased agriculture-related income of targeted households
- Improved natural resource management in targeted communities
- Improved health and nutritional status of the targeted population
- Increased water and sanitation facilities for targeted households and communities
- Strengthened capacity of municipal governments and OTBs to promote citizen development in their own communities

CARE

STRATEGIC OBJECTIVES:

- Reduced burden of disease and ill health among woman of reproductive age and children under five years
- Increased rural household income in cash and in food supplies
- Enhanced natural resources and common property management through improved local governance and enabling conditions

FHI

STRATEGIC OBJECTIVES:

- Improved integrated health of targeted populations in food insecure areas of Bolivia
- Increased incomes from agricultural or agriculture-related activity in communities assisted by FHI
- Reduced unsustainable exploitation and degradation of natural resources

SCB

STRATEGIC OBJECTIVES:

- Increased rural incomes through improved agriculture and market participation
- Improved maternal and child health and nutrition
- Enhanced natural resource management by improving local capacity
- Generate temporary employment for the disenfranchised inhabitants of El Alto as a means to mitigate political unrest*

* This SO was added to the SCB program in 2005.

2 The Final Evaluation (FE)

2.1 Purpose of the FE

The main purpose of the FE was to determine the extent to which the Title II programs had a positive impact on the food security of their target populations. In carrying out this purpose, the Final Evaluation (FE) team examined the extent to which the major impact indicators were achieved. This included assessing whether the:

- MCH/N programs contributed to a reduction in the rate of chronic malnutrition among children less than 36 months of age.
- IG agricultural and marketing activities contributed to an increase in the incomes of the participating households.
- NRM programs contributed to a reduction in the unsustainable exploitation and degradation of the natural resource base in the Title II program areas of influence. Specific attention was also devoted to assessing the participant communities' management of their natural resources through conservation and rehabilitation programs.

The team also was asked to:

- Identify successful specific implementation strategies that proved to be effective in achieving objectives in each program area and draw lessons learned to be disseminated with other CSs and the Government of Bolivia (GOB).
- Analyze why planned results were or were not achieved or were not measured, including exogenous variables, such as unanticipated social, political, or disaster conditions; food and non food constraints; target group characteristics; measurements systems chosen; and other design and implementation considerations.
- Verify whether the designs of the Title II programs responded effectively to the needs of participating communities and to what extent these needs were fulfilled.
- Assess the degree of compliance with 22 CRF 216 as described in CSs Initial Environment Examinations (IEEs) and evaluate the procedures followed by the CSs in the use of "*Guías de Infraestructura*".
- Identify factors that contributed to the establishment of constructive relationships with municipal governments, grassroots organizations, and between CSs. This included assessing whether the programs fostered municipal development and community leadership capacity building.
- Determine whether the CS Monitoring and Evaluation (M&E) systems aided in program management and administration and if they were able to measure the extent to which a program caused change in food security conditions at the beneficiary level. This included assessing whether the M&E systems in place were adequate and reliable for the program activities and outcomes.
- Given the current circumstances of Bolivia, determine how the Title II activities impacted on the Mission's overall program, on achieving Strategic Results.

- Based upon the “Sustainability Plan” developed by the four CSs, identify activities that showed a high degree of sustainability.

If there had been plans for a follow on program, the FE team would have devoted more attention to the identification of strengths and weaknesses of each of the current programs and the development of specific recommendations for each of CSs that they could use to help improve the management and impact of future program. Since this was not the case, the FE team devoted more of its attention to the identification of lessons learned and best practices – findings that could be transferred to other programs and other countries.

2.2 Methodology

2.2.1 What Took Place

The FE team was multidisciplinary and included three expatriates – an agricultural and marketing specialist who also served as team leader, a maternal and child health and nutrition specialist, and a natural resource management and environment specialist. A Bolivian engineer was also contracted to focus on the infrastructure dimensions of the program.

Table 2.1: Composition of the Bolivia Title II Final Evaluation Team

Sector Specialist	Name
Agriculture/Marketing (Team Leader)	Roberta van Haeften
Maternal Child Health/Nutrition	Judiann McNulty
Environment/Natural Resources	Jeffery Bentley
Infrastructure	Alfredo Fernandez

The original plan was for the FE to take place in the fall of 2008 following the general format used for the MTE. That is, the team would spend six weeks in Bolivia (three weeks in October and three weeks in November) reviewing the four programs, with all four team members spending at least five days in the field, together, with each of the CSs. But events interfered.

The October trip was delayed at first due to political unrest in Bolivia and eventually canceled. This resulted in the field work for the IG and MCH/N components being compressed into two weeks in November. This meant that the IG and MCH/N consultants only had three days to review each of the CS’s programs – a half a day for introductory briefings on each of the programs and two and a half days to visit project sites. The NRM and infrastructure consultants, because they live in Bolivia, were able to adhere to the original five day per CS schedule. Members of the USAID Food Security Unit participated in the field visits to all four programs.

Both quantitative and qualitative data were used to assess program performance and impact. Qualitative data were collected through a review of key documents, interviews with key informants, and observations of programs in the field. FE team members also reviewed and

assessed the quantitative data available on program performance from the baseline survey results and results from the mid-term and final surveys.

Specific activities included:

- ***A Review of Documents.*** Documents reviewed included the 2004 Mid-term Evaluation and the Sustainability Strategies for each of the four CSs. Team members also reviewed the FY 2006, FY 2007 and FY 2008 results reports from each of the four CSs, which contained detailed information on each of the CS's performance indicators.
- ***Interviews.*** Interviews were conducted both in La Paz and in the field with a wide range of key informants, including senior staff from USAID/Bolivia and each of the CS's national, regional and local staff, municipal officials and staff, representatives from a range of CS partners (firms, universities, other NGOs, GOB agencies), community leaders, community volunteers and clients and beneficiaries.
- ***Field visits.*** Separate visits were made to communities in each of the CS's sites in the Departments of Chuquisaca, Cochabamba, La Paz, Potosí, Sucre and Tarija. Sites were selected by each of the CSs to provide FE team members with a good representation of their activities, given the time constraints and the dispersed location.

The FE team provided a briefing to USAID Bolivia staff after the conclusion of the majority of the field work that included the acting Mission Director, the staff of the Food Security, Health, Environment and Economic Opportunity offices. Due to the time constraints, the FE team did not have enough time to brief CS staff in the field and the briefings to central staff in La Paz were limited to an hour each. The team leader was also able to spend several more hours with USAID staff from the USAID's technical offices to discuss in more detail whether and how the Mission's current and proposed programs might be able to continue to support and/or build on the Title II programs that are closing down.

2.2.2 Some Effects of the Shortened Time Frame

The short amount of time available for field work made it difficult for the FE team to take a strong participatory approach to the evaluation, as was done in the case of the MTE. The CSs were asked to provide the FE team with their perceptions of lessons learned and best practices. However, three days in the field and only one hour for a final briefing for each of the CSs at their headquarters limited the amount of time for more thorough exchanges about what the CSs had learned about what worked best; what they thought were their greatest successes and difficulties; what did not turn out as planned; and what they would have done differently if they could start over with a new project.

One result was that the FE team may not have captured as much as it could have, especially with respect to lessons learned, if it had had more time for interaction. Cutting short the time for interactions with CS staff, especially at the end of the field work, may have also

resulted in misunderstandings about the program, on the part of the evaluators, and misunderstandings of the reactions of the evaluators to the programs, on the part of the CSs.

The short amount of time available for the field visits may have also led the CSs to over structure the time that was available. Separate schedules were often set up for each of the team members, in an effort to enable them to see as many activities in their technical areas as possible. However, the combination of insufficient time and individual schedules meant that team members had little time before, during and after the field visits to compare information and reactions. Arranging individual schedules helped team members understand the details, but it also made it more difficult for them to get a more comprehensive understanding of the overall programs of each of the CSs.

The MCH/N and NRM evaluators also felt that many of the field visits were too staged and wanted more time to talk with local people and see their work. The IG evaluator appreciated the amount of information that the CSs provided at each of the sites, especially the information on the costs and returns of the specific activities that were being visited. She also appreciated the efforts that all four of the CSs made to insure that she was able to talk with representatives from some of the other service providers that the CSs were working with as part of their sustainability strategies and with some of the buyers that the CS client farmers had been introduced to as part of the IG marketing program. The fact that a number of these people came from some distances, including the cities of Cochabamba and Santa Cruz, in itself, said something positive about the importance that these people attached to these relationships and their potential sustainability. What was missing, from her point of view, was a more time at each of the sites to be able to talk in a little more detail with the farmers and the other stakeholders to get additional perspectives and insights.

The MCH/N evaluator was also concerned about the number and type of activities that had been programmed for many of the MCH/N visits. From her perspective, many of these activities were more suitable for an assessment of the quality of program implementation (an objective of the MTE) rather than an assessment of program results. Since this was a final evaluation and the time was short, her focus (and the focus of the other team members) had to be on assessing results and the potential for sustainability, on capturing some key lessons learned, and, insofar as possible, discerning what contributed to program successes. In order to assess the sustainability of the MCH/N program, she felt that she needed more time for more private interactions with community volunteers, mothers, fathers and health workers. What she was interested in was whether the community volunteers had the capacity to solve problems, analyze specific situations or cases and convene groups, for example. She also felt that she needed more time with the health workers, mothers and families, and community and municipal leaders to be able to assess whether they were motivated and committed enough to continue taking actions to prevent malnutrition and improve health status.

One lesson learned might be that more direct communication between the FE Team and the CSs prior to the field visits to share expectations might have helped avoid some of these problems. Another lesson might be that only three days in the field to assess a program as geographically dispersed and programmatically complex as the Bolivia Title II programs is just not enough time. One thing that did help is the fact that all four of the evaluators either had prior knowledge of these programs, prior knowledge of Bolivia, or both. Also, the other

options – to have no final evaluation or to have only done a desk review – would have been less desirable options. Three days in the field per program was better than no days and, even given the problems, the Bolivian Title II programs have accomplished too much and have produced too many lessons learned that could be of use to others in Bolivia and elsewhere in the world to not have done a final evaluation.

3. Findings: Maternal Child Health and Nutrition (MCH/N)

3.1. Program Objectives

The main objective of MCH/N component was to improve the health and nutritional status of the target population, women of reproductive age and children less than five years of age, in food insecure areas of Bolivia. The Title II CSs used a combination of activities to achieve this objective, including health and nutrition education to improve knowledge and promote behavior changes, the provision of food rations to vulnerable individuals including pregnant women and children under three years of age, and capacity building focused on communities, municipalities and the health system in order to make more effective use of existing resources, increase resources and ensure the sustainability of efforts once the program phased out. These Title II activities were also designed to support the USAID Mission's Strategic Objective of *Improved health of the Bolivian population*.

3.2. Background

3.2.1. Health and Nutrition Situation in Bolivia

Bolivia's rates of chronic malnutrition, infant mortality and maternal mortality are still high in comparison to most other countries in the region. According to results from the 2003 Demographic and Health survey (DHS), the prevalence of chronic malnutrition (low height for age) among children less than five years of age was 26.5 percent for the country as a whole, 18.5 percent in urban areas and 37 percent in rural areas. And, these levels had not changed since the previous DHS survey in 1998. Chronic malnutrition was highest in the department of Potosí (42.3 percent), followed by Chuquisaca (36.6 percent), Cochabamba (28.8 percent), La Paz, (28.5 percent) and Tarija (17.8 percent). High levels of malnutrition in Bolivia are related to poor access to resources that can have positive effects on children's nutritional status as well as to inadequate infant and young child feeding practices. This includes lack of access to water and sanitation services that can help prevent diarrheal disease; poor knowledge about nutrition and health, including knowledge about the benefits of exclusive breast feeding, appropriate complementary feeding and child care during illness; and lack of a diet sufficiently varied to provide the needed range of nutrients, which is due in part, to the lack of access to or unavailability of animal source foods and other foods of high nutrient density.

Nationally, 51 percent of children aged 6-59 months suffer from anemia, mostly caused by iron deficiency. The 2003 DHS survey found anemia among 46.7 percent of children in urban areas and 56.3 percent in rural areas. Anemia levels among children are highest in Potosí (67.6 percent), followed by La Paz (60.3 percent), Cochabamba (51.6 percent), Chuquisaca (46.9 percent) and Tarija (38.6 percent). About one-third of women 15-49 years of age are anemic, 30 percent in urban areas and 40 percent in rural areas. Women's anemia levels are highest in La Paz, 43.4 percent, and lowest in Tarija, 25.6 percent.

Bolivia also has high rates of infant and maternal mortality. According to the DHS survey, the infant mortality rate (IMR) in 2003 was 54 deaths per 1,000 live births, with rates of 44 per 1,000 in urban areas and 67 per 1,000 in rural areas. The IMR is highest in the department of Potosí (72), relatively high in Chuquisaca (67) and Cochabamba (61), slightly lower in La Paz (51) and lowest in Tarija (29). The high rates of infant mortality are directly related to high levels of malnutrition, frequent illnesses among young children, poor caretaker knowledge and care-seeking behavior, and poor access to and quality of health services, most frequently seen among the poorest individuals in the population. Bolivia's maternal mortality (MMR) ratio is 399 deaths per 100,000 live births (DHS, 1994, calculated by direct method for 1984-1994), the highest in the region after Haiti. The MMR in rural areas is two times that of urban areas (563 vs. 262, DHS, 1994). High maternal mortality is associated with poverty, women's poor nutritional status, and poor access to and use of health services. Preventive health services are provided by the Ministry of Health (MOH) and NGOs working among the neediest populations.

About half of Bolivian children aged 12-23 months are completely immunized against major childhood diseases, with rates for urban areas slightly higher than for rural areas (52.1 percent vs. 47.8 percent). Vaccination rates are higher than national levels in the Departments of Tarija (70.7 percent) and Chuquisaca (67.2 percent), slightly higher in Potosí (52.6 percent), and lower in Cochabamba (48.3 percent) and La Paz (37 percent). La Paz has the lowest vaccination rates of all the Departments of Bolivia (DHS, 2003).

3.2.2. The GOB Nutrition Strategy

Ever since the start of the current DAPs, the Government of Bolivia has been in the process of developing a nutrition strategy, which is now known as Zero Malnutrition (ZM) (*Desnutrición Cero*). The objectives of the strategy are: (1) to prevent chronic malnutrition, (2) to prevent and treat acute malnutrition, and (3) to reduce mortality from acute malnutrition. To improve access to nutrients, the Strategy includes plans for the distribution of a mix of micronutrients in a powdered form (Sprinkles) for mothers to add to a child's food, and more recently, the introduction of a weaning food known at the central MOH as Nutribebe. A decree has been issued for municipalities to purchase Nutribebe for distribution to all children less than two years through the health services. Nutribebe, which comes in a variety of flavors

Box 3.1: Nutritional Content of Nutribebe

Cantidad por porción (25g)			
	Aporte en 100 g	Aporte diario (50 g)	% RDA niños de 6 a 11 meses
Calorías	440 Kcal	220 Kcal	24%
Proteína	12 g	6 g	43%
Grasa total	12 g	6 g	17%
Grasa poliinsaturada	9 g	4 g	
Grasa trans	0 g	0 g	
Colesterol	10 mg	5 mg	
Carbohidratos totales	73 g	37 g	26%
Fibra dietética	0.9 g	0.5 g	
Vitamina A	500 µg RE	250 µg RE	50% [†]
Vitamina C	140 mg	70 mg	140% [†]
Hierro	22 mg	11 mg	100%
Vitamina D	2 µg	1 µg	20%
Vitamina E	10 mg	5 mg	100%
Tiamina	0.36 mg	0.18 mg	60% [†]
Riboflavina	0.36 mg	0.18 mg	45% [†]
Niacina	6.6 mg	3.3 mg	83% [†]
Vitamina B6	0.44 mg	0.22 mg	73% [†]
Acido Fólico	83 µg	41.5 µg	52% ^{††}
Vitamina B12	0.5 µg	0.25 µg	50% [†]
Biotina	2.9 µg	1.45 µg	24% [†]
Acido pantoténico	0.7 mg	0.35 mg	19% [†]
Calcio	200 mg	100 mg	37%
Fósforo	200 mg	100 mg	36%
Magnesio	80 mg	40 mg	53%
Manganeso	1.2 mg	0.6 mg	100% [†]
Yodo	180 µg	90 µg	69% [†]
Zinc	10 mg	5 mg	167% [†]
Cobre	800 µg	400 µg	200% [†]
Selenio	20 µg	10 µg	50%

^{*} RDA (Recommended Dietary Allowances)
[†] Valor indicado corresponde a la AI (Adequate Intake)
^{††} Los valores que aparecen en la columna se refieren a Equivalentes dietéticos de Folato (EDF)
1µg de EDF= 1µg de folato proveniente de alimentos = 0.5 µg de ácido fólico consumido con el estómago vacío =0.6 µg de ácido fólico ingerido junto con las comidas

such as strawberry and banana, is meant to be mixed with water to serve to children twice a day. It is manufactured locally of rice flour, powdered milk, sugar and vegetable oil and fortified with key micronutrients as listed in Box 3.1.

Under ZM, a new Child Health Card was introduced, which includes a curve for height for age and spaces for marking height and weight as well as micronutrients given and developmental milestones. Introduction of this card has created some confusion as health post staff and volunteers have to revert to old growth charts to calculate the child's weight-for-age status and, if not using expected weight gain also, have no way of giving the mother immediate feedback on her child's growth from the previous month.

The ZM strategy has included introducing a version of Integrated Management of Childhood Illness (IMCI) with a stronger focus on nutrition called IMCI-N (AIEPI-Nut in Spanish) for both the clinical and community levels. ZM is creating Integrated Nutrition Units (UNIs) at health centers in targeted municipalities selected for high levels of food insecurity. The UNIs are intended to promote better nutrition, monitor nutritional status, and to rehabilitate moderately wasted children while referring severely wasted children to the regional hospitals, which have received additional training and inputs to treat such children. The strategy calls for family and community education to improve feeding practices, but did not yet spell out how best to accomplish this, other than to say this is a shared responsibility between UNI and other MOH staff, with community participation. At the time of the FE, a behavior change strategy defining key behaviors and how to promote them was still under development.

3.3. Overall Strategy and Approaches

3.3.1. Community-based Growth Promotion (PCC)

During the first years of the DAPs, all four CSs were doing some form of growth monitoring, weighing children in the target areas once a month to once in two months. The community health volunteers (CHVs) were involved in the activity, as were CS staff and, often, MOH staff. The objective was primarily to monitor children's weight and height by classifying the child as normal, at risk, or malnourished according to growth curves based on percentile of weight for age. The results were used to identify malnourished children and focus efforts on their recuperation through intensive work with the families. Other educational activities were conducted with mothers' groups to disseminate general messages. The MTE recommended that the CSs shift the focus of growth monitoring to detecting growth failure compared to expected monthly weight gain even among children classified as "normal" and to provide individualized counseling to each mother in order to prevent malnutrition.

Shortly after the MTE, SC Bolivia staff learned about the Central American growth promotion approach known as Community Integrated Child Attention (*Atención Integral al Niño* or AIN-C). This approach was being implemented by colleagues in Nicaragua and seemed the perfect answer to the MTE recommendation. One of SC's Nicaragua staff, Dr. Ofelio Mayorga, was invited to Bolivia to train staff from all the CSs, after which, all four CSs adopted, to a greater or lesser degree, this approach, which was renamed Community

Growth Promotion (*Promoción Comunitaria de Crecimiento* or PCC). All the CSs, except FHI, had previous experience with AIN-C in Central America, but SC took the initiative to provide the training, and it does not appear that there was any other cross-over of learning between Title II programs in the different countries.

The principle of PCC involves monitoring a child's expected growth, rather than just its nutritional status or growth trend. In this way, growth faltering is identified much more quickly, enabling health workers to assess the cause with the mother and then give advice and negotiate with her on what she can do to assure the child gains the expected amount of weight by the next month. This individualized counseling with negotiated behavior change is key to the success of PCC as is focusing parents' attention on whether or not the child is gaining weight as expected, rather than nutritional status. Various experiences in Central America have documented the success of this approach in reducing levels of malnutrition, and have convinced the governments of several countries to adopt the approach as the key component of their nutrition and child health strategies along with IMCI.

3.3.2. Title II Program Support for the Government Strategy

As the Zero Malnutrition program evolved, the CSs implemented a number of activities specifically to support it. CSs trained a total of 469 MOH health personnel in clinical IMCI (AIEPI), 550 in AIEPI-Nut and 1,350 health volunteers in the community version of AIEPI-Nut. The CSs provided materials for implementation as well as monitoring and mentoring to MOH staff in training and supervision of volunteers. When ZM shifted to monitoring height rather than weight for age, all four CSs successfully trained community volunteers to measure length/height with reasonably good accuracy and assisted MOH staff and health volunteers in learning how to fill out the new Child Health cards.

Three of the CSs invested Title II funds in equipping the UNIs that had recently started in their target areas, and they continued to work closely with UNI staff, most of whom have little or no experience in community outreach or prevention, to orient them to community work, particularly PCC. To that end, the CSs supported training for the 29 staff members of the UNIs in their target areas in AIEPI-Nut and PCC, as well as providing them training on a variety of related topics.

While not endorsed yet by the Bolivian Government, PCC could serve as the community promotion and education approach for the ZM strategy. It provides a concrete way for health personnel to interact with the community and for motivating parents and communities to eliminate growth faltering. Not only are there specific counseling messages, materials, and training curriculum for volunteers, but it has enabled MOH staff to achieve high coverage not only for growth monitoring but also for immunizations and pre-natal care. (See more on the potential for PCC and sustainability later in this document.)

3.3.3. Improving Health Service Delivery

The CSs worked throughout the DAPs in close collaboration and partnership with the local government health services, from the level of the health posts up to the levels of municipal, area, and district management. Each had a slightly different approach to capacity building.

For example, ADRA focused on management capacity, particularly improving the quality of the health information system and in converting the municipal health governance committee (DILOS) into a functional, representative body with the ability to make prudent decisions about the utilization of the resources it controls. FHI also strengthened the DILOS, information system and epidemiological surveillance. SC focused on building the technical capacity of health personnel and assisting the area managers make plans and advocate for municipal funding. CARE provided extensive support for up-grading staff skills as their key intervention. The amount and type of training support provided by the CSs are summarized in Tables 3.1 and 3.2. The CS training efforts are also described in further detail in the individual CS sections.

Table 3.1: MOH Health Personnel and Volunteers Participating in Training Supported by Title II

Category	Technical Capacity In Nutrition	Improving Community Outreach	Health Information * And Epidemiology
Health facility staff	360	716	165+
UNI staff	33	30	8
Community volunteers	3,003	1,352	596

*Many additional personnel received HIS training as part of other topics.

Table 3.2: Total Government Personnel and Volunteers Trained* by CSs

	ADRA	CARE	FHI	SC
Government Personnel	136	448	136	70
Community Volunteers	226	1,611	540	622

*Participating in one or multiple training events

3.3.4. Behavior Change Strategy

A behavior change strategy (BCC) goes far beyond materials and channels for message dissemination. A BCC strategy looks for ways to surmount barriers to adopting new behaviors. None of the CSs, except FHI, had the technical support needed to do this, even though some hired local consultants to assist them. Headquarters technical support to FHI occurred very early in the program and did not lead to a full BCC strategy. However, FHI Bolivia

Recommendation: If there is another Title II program in Bolivia, USAID and the CSs may want to coordinate the hiring of an external consultant (preferably one trained by the CORE Group) to facilitate the development of BCC strategies, not only for health and nutrition but also for other project components. This would include assistance with conducting appropriate, rapid qualitative investigations necessary for the strategy development. Such strategies not only enhance results, but also help make more efficient use of project resources.

had done some barrier analysis before and a Bolivian consultant helped them later to select a few key messages on which to focus. Prompted by an MTE recommendation, all four CSs conducted their own version of a positive deviance inquiry. These experiences are discussed in more detail in the individual CS sections.

The CSs succeeded in identifying a key motivating factor to use with parents. They found that, while parents at baseline did not recognize under-nutrition as a problem, they are very concerned about the future of their children and especially want their children to be bright and to do well in school. Therefore, in key messages to parents and leaders, the CSs linked being well-nourished to assuring the child's potential to do well in school. Contrary to an urban myth among health workers, the CSs found that parents do value their children more than their livestock; however, some had more self-confidence in their skills to raise livestock than in their skills to care for a small child, particularly during episodes of illness.

Although not contemplated as a specific BCC activity, both CARE and ADRA undertook efforts which addressed a key barrier to improving dietary diversity in the Bolivian *Altiplano*. There was confusion over their intent during the MTE, but both activities should be considered as part of the nutrition activity as a means of improving dietary quality.

Realizing that access to vegetables was a serious barrier to improving dietary quality, CARE promoted family and community gardens during the first years of its program. But instead of including these gardens as part of its MCH/N program, they were promoted as a key intervention in its Income Generation (IG) program. The MTE questioned this strategy and recommended that CARE focus its IG program on activities with stronger income earning potentials.⁸ So CARE dropped the gardens. However, some people continued to work on these gardens, which is a testament to the concept that people will continue working on activities from which they perceive they are benefiting, and they brought them to the attention of the FE team during its field visits. Community members told the FE team that their only access to vegetables was due to the gardens. Gardening, in other words, can be a very effective nutrition strategy, but the methods need to be kept simple and the activity conducted as part of the nutrition component not mixed with income generation. The amount of food produced may have impact on food security, as well as diversifying the diet.⁹

To address the same barrier of access, ADRA promoted the preservation of fruit and vegetables available seasonally. ADRA emphasized dehydration, which is truly cost-effective, but it also promoted some canning. These activities are described in more detail in the ADRA section.

ADRA and FHI also developed separate educational components directed at helping families better plan how to use their cash resources. These educational efforts represent

⁸ The changes that CARE made in response to the MTE recommendations to strengthen the income earning potential of its IG activities are discussed in more detail in Section 5.

⁹ Helen Keller International, "Sustainability of the Homestead Food Production Project in Bangladesh", NY, 2003 and Helen Keller International (2002). *Economic and Social Impact Evaluation*. NGO Gardening and Nutrition Education Surveillance Project (NGNESP), HKI, Dhaka and Kiess L, Moench-Pfanner R, Bloem MW (2001). *Food based strategies: Can they play a role in poverty alleviation?* Food and Nutrition Bulletin 2001, Vol. 22 (4), p. 436-442.

another way that a barrier to changing behaviors related to increased dietary diversity can be overcome, that is, by purchasing more fruits, and vegetables. In the case of FHI, this activity was the result of a study that showed that the families in Tomoyo were not using their increased incomes to purchase more nutrient-rich foods. The important concept of teaching basic family economics has long been neglected in development programs around the world. For this reason, these efforts by ADRA and FHI are especially laudable.

The CSs used a variety of communication channels to increase people's knowledge and raise awareness of nutrition and health issues. These included organizing women's groups or working with existing women's groups, convening community assemblies, disseminating messages via radio, and explaining health and nutrition issues to elected officials, community leaders and influential persons such as teachers and religious leaders. FHI explicitly organized a few men's groups, SC renamed the "Women's Centers" as "Family Centers" and all the CSs used gender sensitivity in photos and drawings in their print materials. By and large, for the use of the volunteers, the CSs adopted the counseling materials and posters previously developed by the USAID-funded LINKAGES project. This was a very good decision since the materials had been fully tested and carefully developed for Bolivia to promote appropriate infant and young child feeding practices.

3.3.5. Cookbooks

Each CS produced a cookbook for distribution to families. The cost of producing the cookbooks ranged from about \$1.90 per copy to \$11.00 per copy. All were done in color with photos on quality paper and bound. Each of the CSs justified making their own cookbook because of differences in local foods available in their particular target areas. However, a review of the recipes revealed that, by and large, they did contain very similar ingredients, and often were the same recipes

Considering Guideline Number 8 from the WHO "Guiding Principles for Complementary Feeding of the Breastfed Child,"¹⁰ which stresses that children need to be fed meat, poultry, or eggs daily or at least as often as possible, it was disappointing that two of the CSs did not include any recipes for meat or poultry. While we may feel that such foods are not available or affordable to the target families presently, we need to hold up the WHO guidance as something they should strive for. Providing some practical, affordable recipes for meat and poultry is one way of doing this. Ironically, when mothers in one area were asked what additional recipes they would have liked, they named preparations containing meat.

Another concern about two of the cookbooks, which include recipes for snacks, is that many of these recipes require cooking at the time of serving, or are for snacks that will not transport well, or that will present food safety risks if served hours after preparation. This conflicts with a message that the CSs rightfully adopted – that mothers take a snack along to feed to the child while working in the fields or other places away from home. This message could have been reiterated in the two cookbooks where it is lacking, along with appropriate recipes. It is also doubtful that mothers staying at home will build a fire just to prepare a hot

¹⁰ PAHO/WHO, "Guiding Principles for Complementary Feeding of the Breastfed Child," 2003.

snack. Further, the emphasis on preparing snacks in both the cookbooks and the cooking sessions detracts from the opportunity to promote use of fresh fruits or vegetables as snacks, thus assuring that the child gets enough of these foods during the day.

Three of the four cookbooks provide additional, useful information on hygiene, safe food handling and preparation and on the quantity and types of foods for different age groups. The organization of the CARE cookbook is especially appealing in that it gives recipes by age group, moving from semi-solids and purees for children 6-7 months old, to more substantive foods, and for children over one year of age, gives nutritious recipes to be enjoyed by the whole family since the child at that age should be eating the same foods as the rest of the family.

3.3.6. ADRA and CARE Breastfeeding Support Groups

Two of the CSs formed breastfeeding support groups. CARE did so as a conscious decision from the time of project design while ADRA added this as the project evolved, in response to a need to create more suitable opportunities for women to actively participate in discussions. Using this strategy enabled both CSs to significantly improve rates of exclusive breastfeeding as shown by their final surveys. However, FHI and SC achieved reasonably good results with increasing exclusive breast feeding rates, perhaps because the small-group meetings held in each community served a similar function in that the women were providing support either directly during the discussion or informally during side conversations. Whether or not specific support groups were formed with facilitators, the community women now have opportunities and the self-confidence to engage in discussions among themselves on topics, which heretofore they may not have felt comfortable discussing with anyone other than immediate family.

Lesson learned: Community women need opportunities to get together regularly to discuss health and nutrition concerns. A small group of ten persons or less ensures a “safe space” in which women can gain confidence in expressing themselves and asking for guidance. Semi-structured facilitation is needed during initial encounters.

3.3.7. Emergency Medical Transport Plans

ADRA and CARE mobilized communities to create plans for transporting persons with medical emergencies, such as women with childbirth complications, to the appropriate medical care. The plans include identifying owners of vehicles who are willing to collaborate, setting up a system for communicating with the health post or center, and, in some cases, organizing brigades of men willing to carry a stretcher with the patient to a point where there is access to a vehicle. In the remote communities of rural Bolivia, such plans have good potential to avert unnecessary deaths.

3.3.8. Early Childhood Stimulation

ADRA included early childhood stimulation in its original proposal and FHI and SC added it to their programs. Evidence exists that interventions to promote early childhood development also result in improved health status,¹¹ and in Bolivia, this activity obviously helped motivate mothers and volunteers.

The many MCH/N “best practices” applied by the Bolivia Title II CSs are summarized in Table 3.3.

Table 3.3: MCH/N Best Practices Applied by the Bolivia Title II CSs

	ADRA	CARE	FH	SC
PCC	X	X	X	X
IMCI-N (AIEPI-Nut)	X	X	X	X
Early childhood stimulation	X		X	X
Specific targeting of men			X	X
Positive deviance study	X	X	X	X
CHV associations	X	X	X	X
Emergency transport plans	X	X	X	
Birth planning	X	X		X*
Breastfeeding support groups	X	X		
Solar disinfection of drinking water	X	X	X	X

*SC trained health staff and volunteers to promote birth planning but did not directly implement this activity in the communities.

3.3.9. Use of Title II Food in the MCH/N Program

The four CSs provided MCH/N rations to households whose caretakers, mothers and young children participated in project activities, such as educational sessions and the growth promotion program. The MCH/N ration generally included 10 kilograms (kgs.) of Corn Soy Blend, 10 kg. of flour, 5 kgs. of dried peas, 4 kgs. of dried lentils, and 1 liter of vitamin A-enriched vegetable oil.

The ration was developed among all the CSs using a prevention model (a direct input to prevent malnutrition or maintain adequate nutritional status) and calculated to meet 90 percent of the range of caloric deficits in the CS target areas. CARE included locally purchased iodized salt in the MCH/N ration given the high rates of iodine deficiency in Bolivia and particularly in its target area.

All four CSs phased out ration distribution over the last year or so of the DAPs. This sometimes resulted in considerable drops in attendance at growth promotion and other educational activities. This desertion varied as much between communities within a single CS target area as between CSs, although ADRA may have seen a smaller drop in participation than the others. The CSs and CHVs worked very hard to find other ways to motivate mothers to return to the sessions and largely succeeded. In their recommendations

¹¹ *The Lancet*, Volume 369, 2007.

for future program design, several of the CSs cited the challenge of using food rations as the incentive for participating. These recommendations are discussed in the individual CS sections.

Table 3.4: Total Number of MCHN Food Recipients Reached During the Life of the 2002-2008 Title II Program

Food Recipients	ADRA	CARE	FHI	SC	Total
Pregnant or Lactating Women	5,951	15,883	4,466	3,855	30,155
Children < 24 months of age	4,805	14,885	5,820	3,345	28,855
Children 2-5 years	6,777	9,334	5,582	8,362	30,055
Total	17,533	40,102	15,868	15,562	89,065

3.3.10. Sustainability Strategies and Potential for Sustainability

Each CSs developed a sustainability strategy, most of which was thought out and implemented during the last years of their programs. All four CSs participated in a brief workshop in September, 2006 during which elements of the programs which need to be sustained were identified. These included CHV's service, community outreach by the health services, recognition of health and nutrition and continued action by the community and municipal leadership, and improved health and nutrition behaviors of communities and families. Much of the FE effort focused on assessing the adequacy of the sustainability strategies to assure maintenance of these key elements and the potential for sustainability. Sustainability strategies of each CS are discussed in the individual CS sections, but two sustainability activities deserve mention here as "best practices."

3.3.10.1. Associations of the Community Health Volunteers (CHVs)

As part of their sustainability strategies, each of the CSs instigated the formation of associations of the CHVs. Such associations were developed in Peru and were so successful in maintaining the commitment and quality of effort of the CHVs that the Peruvian Government adopted the concept as national policy. ADRA was able to send a key staff person to Peru to learn first-hand about the associations. The objectives of the CHV associations are to provide the volunteers with a forum for sharing and learning from each other, a system for providing training and support to each other and new volunteers, and a single voice in representing the volunteers before the health services and municipal governments. It was evident that these objectives had not been fully grasped by the volunteers and CS staff at the time of the FE, but there was still some time before the project ended to strengthen this understanding. ADRA emphasized to its associations the importance of negotiating with their municipal governments as a means of raising funds for training, incentives and materials. Success with this approach should not overshadow the importance of the other two objectives of the associations, however, which have proven equally important in Bolivia for insuring sustainability.

3.3.10.2. Committees to Analyze Information (CAI)

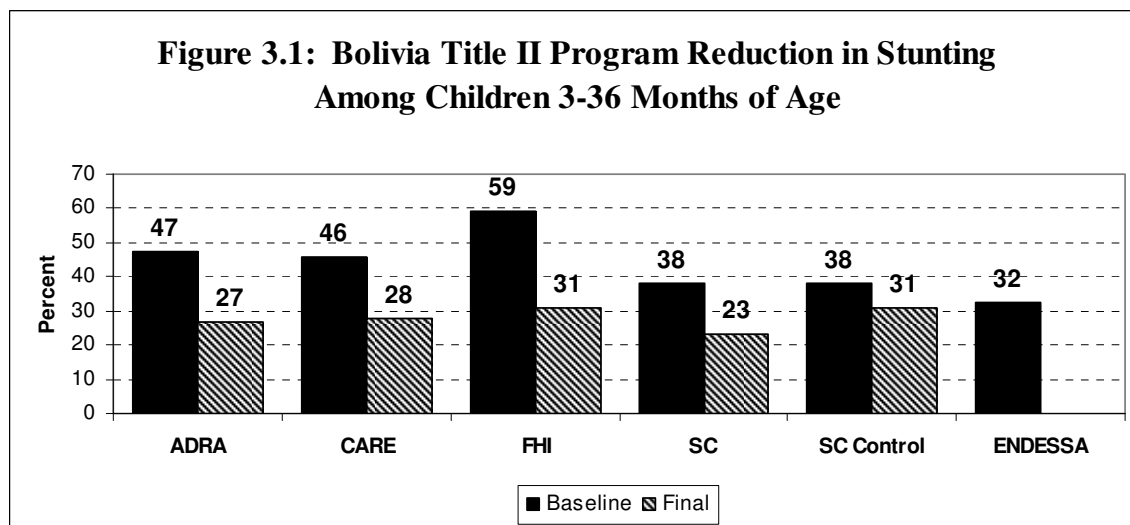
All four CSs instituted CAIs, which are regular sessions at the community and/or municipal level where local health data are presented and discussed by community members, leaders, CHVs and health staff. The data may come from local growth monitoring or from the health facility. While these may or may not be explicitly mentioned in the CS's sustainability plans, the CAIs serve as a means of continual community mobilization around health and nutrition issues. For example, if the immunization coverage is incomplete, the community leaders may decide to visit each family to encourage them to go seek the lacking immunizations for their children, possibly even arranging for transportation.

3.4. Results Achieved

3.4.1. Quantitative Results

3.4.1.1. Reductions in Chronic Malnutrition (Stunting)

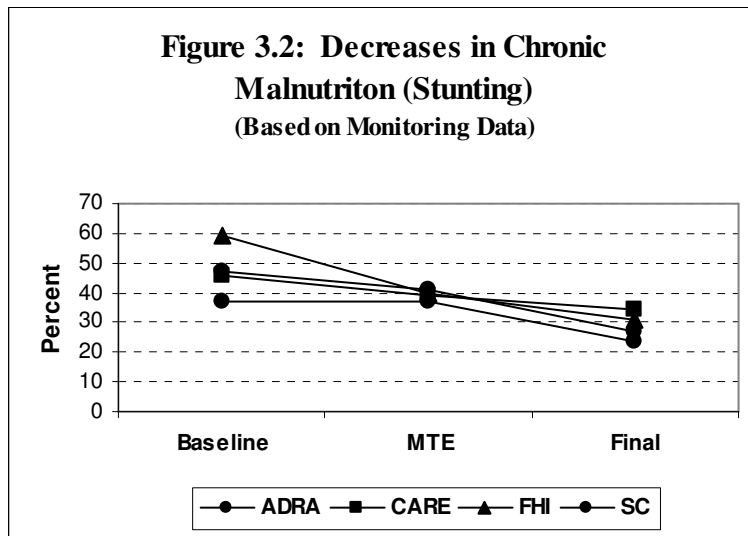
The Bolivia Title II program can be judged a success in terms of meeting the targets that the CSs set with respect to the reduction of stunting among children 3 to 6 months of age in the target areas (See Figure 3.1). As Figure 3.1 clearly shows, stunting in each of the Title II target areas was reduced to levels near or well below the national average reported in the 2003 DHS. Including the stunting levels in the SC control sites in the graph shows that, while there has been some reduction in malnutrition even without program interventions, there has been even more change in the program target areas since PCC and market-driven income generation were adopted after the MTE.



*Both the CARE and SC baseline data presented excludes the municipalities that were dropped after the MTE.

A paper produced by FANTA in 2012 compared stunting data for 16 different Title II programs ending in 2000 or 2001. These programs reduced stunting by an average of 2.4 percentage points per year over a period of four years. The average stunting at the baseline for these programs was 53 percent. In Bolivia, the data shows that each of the four CSs reduced stunting by an average of 3.8 percentage points per year over the five years between the baseline and final data collection -- an impressive average of 16 percentage points for each of the CSs over the LOP. This is in comparison to Peru, where three of the CSs – ADRA, CARE and CARITAS -- were only able to reduce chronic malnutrition by 5.8 percentage points over the LOP of the Title II programs that they had been implementing during approximately the same time period in a similar cultural and socio-economic environment.

For three of the four CSs (ADRA, CARE, and SC) most of the reduction in stunting occurred after the MTE, indicating that making changes following the recommendations of the MTE significantly improved the effectiveness of not only of their MCH/N activities, but possibly also of income generation activities, presumably giving families increased cash for expenditures on health and nutrition. Note that most CSs reduced or discontinued food rations during the same time period without affecting rate of reduction of chronic malnutrition.



3.4.1.2. Key Behavior Changes

The changes in family behaviors and community behavioral norms around child feeding, which have occurred as a result of the Title II program, will lead to sustaining the reduction in chronic malnutrition among children born into the community in the future. The CSs measured changes brought about by their MCH/N intervention for four specific indicators using cluster-samples of mothers of children in the 3-36 month age range for both baseline and final surveys. (See Annex B for complete results of the MCH/N indicators for each CS.)

While all these behavior changes are better than the CSs expected, some are particularly notable. Extraordinary examples include the success achieved by CARE in promoting latrine usage, the increase in hand washing achieved by ADRA and FHI, and the increase in

¹²Swindale, A, et al. “The Impact of Title II Maternal and Child Health and Nutrition Programs on the Nutritional Status of Children.” Occasional Paper No. 4, USAID FANTA Project, 2004

Table 3.5: Improvements in Key Behaviors

Indicator	ADRA		CARE		FH		SC	
	Base-line	Final	Base-line	Final	Base-line	Final	Base-line	Final
Percentage of children under six months receiving exclusive breastfeeding during the previous 24 hours.	46	90	60	84	67	93	75	85
Percentage of children under five years with diarrhea in the past two weeks who received ORS or recommended home fluids.	62	89	65	95	53	95	78	95
Percentage of caregivers or those responsible for preparing food who practice adequate hand-washing.	0	100	77	85	0	93	22	89
Percentage of families using a latrine or toilet.	19	75	0	85	7	38	31	34

the rate of exclusive breastfeeding achieved by ADRA. SC's results are all noteworthy when compared to their MTE results, with significant changes in behaviors accomplished in half the life of the project.

3.4.2. Unexpected or Unanticipated Results

A universal result of the MCH/N component was the increased self-confidence of women participating in the activities. This was not only noted by CS project staff, and observed by the evaluation team, but was also articulated by the women themselves. Many said they were too shy to say anything when they first started attending group activities but, as time passed, they became more confident and involved. Some explained how they had overcome their shyness, began to participate in discussions, and eventually, became empowered enough to decide to meet with community leaders or other officials. During the MTE, the MCH/N evaluator noted that certain groups of women in one project area were too timid to answer questions, but this was not found to be the case when the final evaluation consultant visited some of the same women's groups.

A related result has been the ascent of some women volunteers to official positions in their community or municipality. During the FE, the team met two women health volunteers who are now elected representatives to their respective municipal councils.

3.5. Monitoring and Evaluation

As pointed out in the MTE, the programs appear to have similar monitoring and evaluation indicators, but their definition and calculation were not completely harmonized across all CSs, making measurement of achievement difficult. The questionnaires used for collecting baseline and final data were not standardized, and some indicators were not worded appropriately.

A major difficulty encountered by the FE team was the fact that not all CSs collected their final data using a population-based sampling and some reported monitoring data as a final result instead of results from a survey. Comparisons could not be made between baseline and final results in these cases. Because the survey instruments and/or monitoring systems were not standardized across CSs, the manner of collecting data for certain indicators required much questioning and explaining. USAID hired a consulting group to oversee the validity of the data collection, and they carried out their scope of work, but this did not obviate the principal issues with the data that was reported.

Recommendation:

Future Title II programs should harmonize indicators, data collection and monitoring methods and tools, and calculation procedures during program development, certainly before the baseline survey. All CSs should understand that they must use a population-based sample for the baseline and final survey, reporting numerators, denominators, and confidence intervals for all indicators. CSs should use standardized indicators for MCH/N available from FANTA or Child Survival Technical Support (CSTS).

Lesson Learned: The investment in the consulting firm to validate data might have been better used to ensure each CS made a plan for the quantitative evaluation that would allow complete comparability with the baseline

3.6. Findings for the Individual Programs

3.6.1. Adventist Development and Relief Agency (ADRA)

3.6.1.1. Background

ADRA had implemented other programs and a previous Title II Development Program in or near the target areas. ADRA also had a concurrent maternal health project with the White Ribbon Reliance as a complement to its Title II Program. While ADRA's target areas were classified as moderately to highly food insecure, and some health indicators, such as pre-natal care coverage and use of ORT, were quite good at baseline, the prevalence of chronic malnutrition was very high and approximately half the children were mildly malnourished according to weight for age.

3.6.1.2. Key Program Approaches

ADRA addressed maternal child health and nutrition through three avenues, in addition to direct food distribution. These included: (1) building the capacity of the MOH, (2)

institutional strengthening of health facilities and the local and municipal health structures, and (3) promoting healthy behaviors at the community level.

3.6.1.2.1. Building the Capacity of the MOH

ADRA worked purposefully to improve the quality of the health services provided by the MOH through increasing the technical capacity of the staff, strengthening data collection and use, and organizing service delivery within health facilities as well as at the community level.

The key means used to strengthen service delivery was through assigning an ADRA staff person to the health center. This individual was called the Institutional Strengthening Advisor (AFI for *Asesor de Fortalecimiento Institucional*). The goal of the AFI was to institutionalize continuous quality improvement within the health services. The details of their role and processes used, including minimizing errors in data reports, have been documented by ADRA in No. 3 of its series on “Documenting Successful Experiences.” The AFIs worked closely with the DILOS and other government entities, as well as with health personnel. This seems to have been a very effective strategy.

Table 3.6: Summary of ADRA’s Training Program

MOH Health Personnel Trained						
Clinical IMCI	IMCI-Nutrition	PCC	Breast Feeding	Health Information	Field Work	Working with CHVs
109	136	109	109	70	120	126
Communication and Education for Communities	IMCI-N	PCC	Breast Feeding		Complementary Feeding	
115	6	3	6		6	
Community Health Volunteers (CHVs) Trained						
SODIS	PCC	Breast Feeding	Complementary Feeding	ORPA	Early Child Stimulation	Community IMCI
226	216	220	220	220	220	220
Nutrition Rehabilitation Sessions	Nutrition During Pregnancy	Support Groups	Food Preparation and Recipes	Sustainable Human Development	Family Budgeting	Alcoholism
216	216	220	220	220	220	226
Domestic Violence	Hygiene and Basic Sanitation	Hand Washing	Appropriate Use of Water		Monitoring System for Community Health	Gender and Self Esteem
226	220	220	220		226	226

The main avenue for improving and assuring health service delivery at the community level was to build a stronger collaboration between health personnel and the CHVs, while increasing the capacity and role of the CHVs. This resulted in establishing programmed monthly visits of a health team to each community called “Field Work,” where they collaborate with the CHVs to provide basic services in conjunction with growth monitoring and women’s group activities. Key to this collaboration was strengthening the supervision skills of the health personnel and defining their roles.

ADRA supported or directly provided considerable training for both health personnel in the target area and for CHVs, sometimes financially supporting the participation of additional CHVs from non-target communities in the same health jurisdiction. Information on the numbers of people ADRA trained and the training topics is provided in Table 3.6 on the previous page.

3.6.1.2.2. Institutional Strengthening

As part of the Zero Malnutrition program, each municipality is supposed to have a Food and Nutrition Council (COMAN) made up of elected officials, and representatives of communities and government. These councils did not exist in ADRA’s target area at the onset of the project. So, ADRA facilitated their formation and organization in each of its target municipalities. ADRA’s goal was to leave each COMAN functioning with a strategic plan, but this goal had not yet been reached at the time of the FE.

The DILOS in each municipality is comprised of the mayor or president of the city council, a representative of the health directorate, representatives of the medical staff, the CHV association and the social networks. Obviously, ADRA influenced the incorporation of the latter two representatives. The DILOS manage funds and are authorized by the mayor to make decisions. Among other activities to strengthen the DILOS in their ability to make appropriate use of the funds at their disposition and their authority, ADRA engaged them in doing a Committee for Analysis of Information (CAI), utilizing data provided by the health services. The fact that the DILOS are doing a CAI at the municipal level puts pressure on the health services to maintain quality and coverage, because no health post wants to appear to be doing service delivery inferior to the others.

3.6.1.2.3. Behavior Change in the Communities

ADRA implemented a potpourri of activities at the community level to promote behavior changes. This included growth monitoring sessions which it added to the activities of the women’s groups that it was already working with, which is commendable. These groups were also involved with other activities, including cooking sessions, handicrafts, and early child stimulation. These groups tended to be large and required various inputs from ADRA to support their activities.

The MTE recommended that ADRA, like the other CSs, begin to monitor expected weight gain rather than simply nutritional status. ADRA attended the PCC training and replicated it, at least partially, for all the CHVs in its areas and for pertinent health staff. ADRA did not, however, explain the results of the weight monitoring to the mother at the time of

weighing or use this information to detect why the child was not gaining. ADRA continued to identify children by growth curve, while tacitly showing expected weight gain status through the color of the figure the mother placed on the large growth curve poster. When the MOH subsequently shifted to curves for height for weight on the cards, this resulted in even more confusion for the CHVs, as they were no longer even able to tell the mother the child's weight for age status at the time of weighing. Weight for age had to be calculated later with the health worker then plotted.

As another follow-up to the MTE recommendations, ADRA reinforced home visits by the CHVs and provided specific training in counseling and negotiation skills, along with supervision, to help the CHVs and health staff master these skills. ADRA staff reported that imparting these skills to the professional health workers was one of their biggest challenges, because of the high level of staff rotation. This creates a problem for future supervision of the CHVs, as well, if MOH staff members do not fully understand the skills. ADRA developed forms for the CHVs to use in counseling and negotiation, which may help them retain these skills once supervision becomes infrequent and/or less supportive.

As described earlier in this document, ADRA figured out that holding large group sessions with the women was limiting participation, and hence, learning. So it began dividing the groups into a breastfeeding support group and another group for women whose children were over six months of age to discuss complementary feeding. This did offer the women a better learning environment and helped timid women gain enough confidence to ask questions.

ADRA taught some women's groups food preservation in order to overcome barriers to food access. In the one example of food preservation observed during the FE, the women's group had much better than average facilities in which to work, although it lacked running water. Presumably, in other communities more emphasis was put on dehydrating fruits and vegetables in the sun rather than costly canning. Some women were also learning to make extracts from alfalfa and leafy green vegetables with the idea that they would need only a small amount of the extracts to obtain Vitamin A and iron requirements when other vegetables are scarce during the dry season. This approach merits substantiation through research into the nutritional value of these extracts and a study of the cost-effectiveness of their use.

The cooking sessions seemed to be very popular with the women. Much of the emphasis was on baking and, while these recipes may not be terribly practical or nutritious for family consumption, some of the women's groups were turning baking into a business. One community group had already obtained a contract with the municipal government to prepare cookies for the school snack.

ADRA reported conducting educational sessions in every single community to raise awareness with the entire population about nutrition, health and hygiene. It also broadcasted messages by radio and convinced the municipal governments to fund annual health fairs. These activities were undertaken in response to the MTE recommendation for a behavior change strategy. However, they are more like an Information, Education, and Communication (IEC) strategy, since there was not sufficient investigation to discern

determinants or key factors. The qualitative study that was conducted by an outside consulting group was called a “positive deviance” study, but the methodology did not follow the standard positive deviance methodology, which is based almost entirely on observation and not interviews. The conclusions, however, may have been helpful in understanding current practices and beliefs. ADRA’s final BCC “strategy” consists of a recommendation to reach mothers, fathers and other caregivers such as older siblings, but it does not elaborate on potential methods for doing so other than using the existing women’s groups and the radio. It also includes a list of 19 key behaviors to be promoted, and a list of barriers and facilitating factors, but these are presented from the perspective of the authors and not the audience. As mentioned previously, all four CSs needed more highly qualified technical support to develop their behavior change strategies.

In connection with its White Ribbon Alliance project, ADRA encouraged communities to develop plans for rapidly moving people to a medical facility in case of obstetric complication or other emergencies. All 127 communities had emergency transport plans in place by the time of the FE, and at least 119 of the communities had used this system.

3.6.1.3. Results

ADRA measured its MCH/N indicators in 2002 (baseline survey) and 2008 (final survey) using population-based sampling and an instrument adapted from KPC 2000+. Thus, its final results are quite reliable and are comparable between the baseline and final surveys.

Table 3.7: ADRA – Stunting and Behavior Change Results

Indicators	Baseline 2002	Final 2008
Percentage of children 3-35 months of age with chronic malnutrition (height for age).	47.3	26.7
Percentage of children 3-35 mos. of age in the target area who participate in growth monitoring.	61.8	90.1
Percentage of children 3-35 mos. of age participating in the program who are above normal weight for age (> -1SD).	41.5	61.2
Percentage of children 3-35 mos. of age participating in the program who are <-2 SD weight for age.	10.6	8.4
Percent of pregnant women in the target population with at least one prenatal visit during the calendar year.	91.9	100.0
Percent of pregnant women with one prenatal visit who had their first prenatal visit before their fifth month of pregnancy.	71.9	80.8
Percentage of infants under six months who received only breast milk during the previous 24 hours.	46.2	89.7
Percentage of children under five years of age with diarrhea during the past two weeks who were treated with ORT.	62.7	89.1
Percentage of caregivers or those responsible for food preparation with adequate hand-washing behavior.	0.0	100.0

The two indicators ADRA used to measure immunization coverage were not harmonized with the indicator adopted by the other CSs, which measured coverage among children 12-23 months. ADRA's indicators stated "children under one year." This presented a

Lessons Learned: Indicators need to be approved and harmonized before the CSs conduct their baselines.

difficulty in that children under one year are receiving the 3 DPT or pentavalente vaccinations over a period of several months, which means, any children in the younger months will have received only one or two doses. ADRA compensated for this by looking at MOH data for children under one year who should have received all three doses according to their age. For coverage of all three doses, this gave them 96.7 percent. However, since the MOH data comes from population estimates, the DPT drop-out result of a negative 11.7 percent indicates that there are more children living in the target area than the MOH estimates. In any case, vaccine coverage is shown to be very high. ADRA credits this to their implementing a system with the CHVs and the health services to track every child. ADRA's indicator for prenatal care starting early in pregnancy also was not harmonized with the accepted standard used by the other CSs.

3.6.1.4. Sustainability Strategy and Potential for Sustainability

ADRA developed a carefully thought-out sustainability plan which identified the key elements to sustainability and laid out a "big picture" approach for assuring their sustainability. The plan included a vision statement: *Within the target communities there is an adequate state of nutrition and health as a result of increased demand for health services, the offer (availability) of improved health services, and adoption of healthy practices on nutrition, hygiene and sanitation.* Table 3.8 provides information on the objectives of ADRA's sustainability plan and the accomplishments it planned to measure.

Interestingly, ADRA's plan did not mention formation of the CHV associations, even though ADRA undertook this activity quite effectively. There was not enough time during the FE team field visits to discern whether there were additional positive measures taken to assure sustainability. The plan also does not mention the continuation of the AFIs as part of the local health teams to assure continued quality improvement of health service delivery. However, as ADRA pointed out, it is more important that the health facilities institutionalize what they learned from the AFIs.

ADRA invested time and effort in a number of community level activities which it decided not to include in its sustainability plan. One example is the community health information systems (*Sistemas de Información y Vigilancia Comunitaria en Salud (SIVICS)*). The SIVICS should feed directly into the CAI. However, it seemed from very limited interviews that this concept had not been fully grasped by the CHVs. So, perhaps for this reason, ADRA decided not to include it among the actions or responsibilities of the CHVs in the future.

While the steps listed in Table 3.8 on the following page are critically important and ADRA took these major steps to achieve sustainability, it seemed as though field staff may not have understood the importance of empowering CHVs, presidents of women's groups, etc. to take full responsibility for future implementation. There is no doubt about the CHVs'

technical knowledge; the concern is about whether they have the skills and self-confidence to work entirely alone.

Table 3.8: ADRA’s Sustainability Strategy

Activity to be Sustained	Steps to Achievement	Final Accomplishments
1. Field work by MOH health personnel with support of CHVs and community participation.	<ul style="list-style-type: none"> • Develop a strategy for field work which includes the responsibilities of health workers, volunteers and the community. • Implement AIEP- Nut. • Develop supervision abilities (of MOH personnel). • Organize and strengthen the municipal Food and Nutrition Councils (COMAN) • Assist with the initiation of the Integrated Nutrition Unit. (UNI) 	<ul style="list-style-type: none"> • 127 communities are consistently receiving the monthly field work visit by MOH health personnel. • 136 health personnel trained in AIEPI-Nut • 17 health services receiving adequate supervision in AIEPI-Nut • 17 health services have a strategy for field work. • 4 COMANs formed and functioning • The one UNI in the target area is equipped and functioning, staff trained.
2. Continuation of CHVs.	<ul style="list-style-type: none"> • Recognition of the rights and responsibilities of CHVs by the community, health services and DILOS. • Accreditation of CHVs by DILOS 	<ul style="list-style-type: none"> • All CHVs in all communities exonerated from communal labor requirement. • CHVs and their families entitled to free medical care at health services. • 189 (100 percent) CHVs accredited by DILOS
3. Balanced diet based on local foods	<ul style="list-style-type: none"> • Develop the cookbook based on local foods. • Train families to use the recipes. 	<ul style="list-style-type: none"> • Balanced diet based on local foods in 93 (73 percent) communities.*

* ADRA did not explain how this indicator was to be measured.

Another aspect, not explicitly pointed out by ADRA nor in the sustainability plan, is the social networks that have been formed or strengthened at the community level. These networks consist of community leaders and are responsible for making and carrying out the community development plans. They also serve to represent the community to institutions such as the MOH. During the FE, MOH staff reported that the health services have now signed agreements with the networks to assure that the MOH provides health workers for community outreach (field work) on the specified date each month. In return, the social networks make sure the community attends the field work activities. The social networks also hold community assemblies to discuss health issues.

Through its work to strengthen the DILOS and organize the municipal COMANs, ADRA succeeded in getting municipal government funds for certain activities such as the annual nutrition and health fairs. During the final months of the project, ADRA planned to continue to help the COMAN's make strategic plans and to orient the DILOS.

3.6.1.5. Lessons Learned

Lessons Learned Reported by ADRA Staff

- Analyzing activities and results with the actors involved (CHVs, health personnel and community leaders) facilitates the identification of effective corrective actions and their rapid implementation.
- Synchronizing activities with public health policies permits a better level of empowerment for local leaders.

3.6.1.6. Recommendations

In the future, ADRA should:

- Provide all staff training in community empowerment.
- Consider all inputs, particularly incentives, with a lens of sustainability when continuation of program activities will depend on the MOH and government funds.
- Revisit the concept of home gardening and small animal production as a part of future nutrition interventions in order to improve access to foods which supply a range of vitamins, zinc and heme iron. Technical assistance is available from ADRA headquarters and other ADRA country programs. Sprinkles are not a complete substitute for dietary sources of needed vitamins and minerals.

Recommendations from ADRA Staff for Future Projects

- Link project interventions closely with national health policies and programs as a means of empowering local public health leadership.
- Build capacities of local actors (community leaders, health personnel, municipal government) in self-reliant management from the beginning of the program.
- Adopt a multi-sectoral approach, which is essential to improving family living conditions (education, income generation, availability of food and basic sanitation) and achieving significant results in reducing malnutrition.

3.6.2. CARE

3.6.2.1. Background

CARE's program area and its target population remained the largest among the four programs, even after CARE made significant cuts in both following the MTE recommendations. CARE's original project proposal was very ambitious, but the budget it proposed was not commensurate with the financial and human resources needed to implement the proposed program. Although the reductions that CARE took in 2005 in the numbers of communities covered helped alleviate the problem, CARE continued to be challenged to adequately cover such a large target area. The addition of a nutrition specialist at the national office and in each department plus providing further focus to the MCH/N activities resulted in a significantly improved quality of programming during the last years of the project.

Table 3.9: Change in CARE Project Area after MTE

	Communities	Families	Municipalities	Departments
2002 - 2004	756	29,677	16	3
2005 - 2008	264	18,577	10	3

It must be noted that all the other CSs received considerable technical support from their headquarters in project design and for assuring the quality implementation of their MCH/N activities. CARE did not receive any headquarter support at any stage, other than for food logistics. This was coupled with a rather high staff turnover at all levels from field staff to country director. Therefore, CARE's results, which were quite good, need to be understood in the context of these challenges.

3.6.2.2. Key Program Approaches

CARE's project design included both strengthening MOH health services and improving health and nutrition practices at the community level.

3.6.2.2.1. Strengthening Health Services

To strengthen the technical capacity of health personnel working in the MOH health services in the target area, CARE either directly provided or paid for training in topics key to improving child health and nutrition. Even though the Government had adopted clinical and community IMCI (AIEPI), limited resources meant that the majority of health personnel had not received any training. Through the DAP, CARE was able to fund training for 247 practitioners in clinical IMCI, a step which greatly improved the quality of services within the health facilities.

To improve access to basic services at the community level, health personnel needed skills for working in the communities, which they obtained through the training CARE provided

Table 3.10: Summary of CARE's Training Program

MOH Personnel Trained					
Community AIEPI-Nut	PCC	Lactation Management	Complementary Feeding	Clinical IMCI	
293	448	170	170	247	
UNI Staff Trained					
Community AIEPI-Nut	PCC	Lactation Management	Complementary Feeding		
16	16	16	16		
Community Health Volunteers (CHVs) Trained					
Community AIEPI-Nut	PCC	Breast Feeding Promotion	Complementary Feeding	Early Child Stimulation	Education for Adults
810	1611	723	685	744	280

in AIEPI-Nut and PCC. CARE field staff also accompanied them on community visits and coached them until they mastered the skills for working with volunteers and community members. Formation of effective CHVs was an essential element for strengthening health service delivery at the community level. Summary information on the numbers of personnel trained and the key training topics is provided in Table 3.10

3.6.2.2.2. Initiation of the Integrated Nutrition Units (UNIs)

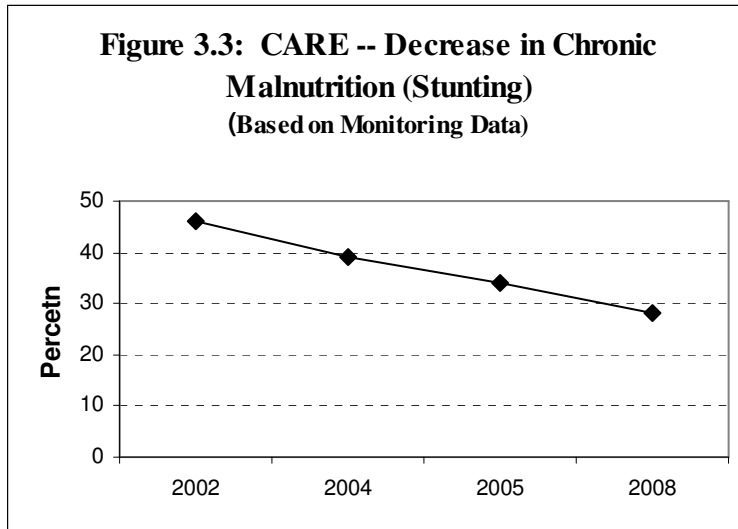
The national program Zero Malnutrition is instituting UNIs in the municipalities with the highest rates of malnutrition, as measured by low weight for height or wasting. In many cases, these municipalities are also categorized as highly food insecure and/or have high rates of stunting. Because of this overlap, UNIs had recently been established in six of the municipalities in the CARE target area.

CARE's willingness to help equip the UNIs with some very basic materials paved the way for CARE to offer training and technical direction. CARE undertook this role of providing technical support as a means of assuring that the UNIs would have the capacity to fulfill their role in preventing malnutrition, rather than focusing on treating the rare cases of severe acute malnutrition or marasmus. As Table 3.10, shows, CARE trained staff of the six UNIs in skills essential for community work, including the concepts of PCC. To reinforce technical skills, CARE also provided training related to infant and young child feeding.

3.6.2.2.3. PCC and Nutrition Promotion in the Community

CARE worked with existing women's groups, for the most part, sometimes helping the MOH staff or CHVs to form new groups where none existed. With the existing groups, which often had their own women's centers or pre-schools, CARE's objective was to assure that they incorporated all women with small children and to shift their focus to improving nutrition and health practices. CARE used the food rations until May, 2008 as an incentive for women to participate in monthly growth monitoring and educational activities.

After the training provided to the four CSs in 2005, CARE quickly switched to PCC. Additional community volunteers, sometimes called “mother guides” were trained to conduct the weighing, maintain records, and to provide quality counseling to each mother, thus, creating community-level teams. CARE also trained all the relevant health staff in their target areas as shown in Table 3.10. The fact that CARE’s monitoring data



shows a larger reduction in chronic malnutrition in the last four years of the DAP(See Figure 3.4) may well be due to the adoption of PCC. Health workers interviewed by the FE team expressed great satisfaction with the approach and results.

At the same time, CARE assured that the MOH health personnel, whom the project trained in AIEPI-NUT in accordance with national policy, could understand the relationship and potential synergy between that program and PCC. CARE facilitated a merger of AIEPI-NUT and PCC that was acceptable and beneficial to all health personnel in the target area.

Health workers and CHVs did not convert completely to PCC, in that they still orient the mother to the child’s nutritional status using the weight for age chart, rather than focusing exclusively on expected weight gain. This hinders getting the mother to focus on changing something so that her child will gain weight better because she will not be so motivated if told that her child is normal, as well. The situation was further complicated when the MOH decided to adopt height for age and changed the growth cards to reflect this new policy.

In addition to PCC, other nutrition education activities were limited to radio messages and demonstrations on how to prepare meals including Title II foods. However, community women say there is much diffusion of the new information throughout the community. Some reported that when a woman is absent from the community for some months, upon her return, they visit her to tell her what all they learned from the sessions in her absence. The women and volunteers interviewed during the FE fully comprehended the key practices for infant and young child feeding and were able to problem-solve and generate strategies when presented with difficult mock situations.

Perhaps because there is more meat available in the CARE target areas, such as the dried llama meat in Tarija, the CARE cookbook includes many recipes containing small amounts of meat and also a variety of good recipes that use fresh vegetables and fruits. As mentioned previously, CARE started communal gardens during the first half of the project and at least some of these have continued solely on community initiative. Families credit these gardens,

or in some areas, the greenhouses started with the help of other NGOs, as their only sources of fresh produce. Long travel distances make it impossible to procure produce from the irrigated valleys in the target areas, even if families had the money to buy what they need.

3.6.2.2.4. Birth Planning

Applying a best practice that has been mainstreamed across CARE International, the project trained the CHVs and health personnel to teach all pregnant women and their families to do birth planning. A birth plan encourages saving for possible emergency care, making arrangements for someone else to care for livestock and children if the woman should need to go to a medical facility, deciding in advance who will attend the delivery and where, and preparing needed articles for a safe and hygienic delivery. Repeatedly during the FE, community women brought up birth planning as a novel and valuable new practice they had learned from the project.

3.6.2.2.5. WARMI

Pre MTE, CARE was implementing the WARMI¹³ strategy in all its communities to build capacity and mobilize the communities. WARMI, which originated in Bolivia, is a method for community diagnosis and planning. The method involves four stages: self-diagnosis, planning, implementation and evaluation. The method focuses on the family, the importance of women within the family and an analysis of the situation of families within the community. Community members divide into working groups based on topic (health, production, organization, natural resources, etc) and identify principal problems, their origin, solutions and the priority of the problem for the community. From this process, the community makes a plan of action. CARE previously had phenomenal success with the methodology in El Alto, starting with reproductive health issues, but then galvanizing neighborhoods to work with other institutions to obtain water, electricity, and reduce crime and unemployment. The MTE encouraged the continuation of WARMI and strengthening the understanding of the planning phase with the communities, but the FE team understood that, unfortunately, WARMI had been discontinued due to inadequate resources to support the level of effort needed in each community.

3.6.2.2.6. Committees for Information Analysis (CAI)

The CHVs, health personnel and community based organizations are involved in conducting the CAI process periodically. CARE produced nice, durable, flexible charts for this exercise that can be used over and over. The CAI process requires much time for communities to learn minimal analytical and planning skills. The MOH staff interviewed seem committed to providing this support.

3.6.2.2.7. Involvement of Men

While CARE did not explicitly conduct health and nutrition activities for men, the very complete integration of the different components of the CARE Title II program made men

¹³ *Warmi* is an *Aymara* word for women.

aware of their role in assuring the health and nutrition of children and women. During the FE, male leaders and fathers cited many good examples of how men could contribute, such as, husbands herding the livestock on the days women need to take children to growth monitoring or the health center. Men clearly understood that women need to reduce their physical workload during pregnancy and eat a good variety of foods.

3.6.2.2.8. Cross-visits

In Tarija, CARE facilitated a cross-visit between volunteers and women leaders from a highland community with those of a community in the lowlands. Not only did the women experience the extreme contrast in ecological zones and climates, they also became acquainted with a different culture and lifestyle. The visit was a very big incentive to the volunteers. It also helped both groups by reinforcing the learning of key messages and their importance regardless of context.

3.6.2.3. Results

CARE collected data on some indicators from MOH records. The number of women seeking pre-natal care at least once increased from 79 to 81 percent, for example, and the DPT drop-out rate decreased from 11 to 1 percent, with the MOH calculating complete immunization coverage at 99.5 percent. Since a part of the target population migrates away some of the year in search of income, indicators such as prenatal care and growth monitoring participation are challenging to measure using MOH monitoring data because people may be seeking these services in other districts.

Table 3.11: CARE – Stunting and Behavior Change Results

Indicators	Baseline 2002	Final 2008
Percentage of children 3-36 months of age more than 2 SD below height for age.	46*	28**
Percentage of children 3-36 months participating in monthly growth monitoring.	51	82
Percentage of children 3-36 months of age who are >-1 SD weight for age.	56	60
Percentage of children 3-36 months <2 SD weight for age.	14	11
Percentage of children less than six months receiving only breast milk.	60	84
Percentage of children with diarrhea in the previous two weeks treated with ORS.	65	95
Percentage of pregnant women in the target area having at least one prenatal visit.	79	81
Percentage of pregnant women in the target area who had prenatal care before five mos.	66	71
Percentage of child caregivers with appropriate hand washing behavior.	77	85
Percentage of all families using hygienic sanitary facilities.	0	85

* Confidence interval = +/- 3.8 **Confidence interval = +/- 3.5

CARE is to be commended for its extra effort and expense in conducting a separate anthropometric survey of a population-based sample after the FE team’s visit in order to acquire data comparable to the baseline results. Interestingly, the results from analysis of the survey completely matched those CARE was reporting on the IPTT for Indicators 1, 2, 3, and 4. The value of the population-based survey is, therefore, to assure there can be no allegations of bias in data reporting. Complete results of the survey and a detailed explanation of the sampling methodology are available from CARE Bolivia.

Since CARE dropped several municipalities after the MTE, the baseline presented above for the anthropometric indicators was re-calculated without the data from these municipalities in order to compare it to the final results from the remaining municipalities. In Chuquisaca, no municipalities were dropped. So, data from the baseline is therefore directly, statistically comparable to the final data.

Indicator 1 for Chuquisaca Municipalities	Baseline 2002	Final 2008
Percentage of children 3-36 months of age more than 2 SD below height for age.	41	36

Confidence interval = +/- 6 points.

CARE invested heavily in improving access to water and sanitation as described in Section 4. As a testimony to the educational component of the W&S program, the results of not just increasing access to sanitation, but also convincing people to use the facilities and maintain them are very impressive. In communities where CARE introduced sanitation, the final survey found 85 percent of families using the sanitary facilities, whereas, use was zero in the baseline.

3.6.2.4. Sustainability Strategy and Potential for Sustainability

CARE gave priority to its MCH/N component in its sustainability plan for the last year of operation. Among the health behaviors, CARE prioritized reinforcing hand-washing and latrine use, which may account for its great success on these two indicators. The effort involved refresher training for all CHVs, encouraging them to make more home visits and community education on these themes. CARE also installed water and sanitation at many of the women’s centers that lacked these services, a very laudable effort.

To enhance the sustainability of other health and nutrition practices and continued improved access to health care, CARE focused on institutionalizing project interventions as laid out in Table 3.12 on the following page.

Table 3.12: CARE's Sustainability Strategy

Indicator	Activities
Thirty health services in which the project intervenes apply the PCC and ZM strategy instruments by: registration files for children under five, minimum expected weight charts, child health cards and register of home visits.	<ul style="list-style-type: none"> • Reinforcement workshops on C-IMCI-N for CHVs, mother guides, facilitators, health care personnel, and project personnel. • Home visits by the CHVs, mother guides, health care personnel and project MCH facilitators. • Recipe books created based on nutritious local foods.
Thirty health services analyze the health situation in their sector and implement an action plan at least twice a year with support from local authorities and CHVs.	<ul style="list-style-type: none"> • Health CAIs present in 30 health care services in which the project intervenes with the participation of the CHVs and presidents of the women's organizations, and local authorities.
Five municipal governments assign resources to health and nutrition themes.	<ul style="list-style-type: none"> • Five municipal governments and health care managers lobbied to assign resources in the municipal POAs to carry out the community CAIs and support UNIs.
Three UNIs implemented and operational.	<ul style="list-style-type: none"> • Meetings with health care personnel, municipal authorities and the prefecture. • Equipment donated to UNIs. • Methodologies transferred to UNI personnel within the framework of the IMCI Community Nutrition strategy.

CARE's MCH/N sustainability strategy activities were oriented to achieve the following results:

- A community health system, coordinated by all local actors (municipal authorities, community committees and local health officials), is in place to monitor community health, nutrition and control the incidence and prevalence of diseases.
- Municipalities, communities and families continue to carry out and improve upon the healthy practices and habits acquired during the implementation of the project.
- A process for information exchange and analysis of the health and nutrition situation is in place and functioning.

While CARE did not have the luxury of actually documenting these results, it did achieve the targets set out in Table 3.12. The commitment of health personnel to continue the quality service delivery and community outreach was evident during the FE.

The absolute lack of resources in the small, resource-poor municipalities will seriously limit the possibility of paying for CHV refresher training or replicating PCC in other communities, unless they receive support from another NGO. Another threat to sustainability is the frequent turn-over of health personnel, who prefer postings that are not

so isolated. There was no time during the FE to investigate plans that might have been made by CARE and the communities to replace materials such as scales, registers, and educational materials.

A key finding of the FE in the CARE areas was the notable lack of dependency on CARE. No one asked for more food or begged for activities to continue. There was little evidence of CARE material inputs other than educational materials and growth monitoring equipment. This is a very positive finding. Community members were self-confident and open. They led all activities without intervention by CARE or MOH staff. CARE staff members participating in the FE were comfortable leaving the community members, health personnel and leaders alone to talk to FE team members. The level of self-assuredness and organizational ability of the many stakeholders interviewed bodes well for their capacity to continue promoting their own development and progress.

3.6.2.5. Lessons Learned

- ***Work with the women's groups and get women motivated to come to growth promotion sessions before introducing the food rations.*** This lesson came out of discussions with CARE staff during the FE. The concern applies to the other CSs who had similar experiences with using the ration as an incentive.

Some communities lost up to half of their participants after the food was stopped, including many of the families most at risk of having malnourished children. In the communities where participants largely continued, mothers who were interviewed cited several additional reasons for participating, other than receiving food. In most cases, they were already participating in the women's group, or felt honored to be asked to participate.

Other ways of motivating women to attend these sessions could include the use of peer pressure or creating a sense of prestige for those attending regularly. Other Title II projects have had success using no-cost incentives such as naming a woman with perfect attendance "queen of the month" or giving only those who attend a desirable object such as a calendar with key health messages. Projects have benefited by asking women during project start-up what would motivate them to attend and what barriers might keep them from attending. Having an active role is a motivator while feeling that she is wasting her time is a major deterrent, as is the group being led by a dominating person.

Lessons Learned Documented by CARE Staff

- Direct involvement of all stakeholders, including families, communities, local authorities, municipal authorities, and health personnel, was crucial to achieve sustainability and better outcomes.
- A high level of coordination between local authorities, NGOs, decentralized entities and centralized institutions like the MOH has permitted strengthening municipal management while avoiding duplication of activities and efforts.
- The trained CHVs and mother guides are fundamental to achieve results, resolve the problem of malnutrition and promote good practices in health, hygiene and nutrition in the families.
- Coordination and generating synergies between the three project components to address food insecurity has proven to be more effective than independent interventions by each component.
- To achieve good results and sustainability of objectives and activities, it is important not to take on too large a geographic area if the human resources and finances available are insufficient. The result will be low level of effectiveness and doubtful sustainability.
- Aligning strategies and activities with national policies and programs will permit better synergy and sustainable results.

3.6.2.6. Recommendations

In the future, CARE should consider the following:

- As part of its design process, make sure that the size of the proposed program is commensurate with the resources available to insure that the resources are sufficient to support the successful implementation of the program in the field.
- Tap into technical support from headquarters for different components, to review proposals, assess scale, and the appropriateness of indicators, and for assistance with monitoring and evaluation.
- Reconsider the use of WARMI for community empowerment, particularly in smaller-scale projects with adequate resources to support sufficient field staff to work directly with the communities for a time. Maintain the documentation of the El Alto WARMI experience and document the lessons learned on using WARMI from this Title II program for future reference.
- Seriously consider documenting the Bolivia MCH/N model and its success in reducing stunting. CARE has been at the forefront of introducing the model of growth promotion using expected weight gain criteria in Guatemala, Nicaragua, Honduras, and now Bolivia. Since the Bolivia experience is the most current, it offers a good opportunity for CARE US to document lessons learned and experiences to help other CARE programs in adopting the model.

Recommendations from CARE Staff for Future Projects

- Objectives and indicators should respond to the context and the actual availability of resources.
- Develop a multi-sectoral strategy to address food insecurity.
- Use the multi-sectoral focus when doing advocacy with municipal government for themes of environment, productivity, and health.
- Write the sustainability strategy during the project design phase and up-date it at mid-term.

3.6.3. Food for the Hungry (FHI)

3.6.3.1. Background

FHI's target area includes some of the most food insecure municipalities in Bolivia. In spite of the remoteness of the communities, many families are accustomed to migrating to other regions in search of work or subsistence. Since such migration is unpredictable, it presents real challenges for a program such as the Title II development program and for the MOH to achieve coverage with routine services such as immunizations. At baseline, FHI found the highest level of chronic malnutrition in the Title II program and the lowest level of complete immunization coverage.

During the first half of the DAP, the MCH/N component focused on reducing the number of malnourished children and increasing health service coverage by working directly with individual families. FHI staff made regular home visits to families with undernourished children to encourage new practices and consumption of the rations. FHI continued activities from its previous Title II program, including growth monitoring and a variety of educational activities with women's groups. By the MTE, FHI was already seeing positive progress towards achieving its indicators, and the final quantitative evaluation showed very good results.

3.6.3.2. Key Program Approaches

After the MTE, FHI adjusted its MCN/H efforts to focus on the risk of malnutrition rather than recuperation, adopting the concept of expected weight gain from PCC. FHI also reinforced the counseling skills of the CHVs and helped them prioritize home visits. FHI acquired a donation of zinc to add to the micronutrients being distributed by the MOH health services. It also strengthened the use of monitoring information to make decisions and developed a recipe book based on local foods.

FHI implemented a variety of activities at the community level along with growth monitoring and food distribution. These activities included early child stimulation, support groups for breastfeeding and for complementary feeding, community health fairs, radio

programs by CHVs, and teaching basic household budgeting. CAI was instituted in 112 communities.

3.6.3.2.1. Institutional Strengthening

FHI worked with DILOS and COMANs to enhance their potential to prioritize and take effective actions that will continue to support nutrition, health and food security in the future. FHI provided training and mentoring in administration and management while advocating for funding for supporting the community interventions.

For the health services, FHI worked on building technical skills, as shown in Table 3.13. FHI promoted the Baby Friendly Hospital Initiative. It also provided training to improve the collection and management of health information and the quality of health worker-patient interactions.

Table 3.13: Summary of FHI's Training Program

MOH Health Personnel Trained								
AIEPI Clinic	AIEPI-Nut	Breast-Feeding	Health Information	Nutrition	Quality of Care	Epidemiological Monitoring	National Health Insurance	Municipal Management DILOS
92	97	136	95	75	75	25	35	48
UNI Personnel Trained								
AIEPI Nut	PCC	Comp. Feeding	Recuperation of Malnourished Children	Quality Patient Interaction	Positive Deviance	Kangaroo Method for LBW	Early Childhood Stimulation	Health Information System
8	8	11	6	2	4	6	8	8
Community Health Volunteers (CHVs) Trained								
AIEPI Community	PCC	Comp. Feeding	Education Methods	Early Childhood Stimulation	Immunizations	Negotiation and Counseling	AIEPI Nut	Positive Deviance
320	540	500	230	340	250	280	280	60

3.6.3.2.2. Growth Promotion and PCC

Although the CHVs were well-trained in monitoring weight for age and filling out the growth charts, the MTE recommended improving skills in counseling and negotiation and introducing the concept of monitoring expected weight gain. After key FHI staff received the PCC training, health personnel were trained. Then, the training was cascaded to a total of 540 volunteers, including the new ones in each community who joined the existing CHVs to share the new responsibilities. The new volunteers (women leaders) were also trained in AIEPI Nutrition.

Because FHI did not use PCC to replace any of the existing activities, it became just one more add-on and this may have made it difficult for the CHVs and health personnel to distinguish its impact and usefulness. CHVs continued to emphasize nutritional status on the growth curve to the mothers.

3.6.3.2.3. Nutrition Workshops

The nutrition workshops were started in 2003 as a version of PD/Hearth. They have been implemented in about 34 communities with the 12 days spread over five months. The positive deviance inquiry is only conducted once and, apparently, by staff rather than the volunteers. Menus prepared do not meet the nutrient requirements for recuperation without the addition of the Sprinkles micronutrient supplements, but mothers do contribute the ingredients. While the current version has so many modifications it can no longer be considered PD/Hearth, mothers are definitely learning some new practices and enjoy participating. FHI could certainly replicate the activity as “nutrition workshops” in future programs with the objective of teaching mothers new practices.

3.6.3.2.4. Men’s Groups

FHI is to be commended for directly targeting men with health and nutrition education. FHI was able to start men’s groups in 11 communities, and while small, the groups serve a valuable role in gender sensitization and changing community norms towards the role of men in child care and as supportive husbands. While most of the participants are fathers, some are grandfathers.

3.6.3.2.5. Support for the UNIs

FHI was very instrumental in the start-up of the first UNI in Bolivia, which happens to be in its target area. FHI provided all of the furnishings and equipment and significant training for the staff. The UNI now serves as a training site for staff from other UNIs. This UNI has recuperated four severely malnourished children, three of whom came from outside the municipality. During the FE visit, UNI staff were much more focused on the recuperative aspect than what they will do with their 80 percent Level of Effort on prevention. Following the FE, FHI continued to help them plan their community work, culminating in a solid plan of action addressing prevention.

3.6.3.2.6. School Health

To promote healthy behaviors among the next generation of parents, FHI works with grade schools, providing orientation to teachers and a short curriculum in book format. The effort is part of the UNICEF Healthy Schools program. The teachers are pleased to have the support and ideas for teaching health. Students are enthusiastic and able to repeat all the key messages. Schools often lack adequate water and sanitation making it difficult to reinforce health behaviors during school hours.

3.6.3.2.7. Behavior Change Strategy

FHI came the closest to having a true behavior change strategy. During the previous Title II program, FHI had technical assistance from a headquarters staff, who is quite expert in behavior change. He helped conduct qualitative research (barrier analysis). During this DAP, FHI hired a consulting group to help it come up with a behavior change strategy. The resulting product does identify audiences for key themes, but focuses on communication channels for disseminating key messages, without identifying key factors for specific behaviors to be promoted.

On its own, FHI developed a useful framework for organizing messages and educational activities by season, taking into account both the epidemiological cycles during the year and agricultural activities that affect the ability of the household to participate in learning activities. With this, FHI made the decision to focus on fewer messages at “teachable moments”.

3.6.3.3. Results

In looking at FHI’s behavior change results, it must be kept in mind that it has been working in 35 percent of the communities for at least two, sometimes three, Title II program cycles. In 2007, FHI phased out of the 14 percent of communities which had the most disperse populations and difficult access and these were not included in the sample for this final survey (4 percent of the total population). FHI used a sampling frame for the final survey

Table 3.14: FHI – Stunting and Behavior Change Results

Indicators	Baseline 2002	Final 2008
Percentage of children 3-35 months of age with chronic malnutrition (height for age).	59	31
Percentage of children 3-35 mos. of age in the target area participating in growth monitoring.	22	93
Percentage of children 3-35 mos. of age participating in the program who are above normal weight for age (> -1SD).	32	46
Percentage of children 3-35 mos. of age participating in the program who are <-2 SD weight for age.	36	14
Percentage of children 12-23 mos. of age who have first DPT vaccination, but not the 3rd dose (DPT drop out rate).	55	1
Percentage of children 12-23 mos. of age who have received the 3rd dose of DPT or pentavalente vaccine.	15	95
Percentage of pregnant women in the target population with at least one prenatal visit during the calendar year.	50	84
Percentage of pregnant women with one prenatal visit who had their first visit during their first trimester.	23	68
Percentage of infants under six months who received only breast milk during the previous 24 hours.	67	93
Percentage of children under five years of age with diarrhea during the past two weeks who were treated with ORT.	53	93
Percentage of caregivers or those responsible for food preparation with adequate hand-washing behavior.	0	93

that was comparable to the baseline and used the standardized KPC instrument. Use of PDAs for data collection significantly reduced errors. Full results are presented in Annex B.

3.6.3.4. Sustainability Strategy and Potential for Sustainability

The FHI sustainability plan included “graduating” 90 of the 166 communities, particularly those that had also been part of the previous Title II Program. FHI succeeded in graduating an additional six communities by the time of the FE team’s visit. “Graduation” means cessation of direct implementation by FHI but continued accompanying of other implementing organizations (OTBs, producer associations, health services, etc.) until the end of the DAP. In June, 2007, FHI retired completely from 26 communities due to “unfavorable conditions” such as disperse, small population, high rates of migration, and limited access. Unfortunately, these same conditions probably result in poorer health status of the families who live in these places.

Table 3.15: FHI’s Sustainability Strategy

Sustainability Indicators for Health, Water, and Sanitation
<p><i>1. Empowered and committed social players that generate inter-institutional alliances for the development of their community.</i></p> <ul style="list-style-type: none"> • 200 CHVs certified by their respective health department, providing leadership in community vigilance processes. • 400 Women Leaders certified by their respective health department, providing leadership in community health in their communities. • 100 SAS commissions certified by FUNDASAB, providing leadership in community vigilance processes in their communities. • 10 Networks for Health and Development agreements in operation with other internal and external social networks at the national level. • 2 UNIs functioning under an established management model.
<p><i>2. Technical capacity to adopt knowledge and practices adequate for sustainable development.</i></p> <ul style="list-style-type: none"> • 4,560 families with health, hygiene and nutrition practices incorporated and institutionalized at the community level. • 5 DILOS functioning under an established management model. • 5 COMAN functioning under an established management model. • 5 W&S projects functioning as micro-enterprises.
<p><i>3. Legal support for the exercise of rights pertaining to common good.</i></p> <ul style="list-style-type: none"> • 25 EPSAS with legal representation. • 28 EPSAS with Municipal recognition. • 5 Networks of CHVs, EPSAS and women leaders with recognition from the Municipality, Health Districts and FUNDASAB. • 5 Networks of CHVs, EPSAS and women leaders with legal representation.
<p><i>4. Internal and external economic – financial sufficiency to assure investment continuity.</i></p> <ul style="list-style-type: none"> • 28 W&S projects that have an established and operating tariff structure. • 15 health, water and sanitation projects with community auto-financing. • 152 communities informed about external investment processes in health, water and sanitation.

FHI developed forty-two indicators of sustainability and reported achieving 96 percent of them. Table 3.15 on the previous page shows those proposed for health, water and sanitation.

Due to the short time spent in project areas and very limited interaction with government, health officials and staff members, it was impossible to assess the potential for sustainability. Factors that will enhance sustainability include the formation of the CHV associations, the linkages established between communities and health services, and the commitment of funding from some municipal governments to support certain activities.

3.6.3.5. Lessons Learned

Lessons Learned Reported by FHI Staff

- Consolidating and strengthening social networks and institutions in their ability to promote prevention of illness and timely detection of clinical symptoms or danger signs is the way to assure sustainability.
- Applying a prevention model that focuses on risk by ecological zone, seasonality, and life stage will give results, but requires effort six months to a year in advance.
- Implementing a monitoring system that engages the community in monthly analyses of data and decision-making while also adopting technology that allows for rapid feedback to technical teams makes possible efficient mechanisms for monitoring the achievement of objectives.

3.6.3.6. Recommendations

In the future, FHI should:

- Provide leadership in identifying an impartial entity and funding for them to implement a demonstration model for PCC to show the MOH the potential of PCC to serve as the community intervention to prevent stunting. This should include collaboration with SC to provide technical support.
- Conduct further analyses of the variable contributing to reduction of stunting, taking advantage of the quantity of anthropometric data.
- In designing future programs with a nutrition outcome for areas with very limited access to a diverse diet (including market access), consider interventions to help overcome this barrier to dietary diversity. Not every family needs to produce animal foods or vegetables, but some families can produce these products for sale within the community. Demand will also have to be generated among other families for these products through nutrition education.

-
- Consider further refinement of the family budgeting module for inclusion in all future IG, food security and livelihoods projects. Share the module with FHI globally.

Recommendations from FHI Staff for Future Projects

- Develop a working relationship with the central level MOH complete with an institutional commitment that will not be affected by instability of officials.
- At the department level, negotiate with the prefecture to cover the whole department or at least whole cantons.
- At the municipal level, jointly develop participatory planning processes, including the Municipal Development Plan project for sustainability that are multi-sectoral, for example, health, education, basic services, production, etc.

3.6.4. Save the Children (SC)

3.6.4.1. Background

SC's original MCH/N interventions included growth monitoring linked to food distribution, and the promotion of over 35 generic health education messages through traditional channels of health talks given by a community health volunteer. W&S infrastructure was immersed in the MCH/N component for selected communities. At the time of the MTE, SC realized that the MCH/N activities it had been implementing had not produced any impact on reducing the level of chronic malnutrition. Even as the MTE process continued, SC made decisions to revamp its MCH/N component, including changes in staffing and reducing the target area.

SC also made two significant changes in its strategy. The first was to reduce the number of messages disseminated, with the expectation that focusing on fewer messages would have a more immediate and positive impact on a child's nutritional status. The second and more important was to switch from growth monitoring to community growth promotion or PCC. This latter change involved training additional cadres of health volunteers in each community to weigh the children, counsel the mothers and make home visits. This change enabled the existing health promoters to focus on IMCI and referrals, while building the capacity of additional key individuals to promote optimal nutrition and hygiene practices. This group of volunteers, who work together, is called the "PCC Team," and these teams now exist in 193 communities.

3.6.4.2. Key Program Approaches

3.6.4.2.1. PCC

SC adopted PCC as its singular MCH/N approach. Members of the PCC team not only assumed responsibilities for monthly growth monitoring, counseling mothers, making home visits, implementing C-IMCI, but also for monitoring and promoting optimal hygiene

behaviors and discussing local health and nutrition data and issues with the health committee. The PCC monitoring data served as a platform for community mobilization and for motivating officials to support the PCC teams and other preventive health actions.

The use of the giant bar graphs in each community to clearly show the nutritional status of children vis-à-vis expected weight gain helped motivate community members to eliminate the red bar, that is, “children not growing well”. Mothers said their husbands would query them after the growth monitoring session as to whether their child had achieved the expected weight gain and supported them in assuring that the child gained weight before the next weighing session. Both mothers and fathers said they felt a sense of embarrassment if their child was one of those “in red” or not gaining the expected weight. At the same time, SC’s use of parents’ desire to have a bright child who would do well in school, as shown in posters and messages all over its target area, also motivated parents and community leaders to make positive changes.

SC introduced two community-based monitoring systems to engage communities in assessing the current situation and taking actions to improve outcomes. The Integrated Community Epidemiological System (SECI) included data on coverage of preventive health services as well as the bar graphs on nutritional status by weight gain mentioned in the previous paragraph. The Vigilance System for Water and Sanitation (SIVAS) was led by the volunteer in charge of making home visits to monitor hygiene, sanitation, and appropriate water use. The efficacy of this latter system was due to creating peer pressure to conform to the new norms for hygiene and sanitation. Both these community-based monitoring systems fed into the CAIs and served as a means of community mobilization. Community leaders were very proud to point out how the numbers of children “not growing well” had been reduced or eliminated.

SC’s adaptation of PCC to its project included limited MCH/N activities besides those on the actual monthly weighing day. On that day, the child is weighed, the weight compared to the expected weight gain, results explained to the mother in terms of “growing well or not growing well”, the results recorded by the health promoter, and appropriate counseling given to the care-giver by the volunteer “nutritionist.” A MOH staff member attends each weighing session and provides basic services such as immunizations, micronutrients, and pre-natal care. In addition to the monthly weighing sessions, SC staff and volunteers led “cooking schools” at another time during the month, teaching age-appropriate foods and feeding practices. There were no other routine MCH/N activities after the MTE, which is a positive aspect of the SC program.

The evaluator was able to observe the good skills of the PCC teams, which testifies to the level of training and supervision they have received. Both the volunteers and MOH staff involved seem highly motivated and committed to continuing PCC. PCC, as implemented in the SC sites, most closely follows the Central American model.

Because SC’s application of the PCC approach is essentially “uncluttered” by multiple other MCH/N activities led by the NGO, it represents a model that could be replicated by the MOH as its community strategy for Zero Malnutrition. This conclusion is supported by the fact that other area health offices in La Paz have already been able to replicate PCC with

their existing resources, with minimal technical support from SC. SC provided training in PCC, upon request, to 35 health personnel from other health areas in the Department of La Paz, who are now replicating the model. Additionally, several of the district health directors where SC has been working have decided to scale up the model in the rest of the areas and have mandated that other NGOs working in the area adopt PCC.

A key to the success of SC's community work in changing behaviors is the number of community health workers compared to the numbers of mothers. Table 3.16 provides information on the number of PCC teams and the number of volunteers, which when totaled and divided into the number of mothers, shows that each community had a ratio of one volunteer for about four mothers.

Table 3.16: SC MCH/N Outputs

Municipalities	Communities	Number of Health Services	Number of PCC Teams	Volunteer Weighers	Volunteer Nutrition Educators	Community Health Volunteers	Participating Mothers	Number of Children
Calamarca	15	4	28	42	43	35	480	500
Sica Sica	28	8	28	30	35	28	380	399
Patacamaya	27	3	43	41	43	41	650	700
Cairoma	31	5	28	31	33	32	420	466
Yaco	17	7	17	19	22	19	200	210
Sapahaqui	38	2	17	21	21	20	200	229
Luribay	27	5	18	22	25	19	230	232
Total	196	34	179	206	222	194	2,560	2,736

3.6.4.2.2. Qualitative Research and Behavior Change Strategy

Post MTE, SC conducted qualitative research using the positive deviance methodology to differentiate between the complementary feeding and hygiene practices of families with well-nourished children and those who had underweight children. These results were detailed in the Post- Mid-Term Assessment (PMTA) report.¹⁴ SC used the results to narrow the list of 35 messages they had been promoting to 18 key messages. SC also devised ways to address particular behaviors, for example, how to enable mothers who work in the fields all day to feed their child while there by teaching them to prepare portable foods derived from traditional foods such as pito.

3.6.4.2.3. Involving and Strengthening of Local Government

¹⁴ Roberta van Haeften, Alfredo Fernandez, Judiann McNulty and Tricia Peterson, "An Assessment of the Save the Children Bolivia Title II Program Post Mid-Term Evaluation," a report prepared for Save the Children in Bolivia, November 2006.

For purposes of facilitating advocacy and sustainability, SC chose to focus capacity-building on strengthening existing functionaries and committees within local government structures at both the community and municipal levels. This included the health secretary in each community and members of the municipal health committee. These individuals did not have sufficient information previously on the health situation to make informed decisions. Once informed, they have become active proponents of addressing health and nutrition needs. SC has facilitated linking the health secretaries with the community volunteers and health post staff who share results of weighing sessions and other health activities. At the municipal level, SC facilitated greater communication between the area health officer or health center director and the health committee.

3.6.4.2.4. Monitoring and Evaluation

The SC country office in La Paz has an excellent monitoring and evaluation unit with highly skilled staff. For this project, they created a database to track the project outputs and outcomes, including tracking the monthly weight and weight gain of each participating child. The system has evolved from local monitoring by staff to computerized data management of local data, most recently facilitated by the adoption of Personal Digital Assistants (PDAs), which allow direct data input into the system from the field.

From the beginning, SC used 30-cluster sampling for a population-based sample for baseline and again each subsequent year to assess progress towards targets. This level of effort is greater than expected, but leads one to have more confidence in SC's results, since its annual data is always comparable to the baseline. For the MCH/N indicators, SC mostly used the standardized KPC+ questionnaire, which also assures the reliability and validity of results. SC prepared a detailed report on its final survey, which included the methodology and detailed results for each question. It could easily serve as a model for other CSs in Bolivia and elsewhere, particularly with one addition; that is, a chart comparing the results and confidence intervals for all indicators, including the baseline and MTE results and confidence intervals.

At the time of the final quantitative data collection, SC decided to collect anthropometric data on a separate sample of children from the four municipalities which were dropped after the MTE. Since, these four municipalities received the same level and type of intervention during the first half of the project, they can be viewed as a control sample and used to assess the impact of program strategy post MTE.

3.6.4.2.5. SANTOLIC

Although SC invested in W&S systems in sixteen communities, fifty-seven percent of the communities in the project area are still without sanitation. Late in the project, SC learned about a methodology from UNICEF called SANTOLIC (*Saneamiento Total Liderado por la Comunidad*) or Community-Led Total Sanitation, which uses personal and community reflection, similar to Participatory Learning and Action, as a means of motivating communities to undertake their own sanitation projects. These projects usually include construction of latrines made of local materials, accompanied by a community vigilance system to monitor usage and maintenance through peer pressure. SC has provided some

roofing materials, but this methodology holds great promise as a truly low-cost way to introduce sanitation in many more communities. At the time of the FE, five communities had participated and built their own latrines.

3.6.4.3. Results

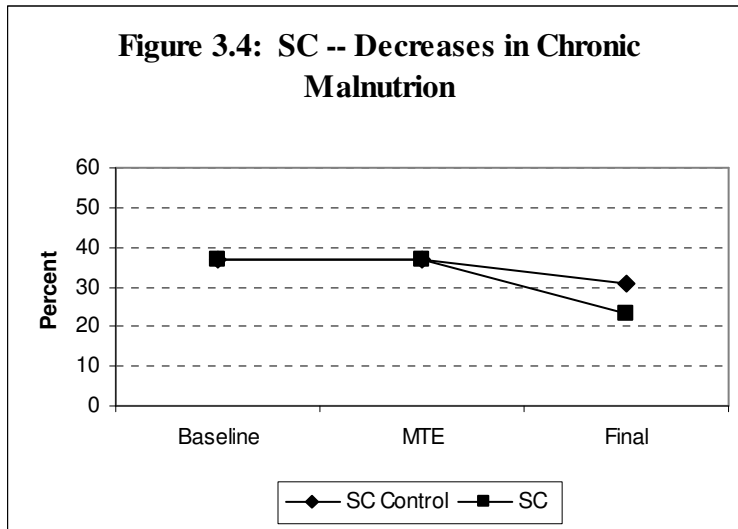
SC conducted its baseline and final surveys and annual monitoring using the 30-cluster sampling methodology. So, all its results are directly comparable. As shown in Table 3.17, SC had a significant impact on reducing chronic and global malnutrition. It also exceeded all of its original targets for all of its MCH/N indicators. (The complete results for its MCH/N program are provided in Annex B.)

Table 3.17: SC – Stunting and Behavior Change Results

Indicator	Baseline 2002	Final 2008
Percentage of children 3-35 months of age with chronic malnutrition (height for age).	37.0	23.3
Percentage of children 3-35 mos. of age in the target area who participate in growth monitoring.	47.0	89.3
Percentage of children 3-35 mos. of age participating in the program who are above normal weight for age (> -1SD).	48.0	55.0
Percentage of children 3-35 mos. of age participating in the program who are <-2 SD weight for age.	16.7	9.7
Percentage of children 12-23 mos. of age who have first DPT vaccination, but not the 3rd dose (DPT drop out rate).	27.4	6.9
Percentage of children 12-23 mos. of age who have received the 3rd dose of DPT or pentavalente vaccine.	40.9	93.1
Percent of pregnant women in the target population with at least one prenatal visit during the calendar year.	55.9	83.5
Percent of pregnant women with one prenatal visit who had their first visit during their first trimester.	31.0	51.8
Percentage of infants under six months who received only breast milk during the previous 24 hours.	75.4	85.1
Percentage of children under five years of age with diarrhea during the past two weeks who were treated with ORT.	77.8	94.9
Percentage of caregivers or those responsible for food preparation with adequate hand-washing behavior.	22.3	89.3

Figure 3.4 provides information on the changes in chronic malnutrition in two sets of communities -- those that SC dropped from its program post MTE (the control group) and those where SC continued to work using its new MCH/N strategy. Although the rates of malnutrition decreased in both sets of communities, the reduction was much greater in the communities where SC continued to work using PCC, providing additional evidence of the effectiveness of this approach. All eleven municipalities received the same type and level of effort prior to the MTE. The reductions in malnutrition in the dropped municipalities may

be an effect of the project's earlier efforts there, or an effect of possible national-level improvements in health and the economy. Food was also stopped in the four control municipalities post MTE, but was also halted in the other municipalities one year before the final survey. The 7 percentage point difference between the final project area and the control municipalities is statistically significant.



3.6.4.4. Sustainability Strategy and Potential for Sustainability

As a part of developing its sustainability strategy, SC made a very useful analysis of the existing operations of municipal governments, including their organic structure, decision-making style, and external linkages. This analysis pinpointed the lack of a long-term vision, internal structures to address development, and missed opportunities for implementing national policies and funding. Based on this, SC focused its sustainability strategy on strengthening the municipal governments' ability to identify and respond to social and economic development priorities. To accomplish this, SC promoted the adoption of the Pan American Health Organization's (PAHO) Healthy and Productive Communities Model (HPM).

PAHO developed the HPM over several years as a means of confronting key socio-economic factors that can have a negative impact on individual and collective health, such as the lack of opportunities for the poorest communities, in an attempt to generate better environments and living conditions for a more healthy and dignified life. According to PAHO's definition a healthy and productive municipality is *“one in which private organizations, public institutions, producers, entrepreneurs, workers, administrative and civil authorities, and the community at large are constantly striving to improve agricultural production, the processing and marketing of goods, and living and working conditions, in order to guarantee the nutrition and food security of individuals and families. At the same time they continually systematize the care, protection, and promotion of the health of rural community members.”*¹⁵

SC expanded the concept to both the municipal and community level denoting the model as “Healthy and Productive Municipalities and Communities” (HPMC). SC also came up with specific indicators for each component to assess the potential for sustainability using the HPMC model. Those for MCH/N are shown in Table 3.18 on the following page, with the

¹⁵ Source: PAHO Website/ Healthy and Productive Municipality.

potential noted by municipality. During the final phase of the project, SC focused on the municipalities found lacking.

One step SC took to assure the sustainability of trained CHVs, who are so essential to continuing PCC, included initiating an accreditation process in collaboration with the University of San Andres (UMSA). The nutrition faculty sends students to the field to spend several weeks observing CHV work using a check list developed by SC. The volunteers who perform well receive accreditation valid for two years. During that time, they should receive training up-dates and continued supportive supervision from health services staff in order to be reaccredited. Some municipalities have signed agreements with UMSA to continue the process, with the municipalities paying travel expenses for the students. This collaboration foments another aspect of sustainability in that nutrition faculty and students are learning first-hand about PCC, IMCI, and community development. Students interviewed during the FE expressed appreciation for the learning experience and the additional skills they have acquired. The faculty is now incorporating the PCC concept into the curricula with SC support.

Table 3.18: SC's Sustainability Strategy

Sustainability Criteria	Municipality						
	Cairoma	Calamarca	Sapahaqui	Luribay	Patacamaya	Sica Sica	Yaco
More than 75 percent coverage Community Growth Promotion Teams	X	X	X	X	X	X	X
Municipal Association of CHVs	X		X		X	X	X
Councilman supportive of Community Growth Promotion (PCC)		X	X	X	X	X	X
Area Health Network has adopted PCC		X	X	X	X	X	X
Community leaders support PCC	X	X	X	X	X	X	X

In some communities, SC successfully advocated that the CHVs be all or partially exonerated from the required community manual labor, which is an annual form of tax common in Andean society. This action recognized the work they are already putting in as volunteers and motivates them to continue as a CHV. This is something the CHV Associations can continue to advocate for in communities where the exoneration has not been granted.

Another aspect of SC's sustainability strategy was to raise awareness of nutrition and health by strengthening the existing community health committee and the functioning of municipal entities with responsibility for health and nutrition. CHVs or health staff now share reports on the local situation at each meeting.

3.6.4.5. Lessons Learned

Lessons Learned Reported by SC Staff in Their FE Presentation

- Greater engagement with municipal and community authorities earlier in the project advances prioritization of health and nutrition issues.
- Creating a cadre of health volunteers to share activities prevents over-burdening a single volunteer and assures more sustainable capacity in the community.
- Tendency or expected weight gain is a sensitive indicator which permits decision-making in the field. Other indicators can also be measured just annually to assess progress.
- The discontinuation of food distribution should happen gradually starting in the third year and be accompanied by activities to continue motivating mothers, fathers and the community.
- Obtaining the support of all the local social actors should happen in a systematic and ordered way.
- Aligning SC strategies with national policies automatically assures greater impact.
- Focusing on a limited number of health and nutrition messages has more potential to change behaviors, a lesson that was learned through discussion during the PMTA.

3.6.4.6. Recommendations

In the future, SC should:

- Provide technical support to the UMSA nutrition faculty or another impartial entity to replicate the PCC model, possibly with an UNI, in a municipality where the central MOH can quickly see the results.
- To expand access to sanitation, try to continue SANTOLIC, with even minimal funding, in target communities where SC is continuing to work as well as in future projects.
- Revisit the concept of home gardening and small animal production as a part of future nutrition interventions in order to improve access to foods which supply a range of vitamins, zinc and heme iron. Best practices and lessons learned can be obtained from SC Guatemala.

Recommendations from SC Staff for Future Projects

- Start sustainability planning from the design stage of the project and initiate it upon start-up.
- The distribution of food should respond to a plan which contemplates a progressive withdrawal of food, graduation criteria, and synergy with other components.
- It's essential to get a commitment from all the decision-makers in the community and municipal government.

4 Water and Sanitation (W&S)

4.1 Program Objectives

The main objectives of the Water and Sanitation (W&S) component were to increase access to safe water and to improve the sanitary conditions for households in the food insecure areas of Bolivia. Achieving this objective was expected to contribute to a decrease in illnesses in the participant population, particularly in children less than five years of age, caused by a lack of safe drinking water, inadequate sanitation facilities, and improper hygiene behaviors. The program was also expected to improve the conditions of women and girls, giving women more time to spend on activities other than carrying water, including taking care of their homes and income generating activities, and enabling young girls to attend school and spend time on their studies, thereby improving their future economic prospects.

4.2 Background

Lack of adequate water and sanitation is a serious problem in Bolivia, with only 57 percent of the rural population in Bolivia having access to potable water, according to the 2003 DHS survey, and only 40 percent having access to basic sanitation facilities. Data from the baseline studies from each CS revealed that the situation was even worse in their work areas, particularly access to sanitation facilities (See Table 4-3). Lack of access to safe water and improper human waste disposal contributes to diarrheal infections. This in turn affects the body's ability to absorb nutrient and utilize calories, and leads to malnutrition. Ultimately, malnutrition induced by acute diarrheal disease creates serious health problems and is one of the major causes of child mortality in Bolivia.

The Title II rural population also lacked access to health education and basic knowledge about hygiene, which also contributed to diarrhea and gastrointestinal problems. Only 25 percent of child caregivers and food preparers in the target population surveyed in the baseline study demonstrated adequate hand-washing behavior at the five critical moments: after defecation, after changing young children's diapers/helping them use the bathroom, before food preparation, before eating, and before feeding children. W&S interventions targeted at the poorest communities were, therefore, a critical strategy for decreasing illness and malnutrition in rural Bolivia.

Sustainable improvements in access to safe water and sanitation facilities in the rural areas of Bolivia are not possible without the effective involvement of municipal governments and community members. This is another part of the sanitary problems in the rural areas, the lack of capacity of local organizations to promote and implement effective W&S projects that meet basic technical, social and economic criteria and are sustainable over time. The development literature includes numerous examples of water projects that ceased to function after a short time or latrines that did not accomplish their purpose and ended up being used as storage sheds in the communities. Similar types of experiences could be observed in the past in the areas where the Title II CSs worked.

4.3 Overall Strategy and Approaches

Each of the four CSs carried out some combination of hardware (installation of community and family water systems, showers, sewerage systems and latrines) and software (community capacity building and hygiene education). The CSs built sustainability into their programs by training community W&S committees (CAPYS) on the management, operation, maintenance and appropriate use of their new W&S systems. The sustainability of these systems will ultimately depend on the willingness and ability of these community committees to monitor, maintain and repair them. Behavior modification was also a key element in each of the CS's programs, and system beneficiaries were trained in improved hygiene practices through health education and behavior change strategies.

All four CSs worked with the communities and their respective municipal governments on the selection and prioritization of the W&S projects, which were included in the annual operational plans (POAs) of the municipal governments. The projects were funded with monetization monies from the CSs, matching funds from the municipal governments, and contributions in cash, local materials and non-skilled labor from the system beneficiaries. The cash was used to pay for the technical staff and skilled manual labor working on the systems, equipment and non-local materials. Title II food rations were not used in any of the rural W&S program activities.

ADRA, CARE and SC improved their capacity to design and implement their infrastructure activities post MTE and began designing and implementing their W&S projects, as FHI had already been doing, using their own personnel and/or temporary hires. Their approaches differed, however, in terms of their technical complexity. ADRA and CARE employed local unskilled labor in all their W&S construction work, for example, under the modality of self-construction, while SC and FHI used local unskilled labor to provide support to contracted skilled labor. SC and FHI also used sophisticated engineering software and topographical equipment, for example.

4.3.1 Construction of the W&S Infrastructure

4.3.1.1 Scale of the Program

The CSs completed a total of 192 W&S projects under these DAPs. This included over 8 thousand household standpipes/sinks and over 7 thousand household latrines (See Table 4.1 on the following page). CARE was responsible for 118 of these projects. This was significantly more than any of the other CSs and represents almost half the total W&S infrastructure constructed under the program.

All four CSs were able to negotiate considerable additional resources to help fund the construction of their W&S projects. Over \$6 million was spent on W&S projects during the DAPs, almost half of which came from other sources – 17 percent from the municipalities and 21 percent in both in-kind and cash contributions from the participants (See Table 4.2). In other words, by leveraging funds from other sources, the CSs were able to almost double the amount of resources that they were able to devote to their rural W&S programs. CARE

also stands out as having invested more in W&S projects in monetization funds than the other CSs. The participants in CARE's programs made larger in-kind contributions as a result of the self-construction strategy that CARE used to implement its W&S projects.

Table 4.1: W&S Infrastructure Constructed Between 2002 and 2008, by CS

Agency	Number Projects Completed	Number Water Standpipes/Sinks Constructed		Number Latrines Constructed	
		Household	Public	Household	Public
ADRA	18	803	56	622	56
CARE	118	4,322	136	4,654	158
FHI	36	1,929	34	1,726	28
SC	20	1,182	18	575	7
Total	192	8,236	244	7,577	249

Table 4-2: W&S Direct Investment Costs Cumulative by Funding Source

Agency	Funding Source (US\$)						Total
	Monetization	Title II Food Rations	Municipalities	Participants		Other Donors	
				In-Kind	Cash		
ADRA	426,995	-	231,296	111,155	-	-	769,446
CARE	1,574,354	-	333,943	805,901	39,822	393,760	3,147,780
FH	690,804	-	303,879	153,794	71,343	93,843	1,313,663
SCB	466,270	14,060	189,102	97,775	46,414	176,833	990,454
Total	3,158,423	14,060	1,058,220	1,168,625	157,579	664,436	6,221,343
Percent	50.8	0.2	17.0	18.8	2.5	10.7	100.0

4.3.1.2 Characteristics of the Infrastructure

Most of the water systems that were constructed during the DAP are gravity-fed systems that capture water from springs or streams through an intake structure or through a small dam. SC also constructed 11 pump systems in the *Altiplano* that access underground water at depths that vary from 24 to 80 meters. The systems include a collection chamber where the suspended solids and sand in the water are retained and a storage tank normally made from concrete, stressed concrete or ferro-cement. The water is distributed from the storage tanks to the households through a network of pipes. Early on the water was distributed to household standpipes, but now household sinks are most common. Post MTE, most CSs included household units in their systems, which include a sink, a shower and a latrine.

The evaluators were able to inspect a number of systems during their field visits, including their intake structures, collection chambers and storage tanks. The systems were generally well-constructed, appropriate engineering criteria were followed and careful attention was paid to their potential environmental impacts. All the collection chambers and storage tanks as well as the pump stations for SC's systems had a perimeter fence, for example. In ADRA's Tambomoqo system, even the intake structure was protected from animals with a barbed wire fence.

The MTE had recommended that the CSs consider using ferro-cement techniques in the construction of their W&S projects, an approach that CARE had already been using successfully for its water storage tanks for approximately ten years. ADRA accepted this recommendation and began constructing ferro-cement storage tanks in all its systems post MTE, as did FHI. Ferro-cement tanks are cheaper than those made of concrete and easier to construct and repair. ADRA followed standard design parameters, while FHI introduced additional reinforcement to the regular ferro-cement tanks. This increased their costs and made FHI's ferro-cement tanks cheaper than the concrete ones only for storage volumes above 8.5m³. For one of its irrigation water storage tanks, which has an 800 m³ capacity, FHI indicated that it was able to save 50 percent of the cost by not constructing the tank with regular concrete. SC did not construct any ferro-cement tanks in its water systems.

The installations that were constructed at the household level became very similar post MTE, following the same basic pattern introduced by FHI in its Title II projects in 1997.¹⁶ This model includes a sink and a latrine with a flushing porcelain toilet. For communities that have electricity, FHI, SC and CARE-Tarija also included showers with electric showerheads in their household latrines. FHI constructed public solar showers in communities that do not have electricity. SC also constructed public electric showers in their first W&S systems in the *Altiplano*, in the Piquiñani system for example. The sinks were preferred over a standpipe, especially by the women, because it allows them to wash clothes and kitchen plates and utensils more easily and comfortably.

All of four CSs constructed pits to absorb the waste water from the sinks and showers. FHI and SC constructed two pits for sewage which alternate in use, so that once one is filled it can be cut off and the other pit used. The usual size of the absorption pits for sewage was 1.3 m³. And, as long as the soils had regular permeability, the pits would easily last for three to five years or more before filling up. This means that there should be ample time for the accumulated material in the first pit to decompose while the second absorption pit is in use.

ADRA and CARE decided to construct only one absorption pit for sewage water in their systems, arguing that the additional work required for a second pit would be done by participants in the future, once the first pit was full. The FE team believes that both are probably being over optimistic, given that a significant effort is required to construct the absorption pits and include concrete covers and plastic piping to properly conduct the waste water. Soil characteristics and water table levels add to the complexity of the construction. The FE team believes it will be difficult for project participants to replicate these pits on a

¹⁶ ADRA implemented a model from the Pan-American Center for Sanitary Engineering and Environmental Sciences (CEPIS).

massive scale without outside assistance. This means that it is very likely that these systems will generate sanitation problems in the medium term with toilets that will not properly flush because their absorption pits are full, for example. ADRA and CARE believed that the CAPYS, the participants and the municipal technical units would be able to deal with these technical problems if and when they arose. Since experience in Bolivia and other countries has demonstrated that these absorption pits are critical to the sustainability of the latrines, the evaluator recommends that two absorption pits be constructed in future projects.

The materials used in the construction of the latrines varied. ADRA used stone and adobe with a thin layer of cement mortar for the walls, while SC and FHI used bricks. CARE used bricks for 70 percent of its latrine and adobe with a thin layer of cement mortar for the rest. Adobe was convenient, because it is a local material that could also serve as matching funds from the community in self-construction projects. In some projects visited, however, the thin cement layer was rapidly deteriorating along with the adobe. The result was that projects that had only been constructed a few years earlier looked rather old and led one to question whether they would last for the 20 years that is standard for sanitation projects. The use of wooden versus metallic doors seen in other projects also seemed likely to contribute to a reduction in the useful life of the latrines.

4.3.1.3 Project Unit Costs

The costs per project differed among the four CSs. The relatively low cost per household achieved by FHI, given the quality of its projects, is impressive. SC's costs were higher than the other CSs because of the additional costs in their pump systems, the relatively more expensive qualified manual labor in the Department of La Paz, and the type of bricks used in their latrines, which were more expensive than the rustic ones used by FHI. The unit costs for ADRA were close to the average, while CARE had the lowest unit cost per household standpipe/sink and latrine because of its self-construction strategy. While CARE's strategy resulted in lower construction costs, which translated into reaching a higher number of participant families, the quality of the construction, on average, was not as high as FHI and SC.

Table 4-3: Average Direct Cost per Household Water Standpipe/Sink and Latrine (in US\$)

Agency	Direct Cost per Household Standpipe/Sink and Latrine (US\$)
ADRA	981
CARE	667
FHI	828
SC	1,370
Average	961

Source: CS Reports

4.3.2 Capacity Building

4.3.2.1 Organizing and Strengthening the W&S Committees (CAPYS)

All four CSs worked to organize water and sanitation committee (CAPYS) as a way to get participating communities involved in the selection and construction of their W&S projects and then in their operation and maintenance. The CSs used these committees to coordinate with the communities on issues related to the conception, design, and construction of the

systems. Once the construction phase was finished, these committees were reorganized and strengthened so that they would be able to take over responsibility for operating and maintaining the systems.

The MTE had been concerned about the sustainability of these systems, because (1) the CAPYS did not have sufficient training or access to the manuals they needed to properly manage the systems and (2) the system user fees were not being charged periodically or were too low to assure the sustainability of the systems. Both situations had improved significantly by the time of the FE.

The CAPYS that were visited have statutes and rules that were approved by the community, an organizational structure with defined functions, a fee structure for the user fees, a basic accounting system, and a yearly schedule of maintenance activities for the system. In some communities, the CAPYS yearly schedule was extremely detailed. The FE team was also able to verify that between 25 to 70 percent of the leadership positions in the CAPYS committees were occupied by women, a percentage apparently higher than the one observed during the MTE.

All the systems had user fees, which were being paid with minimal late payments. However, the amount actually being charged was usually less than the calculated fee. This lower amount is referred as the social fee and is recognized by Bolivian law. The basic amount charged ranged from \$0.30 per family per month in the ADRA systems to \$1.40 per family per month in the SC systems, differences due in part to differences in the operating costs of gravity and pump systems. The evaluators also were able to verify that some savings were being accumulated in the majority of the systems. ADRA mentioned that it had established a separate fee, in addition to the social fee, that was being charged in the water systems in the municipality of San Lucas so that the communities would have some savings that could be used in the case of emergencies. The CAPYS for the Cauchi Titiri system, which SC helped develop, had accumulated almost \$2,000 in savings after only two and a half years in operation. The community planned to use these savings to buy a new replacement pump by the end of 2008. In a way, the social fee has served as an excuse so that some CAPYS can avoid charging adequate fees.

All the CAPYS were covering the operation, maintenance and repair costs for their systems at the time of the FE. All the systems also had operators (or plumbers) who were selected from their own communities to handle system operation and maintenance tasks. Not one complaint was heard in any of the systems visited about an interruption in water service for more than the strict time required to make necessary repairs. This was an indication of the effectiveness of the current operations and the likely sustainability of the systems.

The savings are usually managed in cash by the CAPYS treasurer. The members of some CAPYS knew that they should deposit the savings in a bank account to avoid problems, while others did not appear to perceive any risks from handling cash. In the Charamoco system, which FHI helped develop, the CAPYS decided to directly administer the funds due to bad experiences in the past with a bank in Capinota. As a good administrative practice, however, the CSs should recommend that the CAPYS keep their savings in a bank account. Normally there are banks or rural credit entities in the capitals of every municipality. Several

of the CAPYS that were visited were using their savings to offer loans to system participants (See FHI section for more details on one of these systems.)

All the CAPYS visited had tools and a stock of materials and accessories for repairs. The CAPYS operators were trained by the CSs during and after the construction of the systems. The majority receive some type of payment for their services directly from the CAPYS, although the payment is not uniform even within the same CS. For example, at the time of the FE, the operator in SC's Piquiñani system was receiving a set salary of \$10 per month, while in the Cauchi Titiri system, the operator was receiving \$72 per month. Obviously the difference in amount is affected by the size of the system and the monthly user fee charged. In general, the salary paid covers whatever maintenance tasks or repairs are necessary on the communal part of the system. In terms of the private components of the system, the operator normally charges according to the number of hours worked up to \$8.50 per day, depending on the community. Only in a few systems visited with more than one year of operation did the operator receive no type of payment.

At the time of the FE, the CAPYS were doing bacteriological water analysis tests at least once a year, taking the samples to laboratories or universities or taking advantage of agreements with other organizations such as the SODIS Foundation. ADRA helped strengthen the Camargo Services Cooperative (COSERCA) in Camargo, which had the necessary laboratory equipment but did not have an individual on staff with the capacity to do the testing. This EPSAS is now doing the water analyses for the communities in the municipalities of Camargo and San Lucas. The FE team noted, however, that with a few exceptions in some of the SC systems and another in FHI, the CAPYS members did not demonstrate confidence when it came time to interpreting the water analysis results. None of the CS's training materials cover this topic, a shortcoming that should be corrected.

Another problem that was flagged during ADRA's water quality testing was that the water in La Cueva system was being contaminated, not at the source or in other parts of the system, but at the household level. This was due to poor handling of the water, including the use of unclean utensils, not protecting water stored in buckets, etc. So, ADRA added this issue to its training program.

4.3.2.2 Training Manuals

The MTE had raised issues about the lack of training materials or that some of the training materials that were being used required too high a level of education. These issues seemed to the FE team to have been mostly taken care of by the time of the FE. The manuals that the CSs developed post MTE to use in training the CAPYS cover most of the important topics related to the organization, structure and functioning of the CAPYS, the operation and maintenance of the systems, and accounting. The ADRA manual also includes a model format for statutes and rules for the CAPYS, while the SC and FHI manuals include information on plumbing and water disinfection. The ADRA and SC manuals also include a model for the calculation of user fees. SC and FHI also place stickers that explain how to use and maintain the latrines on the latrine doors. FHI also developed a control sheet for its CAPYS to use that enables them to track every family sink and latrine, a control mechanism that the other CAPYS should be encouraged to adopt.

4.3.3 Sustainability Strategies

Efforts to strengthen the CAPYS, which are essential to the proper operation and maintenance of the systems, were an essential part of the sustainability strategies of all four of the CSs. In the last two years of the program, all four of the CSs also designed and implemented an institutional strengthening program for the municipal governments to strengthen their technical and managerial capacities.

The municipal government responses to this program varied and depended to a large extent on internal factors or politics; some were indifferent while others were deeply impacted. The FE team noted that the Patacamaya and Cotagaita municipal governments adopted a developmental vision, strategy and objectives in-line with those of SC and CARE for these respective work areas. Also, the municipal governments in Patacamaya and Toro Toro modified their organizational structure and strengthened their technical and environmental units, hiring civil engineers, agronomists and architects. At the time of the FE, these municipal governments were already capable of designing some of their own projects and developing the Bolivian environmental documentation (*fichas ambientales*) required for these projects.

Other municipal governments visited were also influenced by their relationships and exchanges with the CSs, although to a lesser degree. The Yaco and Toro Toro municipal governments indicated that SC and FHI had helped them establish a minimum quality standard for future infrastructure projects to be undertaken by these municipalities. The municipal governments of Entre Ríos and Vitichi adopted a regulation covering the exploitation of gravel in their municipalities, demonstrating a clear environmental awareness that did not exist before. Many of the current municipal leaders and technical staff are former program participants or personnel who used to work for the CSs.

These findings are indicative of improvements in the management and technical capacity in the municipal governments, which should help them better respond to the aspirations and demands of the communities and increase their capacity to help resolve problems. While the sustainability of many projects depends more on the communities than the municipal governments, as is the case of the W&S projects, it is reasonable to think that in the future the municipal governments will be able to contribute to the resolution of those issues that are beyond the capacity-level of the communities. The municipal government of Entre Ríos, for example, had already hired a technician and a plumber, whose jobs are to continuously evaluate the water projects constructed in the municipality, complementing the work of the CAPYS.

4.4 Results Achieved

The FE team was impressed with the quality of the projects visited, the responsiveness of the CSs to the MTE recommendations, the close coordination between the MCH/N and W&S staff, and the positive impacts that the W&S projects had on the lives of thousands of people in some of the poorest areas of Bolivia.

4.4.1 Quantitative Results

The numbers reported by the CSs on access to infrastructure indicate that there have been significant improvements in the percentage of household in the CS's work areas with access to safe water and latrines.¹⁷ CARE's performance stands out, showing an impressive improvement in the level of access to both safe water and latrines for the general population between the baseline and 2008. All four CSs also performed well in terms of the potential sustainability of their systems, with all four reporting that over 90 percent of the water supply systems that they constructed were being adequately operated and maintained by the communities at the time of the final survey in 2008.

Table 4-4: W&S Results Indicators by CS

Indicator	ADRA		CARE		FHI		SCB	
	Base-line 2002	Final 2008	Base-line 2002	Final 2008	Base-line 2002	Final 2008	Base-line 2002	Final 2008
Percentage of households with year-round access to new or improved safe water source	58	77	44	83	30	67	59	88
Percentage of households with access to latrines or sewerage	19*	75*	20	80	22	55	31	43
Percentage of constructed water supply systems adequately operated and maintained by the community they serve	79	100	-	97	24	96	NA	93

* Although ADRA did not report on this indicator on an annual basis, it did collect it through surveys and made it available to the FE during its review of the draft final report.

4.4.2 Qualitative Results

The site visits provided additional information on the positive effects of these projects on the recipient families and communities.

Easier access to safe water. In all the communities visited, there were many sincere expressions of gratitude from the participants, community leaders and municipal government authorities as they remembered how they lived before they constructed the systems and how they live now. Many indicated that they used to drink water from unprotected sources including wells, drainage canals or small seasonal rivers. In Charamoco, people used to drink water from the Rocha River which contains waste water and sewage

¹⁷ The results with respect to the changes in hygiene behavior are reported in the previous section on the MCH/N programs (Section 3.4.1.2).

from the city of Cochabamba. Others indicated that they used to have to travel long distances to carry water to their homes. In Chalchaquí, for example, they carried water from a spring located a half hour walk from the community.

Improvements in health. With the new infrastructure and an aggressive behavior change strategy implemented by the CS infrastructure and MCH/N teams, hygiene habits changed substantially which resulted in an improvement in the general health of the population, and, in particular, the health of the children. The FE team noted the diminished prevalence of diarrhea among children less than five years of age in several of the communities visited. In the San Lorenzo system, for example, the cases of diarrhea were progressively reduced between 2003 and 2008 from 16 cases of diarrhea per 17 children to 0 cases per 15 children respectively.

Increased knowledge of appropriate hygiene behaviors. The majority of the population interviewed were able to cite at least three of the five critical hand-washing moments promoted through the CS health programs. Also, soap was sighted at the majority of the sinks visited along with soap and shampoo in the showers. In the Charamoco and Kehuayllani systems, the participants indicated that most members of the community showered every day or even twice a day, due to the warmer climate. In Cauchi Titiri, in the middle of the *Altiplano* between La Paz and Oruro, the participants mentioned that they showered two to three times a week. In Tahua Reja and Pajli, located in a very high and cold zone in Potosí, the participants stated that they bathed on average one time a week with the solar showers.

The principle strategy used to change these behaviors was to apply social pressure within the community. The CHVs or the CAPYS members made frequent monitoring visits to every household to reinforce appropriate sanitation and hygiene messages and to observe hygiene behaviors, cleanliness of the latrine and dooryard. Checklists helped the volunteers track their observations and negotiate with families to improve their behaviors. There were a number of creative small strategies such as soap necklaces, awards for the cleanest household, etc. Two CSs promoted the health and hygiene messages in the schools, a very effective way of changing family norms.

Improvements in water treatment. All four CSs promoted purification of drinking water. (ADRA did not have to do this in the communities where the water met standards when tested for biological contamination.) The most widely promoted method was the Solar Disinfection system (SODIS), in which clean, clear water is put in clear plastic bottles which are left in the sun for a minimum of six hours. This method is effective and without cost, but will not be effective if the water has turbidity or the bottles are not clear or still partially covered by paper labels. Adoption rates were exceedingly high in all target areas. ADRA taught women's groups to make shoulder bags in which to carry a bottle of SODIS water to the fields. Where FHI was working with school health, each child had a clear bottle with his/her name on it, and SODIS water was either brought to school in the bottle, or disinfected in the sun at the school. In the highlands of Bolivia, adequate water intake has long been a concern when family members were away from home.

Proper use and maintenance of the latrines. The latrines visited had evidence of use and were found to be clean. In the majority of them, toilet paper and a trash can were observed. Compared to the latrines constructed by other institutions in the past, 88 percent of the latrines constructed by ADRA in their DAP were being used hygienically while FHI reached over 87 percent usage in the systems they constructed. The data for FHI includes latrines that were constructed up to 12 years ago in certain areas. Participants also indicated that their children had adopted the new W&S systems as their own and made good use of the new infrastructure.

Increases in the quantity of water available. The quantity of water available for the participant families has increased to no less than 50-60 liters/person/day for the majority of the systems constructed. Before the construction of these systems, the probable water use for the general population in the beneficiary communities was estimated to range from 10 to 15 liters/person/day. (ADRA reported 17.4 liters/person/day in their baseline.). ADRA also had an indicator that measured water use and in its 2008 annual report it reported that the average water use for its systems was at 64.3 liters/person/day.

While the hygiene education was undoubtedly very important in changing behaviors, simply increasing access to sufficient water was probably the biggest factor in improving hygiene and, thus, reducing incidence of illnesses, particularly diarrhea. The CSs deserve commendation for what they have done in this Title II program to significantly increase access to sufficient water and to sanitation facilities.

4.5 Constraints to Future Development

Several constraints to expanding W&S systems in rural Bolivia were identified in the course of the FE. These include:

- ***The high costs of W&S systems relative to municipal budget.*** The costs of these systems are relatively high in comparison to the levels of the annual budgets managed by the municipal governments. The majority of the municipal governments visited during the FE indicated they needed additional funds from external donors because their own funding was insufficient.
- ***The weak technical capacity of some of the municipal governments' technical staff.*** Some municipal governments do not have the technical staff needed to design, supervise and direct the W&S projects to insure they meet the required technical and quality standards. The municipal governments are weak organizationally and this adversely affects their technical capacity as does the excessive rotation of municipal government personnel due to political reasons or other causes.
- ***Political problems that affect municipal government management.*** The municipal government of Sapahaqui has had years of governance problems and something similar happened with the Luribay municipal government, to cite two specific examples that jeopardized SC's work. CARE experienced similar problems with the Tarvita and Vitichi municipal governments.

4.6 Lessons Learned

- ***Finding the right design for the household installation can take time but is necessary to achieve widespread adoption.***

According to the literature from UNICEF, the World Bank, and other organizations, many different types of strategies and designs for W&S systems have been tested all over the world, with rather discouraging results, with latrines in particular.¹⁸ Some of the Title II CSs had similar experiences in Bolivia the past. However, after many years of testing different designs and types of construction, the CSs seem to have found a design for their W&S household installations that is acceptable in all the ecological zones and by the majority of the cultural groups found in rural Bolivia. This design, which includes a sink and a porcelain flush toilet and showers, seems to represent a cost effective solution to what had been a long standing problem of rural sanitation in Bolivia. These facilities are hygienic, odorless, and well-constructed household units and seem to give their owners pride and greatly facilitate the adoption of good sanitary practices among the population. Using higher quality materials in the construction also has advantages, because it enhances the useful life, of the latrines in particular. Using alternating pits to absorb the sewerage water from the latrines also worked well in the majority of the locations, with small variations in cases of soils with too much clay or rock. Only approximately 2 percent of all the latrines constructed during the DAPs ran into difficulties due to the high water tables in some communities. In these cases, septic tanks or other solutions were employed.

- ***Title II infrastructure projects can benefit from the application of the principles of Total Quality Management.*** (This lesson applies to all types of infrastructure projects constructed under the Title II program and not just the W&S projects.)
 - ***The quality of the projects starts with the quality of the designs.*** A major reason for the strength of the FHI and SC infrastructure projects was that they were supported by rigorously detailed designs that left little to guesswork or improvisation. The CSs also benefited from forming strong technical design teams within their organizations, staffed with well-trained and experienced personnel. SC experienced a surprising improvement in the quality of its projects after the MTE merely from following this principle.
 - ***The continuous improvement principle must be applied to achieve excellence in the projects.*** The CSs should capitalize on the things they did

¹⁸ In their Progress Report No 1 from 2006, UNICEF cites a study of 5,617 ecological latrines and 433 blocks of ecological latrines in schools constructed between 1999 and 2005 in 451 communities in 32 municipalities of Bolivia. The results of the study indicate that, between May and August 2006, 39 percent of the families used the latrines frequently, 31 percent occasionally and 30 percent did not use the latrines. In the schools, 93 percent of the students used the latrines while they were at school. Of the families that used the latrines, 64 percent used them incorrectly (insufficient quantity of ashes, insufficient compacting, etc.) and 40 percent of the school latrines were dirty (88 percent with odor and vectors). The report also indicates that there was no demand in the general population for this type of latrine. In summary, the report has very disappointing results for years of work in rural sanitation in Bolivia.

correctly as well as on their failures to continuously improve the design and implementation processes of the projects. FHI achieved a high degree of effectiveness in its W&S and irrigation projects, for example, by developing and improving processes over the years related to the implementation of quality projects and responding to participant expectations and FHI objectives, improvements which led to better constructed projects. This philosophy of continuous improvement should be applied by all the CSs in all their areas of work.

- ***Clients' perceptions of quality should be taken into consideration when setting quality levels for the projects.*** The participants and the municipal governments were able to distinguish the value added by a high-quality versus a low-quality project, and some of the CSs used this to leverage higher municipal and participant matching funds as well as greater interest and demand for their projects.
 - ***Project quality is a function of strategic decisions made by organizations.*** Explicitly or implicitly, the CSs defined the level of quality of their infrastructure projects on the basis of the objectives of their organization, their organizational structure, the budget for infrastructure, etc. In other words, it was not by chance that some CSs had better results in their infrastructure projects than others.
 - ***Quality projects require leadership that seeks quality.*** Vision, planning and communication are required to implement quality projects, all of which are the responsibility of top management.
- ***Hygiene improvements can be facilitated by closer collaboration between those responsible for the development of the infrastructure and the MCH/N programs.***
 - ***Working with and through public and private strategic partners can help leverage additional resources which can be used to expand the size and quality of a W&S program.***

4.7 Recommendations

All four of the CSs should seriously consider taking steps to:

- ***Assess, systematize and disseminate information on their experiences in implementing W&S projects in rural Bolivia.*** Documents that could orient the steps of others, helping them avoid years of trial and error and wasted resources, are urgently needed. Studies of this nature should include reviews and assessments of: (1) the technical characteristics of the household units versus other options, (2) the cost effectiveness of the different options, (3) how well the installations functioned and how the beneficiary population perceived and used them., (4) the degraded material in the absorption pits and (5) the useful life of the installations and their technical perspectives for sustainability.

In the event that the CSs continue to do W&S projects in the future, they should also:

-
- ***Collect systematic information on the flow rates of the water sources for future water systems.*** For potential future projects, the CSs should establish water measurement field visits every three months, and on a monthly basis during the dry season (between August and November), for the years that they work in an area. This will provide them with statistically reliable hydrologic information for the water sources available. In cases where the CSs implement projects that have been developed by other institutions or consultants, design parameters such as the water measurements should be directly verified during on-site visits to the field.
 - ***Standardize the CAPYS training manuals.*** This would simplify the process and capitalize on the individual strengths of each of the CSs, reducing costs and creating more complete materials covering all the necessary areas related to the administration, operation and maintenance of the systems.
 - ***Improve their management accounting systems in order to control the costs of their infrastructure components and their individual projects.*** Surprisingly, none of the CSs' accounting departments could provide the FE evaluator adequate accounting information about the total expenses for their W&S, irrigation and roads components during the 2002-2008 DAP. With the exception of FHI, the agencies did not control expenses by individual infrastructure project, charging everything to a common pot. All of this contradicts the basic management criteria for programs and projects, and it should be improved in the future.
 - ***Encourage exchange visits between communities to help overcome cultural barriers in latrine use.*** This was a successful strategy used during the DAP for community participants to see a successful project and visualize real change for their own community. These participants then acted as change agents in their communities, facilitating the job of the CSs in the promotion, construction and operational phases of the projects.
 - ***Develop a sustainability plan at the beginning of a program, concentrating on strengthening the CAPYS and the municipal technical and environmental units.*** The strong emphasis on sustainability began in 2005 and 2006 instead of at the beginning of the DAPs. If the CSs had put more emphasis on sustainability from the beginning of their DAPs, they might have been able to achieve even greater results. To enhance the likelihood of sustainability, points that need to be stressed with the CAPYS include the importance of: (1) managing CAPYS positions, not on a rotational basis, but based on the capacity of individual participants, (2) keeping their savings in a bank account, (3) being able to, with additional assistance, interpret bacteriological water analyses, (4) paying their operators/plumber some type of fixed or temporary work payment, and (5) obtaining, as the FHI CAPYS have done with FHI assistance, certified rights over their water sources as well as jurisdiction over their W&S systems, which is provided by the Superintendent of Basic Services (SISAB) (See section 4.9.4.3. for further details).

4.8 Monitoring and Evaluation¹⁹

The FE team reviewed the monitoring and evaluation systems that the CSs used to control their W&S, irrigation, roads and other infrastructure projects. As a general observation, the environmental checklists that the CSs developed to use during the design, construction and operational phases of each type of infrastructure project helped the CSs systematize the environmental and technical monitoring of their projects and to rapidly overcome one of the major weaknesses that had been cited in the MTE. These instruments proved very useful to all four CSs.

Adventist Development and Relief Agency (ADRA). ADRA developed a good monitoring system for its infrastructure projects, which consisted of electronic spreadsheets and a schedule of activities in which the physical progress or the estimated percentage of progress of every activity/phase of a project was reported monthly and compared to what had been planned. The system also included information about the total volume of the civil works of every activity/phase of a project, the number of days of work required for the assigned resources, the accumulative progress to the date of the report, and the end date of the project. All this information helped those responsible for a project to adequately control the time periods allotted for its construction. ADRA also used a flowchart and a matrix which provided details on the complete cycle of each infrastructure project, defining who was responsible and what control form to use for every phase of the project.

ADRA had an average of three to four infrastructure staff at the national level during the DAP: one national infrastructure coordinator, one infrastructure assistant (since 2007) and two project engineers. ADRA completed 18 W&S projects during the DAP, which implies an average of around two projects per year, a number that was feasible to design and control with the size of its team.

CARE. CARE used Excel sheets, which the technical personnel responsible for each project used to periodically report on the estimated progress during each major stage of a project. The control sheets for latrines were more exhaustive than those for the water systems, and included controls that indicated the progress being made on each individual participant's latrine. While the CARE system was simple and practical, the spreadsheets did not include a comparison between what was planned and what was accomplished during the reporting period, a short-coming that could lead to problems of not adequately controlling the productivity of the workers or extending the completion date of projects for longer than they should have been, which could adversely affect the general budget of the project.

CARE's organizational chart included 15 infrastructure positions and three environment positions. The infrastructure positions included a general infrastructure supervisor, three technical assistants (one for each regional office), eight infrastructure facilitators, one irrigation training consultant and two training facilitators for the CAPYS. Based on a list of the W&S, roads and irrigation projects undertaken during the DAP, CARE constructed an average of seven projects in each regional office per year. Although this number seems

¹⁹ This section pertains to all infrastructure projects of the agencies and not only to water and sanitation projects

reasonable and feasible, the evaluator was still concerned that CARE did not have enough design and support personnel, such as design engineers and topographers, in its organizational structure.

Food for the Hungry International (FHI). FHI developed and implemented a computerized monitoring system for its infrastructure projects during this DAP, which replaced a previous narrative reporting system. This new system included electronic control sheets and the use of MS Project. The new system enabled FHI to control all the infrastructure and environment activities undertaken in each of its regional offices and to be able to easily consolidate these results at the national level. This system has enabled FHI to have detailed, up-to-date information about each project and each work area. The control system, for example, provides information on the percentage of progress in the distinct activities/phases of each project, as well as the response to environmental observations made during each supervisory visit, according to each pertinent checklist. This system also enabled FHI to monitor the progress of the DAP results indicators for each fiscal year. The reports that are produced by the system were designed to facilitate analysis and decision-making. Although the development and implementation of this system took a long time, it has tremendously simplified the management of large volumes of information about FHI's projects, helped organize the work of FHI's technical personnel and avoided a lot of bureaucracy.

FHI had an average of 20 infrastructure staff in its two regional offices during the DAP: one national infrastructure coordinator, two regional infrastructure coordinators, four project engineers, nine technical assistants and two topographers. FHI constructed on average six infrastructure projects per year in each of its regional offices.

Save the Children (SC). SC's infrastructure monitoring system included a narrative report and electronic control sheets in which estimated project progress was reported for each activity/phase of a project on a monthly basis. The control sheets included the quantity of work planned for each activity/phase of a project as well as the scheduled start and finish dates for the entire construction process which was obtained from the activity schedule in the final design documents. These last two elements helped assure that projects remained on-schedule. A better way would have been to compare the planned progress versus the actual progress for each activity/phase for the reporting period.

SC employed nine people on a permanent basis in its infrastructure area: one infrastructure supervisor/project engineer, two project engineers, one topographer, three field engineers, one organizer/trainer and one engineering and environmental fiscal officer. The project engineers were specialists in the design of W&S, irrigation and roads, respectively. Based on demand, one or two project engineers and up to three field engineers were also hired on a temporary basis. On average, SC implemented a total of eight infrastructure projects per year in their rural work areas. One of SC's comparative advantages was that it used the latest technology for topographical surveys, which provided a solid and efficient foundation for the subsequent designs, which were done using computerized engineering software. Additionally, the design and construction processes were very efficient, as SC's personnel had solid training and many years of experience. All of these factors enabled SC to accomplish its objectives and construct high-quality projects with relatively few staff.

4.9 Findings for the Individual Programs

4.9.1 Adventist Development and Relief Agency (ADRA)

ADRA constructed 18 W&S projects during the DAP. This included 803 household and 56 public standpipes/sinks and 622 household and 56 public latrines (See Table 4-1). ADRA spent over \$769 thousand on these projects, almost 45 percent of which came from matching funds from municipal governments and local materials and manual labor from its beneficiary communities (See Table 4-2). Although ADRA was able to obtain a significant percentage of matching funds for its W&S projects, it did not charge cash matching funds to the participants for the construction of the systems. Additional cash would have helped cover some costs and promote a greater sense of ownership on the part of the participants.

4.9.1.1 Key Program Approaches

System Design and Construction. ADRA continued to make improvements in the design of its W&S systems during the DAP. ADRA also began constructing ferro-cement storage tanks in all its systems in response to a MTE recommendation. Post MTE, ADRA also began replacing the cement toilets with porcelain toilets, added doors on the latrines instead of sight-blocking walls, and improved the general construction standards for its latrines. ADRA also made good use of abundant local materials, such as stone for example, to construct the latrines in the La Cueva system, achieving a good finished product.

A few problems were noticed during the field visits, however. There was no water in the Tambomoqo system at the time of the FE visit, for example. The original water source had dried up, and the community was suing a neighboring community over the use of another water source. This litigation had not been resolved at the time of the FE visit, although ADRA management indicated later that the problem had been resolved.

Environmental Concerns. ADRA also created an environmental unit in response to a MTE recommendation, which helped it strengthen its infrastructure program, including through the creation of a rigorous environmental control system which it used in the design and construction phases of all its infrastructure projects. Observations during the field trips indicated that ADRA had paid careful attention to environmental concerns and had completed all the necessary mitigation measures for its W&S systems. All its W&S systems also had their environmental documentation in order (*fichas ambientales* and *certificados de dispensación*) signed by the Prefecture of Chuquisaca.

Collaboration on Hygiene Training. ADRA's infrastructure unit collaborated with its MCH/N program in the training of the participants in its W&S systems about health and hygiene. Emphasis was placed on proper hand washing behavior during the five critical moments and the proper use of latrines.

4.9.1.2 Results

Table 4-5: ADRA W&S Program Performance

Indicator	Baseline 2002	Final 2008	LOA Target	Percent of Target Achieved
Percentage of target families who have access to safe water during the whole year.	58	77	65	118
Percentage of households with access to latrines or sewerage.	19	75	58	131
Percentage of communities who pay on a regular basis maintenance fees and operations of water services and sanitation.	79	100	88	114

ADRA surpassed its Life of Activity (LOA) targets for its three indicators -- access to safe water, access to latrines, and systems operated and maintained by the beneficiary communities (See Table 4-5). All three indicators showed a significant improvement compared to the baseline, particularly the indicator for access to latrines. ADRA attributed the excellent results that it obtained for the operation and maintenance of its W&S systems to the implementation of the Quality Surveillance of Rural Water Supply Services program within its work area, with help from the Health and Environmental Engineering Institute of the University of San Andres.

ADRA also reported on another indicator that that the other CSs did not include in their indicator tables -- the quantity of water consumed per capita per day among target families. The MTE had recommended that ADRA install water meters in its water networks to obtain precise information for this indicator, which it did successfully. In 2008, ADRA reported that water consumption was at 64.3 liters/person/day in the systems constructed during the current program, a very significant figure for the rural areas.

The improvements in infrastructure were also accompanied by improvements in the health conditions in ADRA's participant communities. In the San Lorenzo system, as reported earlier, 16 out of 17 children were reported to have had diarrhea in 2003 compared to 0 out of 15 in 2008. And, in the Tambomoqo system, the health program reported that the incidence of diarrhea decreased from 60 percent in 2005 to 25 percent in 2007 and to 12 percent in 2008.

4.9.1.3 Sustainability Strategies and Potential for Sustainability

ADRA's CAPYS are well organized and function well. They were trained in masonry and plumbing during the construction of the systems, and later, in system operation and maintenance, administration and accounting. At the time of the FE, they all had statutes and rules, an organizational structure, a fee structure, a basic accounting system, a yearly schedule for maintenance activities and some tools. In most of the systems, the fees were being paid with minimal late payments. All the CAPYS also had operators/plumbers selected from the communities who were responsible for the maintenance and repair tasks.

ADRA produced a training manual for the CAPYS and system participants. This manual covers organizational, administrative and technical topics, but it does not include sections on plumbing and bacteriological water analyses.

ADRA also helped strengthen the Camargo Services Cooperative (COSERCA), which, at the time of the FE, was doing water analyses for the communities in the municipalities of Camargo and San Lucas.

The systems in Rodeo Pampa, Tambomoqo and La Cueva had accumulated some savings after a few years of operation (\$379, \$495 and \$463 respectively). However, the 0.30/family/month user fee charged in the majority of ADRA's water systems seems to be too low to adequately cover all the administrative and operating costs, including a monthly salary for the operator (which was not happening), and to produce some savings.

4.9.1.4 Recommendations

In the future, ADRA should:

- Include two absorption pits for sewage in all its sanitation systems.
- Increase its user fees so they adequately cover all the administrative and operational costs of the systems and enable the CAPYS to accumulate some savings.
- Correct some plumbing details in its systems, making sure that two universal unions are used in the valve chambers, filters are in place in the storage tank and the collection chamber, and leaks are repaired in the siphons in the sinks.

4.9.2 CARE

CARE constructed 118 water and sanitation projects during this DAP. This included 4,322 household and 136 public standpipes/sinks and 4,654 household and 158 public latrines (See Table 4-1). CARE spent over \$3 million on these projects, almost 27 percent of which came from matching funds from the participants and over 23 percent from other sources (See Table 4-2). As indicated earlier, CARE constructed significantly more W&S systems than any of the other CSs.

4.9.2.1 Key Program Approaches

System Design and Construction. CARE' used ferro-cement techniques to construct its storage tanks, which stood out due to the quality of their construction, their slim and sleek design, and the attention that CARE paid to the surrounding environment.

After the MTE, the CARE Regional Office in Tarija changed the design it was using for the household units that it was promoting in the Entre Rios area to one that included a porcelain flush toilet and a shower. The CARE-Tarija regional infrastructure staff told the evaluators that, "after many years of testing one design or another, now we have one that really works." The improved quality of the construction appeared to help increase the adoption rate, but

the users were also attracted by the additional features, including the showers, which can be very useful in the warm and humid communities where temperatures can reach 40° C (104 °F).

The CARE Regional Office in Potosí did not make this change, and the systems that were visited in Yurac Cancha, Totorá I and Ascanty had a fiberglass slab “Turkish seat” style instead of the porcelain flush toilets that were being used in Entre Ríos. One disadvantage of these toilets is that they can only be cleaned by carrying water in a separate container from outside the latrine. On the other hand, this style is easier for small children to use, even when unaccompanied. Tank flush mechanisms also are available for “Turkish” toilets, and CARE may wish to use them in future projects. The latrines in Yurac Cancha were well made, with local stone used in their construction. One of the arguments that the Potosí Office made for selecting this design was that they wanted to preserve the tradition and culture of the area. For areas as warm as those visited, putting a cold shower into the latrines would have represented a marginal investment cost of around \$20 per latrine for significant additional benefits. CARE Potosí did locate showers in the schools in the first two communities, and a couple of showers were constructed by participants on their own. The evaluator believes that the CARE-Potosí Office would have greatly benefited if it had adopted the better and apparently more successful design used by CARE-Tarija.

Environmental Concerns. With the exception of a few small problems in the San Simón and Lajitas systems, CARE paid careful attention to environmental concerns and completed all the necessary mitigation measures in its W&S systems. CARE also created an independent environmental unit, in response to a MTE recommendation, which helped it strengthen its infrastructure component and systematize its environmental monitoring and follow-up. All the CARE W&S systems constructed post MTE had the Bolivian environmental documentation (*fichas ambientales* and *certificados de dispensación*) in order, signed by the prefectures.

Collaboration on Hygiene Training. CARE’s infrastructure unit and its MCH/N program collaborated on a health and hygiene training program for its W&S system participants. The majority of the participants interviewed during the field visits knew about the critical hand washing moments and appeared to be using their latrines adequately. CARE also promoted the general cleanliness of the homes in its Potosí work area, establishing a community control system using different colored flags to indicate the state of each house, with findings discussed in community meetings.

4.9.2.2 Results

CARE surpassed its LOA targets for its three indicators -- access to safe water, access to latrines/sewerage and systems operated by the beneficiary communities (See Table 4-6). As mentioned in Section 4.4.1., CARE was very successful in expanding access to safe water and latrines in its work areas in comparison to the other CSs. At the end of the DAP, more than 80 percent of CARE’s participant population had access to safe water and latrines, a notable achievement for the conditions in rural Bolivia. In its 2008 CSR4, CARE attributed part of this achievement to negotiating matching funds from other sources, including participant contributions through CARE’s self-construction strategy. Plus, 97 percent of

the W&S systems that CARE constructed were being adequately operated and maintained by the communities, which was 26 percent higher than the LOA target and a considerable achievement. The people interviewed also talked about the improvements in health among the general population, and particularly among children less than five years of age.

Table 4-6: CARE W&S Program Performance

Indicator	Baseline 2002	Final 2008	LOA Target	Percent of Target Achieved
Percentage of households with year-round access to new or improved safe water source.	44	83	71	117
Percentage of households with access to latrines or sewerage.	20	80	66	122
Percentage of constructed water supply systems adequately operated and maintained by the community they serve.	0	97	77	126

4.9.2.3 Sustainability Strategies and Potential for Sustainability

CARE's CAPYS have statutes and rules, an organizational structure, a basic accounting system, and some tools. The CAPYS were trained in masonry and plumbing during the construction of the systems, and later in administration, accounting and operation and maintenance of the systems. Participants were also trained in systems operation and maintenance. CARE's self-construction strategy also contributed to the formation of semi-skilled construction labor in the areas where it used this strategy.

The operators/plumbers do periodic maintenance of the systems with help from the participants. The operators are paid for repair work done in the homes, and in the Yuraj Cancha and Ascanty systems, they receive an annual incentive from the CAPYS.

CARE produced very good organization and basic accounting materials for the CAPYS and, during the visits, masonry and plumbing manuals were also observed. However, CARE's manuals do not include a user fee calculation structure, a plan or schedule for the operation and maintenance of the W&S systems, or a section on bacteriological water analyses.

With the exception of the Lajitas system, the fees were being paid with minimal late payments in all the systems visited. Also, the accounting books were not up-to-date in the Totorá I system due to the annual rotation of the CAPYS leaders.

CARE's institutional strengthening program had a positive impact on the municipalities of Entre Ríos, Vitichi and Cotagaita. The Cotagaita municipal government adopted CARE's developmental vision, strategy and objectives, for example, while the municipal governments of Entre Ríos and Vitichi adopted environmental regulations for their municipalities.

4.9.2.4 Recommendations

In the future, CARE should:

- Standardize the CARE-Tarija latrine design and implement it in all its regional offices.
- Include two absorption pits for sewage in all its sanitation systems.
- Increase technical support and supervision for the self-construction activities in order to assure uniform quality in the constructions.
- Correct some plumbing details in its systems, making sure that two universal unions are used in the valve chambers, filters are in place in the storage tank and the collection chamber, and leaks are repaired in the siphons in the sinks.

4.9.3 Food for the Hungry International (FHI)

FHI constructed 36 W&S projects during the DAP. This included 1,929 household sinks and 1,726 household latrines – an impressive number (See Table 4-1). FHI also constructed 28 public standpipes and 34 public latrines in its Cochabamba regional office, mainly in schools. FHI spent over \$1.3 million on these projects, over 47 percent of which was from matching funds (See Table 4.2).

4.9.3.1 Key Program Approaches

System Design and Construction. FHI continued to construct sinks and latrines during this DAP, using the basic design that it introduced in 1997, with some small improvements made over the years. The results have been good and have given FHI a solid reputation for doing good quality projects.

FHI began constructing ferro-cement storage tanks in all its systems post MTE. However, FHI introduced additional reinforcement to the regular ferro-cement tank design, which increased their cost and made them cheaper than the concrete tanks only for storage volumes above 8.5 m³. FHI justified this approach, arguing that the ferro-cement technique simplified its overall water storage tank construction and repairs, in addition to reducing the total quantity of aggregates required. Post MTE, FHI also corrected the method it used to calculate distribution networks for water systems with less than 30 connections, and, it also covered the rungs of the ladders in the storage tanks with PVC.

During the field visits, the FE team was able to see some of the systems that FHI had constructed ten to twelve years earlier that had not experienced any serious problems. A latrine from one of these earlier systems was also inspected and found in perfect condition, needing only perhaps a fresh coat of paint. In that case, however, one of the absorption pits was full and the other absorption pit had not been connected, which created problems in flushing the latrine. Although this is merely anecdotal information, it says a great deal about the quality of the projects constructed by FHI and offers a positive perspective on the future sustainability of these facilities. At the time of the FE, over 85 percent of FHI's population was using the latrines in a hygienic manner.

FHI also experimented with appropriate technologies in its efforts to find workable solutions to some of the problems it encountered in specific rural areas. FHI constructed public solar showers in places that had no electricity, for example, and included chlorination systems made in Bolivia in the systems in Charamoco and Calahuta. The results have been good, although some problems were reported with some solar panels that use liquid antifreeze. These were expensive to replace, and FHI changed to another brand of solar panels that do not require liquid antifreeze.

In a school visited by a member of the FE team, the infrastructure existed, but water had ceased to come. Neither school personnel nor the community was taking responsibility for maintenance. FHI could have worked with the community to assure a permanent maintenance system and rectify the current lack of water.

Environmental Concerns. FHI had begun implementing an environmental control system for the design, construction and operational phases of its projects at the beginning of the DAP. This worked well, and FHI continued to strengthen the environmental dimensions of its program during the DAP. FHI also was the only CS that had an environmental unit included in its organizational structure at the time of the MTE. FHI strengthened this unit post MTE by adding personnel to each of its regional offices.

Collaboration on Hygiene Training. FHI's infrastructure unit and its MCH/N program collaborated on a health and hygiene training program for its W&S system participants.

4.9.3.2 Results

FHI surpassed its LOA targets for its three W&S indicators -- access to safe water, household access to latrines/sewerage and the operation/maintenance of the systems. These indicators also showed significant improvement in comparison to the baseline (See Table 4-7). FHI attributed its achievement in the operation and maintenance indicator to its training strategy for the CAPYS.

FHI was also able to achieve significant improvements in the hygiene habits of its participant populations, as a result of the new infrastructure in combination with the training carried out by the W&S and MCH/N staff. The participants interviewed expressed a great deal of satisfaction with the improvements in their quality of life. In the warmer areas served by the Cochabamba regional office, participants also mentioned the advantages of having electric showers as a part of their household latrines. These activities also had a significant impact on the health of the general population. In Charamoco and Calahuta, for example, the participants interviewed also mentioned major reductions in malnutrition rates among young children.

Table 4-7: FHI W&S Program Performance

Indicator	Baseline 2002	Final 2008	LOA Target	Percent of Target Achieved
Percentage of households with year-round access to new or improved safe water source.	30	67	65	103
Percentage of households with access to latrines or sewerage.	22	55	55	100
Percentage of constructed water supply systems adequately operated and maintained by the community they serve.	24	96	95	101

4.9.3.3 Sustainability Strategies and Potential for Sustainability

FHI's CAPYS are well organized, have statutes and rules, an organizational structure, a basic accounting system, a yearly schedule for maintenance activities and some tools. At the time of the FE, FHI's CAPYS were able to efficiently operate, maintain and repair the systems. The CAPYS operators/plumbers are responsible for maintenance and routine repairs to the systems. They are paid by the participants for work done within their homes and by some CAPYS for community-level work. In the Tahua Reja and Pajli systems, the work done by the operators was considered to be a general service to the community.

FHI produced various training materials for the CAPYS and system participants. These manuals, which were well done, cover organizational, administrative and technical topics. What is lacking is a user fee calculation structure, a basic accounting system for the CAPYS, a model schedule for the operation and maintenance tasks of the systems, and a section on bacteriological water analyses. FHI staff indicated that they had developed these materials in response to a MTE recommendation and, given the MTE recommendation that these materials be appropriate to the educational level of the FHI beneficiaries, staff did not want to make the materials too complex for their beneficiaries whose educational level tends to be limited to the 2nd or 3rd grade.

Fees were being paid with minimal late payments in all the FHI systems visited. The Charamoco CAPYS had saved \$14,800 since the system was completed in July 2003 and is using these funds to offer loans to the water system participants at a monthly interest rate of 2 percent. Loans require the signature of a second person and may not exceed the amount of the cost of a share in the system, which is equivalent to \$600. The Charamoco CAPYS uses the interest earned on the loans to pay the salary of the CHV and, in the future, is planning to get health insurance for all the system participants from the Capinota Health Center.

Initially only 90 families were willing to participate in the Charamoco system. This was due to past failures on the part of three other organizations that had promised to provide water

and sanitation for the community. By the time of the FE, the system had expanded to 150 families, which is one indication of how effective the Charamoco CAPYS has become. To become a new partner in this system, people must construct their sink and latrine with their own funds, following the standard FHI model, and pay \$600 to become a member of the system. The CAPYS in Tahua Reja, on the other hand, needs some additional training. Perhaps due to differences in language or education, the members did not seem to understand the questions asked. Nor were they able to clearly communicate their ideas or explain the results of the water quality tests.

FHI also helped the communities that it was working in to get their legal rights over their water sources certified and to be given jurisdiction over their water systems by the Superintendent of Basic Services (SISAB). This certification protects communities in the case of water disputes and contamination that could occur as a result of industrial or mining activities in the area, among other things. The legal process to obtain these certifications only started in early 2007, and FHI was the first NGO in the country to get them.

FHI also had a positive impact on the municipality of Toro Toro, which modified its organizational structure, strengthened its technical and environmental units. So, at the time of the FE, the municipality was capable of designing projects and developing all the necessary environmental documents.

4.9.3.4 Recommendations

In the future, FHI should:

- Construct standpipes, latrines and showers in all the schools in its beneficiary communities. This should help encourage and solidify the use of these installations and good hygiene habits among the younger population. To insure the sustainability of these facilities, FHI will also have to work with the broader community on the development of a community system for permanent maintenance and not leave maintenance to school personnel.

4.9.4 Save the Children (SC)

SC constructed 20 W&S projects during this DAP. This included 1,182 household and 18 public standpipes/sinks and 575 household and 7 public latrines (See Table 4-1). SC spent over \$ 990 thousand on these projects, over 50 percent of which came from other sources (See Table 4-2).

4.9.4.1 Key Program Approaches

System Design and Construction. SC modified and standardized the design of its W&S systems post MTE, including by combining the water and sanitation facilities into one unit rather than constructing them separately as it had done in the past. The household sinks and latrines in SC's latest projects are among the best ones the evaluator has seen. Good

materials were used, the construction itself was very well done and the environmental aspects were taken into consideration. As mentioned in section 4.3.3., however, this had certain implications with respect to the final cost of the latrines.

The MTE had identified a potential problem with the latrines in the Piquiñani and Churillanga systems and the possibility that they could contaminate the water table during the rainy season. SC corrected this problem post MTE, replacing the original pits with two chambers lined with cement below each latrine, which will be used on an alternating basis every three years. The FE evaluator verified that the latrines were being used by the participant families and that there was little to no odor as long as the families put ashes into the chambers after every use; they also placed manure in the chambers twice a week. The water and sanitation trainer from SC and the local school teacher were key to the success of this project.

SC also constructed 11 water systems with pumps to service 18 communities in the *Altiplano* and valleys in the La Paz Department. These systems solved the problem of providing water to communities that lacked surface water and have demonstrated that the more expensive pump systems can be sustainable in small rural communities. SC signed an agreement with the Japanese Cooperation Agency (JICA), which dug the wells while SC built the rest of the systems. One of the systems benefited 315 families from eight communities in the municipality of Luribay. This municipality had suffered from a lack of water for many years, and community members at times even had to resort to drinking water from the rivers even though they were contaminated with agrochemicals.

Environmental Concerns. After the MTE, SC created a separate environmental unit, which helped strengthened its infrastructure program. This environmental unit assured that the design of the projects included appropriate environmental criteria. SC also did a rigorous follow-up of the planned mitigation measures during project construction.

Collaboration on Hygiene Training. The SC infrastructure unit and its MCH/N program collaborated on a program to train the participants in the SC W&S systems in health and hygiene topics. During the DAP, SC also implemented a community W&S surveillance system that promoted appropriate hygiene practices in the participant population such as hand washing in critical moments, disinfecting water using the SODIS method or boiling the water, storing treated water in clean and covered containers, the adequate use of latrines, and trash management in the home. The findings were discussed in community meetings. All these activities had a significant impact on the health of the participant population.

4.9.4.2 Results

SC surpassed the LOA targets for the first two indicators -- access to safe water and access to latrines/sewerage -- by 42 percent and 23 percent respectively (See Table 4-8). Both indicators also show a clear improvement from the time of the MTE. Although SC was able to increase the access to latrines in its work areas, access still remains relatively low. SC pointed out that the community of Viloco did not want to construct the 360 latrines that had been planned and that SC did not have enough resources to construct the 315 latrines that

had been planned for the Luribay water system. The indicator for operation and maintenance of the water systems by the communities reached over 93 percent of the target.

Table 4-8: SC W&S Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Percentage of households with year-round access to new or improved safe water source.	59	71	88	79	142
Percentage of households with access to latrines or sewerage.	31	40	43	41	123
Percentage of constructed water supply systems adequately operated and maintained by the community they serve.	NA	88	93	-	-

4.9.4.3 Sustainability Strategies and Potential for Sustainability

SC's CAPYS are well organized and trained and function well. They have statutes and rules, an organizational structure, a fee structure, a basic accounting system, a yearly schedule for maintenance activities and some tools. At the time of the FE, SC's CAPYS were able to efficiently operate, maintain and repair their systems and had operators/plumbers selected from the communities charged with these tasks. The operators were paid by the CAPYS for community service of the systems, although the amount differed according to the size of the system. They were also paid for repairs done for individual participants within their homes.

SC produced various manuals for training the CAPYS and participants, which cover a variety of topics including organization, administration and technical matters. The manuals provide much useful information, although a secondary education is probably required to fully understand them.

The user fees were being paid in all the systems visited with minimal late payments. After two and a half years in operation, the Cauchi Titiri pump system had accumulated \$2,000 in savings which it proposed to use to buy a spare pump for the system. On the other hand, the user fees that were being charged in the Piquiñani system were barely enough to cover the administrative and operational costs of the system and left very little in savings. Although the user fee calculation includes an item for the annual depreciation of the pump (cost of the pump divided by the number of years of useful life of the pump), this cost was not included in the 2008 budget. If there were a serious problem with the pump, the system would simply stop functioning for a long time. While the user fees in the various pump systems are based upon consumption registered by the water meters, the FE evaluator observed that if consumption exceeded a certain pre-established amount, the user was charged with a much higher user fee. Members of the CAPYS leadership explained that this

was to avoid excessive use of the pump equipment and other parts of the system which are very expensive.

SC had a positive impact on the municipality of Patacamaya, which adopted SC's developmental vision, strategy and objectives. Patacamaya also modified its organizational structure and strengthened its technical and environmental units, which at the time of the FE, were capable of designing projects and developing all the necessary environmental documents.

4.9.4.4 Recommendations

In the future, SC should:

- Change the calculation of the user fees in its pump systems to include the depreciation costs of all the equipment, electricity, etc. In other words, a real user fee needs to be charged that encourages water use within the limits of the aquifer capacity and that enables the CAPYS to accumulate some savings.
- Correct some technical details in its systems to: (1) prevent the water meters in the *Altiplano* systems from freezing and breaking in the winter, (2) make the pump systems function automatically and avoid overdependence on the system operator, and (3) avoid leaks in the siphons in the sinks.

Lessons Learned Reported by SC Staff

- Communities should be involved in the entire design process so that they participate and know about the infrastructure project to be constructed.
- Exchange opportunities between communities should take place to increase the degree of receptivity for the projects, especially irrigation, due to the introduction of new technology
- The environmental guidelines allowed for an optimal technical and environmental implementation of the infrastructure projects and activities.
- The municipal governments should have designated technical staff to serve as active counterparts during the implementation and operational processes of the systems.

5 Findings: Income Generation (IG)

5.1 Program Objectives

The main objective of this component was to increase family incomes in food insecure areas through helping farm families increase their agricultural productivity and improve their access to markets. Since poverty is the root cause of food insecurity in Bolivia, these income generation programs were critical to the achievement of the CS's overall food security objective. These Title II activities were also designed to support the USAID Mission's Strategic Objective of *Increased incomes of Bolivia's poor*.

All four of the CSs used a combination of food and cash to achieve their income generation objective. All four CSs used cash from 202 (e) and monetization to pay for the technology transfer, market development and organization and capacity building components of their programs, for example, all three of which consist primarily of technical assistance and training. Plus, all four used food rations to support the construction of large-scale community-based productive infrastructure, for example, including improvements in roads, land protection and reclamation and irrigation systems.²⁰ (This part of the IG program will be discussed in Section 6 on Productive Infrastructure.)

5.2 Background

The Title II CSs located their programs in some of the poorest and most food insecure areas in Bolivia. The areas selected are rural, with communities widely dispersed, and where subsistence agricultural tends to play a major role with respect to food availability and access. Major constraints identified at the time the programs were designed included:

- Low agricultural productivity
- Geographical isolation
- Weak and underdeveloped market linkages
- Water scarcity and lack of access to water for irrigation
- Degraded natural resource base
- Lack of productive infrastructure
- Lack of agricultural support services, technical and financial

Levels of agricultural productivity were generally low in the Title II areas at the time these programs were initiated, although some areas did have good potential for increasing agricultural productivity and production, with limited potential in other areas. The environment in many of these areas is harsh – cold temperatures in some areas, long dry seasons, heavy rains and flooding and hail make agricultural yields unpredictable. Lack of irrigation made farmers dependent on rain to water their crops. But, the low annual rainfall

²⁰ At the time of the mid-term, several of the CSs were also using food to encourage farmers to construct/purchase the silos and other small family-level infrastructure that they were experimenting with, a practice that was discouraged by the MTE team.

coupled with its uneven distribution and little if any water storage capacity presented serious limitations for crop and livestock production. Because many communities are remote and market roads are few in number, access to markets was often difficult and time consuming. Knowledge about agricultural marketing and business and natural resource management was limited. Deforestation, over-grazing and soil erosion were also significant problems. And, farmers had limited access to information on improved agricultural technologies, credit and markets and market prices.

The agro-ecological conditions in the areas where the CSs have been working vary considerably, with conditions in the highlands (*Altiplano*) significantly different from those in the valleys (*Valles*). In some of the areas, agricultural potential is low, for example, due to high altitudes, limited or uncertain rainfall, degraded soils, steep slopes, and/or other biophysical constraints. In other areas, the agricultural potential is better, in some of the lower altitudes, for example, but the level of development is low due to lack of infrastructure, long distances to markets, low population densities, and lack of investments and/or political neglect. To succeed in their objectives, the CSs have had to tailor their income generation programs to the conditions in each area, a necessity which has greatly complicated their work. A combination of activities, including small-scale irrigation, improving market access roads and market development, is going to be more suitable for areas with high potential for crop production, close to markets and higher population densities. On the other hand, investments in livestock and pasture improvements may be more suitable for areas with low crop potential, low population densities and long distances to market.

The areas where the CSs worked also differed with respect to culture and language (some communities are all Spanish speakers, others all *Amarya* or *Quecuba* speakers and some mixtures). Although little information is available on the question of whether and how cultural differences have affected behavioral change objectives, at the very least the language differences complicated communications with client groups, making it necessary to hire bilingual staff and to translate training materials into several languages.

IFPRI economists, in a recent analysis of food insecurity in developing countries, included Bolivia in a category of countries they described as being “low food security” and characterized by “consumption variability” and “inclement weather.”²¹ Inclement weather has definitely been a problem in many of the Title II areas, in many cases a result of the El Nino phenomenon. Drought has been a perennial problem, which the Title II CSs have tried to address by helping communities increase the amount of hectares under irrigation. Too much water has also been a problem in some areas, leading to damages from flooding. Frosts, freezing rain and hail, also a consequence of the El Nino phenomenon, have also caused serious damage to crops, driving down production levels and increasing post harvest losses. All four programs were adversely affected by these climate events at one time or another, the most recent being the frosts and hail that damaged crops in some of ADRA and CARE’s program areas in Chuquisaca in 2007 and 2008.

21 Bingxin Yu, Shenggen Fan and Anuja Saurkar, “Towards a Typology of Food Security in Developing Countries under High Food Prices: A Cluster Analysis.” International Food Policy Institute (IFPRI), Washington, D.C. December 28, 2008.

5.3 Overall Strategy and Approaches

5.3.1 Pre-MTE

All four of the CSs implemented a variety of activities under this component. This included activities related to technology transfer, improved market information and market linkages, the development of productive infrastructure at the community level (including rural roads, irrigation systems, land protection and reclamation), the introduction of family level productive infrastructure (including silos and livestock shelters) and organization capacity building. Although each of the four programs included some combination of most of these activities, none of the CSs included all of these activities in its program. ADRA did not work on livestock, for example, and did not include family infrastructure investments in its program. ADRA also was the only one of the four that incorporated the development of agricultural service centers as a key component of its strategy.

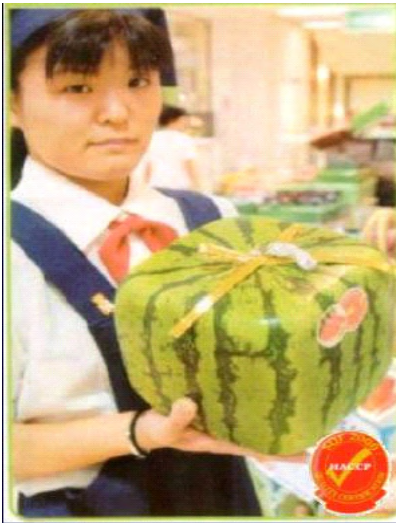
The ADRA program was designed from the start to be demand driven, with market potentials and needs driving its entire agricultural programs, including its agricultural technology transfer program. FHI had also made progress in making more effective use of market analyses and had achieved some success in identifying and helping link some of its small farmer clients to higher valued markets by the time of the MTE in 2004. CARE and SC, on the other hand, needed to make more and more substantial changes in their programs, according to the MTE, to give them a stronger market and business development orientation. This required adding staff with hands-on marketing expertise, a MTE recommendation for FHI as well. The MTE also recommended that CARE and SC reassess the market demand for products that could be produced in their intervention areas and concentrate more on helping identify and facilitate links with potential buyers, including key domestic and export oriented firms, and where possible, help their client farmers sell their products through forward contracts.

5.3.2 Market Focus

All four IG programs had a strong market orientation at the time of the FE, as a result of the changes that were made in response to the MTE recommendations, and this change in focus paid off in terms of improvements in sales and the incomes of their target households. Although the CSs continued to implement many of the same activities they were working on at the beginning of their programs, their overall vision and strategy changed, with all four of the CSs giving more emphasis to market demands and marketing. ADRA continued with and strengthened its strong market orientation. Post MTE, CARE and SC refocused their IG programs to give them a stronger market orientation and to focus more on helping their client farmers produce and market the type and quality of products in demand in higher value markets. FHI, which had been more market oriented than CARE and SC, also strengthened its market orientation post MTE.

It is this market orientation and the results that were achieved that make the Bolivian Title II IG programs noteworthy and potentially important as a model for IG programs in other countries.

**A Market Driven Program
Focuses on Producing What You
Can Sell**



**Not on Selling What You Can
Produce**

Source: Save the Children Bolivia

**Characteristics of a Market
Driven Program**

What distinguishes a market driven program is its focus on *producing what you can sell*. This is in contrast to the strategy which has been followed by most agricultural development and agricultural-based income generation programs in the past which was to focus on *selling what you can produce*. The picture of this young woman with her square watermelon probably does a better job than words do in communicating the essential nature of a market-driven program, with its implication that if the market wants square watermelons that is what producers should be concentrating on – how to supply the market with square watermelons.

Market Assessment and Market Information. One of the first things that farmers need to be able to take better advantage of marketing opportunities is to have access to timely and reliable information on the prices being paid for their products in alternative markets. There was talk early on in the development of these programs that the CSs might have to develop their own price information systems. However, this task was taken up by SIMA (*Servicio Informativo de Mercadeos Agropecuarios*, under the auspices of the FDTA (Bolivian Foundation for the Development of Agricultural Technologies) Valles with initial support from USAID/Bolivia's Market Access and Poverty Alleviation (MAPA) project.²² SIMA has been collecting and reporting on the prices of over 250 commodities in five major markets – Cochabamba, La Paz, Santa Cruz, Sucre and Tarija – since 2002.

To meet their objective, which was to increase the incomes of the households in their intervention areas, all four CSs eventually realized they needed to focus their attention on higher valued markets and markets with growing demand. This required looking more to markets in the country's growing urban centers and internationally, rather than to local markets, which are much smaller and where adding small amounts of additional produce can easily depress prices and reduce or eliminate profitability.

²² The Bolivia Mission's MAPA project was designed to improve agricultural producers' access to markets and stimulate new market demands.

ADRA, CARE and FHI started their programs with the market in mind, using outside experts such as BOLINVEST²³ to help them identify and better understand the market potential that existed for their clients and the products with the greatest market potentials. These analyses provided information on the size and nature of demand for a range of products and identified specific markets for the products with high potential, providing detailed information on the requirements of these markets and potential buyers.

However, all four CSs learned that collecting market information and assessing markets is not a one time activity. Markets change, sometimes rapidly, and to be successful, market participants need to keep up with these changes. So, all four CSs also taught their farmer clients the importance of following changes in market prices and conducting rapid assessments of their key markets on a periodic basis. By the time of the FE, it had become common practice for CS farmer clients to actively participate in a variety of agricultural and trade fairs, including the major fairs in La Paz and Santa Cruz, and in business interworking forums.

Priority Products. The products that each of the CSs focused on post MTE are listed in Table 5.1. on the following page. ADRA basically stayed focused on the same priority crops over the life of its DAP. CARE and SC completely reassessed the market opportunities for their clients post MTE and identified a different set of products with greater market potential to focus on. FHI also reassessed the market opportunities for its clients and made adjustments in its priority products, reducing the number at first and then expanding the number in response to market changes.

The first two questions that the CSs had to answer related to *market potential* (i.e., was there a promising, i.e., high valued and growing, market for the product) and *production potential* (i.e., could the product be physically produced in the CS's intervention area and at a potential profit). Other criteria used in selecting the priority crops for the Bolivia Title II program included: whether small producers could be at a competitive advantage; their potential for generating additional employment; whether the Title II client producers might be able to differentiate their products in some way, such as being able to place their product in the market before or after current suppliers, for example.

Each of the CSs ended up with a relatively large number of products. This result was due in part to the nature of the geography of the areas where the Title II programs were working, where altitudes can vary greatly within short distances. This has resulted in a relatively large number of distinct agro-ecological zones located in close proximity to each other, each with distinct advantages with respect to the crops that can be grown there. In other words, a diversified portfolio of products made sense from a physical point as well as a risk management point of view. Since Bolivia's domestic markets, even the higher values ones could be viewed as niche markets, this strategy also made sense from a marketing point of view.

²³ BOLINVEST is a foundation that was set up to promote exports and attract investment to the Bolivian Agricultural sector.

Table 5.1: Priority Products

ADRA	CARE	FHI	SAVE
<ul style="list-style-type: none"> • Barley • Broad beans • Corn (seed) • Garlic • Grapes • Onions • Peas • Peaches (fresh/processed) • Plums (fresh) 	<ul style="list-style-type: none"> • Camelids (textiles/meat) • Chamonile • Cheese • Honey • Peaches • Peanuts 	<ul style="list-style-type: none"> • Amaranth • Broad beans • Corn (seed) • Maca (organic) • Milk • Onions (sweet) • Peanuts • Potatoes (commercial/seed) 	<ul style="list-style-type: none"> • Apples (fresh/dehydrated) • Camelids (meat) • Broad beans • Maca (organic) • Milk • Onions/sweet onions • Peas • Peaches (fresh/processed) • Pears (fresh) • Plums (fresh) • Potatoes (commercial/seed) • Vegetables

The large number of products added to the complexity of these programs, since each product requires unique knowledge and skills with respect to both its production and marketing. However, the Bolivia Title II CSs proved that they can implement these types of programs successfully if they have the right vision and strategy and are willing and able to assemble the necessary technical capacity by adding it to their staffs and/or contracting for it. The technical expertise needed to successfully implement a program of this nature may not be available in all Title II countries. On the other hand, Bolivia does not have a particularly strong human capital base either, especially in comparison to many of the other LAC countries.

Market Linkages and Marketing. Helping improve farmers’ access to information on market prices and supplying them with professional analyses of market demand are important, but this is a relatively passive approach. As the experience in Bolivia demonstrates, small farmers often need a more active or aggressive approach at least in the beginning, one that also helps them identify and make contact with specific buyers and encourages the development and strengthening of these relationships. ADRA was also among the first to concentrate on the development of these relationships, but all four included these types of activities as an essential part of their IG programs post-MTE. All four of the CSs helped their clients learn how to market their products in the higher end fairs that are held on a recurring basis in some of Bolivia’s larger cities including Santa Cruz, Cochabamba and La Paz. Several of the CSs, beginning with SC also developed branding programs for some of the products destined for higher-end markets, developing distinctive logos and attractive advertising materials and packaging. They also helped their clients make

contacts with and sell to wholesalers based in the larger cities and to larger firms, including super markets, food processors and exporters.

There are a number of benefits to be gained from working with larger firms. It may be easier for them to buy through forward contracts, for example, a mechanism that can provide small farmers with some degree of price stability. Many are also in a better position to assess market demand and develop and promote new products than the Title II small farmers clients are. Plus, these larger firms may frequently find it to their benefit to provide their suppliers with what are referred to as “embedded services. That is, these firms are in the position to and may benefit from providing their suppliers with the market intelligence and/or technology packages and technical assistance that will enable these suppliers to better meet the firm’s requirements.

Making contacts with and learning how to work with larger firms has been particularly important with respect to export markets, where larger firms have more contacts and should find it easier to track what is happening in overseas markets, anticipating and identifying changes earlier on, than smaller farmers, whether operating individually or as part of a group. If these larger firms thrive, they can pass these benefits on to their suppliers, but if they run into problems, as they can, their problems can translate in some combination of lower demand, lower prices and/or fewer services for the farmers. The Title II program in Bolivia provides examples of both types of situations, several of which are discussed below and in the individual CS sections.

As part of their marketing strategy, the CSs also worked with their client famers to help them increase the amount of sales made as a group in the belief that farmers selling in a group will have more negotiating power. Buyers could also be responding to a reduction in their transactions costs when they buy in bulk, which also likely to be important in explaining why farmers can get a higher price when they sell as a group. The efforts that the CSs made to teach their farmers how to develop and use information on prices and their costs of production also helped farmers improve their capacity to negotiate better prices, perhaps as much or more than selling as a group. .

The CSs also helped their client farmers sell more of their products through forward contracts, as part of a broader strategy designed to help them reduce market risks. This included helping introduce the idea and playing a facilitating role at the beginning in bringing buyers and sellers together in the negotiation of these contracts. Many of the famers interviewed by the FE team were selling through forward contracts, a development which they spoke very favorably about, including because it gave them more confidence to invest in their farming operations. Teaching farmers how to analyze and take advantage of the seasonal price variations that occur in some markets was another aspect of the CSs strategy for reducing market risk. Once farmers are aware of these price variations, they have the option to try to time their production and marketing, to the extent they can, to take advantage of the times when prices are higher. Of course the basic concept -- producing products that are in demand in the market -- was also a key part of the CSs’ risk reduction strategy.

Market opportunities changed over the life of these DAPs, and the CSs and their clients had to deal with and adapt to these changes. This ability to be flexible and adapt to changing circumstances will be crucial to sustainability. The following are examples of some of the market changes that were identified by the FE team during its field visits. Others are discussed in the individual CS sections.

- **Habas (broad beans)** – In 2004, at the time of the MTE, the export market for dried *habas* for use as snacks or in dried soups, for example, looked promising with ADRA, CARE and FHI farmers selling their production through forward contracts to major exporters such as ASOHABA and ASOMEX. By the time of the FE, some of the farmers interviewed were finding it more profitable to sell their beans to buyers for the local market, explaining that they were receiving a premium price for their higher quality beans which were destined for the seed market.
- **Organic maca** –Naturalcos, a domestic firm, which sells natural health and medicinal products, began buying organic maca from FHI and SC producers post-MTE and using it in a new natural medicine product which it was developing markets for in Canada and Germany. Although the market potential for maca long term still looks very promising, Naturalcos management indicated during an interview with the FE team that orders for its organic maca products declined after the election of the current Bolivian Government as a result of external buyers' perceptions that Bolivia could become a less reliable source of supply. This led FHI and SC to begin helping their clients look for other buyers, which included other firms (e.g., Maca Export and Naturaleza) as well as groups that were looking to sell to the new municipal school feeding program. Naturalcos is also exploring new markets, both export (in China, for example) and domestic (developing a new product to sell to the municipal school feeding program).
- **Municipal school feeding program** – At the time of the FE, many of the CS clients interviewed were excited about a new opportunity to sell their products to the municipal governments, who were under directions from the current Bolivian Government to implement a school feeding program and to spend a portion of the resources dedicated to this effort on the purchase of local foods. Several organizations indicated that they were gearing up to try to supply this market, including several of ADRA's mothers' clubs, two of FHI's clients – a rural micro enterprise and urban small businesses. All these entities were planning to use amaranth, and in some cases maca, in the products they are producing for the school feeding program, which should lead to a better market for the FHI and SC farmers whose lands are suitable for the production of these crops.

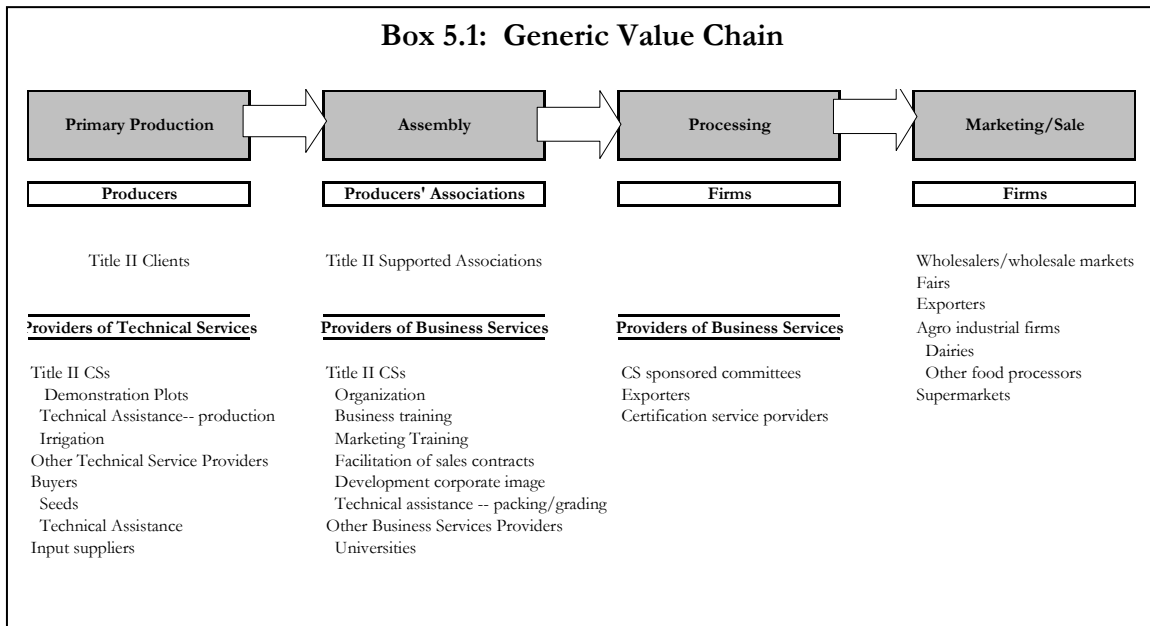
5.3.3 Value Chains

All four of the CSs also adopted a value chain approach post-MTE, which they applied to all of their priority products, those destined for domestic as well as international markets. A value chain (or value chain analysis) is a concept taken from business management. The term "chain" refers to the series of activities that a product goes through from pre production and production through harvesting, processing and all the other activities that

take place until the product reaches the final consumer and the term “value” refers to the additional value that gets added to the product at each stage of the chain.

If done correctly, a value chain analysis identifies the key stages in the value chain and provides detailed and important information for each stage of the chain about:

- The key actors,
- The roles (functions) that each of these actors play (or could play),
- The major opportunities, constraints and bottlenecks (current and potential).



Each value chain is unique, although some bottlenecks may be similar across chains and some actors will play similar roles in a number of chains. Key actors in the CS value chains included: input suppliers (fertilizer, seeds, and machinery), technical assistance providers, transporters, universities and other training organizations, business service providers, transporters, agro-industrial firms, exporters, wholesalers, retailers, supermarkets. Several types of support services have been important to the CS clients across value chains, helping them link to and become more competitive in markets. These included: training in business and marketing, the transfer of agricultural and post harvest technologies and practices, the facilitation of contracts, and the provision of certification services.

Some of the more important organizations that the four CSs collaborated and partnered with are listed in Box 5.2.

Box 5.2: Examples of IG Program Partner Organizations

- **ANED** (*Asociación Nacional Ecuémica de Desarrollo*) -- a Bolivian Micro Finance Institution (MFI) that specializes in rural micro finance.
- **AOPEB** (Bolivian Association of Ecological Producer Organizations) -- an association that provides technical assistance in ecological production methods and organic certification.
- **APIA** (Association of Suppliers of Agricultural Inputs) -- provides training and technical assistance in the safe use of pesticides and supports the training of Integrated Pest Management promoters.
- **BIOLATINA** -- an internationally recognized company that certifies organic products in the Title II program area.
- **CIAT** (*Centro de Investigaciones Agrícola Tropical*) -- an agricultural research center, under the auspices of the Prefecture of Santa Cruz, focused on tropical agriculture.
- **CIFEMA** (Center for the Development of Agricultural Mechanization in Bolivia) -- began as the agricultural engineering center of the Greater University of San Simon and specializes in agricultural implements adapted to small farmer's conditions.
- **DELACH** (*Desarrollo Economico Local Agropecuario de Chuquisaca*) -- a project financed by Denmark, which implemented a major irrigation project in the Cintis in the areas where ADRA was working.
- **FADES** (Foundation for Development Alternatives) -- a Bolivian NGO which provides micro finance services.
- **FDTA Valles and FDTA Altiplano** -- foundations for the Development of Agricultural and Livestock Technologies in the Andean Valleys and *Altiplano* respectively.
- **ORS** (*Oficina Regional de Semillas*) -- the regional seed office, which is in charge of certifying commercial seed.
- **PLAGBOL** (*Plaguicidas Bolivia*) -- an NGO that provides training and technical assistance in Integrated Pest Management (IPM).
- **PNS** (*Programa Nacional de Semillas*) -- a GOB program whose objective is to increase national agricultural productivity through making good quality improved seeds more accessible to small and medium sized producers.
- **PRODEPE** (Program for Entrepreneurial Development) -- a Bolivian NGO licensed by the ILO that provides training in business management, including to producer organizations.
- **PROMARENA** (Natural Resource Management Program) -- a NGO that conducts competition in natural resources management and provides support to the development of business plans and market development.
- **PROMETA** -- a NGO whose objective is to protect the environment in Tarija.
- **SARTAWI** -- (Fundacion SARTAWI) a Bolivian MFI that provides that provides rural as well as urban micro finance services.
- **SENASAG** (National Service of Agricultural and Livestock Health and Food Safety and Quality) -- a GOB organization that provides training in plant and animal health and quality certifications for processed agricultural products.

The adoption of the value chain approach provided a number of benefits to the CSs, including:

- **Providing conceptual clarity** – The analytical process that the CSs went through to develop these value chains was useful because it helped them better understand the nature of the markets that they were trying to help their clients participate in, the opportunities in these markets and the constraints and bottlenecks. It also made it easier for them to identify where their assistance was most needed and what that assistance should be, providing technical assistance in production and post harvest technologies, for example, helping conduct market assessments and/or facilitating market connections, or providing business management training.
- **Guiding program management** – The adoption of the value chain approach was also useful at a more practical level, because it helped the CSs organize the individual activities they had been implementing under their IG programs in a more coherent way that facilitated the management of their own programs and staff and helped them better coordinate activities with other actors in the chain. The value chain approach also seems to have helped some field technicians do their work better by giving them a clearer vision of their roles and the contribution their work makes to the overall program.
- **Encouraging identification of and collaboration with partners** – Several of the CSs were criticized in the MTE for trying to do too much on their own and not collaborating enough with other organizations operating in their areas with similar or overlapping objectives. This need to enlist the help of other organizations in order to achieve their income generation objectives seemed to become more obvious and harder to ignore once a value chain was developed. And, by the end of their Title II programs all four CSs were working more closely with and relying to a larger extent on other organizations as a major aspect of their sustainability strategies. Having a clearly articulated value chain also seemed to have helped some of the CSs partners get a better understanding of where and how their activities were contributing to improving and sustaining the overall operation of the value chain.

5.3.4 Agricultural Technology Transfer

The transfer of improved agricultural practices and technologies was an important part of all four of the IG programs.

Production and Post Harvest Practices and Technologies. All four of the CSs introduced their client farmers to improved production technologies and practices. These core activities included introducing farmers to improved varieties of existing crops and new crops, providing instructions on techniques for improving crop management, introducing concepts of integrated pest management and training farmers in ways to improve the management of soil fertility, including the appropriate uses of organic and chemical fertilizers. CARE, FHI and SC also worked in the livestock area, helping introduce improved livestock practices, including those related to improved health and nutrition, to their clients. FHI and SC had also promoted the construction of stables as part of their IG

programs prior to the MTE. The MTE raised a number of questions about the cost effectiveness of these stables. Post MTE, FHI's and SC's livestock activities were integrated into their dairy value chains and CARE's livestock work was integrated into its camelid value chain.

All four CSs also provided technical information and assistance related to a broad range of post harvest technologies and practices post-MTE. This included providing advice and guidance on when and how products should be harvested, dried, packed, shipped, and presented, and also on their size, color and shape. This change helped farmers better respond to market needs and add value to their products, both of which helped them get higher prices. Prior to the MTE, CARE, FHI and SC had promoted the construction of silos as a part of their programs to improve crop storage and reduce post harvest losses. The MTE suggested that, from an income generation perspective, it was probably more important to provide farmers with more information and assistance in implementing a myriad of other steps post harvest that would help them increase the value of their products in markets. ADRA had already integrated this type of assistance into its technology packages from the beginning of its program.

Technology Selection and Dissemination Approaches. All four CSs worked with groups of farmers, which is more efficient than having to meet with each farmer individually to deliver a message or provide a service. ADRA organized its farmers into Technical Assistance Groups (TAGs), whose members become members of the Agricultural Services Centers that ADRA also organized (see following section on ADRA), and CARE and SC experimented with farmers' schools (*escuelas del campo*). In earlier Title II programs, FHI had experimented with establishing its own demonstration farms where FHI staff lived and where it tested and adopted new technologies. But, by the time of this DAP, FHI had graduated to validating new technologies and practices on farms and using demonstration plots on lead farmer's fields. By the end of the DAP, all four CSs had found that it was more effective to identify and select promising technologies and practices through on-farm validations and to use demonstration plots on lead farmer fields as a basis for their technology transfer programs.

Training Materials. All four CSs also spent considerable time and effort on the development of training materials covering a broad range of topics relevant to their priority products and interventions. These materials, which are generally well designed with key messages clearly articulated in text and pictures, are being distributed to their farmer groups and other key collaborators as part of their sustainability strategies.

5.3.5 Economic Analysis and Entrepreneurship

All four of the CSs improved their capacities to conduct and make use of economic analysis to inform the selection and implementation of their IG activities. Some information on the costs and benefits of their IG activities were available from ADRA and FHI at the time of the MTE. By the time of the FE, this type of information was being produced and used by all four and for more activities. Information on the costs and returns of the farming operations was available at all of the sites visited during the FE, and the CS staff and their farmer clients were able to discuss the data and seemingly to understand their importance as

a tool that can be used to help them in negotiating with buyers and to stay competitive in the market.

All four CSs also increased the amount of emphasis they were giving to the development of entrepreneurial skills among their farmer and association clients and to helping them understand the importance of increasing their profitability and competitiveness. Business management also had become an important addition to the training curricula of all four organizations.

5.3.6 Credit

The need for credit became more important to the ADRA, FHI and SC client farmers and associations as their farming operations became more sophisticated, and their needs for purchased inputs such as seeds and fertilizers as well as the equipment needed to improve grading and packing and other processes that will add value to their products increased. In some value chains, the buyers (larger firms) were able to provide their suppliers with seeds, fertilizers, feed, and sorting equipment. This was true for Pil Andino, a large dairy that owns plants in the Altiplano and Santa Cruz and several of the *haba* bean exporters. However, these types of situations are not characteristic for all chains.

Access to credit from the banking system has not been a viable alternative, since most banks and other financial entities are only willing to provide loans in exchange for collateral in the form of fixed assets, such as real estate, which is very difficult for small farmers to provide. So the three CSs had been looking for other organizations to work with that are willing to work with small farmers and to experiment with the development of new arrangements and new financial products more suitable to their needs and circumstances.

In the discussions with SC staff and their credit partner, SARTAWI, the focus was on understanding the unique situation of different types of clients, adapting payment plans to these differing situations, assessing risk and developing mechanisms to reduce risk, including experimenting with different ways to provide mutual protection. FHI had been collaborating with ANED and the irrigation association in Tomoyo (ARISSET), which has considerable savings, to establish a fund that could be used to provide loans to milk producers so they can purchase improved cows and upgrade their herds. Under the system that was developed, the cows are owned by ANED until the producers pay off the loans, and ARISSET guarantees the loans. SARTAWI also developed a program in collaboration with SC and Delizia, a buyer of milk, that has enabled SC's milk producers to get loans for buying cows (See the individual CS sections for more details).

ADRA, which was still looking for a partner at the time of the FT to on loan some of the funds that were still available for providing credit to its client producers, was focused on the potential benefits of trying to experiment with two new loan products that it felt might be particularly suitable for its clients -- micro warrants and micro leasing. The topic of micro warrants also came up in the course of a visit to one of ADRA's agricultural service centers which was a part of a peach value chain. Micro warrants were described in this context as a mechanism that could enable these farmers to store their dried peaches at the center for a given period of time and use them as collateral (guarantee) for a loan. This would enable

them to hold on to their peaches until later in the season, when they might be able to sell them at a higher price, and, in the meantime, still get access to the income they had earned. Fresh peaches could not be used as collateral for one of these loans, because the product needs to have a storage life equal to or greater than the loan period to qualify for such a program. However, these farmers had already switched to dried peaches, and dried peaches, according to ADRA, can be stored up to two years without any deterioration in quality.

This was and still is a big challenge – how to develop and diversify the financial resources available to small producers in rural Bolivia. In the latter years of the DAPs, ADRA, FHI and SC began to experiment with different strategies and new loan products, some of which seem promising. However, much more needs to be done to enable the small farmers that the Title II programs have been working with to consolidate and expand their gains.

5.3.7 Capacity Building

All four CSs also spent considerable time and effort to build local capacities. Strategies included: providing training to participating farmers, helping increase their knowledge and skills; helping to organize and strengthen producers’ associations; and working with municipalities to get them more engaged and willing to provide support to some of the IG activities that the CSs had initiated.

5.3.7.1 Training

General agricultural training. Taken together, the CSs trained more than 8 thousand of their farmer participants per year. Most of this training focused on agricultural production technologies prior to the MTE, but post-MTE, modules were added covering post harvest technologies and practices, marketing and business development.

Table 5.2: Number of Participants Receiving Systematic Agricultural Training

	2002	2003	2004	2005	2006	2007	2008	Average
ADRA	1,199	1,054	1,099	1,205	1,642	1,306	1,378	1,269
CARE	2,662	3,219	6,596	3,929	1,918	5,967	1,637	3,704
FHI	580	1,140	1,222	1,593	2,414	2,701	2,927	1,797
SC		1,742	1,742	2,000	2,159	3,479	2,559	1,954
Total	4,441	7,155	10,659	8,727	8,133	13,453	8,501	8,724

Source: CS IPTTs

Training Junior Technicians/Experts. Several of the CSs also devoted resources to support more advanced training for people in their project areas, including training in animal health and veterinary services, fruit horticulture, and plant health. Some of this training was contracted for through local universities and graduates received certificates. This represents a major increase in technical capacity in the Title II areas. This also seems like it could be a very promising approach to increasing the level of expertise available in rural areas of Bolivia. However, the issue now, at the end of the Title II program, is whether and how this

increased capacity is going to get used. To insure sustainability of this capacity, these people will need to get some reimbursement if they provide services to others in their community. The level of expertise that these people have developed should take them beyond the role of volunteer. Plus, there are opportunity costs to themselves and their families if they provide technical services without compensation.

FHI and SC trained veterinarian assistants in basic animal health and veterinarian practices and provided them with medical kits. Animals are a very important component of many small farm enterprises, and the training of these people should help expand the access of people living in the Title II areas to basic veterinarian services for their animals. The MTE recommended that the CSs take a business oriented approach to the development of these animal health services, including by providing the assistants they trained with additional training in business management so they would know how to set up and run a micro business enterprise, set fees, keep books, etc. SC provided business training to the veterinarian assistants that it had trained post-MTE. Based on a meeting with one of the assistants in 2006 and a brief conversation with another during the FE field visits, there is a possibility that this type of activity could be a successful model for increasing poor farmers access to veterinarian services. Unfortunately, there was not sufficient time to explore with the SC and FHI staff whether helping these trainees transform themselves into successful micro-business was proving effective among a larger percentage of the trainees.

The FE team is not sure whether this micro enterprise model will work for some of the other types of types of junior technicians that were trained, the fruit experts, for example. ADRA experimented with another model for obtaining resources needed to continue support to the agricultural promoters that it had trained. This involved trying to get resources from a combination of sources, including famers associations, municipalities, and other service providers operating in their areas. SC also arranged for fruit experts that it had trained to get additional training in IPM. The idea was that this would enable them to work with PLAGBOL, an NGO that sells agricultural inputs as well as provides technical assistance and training in IPM on a fee for service basis. At the time of the FE, it also was not clear how whether either of these models were going to be sustainable.

5.3.7.2 Strengthening Producers Associations

All four CSs also devoted considerable time and effort to the organization and strengthening of producers' associations.

The rationale for working with groups of small farmers is strong. There is no question that it is more efficient to work with small farmers in groups rather than having to work with each farmer individually. There are also economies of scale in selling as a group, which can benefit both sellers and buyers. However, the development community is not as

Table 5.3: Number of Producer Organizations Strengthened

CS	Number of Producer Associations Strengthened	CS	Number of Producer Associations Strengthened
ADRA	7	FHI	27
CARE	24	SC	24

clear about the answers to the questions related to how much of the organization work needs to be done up-front and how formal these organizations have to become to be effective. What ADRA found early in its program was that farmers are more interested in getting organized once they see some real concrete financial benefits and then begin to see how further organization can help them expand and sustain these benefits. This motivates them much more than theoretical arguments about the benefits of producer associations.

Post MTE, the other CSs also began to give more priority to producing results first (i.e., increases in sales and income), to be followed by help in organizing and technical assistance to their farmer groups as the need for such assistance became more apparent. Post-MTE, training in business management, accounting, quality control and the development of business plans became an important part of the CSs strengthening activities.

ADRA worked with a smaller number of associations than the other three CSs, which is a result of the fact that most of its associations were formed around the seven Agricultural Service Centers (ACSS) that ADRA helped construct in the communities where it worked. The ADRA associations, in other words, tended to be geographically based, with the membership of each association involved with a number of crops. This is in contrast to the other CSs, whose associations tended to be more single product oriented. The fact that ADRA's associations were organized around a capital investment put a greater demand on these associations, if they are eventually going to be able to take over the management of these buildings and the functions they have been providing and be able to run them profitably. The bar was much lower for the FHI and SC associations who can sell as a group without having to transform themselves into commercial enterprises. Whether these organizations, the ADRA associations in particular, will continue to develop and provide useful services to their members is one of the bigger questions with respect to program sustainability.

5.3.7.3 Working with Municipalities

With resources available at the municipality level, and in the absence of a strong field presence on the part of the Ministry of Agriculture, the CSs turned to the municipal governments as potential sources of funds to support their IG activities. All four were successful in getting the municipalities to increase the amount of resources they provided to IG activities and to broaden the categories of support beyond productive infrastructure such as roads. Municipalities did become more active in supporting local agricultural fairs and the participation of farmers in fairs outside the municipality toward the end of the DAPs. CARE persuaded one of the municipalities where it worked to help its peach growers by supporting part of the costs of procuring and testing a machine to determine whether it might be a cost effective way for these farmers to protect their peaches from frost. ADRA convinced the Prefecture of the Department of Chuquisaca to provide support to an agricultural market information program for the Department and to support the testing of a new technology – nets – to determine whether they might be a cost effective way to protect grapes from hail. ADRA and SC also worked with their municipal governments to help them establish separate entities within the government, which would formalize their role in supporting and facilitating IG activities in their municipalities (See individual CS sections for a further discussion of these programs).

5.3.8 Sustainability Strategies and Sustainability

Sustainability takes on a number of dimensions in the context of the IG program. One dimension has to do with whether the value chains will be sustainable over time. Another important dimension is whether the complex links of support services that the CSs have tried to put together will continue to function and provide support services to the Title II clients after the program ends.

Whether the value chains continue to function will depend to a large extent on profitability. That is, the farmers will continue to use the new technology packages introduced by the CSs and the marketing links that were initiated will continue as long as the farmers and other along the marketing chain continue to make a profit. Trust has also emerged as important glue that helps to maintain the links among the different actors in the chain. Lack of trust increases risk. If people in the chain lose trust in one another, the relationships may breakdown, even though the profit potentials still exist. This is another reason why the CSs have encouraged and facilitated personal contacts between their clients and key buyers and other key actors in the value chains.

To deal with the institutional issues, all four CSs put considerable emphasis in the last several years, in particular, on developing and strengthening strategic alliances with other actors in their implementation areas. This was with the expectation that they would be willing and able to provide the technical and financial support that the CS small farmers and association clients will still need after the Title II program ends. In other words, all four of the CSs focused their efforts during the last two years of their DAPs on activities designed to consolidate and strengthen the links in the value chains that they had been supporting. This included the links with the municipalities as well as private sector NGOs and firms.

All four CSs are expecting that the municipalities will play an important role in helping sustain these chains, as an alternative source of funds, in particular. All four worked with their municipal governments, helping them understand that they can play a broader and more proactive role in supporting IG activities and helping strengthen their capacities. On the plus side, the municipalities are receiving additional funds under the new Bolivian Government. On the other hand, the new Government has also tasked them with additional responsibilities.

The key question is what happens when a major change occurs somewhere along the value chain – the demand in an important market drops precipitously, for example, or a new plant disease or pest attacks a crop and reduces production levels dramatically. How will the farmers respond in the absence of the assistance they have been receiving from the CSs? Who will they be able to go to for advice and assistance? Will they turn to the strategic partners that the CSs identified as part of their sustainability strategies? Will these organizations be willing and able to respond? Will the municipal governments have the interest and funds available to help? Will people emerge that can play the role of the facilitator – the honest broker – that the CSs have been playing, or help people stay focused and continue to work together when problems arise? The answers to these questions were not clear at the time of the FE.

5.4 Results Achieved

Results have been impressive since the MTE, especially in terms of increases in the value of sales achieved and increases in household incomes. Major changes were also apparent in the knowledge and attitudes of the CSs' clients, with many at the time of the FE:

- Being more market oriented and entrepreneurial
- Having a better understanding of the profitability and costs and benefits of activities.

5.4.1 Quantitative Results

5.4.1.1 Increases in Sales

The value of sales through forward contracts and producers associations increased significantly from only \$30 thousand in 2002 to almost \$1.6 million in 2008. ADRA, which had a market driven approach from the beginning saw a significant increase in sales even in its first year. Whereas, the sales figures for FHI and SC did not really begin to take off until 2005/06 after the MTE and after they, SC in particular, recast their programs to give them a stronger market orientation. CARE's sales also jumped between 2005 and 2006 but leveled off during the last three years of the program (See Figure 5.1 and Table 5.4).

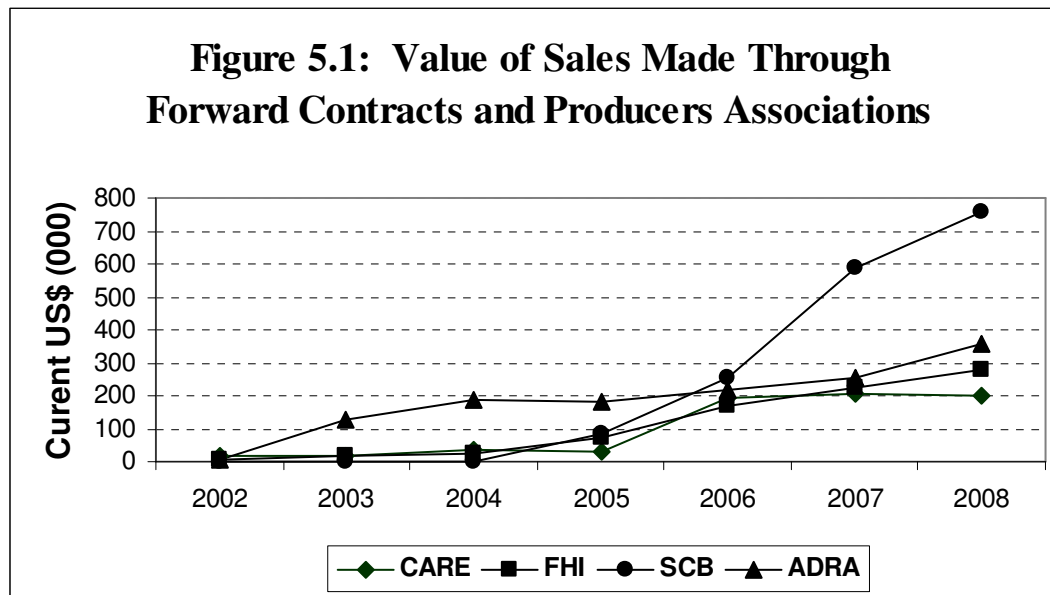


Table 5.4: Value of Sales Made Through Forward Contracts and Producers' Associations
(US\$ 1,000)

	2002	2003	2004	2005	2006	2007	2008
ADRA	7	126	188	184	216	253	357
CARE	18	16	36	28	194	206	203
FHI	6	20	22	71	172	227	278
SC	0	0	0	83	252	589	760
Total	30	162	245	366	834	1,275	1,597

The value of sales facilitated by the ADRA program might have increased more substantially in 2007 and 2008 had it not been for El Nino, which had a negative effect on production and post harvest losses in over half of the ADRA program area. On the other hand, the value of sales was also influence by the upward pressure on prices due to the reductions in supplies in the market and to the effects of the rapid increases in food prices that were taking place world-wide in 2007 and the first part of 2008.

5.4.1.2 Increases in Household Incomes

All four programs also had a measurable and significant impact on the key impact indicator – *increases in the average annual income of the Title II assisted households*. The average income for ADRA households doubled between the baseline in 2002 and the final survey in 2008 (from \$941 in 2002 to \$1,986 in 2008). The average income for CARE households almost tripled (from \$602 in 2002 to \$1,699 in 2008). The average income for SC households more that tripled (from \$513 in 2002 to \$1,673 in 2008). And, the average income for FHI households more than quadrupled (from \$577 in 2002 to \$ 1,793 in 2008). These income estimates are in constant 2002 dollars, that is they have been deflated using the Bolivian consumer price index for 2002, and are significantly greater for the latter years when reported in current dollars. (See Figure 5.2, also Table 5.5 for estimates in both current and constant (2002) US dollars.)

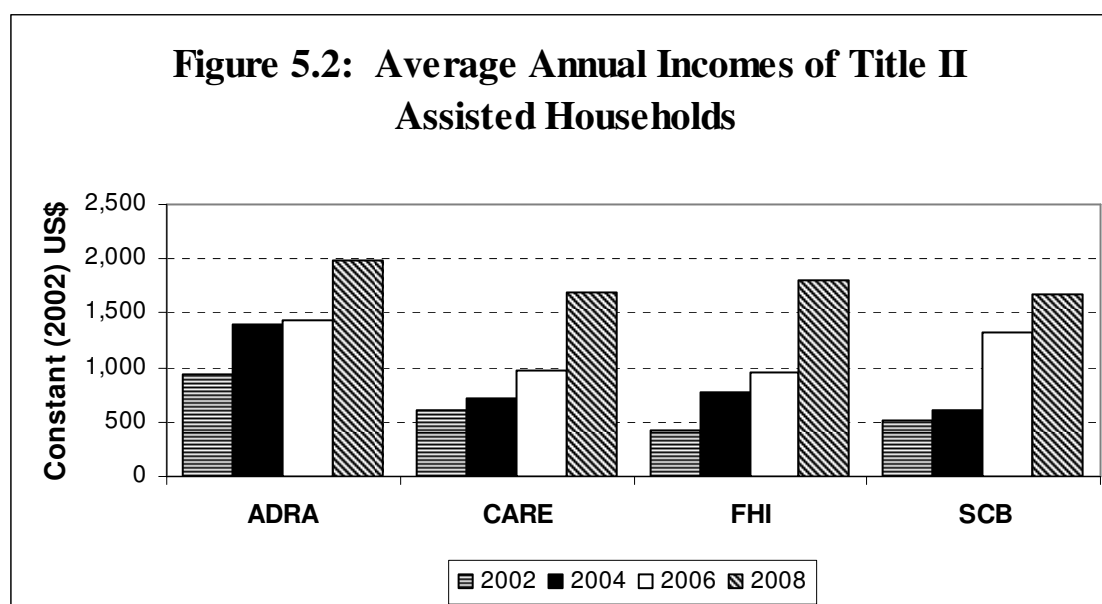


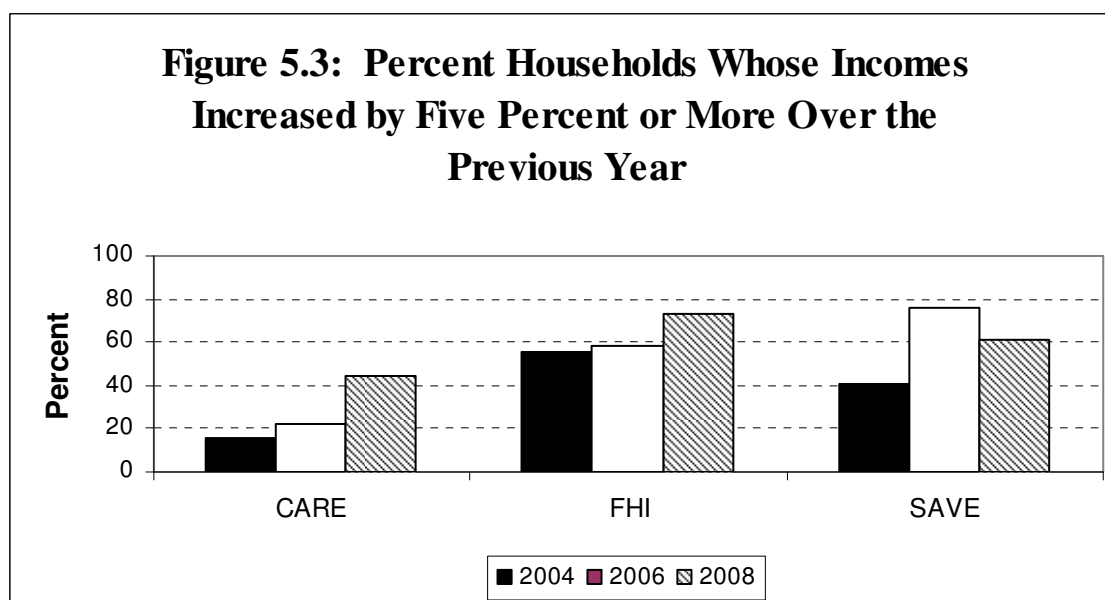
Table 5.5: Average Annual Incomes of Title II Assisted Households
(Current and Constant (2002*) US\$)

	2002		2004		2006		2008	
	Current	Constant	Current	Constant	Current	Constant	Current	Constant
ADRA	941	941	1,514	1,406	1,694	1,432	2,911	1,986
CARE	602	602	763	709	1,150	972	2,490	1,699
FHI	419	577	823	765	1,133	958	2,628	1,793
SC	513	513	651	605	1,572	1,329	2,452	1,673

*Current values in Bolivianos as reported by the CSs were deflated using the Bolivian 2002 Consumer Price Index.

5.4.1.3 Distribution of Income Increases

Even though average incomes increased, it does not follow that the incomes of all or most households that were participating in these programs increased. The objective was to have a large number of participating households derive benefits from these programs, but a few households could have captured all or most of any increases in income. So, to get some sense of how the increases in incomes generated under their programs were distributed among their clients, three of the CSs – CARE, FHI and SC – developed a second income indicator which they also tracked annually. This indicator was *the percent of households whose incomes increased by 5% or more over the previous year*. Data on this indicator suggest that two of the CSs -- FHI and SC -- were fairly successful in achieving their income distribution objective, with over half their households achieving at least 5 percent increases in incomes in 2006 and 2008. CARE also saw a significant improvement in its distribution indicator between 2006 and 2008.



5.4.2 Qualitative Results

Adoption of New Agricultural Technologies and Practices. All four of the CSs collected information on an annual basis on their progress in getting the new technologies that they were promoting adopted. These quantitative results were not reported in the previous section, however, because the evaluators have some doubts about the validity of this information and, in particular, whether the results reported can be compared across programs (Also see the discussion in the following section on M&E). With respect to the CARE program, the evaluators are also unsure about whether the results can be compared pre and post MTE, given the major changes in priority crops, for example, and approaches that took place.²⁴ The adoption rates reported by ADRA, FHI and SC for their programs will be discussed in their individual sections.

This does not mean that the CSs were not successful in achieving their adoption objectives. It was apparent from the field visits that the new agricultural technologies and practices that the four CSs were promoting were being adopted. FE team members could see the results of the recommendations with respect row spacing in the fields, for example, and the results of the pruning recommendations in the orchards. The farmers interviewed in the field also could speak knowledgeably about the technology packages that the CSs had been disseminating and indicated that they were using them. The quantitative information available on increases in sales and household incomes also suggests that the CSs were at least somewhat successful in getting their clients to adopt the more productive technologies and practices that they were promoting.

Improvements in Household Well-being. The farmers that were interviewed during the field visits also talked about the differences that the programs had made in their lives. Most talked about using some of the increases in income to improve their diets. Purchases of wheat flour, sugar and oil were most frequently cited. Some also talked about making improvements in their housing; in some cases these improvements were also made in conjunction with the availability of resources from another donor project operating in their communities. All also cited as one of the benefits of the increases in incomes being able to keep their children in school and, in some cases, to be able to send them out of the community to high school.

Investing in Their Businesses. Most farmers interviewed also cited using some of their income increases to invest in their farm operations. This included buying fertilizer and improved seeds, buying animals and investing in equipment and machinery.

Increases in Entrepreneurship and Self-Reliance. Although this was not a stated objective, discussions with CS clients during the field visits revealed a striking improvement in their knowledge and attitudes about business, markets, profitability and competitiveness. Farmers and other community members seemed much more entrepreneurial, more

²⁴ The MTE had noted, for example, that the high adoption rate that CARE had reported in its 2004 annual report could be due to CARE's counting the use of its recommended practices on the plots that were being farmed as part of its farmers' schools program, where the real test, according to the MTE, was whether and to what extent farmers were using these new technologies on their own individual plots.

knowledgeable about business and markets, including the dynamic nature of these markets, and were able to talk much more concretely about the changes they had already made in response to market changes and their plans for the future. Some of these improvements were a result of more information being available on costs and benefits and profitability from the CSs. However, the farmers seemed to understand the implications of these analyses and how to use this information, even if not all of them were able to do the calculations themselves. A better understanding of their costs of production was helping farmers in negotiating prices with buyers, for example, and helped reinforce the importance of staying competitive in order to maintain sales and incomes. Related to this was the immeasurable but unmistakable feeling that one got in talking with farmers, in particular, of a new sense of pride and self-reliance based on the fact that they have been able to use the new knowledge and opportunities made available to them through the Title II programs to better their lives and the lives of their families.

Reductions in Migration. Migration has been a typical response to climate shocks and other adverse conditions in many of the rural areas of Bolivia and especially in many of the Title II communities with their high levels of poverty and food insecurity. The places that people migrate to differ in different areas of the country, with some traveling to the nearest big city, others to where agricultural labor is needed for harvesting, for example, and others leaving the country. The length of time people migrate also varies, as does the number of people involved – whether only one person goes or the whole family migrates.²⁵ There are no hard numbers available on the numbers or percentage of the population that migrates or the changes in migration over time, and none of the CS staff or community members interviewed understand the full magnitude of the impact that migration is having on communities and on the structure of economic incentives for individuals and within and among communities. Still CS staff and many community members interviewed in the communities that were visited seemed convinced that many migrants had returned home and that fewer individuals and families were continuing to migrate as a result of the new income earning opportunities in their communities.

5.5 Constraints to Further Development

When asked what they believed were the major constraints to the continued development of their farming operations and further improvements in their incomes and standard of living, the farmer that were interviewed by the FE team consistently mentioned:

- Lack of irrigation -- a problem that Title II resources were used to address.
- Lack of credit -- a need that has become more important as the CSs' clients farming operations have become more sophisticated.
- Climate events, including drought, hail, sleet -- problems that might be difficult to find cost effective solutions for.

²⁵ The ability to take advantage of income earning activities elsewhere affects whether people are going to be willing to use their time to participate in income earning activities in their communities or origin and what level of return they are going to expect for their efforts. This is the case whether or not CS staff or community members understand the full magnitude of the impact that migration is having on communities and on the structure of economic incentives for individuals and within and among communities.

The FE team also identified the following constraints:

- Weak management capacity on part of the producers associations.
- Potential breakdowns in specific value chains:
 - Supply bottlenecks – e.g. llama meat and fiber (See discussion in the CARE section).
 - Demand – e.g., slow growth in market for fruit teas (See discussion in the SC section) and management problems in the Chuquisaca Pil (See discussion in the FHI section).
- Labor shortages if production increases as planned.
- Political and economic uncertainties.

5.6 Lessons Learned

A number of lessons were learned from the Bolivia IG programs that have relevance for other food security-oriented IG programs in Bolivia and elsewhere in the world. These lessons include the following:

- Income generation programs are more successful if they are market-oriented.
- Market oriented programs can be designed so that Title II clients can participate successfully.
- Small, resource poor farmers respond positively to economic incentives and facilitating market contacts and sales early on helps spur interest, increases farmer participation and can improve technology adoption rates.
- The value chain model is a useful way to conceptualize and organize activities, but the chains need to be market and not production driven.
- Value chains will tend to be sustainable if there is trust among members and activities continue to be profitable.
- Value chains are not static, however. So building in diversity and flexibility is important.
- Working with groups of small farmers is essential to achieve economies of scale in extension and marketing.
- A number of years may be needed, however:
 - For the programs to expand beyond the first adopters and include the majority of community members, and
 - To convert these groups of poor farmers into successful and sustainable producer organizations. Strengthening their management capacity is particularly important to long-term sustainability.
- Increasing incomes in the absence of expanding farmers' access to irrigation may be difficult if not impossible in many of the communities in which the Title II development programs operate.

5.7 Recommendations

The following recommendations are directed to USAID, which includes the USAID Mission in Bolivia, the LAC Bureau in Washington and the Food for Peace Office.

-
- ***USAID – USAID Bolivia, the LAC Bureau and FFP -- should encourage and facilitate the transfer of the Bolivian Title II experience to other programs/countries.*** For example, USAID could support and work with the CSs to develop case studies and handbooks of selected value chains and the lessons learned about the development and implementation of these chains.
 - ***USAID – USAID Bolivia and the LAC Bureau -- should explore various options for continuing support to these IG programs for several more years in order to improve the functioning of the value chains and increase the likelihood that the progress and impacts made to date are sustained.*** Some value chains had only been operating for two to three years. Additional support would help insure that more families are able to participate in these chains and increase their likelihood of sustainability. Potential sources of support include USAID Bolivia DA programs, the DA-plus up for food security and the Farmer-to-Farmer program.
 - ***USAID – USAID Bolivia and the LAC Bureau – should consider providing assistance to the following types of activities:***
 - Technical assistance to the Title II producer associations, including assistance to help strengthen their management capacity.
 - Specialized short-term technical assistance to help solve problems and mitigate bottlenecks in the Title II value chains, including those identified during the FE:
 - Help repair breaks in value chains (e.g. fruit teas, milk).
 - Assist with the financial and technical assessment of new technologies introduced under the program (e.g. technologies for mitigating the effects of freezing rain and hail).
 - ***USAID -- FFP -- should consider supporting the replication of these successful programs in other food insecure areas of Bolivia in the event that additional Title II development resources become available.*** Bolivia is still a food insecure country by many definitions, with rates of poverty and chronic child malnutrition still very high in some rural areas. The fact that these programs have been successful in increasing the incomes of food insecure rural households and reducing chronic child malnutrition should also help make the case for further investments in Bolivia.

5.8 Monitoring and Evaluation

Although USAID/Bolivia encouraged the CSs right from the beginning to try to harmonize their IG indicators, some variations in how these indicators were defined and measured continued over the life of the DAPs. These differences continued to make comparisons across CSs difficult. The lesson learned here, which has relevance to other countries with multiple CSs and/or in the event that Bolivia were to get another round of Title II programs, is that more attention needs to be paid to the harmonization of IG indicators, in how they

are measured as well as how they are defined, right from the baseline survey on. The experience in Bolivia also suggests that the push for harmonization is likely to have to come from the USAID, and because of the complexity of these indicators and the data collection process, may well require the USAID and/or the CSs to acquire outside technical assistance.

Table 5.6: Agricultural and Rural Incomes Program Performance Indicators

Indicator	How Collected	Accuracy
1. Average annual gross income of rural households assisted by the Title II program	Annual agricultural survey	Medium to high
2. Percent of households assisted by Title II with increased gross incomes of five percent or more over the previous year.	Annual agricultural survey	Medium to high
3. The proportion of the target population that has adopted improved agricultural technologies and practices.	Annual agricultural survey/KAP survey	Low to medium
4. The number of participants that received systematic agricultural training during the past year.	CS monitoring	Medium to high
7. Value of products sold through a forward contract or through a producer association.	CS monitoring	Medium to high
8. Number of producer organizations strengthened.	CS monitoring	Medium to high

Household Income. All four CSs adopted some measure of change in household incomes as their major impact indicator, with CARE, FHI and SC standardizing on two indicators. These were: (1) *the average annual gross income of rural households assisted by the Title II programs* and (2) *the percent of households assisted by the Title II programs with increased incomes of 5 percent or more over the previous year.* ADRA eventually adopted the first indicator, but not the second one.

Household income is not necessarily the best impact indicator for an income generation project, if its ultimate objective is to improve food security. Although better diets are strongly correlated with higher incomes in cross section studies, increases in incomes at the individual household level do not necessarily result in improvements in household diets. Household income is also a notoriously difficult indicator to measure, both for definitional reasons and because it is very difficult to get accurate information from respondents who frequently reluctant to provide information on their incomes. On the other hand, the fact that the CSs are measuring gross incomes and that CS staff have considerable information available to them from their projects on crop yields and prices gives them an advantage in assessing the accuracy of the information provided by their respondents that others assessing farm incomes do not have. Another potential weakness is that household incomes are also driven by factors outside the control of the individual CS, including weather and economic developments elsewhere in the country and the world, and can vary considerably from year to year.

The Bolivian SCs did not use the two consumption indicators that FFP now requires of all programs that aim to “protect and enhance” the access components of food security.²⁶ FFP argues that consumption is easier to measure than income and a much more direct measure of changes in food security. Changes in diets, on the other hand, are also another step removed from production increases and increases in product sales and incomes and can also be influenced by some of the same economy-wide factors that influence incomes as well as other factors, such as changes in tastes due to education and advertising campaigns that are independent of the typical agricultural production and income generation programs. Measurements of household incomes also have the advantage that they are more consistent with the types of indicators that USAID missions use to report on their own DA supported agricultural development and income generation programs.

Technology Adoption Rates. FFP also requires that all new Title II development programs with availability and access dimensions report on the rate of adoption of the new agricultural technologies and practices being promoted under the programs. All four of the Bolivian CSs adopted this as one of their output indicators at the beginning of their DAPs, but their successes in being able to collect information and report on this indicator vary considerably. Although a number of problems were identified in the MTE, some problems continued to exist with how the technology packages were defined and what constituted adoption. These problems underscore the difficulties in defining this indicator in more complex programs that involve the production and marketing of a wide range of crops and livestock products in a variety of agro-ecological environments. More consistency was also needed in how the questions were asked.

Value of Sales Made Through Forward Contracts and Producers’ Associations. This proved to be a useful output indicator to include in a market-oriented, agricultural-based, income generation program. The data were fairly easy to collect through the CS’s monitoring systems and provided information on program performance that is easily understood. This information also proved useful in helping to confirm the changes that were measured in household incomes.

5.9 Findings for the Individual Programs

5.9.1 Adventist Development and Relief Agency (ADRA)

5.9.1.1 Pre-MTE

The ADRA IG program was focused geographically in two provinces in the Department of Chuquisaca and on a limited number of crops with strong market demand. The program was designed from the start to be demand driven, with market potentials and needs driving its agricultural production programs, not the other way around.

²⁶ A FFP Information Bulletin dated August 8, 2007 (FFPID 07-02) states that all Multi-year Assistance Programs (MYAPS) that include activities designed to increase households’ access to food (e.g., programs in agriculture, micro enterprise development, income generation and diversification) will be required to report on the following indicators collected using a population based representative sample survey at baseline and final: (1) number of months of adequate food provisioning, (2) household dietary diversity score, and (3) number of households benefiting from activities to maintain or improve household access to food during the FY.

5.9.1.2 Key Program Approaches

5.9.1.2.1 Market Focus

Priority Products. ADRA designed its program with the market in mind, using outside experts such as BOLINVEST at the beginning to help it better understand the marketing potentials that existed for its clients and the products with the highest market potentials. ADRA started with eight priority crops but expanded to ten in response to changes in market demand. In making its selections, ADRA also looked at the potential competitiveness of its clients, whether its clients would be able to participate in these markets and the institutional setting, including whether other organizations existed that might have an ability and/or interest in providing support to these clients. Other questions asked included: whether its clients would be able to produce these products at a profit and their potential for generating employment. ADRA also looked at whether there were competitive advantages that could be exploited, whether a possibility existed to differentiate these products in the market, through quality changes and/or being able to place the product in the market before or after current suppliers, for example.

Table 5.7: ADRA's Priority Commodities

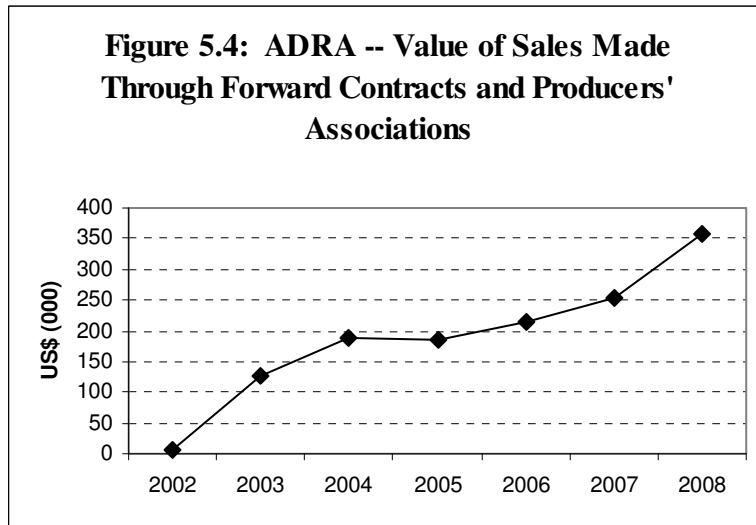
Fruits	Root Crops	Grains
<ul style="list-style-type: none">• Peaches (fresh and dried)• Plums• Grapes• Apples	<ul style="list-style-type: none">• Onions• Garlic	<ul style="list-style-type: none">• Broad beans (<i>habas</i>)• Peas• Corn• Barley

Marketing Approaches. ADRA continued to give priority during the DAP to the need for up-to-date market information and for involving its client farmers, association leaders in particular, in the collection and assessment of market information, including through involving them in quick market surveys, fairs and business networking fora. ADRA's farmers visited the major markets in Bolivia, agro-industrial companies and exporters to obtain information on the demand for their products and the requirements of the market. Buyers, wholesalers as well as representatives from agro-industrial companies and exporters, were also encouraged to visit ADRA's program areas as part of its strategy to create and strengthen linkages between producers and buyers. ADRA paid for its clients to participate in these information gathering and marketing activities, but a part of its sustainability strategy was to convince the Department of Chuquisaca to provide support to these types of activities in the future out of its own budget.

ADRA also placed considerable emphasis on identifying potential buyers and facilitating market linkages. By 2008, ADRA's client farmers were selling their products in six of Bolivia's largest cities – Cochabamba, Santa Cruz, Sucre, La Paz, Oruro and Potosi – as well as into the export market. As examples, ADRA's client farmers established relationships

with two export companies (Alba Trading and ASOMEX), two food processors (Naturaleza headquartered in La Paz and *Industrias de Valle* headquartered in Cochabamba), and major grain, fruit and vegetable wholesalers throughout the country.

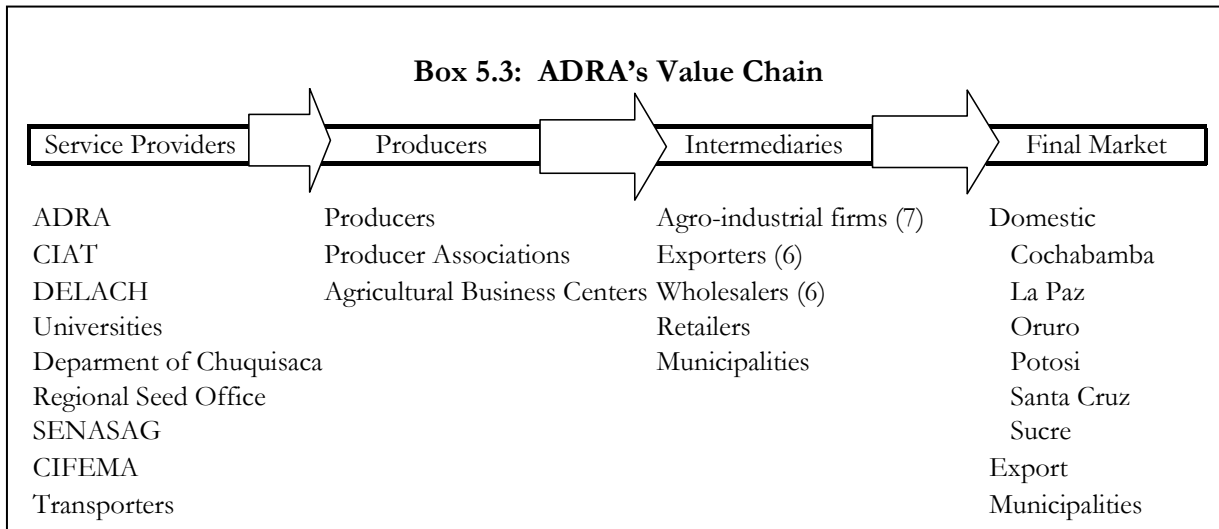
ADRA's emphasis on the market and encouraging and facilitating market linkages right from the start resulted in increased sales even in the first year of its DAP. The value of sales in 2004 was 26 times the value in 2002 and the value in 2008 was almost double the value in 2005 and more than fifty times the value in 2002. The value of sales increased more rapidly in the first and last two years of the program. Sales



might have been higher in 2007, in particular, if the ADRA areas had not been impacted so adversely by the El Nino climate events. Flooding, hail, frost, and excess humidity led to both production and post harvest losses of peaches, *babas*, barley and onions. According to ADRA, the El Nino event also resulted in a significant number of farmers leaving to work in the mining industry that was still booming in 2007, and others may have migrated on a seasonal basis to other regions of Bolivian and/or Argentina.

5.9.1.2.2 Value Chains

ADRA also began using the value chain analytical framework post-MTE as a better way to think about and discuss its IG program. ADRA used its own staff to provide many of the support services required to strengthen these value chains. This included working with lead farmers to develop demonstration plots, training farmers about new production and post harvest technologies and practices, providing technical assistance and training related to meeting product quality standards and helping secure product certification, helping organize and strengthen producer associations, and helping facilitate contacts with buyers and the development of forward contracts. Post-MTE, ADRA also began to put more effort into identifying and developing working relationships with other organizations that were already providing needed services (or had the potential to do so) to its farmer clients. This included DELACH, CIAT, the Regional Seed Office, CIFEMA, SENASAG and the University of San Xavier -- organizations that also would become key actors in ADRA's sustainability strategy (See box 5.2 for further information on these organizations).

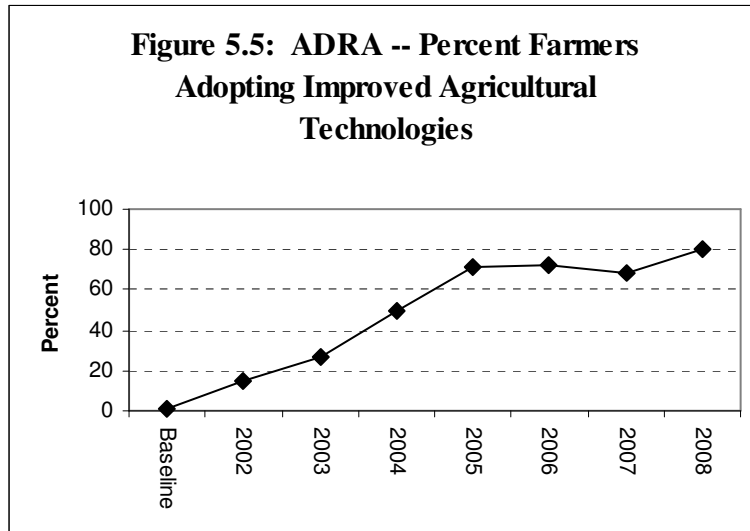


The FE team had an opportunity to visit several of ADRA's value chains, including the chains for grapes, peaches, garlic and *habas* (broad beans)

- Grapes** – ADRA was working with the farmers in San Lucas helping them improve their incomes from the sale of grapes, both fresh and as juices. The farmers in this community had already been growing grapes, but ADRA introduced several new varieties of table grapes, established demonstration plots and promoted a new technology package, which included pruning and integrated pest management (IPM). ADRA also helped facilitate market contacts in Cochabamba, La Paz, Potosi, Sucre and Santa Cruz. Sales were increasing, but the plants and production levels are vulnerable to the frequent hail storms in the area. So ADRA had begun to work with two lead farmers to test the costs effectiveness of using nets to protect the grapes in demonstration plots in their fields. Plans were also underway at the time of the FE visit, to get money from the Department of Chuquisaca to help with the testing and the expansion of the net program, if the use of the nets proves to be cost-effective. This is a technique that the USAID MAPA project was also experimenting with in the same municipality.
- Garlic and Habas** – The farmers in Centro Villa Charcas in Incahuasi spoke at length about the positive changes that had occurred in their farming operations, incomes and the quality of their lives since 2002. The Germans had financed an irrigation system that had enabled the farmers to grow two crops a year. However, it was ADRA that provided them with the new production and post harvest technologies and helped them link to higher valued markets. ADRA's new technology packages, the farmers explained, included the introduction of new varieties and advice on land preparation, seeding, the preparation and use of organic fertilizer, integrated pest management, and product quality and classification. Prior to the MTE, ADRA had partnered with PASACH, an organization providing agricultural assistance in the Department of Chuquisaca, to enable famers' to get access to access to irrigation pumps, modern metal plows, harrows and seeders, labor saving equipment that became more important once farmers' could grow two crops a years. Initially PASACH had covered half the cost, with the farmers' paying for the rest. At the time of the FE, the farmers were buying the equipment on their own.

5.9.1.2.3 Technology Transfer

The technology packages that ADRA promoted for its priority crops were already well developed at the time of the MTE, with both the production and post harvest technologies and practices being promoted for its target crops fully integrated. ADRA had already completed much of the on-farm validation work for its priority crops prior to the approval of the DAP. ADRA used its own



technical staff to help disseminate these new technologies and practices, working with lead farmers who were willing and able to try these new technologies on their own fields. And this extension strategy -- using demonstration plots on lead farm fields (250 demonstration plots over the life of the program) as a basis for disseminating information on its technology packages -- has proven successful. According to data from ADRA's agricultural surveys, adoption rates rose dramatically in the first several years of its DAP and peaked in 2008 at 80 percent. The field visits confirmed this success, with farmers interviewed in the field at the time of the MTE and FE appearing knowledgeable about the information and technology packages that ADRA had been disseminating. ADRA's demonstration plots continued to be impressive, with real comparisons being made of alternative varieties and practices.

When asked how much time is needed to develop a value chain, the ADRA IG program director, who had designed and implemented the ADRA IG program, answered four to five years at a minimum. This includes a year to do the market feasibility assessments, and another year to two years to develop and test the technology packages; he recommended testing over at least three agricultural cycles. Demonstrating the new packages on farmer's fields comes next, and could take one into the fourth year. Some of the work needed to develop market linkages and strengthen links along the value chain can occur simultaneously with the development of the technology packages, but this latter work will have to continue beyond the initial transfer of the new technologies, as will the work with the producers associations, if the participation of small farmers in the value chain is to be sustainable.

ADRA also spent considerable time and effort on the development of training materials covering a broad range of topics relevant to its priority crops and interventions. These materials are well designed with key messages clearly articulated in text and pictures. As part of its sustainability strategy, these materials were distributed to each of its farmers associations, depending on the crops each association was working on. ADRA also gave these packages to the *Unidad Departamental de Desarrollo Productivo y Competividad* in the

Department of Chuquisaca and to the UDEM's in the four municipalities where it had been working.

5.9.1.2.4 Economic Analysis and Entrepreneurship

Information was available from ADRA on the costs and returns of the activities that it was promoting at the time of the MTE. This capacity was strengthened post-MTE and more attention focused on developing the capacity to do cost analyses within the Agricultural Service Centers (ASCs) (See further discussion in the following section on capacity building). Information on the costs and returns of activities was available at the field sites visited and the two ASCs. The farmers and leadership of the associations appeared to understand this information and its uses, including as tools to help in negotiations and to maintain competitiveness. A key objective of the ADRA program was to transform these ASCs into commercial enterprises, and ADRA, as is also described in the following section, made a considerable effort post-MTE to try to make this happen.

5.9.1.2.5 Credit

ADRA had originally developed a relationship with FADES in order to assist its farmer and association clients to get access to credit. Most of the early loans FADES made were for the purchase of farming supplies such as fertilizers and seeds. This agreement expired in November 2006 and was not renewed, according to ADRA, because FADES was not willing to reduce the interest rate that it was charging. According to ADRA, its clients needed better access to credit to be able to increase their investments in their farming enterprises, but they were still shut off from credit because of the requirements of the existing financial institutions for collateral in the form of fixed assets. At the time of the FE, ADRA had just issued a request for proposals in an attempt to identify another organization to help it disburse the \$80 to 85 thousand that were still available for making loans to its client farmers. ADRA had recovered these funds from FADES and was hoping to be able to find a new partner willing to experiment with some of the new types of products such as micro-warrants and micro-leasing that ADRA believed were more suitable to the needs of its small farmer clients (See a more detailed discussion of these products in Section 5.3.6). ADRA planned to make two awards, to enable it to provide coverage to its four municipalities, and expected to make the awards in December 2008 and the money to be released in February 2009.

5.9.1.2.6 Capacity Building

Training Farmers. ADRA trained over a thousand participants each year on a wide range of topics related to its value chains, including production and post harvest technologies and marketing. Part of this training was focused on developing the capacity of the local agricultural technicians that ADRA used to implement its program at the field level, improving their ability to provide oversight and technical assistance to its client farmers.

In the last two years of its DAP, ADRA began working more closely with the *Asociación Federativa Integral de Productores de los Cintis* (AFIPAC) on the delivery of agricultural technical assistance. ADRA's plans were for AFIPAC to take over responsibility for monitoring the

work of the agricultural technicians that ADRA trained after the end of the program and to provide refresher training when needed. ADRA also tried to arrange it so AFIPAC will be able to get additional support for this role from the municipalities, the Department of Chuquisaca and DELACH (*Desarollo Economico Local de Chuquisaca*), universities and the Agricultural Technical Education Centers.

Table 5.8: ADRA -- Number of Participants Receiving Systematic Agricultural Training

	2002	2003	2004	2005	2006	2007	2008	Average
ADRA	1,199	1,054	1,099	1,205	1,642	1,306	1,378	1,269

ADRA's objective was for the technicians that it trained to continue to provide technical assistance to the Agricultural Services Centers (ASCs) that it had created (See further discussion below) and their associations, a cost that had been covered by ADRA under the Title II program. ADRA realized that most associations will not be able to pay the complete costs of this technical assistance on their own. So ADRA tried to find other sources of funding to replace its contribution, including from its farmer associations, DELACH and/or other private and public entities. ADRA experimented with this model in Culpina, with the technicians paid by the farmers associations, ADRA and FDT *Valles*, with some success. However, it still remains to be seen how well or how long this will work.

Creating Agricultural Service Centers. As a unique part of its program, ADRA financed the development of six Agricultural Service Centers (ASCs) in its four targeted municipalities. These large warehouse structures were not cheap; the one in Chinimayu cost \$8,000 to build, for example. However, according to ADRA, they were key to its IG strategy, providing a physical place for its clients – its Technical Assistance Groups (TAGs) – to bring their products for consolidation and sale. ADRA also used these Centers as a locus point for collecting commercial information and transferring information to its clients, grading, limited processing and packaging and sales and other commercial activities.

ADRA's objective was to transform these Centers into true commercial enterprises, which also serve the broader community, not just members of ADRA's TAGs. Several of the ASCs were already covering their operating costs at the time of the MTE, earning additional income by charging new clients entrance fees and also charging for services performed, including the use of grading equipment. ADRA had made progress since the MTE in strengthening the managerial capacity of these Centers, including by providing training based on an International Labor Organization (ILO) model that covers the organization and management of small businesses. All seven associations had obtained legal status in 2006 and all had business plans in place by 2007, also facilitated by ADRA.

The FE team was able to visit two of these centers and hear from their management and membership. Speakers at both centers expressed an interest in transforming their centers into true commercial enterprises. However, there are potential problems associated with

making this change, including legal and tax consequences, which people were not very clear about.

In other words, it was still not clear at the time of the FE that these Centers will be able to make the transition to true commercial enterprises. ADRA technicians had been helping with many of the management tasks, and once the Title II program ends, some of this will be picked up by business students under an agreement with San Xavier University. Ultimately, these centers will need to be able to hire good managers from the private sector, if they are to attain sustainability. The inability to attract and keep good managers was one of the downfalls of many efforts to develop producer and marketing cooperatives in many developing countries. Another option could be for these centers to be purchased and operated by an existing and/or new commercial enterprise. The reality seems to be that, despite considerable efforts on ADRA's part, seven years has not been enough time to transform these centers into sustainable business enterprises. But this result is not inconsistent with results elsewhere in the world.

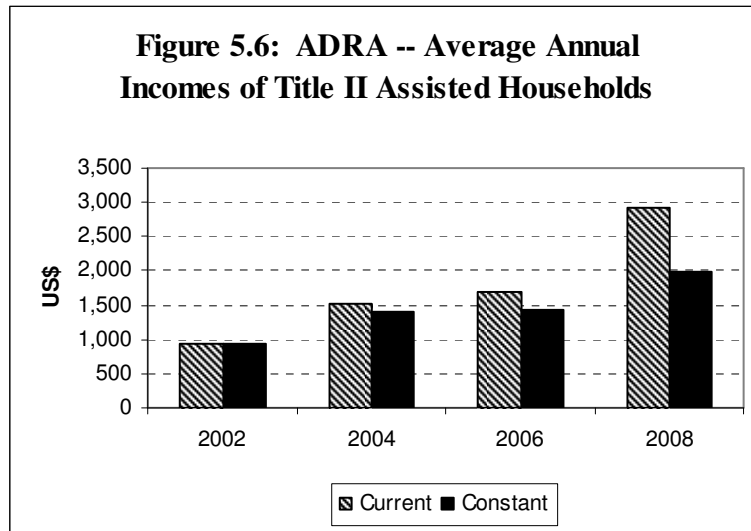
The FE team agreed with the MTE conclusion that this was a “novel approach, and one that is risky, but with a potentially high pay-off.” The MTE had also concluded that the Centers could be sustainable, if they could become profitable and their clients along the value chain – both producers and buyers – would also continue to make a profit, which does seem to be the case. The MTE also had questions about the replicability of this approach, in the absence of other donors, given the size of the initial injection of capital that is required. The FE team was told that one of the communities that the team had visited (San Luis) had built its own ASC, but there was no time to either visit or to learn more details about how it was financed, who manages it, or anything about its costs and returns.

Recommendation: Given that this is a novel approach and one with a potentially high pay-off, the FET recommends that ADRA conduct a post project assessment of the role of the agricultural service centers in the development of the value chains, their costs and benefits and likely sustainability as business enterprises.

Strengthening Municipalities. ADRA devoted an increasing amount of time and effort during its DAP to working with its municipal governments, helping them understand that they can play a broader and more proactive role in supporting IG activities and helping strengthen their capacities. ADRA focused on the DILPEs (*Directorios Locales de Promocion Economico*) and the creation of a new organization – the UDEMs (Municipal Economic Development Units). ADRA envisioned this latter unit as playing a more technical role, including developing proposals for inclusion in the municipal budget. ADRA helped equip these units in the four municipalities where it worked, and also arranged for students from the University of San Xavier to support the development of technical proposals, business plans and market studies. As part of its sustainability plan, ADRA envisioned that the UDEMs would provide support to marketing activities, including market research, supporting the participation of farmers in fairs and business roundtables, providing technical assistance, and other efforts to facilitate market linkages between local farmers and buyers.

5.9.1.3 Program Impact

The effectiveness of ADRA's market-driven approach is clear when one looks at the information on the changes in the incomes of the households that participated in the ADRA IG program. The positive impact of the program can be seen early on, with household income increasing, on average, by over 60 percent in the first two years of the project. Incomes continued to increase and tripled over the



life of the project. Some of the increases that took place in 2007 and 2008 were due to inflation caused by the rapid increase in prices, food prices in particular, that were taking place in international markets. If one takes this inflation into account, the incomes of the ADRA households still doubled (measured in 2002 US\$) over the LOP. The improvements in incomes would likely have been even greater were it not for the adverse effects of El Nino during 2007 and 2008 in the ADRA intervention areas.

5.9.1.4 Sustainability Strategies

ADRA viewed its farmers associations and ASCs as key to the sustainability of its IG program over the longer run. As part of its sustainability strategy, ADRA made a concerted effort to strengthen the management capacity of these organizations and to transform them into true commercial enterprises, as was discussed in the previous section on capacity building. ADRA also focused on consolidating and strengthening the linkages between its client farmers and associations and their buyers, and developing strategic alliances with other service providers. This latter effort was made with the expectation that these organizations would be willing and able to take over some of the support functions to ADRA's clients that it had been performing. ADRA also looked to its municipalities for sources of funds and technical assistance, encouraged them to play a more active role in promoting the economic development of their municipalities and helped to strengthen their capacities. This included helping establish the technical units in the municipalities (UDEMs), which ADRA expected would be able to take over some of the marketing support activities that ADRA had been providing. One of ADRA's key staff commented that if he could do the project over, he would have started working more closely with the municipalities on IG activities right at the beginning of the DAP.

Box 5.4: ADRA – Strengths and Weaknesses of Its IG Program

Strengths	Weaknesses
<ul style="list-style-type: none"> • ADRA’s IG program was demand driven with market potentials and needs driving its agricultural technology transfer program from the beginning. • ADRA placed considerable emphasis from the beginning on identifying potential buyers and facilitating market linkages, which resulted in increases in product sales and incomes even during the first year. • ADRA’s program was focused both geographically and on products with strong market demand. • ADRA assembled a strong technical staff, with marketing as well as agricultural production expertise. • ADRA’s technology transfer program was strong, with good training materials and considerable emphasis given to post harvest technology transfer. • ADRA identified and made increasingly effective use of strategic partners to support its IG program, and as a key component of its sustainability strategy. 	

5.9.2 CARE

5.9.2.1 Pre-MTE

CARE recast its IG program in 2005, in response to the MTE recommendations, to give it a stronger market orientation and to focus on helping clients in its intervention areas produce and market the type and quality of products in demand in the market. Although CARE emphasized the demand driven nature of its program in its original proposal (DAP) and had some marketing expertise on its staff at the time of the MTE, it was really more production focused, concentrating on helping the communities where it was working increase their production of selected crops through the transfer of new and/or improved technologies. In the field, CARE also gave more priority to social objectives, including the organization and development of numerous community-led groups, than to market and business development objectives. CARE did take a broader view of the potential markets initially. However, with its emphasis on working closely with communities and focusing on their needs, CARE had tended to look more closely at the needs in local markets, which tend to be small and less able to absorb increases in supply without a drop in prices.

5.9.2.2 Key Program Approaches

5.9.2.2.1 Market Focus

CARE reoriented its IG program post-MTE to give it a stronger market orientation. This entailed doing a reassessment in 2005 of the potential marketing opportunities in the three regions where it was working in order to identify priority products and value chains. CARE used a participatory process working closely with its community partners to identify higher valued products with promising markets and assess the production potentials in these areas and current and potential bottlenecks. CARE's focus during the remainder of the DAP, was on developing and strengthening these priority value chains, helping to increase agricultural productivity, developing the capacity to add value to products, and strengthening the management and marketing capacity of the producers' associations, including their capacity to undertake market assessments.

Priority Products. At the end of this process, CARE had identified seven priority products that it felt that its clients could have a competitive potential in national, regional and local markets. Two each were identified for Chuquisaca and Potosi and three for Tarija.

A number of factors influenced the selection of these products/value chains -- local capacities, including the capacity to produce the product and get it to market at a competitive price -- as well as market opportunities. Given the short-time left in the project, the presence of other organizations in a value chain that CARE could collaborate and partner with was also an important factor in deciding which value chains to concentrate on. The decision to identify separate value chains for each of the areas of the country where it was working was, to a large extent, the result of geography. The CARE program operated in three distinct areas of the country with distinct agro ecological zones and separated by long distances and difficult, often mountainous terrain. This resulted in numerous distinct areas with different production potential and market access problems.

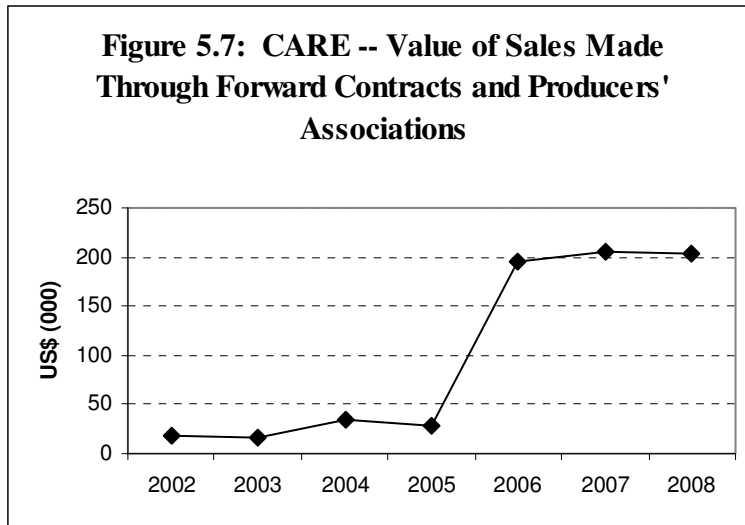
Table 5.9: CARE – Priority Products/Value Chains

Chuquisaca	Potosi	Tarija
<ul style="list-style-type: none">• Cheese• Peanuts	<ul style="list-style-type: none">• Honey• Dried peaches	<ul style="list-style-type: none">• Chamomile• Peaches• Textiles

Marketing Approaches. CARE like the other CSs encouraged its clients to pay more attention to markets and market demand and facilitated their participation in high end fairs and business roundtables at the national and regional levels. CARE involved the peach producers in Entre Rios in a series of rapid market assessments in 2006 and 2007, for example. It also contracted with a local consultant to develop new apparel designs for the Tajzara Textile Association, which is an important aspect of market development in this

value chain. This type of assistance helped CARE's clients promote their products and facilitated the signing of concrete agreements with the private sector.

This change in focus – the selection of new priority products and strengthening their value chains – resulted in an immediate and large increase in the value of sales made through forward



contracts and producers' associations, from \$28 thousand in 2005 to \$194 thousand in 2006. The value of sales appears to have reached a plateau after 2006, however, which could be due to problems with supply bottlenecks (See the following discussion of the camelid chain) or to the adverse effects of El Nino in some of CARE's areas in 2007 and 2008 (See the following discussion of the peach value chain).

5.9.2.2.2 Value Chains

Once the products were identified, CARE turned its attention to strengthening the value chains that it had identified. Since one of the reasons that CARE selected several of these chains was the presence of other organizations that it could partner with, the roles that CARE played tended to vary more by specific value chain depending on the interests and capacities of the other service providers active in the chain. CARE also learned that it could be more effective if it focused on the bottlenecks in a chain and tailored its technical assistance to help solve these bottlenecks. Sometimes CARE staff provided assistance, and in other cases, it contracted with other individuals and organizations, but it also learned that providing qualified and specialized technical assistance was important to achieving quality products and increasing sales.

CARE, in other words, played different roles in different chains, depending on the interests and capacities of its collaborators and partners. Some of CARE's more important partners were: Plan International, PROMETA, IICA, CETA, SENASAG, National Seed Program, CEDEC, SNV, CIOEC, ACLO Foundation and COSIM. Given the time constraint, working with strategic partners meant that CARE could play a more limited role, complementing and supplementing activities already underway, and still stand a chance of achieving its income generation objectives. Developing these strategic relationships also helped generate additional resources to support the development of the value chains, and provided greater opportunities for joint marketing. As is discussed in further detail in the following section on "Sustainability Strategies," these strategic partners constituted an important part of CARE's sustainability strategy for its IG program.

The FE team only had time to visit two of CARE's value chains in the Tarija area – the fresh peach chain in Entre Rios and the camelid/textile chain in Yunchara.

- ***Peaches*** -- CARE began working with 12 community-based associations of peach producers in Entre Rios in 2006. CARE concentrated on providing technical assistance and training to farmers designed to improve the way they manage their trees (including pruning, and improving the management of the orchards) and get their peaches ready for market (including introducing grading and helping them improve their quality control and packing). CARE also facilitated the sale of peaches in the regional market. Most peaches are sold fresh and Entre Rios has an advantage in being able to place its peaches in the market earlier than some of its potential competitors. The Loyola Cultural Association (ACLO) provided CARE's farmers with improved seedlings and technical assistance and training in IPM. COSIM, a private provider of technical assistance services under contract with the Municipality of Entre Rios to work on agro-forestry issues, also started to work with CARE in the implementation IPM and NRM practices in the value chain. The farmers that were interviewed were very enthusiastic about the CARE program and in particular with the increases in the value of the sales of fresh peaches (sales from the area as a whole increased from less than \$16 thousand in 2006 to almost \$55 thousand in 2008). The farmers also identified a number of constraints to the future development of the chain, including drought and frost. CARE and COSIM were aware of the frost problem and had been exploring cost effective methods for dealing with the problem – both passive and active -- and also collaborating on training. At the time of the FE, plans were underway to purchase frost control equipment from Uruguay and test it during the 2009 winter season. The cost of the equipment was being shared between CARE (55 percent) and the municipality (45 percent); the municipality was also planning take over the responsibility for testing the equipment; and COSIM, which will still be under contract with the municipality, was planning to provide technical assistance and training to the local promoters.
- ***Camelids/Textiles*** – This value chain involves two very different markets – the market for fresh and dried meat and the market for textiles and apparel made from these textiles.

Although the reference is to camelids, sheep are also grown in these highland communities as well as llamas and alpacas. CARE partnered with PROMETA and the Tajzara Livestock Association on the production side, contributing to improvements in animal health (including providing assistance to ten vaccination campaigns) and improved forage (including the introduction and testing of improved forage seeds). CARE's NRM program also worked with PROMETA on an innovative grazing system based on parcel rotations for pasture management. The FE team visited a slaughter house that had been built with PROMETA assistance. CARE helped train the butchers and provided assistance and training in business management. At the time of the visit, there were not enough animals available to keep the plant operating at full capacity or to meet the demand for dried llama meat (*Charque*), which all those interviewed said was a profitable and growing market. These activities had been transferred to the municipality and PROMETA as part of CARE's sustainability strategy.

The FE team also visited with members of the Tajzara Textile Association at one of their work units and in their store in Tarija. CARE had hired a local consultant from *Fundacion Jalsuri* to help the association develop a business plan. The Association has a catalog, a web site and participates in local and national craft shows. The plan covered a wide range of issues from management recommendations to market development and designs for new products with better market potential in the higher end apparel markets in La Paz and some of the other bigger Bolivian cities. The plan also included detailed analyses of the costs and returns of the operations and the entire production process (from shearing, carding dyeing, spinning and weaving) and included recommendations for reorganizing the production process to make it more cost effective and improve quality control. CARE was also able to provide assistance with the implementation of some of these recommendations, including helping standardize the dying process and helping provide equipment. The Textile Association has a professional manager, who indicated to the FE team that she is committed to moving ahead on these recommendations. At the time of the FE, sales were down for the year, and there were indications of some potential for conflicts developing within the chain, between the Textile Association that wanted to keep articles made from sheep wool in their sales line, for example, and some members of the Livestock Association, who wanted to reduce or eliminate sheep from the areas and concentrate on camelids.

5.9.2.2.3 Technology Transfer

CARE also changed its approach to the technology transfer process post-MTE. CARE continued to work with groups of farmers, post-MTE, however, it began to rely more on the use of demonstration plots on lead farmer fields as a basis for its technology transfer program. Pre-MTE, CARE was also trying to implement a farmers' school (*escuelas de campo*) approach, which entailed organizing farmers into more formal groups and using these groups as a mechanism for disseminating technical information, including in several cases by encouraging farmers to implement the technologies that CARE was recommending on community land. The NRM evaluator did visit one poorly performing group-run demonstration plot, however.

CARE had focused pre-MTE, on the construction and promotion of metal silos as its primary post harvest activity. Post-MTE it provided technical assistance on a broad range of topics related to the steps that farmers can take to increase the value of their products in markets, including classifying their products and the use of improved packing methods. CARE also made a concerted effort to introduce better quality control practices across its value chains.

5.9.2.2.4 Economic Analysis and Entrepreneurship

In addition to its technology transfer role, CARE devoted a considerable effort to helping improve the business aspects of its value chains, helping all the associations that it has been working with develop and then up-date their business plans. Information on the costs and returns of the operations were available at all the sites visited, and CARE's clients seemed to understand their implications and uses. CARE also emphasized quality control issues as part of its business training, making its clients aware of the importance of being able to meet

national and international quality standards, developing quality control standards and marketing guides for each of the products and trained association members of in their use.

5.9.2.2.5 Capacity Building

Training Farmers. CARE trained almost four thousand participants each year on average between 2002 and 2008. Post-MTE, the topics covered related to agriculture and livestock

Table 5.10: CARE -- Number of Participants Receiving Systematic Agricultural Training

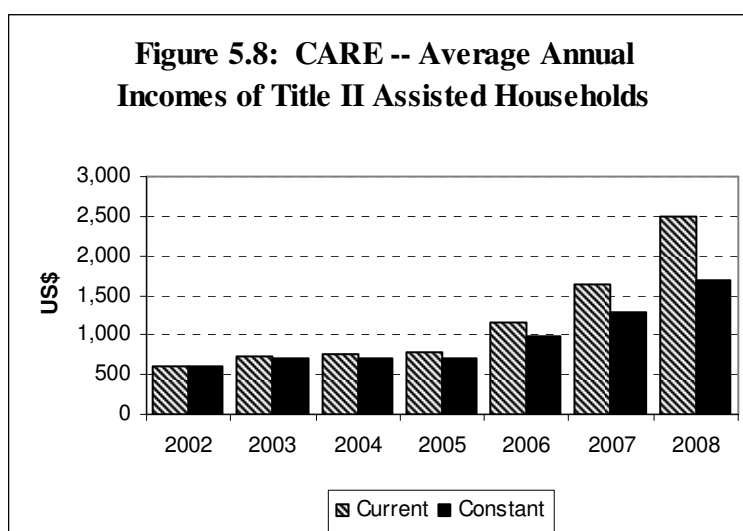
	2002	2003	2004	2005	2006	2007	2008	Average
CARE	2,662	3,219	6,596	3,929	1,918	5,967	1,637	3,704

technologies and practices, product transformation, quality control, market studies, management and marketing techniques, all tailored to the needs of the specific value chains. For example, in 2008, participants in the peach value chain in Entre Rios, including producers, technical personnel from the municipality and COSIM local promoters, were provided specialized training in frost control. Similarly, the members of the Tajzara Textile Association were trained in design development, quality control and tailoring.

Strengthening Producers Associations. CARE worked with 24 producers' associations during the DAP, helping them organize and strengthening their capacity to help their members compete more effectively in higher valued markets. Post-MTE, CARE emphasized the development of business plans and training in business management.

5.9.2.3 Project Impact

CARE's change in strategy did produce results. Incomes, which had changed little in the first four years of the program, more than tripled in the three years after CARE recast its program to give it a much stronger market orientation. Some of the increases that took place in 2007 and 2008 were due to inflation caused by the rapid increase in prices, food prices in particular, that were taking place in international markets. If one takes this inflation into account, the incomes of CARE households still more than doubled since 2005.



5.9.2.4 Sustainability Strategies

The sustainability plan that CARE developed for its IG program focused on strengthening existing community and producers' associations. To make better use of its limited resources during the last year of its DAP, CARE also decided to concentrate on only three of the six value chains that it had initially selected in 2005 -- the cheese chain in Chuquisaca, the dried peaches chain in Potosi and the handmade textile chain in Tarija. CARE selected these three chains for several reasons: it thought that it would have the greatest chances of success with these three chains, FHI had agreed to take over the role that CARE had been playing in the development of the peanut chain in Chuquisaca, and CARE had concluded that the chamomile and honey chains would require more assistance than it would be able to provide during the last year of the DAP.

The CARE sustainability plan focused on the transfer of activities being implemented by CARE and its staff to its strategic partners and to the communities and beneficiary families. Separate sustainability strategies were developed for each of the major components. Under the IG and NRM components, CARE planned to concentrate its efforts in the Department of Potosi, because it is the poorest and because many of the communities where it worked were adversely affected by the flooding, hail and drought effects of El Nino.

Because CARE had selected these value chains in part because of the presence of strategic partners that it could work with and whose activities it could supplement, another major aspect of its sustainability strategy was to turn responsibility for the value chains back to these strategic partners (See previous discussions of the peach and camelid/textile value chains). In the case of the peanut chain, this meant transferring its own responsibilities to FHI, which will continue working with Plan International and the municipal governments, which were the other two major partners in the value chain.

Box 5.5: CARE – Strengths and Weaknesses of Its IG Program

Strengths	Weaknesses
<ul style="list-style-type: none"> • CARE's IG program became more demand driven post-MTE, with products/value chains selected in part based on promising market opportunities. • CARE increased its emphasis on marketing and facilitating market linkages post-MTE. • CARE selected its priority value chains post-MTE, in part, because of the presence of potential partners and collaborators, which increased the likelihood that its programs would have an impact in the few years that were left. • CARE tailored its technical transfer programs to the needs of the specific value chains, contracting with the specialized expertise that was needed when it was not 	

<p>available on staff.</p> <ul style="list-style-type: none"> • CARE also concentrated on the gaps and bottlenecks in its value chains, which was also a cost effective use of its resources in the limited time remaining. 	
--	--

5.9.3 Food for the Hungry International (FHI)

5.9.3.1 Pre-MTE

FHI has a long history of working in the rural areas of Bolivia and had included an agricultural component in its Title II programs, even in the mid-1990s when the other Title II programs were focused on school feeding and urban employment generation. FHI's earlier programs were characterized by a strong emphasis on infrastructure and increasing agricultural production of crops already growing in its intervention areas. At the time of the MTE, FHI had made some progress in making more effective use of market analyses and achieved some success in linking some of its small farmer clients to higher valued markets. However, its focus was still primarily a supply one, on increasing incomes through increasing the production of crops supported by investments in irrigation, land reclamation and farm to market roads.

5.9.3.2 Key Program Approaches

5.9.3.2.1 Market Focus

FHI placed more focus on value chains post-MTE, and on identifying and promoting products that have good market potential that can also be produced in its intervention areas in Cochabamba and Potosi, the transfer of post harvest technologies and assisting farmers make linkages with buyers.

Priority Products. FHI had been focusing on 17 crops prior to the MTE. Post-MTE, FHI decided to reassess the market opportunities for its clients and indentified a smaller set of products that were higher valued and had greater market potential. Markets are dynamic, however, and FHI added more crops to its list in response to emerging market opportunities.

Table 5.11: FHI's Priority Products

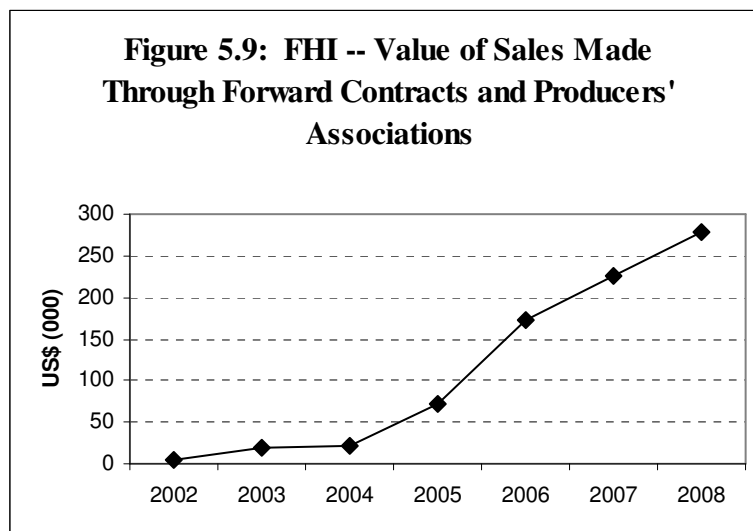
Grains	Root Crops	Animal Products
<ul style="list-style-type: none"> • Amaranth • Corn (seed) • <i>Habas</i> (broad beans) 	<ul style="list-style-type: none"> • Maca (organic) • Onions (sweet) • Peanuts • Potatoes (commercial/seed) 	<ul style="list-style-type: none"> • Milk

Marketing Approaches. FHI began its IG program with the market in mind, using outside experts such as BOLINVEST to help it identify the market potentials that existed for the clients in its areas of intervention and the products with the highest market potentials. These analyses provided information on the size and nature of demand for a range of products, and identified specific markets for the products with high potential, with detailed information on the requirements of these markets and potential buyers.

Identifying promising markets is important, and also a continuous process, but identifying and developing relationships with specific buyers is also key. At the time of the MTE, FHI had already linked some of its farmers in Tomoyo with the Association of *Haba* Producers (ASOHABA), which was buying their beans and exporting them along with beans being produced elsewhere in the country to Japan. ASOHABA was buying beans under contract and, in the case of the *haba* producers in Tomoyo, had provided them with the equipment they needed for sorting the beans to insure proper size and was taking over responsibility for providing technical assistance to these farmers on production and marketing. Post-MTE, FHI began to put more emphasis on the development and strengthening of commercial relationships with more buyers, including some of Bolivia's larger firms such as ASOMEX, *Sol de los Andes*, Naturalcos, *Laboratorios de Valencia*, and *La Salvadora*.

FHI, like the other CSs, actively involved its client farmers in local, regional and national fairs, market surveys and business networking forums. In Bolivia participation in these events has proved to be an effective way of gathering up-to-date market information, making contacts with potential buyers and developing longer-term relationships. To initiate farmers in this process, FHI developed a "Participatory Market Research" method which had farmers assume the roles of buyers and sellers in order familiarize them with the steps involved in assessing market opportunities and give them more confidence. In 2007 and 2008, FHI also initiated a new round of rapid market assessments.

FHI's decision post-MTE to give more emphasis to products with good market potential and to focus more on facilitating marketing and the development of market linkages produced results. The value of the products that FHI clients were able to sell through their producer associations and/or forward contracts increased substantially after the MTE, from \$21 thousand to \$71 thousand in just one year. By 2008, sales had reached \$278 thousand, an amount almost four times greater than in 2005.



5.9.3.2.2 Value Chains

FHI also adopted a value chain approach post-MTE which helped it better conceptualize and manage the many interventions that it already had underway. FHI used its own staff to provide many of the support services to strengthen these value chains. This included working with lead farmers to develop demonstration plots, training farmers about new production and post harvest technologies and practices, providing technical assistance and training related to meeting product quality standards and helping secure product certification, helping organize and strengthen producer associations, and helping facilitate contacts with buyers and the development of forward contracts. Post-MTE, FHI also began to focus more on identifying and developing working relationships with other organizations that were already providing needed services (or had the potential to do so) to its farmer clients. For FHI, this included the Regional Seed Office, CIFEMA, SENASAG, FDTA *Valles*, MAPA, PNS, ORS, UCB and ANED -- organizations that are also likely to become key actors in FHI's sustainability strategy (See box 5.2 for further information on these organizations).

Due to the time constraints, the IG evaluator was only able to visit FHI's program in Tomoyo, but since she had visited Tomoyo in 2004 as part of the MTE, she was able to appreciate the extent of the changes that had taken place in this valley in just four years. Tomoyo was also a good choice for a site visit, because many of the value chains that FHI was working with are active here. So it provided a good example of how FHI has been able to integrate its new, more market oriented approach with what began as a more infrastructure driven initiative. Tomoyo is also a good example of the huge difference that access to water can make to household incomes and of the multiplier effects that these increases in income can have on a community more broadly.

Tomoyo is a large project for a Title II program, diverting enough water to irrigate 600 hectares of land spread along the river valley among three communities, and it was a major undertaking for FHI. The construction of the intake that diverts the water from the river and the main canal that delivers water to the three communities was completed during FHI's previous Title II program. At the time of the MTE, FHI was helping farmers systematize their plots for irrigation and finish the canals that deliver water to their fields, continuing to work on production technology transfer, providing some marketing support and helping increase the capacity of the irrigation association to operate and maintain the irrigation system.

In 2002, at the beginning of the DAP, the farmers in Tomoyo were only able to grow one crop a year, and the major crops – yellow corn, potatoes, wheat and barley – were destined mainly for household use (see Table 5.12). In 2004, at the time of the MTE, some farmers were already beginning to cultivate two crops a year and by 2008, three crops were possible. The cropping patterns also became more diversified, with farmers adding more crops that were destined for market. Over time, production became more diversified, production levels rose and the value of sales through forward contracts and producers' associations increased from 0 in 2002 to almost \$65 thousand in 2008.

Many of the farmers interviewed during the FE were still producing some of their traditional crops such as corn and potatoes but for sale into the seed market rather than the normal

commercial market. Producing for the seed market is much more demanding technically, but as the farmers explained it, the prices were better and it was more profitable. FHI helped arrange for them to get technical assistance from the Regional Seed Office which helped with the design of production plans and the seed certification process. Work also began in 2007 to divide areas in the valleys into separate zones for seed production.

The changes that have occurred in Tomoyo go beyond crop diversification, the adoption of new technologies and increases in sales. Incomes increased substantially, from \$238 in 2002 to \$1,725 in 2008, for example and the percentage of children chronically malnourished dropped dramatically from 59 percent in 2002 to only 18 percent in 2008. People's attitudes also changed, with many more open and willing to try new ideas and more people interested in taking advantage of new business opportunities. All the associations visited had business plans. The farmers who gave the presentations were knowledgeable about market conditions and conversant with the costs and returns of their operations and the importance of profitability and staying competitive, even those who made their presentations in Quechua. Many also talked about improvements in the quality of their lives more generally.

Table 5.12: Basic Data on the Changes in Tomoyo (Molle Molle, Sorojchi and Yoroca) During FHI's 2002-2008 Title II Program

	2002	2004	2008
Cultivated area under irrigation (has)	0	258	377
Crops	Yellow corn Potatoes Wheat Barley	Habas (dried) Habas (green) Green beans Yellow corn Alfalfa	Amaranth Potatoes (seed) Habas (green) Green beans White corn Choclero Vegetables Alfalfa
Livestock	Sheep Cattle (Criollo)	Sheep Cattle (Criollo) Intro of five milk cows (Holsteins)	Development of milk value chain (expansion to 55 Holsteins)
Value of sales through forward contracts and/or producers' associations	0	US \$8,000	US \$64,888
Average annual household income	US \$238 (Tomoyo canton)	US \$516	US 41,728
Percent of children under five chronically malnourished	59	42	18

Although crops still dominated the farming systems in Tomoyo at the time of the FE, some FHI staff are convinced that the future lies in the milk value chain and that most of the

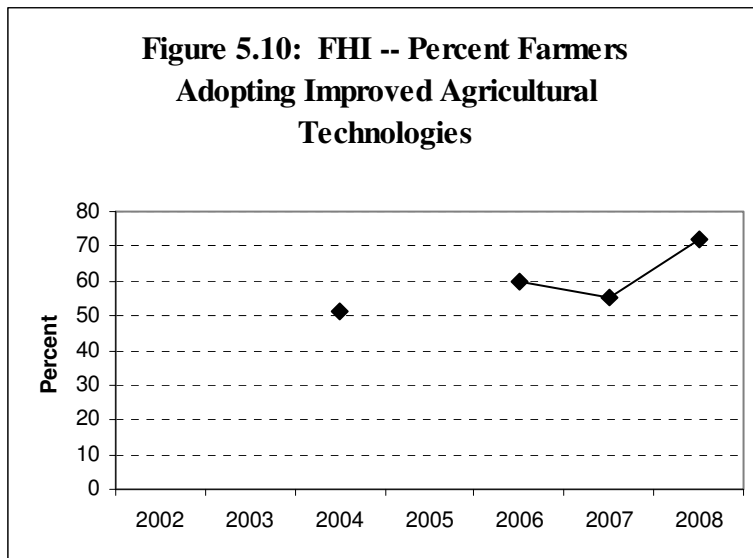
valley could convert to milk and forage production sometime in the future. The milk value chain in Tomoyo only really got started in 2006 and with only six farmers. In 2004, there were only four Holsteins in the valley, but by 2008 the number had increased to 55. Milk is a very attractive product for a number of reasons: the demand for milk in the Sucre area is greater than the supply and the demand is growing; the price the producers receive for their milk is attractive and they can sell their milk year round; the truck from the Pil (dairy) in Sucre comes every other day to pick up the milk and the producers get paid at the end of each month; and the Pil provides technical assistance in veterinary services and forage. Expanding production has not been easy according to FHI staff. This was a new enterprise for the Tomoyo farmers, and FHI had to provide the farmers with a considerable amount of technical assistance and training. Arranging for the producers in Tomoyo to visit more advanced milk operations in Oruro also helped.

At the time of the FE, lack of credit had emerged as one constraint to the expansion of the value chain. The farmers need credit to be able to expand and up-grade their herds (see following section on credit for a discussion of the micro leasing program that was developed to deal with this bottleneck). Another potential bottleneck, which the FE team identified, is the Pil in Sucre. When the Pil was privatized, it was purchase by a local producer’s association. Since then it has gone through a number of changes in management. The new management is young and seems to have a number of good ideas, but is also facing a number of technical and management challenges.

5.9.3.2.3 Technology Transfer

Like the other three CSs, FHI found it more efficient to work with groups of farmers than to try to deliver messages on an individual basis. The technology packages that FHI had put together for its priority products are well developed, with post harvest technologies and practices now added to the packages per the MTE recommendations. In earlier programs, FHI had set up its own demonstration farms where FHI staff lived and where it tested and adopted new technologies. However, FHI also found through experience that validating new technologies and practices on farm and using demonstration plots on lead farmer’s fields are more effective approaches to technology dissemination.

Prior to the MTE, FHI concentrated on the construction of silos as its primary post harvest activity. Post-MTE it provided technical information and assistance related to a broader range of steps that farmers can take to increase the value of their products in markets. This included changing when and how



products are harvested, dried, packed, shipped, and presented, and also their size, color and shape. This helped farmers better respond to market needs and add value to their products, both of which helped them get higher prices.

By the end of the DAP, FHI had achieved a 72 percent adoption rate, 10 percentage points above the 60 percent adoption rate that it had set as its LOP target. The field visits confirmed this success with farmers interviewed in the field knowledgeable and able to talk about the information and technology packages that FHI had been disseminating. According to its 2008 KAP survey, the technologies with the highest adoption rates included: the use of improved seed (100 percent), post harvest practices such as product selection and classification (99 percent) and the use of the prices information system (96 percent).

FHI also spent considerable time and effort on the development of training materials covering a broad range of topics relevant to its priority products and interventions. These materials, which are well designed with key messages clearly articulated in text and pictures, were distributed to its farmer groups and as part of its sustainability strategy.

5.9.3.2.4 Economic Analysis and Entrepreneurship

FHI already had a strong analytical capacity, relative to the other CSs, at the time of the MTE, which included the ability to conduct and make use of cost benefit analyses. FHI strengthened its analytical capacity post-MTE and cost benefit analyses are now available for a substantial number of its activities included in its W&S, NRM and IG programs. FHI also made an effort to train its staff and lead farmer clients on how to assess the costs and returns of their farming activities. This information is important for farmers to have, because information of the costs and returns of their activities can help them improve their ability to negotiate with buyers and to increase their competitiveness and profitability. In 2006, FHI developed a training program entitled “To earn money you ought to know how to negotiate” in cooperation with CIAT, FDTA and USAID’s MAPA project.

FHI also began giving much more emphasis to the development of entrepreneurial skills among its farmer clients post-MTE and to helping them increase their profitability and competitiveness. The FE team had a chance to meet with two small entrepreneurs that FHI was working with -- a small business in Sucre and a micro business in Tomoyo. Both were trying to take advantage of the new opportunity for sales to the new municipal school feeding program.

5.9.3.2.5 Credit

FHI had collaborated with a micro finance provider earlier in the DAP, but the need for credit only really emerged as an issue when the operations of its farmer clients expanded and became more complex. Lack of credit has also emerged as a real constraint to the expansion of the milk value chain in Tomoyo. So FHI and ANED collaborated in the development of a model micro-leasing program to deal with the problem. The program involves FHI, ANED and ARISSET, the irrigation association in Tomoyo. All three collaborators contributed to the loan fund (ANED 84 percent, ARISSET 9 percent and FHI 7 percent).

FHI and ARISSET identify the potential borrowers; the producers select the cows; ARISSET guarantees the loan and owns the cows; the producer pays ANED; and in 18 months, when the loan is paid off, ownership is transferred from ARISSET to the producer. Over three hundred producers had expressed an interest in getting one of these loans at the time of the FE team visit.

5.9.3.2.6 Capacity Building

Training Farmers. FHI trained almost two thousand participants during the DAP, with the numbers increasing in the latter years of its program. Most of the training focused on irrigation and commercial agricultural production practices pre-MTE, but was expanded to include more harvest and post harvest techniques and marketing topics post-MTE and more of the training tailored to the needs of each value chain.

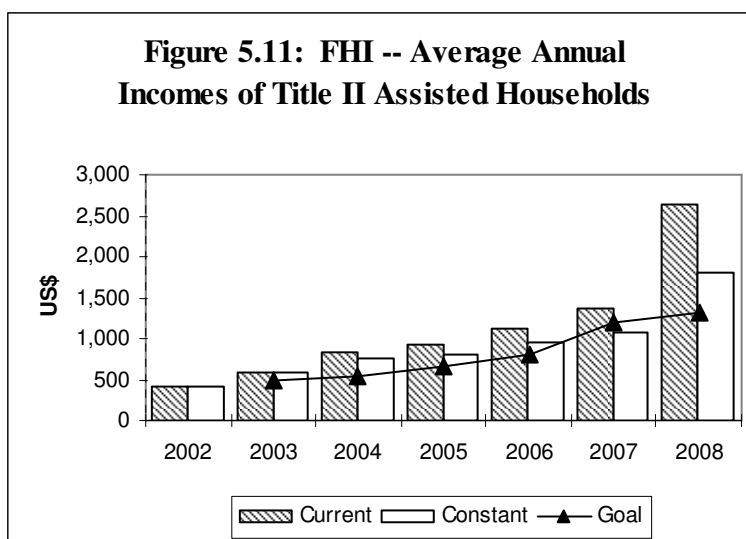
Table 5.13: FHI -- Number of Participants Receiving Systematic Agricultural Training

	2002	2003	2004	2005	2006	2007	2008	Average
FHI	580	1,140	1,222	1,593	2,414	2,701	2,927	1,797

Strengthening Producers Associations. FHI also worked with 27 producers associations during the DAP, helping them organize and develop the capacity to help their members compete more effectively in higher valued markets. Several of FHI's associations, such as ARISSET in Tomoyo, were originally organized to manage irrigation systems, but expanded their roles to include marketing. FHI also worked with these associations to develop business plans and provided them training in business management.

5.9.3.3 Project Impact

The effectiveness of FHI's approach is clear when one looks at the information on the changes in the incomes of the households that participated in its IG program. The positive impact of the program started in the early years but gained momentum over time as the move to a stronger market orientation took hold. Households participating in the FHI IG program increased their incomes, on average, six



fold between the baseline and 2008. Some of the increases that took place in 2007 and 2008 were due to inflation caused by the rapid increase in prices, food prices in particular, that were taking place in international markets. If one takes this inflation into account, the incomes of FHI households still more than quadrupled over the LOP. In most years, both were above the annual goals that FHI had set for itself.

The magnitude of the impact varied by region, with the largest increase taking place in Tomoyo, whose households had the lowest annual income on average at the time of the baseline survey. In Tomoyo, the average annual income of Title II assisted households increased by almost nine fold. This was in contrast to the households in Sucre, which had the highest average annual income at the time of the baseline, but only saw a five fold increase in their incomes over the life of the project.

Table 5.11: FHI – Average Annual Incomes of Title II Assisted Households, by Intervention Areas

	Baseline	2008	Increase
FHI Intervention Area			
Average	419	2,628	6.3
Cochabamba	415	2,924	7.0
Sucre	424	2,212	5.2
Tomoyo	238	2,066	8.7

5.9.3.4 Sustainability Strategies

FHI's planned a phased graduation from the communities that it had been working in under its DAP. However, FHI was able to obtain additional funding from USDA and IDB, which will enable it to continue some of its IG activities beyond the end of the DAP. These additional resources will also enable FHI to take over some of CARE's IG operations in Chuquisaca, the peanut value chain in particular.

- **USDA** -- FHI received approximately \$2.9 million (November 2007 to November 2010) from USDA's Food for Progress Program to support the transformation of small farmers from subsistence agriculture to commercial production and marketing.
- **IDB** -- FHI received \$845 thousand (April 2009 to October 2011) to support the formation and strengthening of rural oriented enterprises that provide infrastructure type services, such as road maintenance, and other types of technical and business services to farmers and other small rural enterprises.

Box 5.6: FHI – Strengths and Weaknesses of Its IG Program

Strengths	Weaknesses
<ul style="list-style-type: none"> • FHI's IG program became more demand driven post-MTE, with market potentials and needs driving its agricultural technology transfer program. 	

<ul style="list-style-type: none"> • FHI strengthened its emphasis post-MTE on identifying potential buyers and facilitating market linkages, which resulted in significant increases in product sales and incomes in the latter half of its program. • FHI assembled a strong technical staff, which post-MTE, included marketing as well as agricultural production expertise. • FHI's agricultural technology transfer program was strong, with good training materials and considerable emphasis given to post harvest technology transfer post MTE. • FHI identified and made effective use of strategic partners to support its IG program. • FHI developed a strong analytical capacity, including the ability to conduct and make use of cost benefit analyses and farm budgets, and made progress in transferring this capacity to the clients in its value chains. • FHI expanded its assistance to include working with micro and small entrepreneurs, beginning with those that were a part of its priority value chains. 	
---	--

5.9.4 Save the Children Bolivia (SC)

5.9.4.1 *Pre-MTE*

SC's IG program was very production oriented prior to the MTE with an emphasis on increasing agricultural production and a tendency to worry about marketing after the production gains were achieved. SC included a broad range of interventions in its IG program, including those related to the construction of infrastructure, both community level infrastructure (irrigation, water reservoirs and roads) and family level infrastructure (silos and animal shelters for small and large animals); the transfer of production technology packages for selected crops (primarily potatoes in the Altiplano and peaches and pears in the Valleys) and livestock (cattle and sheep, in particular); and management training and some exposure to marketing issues, with only a limited amount of attention given to the development of market intelligence and facilitating marketing linkages. SC did have a market specialist on its staff prior to the MTE, but its IG program was dominated by agronomists and was supply (production) driven.

5.9.4.2 *Key Program Approaches*

5.9.4.2.1 **Market Focus**

In 2005, in response to the MTE recommendations, SC recast its entire IG program to give it a stronger market orientation and to focus on helping its client groups produce and market the type and quality of products that are in demand in the market. SC described its revised

program as having two main objectives: (1) to link its farmers with local, national and international markets and (2) to strengthen farmers' organizations so that they and their members are effective and competitive. To help develop and implement its new vision, SC also hired new staff -- a new Title II program manager with considerable experience in economics and business management and, per the MTE recommendation, a market expert with hands on experience. Field staff were also provided training to help them reorient their own thinking to be more in tune with the new market focus.

Priority Products. SC also reassessed the market opportunities for its client groups in both of the ecological areas in which it was working and identified an expanded set of products with greater market potential. Seven products were initially identified as a priority post-MTE. Since markets are dynamic, products were added and subtracted and the priority given to them changed over time in response to market changes.

Table 5.14: SC Priority Products Post-MTE

Altiplano	Valles
<ul style="list-style-type: none"> • Maca • Meats (llama) • Milk • Potatoes • Sweet onions • Vegetables (onions, carrots) 	<ul style="list-style-type: none"> • <i>Habas</i> (broad beans) • Fresh fruit (apples, peaches, plums, pears) • Processed fruit (dehydrated apples, marmalades, juices) • Sweet onions • Vegetables (squash, peppers)

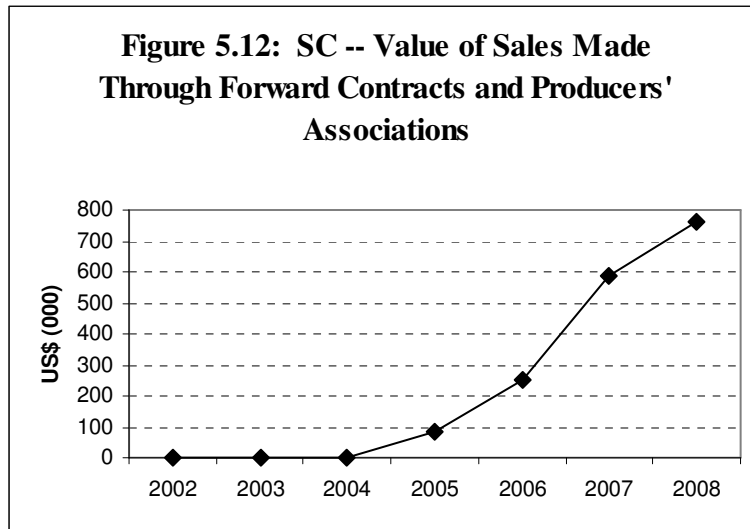
Approaches to Marketing. Identifying promising markets is an important first step, but identifying and developing relationships with specific buyers is also key. As part of its new market orientation, SC immediately began to put emphasis on developing market linkages with key domestic and export oriented firms, and, where possible to help its farmer clients sell their products through forward contracts. The first forward contract was arranged in the fall of 2004, right after the MTE, with one of the Bolivian firms that exports dried *habas* to Europe and Japan, a market that the other three CSs were already linked into. During 2005, SC also succeeded in developing links with a number of other firms, including Naturalco, which is a seller of organically produced natural foods and medical products, and Windsor (a subsidiary of HANSA, which is one of the largest firms in Bolivia), which is the major producer of tea in Bolivia. SC also helped facilitate contacts and contracts with dairies (PIL Andina and Collana Tholar), several supermarket chains (Hypermax and Ketal) and their buyers and introduced its clients to the benefits and requirements of selling at higher-end local fairs.

SC staff made many of their initial business contacts through active participation in some of Bolivia's major trade fairs, the one in Santa Cruz in particular. Participation in trade fairs and other business networking opportunities also proved to be an effective way of gathering up-to-date market information. So SC actively involved its famers in local, regional and

national fairs, market surveys and business networking forums. Participation in these events also proved helpful in increasing its client's knowledge about the requirements of different markets, and in particular, helping them better understand the importance of quality, and made them more willing to change their behavior and try new ideas.

To make these products more attractive in higher-end markets and increase their value, SC also developed an innovative branding program for the products destined for the higher end consumer markets, including potatoes, peaches and jams. As part of this effort, SC also developed very attractive labels and posters for these products and used them in a series of marketing campaigns. SC farmer clients as well as the municipal governments were very pleased with and supportive of this program, which SC referred to as the development of corporate images, and the municipalities began to spend their own funds to support the further development of these corporate images. SC's municipalities also helped fund local agricultural fairs and the participation of local farmers in fairs outside of their municipalities.

SC's decision to change its emphasis to focus on products with good market potential and to help facilitate marketing and the development of market linkages produced impressive results. The value of the products that SC clients sold through their producer associations and/or forward contracts increased dramatically after the MTE, going from 0 in 2004 to \$83 thousand in one year. And, sales between 2005 and 2008 increased by more than nine times.



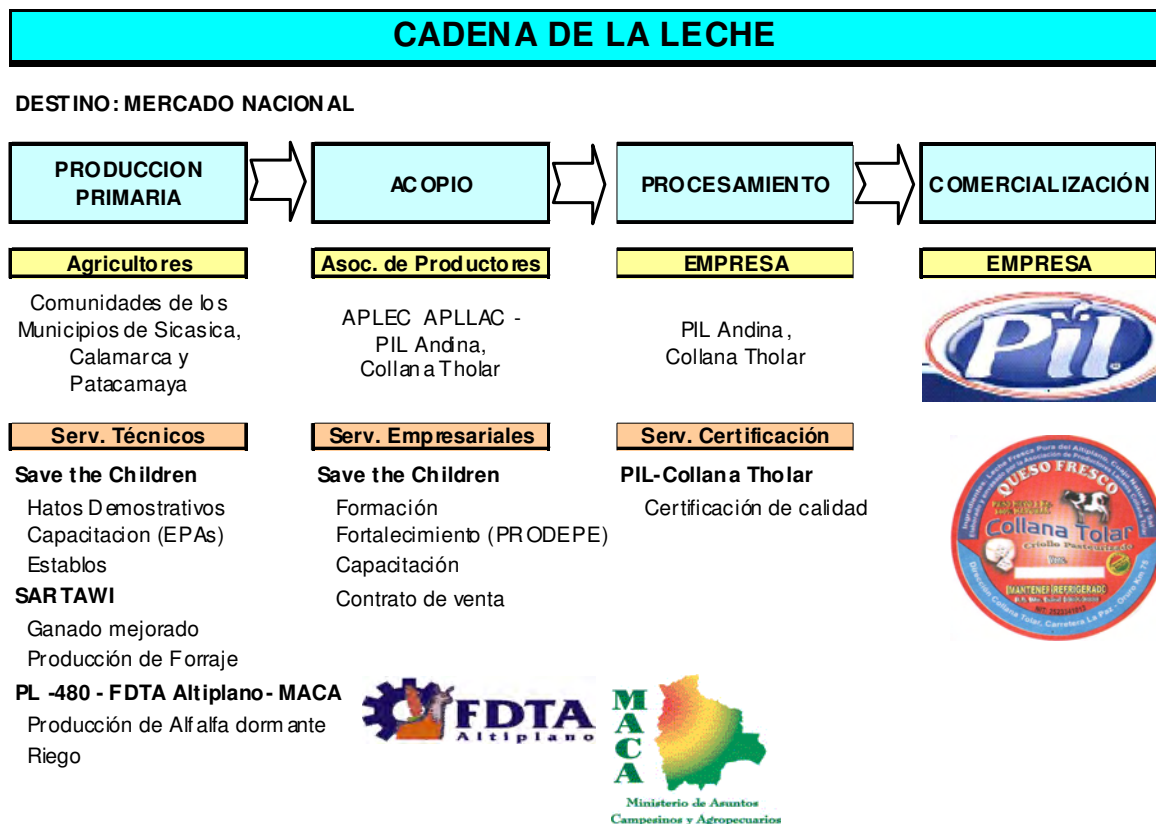
5.9.4.2.2 Value Chains

To help it operationalize this new market focus, SC also adopted a value chain approach and applied it in all of the communities in which it was working both in the *Altiplano* and the *Valles*. By adopting this approach, SC was able to link the majority of the interventions that it was already promoting into a coherent framework that its staff and clients were able to understand. This value chain approach was applied to products destined for both domestic and international markets.

SC used its own staff to provide many of the support services required to strengthen these value chains. This included working with lead farmers to develop demonstration plots, training farmers about new production and post harvest technologies and practices, providing technical assistance and training related to meeting product quality standards and helping secure product certification, helping organize and strengthen producer associations,

and helping facilitate contacts with buyers and the development of forward contracts (See the description of SC's milk value chain on the following page). Post-MTE, SC also began to focus more on identifying and developing working relationships with other organizations that were already providing needed services (or had the potential to do so) to its farmer clients. This included SARTAWI, APIA, FDTA *Valles* and FDTA *Altiplano*, PRODEPE, BIOLATINA and SENASAG -- organizations that also would become key actors in SC's sustainability strategy (See box 5.2 for further information on these organizations).

Box 5.7: Example of SC Value Chain



The FE team had an opportunity to visit several of SC's value chains, including the chains for milk, fresh peaches, and dehydrated apples.

- **Milk** – the milk value chain that SC was working on in the *Altiplano* is very attractive for a number of reasons: current demand is strong and the market is growing; the price producers receive for their milk is attractive and they can produce and sell milk year round; the dairies (Pil Andino and Collana Tholarr) buy milk on contract, which helps mitigate price risks to farmers; the dairies have also been providing the producers with technical assistance and access to improved feed. SC's contributions to this chain, which have been numerous and varied, provide a good illustration of how the value chain approach has helped SC better integrate almost all of its activities. SC helped build the road that has made it possible for the milk producers to get their milk to market year

round, during the rainy as well as the dry season. SC's marketing specialists helped make the initial contacts with the dairies and facilitated the development of the forward contracts. Once the links were made to the market, a number of other activities that SC had initiated earlier in its program began to have more value to the milk producers. This included SC's agricultural technicians who provided technical assistance in forage production and animal nutrition; the veterinarian assistants that SC trained, who are now available to provide veterinarian services; and the *atajados* (stock tanks) and family stables that were constructed with SC assistance, which are contributing to increased milk production, the *atajados* by increasing animals access to water year round and the stables by providing them protection from the cold. The farmers that were interviewed during the FE team visit were knowledgeable about the details of the milk market, had a fair knowledge about the economics of their operations and were thinking about how to improve their operations, including by up-grading their herds, in order to take better advantage of what they saw as an expanding market.

- ***Peaches*** – The FE team also visited one of the valleys where SC had been working with peach producers and saw the dramatic improvements that had occurred since the MTE and SC's decision to increase its focus on marketing. Peaches were already growing in several of the valleys where SC decided to work, but the volumes produced were low and the quality poor. At the time of the MTE, most of the trees had never been pruned and many were covered with parasitic vines. The junior technicians that SC had trained in fruit cultivation were in the field promoting a new package of technologies, which included replacing the trees with new, improved varieties and pruning both the old and new trees. Farmers were particularly reluctant to prune trees, in part because of a belief that this could hurt the trees. Once SC helped these farmers make contacts with buyers in the higher priced markets in La Paz, they began to have a better understanding of the quality requirement of these markets and how the adoption of the pruning and other production practices that SC was recommending and the new packaging techniques would help them increase the quality of their product and sales. By the time of the FE, there were areas in this valley where more than half the farmers had adopted the SC package of technologies, new trees had been planted, old trees had been pruned back dramatically and sales had increased. SC's contributions included irrigation, demonstration plots, technical assistance provided by the fruit technicians, technical assistance in packaging, developing market contacts and market development, which included the development of a brand (Peaches of Sapahaqui) and advertising materials. In the last several years of its program, SC began to put more emphasis into strengthening its relationships and the relationships of its clients to other service providers in the area, including BOPLAG and the University of Oruro. Representatives from several of these organizations were present during the FE team's visit and explained how they had been working with the peach producers and how they saw their role in the future.
- ***Dehydrated Apples*** – While in Sapahaqui, the FE team also visited the site of a micro enterprise that, post-MTE, had developed a lucrative business, with SC's assistance, selling dehydrated apples to Windsor Tea Company. The apples that were produced in this valley had little value in the fresh market, because they were too acidic, but they hold up well to drying and were perfect for use in the production of an apple tea which was part of a new line of fruit teas that Windsor was in the process of developing. Sales of dehydrated

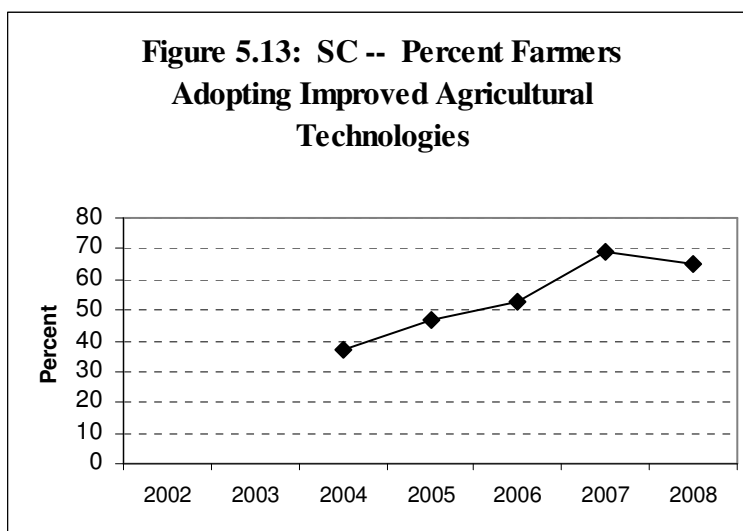
apples grew rapidly in the first couple of years, as did job and incomes. But Windsor Tea was not able to expand the market for its fruit teas as rapidly as it had expected, the supplies of dehydrated apples in its warehouse increased, and it basically stopped buying apples from the producers in Sapahaqui. By the time of the FTE, SC was trying to assist this micro-enterprise develop a line of processed fruit products, including jams and jellies, that it could sell in supermarkets in La Paz such as Ketal and Hildaga. In addition to formulating a product that would be attractive in these markets, this micro-enterprise also needed to get a barcode, which necessitated that it meet certain quality standards and be registered by SENASAG, steps which SC also assisted with.

5.9.4.2.3 Technology Transfer

Like the other three CSs, SC has found it more efficient to work with groups of farmers than to try to deliver messages on an individual basis. The technology packages that SC put together for its priority products are well developed, with post harvest technologies and practices now added to the packages per the MTE recommendations. SC used its own technical staff to help disseminate these new technologies and practices, working with lead farmers who were willing and able to try these new techniques on their own fields.

Prior to the MTE, SC had concentrated on the construction of silos as its primary post harvest activity. Post-MTE it provided technical information and assistance that covered a broad range of steps that farmers can take to increase the value of their products in markets, including product classification and helping identify and promote the use of improved packing methods. This helped farmers better respond to market needs and add value to their products, both of which have helped them get higher prices.

The whole process of technology transfer seemed to become easier post-MTE, with farmers much more interested in adopting the technologies and practices that SC was promoting once they were able to see the results in increased sales and incomes. Post-MTE, SC's technology packages also seemed to be better defined and its farmers more knowledgeable about them and the adoption rates began to get above 50



percent. In 2007, SC had achieved a 70 percent adoption rate, which fell to around 65 percent in 2008, below its LOP target but still a significant achievement.

SC also spent considerable time and effort on the development of training materials covering a broad range of topics relevant to its priority products and interventions. These materials

are well designed with key messages clearly articulated in text and pictures. As part of its sustainability strategy, these materials were distributed to the OTB Secretaries of Agriculture and its collaborators in the municipalities where it was working as well as to the cadre of junior experts that it trained and key members of the producers associations that it was working with.

5.9.4.2.4 Economic Analysis and Entrepreneurship

Per the MTE recommendations, SC also strengthened its analytical capacity and began to conduct cost benefit analyses of economic returns for a substantial number of its activities, in its W&S and NRM as well as its IG programs. This information was used to inform activity selection. Information on the costs and returns to client farmers was available at all the field sites visited by the FE team, and SC staff and its client groups now have a much better understanding of the costs and profitability their operations, information that is needed to improve their ability to negotiate with buyers and to increase their competitiveness.

SC also gave much more emphasis to the development of entrepreneurial skills among its farmer clients post-MTE and to helping them increase their profitability and competitiveness. SC provided business training to the veterinarian technicians that it had trained, a MTE-recommendation, so that they would be able to establish themselves as micro-enterprises. Post-MTE, SC also provided training in business organization and management to many of the producers' organizations and other cooperatives and small business that it was working with, working through PRODEPE, which is an NGO licensed by the International Labor Organization (ILO) that provides training in business management. The first training was paid for by SC, with the costs of subsequent trainings covered by the municipalities.

5.9.4.2.5 Credit

With its successes post-MTE, SC staff became more aware that their clients were going to need access to credit if they were going to be able to grow their operations. So SC staff were interested when SARTAWI, an NGO that was providing credit in their areas, contacted them about the potential for working together. SARTAWI had enough resources to make loans in the SC areas, but it did not have a presence in the rural areas or the capacity to provide technical assistance to its borrowers, both of which SC did have. SARTAWI management and staff had experience working in rural areas and were aware of the different circumstances and needs of farmers, who had a limited ability to put up fixed assets as collateral for a loan and to make loan payments every week or couple of weeks as is common in the case of micro credit loans for commercial activities. SARTAWI was willing to adapt its payment schedules based on an analysis of the unique situations facing different types of clients with respect to the sources and timing of their incomes. It also does an analysis of the risks involved in each type of lending situation and is experimenting with different ways of providing mutual protection, including requiring life insurance on its borrowers or insurance on the equipment.

The specific program that was discussed in more detail with the IG evaluator was designed to help SC's milk producers who want increase their milk production by buying improved cows and upgrading their herds. The program involves an arrangement between SC, SARTAWI and Delizia, a firm that buys milk from SC's clients. SC helped identify the potential borrowers; SARTAWI provides the money for the purchase, accompanies the producer when he purchases the cow and basically owns the cow until the loan is paid off; SARTAWI provides the information on the loan to Delizia's accounting department which deducts the loan payments from the payments made to the producers for their milk deliveries. SC and SARTAWI expect this program to continue after the SC program ends. SARTAWI still plans to be active in the region. Plus, Delizia has a technical department that can take over some of the technical assistance functions that SC's staff had been providing.

5.9.4.2.6 Capacity Building

Training Farmers. SC trained between two and three thousand participant each year. Most of this training focused on agricultural production technologies prior the MTE, but was expanded post-MTE to include post harvest technologies and practices, marketing and business development. In 2006, for example, training modules included topics such as the use of certified seeds, marketing, post harvest technologies, production of forage crops, and proper animal health and nutrition. During 2008, SC phased out of the direct training component in order to focus on providing technical assistance to help strengthen local service providers participating in its value chains.

Table 5.15: SC -- Number of Participants Receiving Systematic Agricultural Training

	2002	2003	2004	2005	2006	2007	2008	Average
SC		1,742	1,742	2,000	2,159	3,479	2,559	1,954

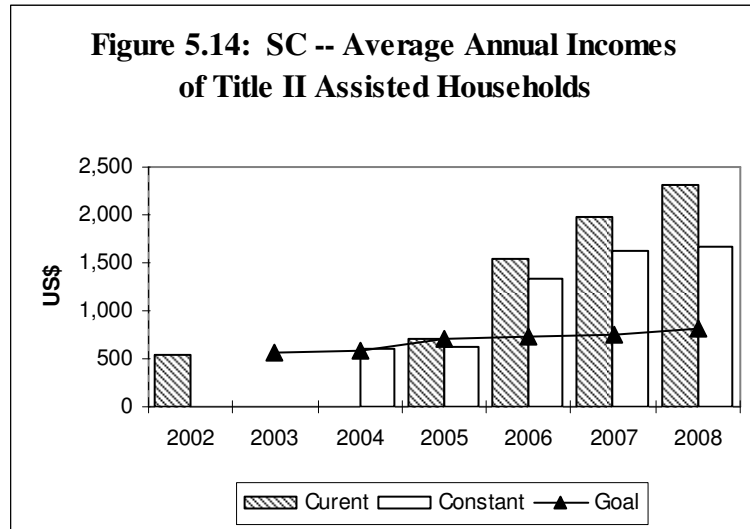
Strengthening Producers Associations. SC also worked with 24 producer associations during the DAP, helping them to organize and build a capacity to help their members compete more effectively in higher value markets. As part of this effort, SC provided the membership with training in business administration, profitability analysis, basic accounting, and the determination of standards of quality. By the time of the FE, all these organizations had gained legal recognition as producers associations, limited liability companies or as a one person company and two of these organizations were working with SENASAG to complete all the steps needed to be able to sell their sell their processed products to supermarkets.

Working with Municipalities. SC devoted an increasing amount of time and effort toward the end of its DAP to working with the municipal governments, helping them understand that they can play a broader and more proactive role in supporting IG activities and helping strengthen their capacities. SC worked with the Municipal Economic Development Commissions (SCD), which are responsible for supporting economic development in the municipalities, and with community level competitiveness committees, which it helped set up in three of the municipalities where it was working. These latter committees were set up to help the municipalities participate more effectively in national fairs and business roundtables

and as a mechanism for helping the communities and municipalities manage their corporate image. Part of SC's market development strategy involved helping the communities and municipalities develop a brand which their producers could use to promote their products. One of the roles of the competitiveness committees was to review product quality to determine whether the quality standards established for the community/municipality brand were being met and, if so, to certify the products and allow the producers to use the established packing, logos and advertising material of their community or municipality.

5.9.4.3 Project Impact

The effectiveness of SC's change to a more market driven strategy is evident from the data on the changes in the incomes of the households participating in the its IG program. Incomes, which had changed little in the first four years of the DAP, almost quadrupled in the three years after SC recast its program to give it a much stronger market orientation. Some of the increases that took place in 2007 and 2008



were due to inflation caused by the rapid increase in prices, food prices in particular, that were taking place in international markets. If one takes this inflation into account, the incomes of SC households still tripled (measured in constant 2002 US\$) since 2005. Both are substantially above the results (goals) that SC had set for itself.

5.9.4.4 Sustainability Strategies

The main focus of SC's sustainability strategy was to consolidate the value chains that it had developed. This included strengthening the linkages between buyers and sellers and developing strategic alliances with other service providers and potential sources of support, with the expectation that they would be willing and able to take over some of the functions that SC had been providing after the Title II program ended. SC focused its training activities in the last year of its DAP on providing technical assistance to some of these partners to help strengthen their capacities. SC also looked to the municipalities for sources of financial and technical support, encouraging them to play a more proactive role in promoting economic development in their communities and helping strengthen their capacities. This included working with the municipalities on the application of PAHO's Healthy and Productive Municipality Model and helping improve their links with. GOB ministries, the Prefecture of La Paz, universities and private enterprises. The sustainability of these value chains, according to SC, ultimately will depend on whether the producers associations that it helped organize and strengthen have the skills and knowledge needed to

prepare business plans, analyze the costs and benefits of their and their members operations and adapt to market changes.

At the time of the FE, SC had received additional funding from the Academy for Educational Development, which will enable them to keep their IG program director, their marketing specialist and three field technicians on staff through the end of 2009. These resources will be used to continue support to the milk and horticulture values chains and to consolidate their experiences with the development of value chains into several case studies.

Box 5.8: SC – Strengths and Weaknesses of Its IG Program

Strengths	Weaknesses
<p>Post MTE,</p> <ul style="list-style-type: none"> • SC’s IG program became demand driven Post-MTE, with market potentials and needs driving its agricultural technology transfer program. • Post-MTE, SC began to place considerable emphasis on identifying potential buyers and facilitating market linkages, a change that contributed to the significant increases in product sales and incomes that began in 2005. • SC put together a strong technical staff which post MTE included personnel with hands-on marketing expertise as well as agricultural production expertise. • SC’s technology transfer program became stronger Post-MTE, with good training materials and considerable emphasis given to post harvest technology transfer post MTE. • SC identified and made increasingly effective use of strategic partners to support its IG program, and as a key component of its sustainability strategy. • SC developed a strong analytical capacity, including the ability to conduct and make use of cost benefit analyses and farm budgets and has made progress in transferring this capacity to the clients in its value chains. 	

6 Findings: Productive Infrastructure

6.1 Program Background and Objectives

The ability of a Title II program to help farm families and rural communities increase their access to markets, through the rehabilitation of roads, and increase their access to water, through the construction of irrigation systems and water reservoirs, can be extremely important to the development of poor rural areas. This was certainly true in Bolivia, where the lack of access to markets and water for irrigation were two of the more important constraints facing the target populations at the beginning of the DAPs. In this sense, these programs are unique within USAID. That is, few other USAID development projects now have the resources needed to be able to help rural communities improve their basic productive infrastructure.²⁷

6.2 Overall Strategies and Approaches

Each of the four CSs included roads and irrigation activities in their DAPs. All four worked with the communities and their respective municipal government on the selection and prioritization of these projects, which were included in the annual operational plans (POAs) of the municipal governments. With the exception of ADRA's roads projects, the roads and irrigation projects were funded with monetization monies from the CSs, matching funds from the municipal governments, and contributions in cash, local materials and non-skilled labor from the infrastructure beneficiaries. The cash was used to pay for the technical staff and skilled manual labor working on the infrastructure, equipment and non-local materials.

All four CSs used Title II food to pay for the unskilled labor used on the roads, providing workers with 50 kg ration for each 72 hours of work completed. ADRA only used food on its road projects. FHI used food rations in some of its irrigation projects, and SC used rations in one of the irrigation projects that it implemented half way through its DAP. In general, food rations were not used as frequently in the irrigation projects, in part because the CSs recognized that the participants in these small-scale systems were going to benefit directly in terms of increased production and household incomes and should, therefore, be more willing and able to cover some of the construction costs themselves.

The MTE was convinced of the importance of roads and irrigation as mechanisms for improving the lives of the Title II clients. However, it also had a number of concerns about the quality of the engineering, and whether the CSs, with the exception of FHI, had enough technical capacity on their staffs to be able to design and implement quality infrastructure. Other concerns related to environmental compliance and mitigation activities and the sustainability of the infrastructure.

²⁷ Three of the CSs – CARE, FHI and SC – also included activities designed to help farm families increase their access to farm level infrastructure. This included greenhouses (FHI), silos (CARE, FHI and SC) and shelters for livestock (FHI and SC). These activities were reviewed during the MTE, which raised some questions about their design and cost effectiveness. There was not sufficient time during the FE to take another look at these activities, which were, in any event, a relatively small part of the CS's productive infrastructure programs.

The FE team found that ADRA, CARE and SC had improved their capacity to design and supervise the construction of their infrastructure activities, as the MTE had recommended, including by hiring more and more qualified staff. This meant, that post MTE, all four CSs were designing and implementing their roads and irrigation projects using their own personnel and/or temporary hires. There were still differences among the CSs in terms of the technical complexity of their approaches, however. FHI and SC were using more sophisticated engineering software and topographical equipment, for example, and also had people on staff with more training and experience building roads and irrigation systems. The greatest improvements were seen in the SC infrastructure staff and programs.

6.3 Roads

Helping improve the system of rural roads in Bolivia is one of the most important steps that can be taken to improve the lives of people living in the rural areas. So, all four of the CSs were involved in road rehabilitation activities. Better roads help improve farmers' access to markets, reducing the time that it takes to get to markets, expanding access to markets further afield and helping reduce product losses. Roads also have social benefits, making it easier for people to get to schools and health posts, for example, and for social service providers to get to the communities.

6.3.1 Program Performance

CARE, FHI and SC improved over 700 kilometers of rural roads under these DAPs, which had a direct benefit on over 18 thousand households and an indirect benefit on another 14 thousand households (See Table 6.1). ADRA did what it called maintenance on over 300 kilometers of roads, which benefited almost 12 thousand households.

Table 6.1: Roads Projects Implemented During the DAPs (2002-2008)

Agency	Number Projects Completed	Number of Kilometers Constructed/ Improved/ Maintained	Number Households Benefited	
			Directly	Indirectly
ADRA	197	322.9	11,686	--
CARE	52	418.7	4,197	555
FHI	23	173.3	9,405	11,308
SC	11	112.8	4,467	2,237
Total	283	1,027.7	29,775	14,100

An amount equivalent to over \$5 million was spent on these road improvements, with almost 80 percent coming from Title II resources (45 percent in the form of food rations and 34 percent in monetization funds) (See Table 6.2). ADRA, as indicated above, did not

Table 6.2: Direct Investment Costs for Roads Projects during the DAPs by Funding Source

Agency	Funding Source (US\$)						Total
	Monetization	Title II Food Rations	Municipalities	Participants		Other Donors	
				In-Kind	Cash		
ADRA	-	721,322	-	-	-	-	721,322
CARE	306,942	844,855	87,565	138,781	-	96,178	1,474,321
FHI	668,098	477,438	358,959	48,450	5,944	82,984	1,641,873
SC	733,813	233,190	169,437	43,220	-	-	1,179,660
Total	1,708,853	2,276,805	615,961	230,451	5,944	179,162	5,017,176
Percent	34.1	45.4	12.3	4.6	0.0	3.6	100

use any of its monetization funds on its road maintenance activities; nor did it leverage additional funds from the municipalities or participants. FHI was able to leverage over 21 percent of the funds it spent on road construction from the municipalities. However, funds from the municipalities accounted for only 12 percent of the total resources spent on roads overall, which was a much lower percentage contribution than the CSs were able to achieve for their W&S projects, for example.

The FE team saw numerous examples during its field visits where the CS road improvement projects had had major positive effects on the beneficiary communities. Some examples of the impacts that these road improvements have had on peoples lives can be found in the reviews of the individual CS programs, later in this section. Many of these projects also both enabled and contributed to the results that the CSs were able to achieve from their IG programs, which are discussed in Section 5.

6.3.2 Program Approaches

CARE, FHI and SC focused on making improvements to rural roads, which usually involves making corrections to their horizontal and vertical alignments and transversal sections. The purposes of these activities are to correct: (1) the horizontal curves, making them wider, (2) the vertical curves, to improve visibility, and (3) the slopes along the road, so that they are not too steep. Road platforms are also widened and their stability and durability increased and the slopes on the sides of the roads are corrected to reduce the likelihood of landslides. Putting in or improving drainage systems is another important component of a road improvement project to help avoid the destruction of the road platform. The construction of roadside ditches, brow ditches, culverts, fords and bridges can all help channel water from streams or rainfall off the road platform. Controlling ravines and gullies, building retaining walls and other environmental mitigation works also help assure the stability and durability of a road.

ADRA focused on what it called road “maintenance,” but went beyond what is normally thought of as road maintenance. ADRA did all the tasks involved in making road improvement, for example, with the exception of making corrections to the horizontal and vertical alignments of the roads. ADRA also used simpler designs than the other CSs and used only local materials and manual labor paid with Title II food rations. Normally, road maintenance involves fewer activities and it is usually done on roads that have fairly adequate technical characteristics.

The FE team was impressed with the quality of the roads projects that it was able to visit and with the responsiveness of the CSs to the MTE recommendations. FHI continued its tradition of doing good quality road projects, while SC made changes post MTE that resulted in major improvements in the capacity of its staff and the quality of its road improvement projects. The horizontal and vertical alignments in the CARE-Tarija, FHI and SC roads that were visited were done according to the norms for 4th order roads. These were significant accomplishments, since both FHI and SC had to move significant amounts of earth in order to align the roads correctly and make sure the road platform had the necessary technical characteristics. CARE, FHI and SC also did good work on the drainage systems for the roads, constructing good quality culverts and ford-walls that followed engineering norms. The culverts were well-located and had energy dissipaters at the exits. The roadside ditches were constructed so that the water drained properly, and small energy dissipaters made from stone or concrete were installed to avoid longitudinal erosion. Brow ditches were missing from several of the roads visited, although this did not seem to affect the behavior of the roads during the rainy season.

The work that ADRA did on the Jankoague road, where it took advantage of locally available materials to build some well-done retaining walls and culverts, was interesting. With the addition of some cash resources, this approach could be worth replicating elsewhere as a low-cost strategy for maintaining roads with similar technical and use characteristics.

The CSs also took steps post MTE to strengthen the environmental compliance and mitigation dimensions of their roads projects, which was noticeable during the field visits. All four CSs strengthened the environmental criteria in their designs and incorporated mitigation measures to avoid possible negative impacts on the environment. The evaluator was particularly impressed with the stone works that ADRA, CARE and SC built to control the gullies and ravines in their roads. All four CS also established

Table 6.3: Average Direct Cost per Kilometer of Road Improved or Maintained (in US\$)

Agency	Cost Per Kilometer (US\$)	
	Improved	Maintained
ADRA		2,234
CARE	4,121	
FHI	9,463	
SC	10,458	
Average	8,014	
Reference	12,000	

Source: CS reports.

environmental control systems for the design, construction and operational phases of their roads projects. These were strictly followed and proved very useful.

Unit Costs. Information on what the four CSs spent to maintain or improve a kilometer of road is provided in Table 6.3 on the previous page. The unit costs for FHI and SC were similar, which is interesting considering that FHI owned much of the equipment and heavy machinery it used while SC had to rent it. CARE's unit cost was 50 percent of the FHI and SC unit costs, which suggests that its road improvements might lack some important technical features that were included in the FHI and SC roads. The unit cost for ADRA's road "maintenance" projects was \$2,234 per kilometer.

6.3.3 Sustainability Strategies and Potential for Sustainability

All four CSs recognized that the sustainability of these road improvements will depend on the interests and abilities of the local communities to maintain them. The CSs also envisioned that the municipalities would take on more responsibility for road maintenance over time. So, all four also took steps to strengthen the capacities of the municipalities so that they would be better able to carry out these responsibilities in the future.

6.3.3.1 Road Committees

All four CSs worked to organize and train roads committees in the participating communities. The CSs used these committees at first to help them coordinate with the communities on issues related to the design and later the construction of the improvements, similar to the process that they used with their W&S groups. Once the construction phase was finished, the CSs began to train the road committees and the communities in routine road maintenance activities. This included filling potholes and cleaning and maintaining the roadside ditches, brow ditches, culverts, gully controls, etc.

The CSs efforts to promote community maintenance were made easier by the fact that it is tradition in the rural areas of Bolivia for communities to work a certain number of days each year doing road maintenance, an activity that is referred to as *prestación vial*. The communities have specific months when they do routine maintenance activities, assigning specific sections to each of the communities. Occasionally the communities also do emergency work if, for example, there is a landslide along a section of the road. One of the ADRA roads visited -- the Cochaca-Falsuri road -- was in the process of being maintained during the FE team visit, and there was other evidence during the field visits that the communities were doing periodic maintenance.

6.3.3.2 Training Manuals

The FE team reviewed the manuals that ADRA, FHI and SC had prepared for their road maintenance training. These were well done, included all the necessary concepts, were illustrated with graphics and photos, and should be understandable to an audience with a medium level of education.

6.3.3.3 Strengthening the Municipal Governments

As part of their overall sustainability strategies, all four CSs also designed and implemented institutional strengthening programs for the municipal governments focused on strengthening their technical and managerial capacities. These programs are discussed in more detail in W&S Section (Section 4.3.3). While the sustainability of the roads will depend heavily on the communities, over time more of this responsibility is being assumed by the municipal governments. Some municipalities already owned heavy machinery at the time of the FE, for example, and were using it to do periodic maintenance on their roads. Others were planning to include funds in their annual budgets to pay for regular road maintenance. Other municipal governments (or the prefectures) are subcontracting with local micro-enterprises to do routine road maintenance work. These micro-enterprises are part of a national strategy for road maintenance, and the FE evaluator had the opportunity to see several of them working in the Tomoyo area as well as on the Thola Kasa-Carasi road. The fact that the municipal governments are also required by law to set aside a certain amount of money in their annual budgets to respond to emergencies, also suggests that they will be in a better position in the future to help assure the sustainability of the road improvements.

6.3.4 Lessons Learned

A number of lessons were learned from the Bolivia road improvement projects that have relevance for other road improvement projects in Bolivia and elsewhere in the world. These include:

- ***The importance of the projections made at the design stage about the levels of economic activity that might be expected in the vicinity of a proposed road improvement in the medium and longer term.*** These projections are important because they affect which roads are selected and the level of improvements that are designed in. This means that it is important to have a project engineer who has enough experience to be able to anticipate what could potentially happen in an area and incorporate those judgments into the design of the road improvements. One does not want to over design a road in anticipation of an increase in economic activity in the future that does not take place, but the work might have to be modified or done over if the projections are too conservative, as was the case in one of CARE's roads. Ideally, road improvements would be designed in ways that facilitate the expansion of the road in the event that becomes necessary in the future.
- ***The importance of cash in addition to food.*** The experience in Bolivia indicates that food can be used to cover the costs of unskilled labor, but money is needed to cover the costs of design, personnel, heavy equipment, non-local materials, etc. Experience also suggests that road improvement projects in Bolivia will cost between \$10,000 and \$12,000 per kilometer (including food resources).
- ***The importance of heavy machinery.*** Heavy machinery needs to be used even in a roads improvement project to insure that all the necessary technical, environmental and quality requirements are met. Certain tasks in the road improvement projects should be

done with heavy machinery, including moving significant volumes of earth and compacting soils. Making quality improvements in roads is not possible using only local manual labor paid with food rations.

6.3.5 Findings for the Individual Programs

6.3.5.1 Adventist Development Relief Agency (ADRA)

6.3.5.1.1 Program Performance

ADRA used over \$700 thousand in food rations to maintain 197 road segments (See Tables 6.1 and 6.2). This added up to almost 323 kilometers of roads, which meant that ADRA was able to exceed its LOA target by 32 percent. Over 95 percent of this work was done post the MTE.

Table 6.4: ADRA Roads Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Kilometers of market access roads rehabilitated.	0	14.4	322.9	244.5	132

6.3.5.1.2 Program Approaches and Results

ADRA focused on what it called road “maintenance,” but this went beyond what is normally thought of as road maintenance. ADRA did all the tasks involved in making road improvement, for example, with the exception of making corrections to the horizontal and vertical alignments of the roads. ADRA also used simpler designs than the other CSs and used only local materials and manual labor paid with Title II food rations. Normally, road maintenance involves fewer activities and it is usually done on roads that have fairly adequate technical characteristics.

The approach that ADRA used is suitable for roads such as the Jankoaque road that have little traffic on them. In other cases, when roads will have to carry more traffic, for example, they need to be designed to higher standards, including to insure sustainability, and additional resources are needed to cover the costs of the design, personnel, machinery, non-local materials and specialized manual labor. Although the FE team did notice a number of technical problems with the Jankoaque road and the Cochaca-Falsuri-Sastreyoc-Majuelo, the roads that ADRA had maintained had noticeably better characteristics than the other roads in the area that ADRA had not worked on, and the improvements were clearly appreciated by the beneficiaries.

ADRA created a separate environmental team after the MTE that helped it strengthen its infrastructure program. Working in collaboration with the other CSs, ADRA developed guides for the design, construction, operation and maintenance of rural roads, which were

shared widely. All the road maintenance projects that were visited had *fichas ambientales* and *certificados de dispensación* signed by the Prefecture of Chuquisaca. The evaluator also verified that ADRA followed a strict environmental follow-up system for all its road maintenance projects.

6.3.5.1.3 Sustainability Strategies and Potential for Sustainability

As part of its sustainability strategy, ADRA trained members of the roads committees and workers in road construction and maintenance activities. ADRA developed a manual to use in this training, which is well done and covers all the basic elements required to do road maintenance, including complementary sheets that are used to train the participants. One of the ADRA roads visited -- the Cochaca-Falsuri road -- was in the process of being maintained during the FE team visit, and there was other evidence during the field visits that the communities were doing periodic maintenance.

6.3.5.1.4 Recommendations

If ADRA wants to get involved in road improvement projects in Bolivia in the future, it:

- ***Should consider improving on its “maintenance” approach***, which, with the addition of some cash, could represent a feasible, low-cost strategy for improving small, less frequently used roads.
- ***Should make a clearer distinction between the roads that can be “maintained” and those that should be “improved,” and will require more investment.***
- ***Needs to be willing to invest more money, including in staff resources.*** Whether ADRA stays focused on road maintenance or decides to undertake road improvements, it needs to invest more money in these projects, including by hiring more specialized personnel who are needed to provide technical support and supervision during the design and construction of the roads. This is necessary to ensure that its infrastructure projects will be able to meet all the necessary technical and quality requirements and applies to all infrastructure projects, not just roads.

6.3.5.2 CARE

6.3.5.2.1 Program Performance

CARE spent over \$1.1 million in monetization funds and rations on the improvements to 52 roads (418.7 kilometers). CARE was also able to leverage over \$87 thousand in funds from the municipalities and over \$138 thousand in in-kind contributions from the participants (See Tables 6.1 and 6.2). Over 80 percent of the kilometers that CARE counted as improved were worked on prior to the MTE, and CARE fell short in meeting its LOA target. This latter development was not surprising, since the target had not been adjusted downward after the MTE to take into account improvements that CARE made in the quality of its road improvement work in response to the MTE recommendations.

Table 6.5: CARE Roads Program Performance

Indicator	Baseline 2002	Mid- term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of kilometers of roads improved/ constructed.	NA	352.7	418.7	583	72

6.3.5.2.2 Program Approaches and Results

One of the roads that CARE worked on in 2004 and 2005 was the Potrerros-Narv ez road, which was opened by the Mayor of Entre Rios in 2001. CARE’s improvements included the construction of retaining walls, culverts, roadside ditches and resurfacing the road with gravel, improvements that were well-located and well-constructed. According to the community members interviewed during the field visit, these improvements helped initiate a dynamic development process that has had a positive effect on the entire area. The community now has permanent access to other regions of the country, which has stimulated commercial exchanges. The successful development of the peach chain was made possible by the road improvement, for example. Members of the community now sell fresh peaches, peach seeds, tree saplings, and marmalade, which is made from the poorer quality peaches in the new community processing center.

CARE also worked on improvements along the 62 plus kilometers of the Yawisla-Estumilla corridor that connects 15 communities to the main road to the city of Potos . Given the magnitude of this project, it probably would have been better for CARE to have worked on smaller sections of the road at a time instead of trying to work on the entire stretch all at the same time. For a project this size, it also would have made sense for CARE to have used some earth moving equipment rather than relying solely on FFW manual labor. The majority of the work was well done, but many of the environmental mitigation activities had been left to the end of the project. Environmental mitigation activities should be worked on from the beginning of a project, but CARE said that it had difficulties in attracting sufficient manual labor to do the basic road work as well as the mitigation activities.

The work that CARE started on this road stimulated interest of the part of the Prefecture of Potos , which upgraded the category of the road and assumed direct responsibility for completing the additional improvements that now become necessary and for maintaining the road. A private company was working on the road at the time of the FE, widening the platform and making other improvements, including with heavy machinery. The company is making use of some of the improvements that CARE had made, including some of the environmental mitigation measures that CARE had already taken.

This experience illustrates how important it is to have good projections of the levels of economic activity that might be expected in a given area over the medium and longer term. One does not want to over design a road in anticipation of an increase in economic activity

in the future that does not take place, for example. Nor does one want to under design the road and have to redo work a short time later. It takes an experienced project engineer to be able to find the right balance.

6.3.5.2.3 Sustainability Strategies and Potential for Sustainability

As part of its sustainability strategy, CARE trained members of the roads committees and workers in road construction and maintenance activities. Municipal government officials also participated in these training activities.

6.3.5.3 Food for the Hungry International (FHI)

6.3.5.3.1 Program Performance

FHI spent over \$1.1 million in monetization funds and rations on the improvements to 23 roads. This added up to over 173 kilometers, which meant that FHI was able to exceed its LOA target by 3 percent. FHI was also able to leverage almost \$360 thousand in funds from the municipalities and over \$54 thousand in cash and in-kind contributions from the participants (See Tables 6.1 and 6.2).

Table 6.6: FHI Roads Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of kilometers of roads improved/ constructed.	NA	97.5	173.3	168.4	103

6.3.5.3.2 Program Approaches and Results

FHI continued to follow good design and construction practices for its roads during the DAP. The roads that were visited were well designed and constructed, the drainage works in particular. FHI had to move significant amounts of earth to achieve quality alignments on several of the roads and, in the municipality of Toro Toro, to move large quantities of rock. The environmental mitigation measures were also appropriately done, although in the case of the Thola Kasa-Carasi road, there was evidence that some of the excess material from the cuts had been pushed over the side of the road rather than transported to designated areas.

As indicated earlier, FHI had begun implementing an environmental control system for the design, construction and operational phases of its projects at the beginning of the DAP. This worked well, and FHI continued to strengthen the environmental dimensions of its program during the DAP. FHI also was the only CS that had an environmental unit included in its organizational structure at the time of the MTE. FHI strengthened this unit post MTE by adding personnel to each of its regional offices.

With its experienced personnel and access to heavy machinery and design software, FHI had the capacity to take on some significant challenges during the DAP. One important example was the improvements that it made during the last several years of its DAP to 43.26 kilometers of difficult roads in the municipality of Toro Toro. These improvements, which included a rocky and complicated road section between Sucusuma and Toro Toro, also encouraged the Prefecture of Potosí to lay approximately 40 km of cobblestone from the bridge crossing the Caine River to Toro Toro. The road network in Toro Toro had been very rudimentary prior to the FHI interventions, and these improvements helped connect various parts of the municipality with each other and with markets in Cochabamba. They also improved residents' access to health and education services and made it easier for tourists to travel to the area, which is known for its national park, unique landscape and paleontological fossils.

During the visit to the Thola Kasa-Carasi road, the participants from Carasi told the FE team that they used to have to carry their produce to Toro Toro by donkey, which took 15 hours, and that now it only takes 1½ hours on the improved road. Public buses and trucks travel the road at least twice a week now and private vehicles more frequently. Other participants indicated that they used to sell their maize and wheat at the edge of the path, while now they sell 60 percent in Toro Toro or in Cochabamba. The variety of products that are produced locally, which includes potatoes, maize, quinoa, peanuts, watermelon and vegetables, have increased as a result of the road, FHI's IG program and the construction of a sprinkler irrigation system in Collpa Potrero which FHI finished in 2006. Now the participants in Carasi hope that the Carasi-Sucre road, which is 150 kilometers long will be completed and connect the entire area to the cities of Sucre and Potosí. In the case of the Rodeo-Pata Huayllas road, it was common for trucks to get stuck in the mud for up to two days during the rainy season due to the poor road conditions. Prior to the improvements, one truck left every three days or sometimes only one truck a week. Once the improvements were made, however, two to four trucks were able to leave the area each day delivering produce to market in Sucre, Potosi, La Paz and Santa Cruz. Since the beginning of the 2008 school year, the 90 students are also able to travel to school by bus rather than having to walk through mud during the rainy season and cross rivers on foot in order to get to classes.

6.3.5.3.3 Sustainability Strategies and Potential for Sustainability

FHI trained members of the roads committees and workers in road improvement and maintenance topics as part of its sustainability strategy. FHI also trained some municipal government officials that were involved in the follow-up to the roads projects in administrative and technical topics. FHI had a major influence on the Toro Toro municipality, which modified its organizational structure and strengthened its technical and environmental units, hiring civil engineers, agronomists and architects. At the time of the FE, this municipal government was capable of designing some of its own projects and developing the Bolivian environmental documentation (*fichas ambientales*) for its own projects. FHI also developed a manual to use in these training activities, which is well done, presents all the necessary concepts clearly and is illustrated with graphics and photos.

Ravelo and some of the other municipalities that FHI was working with have heavy machinery and do periodic maintenance on all the roads in their municipalities. Others, including the Toro Toro Municipality, mentioned that they are planning to include funds in their annual budgets to pay for regular road maintenance. Other municipal governments (or the prefectures) subcontract with local micro-enterprises to do the routine road maintenance work. These micro-enterprises are part of a national strategy for road maintenance, and the FE team had the opportunity to see a couple of them working in the Tomoyo area as well as on the Thola Kasa-Carasi road. In both cases, FHI took the initiative to strengthen these micro-enterprises, providing them with technical training and some equipment, including helmets, boots and overalls.

6.3.5.4 Save the Children (SC)

6.3.5.4.1 Program Performance

SC spent over \$967 thousand in monetization funds and rations on the improvements to 11 roads. This added up to over 112 kilometers, which meant that SC was able to exceed its LOA target by 3 percent. SC was also able to leverage almost \$170 thousand in funds from the municipalities and over \$43 thousand in in-kind contributions from the participants (See Tables 6.1 and 6.2).

Table 6.7: SC Roads Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of kilometers of roads improved/ constructed.	NA	62.0	112.8	110.0	103

6.3.5.4.2 Program Approaches and Results

SC increased the technical capacity of its infrastructure staff post MTE and this showed up in the improved quality of its roads projects, both the design and construction. SC also began doing more sophisticated design work, utilizing hydrologic and soil studies, computerized topography and computerized designs of the roads, for example. The Sica Sica Dairy Belt was still under construction at the time of the FE visit, and there were still a few construction activities pending on the Cairoma-Corocuta road. The alignments on the three roads visited that were finished were good as were the drainage systems. The culverts were well-located and had energy dissipaters at the exits. The roadside ditches were constructed so that the water drained properly, and small energy dissipaters made from stone or concrete were installed to avoid longitudinal erosion. SC was also able to achieve a good quality on its road surfaces as a result of renting the heavy equipment needed to insure adequate compaction.

SC created an independent environmental unit post MTE, which helped it do a better job of including environmental criteria in its road designs and incorporating mitigation measures in

its projects to avoid possible negative impacts on the environment. Together with the other three CSs, SC established environmental control systems covering the design, construction and operational phases of the roads projects, which its technicians strictly followed. All the projects visited had their *fichas ambientales* and *certificados de dispensación* signed by the La Paz Prefecture.

The gully control stone works along the Cairoma-Corocuta road were very good, although there was a lack of brow ditches in some sections of this road and other gully control activities and activities to prevent the erosion of the roadside ditches were also pending. SC had planted vegetation to protect many of the slopes along the roads, something that the other CSs had not done, which is commendable, and it had also installed road signs. On the Ajoya-Cañuma, Cañuma-Sivicani-Panzuri and Sica Sica Dairy Belt, SC constructed small embankments on top of the old road platforms, which elevated their levels and avoided difficulties during the rainy season. In the case of the Ajoya-Cañuma road, the material for the embankments was taken from the bed of a small river which used to over flow its banks during the rainy season. Using this as a source of material for elevating the road bed has reduced the likelihood that farmland and homes will be flooded during the rainy season.

The Ajoya-Cañuma and Cañuma-Sivicani-Panzuri roads are two concrete examples of the economic impact that the road projects can help to produce. The improvements that SC made in these two roads helped link dairy farmers in the *Altiplano* to the main roads year round, where previously they only had easy access during the dry season. The result is that they are now able to sell their milk to Pil Andina., which is one of the largest dairy companies in Bolivia. SC improved the Ajoya-Cañuma road in 2005 and the second road in 2006 at the urging of the Mayor of Calamarca, who also contributed approximately 30 percent of the cost of the improvement. At the time of the FE, eight public transport vehicles a day, on average, were servicing the area, up from the two to three vehicles per week that were common before the road improvements. In 2005, before the road improvements, the farmers in the area were lucky to be able to sell 27,200 liters of milk a year as cheese, but with the road and SC's support to the development of the milk value chain, this had increased to 92,275 liters of milk per year -- a three fold increase. In terms of incomes, the values of the sales went from \$4,809 to \$30,019 – a six fold increase. This is a major improvement in only three years, and also significant given the fact that it cost only \$88,900 to improve these 15.8 kilometers of roads. These road improvements have also made it easier for children to get to school, on a public school bus, and the community also has better access to the health post located in Sivicani.

6.3.5.4.3 Sustainability Strategies and Potential for Sustainability

During the DAP, SC trained the road committees and the participants in its roads projects in road improvement and maintenance tasks. Some municipal government officials also were trained in general administration and technical matters related to the design, construction and maintenance of the rural roads. This stimulated the Patacamaya municipal government to modify its organizational structure and strengthen its technical and environmental units, including by hiring civil engineers, agronomists and architects. By the time of the FE, this municipal government was capable of designing some of its projects and developing Bolivian environmental documentation (*fichas ambientales*) for its own projects. SC also produced a

road improvement and maintenance manual, which is well done, presents the necessary concepts clearly, and is illustrated with graphics and photos. This manual also includes a section on environmental mitigation works.

6.4 Irrigation and Land Reclamation

All four CSs also made an effort to expand the amount of land under irrigation in their work areas to help expand farmers' productive capacity and reduce risk. Having a more assured access to water reduces farmers' vulnerability to droughts and makes the adoption of new crops and improved agricultural practices more feasible. With a more assured access to water, farmers can increase their incomes even without adopting the new agricultural technologies and higher valued crops that the CSs were promoting just by increasing the numbers of crops they are able to harvest each year.

6.4.1 Program Performance

The four CSs completed 60 irrigation projects, which added together brought over 800 hectares under new/improved irrigation systems. FHI and SC, which got a later start, brought considerably more hectares under irrigation than ADRA or CARE.

An amount equivalent to over \$2.2 million was spent on these systems, with over 60 percent from monetization. The municipalities contributed over \$400 thousand (or over 18 percent of the total), and the beneficiaries contributed over \$300 thousand in cash and in-kind contributions. FHI used a 50 kg ration in some of its irrigation projects, and SC used food rations in one of the projects that it implemented part way

Table 6.8: Irrigation Projects Implemented During the DAPs (2002-2008)

Agency	Number Projects Completed	Number of New Hectares under Irrigation	Number Households Benefited
ADRA	10	137.5	403
CARE	8	158	299
FHI	32	315.3	1,320
SC	10	230.9	544
Total	60	841.7	2,566

through its DAP. ADRA and CARE did not use food for work. FHI and SC were also able to leverage cash contributions from the beneficiaries, which underscores the interest on the part of the farmers and the likely sustainability of these systems. (See Table 6.9)

The field visits really brought home the importance of water to the farmers in the food insecure areas of Bolivia and what a difference having access to water for agricultural purposes can make to people's lives. Having a more assured access to water has reduced farmers' vulnerabilities to drought and made the adoption of new crops and agricultural practices more feasible. With a more assured access to water, many farmers have been able to increase their incomes even without adopting the new agricultural technologies and higher valued crops that the CSs were promoting under their IG programs just by increasing the

Table 6.9: Direct Investment Costs for Irrigation Projects during the DAPs (2002-2008), by Funding Source

Agency	Funding Source (US\$)						Total
	Monetization	Title II Food Rations	Municipalities	Participants		Other Donors	
				In-Kind	Cash		
ADRA	155,685	-	84,761	28,191	-	-	268,637
CARE	86,551	-	16,177	50,021	-	2,604	155,353
FHI	600,582	36,117	197,647	102,129	33,476	52,190	1,022,141
SC	531,184	4,498	114,878	55,683	49,336	20,606	776,185
Total	1,374,002	40,615	413,463	236,024	82,812	75,400	2,222,316
Percent	61.8	1.8	18.6	10.6	3.7	3.4	100

number of crops that they are able to harvest each year. Some more concrete examples of the impacts that these irrigation systems have had on people's lives can be found in the reviews of the individual CS programs later in this section and in the discussions of the IG programs in Section 5.

6.4.2 Program Approaches

The irrigation work, in the broadest sense, consisted of three types of activities: (1) the construction of the infrastructure, which was the main responsibility of the CS's infrastructure units, (2) the transfer of the irrigation technology to the beneficiaries of the systems through their IG programs, (3) the efforts to help organize and strengthen local irrigation committees so that they would be able to operate and maintain these systems once the DAPs were over.

At the time of the MTE, CARE, FHI and SC had been concentrating on the development of community-level, gravity-fed irrigation systems, developing some from scratch and rehabilitating, improving and expanding others. In the first several years of its DAP, ADRA was able to help some client farmers purchase pumps to use to get access to nearby surface water. ADRA's IG program also benefited from the fact that other donors, including the Danish Development Agency, were investing in the development of gravity-fed irrigation systems in the ADRA program area.

Post MTE, ADRA and CARE focused on the development of new gravity-fed systems or the improvement of existing systems. SC made the decision to convert to sprinkler systems, and FHI constructed both types of systems. Most systems that were constructed include an intake structure in a creek or river connected to a small dam, a small basin where the solid particles transported by the river, such as small gravel and sand, settle out, and a tank for storing the water. The tank prevents water that is not immediately needed from being lost and increases the amount of water available for consistent, regulated distribution. Finally,

the water is conducted from the tank (or directly from the intake structure) to the irrigation parcels through a network of canals or pressurized piping, where it is distributed through outlet chambers or hydrants.

The FE team was impressed with the quality of construction of many of the systems that it was able to see during its field visits and was impressed with the many improvements that had been made since the MTE recommendations in particular. The intake structures and the settling basins were well located and constructed, for example, and canals and distribution networks were leak free, although the evaluator did notice some problems with the connector mechanisms in the FHI and SC sprinkler systems. All four CSs had followed the appropriate environmental criteria in the design and implementation of these systems and had completed the necessary mitigation measures.

The team did notice some problems relative to water availability and use in several systems. These problems had their origins in inadequate planning during the design stage and were still having an adverse impact on the operation of the systems. These related to:

- ***The analysis of the hydrological balances of the systems.*** Two of the basic steps that need to be taken in designing an irrigation project are (1) to calculate the amounts of water that will be needed for the crops that are likely to be grown in the new system, on a monthly basis and (2) to compare these monthly flow requirements to monthly water flow data from the site, using on-site measurements and historical data if available. What became evident during the site visits was that these calculations had not always been done properly. The flow rates that were observed in the field for the Tahua Reja (FHI) and Wilapampa (SC) projects were very similar to the rates used in the project design documents. However, the flow rates that were seen during the visits to the Santa Rosa (ADRA) and Tucumillas (CARE) projects, which were took place at the time of the greatest demand for water, were 80 percent less than what was specified in their design documents. The result was that these latter two projects are not able to provide the amount of water that they were designed to provide, which is continuing to adversely affect the operation and impact of these systems.
- ***Planning for the organization of irrigation turns and frequency of irrigation.*** In the areas of rural Bolivia where the Title II programs have been operating, there are likely to be differences between how water has been distributed traditionally and how it should be distributed if one's objective is to enhance the efficiency of the system. If one's objective is the latter, water should be distributed based on technical factors such as parcel size, soil characteristics, type of crop and type of irrigation. These analyses should be done during the planning stage and the results translated into recommendations about the irrigation turns for the individual participants and the amount of time between turns, so that these recommendations can be negotiated with the communities before construction activities even begin. If this is not done, participants may insist that they are entitled to the water rights that prevailed under the old systems, for example, and/or others may acquire water rights though the work that they perform on the systems. And, in both cases, the distribution that results may be very inefficient. FHI and SC appeared to have dealt with these distribution issues in their Tahua Reja and Wilapampa projects during the design phase, which made it much easier for them to organize the farmers after the construction

was completed. ADRA and CARE, on the other hand, left these tasks to the end, with the result that several of their systems still did not have adequate plans covering the frequency of irrigation and the distribution of the turns at the time of the FE, with the result that farmers were not able to irrigate as frequently as they might otherwise have done.

Unit Costs. Information on what the four CSs spent to bring a hectare of land under irrigation as part of a gravity-fed or sprinkler systems is provided in Table 6.10. The average cost for sprinkler irrigation was roughly \$3,300 per hectare compared to around \$1,600 per hectare for gravity-fed systems. The unit costs for FHI and SC for sprinkler irrigation were below the reference market price. CARE's per hectare costs was significantly below the average of the other CSs and other organizations working in irrigation. ADRA's unit costs were close to the average for the four CSs. The variation in the unit costs implies significant technical differences among the four CSs.

Table 6.10: Average Direct Cost Per Hectare Under Irrigation in US\$

Agency	Direct Cost per Irrigated Hectare (US\$)	
	Gravity-Fed Systems	Sprinkler Systems
ADRA	1,715	-
CARE	983	-
FHI	2,209	3,223
SC	-	3,319
Average	1,636	3,271
Reference	2,500	4,500

Source: CS reports.

6.4.2.1 The Introduction of Sprinkler Irrigation

Sprinkler irrigation has proven to be an appropriate technology in many of the areas where the Title II program had been working for a number of reasons. The system uses water much more efficiently, enabling farmers to irrigate twice as much land with a given amount of water than if they were using a gravity fed system. This is a significant advantage in the rural areas of Bolivia where the Title II programs were operating, where water is scarce and the demand for what is available is increasing. The MTE had identified the lack of water as one of the major constraints in the areas where the Title II programs were working, and the introduction of sprinkler irrigation has proven to be an appropriate response to this problem.

Sprinkler irrigation systems require a 10-50 meter gradient between the intake structure or storage tank and the point of application to create enough pressure for the system to function. Because of the mountainous terrain in western Bolivia, where the CSs have most of their projects, sprinkler technology will work. Because applying water using sprinklers is like falling rain, it helps prevent soil erosion in terrain with slopes up to 35 percent. In areas where the slopes are greater, one has to construct terraces in order to protect the soils. In places like SC's Wilapampa, irrigation would not have been possible with any other method.

The amount of labor required using sprinkler irrigation is approximately 50 percent less than the amount required to use a gravity fed systems. The farmers interviewed in the visits to FHI's system in Hornoma and SC's system in Yunga Yunga, told the FE team that they now have more time for other tasks, including taking care of their livestock, pursuing other incomes earning activities and spending more time with their families. During the field trips, women and young children were observed setting up the sprinkler equipment, which is in contrast to the gravity systems where much more time and effort is required to make the furrows, for example.

The introduction of this new technology also seems to have facilitated changes in the traditional water use systems that were in place. As an example, when SC helped convert the Chuacollo Grande system from a gravity system to sprinkler irrigation, some of the participants agreed to give up their traditional water rights when they realized that they would not actually be losing benefits under the new system, but that they and the community would gain benefits through an increase in the efficiency of the overall system.

People were very pleased with the results at all the sites visited. The municipalities and other donors have become interested in the technology and the technology is expanding on its own in some places. The mayor of Cairoma told the FE team, for example, that the municipality had "officially adopted sprinkler irrigation for the area." The FE team was able to see a project constructed by the Cairoma mayor's office with support from the Japanese Cooperation Agency JICA and the Italian Cooperation Agency (ACRA) where sprinkler irrigation technology was used. The FE team was also able to see examples where other farmers were replicating the sprinkler systems on their land with their own resources.

6.4.3 Sustainability Strategies and Potential for Sustainability

The sustainability of these systems will depend primarily on the interest and abilities of the beneficiaries to maintain them. The MTE had recommended that the CSs invest more time and effort in strengthening the irrigation associations, viewing them as the most promising vehicle for insuring the future sustainability of these systems. Specific needs identified at the time of the MTE included: help in developing and implementing operations and maintenance plans, fee structures, and systems for administering the funds generated by the collection of users' fees.

6.4.3.1 Irrigation Associations

All four CSs had made considerable progress in responding to the MTE recommendations. All of the associations that were visited have statutes and rules approved by their communities; an organizational structure with defined functions; water user fees, which were being collected; a basic accounting system; and an annual schedule of maintenance activities. Less than 25 percent of the leadership positions in these associations were occupied by women, which is low in comparison to their participation in the W&S associations.

The associations that had been in existence longer were further along in the development of their capacity to manage and operate their systems and included members who have accumulated considerable knowledge and experience. This included the Tomoyo association

(ARISSET), which has added numerous other activities to its agenda (See the discussion in the IG section), and the Yunga Yunga Association. There are a number of other associations that have made progress but still need more experience in operating their systems and need to consolidate their administrative processes (See Table 6.10). Several of these associations also face with several specific problems. The organization of irrigation turns needs to be improved in the

Table 6.11: The Irrigation Associations Visited by Level of Development

CS	Level of Development of the Association		
	New	In Process	Mature
ADRA		Miskamayu Santa Rosa Sultaca Baja Suquistaca	
CARE			Tucumillas
FHI		Tahua Reja Hornoma Kehuayllani	Tomoyo
SC	Torrepampa Tucurpaya	Pasto Grande Wilapampa	Yunga Yunga

Miskamayu, Santa Rosa, Suquistaca and Tucumillas systems, for example. And a number of associations still need to improve their systems for calculating users' fees. The Tomoyo and Yunga Yunga systems were the only ones that had accumulated some savings at the time of the FE, which means that the others could face difficulties in coping with unanticipated expenses. The FE evaluator saw a number of cases where the fee calculations were left to the end, rather than developed during the design stage so the fees could be negotiated and agreed to by the communities before construction was started, as SC did in its projects. Several of SC's systems -- Torrepampa and Tucurpaya -- were still under construction at the time of the FE and are still going to need assistance and training after SC's DAP ends. On the plus side, other SC-supported systems are operating nearby in the Cairoma area, including Tenería, Wilapampa and Yunga Yunga, which the new associations can turn to for help if needed.

6.4.4 Lessons Learned

A number of lessons were learned from the Bolivia irrigation programs that could have relevance for other irrigation projects elsewhere in Bolivia and elsewhere in the world. These include the following:

- *The CSs were able to multiply the results and impacts of their irrigation projects by better integrating the work of their IG and infrastructure programs.*
- *Facilitating the exchange of experiences among communities can be a very effective way to introduce a new technology such as sprinkler irrigation.*
- *The introduction of a new technology sometimes makes other changes possible, as was the case with sprinkler irrigation which altered the distribution of the benefits from the water and opened up the possibility for making changes in the traditional allocation systems.*

6.4.5 Recommendations

If the CSs do irrigation projects in the future, they should:

- ***Collect information on a systematic basis on the flow rates of the water sources in areas where they are thinking about implementing irrigation projects at a future date.*** One approach might be to establish water measurement field visits every three months, and on a monthly basis during the dry season (between June and November), for the years that they work in an area. This would provide them with statistically reliable hydrologic information for the water sources available. In cases where the CSs implement projects that have been developed by other institutions or consultants, design parameters such as the water measurements should be directly verified during on-site visits.
- ***Take advantage of irrigation materials published by other organizations.*** Otherwise, they should try to standardize their irrigation training manuals.
- ***Standardize their fee calculation structure similar to the approach used in the W&S projects and use the same system in all their irrigation projects. The CSs should also develop estimates of the users' fees during the final design and not wait until the construction is completed to negotiate the fees with the participants.***
- ***Evaluate potential irrigation projects using financial tools, such as the internal rate of return (IRR) or net present value, and use this information as a basis for deciding which projects to invest in.*** These evaluations affect even the level of technology to be adopted in the systems, and will be increasingly important as a basis for accessing resources in the future (See below). All four of the CSs had included estimates of the IRR in their project documentation, but some seemed to take these estimates less seriously than the others.
- ***Help the municipal governments and communities explore the possibilities of obtaining additional financing for irrigation projects through public or private credit institutions.*** Given the successes that the CSs have had with their IG programs and the important role that increased access to water has played in enabling these successes to take place, there is some reason to believe that additional resources might be available to help finance new/improved irrigation systems on a loan basis. The municipal governments seem interested in providing some support but have limited funds, and donor funds are also limited. However, to get access to these resources, the CSs will need to have valid and convincing estimates of the potential profitability of these new systems.

6.4.6 Findings for the Individual Programs

6.4.6.1 Adventist Development Relief Agency (ADRA)

6.4.6.1.1 Program Performance

ADRA completed ten irrigation projects during the DAP, which brought over 137 hectares under irrigation. Most of the increases took place post the MTE and enabled ADRA to surpass its LOA target. To meet its target, ADRA spent over \$155 thousand in monetization funds and leveraged an additional \$85 thousand (over 31 percent of the total resources spent on the projects) from the municipalities. (See Tables 6.8 and 6.9)

Table 6.12: ADRA Irrigation Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Hectares of irrigated land used for production of selected marketable produce.	0	29.2	137.5	129.5	106

6.4.6.1.2 Program Approaches and Results

ADRA constructed new irrigation systems during the DAP and improved existing systems. All were gravity-fed. The specific works that were undertaken, which were generally of good quality, included water intakes, water storage tanks, concrete canals, laying piping for conducting water. Based on the observations made during the field visits, ADRA used appropriate environmental criteria in the design and implementation of its irrigation projects and took a rigorous approach to insure that all the planned mitigation measures were completed. The environmental unit that ADRA created after the MTE helped make this happen, as well as the environmental control and follow-up system that ADRA created along with the other CSs post MTE.

What was common to all the systems visited were the descriptions of the benefits from the systems, with all the participants interviewed indicating that they were now able to produce two crops a year, an improvement that has had a very positive impact on them and their families as well as on the community as a whole. The FE evaluator also observed cases where he thought there were additional opportunities to make better use of the additional water resources that are now available, such as in the Santa Rosa and Miskamayu systems, for example.

6.4.6.1.3 Sustainability Strategies and Potential for Sustainability

As part of its sustainability strategy, ADRA trained the irrigation associations in administration, operation and maintenance of the systems. The irrigation associations that were visited have statutes and rules; an organizational structure; and user's fees, which were being charged. The association in Sultaca Baja, needs more experience in order to consolidate its technical and administrative processes. Also, the fees charged in the Suquistaca system seem too low to cover the operation and maintenance costs of the system and also enable them to accumulate some savings. The fees for Sultaca Baja are more realistic but need to be better structured. What was also evident in all of ADRA's systems was that the organization of the irrigation turns needed to be revised and improved in order to take better advantage of the water available. ADRA produced a manual that covers topics related to the organization and functioning of the irrigation associations, and the operation and maintenance of the systems. What is still missing is a section on basic accounting and technical topics on irrigation.

6.4.6.1.4 Recommendations

If ADRA wants to continue to be involved in irrigation projects in Bolivia in the future, it:

- ***Will need to be willing to invest more resources to insure quality programs.***
ADRA will need to invest more time in designing/reviewing appropriate irrigation projects, ADRA will need to include more details on water measurements, water and soil studies, the organization of irrigation turns and frequency of irrigation, user fee calculations and investment analysis in its projects and it will need to strengthen the technical capacity of its staff in irrigation related topics in particular.

6.4.6.2 CARE

6.4.6.2.1 Program Performance

CARE completed eight irrigation projects during its DAP, which enable it to bring 158 new hectares under irrigation. Most of the increases took place pre MTE, and CARE was only able to achieve 53 percent of its LOA target. CARE did spend over \$86 thousand in monetization funds on these projects and was able to leverage an additional \$50 thousand in in-kind contributions from the participants and \$16 thousand from the municipalities (See Tables 6.8 and 6.9).

Table 6.13: CARE Irrigation Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of new hectares under irrigation.	NA	114	158	300	53

6.4.6.2.2 Program Approaches and Results

The FE team was only able to visit one of CARE's irrigation systems – the Tucumillas system – which is located in a highly productive area close to the city of Tarija. The improvements, which were made prior to the MTE, included the construction of two water intakes, two settling basins, 3,000 meters of concrete canals, two ferro-cement storage tanks, and four aqueducts. The construction work was fairly well done, and the necessary environmental mitigation measures were completed. The system also had its Bolivian *ficha ambientales* and *certificado de dispensación* signed by the Prefecture of Tarija. The participants that were interviewed were very enthusiastic and told the FE team that the improvements to the system meant that they are now able to grow three crops a year and also to produce more high valued crops, including vegetables, flowers and seed potatoes, changes which have had a very positive impact on their incomes.

6.4.6.2.3 Sustainability Strategies and Potential for Sustainability

The Tucumillas irrigation association has statutes and rules; an organizational structure with functions; water user fees, which are being charged; and an annual schedule of maintenance activities. The irrigation association has been carrying out the routine and periodic maintenance tasks. The participants also indicated that the producer association had a five-year production plan which began in 2007 and also had registered sales made during the last three years.

As was mentioned earlier, the Tucumillas system does not have enough water available during the peak demand season to meet all the water needs of its membership. During the field visit, participants indicated that they are able to use the irrigation water two to three times a month, which is significantly better than previously, when they were only able to use the system once a month. CARE had introduced a 1.20 Bs/hour fee (about 0.17 \$/hour), which has helped improve the management the water that is available. However, the overall efficiency of the system is still low due to the limited amount of water and the manner in which the water is applied. The participants still need technical assistance to help them figure out when is the optimal time for watering their crops. How best to use the irrigation water is not as intuitive as it may appear, and Bolivian farmers commonly use more water than necessary.

6.4.6.2.4 Recommendations

If CARE wants to continue to be involved in irrigation projects in Bolivia in the future, it:

- ***Will need to be willing to invest more resources to insure quality programs.*** CARE will need to invest more time in designing/reviewing appropriate irrigation projects and include more details on water measurements, water and soil studies, the organization of irrigation turns and frequency of irrigation, user fee calculations and investment analysis in its projects. CARE also will need to strengthen the technical capacity of its staff in irrigation related topics in particular.

6.4.6.3 Food for the Hungry International (FHI)

6.4.6.3.1 Program Performance

FHI constructed 32 irrigation projects during its DAP, which brought over 315 new hectares under irrigation. This enabled FHI to exceed its LOA target by 1 percent. FHI invested over \$600 thousand in monetization funds and leveraged an additional \$385 thousand from other sources, including the municipalities, participants and other donors (See Tables 6.8 and 6.9)

Table 6.14: FHI Irrigation Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of new hectares under irrigation.	NA	122.7	315.3	312	101

6.4.6.3.2 Program Approaches and Results

FHI has a long tradition of working in irrigation, and its experienced personnel and investment in advanced technology enabled it to implement a solid and effective irrigation program from the start of the DAP. FHI implemented both gravity-fed and sprinkler irrigation projects. FHI also added irrigation activities to its land reclamation projects located on the banks of the Tapacarí and Arque rivers in the Department of Cochabamba. FHI's decided to only construct new irrigation systems, i.e. systems in places where no irrigation systems had previously existed. This policy decision on FHI's part required additional effort, technical capacity and creativity, particularly in areas where surface water is scarce. The sprinkler technology was appropriate for use in many of the FHI areas, because, as indicated earlier, it doubles the surface area that can be irrigated, is appropriate for mountainous terrains, reduces by 50 percent the labor needed for water application, prevents soil erosion, and has better overall results than gravity-fed systems.

The projects visited were very well-constructed, and FHI followed appropriate engineering criteria and practices in the design, construction and operation of its projects. All the projects had Bolivian *fichas ambientales* and *certificados de dispensación* signed by the appropriate prefectures. As indicated elsewhere, FHI was the only CS that had environmental unit in its organizational structure from the start of the DAP. The environmental control system that FHI had put in place at the beginning of the DAP, which covered the design, construction and operational phases of its projects, also produced very good results.

The story that the participants told was basically the same at all the systems visited. The new systems meant that they were able to plant a second crop and even a third crop in the Hornoma, Kahuayllani and Tomoyo systems. And, this change alone had a significant, positive impact on their incomes.

The Tomoyo irrigation project, which was also discussed in the IG and NRM sections, was a major undertaking for FHI, and one that has had a huge impact on the immediate beneficiaries and on the economy of the area as a whole. The basic construction work took place during the previous DAP. The main canal is more than 15 kilometers (9.3 miles) long, and much of it was excavated directly into rock. The system also has 23 aqueducts, some of which are suspended dozens of meters above the many ravines in the area, and a network of canals and pipes that is more than 11 kilometers long. The system irrigates 548 hectares, 378 of which are gravity-fed irrigated and the rest irrigate by sprinklers. The Tomoyo irrigation association (ARISSET) is a well organized, quite effective organization that was already providing a variety of services to its members in addition to the operation and maintenance of the irrigation system. In 2008, ARISSET had to reconstruct several retaining walls and other structures that had been damaged by a landslide that threaded to destroy almost 30 meters of the main canal. At the time of the FE, ARISSET had over \$3,000 in savings in the bank, had negotiated \$180 thousand from the Prefecture of Potosi to enlarge and improve the intake structure for the system, which was underway, and had signed a cooperative agreement with one of the main providers of irrigation supplies in Bolivia.

In Capinota, FHI worked with a group of farmers, who lived in the area but had no access to land, to reclaim land along the banks of the Arque River. Once the retaining walls were built and the land prepared with sediment from the river, FHI began working with the farmers under its IG program to provide them with information on new agricultural technologies and practices and to help link them to higher valued markets. Other organizations had tried building retaining walls along this river in the past, but ran into technical difficulties and abandoned the efforts. FHI designed the walls using sophisticated technology, including hydrological studies of the river basin and a digitalized topographical map of the area, but the work itself was done only using manual labor, a huge task, but a major success. The total cost of the project was over \$214 thousand, almost half of which was in matching funds from the participants in local materials and labor. A total of 1,125 meters of walls were built; 48.5 hectares of land was reclaimed; and four communities and 117 families benefited. It cost \$4,428 per hectare to reclaim the land, but at the time of the FE it was already worth between \$8 and \$10 thousand per hectare.

6.4.6.3.3 Sustainability Strategies and Potential for Sustainability

As part of its sustainability strategy, FHI trained and strengthened irrigation associations in its projects. Mature organizations, such as Tomoyo, have accumulated considerable knowledge and experience about how to administer and operate these systems. In other systems, including Tahua Reja, Hornoma and Kehuayllani, the associations require more experience and they need to consolidate their administrative processes.

FHI's irrigation associations have statutes and rules; an organizational structure with functions; water user fees, which were being charged, a basic accounting system and an annual schedule of maintenance activities for the systems. The irrigation associations were also carrying out most of the routine, periodic and emergency maintenance tasks.

FHI's made an extra effort to organize the irrigation turns during the design phase of its projects. This made it easier to organize the farmers after the construction was completed and in a way that facilitated the more efficient use of the water.

FHI developed manuals that cover the organization and functioning of the irrigation associations, and the operation and maintenance of the systems. FHI also was the only Title II CS that had developed technical training materials covering the proper use of irrigation, which was adapted for each of its major systems. What seems missing is a basic accounting manual.

FHI also helped the irrigation systems that it was working with to get the legal rights over their water sources certified and to be given legal jurisdiction over their systems by the National Irrigation Service. This certification protects communities in the case of water disputes, contamination that could occur as a result of industrial or mining activities in the area, among other things. The legal process to obtain these certifications started only in early 2007. This is an important development and the other irrigation associations that have been developed and strengthened under the auspices of the Title II program should be encouraged to obtain the same certification.

6.4.6.4 Save the Children (SC)

6.4.6.4.1 Program Performance

SC constructed 10 irrigation projects during the DAP. These brought over 117 new hectares under irrigation and improved the irrigation on another 113 hectares. Most of these increases took place post MTE (over 80 percent) and enabled SC to surpass its LOA target by 17 percent. SC spent over \$500 thousand in monetization funds to achieve this target and was also able to leverage an additional \$240 thousand from the municipalities, participants and other donors (See Tables 6.8 and 6.9)

Table 6.15: SC Irrigation Program Performance

Indicator	Baseline 2002	Mid-term 2004	Final 2008	LOA Target	Percent of Target Achieved
Number of new hectares under irrigation.	NA	30	230.9	197	117

6.4.6.4.2 Program Approaches and Results

SC made substantial changes in its infrastructure component post MTE, contracting trained and experienced personnel, acquiring the latest equipment and software, and assigning the necessary economic resources for the implementation of the distinct types of infrastructure projects. All of this enabled SC, in only four years, to implement a very high quality irrigation program that was also able to produce extremely encouraging technical, economic

and social results. The FE evaluator believes that the SC irrigation program, along with the FHI program, should serve as examples that are worthy of following by other organizations interested in working on small-scale irrigation projects in poor rural areas elsewhere in Bolivia and in other countries.

SC concentrated on sprinkler irrigation, especially post MTE. This technology doubles the surface area to be irrigated, is appropriate for mountainous terrains, reduces by 50 percent the labor needed for water application, prevents soil erosion, and has better results overall than gravity-fed irrigation. SC was able to implement four sprinkler irrigation projects in the Cairoma area alone (Yunga Yunga, Wilapampa, Torrepampa and Tucurpaya), which cost \$540,571 to bring 168 hectares of land under irrigation. Due to the topography in this area, projects such as Wilapampa would not have been possible without sprinkler irrigation. These four irrigation projects in Cairoma contributed to a significant increase in production in an area already known for its agriculture and also had important multiplier effects. With the support of the British Embassy in Bolivia, for example, SC was able to obtain funding to build a collection center in Pucarani, which is being used as a place for aggregating and selling the products being produced in all four systems. The local mayor's office is promoting sprinkler irrigation; other donors are also becoming interested; and other farmers in the area are beginning to replicate these systems on their own.

The projects that were seen during the field visits were very well-constructed, and SC followed appropriate engineering and environmental criteria and practices in their design, construction and operation. The double chamber concrete tanks constructed in the sprinkler irrigation systems stood out, both for the volume of water stored and the quality of their construction quality, making it easier to regulate the systems and to have more flexible water distribution schedules.

All of the projects visited had their Bolivian environmental *fichas ambientales* and *certificados de dispensación* signed by the Prefecture of La Paz. SC strengthened its environmental program in response to a MTE recommendation. SC, like the other CSs, developed environmental guidelines for each type of infrastructure project as well as an environmental monitoring system which helped strengthen its infrastructure activities.

SC's irrigation systems enabled the communities to introduce a second annual crop and even a third crop in the Yunga Yunga and Torrepampa systems, for example, which had a significant impact on the productivity of the land as well as the income of the participants. The priority crops in the SC areas include potatoes, fava beans, vegetables and fruits. The irrigation beneficiaries also adopted improved varieties of local crops and/or introduced more profitable crops, such as fava bean seed in the Wilapampa system. Many of the systems visited in the Cairoma area were exporting their products while others were increasing their sales in higher value local markets, in La Paz in particular.

6.4.6.4.3 Sustainability Strategies and Potential for Sustainability

As part of its sustainability strategy, SC trained and strengthened the irrigation associations in its projects. The SC irrigation associations are at different stages of maturity. Mature organizations, such as Yunga Yunga, have accumulated considerable knowledge and

experience about how to administer and operate their system. Yunga Yunga was charging a fee of \$5.70/participant/year and all members are up to date with their payments. In other systems, such as Wilapampa and Pasto Grande, the associations require more experience and need to consolidate their administrative processes. And, the newest associations, including the ones from the systems that were still under construction at the time of the FE (e.g., Torrepampa and Tukurpaya) also need further strengthening.

The associations that were visited were well organized and structured; had statutes and rules; water user fees, which were being charged; a basic accounting system; and an annual schedule of maintenance activities. These associations were also taking care of all the basic maintenance tasks. The extra effort that SC took to organize the irrigation turns during the design phase of its projects, made it easier for them to organize the farmers after the construction was completed and in a way that facilitated the more efficient use of the water.

Although the general fee structure for SC's irrigation systems is well defined, there are a few items that tend to distort the calculations. Examples include the costs for replacement and expansion in the Wilapampa and Yunga Yunga systems, and the costs of the operator/plumber and the administrator/treasurer in small systems like Pasto Grande. This has resulted in user fees that are too high and unrealistic, and has led to the communities charging any amount they choose.

SC also produced manuals that cover the organization and functioning of the irrigation associations, and the operation and maintenance of the systems. What was still missing was some technical training materials on irrigation for the participants.

6.5 Water Harvesting

The CSs were very enthusiastic at the start of the DAP about the construction of water reservoirs (also referred to as stock tanks in parts of the United States and as *gotanas* in Aymara) for harvesting rain water. These types of projects had the potential to be very important as a source of water for animals and particularly in the dry areas in the *Altiplano* where surface water is in short supply. The construction of these reservoirs was a more important part of the SC program than for the other CS, and by the time of the MTE in 2004, SC had constructed around 1,275 water reservoirs in the La Paz *Altiplano*, using a 50 kg food ration to compensate the participants for 72 hours of work.

The MTE, which was also enthusiastic about the potential importance of these reservoirs, also raised a series of technical questions about their design and construction and their potential adverse environmental effects. One of the main issues raised was the potential for water contamination, due to the fact that the animals were all drinking directly out of the reservoir as well as defecating.

SC made changes in the design and construction of these reservoir post MTE, including using hydrologic criteria to calculate the dimensions of the reservoirs, constructing separate drinking troughs for the animals and spillways to channel the excess rain water, protecting the slopes against erosion, and installing a perimeter fence. These changes were made in response to the MTE concerns, but they also added to the costs of the reservoirs. Because

of the additional costs, SC decided to improve some of its old reservoirs (125) instead of constructing new ones. ADRA, CARE and FHI discontinued these activities post MTE.

The original design was popular, because it could be copied by almost anyone. The improved design, on the other hand, was harder to replicate because it cost more to build. So some communities began asking for help from the municipal governments to construct new communal water reservoirs. Household-level reservoirs could be seen in the SC area at the time of the FE, which are copies of the communal reservoirs but smaller in size.

SC sponsored an analysis of its water reservoirs in 2008 based on a sample of improved and non-improved reservoirs in five municipalities in the *Altiplano*.²⁸ The preliminary report highlights the following points:

- The demand for water exceeds the supply, with the result that an improved water reservoir of 520 m³ reservoir does hold enough water to meet the needs of all the animals during the dry season.
- The water in the non-improved reservoirs tends to become contaminated and the animals that drink this water get diarrhea and some of the young animals may die. There were no noticeable increases in weight among the animals that drank contaminated water.
- The animals that drank from the improved reservoirs, where the water was not contaminated, gained approximately 0.75 kg per day. This weight gain was attributable to the better sanitary conditions at the improved reservoirs as well as to the fact that the animals were using less energy because they did not have to travel as far to drink water.
- The study reported that the improved water reservoir project had an internal rate of return (IRR) between 28 and 40 percent.

The high IRR suggests that these structures should be expanding faster than they are. Further analyses are needed of these water reservoirs, including adaptations that could enhance their cost effectiveness and likelihood of being replicated.

The new design uses gravity to move the water from the reservoir to the drinking troughs, which makes the design more suitable for use in hilly areas where the reservoirs can be located higher than the drinking troughs. An alternative for reservoirs that have to be constructed in flat areas could be to install a manual pump. The cost of the pump would not add that much to the overall cost of the reservoir, but it could require considerable additional time and effort on the part of the farmers if they have a large number of cows. Wells might be another alternative in areas that have relatively high water tables, such as in the *Altiplano*. During a visit to one of SC's W&S system, the FE evaluator noticed that community members were using the wells that were dug before the new W&S was constructed to water their animals. These wells did not even have a pump. Another variation could be to include an electric pump in areas that have electricity. The extra cost would not be high, and it would eliminate the time and effort required to manually pump the water.

²⁸ Maria del Carmen Auca, "Impact Analysis of Water Reservoirs in the Altiplano," January 9, 2009.

6.6 Constraints to Future Development

Several constraints to making further progress on productive infrastructure in rural Bolivia were identified in the course of the FE. These are listed below but are discussed in more detail in the W&S section (Section 4.5):

- *The high costs of road improvements and irrigation systems relative to municipal budgets.*
- *The weak technical capacity of some of the municipal government technical staff.*
- *Political problems that affect municipal government management.*

6.7 Recommendations

- *Document and disseminate information on best practices.* FHI and SC should seriously consider documenting and disseminating information on their experiences in implementing roads and irrigation projects in rural Bolivia. Analyses of the experiences in introducing sprinkler irrigation are particularly important.

In the event that the CSs do productive infrastructure projects in the future, they should:

- *Standardize their training manuals.* This would simplify the process and capitalize on the individual strengths of each of the CSs, reducing costs and creating more complete materials covering all the necessary areas related to the construction, operation and maintenance of the infrastructure be it roads or irrigation systems..
- *Improve their management accounting systems with the purpose of controlling the costs of their infrastructure components and their individual projects.* (See the Section 4.7 on the W&S recommendations for more details)
- *Develop a sustainability plan at the beginning of their programs.* The strong emphasis on sustainability began in 2005 and 2006 instead of at the beginning of the DAPs. In the future, the CSs need to focus more and sooner on increasing the capacity of the municipal technical and environmental units in the design, supervision and maintenance of productive infrastructure. This is needed so that in the future the municipalities will be able to develop and implement similar quality projects as well as contribute more effectively to their sustainability.
- *Consider applying the principles of Total Quality Management in managing their infrastructure projects.* (See the Section 4.7 on the W&S recommendations for more details).

7 Findings: Natural Resource Management (NRM)

7.1 Program Objectives

The objective of the Natural Resource Management (NRM) component was to reduce the unsustainable exploitation of natural resources in the Title II Program areas. According to the MTE, more specific objectives included:

- Participant communities effectively manage their natural resources through conservation and rehabilitation programs on communal and public lands.
- Farmers manage and reduce natural resource degradation through conservation and rehabilitation programs on their own lands.
- Community-based organizations (CBOs) effectively lead the development of communal NRM initiatives.
- Natural resource base and water quality is improved through a reduction in contamination from pesticides, fertilizers, human and animal wastes.

NRM, in other words, was expected to contribute to improved food security through sustainable increases in food availability and income.

7.2 Background

Deforestation and Erosion. Most of the Bolivian Andes are now largely deforested, especially in the middle and higher altitudes, above about 2,500 meters. In some lower, more humid areas forest is still common, although much of it is secondary. Andean forests were felled in colonial times for mining timber and fuel, and most remnants were stripped for the railroads by the nineteenth century.

There is now a firewood shortage. While some families buy bottled natural gas, others on the *Altiplano* are reduced to burning the *t'ula* shrub, roots and all, for cooking fuel.

The Andes are by nature erosion-prone: high, young mountains with an overburden of soft sedimentary rock, especially sandstone, which decomposes into friable, sandy soil. Erosion is exacerbated by deforestation and by overgrazing. However, much of the evidence for erosion in the program area is anecdotal, rather than quantitative. The rivers run muddy during the short rainy season and deep gullies threaten to obliterate whole fields, especially near roads. Yet soil erosion has rarely been measured. Agronomists merely guess at the exact amount of soil erosion caused by arable farming, deforestation and livestock (Maître et al. 2003). Changes in soil fertility are even less well understood, although program design assumed that soil fertility was declining, which may have been the case.

One of the challenges of working with communities is that rural people often fail to perceive declining soil fertility or erosion as problems (Thiele and Terrazas 1998). The loss of soil just two centimeters deep is equivalent to twenty tons of erosion per hectare; local people may not immediately notice it. Or they may not care especially if they are farming a pocket of

Pleistocene glacial loess five meters deep. Farmers are quick to notice declining crop yields, but those may be caused by declining soil fertility or by pests like nematodes or virus which are too small to be seen with the naked eye.

Settlement Patterns and Social Structure. In the program area, human settlement is usually disperse, yet communities are formally structured (as a *sindicato* or an OTB—a grassroots territorial organization). Communities have monthly meetings and formal elected political offices (e.g. president or *dirigente*).

Geomorphology. Just north of Lake Titicaca, the Andes fan out into an east and a west range, separated by a rolling plain about 4,000 meters high. This is the Bolivian *Altiplano*. Rainfall is scant (300 mm) and with frost 150 days a year it is an austere place to farm. There is limited scope for irrigation and vast areas of native grasses for llamas, alpacas, cattle, sheep and goats. Below the crest of the Andes, on the east slope, the land becomes steeper; in places it is nearly straight up and down. The lower reaches are warmer and moister. This geophysical province is called “the valleys”, although it also includes canyons and mountains.

Land Use Types. The three main types of land use are: extensive, rainfed agriculture and irrigated agriculture.

- ***Extensive land*** use includes forest (remnant, secondary and replanted), grasslands and rock outcrops. Economic activities include grazing and the extraction of grass and timber, besides mining and quarrying in a few places. The dominant plant is needle grass (*Stipa ichu* and other *Stipa* spp.) which can be grazed or cut and sold as construction material. Even in the city of Cochabamba, many roofs are still built with a thick layer of needle grass below the plaster. Extensive land is by far the most abundant land use type in the program area.
- ***Rainfed agriculture*** (Spanish: temporal) is common on the *Altiplano* and in the valleys. Crop rotation is traditional and common and usually starts with a potato crop (almost always fertilized, either with manure or chemicals), followed by maize in the lower elevations or by other Andean tubers (especially *oca* and *olluco*, called *papalisa* in Bolivia). Then broad beans (*haba*) may be planted and the rotation ends with barley, wheat or oats.
- ***Irrigated cropland*** is the most valuable. In the valleys it allows two crops a year, so people can farm through the long dry season. Irrigation lets farmers add vegetable crops to the tubers, haba and cereals. Many communities in the valleys have long been clustered around a small green patch of land irrigated with earthen canals. Since the 1980s various institutions in Bolivia have helped communities upgrade these systems with concrete canals or pipe, reducing water loss and extending the irrigated area into former rainfed fields. However communities can rarely afford to improve irrigation unless an outside agency buys the non-local materials.

Aynoqa. In some parts of the *Altiplano* and the higher valleys, communities organize the land into different sections, called *aynoqas* in Aymara and in Quechua. Each household owns land in each *aynoqa*. The community agrees on a crop and planting date and plants the *aynoqa* at the same time. They usually start with potato, rotate through other crops for about four more years and then let the *aynoqa* lay fallow for about ten years, allowing the soil to recover.

A community typically has a dozen or more *aynoqas*, one planted in potatoes, several in other crops and 10 or so laying fallow. Any community member can graze livestock on *aynoqas* in fallow.

Forestation. Since the 1980s or so various agencies, often financed by European donors, planted non-native trees, especially eucalyptus and pine, on community (extensive) lands. At first foresters had little knowledge of how to germinate native Andean trees, which often died of disease in nurseries even if they did germinate. Eucalyptus has been grown for at least 200 years in Bolivia and most people have little notion that it is foreign. Pine and eucalyptus are both valued as fuel and timber. This report refers to both genera as “naturalized,” because they are long-established, economically valuable and non-invasive.

Overgrazing. This undoubtedly impacts the largest area of land as livestock range freely over forests, grasslands and fallow fields, nibbling away the pasture, eating the seedlings of rare native trees, breaking the crust of the soil with their hooves and even climbing acacia trees to browse the branches. There is some evidence that rural communities may reduce overgrazing of their own accord. Children often herd livestock. As children spend more time in school and as irrigation and other technologies expand the area of high-value crops, farm families have less time and patience for free-ranging livestock.

Summary. Andean forests have been devastated, grasslands overgrazed and soil erosion is a real if poorly understood problem. Recent interventions by other agencies and other donors to plant trees and improve irrigation have provided background experiences upon which this project was built, even if some native soil management practices (e.g. *aynoqas*, crop rotation, and manuring, even stone terraces in a few places) were not explicitly valued under this program.

7.3 Overall Strategy and Approaches

The CSs dealt with degradation of forests and grasslands, soil erosion, and declining soil fertility using several strategies as discussed below, which were often innovative and effective.

7.3.1 Conservation Areas

Conservation areas are parcels of community-owned and managed land which protect perennial and annual plants, usually native ones. Areas range from two to 60 hectares or more. The areas are often surrounded by a fence or a wall, built with program support, but maintained by the community. Early fences were made of all local materials (e.g. stone). Later ones were often (but not always) made with posts and barbed wire. Stone walls are labor-intensive to make, and the wire fences often cost less than the rations needed to make stone walls.

The CSs encouraged the communities to discuss and agree on local norms for protecting the vegetation (e.g. limiting extraction of pasture, wood or other natural resources, especially in the first few years). A few of the areas include remnant forests with some mature trees. Others are grasslands. Some were created on highly degraded lands with little vegetation. In

most or all cases, the CSs helped community members plant trees, bushes or grasses in the conservation areas.

Most conservation areas are successfully tied to an income generating activity. This is important for securing buy-in from the community. For urban people who earn a salary, biodiversity conservation may have intrinsic value. But rural people living in poverty find conservation areas attractive if they help improve their livelihoods.

The CSs usually combined grasslands with either grazing or harvest of grass. The forested areas can be used to harvest grass (growing beneath the trees) and for limited amounts of wood: either branches of native hardwoods—for tools—without killing the tree, or the proposed future cutting of timber in the case of pine and eucalyptus. Some conservation areas in arid valleys propose the sustainable harvest of five or six species of desert plants, mostly for fruit. The most important of these is the prickly pear cactus fruit, which finds ready buyers in Bolivian markets.

In at least one case near Toro Toro, local farmers were encouraged to maintain a conservation area not to extract any natural products, but as a habitat for foraging macaws. The villagers hope the macaws will attract tourists and support a local eco-tourism guide service.

In some cases with endangered, native trees on the *Altiplano*, local people claimed not to have planted the conservation areas for any economic uses, but just because they wanted to have some trees.

As mentioned above, some conservation areas were planted in pine and eucalyptus, which are easier to germinate and which grow faster than native trees. Pine and eucalyptus can be harvested with no qualms about cutting down endangered species. However, after one severely degraded area was fenced and planted in eucalyptus, native trees began growing back as well, because keeping sheep and goats out of the area allowed native vegetation to recover.

The CSs strengthened and helped establish municipal and community nurseries to produce fruit trees, naturalized timber trees and native trees. During the evaluation, local people expressed an appreciation for the conservation areas and a willingness to continue to manage them. Some conservation areas were also important to conserve soil and to prevent runoff and soil erosion from damaging irrigation or other structures downhill.

Some community nurseries were also established as small businesses. The evaluators briefly visited one community nursery (*Vivero Frutícola Santa Bárbara*, in Charcoma, Culpina, Chuquisaca, with ADRA). Half a dozen community members were producing pine seedlings to plant in their conservation area, and peach and apple seedlings to sell.

7.3.2 Soil Conservation

The CSs worked in an area of high geomorphological diversity: from flat lands to steep slopes, from fragile soils to deep pockets of earth, from the frigid, arid *Altiplano* to moist

semi-tropical valleys, from rocky grazing lands to rich valley bottoms. Despite these differences, program implementers appear to have assumed that soil erosion rates were high everywhere in the program area. And this led them to develop a large menu of soil conservation techniques. Local technical staff and farmers could select among these, choosing the ones best suited to their conditions. SC and other PVOs wrote guides on soil and water management (SWM) to explain each activity. For example, forestation on (parts of) the high areas, terraces in areas less than 45° slope, taking into account type of soil.

Soil conservation techniques used by the CSs included check dams, infiltration ditches, terraces, gabions, live barriers, barriers of crop residues.

- **Check dams** (*diques*): walls of dry stone built across gullies to slow rain runoff. Most were so effective they captured many tons of sediment during their first season, vividly demonstrating the reality of soil erosion.
- **Infiltration ditches** (*zanjas de infiltración*): trenches about 30 cm wide and 30 to 50 cm deep, dug along the contour to trap rain runoff. They encouraged plant growth and were usually applied to extensive lands, sometimes in conservation areas with native grasses.
- **Gabions** (*gabiones*): thick wire cages in blocks of two cubic meters. They are grouped into defensive walls and filled with stones. They protect vulnerable crop land along river banks and even trap river-borne sediment, creating new fields of rich alluvial loam.
- **Stone terraces**, or bench terraces (*terrazas de banco*): about a meter tall, built in a field along the contour, and back filled with soil, they prevent soil erosion while providing a pocket of soil for fruit trees or other crops.
- **Slow formation terraces** (*terrazas de formación lenta*): usually also made of stone, laid on the soil surface along the contour. Eroding soil is trapped behind the barrier, slowly building a terrace.
- **Live barriers** (*barreras vivas*): elsewhere in Bolivia and in Central America, live barriers are usually rows of grass or perennial crops, planted along the contour to trap runoff in fields. The Title II CSs tried planting live barriers of xerophytic plants in semi-arid, extensive lands, with mixed success.
- **Barriers of crop residues** (*barreras de rastrojos*): crop residues are raked into lines, along the contour, where they detain runoff and eventually provide mulch and compost for the field.
- **Contour plowing** (*preparación del suelo a nivel*): was not mentioned in the indicators, but the evaluators noticed that this appropriate technology accompanied many of the other conservation measures. The local extension agents tended to encourage farmers to plow with the contour.

-
- **Individual terraces or tree wells** (*terrazas individuales o tazas*): on steep land the terrace is a wall, usually crescent-shaped, around downhill side of the fruit tree. On flat land the fruit tree is surrounded by a rim of earth, usually square, forming a depression around the tree. This makes it easier to manage irrigation water and fertilizer.

Most of the above techniques involve breaking or modifying the surface of the soil. As Shaxson notes (1989) this often tends to exacerbate rather than halt soil erosion. However, all or nearly all the CS's soil conservation structures were appropriately installed. The CSs did not measure soil erosion, but visual inspection revealed few obvious problems with soil erosion caused by project structures.

Earthmoving (e.g. digging ditches) is labor-intensive. Food rations can be used to encourage it, which may be one reason the CSs favored it. The earthmoving bias led the program to miss opportunities to propose alternative soil conservation techniques, e.g. limits on overgrazing. According to qualitative, visual inspection, the infiltration ditches successfully collected water and seeds which stimulated the growth of pasture and contributed to soil conservation. What is lacking is a cost benefit analysis to compare the high labor cost of these structures with the value of the pasture conserved. A limit on overgrazing would be able to cover a much larger area, at a fraction of the cost of digging trenches.

Grazing controls may be becoming more feasible as children spend more time in school, and less time herding livestock on the open range. The program could have worked with communities to do simple back of the envelope calculations on the costs and benefits of grazing, and propose community norms to limit overgrazing.

More could have been done to conserve soil through managing crop residues (*rastrojos*) as mulch. In Entre Ríos, CARE was working on barriers of crop residue and encouraging local people not to burn crop residues. Farmers had seen that soil erosion was reduced by leaving leaf litter on the surface of the soil, which requires less labor than digging trenches and building walls.

The program placed less emphasis on soil fertility enhancement than on soil conservation. ADRA proposed bringing soil in from other nearby areas (e.g. putting sand in clayey soil) to improve texture. It is unclear how much labor this demanded, although ADRA staff noticed that adding aggregates to the soil does improve its texture and structure. This improves soil fertility when organic fertilizers are also applied. There may have been fewer project activities with soil fertility enhancement because local technical staff understood that local people often apply manure to their soil.

The CSs successfully avoided the mistakes of earlier projects, which proposed *mucuna*, *canavalía* and other inedible legumes as cover crops. These are not profitable and are being abandoned in the areas (e.g. Nicaragua) that had once adopted them (Anderson et al. 2001).

Instead of cover crops, CS staff appropriately encouraged farmers to plant edible legumes to fix nitrogen. Several local people mentioned that peas, *tarvi*, broad beans (*haba*) etc. were good for the soil and that the CSs encouraged them to plant these crops. Since these legumes are already used in crop rotation in Bolivia (Bentley et al. 2005) it is unclear if the

program increased their use. But it is useful to reconfirm the value of worthwhile local practices.

The CSs also encouraged some farmers to plant alfalfa between rows of peaches, although this practice was not measured quantitatively. Alfalfa is also a legume and it helps to conserve soil. Farmers like to grow alfalfa, and it is curious that the program did not encourage it more.

In one case, an extensionist had encouraged local people to plant peas in an orchard and plow them up before harvesting them. He said the nodules were at their peak at the beginning of flowering. That may be true, but it no doubt seemed wasteful to the local farmers to forgo the harvest of perfectly healthy peas.

7.3.3 Integrated Watershed Management (IWM)

The concept of integrated water management (IWM) recognizes that the watershed is empirically real and that NRM actions implemented in isolation may fail. For example, an irrigation pipe may wash out if rain runoff is allowed to flood across it. A dam may fill with sediment if the land above it is denuded. All the CSs made a sincere attempt to adopt this approach, even though there was usually not enough labor or money to apply soil conservation measures to all the watersheds in the program area. Because of these difficulties, many program interventions were conducted in the smallest micro-watersheds in the area.

IWM is an academic ideal. As Blomquist and Schlager (2005) observe, IWM has been prescribed in the water policy literature for decades. Yet there are few instances where it has actually been implemented.

The MTE encouraged IWM and the CSs adopted it. Yet boundaries of communities and municipalities do not follow watershed limits, creating a potential conflict between the goal of integrated watershed management and the goal of strengthening municipal government. This was another reason many CS interventions occurred in micro-watersheds, which are more likely to fall within a single municipal or community jurisdiction.

7.3.4 Strengthening Community and Municipal Leadership

All the CSs had extensionists that worked in close contact with the communities. Most communities received visits weekly, if not more frequently. The CSs trained local people by explanation, and by practical demonstrations in farmers' fields. Demonstration farms and plots were common. Demonstration farms are a teaching method especially suited for topics like soil and water conservation (SWC) and NRM where the results may take years to see. Some demonstration farms were installed in the farm of a single household, and others were created with a group of farmers.

The CSs were refreshingly free of dogma and rhetoric regarding training. They were not pushing a new model or leaping onto bandwagons. Instead, they just got on with the business of visiting communities, demonstrating new ideas and explaining them.

CARE staff said they had used a version of the farmer field school (FFS) until discouraged to do so by the MTE. The groups that the MTE saw in Entre Rios were working on group land and CARE was trying to convince the farmers to sell the harvest as a group and put the money into a fund to make further investments. This is a needless complication of FFS, which is basically a weekly visit with a demonstration and some discussion (Bentley 2009). Sometimes CIALs (Local Agricultural Research Committees) do fund-raising activities in their second year, but this is not part of an FFS (see Ashby et al. 2000, Bentley et al. 2006).

Another group visited in 2004 had no group land. So CARE was encouraging them to clear some new land so they would have a place that they could work as a group. The evaluators had environmental concerns about clearing forest. Again the group plot was a needless complication; FFS demonstration plots are installed in the field of a member farmer, not in a group plot (Winarto 2004, Gallagher 2003). By 2008 the CSs were using pragmatic, common-sense approaches to adult education.

The demonstration farms helped some local families access the capital to invest in productive technology. Most farmers want irrigation, but pipe and cement cost money. Helping a household make a capital investment is a demonstration to the farmers that the technology functions very well indeed, but it also shows the CSs and donors that poverty can be alleviated by investing in materials (cement, water pipe etc.).

The CSs perceptively used food rations as incentives to encourage people to try new techniques. For example, the CS explained the importance of a soil conservation method, say check dams or infiltration ditches, and then used FFW to motivate local people to try them. In this way, farmers were encouraged to overcome their skepticism and try labor-intensive techniques. But after several years, community members saw that the techniques worked and realized their importance.

Bolivia has had elected local leaders since at least 1952. They form an increasingly powerful and interconnected political system, which has become effective at mobilizing people, funds and ideas, but has been slower to manage natural resources, even though all or most local economies are based on farming and herding.

Working with community and local leaders is challenging at best. An outside agency has to overcome mistrust, sort out local factionalism and decipher local agendas. Elected leaders have a rapid turnover. Some agencies in Bolivia simply sidestep local socio-political structure and create new institutions, which are easy for the agency to manipulate, but which fall apart when the project ends. To their credit, the Title II CSs worked hard to strengthen local leaders. These efforts involved:

- Training community members, farmers, and leaders. For example, local people were trained as plumbers to be able to manage potable water and irrigation systems after the project ends.
- Training municipal technical staff in environmental regulations and project development, among other topics.

-
- Raising awareness among elected municipal officials about the importance of having environmental technical units and helping municipalities establish these units.

Now, for example, if a road builder begins to take gravel from a streambed, the municipal government can send an engineer to assess the impact, and stop the activity, mitigate it, and/or levy a fee for extracting the material.

There were some slight differences among the CSs. ADRA led each of its communities to create a “secretary of natural resources” as part of its formal structure. CARE established a “natural resources group,” including as many community members as possible. FHI trained local leaders to be permanent, voluntary advisors to their community. SC trained local people to be agricultural experts and organized communities to manage irrigation and other resources.

7.3.5 Rules and Plans

Although the details differ, each CS used some sort of rules and plans for helping communities to express and agree upon concrete strategies for managing natural resources. ADRA (and to a lesser extent CARE) used the POP (land organizing plan) to map out community land and plan appropriate uses for it. In the case of ADRA, the POP is a legal, technical document intended to give continuity to the CS’s activities, supported by the municipal technical units. CARE encouraged communities to define their own norms for managing natural resources (e.g. agreeing to use some kinds of wood but not to cut down trees). The community norms were backed up by municipal ordinances. All four CSs crafted management plans for their activities, which were carefully agreed upon with the community members themselves.

7.4 Results Achieved

7.4.1 Quantitative Results

The CSs tracked the results for six quantifiable indicators, starting with the baseline in 2002, and ending with the final results for late 2008. At the baseline, only ADRA and FHI attributed SWC practices to local communities. All four CSs seemed to be saying that there were few if any existing SWC practices, ignoring local practices such as terracing, *aynoqas*, crop rotation, and defensive walls in rivers. In fact, the CSs probably did appreciate local practices. When agencies are rewarded for achieving certain indicators it makes sense to set the baseline as low as possible. The field staff certainly appreciated local practices.

Table 7.1: NRM Program Performance by CS

<i>Indicators</i>	<i>ADRA</i>		<i>CARE</i>		<i>FHI</i>		<i>SC</i>	
	<i>2002</i>	<i>2008</i>	<i>2002</i>	<i>2008</i>	<i>2002</i>	<i>2008</i>	<i>2002</i>	<i>2008</i>
1. Hectares of “conservation areas” with adequate management.	5	848	NA	3210	17	696	0	356
2. Number of communities in which the creation of “conservation areas” has been initiated.	0	78	NA	90	ND	38	0	34
3. Percentage of the target population that has adopted improved soil and water management (SWM) practices.	0	78	NA	60	2	55	0	68
4. Number of producers that have received training in natural resource management practices.	0	3,925	NA	3,194	45	2,113	0	4,703
5. Estimate of area of micro-watersheds that are under “appropriate” management.	0	406	NA	1,462	ND	3,535	0	958
6. Number of new hectares where soil conservation measures are being implemented.	11	2,732	NA	612	ND	3,047	0	1,957

The size of each CS program was roughly similar, ranging from 34 to 90 communities. Yet CARE had five to ten times as many hectares in conservation areas as the others. CARE may have been able to take advantage of some rather large remnant forests, e.g. in the Sama protected area. The total hectares conserved by all four CSs (5,110 hectares or about 21 hectares per community) is not a huge area, but it did provide habitat for some endangered trees and helped teach local people to plant and care for trees. By linking conservation with income generation the program gave communities a model for proactive conservation in the future. All the program communities started at least one conservation area, which is a laudable achievement.

The number of producers who received training was similar across CSs. The maximum number reported (4,703) was just over twice that of the lowest figure (2,113). The CS with the fewest communities trained the most farmers, suggesting either different definitions for “training” or error in how the numbers were tabulated.

Indicators 5 and 6 use similar technologies. The main difference between them is that Indicator 5 was planned with the community and Indicator 6 was individual household management. The sum for all four CSs for both indicators (14,709 hectares) implies a considerable effort, by the CSs and the communities.

7.4.2 Qualitative results

The MTE had concluded that “The Bolivia Title II program NRM activities have unquestionably had a positive impact on the livelihoods of participating households and communities and on the ecosystems” in the program area. The FE found that this was still true.

All four CSs had well-integrated programs. All four CSs put their main emphases on conservation areas (forests and grasslands) and soil and water conservation (SWC), including soil fertility enhancement. In most cases, local communities and the CSs designed conservation areas to include at least some economic extraction (e.g. grazing, cactus fruit). Many conservation areas also help stabilize slopes to protect roads, water projects or other program-sponsored structures downhill.

The nurseries had improved. The volume and quality of tree seedlings produced in community and municipal nurseries seemed to have improved a lot since the MTE. For example, ADRA has four municipal nurseries with an average production of 90,000 seedlings, which was increased to 130,000 because of the demand and interest of the municipal governments. Six community nurseries produced an average of 35,000 seedlings.

SWC was integrated with income generation. Local people are excited that soil conservation helps them to produce more; it goes hand in hand with economic opportunities such as irrigated vegetables, early season potatoes and improved peaches.

The CSs successfully produced native trees. All four CSs had remarkable success germinating native trees, raising them in nurseries and transplanting them to the open. Growing native trees is easier said than done, and until a few years ago few groups in Bolivia could do it well.

Participation and empowerment of beneficiaries will help assure sustainable impacts. All four CSs trained local communities and made extensive plans (e.g. POPs, management plans) with them to ensure that the communities would approve of and support the program. The community organizations and the municipalities were strengthened by working with the program. All four CSs trained local people to be elected office-holders or advisors with natural resources. Many of the communities adopted new norms for managing natural resources (e.g. restrictions on cutting firewood). Municipalities working with all CSs designed appropriate municipal ordinances and/or started or improved municipal technical offices. Community members and local leaders value the program and are proud of their involvement in it.

Community counterpart will help make project results sustainable. Community members spent many days of hard physical labor on the projects. In many cases they paid counterpart funds. They were organized and trained and will probably care for most of the program structures (e.g. roads, water works).

Municipalities recognize conservation areas. In most or all cases, the conservation areas established in local communities are recognized by the municipal government.

DAP activities generated much goodwill for USAID and the CSs. The community members and local authorities expressed an enormous, sincere gratitude for the program. The program created much goodwill.

All four CSs had their fichas ambientales and other environmental documents in order. They all showed a sincere interest in avoiding negative environmental impacts.

All four CSs were seriously committed to conservation and did an excellent job promoting appropriate strategies. For further information, see the Section 7.9 for additional information on each of the CS's programs.

7.5 Constraints to Future Development

The following constraints to future development were identified:

- ***Farmers and communities may not be able to continue with program activities once the program ends.*** Community members repeatedly asked for the program to stay, implying that they valued it, but also perhaps that they did not feel that they could continue alone. Continued funding and leadership may be necessary. Program staff were a social catalyst. Sympathetic outsiders can be honest brokers in local disputes, besides adding management skills and prestige to novel activities. When the program is no longer there to contribute money, ideas and social skills, it is unclear if the local leaders will still be able to carry out natural resource activities. Local communities may or may not stay united around the activities.
- ***Municipalities may not have the resources for follow-up.*** In most cases, the CSs are counting on the municipalities to conduct follow-up of program activities. While the local governments have obviously been strengthened and are committed to the programs, it remains to be seen if they will have the resources over the long-term to support all program activities.
- ***Follow-up is lacking.*** No evaluation can predict how a program will still impact a region years after the program ends. Some follow-up should be done five or ten years later.

7.6 Lessons Learned

A number of lessons were learned that have relevance for other NRM programs in Bolivia and elsewhere.

- ***Integrated watershed management (IWM) demands more resources than a community development program can spend.*** IWM has some validity and has a useful focus on landscape, but a program focused on child and maternal health and general community development cannot replicate work done by specialist programs with large budgets devoted to watershed management. For example, some of the CSs

sought to implement practices learned from the PROMIC project which is an unfair comparison. PROMIC has had SWC funding for over 15 years, to work in central Cochabamba.

Even so, the Title II program made many valuable contributions, including the conservation of some forests and grasslands. The program installed many useful conservation structures (e.g. check dams) in micro-watersheds, and increased awareness in the program area about the importance of SWC. IWM is a challenge, but the CSs all made a sincere effort. Perhaps their most valuable contribution was being able to identify and remedy problems in vulnerable areas of a micro watershed. Pinpointing an area that needs treatment can help to protect a water source or something else that is important to a community.

- ***Natural resource management (NRM) activities should be tied to income generation opportunities.*** This helps local people become interested and stay interested in conservation.
- ***Have earlier guidance about program policy.*** The CSs accepted the MTE recommendations and improved their programs. However the critical MTE created anxiety among the CS staff. Perhaps more guidance from USAID and more frequent contact could have avoided some of the early quality control problems.
- ***Food rations can be a teaching tool.*** Giving FFW to community members can stimulate them to try practices they would otherwise avoid.
- ***Food rations can lead to a bias towards labor-intensive technologies.*** When agencies rely heavily on FFW, they may unconsciously seek out labor-intensive technologies, for example, privileging earth-moving to conserve soil when it may be more effective to curb over-grazing or to use mulch.
- ***Demonstration farms can be useful to show how capital investment can alleviate poverty.*** Stables, water pipe, cement, and fences are just some of the materials that rural people want but often cannot afford. A demonstration farm shows the technologies to the farmers, but it also teaches the agencies the importance of capital investment to alleviate poverty.

7.7 Recommendations

These recommendations include some ideas for future research. In cases where all the CSs had similar weaknesses, the evaluators assume that this is attributable to program design or policy, and not to the CSs themselves.

- ***Commission a proper study of adoption of SWC practices.*** As mentioned in Section 7.8 the assessment of SWC practices was flawed. A new study should be based on a random, stratified sample of program beneficiaries, other community members and a pseudo-control (similar communities not involved with the program). The adoption of

practices should be measured based on interviews, but reconfirmed by field inspection. Adoption should be defined as the use of practices without continued program support. Which practices were adopted and under which conditions should be discussed.

- ***Do long-term studies of soil conservation structures.*** The community members and the technical people insisted that the infiltration ditches work, but they require much labor to make. USAID needs a long-term study to see if they are worthwhile. For example, this study could have two treatments, one that is fenced but without infiltration ditches and another that is fenced and has infiltration ditches installed, with an absolute control with no intervention. Biomass should be measured in both treatments and in the control every year. Although previous projects have worked with similar SWC technologies, their studies are usually limited to documenting the adoption of the technology (see e.g. Baldivia 1999), and are not a systematic comparison of the rates of soil erosion in formal experiments.
- ***Measure soil erosion.*** None of the CSs measured erosion. Apparently USAID did not request it. Obviously there are some technical challenges to measuring erosion, but health programs measure malnutrition and income generation programs measure income. However natural resource components simply measured activities and assumed that these works conserved the soil. But no one knows if that is true or not. The same recommendation also applies for soil fertility enhancement, although a pragmatic alternative would be to use long-term changes in agricultural yields and profitability as a proxy indicator of general soil productivity.
- ***Understand local SWC practices.*** A future program should start by understanding the local SWC techniques, even if they are imperfect, rather than assuming that there are no local SWC practices.
- ***Work more with overgrazing.*** Work with communities to understand grazing and how to rationalize it, in order to conserve soil over a large area without installing labor-intensive soil conservation structures. According to SC, fenced areas have been shown to be the best way to manage and recuperate native pastures.
- ***The focus should be IPM rather than natural pest control.*** The program promoted natural pest control, especially after the MTE. Natural pest control was often naively applied (e.g. useless pop bottle traps and yellow traps). All control options should be systematically evaluated.
- ***A follow-up study*** in about five years would help to see the long-term effects of the program. This is not standard practice, but it is the only empirical way to see if a project was as sustainable as it appeared to be at the close of the work.

7.8 Monitoring and Evaluation

The CSs' field staff submitted detailed reports on all their NRM activities, including persons trained, soil conservation structures implemented, conservation areas created. Presentations

for the evaluators were often accompanied by detailed maps showing the locations of these activities.

Each CS conducted a quantitative evaluation using a questionnaire survey to measure adoption of natural resource practices. Unfortunately the survey was so poorly designed that it provided little useful data. An adoption study should be done soon to measure the programs' valuable results. It is important to know which practices were adopted, where and why, for example, to demonstrate why stone terraces are adopted in some places and not others.

USAID asked the CSs to track implementation via six indicators which covered conservation areas (Indicators 1 and 2) and soil conservation (Indicators 3 through 6). Institutional strengthening efforts were not included in any indicator.

Table 7.2: NRM Indicators -- Definitions and Rationales

Indicator	Definition/Discussion	Target problem
1. Hectares of "conservation areas" with adequate management.	Grasslands or forests, often highly impacted prior to the project. Native plants are planted and/or protected.	Deforestation and over-grazing
2. Number of communities in which the creation of "conservation areas" has been initiated.	The community usually (but not always) allows some sustainable use of plants. Community statutes detail which activities are allowed or prohibited in the area.	Same as above
3. Percentage of the target population that has adopted improved soil and water management practices.	This indicator should have measured the percentage of the population that adopted practices on their own land, on their own initiative, not as part of a project activity and not for FFW. However the survey was poorly designed and the results are invalid.	Soil erosion, soil fertility problems
4. Number of producers that have received training in natural resource management practices.	Number of farmers who attended at least three fourths of the training events offered by the CS.	All of the above
5. Estimate of area of micro-watersheds that are under "appropriate management."	Various practices, including check dams for gully erosion, infiltration ditches, several kinds of terraces, walls to reclaim land in river beds and fenced areas.	All of the above
6. Number of new hectares where soil conservation measures are being implemented	The same practices as above. The difference is that the land in Indicator 5 is part of a community management plan, and Indicator 6 is spontaneous adoption.	All of the above

Results reported by each CS varied widely. This may reflect differences in definitions or in how results were gathered and tabulated. However as the following table shows, some of the numbers are more trustworthy than others.

For example, the data on hectares of conservation areas and the numbers of farmers trained come from the monitoring by the CS themselves, and these numbers are accurate. The numbers for Indicator 5 are fairly accurate, allowing for differences in definitions. Some CSs seem to count check dams alone as adequate management, while others insist on terraces and plant cover.

Table 7.3: NRM Indicators – Collection Methods and Accuracy

<i>Indicator</i>	<i>How collected</i>	<i>Accuracy</i>
1. Hectares of "conservation areas" with adequate management.	CS monitoring	High
2. Number of communities in which the creation of "conservation areas" has been initiated.	CS monitoring	High
3. Percentage of the target population that has adopted improved soil and water management practices.	Questionnaire survey	Low
4. Number of producers that have received training in natural resource management practices.	CS monitoring	High
5. Estimate of area of micro-watersheds that are under "appropriate management."	CS monitoring	Moderate
6. Number of new hectares where soil conservation measures are being implemented.	CS monitoring	High?

The data for Indicator 3 is flawed. All four agencies used a survey instrument designed by a consultant. To score a "yes" the respondent must claim to have adopted three-fourths of the practices he or she was taught. This is unrealistically high and excludes people who have adopted some practices. On the other hand, if a person merely adopted a practice in exchange for a food ration, or worked on a communal project, this counts as "yes," even if the person later abandoned the practice. In other words, if person X adopted two practices on her own land, she would be counted as a non-adopter. And if person Y performed six practices for FFW, but then abandoned them, he would be counted as an adopter. This is counter-intuitive. The numbers for this indicator are meaningless.

7.9 Findings for the Individual Programs

7.9.1 Adventist Development and Relief Agency (ADRA)

7.9.1.1 Key Program Approaches

ADRA's overall approach to NRM: Careful planning, pragmatic extension approaches, demonstration farms, a stress on forestry and improvement of soil texture. ADRA combined NRM with IWM and income generation. ADRA respected local practices, e.g. terraces and *tojeo*, and promoted crop rotation.

Changes made after the MTE: ADRA made more effort to use IWM, to promote crop rotation and to increase the amount of land in conservation areas and the amount of land conserved with SWC practices. Post MTE, ADRA increased the target for conservation areas (Indicator 1) from 225 to 385 hectares, (and actually achieved 848 hectares) and changed its indicators to be more comparable with those from the other CSs. Extension improved so that community members learned project skills and could describe what they had learned, and the results of the POP, without prompting. ADRA coordinated carefully with the municipal governments and helped strengthen them.

Difference from the other CS programs: intensive planning with communities resulting in a POP, more emphasis on naturalized tree species and household forests (called “woodlots” in the MTE). Some of the conservation areas were planted with naturalized tree species (such as pine and eucalyptus).

7.9.1.1.1 Conservation Areas

ADRA’s conservation areas were often integrated with income generation, such as prickly pear fruit and peaches. Local people were taking good care of the cactus and other plants in the conservation areas (e.g. keeping out the jackrabbits).

Some communities had successful tree nurseries with fruit and timber trees.

The residents of Tambo Moqo made their own building (*centro de acopio*) to store harvested cactus fruit, on their own initiative, without project funds. This investment suggests that they have accepted ownership of the conservation area and will sustain it. They also planted eucalyptus, to harvest for wood to make poles to replace the fence when it eventually wears out.

Unlike the other CSs, much of ADRA’s work in conservation areas was actually forestation with naturalized species, especially pine and eucalyptus. This is not a criticism. It required much hard work to plant these trees in dry, stony soil, and to water them by hand until the trees could survive on their own. In most cases local people value the naturalized species highly, especially eucalyptus. There were some problems with pine blight, but there was little the program could have done to anticipate that. In Tira Hoyo, forestation with eucalyptus greatly increased the spontaneous growth of native trees; as people protected the eucalyptus, e.g. keeping out livestock, the *qheviña* seedlings had a chance to grow.

In Quirpini, people bought 5,000 more seedlings of native trees, with their own money, to expand the conservation area.

ADRA encouraged household forests in some contexts. No other CS did this, but it is a good idea, especially for naturalized tree species on household land. This way the household is responsible for the small forest and will harvest the trees at maturity.

Conservation area in Carusla, Camargo, Chuquisaca

ADRA helped the community build a large defensive wall in the river, at the lower edge of the conservation area, with trees planted along the edge to control the flood waters. People built stone terraces and planted peach trees on the hillside.

The community members explained that when they first make the terraces, the soil is sandy, with little organic matter. They plant peas and *tarwi* (*Lupinus mutabilis*, the edible Andean lupine), both legumes. The farmers manure the soil and plant pine and eucalyptus trees on the slopes, outside of the terraces. They irrigate the trees with a water harvesting tank which fills up with rainwater running off the rocky hillside.



Water harvester and eucalyptus saplings in the conservation area.

The farmers said that they would keep on with the work, even if there was no project, because this was for them. “The trees are little now, but we hope you come back in two years and they will be big, and in five years this will be in the shade.”

Conservation area and income generation in Tambo Moqo, San Lucas, Chuquisaca

The community was waiting for the evaluators with a band, to escort us through an archway onto the rocky hillside where they had dug holes into the bare shale to plant prickly pear (*Opuntia ficus-indica*). The year old cactus was starting to bear fruit. As the people explained during their formal session at the top of the hill, the cactus fruit was to sell, to earn money.



Prickly pear planted on the hill in Tambo Moqo.

Economic ability to continue with the activities. The people were so encouraged by the prickly pears that they made a small warehouse (*centro de acopio*) to store the fruit. They made the one-room house themselves, from local material.

The people were thinking years into the future. In the moister land in the bottom, they planted eucalyptus to eventually replace the fence posts. They also planted peaches in the very bottom.

The people manured the prickly pear when they planted them. But in the year since then, the villagers were so encouraged by the cactus's growth that they collected leaf litter (*sach'a wanu*) from under the *molles* in the village, to place around each cactus plant.

Forestation. ADRA staff pointed out that prickly pear prefers dry areas and on one wetter slope it was turning yellow, but the great majority of it is thriving. This was a successful learning experience. The people also planted other cactus, *ulala* (*Eriocereus tephrocanthus*) and *airampo* (*Opuntia* spp.), underneath the barbed wire fence, to keep out the jackrabbits.

Soil fertility. Community members said that every household had built an improved corral, to collect manure from their livestock, and an individual *atajado* (stock water pond). They showed the evaluators one in the conservation area (the cactus forest), which was filling up with clean water.

Integrated soil conservation and forestation in El Terrado, San Lucas, Chuquisaca

The POP. The secretary of natural resources in El Terrado explained the POP and how important it was, because now they knew what kind of land they had and what it was good for. He showed a map and explained the color of each code, and said the most important was the intensive agricultural land closest to the river, "Because first we think about our stomachs." (*Porque primero pensamos en el estómago.*)

Forestation. The local people had dug thousands of holes for trees, most through solid shale. Each person dug twenty a day, for FFW. The people showed the trees to the evaluators, on the slope high above the village. They had not expected the trees to grow so high in just a little over a year, but they were nearly two meters tall.



The people of El Terrado are pleasantly surprised that the eucalyptus trees have grown so tall in less than two years. Note the stony soil and the bare hill in the background.

They also have a nursery, which the evaluators did not see because of a lack of time. At first they had to bring in tree seedlings from the municipal nursery in San Lucas. But then they built their own, producing 800 trees the first year, then 20,000, and then 50,000. They think they will soon have enough to sell.

El Terrado has six fenced forests of three hectares each. They call them conservation areas, even though most of the trees are eucalyptus. But the people appreciate the trees, will continue to care for them, and planting 18 hectares of trees in solid stone has been a lot of work. They said that in 20 years they would have their own wood and would not have to buy it.

Soil fertility. The secretary of natural resources explained that crop rotation was like changing your clothes, that the people grow potatoes, then maize, broad beans, peas, and that this is good for the soil. Dozens of villagers listened and some of them seconded him, saying that broad beans and peas are green manures.

Integrating income generation and improved soil fertility. ADRA taught the people to produce better peaches. The farmers said that before ADRA they would plant a tree and put a little manure just below the surface, in a ring around the tree, and the peaches did not produce very much. Now they dig a deep hole and put manure in it. If the soil is clayey (*llink'I jallp'a*), they mix in sand, which they also learned from ADRA.

Sustainable community organization. In 2005, a big flood killed the peach and poplar trees along the river edge, destroyed the defensive wall, and washed out much of the fertile soil. But help from ADRA, USAID and from community members living in Argentina, Santa Cruz and other places enable El Terrado to rebuild the river walls and replant trees. Every year they mix in manure and they plant legumes to improve the soil. But they do not buy chemical fertilizer.

The people of El Terrado said that since they started working with ADRA and USAID, they had almost eliminated child malnutrition. Before, 80 percent of the children were malnourished, now only 20 percent. They told the evaluators repeatedly how grateful they were and that they wished that ADRA and USAID would continue.

Conservation area in Huancarani Alto, Culpina, Chuquisaca

Pest management. The conservation area was planted in pines. Unfortunately some of the trees were turning brown, drying up and dying. This was almost certainly due to dothistroma blight, caused by a fungus. Some varieties of pine are susceptible to it, although the disease only appears when the trees are several years old.



Healthy pines and brown ones killed by needle blight, caused by the *Dothistroma* fungus.

Conservation area in Andamarca, San Lucas, Chuquisaca

Forestation. This was one of the first conservation areas, and it shows how ADRA learned from experience. The area is surrounded by a wall of *tapial* (rammed earth) instead of a wire fence. The wall required only local materials, but it took too many rations to make. Wire fences are cheaper.

The area was planted in two species of eucalyptus, *E. globulus*, and *E. viminalis*. *Casuarina* trees were also planted (some of which are thriving, and some are quite short).



Casuarina.

7.9.1.1.2 Soil Conservation

Soil conservation techniques were generally linked to income generating agricultural activities.

To improve soil fertility, ADRA encouraged manuring, crop rotation, growing nitrogen-fixing legume crops, and improving soil texture by bringing in sand for places with very clayey soil. Some community members gathered tree mulch (*sach'a wamu*) to spread around young cactus plants, to improve the soil fertility.

ADRA worked with communities to plant trees as defensives along field edges in river beds, to preserve this productive land. In one creative case in El Centro, ADRA used native willows to protect a water structure that the community had built previously.

Local people are adopting soil conservation and soil fertility improvement practices, e.g. in Taco Mayu, closely linked to preserving the watershed and to generating income through improved peaches. People in Tambo Moqo are adopting *atajados* and other techniques. ADRA taught people how to fertilize peach trees with manure, and the practice is being adopted. However, stone terraces are not adopted in dry areas without irrigation.

Check dams in gullies usually fill with sediment, conserving stream water and providing soil for plants.

People claimed that the infiltration ditches really work. ADRA promoted A-levels to trace contour lines (for infiltration ditches and other structures).

7.9.1.1.3 Integrated Watershed Management (IWM)

ADRA made a sincere attempt to apply the PROMIC model. For example, ADRA applied soil conservation techniques to its conservation areas. ADRA has at least one water harvester to provide irrigation for trees in a conservation area. But the watersheds are so large, it was impossible to apply SWC techniques over the whole area, given the available budget and labor.

In certain cases, ADRA came close to meeting the ideal of IWM. For example in Taco Mayu, where the municipality of Camargo is building a dam, the community members were highly motivated to collaborate with ADRA to build dozens of large check dams upstream

from the dam site, to keep the future dam from silting up. In anticipation of the new water supply, the villagers built terraces to grow peaches downstream from the dam site.

Of all the techniques for IWM, check dams are the most feasible, since they can be applied over a micro-watershed. However, given the funding available, it was not feasible to apply some techniques (e.g. forestation) over a whole watershed. (See the case from Jolencia.)

Integrated SWM and income generation in Taco Mayu, Camargo, Chuquisaca

Taco Mayu (i.e. Thaço Mayu—Mesquite River) is a small, arid canyon of sandstone and shale. But some of the lower canyon sides have been painstakingly worked into terraces. As the evaluators drove in a group of people were making a large stone wall to support a new terrace above the irrigation canal. They paused to look up, but quickly went back to work. They were not the welcoming committee.

Houses are dispersed along the canyon, and at the end of the settlement there is a new road, which the villagers chipped through the bedrock by hand. It leads to a spot on the canyon wall above a new dam being built not by ADRA or by USAID but by the mayor's office of Camargo. Thanks to ADRA, the people realize that it is necessary to control erosion above the dam and to manage soil and water below it.

Further up the canyon, there is a series of small rock check dams (*atajos*) built in the bottom of the canyon, over a slender stream. Some are simple, dry masonry. Others are more complicated, made of gabions (wire boxes filled with stone), and one is of stone and mortar masonry. Each check dam had filled with sediment, trapped during the rainy season. Clean water percolates from the base of each check dam.

Seeing the soil trapped by each check dam convinced the local people that soil erosion was real and that it can be controlled. A group of local people showed the evaluators that there were more check dams visible from the fork in the canyon. They also displayed a map, and proudly told how they had made 35 dams in three years, and how now the water did not rush through the canyon to be lost in two hours. Rather it stayed longer, and even without the dam (under construction), they already had more water. They said they wanted to plant trees all over the slopes of the canyon to keep the dam from silting up.

Later the ADRA staff explained that they had trained the people to see soil erosion by using models: pouring a watering can onto a box full of soil. But soon the people had observed the results themselves in the field.

The villagers wanted to take the evaluators upstream to see more check dams but time was short. Instead the evaluators drove back to the mouth of the canyon where a group was making a set of stone terraces. One man explained how they were bringing in large amounts of manure, gradually changing the red sand to dark earth. They had peach trees several years' old and new ones just starting. All the furrows on the terraces are gently curving, with the contour, planned with an A-level.

The people were planting terraces on the far slope in anticipation of receiving water from the new dam. Peaches are bigger now than they used to be, and although the people of Taco Mayu still dry peaches (*pelón, moqochinchi*), their peaches are now of high enough quality to sell fresh. ADRA helped them organize into a farmers' association. They claimed to have controlled mites with sulfocalcio (a home-brewed sulfur and lime mix) and Bordeaux mix.

Sustainability. Various local people took turns explaining their work. Julián Rengijo got out the POP (*plan de ordenamiento predial*), a thick document which describes the land and how to improve its use. The POP is a lot of work to make, yet ADRA wrote one in each community. One local resident said that the terraces are individually owned, but the group takes turns helping each family build one. They all worked together. He stressed how important the POP was to them, that it was their guide, and that they would keep working on the activities it described even after the project ended.

Applying practices on household land. Then a young mother said she wanted to show the evaluators the terraces she was making on her land. She walked fast, even though she was carrying a six-month old baby. The evaluators climbed down several terraced walls, including one with a beautifully crafted stairway, to a patch of land, no bigger than half a hectare, where the young mother showed them a narrow terrace crowded with peaches, broad beans, maize, potatoes, quince and apple. The trees were still small, but she grew legumes between them to improve the soil.



Walking down the stone steps built into the wall of a stone terrace. Note the thriving peach trees.

The woman's husband was tending the baby's twin. He had put the baby in the shade and was doing "*tojeo*," a backbreaking job. On a steep rocky slope, he had dug through solid sandstone with a hand pick. He piled the stone slabs onto the bedrock, making a wall. In the pocket behind the wall he filled in what little soil there was. This would eventually become a terrace of rich earth, planted with fruit trees.

Farmers are willing to adopt such labor-intensive practices for profitable, permanent crops. Thirty three families in Taco Mayu made a total of 1.6 hectares of *tojeo* and 2.8 hectares of other terraces. These terraces are so much work that making even 1,300 square meters per household is a great accomplishment.

Integrating natural resources and income generation. The people of Taco Mayu admitted that they had made terraces before the project came, but they said that they now made them better. They once received FFW, but no longer. They continue to make irrigated stone terraces,

where the soil is fertilized, conserved, and planted to high-value commercial crops. This hard work shows a vision of the future, with conviction and healthy ambition.

Managing soil and water in Quirpini Sacapampa, San Lucas, Chuquisaca

The villagers built a stone dam over the gullies in a short, dry, denuded watershed. Thanks to a proper design and hard work, the dam is actually impounding water. ADRA helped the people get machinery support from the municipality of San Lucas to add an earthen layer to the stones. The dam holds 800 cubic meters of water and irrigates 48 hectares of land. Just above the dam, the community fenced in 12 hectares of land. ADRA provided the barbed wire and the local people provided the posts and the labor. Then they planted trees in the area. And in some spots they are putting in infiltration ditches to retain water. They planted *molle* (*Schinus molle*), *jarka* (*Acacia visco*) and eucalyptus trees. Jackrabbits damage the little trees. The people are upset, but they bought 5,000 more trees from the CETA (agricultural training school) at San Lucas, for 5,000 Bs. (\$700) with their own money. They already dug the holes for the trees, through the rock.



This check dam silted up completely in one year. Powerful object lessons like this help convince communities that soil erosion is real.

The people also dug infiltration ditches in bare slopes of broken shale, using an A-level to follow the contour. In the gullies, stone check dams were carefully designed with a spillover. The people were amazed that the dams had completely filled up in the first year. “Now we will make them higher!” (*¡Ahora vamos a hacerlos más altos!*)



An A-level is made with simple material: poles, wire, string and a stone, but it allows farmers to trace a contour line.

The community members noticed that the sediment creates a soft, moist terrace where they can plant pasture or trees. Clean water seeps out at the bottom of the dam.

Municipal government. A staff member from the technical unit of the municipality of San Lucas was there for the evaluation. She said that the municipality was committed to doing the follow up with the communities, as long as they have the activities in their POA. She agreed that having a community need described in the POP helps to include it in the POA.

Natural resources and income generation in San Luis, Camargo, Chuquisaca

During their formal presentation, a spokesman said that they appreciated the program very much and that all the components were integrated.

Integrating natural resources with income generation. The secretary of natural resources for San Luis and other local people took the evaluators to see a mixed vineyard and fruit orchard, with barley, broad beans, beets, onions and other row crops intercropped between the trees.

Soil fertility management. They grow peas and when they are flowering they plow them under as green manure. (That may be the best way to incorporate the most nitrogen-bearing nodules into the soil, although it would probably be more profitable to harvest the peas first).

Defensive wall in the river. A smallholder was having a gabion built to expand his land and to protect it from the river. In 1985 a cement and stone wall had been built, but half of it had recently washed away. The smallholder provided the rocks and labor for the new gabion, and will also haul in new soil in a wheelbarrow, but ADRA bought him the wire boxes to hold the stones. These cost 600 Bs for each unit of two cubic meters. No one was quite sure how many cubic meters the wall would need, but it was at least 20 or 30.

Conservation area. On the hillside above the river, the group planted a conservation area of desert plants. First they tried *molle* and *pallki*, but it was too dry and the trees died. Now they are planting prickly pear. The farmers complained that prickly pear now fetches a good price, 120 Bs. (\$17) a box, but it is being ruined by cochineal insects (which were introduced in the early 1990s to sell as a natural red dye). The cochineal used to be worth \$100 a kg, but now it is only worth 20 Bs. (\$3).

The farmers tried spraying insecticide to kill the cochineal, but the cactus is so waxy that the solution slides right off the leaves. One of the evaluators improvised a whisk broom of straw and showed the people how easy it was to sweep off these soft, sessile insects, cleaning off a whole plant in a few minutes. The farmers were not impressed, but whisking may still an option.

Non-adoption of practices. The community made some stone terraces for fruit trees, but it is too dry for fruit, so they planted prickly pear. No one is replicating the walls on their own land.

Integrated watershed management. The group made stone check dams inside and outside the conservation area.

Income generation. A vineyard owner showed the evaluators a new vineyard she and her husband made with help from ADRA. The household also invested 9,000 Bs. (\$1,290) of their own money, which they made selling grapes from an older vineyard.

The new vineyard is on a dry patch of ground above the road, above the community irrigation canal. The owners blasted out the big rocks with dynamite and carried in soil. They used nine hours of tractor time to level the field. Then they bought a pump to irrigate the

vines with canal water. The vineyard owner is hopeful that the effort will pay off. They planted early maturing grapes, which can be harvested in December, when prices are high. (Many people in Bolivia eat white grapes on New Years' Eve).

Pest control. The only problem is that jackrabbits are attracted to the young vines. The vineyard owners planted a thick row of barley around the vineyard to tempt the hares to stay on the edge of the plot.



A row of barley keeps jackrabbits out of the vineyard.

Soil conservation and archaeology in Tira Hoyo, San Lucas, Chuquisaca

Stone terraces and forestation. The people of Tira Hoyo made two arcs, wooden frames covered with weavings, to honor the evaluation team. Twenty people sat on the terraces they had dug through solid rock, where they had planted eucalyptus. They made a wall around the new three hectare forest with the stone they took from the holes for the trees. They said it was so hard they could only make a couple of holes a day. For the first two years, they carried water in buckets up the long, steep slope to water the trees. Before planting the eucalyptus and making the wall, the area was mostly bare rock, but now native tree seedlings, *t'ula* and *qbewiña* (*Polylepis* spp.) were growing profusely between the eucalyptuses, because the animals were being kept out. A forest of naturalized trees can help native trees recover.



The conservation area was planted in eucalyptus, but native *qbewiña* are also thriving. These grew back from the roots, now that livestock are kept from the area.

Municipal government and environmental mitigation. On the slopes below the new forest, the community had dug three round water tanks. ADRA helped them draw up the plans with the municipality of San Lucas, which sent the machinery. ADRA helped them design the environmental mitigation, e.g. keeping the angle of the earthworks low enough to avoid erosion.

Empowerment. Like other ADRA communities, Tira Hoyo has a secretary of natural resources, who is part of the OTB. The secretary serves a two year term and then another person is elected.

Cultural resources. The community members showed the evaluators a map of the POP, which indicated an archaeological site. The site had some stone house remains, but the former secretary of natural resources said they were recent, from the 1950s. The adobe church looked ancient, but it was also from the 1950s. The former secretary said that before the 1950s there was another old church, older than living memory (*desde que se formó el mundo*). But it was gone now. It once stood next to the cemetery.



Colonial cremation: pile of partially burnt human bones.

The archaeological site looked early colonial; it was perhaps 200 meters from the cemetery. There were some glazed ceramics and glass (colonial or republican), and many plain ceramic sherds (which can be pre-Hispanic or later), but no chipped stone (lithics), which would indicate a pre-Columbian site. Part of the site was old, from before the 1950s, and the former secretary pointed out the house foundations and lines of streets there, and some rings of stone with large piles of cremated human bone.

Interpretation. This is probably an early colonial site, perhaps a *reducción*, where the Spaniards forced Indians to live in towns near churches. The population may or may not have been ancestral to the people living nearby now. It is not an extremely unusual site, but it is significant enough to preserve. It is a tribute to ADRA and the villagers that they identified the site on their POP. ADRA thought of putting a fence around the site, but that would be a needless expense that might simply call attention to it rather than protect it. It would be useful to use the site as an opportunity to discuss the community's past with the current-day residents.

Integrated watershed management in Jolencia, Culpina, Chuquisaca

PASACH (*Programa de Apoyo al Sector Agropecuario de Chuquisaca*) made a large concrete dam over the river in 2002. ADRA came in soon after that and helped the people manage the watershed above the dam, building check dams over the gullies and gabions on the main stream. At the top of the slope, they planted pine trees surrounded by a wire fence.



Pines in conservation area in Jolencia, at the top of the watershed.

However most of the slopes around the conservation area were bare. With the funding available, it was not feasible to

plant trees in a whole watershed.

Integrated watershed management in Sultaca Baja, Culpina, Chuquisaca

Forestation. The people of Sultaca Baja built a large canal for irrigation. Above that, on a slight rise, they planted a three hectare, fenced forest of *molle*, eucalyptus and pine to protect the canal and the tank for their new potable water system. Including other areas, they have planted seven ha of protected areas with ADRA. The people still care for the groves of willow they planted in the 1970s with CORDECH (*Corporacion de Desarrollo de Chuquisaca*, a departmental development agency), although they do not plant trees unless an institution helps them to do so.



Little *molle* growing in a stone wall in the conservation area in Sultaca Baja.

Soil conservation. They also built check dams in the ephemeral streams to protect the water works further downhill.

Natural resources and income generation in El Centro, Culpina, Chuquisaca

In the 1970s, Antonio Aguilera noticed that in the dry season a pool of water collected in a sandy spot in a bend of the river. He organized the village, got a donation of 1,000 sacks of cement from the Canadians and dug a trench across the sandy bar. They built a three meter wall in the trench, and then buried it. Thanks to the wall buried in the sand, now even more water collected in the river bend. The people built a well into it, and an underground canal to tap into it.



Willows defending El Centro's irrigation water.

The system worked well until the early 2000s, when the river began to invade the sand bar and threatened to destroy their hard work. The community asked ADRA for help.

ADRA's forester reasoned that gabions would be too expensive, so he looked for a local solution. Upstream from the village, he found a grove of wild willow growing in the stream bed. Its thick mats of roots held the earth in place. The forester knew that all willow species have delicate seeds but can be reproduced from cuttings. So in 2003, he cut a few branches. The people of El Centro planted the willow branches and waited. The willows thrived. So the next year they went back and cut a few hundred more branches and planted them in a protecting arc around the sandy spot in the bend of the river.

Adoption of practices. By 2008, the whole village turned out to show the evaluators the living wall of willow. It was clearly important to them. They had stopped harvesting wild willow branches, in order not to threaten the native stand. When their trees are big enough, they will cut more branches from their own trees, and plant more willows. They took ownership of an innovation made with the help of a creative forester.

7.9.1.1.4 Strengthening Community and Municipal Leadership

Training (including demonstration farms). ADRA used demonstration farms to apply various technologies in an integrated way, in a place where other community members could see them, to teach soil conservation, sprinkler irrigation, improved peach production and other techniques. ADRA trained people with models (e.g. water poured on loose earth) to show the effects of erosion. People were convinced that erosion was real after building check dams and seeing how much sediment was trapped behind them. FFW made these learning experiences possible; without a stimulus, people might not have been motivated to spend several days of hard work making a dam if they were skeptical of the results.

Community and municipal leadership. The municipal governments and the OTBs recognize the conservation areas established with ADRA. ADRA helped the OTB to establish a new elected position for a secretary of natural resources. At least some of the municipalities have technical units and are committed to following up on ADRA's projects.

Rules and plans. The POP is a challenging document to make. It takes weeks of planning with the community, examining the natural resources, designing improved land uses and agreeing on issues with the community, besides time spent writing and map-making. In a way it is like an improved PRA. Only instead of some drawings and charts the community has a document it can take to the municipality or another institution to request new projects. The POP makes it easy for the municipality to insert a proposed project into the municipal POA. The communities were proud of their POPs and recognized them as plans for future use of land and other resources. At least one of the POPs helped ADRA identify an archaeological site.

Demonstration farm in Carusla, Camargo, Chuquisaca

Water. The demonstration farmer had a seep in a small canyon near his house. The seep drained into a little pond. So about 1998, he started blasting a tunnel into the rock, opening the seep until it became a steady spring of water. "Because I do not want to migrate. I want to work where I was born," he explained (*Porque no quiero migrar. Quiero trabajar donde he nacido*). ADRA helped him make a plan and helped him buy materials. The demonstration farmer made a water tank and installed a pipe to carry water from the spring to the tank and from there to his house, where he has a shower. He smiled when he mentioned the shower.

Soil fertility. The goat pen had a new roof, which the demonstration farmer said is important, so the animals can get out of the rain, and the sun. He collects manure in the pen which he applies to his crops.

Sprinkler irrigation. The demonstration farmer proudly showed the evaluators a drinking trough for livestock and an irrigation tank which feeds three sprinklers in the demonstration plot, where he is growing peaches.

Peaches. The trees are four to five years old. ADRA taught the demonstration farmer how to prune. The trees were doing well until a recent hail knocked out most of the ripening fruit. The demonstration farmer was not discouraged; he thought the peach trees will recover next year.

He said his only problem has been mites. The evaluators examined the leaves and there was little sign of mites, which are arthropods (like spiders). With advice from ADRA, the demonstration farmer has been controlling them with Bordeaux mix, which is of course the classic fungicide used to control fungal diseases for over 100 years. Technically Bordeaux mix is a chemical, made from copper, but it is inexpensive, not very toxic, and is allowed in most “organic” agricultural programs.



Soil and water conservation: sprinkler irrigation on the demonstration farm. The field has been plowed on the contour and fertilized with manure.

In the field the furrows all followed the contour. There was a barbed-wire fence around the field. ADRA bought the non-local material and took it to the farm. But the local people paid back 70 percent of the cost of store-bought material, did all the hand labor and provided the rock and other local materials.

Demonstration plot in Qhelqewisi, San Lucas, Chuquisaca

Income generation. ADRA brought in 50 seedlings of the Gumucio Reyes variety of peaches from Cochabamba, and planted 150 creole trees. ADRA taught the people to prune and graft. They have a nursery of creole peaches which they are growing for rootstock. They will graft Gumucio Reyes branches into them.

Soil and water conservation. This demonstration plot was at the edge of a river bed. The people planted maize and potatoes in the gravelly soil between the peaches. They dug infiltration ditches for the peaches. The ditches did not collect enough water, so they made an earthen irrigation tank in the hillside and they installed



With a little care, fertilizer and water, peaches can bear fruit in stony soil

pipe to irrigate as soon as it rains and fills up the tank, which catches water from a little dry wash.

People planted the slopes with *molle* and cypress, also *jarka* and *chburki*. They tried *tara* (*Caesalpinia tinctoria*), but it grew poorly. They also made check dams, so the area has soil conservation, native trees in a conservation area and peaches for income generation.

Box 7.1: ADRA -- Summary of NRM Program Characteristics

Natural Resource Management	
Strengths	Weaknesses
<ul style="list-style-type: none"> • The individual terraces for fruit trees conserve soil and water while demanding less labor than bench terraces. • Check dams trap sediment in gullies, and are a practice that can be applied over large areas (e.g. a micro watershed). • <i>Tojeo</i>, although it requires much labor, is adopted if people have irrigation, high value crops (e.g. peach trees) and if land is in short supply. • The A-level is appropriate technology (inexpensive and easy to make) for tracing the contour line. It is a basic tool for applying many SWC technologies. • <i>Atajados</i> are functional enough that community members are building small ones on their own. • Individual, household forests are an interesting alternative to communal forests. • Some communal forests are now five years old, and communities manage them well, through the OTB structure, which bodes well for sustainability. • ADRA helped some communities draw up development plans with municipalities, for future activities. • The communities have taken ownership of their POPs and can use them to add activities to the municipal POA. • The demonstration farms used appropriate technologies. The beneficiary families appreciated the demonstration farms • Micro-irrigation producing early season potatoes (<i>papa mishka</i>) and other crops. • Promoting and improving fruit trees. • Sprinkler irrigation that avoids soil erosion. • ADRA trained local people as plumbers to manage water systems. 	<ul style="list-style-type: none"> • Many of ADRA’s conservation areas are planted in naturalized, rather than native species. This is a valuable activity, but perhaps it should be called “forestation” and not a “conservation area” if the vegetation is predominantly naturalized.

7.9.1.2 Results

ADRA achieved 220 percent of its goal for Indicator 1; 848 hectares equals 10.9 hectare per community, which is credible. The reported results for the number of farmers trained are probably accurate: an average of 50 people per community. The result for Indicator 5 is 111 percent of the goal and is consistent with the annual results reported. This is 5.2 hectares per community. Indicator 6 refers to hectares of land where farmers adopt soil conservation. The technologies used are essentially the same as those in Indicator 5 (terraces etc.). The difference is that Indicator 5 refers to land managed under a plan, and Indicator 6 tallies the hectares where farmers have adopted the measures on their own. So this is a meaningful measure of adoption. Assuming that 3,925 farmers have been trained, this equals almost 7,000 square meters of soil conservation for each, which is quite a lot of hand labor.

Table 7.4: ADRA: NRM Program Performance

Indicator	Baseline 2002	MTE 2004	Result 2008	LOA Target	Percent of Target Achieved
1. Hectares of conservation areas.	5	149	848	385	220
2. Communities which started conservation areas.	0	37	78	78	100
3. Percentage of target population that adopted SWM practices.	0	40+	78	92	92
4. Producers that received training in NRM.	0	2,810	3,925	2,400	164
5. Area of micro-watersheds under appropriate management.	0	67	406	367	111
6. New hectares where soil conservation measures are implemented.	11	904	2,732	2,204	124

7.9.1.3 Sustainability Strategy and Potential for Sustainability

ADRA's sustainability strategy rested on having a study and a plan (POP) written with full community engagement, which sets out future land uses. Ideas from the POP can be easily included in the municipal POA. ADRA had forged ties with the technical officers of the municipalities, who expressed interest in continuing with ADRA's activities after the program ended. ADRA may also seek alternative funding to continue working in the program area. ADRA also encouraged each OTB to include a Natural Resources Secretary in the community organization.

Since the MTE, ADRA focused on implementing the sustainability plan, which strengthens community and municipal organizations through the Municipal-Territorial Organization Units. At the time of the FE, all 78 of ADRA's beneficiary communities had written a POP.

Community organizations attended reinforcement workshops on techniques for sustainable use and management of natural resources, aimed at leaders, community authorities and natural resources secretaries, who are now part of the community's organizational structure.

The NRM Component's technologies were transferred to the staff of the Municipal-Territorial Organization Unit (MTOU).

As a result of the MTOU and collaboration of the local community, municipal governments, Prefecture of Chuquisaca, and Vice-ministry of Territorial Organization and Planning, the municipalities of Camargo, San Lucas, Culpina and Incahuasi decided to write Municipal Territorial Organization Plans (MTOU). These regulatory, political and administrative instruments establish regulations and actions which permit the planning and regulation of natural resources, social services and productive activities in the municipality.

The municipal governments included funds in their budgets for 2009 for natural resources. Areas funded included micro watershed management, forestation, soil conservation, production of seedlings in nurseries and the salary for the technical person in the *Unidades de Ordenamiento Territorial Municipal* (UOTMs).

Municipal Budgets for NRM Activities in 2009

- Municipality of Camargo Bs. 785,155.00
- Municipality of San Lucas Bs. 182,250.00
- Municipality of Incahuasi Bs. 104,500.00
- Municipality of Culpina Bs. 351,500.00

The POP also encourages greater investment from the prefecture.

Household forests in San Lorenzo, Culpina, Chuquisaca

Sustainability. About 2004, after a few years' experience with community forests, ADRA gave people the option of planting household forests, and several people accepted the idea. Now the little forests (less than a hectare each) dot the sides of this large, dry valley. The household forests are on individual land and are intended more to produce wood than to conserve soil. But people still plant community forests in community land in areas where they want to control soil erosion. The community created its own regulations, obliging people to keep animals out of each others' land.



A healthy, household forest at the top of a fallowed field.

Conservation area in Tojlasa, Culpina, Chuquisaca

Sustainable forestry. ADRA integrated NRM into the community structure. The president of the OTB opened the meeting, then he turned the floor over to the secretary of natural resources, who is now recognized as an official of the OTB. With help from ADRA, they wrote a new proposal on forestry and submitted it to the municipality.

Empowerment. The POP map shows all their activities, the poplars for windbreaks and the various forests they have planted. The map is stamped with the seal of the OTB. The men said that when they started planting trees on this bare, rocky soil that the others laughed at them. “How are you going to plant there if we have planted and not been able to grow trees?” (*¿Cómo vas a sembrar allí si nosotros hemos sembrado y no hemos podido crecer árboles?*)



Ramiro Cortez, president of the OTB, holds the POP map while community member Ramiro Cortez explains it.

But after just five years, the pines are tall enough to cast shade. One can hear the birds singing, smell the pines, and hear the wind whistling through the branches. The forest is not fenced, because the OTB has used the POP to organize the whole community to keep grazing animals out of it. “The POP has been agreed upon by the whole community.” (*El POP está consensuado con toda la comunidad*). If animals do get in, the owner is fined.

Forestry and soil and water conservation. The pine forest has infiltration ditches and individual terraces around the trees to catch the water. The trees are well managed. The lower branches are pruned to make the trunk grow thicker. The community members want to grow more trees and more peaches and apples. They now have a small nursery with apple trees.

The community leaders encouraged the evaluators to come back and see them again. They said they had done many other things with trees and forests, which they would be proud to show us, and they pointed out some of the other dense stands of trees in the distance.

7.9.1.4 Recommendations

In the future, ADRA should:

- Monitor needle blight in pine and determine which species and seed proveniences are susceptible to the disease.
- Consider relabeling its conservation areas, which are planted in naturalized plant species rather than native ones, as “forestation” areas.

7.9.2 CARE

7.9.2.1 Key program approaches

CARE's overall approach to NRM: Careful planning, stress on income generation, on capacity building with local municipalities, on IWM, demonstration farms and pragmatic extension, as well as respect for local practices (e.g. agricultural terraces).

Changes made after the MTE: abandoned the FFS, which CARE seems to have misunderstood anyway. CARE reduced the number of communities it worked with, although it is not clear how this really worked. Tucumilla, for example, was supposed to be a community abandoned after the MTE, but when the evaluators visited, it was clear that CARE continued to have a presence there. CARE reduced its targets for Indicator 1 (conservation areas) from 15,000 to 9,000 hectares, for Indicator 4 (numbers of farmers trained) from 3,450 to 2,693 and for Indicator 5 (area under planned SWC) from 5,000 to 3,200 hectares.

Difference from the other CS programs: emphasis on community norms, reached by consensus and backed up by municipal ordinances. More emphasis on managing crop residues to conserve soil, a technique other CSs could emulate. CARE also wrote POPs in some areas.

7.9.2.1.1 Conservation Areas

Some conservation areas with native desert plants were integrated into income generation programs, for sustainable harvest of fruit, for example. Communities planted half a dozen native, desert plant species to generate future income. The communities were caring for the areas, e.g. maintaining the fences and keeping out jackrabbits and livestock.

In Tarija some conservation areas are inside the Sama protected area (part of the national park system) and help conserve native species: Andean trees were planted and enclosed pastures (*cerramientos*) were developed to carry llamas through the dry season.

Conservation area of native desert plants in Ampa Ampa, Vitichi, Potosí

Integration with income generation. In 2006, with help from CARE, a group in Ampa Ampa built a fence around two hectares of partially deforested desert vegetation, and planted more native plants. They piled *qhevayllu* cactus under the fence to keep out jackrabbits, which were eating the young prickly pear. The group built dikes on some of the steep slopes to control erosion. The local people like the conservation area and say it prevents excessive rain runoff from flooding the village. They also planted a cactus called *tablas*, which looks a little like the North American saguaro. The *tablas* is grown locally for its woody skeleton, which can be made into boards. They also planted the bush *pillawa* to burn into ash, the main ingredient for the local *lejía*, which people chew with coca. The *lejía* is sold in local markets.

They also tend other trees, like the mesquite (Quechua: *thago*, scientific name: *Prosopis* spp.) and the *pallki* (*Acacia feddeana*) to eat the pods. They tend the *chburki* tree (*Acacia caven*) to harvest its leaf litter (sach'a wanu), and to collect the pods for goats to eat.

The conservation area cost \$9,000 to establish, and a hectare of land is only worth 3,000 Bs. So it is not clear if such a high investment will be justified by harvesting cactus skeletons and leaf litter. Thirty owners are a lot for two hectares of desert, so it is not clear if they will be able to manage it equitably. However, three community members stressed to the evaluators that they would maintain the area even after the project ends. It would be a perfect topic for a restudy in five years.



Mesquite pods are one of the economic products growing in the conservation area in Ampa Ampa.

Conservation area in a national park, Vizcarra, Yunchará, Tarija

Vizcarra is in the Sama Biological Reserve, in the basin of Tajzara, where flamingos wade in the brackish lake. Pumas and vicuñas live in the surrounding mountains. Most of the vegetation is needle grass (*ichhu*, *Stipa ichu* and other *Stipa* spp.). Settlement is disperse, with some houses a kilometer from their nearest neighbor. Yet people traveled from eight scattered communities to meet the evaluators in a rural schoolhouse. One by one the villagers got to their feet to say how the project was important to them, and they wished it would stay.

Near a small spring, the people showed the team some *qbeviña* (*Polylepis* sp.) and *kbishwara* (*Buddleja coriacea*) trees they had planted, laboriously making stone walls around each one to protect them from the wind, the cold and animals.

When asked what the trees were for, the people refused to give economic rationales. Young adults said the trees were for their grandchildren. One man said it was a garden. The trees were just a place that would make the community look better, they said.

Germinating native trees is not easy, but CARE successfully taught the community members to rear trees from seed in local nurseries.



Qbeviña tree surrounded by protective wall. It is a lot of work to plant a native forest from scratch. Needle grass (*ichhu*) grows in the background.

Because the basin is in a protected area, part of the national park system, CARE was careful to plant only native trees. Vizcarra also has a remnant forest of native trees on the mountain slope, which was too far to go see, but which was also one of the CARE conservation areas.

Soil and water conservation. The community had dug infiltration ditches in a *pampa* filled with dense stands of needle grass. The local people said that the trenches helped collect water which made the grass grow, and this was good pasture for their llamas.



Qhewiña seed. Community members now know how to rear native tree seedlings.

Income generation. CARE also worked with native livestock, especially llamas. CARE had some cleverly designed llama pastures, called *cerramientos*. They dug ditches to drain rain runoff into a big stock pond, or *atajado*, which is surrounded by wire fences. In the rainy season, the llamas graze on the open range, and in the dry season, the people put the animals into the native pasture around the stock pond.

The pastures were divided into three parts, with the pond in the middle. As the llamas eat the pasture in each part, they are passed to the next one. The people grow three hectares of barley to feed the llamas at the very end of the dry season. Then when it rains they release the llamas onto the open range again.

People did not present numbers on costs and earnings, but they were clearly pleased with the pastures and asked the evaluators repeatedly if USAID would fund more. One pasture has nine member households with 140 llamas on 48 hectares; it is three years old. The other has eight members, 110 llamas and 24 hectares, and is two years old.

Conservation area of native desert plants in Ascanty, Cotagaita, Potosí

Integration with income generation. This conservation area is two hectares of native desert plants, much like the one in Ampa Ampa. The area had been moderately impacted by grazing, and after fencing it, the community planted more native plants. Community members provided information on number of plant species, their products and the sale value of each one, which is given in Table 7.5.

This rough estimate assumes that all the small plants survive to become mature ones. If this harvest and price data is correct, then two hectares may gross up to \$4,000 a year, which would justify the \$9,000 start up cost. A follow up study in five years would be worthwhile.

Table 7.5: Estimated Values of Native Plants

Species and Number	Commercial Product	Value of Product	Min/ Max Total Value
Tuna cactus (560 small ones)	Prickly pear fruit, 15-20 kg per plant	40 to 60 Bs. per 30 kg box	11,200 Bs. to 22,400 Bs.
Pallki (180)	Beans, 0.5 kg per tree	20 Bs. kg	1800 Bs.
Chhurki (30)	Pods, about 0.5 arroba per tree. 4 arrobas make 1 quintal	25 Bs. per quintal	94 Bs.
Mesquite (28 mature trees and 70 small ones)	Pods, 2 to 3 bags per tree. 2 bags make 1 quintal	25 Bs. per quintal	2450 Bs. to 3675 Bs.
Qhewayllu cactus (10 big ones and 1000 small ones)	Fruit (called pasakana), 3-4 per plant	1.5 Bs. for big fruits and 1 Bs. for small ones	3000 Bs. to 6000 Bs.
Total	18,544 Bs. to 33,969 Bs. (\$2650 to \$4853)		

7.9.2.1.2 Soil Conservation

Several communities adopted the soil conservation practices, which are appropriate for their area, in addition to adopting the methods CARE promoted to improve peach production and marketing. CARE encouraged people to plant trees, including native ones, on their farms in Entre Ríos. In some places where stone terraces are practical, CARE encouraged communities to combine stone terraces with irrigation and peach trees.

Integrating soil conservation and income generation in La Vilca, Entre Ríos, Tarija

In La Vilca, Narváez and other communities in Entre Ríos, people adopted soil conservation practices along with an early variety of peach. It ripens in October or November, months ahead of the other varieties. Large, red and juicy, it commands a high price. One farmer told the evaluators how CARE had taught her how to graft the early peach branches onto the local rootstock. She had several mature trees growing on terraces. She had learned from CARE not to burn her crop stubble, and was mulching cut weeds in rows between the peaches. She had several hundred peach seedlings in her nursery and a tub of cedar seedlings. She also had some mature, native *Podocarpus* trees growing on her land, for timber.



Early maturing peach trees on an individual terrace, with the soil covered in mulch.

Soil conservation and income generation, Yuraj Cancha, Vitichi, Potosí

Few places are as in touch with stone as Yuraj Cancha. Almost all the buildings are made of stone. The walls are thick and straight, cleverly laid shale. Even the roofs of the houses are made of slate. The people have four local terms for stone, a classification eminently suited to use, and the local geology.

The people of Yuraj Cancha made six hectares of terraces with CARE, for FFW. Then they made another three hectares with technical assistance from CARE, but without food rations.



Newly built terraces ready to be filled with soil.

It is challenging to work on a topic that local people know well. The people in Yuraj Cancha have made stone terraces and irrigation systems for generations. Some of the canals and terraces still in use were already there in the time of their grandparents. The fine stone buildings and bridges around the village show that the locals are master stonemasons.

One of CARE's contributions was to help the people organize to work as a large group. They divided the six hectares into 31 parcels of equal value, and then drew lots to assign them. People worked as individuals, but with each terrace laid out to dovetail into its neighbor.

The canyon wall is filled with rock outcrops, extremely difficult to dig through. It is a significant accomplishment that 31 men were able to craft nine hectares into flourishing, fertile terraces. They broke the rock up by hand, stacked it into walls, and carried in soil and manure and leaf litter.



Marcos Colque, leader of the group, and his demonstration farm. Potatoes have just been planted in the terraces between the peach trees.

Pest management. The first set of terraces CARE helped make is irrigated with furrow irrigation. But in the new three hectare area, CARE installed sprinkler irrigation. The staff thought this will help control mites in peaches.

Adoption of practices. Several households have thriving peach nurseries in the patio, a sign of future commitment to fruit.

Empowerment and income generation. CARE helped the community members form a peach growers' association with 21 members. CARE brought in metal grain bins for maize, but the people are using them to store dried peaches, *moqochinchi*. The grain bins help the dried peaches keep from losing weight, and the people sell them as *moqochinchi* when the prices go up. CARE taught the local people to prune the peach trees, so they yield bigger peaches. The locals also have an ingenious technique for training peach trees to grow right through the wall of the terrace. CARE thoughtfully respected this.

7.9.2.1.3 Integrated Watershed Management (IWM)

CARE tried to apply the IWM model. For example, in Ampa Ampa people appreciated the new conservation area, because the soil erosion structures built in it help prevent rain runoff from flooding into the community.

7.9.2.1.4 Strengthening Community and Municipal Leadership

Training (including demonstration farms). People were trained with practical, on-farm demonstrations. There were also demonstration farms, e.g. in Yuraj Cancha.

Community and municipal leadership. CARE worked closely with all municipalities in its area. Some rural people, who started working with CARE in community groups in Vitichi, Potosí, were eventually prepared to take elected positions in the municipal government. These leaders are now interested in supporting rural development. CARE helped community members organize into groups to sell their produce, e.g. in San Luis, the peach producers' association in Yuraj Cancha, and the honey producers' association in Pecajsi, which had created links with the MOH. CARE also helped each OTB organize a natural resources group, with a local elected leader.

Rules and plans. CARE used participatory planning to write management plans with local communities for natural resource projects.

CARE helped communities craft their own norms, agreed upon through consensus, to establish how the groups will use natural resources. The norms are written and recognized by the municipality, usually seconded by municipal ordinances. With guidance from CARE, local people created norms to conserve the protected areas (native forests) in Sama and to prohibit burning of crop residues in Entre Ríos, for example.

The Vizcarra norms (*Normas Comunes para el Uso y Aprovechamiento Racional de Nuestros Recursos Naturales*, Tarija, 2008) are a remarkable document. Each of the nine norms describes a type of natural resource to be protected, outlining the actions which are prohibited. For example, to protect water, eucalyptus should not be planted near springs. The norms are written in clear, understandable prose, clearly reflecting local knowledge and values regarding the behaviors that damaged the natural resources in the past. For example, the norm on fire to clean agricultural fields recognizes that sometimes it is necessary, but

that a fire should never be started on a windy day, and only when the farmer has several people to help manage the fire.

Local best practices are acknowledge, e.g. livestock must be confined or controlled from All Saints Day (1 November) to Saint John's Day (24 June, actually Saint John's Eve, 23 June), when crops are in the fields. But the rest of the year, the animals may be released to graze.

The norms are given official approval by the mayor of Yunchará, with a formal municipal ordinance approving both the norms and the sanctions (e.g. fines) established for each one. CARE is acknowledged as having facilitated these community norms on: vegetation and water, domestic use of trees, sale of firewood, conservation of agricultural soils, burning of agricultural fields, pasture and crops, outsiders are forbidden from cutting trees, protection of natural and planted forests, and fenced pasture.

The forest nursery regulations (*Reglamento de Funcionamiento Interno, Vivero Forestal Comunal, Municipio de Yunchará, Comunidad: Vizcarra*) contain 22 articles written in formal language, establishing that members of the group must attend meetings, punctually, provide work and food for activities, and that the seedlings may be sold. The proceedings will be divided among members, with 30 percent kept for operating capital. Or the seedlings may be divided among the members to plant. The regulations specify the owner of the nursery and provide an inventory of the tools and supplies. It stipulates that the nursery is for sustainable environmental conservation, to protect the micro watershed and rehabilitate native forests, grasslands and soil by planting native trees.

Demonstration plot in Pecajsi, Vitichi, Potosí

The CARE staff showed the evaluators a demonstration plot of peaches on one hectare of stone terraces behind the *Aprimical* installations. The leaves were dry and brittle and the trees were barren. The president of this group, José Viga, said that it had not rained and that the only irrigation water they had was the overflow from the potable water tank. But because the season had been so dry, there was no overflow from the water tank. Each member has eight trees. It was an unconvincing demonstration plot.



Dried up peach trees in the demonstration plot in Pecajsi.

Box 7.2: CARE -- Summary of NRM Program Characteristics

Natural Resource Management	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Keeping cattle out of the micro watershed (above the irrigation project in Tucumilla, Tarija) avoids over-grazing, which is vital for soil conservation. • Planting native forests with local people. • The enclosed pastures (<i>cerramientos</i>) protect grazing land for llamas, which do not damage native pasture the way European livestock do. • Open water tanks (without drinking troughs) work for llamas, because they do not defecate into their drinking water. • En Entre Ríos, people adopted barriers made of crop residues (<i>rastrojos</i>) which conserves soil and uses much less labor than stone terraces. • The community members were making their own individual peach nurseries (sustainability). • There are community norms forbidding agricultural burning and governing the use of native forests. These norms were carefully designed with community consensus. • CARE enjoyed excellent relations with the municipalities (elected officials and the technical staff). • Local governments created municipal ordinances supporting the community norms and strengthening the sustainable use of natural resources in the municipality. • CARE helped municipalities establish technical units. • Conservation areas protect native desert vegetation. • In Yurac Cancha CARE taught people to prune peach trees and to organize themselves, while recognizing that the people already knew how to make terraces. • Farm families will build stone terraces if land is in short supply and if irrigation makes it possible to produce a high value crop. • The beekeepers' association found an opportunity to sell honey through the MOH. CARE capitalized the association so it can buy honey from its members in cash, which will enhance sustainability. • The individual terraces for fruit trees conserve soil and water while demanding less labor than stone bench terraces. • Micro-irrigation producing early season potatoes (<i>papa mishka</i>) and other crops. • CARE organized 32 women's groups in Vitachi and six farmers' associations. 	<ul style="list-style-type: none"> • Stone walls were not being replicated in some places (e.g. Entre Ríos). People only make them for food rations or to participate in a contest. Farmers will not make stone terraces if land is abundant. • <i>Phalaris</i> grass seemed functional in Entre Ríos. It could have been more widely promoted. • The demonstration plot of peaches drying up in Pecajsi. Peaches are an intensive crop. They must be managed by a household (or a firm) not by a group.

7.9.2.2 Results

For Indicator 1 (conservation areas), 36 percent of the target seems low. However, CARE probably set unrealistically high goals. CARE conserved an average of 35.6 hectares per community, far more than any other CS and 63 percent of the total for the whole program (total of 5,110 hectares). All 90 communities now have a conservation area. The number of trained farmers equals 35 people per program community, which is reasonable. CARE reported meeting only 46 percent of its goal for Indicator 5. Again, CARE may have had unreasonably high expectations. It managed 16.2 hectares per community, over three times as much as ADRA, for example. The figure for Indicator 6 is 1,900 square meters per trained farmer, which is lower than the figure for ADRA, but still respectable (about the size of one field on a small farm in Bolivia).

Table 7.6: CARE: NRM Program Performance

Indicator	Baseline 2002	MTE 2004	Result 2008	LOA Target	Percent of Target Achieved
1. Hectares of conservation areas.	NA	3,209	3,210	9,000	36
2. Communities which started conservation areas.	NA	90	90	90	100
3. Percentage of target population that adopted SWM practices.	NA	26	60	58	103
4. Producers that received training in NRM.	NA	792	3,194	2693	119
5. Area of micro-watersheds under appropriate management.	NA	348	1,462	3,200	46
6. New hectares where soil conservation measures are implemented.	NA	272	612	272	225

7.9.2.3 Sustainability Strategy and Potential for Sustainability

CARE encouraged communities to set their own norms for managing community resources. Since these were carefully discussed with community members and reached by consensus, there is a good chance that people will continue abiding by them after the program ends. CARE formed a natural resources committee in each community, involving most households, represented by a leader of the community. CARE also helped to found women's groups and producer's groups in rural communities and municipal environmental units. Some elected municipal leaders "came up through the ranks" by first joining women's groups, where they gained appropriate experience in community leadership, before being elected to office. These leaders are eager to continue with rural development projects.

The sustainability plan encouraged continuing SWC and conservation areas through joint initiatives with the municipal governments and communities. These commitments are reflected in the Municipal Development Plans and Communal Management Plans. There are now Territorial Organization Plans for three micro watersheds in Chuquisaca. The Territorial Organization Plan for the micro watershed of Cotagaita in Potosí is being approved and the plan for the micro watershed of Tajzara in Tarija is being coordinated with the prefecture, which hired a company to draft the POP. The natural resources team in Tarija developed community management plans, which are recognized by the municipal government and backed up by a municipal ordinance.

CARE developed resource conservation practices with 18 communities in Tarija in the Tajzara watershed in the Sama Biological Reserve, in Chuquisaca in the micro watersheds of the Platera and Picachani and part of the micro watershed basin of Cotagaita in the department of Potosí. To obtain sustainable results, management plans were developed with the communities involved and the local and municipal authorities to generate a joint commitment.

To achieve more sustainable effects and impacts, CARE worked in partnership with institutions such as SERNAP (Bolivia National Park Service) and PROMETA (Foundation for the Protection of the Environment of Tarija) in Tarija (Sama). In Chuquisaca, efforts were focused on the Platera watershed for conservation of protected areas.

Stone terraces in Entre Ríos, Tarija

Non-adoption of soil conservation practices.

The evaluators saw stone terraces on several farms in La Vilca and Narváez, two communities in Entre Ríos. People had made them with the program, but admitted they did not make them on their own. They enthusiastically adopted other soil conservation measures, such as straw barriers and mulching instead of burning, but they would only build stone terraces for FFW, or to compete in a contest. Land is too abundant. People only make stone terraces if land is in short supply, as in Taco Mayu.



People in Entre Ríos do not make stone terraces on their own accord.

Sustainability in a national park, Vizcarra, Yunchará, Tarija

The people managed the llama pastures in Vizcarra as CARE instructed them to (See Section 7.9.2.1.1), suggesting that the *cerramientos* are functional. However, the people interviewed said they could not invest in more, because of the cost of the fencing.

Municipal government. The president of the municipal council asked for advice on how to continue supporting the program activities. He said the collaboration with CARE and USAID had been important to the municipality and asked the evaluators to transmit their thanks to the donors of the project.

Municipal and community norms. CARE helped the local people fashion community environmental norms. These were discussed at length, until the communities reached consensus. For example, local people can cut a branch off a tree to make a tree handle, but they cannot sell firewood to outsiders, nor can local people cut down whole trees. The norms also protect llama pastures and springs of water. The community norms were further backed up by a municipal ordinance signed on 22 October 2008. The president of the municipal council is a committed environmentalist, and CARE simply helped the local government put their ideas on paper and into action.

Municipal environmental unit. The municipality created an environmental unit with two staff members, who will oversee construction companies working in the area (e.g. on roads), to ensure proper use of natural resources.

Community empowerment. CARE helped each community form a natural resources committee, with a person in charge (*responsable del comité de recursos naturales*), who is legally recognized by the community and by the municipal government. This is an important example of institutional development.

Community soil conservation norms in La Vilca, Entre Ríos, Tarija

In a formal community meeting, the people of La Vilca expressed deep thanks to CARE and USAID. One peach farmer took the evaluators to see his farm, with a citrus nursery and mature orange, peach and apricot trees. His fruit trees were planted on a hillside, but the peach farmer had made soil barriers of maize stalks neatly arranged on the contour, between the trees, to prevent soil erosion.

Community empowerment. The community had reached a consensus to stop burning crop residues (as a soil conservation measure), and with encouragement from CARE, drafted a community norm to prohibit burning. Everyone abides by the new rule.



A profitable new peach variety helped encourage community members to adopt soil conservation.

Municipal leaders in Vitichi, Potosí

The evaluators met with four members of the municipal council in Vitichi: Remigio Vera (acting mayor), Carlos Torrejón (municipal technical person), Magaly Martínez and Berna Durán (councilwomen).

Empowerment. They explained that CARE had organized 32 women's groups in the area and six farmers' associations, each with its legal charter (*personería jurídica*).

Environmental mitigation. CARE helped improve two roads and fruit tree terraces in Yuraj Cancha. CARE also completed the *fichas ambientales* for all its irrigation and road projects.

Sustainability. CARE put in water systems and latrines, which benefited many households. Each project has its CAPYS (water users' association) and its plumber. CARE was the first to use ferro-cement in the water projects, but other institutions are now copying the technology. All CARE's projects have a counterpart in cash from the municipality, which now has a technical unit, with an engineer to provide follow up to these projects.

- *Institutional strengthening.* Many of these leaders came up through the ranks with CARE. The acting mayor was CARE's cement mason. The councilwomen started as members of CARE's women's groups. The leaders said that they had learned about sustainable development from CARE and wished the program would stay.

7.9.2.4 Recommendations

In the future, CARE should:

- Continue to promote stone terraces in areas where land is scarce or where land can be made valuable through irrigation, but not where land is abundant or of low value.
- Promote *phalaris* grass as a live barrier in areas where it performs well (i.e. where there is enough moisture).
- Manage peaches in household orchards, not in group plots.

7.9.3 Food for the Hungry International (FHI)

7.9.3.1 Key Program Approaches

FHI's overall approach to NRM: Careful planning, Christian values, an attitude that people are in charge of their own destiny and should control nature, capacity building with municipalities and communities, high acceptance of IWM, demonstration farms and practical extension.

Changes made after the MTE: FHI increased its conservation areas target (Indicator 1) from 400 to 601, and increased the target number of communities with conservation areas (Indicator 2) from 20 to 38. The target of farmers trained (Indicator 4) was also increased from 1,500 to 1,900. The target for Indicator 5 was increased from 500 to 3,205 hectares and the target for Indicator 6 was increased from 1,770 to 2,864 hectares.

Difference from the other CS programs: better control of the M&E data. FHI also has impressive computer mapping skills. These skills allowed FHI to pinpoint small areas within a watershed and make appropriate interventions (e.g. in controlling extreme erosion). FHI

had larger conservation areas than ADRA or SC and a delightful project to train schoolchildren to appreciate endangered macaws. FHI also has a successful irrigation project in Tomoyo, the largest one in the program area.

7.9.3.1.1 Conservation Areas

Conservation areas were integrated with income generation, e.g. grazing or sustainable harvest of wild grass. Local people were clearly caring for the areas and investing in them (e.g. repairing fences, planning to buy fertilizer for some of the grasslands).

FHI also has some large conservation areas, 60 hectares. FHI helped local people to value their traditional knowledge of plants. In Potosí, some conservation areas in the Toro Toro national park help to conserve native trees as habitat for endangered macaws.

Conservation area in Sauce Mayu Norte, Ravelo

Empowerment. The community has a 60 hectare conservation area, much larger than those sponsored by other CSs, but too far away for the evaluators to inspect. The people proudly explained the rules they had developed for the area: no exotic plants, no grazing and no wood cutting.

They leafed through a herbarium-style collection of pressed plants. They were paying attention to herbs and shrubs, not just to trees, and FHI had helped them collect their local ethnobotanical knowledge.



Pressed plants from the large conservation area in Sauce Mayu.

Conservation area with grazing, Canchas Blancas, Ocurí

This high altitude (3,928 meters) grassland of 16.1 hectares is being managed by 20 local residents to feed their cattle. The area was divided by a fence into two pastures. The cattle are moved from one to another to let the grass recover. For part of the year, there is no grazing at all.

Income generation. The men have noticed that with this pasture, the cattle get fatter, are worth more and more of the calves survive.

Municipal government. The pasture was fenced in three years ago and declared a conservation area, which is supported by a municipal ordinance.

Empowerment, adoption of practices. The local people have noticed that there is now more grass in the area, and they are so encouraged they want to add urea to fertilize it. They said the infiltration ditches keep water from running off and that the grass grows thicker near the ditch.

Sustainability. The local people said the area was very useful, and that it was theirs, even though FHI had paid for the non-local materials. The community members were now maintaining the area. They charge 20 Bs. a month, for every month that a member has animals in the pasture. This way, if they need to buy barbed wire or other materials, they will be able to.

Watershed model. Like most of the FHI communities, this one had a large 3-dimensional, raised relief model of its micro watershed. A pickup truck from FHI would precede the evaluators to each spot, and set up a shady awning, illustrated posters and the 3-D model of the watershed, which was obviously professionally prepared. The evaluators began to wonder if the local people really understood the 3-D model. They did.

The evaluators asked the local people to point to where we were now, on the model. One of them did so, instantly, without looking around for assurance from anyone else. So the evaluators asked a harder question, if any of the community lands went outside of the micro-watershed. Yes, they did, and the local people traced the boundaries of the community on the model, even though the boundaries were not drawn on. They showed how one rancho (hamlet) was outside of the micro watershed.



Group at Canchas Blancas, with FHI staff and the 3-D model.

Conservation area as wildlife habitat, Kewayllani, Toro Toro, Potosi

FHI helped the local farmers grow “ecological peanuts”, without agrochemicals. They use sulfocalcio (homebrewed chemicals) and foliar fertilizer made from leaves.

The farmers said they used to kill the macaw, because it digs up peanuts, but now they scare it with sling shots and petards. One explosion of a two-peso petard will keep macaws away from a field for up to six hours. The farmers showed the evaluators a formally prepared illustrated poster and explained that the macaw was endangered because people cut down the trees they feed in, capture them to sell and hunt them. The local people said they no longer hunted, trapped or killed the macaws.



The macaw (*Ara rubrogenys*) nests in the canyons and feeds in the thorn forests. About 200 still live in the area.

Kewayllani is at the mouth of one of the canyons where the macaw nests, and every morning the birds fly out to look for seed, especially the seeds of native trees. These seeds are getting hard to find, because so much of the native dry forest has been converted to fields or pasture. So the community started a conservation area, with FHI help, of eight hectares on a hill near the river, along the macaw's flight path. The area was fenced and planted with local trees.

Income generation. The people created the conservation area without FFW. They said they made it for their children, and because there are fewer goats now anyway. People now grow more crops like peanuts and lemons, and the goats are becoming a nuisance. FHI is organizing the community to be part of the tour guide association. As the conservation area matures, it will attract more macaws, and local people will be able to supplement their income taking visitors to see them.

Cultural resources. Unfortunately, while digging the holes to plant the native trees, the people dug up many ceramic sherds, probably pre-Columbian. The local people said that the area used to have *chullpas* (ancient burial structures). The technical staff needs training in how to recognize cultural resources and how to manage them.

Generating income in the conservation area in Cañahui Pallca, Tapacarí, Cochabamba

In 2005, FHI helped the people of Cañahui Pallca establish a 22 hectare conservation area of native grassland. They built a stone wall around it, because they thought a stone wall would last longer and be easier to repair than one made of posts and wire. Then they encouraged *chillka* and *icbbu* and other native plants to grow. The people showed the evaluators how the plants were producing seed now.



The native grass is thicker near an infiltration trench.

They do not graze livestock in the conservation area, but in 2008, after three years, they sold three truckloads of grass as construction material in Cochabamba. Each of the 30 participating households received 800 Bs. and the group retained some of the money to buy tools.

Soil conservation. Infiltration ditches have enabled the grass to grow thick and have stopped soil erosion. The grass was harvested from just one small part of the area, but the rest is now recuperating and they will soon be able to harvest grass over a larger area and earn more money.

Training. FHI trained the local people, and two of them earned diplomas as *peritos*, agricultural technicians from the Catholic University of Bolivia.

7.9.3.1.2 Soil Conservation

FHI used trees innovatively to control extreme gully erosion. FHI successfully applied infiltration ditches to conserve soil and improve grass growth in conservation areas. Some of the stone terraces were built in *aynoqas*, but when the *aynoqa* entered its fallow stage the terraces were abandoned. Local people did not build more stone terraces on their own. However, the stone bench terraces in Tomoyo are functional because the local agriculture is intensive, and irrigated. FHI promoted and improved fruit trees, integrated into soil conservation activities.

7.9.3.1.3 Integrated Watershed Management (IWM)

Of all the CSs, FHI was the most convinced of IWM. They made careful 3-D models and computer-generated maps of watersheds in their area. They studied the areas intensely and decided which parts of the watershed are the most vulnerable. These areas were then stabilized with terraces, check dams and some forestation and other techniques. The check dams are especially successful and applicable. These activities were combined with income generation, e.g. raising certified seed potatoes. FHI also managed watersheds to help protect potable water systems and other structures built as part of the program.

In spite of its commitment, even FHI was limited by budget and labor constraints. While it is feasible to apply check dams over a watershed, FHI was not able to reforest more than a fraction of the area.

Controlling extreme erosion with trees in Parancaya, Ravelo, Potosí

Fields of deep loess in Parancaya are threatened by gully erosion several meters deep, caused by runoff from the poorly designed road to Ocurí, opened decades before the program started. The gullies have swallowed up whole fields.



Alders stabilizing the bottom of a deep gully.

The landowners were obviously alarmed. FHI first tried installing stone check dams, but the runoff washed them away. So FHI planted pine (*P. radiata*), eucalyptus and alder (*Alnus* sp., *aliso*). But the people did not like to grow eucalyptus in farm land. It ruins the soil, they said. Pine would start to grow in the gullies, but if the trees toppled over they died. But the alder worked fine. It began to stabilize the erosion. If the alder falls over in this rapidly shifting soil, the tip of the tree simply bends towards the sky and keeps growing. People began planting alder from cuttings and from seedlings that grew spontaneously under mature trees.

Integrated watershed management in Sauce Mayu Norte, Ravelo, Potosí

During their formal presentation, the villagers showed the evaluators a large poster of photographs they had made with FHI. Before the program, they said, there had been gulley erosion, deforestation, migration, overgrazing, subsistence agriculture, bad roads and malnutrition. One man spoke emotionally about their vision of the future, what they wanted in 20 years: nice houses, cars, good roads, fruit trees and green fields everywhere.



Irrigation allows early season potatoes and improved incomes.

Thanks to FHI and USAID, Sauce Mayu Norte now has irrigation, better roads, latrines, and water in all of the *ranchos* (hamlets) except one. They also have a conservation area, some model farms and some soil conservation structures. They have yet to control gulley erosion, plant forests and get electricity, but they are confident that they will.

Integrated watershed management in Palcoma, Tapacari

Just below the crest of the micro-watershed, the villagers of Palcoma had planted two and a half hectares of *kbishwara* trees.

They built large check dams in the gullies, and the grass is growing thick and healthy in the sediment behind each one. All the gullies were controlled this way.



The group in Palcoma was delighted with the program.

Adoption and non-adoption. The people were also making slow formation terraces on their own, without FFW. There were some large stone terraces, but nothing is growing on them now, because they were built on an *aynoqa* and the *aynoqa* has moved on. In other words, people will adopt an innovation that suits them, like slow formation terraces, but reject others that are inappropriate for their area.

Water. Palcoma also has a drinking water system, made with FHI help. The people are delighted with it. All 33 families have a toilet, shower and septic tank. Many of the soil conservation works were built to protect this potable water system.

Income generation. Two of the families were using the water to raise trout to eat and to sell. If they have a good experience, other community members may raise more. They would also like to raise irrigated vegetables but had not yet started.

Integration. In a formal presentation, the community stressed how everything was integrated. The soil conservation protects the water supply. The clean water improves their health. They conserve soil to grow potatoes, which they use to earn an income, so they have more food.

According to FHI staff, a few years ago 60 percent of the children were malnourished; they had no hope and no money. Now malnutrition is down to 25percent, the people are making money on organic potatoes, they have clean water and everyone is healthier.

Micro-watershed management. Some activities cannot be done on the scale of a micro-watershed, typically 1,000 hectares or larger. This micro-watershed dwarfs the little area planted in trees, for example, but check dams and slow formation terraces can be done. Stone terraces are well adapted for intensive agriculture, but not for *aynoqas*, where the crops move on, leaving the terraces in grazing land.

7.9.3.1.4 Strengthening Community and Municipal Leadership

Training (including demonstration farms). FHI helped about 150 households adopt model farms. The benefited households were pleased with the results (e.g. sprinkler irrigation, fruit trees, fodder crops, vegetables). Some neighboring households may be adopting some of the technologies, which seem appropriate on the farms where they are being used. FHI helped pay for the store bought materials: some investment may be useful for helping lift families out of poverty, with technical assistance and if the local family is willing to provide the unskilled labor. FHI trained schoolchildren in its macaw project. This created a local constituency for an endangered species. Various local people were trained by the Catholic University and have acquired technical titles in agriculture (*peritos agrícolas*).

Community and municipal leadership. FHI trained local leaders and farmers to be advisors for natural resource issues. These are un-elected, volunteer positions, recognized by the community and the municipality. FHI created environmental units in five municipal governments, funded by the municipalities themselves, and trained them to oversee natural resource projects. All of the conservation areas were recognized by their local municipality. FHI helped the communities in Tomoyo organize a local association (ARISSET) to operate and maintain the new irrigation system.

Rules and plans. Each community has rules and plans to manage the conservation areas.

Model farm in Teja Mayu, Ravelo, Chuquisaca

Water. The farm couple beamed as they showed the evaluators around their small but tidy farm. They used to grow mainly potatoes for subsistence. Now they have a spigot with drinking water piped into the yard. They have a new irrigation tank, which they use for furrow irrigation, but it could be adapted in the future to low pressure sprinkler irrigation.

Adoption of practices. The FHI staff were proud that the neighbor across the road was adopting the practices. He had some peach trees and was putting a wire fence around it, and paying for it himself.

Income generation. The model farmer had put in all of the labor on his farm improvements. FHI helped pay for the non-local materials. A little capital investment can help poor people adopt new technology.



The model farmer is pleased with the changes on his farm, like vegetable gardening and irrigation.

The family also started several new activities, thanks to the irrigation, including early potatoes (*papa mishka*), onions and more maize than before. There were also two little apple trees, a few peach trees (the improved variety Gumucio Reyes), *quinoa* and carrots. The model farmer was pleased with the carrots. He makes a cloth bundle (*q'epi*), puts it on his back and walks to the town of Ravelo. He arrives in an hour and a half, sells the carrots and walks home the same day. He was so happy with the experience that he wants to grow more vegetables. He has planted a few rows of peas, to see if they perform well.

The household also had a new greenhouse, made with adobe walls and a plastic roof, where they were growing cucumbers, lettuce and tomatoes.

Later in nearby Sauce Mayu Norte, a community member talked about his model farm, also with a greenhouse, terraces, irrigation, potable water, an alfalfa pasture, vegetables, nursery, and forest trees. He said at first he had not believed it, but when he saw the results he wanted to do more and more.

Box 7.3: FHI -- Summary of NRM Program Characteristics

Natural Resource Management	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Successful control of spectacular gully erosion in Ravelo. • FHI trained farmers and leaders to be volunteer 	<ul style="list-style-type: none"> • The bench terraces in <i>aymoqa</i> systems (private-communal tenure, with long fallow) are used for a few short years

<p>advisors, working within the OTB system, recognized by communities and municipalities, but not holding elected office in the OTB. This approach is unique (the other three CSs worked with elected officials in the OTB). Time will tell which model has worked the best.</p> <ul style="list-style-type: none"> • The model household farm (<i>predio familiar</i>), with appropriate technologies seems to be of low cost. Some of the neighbors were adopting the practices. The beneficiary families liked the model farms. • Some conservation areas are much larger than those of the other CSs. They paid attention to other plants (e.g. flowering annuals) in addition to trees. They also documented local ethno-botanical knowledge. • Micro-irrigation producing early season potatoes (<i>papa mishka</i>) and other crops. • Conservation areas with native pasture, recognized by the municipality. • Promoting and improving fruit trees. • Bench terraces in Tomoyo are functional because the local agriculture is intensive. • Alfalfa, to improve the soil in Tomoyo and to feed cattle, which generates income and produces manure, which is incorporated into the soil. • The irrigation system in Tomoyo is functional: productive and organized. This system was built from scratch (not an improvement of a traditional irrigation system), based on training, creativity, investment and hard work. • Producing needle grass in the conservation area in Cañahui Pallca. They sell it to generate income while managing natural resources. They also have a municipal resolution recognizing the area. • <i>En Palcoma</i> native grass now grows thick on the soil trapped behind the stone check dams • The macaw club (<i>Club de las Paribas</i>) is a fun way to teach school children to love wildlife. • In the Toro Toro national park, communities make conservation areas as habitat for wild macaws. • Sprinkler irrigation avoids soil erosion. 	<p>and then are in pasture for perhaps ten years. The investment in labor is not justified in a low intensity farming system.</p>
---	---

7.9.3.2 Results

Each FHI community had a conservation area, an average of 18.3 hectares, more than ADRA but less than CARE. An average of 56 farmers per community received training in SWC, which seems to be an accurate figure. Indicator 5 averaged 93 hectares per community, almost six times as much as CARE and 18 times as much as ADRA. FHI

seemed to have defined appropriate management to include areas targeted for interventions such as check dams, with lower labor requirements than some of the other interventions; this may be a more efficient strategy. Indicator 6 averaged 1.4 hectares per farmer trained. Two hectares is a lot to farm by hand, and soil conservation measures can be backbreaking. Assuming the number is accurate, it is a praiseworthy accomplishment.

Table 7.7: FHI: NRM Program Performance

Indicator	Baseline 2002	MTE 2004	Result 2008	LOA Target	Percent of Target Achieved
1. Hectares of conservation areas.	17	400	696	601	116
2. Communities which started conservation areas.	ND	20	38	38	100
3. Percentage of target population that adopted SWM practices.	2	24	55	55	100
4. Producers that received training in NRM.	45	872	2,113	1,900	111
5. Area of micro-watersheds under appropriate management.	ND	425	3,535	3,205	110
6. New hectares where soil conservation measures are implemented.	ND	1,163	3,047	2,864	106

When interviewed about Indicator 3, most of the CSs had some difficulty explaining the data. FHI was the only CS that had organized the data in a software program that allowed it to be disaggregated easily. FHI had an impressive command of its data and was able to provide the evaluators with additional information on Indicator 3 (See Table 7.7) in just a few minutes.

The numbers indicate that some practices are much more likely to be adopted than others. However the numbers also show a low response to training: untrained farmers adopted practices only a few percentage points less frequently than trained farmers. Since such low numbers were reported in the baseline, and all of the CSs stressed how difficult it was to convince farmers to try SWC measures, there may be some noise in the statistics. Note that adoption of defensive walls was lower for trained farmers, suggesting sampling error.

Table 7.8: Adoption Rates for SWM Practices

Practice	Percentage of All Farmers Who Adopted	Percentage of Trained Farmers Who Adopted
Control of gully erosion (<i>control de cárcavas</i>)	47	53
Infiltration ditches (<i>zanjas de infiltración</i>)	25	32
Crown ditches (<i>zanjas de coronación</i>)	35	47
Slow formation ditches (<i>terrazas de formación lenta</i>)	71	84
Stone terraces (<i>terrazas de banco</i>)	27	30
Terraces of crop residues (<i>terrazas de paja</i>)	4	7
Defensive gabion walls (<i>defensivos</i>)	19	11
Enclosed, fenced areas (<i>canchones</i>)	13	13

7.9.3.3 Sustainability Strategy and Potential for Sustainability

FHI trained local farmers and leaders to be permanent, volunteer advisers in their community, recognized by the municipality. Conservation areas have management plans and are recognized by the municipality. FHI helped five municipalities create environmental units. All communities that worked with FHI strengthened their community organizations to manage natural resource projects, as well as to maintain road and water projects. FHI helped some local people receive university training in agriculture.

The sustainability plan's greater emphasis on economic benefit encouraged more adoption of SWC practices. There is now a greater awareness of the importance of conserving native species and soils. The municipalities participated in conservation efforts, which make them more sustainable.

Practical training workshops, visits to exchange experiences and the model farms enabled the adoption of NRM practices.

Adequate planning with a focus on IWM enabled the investment of resources in prioritized areas to maximize the positive effects of soil conservation, creation of conservation areas and forestation projects.

A close link between IWM plans and municipal development plans should help ensure the sustainability of the implementation of watershed activities.

A new style of leadership in Ravelo, Potosí

In Ravelo the evaluators met a large group of farmers and leaders who had received training from FHI. They were excited to meet the evaluators.

There are five prerequisites to be certified: (1) the candidate must be a community member in an FHI area, (2) a resident, i.e. currently living in the community, (3) participate in FHI programs, (4) receive training, and (5) have held previous community posts.

Municipal government. The certified leaders took at least three of the four FHI modules and had to pass a test. They were then certified by the municipality. They were also recognized by the communities. However these are volunteer, unpaid positions.



Pleased to be a community leader.

Empowerment. The certified leaders and farmers are not elected, and they serve an indefinite term. They do not hold an official office in the OTB. The other three CSs (ADRA, CARE and SC) also trained farmers and strengthened local leadership, but the other three CSs incorporated their leadership positions (e.g. secretary of natural resources) as elected offices in the OTB.

The FHI leaders are not formal office holders; they are advisors. The leaders the evaluators met were honored to be certified. They said that in the future they would teach other community members about managing natural resources, especially by example.

This is a thoughtful approach, which FHI is now trying after 15 years of working with local leaders. It will be worth a follow up study in later years to see how the results compared with other leadership styles.

Training schoolchildren, Juló Chico, Toro Toro

The evaluators saw one of five schools where FHI has promoted a macaw club (*club de la paraba*) in the sixth grade, where 150 children learned to appreciate these endemic birds. The kids drew the macaws in handsome coloring books, with sharp line drawings and informative captions. They learned songs about the macaws and dances, complete with masks. The teacher, Norberto Ramírez, and the principal, José Morales, were both on hand to welcome the evaluators, and to say that they are proud of the club.



Teaching youngsters to appreciate wildlife.
The macaw club in Juló Chico.

Sixth graders will be young adults in a few years. When they are grown up, they will remember the fun class in school where they learned about these endangered macaws, which

live only in Bolivia. The program is a charming way to create a local constituency for this emblematic bird.

Environmental unit, municipality of Toro Toro

The municipal government of Toro Toro has a new municipal environmental unit, established with training from FHI, with two staff members. The office space, salaries and other expenses are paid by the municipality itself. The evaluators also saw a similar office in Ocurí, but FHI helped create others in Ravelo, Tapacarí and Capinota as well. The units inspect and approve natural resource projects and other projects (e.g. infrastructural) that may impact the environment. The units also seek funding for forestry and irrigation projects to be managed by the municipality. Working with local government can be challenging, and setting up these units is a real achievement.

7.9.3.4 Recommendations

In the future, FHI should:

- Not try to make stone terraces in *aynoqas* but focus instead on labor-saving techniques, such as contour plowing and barriers made from crop residues.

7.9.4 Save the Children (SC)

7.9.4.1 Key Program Approaches

SC's overall approach to NRM: Careful planning and income generation. Encouraging community members to invest cash in irrigation ensures the sustainability of the systems. Municipal and community strengthening. More emphasis on SWC on dry slopes. A sincere effort to apply IWM.

Changes made after the MTE: SC placed great emphasis on the integration of the components, which they must have explained to the evaluators at least 20 times—complete with Venn diagrams. SC improved the stock ponds (*atajados*) so that cattle could drink without fouling the water. The target for Indicator 1 (conservation areas) was increased from 161 to 380 hectares, but the other targets were decreased: the communities (Indicator 2) from 34 to 20, the farmers trained (Indicator 4) from 3,000 to 2,400, and Indicator 5 from 925 to 630 hectares and Indicator 6 from 1,216 to 700 hectares.

Difference from the other CS programs: SC showed remarkable improvement after the MTE and by 2008 was quite a sound program.

7.9.4.1.1 Conservation Areas

The community of Cebada Pata conserved a remnant forest of endangered native trees, with limited subsistence off-take allowed by the community. The Bolivian environmental law 1333 specifies that natural resources are for the use of indigenous communities.

Conservation areas were integrated with income generation, e.g. grazing or sustainable harvest of wild grass. The local people are managing the area and have expanded it.

The community of Iquilluyo has a conservation area of native pasture, also for limited harvesting of wild grass. The local people appreciated the area enough to have created another one on their own initiative, with their own resources. Likewise, the community of Ayamaya manages a conservation area of native pasture for grazing, and is planning on creating another one.

The native forest in Calamarca was planted with the municipality, which also has a successful nursery. Survival rates are high and local people are caring for the trees.

Conservation area, native forest in Cebada Pata, Cairoma, La Paz

The community of Cebada Pata has a protected forest of native *queñua* trees (*Polylepis* spp.). At first the area was 10 hectares, but the people expanded it to 18. They built a fence around it, using wire and posts from SC.



Endangered *queñua* (*Polylepis*) trees in the community-sponsored conservation area of Cebada Pata.

Innovation for sustainability. The area was a remnant *queñua* forest, but the community also planted new *queñua* trees in it. They created a simple but ingenious method to get new seedlings. When the farmers plow up a fallow (*barbecho*), as they find *queñua* seedlings they collect them and transplant them to the conservation area.

Income generation. The brush and grass is thick under the trees, and the local people harvest grass occasionally to make mattresses, or to make bundles (*k'ipas*) for taking their fresh fruit to market or for roofing their houses.

Empowerment. Other villages used to come and cut trees in this forest, but the people of Cebada Pata have prohibited that. They organized themselves to maintain the forest. Someone stole part of their fence, and instead of asking the project to replace it, they bought the material themselves.

Queñua is excellent wood for plows and yokes, essential farming tools. The villagers want to use a bit of the wood to make tools. But they are not interested in cutting firewood or making charcoal from the wood. They remember with some bitterness how other villagers used to cut so much wood for charcoal that the forest was once filled with smoke. Those days are gone.

Conservation area of native pasture in Iquilluyo, Yaco, La Paz

Until 2005 the hill on the outskirts of Iquilluyo was bare, like all the other hills around it, stripped by goats and sheep. With help from SC, the people of Iquilluyo organized themselves to build a fence around the 12 hectares. They received posts and wire from SC, but they did all the work themselves. They agreed to keep out livestock. Almost all the households joined in.



Yareta looks like moss, but it is actually a flowering plant. It is becoming scarce as cattle eat it and people burn it for fuel. The *yareta* is making a comeback in the conservation area.

By 2008 when the evaluation team saw it, the pasture was starting to grow back. It was an austere, arid environment at 4,000 meters. The people planted *cebadilla* (*Bromus catharticus*) with seed from CEFO (*Centro de Semillas Forrajeras*, the forage seed center in Cochabamba), some *ichhu* (*Stipa ichu*), and *chillima* (*Festuca dolichophylla*) which grow in the area. Other native plants, like *kaylla* (*Tetraglochin cristatum*), *t'ula* (commonly misspelled as 'thola,' *Parastrephia* spp.), *ñaka t'ula* (*Baccharis incarum*) and *yareta* (*Azorella compacta*) began to grow back on their own.

The people made infiltration ditches. “What would happen if you planted grass, and made a fence, but did not make the ditches?” the evaluators asked.

One local resident explained “It wouldn’t work”. And he showed how wild plants were growing in the bottom of the trenches. But he also said that the fence was important too. “If not for this fence, these *kayllas* would not be here. The cattle eat them like candy.” (*Si no fuera por el cerco, estas kayllas no estarían. Son el dulce del ganado*).

Now that the pasture is three years old, it has recovered enough that the members have started to cut a little forage from it to feed their animals. Each household has three small parcels. They obtain permission from the pasture’s steering committee before they cut.

Sustainability. The community liked the conservation area so much that on a neighboring hill, 26 community members joined together in 2008 to plant another native pasture. The members each contributed 50 Bs. (US\$7) of their own money and seven days’ work to plant three hectares in native grasses: *ichhu*, *chillima*, *agujilla* (*reloj reloj*), and *chhujilla* (*cebadilla*).

Conservation area in Ayamaya, Sica Sica, La Paz

The people of Ayamaya were delighted with their 20 hectares conservation area. A local resident showed the evaluators how the native *t'ula* bushes were growing inside the barbed wire fence, and how native grass was sprouting below each bush. He picked up some of the tiny, down-like seeds of *t'ula*, and showed how the wind scatters them.

Ayamaya is on the immense, flat plain of the *Altiplano*. Land is abundant, although not always of the highest quality. The long, straight infiltration ditches in the conservation area were dug with a tractor. It would have taken too long by hand. The local people were

pleased with the ditches, and said they encouraged plant growth by forcing the water to soak into the soil.

Sustainability. The community members want to make another 40 hectares conservation area. They will buy the posts and wire with the money they make by charging themselves to pasture animals in this conservation area. This area is closed for nine months a year, and is then open from 15 September to 15 December. When it is closed, the community ensures that “No animals enter, just birds.” (*No entra ningún animal, solo el pájaro*).



Tula flowering in the community conservation area of Ayamaya.

SC taught the community to make earthen water tanks or stock watering tanks (*atajados*, in Spanish, *qhotañas* in Aymara), and the local people have since made about 100 smaller ones on their own. SC also taught them to make wells. One local resident explained that when she was a girl she had to walk to the Río Desaguadero and carry water back in pop bottles. Now every household has a well.

Environmental impact. The evaluators inspected one large stock tank made by the community with SC support. It fills from an ephemeral stream that runs into the tank. The people made a deviation from the stream above the tank to detour the water after the reservoir gets full. The discharge was eroding the soil a little.

Planting a native forest in the conservation area in Calamarca, La Paz

The small town of Calamarca is near a treeless range of hills on the edge of the *Altiplano*. At the municipal nursery several local residents explained how forty families manage the conservation area. Seedlings of native trees are thriving in the municipal nursery, and the survival rate is well over 95 percent, quite an achievement for native Andean trees.



When this little girl is a young woman, the town of Calamarca will once again have a native forest.

Each family cares for 30 little trees. Each family waters their trees, and if one dies they replace it. Most of the trees are *qheviña*, but some are *kbishwara* and some are pine (*Pinus radiata*) and a handful of Eucalyptus globulus, already much taller than the four-year old native trees.

Empowerment. A local resident showed the

evaluators how to plant a tree. He deftly cut open the black plastic bag, filled the hole with loose soil and manure, planting the tree and then watering it, while his five-year-old son watched intently.

The Calamarqueños said that they did not expect to use their trees for wood. They just wanted a living forest, for their children and grandchildren.

7.9.4.1.2 Soil Conservation

Micro-irrigation programs have been successful in various communities, integrating soil and water conservation with income generation. Infiltration ditches have worked to stimulate grass growth in various communities.

Soil conservation on steep dry slopes has had mixed results. It has not been very well accepted in Wilapampa, for example, where the slope is not very important economically to the community, but has been in Caloyo, where the watershed is directly upstream from the community and is the source of serious flash floods.

SC introduced sprinkler irrigation in six communities, which has helped avoid soil erosion.

Stock water tanks have been much improved since the MTE. They include drinking troughs and are integrated with income generation, e.g. cattle-raising. People of Ayamaya made about 100 small stock tanks on their own.

SC taught farmers to plant peach trees in individual tree wells, to fertilize them and plant alfalfa between them. Some farmers were adopting soil conservation techniques for peaches.

7.9.4.1.3 Integrated Watershed Management (IWM)

SC made a sincere effort to apply this model, but did not have the resources to apply SWC techniques to more than 10 percent of even micro watersheds. According to management plans written by outside consultants, it was not always necessary to intervene in the whole area of the micro watershed. The most rapidly eroding or most vulnerable areas could be stabilized in order to manage the micro watershed, based on maps of vegetation, degree of erosion and satellite images, verified on the ground.

Integrating natural resource management with income generation in Machacamarca, Cairoma, La Paz

In Machacamarca a local farmer showed the evaluators his peach trees. He used to grow sour peaches. SC helped him plant sweet varieties and prune them properly.

Pest management. He has few pest problems. He has some yellow traps and a pop bottle trap, but they are too few and ineffective. The pop bottle trap had been filled with orange juice and caught a few gnats, but no fruit pests. The yellow trap was also full of non-pest insects.

But the local farmer said that the sun seemed to keep the pests away, thanks to proper pruning which let in more light. He said he made sticky spray from the pads of prickly pear, and said that it stuck to the aphids and kept them from moving. The evaluators inspected the trees and there were indeed few aphids and little or no other pests or diseases.

Income generation. The local farmer explained how he had made 20,000 Bs. by selling fresh and dried peaches, and he talked about how much this would mean for his family and for others in the area who were adopting peaches, how they wanted their children to be fat and healthy and to go to school and be professionals. To show his gratitude he gave a big hug to his local extensionist, who was visibly surprised. It was so sincere and spontaneous that the local farmer got a bit choked up and stopped speaking for a while.

Soil conservation. SC blended income generation activities neatly with soil conservation. SC taught farmers to plant the peach trees in a pit, with bones and manure and loose soil. They dug individual terraces around each tree and covered the tree wells with a mulch of cut weeds and straw. They grew alfalfa between the trees, to both hold and fertilize the soil.



Commercial peach trees carefully tended in tree wells. Living barriers of alfalfa add nitrogen to the soil.

New marketing practices. The farmers used to tie the peaches into a bundle, pile it onto a truck, and sit on it during the trip to La Paz. The fruit would be mostly ruined. “We would come back with no money and only a few things (from the store). Within a week we would be out of groceries and would have to look for day work to feed our families.”

Since then, SC helped improve marketing. The farmers sell the peaches in wooden boxes, which the program made. The boxes have a label telling where they are from. The farmers have been to marketing fairs in La Paz, Cochabamba and Santa Cruz, where they met consumers and learned the importance of getting the fruit to market without crushing it.

Soil conservation and irrigation in Wilapampa, La Paz

Irrigation. A large group of farmers in Wilapampa told the evaluators that their new irrigation system is functioning perfectly. They showed the evaluators an irrigated field where they installed stone terraces. While that is certainly a success story, on a nearby hillside they also dug some infiltration ditches into bare hillsides where nothing grows but wild plants.

Soil conservation. Receiving food rations as an incentive, the villagers also planted live barriers of agave-like “*cardo*” (“thistle”) in the hillsides.

The men showed a graph and, with a distinct lack of enthusiasm, said they would plant eight more hectares of trenches and live barriers each year for the next three years until they

fulfilled their commitment to SC. Their goal was to install 44 hectares of these structures, but it was simply too much work. They were able to do about half of it, which is why they committed to finishing the job on their own.

In the early years of the program, when they received rations, each person would dig 150 to 200 meters of trenches per year. In 2008, without rations, but still with encouragement from SC, they dug about 50 meters each. It is unclear how much they will dig once they are totally on their own.



The “cardo” is an agave, not really a thistle.

Soil conservation and integrated watershed management in Caloyo, Sapahaqui

One night in 1993 a man was awakened by the crash of a mud avalanche coming from the nearby mountain. The sound kept coming closer until the mud buried part of his house. He was barely able to get the door open and get his family out. Soil erosion is often hard to see, but in Caloyo it has become all too clear that it is a serious problem.

Caloyo is a village on a pocket of fertile soil at the base of a mountainside. At 2,500 meters, peaches and other fruit thrive, and the community has a ready market in La Paz, only 111 km away.

The people of Caloyo are so worried about mudslides that, before working with SC, they dug a trench through the alluvial fan above the village to channel runoff away from their fields and homes. Later SC helped them plant live barriers of native plants on the upper slopes of the mountain.

Integrating soil conservation and income generation.

The alluvial fan is formed of shale gravel, so it is not especially fertile. With technical assistance from SC, the villagers dug infiltration trenches and planted prickly pear. The farmers insisted that just digging one of these trenches doubles the yield of prickly pear. The trench collects enough water that the cactus bears more fruit, which can be sold for 1.50 Bs. each in the city. SC also taught them how to sell the fruit.

On the lowest, richest land, they plant peach trees. SC brought in a peach expert from Cochabamba, who taught them how to prune their trees and care for them so



Prickly pear on the alluvial fan generates income and conserves soil. Steep, dry slopes in the background are more of a challenge.

they bear more and larger fruit. SC also helped the villagers create their own label and a fruit growers' association.

Adoption of practices. Now the people are earning more money from peaches. They learned to make individual terraces or cups (*tazas*) around the trees to hold in the irrigation water and the organic fertilizer. The cups work so well that villages all along the canyon bottom are adopting them on their own, without incentives.

In 2008, the fruit growers' association planted 600 more prickly pear plants on the alluvial fan, without incentives. FFW is useful as a teaching tool, to encourage soil and water conservation, which often takes several years to yield results. After people see the results of soil conservation, they may adopt the practices on their own (e.g. cups for peach trees, prickly pears on the alluvial fan).

Integrated watershed management. Even a small micro watershed is a big place. This one is over 200 hectares and it is one of the smallest in the program area. Many of the slopes are bare and almost straight up and down. Even with hard work and motivation, the locals have only been able to plant live barriers on 10 percent of their watershed. Yet they perceive that it has made a difference. They say that the last time there was a big rain, they expected a mudslide, but it never came.

Water harvesting in Phinaya, Calamarca

In Phinaya (Finaya), the whole village turned out to show the evaluators their stock tank made in 2005. It is a round earthen tank 30 meters in diameter and three meters deep. A pipe from the bottom runs to a cattle trough outside the fenced area.



There is still clean water in the tank, even at the end of the dry season.

The *malku* (community leader) turned on the water and his cattle trotted over for a drink. Even though it is near the end of the water season, the water was still drinkable. Villagers pay the users' committee 5 Bs. (\$0.70) a month for the right to water their animals, and the committee saves the money to maintain the water harvester.

This stock tank was cleverly designed to fill with water that drains off the local dirt road. A shallow ditch runs along the road and into the tank. Rain water from two hectares of road, collected over the short rainy season in this arid land, lasts all through the dry season.

Integrating soil and water conservation with income generation. María del Carmen, a thesis student from the University of Oruro, spent several months in the area weighing cows and counting how often they drank. She learned that young calves put on weight faster when they have

enough water to drink. The families that use the watering tank have fatter cows, which can be sold for a higher profit.

7.9.4.1.4 Strengthening Community and Municipal Leadership

Training (including demonstration farms). When SC was just starting to promote sprinkler irrigation, they took farmers to see other irrigation areas and talk to farmers there. SC’s extensionists visited communities regularly, at least once a week, for demonstrations, talks and personalized attention. In Cairoma SC brought in a peach expert from Cochabamba, who taught the local people how to prune their trees and care for them so they would bear more and better fruit. In each community in Cairoma, SC also trained a local person to be the IPM expert and another to be the fruit expert.

Community and municipal leadership. SC had model urban development programs, conducted in close collaboration with the city governments of El Alto (especially street paving). Local people did the work, for rations. The city government appreciated the programs for benefitting poor people and for helping to build valuable infrastructure. SC worked with all the municipal governments in its area, but the government of Patacamaya in La Paz met with the evaluators specifically to explain that they had been strengthened by participating in projects in their municipality. SC helped local people start fruit growers’ associations, and helped them create their own labels. The protected areas have local steering committees to supervise the management.

Rules and plans. SC wrote management plans with local communities for natural resource projects.

Box 7.4: SC -- Summary of NRM Program Characteristics

Natural Resource Management	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Conserving a remnant forest of <i>qbeviña</i>. SC developed a way to salvage wild seedlings from fallowed fields. • Management plans, drawn up with each community to manage their natural resources. • Tree wells (<i>tazas, terrazas individuales</i>) for peaches, with good management with organic matter. Also, alfalfa planted as living barriers in the orchards. • The introduction of sprinkler irrigation, which avoids soil erosion. • The community members will manage their irrigation systems, because they paid counterpart funds, provided all the unskilled labor, and because they have been organized and trained. • Conservation of native pasture. The people of Iquilluyo planted native pasture in another area, besides the conservation area they made with SC. 	<ul style="list-style-type: none"> • Using some IPM technologies that do not work, e.g. yellow traps. • A small problem with soil erosion in one of the stock tanks in Ayamaya.

<p>There is also a 20 hectare native pasture area in Ayamaya, which is well managed.</p> <ul style="list-style-type: none"> • Stock tanks with drinking troughs, for example in Puchuni. • The adaptation of sprinkler irrigation to very small parcels. • The community members in Ayamaya, Sica Sica made over 100 small stock tanks on their own. • The native forest in Calamarca, managed by the municipality. The community members value it as a way of beautifying their town. They are not thinking of economic returns. • The ingenious stock tank in Ayamaya, which harvests water from the dirt road. • The spontaneous adoption of some technologies, such as tree wells for peaches. • SC trained local people as plumbers to manage water systems. • En Pampa Grande, people are starting to use the irrigation system, but it will take time for it to be fully used. • Check dams trap sediment in gullies and are a practice that can be applied over large areas (e.g. a micro watershed). • The A-level is appropriate technology (inexpensive and easy to make) for finding the contour line. It is a basic tool for applying many soil and water conservation technologies. • Micro-irrigation producing early season potatoes (<i>papa mishka</i>) and other crops. • Promoting and improving fruit trees. 	
---	--

7.9.4.2 Results

SCs conservation areas averaged 10.5 hectare per community, a reasonable amount of forest for a village to manage, although less than FHI or CARE. Every community has a conservation area. The number of producers trained equals 52 per community. Indicator 5 averaged 28 hectares per community, which is probably accurate, although more than CARE and ADRA. Indicator 6 averaged just over 4,000 square meters (one acre) per trained farmer, which is a believable and respectable result.

Table 7.9: SC NRM Program Performance

Indicator	Baseline 2002	MTE 2004	Result 2008	LOA Target	Percent of Target Achieved
1. Hectares of conservation areas.	0	41	356	380	94
2. Communities which started conservation areas.	0	11	34	34	100
3. Percentage of target population that adopted SWM practices.	0	ND	68	60	114
4. Producers that received training in NRM.	0	1,490	4,703	3,000	157
5. Area of micro-watersheds under appropriate management.	0	327	958	925	104
6. New hectares where soil conservation measures are implemented.	0	480	1,957	1,216	161

7.9.4.3 Sustainability Strategy and Potential for Sustainability

SC wrote management plans with communities as a form of participatory planning. SC asked project beneficiaries to make a contribution in cash for irrigation projects. This (and training in how to manage the systems) helped ensure that communities will continue to look after the irrigation systems after the program ends. SC trained local people through the university, to be local technical people. CS also strengthened community governments, e.g. in Patacamaya.

With 5,664 participating households from 155 communities, IWM was integrated with NRM and linked to IG activities. Plans for the conservation of grasslands and native forests as well as soil and water management plans were prepared with communities. By 2008 all activities were carried out under local community leadership.

The training study plans (NRM cards) were transferred to the persons responsible within the communities, which will help these local leaders to continue with activities.

The CMAMRN (Municipal Environment and Natural Resources Management Commissions) were strengthened in four municipalities. These are responsible for supporting adequate environmental and natural resources management. These four municipalities will continue to support sustainable development. They are now including NRM projects into their municipal POAs, in coordination with the local communities. CMAMRN works with the municipal technical units to ensure effective environmental mitigation measures in all infrastructure projects, ensure project sustainability and avoid damages to the environment.

Links between the municipalities and government and inter-municipal agencies (AMDEPAZ), the Association of Municipalities of La Paz, were strengthened.

SC supported training workshops with the Climatic Change Unit to strengthen the municipal capacity in this topic. Environmental contingency plans were developed with five municipalities: Calamarca, Patacamaya, Luribay, Sicasica, Cairoma.

Paving the streets of El Alto

Municipal government. According to the mayor, El Alto had around 600 thousand inhabitants at the time of the last census, but by 2008 it had almost a million. However, it continues to receive Popular Participation funds for just 600 thousand people. The city, in other words, is chronically underfunded.

The city government has always had good relations with USAID. Food rations from USAID, via SC, enabled the city to pave two or three blocks of streets, while they would only be able to do one block on their own.



The people and city government of El Alto were thrilled with the street paving program.

The local residents provided the hand labor on their own street. For nine days' work they received a 50 lb ration. Local people did all their own quality control, and they did it faster and better than a commercial company would do, although some local people have formed their own micro-businesses to do paving for the city.

Much of the construction work was done by women, who often came from the same community on the *Altiplano*. The women knew each other and enjoyed working together.

Technique. One of the SC staff explained how they paved the streets. First they brought in sand with few rocks. They spread it out and taught the women how to shape it into a gentle arc so that water will run off the top. Then a master craftsman laid out a few blocks on the sand, and the women set out the rest, arranged in the same pattern. At the edge they cemented in the blocks next to the curb. The women wanted to get the job done right, because they live on this street.

The evaluators met one woman who started working for food rations but got good enough that the municipality hired her as a foreman. “No,” she said “the work is not too hard. I have worked since I was 18. I’m not afraid of work. I have to support my family.” She said the men did not give her any trouble. Some said they did not want to be supervised by a woman, but she did not let that bother her, because she knew her work and just got on with it.

The mayor said it was important for the women to earn food, because they are poor and really need the help. The mayor was interested in continuing the work with USAID for as long as possible.

7.9.4.4 Recommendations

In the future, SC should:

- Stop promoting some of the pest management technologies that did not work, e.g. yellow traps.
- Correct the problem with soil erosion in the stock watering tanks in Ayamaya and review similar tanks for erosion problems.
- Measure the carrying capacity of rangeland and encourage villagers to limit the numbers of livestock to encourage grass cover. This may be more important for soil conservation and less work than digging trenches.

8 Findings: Urban Temporary Employment Generation Programs

8.1 Program Background and Objectives

The FHI and SC programs were modified part way through their DAPs to add urban temporary employment generation activities in El Alto (SC) and Potosi and Sucre (FHI). SC added these activities to its DAP in 2005, initially using resources (primarily commodities) that had become available as a result of its decision post MTE to consolidate its rural activities into a smaller number of communities. FHI had been working in Potosi since the beginning of its DAP and in FY2006 it transferred some of the rations from its program in Potosi to start up its urban public works program in Sucre. In 2007, FHI received an additional \$250 thousand in water and sanitation funds from the USAID for public works programs in both cities. All three cities had been growing rapidly, El Alto in particular, and these job creation programs helped these municipalities cope with the increasing lack of job opportunities for the newly arrived rural migrants and the growing demand for basic services.

The immediate objectives of these programs were to create temporary jobs and help improve the basic public infrastructure in these cities. These activities were also expected to help improve the quality of life of the people who were living in the affected neighborhoods and to help reduce social tensions.

8.2 Overall Strategies and Approaches

8.2.1 Types and Quantities of Infrastructure Constructed

FHI concentrated on the construction of water systems, storm drains and sewer projects. SC also constructed water and sewer projects plus parks and playgrounds, schools, street improvements (including curbs, sidewalks, and leveling, cobbling and paving streets), and digging trenches so that neighborhoods could be connected to gas, water and sewerage systems. (See Table 8.1 on the following page for estimates of the amounts of different types of infrastructure constructed under these programs.)

8.2.2 Collaboration with the Municipalities

Both FHI and SC worked very closely with the municipalities and were able to leverage considerable additional financial support from them to assist with the implementation of these activities. In FHI's case, the municipalities contributed over 78 percent of the resources used in the program, and in SC's case, the municipalities were responsible for over 50 percent (See Table 8.2). Both CSs entered into formal agreements with the municipal governments. The municipal governments were generally responsible for providing the non-local materials and for paying the costs of any skilled labor, and heavy machinery. FHI and SC were responsible for proving project oversight and the food rations that were used to pay the unskilled labor. In El Alto, the participants also covered some of the costs of the non-local materials that were used, since most of them worked on projects being constructed in

Table 8.1: Infrastructure Constructed During the Title II Urban Employment Generation Programs

Project Type	Unit	FHI			SC	Total
		Potosí	Sucre	Total	El Alto	
Potable Water Systems	km	8.5	2.9	11.4	59.5	70.9
Sewerage/Drainage Systems	km	95.3	8.5	103.8	27.8	131.6
Vault-Shaped Canals	km	12.3	8.1	20.4	-	20.4
Curbs	km	-	-	-	247.4	247.4
Street Cobble Stoning	sq meter	-	-	-	122,086.0	122,086.0
Concrete Slabs for Streets	sq meter	-	-	-	472,105.0	472,105.0
Street & Public Areas Excavation and Leveling	cu meter	-	-	-	201,233.0	201,233.0
Sidewalks	sq meter	-	-	-	57,979.0	57,979.0
Gas Ditches Excavation	km	-	-	-	180.7	180.7

Table 8.2: Contributions to the FHI and SC Temporary Employment Programs by Funding Source (US\$)

Cooperating Sponsors	Number of Temporary Jobs Created	Amount of Resources by Funding Source (US\$)				
		Title II Food Rations	Municipalities	Participants	Other Donors	Total
FHI						
Potosí	65,627	2,240,061	4,911,589	-	-	7,151,650
Sucre	14,268	2,633,292	12,697,699	-	-	15,330,991
Total	79,895	4,873,353	17,609,288	-	-	22,482,641
Percent		21.7	78.3	-	-	100.0
SAVE – El Alto	115,173	2,979,405	4,193,890	654,794	279,717	8,107,806
Percent		36.7	51.7	8.1	3.4	100.0
Total	195,068	7,852,758	21,803,178	654,794	279,717	30,590,447
Percent		25.7	71.3	2.1	0.9	100.0

their own neighborhoods. The municipal governments and local neighborhood associations were involved in the identification and prioritization of the projects, and the projects were included in the municipal governments' annual operating plans (POAs) and their budgets. The municipal governments also committed to providing technical support for project design and supervision.

8.2.3 Use of Food

Initially, both FHI and SC provided the participants with a 50 kg food ration for each 72 hours of work completed.²⁹ During FY 2008, the market value of the food ration was \$31, which was equivalent to 60 percent of the wage for unskilled labor that was being paid in the cities of El Alto, Potosí and Sucre for nine days of work. At this wage rate, the vast majority of the workers employed were women. SC did not have enough food for all the rations that it was committed to providing in 2008, due to the restrictions that the Bolivian government had put on importing donated food. So SC provided an amount equivalent to the value of the food in cash, and the municipal government used its matching funds to buy the food that was needed for the rations in the local market.

8.2.4 Environmental Compliance and Mitigation

FHI and SC ensured that all the infrastructure designs incorporated the necessary environmental criteria and that the necessary mitigation measures were carried out during the construction phase of all activities. All three municipalities have now adopted the environmental check lists that FHI and SC were using in the design and construction phases of these projects.

8.2.5 Complementary Activities

FHI and SC also provided the women workers with training in hygiene, nutrition and food management and preparation.

8.3 Sustainability and Sustainability Strategies

The sustainability of this infrastructure will depend on the interests and abilities of the municipalities to monitor and maintain it. So, both FHI and SC worked closely with the three municipal governments during the DAPs to strengthen their management, technical and financial capacities. And, these increases in capacity should have a positive impact on the cost effectiveness and quality of the public works projects constructed by these municipalities in the future.

Both CSs indicated that there had been important improvements in the overall operation of the three municipal governments and in their administrative and logistics capacities during the time that they had been working with them. The municipalities were responsible for preparing the designs for the projects, and the quality of these designs improved significantly over time as a result of having to meet FHI's and SCs' more rigorous technical and environmental standards. The level of supervision provided by the municipalities also improved due to the rigorous quality control processes that both of the CSs were using. Following the examples set by the two CS, all three municipal governments also introduced technical and environmental control systems throughout their public works project cycles (project approvals, starting projects, monitoring construction, concluding projects, and

²⁹ This quantity may have been reduced slightly later in the programs, according to CS staff.

change orders). FHI and SC also trained the neighborhood associations so that they would be able to do a better job of presenting their proposals to the municipal government, organizing and controlling the work groups, and preparing and managing the lists of food recipients.

8.4 Results Achieved

The two programs generated almost 200 thousand temporary jobs (almost 80 thousand for FHI and 115.2 thousand for SC) and paid out the equivalent of \$7.8 million US dollars in food rations. Given the fact that over 90 percent of the participants were women, it is likely that a relatively large percent of these income transfers were used to increase the quality of life of the participants and their families.

FHI measured its performance in terms of access to safe water and sewerage, exceeding both LOA targets. SC measured program performance in terms of projects completed and jobs generated, exceeding its LOA target in the first case but falling short in the second case due to a number of logistics problems. (The details on program performance are provided in Section 8.6.1 (FHI) and 8.6.2 (SC) at the end of this section.) The differences in indicators used by the two CSs reflect the differences in how the two CSs viewed these activities. In the case of FHI, for example, the activities in Potosi had been integrated into its program from the beginning of its DAP. SC's urban public works programs, on the other hand, were developed at a later date, independent from its rural activities and the activities continued to be managed and monitored separately as well.

The site visits provided additional information on the positive effects of these projects on the workers and the quality of life in their communities. In all the sites visited, there were sincere expressions of gratitude from the participants, community leaders and municipal government authorities. In El Alto, the street improvements, for example, transformed whole neighborhoods, improving the environment in which people were living and increasing property values. In Potosi, the mayor informed the evaluators that the projects that FHI had helped them construct during the DAP totally transformed the sanitary conditions in the city.

The majority of the workers were women, and many of them were recent migrants from rural areas. Thousands of them were trained in masonry and other construction techniques by CS and municipal technicians and skilled laborers hired for specific projects. This enabled them to gain additional skills and confidence, which improved their employment opportunities. Some had already gone on to become supervisors and to establish construction-related microenterprises.

8.5 Lessons Learned

A number of lessons were learned from these programs that could have relevance for other temporary employment programs in Bolivia and perhaps elsewhere in the world. These lessons include the following:

-
- *Developing close working relationship with the entities responsible for local public works (e.g., municipalities) can help leverage additional resources for a program, improve project quality and help strengthen the capacities of these entities to implement quality public works in the future.*
 - *The processes of project identification, design, construction and quality control can be made easier and more effective by also involving local neighborhood groups.*
 - *It is easier logistically and more cost effective to implement FFW in an urban area where projects and beneficiaries are more concentrated than in rural areas, especially in Bolivia, where populations and priority infrastructure projects are likely to be more dispersed geographically.*
 - *The monetary equivalent of a ration does matter in terms of one's objectives. In the Bolivia programs, where the ration was set at approximately 60 percent of the going wage for unskilled workers, the programs attracted primarily women workers, who could be expected to spend a larger share of the income transfer on food and other basic necessities.*

8.6 Findings for the Individual Program

8.6.1 Food for the Hungry International (FHI)

Summary of the FHI Urban Temporary Employment Generation Program

Location of the Program: Potosi and Sucre

Duration: 2002 to 2008 in Potosi and 2006 to 2008 in Sucre

Types of Infrastructure Constructed: water systems, drainage systems and sewer projects.

Quality of Design and Construction: High

Environment Considerations: The projects that were visited had all their environmental documents in order. FHI took measures to ensure that all the infrastructure designs incorporated the necessary environmental criteria and that the necessary mitigation measures were carried out during the construction phase of the projects. The Potosi and Sucre municipal governments also adopted the environmental check lists that FHI had been using in the design and construction phases of these projects.

Sustainability: To promote sustainability, FHI worked closely with the Potosi and Sucre municipal governments to strengthen their management, technical and financial capacities. FHI also trained the neighborhood associations so that they would be able to do a better job of presenting their proposals to the municipal government, organizing and controlling the work groups, and preparing and managing the lists of food recipients.

Results: FHI measured its performance in terms of access to safe water and sewerage and exceeded both LOA targets.

Table 8.3: FHI Urban Temporary Employment Generation Program Performance

Indicator	Baseline 2002	Mid-Term 2004	Final 2008	LOA Target	Percent of Target Achieved
1. Number of households with year-round access to new or improved safe water source	-	1,358	1,350	720	189
2. Number of households with access to latrines or sewerage (1)	-	24,758	62,568	60,603	103

(1) The large jump in latrine coverage between 2004 and 2008 is due to the addition of the projects in Sucre which consisted primarily of sewage and storm drainage. The evaluator was concerned that there might be some discrepancies in these numbers, however.

8.6.2 Save the Children (SC)

Summary of the SC Urban Temporary Employment Generation Program

Location of the Program: El Alto

Duration: 2005 to 2008

Types of Infrastructure Constructed: water and sewer projects plus parks and playgrounds, schools, street improvements (including curbs, sidewalks, leveling, cobbling and paving streets), and digging trenches so that neighborhoods could be connected to gas, water and sewerage systems.

Quality of Design and Construction: High

Environment Considerations: The projects that were visited had all their environmental documents in order. SC took measures to ensure that all the infrastructure designs incorporated the necessary environmental criteria and that the necessary mitigation measures were carried out during the construction phase of the projects. El Alto also adopted the environmental check lists that SC had been using.

Sustainability: To promote sustainability, SC worked closely with the El Alto municipal government to strengthen its management, technical and financial capacities. SC also trained the neighborhood associations so that they would be able to do a better job of presenting their proposals to the municipal government, organizing and controlling the work groups, and preparing and managing the lists of food recipients. The El Alto municipal government decided to use its own resources to continue the FFW public works program in 2009.

Results: SC measured program performance in terms of projects completed and jobs generated, exceeding its LOA target in the first case but falling short in the second case due to a number of logistics problems. (1)

Table 8.4: SC Urban Temporary Employment Generation Program Performance

Indicator	Baseline 2002	Mid-Term 2004	Final 2008	LOA Target	Percent of Target Achieved
1. Number of temporary jobs generated	-	-	108,503	137,903	79
2. Number of projects approved	-	-	1,109	800	139
3. Number of projects completed	-	-	967	700	138

(1) SC had to reduce its temporary jobs target in FY2006 because it did not receive the operational reserve that it had asked for in its Resource Request; in 2007, the food for the rations were late in arriving in Bolivia due to logistics problems; and in 2008, SC had to transfer rations from the temporary employment program to its MCH/N program as a result of the restrictions that the Bolivian Government had out on the importation of Title II food commodities.

9 Findings: Environmental Assessment -- Regulation 216 Compliance

9.1 Introduction

All USAID projects must comply with Environmental Regulation 216. The Initial Environmental Examination (IEE) is the principle management tool in Regulation 216 to analyze potential impacts and mitigation measures. Each CS carried out an IEE at the beginning of their DAPs, and each made serious efforts to meet both the letter and intent of Regulation 216.

By the time of the FE, all of the CSs had their *fichas ambientales* and other documents, e.g. PMM-PASA (*programa de prevención y mitigación—plan de aplicación y seguimiento ambiental*). All of the CSs had environmental monitors who inspected projects (e.g. roads and water works) to ensure compliance with environmental mitigation measures. All the CSs also had a resident engineer for all works projects, who lived in the community and oversaw environmental compliance.

9.2 General Recommendations for the Program

- ***Adopt a cultural resources policy.*** The Title II program should have had a cultural resources policy. The program did not have a plan to mitigate impacts on archeological sites or other cultural resources. Some of the program's projects impacted archaeological sites, with no mitigation. USAID did not provide the CSs with training or guidance on cultural resource management. USAID/Bolivia needs a policy for future programs. The technical staff in the CSs needs training on how to recognize sites and artifacts and what to do when they find them. Archaeological sites in highland Bolivia are especially common near springs and other sources of water. Before construction projects, especially those impacting on or near water sources, the project area should be surveyed for cultural resources by competent archaeologists, certified by the Bolivian Government's UNAR (*Unidad Nacional de Arqueología*). USAID should also create a protocol on what to do in case of chance finds.
- ***Focus on environmental issues from the beginning.*** USAID should not assume that CSs understand environmental regulations before a project starts. By the time of the final evaluation, the CSs had responded to most of the concerns expressed during the MTE. The CSs were more than willing to make these changes. Frustration could have been avoided by more oversight near the start of the project.

9.3 Findings for the Individual Programs

9.3.1 Adventist Development and Relief Agency (ADRA)

9.3.1.1 Effectiveness of mitigation of roads, potable water, irrigation etc.

ADRA's mitigation measures were adequate, and there were few if any negative environmental impacts resulting from its program.

9.3.1.2 Monitoring and mitigation system

Environmental Regulations	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Ecological discharge of water (<i>desagües ecológicos</i>) allowed using water while leaving some for native flora • The POPs incorporate environmental mitigation into a document, which was drawn up with full community participation, and which the community respects and consults. • ADRA identified an archaeological site in one of its POPs, and wants to preserve the site. • <i>Fichas ambientales</i> and other environmental documents were in order. 	

Environmental monitoring. ADRA hired an environmental monitor after the MTE. After the MTE, ADRA began the following procedures.

Before implementing a project, ADRA started with a *visita inicial de campo* (VIC) to conduct an in situ environmental analysis to determine the initial state of the area where the project was to be implemented, before starting the project. Based on this information, a *ficha ambiental* was filled out and presented to the competent environmental authority (the prefecture of Chuquisaca) to obtain the environmental license, classifying the job as I, II, III or IV.

All of ADRA's projects were classified as IIIs or IVs. For each project classified as category III, ADRA wrote an environmental *Programa de Prevención y Mitigación* (PPM) with its *Plan de Aplicación y Seguimiento Ambiental* (PASA). The road maintenance projects were typically classified as IIIs.

A IV classification does not require a prevention and mitigation program (PPM) or an environmental application and follow-up plan (PASA). The *ficha ambiental* suffices. All projects were given environmental monitoring, regardless of their category.

ADRA then formulated a mitigation plan (*plan de mitigación*). The *ficha ambiental* was filled out using DOS software called PCEIA (*Programa Computarizado de Evaluación de Impacto Ambiental*), which ADRA bought for 30 Bs. each time.

The environmental monitor designed a field notebook to document her monitoring. She inspected the construction jobs in the field and wrote a recommendation in her book. She tore out a carbon copy of her hand-written report, discussed it with the resident engineer,

and left a copy with him. Later, in the office, she gave another copy to the head of infrastructure and discussed her recommendations with him.

The system was convenient, and allowed for instant reporting to people in the field and to their supervisors. The observations or non-conformities were always for small things, which were usually fixed on time (by the date established by the environmental monitor, after discussing it with the resident engineer). The environmental monitor had her own vehicle and would drive to the sites for un-announced inspections. It seems like an excellent system.

Steps in ADRA's Environmental Monitoring

- **Step I Initial field visit:** an environmental analysis in the field to determine the condition of the area before starting the project.
- **Step II Obtaining the environmental license:** a *ficha ambiental* is filled out using the PCEIA (Computerized Program for Environmental Impact Evaluation) and submitted to the competent environmental authority, the prefecture of Chuquisaca.
- **Step III Environmental monitoring:** while the project is carried out, to verify implementation of the mitigation measures that were proposed in the *ficha ambiental* and in the PPM and PASA, using the check lists and field supervision notebooks.
- **Step IV Environmental closure:** the project is considered closed when all the mitigation measures have been fully implemented and there is adequate sustainability.

9.3.2 CARE

9.3.2.1 Effectiveness of mitigation of roads, potable water, irrigation etc.

Irrigation in Tucumilla, San Lorenzo, Tarija

Tucumilla was one of CARE's early communities. CARE finished an irrigation system by 2004 but had some income generating activities after that. There are two large tanks of water, filled with river water, carried in through pipes.

Mitigation included stone walls to retain soil around the canals, and stone works to drain stream water under the cement channel. Once a year they fixed new cracks with cement. At the second tank, CARE had helped the community bring in Kikuyu grass to stabilize the soil around the tank. Kikuyu grass has been grown in Bolivia for decades, and there was little or no soil erosion around the tank.

Watershed management. Above the river at the water intake, the community fenced about twenty hectares of forest. The grass was tall and healthy inside the fence, even though it was near the end of the dry season; the catchment was not overgrazed.

Income generation and institutional alliances. The people of Tucumilla liked the USAID irrigation project because it has allowed them to grow vegetables. CARE also helped them produce

certified seed potatoes, e.g. helping them create contacts with the seed certification agency, ORS.

Soil fertility. Farmers in Tucumilla made terraces on their own, and fertilize the soil with animal manure, which they say they have done for many years.



Mitigation, stone wall to retain soil.

Potable water in Narváez, Entre Ríos, Tarija

Empowerment and sustainability. The treasurer of the new potable water system in Narváez (Zona Sud) went to great pains to show the evaluators how he was using CARE's workbook on water users' associations to keep track of the group's money. The association receives 5 Bs. (\$0.70) per month from each of the 23 users; most are paid up until the end of the year. No one was behind on their payments. The association has a list of the wrenches, locks and other equipment purchased and 700 Bs. (\$100) in the cash box.

One by one the water users rose to their feet to say how grateful they were. They said their children no longer get sick from drinking river water. This system delivers beautiful, clear spring water to each house, while a system built by a contractor for Narváez Centro never did really work. This one works because the people built it themselves.



Clean water helps raise healthy children.

An inspection suggested that water system was all in order. The people had keys to everything, in labeled boxes, and a chain link fence around the potable water installations.

Mitigation of environmental impact. The overflow from the spring runs across the little pampa, near a small wetland (*bofedal*). They left this overflow as a source of water for local flora and fauna, a *desagüe ecológico*. The pipeline was carefully buried. CARE had a *certificación ambiental* (environmental certificate) from the prefecture for the water project.

Mitigation of social impact. The spring was on the land of an elderly woman, who used it to water a field. She conveyed the water in a ditch, crossing the gully in an aqueduct of stone, mud and bark. The woman did not want to give up the spring, but the water users made a document, promising that she would have irrigation water. She finally accepted, and the water users offered her water for her house as well.

The users built her a ferro-cement irrigation tank, a PVC siphon emerging right at the top of her field. If she wants to irrigate, all she has to do is turn a spigot at the base of the irrigation tank and clear water rushes out of the pipe in her field. That is her compensation for giving the spring to the users for drinking water. And like all the other users, she also had a modern bathroom with a toilet and shower in her home.



Ferro-cement water tank, safely locked and fenced. The municipal government is prominently named on the tank (along with CARE and USAID).

The road in Potrerros, Entre Ríos, Tarija

Sustainability. In Potrerros, Entre Ríos, Tarija, the local people explained that the road into their community is the key to other community development. In 2001, they had no road. They finally convinced the mayor's office to build them one, but it was just pushed in with a bulldozer. Then CARE helped them finish it. The road is six km long. Each household donated 70 days' work, just for the road, besides about 70 days more for other CARE activities. That is a huge amount of time for a rural household to give up, well over a third of their annual labor budget. They made the sacrifice because the road was an important investment.



A retaining wall holds the road in place. Most of the structures were well made.

Environmental mitigation. The culverts, drains, retaining walls and other structures were in general well made, although there was some minor erosion in spots.

Integration of infrastructure and income generation. The people explained that with the road, now they could get their peaches to market. Like the other people in Entre Ríos, they are now growing the early variety, and they need good roads if they are going to sell fresh produce. They have planted so many new trees that within about three years, they expect to have three times as many peaches to sell. One man also started a small egg-raising business to supply the town of Entre Ríos.

Empowerment. The road has allowed many positive changes to come in. The community has a new school and electricity. The municipality has just provided them with drinking water. The experience with CARE may have helped the people monitor the construction firm the municipality hired. The residents of Potrereros had a list of specifications and materials, and when the company tried to substitute cheaper ones, the people complained and insisted on proper materials.

Potable water system in Ascanty, Cotagaita, Potosí

Environmental mitigation. The evaluators inspected the ferro-cement tank. There is a deviation trench across the top to keep water from running into the base of the tank. Two fences surround the tank, to keep out children and animals. Because the fences keep out livestock the trees are starting to grow back.

Impact on cultural resources. The tank was built at the edge of an archaeological site which local residents call Chullpa Punta. The name suggests it is pre-Columbian, although the evaluators found only one pre-Hispanic artifact, a single chipped stone flake, besides a shell bead, which is probably pre-Columbian. Ceramics were abundant, but none were diagnostic. There is abundant surface architecture, including rock alignments which look like house foundations along streets. The CARE staff realized that the area was a site, so they moved the water tank “to the edge of it” and while digging the foundation for the tank. they did not find “very much” archaeological material.



Artifacts, clockwise: a modern pen (for scale), a sherd, slag, chipped stone flake, shell bead.

9.3.2.2 Monitoring and mitigation system

The CARE monitoring person was unavailable for an interview, but the environmental monitoring in general seems reasonable.

Environmental Regulations	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Mitigation measures helped avoid soil erosion in irrigation systems. • In rare cases where community members must be compensated for the loss of natural resources (e.g. if one household donates a spring for a community water system), the impacted household was compensated with natural resources (e.g. 	<ul style="list-style-type: none"> • There was some erosion in some of the roads.

<p>improvement of the household irrigation system).</p> <ul style="list-style-type: none"> • <i>Fichas ambientales</i> and other environmental documents were in order. 	
--	--

9.3.3 Food for the Hungry International (FHI)

9.3.3.1 Effectiveness of mitigation of roads, potable water, irrigation etc.

The road to Abra Antora, Ravelo

Roads and income generation. The community of Pata Huayllas turned out en masse to thank the evaluators profusely for this road. Before FHI helped them improve the road, they could not get their harvest out, and the potatoes would rot before they could sell them. Trucks rarely visited the area. Now many trucks come, making travel and trade much easier.



With help from FHI, community members improved and leveled the roadbed. They built check dams along the road and above it. There are crown ditches to keep water off the roadbed. They clean out the gutters and the drains after the rain.

Forestation. They were especially pleased with the black and yellow “dangerous curve” sign, which makes the road look like a real highway, and with the two hectares of trees planted to stabilize one steep slope.

Sustainability. The road runs through three communities. Each community has accepted the responsibility for maintaining its sector and has a maintenance plan. There is little doubt that they will actually maintain it. When repairs are scheduled, each household has to send one person to work, but often many extra people come, especially the young men, who appreciate the road and are happy to work on it.

The road into Toro Toro, Potosí

Toro Toro is a small town in northern Potosí, but its connection to the outside world is through the city of Cochabamba. The road towards Cochabamba used to be rocky. After 2005, FHI helped the municipality repair the roadbed, and then the prefecture cobbled it. FHI thinks this helped lead to the development of a tourist industry in the town, with little hotels and restaurants starting after the road came in. FHI also supports an association of tourist guides.

Environmental mitigation. FHI had a *certificado de dispensación* for the road, and someone from the Toro Toro national park accompanied the roadwork to see that paleontological resources were not damaged. (Toro Toro is famous for its dinosaur tracks).

FHI also had a PMM-PASA (*programa de prevención y mitigación—plan de aplicación y seguimiento ambiental*), written by a consultant, who has RENCA (Registro Nacional de Consultoría Ambiental), in collaboration with the municipality of Toro Toro.



A better road to Toro Toro improved the municipal economy while respecting environmental standards.

Irrigation in Tomoyo, Ocurí, Potosí

In 1999, FHI thought of building a four-community irrigation project. They looked for funding, and found it with USAID. Convincing local farmers to work on an irrigation project was a challenge. They took tours to see irrigation in other parts of Bolivia, and finally decided to base their system on one in Punata, which also watered several communities.

Over the next four years, some local residents donated as much as 250 days work to the system. That is a huge amount of labor for a poor rural household. After a few years some gave up, and others kept going. They did not receive FFW, but FHI did provide the non-local materials.



Irrigation allows raising alfalfa to improve the soil. A rock wall prevents erosion. Note the dry hills in the background.

In 2005 they began to irrigate. FHI had carefully trained the people to operate the system, but it has taken several years' experience to actually get it running smoothly. By 2008, the system was working well. There is a users' association managing the system and collecting funds from the members. Each user submits a weekly request for water, which is released on time, per request. The users do their own maintenance, with advice from an FHI civil engineer.

Until 2005 the land was sandy and of little use. With irrigation, people began to grow alfalfa, which improved the soil. Alfalfa allowed farmers to expand their cattle herds, and plow the manure into the soil. It is gradually becoming dark and fertile. Fruit trees are growing well and promise to be important in the future.

9.3.3.2 *Monitoring and mitigation system*

FHI had quite good monitoring. They were the only CS that managed its survey data well enough to be able to tease apart data on adoption of individual practices. Much of its monitoring and environmental data is computerized, and it can generate maps of soil conservation features, for example.

FHI monitors all of its projects for compliance with PMM-PASA. It fulfilled all of its environmental monitoring obligations with the prefectures and other relevant governments. As mentioned elsewhere, it also trained municipal staff and created five environmental units in municipal governments to monitor projects that impact on natural resources (among other functions).

Environmental Regulations	
• Strengths	Weaknesses
<ul style="list-style-type: none">• People appreciate the local roads, e.g. the one from Rodeo to Abra Antora. Local people expressed a deep commitment to maintaining the road.• Environmental units created in five municipal governments: Ocurí, Toro Toro, Ravelo, Tapacarí and Capinota.• <i>Fichas ambientales</i> and other environmental documents were in order.	

9.3.4 **Save the Children (SC)**

9.3.4.1 *Effectiveness of mitigation of roads, potable water, irrigation etc.*

The road to Cairoma, La Paz, Save the Children

Income generation. In Cairoma grateful villagers showed the evaluators the nine km road that connects the small municipal town to some of its communities. They showed us a chart reporting that 9,000,000 Bs (\$129,000) worth of goods a year is hauled over the road. And that is increasing.

But those numbers do not really convey how much this road means. Now people can get their produce to market. Before, as recently as 2007, sometimes it took a week to get produce over the nine km. The road was a mud track in the rainy season. In one spot it had almost completely sloughed off the mountainside. In another place, a huge gully threatened to cut the road in two. One curve was too tight to turn in a truck. Another spot was a permanent mud pit where people had to unload the trucks, pull them through the mud, and then hand carry the cargo (through the mud) back to the truck. When it rained they could not drive through the river at all.

Now all of that has changed. Where the road was falling off the slope, it was stabilized with a carefully built rock wall. Check dams now capture the soil and are gradually filling in the gulley. The mud hole was filled in and drains installed to keep it dry. There is a new bridge over the river. “God must have sent you” one of the road users said. “We never thought we would have a bridge. Now we don’t have to carry our kids through the river when they go to school.” Another said “When we look at this road now, we feel like crying for joy, but before we also felt like crying, because it made us suffer.”



Bus traffic from Cairoma to outlying villages has increased over the improved road. A trip that used to take a week now takes half an hour, making it possible to get fresh fruit to the market.

A trip that once took a week now takes half an hour. And from Cairoma, people can drive to La Paz, where they can sell their produce and make money to feed their families.

Sprinkler irrigation in Yunga Yunga, Cairoma

In Yunga Yunga, they had a conventional earthen canal. When they released the water from the intake, it would take an hour and a half to reach the first fields, four hours to reach the last ones.



Sprinkler irrigation and contour plowing preserve the soil. Potato yields have doubled.

Now it takes ten minutes, because it runs through pipe to an irrigation tank, and then to individual hydrants. People take the water from there to their field in hoses to water through sprinklers. Now the water soaks in 30 cm deep instead of eight. Potato yields have doubled, and less water is lost so people can irrigate 52 hectares instead of 41.

Municipal government. The president of the municipal council said that they want to use the system as an example of irrigation. They want every community in Cairoma to have a system like this one.

Environmental mitigation. Since finishing the system in 2006, the people of Yunga Yunga have planted some trees, but there is little erosion since the pipe was buried in the trench of the old irrigation ditch, which basically follows the contour. They have made overpasses where the dry washes can run over the trench without eroding it.

Soil conservation. People say that the sprinkler irrigation is improving the soil, which is becoming lighter, and the water is not running off the way it did with ditch irrigation.

Water management in Puchuni, Yaco, La Paz

In Puchuni the evaluators inspected two round, earthen stock tanks, built to collect water from two springs or *bofedales*. (Because the tanks fill with spring water and not with rain runoff, technically they are not “water harvesters.”)

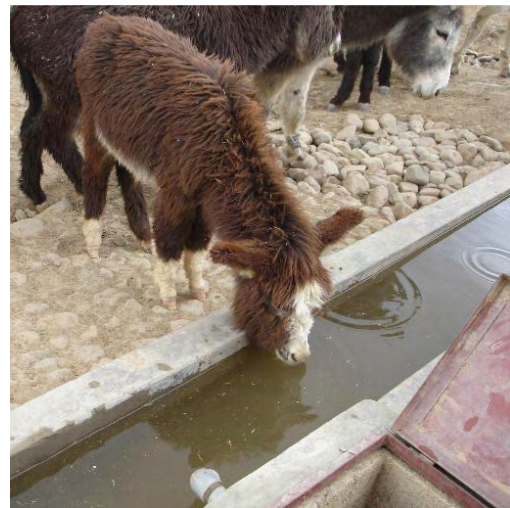
Before 2005, the tanks had been walk-in reservoirs, where cattle would enter, drink, and occasionally defecate into the water. The livestock often got sick from drinking the foul water. In 2005, SC helped the people make these reservoirs, each one about 25 meters in diameter. Each one is surrounded by a fence. The bottom was not sealed (e.g. with bentonite) but was lined with stones; there is an overflow and *sewenqa* plants (Andean pampas grass, *Cortaderia jubata*) to help to stabilize the earthen slope.

Empowerment. The tank has a concrete drinking trough outside the fence. Every morning Puchuni’s president of natural resources comes and turns the spigot to fill the tank. At night he puts a lock on it so no one can open it. Water stays in the reservoir year round. The evaluators saw it at the driest time of year, and it still had clean water and was functioning.

Sustainability. Every water user pays 1 Bs. (\$0.15) a month, which they keep for repairs. The users are obviously pleased with the results. They dug both tanks with picks and shovels. Although they received FFW, the users divided into two teams, one for each tank, and raced to see which one would finish first.

Income generation. Now the livestock drink more water, cleaner water. The animals put on more weight and are worth more money at market.

Cultural resources. One of the tanks is near an old church and cemetery. People used to get their drinking water at this spring, in ceramic pots. The ruins of an old hacienda house lie nearby. The earth around the tank was covered in pot sherds. None were obviously pre-Columbian, and one was glazed (i.e. historic). The cultural material on the surface, including the ruined hacienda, is consistent with colonial or republican times. The users said they found many pot sherds (k’allanas) and bones when they dug the reservoir.



Livestock drink from a trough, and the tank is protected within a fence.

Recommendation. Although it was clearly a large, historic site, any source of water in the semi-arid Andes could easily be associated with a pre-Hispanic site as well. No US government-funded project should dig through a large archaeological site without mitigation. The CSs need training on how to recognize these sites and how to manage cultural resources.

Irrigation, soil conservation and income generation in Chuacollo, Sica Sica

Chuacollo is on a canyon slope, just below the rim of the Altiplano. Most of the land is too steep and dry to farm, although the community is easy to reach, because SC helped the community improve the road in 2006 with funding from the Title II program.

Integrated watershed management. In the long, narrow basin people, planted trees and dug trenches in the higher areas, planting live barriers of *t'ula*. These structures were much work to make, but all together they cover less than 10 percent of the area of the micro-watershed. Local residents did the work for FFW, and did not do any more once the program stopped the rations. The SC staff learned about IWM from Promic, an NGO in Cochabamba, which refined its techniques on the outskirts of the city of Cochabamba. Promic had generous funding from the Swiss Agency for Development and Cooperation (SDC) and the prefecture, and many years to work. Promic stabilized the Taquiña Basin and other important sources of water, but that model may not be applicable for programs with less time and less money.

Micro-irrigation. What does work is micro-irrigation. The villagers of Chuacollo built a pressurized irrigation system, one of ten that SC built in Bolivia. And they did it without FFW.

SC had an irrigation manager, a local extensionist and a resident engineer to supervise construction, besides two supervising natural resource engineers from La Paz.



After harvesting the barley, farmers in Chuacollo apply manure to the field for the next crop. With only six hectares of irrigated cropland, every bit is precious.

First, SC had to convince the villagers to provide all the unskilled labor and the local materials, without receiving food rations. And each beneficiary had to pay \$200 in cash per hectare. Their fields were so small that some people only had to pay \$25 or \$50, but for poor people that is a lot of money. To convince them, SC gave the people talks, showed them videos of sprinkler irrigation and took them to Yunga Yunga to see and talk to the water users there.

Chuacollo has just six hectares of irrigated land, farmed by 38 households. At first, the people who owned the least land resisted building the irrigation system, because they realized that they would do the same amount of work as the others, for less benefit. But eventually everyone agree. It was an accomplishment to get 100 percent commitment to adopting and investing in a technology that the people had not yet been able to try themselves.

The irrigators divided themselves into four teams of nine or ten households. Each team gets a water turn every day. So each household gets a turn every nine or ten days. There are four

hydrants, one per team. Every night they store water in the tank and the next day from 9AM to 3PM they irrigate through sprinklers.

Soil conservation. The first thing the farmers noticed was that the sprinklers did not wash the soil away the way ditch irrigation does. The water soaks in like gentle rain, without running off.

Income generation. Because they do not lose water in an earthen canal, the users have more water, so they get a turn every nine or ten days instead of every 52. This means that they can grow carrots, onions and other vegetables, some of which they can take to market on their improved road.

Training. The extensionist came every few days and the other engineers also visited. The local people learned about plumbing and construction, including cement work, besides learning about irrigation. They said they are pleased with the training and could learn perhaps a bit more plumbing, but in general they feel confident to run the system.

Sustainability and environmental mitigation. The community also built soil retention walls around the lower fields. They continue with their traditional practices of manuring the soil and plowing with the contour. They said they continue to build stone walls around the fields, even without rations. People will invest labor and money (e.g. for stone terraces) in high-value land for intensive agriculture.

Innovation for sustainability. When the farmers used their sprinklers for the first time, the water shot in a 20 meter radius, going clear over their small fields. So SC helped them design little wire muzzles to put over the sprinkler head, to break the force of the water, so they can irrigate a smaller area. There are 60 fields in the irrigation area, and each one has its own wire device, worked out one by one by the owners to custom fit the parcel. So each plot of land is perfectly watered.

Sustainable organization. As explained above, SC asked the people to pay something for the system. This made extra work for the SC staff, and the money was just a fraction of the total construction cost. As SC staff explained, “By making people pay for the irrigation, we ensured the sustainability of the system.”

The people are now irrigating every available square meter of land. They said they were committed to maintaining it. The farmers are not about to let anything go wrong with a productive irrigation system that cost them money and hard labor.

Irrigation in Pasto Grande, Calamarca, La Paz

The villagers in Pasto Grande wanted irrigation for a long time. Their fields are dry, and they barely made a living by planting crops when it rained in November.

In 1999, they got a company to help them start working on irrigation. They made canals, but they were poorly designed and the water never flowed. By 2005, the FPS (*Fondo de Inversión Social y Productiva*) had built a tank further up the canyon and had piped the water to

individual cement tanks above the fields. But the system still worked poorly, and people were frustrated that little water reached their fields.

Soon after that, SC began helping the people improve the irrigation system to make it work. SC designed a topographic survey. Every user had to pay, and then SC designed pressurized irrigation tubes, with sprinklers.



Irrigating early potatoes: generating income and conserving the soil. Some neighboring fields are still dry. It takes time to learn to irrigate.

Integrated watershed management. In the watershed above the irrigation system, the local people built check dams. They planted trees on the fragile slopes. They also decided to stop grazing livestock in the area.

Because they had no previous tradition of irrigation, there were several challenges. Some people were disappointed that the system was an hour and a half walk from the village. (But it had to be sited where there was water). The walk seems longer when carrying irrigation hoses or other tools. Six hectares is not much land to divide among 35 households.

In spite of these problems, the people were planting irrigated potatoes and peas in the area, and onions for the first time. They are learning about the system. Some fields are not irrigated yet, and the water in the tanks is not being used to its full capacity.

9.3.4.2 *Monitoring and mitigation system*

SC had an experienced, full-time environmental monitor, who fulfilled all formal obligations for environmental monitoring and was sincere about protecting the environment. He kept an extensive paper record of monitoring and evaluation, running to several dozen volumes and tens of thousands of pages. He enjoyed full collaboration from the other staff.

Environmental Regulations	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Good mitigation measures to prevent soil erosion in road and water projects. • <i>Fichas ambientales</i> and other environmental documents were in order. 	

References

- Anderson, Simon; Gündel, Sabine; and Pound, Barry with Bernard Triomphe. *Cover Crops in Smallholder Agriculture: Lessons from Latin America*. London: ITDG Publishing, 2001.
- Ashby, Jacqueline; Braun, Ann R.; García, Teresa; del Pilar Guerrero, María; Hernández, Luis Alfredo; Quirós, Carlos Arturo; and Roa, José Ignacio. *Investing in Farmers as Researchers: Experience with Local Agricultural Committees in Latin America*. Cali: CIAT, 2000..
- Baldivia Urdininea, José. “Estrategias para Recuperar El Altiplano Achamamam Ukrupa Qhantawi,” Ejecutado por Strategies for International Development- Sid En Los Municipios de Patacamaya y Umala de La Paz Bolivia.” 1999. <http://www.fidamerica.cl/actividades/conferencias/desertificacion/pachamamam.html>.
- Bentley, Jeffery W. “Impact of IPM Extension for Smallholder Farmers in the Tropics,” Chapter 8 in *Integrated Pest Management: Dissemination and Impact*, Vol.2. Edited by Rajinder Peshin and Ashok K. Dhawan. New York: Springer, 2009.
- Bentley, Jeffery W; Webb, Morag; Nina, Silvio; and Perez, Salomón. “Even Useful Weeds Are Pests: Ethnobotany in the Bolivian Andes.” *International Journal of Pest Management* 51(3):189-207, 2005.
- Bentley, Jeffery W.; Priou, Sylvie; Aley, Pedro; Correa, Javier; Torres, Róger; Equise, Hermeregildo; Quiruchi, José Luis; and Barea, Oscar. “Method, Creativity and CIALs.” *International Journal of Agricultural Resources, Governance and Ecology* 5(1):90-105, 2006.
- Blomquist, William and Schlager, Edella. “Political Pitfalls of Integrated Watershed Management.” *Society and Natural Resources* 18(2):101-117, 2005.
- Gallagher, K. “Fundamental elements of a farmer field school.” *LEISA Magazine* 19 (1):5-6, 2003.
- Helen Keller International. “Economic and Social Impact Evaluation, NGO Gardening and Nutrition Education Surveillance Project (NGNESP),” HKI, Dhaka, Bangladesh, 2002.
- Helen Keller International. *Sustainability of the Homestead Food Production Project in Bangladesh*, New York, 2003.
- Kiess, L; Moench-Pfanner, R; and Bloem, MW. “Food based strategies: Can they play a role in poverty alleviation.” *Food and Nutrition Bulletin*, Vol. 22 (4), 2001, pp. 436-442

-
- Maître, Adrian; Bentley, Jeffery W; and Fischler, Martin. “¿Qué Es Más Urgente, el Manejo Integrado de Plagas o el Manejo Sostenible de Suelos?” Quito: ASOCAM. Serie Debate No 1. 44, 2003.
- PAHO/WHO. “Guiding Principles for Complementary Feeding of the Breastfed Child,” 2003.
- Shaxson, T.F. *Land husbandry: A framework for soil and water conservation*. Ankeny, Iowa: Soil and Water Conservation Society, 1989.
- Swindale, A., et. al. *The Impact of Title II Maternal and Child Health and Nutrition Programs on the Nutritional Status of Children*. Occasional Paper No. 4, USAID FANTA Project, 2004.
- Thiele, Graham and Terrazas, Graham. “The Wayq'os (Gullies) Are Eating Everything! Indigenous Knowledge and Soil Conservation.” *PLA Notes*, 32 (1998). Pp. 19–23.
- Van Haeften, Roberta; Fernandez, Alfredo; McNulty, Judiann and Peterson, Tricia, *An Assessment of the Save the Children Bolivia Title II Program Post Mid-Term Evaluation*. A report prepared for Save the Children in Bolivia, November 2006.
- Van Haeften, Roberta; Woldt, Monica; Solberg, Scott; Castaneda, Wilson; Caceres, Humberto; Castellon, Fernando. *Mid-Term Evaluation for the FY 2002-2006 Bolivia Title II Development Assistance Program*. A report prepared for USAID Bolivia, March 2005.
- Winarto, Yunita Triwardani. *Seeds of Knowledge: The Beginning of Integrated Pest Management in Java*. New Haven, Connecticut: Yale Southeast Asia Studies

Annexes

ANNEX A: Terms of Reference for the Final Evaluation

Terms of Reference

Title II Final Impact Evaluation

CY 2002-2008 Development Activity Program

Background

The PL 480 title II program in Bolivia currently involves four Cooperating Sponsors (CSs): the Adventist Development and Relief Agency (ADRA), Cooperative for American Relief Everywhere (CARE), Food for the Hungry (FHI) and Save the Children (STC). All CSs are implementing seven-year (CY2002-2008) Development Activities (DAPs).

An Evaluation Team (ET) of consultants shall conduct the Bolivia Title II final evaluation during a six-week period in the third quarter 2008. For operational reasons the Final Evaluation will be divided into two tranches (August and September). During the first tranche, the team will spend its first week in La Paz developing a teamwork plan and interview instruments, and conducting interviews with the four CSs. Weeks two and three will be spent in field travel with the first two CSs. In the second tranche, week four and five will be spent with the others two CSs, and week six shall be spent in the preparation of the final report.

Additionally, before the arrival of the international consultants, a Bolivian consultant shall collect process and report the quantitative information for approximately 10 indicators of impact and process.

Title

Final Evaluation of CY 2002-2008 Bolivia Title II Program

Purpose

The purpose is to conduct an impact evaluation of the Title II Cooperating Sponsor's planning and implementation of activities in each of the three program elements:

1. The Income generation component that focuses on agricultural technology transfer, marketing assistance, rural access roads, community infrastructure (silos), and community micro irrigation.
2. The maternal and child health (MCH) component which includes reduction of chronic malnutrition, immunization campaigns, exclusive breast feeding, minimum weight growth of children below the age of three, monthly distributions to eligible beneficiaries, and nutrition and health education. This component also includes

Community Water and Basic Sanitation (W&S), encompassing the construction of community and family water systems, community sewage systems, latrines and showers.

3. The Natural Resources Management component designed for sustainable increases in food availability and access by conserving and rehabilitating the natural resource base which sustains agricultural productivity and rural Bolivian economics.

Objectives

In the interest of disseminating the lessons learned from the Title II Program, the specific objectives of the final evaluation will be:

Prime objectives

1. Assess whether Title II interventions have resulted in a positive impact on food security that can be qualitatively verified. Quantitatively assess the reasonableness of data presented by the CSs to USAID and the methods used to calculate results vis-à-vis the baseline.
 - a. Examine the extent to which CSs achieved the MCH component strategic objective and the results planned in their DAPs. Specific attention should be placed on verifying if there was a reduction in “children less than 36 months of age with chronic malnutrition”.
 - b. Examine the extent to which CSs achieved the Income Generation component strategic objective and the results planned in their DAPs. Specific attention should be placed on verifying if there were “increased net incomes from agriculture and marketing related activities”.
 - c. Examine the extent to which CSs reduce the unsustainable exploitation and degradation of the natural resource base in the Title II program areas of influence. Specific attention should be placed on the participant communities’ management on their natural resource through conservation and rehabilitation programs.
2. Identify successful specific implementation strategies that proved to be effective in achieving objectives in each program area and draw lessons learned to be disseminated with other Agencies and the GOB.

Analyze why planned results were or were not achieved or were not measured, including exogenous variables, such as unanticipated social, political, or disaster conditions; food and non food constraints; target group characteristics; measurements systems chosen; and other design and implementation considerations.

Verify whether the designs of Title II programs respond effectively to the needs of participating communities and to what extent these needs are fulfilled.

Complementary Objectives

1. Determine the cost effectiveness of Title II interventions and draw lessons learned for targeting communities and selecting specific projects.
2. Analyze whether the ration composition, size and market value is the most appropriate for the implementation of activities where food is used.
3. Assess the degree of compliance with 22 CRF 216 as described in CSs Initial Environment Examinations (IEEs) and evaluate the procedures followed by the CSs in the use of “Guias de Infraestructura”.
4. Identify factors that contribute to the establishment of constructive relationships with municipal governments, grassroots organizations, and between CSs. Has the program fostered municipal development and community leadership capacity building? Identify lessons learned.
5. Determine whether CS M&E systems aid in program management and administration and if they are able to measure the extent to which a program causes change in food security conditions at the beneficiary level. Are M&E systems in place adequate and reliable for the program activities and outcomes?
6. Given the current circumstances of Bolivia, determine how the Title II activities impacted on the Mission’s overall program, on achieving Strategic Results.
7. Base upon the “Sustainability Plan” developed by the four CSs, identify activities that show a high degree of sustainability. Are infrastructure activities being operated and maintained properly?

Methodology

The final evaluation will take place in five phases:

- 1. Planning meetings with CSs and USAID. week 1**
A team planning process adopting a step-by-step approach that allows team members to understand and shape the final product. Elements that will be studied include: (1) current status of the program; (2) chief clients for the report; (3) scope of work; (4) developing a work plan; (5) administrative and trip planning details.
- 2. Review of documents week 1**
Numerous documents need to be reviewed. Key among them is each Cooperating Sponsor’s Development Activity Plan, Annual Results Reports, CY Annual Plans, Sustainability Plans, Quantitative Reports of the Indicators, and other program documentation. In addition, several regional offices will prepare briefing papers to assist the team in understanding of the projects. One member of the ET will spend additional time reviewing M&E systems from each CS in their La Paz head offices.
- 3. Interviews week 1-5**
Chief groups to be interviewed are senior leadership of the four CSs; USAID/Bolivia staff; technical committees; PVO field personnel including engineers, agronomists, health personnel, community promoters, and a number of community members. Some interviews will be one-on one, while others will be held in groups. Focus

groups with nurse auxiliary (male and female), village women, farmers and project participants need to be developed.

- 4. Field travel** **weeks 2-5**
Coordinate all necessary logistics for the qualitative and quantitative collection of data. Plan approximately 5 to 6 days per CS in the field visits and 5 days for the quantitative collection of data per Agency that has to be done prior to the field visits.

- 5. Final report and lessons learned seminar** **week 6**
Draft a preliminary evaluation report with all lessons learned. Hold a one day briefing workshop for senior management of the four CSs and technical staff and USAID/Bolivia. The purpose of the workshop is to share the draft report and solicit feedback. Upon reception of comments and suggestions from USAID/Bolivia, the ET will deliver by the end of the sixth week a final report in English containing results, and lessons learned. The final activity will be a one-day presentation of lessons learned and recommendations; the audience will include staff from USAID and the PVOs, as well guests from other relevant organizations.

6. Reporting and deliverables

There are five main “deliverables” for the final evaluation:

1. A Planning Workshop
2. An approved Final Evaluation “implementation strategy”
3. A draft Final Evaluation report
4. A one day lessons learned seminar
5. A final report for each CS with generic and CS –specific sections.

The following format is a guide for the final report:

- I. Executive Summary
- II. Introduction
- III. Methods
- IV. Results for each of the three program areas (By cooperating sponsor)
- V. MCH Water and Sanitation
- VI. Income Generation
- VII. Natural Resources
- VIII. Lessons Learned by Component
- IX. Actionable Recommendations

7. Language requirements and other required qualifications.

A team of experts with appropriate experience in food security issues addressed by the Title II program in Bolivia will perform the evaluation. The Evaluation Team will consist of four senior professionals with extensive development experience; they should have excellent oral and written presentation skills (both Spanish and English).

One of the team members should have an agricultural economics background and another strong background in maternal health/nutrition programs. The third person's background should complement the team with skills in natural resources management, project design and evaluation, monitoring and evaluation systems. Finally, the fourth member of the ET should be an in-country consultant with theoretical and practical knowledge of major development issues in Bolivia and experience in infrastructure development projects.

The team members should have ten years of experience in development programs similar to Title II projects, while other contractor personnel will have at least five years of similar experience. The team leader-minimally-will is familiar with Bolivia's geography, people, customs, etc. Furthermore, the team leader will be responsible for providing guidance and oversight to the field operations ensuring the quality of the program assessment, integrating and synthesizing report components, and helping to prepare the Final Report in fulfillment of Regulation 11 requirements.

Professionals who are directly related to PL-480 Title II program and Title II Cooperating Sponsors are not eligible for this contract.

ANNEX B: CS Indicator Performance Tracking Tables (IPTTs)

Adventist Development Relief Organization (ADRA) 2008 IPTT

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
Component 1: Rural Income Program																							
Component 1 Impact Indicator 1 % Increased in yield of selected marketable produce by Targeted House holds	Onion : 27 MT							5% (28.35 MT)	0% (22.97 MT)	0%							13% (30,51 MT)			14%			14%
	Dried broad bean: 2.2 MT							5% (2.31 MT)	0% (2.05 MT)	0%							10%			11%			11%
	Peach: 9.28 MT							50% (13.92 MT)	1.72% (9.44 MT)	0%							60%			60%			60%
	Plum: Not included		11 MT					25% (13.75 MT)	18.2% (13 MT)	72.8%							60%			60%			60%
	Bean: Not included		0.75 MT					27% (0.95 MT)	20% (0.9 MT)	74.1%							33%			35%			37%
	Peas: Not included ³⁰																10%			12%			13%
	Garlic: 8.84 MT																10%			15% (10,17 MT)			15%
	Grape: 7.0 MT ^{31,32}																10%			12%			12%
Barley not include																8%			10%			15%	
Component 1 Impact Indicator 2																							

³⁰ During tFY2004 ADRA identified 3 news crops (peas, garlic and grapes) with market potential and started to produce them, expecting to have good results.

³¹ A new variety of grapes (with market demand) has been planted in September, 2004. ADRA expect to report results in 2006.

³² Debido a un error de tipo, el dato de Línea de Base para la Grape fue cambiado de 59.34 a 7.0 MT

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003% Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004% Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006% Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
% Increased in average annual gross income of targeted farmers from produce	US\$ 941.12	-						43% (US\$1,345.80)	60.85% (US\$1,513.82)	141.51%				83% (US\$1,722.24)			85.9% (US\$1,750.00)			87% (US\$1,760)			87% (US\$1,760)
Component 1 Monitoring Indicator 1 % of farmers adopting improved agricultural techniques in the production of selected marketable produce	1%	15% (283/1900)	15% (283/1900)	100%	30% (753/2510)	26.7% (670/2510)	90%	45%	49.9%	110.9%	65%	70.8%	109%	75%	71.6%	95.5%	80%	68,4 %	85,5 %	82%	79,6%	97%	82%
Component 1 Monitoring Indicator 2 Number of farmers assisted with credit-for-input services in the production of selected marketable produce	114	³³	347		546	521	95,5%	819	783	95,5%	910	421	46,2%	800	279	34,9%	1000	9	0,9 %	1092	*		1092
Component 1 Monitoring Indicator 3³⁴ Hectares of	0	0	0		6	2.5	41,7%	33,7	29,25	96,6%	90,4	56,55	48%	109,5	109,5	277,2%	124,5	124,52	100,1 %	129,5	137,52	106%	

³³ At the time of the Baseline, FADES was already working with credits so only for the second and others years targets were established.

³⁴ The method of managing this indicator has changed. ADRA Bolivia is now using the methodology of summing up the yearly targets and annual achievements.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
irrigated land used for production of selected marketable produce																							129.5 ³⁵
Component 1 Monitoring Indicator 4	Onion: 21.32 %				20%	13.6%	100%	18%			16%	16.51%	90.41%	12%	16.8%	48.5%	10%	17 %	38,16 %	10%	12,87%	128.7%	10%
% Reduction of Post harvest losses of selected Produce ³⁶	Broad Bean: 25.23 %				23%	25.08%	7%	20%			18%	9.87%	212.4%	15%	16.5%	85.3%	14%	24%	10,95 %	10%	15,42%	154.2%	10%
	Peaches: 17.35 %				15%	15.5%	78.7%	14%			10%	7.43%	134.9%	10%	12.8%	61.9%	10%	11,87%	74,56 %	10%	8,53%	85.3%	10%
	Plum: Not included 21,6					20%		17%			15%	10.00%	100%	12%	9.6%	125%	10%	10,71%	93,88 %	10%	9%	90%	10%
	Bean: Not included							25%			20%	0%	0%	15%	25%	60%	15%	24,0%	10 %	12%	24%	200%	12%
	Peas: Not included										25%	8.00%	100%	20%	4%	420%	4%	4%	100 %	4%	4%	100%	4%
	Garlic: 10.98 %										10%	9.70%	130%	9%	10.3%	34.3%	9%	8,53%	123,74 %	9%	7,97%	88.5%	9%
	Grape: 30.66 %													20%	16%	137.5%	18%	9%	171,09 %	15%	10%	66.7%	15%

³⁵ Due to a transcription error the figure reported in the last CSR4 for this indicator was 203.4 Ha. The planned result is 124.5 Ha.

³⁶ This indicator is obtained by calculating the percentage change of the achieved versus the baseline figure.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target			
	Barley: Not included													20%	15%	100%	18%	21%	0%	13%	15%	115.3%	13%			
Component 1 Monitoring Indicator 5 Volume of selected produce marketed by ASC (aggregated by produce) (In MT)	Onion:				944 MT	192.67 MT	20.41%	400 MT	471.44 MT	118%	450 MT	456.50 MT	101.4	480 MT	487.4 MT	101.5%	480 MT	406,6 MT	84,7%	488 MT	437,78 MT	89.7%	488 MT			
	Broad Bean:		18.4 MT		105 MT	23.6 MT	22.47%	70 MT	82.55 MT	118%	78 MT	84.50 MT	108.3%	85 MT	85.5 MT	100.6%	90MT	101,80 MT	113,1%	92 MT	74,51 MT	81%	92 MT			
	Peaches:		3.5 MT		33 MT	19.74 MT	59.81%	48.1 MT	210.81 MT	438%	62.8 MT	142.11 MT	226.4%	78 MT	67.3 MT	86.3%	85MT	34,30 MT	40,35%	88 MT	56,12 MT	63.8%	88 MT			
	Dried Peaches:				90 MT	87.36 MT	97.06%	57.3 MT	13.25 MT	23%	76.2 MT	25.94 MT	34.00%	40MT	37.5 MT	93.8%	45MT	47,7 MT	106%	48 MT	54,92 MT	114.4%	48 MT			
	Plum:				12 MT	8.75 MT	72.97%	16.8 MT	16.1 MT	96%	22.9 MT	25.80 MT	112.6%	28.1 MT	28 MT	100%	30MT	31,1 MT	103,7%	32 MT	4,20 MT	13.1%	32 MT			
	Bean:							11.3 MT	0 MT	0%	15 MT	0	0	20 MT	1.6 MT	8%	10MT	1,36 MT	13,6%	10 MT	10,35 MT	103.5%	10 MT			
	Peas:													7.5 MT			10 MT	40.6 MT	406%	41MT	34,4 MT	83,90%	42 MT	51,00 MT	121.4%	42 MT
	Garlic:													10. MT			11 MT	17MT	154.5%	15MT	15,5 MT	103,3%	18 MT	18,17 MT	100.9%	18 MT
	Grape:													8.78MT			9 MT	4.2 MT	46.7%	10MT	15 MT	150%	12 MT	6,10 MT	50.8%	12 MT
	Barley													20 MT			25MT	20,5 MT	82%	25MT	25,3 MT	101,2%	25 MT	25,10 MT	100.4%	25 MT
	Apple													31.6 MT	31.6 MT	100%	35 MT	35,2 MT	100,6%	35 MT	48,19 MT	137.7%	35 MT	48,19 MT	137.7%	35 MT
	Corn													4.1 MT	4.1 MT	100%	5 MT	0 MT		6 MT	9,76 MT	162.7%	6 MT	9,76 MT	162.7%	6 MT
	Transformed of fruits													0.3 MT	0.3 MT	100%	0.5 MT	1,12 MT	224%	0,6 MT	2,66 MT	443%	0,6 MT	2,66 MT	443%	0,6 MT
Component 1 Monitoring Indicator 6 % of farmers with knowledge of prices of					30%	56.6%	188.67%	60%	88.8%	148%	70%	94%	134%	80%	94.4%	118%	90%	89,5%	99.4%	90%	94,2%	104.6%	90%			

³⁷ This indicator was not contemplated at the time of the baseline study. The information was collected in the second year of the DAP

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
selected produce at a given time																							
Component 1 Monitoring Indicator 7³⁸ Km. of market access road rehabilitated.	0							25	14.38	57.52%	87	82.85	110%	165	172.17	114.5%	229	272,14	156,2 %	244.5	322,9	132%	244.5
Component 2: Natural Resources Management																							
Component 2 Impact Indicator 1 Hectares of "conservation areas" with adequate management	5	20			72	56	78%	75	92.4	123%	78	96,5	123%	60	146.7	244.5%	60	185.7	309.5%	40			385
Component 2 Monitoring Indicator 1 Hectares of land assigned in the target communities in accordance to practices used to control soil erosion	11	100	91	91 %	204	327.58	160.6%	420	485	115%	480	516.23	107 %	400	408	102%	400	394.98	98.7%	200	508.75	254.4%	2204
Component 2 Monitoring Indicator 2 % of the families who have adopted improved practices of erosion control	0				9%	9% 402/4553	100%	20% 961	31.8%	159%	30% 1442	63%	210%	60% 2880	73.4% 3517	122.3%	85% 3766	68.1 % 3001	80.1%	85% 4080	78.0% 3456	91.7%	85% 4080

³⁸ The method of managing this indicator has changed. ADRA Bolivia is now using the methodology of summing up the yearly targets and annual achievements.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
and soil fertility.																							
Component 2 Monitoring Indicator 3 Municipalities in the target areas which have investment plans to improve the handling of natural resources.	0	4	4	100 %	4	4	100%	4	3	75%	4	4	100 %	4	4	100%	4	4	100%	4	4	100%	4
1. Development and Implementation of POP's		23 Communities 4 Municipalities	5 Communities 4 Municipalities	22 % 100 %	36 Communities 4 Municipalities	17 communities 4 Municipalities	47%	20 Communities 4 Municipalities	48 Communities 4 Municipalities	240%	11 Communities 4 Municipalities	8 ³⁹ Communities 4 Municipalities	100 %	78 communities	78 communities	100%	78 communities	78	100%	78 communities	78	100%	78 Communities 4 Municipalities
2. Sustainability of nurseries		4	4	100 %	4	4	100 %	4	3	75 %	4	3	75 %	4	4	100%	4	4	100%	4	4	100%	4
3. Assigning financial resources		4	4	100 %	4	4	100 %	4	3	75 %	4	4	100%	4	4	100%	4	4	100%	4	4	100%	4
Component 2 Monitoring Indicator 4 Number of households with appropriate and sustainable natural resources management projects for domestic use								175	261	149%	215	1290	600 %	600	2760	460%	800	2648	332%	400	2880	720%	2190
Component 3: Health																							
Component 3 Impact										107.7 %				36.8%	35.7 % (131/367)								

³⁹ The target for this FY was 81 communities with POPs elaborated, however, as a result of the land borders of 3 communities, the established target was not achieved; therefore, resulting in 78 communities with established POPs.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003% Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004% Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006% Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
Indicator 1⁴⁰ % of boys 24 – 59 months of age with chronic malnutrition	46.8%							41.8%	38.8%							103.1 %	35.8%	37.5 % (128/341)	95.5 %	35.8 %			35.8%
% of girls 24 – 59 months of age with chronic malnutrition	40.9%							35.9%	34.5%	104.0 %				30.9 %	38.4 % (131/341)	80.5 %	29.9%	33.2 % (113/340)	90.1 %	29.9 %			29.9%
Component 3 Impact Indicator 2 % of infants under 6 months of age that were exclusively breastfed during the last 24 hours	46.2%							51.2%	83.7%	163.5%				85.7 %	90.9 % (120/132)	106 %	86.7%	76.6 % (83/109)	88.3 %	88 %			88%
Component 3 Impact Indicator 3 % of infants 6 – 11 months that received appropriate complementary foods	7%							17%	45.6%	525.3%				55.6 %	52.5 % (73/139)	94.4 %	57.6%	44.4 % (67/151)	77.1 %	57.6 %			57.6%
Component 3 Impact Indicator 4 Pregna								38.5%	61.5%	159.74%				69.5 %	53.9 % (450/834)	77.5 %	71.5%	56.3 % (468/831)	78.7 %	71.5 %			71.5%

⁴⁰ The age range was changed from 24-60 months to 24-59 months; this was as a result of a focus on families with children under five years of age.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
% of women who know three danger signs during pregnancy, birth and postpartum	ncy: 28.5% Birth: 6.6% Post Partum : 1.7%							16.6%	20.3%	122.29%				28.3 %	27.7 % (231/834)	97.9 %	30.3%	26.0 % (216/831)	85.8 %	30.3 %			30.3%
								11.7%	13%	111.11%				21%	20.5 % (171/834)	97.6 %	23.0%	38.0 % (316/831)	165.2 %	23.0 %			23.0%
Component 3 Impact Indicator 5⁴¹ % of children under 5 years with a case of diarrhea in the last two weeks who were treated with ORS, fluids or recommended fluid increments.	62.7%							65.8%	75.5%	114.7%				78.5%	88.6 % (203/229)	112.8 %	79.5%	83.3 % (205/246)	104.8 %	92.0 %			92.0 %
Component 3 Impact Indicator 6 % of integrated health services provided to mothers and children	0%							10%	17%	170%				22%	NL		24%	NL		24 %			24%
Component 3											10%	47.1%	471%	68.7 %	NL		69.7%	41.2 %	59.1 %	69.7			69.7%

⁴¹ This indicator replaces the “% of children under five years of age with diarrhea in the last 2 weeks with health assistance” due to the fact that better & positive results were expected at family level.

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
Impact Indicator 7 % of services reported without errors in the SNISS																		(7/17)		%			
Component 3 Monitoring Indicator 1 % of children 3-35 months of age in the Title II MCH program that are at or above minus one standard deviation of normal weight for age.	41.5%	46.5%	59% (1491/2527)	126.9%	51.5%	62% (1723/279)	120.4%	56.5%	57.6% (1802/3126)	102%	61.5%	66.1% (2024/3061)	107.5%	66.5%	53.3% (1544/2895)	80.1%	68%	53.5% (1560/2917)	78.7%	68.0%	61.7% (1737/2817)	90.7%	68%
Component 3 Monitoring Indicator 2 % of children aged 3 - 35 months in intervention areas that participated in the MCH growth monitoring program	61.9%	95%	95.1% (2527/2656)	100%	95%	91.8% (2779/3028)	96.6%	95%	74.8% (3126/4177)	78.7%	80%	85% 3061/3602	106.3%	80%	79.9% (2895/3624)	99.9%	80%	88.6% (2917/3294)	110.7%	80%	90.1% (2817/3128)	112.6%	80%
Component 3 Monitoring Indicator 3	32.7%	42.7%	67.6% (694/1026)	158.3%	52.7%	71% (961/1354)	134.7%	62.7%	56.5% (995/1761)	90.1%	72.7%	79.7% 1159/1454	109.6%	82.7%	79.9% (1110/1388)	96.6%	82.7%	81.7% (1156/1414)	98.8%	82.7%	96.7% (1153/1192)	116.9%	82.7%

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
% of children under one year of age within the intervention area who received the third dose of the DPT (or Pentavalent) vaccine																							
Component 3 Monitoring Indicator 4 % of pregnant women in the population of the target area with at least one prenatal examination before the fifth month of pregnancy	71.9%	72.9%	61.6% (365/593)	84.5%	73.9%	71.3% (657/922)	96.5%	74.9%	70.4% (655/930)	94%	75.9%	72.4% (696/966)	95.4%	73.4%	74.5% (582/781)	101.5%	74.4%	75.4% (654/867)	101.3%	74.4%	79% (712/903)	106.2%	74.4%
Component 3 Monitoring Indicator 5 % of communities that have an emergency medical evacuation system in use	0	50% of communities have a EME system organized	49.98% of communities have a EME system organized (48/98); 0% of the community	99.8%	60% of communities have a EME system organized	64.71% of communities have a EME system organized (66/102); 10% of	107.85%	70% of communities have a EME system organized	57.3% of communities have a EME system organized (73/128); 11.02% of	81.8%	80% of communities have a EME system organized	78% of communities have a EME system organized	97.5%	% of communities have a EME system organized	127 of communities have a EME system organized	100%	100% of communities have a EME system organized	127 of communities have a EME system organized	100%	%100 of communities have a EME system organized	127 of communities have a EME system organized	100%	100% of communities have a EME system organized

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003 % Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004 % Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006 % Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
		the communities have an EME system organized and in use.	ies have an EME system organized and in use.		the communities have an EME system organized and in use.	0% of the communities have an EME system organized and in use.		20% of the communities have an EME system organized	the communities have an EME system organized and in use.		30% of the communities have an EME organized and in use.	es have an EME system organized and in use.		40% of the communities have an EME organized and in use.	58.26% (74/127) of the communities have an EME in use.		the communities have an EME organized and in use	of the communities have an EME organized and in use		zed 58.0 % of the communities have an EME organized and in use	communities have an EME organized and in use		of the communities have an EME organized and in use

Component 4: Water & Sanitation

Component 4 Impact Indicator 1 % of child care givers who practice proper cleanliness and prepare food using appropriate hygiene practices	0%							10%	11.2%	112%							17%	94,5 % (171/181)	555.9 %	17%			17%
Component 4 Impact Indicator 2 Quantity of water consumed per capita per day among target families	17.4 liters										21.75 liters	34.61 liters	159.13 liters				50 liters	54.04 Lt	108.1 %	50 liters			50 liters
Component 4	19.2%							24.2%	33.82%	139.8%				35 %	57.5 %	164.2 %	43.82%	49,1 %	112.1 %	57.5			57.5%

Indicator	Base-line	FY 2002 Target	FY 2002 Achieved	FY 2002 % Achieved vs. Target	FY 2003 Target (a)	FY 2003 Achieved	FY 2003% Achieved vs. Target	FY 2004 Target (a)	FY 2004 Achieved	FY 2004% Achieved vs. Target	FY 2005 Target	FY 2005 Achieved	FY 2005 % Achieved vs. Target	FY 2006 Target	FY 2006 Achieved	FY 2006% Achieved vs. Target	FY 2007 Target	FY 2007 Achieved	FY 2007 % Achieved vs. Target	FY 2008 Target	FY 2008 Achieved	FY 2008 % Achieved vs. Target	LOA Target
Impact Indicator 3 % of families in target areas utilizing adequate sanitary facilities															(192/334)			(158/322)		%			
Component 4 Monitoring Indicator 1 % of target families who have access to safe water during the whole year.	57.7%							60%	47.9%	79.8%	62%	59.95%	96.69%	64%	64.1% (2495/2490)	100.1%	65%	57.5% (1466/2550)	88.4%	65%	76.8%	118%	65%
Component 4 Monitoring Indicator 2⁴² % of communities who pay on a regular basis maintenance fees and operations of water services and sanitation.	79%										83.6%	87.5% (7/8)	105%	85%	50% (6/12)	58.8%	88%	41.6% (5/12)	47.3%	88%	100%	125%	88%

* En el Indicador: Número de agricultores asistidos con créditos para insumos de la producción de productos comercializables seleccionados, no se reportan datos porque hasta el final del AF 08 USAID no aprobó el uso de los fondos.

⁴² ADRA Bolivia started the construction of water and sanitation systems in September 2003. The first 6 constructions were completed between July and September 2004 and information was not collected until FY2005.

CARE 2008 Indicator Performance Tracking Table

CARE 2008 Indicators Performance Tracking Table (IPTT)

Performance Indicators	Baseline 1999	Target 2002			Achievement			Target 2003			Achievement			Baseline 2002	Target 2004			Achievement			Target 2005			Achievement		
	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%
1.a. Percent of children 3-35 months of age, by sex, with chronic malnutrition (height/age Z scores).	34%	2,131	6,765	32%	2,431	7,367	33%	1,996	6,765	30%	2,206	7,608	29%	46%	2,814	6,545	43%	1,750	4,481	39%	1,613	4,481	36%	1,869	5,482	34%
1.b. Children 36-59 months of age, by sex, with chronic malnutrition	53%	1,068	2,225	48%	1,142	2,331	49%	950	2,160	44%	778	2,510	31%	51%	1,149	2,393	48%	936	1,985	47%	865	1,922	45%	1,015	2,219	46%
2. Percent of children from 3 to 35 months in target areas that participate in Title II MCH growth monitoring programs.	51%	6,765	8,467	80%	7,367	8,454	87%	5,238	6,547	80%	7,608	8,454	90%	51%	6,545	8,181	80%	7,519	9,859	76%	7,272	9,090	80%	5,482	7,086	77%
3. Percent of children from 3 to 35 months enrolled in the Title II MCH program that is above -1 standard deviation of the normal weight for age.	80%	3,382	6,765	50%	3,904	7,367	53%	3,924	6,765	58%	4,260	7,708	55%	56%	3,731	6,545	57%	4,210	7,519	56%	4,217	7,272	58%	3,090	5,482	56%
4. Percent of children from 3 to 35 months enrolled in the Title II MCH program below -2 standard deviations from expected normal weight for age (-2	17%	1,015	6,765	15%	817	7,367	11%	732	5,231	14%	913	7,608	12%	14%	851	6,545	13%	620	4,729	13%	872	7,272	12%	680	5,482	12%

9. Percent of infants less than 6 months old who were breastfed exclusively during the last 24 hours.	50%	130	200	65%	132	167	79%	142	200	71%	179	213	84%	60%	130	200	65%	87	109	80%	140	200	70%	85	109	78%
10. Percent of children under 5 years of age with diarrhea in the last two weeks who were treated with ORT, recommended fluids or increased fluids.	76%	237	300	79%	411	490	84%	246	300	82%	1514	1521	99.5%	65%	204	300	68%	819	934	88%	216	300	72%	1698	1807	94%
11. Number of health-related activities, implemented by the CS, that broaden and sustain community participation in preventive and primary health care.	N/A	50			272			100						N/A	300				2082		1500				2093	
12. Percent of child caregivers and food preparers with appropriate hand washing behavior	40%	200	400	50%	255	391	65%	451	820	55%	129	192	67.2%	77%	656	820	80%	471	631	75%	697	820	85%	220	279	79%
13. Percentage of population using hygienic sanitation facilities	0%	160	400	40%	270	391	69%	410	820	50%	151	192	78.6%	0%	492	820	60%	69	104	66%	574	820	70%	30	51	59%
14. Percentage of households with year-round access to new or improved safe water source.	34%	184	400	46%	372	540	69%	418	820	51%	921	1034	89.1%	44%	549	820	67%	1690	1942	87%	623	820	76%	917	1084	85%
15. Percentage of households with access to	18%	140	400	35%	352	540	65%	369	820	45%	921	1,034	89.1%	20%	533	820	65%	1782	1980	90%	615	820	75%	917	1084	85%

29. Estimate of area of micro-watersheds that are under "appropriate management."	N/A	600		120		1,200		168		N/A	3200		160		160		160							
30. Number of new hectares where soil conservation measures are being implemented.	N/A	30		8		60		195		N/A	90		272		100		99							

Performance Indicators	Target 2006			Achievement			Target 2007			Achievement			Target 2008			Achievement 2008			Target 2009			Achievement 2009		
	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num.	Denom	%	Num	Denom	%	Num.	Denom	%
1. a. Percent of children 3-35 months of age, by sex, with chronic malnutrition (height/age Z scores).	1478	4481	33%	1,317	3,960	33%	1,344	4,481	30%	1,399	4,015	35%	1,399	4,014	35%	1,308	3,897	34%	NA	NA	NA	179	644	28%
1.b. Children 36-59 months of age, by sex, with chronic malnutrition	834	1922	43%	676	1,588	43%	769	1,922	40%	657	1,599	41%	657	1,599	41%	693	1,666	42%						
2. Percent of children from 3 to 35 months in target areas that participate in Title II MCH growth monitoring programs.	5675	7090	80%	5,668	6,637	85%	5675	7090	80%	3,616	5,171	70%	3,616	5,171	70%	4,070	6,717	61%	NA	NA	NA	526	644	82%
3. Percent of children from 3 to 35 months enrolled in the Title II MCH program that is above -1 standard deviation of the normal weight for age.	3348	5675	59%	2,208	4,050	55%	3,405	5675	60%	2,269	4,040	56%	2,269	4,040	56%	2,268	4,070	56%	NA	NA	NA	384	644	60%
4. Percent of children from 3 to 35 months enrolled in the Title II MCH program below -2 standard deviations from expected normal weight for age (-2 Std. Dev.)	368	3348	11%	486	4,050	12%	340	3405	10%	359	3,286	11%	358	3,286	11%	494	4,070	12%	NA	NA	NA	69	644	11%

10. Percent of children under 5 years of age with diarrhea in the last two weeks who were treated with ORT, recommended fluids or increased fluids.	225	300	75%	406	413	98%	234	300	78%	263	280	94%	263	280	94%	292	308	95%						
11. Number of health-related activities, implemented by the CS, that broaden and sustain community participation in preventive and primary health care.	1200			1,129			1,200			1,217			694			456								
12 Percent of child caregivers and food preparers with appropriate hand washing behavior	738	820	90%	204	258	79%	779	820	95%	597	705	85%	597	705	85%	897	1,055	85%						
13 Percentage of population using hygienic sanitation facilities	656	820	80%	175	258	68%	656	820	80%	312	380	82%	465	1,074	43%	370	435	85%						
14. Percentage of households with year-round access to new or improved safe water source.	705	820	86%	258	323	80%	705	820	86%	732	857	85%	-	-	0%	320	482	66%	63	63	100%	63	70	90%
15. Percentage of households with access to latrines and sewerage.	656	820	80%	258	323	80%	656	820	80%	696	857	81%	-	-	0%	320	482	66%	82	82	100%	82	137	60%

16. Percentage of constructed water supply systems adequately operated and maintained by the community.	8	10	80%	4	6	67%	11	14	79%	8	17	47%	8	17	47%	6	7	86%	2	2	100%	2	2	100%
17. Average annual gross farm income of rural households assisted by Title II.	841			1,150			1,207			1,684			-			2,490								
18. Percent of households assisted by Title II with increased gross incomes of five percent or more in the last year.	246	820	30%	422	1918	22%	287	820	35%	499	1,011	49%	-	-	0%	689	1,196	58%						
19. Proportion of target population that has adopted improved agricultural technologies and practices.	1571	3143	50%	1,554	1,918	81%	1,792	3,143	57%	1,778	2,393	74%	-	-	0%	1,201	1,637	73%						
20. Number of participants that received systematic agricultural training the past year.	3143			1,918			3,143			5967			3,697			1,637			150				110	
21. Number of kilometers of roads improved or constructed (as a result of Title II interventions).	30			19			30			0.00			-			-								
22. Number of new hectares under irrigation (as a result of Title II intervention).	20			0			20			5			-			9								

23. Value of products sold through a forward contract or through a producer marketing association.	30,000			194,257			30,000			205,615			189,657			202,885							
24 Number of producer marketing organizations strengthened	15			18			15			25			22			24			2			3	
25. Hectares of "conservation areas" with adequate management.	3,210			3,210			3,210			3,210			3,210			3,210							
26. Number of communities in which the creation of "conservation areas" (e.g. grasslands and forests) has been initiated.	90			78			78			30			3			33							
27. Percentage of the target population that has adopted improved soil and water management practices.	235	672	35%	787	1,662	47%	269	672	40%	1,424	2,367	60%	1,328	2,292	58%	642	913	70%					
28. Number of producers that have received training in natural resource management practices.	792			1,662			792			3,194			2,693			2,181			50			57	
29. Estimate of area of micro-watersheds that are under "appropriate management."	160			508			160			1,462			50			115							

Performance	LOA Target			LOA Achievement (2002-2008)		
	Indicators	Num.	Denom	%	Num.	Denom
1. a. Percent of children 3-35 months of age, by sex, with chronic malnutrition (height/age Z scores).	1,825	5,362	34%	1,754	5,258	33%
1.b. Children 36-59 months of age, by sex, with chronic malnutrition	899	2,020	44%	842	1,985	42%
2. Percent of children from 3 to 35 months in target areas that participate in Title II MCH growth monitoring programs.	5,827	7,377	79%	5,904	7,483	79%
3. Percent of children from 3 to 35 months enrolled in the Title II MCH program that is above -1 standard deviation of the normal weight for age.	3,468	6,105	57%	3,173	5,748	55%
4. Percent of children from 3 to 35 months enrolled in the Title II MCH program below -2 standard deviations from expected normal weight for age (-2 Std. Dev.)	648	5,122	13%	624	5,227	12%
5. Percent of children less than one year of age in the target area who receive the first dose of DPT (or Pentavalente vaccine) that never receive the third dose of DPT (or Pentavalente vaccine)	2,129	11,208	19%	371	10,475	4%

6. Percent of children under one year in the target area receiving third dose of DPT or Pentavalente vaccine.	347	1,998	17%	415	1,736	24%
7. Percent of pregnant women in target population over the past calendar year who had at least one prenatal visit.	1,263	1,506	84%	1,503	1,683	89%
8. Percent of pregnant women with one prenatal visit during the trimester that made their first prenatal visit during this pregnancy before their 5th month of pregnancy.	5,696	8,841	64%	6,635	10,520	63%
9. Percent of infants less than 6 months old who were breastfed exclusively during the last 24 hours.	136	189	72%	177	210	84%
10. Percent of children under 5 years of age with diarrhea in the last two weeks who were treated with ORT, recommended fluids or increased fluids.	232	297	78%	772	822	94%
11. Number of health-related activities, implemented by the CS, that broaden and sustain community participation in preventive and primary health care.	1,500			2,093		

12 Percent of child caregivers and food preparers with appropriate hand washing behavior	588	744	79%	396	502	79%	
13 Percentage of population using hygienic sanitation facilities	488	796	61%	197	259	76%	
14. Percentage of households with year-round access to new or improved safe water source.	3,184	4,500	71%	5,181	6,242	83%	The number of households benefited with access to safe water goes with the 119 communities of indicator 16 (2002 - 2008)
15. Percentage of households with access to latrines and sewerage.	2,969	4,500	66%	4,528	5,646	80%	
16. Percentage of constructed water supply systems adequately operated and maintained by the community.	118	153	77%	115	119	97%	The adjustment has been made according to the Life of the Project (LOA 2002-2008) (2 systems are registered in 2009 year, due the conclusion and delivery to the communities has been done in February 2009)
17. Average annual gross farm income of rural households assisted by Title II.	1,207			2,490			
18 Percent of households assisted by Title II with increased gross incomes of five percent or more in the last year	255	1,482	17%	432	1,677	26%	
19. Proportion of target population that has adopted improved agricultural technologies and practices.	2,571	6,746	38%	4,980	6,596	76%	Los resultados por encuesta para la gestión 2008, se encuentran en la parte inferior del CUADRO
20. Number of participants that received systematic agricultural training the past year.	6,746			6,596			

21. Number of kilometers of roads improved or constructed (as a result of Title II interventions).	583			357.77		
22. Number of new hectares under irrigation (as a result of Title II intervention).	300			121.25		
23. Value of products sold through a forward contract or through a producer marketing association.	189,657			205,615		
24. Number of producer marketing organizations strengthened	34			46		
25. Hectares of "conservation areas" with adequate management.	9,000			3,210		
26. Number of communities in which the creation of "conservation areas" (e.g. grasslands and forests) has been initiated.	90			90		
27. Percentage of the target population that has adopted improved soil and water management practices.	1,328	2,292	58%	1,424	2,367	60%
28. Number of producers that have received training in natural resource management practices.	2,693			3,194		
29. Estimate of area of micro-watersheds that are under "appropriate management."	3,200			1,462		

30. Number of new hectares where soil conservation measures are being implemented.	272			612		
--	-----	--	--	-----	--	--

Food for the Hungry International (FHI) 2008 Indicator Performance Tracking Table

Integrated Health Program (FHI)

Indicator	Baseline 2002	FY 02 Target	FY 02 Achieved	FY 02 % Achieved vs. Target	FY 03 Target	FY 03 Achieved	FY 03 % Achieved vs. Target	FY 04 Target	FY 04 % Achieved vs. Target	FY 05 Target	FY 05 % Achieved vs. Target	FY 06 Target	FY 06 % Achieved vs. Target	FY 07 Target	FY 07 % Achieved vs. Target	FY 08 Target	FY 08 % Achieved vs. Target	LOA Target 08	LOA Achieved vs. LOA 08						
1. Percent of children 3 to 35 months of age, by sex, with chronic malnutrition (height / age / Z-scores)	177 / 302 59%	518 / 1205 43%	N.D.	N.D.	1126/2125 53%	N.D.	N.D.	1190/2125 56%	850/342521 25 40% MTE	140%	1081/2125 51%	808/2035 40%	128%	814/2035 40%	1299/3418 38%	105%	1265/3418 37%	1378/3751 37%	100%	1341/3751 36%	1028/3316 31%	116%	36%	31%	116%
2. Percent of children from 3 to 35 months in target areas that participate in Title II Integrated Health growth monitoring programs	66 / 302 22%	1154/1924 60%	1205/1924 63%	105%	1487/2125 70%	1759/2125 83%	119%	1481/2125 70%	1913/2125 90% MTE	129%	1709/21258 0%	3110/3436 91%	114%	3092/3436 90%	2990/3418 87%	97%	3076/3418 90%	3607/3751 96%	107%	3373/3751 90%	3088/3316 93%	103%	90%	93%	103%
3. Percent of children from 3 to 35 months in the Title II Integrated Health program that are above -1 standard deviation of the normal weight for age	97 / 302 32%	205 / 1205 17%	480 / 1205 40%	235%	861 / 1913 45%	758 / 1913 40%	89%	765 / 1913 40%	939/1913 49%	123%	964 / 1913 50%	909/2078 44%	88%	1143/2078 55%	1470/3418 43%	78%	1880/3418 55%	1599/3751 43%	78%	1690/3751 45%	1526/3316 46%	102%	45%	46%	102%
4. Percent of children from 3 to 35 months enrolled in the Title II Integrated Health program below -2 standard deviations from expected normal weight for age (>-2 S.D.)	110 / 302 36%	374 / 1205 31%	277 / 1205 23%	135%	383 / 1913 20%	339 / 1913 18%	111%	574 / 1913 30%	392/1913 20%	150%	352 / 1913 18%	369/2078 18%	100%	312/2078 15%	547/3418 16%	94%	513/3418 15%	582/3751 16%	94%	564/3751 15%	466/3316 14%	107%	15%	14%	107%
5. Percent of children less than one year of age in the target area who receive the first dose of DPT (or Penta-valent vaccine) that never receive the third DPT dose (or Pentavalent vaccine)	21 / 38 55%	121 / 258 47%	142 / 258 55%	85%	142 / 383 37%	40 / 614 6%	617%	180 / 383 31%	70/529 13%	238%	31 / 384 8%	126/961 13%	62%	144/961 15%	172/1560 11%	136%	203/1560 13%	94/1031 9%	144%	103/1031 10%	7/848 1%	1000%	10%	1%	1000%
6. Percent of children under one year in the target area receiving third dose of DPT or Pentavalent vaccine	17 / 111 15%	399 / 752 53%	116 / 752 15%	29%	481 / 752 64%	574 / 752 76%	119%	455 / 759 60%	459/759 61%	102%	526 / 752 70%	835/1153 72%	103%	865/1153 75%	1217/1560 78%	104%	1279/1560 82%	939/1148 82%	100%	939/1148 82%	841/889 95%	116%	82%	95%	116%
7. Percent of pregnant women in target population over the past calendar year who had at least one prenatal visit	55 / 111 50%	84 / 183 46%	106 / 183 58%	126%	186 / 300 62%	449 / 624 72%	116%	434 / 624 70%	434/624 70%	100%	240 / 300 80%	693/935 74%	93%	795/935 85%	618/702 88%	104%	597/702 85%	550/647 85%	100%	552/647 85%	535/638 84%	99%	85%	84%	99%
8. Percent of women with one prenatal visit during the trimester that made their first prenatal visit during this pregnancy before their fifth month of pregnancy	26 / 111 23%	62 / 183 34%	57 / 183 31%	91%	150 / 300 50%	245 / 449 55%	110%	240 / 436 55%	163/436 37%	67%	166 / 300 55%	474/636 68%	124%	475/795 60%	403/618 65%	108%	420/618 68%	372/550 68%	100%	374/550 68%	365/535 68%	100%	68%	68%	100%
9. Percent of infants less than 6 months who were breastfed exclusively during the last 24 hours	31 / 46 67%	70 / 175 40%	N.D.	N.D.	105 / 175 60%	201 / 273 74%	123%	140 / 175 80%	256/348 74%	93%	140 / 175 80%	207/245 84%	105%	196/245 80%	895/994 90%	113%	845/994 85%	274/287 95%	112%	258/287 90%	156/168 93%	103%	90%	93%	103%

Water and Sanitation Projects

Indicator	Baseline 2002	FY 02 Target	FY 02 Achieved	FY 02 % Achieved vs. Target	FY 03 Target	FY 03 Achieved	FY 03 % Achieved vs. Target	FY 04 Target	FY 04 Achieved	FY 04 % Achieved vs. Target	FY 05 Target	FY 05 Achieved	FY 05 % Achieved vs. Target	FY 06 Target	FY 06 Achieved	FY 06 % Achieved vs. Target	FY 07 Target	FY 07 Achieved	% Achieved vs. target 07	FY 08 Target	FY 08 Achieved	% Achieved vs. target 08	LOA Target 08	LOA Achieved 08	% Achieved vs LOA 08	
1. Percentage of child caregivers and food preparers with appropriate hand washing behavior	0/775 0%							Rural: 40% Urban: N D	10 8% MTE	27%		26 0%		Rural: 60% Urban: N D	70 0%	117%	Rural: 75% Urban: N D	72 0%	96%	Rural: 72% Urban: N D	93 0%	129%	Rural: 72% Urban: N D	93 0%	129%	
2. Percentage of population using hygienic sanitation facilities	384/526 7%							Rural: 20% Urban: N D	29 6% MTE	148%		21 0%		Rural: 30% Urban: N D	35 0%	117%	Rural: 35% Urban: N D	40 0%	114%	Rural: 38% Urban: N D	38 0%	100%	Rural: 38% Urban: N D	38 0%	100%	
3. Percentage of households with year-round access to new or improved safe water source	Rural: 1568/5226 30% Urban: 240 Families	Rural: 1359/5226 26% Urban: 240 Families	Rural: 1803/5226 35% Urban: 0 Families	Rural: 133% Urban: 0%	Rural: 2203/5226 42% Urban: 240 Families	Rural: 2298/5226 44% Urban: 1358 Families	Rural: 104% Urban: 566% Families	Rural: 2463/5226 47% Urban: 240 Families	Rural: 2559/5226 49% Urban: 0 Families	104% Urban: 0%		Rural: 2723/5226 52% Urban: 0 Families	Rural: 3030/5226 58% Urban: 0 Families	Rural: 112% Urban: 0 Families	Rural: 2983/5226 57% Urban: 0 Families	Rural: 3224/5226 62% Urban: 0 Families	Rural: 109% Urban: 0 Families	Rural: 3354/5226 64% Urban: 0 Families	Rural: 3364/5226 64% Urban: 0 Families	Rural: 100% Urban: 0 Families	Rural: 3404/5226 65% Urban: 0 Families	Rural: 3497/5226 67% Urban: 0 Families	Rural: 103% Urban: 0 Families	Rural: 3404/5226 65% Urban: 720 Families	Rural: 3497/5226 67% Urban: 1358 Families	Rural: 103% Urban: 189%
4. Percentage of households with access to latrines or sewerage	Rural: 1150/5226 22% Urban: 560 Families	Rural: 1254/5226 24% Urban: 3479 Families	Rural: 1403/5226 27% Urban: 621 Families	Rural: 112% Urban: 621%	Rural: 1803/5226 34% Urban: 1500 Families	Rural: 1854/5226 36% Urban: 11637 Families	109% Urban: 776% Families	Rural: 2063/5226 39% Urban: 1500 Families	Rural: 2138/5226 41% Urban: 964 Families	104% Urban: 643% Families		Rural: 2323/5226 44% Urban: 1500 Families	Rural: 2334/5226 45% Urban: 6500 Families	Rural: 102% Urban: 433% Families	Rural: 2583/5226 49% Urban: 6000 Families	Rural: 2603/5226 50% Urban: 9190 Families	Rural: 102% Urban: 153% Families	Rural: 2803/5226 54% Urban: 6500 Families	Rural: 2806/5226 54% Urban: 10155 Families	Rural: 100% Urban: 156% Families	Rural: 2853/5226 55% Urban: 10000 Families	Rural: 2876/5226 55% Urban: 11965 Families	Rural: 100% Urban: 120% Families	Rural: 2853/5226 55% Urban: 60603 Families	Rural: 2876/5226 55% Urban: 62568 Families	Rural: 100% Urban: 103%
5. Percentage of constructed water supply systems adequately operated and maintained by the community they serve	Rural: 24/101 24% Urban: N D	Rural: 0/0 Urban: N D	Rural: 0/0 Urban: N D		Rural: 8/10 80% Urban: N D	Rural: 12/17 71% Urban: N D	89% Urban: N D	Rural: 16/17 95% Urban: N D	Rural: 19/25 76% Urban: N D	80% Urban: N D		Rural: 25/27 94% Urban: N D	Rural: 28/31 90% Urban: N D	Rural: 96% Urban: N D	Rural: 35/37 95% Urban: N D	Rural: 36/38 95% Urban: N D	Rural: 100% Urban: N D	Rural: 38/40 95% Urban: N D	Rural: 40/41 98% Urban: N D	Rural: 103% Urban: N D	Rural: 41/43 95% Urban: N D	Rural: 45/47 96% Urban: N D	Rural: 101% Urban: N D	Rural: 41/43 95% Urban: N D	Rural: 45/47 96% Urban: N D	

Agricultural Production and Income Generation Program

Indicator	Baseline 2002	FY 02 Target	FY 02 Achieved	FY 02 % Achieved vs. Target	FY 03 Target	FY 03 Achieved	FY 03 % Achieved vs. Target	FY 04 Target	FY 04 Achieved	FY 04 % Achieved vs. Target	FY 05 Target	FY 05 Achieved	FY 05 % Achieved vs. Target	FY 06 Target	FY 06 Achieved	FY 06 % Achieved vs. Target	FY 07 Target	FY 07 Achieved	FY 07 % Achieved vs. Target	FY 08 Target	FY 08 Achieved	% Achieved vs. target 08	LOA Target 08	LOA Achieved 02	% Achieved vs. LOA 08
1. Average annual gross income of rural households assisted by Title II	SUS 419	-			SUS 480	SUS 595	124%	SUS 530	Sus 823	155%	SUS 650	SUS 919	141%	SUS 800	SUS 1133	142%	SUS 1200	SUS 1365	114%	SUS 1320	SUS 2628	199%	SUS 1320	SUS 2628	199%
2. Percent of households assisted by Title II with increased gross incomes of five percent or more in the last year.	N D	-			534/1406 38 %	753 / 1406 54%	142%	750 / 1800 42%	187/332 56%	133%	1155/2100 55%	1082/2100 52%	95%	1392/2400 58%	1382/2400 58%	100%	1620/2700 60%	1359/2700 50%	83%	1566/2700 58%	1972/2700 73%	126%	1566/2700 58%	1972/2700 73%	126%
3. Proportion of target population that has adopted improved agricultural technologies and practices	N D							891 / 2700 33%	384/760 51% MTE	155%				1350/2700 50%	1612/2700 60%	120%	1620/2700 60%	1475/2700 55%	92%	1620/2700 60%	1932/2700 72%	120%	1620/2700 60%	1932/2700 72%	120%
4. Number of participants that received systematic agricultural training during the past year	N D	900	580	64%	1250	1140	91%	1600	1222/0 76%	76%	1950	1593	82%	2295	2414	105%	2450	2701	110%	2475	2927	118%	2475	2927	118%
5. Number of kilometers of roads improved/ constructed	N D	20 / 5	47 6	238	35	23 4	67%	26	26 5	102%	27	26 40	98%	30 78	29 59	96%	7 5	7 8	104%	7	11 90	170%	168 36	173 26	103%
6. Number of new hectares under irrigation	N D	40 0	32 5	81%	57 5	42 6	74%	55.0	47 6	87%	63 0	65 41	104%	55	63 63	116%	40	40 31	101%	20	23 29	116%	312 05	315 34	101%
7. Value of products sold through a forward contract or through a producer marketing association	N D	SUS 3305	SUS 5708	173%	SUS 10303	SUS 19735	192%	SUS 30341	SUS 21635	71%	SUS 48600	SUS 71328	147%	SUS 78975	SUS 172320 30	218%	SUS 150000	SUS 226721 62	151%	SUS 200000	SUS 277618 09	139%	SUS 717448	SUS 795066	111%
8. Number of producer organizations strengthened	N D	2	4	200%	6	12	200%	16	17	106%	20	21	105%	24	23	96%	24	26	108%	27	27	100%	27	27	100%

Natural Resource Management Program

Indicator	Baseline 2002	FY 02 Target	FY 02 Achieved	FY 02 % Achieved vs. Target	FY 03 Target	FY 03 Achieved	FY 03 % Achieved vs. Target	FY 04 Target	FY 04 Achieved	FY 04 % Achieved vs. Target	FY 05 Target	FY 05 Achieved	FY 05 % Achieved vs. Target	FY 06 Target	FY 06 Achieved	FY 06 % Achieved vs. Target	FY 07 Target	FY 07 Achieved	FY 07 % Achieved vs. Target	FY 08 Target	FY 08 Achieved	FY 08 % Achieved vs. Target	LOA Target 08	LOA Achieved 08	% Achieved vs. LOA 08
1. Hectares of "conservation areas" with adequate management	17 00	15 30	13 9 5	87 % 32%	15 50	34 6 8	227% 14%	20 70	40 7 2	200% 10%	20 100	56 50 39	283% 39%	80 25	103 66 38 20	130% 153%	100 30	100 37,5	100% 125%	80 35	150 94 59 36	189% 170%	600 66	695 96	116%
2. Number of communities in which the creation of "conservation areas" has been initiated	N D	2	2	100 %	3	6	200 %	5	6	120%	5	9	180%	5	9	180%	2	2	100%	2	2	100%	38	38	100%
3. Percentage of the target population that has adopted improved soil and water management practices	20/1509 2.0%							1500/5300 28%	182/760 24% MTE	86%				2400/5300 45%	2886/5300 54%	120%	2915/5300 55%	3065/5300 58%	105%	2915/5300 55%	2937/5300 55%	100%	2915/5300 55%	2937/5300 55%	100%
4. Number of producers that have received systematic training in natural resources management	45/1059 4%	400	295	74 %	700	730	104 %	900	872/900 97%	97%	1100	1315	120%	1500	1764	118%	1800	1974	110%	1900	2113	111%	1900	2113	111%
5. Estimate of area of micro-watersheds that are under appropriate management	N D	10	75	750 %	90	100	111 %	175	250 1	143%	100	420	420%	250	848 95	340%	500	911 35	182%	600	929 86	155%	3205 4	3535 3	110%
6. Number of new hectares where soil conservation measures are being implemented	N D	40	295	738 %	150	575	383 %	300	293 43	98%	300	390	130%	300	610 62	204%	400	400	100%	300	483 29	161%	2864 1	3047 3	106%

Save the Children 2008 Indicator Performance Tracking Table (IPTT)

Save the Children (SC) Indicators Performance Tracking Table (IPTT) – FY2008

Indicators	Base-line 2002	FY 02 Target 2002	FY 02 Achieved 2002	FY 02 % Achieved vs Target	FY 03 Target 2003	FY 03 Achieved 2003	FY 03 % Achieved vs Target	FY 04 Target 2004	FY 04 Achieved 2004	FY 04 % Achieved vs Target	FY 05 Target 2005 *	FY 05 Achieved 2005	FY 05 % Achieved vs Target
1. Number of temporary employments generated	NA	NA			NA			NA			36,000	38,159	106%
2. Number of projects approved	NA	NA			NA			NA			200	341	171%
3. Number of projects completed	NA	NA			NA			NA			150	298	199%
OE-1 Increase Rural Incomes through improved Agriculture and Market Participation													
1. Average annual gross income of rural households assisted by Title II	\$ 539	Baseline	NA	NA	5% IOBL \$ 566	w/out data	w/out data	10% IOBL \$ 593	\$ 662	112%	30% IOBL \$ 700	\$ 714	102%
2. Percent of households assisted by Title II with increased gross incomes of five percent or more in the last year		Baseline	NA	NA	10% 417 / 4173	w/out data	w/out data	20% 835 / 4173	41% 1711 / 4173	205%	45% 1878 / 4173	40% 1669 / 4173	89%
3. Proportion of target population that has adopted improved agricultural technologies and practices		Baseline	NA	NA	20%	NA	Na	30% 1252 / 4173	37.4%	125%	50%	47% 1961 / 4173	94%
4. Number of participants that received systematic agricultural training during the past year		800	NA	NA	1,600	1,742	109%	2,386	1742 (Enc. de Monitoreo)	73%	2,500	2000 (Enc. CAP)	80%
5. Number of kilometers of roads improved/constructed		50	NA	NA	50	59	118%	50	3 (annual) 62 (accum)	6% Annual	18	8.5 (annual) 70.5 (accum)	47% annual

6. Number of new hectares under irrigation		20	NA	NA	20	0	0%	50	30*	60%*	29* (annual) 59 (accum)	29 (annual) 59 (accum)	93% (annual) 97% (accum)
7. Value of products sold through a forward contract or through a producer marketing association		0	NA	NA	0	NA	NA	0	NA	NA	\$10,000	\$ 82,415	824%
8. Number of producer organizations strengthened		0	NA	NA	3	3	100%	4	4	100%	7	8	143%
OE-2 Improve Maternal and Child Health and Nutrition													
1. Percent of children from 3-35 months of age, by sex, with chronic malnutrition (Talla/Edad/Z score)	37%	10% ROBL 33,3%	NA	NA	15% ROBL 31,5%	NA	NA	20% ROBL 29,6% 1264 / 4271	38,2% 228 / 597	0%	25% ROBL 27,8% 989 / 3559	36,8% 1450/3941	2%
2. Percent of children from 3- 35 months in target areas that participate in Title II Integrated Health Monitoring Program	47.0%	30%	85%	283%	50%	89%	178%	60% 2563 / 4271	90,4% 3861 / 4271	151%	90% 3203 / 3559	82,3% 3243/3941	91%
3. Percent of children from 3-35 months in the Title II Integrated Health Program that are above -1 SD of the normal weight for age	48.0%	3% IOBL 49,4%			8% IOBL 51,8%	NA	NA	12% IOBL 53,8% 2298 / 4271	43,0% 1836 / 4271	0%	15% IOBL 55,2% 1964 / 3559	48,7% 1919/3941	88%
4. Percent of children from 3-35 months enrolled in the Title II Integrated Health Program below -2 SD for expected normal weight for age (<-2 SD)	16.6%	10% ROBL 14,9%	12%	82%	15% ROBL 14,1%	13%	95%	20% ROBL 13,3% 568 / 4271	16,6% 709 / 4271	0%	25% ROBL 12,4% 441 / 3559	16% 630/3941	14%

5. Percent of children of 12-23 months of age in the target area who receive the 1st doses of DPT (or Pentavalent vaccine) that never receive the 3rd doses of DPT or Pentavalent (***)	27.6%	20% ROBL 22,%	NA	NA	30% ROBL 19,3%	w/out data	w/out data	40% ROBL 16,6% 281/ 914	4.1%	404.9%	80% ROBL or 5,5% 78/1411	4.1% 56 / 1411	106%
6. Percentage of children of 12-23 months in the target area receiving 3rd doses of DPT or Pentavalent vaccine (***)	41.0%	95% IOBL 80% 1220 / 1525	NA	NA	100% IOBL 82%	w/out data	w/out data	105% IOBL 84% 914 / 1693	86.0%	102%	110% IOBL 86% 1213 / 1411	80% 1129 / 1411	93.0%
7. Percent of pregnant women in target population over the past calendar year who had at least one prenatal visit	56%	20% IOBL 67,2% 1249 / 1858	26%	39%	20% IOBL 67,2% 1249 / 1858	50%	75%	25% IOBL 70% 1340 / 1915	44.4% 977 / 1915	63%	30% IOBL 72,8% 1162 / 1596	54.7% 645 / 1180	75%
(***) Indicators 4 & 5 have been recalculated by the age group of 12-23 months as well as targets, according to the document of Dr. Marcelo Castrillo/USAID cited in report narrative.													
8. Percent of women with one prenatal visit during the quarter that made their 1st prenatal visit during this pregnancy before their 5th month of pregnancy	31%	20% IOBL 37,2%	NA	NA	20% IOBL 37,2%	22%	59%	25% IOBL 38,8% 520/1340	22,9% 224 / 977	59%	25% IOBL 38,8% 452 / 1162	43% 277 / 645	111%
9. Percentage of infants less that 6 months who were exclusively breastfed during the last 24 hours	75.4%	10% IOBL 82,9%	NA	NA	15% IOBL 86,7%	NA	NA	20% IOBL 90,5% 769 / 850	73,8% 627 / 850	81%	25% IOBL 94,3% 668 / 708	76% 538 / 708	81%

10. Percentage of children 3-35 months of age with diarrhea in the last two weeks who were treated with ORS, recommended fluids, or increased fluids	77.8%	15% IOBL 89,5%	NA	NA	20% IOBL 93,4%	NA	NA	20% IOBL 93,4% 3989 / 4271	93.4% 3989 / 4271	100%	22% IOBL 95% 3381 / 3559	88% 3132 / 3559	93%
Save water and improved sanitation													
1. Percent of child caregivers and food preparers with appropriate hand washing behavior	22,3% 1266 / 5679	5% of target HH	NA	NA	10% of target HH	NA	NA	15% of target HH	59,1% 3357 / 5679	394%	60% of target HH 2714 / 4524	64,5% 2918 / 4524	108%
2. Percentage of population using hygienic sanitation facilities	30.6 % 1738 / 5679	10% IOBL 33,7% 1914 / 5679	NA	NA	15% IOBL 35,2% 1999 / 5679	NA	NA	20% IOBL 36,7% 2085 / 5679	34,9% 1982 / 5679	94%	22% IOBL 37,3% 1687 / 4524	32% 1448 / 4524	86%
3. Percentage of households with year-round access to new or improved safe water source	59.3% 3368 / 5679	10% IOBL (336 HH accum) 65,2% 3704 / 5679	25 HH annual (25 HH accum) 59,7% 3393 / 5679	7.4%	10% IOBL (336 HH accum) 65,2% 3704 / 5679	146 HH annual (171 HH accum) 62,3% 3359 / 5679	50.9%	15% IOBL (505 HH accum) 68,2% 3873 / 5679	505 HH annual (676 HH accum) 71,2% 4044 / 5679	134%	20% IOBL (538 HH accum) 71,2% 3221 / 4524	161 HH annual (671 HH accum) 74,1% 3354 / 4524	125%
4. Percentage of households with access to latrines or sanitation	30,6% 1738 / 5679	10% IOBL (174 HH accum) 33,7% 1912 / 5679	236 HH annual (236 HH accum) 34,8% 1974 / 5679	135.6%	10% IOBL (174 HH accum) 33,7% 1912 / 5679	146 HH annual (382 HH accum) 37,3% 2120 / 5679	220%	15% IOBL (260 HH accum) 35,2% 1998 / 5679	145 HH annual (527 HH accum) 39,9% 2265 / 5679	203%	20% IOBL (276 HH accum) 36,7% 1660 / 4524	137 HH annual (311 HH accum) 37,5% 1695 / 4524	113%
5. Percentage of constructed water supply systems adequately operated and maintained by the community they serve	NA	10% IOBL	NA	NA	20% IOBL 5 syst	0	0	30% IOBL	7 / 8	100%	30% IOBL	7 / 8 (**)	78%

** Two water systems in Inquisivi have been eliminated in the indicator table because we withdrew from this i.a. after the MTE.

*** To better understand the indicators, we have listed the annual total plus the multi-year cumulative total for certain indicators.

OE-3 Natural Resource Management Program

1. Hectares of "conservation areas" with adequate management	0	40 Has	NA	NA	40 Has	0	0	40 Has	33*	83%	60 Has	72	120%
2. Number of communities in which the creation of "conservation areas" has been initiated	0	4 CA	NA	NA	4 CA	0	0	4 CA	6*	150%	5 CA	6	120%
3. Percentage of the target population that has adopted improved soil and water management practices	0	0	NA	NA	0	0	0	25% (1500 / 6000)	w/out data	w/out data	27%	34%	126.0%
4. Number of producers that have received systematic training in natural resources management	0	0	NA	NA	0	0	0	1,200	1,490	124%	1,800	2,008	116%
5. Estimate of area of micro watersheds that are under appropriate management	0	50	46	92%	50	211	422%	100	70	70%	150	132.4	88%
6. Number of new hectares where soil conservation measures are being implemented	0	40 Has	169	422%	60 Has	178	297%	80 Has	133	166%	100	234.4	234%

* All changes made to LOA or annual targets are reflected in the report narrative for each indicator. SCB phase over from Inquisivi therefore reduce the target population since 2005

Indicators	FY 06 Target 2006*	FY 06 Achieved 2006	FY 06 % Achieved vs Target	FY 07 Target 2007*	FY 07 Achieved 2007	FY 07 % Achieved vs Target	FY 08 Target 2008*	FY 08 Achieved 2008	FY 08 % Achieved vs Target	LOA Target 2008
1. Number of temporary employments generated	33,200 adjusted	27,144	82%	26,370	21,200	80%	28,140	22,000	78%	137,303
2. Number of projects approved	200	280	140%	200	227	114%	200	261	131%	800
3. Number of projects completed	150	220	147%	200	215	108%	200	234	117%	700
OE-1 Increase Rural Incomes through improved Agriculture and Market Participation										
1. Average annual gross income of rural households assisted by Title II	35% IOBL \$ 728	\$ 1.543	212%	40% IOBL \$ 755	\$ 1974	261%	50% IOBL \$ 808	\$ 2316	307%	50% IOBL \$ 808
2. Percent of households assisted by Title II with increased gross incomes of five percent or more in the last year	50% 1659 /3318	76%	152%	55% 1825 / 3318	66.7%	121%	60 % 1990 / 3318	60,7% (1962/3233)	101%	60 % 1990 / 3318
3. Proportion of target population that has adopted improved agricultural technologies and practices	55% 1825 / 3318	53.4%	97%	60% 1991 / 3318	69.3%	116%	69% 2156 / 3318	65,2% (2108/3233)	94%	69% 2156 / 3318
4. Number of participants that received systematic agricultural training during the past year	2,750	2,159	79%	3,000	3,479	116%	3,500	2,559	73%	3,500
5. Number of kilometers of roads improved/constructed	29.5	21 (annual) 90,2 (accum)	71,2% annual	10	10,4 (annual) 100,6 (accum)	104% (annual)	10	12,2 (annual) 112,8 (accum)	122% (annual)	110*
6. Number of new hectares under irrigation	33 (annual)	35 (annual) 94 (accum)	106% (annual)	20 (annual)	80,6 (annual) 174,6	159%	20 (annual)	56,3 (annual) 230,9 (accum)	282%	197*

	90 (accum)		102% (accum)	110 (accum)	(accum)		197,4 (accum)			
7. Value of products sold through a forward contract or through a producer marketing association	\$ 100,000	\$ 247,295	247%	\$ 120,000	\$ 552,895	466%	\$250,000	\$ 746.682	299%	552,415*
8. Number of producer organizations strengthened	10	16	160%	12	18	150%	14	24	171%	14*
OE-2 Improve Maternal and Child Health and Nutrition										
1. Percent of children from 3-35 months of age, by sex, with chronic malnutrition (Talla/Edad/Z score)	27% ROBL 27% 961 / 3559	31,7% 1195 / 3769	53%	22,4% ROBL 28,7% 1021 / 3559	30,2% 1087 / 3601	82%	22,4% ROBL 28,7% 1021 / 3559	23,3% (805 / 3456)	165%	22,4% ROBL 28,7% 1021 / 3559
2. Percent of children from 3- 35 months in target areas that participate in Title II Integrated Health Growth Monitoring Program	93% 3310 / 3559	85,2% 3211 / 3769	92%	90% 3303 / 3559	82,2% 2966 / 3601	91%	95% 3381 / 3559	89,3% (3086 / 3456)	94%	95% 3381 / 3559
3. Percent of children from 3-35 months in the Title II Integrated Health Program that are above -1 SD of the normal weight for age	17% IOBL 56,2% 2000 / 3559	54,6% 2058 / 3769	97%	20% IOBL 57,6% 2050 / 3559	48,7% 1753 / 3601	85%	37% IOBL 65,7% 2356 / 3559	52,8% (1825 / 3456)	80%	37% IOBL 65,7% 2356 / 3559
4. Percent of children from 3-35 months enrolled in the Title II Integrated Health Program below -2 SD for expected normal weight for age (<-2 SD)	27% ROBL 12,1% 431 / 3559	12,5% 471 / 3769	91%	30% ROBL 11,6% 413 / 3559	13,7% 493 / 3601	58%	30% ROBL 11,6% 413 / 3559	9,7% (335 / 3456)	138%	30% ROBL 11,6% 413 / 3559

5. Percent of children of 12-23 months of age in the target area who receive the 1st doses of DPT (or Pentavalent vaccine) that never receive the 3rd doses of DPT or Pentavalent (***)	80% ROBL or 5,5% 78/1411	4% 53 / 1313	107%	85% ROBL or 4,1% 58/1411	3,8% 55 / 1459	101%	85% ROBL or 4,1% 58/1411	6,9% (79 / 1142)	88%	85% ROBL or 4,1% 58/1411
6. Percentage of children of 12-23 months in the target area receiving 3rd doses of DPT or Pentavalent vaccine (***)	115% IOBL 88% 932 / 1059	79% 1037 / 1313	89.8%	120% IOBL 90% 1182 / 1313	79,5% 1159 / 1459	88%	120% IOBL 90% 1182 / 1313	93,1% (1063 / 1142)	103%	120% IOBL 90% 1182 / 1313
7. Percent of pregnant women in target population over the past calendar year who had at least one prenatal visit	33% IOBL 74,5% 879 / 1180	78,9% 931 / 1180	106%	35% IOBL 75,6% 892 / 1180	79,4% 934 / 1180	105%	44% IOBL 80,0% 944 / 1180	83,5% (348 / 417)	104%	44% IOBL 80,0% 944 / 1180
(***) Indicators 4 & 5 have been recalculated by the age group of 12-23 months as well as targets, according to the document of Dr. Marcelo Castrillo/USAID cited in report narrative.										
8. Percent of women with one prenatal visit during the quarter that made their 1st prenatal visit during this pregnancy before their 5th month of pregnancy	40%* IOBL 43% 378 / 879	47,6% 315 / 662	111%	61%* IOBL 50% 350 / 700	39,3% 128 / 325	79%	54%* IOBL 48% 336 / 700	41% (143 / 348)	85%	54%* IOBL 48% 336 / 700
9. Percentage of infants less than 6 months who were exclusively breastfed during the last 24 hours	10% IOBL 83% 588 / 708	81,5% 346 / 425	98%	13% IOBL 85,2% 426 / 500	83.2%	98%	17% IOBL 88,0% 440 / 500	85,1% (333/391)	97%	17% IOBL 88,0% 440 / 500

10. Percentage of children 3-35 months of age with diarrhea in the last two weeks who were treated with ORS, recommended fluids, or increased fluids	23.5% IOBL 96% 3417 / 3559	90,6% 3415 / 3769	94%	25% IOBL 97,2% 3461 / 3559	93,1% 680 / 730	96%	25% IOBL 97,2% 3461 / 3559	94,9% (600 / 632)	98%	25% IOBL 97,2% 3461 / 3559
Save water and improved sanitation										
1. Percent of child caregivers and food preparers with appropriate hand washing behavior	63% of target HH 2850 / 4524	69.9% 3162 / 4524	111%	70 % of target HH 3167 / 4524	67,2% 3040 / 4524	96%	75 % of target HH 3393 / 4524	89.3%	119%	75 % of target HH 3393 / 4524
2. Percentage of population using hygienic sanitation facilities	23.5% IOBL 37,8% 1710 / 4524	30.7% 1389 / 4524	81%	25% IOBL 38,3% 1730 / 4524	31.5%	82%	31% IOBL 40% 1810 / 4524	34.2%	86%	31% IOBL 40% 1810 / 4524
3. Percentage of households with year-round access to new or improved safe water source	25% IOBL (670 HH accum) 74,1% 3352 / 4524	103 HH annual (774 HH accum) 76,4% 3457 / 4524	116%	30% IOBL (805 HH accum) 77,1% 3488 / 4524	87 HH annual*** (861 HH accum) 78,3% 3544 / 4524	107%	33,5% IOBL (900 HH accum) 79,2% 3583 / 4524	418 HH annual (1279 HH accum) 87,6% 3962 / 4524	142.1%	33,5% IOBL (900 HH accum) 79,2% 3583 / 4524
4. Percentage of households with access to latrines or sanitation	25% IOBL (349 HH accum) 38,3% 1733 / 4524	43 HH annual (354 HH accum) 38,4% 1738 / 4524	101%	30% IOBL (416 HH accum) 39,8% 1800 / 4524	58 HH annual*** (412 HH accum) 39,7% 1796 / 4524	99.0%	32,5% IOBL (450 HH accum) 40,5% 1834 / 4524	142 HH annual (554 HH accum) 42,8% 1938 / 4524	123.1%	32,5% IOBL (450 HH accum) 40,5% 1834 / 4524
5. Percentage of constructed water supply systems adequately operated and maintained by the community they serve	33,5% IOBL	8 / 9	86%	35% IOBL	9 / 10	90%	35% IOBL	14/15	93%	35% IOBL

** Two water systems in Inquisivi have been eliminated in the indicator table because we withdrew from this i.a. after the MTE.

*** To better understand the indicators, we have listed the annual total plus the multi-year cumulative total for certain indicators.

OE-3 Natural Resource Management Program

1. Hectares of "conservation areas" with adequate management	60 Has	111.3	186%	60 Has	78.9	131%	80 Has	91	114%	356* Has (acum)
2. Number of communities in which the creation of "conservation areas" has been initiated	8 CA	8	100%	5 CA	8	160.0%	6 CA	6	100%	34* CA (acum)
3. Percentage of the target population that has adopted improved soil and water management practices	35% (2100/6000)	55.6%	159%	56% (3360/6000)	59.2%	106%	60% (3600/6000)	68,2% (3863 / 5664)	113.7%	60% (3600/6000)
4. Number of producers that have received systematic training in natural resources management	2,100	3,989	190.0%	2,400	4,347	181%	3,000	4,703	157%	3,000
5. Estimate of area of micro watersheds that are under appropriate management	150	166.0	111%	150	175.0	117%	150	158.00	105%	925 (acum)
6. Number of new hectares where soil conservation measures are being implemented	120	381.2	318%	120	374.8	312.3%	150	486.8	325%	1216 (acum)

ANNEX C: Indicator Validations

**VALIDACIÓN DE LA INFORMACIÓN CUANTITATIVA
EVALUACIÓN FINAL DEL TITULO II
PROGRAMA DE MONETIZACIÓN
USAID BOLIVIA**

**CONSULTORA
CONSEJO DE SALUD RURAL ANDINO (C.S.R.A)
CENTRO DE ESTUDIOS Y PROYECTOS (C.E.P)**

SEPTIEMBRE, 2008

Adventist Development Relief Organization (ADRA)

VALIDACIÓN DE LA INFORMACIÓN CUANTITATIVA DE LA EVALUACIÓN FINAL DEL TÍTULO II, PROGRAMA DE MONETIZACIÓN, USAID BOLIVIA INFORME FINAL DE ADRA BOLIVIA Resultados de los indicadores

Indicadores de Salud	Fuente	Numerador	Denominador	Resultado
1a. Porcentaje de niños de 3 a 35 meses de edad con desnutrición crónica (altura/edad/score)	Encuesta	95	354	26.8%
1b. Porcentaje de niñas de 3 a 35 meses de edad con desnutrición crónica (altura/edad/score)	Encuesta	86	323	26.6%
2. Porcentaje de niños de 3 a 35 meses en las áreas del programa título II, que participan del programa de control de crecimiento	SRM	2817	3128	90.1%
3. Porcentaje de niños entre 3 – 35 meses en el programa de salud del título II que están por encima de - 1 DE de peso normal por edad	SRM	1737	2817	61.7
4. Porcentaje de niños de 3 a 35 meses de edad en el programa título II que están por debajo de < - 2 DE de peso normal (P/E)	SRM	234	2817	8.3%
5. Porcentaje de niños menores de 1 año en las áreas objetivo que recibieron la primera dosis de pentavalente que no han recibido la tercera dosis de pentavalente.	SRM	121	1032	-11.7%
6. Porcentaje de niños menores de un año de edad en el área objetivo que han recibido la tercera dosis de DPT (o de la vacuna pentavalente)	SRM	1153	1192	96.7%
7. Porcentaje las mujeres embarazadas en la población objetivo con al menos una visita prenatal durante el último año	SRM	903	903	100%
8. Porcentaje de mujeres embarazadas que realizaron al menos un control prenatal antes del 5to mes de gestación.	Encuesta	643	796	80.8%
9. Porcentaje de infantes de menores de 6 meses que fueron alimentados exclusivamente durante las últimas 24 horas.	Encuesta	104	116	89.7%

10. Porcentaje de niños menores de 5 años de edad con diarrea en las últimas dos semanas que fueron tratados con SRO o fluidos recomendados.	Encuesta	172	193	89.1%
Indicadores de AySB	Fuente	Numerador	Denominador	Resultado
1. Porcentaje de cuidadores de niños y responsables de preparar alimentos con adecuada conducta de lavado de manos.	Encuesta	148	148	100%
2. Porcentaje de familias objetivo que utilizan facilidades sanitarias higiénicas	Encuesta	302	401	75.3%

Indicadores RIP	Fuente	Numerador	Denominador	Resultado
1. Ingreso bruto anual promedio de las familias rurales que reciben asistencia bajo el título II	Encuesta			2861.33\$us
2. Porcentaje de familias que reciben ayuda bajo título II con un incremento del cinco por ciento o más en su ingreso bruto el año pasado.		No se declara		
3. Proporción de la población meta que ha adoptado prácticas y tecnología agropecuaria mejorada	Encuesta	538	676	79.6%
Indicadores NRM	Fuente	Numerador	Denominador	Resultado
3. porcentaje de la población meta que ha adoptado prácticas mejoradas de manejo de suelos y agua	Encuesta	635	814	78%

Nota: La redacción de los indicadores en este cuadro tiene algunas variaciones comparado con el original. La Consultora ha realizado estas modificaciones tomando en cuenta como se han obtenido.

SRM= Sistema de Registro y Monitoreo

CARE

VALIDACIÓN DE LA INFORMACIÓN CUANTITATIVA DE LA EVALUACIÓN FINAL DEL TÍTULO II, PROGRAMA DE MONETIZACIÓN, USAID BOLIVIA INFORME FINAL DE CARE Internacional Bolivia Resultados de los indicadores

Indicadores de Salud, Agua y Saneamiento Básico

Indicadores SMI	Fuente	Numerador	Denominador	Indicador
1a. Porcentaje de niños/ninas de 3 a 35 meses de edad con desnutrición crónica (altura/edad/score)	Encuesta 2009	179	6443897	28%
2. Porcentaje de niños de 3 a 35 meses en áreas meta que participan del programa Salud Integral del Título II control de crecimiento	Encuesta 2009	566	644	82%
3. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II, están por encima de la desviación – 1 de peso normal por edad	Encuesta 2009	348	644	60%
4. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II que están por debajo de la desviación - 2 del peso normal por edad	Encuesta 2009	69	644	11%
5. Porcentaje de niños menores a un año que participan del programa que recibieron la primera dosis de DPT (o vacuna Pentavalente) que no recibieron la tercera dosis DPT (o vacuna Pentavalente)	Monitoreo	59	1120	5%
6. Porcentaje de niños menores de un año que participan del programa que recibieron la tercera dosis del DPT o la vacuna pentavalente en el último trimestre.	Monitoreo	296	1170	25%
7. Porcentaje de mujeres embarazadas en la población meta con por lo menos una consulta prenatal en el año calendario pasado.	Monitoreo	1059	1307	81%
8. Porcentaje de mujeres con una consulta prenatal en el trimestre que tuvieron su primera consulta prenatal en este embarazo antes del quinto mes de embarazo.	Monitoreo	749	1059	71%
9. Porcentaje de infantes menores de 6 meses con lactancia materna. Exclusiva durante las últimas 24 horas.	CAP	92	110	84%

10. Porcentaje de niños entre 3 a 35 meses de edad con diarrea en las últimas dos semanas que fueron tratados con SRO, fluidos recomendados o fluidos incrementados	CAP	292	308	95%
Indicadores ASB	Fuente	Numerador	Denominador	Indicador
1. Porcentaje de cuidadores de niños y responsables de preparar alimentos con una adecuada conducta de lavado de manos.	CAP	897	1055	85%
2. Porcentaje de la población que utiliza instalaciones sanitarias higiénicas.	CAP	370	435	85%

Indicadores de Generación de Ingresos Rurales y Recursos Naturales

Indicadores GIR	Fuente	Numerador	Denominador	Indicador
1. Ingreso bruto anual promedio de las familias rurales que reciben asistencia bajo el Título II.	CAP			2.490
2. Porcentaje de familias que reciben ayuda bajo Título II con un incremento del cinco por ciento o más en su ingreso bruto el año pasado.	CAP	689	1196	58%
3. Proporción de la población meta que adoptó tecnologías y prácticas agrícolas mejoradas	Monitoreo	880	1316	67%
Indicadores RRNN	Fuente	Numerador	Denominador	Indicador
3. Porcentaje de la población meta que adoptó prácticas mejoradas de manejo de suelos y agua.	CAP	642	913	70%

Nota: La redacción de los indicadores en este cuadro tiene algunas variaciones comparado con el original. La Consultora ha realizado estas modificaciones tomando en cuenta como se han obtenido.

Food for the Hungry International (FHI)

VALIDACIÓN DE LA INFORMACIÓN CUANTITATIVA DE LA EVALUACIÓN FINAL DEL TÍTULO II, PROGRAMA DE MONETIZACIÓN, USAID BOLIVIA INFORME FINAL DE Fundación contra el Hambre / Bolivia

Resultados de los indicadores

Indicadores de Salud, Agua y Saneamiento Básico

INDICADORES SMI	Numerador	Denominador	Indicador
1. Porcentaje de niños de 3 a 35 meses de edad, con desnutrición crónica (altura/edad/score)	493	1593	31.0%
2. Porcentaje de niños de 3 a 35 meses en áreas meta que participan del programa Salud Integral del Título II control de crecimiento	3088	3316	93.0%
3. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II, están por encima de la desviación – 1 de peso normal por edad	737	1598	46.0%
4. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II que están por debajo de la desviación - 2 del peso normal por edad	222	1598	14.0%
5. Porcentaje de niños menores a un año en las zonas meta que recibieron la primera dosis de DPT (o vacuna Pentavalente) que no recibieron la tercera dosis DPT (o vacuna Pentavalente)	7	848	1.0%
6. Porcentaje de niños menores de un año en el área meta que reciben la tercera dosis del DPT o la vacuna pentavalente.	841	889	95.0%
7. Porcentaje de mujeres embarazadas en la población meta con por lo menos una consulta prenatal en el año calendario pasado.*	535	638	84.0%
8. Porcentaje de mujeres con una consulta prenatal en el trimestre que tuvieron su primera consulta prenatal en este embarazo antes del quinto mes de embarazo.	365	535	68.0%
9. Porcentaje de infantes menores de 6 meses con lactancia materna. Exclusiva durante las últimas 24 horas.	156	168	93.0%

10. Porcentaje de niños entre 3 a 35 meses de edad con diarrea en las últimas dos semanas que fueron tratados con SRO, fluidos recomendados o fluidos incrementados	241	255	95.0%
INDICADORES ASB			
	Numerador	Denominador	Indicador
1. Porcentaje de cuidadores de niños y responsables de preparar alimentos con una adecuada conducta de lavado de manos.	462	496	93.0%
2. Porcentaje de la población que utiliza instalaciones sanitarias higiénicas.	1376	3663	38.0%

Indicadores de Generación de Ingresos Rurales y Recursos Naturales

INDICADORES GIR	Numerador	Denominador	Indicador
1. Ingreso bruto anual promedio de las familias rurales que reciben asistencia bajo el Título II.			2627.64
2. Porcentaje de familias que reciben ayuda bajo Título II con un incremento del cinco por ciento o más en su ingreso bruto el año pasado.	455	623	73.0%
3. Proporción de la población meta que adoptó tecnologías y prácticas agrícolas mejoradas	337	471	72.0%
INDICADORES RRNN			
	Numerador	Denominador	Indicador
3. Porcentaje de la población meta que adoptó prácticas mejoradas de manejo de suelos y agua.	261	471	55.0%

Save the Children (SC)

VALIDACIÓN DE LA INFORMACIÓN CUANTITATIVA DE LA EVALUACIÓN FINAL DEL TÍTULO II, PROGRAMA DE MONETIZACIÓN, USAID BOLIVIA INFORME FINAL DE LA AGENCIA SAVE THE CHILDREN Resultados de los indicadores

Indicadores de las encuestas de Salud, Agua y Saneamiento Básico

Indicadores SMI	Numerador	Denominador	Indicador
1. Porcentaje de niños de 3 a 35 meses de edad, por sexo, con desnutrición crónica (altura/edad/score)	152	651	23.3%
2. Porcentaje de niños de 3 a 35 meses en áreas meta que participan del programa Salud Integral del Título II control de crecimiento	679	760	89.3%
3. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II, están por encima de la desviación - 1 de peso normal por edad	344	652	52.8%
4. Porcentaje de niños de 3 a 35 meses que participan del programa Salud Integral del Título II que están por debajo de la desviación - 2 del peso normal por edad	63	652	9.7%
5. Porcentaje de niños menores a un año en las zonas meta que recibieron la primera dosis de DPT (o vacuna Pentavalente) que no recibieron la tercera dosis DPT (o vacuna Pentavalente)	14	204	6.9%
6. Porcentaje de niños menores de un año en el área meta que reciben la tercera dosis del DPT o la vacuna pentavalente.	190	204	93.1%
7. Porcentaje de mujeres embarazadas en la población meta con por lo menos una consulta prenatal en el año calendario pasado.*	609	729	83.5%
8. Porcentaje de mujeres con una consulta prenatal en el trimestre que tuvieron su primera consulta prenatal en este embarazo antes del quinto mes de embarazo.	118	288	41.0%
9. Porcentaje de infantes menores de 6 meses con lactancia materna. Exclusiva durante las últimas 24 horas.	97	114	85.1%
10. Porcentaje de niños entre 3 a 35 meses de edad con diarrea en las últimas dos semanas que fueron tratados con SRO, fluidos recomendados o fluidos incrementados	148	156	94.9%
Indicadores ASB	Numerador	Denominador	Indicador
1. Porcentaje de cuidadores de niños y responsables de preparar alimentos con una adecuada conducta de lavado de manos.	679	760	89.3%

2. Porcentaje de la población que utiliza instalaciones sanitarias higiénicas.	260	760	34.2%
--	-----	-----	-------

Indicadores de las encuestas Generación de Ingresos Rurales y Recursos Naturales

Indicadores GIR	Numerador	Denominador	Indicador
1. Ingreso bruto anual promedio de las familias rurales que reciben asistencia bajo el Título II.			\$us. 2315.51
2. Porcentaje de familias que reciben ayuda bajo Título II con un incremento del cinco por ciento o más en su ingreso bruto el año pasado.	205	338	60.7%
3. Proporción de la población meta que adoptó tecnologías y prácticas agrícolas mejoradas	180	276	65.2%
Indicadores RRNN	Numerador	Denominador	Indicador
3. Porcentaje de la población meta que adoptó prácticas mejoradas de manejo de suelos y agua.	247	362	68.2%